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HABITAT LINKAGE WITHIN A TRANSPORTATION NETWORK

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Abstract: Sarasota County is a growing Florida gulf coast community with a strong environmental ethic. As a community, Sarasota has strived to balance growth with habitat protection through a variety of avenues including funding the acquisition of ecologically valuable lands, promoting regional mitigation projects, and encouraging the protection of habitat corridors. Roadways remain one of the greatest threats to the areas protected by these measures, and fragmentation of lands into isolated patches threatens the inherent biodiversity of the landscape. To assess the extent of the problem, Sarasota County Road Program funded several ecological evaluations along local highway corridors. The objective was to identify valuable ecological resources impacted by roadway corridors and develop an integrated approach to reduce the impacts caused by fragmentation. Although these evaluations have been largely observational, when supported by more empirical studies, they have helped provide a framework for developing an objective land acquisition and management process and for formulating local policy. Information obtained through these evaluations has improved project efficiency and in certain instances, allowed for a smoother permitting process. Another significant outcome of the ecological evaluations has been the establishment of a Regional Offsite Mitigation Area program (ROMA) to facilitate the acquisition and restoration of native habitats, many of which “bridge the gap” between established county conservation lands. These land acquisitions and ROMA’s, provide compensation for unavoidable environmental impacts associated with infrastructure projects, including wetland mitigation and restoration of Florida scrub-jay and gopher tortoise habitats. Four ROMA sites, ranging from estuarine to scrubby flatwoods restorations, now exist in varying stages of development. Establishment of the ROMA program has not been without permitting hurdles. Differences between state and federal policy, subjectivity in Florida’s Unified Mitigation Assessment Methodology (UMAM), and lack of incentives for preserving upland habitat and creating artificial wildlife passages, have been some of the challenges faced by the program.

Introduction

Sarasota County, Florida is a growing gulf coast community with a strong environmental ethic. Since 1995, the population of Sarasota County has increased over eighteen percent with a current resident population over 367,867 and an additive seasonal resident population estimated at over 80,000 (Sarasota County Planning and Development Services). As the local population continues to expand across the 1,878 km² (464,000 acre) landscape, new urban space and public infrastructure become necessary to sustain the growing demands of the community, reduce traffic congestion and ensure safe and efficient routes for travel. Unfortunately, these expansions place pressure on native habitat and local wildlife populations. This paper describes efforts to maintain and improve habitat linkages across Sarasota County’s transportation network. It discusses the results of county funded ecological evaluations along local transportation corridors, describes infrastructure projects designed to promote wildlife movement, and highlights some of the key land protection measures the county has established.



Sarasota County government recognizes the value of protecting and connecting native landscapes and strives to balance growth with regionally significant habitat protection measures. This value is realized through the funding of regional ecological surveys along highway corridors and the establishment of land protection initiatives including: the Environmentally Sensitive Lands Protection Program (ESLPP) and the Regional Off-site Mitigation Area (ROMA) program. Since inception in 1992, ESLPP has ensured the protection of over 66 km² (16,357 acres) of land. The ROMA program has facilitated the acquisition of 1.6 km² (nearly 400 acres). Additional land acquisition groups, funding sources and conservation measures have benefited the community’s land acquisition aspirations including: Sarasota County Parks and Recreation, the Southwest Florida Water Management District, Florida Community Trust, and Florida Forever. In total, nearly 23 percent or over 425 km² (105,000 acres) of the land within the county is protected.

Despite acquisition and protection of environmentally significant public lands, fragmentation from infrastructure and development continues to threaten ecologically intact landscapes, inevitably impacting habitat corridors and wildlife populations. Generally, roadways remain one of the greatest threats to the areas protected by these measures, and fragmentation of lands into isolated patches threatens the inherent diversity of the landscape. The need for new roadways and roadway improvements is accelerated in areas exhibiting rapid development and growth, and several local road projects fall adjacent to environmentally significant lands. Consequently, these projects have precipitated the collection of field data with the hope of identifying critical areas to maintain or improve ecosystem connectivity through innovative infrastructure design, strategic land acquisition and large-scale mitigation projects.

To address the ecological pressures associated with expansion of the transportation network, Sarasota County funded two regional ecological evaluations that focused on local highway-wildlife relationships: the SR681/I-75 Regional Ecological Evaluation and the Englewood Interstate Connector Regional Ecological Evaluation. The transportation corridors selected for the study were chosen due to their adjacency to protected land, opportunity for habitat defragmentation, and minimization of ecological degradation.

The objective of the regional ecological evaluations was to identify critical landscape corridors and to develop an integrated approach to reduce impacts caused by habitat fragmentation. The evaluations attempted to identify the effects transportation infrastructure has on local wildlife populations. An equally important aspect was to facilitate improved inter-agency coordination during the design and permitting of local road improvement projects. Although these evaluations have been largely observational, when supported by more empirical studies, they have helped provide a framework for developing an objective land acquisition and management process and for formulating local policy. Information obtained through these evaluations has improved project efficiency and in certain instances, allowed for a smoother permitting process.

The results of the two regional ecological evaluations do not represent the absolute number of individual animals impacted due to factors that may have affected comprehensive data collection including effectiveness of highway cleanup crews, injured wildlife moving outside of the survey limits, scavengers, heavy rains, and motorist collecting specimens (PBS&J, 2006). Despite the scientific limitations of these types of studies, data generated identified trends in wildlife movement and mortality compelling enough to be used to facilitate sustainable transportation design in Sarasota County.

I-75 and Honore Avenue – Pinebrook Road Extension Regional Ecological Evaluation

The Honore Avenue – Pinebrook Road Extension is a large road project currently in design in Sarasota County. The project includes widening of the existing roadway and a significant roadway expansion to the north. The proposed alignment parallels the existing Interstate 75 also proposed for roadway expansion. The completed projects will improve a north-south evacuation route and will provide vehicular access to this rapidly developing area. Although the projects should alleviate transportation pressure currently plaguing Interstate 75, construction of the new highways will increase pressure on local wildlife populations. To address the ecological impacts of the road projects, Sarasota County funded a two-year, Interstate 75 and Honore Avenue-Pinebrook Road Extension Regional Ecological Evaluation. In addition, funding associated with the Honore Avenue – Pinebrook Road Extension was used to purchase the adjacent Fox Creek ROMA parcel.

The regional ecological evaluations in this area involved aerial survey of habitat corridors, inventories of future development proposals and nearby roadway projects and wildlife surveys. A local roadway project concurrently evaluated included the Central Sarasota Parkway Interchange, proposed for construction at Interstate 75. To date, results generated by the evaluation has served as a guide during the planning of the road projects and recommendations derived continue to be incorporated into the design and permitting of the projects.

The referenced evaluations were conducted during 2003 (spring, summer and fall), and again during 2004/2005 (spring, summer, fall, and winter). Thirty-seven wildlife species (314 individuals) were identified during the 2003 surveys. Twenty-seven wildlife species (373 individuals) were identified during the 2004-2005 surveys with the highest numbers recorded during the October 2004 and January 2005 survey (PBS&J, 2006). A brief summary of some of the more significant occurrences are highlighted in the following paragraphs.

Data obtained during the two year evaluations suggested that wildlife mortality may be associated with wetland/roadway interfaces. Specifically, roadkill abundances were observed where the roadway bisected a wetland system (PBS&J, 2004). In 2004-2005, approximately 60% of roadkill were recorded within 200 feet of wetlands. Amphibian (primarily ranid frogs) mortality was recorded highest within proximity to wetlands. The number observed appeared to correlate with heavy rainfall events during the summer and early fall of 2003. Water levels in many of the wetlands in the study area were at or near their seasonal high elevations, which may have resulted in the wetland interface moving closer to the highway causing higher incidence of both frog and turtle roadkill (PBS&J, 2004). As anticipated, reptile mortality also occurred within close proximity to wetlands.

The results of the Sarasota County evaluation is consistent with the studies conducted along Payne's Prairie Preserve, in Alachua County Florida, where significant wildlife mortality occurred along a major wetland/highway interface. In addition to the high occurrence of wildlife mortality, animal/vehicular collisions posed human safety concerns. As a result, FDOT implemented mitigative measures by constructing a barrier wall-culvert system along the interface. As seen in the Sarasota County studies, the Payne's Prairie study observed a high number of amphibian (hylid frogs) mortality (Dodd, 2003). The results of a post construction study indicated a 65% reduction in mortality if hylid tree frogs were included, and a 93.5% reduction if hylid tree frogs were excluded (Dodd, 2003). Unfortunately, amphibian mortality is commonly underestimated due to the size of the animal, which allows for the remains to be quickly obliterated by vehicles (Dodd, 2003).

A large number of the roadkill observed along Interstate 75 during January 2005 consisted of birds, primarily the North American robin (*Turdus migratorius*). This occurrence may correspond to a migratory event, as robins are known to

flock in large number during the winter months. Brazilian pepper (*Schinus terebinthifolius*), an extremely invasive shrub in Florida, is located in dense stands along the Interstate right of way. Brazilian pepper produces a fruit reported to induce a narcotic effects on birds. Robin mortality was specifically observed in areas where dense stands of Brazilian pepper occurred adjacent to the Interstate. However, it is difficult to assess trends in bird mortality. For example, migratory events are not often captured during surveys and they often consist of a temporary presence in a given area. Additionally, collisions with birds do not necessarily occur on the ground and carcasses are often hurled outside of the survey area.

Patterns related to mammal mortality were not evident in the data collected during these ecological evaluations. Impacted mammals were recorded along most of the length of the corridor with no observed connection to upland or wetland habitat (PBS&J, 2006). An interesting observation involved the feral hog (*Sus scrofa*). Feral hog was virtually non-existent in the Sarasota County roadkill studies, similar to the results of other Florida roadkill surveys. Interestingly, the hog is an extremely common nuisance mammal commonly observed along roadways throughout undeveloped areas within the county. Reduced mortality in this animal is attributed to the wariness of the species (Natural Area News, 2006).

A number of natural creeks and channalized canals crossed by Interstate 75 are proposed to be spanned as part of the Honore Avenue – Pinebrook Road Extension. The ecological evaluation report identified three significant waterways within the study zone as top priorities for the preservation of wildlife movement: Salt Creek, Cow Pen Slough and Fox Creek. The report recommends improvements to these span bridges during the widening of I-75 and creation of more expansive span bridges as part of the Honore Avenue – Pinebrook Road Extension. The report also suggests that existing fencing beneath the Interstate bridges be reconfigured or removed to provide wider, undivided dry passage, that existing culverts associated with smaller water features be enlarged, and that supplemental plantings and/or directional fencing be incorporated to promote wildlife movement. Similar to Payne's Prairie, the report recommended the installation of lipped walls at major wetland interfaces. Unfortunately, local funding limitations may prevent incorporation of this final recommendation.

One of the key design features of the road extension includes construction of a wide span bridge across Fox Creek, a freshwater waterway contiguous to the Fox Creek ROMA and the Sarasota Bay Estuary. The ecological evaluation report identified Fox Creek as a viable wildlife corridor linking estuarine areas along the coast and large tracts of publicly owned land east Interstate 75. The proposed Fox Creek span bridge will parallel the Interstate 75 span bridge, which currently provides limited passage for wildlife movement, as documented by wildlife cameras, roadkill data, and track analyses. Results of the ecological evaluations indicated that fewer animal remains were found along the Interstate within 600 feet north and south of this important creek corridor (PBS&J, 2006). The proposed bridge will, at a minimum, mimic the existing horizontal and vertical clearance of the adjacent Interstate 75 Bridge. When completed, this bridge will represent the largest, most ecologically conservative bridge constructed by Sarasota County.

Both the Honore Avenue – Pinebrook Road Extension and the adjacent section of Interstate 75 extend through a largely undeveloped portion of the county. This area has been identified as a significant habitat corridor. An attempt to maintain this landscape corridor is occurring through innovative mitigation measures tied to the protection of county lands, such as the purchase of the Fox Creek ROMA, as well as the creation and improvement of artificial habitat corridors associated with the design of the roadway projects. Coordination between permitting entities is ongoing and discussions regarding protected wildlife and regulated habitat are at the forefront of these discussions. Although these road improvement projects are largely driven by population growth and development pressure, Sarasota County continues to take important steps toward maintaining the ecological landscape through this portion of the county.

Englewood Interstate Connector – Regional Ecological Evaluation

The Englewood Interstate Connector (EIC) is a local county road project in the final stage of design and permitting. The project involves widening of the existing rural two lane road to a four lane divided highway. Significant development is driving this project as large tracts of land in the vicinity of this road are being developed for commercial and residential purposes. In addition, EIC is a major connector providing access from developed coastal communities to Interstate 75. With the continued increase in population and the obligation of the county to provide a safe evacuation route, improvements to this transportation corridor is a county priority. Unfortunately, wildlife mortality is a growing concern in this area and permeability across this roadway is expected to diminish further as the population (and traffic) in this area continues to increase. To address this matter, Sarasota County funded the one year Englewood Interstate Connector Regional Ecological Evaluation to identify the extent of vehicular impact on local wildlife populations and to develop recommendations for reducing wildlife mortality. In addition, funding associated with the EIC project was used to purchase the adjacent Myakka River ROMA parcel.

The regional ecological evaluation for this area began during June 2004, and a final report concluding the study (Kurz *et al.*, 2005a) was completed in July 2005. Data were collected on public lands, along drainage easements, and adjacent to other undeveloped lands. The ecological evaluation along the EIC corridor focused on wildlife utilization of culverts regardless of size or hydrologic function. Significant habitat severed by the road, but not connected by culvert, was also evaluated. Ecologically significant private lands were also evaluated with respect to quality, connectivity potential, and acquisition opportunity. Protected lands, and other ecologically significant landscape features (the Myakka River and unnamed creeks) severed or otherwise, were evaluated for defragmentation opportunities. Specific infra-

structure project needs including mitigation, stormwater, and floodplain compensation were considered opportunities for land acquisition. Field investigations were primarily intended to note the occurrence of native habitat and wildlife, recognize zones of high wildlife mortality, and identify wildlife patterns. The ecological evaluations were also intended to assess the benefits and drawbacks of incorporating artificial wildlife corridors into EIC project.

Motion sensor cameras were used to document wildlife movement within and around culverts. It was determined that the majority of culverts were inadequate for optimal wildlife utilization (PBS&J, 2005) due to size, high water levels, and overgrown vegetation at the culvert openings. Although wildlife was documented using several of the culverts, passage was seasonally restricted by inundation. The 2005 report recommended enlarging culverts (both wet and dry) to improve wildlife movement. Several mammal species, including bobcat, armadillo, opossum, and raccoon were observed using the existing culverts during the dryer months and large species of reptiles, including the American alligator, were observed during the wetter months.

Wildlife permeability across EIC is essential, as large tracts of protected land lie along the east side of the road and creek corridors and conservation easements lie along the west side. In an effort to reduce wildlife mortality associated with the EIC expansion, two wildlife underpasses were designed and several culverts proposed for enlargement. The passages were designed to provide safer passage for wetland dependent wildlife (*i.e.* otter, amphibians, reptiles). The location of the two underpasses was based largely on wildlife mortality concentrations, protected habitat linkages and future land use patterns identified in the EIC Ecological Evaluation Report. Both underpasses are designed adjacent to the Jelks Preserve and connect to protected conservation easements on the opposite side of the road. One passage is associated with a natural (channalized) waterway; the other is designed through upland habitat.

The northernmost wildlife crossing proposed at the Sweetwater Gully, Blackburn/Curry Canal will consist of an elliptical culvert 1.5 meter span by one meter rise (5' x 3.2') established above the seasonal high water elevation. Due to the length of the culvert and the economic restrictions of installing a larger culvert, a grate will be installed within the median to allow additional light penetration into the culvert. An artificial ramp is not proposed, as the culvert location was selected to allow a natural earthen approach. Directional landscaping along the approach will consist of sod and native shrubs.

The southern wildlife crossing is proposed as a connection between upland habitat on the Jelks Preserve and a chain of wetlands contained in a private conservation easement. The 2005 report identified a large concentration of reptile and amphibian mortality in this area. There is currently no culvert connection through this area. The proposed culvert will consist of an elliptical culvert 1.5 meter span by one meter rise (5' x 3.2') established at the seasonal high water elevation. The culvert will be buried a few inches to allow establishment of an earthen substrate in an effort to encourage greater utilization by reptiles and amphibians. In addition, a grate will be installed within the median to allow natural light penetration and facilitate thermal moderation within the culvert.

The permitting process for the EIC project has not largely improved by the early ecological evaluations and coordination efforts initiated by the county. One issue encountered during the permitting of EIC, as well as during the permitting of other county projects has been the lack of a mechanism to derive mitigation credit or value for the incorporation of wildlife underpasses into the project design.

Sarasota County government continues to promote sustainable roadway design. Today, planners and designers are beginning to view the ecological landscape as a tool to design a sustainable project rather than an impediment to roadway design. As future roadway alignments are considered, the environmental landscape remains as the forefront of the discussions. County officials, land planners, roadway engineers, local businesses, citizen groups and environmental organizations strive to work together toward maintaining a healthy landscape that supports the diverse interests of the community: smart growth, sufficient infrastructure and a healthy interconnected environment.

Sarasota County Land Protection Programs

To facilitate the development of an interconnected landscape, Sarasota County developed two local land protection programs: ESLPP and the ROMA program. Each program is unique and applies distinct selection criteria for nominating lands for acquisition. The ESLPP program remains Sarasota County's most celebrated land protection program and is powerful tool and funding mechanism used to acquire land with high ecological value. The ROMA program serves an equally valuable yet smaller role in the land protection arena targeting lands with ecological potential that have been previously affected by anthropogenic activities.

Parcels are nominated for the ESLPP based on habitat quality, connectivity, habitat and species rarity, water resource protection, and manageability. The ESLPP program has had great success in acquiring environmentally sensitive lands through obtaining supplemental grant funding and developing partnerships with state agencies, non-profit organizations, and other county divisions and departments. Even with these successes, numerous challenges face the ESLPP program, including competition with developers, escalating real estate prices, land management costs and security expenses. As of February 2007, the program had enabled the acquisition of 66 km² (16,309 acres).

The ESLPP program (and to a lesser degree the ROMA program) has contributed to the acquisition of public land along the Myakka River corridor, a distinct landscape feature within Sarasota County. The Myakka River meanders through

Sarasota County creating a natural sinuous network of essential habitat linkages. The ESLPP program has been at the forefront of land protection along this essential habitat corridor. To date over 333 km² (82,423 acres) of ESLPP (and ROMA) protected parcels buffer this waterway including:

- Ainger Creek (202 acres)
- Albritton Regional Stormwater Facility (1,000 acres)
- Carlton Reserve (24,565 acres)
- Deer Prairie Creek (7,335 acres)
- Englewood Water District (30 acres)
- Forest Addition (103 acres)
- Fox Creek ROMA (165 acres)
- Jelks Preserve (582 acres)
- Knight's Trial Park (378 acres)
- Myakka Pines (198 acres)
- Myakka Prairie (8,296 acres)
- Myakka River State Park (18,729 acres)
- Myakka River ROMA (72 acres)
- Myakkahatchee Creek Park (160 acres)
- North River Road (303 acres)
- Old Myakka (295 acres)
- Pinelands Reserve (6,151 acres)
- Rocky Ford (949 acres)
- Sand Islands (179 acres)
- Schewe Ranch (3,989 acres)
- Snook Haven (3 acres)
- South River Road (77 acres)

The ROMA program was created in 2003 (unofficially, in 1998 with the acquisition of the county's first multi-project mitigation parcel). The program has facilitated the acquisition of native habitats, many of which "bridge the gap" between established county ESLPP lands. The program was designed to promote ecologically significant mitigation as compensation for unavoidable environmental impacts associated with Sarasota County infrastructure projects, including wetland mitigation, habitat preservation and the restoration of Florida scrub-jay and gopher tortoise habitat. This regional perspective provides an avenue to fund land acquisition in concert with significant habitat creation, enhancement, restoration, and preservation projects.

The criteria for nominating a ROMA differs from the criteria used to nominate land for the ESLPP. When evaluating parcels for acquisition under the ROMA program, staff scientists relied on GIS analysis to identify lands with potential to provide connectivity to other publicly owned parcels, ability to combine multiple mitigation efforts (e.g. stormwater, wetlands, and wildlife), location within a specific watershed basin, potential for habitat enhancement and restoration, benefit to listed wildlife, and location within the landscape as relates to hydrologic flow ways and future land use.

The intent of the ROMA program is to provide mitigation with high ecological function and value. Sarasota County believes that regional mitigation represents an environmentally responsible approach to provide quality mitigation for County projects. The program is set up to derive reimbursement funds by selling mitigation and floodplain credit for county and FDOT infrastructure projects, as well as other local government mitigation projects. Additional savings may be derived through the consolidation of design, permitting, construction, and maintenance efforts. Finally, purchasing and building mitigation facilities today, as compensation for impacts anticipated in the future, should expedite the permitting process for future infrastructure projects.

The objective of the ROMA program is not to replace traditional on-site mitigation. When viable on-site mitigation opportunities exist, Sarasota County incorporates these on-site options into the project design or may choose a combination of on-site and off-site mitigation opportunities. In general, the majority of the county's linear transportation projects occur in urban settings where on-site mitigation opportunities are limited by right-of-way constraints. The roadside wetlands encountered are often compromised due to proximity to urban development, nuisance vegetation and ecological isolation. The ROMA program provides an opportunity to design quality urban mitigation in a larger setting with focus on enhancing habitat connectivity.

Four ROMA sites, ranging from mangrove forest to scrubby flatwoods, exist in varying stages of development. These sites include: Lemon Bay Preserve, Curry Creek, Fox Creek and the Myakka River ROMA. Each ROMA contains native upland and wetland habitats of regional value. Some of the native habitat types include riverine floodplain; wet, mesic and dry prairie; scrubby, mesic, and hydric flatwood; seepage-slope floodplain; xeric mesic and hydric hammock; brackish creeks and coastal wetlands. The American bald eagle (*Haliaeetus leucocephalus*), wood stork (*Mycteria americana*), gopher tortoise (*Gopherus polyphemus*), Florida scrub jay (*Aphelocoma coerulescens*), Eastern indigo snake (*Drymarchon corais*), Sherman's fox squirrel (*Sciurus niger shermani*), and gopher frog (*Rana capito*) are a smattering of species that utilize Sarasota's ROMA sites.

Lemon Bay Preserve

Sarasota County purchased the core section of the Lemon Bay Preserve (LBP) in 1998 as part of a mitigation effort resulting from a Sarasota County impact to the Florida scrub jay. This 67 hectare (165-acre) coastal scrub and estuarine parcel is bordered to the west by the intercoastal waterway, to the north and east by dense residential development and to the south by a series of private preserves, private development and ESLPP parcels. The nearly contiguous pieces of public and private habitat that now interconnect along this coastline (purchased individually over many years) comprise 91 hectares (226 acres) of protected land. The size of the property, quality and diversity of habitat, and proximity to known scrub-jay populations were significant factors affecting the county's purchase of the parcel. Since purchase, the site has afforded protection to the state and federally threatened Florida scrub jay, the state protected gopher tortoise, the state and federally protected American bald eagle and the state endangered Tampa vervain (*Verbena tampensis*) plant. Additionally, the site has provided mitigation credit for several Sarasota County road projects.

The LBP project is an example of Sarasota County's effort to purchase large tracts of ecologically viable land for a multitude of mitigation, restoration, and green space needs. LBP naturally represents a mosaic of scrubby flatwoods and mangrove forest. At the time of purchase, the property was extremely overgrown due to fire suppression and historic drainage alterations. Approximately 36 hectares (90 acres) of restorable scrub-jay habitat existed on the site. Additionally, restoration of an interconnected mosquito ditch network served as an opportunity for a state and locally funded stormwater restoration effort within the tidally influenced Lemon Bay. To date, the site has undergone periodic prescribed fire, roller-chopping, soil disking, exotic removal, native planting and canopy thinning, and a large portion of the mosquito ditches have been restored to estuarine habitat.

The primary reason for purchase of LBP was to provide after-the-fact mitigation for a scrub jay impact that occurred in 1993. Mitigation credit derived from the purchase and subsequent restoration of the parcel has benefited two local road projects: Pine Street and the Pine Street Extension and is anticipated to benefit the Honore Avenue-Pinebrook Road Extension. Through permitting negotiations with the U.S. Fish and Wildlife Service, Sarasota County agreed to restore the parcel to encourage utilization by at least three scrub jay families in return for three mitigation credits. The first credit was available immediately upon purchase and two additional credits were issued following a five year monitoring program that confirmed utilization of the parcel by three jay families. To date, two families have successfully nested on the parcel and transient jays thought to be associated with a third family regularly occupy the northern region of site. Two of the three credits have been deducted for the Pine Street projects. It is anticipated that the final credit will be used as compensation for impacts associated with the Honore Avenue-Pinebrook Road Extension project.

Annual Florida scrub jay monitoring continues to confirm the presence of nesting scrub jay families on the LBP, and, as part of the ongoing mitigation requirements, Sarasota County is committed to manage the parcel in perpetuity. As intended, the LBP has served a multitude of purposes associated with county mitigation needs. It has facilitated the permitting of two local road projects and is proposed to facilitate a third. The stormwater improvements achieved on the site have benefited residential flooding, water quality and ecological restoration efforts.

Curry Creek Regional Offsite Mitigation Area

The 19.2-acre Curry Creek ROMA, located adjacent to Curry Creek in Venice, Florida, was Sarasota County's first regional mitigation facility. The County acquired the parcel in 1997 for floodplain compensation and stormwater treatment associated with an adjacent local road project. Prior to purchase, this coastal site faced strong development pressure due the presence of prime upland habitat, and the proximity to a navigable waterway connecting to two deep water canals. In addition, the Curry Creek site lies within an urban setting within the City of Venice. Sarasota County elected to use the Curry Creek parcel as a ROMA due to landscape location, regional connectivity, habitat rarity and overall ecological value. In addition, the parcel is contiguous to two ESLPP sites and provides an essential link between the two otherwise unconnected parcels. The developed ROMA has satisfied a variety of county infrastructure needs.

Aerial photography (1948) was used in developing the restoration and enhancement plan for this highly altered landscape, with the final layout designed to mimic site conditions similar to those existing prior to anthropogenic disturbance. The project involved conversion of two excavated finger canals into a meandering tidal creek and conversion of historically filled uplands to emergent salt marsh and mangrove forest. In addition to hydrologic restoration, the Curry Creek effort resulted in preservation and enhancement of native uplands. Additionally, two stormwater ponds and a prior mangrove mitigation area are located on the parcel. The final design provides a mosaic of habitat types, including mangrove forest, estuarine marsh, tidal creek, hydric flatwoods, oak hammock, and scrubby flatwoods. The parcel also supports several listed species including a transient American bald eagle, rosette spoonbills (*Ajaia ajaja*), wood storks, West Indian manatee, little blue heron (*Egretta caerulea*), and the tricolored heron (*Egretta tricolor*).

Permitting of the ROMA began in early 2003, and lasted nearly two years. Excavation of the site began in May 2005. Planting began in January 2006 and was completed by May 2006. To date, the parcel has compensated for wetland impacts associated with two permitted road projects: Proctor Road and Bahia Vista Street. Sarasota County is currently negotiating the sale of credits to the FDOT as part of the Senate Bill Program designed to facilitate meaningful mitigation projects for FDOT wetland impacts. Additional mitigation credits are also available for future Sarasota County infrastructure impacts.

Permitting of the Curry Creek ROMA was somewhat convoluted. Due to timing, the permitting process required evaluation of the site using both the state Unified Mitigation Assessment Methodology (UMAM) and the federal Wetland Rapid Assessment Procedure (WRAP). Additionally, the U.S. Army Corps of Engineers (USACE) was not able to directly recognize upland preservation areas as part of the mitigation proposal. As an alternative, the USACE did recognize greater value to the wetlands due to the proximity of the wetlands to the preserved uplands. In the end, the USACE issued less mitigation credit for the project. The inconsistencies between the state and federal evaluations have resulted in the maintenance of two distinct credit ledgers for each project.

Annual habitat monitoring continues at the site to assess vegetative success, soil establishment, water level fluctuations, natural recruitment, wildlife utilization, and benthic colonization. As part of the permit requirements, Sarasota County is committed to manage the parcel in perpetuity. As intended, the Curry Creek site has served a multitude of infrastructure mitigation purposes. As part of the ROMA, it has facilitated the permitting of two local road projects. It has additionally, provided an opportunity for stormwater and floodplain compensation needs. Negotiations are underway to coordinate the sale of credit to the FDOT for a local road project. The improvements associated with the site have benefited local wildlife, water quality and ecological restoration efforts in Sarasota County.

Fox Creek Regional Offsite Mitigation Area

The Fox Creek ROMA consists of 140 acres and is located in a suburbanized region of west-central Sarasota County, between Fox Creek and Cow Pen Slough (west of I-75). The county purchased the property in 2003 using funding associated with the adjacent Honore Avenue - Pinebrook Road Extension project. Prior to county purchase, the site was slated to become a high-scale residential development. The completed ROMA is proposed to satisfy a variety of mitigation needs for unavoidable wetland impacts associated with Sarasota County infrastructure projects. Negotiations are also underway to determine mitigation opportunities for wildlife habitat restoration. Finally, the site will provide floodplain compensation value for the adjacent Honore Avenue - Pinebrook Road Extension project.

Currently, the Fox Creek ROMA consists of varying quality upland and wetland habitats that have been impacted by cattle grazing and dredging/filling activities. Once construction of the mitigation site is complete, the parcel will comprise a network of freshwater marshes, forested wetlands, pine flatwoods, wet prairies, estuarine marshes, and scrubby flatwoods. The site features several unique aspects, including extensive long leaf pine (*Pinus palustris*) uplands utilized by the state-protected Sherman's Fox Squirrel, two currently abandoned American bald eagle nests, relic Florida scrub jay habitat and uplands occupied by the state protected gopher tortoise. Existing aquatic landscape features directly contiguous to the parcel include Fox Creek, Shakett/Salt Creek, and Cow Pen Slough. One of the reasons for acquiring this parcel was to protect a vital linkage between estuarine areas along the coast and protected lands to the east. The maintenance and enhancement of these aquatic features as habitat corridors has been identified as an important ecological benefit of the site.

To date, Sarasota County has benefited from the release of the first phase of mitigation credit. These credits have been used to permit the Webber Street and Pine Street local road projects. The Honore Avenue - Pinebrook Road Extension project is proposed to derive similar value from mitigation efforts at the site. An additional component of the Fox Creek ROMA is the joint agreement that Sarasota County has made with the FDOT. Through the FDOT State Senate Bill, the FDOT will purchase mitigation credit for the adjacent Interstate 75 project. This agreement is beneficial to the Department, the county and the environment.

Permitting of the Fox Creek ROMA has not been without setbacks. Similar to the Curry Creek ROMA, permitting associated with the Fox Creek site has suffered from differences between the state and federal permitting process, specifically with regard to upland preservation. Although the UMAM process allows for upland preservation, federal regulation has not allowed upland preservation for wetland mitigation. As an alternative, the USACE recognizes greater value to the wetlands in proximity to preserved uplands and considers the value the uplands provide to wetland dependant wildlife. Inconsistency between the state and federal interpretation of the UMAM rule has resulted in the need to maintain distinct mitigation accounting ledgers for each entity.

Aside from the permitting hurdles encountered while assessing the value provided by uplands, discussions regarding the mitigation value of wildlife habitat enhancements have also been ongoing. Specifically, discussions are underway to determine whether the Fox Creek ROMA can be designated as a recipient site for the state protected gopher tortoise. This opportunity would provide a managed landscape for relocation of the tortoise while facilitating a smoother permitting process for local road projects proposed to impact this protected species. The Fox Creek ROMA also contains relic scrub habitat nestled between nearly 16.1 hectares (40 acres) of preserved long leaf pine flatwoods and is immediately adjacent to the Fox Creek corridor. With appropriate restoration and management, the site has the potential to attract offspring from nearby scrub jay families. Sarasota County has initiate discussions with the U.S. Fish and Wildlife

Service to restore this area for mitigation purposes. At this time, it is not known if mitigation value for scrub habitat restoration will be granted at the Fox Creek site.

Annual habitat monitoring is scheduled to begin on the site this year to assess vegetative success, soil establishment, water level fluctuations, natural recruitment, and wildlife utilization. As part of the permit requirements, Sarasota County is committed to manage the parcel in perpetuity. It is the intent that the Fox Creek site served a multitude of mitigation purposes including wetland and floodplain mitigation, wildlife relocation and possibly Florida scrub jay habitat mitigation. The future improvements at this site are designed to benefit local wildlife, water quality and ecological restoration efforts in Sarasota County.

Myakka River Regional Offsite Mitigation Area

The 29 hectare (72-acre) Myakka River ROMA parcel was acquired in 2006 by Sarasota County for the purpose of satisfying a variety of ecologically benign project needs including a stormwater facility, EIC mitigation, and the 15.3 hectare (38-acre) mitigation ROMA. This parcel was identified by the Environmentally Sensitive Lands Committee as an ESLPP priority site for purchase, although the site was ultimately purchased by Sarasota County's Road Program Division. The EIC project funded the purchase the Myakka River ROMA, as the project will derive a number of project benefits from the purchase. Prior to purchase, this waterfront parcel faced strong development pressure due the presence of prime upland habitat adjacent to the Myakka River, and the proximity to this navigable waterway. The benefits associated with the purchase of this parcel are expected to extend beyond merely compensating for mitigation needs, as this site adds yet another piece to the protected habitat corridor along the Myakka River.

The Myakka River ROMA is currently in the early stages of design and permitting. The current land use within the limits of the ROMA consists of mechanically disturbed uplands, regenerate hardwood hammocks, isolated wetlands, wet prairie, and a natural creek corridor. The design for the Myakka ROMA expands upon the natural hydrologic features of the parcel, including an incorporation of an interconnected tributary of the Myakka River. Additionally, the design incorporates existing oak hammocks and pine flatwoods and the expansion of wet prairie habitat.

Due to project timing, mitigation required for the EIC project will occur independently on the ROMA site and will include the vegetative enhancement of a 3.3 hectare (8.2 acre) forested creek corridor and seepage slope floodplain and the preservation and enhancement of a 1.4 hectare (3.5 acre) upland habitat adjacent to Myakka River. Required EIC mitigation will also result in the preservation of a significant spine of mesic hammock, a protected upland habitat in Sarasota County. Additional benefits afford the EIC project includes the creation a 2.3 hectare (seven acre) stormwater pond adjacent the roadway. Though permitted as two distinct projects, the EIC and ROMA mitigation projects are designed to be interconnected and mutually beneficial to the area.

Sarasota County's ROMA program targets the purchase of large tracts of ecologically viable land for a multitude of mitigation, restoration, and preservation purposes. All four ROMA parcels were specifically selected due to their landscape position along essential habitat linkages and each is adjacent to a significant waterway feature. The LBP exists along the inter-coastal waterway protecting native coastal scrub from development and linking other protected coastal habitats. The Curry Creek ROMA contributes to an essential link along Curry Creek connecting other protected ESSLP parcels. The Fox Creek ROMA is an important landscape feature situated between three important waterways. Purchase of this parcel maintains a habitat gateway between coastal communities and inland habitats. And finally, the Myakka River ROMA borders the Myakka River. It is adjacent to the Jelks Preserve and the Deer Prairie Creek Preserve and it contributes yet another piece to the protected habitat along the Myakka River corridor. All four parcels contribute to an interconnected network of protected native landscapes across Sarasota County.

Summary

Florida's human population is projected to double between 2005 and 2060 from approximately 18 to 36 million (Zwick, 2006). This growth will place extraordinary new pressures on Florida's native habitats, local wildlife populations and human quality of life. This impending pressure has spurred enthusiasm in Sarasota County aimed at protecting the unique natural communities and rare wildlife that still flourish throughout the county. Sarasota County government understands the value of protecting a healthy landscape and is taking significant strides to maintain the uniqueness of the county by supporting regional ecological evaluations aimed at identifying critical habitat corridors and funding land protection initiatives such as the ESLPP and the ROMA program. Additionally, County staff and local environmental teams continue to work to identify critical areas to maintain or improve ecosystem connectivity through innovative infrastructure design. This combined strategic planning continues to afford protection to environmentally sensitive parcels and serve to alleviate fragmentation pressures on many of the county's protected habitats.

The ESLPP program is the most powerful land acquisition tool used to protect land in Sarasota County. The program has been fundamental in acquiring ecologically sensitive parcels across the county landscape. The less recognized, but equally valuable, ROMA program is in the early stages of development. For this reason, many permitting hurdles still need to be addressed and the cost/benefit associated with the ROMA program still needs to be determined. Additionally, the overall ecological value of the program has not been acknowledged by all permitting entities. Sarasota County Road Program has invested significant time and resources in support of the ROMA program in an effort to promote ecologically significant mitigation as compensation for unavoidable environmental impacts associated with

Sarasota County's infrastructure projects. It is the economic intent that this approach facilitates smoother permitting for local infrastructure projects. The ecologically driven goal of this approach is to preserve biological diversity within core areas of the landscape and to maintain a habitat mosaic across the county. Ultimately, the regional mitigation perspective provides an avenue to fund land acquisition in concert with significant habitat creation, enhancement, restoration, and preservation efforts.

Sarasota County government continues to promote sustainable efforts to acquire environmentally sensitive lands, design sustainable infrastructure, and permit environmentally conscious development. New roadway projects are not only aimed at alleviating congestion created by the growing population pressures, but are concurrently viewed in relation to the natural landscape. As future roadway alignments are considered, planners and designers are using the environmental landscape as a tool to design sustainable roadway projects in an effort to preserve a healthy interconnected landscape for future generations.

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