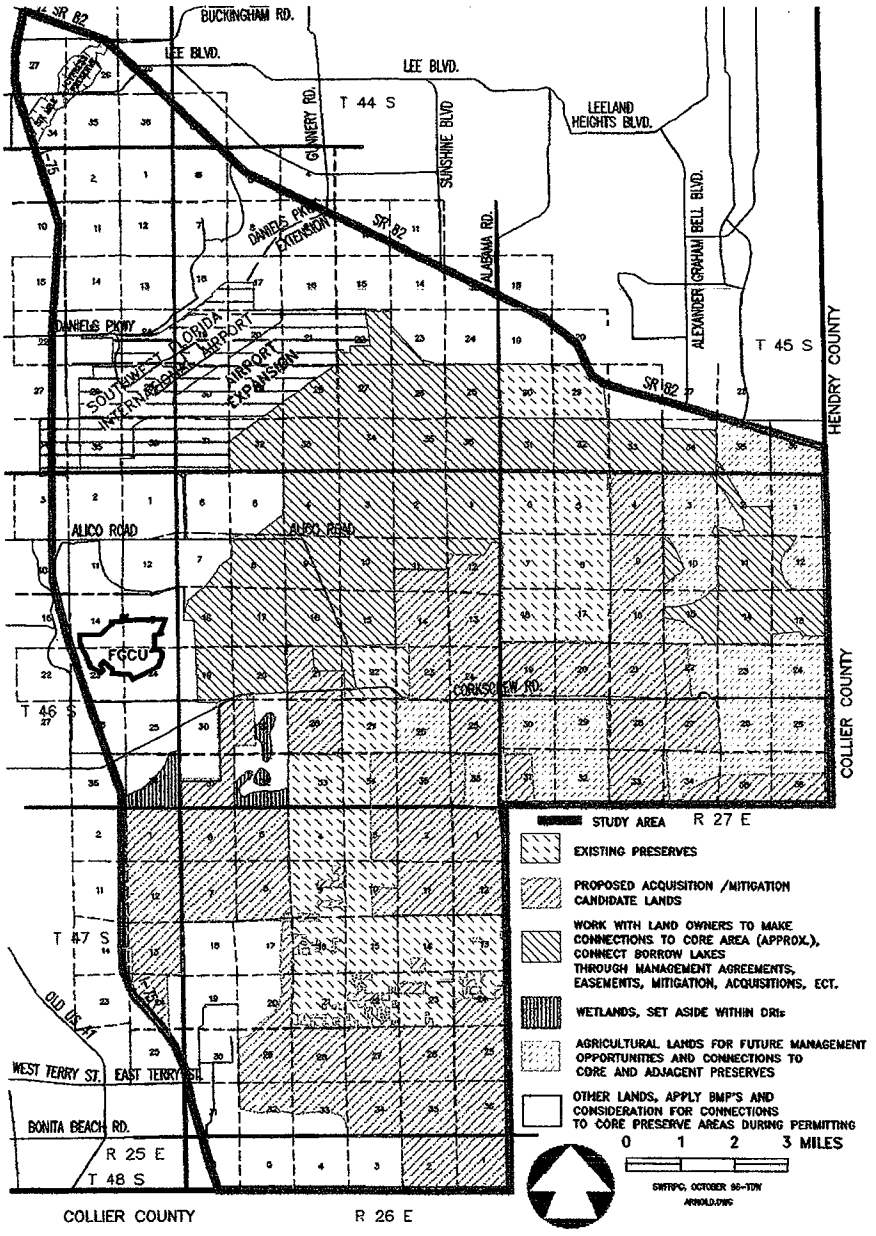

Report and Recomendations

Arnold Committee

Funded by:
Florida Gulf
Coast University
October, 1996

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ARNOLD COMMITTEE
REPORT AND RECOMMENDATIONS

I. BACKGROUND

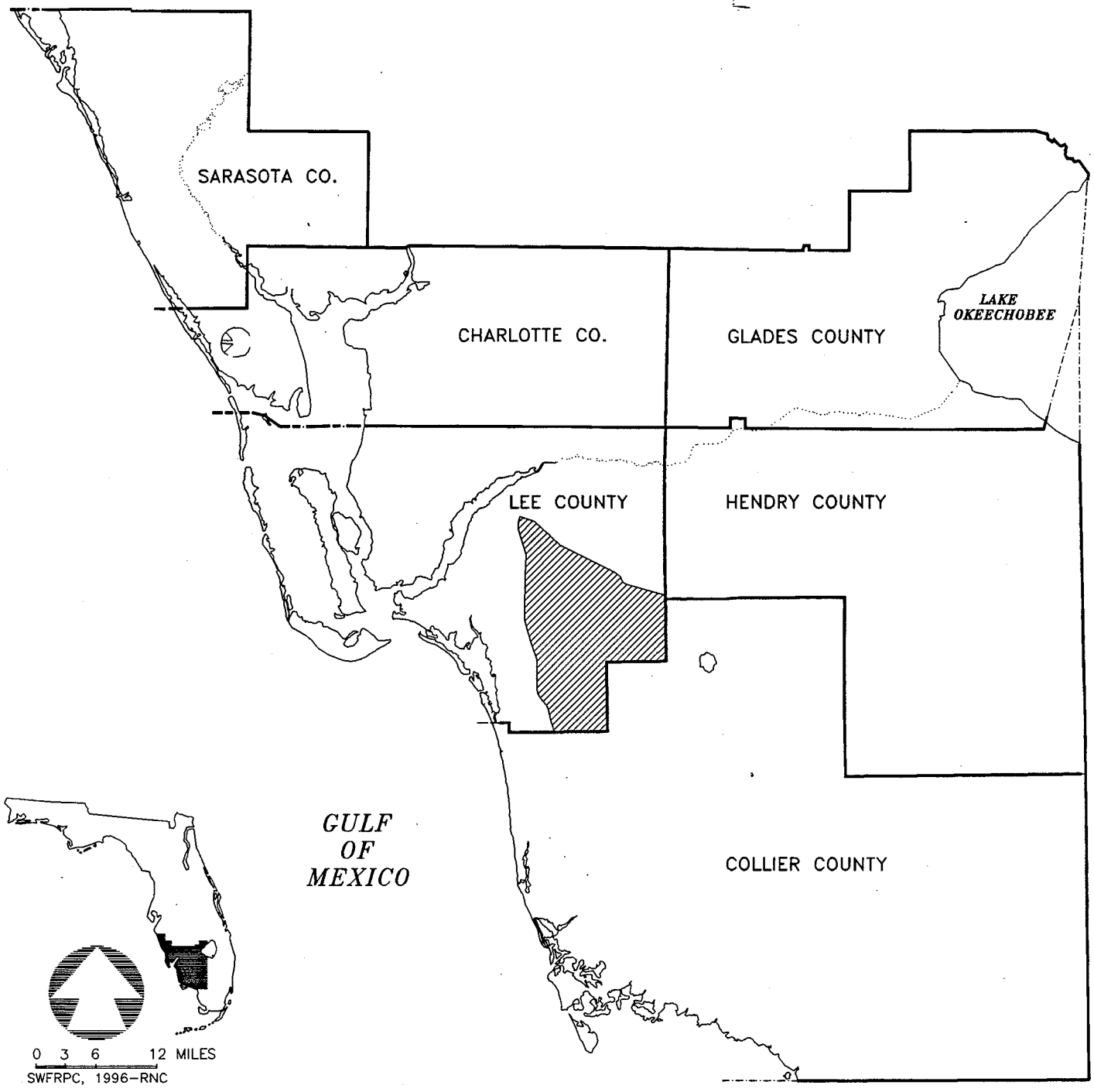
The creation of the Arnold Committee resulted due to permit considerations involving Federal agencies, and due to a challenge to permits pending issuance from the South Florida Water Management District (SFWMD) for construction of the Florida Gulf Coast University. The Florida Gulf Coast University siting process conducted through 1991-2 resulted in the selection of a site by the Florida Board of Regents (the "Alico site"). Siting studies indicated that the site had its natural environment heavily impacted by nearby mining operations, hydrologic alterations and exotic vegetation infestation. Federal agencies, however, had concerns about the direct and secondary impacts that construction would have upon sensitive on-site and off-site natural resources. Further, challengers to the SFWMD permits also raised concerns that this University would introduce more intense urban uses to a rural area, an issue that also concerned Federal entities.

Negotiations over permit issuance led to a settlement agreement that called for the creation of the Arnold Committee and an assessment of overall land uses and natural systems, environmental protection, and mitigation tools. The assessment in turn would lead to recommendations for action, and the creation of an Agency for Bay Management for Estero Bay. This committee, the Arnold Committee is the vehicle by which the settlement agreement is satisfied. The committee is a non-regulatory advisory body made up of private citizens and landowners, along with representatives of non-profit groups and several levels of government.

The primary charge of the "Arnold Committee" was to develop a set of recommendations for the different management entities that would result in a coordinated program of sustained resource management for Southeast Lee County and Estero Bay. At its heart, land-use planning is about connections. Some of these connections are functional: whether avoiding overt conflicts between incompatible land uses, or trying to ensure geographic balance between residential, commercial, and industrial lands. Other connections are physical: understanding the interaction and need for movement of people, drainage, power, drinking water, and wildlife. Most of all, planning is about balance, trying to bind the things our society builds (or conserves) into a mutually supportive whole. The Arnold Committee has undertaken its efforts seeking appropriate connections and a balance between public and private needs.

II. THE STUDY AREA

The study area is an approximately 121,717 acres or 191 square mile segment of southeast Lee County, bordered in the north by SR 82, in the west by I-75, in the east by a small portion of Hendry county, and in the southeast and south by Collier County. The specific study area in relation to other localities is depicted on Map 1.



MAP 1
ARNOLD COMMITTEE STUDY AREA
SOUTHWEST FLORIDA REGION

III. LAND USE ISSUES IN THE STUDY AREA

Southeast Lee County has seen an influx of new land uses during the past 20 years. The Southwest Florida International Airport and the Florida Gulf Coast University are the most prominent, but new agricultural activities and limerock mining are having great impacts as well. A number of major urban developments have also been approved during this period, but more recently the speculative land market has imploded, reducing pressure for urbanization and leaving a void in our imagination of the future of this area. This void provides an opportunity to look at future land uses without the usual pressure from new landowner proposals that require individual and immediate responses.

In southeast Lee County, the important land uses of the future already are at least partially in place:

- ***Agriculture:*** primarily citrus groves and row crops, plus pasture land.
- ***Natural preserves:*** providing habitat for wildlife, protection of water resources, and passive enjoyment of nature for people.
- ***Mining:*** producing fill dirt for local use and crushed rock for all of southwest Florida.
- ***Water supply:*** from underground aquifers, to serve land uses in southeast Lee County plus much of the Fort Myers urban area.
- ***Institutional/urban uses:*** Florida Gulf Coast University, the Southwest Florida International Airport, and existing and future residential and commercial communities, plus supporting services.

The result of these land uses will be a mosaic of wildlife preserves, groves, active and restored mining lands, residential and commercial communities, and critical public facilities that will serve and support the urban core of Lee County and surrounding counties. The importance of each of these land uses will be discussed below:

Agriculture

Although gladiolus fields and other symbols of agriculture in Lee County have disappeared, other types of agriculture remain a major part of Lee County's economy. Urban growth has displaced much of this activity into southeast Lee County where it goes unnoticed by most residents. Yet in 1993 Lee County ranked as the 14th largest county in Florida in cash receipts from agricultural marketing, and Florida ranked as the 3rd largest state in the nation in receipts from all crops combined (following only California and Illinois).

Row crops, primarily fresh vegetables, are important local products. Row crops include tomatoes, watermelons, peppers, cucumbers, eggplant, and squash. The long growing season allows two complete cycles of many crops, keeping fields in production except during the summertime.

Citrus groves have a long history in Lee County, mostly in the Alva and Estero areas. During the mid-1980s, devastating freezes produced Florida's worst citrus tree losses on record. These freezes motivated many growers in central Florida to replant their groves further to the south, especially in southwest Florida. Lee County's share of this acreage is mostly within the Arnold Committee's study area of southeast Lee County. Due to international marketing considerations, little additional planting of citrus groves is expected. However, the major investment required to plant and nurture a citrus grove makes it unlikely that groves planted during the past ten years will be abandoned.

Displacement of agriculture by urban development will continue to be a factor, and some growers with title to their land may welcome and even encourage this kind of change. Insensitive land clearing for future urban development, under the pretense of agriculture, is claimed by some critics to be a problem in some parts of Lee County, but does not appear to be so within the study area of the Arnold Committee.

Natural Preserves

Southeast Lee County contains two major natural preserves. The first is part of the Corkscrew Regional Ecosystem Watershed (CREW), which includes the Flint Pen Strand south of Corkscrew Road and extends into Collier County through the Corkscrew Swamp Sanctuary to the Florida Panther National Wildlife Refuge. This is the largest undisturbed watershed left in southwest Florida. To date, 7,903 acres have been acquired in Lee County, along with 12,612 acres in Collier. The preserve may ultimately include 55,000 acres, and will be managed by the Save Our Rivers program of the South Florida Water Management District (SFWMD) for its habitat and water resource values. Acquisition funds have been provided by SFWMD, Lee County, and the Big Cypress Basin.

A second major preserve in southeast Lee County is being created by the Lee County Port Authority as mitigation for future land disturbances at the Southwest Florida International Airport as it expands. This preserve consists of 5,368 acres already purchased, with the total preserve area to be 7,411 acres. This preserve contains the largest contiguous freshwater marsh in Lee County and four sections of undisturbed land with extensive pine flatwoods, cypress domes, and cabbage palm/hardwood hammocks. Both of these preserves are shown on Map 2.

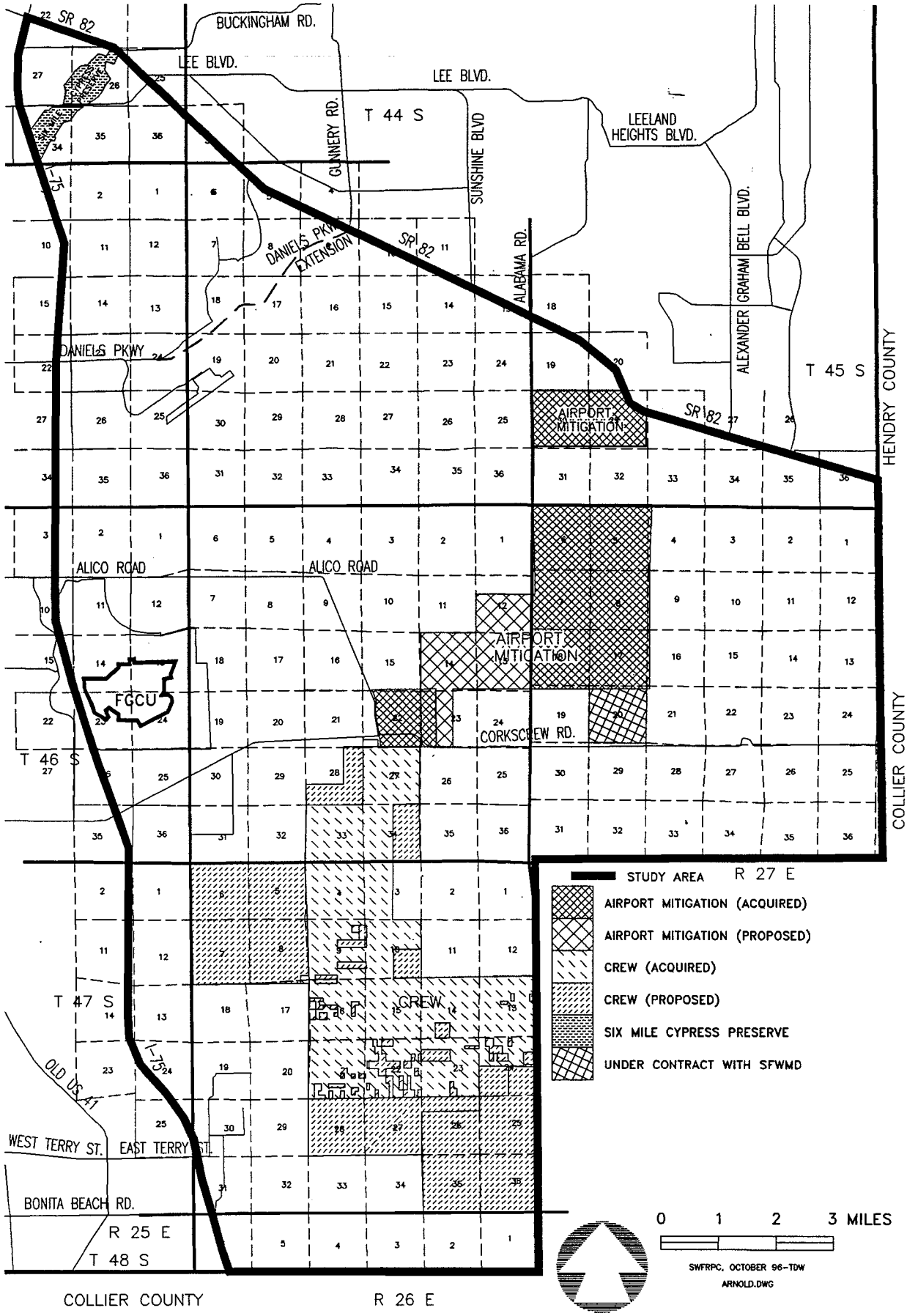
General goals for preserving additional natural habitat in southeast Lee County can be summarized these three headings:

- Acquire the best remaining habitats.
- Encourage site design and management practices on private land that maintain habitat values or augment publicly owned preserves.
- Maintain ecological integrity by providing permanent physical links for surface water flows and for wildlife movement between major natural preserves in and near Lee County.

A variety of land use techniques may be useful in preserving as much habitat value as possible during the land conversion process. Four examples are mentioned here:

- Providing on-site density bonuses or other incentives for residential developers who lay out subdivisions so as to preserve valuable wildlife habitat (especially if this habitat is part of a larger protected system).
- Negotiating preservation of physical links between existing preserves during the planning and permitting of large-scale mining operations.
- Negotiating preservation of valuable forested habitats in exchange for allowing adverse impacts to less valuable habitats, perhaps even including degraded seasonal wetlands that cannot be restored and re-integrated into a diverse natural landscape (an example of the recent trend known as "ecosystem management").
- Allowing developers in intense urban areas to satisfy some of their on-site open space requirements by funding the acquisition of better wildlife habitat in less urban areas.

MAP 2



ARNOLD COMMITTEE STUDY AREA
EXISTING AND COMMITTED PRESERVES

These examples illustrate the value of flexibility in the land development regulation process whereby public needs can be filled through incentives, creative regulations, and negotiated solutions. The fourth example could be accomplished in Lee County through a relatively minor amendment to the Land Development Code. This amendment would describe which land-use categories would qualify as "intense urban areas"; how much of a reduction in open space would be allowed; and a method for computing how much wildlife habitat would be purchased. This topic is discussed in more detail later in this report.

Mining

Southeast Lee County contains one of the best sources in the region for limerock. Due to their weight, fill dirt and crushed limerock are very expensive to transport. Therefore it becomes very expensive to import alternative sources from outside the region. The economic importance of this industry to Lee County can also be assessed by the approximately 200 full-time jobs employed in limerock and fill dirt extraction in southeast Lee County alone (not counting truck drivers who regularly leave the site).

Despite its economic importance, mining produces several impacts that make it a poor neighbor for most urban uses while mining is actively taking place. Also with the closing of the rail line along Alico Road, the finished product must be hauled out by large trucks. Potential public concerns over mining impacts include the following three subjects:

- The mining process inevitably destroys some of the land surface, which may contain wetlands, natural flow-ways, and large areas of natural or restorable wildlife habitat;
- Mining plans, due to their large size or in combination with other mine operators, can create permanent blockages to the future movement of people or wildlife;
- The finished lakes have the potential to be important assets to the community; however, if residential development is allowed around mining lakes in southeast Lee County in the foreseeable future, it would constitute urban expansion into this non-urban area.

Florida Rock Industries is currently seeking a "life-of-the-mine" permit for all of its land holdings in southeast Lee County. They presented an initial mining proposal to the Arnold Committee and then participated in several further discussions about how their plan might be modified to better address natural resource concerns, and also to avoid blocking a desirable alignment for a road connecting Alico Road to Lehigh Acres. A preferred mitigation plan for unavoidable natural resource impacts by Florida Rock may include a strong physical link to the airport's S.R. 82 mitigation area as described in the previous section and the connection of rock mining borrow lake excavations into a system of interconnected lakes and flowways that will enhance wildlife habitat values, human recreation and provide community environmental benefits. There is also potential for preservation of nearby forested uplands, possibly in exchange for impacts to degraded seasonal wetlands that will become isolated from the natural landscape during the mining process.

Water Supply

Several public utilities currently operate wellfields in aquifers in southeast Lee County. These include Lee County Utilities, Gulf Utility Company, Florida Cities Water Company, and Bonita Springs Utilities. Many of these wellfields use shallow aquifers, which have the potential to become contaminated from surface sources. Lee County has adopted a wellfield protection ordinance that regulates potentially

polluting surface activities within varying distances of existing wells. In addition, the Lee Plan has attempted to protect *potential* (not just existing) groundwater sources in southeast Lee County since 1989.

Institutional/Urban Land Uses

This section addresses institutional and other urban land uses in southeast Lee County. The major institutional use today is the Southwest Florida International Airport, which opened in 1983 and has already undergone terminal and runway expansion. Due to continued high demand, further expansion will be needed. Current plans call for a second (parallel) runway at sufficient spacing to allow simultaneous takeoffs and landings, and a new terminal complex between the two runways. Major new access roads would also be built, allowing traffic to enter I-75 either at Daniels Parkway or Alico Road, or at a new interchange on I-75. This expansion would be sufficient to handle growth through at least 2010.

The other major institutional use in southeast Lee County will be the Florida Gulf Coast University (FGCU), set to open in 1997 on a site just east of I-75 between Alico and Corkscrew Roads. FGCU will initially serve the equivalent of 2,500 full-time students, although that number is expected to reach almost 10,000 within six years. About 25% of the students are expected to participate through new "distance learning" programs that will not require students to be physically present on the main campus.

Both of these uses will inevitably need to be served by ancillary uses (some nearby), and can also expect to see other land uses attracted to their periphery. In the case of FGCU, a "university village" was approved for adjoining lands simultaneously with the university itself; this decision also was not questioned by the Arnold Committee. Just to the south along Corkscrew Road, another large area of urban land was approved by Lee County in the mid-1980s.

Most of the land in southeast Lee County is designated in the Lee Plan as "Density Reduction/Groundwater Resource." This category, known simply as DR/GR, was created as a result of a 1989 settlement agreement between Lee County, the Florida Department of Community Affairs, and numerous intervenors. This settlement was an attempt to resolve litigation over the acceptability of the Lee Plan with regard to the new state standards resulting from the 1985/86 Growth Management Act. This new category decreased the allowable residential density from the previous one dwelling unit per acre to one unit per ten acres. This change effectively precludes most urban development from land so designated. Agriculture, mining, and conservation uses are still permitted.

Despite the years that have passed since this category was created, it has never been substantially modified. Even the awkward title remains exactly as originally adopted. The title is significant, though, because although the Lee Plan's description of this category addresses primarily water resource issues, the County Commission in adopting the category acknowledged that "density reduction" and the prevention of urban sprawl was also a significant factor. This category, though extremely controversial, has accomplished its purposes and should generally be maintained in the Lee Plan.

At the same time, an option could be provided through a Lee Plan amendment for an on-site density bonus for a developer who is willing to set aside a desirable portion of a site for wildlife habitat. In some cases such habitats can become a low-impact buffer zone between developed areas and natural preserves. Other benefits could include meeting the demand for rural homesites in a manner that consumes less land than the "10-acre ranchette" form of development that is now permitted in the DR/GR category. A simplified version of such a bonus is presented below, although improvements might be made by scaling

the density bonus to account for the amount and quality of habitat being preserved or its contiguity to existing protected habitats.

A similar option could also be provided for density transfers between non-contiguous parcels of land. Under this concept, potential dwelling units could be shifted from areas that are extremely remote from urban services to areas that are less remote. As in the previous example, conservation easements would permanently eliminate the development rights on land from which density was being transferred. A density bonus could also be provided if that land would provide valuable wildlife habitat (for instance, a forested upland parcel).

The suggested language for both clustering options contained in this Report will need to be expanded by Lee County to include explicit criteria concerning the proximity of clustered dwelling units to urban facilities and some priorities for the character and location of lands that would be preserved.

Changes to the DR/GR category should be evolutionary only. Ample room for growth at least through the year 2020 is provided by Lee County in its future urban area. The urban area itself can be expanded when needed, as evidenced by the changes to accommodate FGCU and supporting land uses. Indiscriminate changes, though, should be strongly discouraged. The "university village" plus other designated urban land near I-75 are more than adequate for the residential and commercial growth that will be needed for the healthy development of FGCU through 2020. Future industrial land has been classified by Lee County along I-75 and north of Daniels Parkway to take immediate advantage of opportunities presented by the airport. When expansion of these industrial areas are warranted, they should be based on analyses of all available land and not just upon immediate landowner requests. A primary factor in this analysis should be proximity to the future labor force, an increasing percentage of which will be living in Lehigh Acres and Cape Coral.

The urban/non-urban boundary contained in the Lee Plan has proven remarkably resilient. The boundary changes to allow FGCU and its university village were adopted and accepted by the state in 1992 and are no longer in controversy. This line of separation should be maintained until additional land is shown to be needed for urban expansion or to resolve major land-use imbalances (such as those found in Lehigh Acres).

One change to the urban boundary that is clearly warranted in the near future would be to reflect the 2010 expansion plans for the airport. That change should be made as soon as possible so that all parties will be clearly on notice of the extent of this expansion and its potential impacts on other land (such as the expanded areas where aircraft noise levels may limit any future residential development).

Regional Transportation Planning

Very limited road construction is planned within the Arnold Committee's study area of southeast Lee County. The only entirely new roads in the study area that are currently planned to be built entirely with public funds during the next 25 years (as shown in the Lee County MPO's 2020 financially feasible plan) are:

- the extension of Daniels Parkway from Gateway Boulevard to S.R. 82; and
- the extension of Treeline Road from its current southern terminus south of Daniels Parkway to Corkscrew Road.

In addition, the plan identifies the following additional new roads that should be built within the study area. These roads would be built by the private sector during the development of adjoining land, or by an appropriate public agency if additional funds become available (e.g. from private sector participation *not* offset by impact fee credits comprising a substantial proportion of their cost):

- the extension of Treeline Boulevard from its current northern terminus north of Daniels Parkway to S.R. 82 at Buckingham Road;
- the extension of Gateway Boulevard north- and westward to the extension of Treeline Boulevard;
- the extension of Commerce Lakes Boulevard westward to Treeline Boulevard;
- the extension of Griffin Boulevard southeastward to Daniels Parkway;
- the new western and southern access roads and internal connecting road in the expansion plan for the Southwest Florida International Airport;
- an extension of Collier County Road 951 (Woodlands Parkway) northward to Bonita Beach Road; and
- the extension of Koreshan Boulevard across I-75 to Corkscrew Road.

There are other potential roads in southeast Lee County that have been widely discussed (and were identified as potentially needed in the MPO's 2020 needs assessment) that would run across land on which no urban development has yet been approved and where such development would be inconsistent with current local government comprehensive plans. Unless access to such new roads is strictly limited, they can have major growth-inducing effects in areas that are not planned for urban growth.

During its deliberations on transportation matters, the Arnold Committee became aware of serious problems that will develop in Lee County's road system by the year 2020. The MPO's "financially feasible" plan for roads in the year 2020 will not be able to provide the levels of service that the public has come to expect and that are adopted in current laws and regulations. This problem will occur for a variety of reasons, including an imbalance of land uses in Lehigh Acres; too few east/west road corridors available because of environmental constraints and previous development approvals; and inadequate funds from currently available sources of revenue.

These problems go beyond the portions of Colonial and Daniels that lie within the Arnold Committee's study area, both to the west and to the east. In addition, traffic congestion on Colonial and Daniels will hasten the time when the construction of a new alternative route will be needed through the non-urban portion of the Arnold Committee's study area (such as the Alico Road extension to Lehigh Acres).

Lee County should investigate these subjects further and develop general policies in its comprehensive plan on long-term road needs in non-urban areas. These policies must balance road needs while mitigating or eliminating the growth-inducing effects of new road corridors outside the designated urban areas.

Flood Control Efforts in South Lee County

An alternative to help provide flooding relief is currently being considered that would have major effects on southeast Lee County. A massive levee has been proposed east of I-75 to divert excess floodwaters southward into Collier County. This latter effort has been examined by the Arnold Committee because it would actually take place in the study area and because it would have major environmental and land-use implications, both of which are the subject of the committee's deliberations.

Under this proposal, the major north-south obstruction to surface water flows in Bonita Springs would be moved eastward to a new levee east of Bonita Grande Drive. This levee, initially estimated at 6 feet high, would be built with fill dirt from a parallel excavation for an interceptor canal that would divert floodwater to the south. The levee itself could be built wide enough to accommodate a 4-lane roadway that would extend from Treeline Avenue's southerly terminus at Corkscrew Road to an extension of C.R. 951, which is currently planned to be extended from Immokalee Road northward to end at Bonita Beach Road.

Questions about the potential environmental effects of this levee have not been asked but would need to be addressed in detail. For example, how would an increased hydroperiod influence native plant communities? What would be the effect on the feeding and survival of animal communities? In addition to strictly environmental questions, what would be the overall effects of storing water on private land, including the extensive agricultural uses in southeast Lee County? And what are the legal implications of converting privately owned range and crop land into a water storage area, especially over the objections of those owners?

Notwithstanding any benefits the levee might create with respect to flood control, the levee would become the major force driving the future use of land in southeast Lee County. Its ability to allow the urbanization of more land east of I-75 coincides with current efforts being made by various parties to effect changes in the Lee and Collier County comprehensive plans. Flood control benefits of the levee must be balanced with other long-term land planning goals.

IV. WILDLIFE RESOURCE ISSUES IN THE STUDY AREA

Historical Trends in Wildlife Habitat Conversion and Development

Limited historical information is available for the development of Southeastern Lee County's resources. However, to provide some context, it should be remembered that prior to Spanish discovery 500 years ago, approximately 1 million native Americans utilized the 35 million acres that we call Florida (Cox, J., Kautz, R., MacLaughlin, M. and Gilbert, T. 1994. Closing the Gaps in Florida's Wildlife Habitat Conservation System. Florida Game and Fresh Water Fish Commission. Tallahassee, FL. 239pp.). In just the last 50 years, 24% of the state's (8 million acres) forest and wetlands have been lost to development. The state's current population (14 million) is expected to top 16 million by the year 2000. According to data available from the U.S. Forest Service, Florida's landscape today is approximately 30% agricultural, 13% urban, and 57% some type of forested or semi-natural land cover (Kautz, R.S. 1993. Trends in Florida wildlife habitat 1936-1987. Florida Scientist 56:7-24).

In the Immokalee Rise area, which includes eastern Lee County, northern Collier County, Hendry County, and part of Glades County, approximately 39% of the area was altered from natural to agriculture/urban, between 1900 and 1973. Freshwater marshes declined by 59% and pine flatwoods declined by 88% between 1900 and 1989 in the project area (Mazzotti, F.J., Brandt, L.A ., Pearlstine, L.G., Kitchens, W.M., Obreza, T.A., Depkin, F.C., Morris, N. E. and Arnold C.E. 1992. An evaluation of the regional effects of new citrus development on the ecological integrity of wildlife resources in southwest Florida. Final Report. South Florida Water Management District. West Palm Beach, FL. 188pp).

An analysis of statewide conservation lands (Cox et al., 1994) indicates that while approximately 46.2% of Florida's *remaining* wetlands are protected as conservation lands, only 19.6% of Florida's *remaining* "natural" upland plant communities are similarly protected. Statewide, 79% of *remaining* mangroves, 62% of *remaining* freshwater marshes, 60% of *remaining* coastal salt marshes, 59% of *remaining* shrub swamps, 30% of *remaining* cypress swamp and 22% of *remaining* mixed hardwood swamps are on conservation lands. Only 16% of the *remaining* pinelands and 17% of the *remaining* dry prairie (this includes palmetto prairies) in the state are in conservation status. The total size of conservation lands in the state is 6.95 million acres or roughly 20% of the land area in the state (Cox, et al. 1994).

Regional Resources

The Arnold Committee Study Area is located in southeastern Lee County, north and west of most of the larger regional resources that are currently associated with "wilderness" or wildlife preserves in South Florida. These areas include the Corkscrew and Bird Rookery Swamps (located adjacent to the Study Area boundary in Collier County), the Florida Panther National Wildlife Refuge (approximately 11 miles southeast of the Study Area), the Fakahatchee Strand (approximately 14 miles southeast of the Study Area), and the Big Cypress National Preserve (approximately 15 miles southeast of the Study Area). These areas have recently been termed the "Northwest Everglades." The Study Area wildlife resources are part of, and contribute to, the resource value of these large public landholdings. Together, "this system of habitat resource areas probably represents the most important region in Florida for several wide-ranging species, including the Florida panther, the Florida black bear, swallow-tailed kite, wood stork, and other wading birds" (Cox et al. 1994). Efforts to conserve and preserve this regional ecosystem have recently accelerated public land acquisition efforts in and around the Study Area.

Additionally, there is potential to provide for habitat conservation connections through and adjacent to private landholdings east from southeast Lee County, by purchase of the proposed Okaloachoochee Slough and Twelve Mile Slough CARL and Save Our Rivers (SOR) projects, and north to the Babcock/Webb Wildlife Management Area and the Charlotte Harbor Flatwoods CARL project. In conjunction with private lands management for wildlife, these efforts would conserve some important aspects of wildlife habitat diversity, including regional and endemic populations of the Audubon's caracara, burrowing owl, Florida sandhill crane, red-cockaded woodpecker, and Eastern indigo snake, as well as many listed plant species, and game and nongame wildlife species.

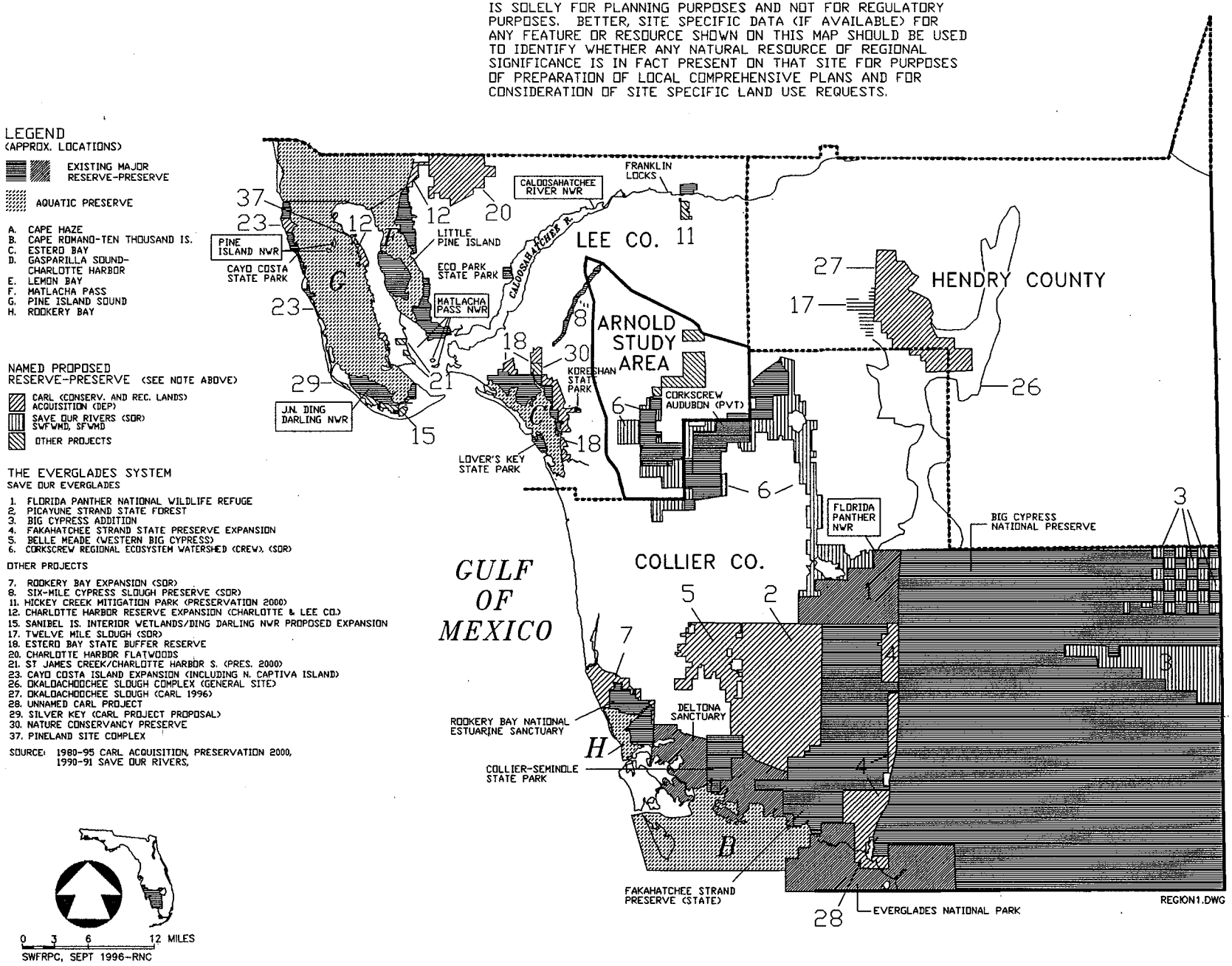
Preservation of wetland habitat and uplands, including creek and riverine habitat buffers, and habitat reserves in developed areas, is essential to Estero Bay and its watershed. Although viable urban and coastal habitat conservation is the most difficult to attain, any effort made to increase habitat conservation in developed coastal areas will promote urban wildlife enjoyment, provide habitat to coastal wildlife species, maintain the quality of the receiving estuaries, and prevent further development of flood-prone areas. In addition, the development of a Florida Yards and Neighborhood Program, which includes habitat enhancement, xeroscape and reduced nutrient and herbicide/pesticide application in urban areas, will enhance regional wildlife protection efforts.

In 1994, GFC published its "Closing the Gaps in Florida's Wildlife Habitat Conservation System" (Cox et al. 1994). This report "describes habitat areas in Florida that should be conserved if key components of the state's biological diversity are to be maintained", using a Geographic Information System (GIS). Update and refinement of this data base continues in cooperation with the U.S. Fish and Wildlife Service. As a result of this analysis, the GFC has identified Strategic Habitat Conservation Areas (SHCA's) in the Arnold Committee Study Area. Strategic Habitat Conservation Areas for the Study Area are lands needed to meet minimum conservation goals for 30 species of wildlife that are inadequately protected by current conservation lands and wetlands important to the breeding success of eight species of wading birds. The study also identified Biodiversity Hot Spots, defined as areas where large numbers of 52 selected species co-occur, and areas that support rare plant and wildlife communities are located.

Public lands set aside for resource management in Southeast Lee County, within the Study Area boundary, include two major conservation areas, the purchased areas of the CREW CARL project (7,903 acres to date) and the mitigation area for the expansion of the Southwest Florida International Airport (approximately 5,368 acres of purchased land, proposed for expansion to a total of 7,411 acres upon completion). The Study Area is approximately 121,717 acres in size. Other smaller reserves in the Study Area include Lee County's Six Mile Cypress Preserve and county-owned wellfields. These areas are indicated on the attached Map 3.

In 1994, Lee County ranked 21st in the state in percentages of conservation lands by individual county, with approximately 17.1% of its land set aside for conservation uses (Cox, et al. 1994). This percentage has probably risen since 1994 as a result of CREW and Airport mitigation land additions.

NOTE: IDENTIFICATION OF NAMED PROPOSED RESERVES/PRESERVES IS SOLELY FOR PLANNING PURPOSES AND NOT FOR REGULATORY PURPOSES. BETTER, SITE SPECIFIC DATA (IF AVAILABLE) FOR ANY FEATURE OR RESOURCE SHOWN ON THIS MAP SHOULD BE USED TO IDENTIFY WHETHER ANY NATURAL RESOURCE OF REGIONAL SIGNIFICANCE IS IN FACT PRESENT ON THAT SITE FOR PURPOSES OF PREPARATION OF LOCAL COMPREHENSIVE PLANS AND FOR CONSIDERATION OF SITE SPECIFIC LAND USE REQUESTS.



MAP 3
ADJACENT REGIONALLY SIGNIFICANT NATURAL RESOURCES

Listed Species

Listed species that are repeatedly of issue in the development and agriculture permitting process within the Arnold Committee Study Area include the Florida panther, wood stork, Eastern indigo snake, bald eagle (nests), red-cockaded woodpecker, Florida black bear, Big Cypress fox squirrel, Florida sandhill crane, snowy egret, little blue heron, tri-colored heron, roseate spoonbill, limpkin, and white ibis (including wading bird rookery sites). Only occasionally will other listed species, such as the gopher tortoise, burrowing owl, least tern, snail kite, scrub jay, or American alligator, be of major concern.

WILDLIFE ISSUES

Biodiversity or Biological Diversity

Biological diversity is generally considered to be the maintenance of the variety and variability of all species of plants, animals, and microorganisms, and their ecosystem. Technological advances such as the development of new medicines and disease/insect-resistant crops, and resource-based industries, such as fisheries or eco-tourism, are dependent on the maintenance of biodiversity.

Ecosystem Management

Ecosystem management is one of the newest terms for the process and prioritization of habitat management. As defined by the Ecological Society of America, ecosystem management is "management driven by explicit goals, executed by policies, protocols, and practices, and made adaptable by monitoring and research based on our best understanding of the ecological interactions and processes necessary to sustain ecosystem composition, structure, and function." Ecosystem management must include "1) long-term sustainability as fundamental value, 2) clear, operational goals, 3) sound ecological models and understanding, 4) understanding complexity and interconnectedness, 5) recognition of the dynamic character of ecosystems, 6) attention to context and scale, 7) acknowledgment of humans as ecosystems components, and 8) commitment to adaptability and accountability (Christensen, N.L. et al. 1996. The Report of the Ecological Society of America Committee on the Scientific Basis for Ecosystem Management. Ecological Applications 6(3): 665-691).

Sustainability

The terms "sustainable development" and "sustainable natural resources" generally refer to the management of natural resources in such a way as to provide for the resources to be continuously utilized by future generations without material degradation.

These above terms (biodiversity, ecosystem management and sustainability) are generally used to define a more or less new direction in policy and attitude towards natural resource management. This new direction recognizes that the "species only" management of the past is not sufficient to protect "biodiversity" and offer "sustainability" of resources into the future. It seeks to establish an "ecosystem" or landscape approach to managing natural resources. The most economical approach to this type of management has generally been to reserve and manage land on a regional or systems basis.

Exotic Plants and Animals

Exotics, non-indigenous, non-native, and alien species are terms that describe plants or animals that are not native to an area, yet may persist, thrive, harm, and displace native species (FDEP, 1994). South Florida is particularly susceptible to these types of invasion because of human disturbance factors and its similarity to an island (bounded by water and frost line, with an impoverished native flora and fauna) (FDEP, 1994). In the Study Area, exotic plant species include the Melaleuca, Brazilian pepper, downy rose myrtle, water hyacinth, hydrilla, torpedo grass, rosary pea, water lettuce, tropical soda apple, and natal grass. Exotic animal species in the study area include the wild hog, fire ant, walking catfish, oscar, Jack Dempsey, various tilapias, Cuban treefrog, various anoles, nine-banded armadillo, Norway rat, black rat, house mouse, coyote, feral house cat, muscovy duck, rock dove, Eurasian collared dove, and house sparrow.

The presence of one or more of these exotics in an ecosystem can degrade the ecosystem. However, in most exotic-invaded habitats, the basic structure and value of the native community remains intact, and the degree to which the habitat is degraded depends on the percentage, size location and type of invasive species. The exact impact of many exotic animal species on the ecosystem is unknown, but notable impacts include: the loss of many native fish species from certain wetland systems and in artificial water bodies such as canals; the potential effects of fire ants on ground nesting birds, including game species such as quail; and the general impacts of a voracious hog population that devours a wide variety of plant and animal material, and causes extensive damage to plant and animal communities as a result of its rooting behavior.

Very little scientific research has been conducted to confirm the extent to which most exotic plant and animals impact ecosystem biodiversity. However, the relatively common trend of targeting exotic-invaded habitats for development, regardless of their ecosystem value, may affect biodiversity by eliminating the underlying native habitat. Similarly, a habitat mitigation strategy of eliminating large areas of exotic-invaded habitat in favor of preserving small areas of "pristine" habitat, may not promote sustainable ecosystem management. It is likely that ecosystem management will, in South Florida and the Study Area, include exotic plant and animal management on a perpetual basis.

Agriculture

Agricultural development in the Study Area includes grazing or range management, vegetable or row crop production, nursery or tree farms, and citrus. The impact of these various uses on the fish and wildlife resources of the Study Area is related to the size of the various types of development (i.e., habitat removal), the type of development pattern within the historical landscape, and the amount of hydrological alteration necessary to maintain the operation. Using these general criteria for a cursory assessment of impacts, the impacts of agriculture use on fish and wildlife resources in the Study Area is generally assessed as follows:

Nursery/Tree Farms

The number and size of these types of facilities in the Study Area appears to be limited and therefore this use has only local impacts.

Grazing/Range Management

The extent to which this land use impacts fish and wildlife resources very often depends on the individual goals and management style of the property owner. "Improved" pasture operations may include clearing of most upland habitats and intensive efforts to plant non-native grass species for forage value. Forested wetlands usually remain on improved pasture sites, seasonal wetlands may be impacted by ditching and diking. Historically, many improved pasture operations included pumping and ditching operations for irrigation, although recently, the expense of water management is prohibitive. This type of use mimics the historical dry prairie habitats of many of Florida's endemic and listed species, including the burrowing owl, the Audubon's caracara, the grasshopper sparrow, and Florida sandhill crane. In some areas in Southwest Florida, concentrations of these listed species may be supported by continued agricultural land practices.

"Native range" or unimproved pasture, typically incorporates more native upland land cover, such as scattered pine, cabbage palm/oak hammock, or patches of pine/palmetto, in addition to forested wetlands and more seasonal wetlands. These lands are often utilized for hunting leases and are managed for some game species including quail, turkey, hog, or deer. These areas support these game species, but are also valuable to many other listed and non-listed species.

The conversion of grazing/range management areas to more intensive agricultural uses may be detrimental to regional wildlife populations utilizing these areas.

Vegetable/Row Crop Production

The overall impact of this type of land use on fish and wildlife populations often depends on the pattern of developed land cover. Where large expanses of habitat, usually uplands, and particularly pine/palmetto areas, have been cleared for crop production, wildlife use is reduced, except for the fallow summer months, when fields are flooded. However, often, due to surface water design, historical clearing patterns, insect and disease control, and wind-shield, smaller row crop fields are designed between larger habitat features, such as forested and seasonal wetlands or hammocks (pine and palmetto habitat is usually developed, however). This type of pattern offers greater habitat diversity and therefore wildlife value than patterns with larger fields and less habitat diversity. During the fallow months of the tropical summer (usually May to mid-August), farm fields may become inundated and briefly vegetated. These shallow impoundments often attract large numbers of wading birds, ducks, and raptors, including roseate spoonbills, wood storks, peregrine falcons, sandhill cranes, and bald eagles. When these fields are drained for production, they often function as seasonal wetlands in drawdown. Many other fish and bird species, as well as alligators, obtain year-round food and refuge in agricultural ditches and reservoirs. Snail kite use of these habitats is notable in the Study Area. The extent to which residual pesticides in water and sediment within these facilities affects wildlife populations in South Florida has not been studied extensively and is unknown.

Since many crop production operations alternate fields, time of field use, or use of whole farms on a yearly and seasonal basis, additional wildlife habitat values can be attributed to this type of agricultural use over time. There has also been considerable argument over whether row crop operations impact undeveloped or adjacent seasonal wetlands, as water levels in ditch-irrigated operations often remain high for most of the year. Forested wetlands and some habitat preserves are also used as water retention-detention areas that receive pumped water during high water events. The impacts of this inundation on these systems can result in losses of upland habitat and exotic plant invasion of wetland systems.

Citrus

This type of agricultural use has the most impact on fish and wildlife populations as a result of the size of the operation, grove design considerations, hydrological changes and the long term commitment of land to the single use. Wildlife species do use citrus groves. Mazzotti et al. (1992) documented 203 species in citrus groves in the Immokalee Rise area (which includes part of the Study Area). However, most of these species (159) were observed in agricultural reservoirs within the groves, and many of these species were "common" (not endemic or habitat-sensitive) or exotic species. Intermediate-aged groves had the most species (93). The extent to which grove size and surrounding native land cover influenced the number and type of wildlife species documented in citrus groves has not been determined, but a general assumption that groves located adjacent to large natural areas will have greater species makes sense.

Citrus development usually requires greater drainage design. Therefore, impacts to adjacent wetlands can be greater than other types of agricultural use in older groves or improperly-designed groves. As a result of drainage requirements, citrus grove development has also targeted the few xeric or scrub oak habitats in the Study Area, including some that were populated by the county's small Florida scrub jay population.

Although citrus development impacts fish and wildlife resources, this type of agricultural use, within spatial limitations, and in association with surrounding native land cover, is less impactive than residential development, and is preferred over urban land uses.

Agricultural Clearing

In the Study Area, agricultural clearing of upland habitat, particularly pine and palmetto, has continued which impacts the extent of wildlife habitat. Typically, this type of clearing does not require permits and therefore no assessment of fish and wildlife resources occurs.

Mining

Rock, sand and fill mining (mineral extraction) is a major feature within the Arnold Committee Study Area. Mining is essential to meet the demand for fill and base materials used in roads, houses and other urban development throughout the region. Mining activities, however, dramatically alter the natural landscape and can have direct impacts to many wildlife species.

Wildlife impacts can be reduced through the appropriate overall siting, and site planning of the mine and processing locations within the mining operation. Generally, the avoidance of mining impacts to high quality natural systems, including uplands and wetlands, can reduce wildlife impacts. Other site planning issues that are beneficial to wildlife include possible system connections to offsite natural areas, avoidance of documented wildlife forage/roosting areas, mining techniques (wet), traffic flow within the mining site and land uses, including urban development after the mine stops operation.

Wetland impact mitigation and subsequent mine reclamation are the two primary environmental areas addressed during mine permitting. Both are expensive in costs to mine operators or land owner. Overall wetland mitigation should be addressed during early site planning and benefits for the highest quality natural systems maximized. Mine reclamation needs to more comprehensive with better acknowledgment provided to future land uses (e.g., agriculture, residential, commercial, industrial, recreation).

Completed mines are typically large, deep freshwater lakes. Wildlife values within the water column and along the littoral zones (edges) can be enhanced through wildlife conservation planning. Pretreatment of stormwater entering the lake, freshwater artificial reefs, aeration, appropriate fish stocking are examples of lake management enhancements within the water column. The slope(s) of the lake bank, planting of wildlife forage species of trees, shrubs and herbaceous plants, concentration of mitigation efforts in one large area, and creation or retention of "islands" within the lake are examples of items that can be wildlife enhancements in a completed mine project.

Upland Habitat Vs. Wetland Habitat Protection

Wetland habitats, except those that are severely hydrologically degraded, or are small, (less than 1/2 acre in size) are protected under state and federal law. Wetlands in South Florida and the Study Area are also generally targeted for preservation as a result of the cost of fill and the necessity of stormwater design. Upland habitat does not have such extensive legal protection or incentives for protection.

The U.S. Army Corps of Engineers has the most flexibility in considering upland or ecosystem issues because of their nexus with the U.S. Fish & Wildlife Service, other federal agencies, and state wildlife agencies, through the Endangered Species Act and the Fish and Wildlife Coordination Act. This regulatory oversight and preference for wetlands protection may not protect ecosystem diversity and in some cases fails to protect even wetlands habitat function.

Forested uplands have some of the highest biodiversity in Southwest Florida. In the Immokalee Rise region studied by Mazzotti et al. (1992), 182 native wildlife species were identified in these systems. Other upland systems with high numbers of wildlife species documented in this study included range (178) and pine flatwoods (169). Freshwater marshes and cypress swamps, protected under current state and federal law, were documented for 172 species each.

The maintenance of upland systems is crucial to the function of many wildlife species in adjacent wetland systems. For example, many toads and tree frogs forage in uplands, but must lay their eggs in wetlands. Sandhill cranes nest in seasonal ponds, but forage much of the time in uplands (Mazzotti, et al. 1992). Bears and panthers den in uplands, but depend on many plants and animals for food that are located in or utilize wetlands.

Additional uplands habitat should be protected and managed to preserve ecosystems and biodiversity. This could be accomplished by targeting uplands in public land acquisition projects and mitigation programs, or providing incentives for less intensive land uses and management of uplands by private landholders.

Off-site Versus On-Site Mitigation

Recent changes in habitat mitigation policy and rule have emphasized off-site mitigation of wetland and/or wildlife habitat impacts. These impacts include both direct and cumulative/secondary habitat impacts that result from on-site development. Cumulative/secondary habitat impacts include issues such as on-site habitat fragmentation or total habitat reduction, additional human presence (noise and lighting disturbance), pet presence (wildlife mortality and disturbance), stormwater or other pollution, hydrological impacts from drainage features or wellfields, road construction increased traffic, and exotic plant and animal invasion.

The choice of off-site over on-site mitigation is not a straight-forward decision-making process. General guidance for allowing use of off-site mitigation exists in state and federal wetland protection rule, and is most often based on wetlands protection policy.

V. WATER RESOURCE ISSUES IN THE STUDY AREA

Background

The southwest region of Florida is fast becoming an economical, social and ecological Landmark in the State. Like the rest of Florida, it has witnessed extraordinarily high growth rates in the 60's (140%), a slower rate in the 80's (58%) and a projected lower rate of growth for the decade of the 90's. Despite the diminishing rates, the net population in the overall 6 county region has grown from 171,000 in 1960 to 909,000 between 1960 and 1990. The effects of almost 1 million residents (with a seasonal winter residence rate of up to 22% perched between the Gulf of Mexico and the greater Everglades ecosystem, has radically changed the landscape.

The climate of southern Florida strongly reflects the influences of its geographical location. The proximity to the equator and bounded by the Gulf of Mexico and the Atlantic Ocean make the climactic conditions markedly different from other areas of the country.

Average rainfall is approximately 53 inches. Intense storms, yielding large volumes of rain are a common occurrence. Approximately 75%, or 39 inches of the regions rainfall occurs during the wet season, which usually lasts from the end of May to the end of October.

The area also experiences contrasts for extended periods. Examples of such contrasts would include the most recent drought of 1988 through 1991 which was followed in 1992 and 1995 by periods of prolonged flooding. The region is also subject to tropical storms and hurricanes which can produce significant amounts of rain. During such years and storms total rainfall for the year can almost double the annual average. A recent example of this would include the flooding during the summer of 1995. The annual average in some areas of Lee and Collier County exceeded 100 inches with approximately 69 inches falling between the months of June and October.

Topographically, southeastern Lee County is flat. This lack of slope will cause the surface water runoff to be slow and blending will occur between watersheds. This is all dependent upon rainfall duration, intensity and frequency.

Aerial photographs taken in the 1940's show the region within the study area was a mosaic of slash pine or scrub uplands, oak/cabbage palm hammocks, tropical hardwood hammocks, and large expanses of wetlands. Most of these wetlands were seasonally flooded freshwater marshes, wet flatwoods, forested swamps, and sloughs. Generally surface water drained from the northeast to the southwest.

In more general terms the region east of I-75 historically had long term stormwater inundation. Storm events created the "head" necessary to drive sheet flow to the Gulf of Mexico.

Impeding slow moving sheet flow are the unregulated development practices and intensive building construction of the 1950's, 60's and early 70's. Such development practices today includes the "pinching-off" of historical flood ways and the filling of historical flood plains. As development moved eastward improvements such as roads, power transmission lines, homes and newer subdivisions became either embankments or impoundments altering the natural "sheet-flow" of surface water. In addition the remainder of these floodways experience their own impacts.

Because of the narrowing of the floodways, trees whose root bases maintained bank stability are impacted by the changes in velocity and duration of flows. As these flows impact the root systems the trees fall into the flowways reducing the capacity of the flowway. Sediments and vegetation growth also compound the limited flowways ability to convey stormwater. Flows are reduced and the tailwater impacts are exaggerated upstream. Competition is now created between the need for flood protection and the value of environmental habitat created by the growth of vegetation and deposition of sediments along the river banks.

In mathematical terms, what goes into the system (rainfall) has to equal what leaves the system (run off and evapo-transpiration) or it becomes storage. This storage factor is critical in the southeast region of Lee County and strongly influences the northern sections of the Arnold Committee study area.

With all of this stated, the region relied on natural outfalls, a "primary" man-made system of drainage was never constructed. From a natural resource stand point, Lee County is fortunate not to have a system of drainage canals similar to that of the east coast of Florida. If your personal property is inundated with stormwater runoff the lack of drainage canals does not, however, seem fortunate. There is a fine line that now has to be walked as development continues.

Because of the growth demands on this region extreme care has to be maintained to not create an increased level flood protection at the expense of the natural resources. Impacts from not accepting this level of responsibility have led to expensive retrofit projects.

After flooding events in the late 1970's and early 1980's Lee County partnered with the South Florida Water Management District to replace the permit by permit mosaic of development with an organized county-wide, basin by basin surface water master plan. The organized surface water management plan is known today as the Lee County Surface Water Management Master Plan (LCSWMMP). The plan identified problems and recommended solutions.

Two major contributing watersheds the Estero River and Imperial River Watersheds are identified within the LCSWMMP. Impacts of development and results of downstream impacts are identified. The following section will provide an overview of the plan in relation to the Arnold study area.

Overview of the Lee County Surface Water Management Master Plan

The LCSWMMP provides a great deal of information on each of the two drainage basins, including: basin boundaries, current development, growth projections, detailed hydrography, sensitive lands, existing and proposed rights-of-way, soil characterization, current and future storm routing characteristics, water-quality assessments, a water table evaluation, and most importantly, plans for a surface water runoff system for a developed watershed that combines adequate conveyance with stormwater detention and passive water treatment for stormwater.

The LCSWMMP advocates controlled growth using broad flow corridors to carry flood waters, improve water quality, and reduce peak flows. The following basic assumptions were used in preparing the master plan:

- Intensity of growth pressures will continue to increase.
- Reservation of waterway and adjoining flood plain space is paramount.

- Historically, development occurred at the River and Gulf outfalls and progressively moved upstream.
  Drainage systems that were adequate for the original small communities have become bottlenecks in larger water management systems that have since developed. The older systems are expensive to retrofit and constrain the conveyance available for newer upstream developments.
- Space continuity and funding continue to be the basic constraints to a fully effective surface water management plan.
- Increases in impervious surfaces reduces infiltration of rainfall and restricts the amount of surface water available for downward leakage into lower aquifers like the sandstone.
- A significant portion of Lee county's water supply is now taken from the Water Table and Sandstone aquifers.
- Understanding threats to water quality and protecting future water quality are of particular significance.
- A critical need exists for an organized system of flow corridors to store runoff waters, prevent downstream flooding, and treat runoff waters.
- If watersheds develop without a corridor plan, the future cost of buying and building corridors after areas are developed will make the funding requirements for retrofit systems almost insurmountable.

The LCSWMMP does give a design flow capacity, sufficient to handle runoff from a 25-year, 3-day storm without significant flooding. The plan also provides a cost estimate for each watershed. Costs are divided into: Cleaning and debris removal, necessary modifications to bridges and culverts (beyond maintenance), installation of new and replacement weirs, excavation and improvements to existing channels, excavation of new channels, purchase of sensitive lands (wetlands), land purchases and construction costs for water quality restoration systems and corridors, engineering costs, and contingencies costs. The cost estimates assume that all new developments will adhere to the conveyance and water quality guidelines of the plan. To date this has held true for most new developments. The plan also assumes that corridors in undeveloped lands can be established via right-of-way easements at minimal costs. This has not happened and these easements are growing in cost and narrowing in size. The plan also recommends retrofit of older developments to provide 1 inch of detention for storage. The implementation of this recommendation may be the most costly of all the recommendations.

The LCSWMMP as a tool has been utilized by the regulatory agencies in the review of proposed planned communities. Trying to create and implement the recommendations on a permit by permit basis is doomed to failure. With the implementation of the planning recommendations further encroachment of floodways would have been reduced. This in addition to maintaining upstream flood corridors would complement the downstream conveyance abilities of Estero River, Imperial River, Halfway Creek, Spring Creek and Hendry Creek.

Flooding of 1995

From a technical standpoint the flooding of 1995 offered a "once in a lifetime" opportunity to extensively document surface water flooding which may not occur again in the foreseeable future.

Agencies such as the South Florida Water Management District and Lee County talk of such storms within the context of a annual rating - once in 100 years, once in 25 years, once in 5 years, etc. When you examine a summer like the summer of 1995 such a rating is not only difficult to determine it becomes even harder to explain to the public and frankly does not explain what happened. From the analysis completed in Bonita

Springs by Johnson Engineering, Agnoli, Barber, & Brundage, and Woodard & Clyde if the entire summer wet system was analyzed the possibility of these storm events occurring in that four month period may be even less than one such event every 100 years.

That leads to the question of how these ratings are developed.

Utilizing a tool called a Isohyetograph, which was created by the U.S. Department of Agriculture, Soil and Conservation Service has provided a "rainfall Frequency Atlas of Alabama, Florida, Georgia and South Carolina ratings are created for durations from 30 minutes to 24 hours and return periods from 1 to 100 years. To complicate this, rainfall is then equated to runoff. The relationship between accumulated rainfall and accumulated runoff are then derived from experimental data using soils, vegetative cover, and land treatment measures. What this really means is this is not an exact science. In English, when we discuss the return frequency of a 25 year, one day storm what we are describing is the statistical probability of a rainfall event in which almost 9 inches of rain falls in southern Lee County in a twenty-four hour period which should occur once every 25 years. Another way to say this is that this storm has a 4% probability of occurrence in any one year. The same discussion works for the 100 year storm event. The statistical probability of a storm delivering greater than ten inches of rainfall within a twenty four hour period in southern Lee County should occur once every 100 years or a probability of occurrence in any one year..

The point here is that these ratings are tools utilized for design work for development. Weather patterns, additional development, new encroachments and the lack of maintenance will all contribute to flooding.

What occurred in Lee County during the summer of 1995 was a very high volume of rainfall that fell over the Estero River and Imperial River Watersheds in a short period of time causing regional flooding. The flooding resulted from a combination of three factors: frequent and large volumes of rainfall, poor conveyance in certain ditches and canals and no conveyance in other areas, and developments which did not undergo the scrutiny of a permit review process. The permitting process requires each project to capture the rainfall equal to the value determined for a 25 year 3 day storm and detain that amount of surface water runoff in a manner that the discharge from the developed area is the same as it was in the undeveloped state and requires the developer to allow historical flows outside of his project to pass either around or through each permitted project. As described earlier many of the older developments choked off much of the historical flood plain.

It is not common for hydrologic engineers to base their design on a series of rainfalls; usually they design the drainage system to handle runoff from a single, large rainfall - a "design rainfall" event. This method sometimes is unsuitable for flat, poorly drained lands. For such areas the design runoff may be more appropriately estimated using a water-budget method that includes the effects of the previous rains. The system inclusive of the Arnold Committee study area is probably at capacity more often than expected. The conditions which simulate a 25 year event may then occur more often than thought and will actually be for an lesser event. This was the case in the Imperial River Watershed. For example, the largest rainfall event recorded at the Bonita Springs Utilities Plant, near the intersection of Terry Street and I-75 was a "once in 18 year" rainfall event. The flooding effects realized were much greater than that.

As briefly described in the beginning of this passage during the flooding event of 1995 the District contracted with Johnson Engineering and Agnoli, Barber, & Brundage to complete the Bonita Springs Flood Reconnaissance, Evaluation and Recommendations Report. The primary objective of the report was to document the extent and duration of the flood event. It is important to also note that flooding in not a new phenomenon to this region. Review of historical information confirms that flooding also

occurred in 1974, 1979, 1981, 1983, 1992 and 1995. This summers flooding may have been the most destructive but by no means will this be the last flooding the region will experience.

The report is divided into two sections. The first section summarizes the data, evaluates the documented data, draws conclusions and makes recommendations. The second section features a report on the feasibility of a storage utilizing lands within the CREW Trust.

The parameters of the study were very large. The minimum for the study was do nothing the maximum was the development of a man made manipulated system. The reason for the extremes was to provide as many options as possible for future implementation.

Of the recommendations, one has stood out as the most controversial. That is the development of storage east of I-75.

Analyzing the summer rains, flooding did not occur west of Bonita Grande Road until the region east of Bonita Grande was so full of surface water runoff that the flow topped Bonita Grande road and flooded in a westerly direction. From that point the "natural" runoff was interrupted by the construction of historical berms embankments and other man-made structures that re-routed some of the natural flow. Although in many cases structures such as I-75, U.S. 41 and the FP&L easements were constructed to accommodate the natural flow, the construction described earlier has blocked the natural drainage flow ways. Tailwater builds and the impacts realized are compounded.

One of the principles of the proposed levee system was to store the stormwater runoff and control the rate of discharge to the west equal to what the remaining natural channels could accommodate without flooding downstream homeowners. At this point in time more research needs to be completed to understand all the impacts associated with this recommendation.

From a water management perspective all recommendations need to be considered no matter how controversial they may be. After completing a scientific review of all of the recommendations the recommendations can be either implemented or discarded.

It is also important to point out that none of the proposed recommendations guarantee that flooding will not occur. In many cases the objective is to improve the level of service of flood protection to equal that of a 25-year, 3-day design storm.

Water Supply

From a regional perspective the South Florida Water Management District completed the Lower West Coast Water Supply Plan in February of 1994. This plan is a guide for addressing future water supply demands in an area which includes Lee, Collier, and Hendry Counties.

Total water demand within this planing area is projected to increase by approximately 55 percent from 307 billion gallons per year in 1990 to 475 billion gallons per year in 2010. Urban demand is projected to increase by 90 percent from 72 to 137 billion gallons per year. Agricultural demand is projected to increase by as much as 44 percent from 235 to 338 billion gallons per year. Growth in public water supply is anticipated to be the largest component of increased urban demand.

The major factors influencing the availability of water in the planning area include 1. dependency upon rainfall falling within the planning area, 2. limited surface water sources, 3. protection of water resources

and associated natural resources, and 4. pressure on these resources from increasing urban and agricultural demands. Competition among users of water is potentially another factor.

What is true in the region is also true in the Arnold Committee Study Area. Increasing urban and agricultural water demands have the potential to adversely impact the environment and water resources. Resource protection criteria have been developed to address three potential problems related to increasing groundwater demand. These problems are wetland protection, intrusion of saltwater into aquifers, and general protection of aquifers from excessive drawdown.

With this stated the District in conjunction with the local governments of Lee County, created the Lee County Regional Water Supply Authority in 1990. The Authority was charged with identifying future urban water demands and sources. The Regional Water Supply Authority (RWSA) contracted with a consultant to produce a long-range water supply plan for urban users and utilities.

The RWSA's planning approach was to provide a more integrated approach than could be accomplished by the individual plans of the separate water suppliers within Lee county. Greater efficiency and utilization of both existing and planned facilities is possible with planning on the level of the RWSA. The Authority may also enable public and private water suppliers and local governments to attain greater economies of scale by pooling their resources for the exploration of new water resources or the enhancement of existing infrastructure.

The Authority established a scope and purpose which is defined in a 40 year master plan. This master plan is to provide a framework to implement regional water supply options in Lee County that will ensure water supplies for potable water customers while taking into account the resource protection criteria described above.

The potable water supply needs of over 85 percent of the people in Lee County are met by nine major water supply utilities. These utilities include pubic and privately owned systems.

The plan when completed in Draft form was opposed by most of the private water suppliers within Lee County. As a result of this opposition, implementation of the recommendations has not taken place. The Authority is meeting, however, two of the original local governments, the City of Cape Coral and the City of Sanibel have dropped out of the Authority's membership. The membership is now made primarily of Lee County and the City of Fort Myers.

The Authority has an important relationship with the Arnold Committee. Several large wellfields are located within the study area. Additionally, any sensitive land purchased near these wellfields may have associated impacts that will need further investigation or the demands of the natural resources may have impacts on the withdrawal from these wellfields.

Estero Bay Management and Improvement Plan

The Estero Bay Management and Improvement Plan (EBMIP) will be developed by the SFWMD with the assistance of an advisory group. Currently, the advisory group is the Arnold Committee; later, after the South Florida Regional Planning Council assumes responsibility, the Agency on Bay Management (ABM) will become the advisory group. The ABM will support to the District in four areas; policy, technical advice, citizen support, and Plan implementation. The advisory group will review all plans and reports. Final reports will be made available at the SFWMD Fort Myers Service Center.

The EBMIP will be developed over a three-year period. This time-frame was suggested by the Arnold Committee. Development of the EBMIP Plan requires three components: a Community Action Plan, a Scientific Assessment, and Plan Development and Implementation. The three components of the plan are explained in more detail below.

Upon completion, the EBMIP should be incorporated into the Lee County Master Plan. The Lee County Stormwater Utility, if reactivated, would be a reasonable entity to administer the plan.

Community Action Plan

The District will develop a Community Action Plan as part of the EBMIP. Community participation will help establish consensus within the community and enhance community involvement. It will also clarify public perceptions and concerns. The Community Action Plan is being developed out of a public workshop held on May 1, 1996. Implementation of the Community Action Plan will be the responsibility of the Regional Planning Council's Agency on Bay Management.

Estero Bay Workshop

The workshop was organized by Len Wagner, the SFWMD Project Manager for the EBMIP. It was attended by private citizens, representatives of special interest groups (Bay Watch, Responsible Growth Management Coalition, Ostego Bay Foundation, and others), public officials and staff of numerous government agencies (SFWMD, Lee County, University of Florida Institute of Food and Agricultural Sciences, U.S. Army Corps of Engineers, D.E.P., and others) and the press.

At the workshop, the keynote address was made by SFWMD Governing Board Member Bill Hammond. Keith Kibbey, Director of the Lee County Environmental Laboratory presented a review of water quality sampling in Estero Bay. Rick Alleman of the SFWMD presented results of a survey on the problems and assets of the bay.

After the orientation, workshop participants identified opportunities and threats to Estero Bay and developed strategies for action. The strategies developed will be the basis for the Community Action Plan. Consultants from the Florida Conflict Resolution Consortium acted as facilitators in this process and have prepared a report on the workshop. The Arnold Committee will receive and review the consultants' report. Copies of the workshop report will be mailed to all workshop attendees.

Public Perceptions

A survey was made of members of various interest groups associated with Estero Bay. The SFWMD sent out 73 questionnaires and more than half responded. The respondents had over 200 years cumulative experience with the bay.

Fisheries were considered to be the most valued bay asset followed by enjoyment of boating, appreciation for the ecosystem and, specifically for the wetlands. People felt strongly about two problems with the bay; loss of natural communities (seagrass, fish, wetlands, and forest) and water quality degradation. Other concerns include inadequate management, alteration of freshwater inputs and inadequate navigational aids. The blame for the bay's problems was polluted runoff and the destruction of natural communities. These were believed to be related to urbanization and the development of marinas and boating. Degradation in the streams surrounding Estero Bay were thought to be caused by development, boating and sewage.

The three most recommended actions to improve the Bay involved regulation, stormwater runoff treatment and acquisition of land. Other suggested actions were restoration of native habitats, land and environmental planning, education, monitoring and research.

Scientific Assessment

The scientific assessment portion of the EBMIP will be accomplished through contracts to professional consultants. The contracts will be managed by the SFWMD. The assessment will be done in two phases; 1) a hydrologic study and general water quality assessment and 2) detailed water quality analyses. Separate studies will be made of the watershed draining into Estero Bay and of the bay itself. The District has funded $200,000 for the Phase 1 assessment from the 1996 budget and plans on $250,000 from the 1997 budget for Phase 2. Written statements of the work to be done by the consultants have been completed for Phase 1 and are now being reviewed by the District. Consultants will utilize local knowledge and will examine workshop results for consideration in the scientific analysis.

Estero Bay Assessments

The Estero Bay is a very shallow subtropical lagoon (11,300 acres), separated from the Gulf of Mexico by barrier islands. The bay has been designated an Aquatic Preserve by the State of Florida. The dominant vegetation around the bay is mangrove and saltmarsh grasses. The mangroves form the primary basis of the bay's food chain and productivity. Within the bay are seagrass beds, tidal flats and oyster bars. About one-third of the species listed as endangered, threatened or of special concern in the State of Florida have been identified within the Aquatic Preserve.

Water quality in Estero Bay is now considered fair-to-good; however, it is suspected that degradation has occurred in recent years. Flushing of the bay occurs through tidal forces and stormwater discharge. Urban development has altered stormwater runoff and perhaps salinity patterns. Some reports indicate pollution increases which are blamed on urbanization.

The Estero Bay Assessment will generate a research plan. The research plan will establish goals which, when met, will improve and maintain the health of the bay's ecosystem. Because the ecology in the bay is only partially understood, much of this phase of the project will involve literature review, identifying data needs, selecting analytical methods and prioritizing research.

Estero Watershed Assessments

The watershed for Estero Bay encompasses about 293 square miles and lies almost entirely within Lee County. There are no incorporated areas in the watershed but unincorporated areas of Estero, Ft. Myers Beach and Bonita Springs surround the preserve. The watershed is very flat and is drained by numerous creeks and small rivers. Historically, the development within the watershed started near the shoreline and mouths of rivers and today much of the undeveloped lands lie at the headwaters of the streams. These areas have very poor drainage and no natural or artificial drainage system. There are numerous wetland areas and some large slough systems within the watershed; including Six-Mile Cypress. Traditional drainage systems cause dramatic changes on this type of landscape; elimination of flooding, lower water tables, destruction of wetlands and surges of stormwater runoff into the estuary. Development in the watershed has been projected to increase by over 130% from 1986 to 2010. Since drainage is needed for development the threat to the estuary is significant.

The Estero Watershed Assessment will recommend basin-specific management strategies. The assessment will also provide a physical description of major features and current land and water management practices; identification of water quality trends; and identification and ranking of potential pollution problem areas. A water quality monitoring program will also be developed. Finally, input data for watershed modeling will be developed and compiled. Modeling will be used to evaluate management alternatives. A watershed assessment report will be generated from this study.

Review of Lee County Surface Water Management Plans

The EBMIP must be coordinated with other planning efforts in the region, in particular the Lee County Surface Water Management Plan. This plan was started in 1990 when Lee County, with the support of the SFWMD, attempted to replace 'planning by permit' with a county-wide, basin-by-basin organized planning effort. Implementation of these plans was to be done by the Lee County Stormwater Utility. Presently, the Utility has no operating budget and plans have not been fully implemented. However, the nine major drainage basins within the Estero Bay watershed have Surface Water Management Plans, developed in 1990-1992. The District has evaluated these plans to see if they need revisions or improvements. The evaluation is attached.

The Lee County Surface Water Management Plan provides a great deal of useful information, including: basin boundaries, current development and growth projections for each basin, detailed hydrography, current and future storm-routing characteristics, water-quality assessments, and, most importantly, plans for a drainage and a natural water treatment system for a developed watershed.

The Lee County Surface Water Management Plan advocates a controlled growth process which is complementary with the objectives of the EMBIP. It addresses the inevitable growth pressures in Lee County. It states that there is a critical need for an organized system of environmental/surface-water-management corridors within each basin which, if delayed, will make funding requirements for a later plan insurmountable. It acknowledges the need for waterway and floodplain space.

The Surface Water Management Plan does have some short-comings: unanticipated growth has made some basin plans obsolete, water quality evaluations are simplistic, the hydrologic analysis of certain basins appear to underpredict runoff and need to be reexamined. Still, these problems do not detract from the substantial work done. Modifications to this Plan and implementation of this Plan should be coordinated with the EBMIP.

Plan Development and Implementation

The most critical part of the EBMIP is Plan Development and Implementation. It is this component of the plan that will require the most interaction between the District and the AMB. Plan development will be an evolutionary process assisted by ABM review of District reports. During the development of the plan, AMB will provide advice on policy, concerns of the public, and technical issues. AMB will also be needed in the development of implementation strategies. Ultimately, the District will produce a written report, approved by the ABM, giving our interpretation of goals and actions needed to preserve the bay. Specifically, the settlement agreement requires that the EBMIP develop biological goals and standards for Estero Bay and its tributaries. It also requires the Plan to develop pollution load reduction goals (PLRG) for point and non-point sources discharging into Estero Bay and its tributaries.

VI. LAND ACQUISITION STRATEGY FOR THE STUDY AREA

Targeting Lands for Land Acquisition

1. Use the Wildlife Subcommittee staff maps identifying lands important to wildlife.

2. Utilize recommendations for lands that should be targeted due to repeated flooding.

3. Existing and Proposed CREW (Flint Pen Strand) and Airport Mitigation lands form important "Core Area" for wildlife and water conservation purposes.

Guidelines for Setting Land Acquisition Priorities within the Study Area

1. Fill in Gaps in the "Core Area"

2. Lands directly adjacent to "Core Area"

3. Lands that are not currently approved for urban development, citrus or mining

4. Lands that are currently approved for urban, agriculture or mining, but that are strategically located adjacent to "Core Area"

5. Lands that provide connections to the "Core Area" and adjacent conservation areas

6. Generally utilize state land acquisition guidelines

State Land Acquisition Guidelines (modified for the Study Area)

Wetlands

Lands that are considered as wetlands. These include configurations of diverse ecosystems that are periodically inundated with fresh water; those areas where the water level is at, near, or above the land surface for at least 30 days of an average (rainfall) year. Examples include: Hydric Hammocks, Hydric Pine Flatwoods, Freshwater marshes, Wet Prairies, Floodplain Forests and Swamps, Cypress Sloughs, Strands and Domes and Wetlands adjacent to Lake Okeechobee.

Natural Communities

Lands that represent the best remaining examples of each of the Region's unique Natural Communities and their subtypes, with priority given to those communities or subtypes which are most endangered or rarest.

Fish and Wildlife

1. Lands that are critical to the survival of wildlife listed as endangered, threatened or species of special concern.

2. Lands that serve as colonial bird nest sites.

3. Lands that are necessary to maintain the Region's native animal species diversity.

4. Lands that perform as large mammal corridors linking critical habitats.

5. Lands that are documented as breeding or nesting sites for listed species.

Vascular Plants

Lands which contain habitat for rare, endangered, and threatened plant species, with priority given to those sites that are: (1) critical to their survival, or (2) are not critical but contain important assemblages of rare or endangered species.

Fresh Water Supplies

1. Lands that serve as protective buffers along Outstanding Florida Water rivers and lakes, protective buffers surrounding potable water wellfields and lands that serve as protective buffers to Lake Okeechobee.

2. Lands that have been identified for acquisition as part of the Save Our Rivers, C.A.R.L. and P-2000 acquisition programs.

Coastal Resources

1. Undeveloped portions of, or entire, Barrier Islands.

2. Upland and wetland buffers to protect the Region's significant commercial and recreational saltwater fisheries, particularly those fisheries which are designated State Aquatic Preserves, National Estuarine or Marine Sanctuaries, Areas of Critical State Concern, Outstanding Florida Waters, or Class II Shellfish Harvesting Areas.

Archaeological and Historic Resources

Lands that contain archaeological and historical sites that best typify the various cultural periods and regions of the state, the classes of cultural activity, the various styles of architecture, and the unique works of individuals.

Outdoor Recreational Resources

1. Lands which help meet needs identified in Regional Comprehensive Policy Plan and in Florida's Statewide Comprehensive Outdoor Recreation Plan.

2. Lands that enhance the representational balance of natural and historic resources within The Region's Park system, or lands that contain prime examples of the state's natural and historical resources.

3. Lands that serve as fish and wildlife oriented outdoor recreation areas.

Forest Resources

Lands which maintain representation of the various forest or timber types of the Region, and maintain Florida's forests so as to perpetuate their environmental, economic, aesthetic and recreational values; giving special consideration to manageable forests that have income producing potential, which helps defray management costs, and to upland forests that help meet the resource-based recreational needs of Florida's growing population.

Geologic Features

Lands that contain prime examples of unique geological exposures, formations, and outcrops.

Land Acquisition Programs

LOCAL PROGRAMS

Lee County Conservation 2020

On the ballot for the November 5, 1996 election day, the Conservation 2020 referendum would allow Lee County to dedicate 0.5 mil of ad valorum taxes for up to seven years to purchase and manage environmentally sensitive lands. The estimated cost based on an average home value would be approximately $27.00.

STATE PROGRAMS

Florida Preservation 2000 (P-2000) Trust Fund

The Florida Preservation 2000 Act was approved by the Governor on May 28, 1991. As originally envisioned, the P-2000 program would raise approximately $3 billion over a ten year period. Currently, the amount of each year's funding is contingent on legislative appropriations of each year's bond debt service, because no dedicated funding source was included in the act.

FEDERAL PROGRAMS

Farm Bill

Funding included $200 million in direct funding with another $100 million in land swap authority. Information received indicate that the Governor's Commission on Sustainable South Florida and the Everglades Task Force have developed the priority list for these funds. The CREW lands in the Study Area were included in this list, however, to far down the list in priority to receive funding.

Land and Water Conservation Fund (16 USC 460 1-4 to 460 1-11

The Land and Water Conservation Fund Act provides federal matching grants for land acquisition and recreation development to states and communities. States must prepare State Comprehensive Outdoor Recreation Plans with a wetlands component to qualify for such grants. The Fund derives revenues from receipts for offshore oil and gas leasing. Funding included approximately $100 million for this fiscal year. For practical purposes, in order to receive funding, a project must involve a willing seller and an agreement worked out between the seller and the Department of Interior in advance of the funding request.

Emergency Wetlands Resources Act of 1986 (Public Law 99645)

This act is to promote the conservation of migratory waterfowl and offset or prevent the loss of wetlands by acquisition of wetlands with funds from the Land and Water Conservation Fund. It directs the U.S. Fish and Wildlife Service to develop a National Wetlands Priority Conservation Plan and to continue the National Wetland Inventory.

Marine Sanctuaries Act and Estuarine Sanctuary Program (16 USC 1431-1434, 16 USC 1461)

This act provides for the establishment of nationally significant marine sanctuaries and estuarine sanctuaries. Funding is provided for the research, planning, and management of such areas.

Pittman-Robertson and Dingell-Johnson Acts (16 USC 669-6691; 16 USC 777-777K)

Under these acts states and territories receive up to 75% funding for comprehensive fish and wildlife resource management plans and restoration and management projects. These programs are funded by excise taxes on fishing and hunting sales.

Coastal Wetlands Planning, Protection and Restoration Act (16 USC 3951-3956)

This act authorizes the U.S. Fish and Wildlife Service to make matching grants to coastal states to acquire, manage, restore, and enhance wetlands. The act is focused primarily on Louisiana's wetlands.

North American Wetlands Conservation Act of 1989 (16 USC 4401-4413)

This act makes grants available to states and private organizations for wetland conservation partnership projects to further the goals of the North American Waterfowl Management Plan and international migratory bird treaties. Acquired land only becomes part of the National Wildlife Refuge System.

Water Bank Act of 1970 (16 USC 1301, et. seq.)

This act provides funding for farmers in participating states to receive annual rental payments for up to IO years for protecting and restoring inland, agricultural wetlands and adjacent uplands that are important to migratory waterfowl.

Conservation Research, Conservation Easement and Wetlands Reserve Provisions (Food Security Act of 1985, Public Law 99-198, Title XII; Food Agriculture, Credit and Trade Act of 1990, Public Law 101-624)

The Conservation Reserve Program provides cost-sharing and rental payments (10-15 years) to farmers for protection and restoration of farmed wetlands. It has largely been replaced by the Wetlands Reserve Program. This program is not only to protect wetlands, but also highly erodible uplands and filter strips adjacent to wetlands.

Wetland Reserve Program (16 USC 3877a-373871)

The 1990 Farm Bill authorized this program which provides financial incentives for landowners for protection and restoration of up to 1 million acres of wetlands through easements which are for 30 years

to permanent. This program applies to farmed or converted wetlands, adjacent buffer, and riparian areas linking wetlands.

Watershed Protection and Flood Protection Act (16 USC 1001-1009)

Pursuant to this act, the Natural Resources Conservation Service provides financial and technical assistance to local governments in carrying out projects for watersheds less than 250,000 square miles in size. The 1990 Farm Bill amended this program to allow 50 percent federal cost-sharing for acquiring perpetual easements for wetlands and floodplain areas for flood prevention and conservation purposes.

Farmers Home Administration Wetland-Related Programs (7 USC 1985, 1987)

The Farmers Home on may forgive loans to borrowers who grant a conservation easement. FHA may also grant or transfer easements on wetlands on reposed farmland to federal or state agencies for conservation purposes.

Farm Program: Swampbuster (16 USC 3821-3824)

This act denies federal farm (subsidy) benefits to agricultural landowners who drain or otherwise destroy wetlands or plant commodity crops on wetlands converted after December 23, 1985. The Natural Resources Conservation Service and the U.S. Fish and Wildlife Service implement this act. Wetlands conversion is allowed if it will cause only minimal effects on hydrologic and biological values. Minimal effect is determined jointly by NRCS and Fish and Wildlife Service with NRCS having the final determination. A producer may drain "frequently cropped" wetlands if the producer provides mitigation by restoring a converted wetland to provide comparable value.

VII. - REGIONAL MITIGATION STRATEGY FOR THE STUDY AREA

This committee has been charged with developing a strategy to utilize the concept of mitigation for wetlands and wildlife impacts in order to obtain for the benefit of the public lands which are targeted for acquisition by the full committee or to provide for restoration of lands which are or become public so that they may better serve the purposes intended. The committee has reviewed the current programs of mitigation, including mitigation banking plans, and based upon this review has discussed the principal strengths and weaknesses of these programs. Finally, the committee has developed a proposed alternate strategy for mitigation for the consideration of the community.

Currently, mitigation occurs when a property owner proposes to impact jurisdictional wetlands or property utilized by regulated wildlife species, and is designed to compensate for the impact. On site mitigation, which has been traditionally preferred, has generally involved the setting aside of portions of the property, improvement of preserved areas of wetlands or even attempts to create new or higher quality wetland or habitat areas. Off site mitigation employs the same strategies, but generally involves a greater attempt to do so in a manner which coordinates with other public or semi-public efforts. Off site mitigation has be traditionally approached as a secondary solution utilized when on site mitigation is not practical, and as such, plans have incorporated a strong emphasis on close geographic proximity between the property where the impact is planned and the property where mitigation will occur.

The current process suffers from several weaknesses and criticisms which have general application, but which are particularly challenging if mitigation is to be a major part of the future in the achieving the objectives described in the full committee report. Mitigation strategies generally have suffered from the permitting origin of most efforts in this region. On site mitigation in a individual permit context has resulted in preservation or improvement of property in small size parcels, which often are not large enough, or remote enough, to optimally serve meaningful purposes for wildlife or wetlands. Additionally, there may be little or no interconnection between parcels preserved in this manner from permit to permit, and this factor further reduces the value of the process. Off site mitigation suffers from similar limitations which often prevent realization of the full potential of such programs for comprehensive protection of integrated ecosystems to be placed in public control. One the one hand, individual permit applicants have little incentive generally to do more than is necessary to mitigate their individual impact. For small scale development, which is a large portion of the whole (consider for instance lot development in Lehigh), off site mitigation is generally impractical and does not now occur. As a result, a significant amount of market activity does not contribute to protecting these resources through comprehensive strategies.

It has been long understood that larger scale mitigation programs are a desirable way to avoid such problems because at least in theory they can be utilized by more than one property owner over a period of time to mitigate impacts and therefore in effect pool the capital of larger segments of the marketplace which is already devoted to compliance with these regulatory systems. In short hand this concept is described as mitigation banking. (It should be noted that this report does not refer to any of the regulatory definitions which have been adopted for mitigation banking, nor is it meant to suggest that these programs have failed. Most are too new to fully evaluate, but early results are favorable.) As a practical matter in this area mitigation banking has not satisfied its full promise. Government sponsored programs have been somewhat successful but because the "bank" property must be acquired or controlled up front, these programs are limited in size by the amount of public money available for this purpose. In considering the Arnold Study Area it seems unlikely that sufficient public resources will be available in a timely manner to acquire the property desired. Private efforts at mitigation banking most frequently result as part of resolving an individual permit applicant's permit needs.

A principal reason private sector money has not been more generally invested into the mitigation banking strategy may well be the unpredictability of the value of the mitigation credit to be available from any given piece of property. Since such credit is the "product" which would be sold by any bank, the inability to value that product is a fundamental problem. Another similar problem is the inability to project demand for the product reasonably since any use of the product requires a case by case approval, and because of the concept that the permitted property must be proximate to the mitigation bank property. The current regulatory approach to mitigation, while derived for understandable reasons, causes these problems. For instance, there is a tension between the desire to place a mitigation bank in comparatively remote locations so that it serves its purpose best, and the resulting limitation on the size of the market in which credits may be sold because the bank property is not proximate to the properties for which owners are seeking permits. Regulators express understandable reluctance to "pre-judge" unfilled permit applications, but the resulting uncertainty limits the potential which might be present to harness the power of the private marketplace to acquire for public use the lands desired. Many other similar tensions are at work as well, all for understandable reasons, but which have the effect of limiting the utility of mitigation as a tool for the Arnold Study Area.

The committee feels that effort should be made to responsibly create the basis for the formation of such a private sector market by introducing sufficient certainty into the process. For instance, when the size of the property desired for acquisition or restoration is compared to the amount of remaining property in the area it is clear that credits for mitigation in the area must be usable over a larger region. Further, the committee believes that both the area within which property use may be eligible for off site mitigated within the study area and the area eligible for locating such off site mitigation, must be large enough to allow a flexible market to develop which has sufficient potential participates on both sides to both permit opportunities and create demand sufficient for off site mitigation on the large scale envisioned by the acquisition programs of the committee. For this reason the committee believes that the area from which off site mitigation may come should be larger than the Arnold Committee Study Area, and the portion of the Study Area in which such mitigation may occur should be the entire study area.

The committee recognizes that there is a significant need for public programs to manage public lands. The committee has concluded however that it is not able to recommend any single way to meet this need. Additionally, the committee believes that the primary matter facing our community now is to place appropriate lands in public hands in order to assure that the basic needs of our community can be meet of the long term and our quality of life protected. We acknowledge that further work will remain.

The report outlines an approach in the recommendations section which the committee recommends the relevant regulatory agencies utilize to create a voluntary alternate to the current permit by permit approach to this area and these problems. The goal of this proposal is to aggregate off site mitigation efforts into a common plan for greater effect, and encourage greater off site mitigation based upon careful evaluation. The proposal is not intended to discourage or substitute for on site preservation or enhancement for mitigation credit of primary wetlands. Instead the proposal assumes that such on site activity will continue as it has.

VIII. RECOMMENDATIONS

A. Land Use Recommendations

Future Land Uses in Southeast Lee County:

1. Lee County's primary agricultural region is its southeast quadrant, an integral part of southwest Florida's extensive agricultural economy. Although some conflicts will always arise between agriculture and other important land uses, the public goal should remain as assuring long-term coexistence of agriculture, mining, and natural lands in southeast Lee County.

2. Ecological Sustainability is a priority land use concern and must be a fundamental criteria for land use decisions within the Arnold Committee Study Area and the flowways from the study area to Estero Bay.

3. Limerock mining is another important part of Lee County's economy. Because limerock extraction must displace large portions of the natural landscape, the precise nature of mining plans will irrevocably shape the landscape of southeast Lee County. Florida's new "life-of-the-mine" permitting process will have far-reaching impacts on southeast Lee County, and local concerns over potential impacts should be expressed in the early stages of that process so that acceptable mining and mitigation plans can be developed and permitted.

4. Every effort should be expended by government, community leaders, and the rock mining industry owners and businesses to seek incentives and permitting initiatives to plan and connect rock mining borrow lake excavations into a system of interconnected lakes and flowways that will enhance wildlife habitat values, human recreation and community environmental benefits from such a system.

5. The Lee County Regional Water Supply Authority should again take an active role in coordinating future water supply needs, or an alternative arrangement for the cooperative development of wellfields should be carried out in the immediate future. In the absence of positive action towards either alternative, Lee County should take the lead by commissioning an independent analysis of the prudence of allowing this public planning function to be delegated (even by default) to private entities.

6. Evolutionary changes should be considered to the Lee Plan's "Density Reduction/Groundwater Resource" category which maintain protection of important groundwater and other natural resources in non-urban areas of Lee County; discourage the proliferation of urban sprawl by maintaining a clear separation of urban and non-urban uses, to clarify its description, and provide some additional flexibility, such as clustering, to landowners who preserve important natural habitats. Lee County should consider adopting both of the following cluster ideas:

- The maximum density level may be increased to one dwelling unit per five acres (1 du/5 acres) under the following circumstances:

    i. Lots for individual dwelling units range from 1 to 3 acres each;

    ii. The total land used for lots, waterbodies, and common facilities and infrastructure does not exceed 30% of the total acreage;

iii. The remaining uplands not used for individual lots and common infrastructure will provide valuable wildlife habitat, as determined by the County Manager or his designee; and

iv. The remaining uplands are protected by a permanent conservation easement acceptable to Lee County.

- Potential dwelling units may also be transferred from one parcel to another noncontiguous parcel under the following circumstances:

  i. Both the sending and the receiving parcels must be located in the Groundwater Resource areas;

  ii. The resulting density of the receiving parcel may not exceed 1 du/acre, and no lots for individual dwellings may contain less than ½ acre of land;

  iii. The receiving parcel must have direct access to an arterial or collector street;

  iv. The receiving parcel may not be on land shown as a future wellfield in a master plan of the Lee County Regional Water Supply Authority or a public water supply provider;

  v. The maximum number of dwelling units that may be transferred to the receiving parcel shall be computed by dividing the number of acres on which the owner's development rights will be permanently extinguished by 10, except where the County Manager or his designee determines that the sending parcel will provide valuable wildlife habitat, in which case the number of acres of such habitat would be divided by 5; and

  vi. Transferred development rights may not be used to obtain a development order on the receiving parcel until a conservation easement acceptable to Lee County that has the effect of permanently extinguishing the rights of the owner of the sending parcel and all successors in interest to develop the sending parcel (or the affected portion thereof) for urban purposes has been recorded in the public records of Lee County.

Note: The suggested language for both clustering options contained in this report will need to be expanded by Lee County to include explicit criteria concerning the proximity of clustered dwelling units to urban facilities and some priorities for the character and location of lands that would be preserved.

7. The Lee Plan's "university village" plus other designated urban land near I-75 currently are more than adequate for the residential and commercial growth that will be needed for the healthy development of the Florida Gulf Coast University through the year 2020.

8. The Lee Plan should not prematurely change the current line of separation between urban and non-urban uses, however, Lee County should amend the Lee Plan to include a policy or policies to discourage further land use amendments in the Arnold Study Area which increase density or intensity of land uses.

9. The Lee Plan's future land use map should be amended to reflect the future limits of the Southwest Florida International Airport.

Regional Transportation Planning:

10. The MPO system has proven to be a successful example of intergovernmental coordination and deserves continued support at all levels of local and state government.

11. Transportation planning should extend as far into the future as accepted transportation planning methodology will support.

12. Future roads may be needed in southeast Lee County due to population pressures from the north, west, and south. Planning for such roads is complicated by wetlands and existing and approved development that limit future road alignments, and by the development-inducing potential of roads. Lee County should investigate ways to minimize the growth-inducing effects of new roads in southeast Lee County while ensuring, through legal means, that land uses allowable under the current Lee Plan do not preclude roads that might be needed to serve urban development permitted by that plan.

13. Lee County should plan for and provide for the acquisition of right-of-way for a suitable corridor for a future road connecting Alico Road to Lehigh Acres.

14. Lee County should allow itself maximum flexibility to minimize the cost of right-of-way for future roads. A single amendment to its current ordinances should provide for a negotiation process that could result in case-by-case relief from development regulations in exchange for needed rights-of-way, avoiding condemnation and the risks of regulatory inverse condemnation.

15. Lee County should establish policies in its comprehensive plan on long-term road needs in southeast Lee County, including:

    a. care in planning for roads that may induce unwanted urban growth;

    b. the option of widening I-75 beyond six general-purpose lanes and/or the construction of a new north-south arterial road near and parallel to I-75;

    c. a plan to provide a measure of protection for future road corridors; and

    d. protection of natural systems by planning for avoidance of major natural flowway systems and the high cost of extensive bridging these systems if crossings are critical.

Flood Control Efforts in South Lee County:

16. The proposed levee and interceptor canal east of I-75 should not be built either as a flood control measure or a transportation corridor, or combination of both, unless all other best available management methods for surface water management are determined to be infeasible and:

    a. a clear need is demonstrated for such a facility; and

b. it is found to be financially feasible (including costs for acquisition, construction, and mitigation for all off-site impacts); and

c. it is demonstrated to be environmentally sound by those agencies having jurisdiction to determine same and issue permits to allow its construction, provided that the following secondary and cumulative impacts are evaluated:

   i. the levee will not cause unnatural changes to water flows, levels, or duration (except during conditions of extreme flooding),

   ii. the levee will not adversely affect fish and wildlife populations,

   iii. the levee will not adversely affect native plant communities,

   iv. the levee will not be used for back-pumping by agricultural interests or flooded urban developments onto land east of the levee;

   v. the levee will not have negative impact on the downstream estuarine characteristics of Estero Bay; and

d. it becomes consistent with amendments to the Lee and Collier Comprehensive Plans without misallocating the overall amount of land designated for urban expansion.

B. Wildlife Resource Recommendations

1. The acquisition and management of public lands indicated on the Arnold Committee Land Management Strategy Map as Proposed Land Acquisition/Mitigation Candidate Lands, should be pursued to provide connections between core habitat conservation areas and to protect regionally significant wildlife populations.

2. The restoration, creation, and enhancement of publicly owned wildlife habitat on lands indicated on the Arnold Committee Land Management Strategy Map shown as Proposed Land Acquisition/Mitigation Banking Candidate Lands and Work with Owners to Make Connections Lands, should be pursued to increase the viability of existing wildlife resource lands of regional importance and to build on core wildlife areas. Federal, state, regional and local agencies should pursue extension of these efforts, on the private lands portions indicated above, through management agreements, mitigation (including planting of vegetation, exotic plant and animal removal, and hydrological improvements) and acquisition.

3. Pasture and rangeland (less intensive) agricultural uses should be encouraged and maintained on existing altered agricultural lands in the Arnold Committee Study Area.

4. State and federal environmental permitting agencies (Florida Department of Environmental Protection, South Florida Water Management District, and the U.S. Army Corps of Engineers), through existing programs and studies such as the Governors Commission for a Sustainable South Florida and the South Florida Ecosystem Restoration Working Group Task Force, should conduct a multi-agency review to determine if more protection of wetlands, and emphasis on upland and non-listed wildlife resources incorporating biodiversity and ecosystem management principles, could be better achieved during the permitting process. The Florida Game and Fresh Water Fish Commission and the U.S. Fish and Wildlife Service should be asked provide regional wildlife habitat conservation recommendations to the referenced agencies to assist in this process. Regional wildlife conservation recommendations should include consideration of the value of urban, rural and coastal wildlife resources.

5. The South Florida Water Management District and other appropriate agencies should fully evaluate the impacts of wellfields and the projected water demand of urban and agricultural areas expected from these wellfields, on both upland and wetland wildlife resources.

6. The South Florida Water Management District and other appropriate agencies should evaluate each watershed basin separately to address projected growth and water demand on fish and wildlife resources, both inland and estuarine. This evaluation should determine and consider the water needs of the ecosystem and the projected population, including optimum and minimum flow needs of receiving water bodies.

7. Adequate long term management funding, including monies for staff and equipment, should be provided for public land purchases and any conservation or mitigation area set aside to off-set a resource impact.

8. Lee County should consider the mapping and inspection of all existing conservation easements and other types of habitat set-asides within the study area to illustrate and assure mitigation compliance and long-term habitat maintenance.

9. Lee County and other appropriate agencies should use available GIS resources to map the amount and type of habitat loss to development and agriculture in the study area, and update this mapping every 3-5 years to assess the impacts of land use planning, mining, and agriculture. This information should be considered in future comprehensive land use plan evaluation and appraisal reports and Lee Plan amendments.

10. Lee County, or other appropriate entities, should compile and produce information on the passive recreational and "ecotourism" opportunities provided by Lee County's public lands in the study area, for use by tourism promotion officials, Chambers of Commerce and others.

11. Passive recreation and "ecotourism" should be promoted by tourism officials and local Chambers of Commerce as a means of encouraging public appreciation and support of conservation lands in Lee County, and to broaden our economy as an incentive for future conservation efforts.

12. The Florida Yards and Neighborhood Program encourages "best management practices for homeowners", which would assist in providing additional wildlife habitat in urban areas of the study area and should be supported by Lee County and other local programs such as the Charlotte Harbor National Estuary Program. Local, state, regional and federal agencies are encouraged to assist in identifying funds to support this and other similar programs.

13. Lee County and other appropriate entities should assist in the development of a "new-comers" document which outlines the state of Lee County's Estero Bay watershed and which encourages future homeowners to be located outside of areas that are prone to flooding or which contain critical natural resources that may present conflicts with residential and other urban uses.

14. Forested upland habitats, especially pine flatwoods, should be publicly acquired and protected using all methods currently available and using new methods, as they are developed, to conserve the ecological integrity of southwest Florida. Protecting uplands not only protects species, but also is essential to maintain significant wetland wildlife functions.

15. Economic incentives for conservation programs on private lands will be a cornerstone of a regional wildlife habitat system. Incentives to landowners to forgo more intensive development of their property is needed. More information is needed on revenue producing land uses compatible conservation activities.

16. Local, state, federal and regional agencies should assist in the implementation of the Arnold Committee regional wildlife habitat recommendations when implementing jurisdiction in the Study Area, and when participating in the following types of programs; developing or modifying comprehensive plans, making land use decisions, considering mitigation strategy, siting public infrastructure, preparing water resources and natural resources management plans, or purchasing land for wildlife resources. Local, state and regional, and federal governments and agencies should consider the adopted U.S. Fish & Wildlife Service's Multi-Species Recovery Plans and the Game and Freshwater Fish Commission's statewide "GAPs" Plan (Cox, et al, 1994), to assess proposed land use modifications within the Study Area. No implementation of the wildlife habitat recommendations should occur without the appropriate peer review, data and analysis, or technical justification and the appropriate rule making or legislation.

17. Public education programs should continue to emphasize the importance of wildlife habitat protection to maintain healthy ecosystems and the importance of these resources to our local economy and quality of life.

18. Preserve wetlands and their hydrology, including seasonal wetlands and isolated wetlands, to the maximum extent possible within the study area.

19. Exotic (plant and animal) invaded habitats in the Study Area should be scientifically assessed for their ecosystem value and restored on that basis.

20. New public road construction should be avoided in areas where wildlife habitat has been acquired for preservation. Where new roads can not be avoided, appropriately designed and located wildlife crossings of roadways should be constructed.

21. The study area should have detailed wildlife surveys to provide a better census of the populations of listed species and areas of critical habitat for these species.

22. Prioritize, acquire and preserve those lands identified as being critical to the success of regionally significant wildlife populations, based on the above survey.

23. Preserve and manage existing core conservation areas, and increase the size of conservation areas as prioritized in the Florida Panther Habitat Preservation Plan (Logan, T., Eller, A.C. Jr., Morrell, R., Ruffner, D., and Sewell, J.. November 1993. Florida Panther Habitat Preservation Plan, South Florida Population. Florida Panther Interagency Committee. U.S. Fish & Wildlife Service. University of Florida, Gainesville, FL.).

24. Development activities and activities involving the installation of row crops and citrus within the study area and which adversely affect the Florida Panther and its habitat should be encouraged to provide mitigation by acquiring lands targeted in the Florida Panther Habitat Preservation Plan.

25. Education concerning the proper fencing of beehives and backyard livestock within the study area, should be conducted to reduce poaching incidents by Black Bears.

26. Preservation of palmetto prairies and pine/palmetto areas, including the management of commercial harvest of palmelto berries should occur on public lands and through private lands management agreements, in the study area.

27. Prioritize, acquire and preserve those upland habitats that support the habitat function of seasonal ponds, such as pine/palmetto habitat or sheetflow flatwoods.

28. In critical sandhill crane habitat, limit powerlines and modify fence design to minimize impacts.

29. Acquire and preserve upland areas adjacent to seasonal wetlands and construct wetland mitigation areas so that they incorporate a mosaic of surrounding upland habitat to provide additional nesting and foraging habitat for young sandhill cranes.

30. Manage "artificially" created owl habitat on publicly owned lands (such as airport facilities) for long-term burrowing owl survival.

31. Incorporate gopher tortoise habitat into proposals for land acquisition where appropriate.

32. Acquire and manage remaining xeric oak scrubs in the Study Area for Florida scrub jays, and provide incentives to agricultural interests to preserve remaining habitat in the Study Area.

33. Explore ways to reduce the use of environmental contaminants (pesticides, herbicides, and fertilizers) in wetland systems.

34. Encourage the placement of nest boxes in and around open pasture and flatwood areas for the southeastern American kestrel, consistent with designs recommended by the Game and Fresh Water Fish Commission.

35. If future documentation of red-cockaded woodpeckers occurs on public lands in the study area, the habitat should by managed and the potential for augmentation of the population should be explored.

36. Manage occupied least tern nesting habitat as it occurs throughout the study area and maintain or enhance roof nesting areas as they may be utilized.

37. Encourage and maintain existing agricultural range and pasture uses (discourage the intensifying use to citrus), and encourage flooding or seasonal inundation of seasonal vegetable crop fields to attract shorebird and duck use (this is routinely done in the fall for tomatoes to control nematodes).

38. Continue educating the public regarding the importance of raptors to ecosystems, and the illegality of shooting raptor species.

39. Continue nest protection efforts under established state and federal guidelines, and the Lee County Bald Eagle ordinance. Monitor nesting buffers and management plans set up under these criteria for compliance.

40. Continue education of the public with regard to coastal habitat conservation, long term bald eagle nesting needs, and eagle nest buffer compliance.

41. Educate the public about the protected (state-threatened) status of the Big Cypress fox squirrel, which cannot be legally hunted in the Study Area.

42. Protect gopher tortoise populations to provide burrow habitat for the indigo snake and gopher frog.

43. Educate the public on the ecological value of snakes and the threatened status of the indigo snake.

44. Continue public education about controlled harvest of alligators and the illegality of poaching alligators.

45. Discourage residential development in alligator habitat within the study area, which would lead to nuisance complaints and harvest of alligators.

C. Water Resource Recommendations

Surface Water Management Recommendations

1. The South Florida Water Management District should complete the engineering necessary to determine the flowway requirements to establish an organized system of environmental / surface water management corridors, for the Estero River and Imperial River Watersheds. This function will be supported and overseen by the Southwest Florida Focus Group, staffed by the SFWMD Ft. Myers Service Center.

   This should be completed in conjunction with the U.S. Army Corps of Engineers and other agencies with regulatory authority for regulatory coordination.

   This study should include an update of the Lee County Surface Water Management Master Plan, revisiting the modeling effort and upgrading the models with current and more detailed information. The entire Estero Bay watershed will be investigated utilizing the Watershed Study Process which links land use, conservation use, and water use planning and management. Recommendations from this study should include a prioritized implementation schedule and project costs.

2. Request that the SFWMD determine optimal and minimum flows and trends for the Estero Bay watershed.

3. The mosaic created by the current regulatory practices does not provide the recommended organized system of flowways discussed by the committee. The Department of Environmental Protection and the South Florida Water Management District should revisit the application of surface water rules to include management and maintenance of conveyances impacting the Arnold Committee Study Area.

4. The current rules regulating the management and storage of surface water and groundwater should be revisited. Revisions necessary to account for the unique topography and natural system need to be implemented. The initiation of this process should begin with the study proposed by the South Florida Water Management District.

5. Require future development to implement flowway strategies identified within the recommended study, after appropriate peer review and rulemaking.

6. Additionally, incentives for developers who design or retrofit conveyances to maintain natural flowways should be initiated by the regulatory agencies. Incentive research should be a part of the South Florida Water Management Districts Study Effort.

   A critical incentive will be a streamlining of the regulatory process. Meeting the goals and objectives of the recommendations from the study should equate to a coordinated, timely, streamlined product.

7. Recommend the purchase of perennially flooded lands east of Bonita Grande Road as a priority area for acquisition.

8. Urge Federal Emergency Management Agency to complete their research and provide up to date Flood Maps for this region and coordinate future study activities on the Estero Bay watershed with the Agency on Bay Management and the Charlotte Harbor National Estuary Program.

9. Lee County and SFWMD are encouraged to correct drainage problems wherever historical flooding problems have been found to occur within the existing and planned urban areas within the study area, as designated in the Lee County Comprehensive Plan, with

   a. Lee County discouraging future development within these flood prone areas through land use regulations and development standards that address the flooding risk and minimize increasing cumulative effects.

   b. SFWMD providing technical support and assistance in identifying the regional basis for flooding and cooperating with the Big Cypress Basin staff on finding solutions within primary flowways to Estero Bay for managing floodwaters that increase as urbanization occurs.

10. Lee County should develop and adopt an official flowway map as it did for the Six Mile Basin ordinance which delineates all existing wetland flowways and historic flowways. Any development interest would, by ordinance, be required to preserve the identified primary flowway as an element of their green space requirements of if the system has been degraded (e.g. by clearing for farming) then when a land use change is sought, a condition for permits is the restoration (with native vegetation and elevations) of the historic flowway as an element of the new plan permit (incorporated into their golf course or green space requirements).

Water Supply Recommendations

11. An organized effort needs to be accomplished to meet the needs of the expanding population of Lee County, while not impacting the demands of the natural resources. Without an organized effort opportunities to implement recommendations identified within the Authority's master plan will be complicated by competing land uses and competing demands.

12. Lee County and the City of Fort Myers have taken the leadership role in the continued operation of the Regional Water Supply Authority (RWSA). It is in the interest of the Citizens of Lee County and the resources within the Arnold Committee Study Area that the RWSA take an active role in organizing and coordinating the future water supply needs.

13. Utilizing the research within the LCRWSA Master Plan complete the engineering necessary to begin the future development of these wellfields. Develop and implement well field protection criteria protecting the natural systems demands while providing cost effective resources for future Lee County development.

14. Invest today in Aquifer Storage and Recovery projects and the technology which will secure resources currently lost as drainage to the Estero Bay.

15. Strongly encourage re-use activities on all new construction projects.

16. Develop incentives for those utilities, agriculture or other uses which implement activities outlined within the LCRWSA Master Plan.

17. Target Land Acquisition activities which protect Natural Systems from becoming impacted by future urban well field drawdowns.

18. Encourage xeriscape and other water conservation measures.

19. Encourage the implementation of the Florida Yards and Neighborhoods Program.

20. Encourage the reduction of per capita water (potable and irrigation) demands.

21. Prohibit consumptive water uses which adversely impact surface water and surficial aquifer levels.

D. Land Acquisition Recommendations

The Arnold Committee has determined that the Existing and Proposed CREW (Flint Pen Strand) and Airport Mitigation lands form an important "Core Area" for wildlife and water conservation purposes. The Committee recommends the following guidelines for setting land acquisition priorities within the Study Area:

1. Fill in gaps in the "Core Area",

2. Lands directly adjacent to "Core Area",

3. Lands that are not currently approved for urban development, citrus or mining,

4. Lands that may be approved for urban, agriculture or mining, but that are strategically located adjacent to "Core Area", and

5. Lands that provide connections to the "Core Area" and other adjacent conservation areas.

E. Regional Mitigation Strategy Recommendations

The following material outlines an approach which the committee recommends the relevant regulatory agencies utilize to create a voluntary alternate to the current permit by permit approach to this area and these problems. The goal of this proposal is to aggregate off site mitigation efforts into a common plan for greater effect, and encourage greater off site mitigation based upon careful evaluation. The proposal is not intended to discourage or substitute for on site preservation or enhancement for mitigation credit of primary wetlands. Instead the proposal assumes that such on site activity will continue as it has.

The proposal involves the issuance of a general permit or adoption of a similarly useful plan for off site mitigation to create the basis for such a market, while limiting the availability of the permit in order to protect the public interest. It is to be anticipated that adjusting factors related to both the parcel for which mitigation is required and the parcel on which mitigation will occur will be adopted. To assure that the general permit is usable however (without detailed parcel by parcel evaluation as would occur in individual permit contexts) these factors should be described to the fullest reasonable extent by objective criteria set out in the permit, and that the agencies try to take into account the concepts of avoidance and minimization as much as possible in defining primary wetlands so that those activities allowed under the permit would already have meet these requirements. The goal of course is to design a responsible permitting approach which reasonably reduces the steps and costs in the process so that the general permit will be utilized as intended and the public will receive the benefit intended - a large integrated ecosystem preserved in public or quasi-public hands for the protection of environmental values.

The committee's proposal builds upon the current off site mitigation concepts in use, and it is premature to fully evaluate the possibility that such an innovative concept can be built into a general permit. Much further study and work will be required. Yet, as a matter of general policy, the committee believes that local government and permitting agencies need to develop a mitigation approval granting system that recognizes that once all best measures are taken on site to protect critical natural systems in the permitting process, then off site mitigation based upon a mutually adopted set of criteria and conditions for credits related to impacts should be a part of a general permit within the Arnold Study Area.

The following may serve as an outline for such an approach:

- Agree on FLUCCS types to be classified as Primary Wetland (PW). PW Lands that are exotic invaded or impacted, and non-PW lands would be available for off site mitigation, or available for exotic removal, and/or hydration or hydrology restoration on site for credit.

- East of Crew/Airport lands other than PW, all the lands would be eligible for acquisition as mitigation, and West of Crew/Airport all land would be eligible for acquisition as mitigation.

- In order to maximize the potential of the program the sending area should be as large as is justifiable - all of Lee County or South West Florida.

- "Off Site Mitigation" would be when lands are purchased and donated to CREW/SFWMD/DEP/ or any similar entity, or when lands already owned by such entities are enhanced or restored.

- All mitigation is based upon an agreed base ratio; i.e. "x" mitigation acquisition acres for each acre of impact; "y" mitigation improvement acres for each acre of impact.

- The ratios would be adjusted on a fixed basis set forth in the permit or plan, with such adjustments being cumulative. An example of a possible adjustment system is as follows:

  i. increased credit should be given for protection of critical natural systems within or adjacent to the proposed acquisition areas identified in this report. Credits should be most favorable for preserving primary flowways to Estero Bay and areas designated as critical wildlife habitat within the study area.

  ii. credits enhanced if 20% of boundary is contiguous with prior crew/airport wetlands or lands contiguous to these;

  iii. some credit adjustment if any adjacent property is in commercial/industrial/or multi family use, or subject to a valid any such use;

  iv. development order credits enhancement given for non-primary lands after mining and restoration completed in proposed mining area;

  v. on West of crew/Airport mitigation lands (East of I-75) enhanced credit would be given to make conveyance of such property to public interests more feasible;

- Property in the study area would remain useable in the manner permitted by applicable land use planning regulation, and subject to the requirements of the general permits.

- General permits would be issued by each relevant agency, and once issued subsequent agency review would not be necessary with regard to the issues resolved through the permit process to the extent any proposed activity and property fit within the parameters established in the general permit. Accordingly agency activity would be limited to implementation of the general permit, individual permit applications (which would not be affected by the general permit) and other issues not resolved through the general permit to the extent such agency has jurisdiction.

F. Regional Land Acquisition and Land Management Strategy

Based upon the work completed by the Subcommittees of the Arnold Committee, the following Map is recommended as a regional land acquisition and land management strategy for the Arnold Review Committee Study Area. Following is a description of the legend:

Existing Preserves:

These lands primarily include Corkscrew Regional Ecosystem Watershed (CREW) lands, Six Mile Cypress Preserve lands, Airport Mitigation lands and recently negotiated SFWMD Mitigation Banking lands. The Airport Mitigation lands can only be considered as a committed preserve lands after all needed land use approvals for the proposed Airport expansion are obtained.

Proposed Acquisition/Mitigation Candidate Lands:

Lands that should be considered as candidates for any and all public lands acquisition programs. If Funds are not available to implement acquisition or mitigation as proposed, they should be considered for the same efforts as indicated in the following category.

Work with Land Owners to Make Connections:

Efforts on these lands should emphasize private lands management, management agreements, special consideration during permitting and conservation easements to provide connections to Airport open lands on the west, to provide connections between Airport Mitigation lands, to provide connections from existing preserves and proposed acquisition lands to adjacent preserve lands to the east, through existing Citrus lands, and to and to provide connections between rock mining borrow lake excavations into a system of interconnected lakes and flowways that will enhance wildlife habitat values, human recreation and community environmental benefits.

Wetlands Set Aside Within DRIs:

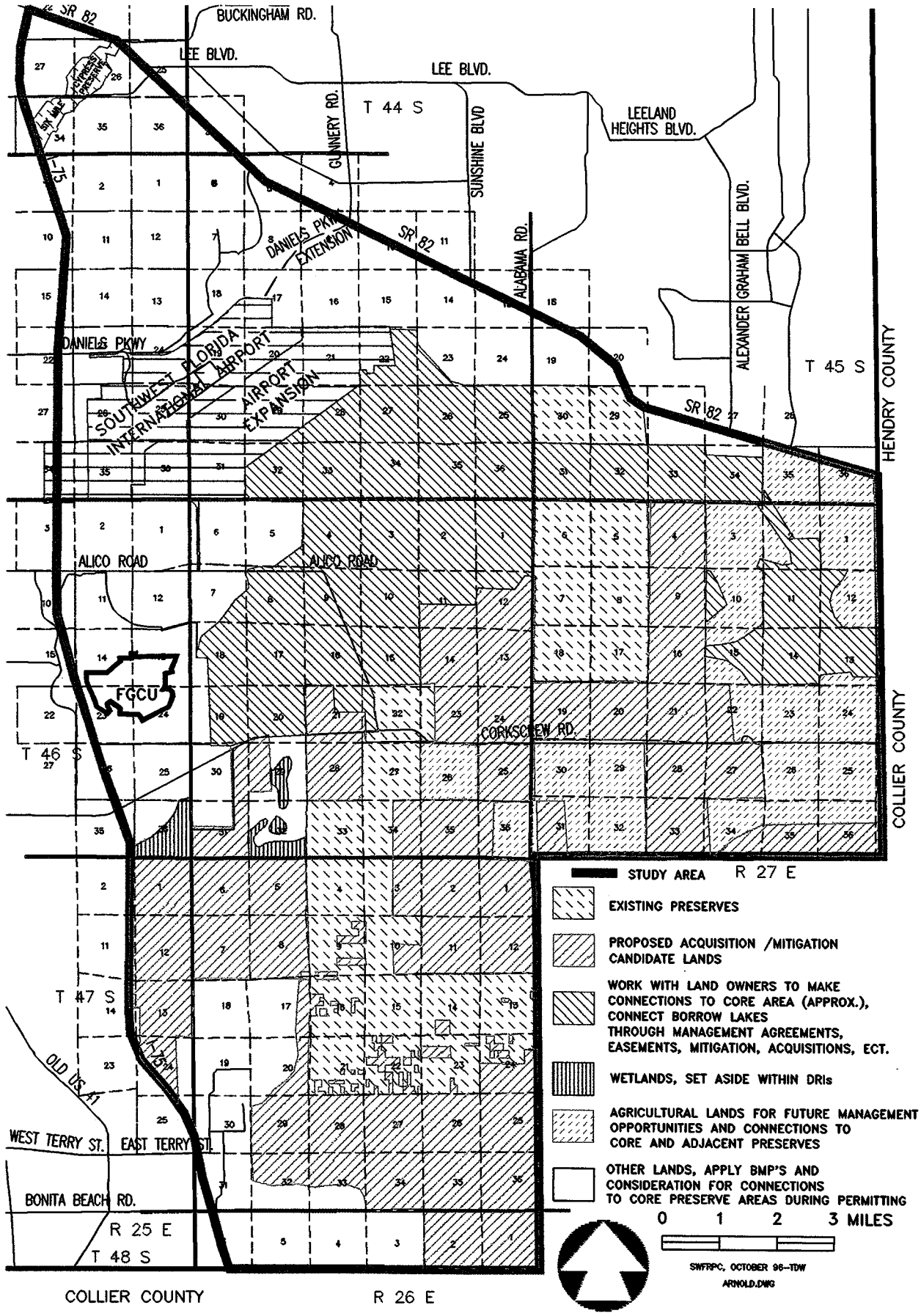
These lands (approximately located) have been set aside during the DRI review process as preserves and surface water flowways, and can provide the wildlife connections continuous to Core Wildlife areas and proposed acquisition/mitigation lands. These lands illustrate the type of connections that may be achieved by working with landowners and agencies during the permitting agencies.

Agricultural Lands:

Pasture and rangeland (less intensive) agricultural uses should be encouraged and maintained in the Arnold Committee Study Area on these lands. These lands should be considered for less intensive types of uses, as Citrus productivity on these lands decline. Additionally, strategically located parcels (directly adjacent or surrounded by Core Areas) may also be considered in the future for public acquisition and habitat restoration/mitigation. Where possible, implement wildlife "best management practices".

Other Lands:

Urban Wildlife "best management practices" should be encouraged on these lands through programs such as the Florida Yards and Neighborhoods Program.



LAND AQUISITION/LAND MANAGEMENT STRATEGY MAP

STATE OF FLORIDA
DIVISION OF ADMINISTRATIVE HEARINGS

RESPONSIBLE GROWTH MANAGEMENT COALITION, INC., and ELLEN PETERSON, Petitioners, v. FLORIDA BOARD OF REGENTS OF THE STATE UNIVERSITY SYSTEM OF FLORIDA, and SOUTH FLORIDA WATER MANAGEMENT DISTRICT, Respondents, and LEE COUNTY BOARD OF COUNTY COMMISSIONERS, Intervenor.	DOAH Case No. 95-569

SETTLEMENT AGREEMENT

Petitioners, Responsible Growth Management Coalition, Inc. (RGMC) and Ellen Peterson (Peterson) and the Respondents, Florida Board of Regents of the State University System of Florida (BOR) and South Florida Water Management District (District) hereby resolve and settle the above styled proceeding on the following terms.

1. The Florida panther.

The final order for the wetland resource permit in this proceeding sought by the BOR shall be amended to include the following language concerning the review of adverse impacts of proposed projects upon the conservation of the Florida panther and

EXHIBIT A

its habitat.

"Section 403.918 (2) (a) (2), Fla. Stat. (1991) [now codified in Section 373.414 (1) (a) (2), Fla. Stat.,] and implemented in this case through the wetland resource regulatory program and Fla. Admin. Code Chapter 62-312) provides in part that:

> "In determining whether an activity, which is in, on, or over surface waters or wetlands. . .and is regulated under this part, is not contrary to the public interest or is clearly in the public interest, the governing board or the department shall consider and balance the following criteria:
>
> * * *
>
> 2. Whether the activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats. . ."

"In order to comply with the directive in Section 403.918 (2) (a) (2), Fla. Stat. (1991), in the implementation of the wetland resource regulatory program, the District's review of impacts of wetland alteration projects upon the conservation of the Florida panther and its habitats must include the evaluation of all habitat impacts on the proposed site. Review can not be limited to just wetland habitat impacts and denning site impacts."

"While the District and the BOR neither agree with nor stipulate to the following findings, they do acknowledge that the October 27, 1994 United States Fish and Wildlife Service (FWS) Biological Opinion for the Florida Gulf Coast University (FGCU) project, the Treeline Boulevard project, and the Timberland & Tiburon project, included such findings as:

1. The FGCU site is dominated by vegetative cover types of high suitability as potential Florida panther habitat, namely upland hardwood hammocks and pine flatwoods (pg. 14);
2. The Greater Corkscrew Region, of which the FGCU site is a part may support a separate breeding segment of the Florida panther population (pg.11);
3. The Florida panther is a potentially present species on the FGCU site according to the BOR consultants (pg. 16);
4. Florida panthers have been documented to the north of the FGCU site (pg. 17);
5. According to the FWS Biological Opinion, no evidence of Florida panther usage has been discovered on the FGCU site (pg. 17). However, the Florida Game and Fresh Water Fish Commission asserts that a radio collared male Florida panther was located via aerial telemetry on the FGCU site on May 29-30, 1989 (Florida Game and Freshwater Fish Commission (FGFWFC) memo, 11/10/94);
6. The FGCU site currently has a deer and pig prey base for Florida panthers, which is in the category of poor (pg. 11);

7. The FGCU site is not within the area delineated by the January, 1994 Interagency Florida Panther Habitat Protection Plan (HPP) as priority lands (pg. 21); and

8. Issuance of the three permits for the FGCU, Timberland & Tiburon and Treeline Boulevard projects will adversely affect the Florida panther, but will not jeopardize the continued existence of the species (pg. 22);"

"In order to mitigate for any potential adverse affects of the FGCU project on habitat, and not create any adverse cumulative and secondary affects on the conservation of the Florida panther and its habitat, Lee County has agreed to mitigate for any lost habitat functions on the FGCU site by purchasing currently impacted lands within the area identified in the January, 1994 Florida Panther Habitat Protection Plan (HPP) within Lee County, in accordance with Lee County Board of County Commission Resolution No. 95-01-13 which is incorporated herein by reference."

"The proposed mitigation plan for the FGCU project consists of $1.7 million for the purchase, restoration and management of approximately 560+ acres of land within the HPP in Lee County. This land is to be located within the area identified in Special Condition #35 of the surface water management permit and Special Condition #32 of the wetland resource permit, and in accordance with Lee County Board of County Commission Resolution No. 95-01-13. The key elements of this mitigation plan are the acquisition of all or part of Section 12 (T 46 R 26 E) or acquisition of all or parts of Sections 23 and 24. The management of these lands will be combined with the management of the Green Meadows Mitigation Areas, which will be consistent with the CREW Project management plan. The purchase of the land will result in the creation of a larger area of ecosystem protection in Lee County, in the area of the Green Meadows and Flint-Penn Strand Corridors."

"This mitigation plan will not individually adversely affect the conservation of the Florida panther and its habitat because there will be no net loss of Florida panther habitat functions since the identified land to be purchased, restored and managed is within the HPP and the land has been disturbed by previous agricultural row cropping activities. The land acquisition, restoration and management provided for herein will address the impacts of the Treeline Avenue and FGCU projects. The purchase of this previously disturbed land replaces and restores the Florida panther habitat functions which may be adversely impacted on the FGCU site, resulting in no net loss of panther habitat functions."

2. <u>Surface Water Treatment Criteria.</u>

For each phase of the project, FGCU shall provide 1/2 inch of dry detention/retention pretreatment in addition to the required primary treatment volume

of the first one-inch of wet or dry detention treatment for all runoff to "waters of the state" (i.e. total treatment of the first 1.5 inches of runoff). For the one-inch of primary treatment volume, FGCU shall have the option of providing this treatment by means of a system which provides the functional equivalent or better of one-inch of wet detention, or the equivalent dry detention treatment in terms of quality. This treatment criteria will be added to the FGCU surface water management permit.

3. Estero Bay Improvement and Management Plan.

The District shall develop an Estero Bay Improvement and Management (EBIM) plan. The EBIM plan shall include and address the following tasks:

a. collect, develop and analyze data on freshwater inflows (surface and groundwater) into Estero Bay;

b. collect, develop and analyze data on the total pollutant loads (i.e. point source, non-point source, airborne) into Estero Bay and its tributaries;

c. collect, develop, and analyze vegetative community trends in Estero Bay and its tributaries;

d. develop biological goals and standards for Estero Bay and its tributaries;

e. develop pollution load reduction goals (PLRG) for point sources and non-point sources discharging into Estero Bay and its tributaries.

The EBIM plan shall be initially funded by the District for a sum of at least $50,000.00 to be funded in the FY 1996 Budget, subject to Governing Board adoption, for an Estero Bay freshwater inflow plan.

It is estimated that an additional sum of at least $500,000.00 will be necessary for the District to develop and complete the plan. In the event the Florida Legislature does not make an appropriation sufficient to fund the study, the District, FGCU, and the SWFRPC shall use their best efforts to obtain the necessary funding. In the event insufficient funding is provided for plan development, the District shall undertake as many of the plan tasks (a) through (e) above as possible with available funding. This agreement, however, does not constitute a commitment by the parties hereto to fund the study beyond the sum of $50,000.00 for the freshwater inflow study, as referred to above.

4. **Representative Arnold Committee**

State Representative J. Keith Arnold shall chair a cooperative planning process composed of state and federal regulatory agencies, Lee County, Responsible Growth Management Coalition, affected property owners, and environmental organizations (Arnold Committee). The Arnold Committee shall be a non-regulatory advisory body. Details of the membership, geographic scope, duration goals and scope of study are set forth in Exhibit A hereto. The Florida Department of Community Affairs agrees to provide the staff support for the Arnold Committee.

5. **Estero Bay Agency on Bay Management**

After the completion of the Arnold Committee, but in no case later than September, 1996, the Southwest Florida Regional Planning Council (SWFRPC) shall establish an Estero Bay Agency on Bay Management (ABM) as a subcommittee on the SWFRPC. The SWFRPC shall provide staff support to the ABM.

The ABM shall be a non-regulatory advisory body whose directive is to make comments and recommendations for the management of Estero Bay and its watershed. The ABM shall collect and maintain data concerning the Estero Bay watershed, and make such data available to the public.

The ABM shall review and comment upon the District's Estero Bay management and improvement study as it is developed. The ABM shall also review and comment to regulatory agencies on issues affecting Estero Bay and its watershed. It is recommended the ABM issue an annual "State of the Bay" report.

ABM members shall initially be appointed to one year terms by the Arnold Committee. Thereafter the ABM shall determine the method of membership appointments. ABM membership shall consist of, but not be limited to, Lee County legislative delegation members who desire to participate, and shall include, but not be limited to, members from the following: local Chambers of Commerce, Citizen and Civic Associations, Lee County, the District, the Department of Environmental Protection, the FGFWFC, the FGCU, the SWFRPC, commercial and recreational fishing interests, environmental and conservation organizations, Responsible Growth Management Coalition, the Ft. Myers Beach Civic Association, Citizens Association of Bonita Beach, scientists, affected property owners, and the land development community.

6. Mitigation Banks in Southeastern Lee County

The District shall identify and establish a mitigation bank in the HPP area of southeastern Lee County. Where appropriate, the District shall also encourage private mitigation banks in the HPP area of southeastern Lee County.

7. Implementation

a. Because the settlement agreement requires the SWFRPC, the Florida Department of Community Affairs (DCA), and State Representative J. Keith Arnold to perform tasks relating to the Estero Bay ABM and the southeastern Lee County cooperative planning process committee, the SWFRPC, DCA, and Representative Arnold have been made signatories to this settlement agreement even though they are not parties to the above-styled permit challenge proceeding.

b. The RGMC, Peterson, the District, and BOR agree to request the State Division of Administrative Hearings (DOAH) to relinquish jurisdiction to the District Governing Board for the purpose of taking final agency action to implement this settlement agreement and issue the challenged surface water management and wetland resource permits to the BOR.

c. The execution of the settlement agreement by the parties and the District Governing Board's adoption of a final order implementing the settlement agreement and issuing the requested permits shall resolve all claims of the parties relating to the subject matter of the permits at issue in this proceeding.

d. In the event the District Governing Board fails to approve this settlement agreement and take final agency action to implement the settlement agreement, the parties shall request the DOAH Hearing Officer to schedule the final hearing as soon as practicable.

e. In the event this settlement agreement is not approved by the District Governing Board, the settlement agreement shall not be admissible at the final hearing and shall in no manner limit the arguments of the parties.

f. The Petitioner RGMC and their undersigned counsel, Thomas W. Reese, hereby agree not to participate in any further judicial or administrative proceedings challenging the FGCU project or any future phases thereto or the Treeline Avenue Project. Actions to enforce the instant settlement agreement are not included within this prohibition.

g. This settlement agreement shall not be construed to bind other projects or landowners that are not a party to this agreement.

h. This settlement agreement is contingent upon the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency providing a letter of support and participation regarding the cooperative planning processes outlined herein.

STIPULATED this 10th day of April, 1995

LINDA LOOMIS SHELLEY
Secretary, DCA

STIPULATED this 10th day of April, 1995

JOHN J. FUMERO, ESQUIRE
Counsel for the District

SAMUEL E. POOLE, III
Executive Director for the District

STIPULATED this 10th day of April, 1995.

JOHN E. ALBION
Chairman, SWFRPC

STIPULATED this 10th day of April, 1995

Robert M. Rhodes
ROBERT M. RHODES, ESQUIRE
Counsel for BOR

Charles B. Reed
CHARLES B. REED
Chancellor, BOR

STIPULATED this 11 day of April, 1995

HONORABLE J. KEITH ARNOLD
State Representative

STIPULATED this 11th day of April, 1995

Thomas W. Reese

THOMAS W. REESE, ESQUIRE
Counsel for Petitioners RGMC and Peterson

STIPULATED this 14th day of April, 1995

for Thomas W Reese
EUGENE BOYD
President, RGMC

EXHIBIT "A"

The Arnold Committee

Section I: Purpose

The parties recognize that there are concerns about the environmental sensitivity of southeastern Lee County and the need for close coordination of land use planning, land acquisition for environmental protection, and environmental permitting. By executing this agreement the parties agree to establish a cooperative, time-limited, interagency advisory committee to make recommendations on planning issues for southeastern Lee County with an opportunity for full participation of property owners in the area and the general public. Each party agrees to participate in the planning process.

The primary purpose of this effort is to share and enhance knowledge of the area, to continue and accelerate land acquisition for environmental protection, to evaluate and where warranted and reasonable improve the technical basis for environmental permitting, and to establish a strategy for regional mitigation banking.

The Southwest Florida Regional Planning Council and Florida Department of Community Affairs agree to facilitate the process and provide technical assistance.

Section II: Membership

By September 1, 1995, there shall be established an advisory committee whose membership shall include the Florida Board of Regents, South Florida Water Management District, Responsible Growth Management Coalition, Inc., Lee County, Southwest Florida Regional Planning Council, Florida Department of Community Affairs, U. S. Army Corps of Engineers, U.S. Fish and Wildlife Service, U. S. Environmental Protection Agency, and affected property owners. The meetings of the Committee shall be public, with notice given in the local newspaper. The Committee shall establish supporting sub-committees: a Land Acquisition Group whose focus will be on coordination of various land acquisition programs and formulation of strategy for regional mitigation banking; and a Technical Work Group whose focus will be on evaluation and improvement to technical standards for environmental permitting. The U. S. Army Corps of Engineers agrees to assist and advise and Committee and sub-committees on the impact of their proposals and recommendations on the Section 404 permit program.

Section III. Geographic Scope

The Committee shall address the area delineated by S. R. 82 to the north, the Lee County boundary to the east, the Lee County boundary to the south and I-75 to

the west, except for the Southwest Florida International Airport Project and expansion lands.

Section IV. Duration

The Committee shall complete a final report no later than one year after execution of this agreement.

Section V. Goals

All efforts of the Committee shall be directed towards establishing a coordinated approach to land use planning, land acquisition and environmental permitting which would achieve the following goals:

1. Improved protection and management of water and wetland resources.

2. Improved protection and management of wildlife resources.

3. The establishment of a regional mitigation bank for the acquisition of land for environmental protection.

4. Continued and accelerated acquisition, restoration and management of lands important for the protection of water, wetlands, habitat and wildlife.

5. Protection of the rights of property owners. The protection of the rights of private property owners shall include, but not be limited to, the provision of greater certainty, predictability and lower permitting costs.

Section VI. Scope of Study

The report for southeast Lee County, prepared by the Committee, shall at a minimum address the following specific topics:

1. Land Use

   The Committee shall identify through maps and inventory existing land uses, future land uses as allowed by the Lee County Comprehensive Plan and land uses which have not yet been developed although specific permits have been issued.

2. Land Acquisition

The Committee shall identify through maps and inventory those areas acquired for environmental protection, those areas identified for future acquisition and those additional areas for which land acquisition is recommended. The Committee shall also identify the potential funding sources for the acquisition, as well as the acquisition costs.

3. Wildlife Habitat

The Committee shall identify through maps and inventory areas of habitat for protected wildlife. The Committee shall address the most desirable methods to protect the wildlife particularly with regard to areas for land acquisition.

4. Water Management

The Committee shall determine if revisions are desirable to South Florida Water Management District and U. S. Army Corps of Engineers wetland permitting criteria for the particular characteristics of southeastern Lee County. Particular attention shall be given to the maintenance of wetland hydrology. The Committee shall determine if post development water quantity and quality, including timing, will degrade the water quality of Estero Bay and Corkscrew Swamp, and make recommendations which address maintaining surface water quality.

5. Regional Mitigation Strategy

The Committee shall formulate a strategy for regional mitigation banking. The strategy shall encompass the efforts of those agencies party to this agreement and shall complement existing acquisition programs.