

NORTH GOLDEN GATE ESTATES ROMA MITIGATION PLAN

Schedule of Enhancement, Restoration and Acquisition

Enhancement

Enhancement will commence when practicable, considering the cost per acre and acreage acquired.

Vegetation enhancement shall be conducted on a project-specific basis. The goal is to re-establish the dominance (99%) of native vegetation in the ROMA. Baseline vegetation data for the entire ROMA is found in Exhibits 1, 2 and 34. A 2000 aerial photograph of the ROMA is found in Exhibit 3. Prior to enhancement activities within each project, the District will conduct a baseline vegetation survey in each project and compare the results with the vegetation data provided herein. These maps will be adjusted as needed in accordance with the survey results. Data will be collected at one (1) year intervals after the completion of enhancement in each project for five (5) years, then bi-annually thereafter until title to the ROMA is transferred from the District.

Enhancement will consist of intensive management for exotic invasive, disturbance and nuisance vegetation, and native tree, shrub and groundcover revegetation. Brazilian pepper (*Schinus terebinthifolius*) and melaleuca (*Melaleuca quinquenervia*) will be killed and burned on site. The existence and prevalence of other exotic plants, as listed in the Florida Pest Plant Council's list of Type 1 invasive plant species, will be assessed within each block, and appropriate measures will be taken to control these species. Nuisance and disturbance vegetation such as primrose willow (*Ludwigia peruviana*) and cattail (*Typha* sp.) may be treated for brush control. The stumps as well as herbaceous species will be chemically treated with EPA-approved herbicides on a schedule recommended by the USDA Department of Agriculture, Natural Resource Conservation Service ("NRCS") and the Collier County Cooperative Extension Service. Initial vegetation removal in each project is expected to take approximately six months. Subsequent removals and re-treatments within each project, if necessary, are expected to take approximately three months, and will be conducted annually thereafter until title to the ROMA is transferred from the District. Because its five-year plan for North Golden Gate Estates includes control of exotic invasive vegetation, the BCB has agreed to work cooperatively with the District in removing such vegetation within the ROMA.

Data regarding the location of exotic invasive, disturbance and/or nuisance vegetation within each project are preliminary (see Exhibit 4). Collier County estimates that almost 19% of the ROMA land cover is comprised of dense exotic invasive vegetation. Furthermore, an unquantified number and density of exotic invasive plants exist along road and canal rights of way and are scattered throughout the ROMA.

After the exotic invasive, disturbance and nuisance vegetation has been removed from any given project, the project will be subjected to prescribed burning on a schedule recommended by the NRCS and the Florida Division of Forestry. Within the first ten (10) years of the ROMA, the goal is to subject approximately 2,400 acres to prescribed burning. Prescribed burning will provide multiple management needs for the ROMA and the surrounding community, i.e. fuel reduction, native and exotic invasive vegetation management and wildlife management, and will resemble as closely as possible the natural fire intensity and frequency.

Brush management will also be used as needed, in conjunction with prescribed burning or in areas where prescribed burning is not feasible, to maintain native vegetation and reduce fuel loads. It is estimated that approximately 2,400 acres will be subjected to brush management within the first ten (10) years of the ROMA.

Planting of native vegetation will occur within areas in which dense exotic invasive vegetation has been removed, but only after the District determines that seed sources do not exist nearby to revegetate the area. The specific locations of these areas will not be known until an extensive survey is conducted, prior to removal. The goal is to plant two (2) acres of native vegetation during the second five (5)-year period of the ROMA.

An estimated 37 acres within the first ten (10) years of the ROMA will be subjected to critical area treatment in the form of earthwork related to grading, modifying or removing roadside ditches. The purpose is to reduce wind and water erosion along such roads.

Wildlife enhancement shall be accomplished passively and is expected to occur as the vegetative communities are enhanced.

Restoration

Hydrologic restoration shall be conducted in cooperation with the Big Cypress Basin of the South Florida Water Management District ("BCB"). Hydrologic restoration of the ROMA may be a part of the SGGE Restoration Plan ("Restoration Plan"). The goals of restoration of the ROMA are to benefit existing homeowners in the ROMA and to provide a more natural flow of water into the flowways and depressional areas and away from uplands and existing residences, thereby reconnecting the southerly flow of water through the area, including the eastern part of North Golden Gate Estates.

Restoration within each project will consist of constructing culverts and roadside ditches in a manner that diverts and channels water away from uplands and existing residences and into depressional areas and flowways. The precise placement of such culverts and ditches will be in accordance with BCB recommendations. Grading of roads will not occur. No structures will be constructed for the purpose of flooding any uplands or existing residences within the ROMA. Owners of existing residences within a two (2) block area of each proposed restoration site will receive written notice of such proposed restoration and can provide input to the District within thirty (30) days of the date of such written notice. The number and size of the culverts will depend on the required flow through a particular depressional location (cubic feet per second, or "cfs") and will follow BCB recommended specifications. BCB cannot submit these specifications at this time but will do so after its Restoration Plan is finalized. Culverts will provide the dual tasks of re-connecting a currently disjointed flowway through depressional areas and of protecting existing residences from flooding.

Installation of culverts in each project, depending on when sufficient funds are collected, will be completed in approximately 18-24 months after restoration work commences. Commencing installation of culverts will be dependent on (1) the acquisition of land that will allow correct functional hydrological connectivity, and (2) availability of sufficient funds.

The precise locations of culverts will not be known until field data is collected and analyzed, the District has ensured that these changes will not adversely affect existing residences, and county permits are approved.

Acquisition

Exhibit 5 depicts the 10-year enhancement planning cycle and associated unit costs for the ROMA. The Environmental Quality Incentive Program (EQIP), the cost basis for the NRCS Best Management Practices program, is being used for this ROMA, and is found in Exhibit 6.

Identification of properties available for purchase. Updated addresses of landowners within the ROMA will be gathered through the Collier County Tax Collector and/or Property Appraiser. Inquiry letters will be sent to landowners on a project-by-project basis. Properties that are available through tax deed sale will also be identified regularly. ROMA properties on the market will be identified through a real estate broker, local newspaper advertisements, the internet and other sources. As with properties within nearby CARL projects, word of mouth will be an important means of identifying properties on the market as well. Periodically, District staff or volunteers will speak at neighborhood and civic engagements about the ROMA program.

Acquisition process. Once a parcel has been identified as available for acquisition, and upon authorization by the District Supervisor to proceed with acquisition of the parcel, a contract for the purchase of land will be executed by the seller and the District, using a contract form prepared by the District, said contract being contingent, in part, on an appraisal if applicable. The contract shall specify that the seller pays for costs involved in clearing title and satisfaction of liens and mortgages, prorated real estate taxes and solid waste fees, documentary stamp taxes, intangible taxes and half the closing preparation fee.

If the estimated value of a parcel is greater than \$10,000.00, one narrative appraisal report will be done by a licensed independent real estate appraiser chosen by the District. The appraisal report may be made available to the seller at the District's discretion. In no instance shall the District pay a greater amount than the market value of the parcel.

A title commitment will be ordered. An environmental assessment will be conducted by a licensed professional biologist. A 30-year title examination will be performed and all supporting documentation as deemed necessary by the District to protect its interests will be prepared by a licensed real estate attorney or title company on behalf of the District prior to the closing date through industry-accepted methods. Title and liability insurance coverage will be provided by the District at the time of closing. The District will record the deed immediately after closing.

In the case of a tax deed sale, the District will attempt to acquire the parcel at auction conducted by Collier County and in accordance with state law. Title insurance will be obtained and an environmental assessment performed at the District's discretion.

If a conservation easement is being acquired, a conservation easement agreement drafted by the District will be executed by seller and the District, and acquisition will proceed as described above.

Cost of acquisition. The approximate average size of individual parcels in the ROMA is three (3) acres. During the first three years of acquisition the cost per parcel is projected to be as follows:

- Average cost for a 3-acre parcel \$15,000
- Title search 200
- Document prep fee 100
- Closing fee (1/2) 75

- Title insurance 360
- Appraisal 200
- Environmental assessment 200
- Recording fee and prorated taxes 225

Total \$16,360

Approximately 3,125 parcels exist in the units containing the ROMA (existing residences have been excluded from this figure). Complete acquisition of the ROMA will total roughly \$51,125,000.00, assuming the projected costs remain unchanged. Three years after the ROMA is established, the cost projections per parcel will be reevaluated.

Schedule of acquisition. Acquisition of ROMA property will commence when the District accumulates sufficient mitigation funds to purchase at least ten (10) acres. The District estimates that approximately 30% of the ROMA area will be acquired within the first ten (10) years of the ROMA. The rate of acquisition, however, depends on market conditions throughout the life of this Agreement and availability of properties for sale within the ROMA.

Project 1: Acquisition efforts shall be concentrated south of 36th Avenue SE, north of I-75, between the eastern boundary of Unit 91 and the Miller Canal, within all lots containing depressional areas, according to Exhibit 2, until approximately 70% of said land area has been acquired.

Project 2: Acquisition efforts shall then be concentrated outside the depressional areas and south of 36th Avenue SE, north of I-75, between the eastern boundary of Unit 91 and the Miller Canal, until approximately 70% of said land area has been acquired.

Project 3: Acquisition efforts shall then be concentrated south of 30th Avenue SE, north of I-75, between the eastern boundary of Units 90 and 91 and Everglades Boulevard, within all lots containing depressional areas, according to Exhibit 2, until approximately 70% of said land area has been acquired.

Project 4: Acquisition efforts shall then be concentrated outside the depressional areas and south of 30th Avenue SE, north of I-75, between the eastern boundary of Units 90 and 91 and Everglades Boulevard, until approximately 70% of said land area has been acquired.

Project 5: Acquisition efforts shall then be concentrated south of 24th Avenue SE, north of I-75, between the eastern boundary of Units 85 and 90 and Everglades Boulevard, within all lots containing depressional areas, according to Exhibit 2, until approximately 70% of said land area has been acquired.

Project 6: Acquisition efforts shall then be concentrated outside the depressional areas and south of 24th Avenue SE, north of I-75, between the eastern boundary of Units 85 and 90 and Everglades Boulevard, until approximately 70% of said land area has been acquired.

Project 7: Acquisition efforts shall then be concentrated south of 16th Avenue SE, north of I-75, between the eastern boundary of Units 84 and 85 and Everglades Boulevard, within all lots containing depressional areas, according to Exhibit 2, until approximately 70% of said land area has been acquired.

Project 8: Acquisition efforts shall then be concentrated outside the depressional areas and south of 16th Avenue SE, north of I-75, between the eastern boundary of Units 84 and 85 and Everglades Boulevard, until approximately 70% of said land area has been acquired.

Project 9: Acquisition efforts shall then be concentrated south of 30th Avenue SE, north of I-75, between 16th Avenue SE and 30th Avenue SE between Everglades Boulevard and Miller Canal, until approximately 70% of said land area has been acquired.

Project 10: Acquisition efforts shall then be concentrated between 10th Avenue SE and 16th Avenue SE, east of the Faka Union Canal.

Reservations and exceptions. The District will acquire properties according to the schedule above. However, the District reserves the right to acquire particular properties not in accordance with the schedule if the District determines that development within the ROMA is imminent; the property contains critical hydrologic or biological resources or is in a depressional area; the asking price is below market value; a large parcel within the ROMA is offered to the District; an interest in a property is donated to the District; or the District cannot acquire sufficient land within a particular project for restoration or enhancement purposes, as determined by the inability to identify any further willing sellers within that project.

The District has budgeted to enhance and/or restore 3,000 acres within the first ten (10) years.

Environmental Success Criteria

The WRAP rating index establishes a numerical ranking for ecological and anthropogenic factors ("variables"). The numerical output for each variable is then used to evaluate the current condition of the wetlands, to ensure consistency and accuracy when evaluating a site for the purposes of acquisition, enhancement, restoration and management. It will document baseline information for a site prior to Best Management Practices ("BMP") installation. WRAP input data consists primarily of field observations and the experience of professional engineers and biologists.

The WRAP variables include the following:

1. **Wildlife Utilization.** Wildlife utilization is a measure of observations and signs of wildlife, primarily wetland-dependent species. In addition, potential wildlife use is detected through the presence of wildlife food sources, nesting areas, roosting areas, den trees, protective cover and landscape position.
2. **Wetland Overstory/Shrub Canopy Rating Index.** The wetland overstory/shrub canopy variable is a measure of the health and appropriateness of the wetland shrub and overstory canopy. The assessment of the canopy variable is objectively evaluated based on food resources, cover, nesting potential and appropriateness of the vegetation community. The canopy stratum is evaluated based on habitat type. This variable may not be applicable to freshwater marsh and wet prairie habitats where overstory/shrub canopy is typically not present. Undesirable plant species include invasive exotic, disturbance and nuisance vegetation.
3. **Wetland Vegetative Ground Cover.** The ground cover variable is a measure of the presence, condition and appropriateness of the wetland ground cover. Ground cover is defined as the plant stratum composed of all plants not found in the canopy or subcanopy, including vines. Ground cover vegetation can provide a refuge for macro-invertebrates, fish fry, reptiles, amphibians and small mammals, and also can provide food sources for small mammals, waterfowl and reptiles. The health and abundance of wetland ground cover can be significantly affected by extremes in wetland hydrology. Human activities can promote significant changes in wetland ground cover as well. Invasive exotic and nuisance plant species have become a serious problem in Northern

Golden Gate Estates and in the ROMA by outcompeting and replacing naturally occurring plant communities.

4. Adjacent Upland/Wetland Buffer Rating Index. This variable is a measure of the area adjacent to the wetlands occurring within the ROMA and the landscape setting of these wetlands. This variable is evaluated based on the adjacent buffer size and the ecological attributes that is being providing in association with the wetland that is being assessed.
5. Field Indicators of Wetland Hydrology Rating Index. This variable is a measure of the hydrologic regime based on observed field indicators for each wetland in the ROMA, including hydroperiod duration and magnitude. Wetland hydrology is generally interpreted using vegetative indicators. In addition, hydrologic indicators such as lichen lines, algal mats, adventitious roots and basal scarring are also used. Signs of altered hydrology may include encroachment of upland and transitional plant species into the wetland.
6. Water Quality Input and Treatment Rating Index. This is a measure of the quality of the surface water flowing into the wetland from adjacent land uses. The percent and type of surrounding land uses as well as any on-site pretreatment of surface waters prior to discharge into wetlands is considered.

A copy of the Field Data Sheet that the District will use when assessment of each site takes place is found in Exhibit 7.

In addition to the above criteria, for consistency with the Restoration Plan, the BCB has agreed to assist the District in gathering hydrological restoration data over time using the following criteria:

- Hydroperiod (depth, duration and timing of flows)
- Vegetation patterns and types (historic)
- Water quality improvements
- Flood attenuation
- Groundwater recharge

Historic, current and planned conditions

Historic conditions

Hydrology

"Prior to anthropogenic impacts, the area was characterized by seasonal flooding several months of the year and broad, slow moving sheetflow sustained wetland vegetation and rejuvenated freshwater aquifers. Three major flowways contributed freshwater inflow to the Ten Thousand Islands Estuary."¹ Sheetflow moved southeasterly through North Golden Gate Estates, turning southward just north of I-75. The flowway traveling through the ROMA was described as follows²:

The two arms converge in the vicinity of Golden Gate Boulevard, at which point the flow-way [was] almost one mile wide and its surface [was]

between 8" and 1' deeper than adjacent dwarf cypress areas. Approximately 2 miles to the south it becomes constricted to a width of roughly ¼ mile before widening once more into what was formerly large cypress and is now a mixed swamp forest.

In the vicinity of S.R. 84 [now I-75] the flow-way is joined from the east by the 'cross-over' from the Fakahatchee by way of a deep, narrow slough heading south adjacent to Frances Boulevard, and a wider, shallower slough slightly to the north.

See Exhibits 8 and 9 for the probable historic flowways through the ROMA.

Flooding averaged seven (7) inches above ground level in the northwest part of Golden Gate Estates. The average depth of pre-drainage flooding along 26 stations on Golden Gate Blvd. was 7.9 inches, with 21.5 inches being the deepest in depressional cypress sloughs. "[T]he hydroperiod persisted for 3 to 4 months on the Golden Gate 'Highlands' [North Golden Gate Estates] and for 5 to 7 months in the deeper strands in dry and wet years, respectively."² The historic hydroperiods and maximum water depths in the Big Cypress region are depicted laterally in Exhibit 10.

A description of the sheetflow through Golden Gate Estates is provided by the BCB^{1,3}:

Historically, the general water movement in the watershed was characterized by slow, overland sheetflow a few inches to a few feet deep and several miles wide. Much of the drainage was concentrated in slightly lower sloughs and strands. Several feet of water regularly inundated the area during the wet season. During the wet season, overland runoff was stored in depressional areas, peak flows were attenuated, and a longer hydroperiod was maintained well into the dry season. Storage of water in wetlands was a part of the hydrology of the watershed. As the wet season ended and throughout the dry season, water stored in depressions was slowly depleted as it recharged the shallow water table aquifer and was used by vegetation in the evapotranspiration process. This reduced the amount of surface runoff. It has been estimated that, of the 50+ inches of rain received in western Collier County, historical natural runoff was on the order of 0 to 10 inches annually.

The BCB documented the change that occurred in the 20th Century:¹

However, significant alterations in the area's hydrology and plant communities have occurred within the SGGE since cypress logging operations began in the 1940s and 1950s. Land drainage activities began in southwest Florida with the diversion and channelization of the Caloosahatchee River, which later culminated in the development of Golden Gate Estates in the 1960s. Golden Gate Estates is a very large subdivision bisected by Interstate 75 (also known as Alligator Alley) into a northern and southern portion. The area was subdivided in the 1960s, an extensive network of roads and canals were built, and thousands of lots were sold. The developer, Gulf America Corporation, went out of business and many of the planned homes were never built.

"The purpose of the Golden Gate Estates canal system was to (1) provide rapid drainage of surface water, (2) lower the water table to reduce flooding, and (3) provide fill for development.¹" The completion of the canals altered not only the flowways but also entire watersheds. The ROMA is now within the Faka Union Canal Watershed (Exhibit 11), whereas historically it was within Subarea C of the larger Big Cypress Watershed (Exhibit 12).

Soils and topography

"Because of the strong correlation between soil type and vegetation under unaltered conditions, observations of soil types in the SGGE provide information about pre-development natural flow-ways and land cover.¹" Historic soil types and elevational gradients in the ROMA have been preserved. The soil types in the ROMA are largely hydric, supportive of wetland vegetation. See Exhibits 2, 13 and 14 for descriptions of the soil types and topography of the ROMA.

Vegetation

The historic vegetation communities in the Estates, including the ROMA, are depicted in Exhibit 15. The Southwest Florida Feasibility Study Team completed a "Pre-Development Vegetation Map of Southwest Florida", and Golden Gate Estates is part of this map (Exhibit 16). A more accurate map of historic vegetation in the Estates will be used for planning purposes in the Feasibility Study effort. Pine-cypress-palmetto communities dominated the western and southwestern portion of the ROMA, with mixed swamp forest and large-growth cypress forests comprising most of the eastern portion. In the north, pine-dwarf cypress forests comprised the majority vegetation community. Tree densities and dominance in historic North Golden Gate Estates cypress sloughs are found in Exhibit 17. Lateral-view drawings of successional processes without fire in two habitats that exist in the ROMA are found in Exhibit 18.

Collier County described the dominant vegetation communities in and around the ROMA in 1976²:

Mixed swamp forest was the "replacement community for the original location of the largest cypress. ...Soil surface ranges from organic in unburned areas to sandy-organic or marl-organic in burned sites. Dominant tree cover of cypress, maple, oak, ash, and cabbage palm with an under canopy of young cabbage palm, wild coffee, myrsine and ferns. Lower areas, with ash dominating, are the sites of greatest orchid occurrence. Canopy density (shade) directly related to fire-history....

Pine-cypress-palmetto mosaic: Cypress tends to be in local heads among the more common pines. Cabbage palms of all age classes commonly dominate sizeable areas. Young pines of several age classes dominate some sites. In the pineland proper, saw palmetto and graminoids occur separately as understory plants. The latter is commonly muhly and broom sedge. Wax myrtle is a common shrub throughout, becoming dense and tall (to 18') especially near cypress margins.

Since drainage began, there has been "increased coverage of upland communities and decreased coverage of deeper cypress and marsh communities....⁴" Cypress logging occurred in the area from

1943 through 1957. Due to drainage of the water table via the canal system in the Estates, the frequency and severity of fires increased. Fire had destroyed up to 18 inches of organic topsoils in the Estates by 1976.¹

A description of the current effects of artificial drainage of the flowways and of the extensive road and berm systems constructed throughout the Estates and in the ROMA, is found below.

Current Conditions

The ROMA comprises approximately 5,875 acres in central Collier County. The southern boundary is Interstate 75, and south of the interstate is Picayune Strand State Forest. The Miller Canal borders the ROMA to the west, and the eastern boundary of Units 84, 85, 90, 91 and 91A forms the eastern boundary of the ROMA. Nearby to the east is the western boundary of the Florida Panther National Wildlife Refuge. To the north is North Golden Gate Estates.

The ROMA acreage will be verified by survey prior to restoration and enhancement.

Population and land use

Collier County is one of the three fastest growing counties in the state. In 1990, 152,099 people resided in Collier County, according to the US Census. By 1999 the population had increased to 210,095, and in 2000 the US Census reported 251,377 people living in the county. That is a population growth rate of 65.3%. The projected 2005 population is 262,929, and by the year 2010, 334,310 residents are expected in Collier County (Young, Kraft, and Smith. 2000. *Florida Statistical Abstract*).

Comprising an area the size of Washington DC, North Golden Gate Estates (the Service Area) is rapidly developing. The population of the Service Area was 24,076 in 1990 and 41,637 in 2000 (72.94% increase). The population is projected to reach 69,231 by 2010 and 90,762 by 2020 (45.9% increase from 2000). Approximately 1,000 homes are being constructed each year in the Service Area. In 2000, the Service Area contained 15,972 dwelling units. By 2020, the number of dwelling units is projected to be 34,817, a 45.9% increase.

For a Golden Gate Master Plan, Collier County Development Services is analyzing Area 4 of North Golden Gate Estates, which comprises the ROMA and approximately 4,000 acres to the north. Area 4 contained a population of 321 in 2000 and is projected to increase to a population of 700 by 2020. Area 4 is by far the least densely populated section of the Service Area. Exhibit 19 depicts urban density in North Golden Gate Estates, including the ROMA.

The City of Naples is pumping approximately 20 million gallons of water every day from the Faka Union Canal Watershed. Collier County is pumping an additional 20 to 25 million gallons per day. Exhibit 20 shows Collier County's wellfield protection zones within the ROMA and the Service Area.

The ROMA is owned as individual, single-family residential lots generally of 1.14 to 5 acres each. One significant exception is an approximately 80-acre preserve in Units 91 and 91A. Land ownership within each unit* of the ROMA is detailed in the following table, including the number and acreage of homesteads or improvements (taken from 2001 Collier County Property Appraiser data):

Golden Gate Unit	Total Number Parcels	Number(Acreage) Homesteads/ Improvements
83**	259	39 (89.53)
84**	284	22 (73.36)
85	288	6 (15.15)
86	270	8 (21.61)
87	274	22 (53.48)
88	246	22 (69.35)
89	257	10 (30.23)
90	277	6 (30.02)
91	274	2 (12.27)
91A	29	0
92	237	11 (25.93)
92A	50	2 (14.63)
93	262	10 (24.04)
93A	24	1 (3.00)
TOTAL	3286 parcels	161 homesteads (462.61 ac)

*Legal descriptions throughout Golden Gate Estates are in terms of units instead of section, township and range.

**Units 83-84, 87 are only partially within the ROMA; therefore, the total number of parcels is inflated.

Surrounding land uses include single-family residential development to the north of the ROMA; a Ford test track and the Florida Panther National Wildlife Refuge to the east; agriculture, cattle ranching and hunting to the west; and the Picayune Strand State Forest to the south, separated from the ROMA by I-

75. The State Forest permits timber harvesting and fishing and nonconsumptive uses such as horseback riding and hiking.

The Collier County Comprehensive Plan Future Land Use Map designates the ROMA as "Estates" (Exhibit 21). Zoning is for one single family residential unit per five (5) acres, agriculture and surface mining. The ROMA itself contains approximately 130 single-family homes, primarily in the northeastern portion. The Comprehensive Plan designates the adjacent land uses to the east and south as "Conservation." The land to the west, North Belle Meade, is designated as "Rural Fringe Mixed Use", with transfer of development rights permitted by Collier County. The county's future land use designation in the ROMA is compatible with the proposed use as a ROMA and offers a significant buffer between the intense residential development occurring elsewhere in North Golden Gate Estates and the conservation lands to the east, south, and potentially the west of the ROMA.

Hydrology

Baseline information. The entire Golden Gate canal system is approximately 183 miles long, averaging 100 feet wide and creating approximately 2,200 acres of permanent water where perhaps less than 100 acres existed before.²

The Faka Union Canal Watershed underlies the ROMA, and is currently drained by the Faka-Union Canal (Exhibit 11). The watershed was created artificially with the construction of the Faka Union Canal and the Golden Gate road network. The existing watershed drains approximately 189 square miles containing approximately 70 miles of four primary canals. The Golden Gate Main Canal, Faka Union Canal and Miller Canal are 27.25, 29.50 and 18.75 miles long, respectively.¹ Water flows over the basin in a general southwest direction.

Water levels in Golden Gate Estates are controlled by 12 weirs, and the majority of the watershed includes a grid-like system of roads spaced every quarter mile. "Approximately 185,000 acre-feet of freshwater is discharged annually from the Faka union Canal to the Faka Union Bay estuary as point source flow."³ Relative to the ROMA, Surface Water Stage Stations are located on Miller Canal at 26th Avenue SE and Faka Union Canal at Weir #4. Weir #4 is located just south of the northern boundary of the ROMA on the Faka Union Canal, and Weir #5 is south of White Blvd., upstream of the ROMA.⁵ Along the Faka Union Canal are a total of four structures, and the Golden Gate Main System contains six structures.

Since the construction of the canals, the roads and canals largely control the surface flow patterns and the subbasin boundaries. The Faka Union Canal system is made up of four major canals and extends [north to south]...some 28 miles. The average discharges for the period of record [1969] are 115 cubic feet per second (cfs) during the dry season (November through May) and 460 cfs during the wet season...with an extreme discharge of 3,200 cfs occurring right after the canals were built...¹

The wet season in the ROMA is July 1 to October 1. Water quality testing by Collier County on the Faka Union Canal at I-75 and on the Miller Canal at I-75 reveals a rating of good.

Negative effects of drainage. The current hydrological contribution of this watershed to Everglades sheetflow is truncated, and the wetlands are relatively isolated. The historic sheetflow through this area

has been greatly impeded by fill, ditches, berms and roadbeds. The system of water management within the current watershed relies on gravity. However, the weirs existing along several junctures of the canal system in North Golden Gate Estates reduce drainage of water during the dry season. See section on proposed conditions, below, for discussion of the ROMA as a component of Everglades restoration.

According to the Big Cypress Basin, the existence of the canal system in North Golden Gate Estates has lowered the underlying water table approximately five to eight feet, pulling water from as far away as one to two miles from the canals. In addition, "[d]rainage has shortened the hydroperiod from 5 months in dry years or 7 months in wet years originally to between 2.0 and 2.5 months at present."² "Since groundwater recharge is achieved primarily through infiltration from surface detention storage, reduced groundwater recharge threatens both groundwater supply for the region and the natural barrier to salt water intrusion."³

In spite of the operation of ...low-head weirs, the effects of the canals on the area's hydrology have been significant and far reaching. The runoff that once slowly drained as overland sheetflow is now channelized in the canals and is released as a point discharge at the south end of the Faka Union Canal. This channelization results in both increased runoff volumes and runoff rates. Less runoff is available for groundwater recharge. Due to the shallowness of the water table aquifer, the canals have affected the groundwater levels.¹

Overdrainage, particularly of higher lands [North Golden Gate Estates], has lowered the water table to a position below the caprock. We believe that this destroys capillary connection between the groundwater and the sands lying on top of the caprock, with a resultant severe water shortage in the plant root zone. This is leading to a rapid conversion from cypress to pine forests which is fostered by repeated burning.²

Approximately 4,400 acres of berm and spoil piles were created when the Golden Gate canal system was constructed. Over 813 miles of road right-of-way were created for the extensive road network, creating approximately 11,800 acres of road, grassy swale and spoil pile in the Estates.¹

The network of roads and "major canals continually overdrain the landscape resulting in reduction of aquifer storage, increased freshwater shock load discharges to the estuaries, degradation of plant communities, and increased frequency of forest fires."^{1,3} In addition, the disturbance caused by the extensive roadway system in North Golden Gate Estates has resulted in increased opportunity for infestation of exotic invasive plant species such as Brazilian pepper and melaleuca. Drainage, blockage and infestation of invasive exotic, disturbance and nuisance vegetation has degraded the functioning of the wetlands in the area to the point that they no longer function as one system.

Cypress sloughs "probably seldom experienced fires...Fires that occur now may burn closer to, or below the soil surface, as surface water and moisture levels are likely to be lower than levels before drainage."¹

The effects of truncated sheetflow to the estuaries along the coast are also devastating. Pathways for detritus and other aquatic food sources from mangroves to the bays are lost, mangrove vigor declines, mangrove filtering of heavy metals and silt declines, and salinity variations are too rapid to sustain juvenile and larval forms of many organisms.²

Topography and Soils

Topography in the ROMA is depicted in Exhibit 14. According to Collier County and the NRCS, depressional and slough areas in the ROMA total 1,143 acres and 3,535 acres, respectively. The surface of the ROMA is 11 to 14 feet above sea level.¹

Vegetation

Baseline vegetation data for the ROMA is found in Exhibits 1, 2 and 34. The dominant vegetation community in the ROMA is the pine-cypress-palmetto mosaic (almost 74%), reflecting a mixture of depressional wetland as well as species more typical of the current drainage pattern in North Golden Gate Estates. An uncertain quantity and density of exotic invasive vegetation inhabit many sites within this community type as well. See preliminary data on exotic invasive species in the ROMA, below.

Given that the vast majority of soils in the ROMA are hydric, approximately 85% of the ROMA's land area consists of a prevalence of vegetation typically adapted for life in saturated soils, including hydric pine flatwoods and cypress. In addition, the understory within the ROMA's hydric pine flatwoods typically are not dominated by saw palmetto.

The table below lists estimated acreages of vegetation communities in the ROMA and adjacent areas, provided by Collier County and South Florida Water Management District:

<u>Vegetation community</u>	<u>Acreage in ROMA</u>	<u>Percent in ROMA</u>
Cypress	1261	18.1
Pine Melaleuca	323	4.6
Hydric Pine	5266	75.7
Mixed Forest	111	1.6
Total	6961	

Because vegetation descriptions in the ROMA itself do not exist, descriptions in the vicinity are substituted herein. Vegetation occurring in the adjacent Picayune Strand State Forest is found in Exhibit 22. A list of rare plant species occurring in the Big Cypress region, including the ROMA, is found in Exhibit 23.

Cypress. Cypress forests (FLUCCS:621 Cypress) in SGGE are dominated by dense stands of bald cypress (*Taxodium distichum*), and occasional hardwoods such as red maple (*Acer rubrum*), pop ash (*Fraxinus caroliniana*), or pond apple (*Annona glabra*), where these hardwoods provide less than 30 percent canopy cover. Ground cover can be sparse or dense, and emergent in standing water during normal wet season conditions. Disturbed cypress can be partially dominated by species such as saltbush

(*Baccharis halimifolia*), wax myrtle (*Myrica cerifera*), muscadine grape (*Vitis munsoniana*), poison ivy (*Toxicodendron radicans*) or Brazilian pepper (*Schinus terebinthifolius*).

Subsequent to commercial logging operations, drainage of the watershed and resultant fires in cypress swamps, willows (*Salix* sp.) and mixed hardwoods typically become dominant.⁶

Hydric pine flatwoods. The Florida Natural Areas Inventory (FNAI) defines hydric pine flatwoods as follows:

Flatwoods with sand substrate, seasonally inundated, subtropical or temperate, annual or frequent fire, with vegetation characterized by slash pine [*Pinus elliottii*] or pond pine [*Pinus serotina*] and/or cabbage palm with mixed grasses and herbs.⁷

Hydric pine flatwoods function as a wetland in the ROMA, as hydric soils underlie the entire area and the prevalent understory vegetation is associated with wetlands. Typically, hydric pine flatwoods are inundated with surface water for one or more months per year during the rainy season. Generally, slash pines are the dominant overstory vegetation in hydric pine flatwoods. In the vicinity of the ROMA, however, slash pines are distributed sparsely and are interspersed with midstory and understory vegetation such as cypress (*Taxodium* sp.) and a wide variety of facultative and obligate wetland grasses and herbs such as muhly grass (*Muhlenbergi capallaris*). Although saw palmetto (*Serenoa repens*) is found in the ROMA's pine flatwoods, it is not the dominant understory vegetation in most areas. A list of vegetation expected to occur in the hydric pine flatwoods of Collier County is found in Exhibit 24.

Slash pines are extremely fire tolerant. However, drainage of North Golden Gate Estates, subsequent drying of the substrate and increased fire intensity and frequency may have increased the frequency and density of the cabbage palm midstory.

Wet prairies. Wet prairies are distributed sparsely in the ROMA, in areas containing mineral soils. They historically burned every one to five years.⁸ Wet prairies have a relatively short hydroperiod (50-150 days annually). Dominant plant species in wet prairies include maidencane (*Panicum hemitomon*), cordgrass (*Spartina* sp.), beakrush (*Rynchospora* sp.) and muhly grass (*Muhlenbergi capallaris*) (Myers and Ewel 1990). Scattered dwarf cypress (*Taxodium* sp.) may be present but typically cover less than 20% of the canopy.⁹

Exotic invasive species. Collier County estimates that the ROMA contains 1642 acres of land heavily infested with exotic invasive vegetation, primarily Brazilian pepper and melaleuca. The District plans to treat approximately 1,400 acres during the first ten (10) years of the ROMA, which is estimated as the area that can be feasibly treated based on budget, access and personnel considerations and on ownership and physical condition of contiguous areas. If feasible, the District will first treat the areas containing dominant or intermediate infestation. The District will treat areas of sparse infestation if it determines that a risk exists of further infestation or such infestation exposes other treated areas to reinfestation.

These invasives tend to colonize disturbed sites, where native vegetation has been cleared or burned. In January 2002, Dr. James N. Burch conducted a preliminary survey of exotic invasive infestation within each project. The estimated acreage of Brazilian pepper infestation is found in Exhibit 4. Dr. Burch noted that most projects contained primarily occasional (0-15% coverage) to intermediate (16-50% coverage) Brazilian pepper infestation. He also found bottle-brush tree (*Calistemon* sp.), cogon grass

(*Imperata cylindrica*) and air potato (*Dioscorea bulbifera*). The District will record the precise locations and extent of infestations within each project of the ROMA prior to enhancement activities.

Wildlife

The site functions only minimally as habitat for wetland-dependent wildlife. Fragmentation of the cypress sloughs, wet prairies and hydric pine flatwoods has contributed to the decline of species such as black bears, Florida panthers, indigo snakes, wood storks and wading birds. According to the Florida Fish and Wildlife Conservation Commission ("FFWCC"), 16 species of federally and state-listed wildlife species actually occur within the ROMA (Exhibit 25). Major factors that limit populations of these species are found in Exhibit 26. The ROMA is considered by both the US Fish and Wildlife Service and the FFWCC to represent important wildlife habitat for the highly endangered Florida panther between the Florida Panther National Wildlife Refuge and Picayune Strand State Forest. Recent panther use is depicted in Exhibit 27. The entire ROMA is a Strategic Habitat Conservation Area (Exhibit 28), and approximately 85% of the ROMA is a "Biodiversity Hotspot" (Exhibit 29), containing seven or more species of wildlife identified by the FFWCC to be indicators of biological diversity. Finally, over 95% of the ROMA is designated as Priority Wetlands, containing highly diverse wetland species (Exhibit 30).

According to the Florida Natural Areas Inventory, the ROMA contains Potential Habitat for Rare Species, based on known occurrences of wood stork, red-cockaded woodpecker, Florida black bear, mangrove fox squirrel, Florida panther and eastern indigo snake. FNAI Element Occurrence Records on or near the ROMA are on record with the District.

Lists of wildlife species occurring in the hydric pine flatwoods of Collier County, the Picayune Strand State Forest and the Big Cypress region, including the ROMA, are found in Exhibits 31, 32 and 33.

Recreation

Recreational use of this site is virtually non-existent. The site is divided into approximately 3,000 different parcels, each as small as 1.14 acres and each owned separately. Management of these parcels for recreational use is varied and usually lacking, resulting in further habitat fragmentation and increased potential for catastrophic fires.

A more extensive assessment of current conditions will be completed when the Restoration Plan is finalized and prior to restoration and enhancement activities in the ROMA.

Proposed Conditions

The plan is to restore and enhance the ROMA to a more natural vegetative composition and hydrologic condition, and to cause such area to be managed permanently in the resulting vegetative composition and hydrologic condition.

Because of the hydric nature of the ROMA's soils and nearby conservation areas, the potential to restore the historic flowways to a high-value, functioning wetland is great. As a by-product, habitat for wildlife, including federally listed species, state species of special concern and wading birds, would thereby be improved on the restored/enhanced ROMA.

The restored site will act as a groundwater recharge area and will be used as a natural flowway and water quality filtration area for Everglades restoration. Because of its proximity to current conservation lands, the site may increase the effectiveness of Everglades restoration, specifically South Golden Gate Estates.

Important components of a functioning wetland are the hydroperiod and water level. The historic wetland communities in the ROMA functioned as illustrated in the following table. Please note that because the BCB is required to maintain drainage in the adjacent North Golden Gate Estates area, the goal is restoration of the ROMA hydrology to approximate these figures as closely as possible without flooding existing residences:

Plant communities	High water level (inches)	Hydroperiod (months)
Hydric pine flatwoods	2 – 6	1 – 2
Wet prairie	6 – 12	2 – 6
Dwarf cypress	6 – 12	2 – 6
Cypress forest	12 - 18	6 – 8

Data provided by Michael Duever 2001

When the flowway through the ROMA is reconnected via culverts and the exotic invasive and nuisance vegetation is removed, the ecological communities present in the ROMA will blend with the adjacent conservation or proposed conservation areas. That connection is expected to continue in perpetuity.

In addition, the application of prescribed burning and/or mechanical brush control should expedite the recovery of both the hydric pine and cypress communities¹ and provide a wildfire buffer to protect nearby homesites.

Creation of the ROMA is consistent with the Restoration Plan and the Southwest Florida Feasibility Study. The objectives of the Restoration Plan include wetland hydroperiod restoration to approach pre-development levels; replacement of concentrated shock load discharges to estuaries with distributed sheetflow; improved aquifer recharge; enhanced surface water deliveries to the adjacent Fakahatchee Strand State Preserve; reduction of overdrainage of the Fakahatchee Strand; reduction of overdrainage of the Florida Panther National Wildlife Refuge; and maintenance of existing flood protection for areas north of I-75.

Because the ROMA overlies an extremely important wellfield for the county’s populace, "[p]rotection of the long term sustained yield of this wellfield is one of the primary water supply related issues for the restoration of SGGE." Additionally, acquisition of "the entire project land under public ownership is the key element of the SGGE restoration plan."³ The ROMA is therefore consistent with the SGGE Restoration Plan..

The BCB plans to maintain flood protection in and around the ROMA.⁵ Response of the plant communities will be used as the primary evaluative factor.¹

The Feasibility Study is not yet complete. However, the adopted Regional Issues Paper by the Feasibility Study Team for the Collier West Watershed (which includes the ROMA Service Area) is consistent with the ROMA and states the following:

The hydrologic benefits of preserved natural lands will be quantified in the modeling efforts associated with the study and, along with other factors, will form the basis of any preservation and/or acquisition/conservation easement recommendations within the watershed....

Opportunity for restoration of flow ways for storage, aquifer recharge, water quality improvement, and wildlife and fisheries benefits will be sought.

The BCB plans to integrate the ROMA into the Feasibility Study and specifically to use the area to reconnect the more natural, southerly flow of water through the area to SGGE.

In addition, Collier County is in the process of formulating a Golden Gate Master Plan, which will guide development decisions in North Golden Gate Estates, including infrastructure, greenspace, fire prevention and wetland mitigation issues. Collier County plans to integrate the ROMA into the Golden Gate Master Plan. The ROMA will protect greenspace in North Golden Gate Estates. More importantly, the ROMA will help restore the watershed that is being depleted by residential development in North Golden Gate Estates.

This Plan will be revised every three (3) years.

Literature Cited

¹Southern Golden Gate Estates Watershed Planning Assistance Cooperative Study: Final Report. No date. South Florida Water Management District, Big Cypress Basin and USDA NRCS.

²Golden Gate Estates Redevelopment Study, Collier County, Fla.: Phase 1. No date. Collier County Board of County Commissioners.

³Hydrologic Restoration of Southern Golden Gate Estates: Conceptual Plan. Final Report. February 1996. South Florida Water Management District, Big Cypress Basin.

⁴Hydrologic Restoration of Southern Golden Gate Estates: Updated Vegetative Community Analysis. December 13, 2001. Big Cypress Basin.

⁵Five Year Plan – 2000-2004. South Florida Water Management District, Big Cypress Basin. Adopted January 21, 2000.

⁶ Myers, R.L. and Ewel, J.J. Ecosystems of Florida. 1990. University of Central Florida Press.

⁷Beever, J.W. III and K.A. Dryden. 1993. The hydric pine flatwoods of Southwest Florida. Florida Game and Freshwater Fish Commission, Office of Environmental Services, Southwest Florida Field Office.

⁸Duever, M.J., et al. 1986. The Big Cypress National Preserve. National Audubon Society.

⁹Florida Fish and Wildlife Conservation Commission. 1984. Closing the Gaps. Florida Game and Fresh Water Fish Commission.

Exhibits

Exhibit 1 North Golden Gate Estates ROMA vegetation communities. Collier County 2003

Exhibit 2 North Golden Gate Hydric Soils Model. Collier County and NRCS 2001

Exhibit 3 2000 aerial photograph of ROMA

Exhibit 4 Northern Golden Gate Estates areas of exotic plant infestation

Exhibit 5 Cost Estimate for ROMA Best Management Practices. NRCS 2003

Exhibit 6 Environmental Quality Incentive Program Pricing List. NRCS 2003

Exhibit 7 ROMA Field Data Sheet

Exhibit 8 Probable historic flowways in Golden Gate Estates²

Exhibit 9 Historic surface flow patterns prior to the development of SGGE¹

Exhibit 10 Normal hydroperiods and maximum water depths in Big Cypress habitats⁸

Exhibit 11 Faka Union Canal Watershed Boundary⁴

Exhibit 12 Subareas of the Big Cypress Watershed⁸

Exhibit 13 Soil Survey of Collier County Area, Florida. NRCS

Exhibit 14 Topographic map. US Geological Survey

Exhibit 15 Historic vegetation map, pre-development²

Exhibit 16 Pre-development Vegetation Map, Southwest Florida Feasibility Study Team

Exhibit 17 Selected tree densities and dominance in a cypress forest of North Golden Gate Estates²

Exhibit 18 Successional processes without fire, shallow water marsh to hammock in Big Cypress National Preserve; Successional processes without fire, deep-water to marsh in Big Cypress National Preserve⁸

Exhibit 19 SFWMD land cover Golden Gate Estates¹

Exhibit 20 Wellfield Protection Zones in ROMA Service Area. Collier County 2003

Exhibit 21 Future Land Use Map, Collier County, Florida

Exhibit 22 Picayune Strand State Forest Plant List¹

Exhibit 23 Rare, endangered, and threatened plants of the Big Cypress National Preserve⁸

Exhibit 24 Vegetation expected to occur in hydric pine flatwoods of Southwest Florida⁷

Exhibit 25 Listed Animal Species of North Golden Gate Estates ROMA Area,

Collier County. FFWCC

Exhibit 26 Major factors limiting populations of rare and endangered animals in the Big Cypress National Preserve⁸

Exhibit 27 Florida Panther Points of North Golden Gate Estates ROMA Area. FFWCC

Exhibit 28 Strategic Habitat Conservation Areas of North Golden Gate Estates ROMA Area. FFWCC

Exhibit 29 Biodiversity Hotspots of North Golden Gate Estates ROMA Area. FFWCC

Exhibit 30 Priority Wetlands of North Golden Gate Estates ROMA Area.

FFWCC

Exhibit 31 Wildlife expected to occur in hydric pine flatwoods of Southwest Florida⁷

Exhibit 32 Wildlife of Picayune Strand State Forest¹

Exhibit 33 Wildlife found in Big Cypress National Preserve, and habitat types associated with each species⁸

Exhibit 34 Hydrologic Features of North Golden Gate Estates ROMA. FFWCC