

## **VI. Conservation Element**

### **Introduction**

The City of Clewiston is approximately 3000 acres in size with a north-south dimension of approximately 10,150 feet and an east-west dimension of 13,070 feet. The City is bordered on the north by the C-21 Canal, on the south and west by the Sugarland Drainage District, and on the east by the Industrial Canal. The City is developed largely with agricultural, residential and community commercial land uses that have no significant or adverse impacts on environmentally sensitive lands.

### **Environmental Setting**

The City's climate is characterized by semi-tropical conditions of high humidity, high annual rainfall, and warm summers. The mean annual temperature is 74 degrees and ranges from a low of 64 degrees during January to a high of 82 degrees in August. Clewiston is historically a physiographic portion of the Everglades. Lake Okeechobee is adjacent to the northeast portion of the City. Historically, water from the lake overflowed the southern rim and provided sustenance to the Everglades. The Herbert Hoover Dike was constructed to form a reservoir for irrigation, municipal water, navigation, and flood control. As a result, the originally occurring sawgrass and hammock vegetation was replaced by agricultural use. There are no rivers, bays, wetlands, or marshes within the City limits. The only water bodies consist of small man made lakes and drainage canals.

### **Air Quality**

Air quality monitoring in the City documents there are no point-sources of air pollution and non-point sources are a result of burning during the sugarcane harvest.

The greatest generator of air pollution in Southwest Florida is the automobile. However, this source of pollution is not a significant factor in a small, free-standing city such as Clewiston as compared to the large metropolitan areas along the east and west coastlines of the State.

In general, the air quality in the Clewiston area appears to be quite stable and has in fact improved as a result of efforts by the sugar cane processing industry to reduce pollutants in emissions.

### **Surface Water Quality**

Clewiston is situated within an agricultural area. Within the City limits, the only surface water is found where the canals have been dredged for drainage and agricultural purposes. Sources of pollution occur as non-point sources that include agricultural runoff, urban stormwater runoff, and from concentrations of septic tanks in isolated areas. According to the Department of Environmental Protection, there are no listed or permitted point source discharges to the City of Clewiston surface waters.

Drainage canals divert runoff through the City and eventually connect to the Caloosahatchee River or to Lake Okeechobee during periods of extreme flooding and water supply recharge. The general water quality of Lake Okeechobee has been described by the South Florida Water Management District as overly enriched or eutrophic. This has been demonstrated by the algae blooms that cover extensive surface areas during portions of the warmer months. Nitrogen and phosphorus are the primary nutrients resulting in pollution of the lake and outfall canals. These pollutants are usually generated naturally from rainfall and also come from sources that include fertilizer runoff and septic tank diffusion. The Lake Okeechobee Surface Water Improvement and Management (SWIM) plan establishes nutrient loading standards for surface waters discharging directly into Lake Okeechobee.

## **Potable Water**

The City obtained a 2025 Consumptive Use Permit for a three million gallon per day (3 MGD) Reverse Osmosis Water Treatment Plant to supply potable water to the City, the South Shore Water Association and the unincorporated Harlem area. The South Shore Water Association provides water to the unincorporated areas between Clewiston and South Bay on the east and between Clewiston and Moore Haven on the west. The new plant became operational in 2008.

The water supply source will be the Upper Floridan Aquifer and the permitted allocation is for 2.6 MGD of raw water. Due to the change in treatment technologies and source of supply, the daily raw water per capita use rate is expected to increase from its current 115 GPCPD to 150 GPCPD. Finished water demands, however, are anticipated to remain at approximately 115 GPCPD. Based on anticipated raw water loss during treatment, the amount of finished water supply available under the new Consumptive Use Permit is approximately 2 MGD, which will support a population of approximately 17,000 within the facilities service area at a level of service of 115 GPCPD.

Based upon projections approved in the Lower West Coast Regional Water Supply Plan, the current facility design capacity of the City's new water treatment plant facility appears adequate to meet projected future demands in the service area to at least 2025. The source of the water supplies to meet the 2015-2025 demands will remain the Upper Floridan Aquifer.

## **Groundwater Resources and Recharge**

Currently groundwater quality in Clewiston is poor. As said above, the City is in the process of developing a potable water source using deep wells with a reverse osmosis plant.

The surficial aquifer utilized for irrigation purposes is controlled indirectly by the Clewiston Drainage District. The Clewiston Drainage District (CDD) encompasses the entire City.

The CDD canal system is maintained at or near elevation 14 feet above sea level during periods of no rainfall. The design elevation during storms is elevation 12 feet above mean sea level.

Lake Okeechobee and the hydrologic conditions existing at any specific time will impact the groundwater elevation. Lake Okeechobee water levels are regulated at a range of 15.5 to 17.5 feet, which provides additional water storage in the Everglades, urban areas, and as a supply for agriculture.

The Surficial Aquifer System is composed of a water table aquifer and a deeper Tamiami aquifer. Separating these aquifers is a leaky confining layer. A low permeability layer, composed of the upper Hawthorn confining zone, separates the Surficial Aquifer System from the deeper Intermediate Aquifer System. The sand-stone aquifer system is contained within the Intermediate Aquifer System.

The primary source of recharge to the water table aquifer in the Clewiston area is direct infiltration of rainfall. Recharge to the lower Tamiami aquifer occurs by downward leakage from the water table aquifer through the overlying confining zone.

In Hendry County, significant recharge to the sandstone aquifer occurs near Immokalee (SFWMD Technical Report 88-12). This recharge region is located about 40 miles to the southwest of the City of Clewiston. Significant, localized recharge areas for the Surficial, Floridian, or Biscayne aquifers are not present in the Clewiston area.

## **Water Conservation**

As a means of ensuring conservation of potable water in emergency conditions, the City has adopted Ordinance 81-4 which sets forth applicable conditions under which the specified water conservation measures will apply.

Historically, demand for potable water had averaged 125 gallons per capita per day (GPCPD). However, due to price increases imposed by the City, consumers have undertaken water conservation measures and there has been increased usage of water saving devices resulting in an 8% decline in per capita demand to 115 GPCPD.

A spray irrigation system, using treated effluent from the City's wastewater treatment plant, is an important water conservation activity of the City. The spray irrigation fields are located in the same area as the treatment plant (see Figure V-1 in the Sanitary Sewer sub-element).

## Vegetation and Wetlands

Figure II-4 in the Future Land Use Element shows the generalized boundaries of wetlands in the City. The approximate boundaries are based on maps provided by the U. S. Fish & Wildlife Service. According to this information, there are about 51 acres of emergent wetlands and about 18 acres of forested/shrub wetlands, all located along the northern perimeter of the City. However, the actual physical extent and quality of the identified wetlands are subject to field verification prior to permitting by the South Florida Water Management District.

The existing conditions in Clewiston are such that native plant communities do not exist. The vegetation existing within the City primarily consists of planted ornamentals.

The following noxious, exotic species shall be prohibited for use in initial or subsequent landscaping, or for replacement of damaged vegetation. Additionally, the following listed exotic species shall be removed during new construction and owners of developed properties shall be encouraged to replace such species with appropriate native plants.

Causarina cumminhamiana	(Beefwood)
Causarina glauca	(Scaly-bark Beefwood, Brazilian Oak)
Causarina equisetifolia	(Australian Pine)
Melaleuca quinquenervia	(Punk Tree or Cajeput)
Schinus terebinthifolius	(Brazilian Pepper)

## Wildlife

The region within the vicinity of Clewiston supports a diversity of wildlife, supplemented by the transitional species of migratory birds. Wildlife in the City consists primarily of birds migrating to the shores of Lake Okeechobee, and wading birds that feed along the edge of drainage canals. Nesting birds in the City are species which have adapted to the urban environment. Table VI.2 indicates the endangered, threatened, and species of special concern associated with Lake Okeechobee.

Table VI.2 Wildlife City of Clewiston, Florida		
Common Name	Scientific Name	Status
<b>Birds</b>		
Little blue heron	<i>Egretta caerulea</i>	S
Snowy egret	<i>Egretta thula</i>	S
Tricolored heron	<i>Egretta tricolor</i>	S
Peregrine falcon	<i>Falco peregrinus tundrius</i>	E
Wood stork	<i>Mycteria americana</i>	E
Crested caracara	<i>Polyborus plancus</i>	T
<b>Reptiles</b>		
American alligator	<i>Alligator mississippiensis</i>	T, S/E, *

Source: Hendry County Planning Department

S Species of Special Concern

T Threatened

E Endangered

\* Alligators are biologically neither endangered or threatened and may be hunted as permitted under state law. For law enforcement purposes they are classified as “Threatened Due to Similarity of Appearance.”

## Commercially Valuable Minerals

There are no sources of commercially valuable and extractable minerals in the City.

## Soils

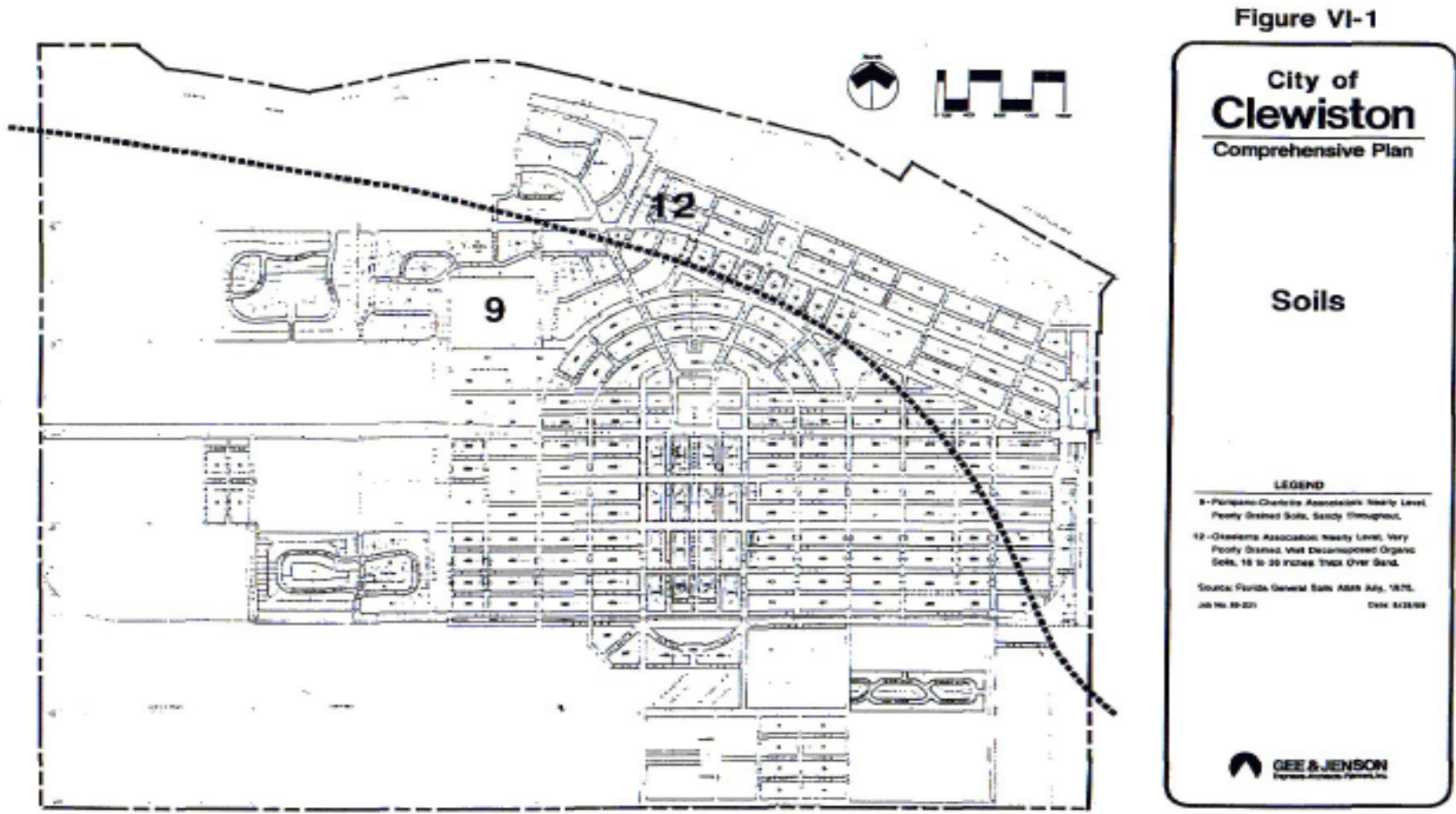
There are two (2) soil types located in Clewiston. The location of the various soil types is shown on Figure VI-1. Each soil classification is described under the DRAINAGE sub-element of Chapter V.

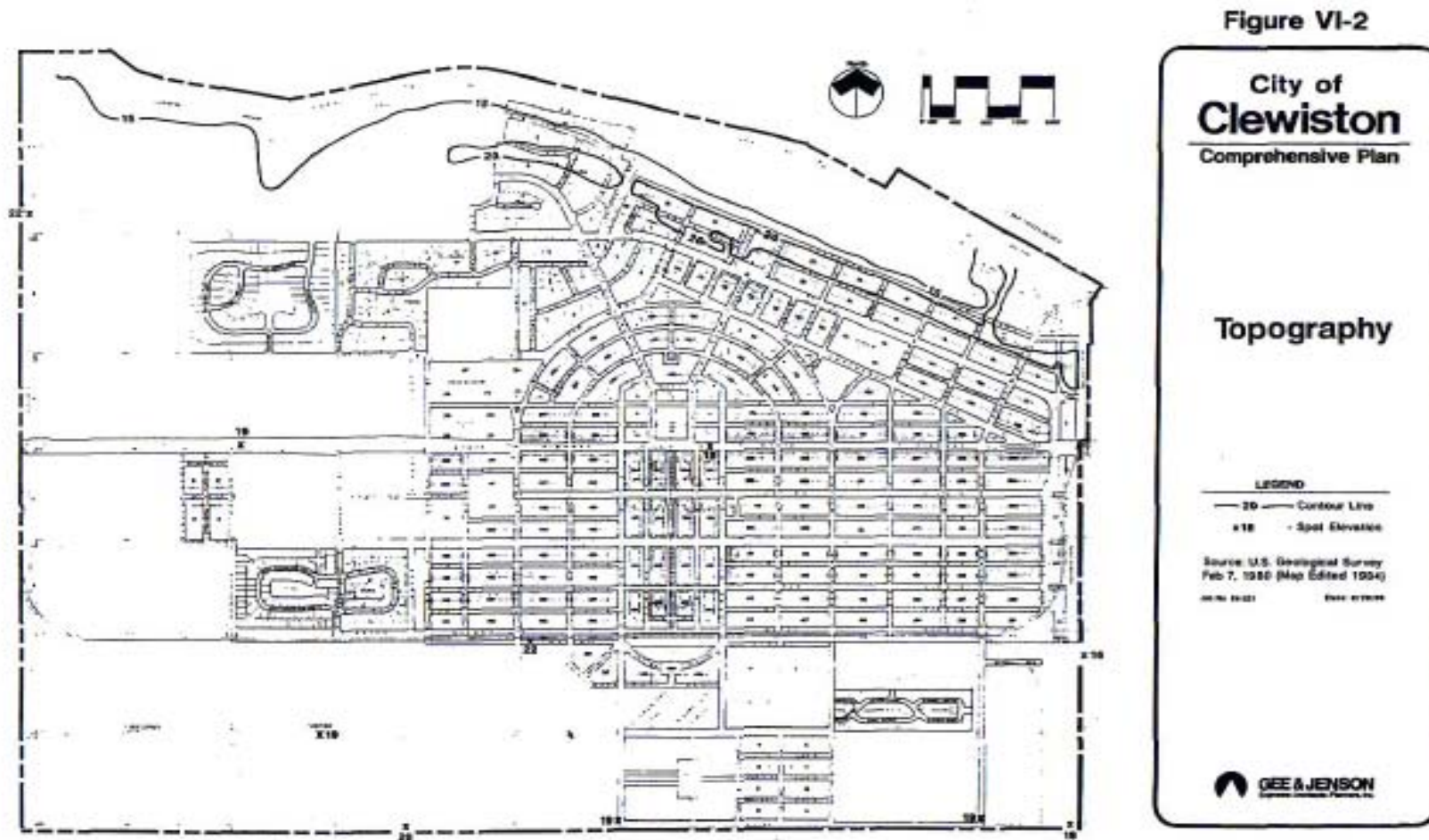
## Soil Erosion

The Soil Conservation Service states that there are no long-term erosion problems and any short-term erosion, in terms of agricultural use, is easily corrected and regulated with the use of drop pipes. The agricultural zones within the City occur on soil that is sandy throughout and lacks organic matter; therefore, subsidence is not an issue.

## Topography

Ground elevations in the City vary from 16 feet to 20 feet above mean sea level. Spot elevations on existing roadways exceed 20 feet in several instances. The higher elevations occur along the western boundary of the City and along the northern boundary where a ridge zone is evident. The ridge zone is a portion of the old lake shore of Lake Okeechobee. Figure VI-2 depicts the City’s topography.





## Conservation Goals, Objectives, and Policies

- Goal 1:** Conservation, protection, and management of the natural resources of the City to ensure maintenance of wildlife habitats for the benefit and enjoyment of future generations while promoting the highest environmental quality possible.
- Objective 1.1:** The City will continuously monitor air quality data collected at sampling stations inside and adjacent to the City; and through its development permitting activities, as well as through effective intergovernmental coordination with Hendry County and the Florida Department of Environmental Protection (FDEP), shall ensure that no established air quality standard is exceeded or degraded on an annual average basis.
- Policy 1.1.1:** The City will review air quality data and reports generated by the FDEP on a regular basis to determine any implications for regional efforts or permitting actions as may be required to maintain air quality standards.
- Policy 1.1.2:** Prior to City approval of a Development of Regional Impact (DRI), the developer shall conduct a study of transportation-related air quality impacts which may be reasonably expected to result from the project, and provide measure for mitigating those impacts.
- Policy 1.1.3:** New commercial or industrial development which will release toxic or hazardous substances into the air will be buffered from existing residential, public, conservation or preservation land uses, as well as areas designated for these land uses on the Future Land Use Map.
- Objective 1.2:** The City shall take steps to conserve, appropriately use, and protect the quality and quantity of current and projected water resources including wetlands.
- Policy 1.2.1:** The City shall update and implement provisions within its land development regulations as required by Section 163.3202 F.S. so as to require all future development to meet stormwater quantity and quality standards as set forth by the South Florida Water Management District.
- Policy 1.2.2:** The City shall enforce Ordinance 81-4 whereby emergency conservation of water sources is accomplished in accordance with the plans of the South Florida Water Management District.



**Policy 1.2.3:** The City shall participate in the Lake Okeechobee SWIM plan and will coordinate with the South Florida Water Management District in the implementation of the plan through the City's public operations and permitting process in accordance with revisions to its land development regulations as required by S.163.3202, F.S.

**Policy 1.2.4:** The City shall work with the Clewiston Drainage District (CDD) to implement a water quality monitoring program for the discharges into the primary canal system and discharges from the CDD pump stations.

**Policy 1.2.5:** At the time Hendry County adopts regulations to protect potable water sources by a wellfield protection ordinance, the City will enact necessary complimentary regulations.

**Policy 1.2.6:** The City will continue its practice of disposing of treated wastewater effluent from its treatment plant by spray irrigation and expand the system to meet future needs.

**Policy 1.2.7:** The City shall not approve any development that would alter the ecological functions of wetlands habitat. Ecological functions include:

- (a) provision of wildlife and fisheries habitat;
- (b) maintenance of in-stream flows and lake levels during periods of high and/or low rainfall;
- (c) erosion control;
- (d) water quality enhancement; and
- (e) natural vegetative communities.

**Policy 1.2.8:** Wetlands, within the City of Clewiston and as shown on Figure II-4 in the Future Land Use Element, are general designations and actual wetland boundaries are subject to field verification by the Applicant at the time of South Florida Water Management District permitting. Once verified as being wetlands, such lands shall be designated Conservation on the Future Land Use Map and development of such wetlands shall be restricted as stated below in Policy 1.2.9.

**Policy: 1.2.9:**

Development within wetlands shall conform to the following criteria:

1. All permits from an agency with jurisdiction shall be approved prior to issuance of a final development order.
2. All new development or redevelopment shall be designed to avoid impacts to wetlands. Where impacts cannot be avoided, impacts shall be minimized and shall be mitigated by wetland compensation or wetland enhancement. Wetland impacts, where unavoidable and where properly mitigated, as determined by state and federal agencies having jurisdiction, shall be permitted for:
  - a) Access to the site.
  - b) Internal traffic circulation, where other alternatives do not exist, or for purposes of public safety.
  - c) Utility transmission and collection lines.
  - d) Pre-treated stormwater management.
  - e) Preventing all beneficial use of the property from being precluded. If a site is such that all beneficial use of the property will be precluded due to wetland restrictions, the property shall be developed at a density of one dwelling unit per 20 acres.
  - f) If buildable uplands are available, residential development shall be clustered away from wetlands such that wetlands and their functions are protected.
  - g) If buildable uplands are available on site, but the proposed development will cause or result in a disturbance of wetlands, residential development shall be transferred from the wetland portions of the site to the non-wetland portions at a density of one unit per 10 acres, and whatever unavoidable impact to wetlands that occurs be mitigated.
3. Commercial and industrial development shall not be located within wetlands.
4. Publicly owned wetlands (designated Conservation) on the Future Land Use Map shall have a density of zero.
5. No parcel shall be created after the effective date of this amendment which consists entirely of wetlands.

**Policy 1.2.10:** Mitigation activities for impacting wetland areas will be permitted when the mitigation activities are intended and designed to restore wetland areas to their natural conditions, including water flows, hydroperiods, and native vegetative communities. Mitigation of wetland impacts will be allowed when permits authorizing the mitigation have been obtained from the South Florida Water Management District, the Florida Department of Environmental Protection, and/or the U.S. Army Corps of Engineers, as applicable. The rate of mitigation shall be one-to-one, or as specified by the permitting authorities, whichever is more restrictive.

**Objective 1.3:** The City of Clewiston shall ensure the preservation of threatened and endangered species, and species of special concern, through the protection of individual species and their critical habitat through the implementation of the following policies:

**Policy 1.3.1:** Sites proposed for development activities within the known range of endangered or threatened species shall be surveyed at the applicant's expense subsequent to a request by local officials. Such survey shall be conducted by a qualified ecologist, approved by the City, prior to approval of a site plan or commencement of development activities to determine whether or not endangered or threatened plant and animal populations occur, and the potential impact of the proposed development upon same. This request will originate within the City's site plan review process.

**Policy 1.3.2:** Where endangered or threatened plant or animal species or their critical habitats are identified as existing on a proposed development site, said population or habitat shall be protected from the negative influences of development by adequate buffering or clustering of development, or other professionally recognized methods of mitigating such effects.

**Objective 1.4:** The City will protect and preserve existing native habitats and re-establish where possible.

**Policy 1.4.1:** The following noxious, exotic species shall be prohibited for use in initial or subsequent landscaping, or for replacement of damaged vegetation. Additionally, the listed exotic species shall be removed during new construction and owners of developed properties shall be encouraged to replace listed species with appropriate native plants.

- |                          |                                      |
|--------------------------|--------------------------------------|
| Causarina cunninghamiana | (Beefwood)                           |
| Causarina glauca         | (Scaly-bark Beefwood, Brazilian Oak) |
| Causarina equisetifolia  | (Australian Pine)                    |
| Melaleuca quinquenervia  | (Punk Tree or Cajeput)               |
| Schinus terebinthifolius | (Brazilian Pepper)                   |

- Policy 1.4.2:** A portion of the natural, native, upland plant communities which may be present on development sites shall be preserved and maintained in their original state, in conjunction with the City's permitting responsibilities except where such preservation can be shown to conflict with the public interest.
- Objective 1.5:** The City shall protect its groundwater resources and the environment through sound stormwater management practices as well as other resource conservation and protection measures.
- Policy 1.5.1:** The City will coordinate with the South Florida Water Management District in the establishment of water quality standards.
- Objective 1.6:** The City shall ensure environmentally sound management of hazardous wastes and reduction of potential problems resulting therefrom.
- Policy 1.6.1:** The City shall support enforcement of current state and federal regulations aimed at prohibiting discharge of wastewater containing hazardous and industrial waste to septic tanks or through stormwater runoff into aquifer recharge areas or surface waterbodies.
- Policy 1.6.2:** The City shall establish public education programs encouraging City residents and business owners to avoid dumping of used petroleum products, paint, hazardous materials and pesticides onto the ground or waterbodies.
- Policy 1.6.3:** The City shall coordinate and monitor hazardous wastes by collection and transportation entities to ensure safe and responsible handling practices.