

2.26 Wellhead Protection – Administrative Arrangements

A. Introduction & Background

Collier County was created in 1923 by the Florida legislature from portions of Lee and Monroe Counties. Located in southwest Florida, Collier County is bordered by the Gulf of Mexico on the west, Lee County to the North, Miami-Dade and Broward counties to the east, and Monroe County to the south. The City of Naples, located in the western and coastal area of Collier County, is the largest of the three (3) incorporated cities in Collier County. The other two cities are Everglades City, located in the south central portion of the County; and, Marco Island, located in the southwestern portion of the County. Immokalee, an urban designated area within unincorporated Collier County is located in the northeastern portion of the County.

Collier County comprises approximately 2,040 square miles of land and lies in a geological location situated between the tropical and the temperate climate zones. Mankind's impact on South Florida ecosystem and natural resources has been considerable, especially in the last century. Extensive drainage of natural wetlands and the rerouting of natural waterways have been compounded by massive population growth, which has led to the rapid development of this sensitive area. These factors highlight our need for a thorough knowledge of the distribution of water, an understanding of the effects of our activities on water availability and purity, and for long-range planning of water requirements. There is a rising political importance to freshwater and it will only grow in the years to come. In the future, the availability of potable water, more than any other factor in the future, will determine the number of humans who can live in any geographical province as well as determining their use of natural resources and overall lifestyle.

In Collier County, the Surficial Aquifer System (Figure 2.26-1), which is representative of the Water Table Aquifer and Lower Tamiami Aquifer, extends approximately 100 feet below the surface, though in some areas it may be deeper or shallower. The Lower Tamiami Aquifer is the major potable water-producing unit in all of Collier County. Surface water that flows through the wetlands is in the water-table aquifer. The Intermediate Aquifer System (Figure 2.26-1), which presently serves as a lesser source of potable water, contains of the Sandstone Aquifer and the Mid-Hawthorn Aquifer. The Intermediate Aquifer System ranges between 100 feet and 400 feet below land surface.

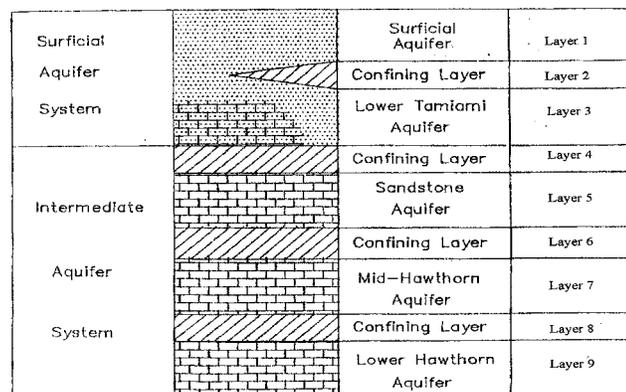


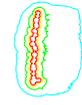
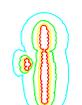
Figure 2.26-1. Stratigraphy and hydrogeologic grouping of aquifers in the study area (based on Bennett et al, 1992)

Extraction of groundwater can lead to a lowering of the water table, ground surface subsidence, and saltwater intrusion into aquifers in coastal areas. The importance of water as a resource will inevitably grow as Collier County population increases with the subsequent impact of its quality. There is an increasing awareness for the need to leave major quantities of water for preservation of the environment.

Pursuant to Florida Statute (§163.3402 F.S.), Collier County has adopted the Division 3.16 "Ground Water Protection" of the County's Land Development Code (LDC), which implements and is in conformity with the components of Collier County's adopted Growth Management Plan. The purpose of this regulation is to protect the public potable water supply wellfields from existing and future land use and surface activities. The Ground Water Protection Division 3.16 of the County's LDC establishes standards, regulations and procedures for the review and approval of existing and proposed development within the mapped wellfield protection zones in the unincorporated and incorporated areas of Collier County. Collier County identifies and protects natural groundwater aquifer recharge areas from activities that could degrade and/or contaminate the quality of groundwater (Figure 2.26-2). Note that the "Marco Lakes Wellfield" designation on Figure 2.26-2 is incorrect.

LEGEND

-  One (1) Year Travel Time
-  Two (2) Year Travel Time
-  Five (5) Year Travel Time
-  Twenty (20) Year Travel Time

-  Coastal Ridge Wellfield (CON CR)
-  Florida Cities Wellfield (FC GGC)
-  Collier County Wellfield (CC CGG)
-  Orangetree Wellfield (OT)
-  East Golden Gate Wellfield (CON NGG)
-  Marco Lakes Wellfield (FC MAR)
-  Everglades City Wellfield (EC)
-  Immokalee Wellfield (IWS INE,INW,SE)

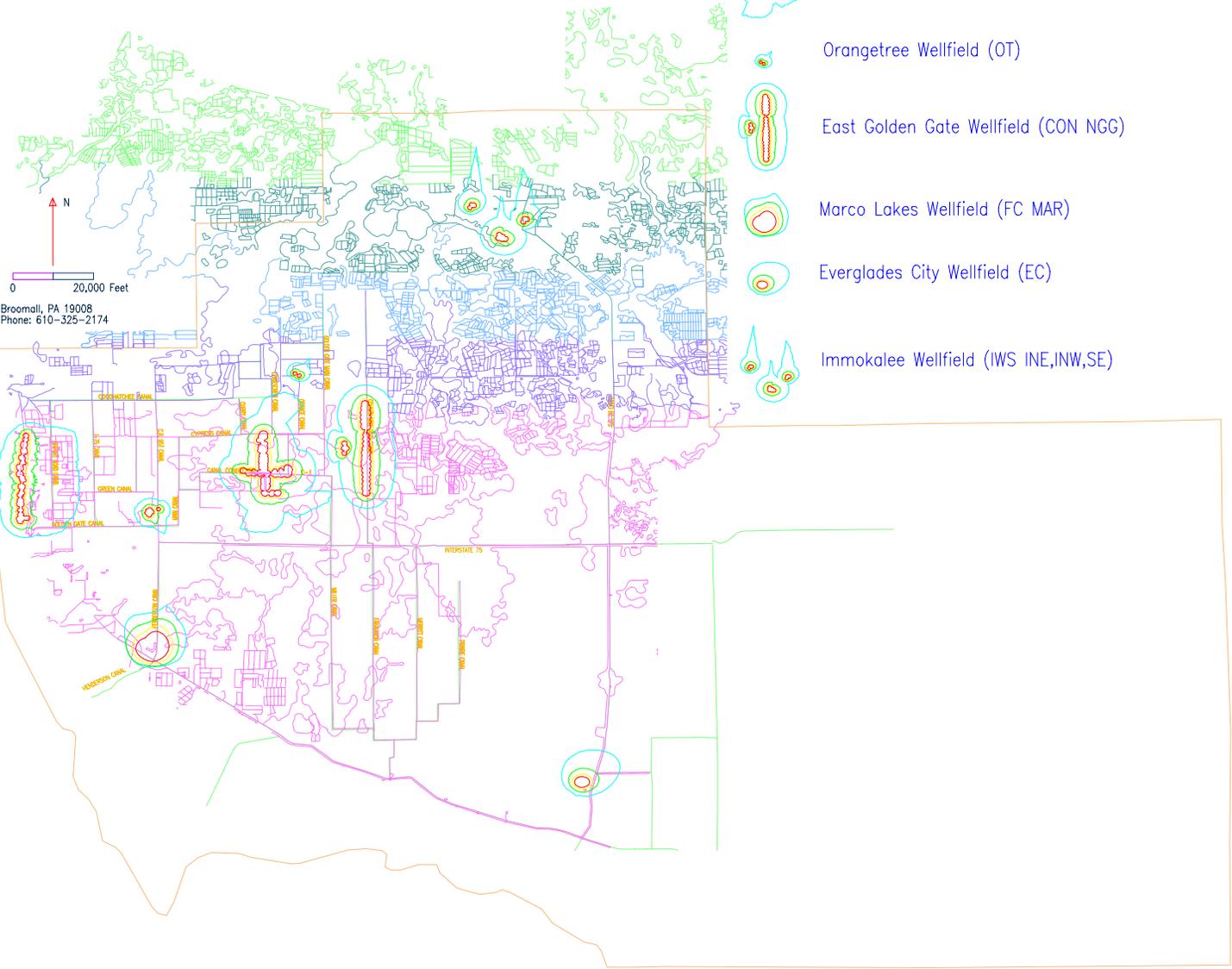


Figure 2.26-2. Wellfield Protection Zones overlaid on Collier County Hydrology

This Evaluation and Appraisal Report (EAR) on Wellhead Protection was prepared in accordance with Florida Statute 163.3191, Evaluation and Appraisal of Comprehensive Plan. More specifically, the EAR includes an analysis of the social, economic and environmental impacts (§ 163.3191(2)(e) F.S.), linking the major issues to specific objectives found in the Conservation and Coastal Management Element of Collier County's Comprehensive Plan (§163.3191(2)(g) F.S.).

B. Identification of Specific Objectives from the Conservation and Coastal Management Element (CCME):

OBJECTIVE 3.1:

“Ground water quality shall meet all applicable Federal and State water quality standards by January 2002, and shall be maintained thereafter.”

Groundwater quality has not “always” met all applicable Federal and State water quality standards by January 2002 or thereafter. Due to local geological conditions, aquifer systems may have concentrations that exceed standards (Primary/Secondary Drinking Water Standards), that were established for Municipal Water Supply Utilities but also apply to the ground water under 62-520.420(1) F.A.C. When comparing these standards against untreated ground water, some exceedances (Total Dissolved Solids, Iron, Color, Manganese) have been detected on a somewhat regular basis (Table 2.26-1). These exceedances may be connected to local geological conditions that are naturally leaching these monitored constituents into the aquifer system. Occasionally exceedances in chromium and lead were detected that may be related to pollution sources (i.e. sewage, hazardous materials). No pattern has yet developed that would warrant a “Very Intensive Study” within the area of the monitoring well. The County will continue to monitor these wells for the purpose of enhancing water quality data and the possible need for further study.

To eliminate or drastically reduce the impact point source pollution has on its ground water, Collier County has implemented numerous proactive and reactive programs designed to protect this valuable resource from man-made pollution sources. Division 3.16, LDC, "Ground Water Protection" is designed to control the location of land uses with the potential of releasing pollutants into the environment in close proximity to Municipal Water Supply Wellfields. The County's Community Development & Environmental Services Division applies these criteria, with no variance to date, to all land use requests. Compliance inspection programs are being implemented to ensure that wastewater treatment plants, domestic sludge application sites, small businesses that generate or use hazardous materials, and petroleum storage tanks are operating in accordance with State and local regulations. To address releases of pollutants in Collier County, the County has established a strong working relationship with the Florida Department of Environmental Protection for the purpose of coordinating the cleanup of approved petroleum release sites (Petroleum Cleanup Contract) and to properly collect and dispose of abandoned hazardous materials reported to the County.

**Table 2.26-1
Non-Potable Monitoring Well
Results, 1997 to 2002**

<u>Well Number</u>	<u>Depth (Feet)</u>	<u>Number of Analyses</u>	<u>Number of Potential Exceedances*</u>
1057	10.5	118	18
996	20	117	19
1097	20	118	12
1068	25	100	12
1059	25	36	5
984	40	121	18
1003	61	216	11
495	70	144	5
1058	80	118	13
985	160	118	11
1055	200	117	16
687	310	36	0
684	490	53	1

62-520.420(1) F.A.C.

OBJECTIVE 3.2:

“The County shall implement a well construction compliance program under criteria specified in the Collier County Well Construction Ordinance, which is designed to ensure proper Construction of wells and promote aquifer protection.”

The Collier County Engineering Department within the Community Development and Environmental Services Division has two full time Well Inspectors that perform onsite inspection of all new wells drilled in Collier County, with the exception of those new wells inspected by the State. This program has been in effect since 1988, when the South Florida Water Management District and Collier County entered into an agreement. During each inspection the inspector checks the well’s casing and total depth, to ensure that the well meets State and County requirements. In addition please find attached a website that tracks those privately owned wells for which the County issues Well Construction Permits. <http://www.colliergov.net/pollutioncontrol/wells/default.cfm>

OBJECTIVE 3.3:

“Continue to identify, refine extents of, and map zones of influence and contribution around potable wellfields in order to identify activities that must be regulated to protect ground water quality near wellfields. (Refer to Objective 1.1 in the Natural Ground Water Aquifer Recharge Sub-Element.)”

An update to the 3-dimensional computer model that calculates cones of depression around significantly sized existing and planned potable wellfields was completed March 2, 2003. This model has been used to update Wellfield Risk Management Zones located around Municipal Water Supply Wellfields; in accordance with Collier County’s Land Development Code, Division 3.16 “Groundwater Protection.” The model can be reviewed by governmental entities and the general public at the following website:

http://co.collier.fl.us/graphics/Zoning_Maps/Collier_County_Base_map.htm

OBJECTIVE 3.4:

“Collect and evaluate data and information designed to monitor the quality of ground water in order to identify the need for additional protection measures. (Refer to Objective 1.3 in the Natural Ground Water Aquifer Recharge Sub-Element.)”

Presently, Collier County collects and evaluates ground water data from thirteen (13) monitoring wells located throughout the County (Map 2.26-1 on page 2.26.17). In accordance with a Collier County / South Florida Water Management District Contract, the County also collects ground water samples for a base line monitoring study in the North Golden Gate Estates area. The Florida Department of Environmental Protection has not yet made available their trend assessment of this data, so it is not incorporated in this report. Another source of ground water monitoring data comes from the monitoring of the County’s municipal water supply wells. Ground water data collected from Collier County’s wellfield in 1999 indicate high sodium, total dissolved solid, chloride and hardness concentrations, all typical of local background water quality conditions within the lower Hawthorn Aquifer. For those wells in the Lower Tamiami Aquifer, the background water quality represented what is naturally found in that aquifer system.

In addition to these sampling programs the Collier County Board of County Commissioners has recently approved a 50% Cost Share Grant (Contract Number C-15055) with the Big Cypress Basin Board and the South Florida Water Management District (SFWMD) designed to monitor ground water quality at 141 randomly selected, privately-owned potable water wells in Golden Gate Estates. The objective of this project is to generate a baseline set of groundwater quality data for Golden Gate Estates that will include a quantitative determination of contaminants that may have entered the ground water from various sources, such as septic tank systems, landscaping and agricultural activities and automobile repairs.

OBJECTIVE 9.2:

“The County shall verify the management and disposal practices of identified businesses that are potential generators of hazardous waste, at a rate of 20% of these businesses per year.”

The fundamental principle of the Resources Conservation and Recovery Act (RCRA) is to promote the protection of human health and the environment from potential adverse effects of improper solid and hazardous waste management, conserve material and energy resources through waste recycling and recovery, and reduce or eliminate the generation of hazardous waste as expeditiously as possible. The core of the RCRA regulations establishes the “cradle to grave” hazardous waste regulatory program set forth in the Chapter 40 Code of Federal Regulations (CFR) through seven major sets of regulations in Chapter 40, Parts 260 – 279 and 148.

Collier County is working with the Florida Department of Environmental Protection to ensure that these Federal requirements are met. Through an Enhanced Compliance Assistance Verification Program, a “sideways management” approach has been implemented where two agencies work together to more efficiently address compliance issues. As a consequence of this enhanced program, there has been an improvement in the percentage of properly managed hazardous waste from 1998 (98.2%) to today (99.8%). This improvement better protects the environment from the release of hazardous wastes due to improper management practices.

OBJECTIVE 9.3:

The Collier County Solid Waste Department shall continue to hold its hazardous waste collection day at least once per year.

The Collier County Solid Waste Department holds its household hazardous waste collection events several times throughout the year. In addition, the Solid Waste Department manages a Household Hazardous Waste Collection Center that is open to residents Tuesday through Friday (12:00 noon till 1:00 pm) and Saturday’s (8:00 am till 12:00 noon). Limited household hazardous wastes (i.e. waste oil, antifreeze, fluorescent lamps, electronics, batteries and paints) are accepted at the County’s three recycling centers during normal operating hours.

OBJECTIVE 9.4:

“The County shall continue to implement its local storage tank compliance program.”

The Pollution Control & Prevention Department carries out annual routine compliance inspections, closure inspections, and installation inspections on all regulated storage tank facilities in Collier County. All records relating to fuel inventory, release detection, registration, insurance and repairs are checked to determine if any historical leaks have occurred. A certified non-compliance letter is issued to the facility owner/operator when a violation occurs and a

written response is requested within 15 days for corrective actions to be taken. A non-compliance re-inspection is performed when the violations have been corrected, or 60 days have passed. Should there be no response or no corrective action, an enforcement case is prepared and referred to FDEP.

The primary focus of the state and federal regulations governing these facilities is the prevention and control of leaking product into the groundwater. The Department carried out 2,344 inspections on aboveground and underground storage tanks between October 1, 1998, and September 30, 2003, with 1,799 violations cited. The average rate of compliance has increased from 88.8% to above 97% during this time frame. This increase in the rate of compliance reflects the ability of Collier County to prevent the possible contamination of the groundwater through citation of violations and extending assistance to the owner/operator of the facility in taking corrective actions. Enforcement against violators, when necessary, is taken through FDEP.

Table 2.26-2 A Brief Summary of the Identified Objectives:

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996-2003)	Comments
<p>Objective 3.1, Conservation and Coastal Management Element:</p> <p>Ground water quality shall meet all applicable Federal and State water quality standards by January 2002, and shall be maintained thereafter.</p>	<p>To ensure that groundwater quality "always" meets all applicable Federal and State water quality standards</p>	<p>At the time this objective was adopted, the County had already established Collier County's Ground Water Protection Land Development Code (LDC) Division 3.16 in November, 1989</p>	<ul style="list-style-type: none"> • On average, each of the thirteen wells were sampled 109 times. • On average, each of the 13 wells was found with potential 11 exceedances. • The County's Community Development & Environmental Services Division applies these criteria, with no variance to date, to all land use requests. 	<p>This Objective should be revised as it is not obtainable.</p> <p>Due to local geological conditions, aquifer systems may have analyte concentrations that exceed standards (Primary/Secondary Drinking Water Standards) that were established for Municipal Water Supply Utilities. This unobtainable objective also applies to ground water under 62-520.420(1) F.A.C.</p>
<p>Objective 3.2, Conservation and Coastal Management Element:</p> <p>The County shall implement a well construction compliance program under criteria specified in the Collier County Well Construction Ordinance, which is designed to ensure proper Construction of wells and promote aquifer protection.</p>	<p>To ensure proper Construction of wells and promote aquifer protection.</p>	<p>At the time this objective was adopted, the County had already established Collier County's Well Construction Ordinance</p> <ul style="list-style-type: none"> • December, 1989 Adoption of LDC, Division 3.6 • 1989-1991: contracts with the SFWMD for well abandonment • 1991, November: adoptions of LDC, Division 3.16 	<p>The County has implemented this objective with the constant vigilance of two full time Well Inspectors that perform onsite inspection of all new wells drilled in Collier County, with the exception of those new wells inspected by the State. This program has been in effect since 1988, when the South Florida Water Management District and Collier County entered into an agreement. During each inspection the inspector checks the well's casing and total depth, to ensure that the well meets State and County requirements.</p>	<p>This is a good straightforward objective which should remain in the updated Comprehensive Plan</p>

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996- 2003)	Comments
<p>Objective 3.3, Conservation and Coastal Management Element:</p> <p>Continue to identify, refine extents of, and map zones of influence and contribution around potable wellfields in order to identify activities that must be regulated to protect ground water quality near wellfields.</p>	<p>Identify activities that must be regulated to protect ground water quality near wellfields.</p>	<p>This was already a requirement of the County through the identification and mapping of the Zones of Concentration provided the basis for the Wellfield Protection Zones and the Groundwater Protection Ordinance</p>	<p>The County has implemented this objective with usage of the 3-dimensional computer model that calculates cones of depression around significantly sized existing and planned potable wellfields.</p> <p>The software was updated for the purpose of making it user-friendlier and to provide the contractor existing wellfield conditions that would allow him/her to update 3-D model.</p>	<p>This is a good straightforward objective which should remain in the updated Comprehensive Plan</p> <p>An update to the 3-dimensional computer model that calculates cones of depression around significantly sized existing and planned potable wellfields was completed March 2, 2003. This model has been used to update Wellfield Risk Management Zones located around Municipal Water Supply Wellfields; in accordance with Collier County's Land Development Code, Section 3.16 "Groundwater Protection</p>
<p>Objective 3.4, Conservation and Coastal Management Element:</p> <p>Collect and evaluate data and information designed to monitor</p>	<p>Monitor the quality of ground water for safe public consumption</p>		<ul style="list-style-type: none"> Collier County has been and continues to collect and evaluate ground water data from thirteen (13) monitoring wells located throughout the County (Table 1). In accordance with a Collier County / South Florida Water Management District Contract, the County will collect ground water samples for a base line monitoring study in the North Golden 	<p>This is a good straightforward objective which should remain in the updated Comprehensive Plan</p> <ul style="list-style-type: none"> Ground water data collected from Collier County's wellfield in 1999 indicates that there was high sodium; total dissolved solid, chloride and hardness concentrations, which is typical of

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996- 2003)	Comments
<p>the quality of ground water in order to identify the need for additional protection measures.</p> <p>Objective 3.4, Conservation and Coastal Management Element, <i>continued</i>:</p>			<p>Gate Estates area.</p> <ul style="list-style-type: none"> Another source of ground water monitoring data comes from the monitoring of the County's municipal water supply wells. 	<p>local background water quality conditions within the lower Hawthorn Aquifer.</p> <ul style="list-style-type: none"> For those wells in the Lower Tamiami Aquifer, the background water quality represented what is typically found in that aquifer system. In addition to these sampling programs the Collier County Board of County Commissioners has recently approved a 50% Cost Share Grant (Contract Number C-15055) with the Big Cypress Basin Board and the South Florida Water Management District (SFWMD) designed to monitor ground water quality at 141 randomly selected, privately-owned potable water wells in Golden Gate Estates. The objective of this project is to generate a baseline set of groundwater quality data for Golden Gate Estates that will include a quantitative determination of contaminants that

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996- 2003)	Comments
				<p>may have entered the ground water from septic tank systems, landscaping and agricultural activities, and automobile repairs.</p> <ul style="list-style-type: none"> • The Florida Department of Environmental Protection has not yet made available their trend assessment of this data, so it is not incorporated in this EAR Report.

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996-2003)	Comments
<p>Objective 9.2, Conservation and Coastal Management Element</p> <p>The County shall verify the management and disposal practices of identified businesses that are potential generators of hazardous waste, at a rate of 20% of these businesses per year</p>	<p>To promote the protection of human health and the environment from potential adverse effects of improper solid and hazardous waste management, conserve material and energy resources through waste recycling and recovery, and reduce or eliminate the generation of hazardous waste as expeditiously as possible.</p>	<ul style="list-style-type: none"> • This was already a requirement of the County • 9,991 verification inspections were accomplished by September 30, 1992 • As of 1996, 2,915 inspections have been accomplished. 	<ul style="list-style-type: none"> • Collier County has been working with the Florida Department of Environmental Protection to ensure that these Federal requirements are met. • Through an Enhanced Compliance Assistance Verification Program, a “sideways management” approach has been implemented where two agencies work together to more efficiently address noncompliant issues. As a consequence of this enhanced program, there has been an improvement in the percentage of properly managed hazardous waste from 1998 (98.2%) to today (99.8%). 	<p>This is a good, straightforward objective which should remain in the updated Comprehensive Plan</p>
<p>Objective 9.3, Conservation and Coastal Management Element</p> <p>The Collier County Solid Waste Department shall continue to hold its hazardous waste collection day at least once per year.</p>	<p>Prevent public, through a purely voluntary program, from illegally dumping household hazardous waste into the County’s landfill and eventual water supply</p>	<p>This was already a requirement of the County</p>	<p>Household Hazardous Waste: a hazardous waste collection day has occurred annually from 1988 through present. In addition, a household hazardous waste collection facility is open every Saturday morning.</p> <p>Business generated hazardous waste: quarterly collections are available to the businesses at a fee.</p>	<p>This is a good, straightforward objective which should remain in the updated Comprehensive Plan</p>

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996-2003)	Comments
Objective 9.4, Conservation and Coastal Management Element	To implement its local storage tank compliance program to prevent groundwater contamination	Level of achievement is regulated by contract on a quantity basis with 100% completion scheduled for the end of the contract year	<ul style="list-style-type: none"> • The Pollution Control & Prevention Department carries out annual routine compliance inspections, closure inspections, and installation inspections on all regulated storage tank facilities in Collier County. • All records relating to fuel inventory, release detection, registration, insurance and repairs are checked to determine if any historical leaks have occurred. A certified non-compliance letter is issued to the facility owner/operator when a violation occurs and a written response is requested within 15 days for corrective actions to be taken. • A non-compliance re-inspection is performed when the violations have been corrected, or 60 days have passed. Should there be no response or no corrective action, an enforcement 	This is a good, straightforward objective which should remain in the updated Comprehensive Plan

Objective	Target	Conditions when Plan was adopted	Current Conditions (1996-2003)	Comments
			case is prepared and referred to FDEP. <ul style="list-style-type: none"> • The Pollution Control & Prevention Department carried out 2,344 inspections on aboveground and underground storage tanks between October 1, 1998, and September 30, 2003, with 1,799 violations cited. The average rate of compliance has increased from 88.8% to above 97% during this time frame. 	

C. Data Assessment – please refer to Section B: Identification of Specific Objectives from the Conservation and Coastal Management Element

D. Objective Achievement Analysis – please refer to Table 2.26-2, A Brief Summary of the Identified Objectives from the Conservation and Coastal Management Element

E. Conclusion

Based on the occasional exceedances in chromium and lead that were detected from the random water samples taken over the past seven years, it may be related to a whole host of both non-point and point pollution sources throughout the County, such as sewage and hazardous materials. However, there has been no “trend pattern” that has yet to develop, which would warrant a “very intensive study” within the spatial proximity of the geographic area consisting of the thirteen monitoring wells. Overall, the low number of exceedences in general indicates that the CCME’s Objective 3.4 has been partially achieved. Statistically speaking, the thirteen-groundwater monitoring wells are insignificant in providing definitive conclusions to the overall groundwater quality standards for a county that is approximately 2,040 square miles in size. The County will attempt to work with other federal, state and/or local agencies to enhance Collier County’s ground water monitoring program. In the meantime, the County’s Pollution Control and Prevention Department, Big Cypress Basin Board and the South Florida Water Management District has embarked upon an ambitious program to establish a baseline set of groundwater quality data for Golden Gate Estates, that is approximately 93 square miles, which will include quantitative determination of contaminants that may have entered the groundwater from septic systems, landscaping and agricultural activities, and mechanical work resulting in the release of chlorinated solvents or petroleum products into the groundwater.

As for the issue of hazardous products posing as an indirect or direct threat to the County's groundwater supply, the County has pursued compliance in the proper management of petroleum product through a very effective compliance and enforcement program. To give an indication of how serious the County has been on this issue, the County issued 1,799 violations between October 1, 1998 and September 30, 2003, yet it has seen an outstanding average of rate compliance increase from 88.8% to above 97%, during this time frame. In addition Collier County has enhanced its effectiveness to ensure hazardous wastes are properly managed County wide, through the implementation of an Enhanced Compliance Assistance Verification Program partnership with the Florida Department of Environmental Protection. Since the implementation of this program there has been a recorded increase in hazardous waste compliance; from 1998 (98.2%) to today (99.8%). These improvements better protect the environment from the release of hazardous products/wastes due to improper management practices.

F. Specific Policy Relevance

The County will propose specific EAR based amendments to modify Wellhead Protection Objectives. For example, see CCME Objective 3.1 below:

CCME, Objective 3.1

Due to natural conditions (i.e. hydrogeologic) affecting the water quality found in Collier County, some federal and state water quality conditions may not be obtainable. This unobtainable objective also applies to ground water under Rule 62-520.420(1) F.A.C.

To make this objective more attainable, this objective should be reworded. In addition, EAR based amendments may be drafted where Wellhead Protection Objectives have been partially achieved.

Map 2.26-1

