

**SUMMARY OF RECOMMENDED CHANGES  
2011 EVALUATION & APPRAISAL REPORT (EAR)**

**Public Facilities Element – Natural Groundwater Aquifer Recharge Sub-Element**

**Goals, Objective and Policies:** The entire Sub-Element will be revised to reflect the proper formatting for all Goals, Objectives and Policies, as defined below:

**Goal:** General statement defining what the plan will ultimately achieve, typically beginning with “TO” followed by a transitive verb, such as, TO PROTECT or TO ENSURE.

**Objective:** A more specific statement than the stated Goal; describing actions that will help achieve the goal(s), typically beginning with the active verb providing the general direction, such as, “Implement”, “Promote” or “Protect”. Objectives use the term “will” and allow Policies to specifically require an activity with “shall”.

**Policies:** Specific statements that provide directives on how to achieve the objectives and ultimately the Sub-Element’s goals, typically beginning with phrases like, “The County shall promote...”, “The County shall continue to...” or “The District shall expand...” or similar phrases. Policies use the terms “may” or “shall” to provide specific direction.

**Goals, Objective and Policies:** The entire Sub-Element should be revised to reflect Department name changes, designee changes, renumbering due to objective and/or policy additions and/or deletions, and grammatical changes.

Goal – revisions to reflect all that aquifer recharge area protection entails, and its interdependence with provisions found in other Elements and Sub-Elements; reformatting

Objective 1 – revisions to extend time allowed to complete a periodic task; reformatting

Policy 1.1 – minor revision

Policy 1.5 – minor revision to update document cite

Objective 2 – reformatting

Policy 2.2 – minor revision to update document cite

Objective 3 – reformatting

Objective 4 – reformatting

Policy 4.1 – minor revision to reference another section in same document

Objective 5 – minor revision, including reformatting

Policy 5.5 – modify to reduce extent of specificity

NGWAR Objective – New recommendation based on 2009 adoptions of HB 697 and the County Energy Audit & GHG Inventory

NGWAR Policy – New recommendation to follow County Energy Audit & GHG Inventory

NGWAR Sub-Element – Attached Documents – Numerous changes, with direction to cross-check GMP locations where similar references to maps & figures are found

**Assessment of the Successes & Shortcomings  
and Recommendations  
for the Public Facilities Element –Natural Groundwater Aquifer Recharge Sub-Element**

**A. Introduction & Background:**

The purpose of the Natural Groundwater Aquifer Recharge Sub-Element is defined within its single Goal, which reads as follows:

**THE COUNTY SHALL IDENTIFY AND PROTECT NATURAL GROUNDWATER AQUIFER RECHARGE AREAS FROM ACTIVITIES THAT COULD DEGRADE AND/OR CONTAMINATE THE QUALITY OF GROUNDWATER.**

The intent of the Natural Groundwater Aquifer Recharge Sub-Element is to assure the provision of efficient and economical services that would enable the citizens of Collier County to meet their needs for the protection of groundwater recharge areas while also assuring public health and safety in accordance with the criteria set forth in Rule 9J-5, F.A.C., and Chapter 163, Florida Statutes.

The annual update and amendment to the Capital Improvement Element, adopted January 28, 2008 included the initial step toward re-naming of the "Drainage" Sub-Element to the "Stormwater Management" Sub-Element. The new name should be used in all references to *that* Sub-Element found in *this* Sub-Element and throughout the Growth Management Plan.

Note that, in one respect, there is overlap in the intended purpose of the Natural Groundwater Aquifer Recharge and Drainage Sub-Elements: both seek to protect aquifer recharge areas. However, the emphasis of the Natural Groundwater Aquifer Recharge Sub-Element is on groundwater protection, whereas the emphasis of the Drainage Sub-Element is on surface water protection. For an evaluation of the Drainage Sub-Element, refer to the Drainage Section of this Report. In addition to the overlap of policies within the Natural Groundwater Aquifer Recharge and Drainage Sub-Elements, there is also an overlap between the intended purpose of the Natural Groundwater Aquifer Recharge Sub-Element and Goal 2 of the Conservation & Coastal Management Element (refer to the CCME Section of this Report), including the Watershed Management Plans discussed under Objective 2.1 of the CCME. EAR-based amendments made to those sections should be reflected in this Sub-Element, as necessary.

As currently formatted, this Sub-Element consists entirely of a single Goal, and its supporting Objectives and Policies.

The provision of public facilities and services for aquifer recharge area protection and watershed management, floodplain management and flood protection, potable water supply, and stormwater management are planned in correlation with future land use projections. This Goal should be expanded to fully capture the County's goals in these areas and ensure collaboration in implementing Objectives and applying Policies. These interdepartmental collaborations should also be recognized, and strengthened if necessary, in the Conservation & Coastal Management Element (CCME) and Intergovernmental Coordination Element (ICE) of this Growth Management Plan.

This Goal should be rephrased to improve its formatting as a "goal".

*[Public Comment from March 15, 2010 EAR Public Meeting – Questioning the status of and adherence to the Comprehensive Watershed Management Plan and the Comprehensive Water Resource Management Plan; another, suggesting that watershed management and water resource management should take a more holistic approach.]*

## **B. Objectives Analysis:**

### General Analysis:

*The Sub-Element Objectives and Policies are implemented primarily by the Collier County Pollution Control & Prevention Department. The Objectives and Policies speak generically about groundwater protection and the identification and protection of aquifer recharge areas. However, virtually all of the Department's work is related to County potable water wellfields (>100,000 GPD design) in accordance with Land Development Code Section 3.06.00 – Groundwater Protection.*

### **OBJECTIVE 1 (MAPPING AND DELINEATION OF RECHARGE AREAS):**

**The County shall continue to review every two years, and revise as necessary, existing map delineations of County potable water wellfields that are most sensitive to contamination from nearby land development and other surface activities. The biennial review and any subsequent map revisions will be based on geologic, hydrogeologic, hydrologic, and updated anthropogenic contaminant data aggregated since the previous revision.**

### Objective Achievement Analysis:

*Currently, Collier County's Pollution Control and Prevention Department uses an advanced 3-dimensional computer model to calculate Wellfield Risk Management Zones around significantly sized existing and planned potable water wellfields (>100,000 GPD design). These Wellfield Risk Management Zones, in the form of maps, are adopted into the County's Land Development Code 3.06.00 Groundwater Protection and placed on the County's Zoning Maps for County planners to use when regulating land development with the intent of protecting potable water wellfields from pollution sources.*

*This Objective should be revised to replace "review every two years" with "review every three years" and "The biennial review" with "The three year review".*

*The proposed amendments for Objective 1 provides adequate time (3 years) for the development of the proposed Wellfield Risk Management Zones, adoption of the proposed Wellfield Risk Management Zones into Collier County's Growth Management Plan's Future Land Use Element (Maps), and adoption of the proposed Wellfield Risk Management Zones into Collier County's Land Development Code, Section 3.06 "Ground Water Protection." The two years that are presently allotted have been found to be insufficient to complete this objective. The recommended language amendment will provide sufficient time (3 years) to complete this objective.*

Based on the above, this Objective is being achieved and should be retained, essentially as rewritten. This Objective should be rephrased to improve its formatting as an "objective".

*[Public Comment from March 15, 2010 EAR Public Meeting – Questioning the status of and responsibility for monitoring and maintaining our water resources.]*

Policy Relevance:

There are five (5) policies within this Objective.

**Policy 1.1:**

**The County shall revise and update its 3-dimensional computer models of ground water flow around public water supply wellfields, as additional data (e.g., withdrawal rates, numbers and locations of wells within wellfields, and hydrogeologic information) become available.**

This Policy requires that groundwater flow around wellfield modeling be revised, as pertinent data is made available. *The Pollution Control Department implements this Policy. There is one recommended change. The term “ground water” should be replaced by “groundwater” in this Policy, and throughout the remainder of this Sub-Element and entire GMP wherever informally used [not in title of formal document]. This Policy remains relevant and should be retained as revised.*

**Policy 1.2:**

**The County shall identify those County potable water wellfields, or portions of wellfields, which are susceptible to contamination, caused by adjacent or nearby land uses, drainage patterns, geomorphic conditions, soil properties, and/or hydrogeologic factors, including the presence or absence of confining units. This information shall be revised and updated as necessary.**

This Policy requires that the identification of wellfields susceptible to contamination be revised, as pertinent updates are made available. *The Pollution Control Department implements this Policy. There are no recommended changes. This Policy remains relevant and should be retained as written.*

**Policy 1.3:**

**The County shall maintain and update data on existing land uses and land use activities that possess the greatest potential for ground water contamination.**

This Policy requires the County to monitor land uses and land use activities to gauge their potential to contaminate groundwater. *The Pollution Control Department implements this Policy. There are no recommended changes. This Policy remains relevant and should be retained as written.*

*[Public Comment from March 15, 2010 EAR Public Meeting – Questioning the status of and responsibility for monitoring and maintaining our water resources.]*

**Policy 1.4:**

**The County shall maintain and update its maps of sensitive recharge areas as additional anthropogenic and hydrogeologic information becomes available.**

This Policy requires that the identification of sensitive recharge areas be revised, as pertinent updates are made available. *The Pollution Control Department implements this Policy. There are no recommended changes. This Policy remains relevant and should be retained as written.*

*[Public Comment from March 15, 2010 EAR Public Meeting – Questioning the status of and responsibility for monitoring and maintaining our water resources.]*

**Policy 1.5:**

**This Sub-Element shall incorporate by reference annual recharge amounts for the Surficial and Lower Tamiami aquifers and deeper aquifers such as the Sandstone and Hawthorne Aquifers, as described in the South Florida Water Management District’s official publications dated April, 2000 (and scheduled to be published in 2006).**

This Policy requires the County to reference a South Florida Water Management District publication to keep current its computer model. A general reference to a 2006 publication however, potentially limits the County’s ability to keep this data current in future years as subsequent editions are published. *The Pollution Control Department implements this Policy.* The “official publications” incorporated by reference are the District’s Lower West Coast Water Supply Plans. A version was first published in 2000 in three parts: a Planning Document, a Support Document and the Appendices Document. There was an update in the 2005-2006 timeframe – also published in multiple parts. There is an update ongoing that may be completed in the 2010-2011 timeframe.

*This Policy remains otherwise relevant and should be retained and revised to identify the specific SFWMD publication or publications being incorporated by reference into this Sub-Element, such as, **This Sub-Element shall incorporate by reference annual recharge amounts for the Surficial and Lower Tamiami aquifers and deeper aquifers such as the Sandstone and Hawthorne Aquifers, as described in the South Florida Water Management District’s Lower West Coast Water Supply Plan, as amended.***

**OBJECTIVE 2 (PROTECTION OF GROUNDWATER QUALITY):**

**Ground water quality shall meet all applicable Federal and State water quality standards.**

Objective Achievement Analysis:

This Objective seeks to protect natural groundwater aquifer recharge features through the imposition of quantity and quality standards.

*Collier County has implemented numerous proactive programs designed to protect Collier County’s groundwater quality from man-made pollution sources and hence remain compliant with this Objective. In addition, Collier County has also developed programs designed to respond to pollution releases into the environment and to monitor their satisfactory cleanup. Finally, the Collier County Pollution Control & Prevention Department has developed strong working relationships with the Florida Department of Environmental Protection, Collier County Environmental Health and Engineering Department, South Florida Water Management District, Big Cypress Basin Board and the Florida Department of Agriculture and Consumer Services that enhance the County’s ability to effectively coordinate efforts to meet this Objective.*

Based on the above, this Objective is being achieved and *should be retained*, essentially as written. This Objective should be rephrased to improve its formatting as an “objective” such as, **Protect groundwater from pollutant discharges that may cause exceedance of applicable Federal and State water quality standards**; followed by a “policy”, such as:

**Policy 2.0.1:**

**The County shall protect groundwater from pollutant discharges that might cause exceedance of applicable Federal and State water quality standards.**

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting a number of these ‘other regulatory agencies’ be identified, including the Federal Emergency Management Agency (FEMA), Department of Environmental Protection (DEP), and the U.S. Army Corps of Engineers (USACOE), as those among whom water resource management is coordinated – including surface water, stormwater, and water supplies for municipal services.]*

**Policy Relevance:**

There are four (4) policies within this Objective.

**Policy 2.1:**

**The County shall prohibit discharges to sinkholes or other karst related features that have direct hydrologic connections to the Surficial or Intermediate Aquifer Systems.**

This Policy provides for the protection of groundwater quality in aquifer systems by prohibiting discharges into open or porous geologic features. *The Pollution Control Department implements this Policy. There are no recommended changes. This Policy remains relevant and should be retained as written.*

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting that watershed management and water resource management should take a more holistic approach.]*

**Policy 2.2:**

**Non-agricultural developments requiring an Environmental Resources Permit from the South Florida Water Management District (SFWMD) shall preserve groundwater recharge characteristics as required by the SFWMD and as set forth in the SFWMD’s Basis for Review, dated January 2004 and as regularly updated. Ground water recharge shall also be protected through the application of the retention/detention requirements and allowable off-site discharge rates for non-agricultural developments specified in Policies 6.2 and 6.3 in the Drainage Sub-Element.**

This Policy identifies groundwater protection requirements of the appropriate Water Management District, with this document reference appearing to be out of date. This Policy also refers to other provisions found in another Public Facilities Element Sub-Element. *The Pollution Control Department implements this Policy. This Policy should be revised to replace “Basis for Review, dated January 2004” with “Environmental Resource Permit Information Manual, Volume IV, 2009”.*

**Policy 2.3:**

**The County standards for protecting the quality of ground water recharge within the wellhead protection areas identified in the Future Land Use Element (FLUE) shall be those provided in Policy 3.1.1 of the Conservation and Coastal Management Element.**

This Policy refers to standards found in another GMP Element for protecting groundwater quality in wellhead protection areas. *This Policy remains relevant and should be retained as written.*

**Policy 2.4:**

**Collier County shall evaluate the necessity for adopting more stringent ground water recharge standards for High or Prime Recharge areas within 2 years of the SFWMD Governing Board's adoption of such areas.**

This Policy calls for an evaluation to determine whether stronger groundwater quality protections are needed in certain recharge areas when they are adopted. *This Policy remains relevant and should be retained as written.*

**OBJECTIVE 3 (GROUNDWATER QUALITY MONITORING):**

**The County shall continue to collect and evaluate ground water quality data, identifying ambient water quality values and trends, comparing analyzed concentrations to Florida Ground Water Guidance Concentrations, and providing information to water resources planning and management entities, and to the general public.**

Objective Achievement Analysis:

*The above Objective requires Collier County to collect and analyze groundwater quality data for comparison to State Standards, and to be able to provide information on analysis results to all interested parties. Presently Collier County's Pollution Control and Prevention Department samples a trend network of groundwater monitoring wells semi-annually, and reports on the data annually. In addition, a Golden Gate Groundwater Baseline Monitoring Report had been completed in 2004, which assessed the groundwater quality data obtained from 84 residential potable water wells. Residents were provided groundwater laboratory results for the well they owned. A follow-up Golden Gate Estates study is presently underway, which will compare this most recent groundwater quality data with the historical 2004 reported data to determine water quality trends.*

Based on the above, *this Objective is being achieved and should be retained, essentially as written.* This Objective should be rephrased to improve its formatting as an "objective".

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting that watershed management and water resource management should take a more holistic approach.]*

Policy Relevance:

There are five (5) policies within this Objective.



**Policy 3.1:**

**The County shall continue its existing water quality monitoring program to provide base-line data, evaluate long-term trends, identify water quality problems, and evaluate the effectiveness of the County's ground water protection program.**

This Policy calls for continuing its water quality monitoring program for evaluating the groundwater protection program. This Policy remains relevant and *should be retained as written*.

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting that watershed management and water resource management should take a more holistic approach.]*

**Policy 3.2:**

**The County shall coordinate data gathering activities with State and Federal agencies to minimize duplication of efforts and enhance the quality of information gathered.**

This Policy requires the County to coordinate their water quality monitoring efforts with other agencies. This Policy remains relevant and *should be retained as written*.

**Policy 3.3:**

**The County will annually assess its groundwater quality monitoring data to determine whether monitoring activities and County Ordinances require expansion, modification or reduction.**

This Policy requires the County to regularly re-assess its groundwater quality monitoring efforts. This Policy remains relevant and *should be retained as written*.

**Policy 3.4:**

**The County shall continually gather and evaluate appropriate data for the purpose of refining and improving the groundwater quality monitoring database used in the County's 3-dimensional ground water model.**

This Policy requires the County to refine and improve its database for its groundwater modeling. This Policy remains relevant and *should be retained as written*.

**Policy 3.5:**

**Collier County shall continue to conduct water resource planning with appropriate County, City of Naples, and SFWMD staff to provide for ground water resource development, utilization, and conservation.**

This Policy requires the County to coordinate their water resource planning efforts with other agencies. This Policy remains relevant and *should be retained as written*.

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting a number of these 'other regulatory agencies' be identified, including the Federal Emergency Management Agency (FEMA), Department of Environmental Protection (DEP), and the U.S. Army Corps of Engineers (USACOE), as those among whom water resource management is coordinated – including surface water, stormwater, and water supplies for municipal services.]*

**OBJECTIVE: 4 (PUBLIC EDUCATION WITH REGARD TO GROUNDWATER PROTECTION ISSUES):**

The County shall continue current activities of providing the public with educational materials concerning ground water protection issues in Collier County. These may include, but shall not be limited to, the preparation of annual technical publications of ground water quality data, an informational website for groundwater quality issues, general information publications, establishment of a speakers' bureau, K-12 classroom presentations, and in-service teacher workshops and seminars.

Objective Achievement Analysis:

*This Objective requires continuation of County public educational activities with regard to groundwater protection issues. The Pollution Control & Prevention Department maintains a website that identifies all of the programs designed to protect the County's groundwater from pollution. The team prepares and distributes an Annual Newsletter designed to educate businesses on the proper method of managing the hazardous wastes they generate. Team members have also spoken before various groups/organizations about what Pollution Control does and the team remains available to answer any questions the public, regulatory community, and/or policy makers may have.*

Based on the above, this Objective is being achieved and *should be retained*, essentially as written. This Objective should be rephrased to improve its formatting as an "objective".

*[Public Comment from March 15, 2010 EAR Public Meeting – Questioning the status of and responsibility for monitoring and maintaining our water resources.]*

Policy Relevance:

There are two (2) policies within this Objective.

**Policy 4.1:**

**The County shall continue to advise the public on the appropriate disposal methods for hazardous wastes, for the purpose of reducing or avoiding the potential for groundwater contamination. In performing this task, the County may utilize the public educational measures listed within Objective 4 of this Sub-Element, or any other measures which may be appropriate.**

This Policy requires the development of a public awareness program relative to hazardous waste disposal issues. This Policy remains relevant and *should be retained as written*. The reference to "Objective 4" should be revised to correspond to the reformatting of said Objective, as applicable.

**Policy 4.2:**

**The County shall continue to provide information in a manner that can be understood by the general public regarding Collier County's groundwater system, its vulnerability to contamination and measures needed to protect it from contamination. In performing this task, the County may utilize the public educational measures listed within Objective 4 of this Sub-Element, or any other measures which may be appropriate.**

This Policy requires the County to continue providing information on these topics in generally understandable manners. This Policy remains relevant and *should be retained as written*.

**OBJECTIVE 5 (PROTECTION OF CRITICAL RECHARGE AREAS AND GROUNDWATER RESOURCES):**

**The County shall implement plans to preserve critical ground water recharge areas and ground water resources, and will review, evaluate, and revise (if warranted) those plans and actions, based on the best available geologic, hydrologic, hydrogeologic, and anthropogenic contaminant data.**

Objective Achievement Analysis:

This Objective shares portions of its stated intent with Objectives 1, 2 and 3 above. This Objective focuses the County's responsibilities on "critical" recharge areas and resources, whereas the above Objectives identify all recharge areas and resources related to groundwater protection. Protecting water quality and minimizing flood hazards employ watershed-based approaches that balance environmental, economic and engineering considerations to meet these standards. This Objective is being achieved and *should be retained, essentially as written*. This Objective *should be revised to replace "implement" with "continue implementing"* and rephrased to improve its formatting as an "objective".

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting that watershed management and water resource management should take a more holistic approach.]*

Policy Relevance:

There are five (5) policies within this Objective.

**Policy 5.1:**

**The County shall develop, and continually update, technical criteria for determining those recharge areas, which are critical to the County's long-term ground water needs.**

This Policy requires the County to regularly re-assess its consideration of groundwater recharge areas considered critical. This Policy remains relevant and *should be retained as written*.

**Policy 5.2:**

**The County shall continue to identify critical recharge areas and appropriate protective mechanisms.**

This Policy requires the County to continue identifying groundwater recharge areas considered critical and the appropriate protections based on assessments developed for Policy 5.1. This Policy remains relevant and *should be retained as written*.

**Policy 5.3:**

**The County shall continue to identify costs, funding mechanisms and private property rights issues associated with the protection of critical recharge areas.**

This Policy requires the County to continue their consideration of the costs, funding sources and issues associated with protecting critical groundwater recharge areas. This Policy remains relevant and *should be retained as written*.

**Policy 5.4:**

**The County shall continue to operate the petroleum storage tank inspection program, especially in identified wellfield protection zones, operating within available State funding.**

This Policy requires the County to continue its State funded petroleum storage tank inspection program. This Policy remains relevant and *should be retained as written*.

**Policy 5.5:**

**Collier County shall continue to operate and maintain a hazardous waste collection facility. The facility shall operate five (5) days per week and will accept household and small business hazardous wastes. Additionally, the County shall continue to hold its hazardous waste collection day at least twice per year targeting residential households but also allowing small businesses to participate.**

This Policy requires the County to continue operating its hazardous waste collection facility. This Policy remains relevant, but provides a level of specificity regarding days and hours of operation that is not necessary in a comprehensive planning document. This Policy remains relevant nonetheless and *should be retained* if rewritten to provide a lesser amount of specificity appropriate for the GMP.

**INTRODUCE A NEW OBJECTIVE AND POLICY FOLLOWING FROM THE 2009 ADOPTIONS OF HB 697 AND COUNTY ENERGY AUDIT.**

OBJECTIVE NGWARSE (GREENHOUSE GAS EMISSIONS):

Reduce Greenhouse Gas (GHG) emissions by developing programs to reduce energy use at County natural groundwater aquifer recharge facilities and by County natural groundwater aquifer recharge operations, and through community oriented programs helping residents reduce their energy use.

Policy NGWARSE.1:

The County will strive to meet the recommendations of the Energy Audit and Greenhouse Gas Inventory for Collier County governmental facilities and operations, prepared by Twentyfifty, LLC and adopted by the Board of Commissioners in July 2009.

*[Public Comment from March 15, 2010 EAR Public Meeting – Suggesting the County should study ideas to target GHG sources – beside transportation, to address a lack of energy efficient plans, to address the need to plan for sea level rise.]*

**C. Attached Documents Analysis:**

***Map 1 Groundwater recharge to the Surficial Aquifer***

*This map should be updated.*




***Map 2 Groundwater recharge to the Lower Tamiami Aquifer***

*This map should be updated.*

# Map 1

## Groundwater recharge to the Surficial Aquifer

### Surficial Aquifer Recharge

-  - < 43"/year
-  - 43 - 56"/year
-  - > 56"/year

Source = SFWMD Publication # 327, Aug. 1995

12

Miles





0 5 10

Prepared for  
R - 99 - 3  
11/2/99

# Map 2

## Groundwater recharge to the Lower Tamiami Aquifer

### Lower Tamiami Aquifer Recharge

-  - 0 - 7"/ year
-  - 7 - 14"/ year
-  - 14 - 21"/ year
-  - > 21"/ year

Source = SFWMD Publication # 327, Aug. 1995

13

Miles

0 5 10

Prepared for  
R - 99 - 3  
11/2/99