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SARASOTA COUNTY

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Water Supply Master Plan Update

Technical Memorandum 4 -
2050 Supply Scenarios

March 2006

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WATER SUPPLY MASTER PLAN UPDATE

TECHNICAL MEMORANDUM 4

2050 WATER SUPPLY SCENARIOS

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Technical Memorandum 4

2050 WATER SUPPLY SCENARIOS

4.0 INTRODUCTION

Sarasota County (County) completed its most recent Water Supply Master Plan (WSMP) in 2001. The purpose of that document was to address the County's water supply needs through 2030 as part of their comprehensive water supply planning efforts. The report outlined future water demand projections, as well as current water supplies for the County. In addition, it described and evaluated several potential new ground and surface water sources, storage technologies and options, and associated costs.

Carollo Engineers was chosen to work with the County to review, update, and expand the 2001 WSMP. The primary goal of the WSMP Update (WSMPU) is to document the County's existing system and its performance and to provide a basis for the continuation of sustainable water supply development throughout Sarasota County.

The WSMPU will be comprised of five technical memoranda and a final, comprehensive graphics-oriented Executive Summary. This document, Technical Memorandum 4 - 2050 Water Supply Scenarios (TM4), identifies water supply strategies to provide water to the County's customers through 2050. This assessment identified various scenarios that may impact how the County will meet its future water demands. The water supply projects described in TM3 - Water Supply Projects, were utilized in various combinations to create scenarios that can successfully meet the County's water demands through 2050.

Demand projections developed in TM1 - Water Demand Projections, were used to predict the quantity of water needed through 2050. Although the projected demands provide a useful starting point for planning future supply, the projects chosen to meet these demands may be altered in the future due to changes in growth patterns and/or per capita water use. It should be noted that based on discussions with County staff in October 2005, the water demand projections presented in TM1 were modified due to recent permit and zoning changes. The updated demand projections that were used in the 2050 scenarios presented in this TM are provided in Appendix A.

A range of scenarios was developed to address planning uncertainties, including potential source alternatives and shifts in the County's water demand. These scenarios provide various combinations of water supply sources to meet the projected demands. One scenario was chosen as the Water Supply Master Plan; however, all feasible scenarios are documented in this TM and will be considered during capital improvements program (CIP) development and future WSMP updates.

In addition to assessing the County's ability to provide water to its own utility customers, consideration was given to the regional effort to provide adequate water supply. Therefore, the County's supply sources in the context of a regional supply were investigated with various groups of other utilities. The following groups were identified as planning groups to consider when evaluating the water supply plans: the County Water Utility, all water utilities within Sarasota County, Peace River/Manasota Regional Water Supply Authority (PR/MRWSA) members and customers, and Water Planning Alliance members.

The Water Planning Alliance is a regional planning body comprised of Charlotte, DeSoto, Manatee, and Sarasota Counties; the Cities of Arcadia, Bradenton, North Port, Palmetto, Punta Gorda, Sarasota, and Venice; the Town of Longboat Key; and the Englewood Water District. The Alliance's main goal is to identify long-term water supply projects for its members on a regional, four-county-wide basis. References to Alliance projects are available in TM3 - Water Supply Projects.

4.1 REVIEW OF POTENTIAL WATER SUPPLY PROJECTS

A summary of potential Sarasota County water supply projects is provided in Table 4.1. These projects were identified as the most understood projects during the project evaluations and were used in various combinations to develop the WSMP scenarios presented in this TM. The table identifies the project and lists its estimated annual average capacity and anticipated cost. The geographic locations of these projects are shown in Figure 4.1.

It should be noted that some regional projects were investigated and documented in TM3. These projects are located outside of the County's boundaries and would be implemented by other utilities, for example, Charlotte County or Manatee County, which would increase the regional water supply as a whole. These projects are discussed further in TM3.

**Table 4.1 Potential Sarasota County Water Supply Projects**

Project	Project Description	Potential Annual Average Yield	Estimated Lifecycle Cost (\$/1000 gal)
Carlton Wellfield Expansion	Modify the existing water use permit (WUP) to increase withdrawal quantities and treat the water with existing Carlton Water Treatment Facility (WTF) infrastructure.	3.15 mgd increase (9 mgd total)	\$1.21
Carlton Wellfield and WTF Expansion	Modify the existing WUP to increase withdrawal quantities, and upgrade and expand the WTF to increase production capacity, primarily by retrofitting the existing EDR units.	5.15 mgd increase (11 mgd total)	\$1.71
Venice Gardens WTF Upgrade	Refurbish the reverse osmosis (RO) units and associated equipment in Building 2.	2 mgd increase (2.75 mgd total)	\$1.59
Dona Bay Watershed	Withdraw water from the Cow Pen Slough (collected from Dona Bay Watershed) and store it in an off stream reservoir prior to treatment at a new surface water treatment facility.	5 mgd, expandable to 10 mgd	\$4.14
University WTF Upgrade	Construct an RO treatment facility to decrease total dissolved solids.	1.5 mgd	\$2.34

Sarasota County Potential Water Supply Projects

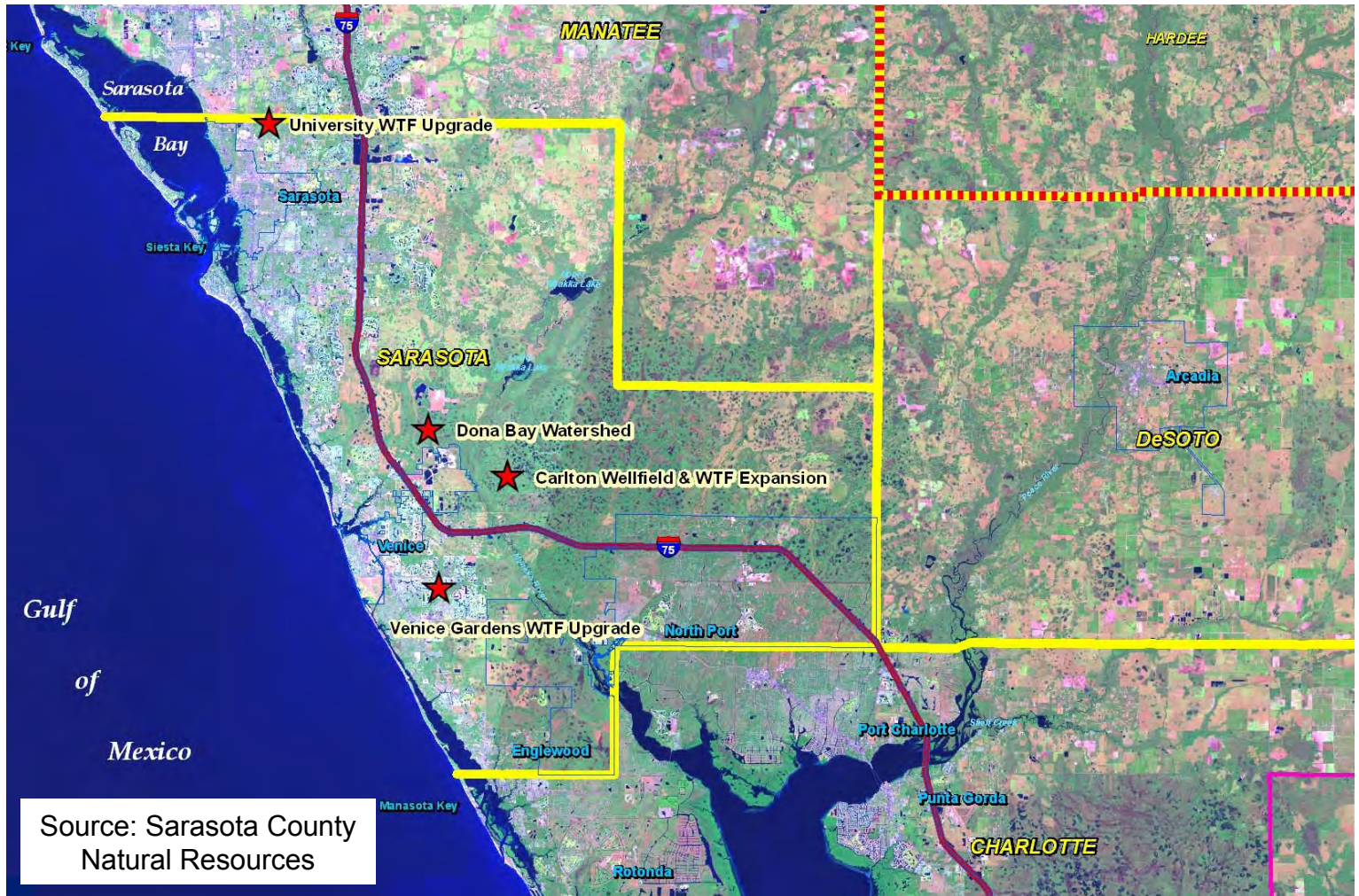


FIGURE 4.1

4.2 WATER SUPPLY PLANNING GROUPS

Due to the increasing regional nature of water supply providers in southwest Florida, incorporating the needs and supplies of other utilities is vital in the County's water supply planning process. Based on input from County staff, it was determined that the WSMPU should be a "hybrid" approach, incorporating regional views as well as self-sufficient supply. In a water supply planning workshop with County staff on September 7, 2005, the project team determined that several supply circumstances must be considered in order to address the range of potential planning groups that may impact the County Utilities in the future. Therefore, in addition to creating a self-sufficient Water Supply Master Plan for the County, several regional scenarios also were developed to provide guidance for future regional cooperation of water utilities. Minutes from the workshop held on September 7 are provided in Appendix B.

The water supply for the following groups was evaluated, and a potential overall water supply plan was prepared for each:

1. Sarasota County Utilities (self-sufficient supply).
2. Utilities within Sarasota County, including Sarasota County Utilities, the City of Sarasota, the City of North Port, the City of Venice, and the Englewood Water District.
3. PR/MRWSA members and customers, including Sarasota County, Manatee County, Charlotte County, DeSoto County, and the City of North Port.
4. Alliance members, including Charlotte, DeSoto, Manatee, and Sarasota Counties; the Cities of Arcadia, Bradenton, North Port, Palmetto, Punta Gorda, Sarasota, and Venice; the Town of Longboat Key; and the Englewood Water District.

4.3 SARASOTA COUNTY UTILITIES WSMP

Several scenarios were developed to determine the most beneficial combination of water supply projects for the County to meet projected demands through 2050. The combinations considered the most advantageous projects from the County's perspective including cost, location, ownership, diversity in supply (ground versus surface water), and the ability to bring projects online when needed. The following sections outline some of the WSMP scenarios available to the County. It should be noted that upgrades and expansions to the Carlton WTF, Venice Gardens WTF, and University WTF were assumed for all scenarios, as these projects have some of the lowest costs and are available to the County regardless of regional water supply issues.

4.3.1 Self-Sufficient Supply

Although regionalization of water utilities, partnerships, and other factors indicate a trend toward a more integrated regional approach to water supply, the County must first consider providing water supply to its own customers. This scenario identifies sources that are already permitted by the County, existing contracts, and new projects that can be developed under the direction of the County. This scenario includes utilizing and expanding and/or upgrading existing County facilities, implementing further moderate conservation measures, and developing one large new water supply source, the Dona Bay Watershed, which is being investigated as part of the Cow Pen Slough/Dona Bay Watershed project. An additional 5-mgd source will also be required in approximately 2040 to meet the projected County water demand through the latter years of the planning horizon. Figure 4.2 illustrates the supply sources that could meet the County's demands through 2050 under this scenario.

It should be noted that under the proposed schedule, a surplus of water may occur for several years prior to the County needing it to meet its own demands. This water may be sold to other regional utilities during the time it is not needed by the County. Under this circumstance, the County should make provisions to receive the water back when it is needed to meet their own demands.

4.3.2 County Supply with Regional Partner(s)

In the event that the Dona Bay Watershed project is able to provide less than 10 mgd of water supply, or if the Dona Bay Watershed is developed as a regional project and the entire yield is not available to the County, the County may need to pursue a new water supply source outside of the County before 2040. This likely would entail partnering with Charlotte County or Manatee County to develop a new source within their counties. Figure 4.3 presents a water supply scenario that would occur if the Dona Bay Watershed is able to provide only 5 mgd of yield to the County. Figure 4.4 illustrates the supply scenario for the County when depending on a regional source of water in place of the Dona Bay Watershed.

Sarasota County Self-Sufficient Supply Scenario

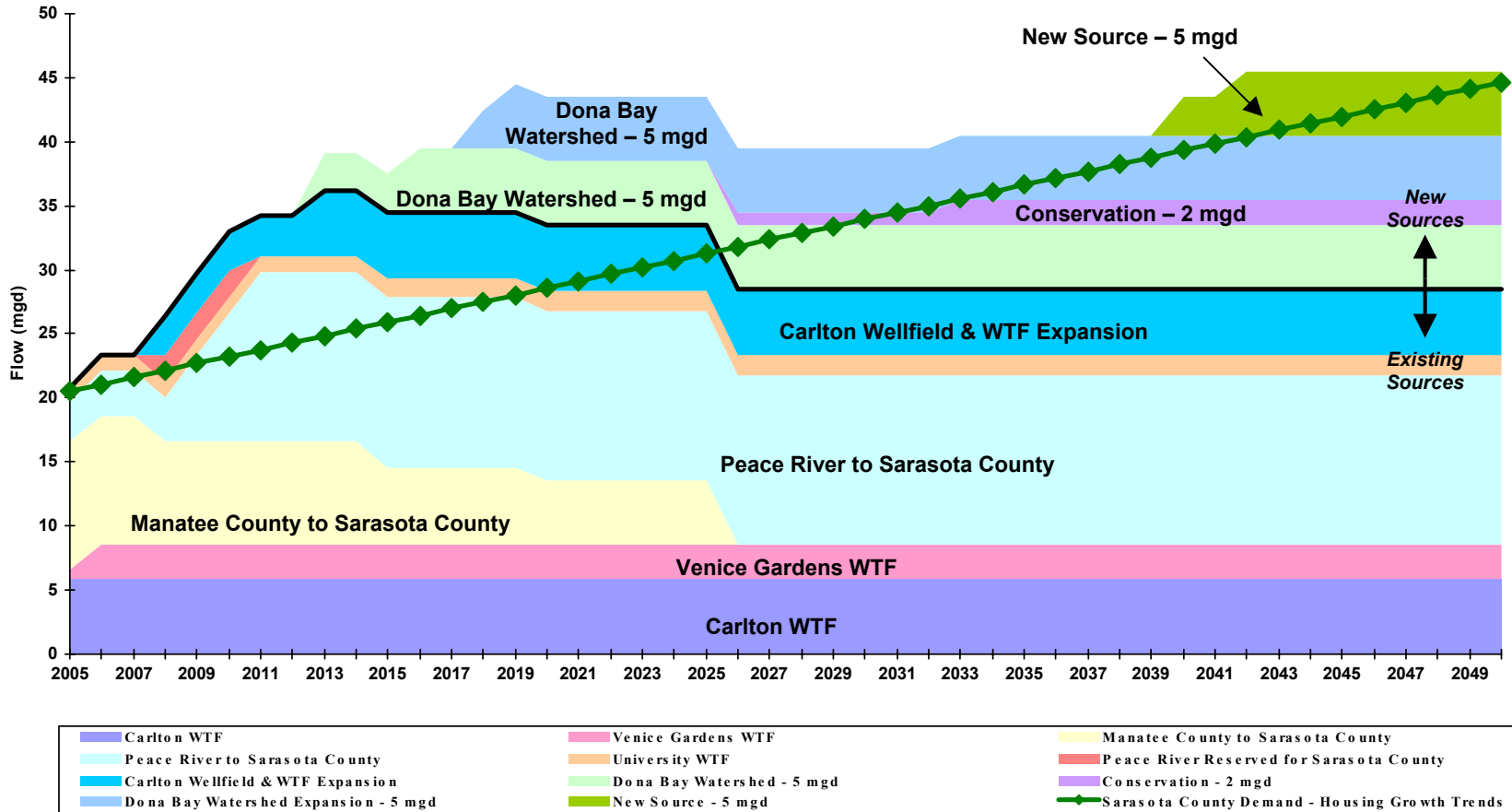


FIGURE 4.2

Sarasota County with Regional Partner – Option A

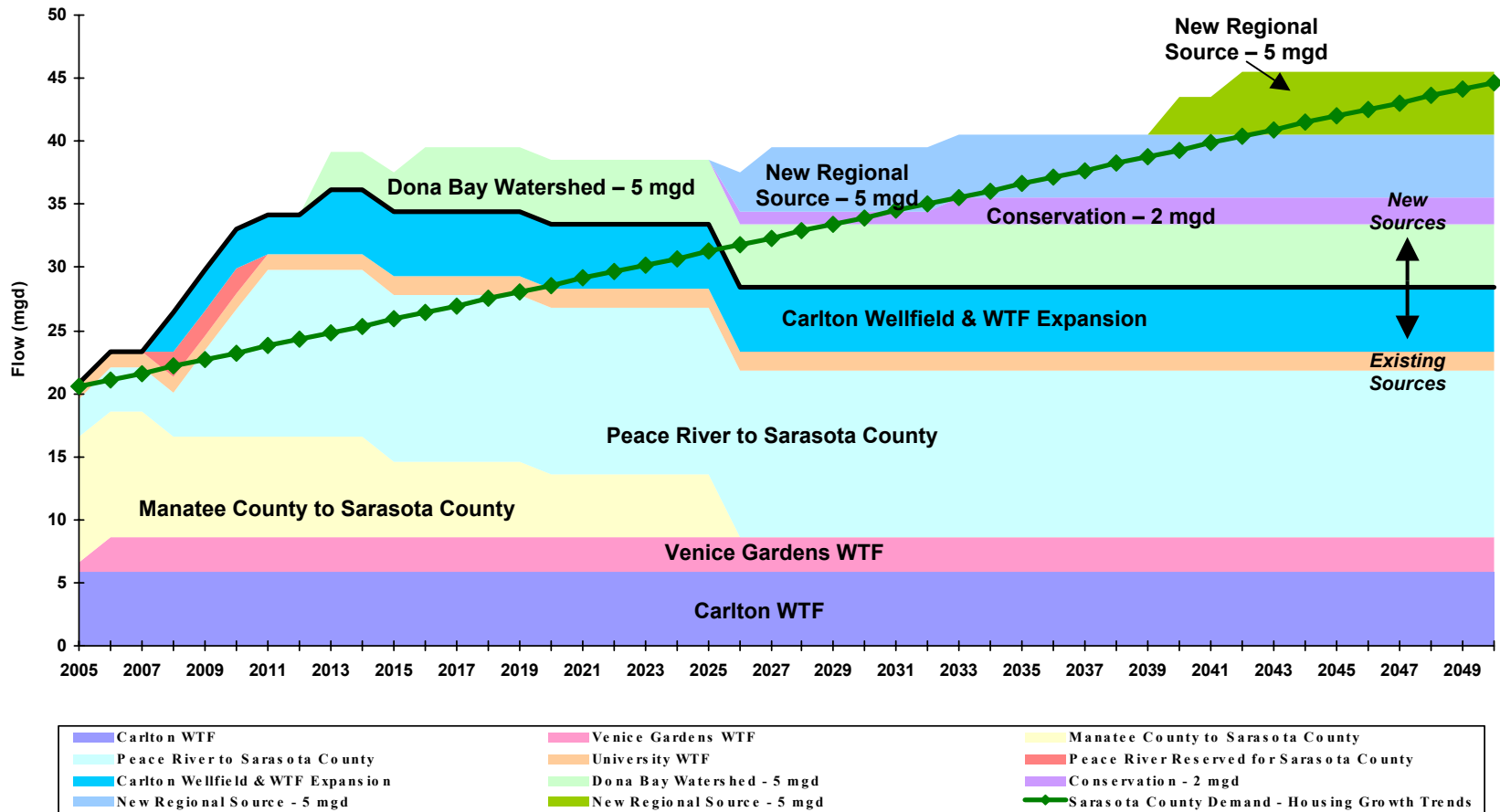
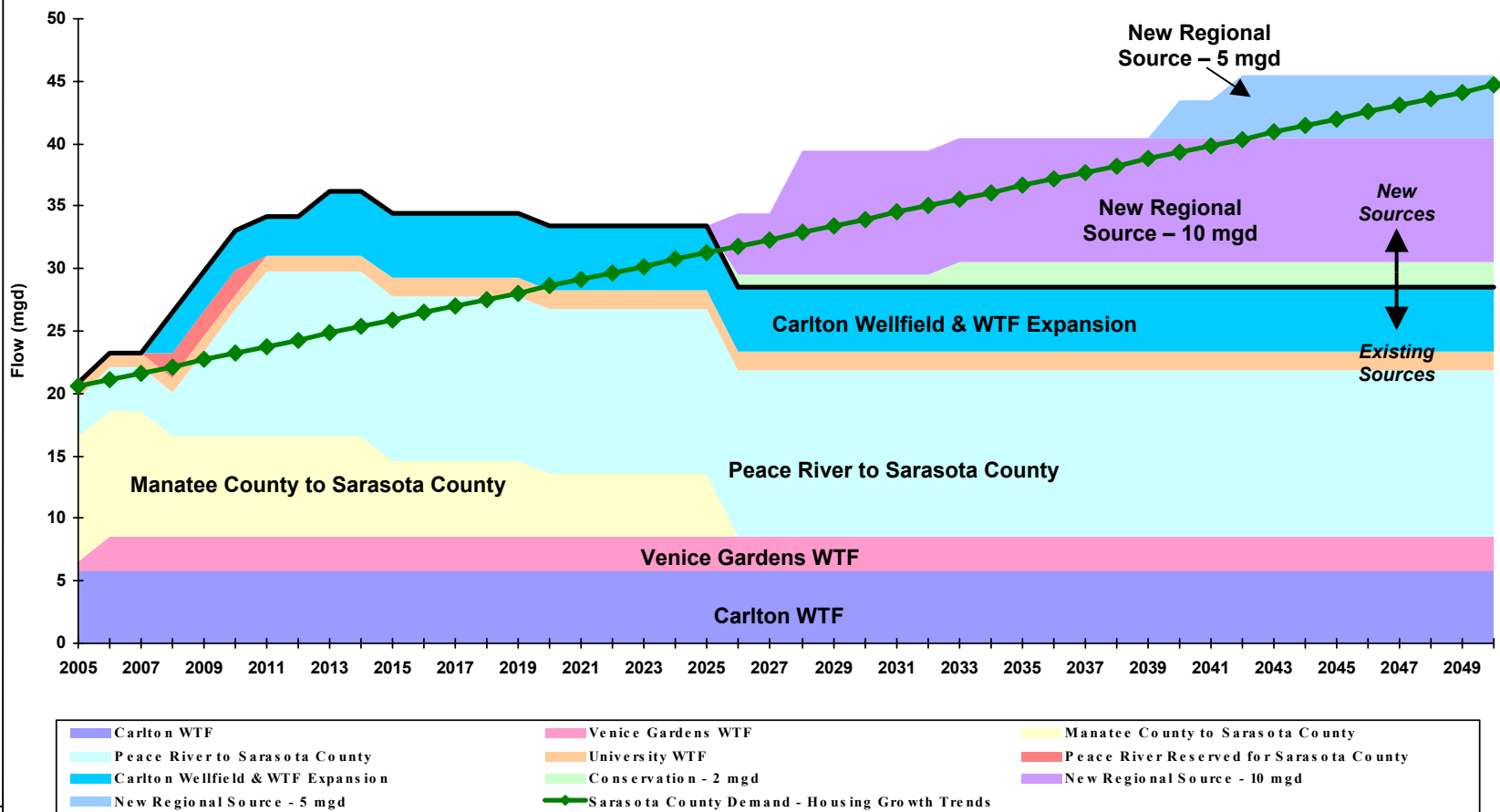


FIGURE 4.3

FIGURE 4.4



4.4 REGIONAL SUPPLY SCENARIOS

The regional perspective of water supply is becoming an increasingly important topic within southwest Florida. Many utilities are purchasing water from other utilities and water supply authorities, and partner projects likely will become a necessity in the future to meet the changing demands of the region. Therefore, it is important to consider the County's supply in the context of regional groups with whom the County is associated. The following sections outline the supply and demand conditions of all utilities within Sarasota County, the PR/MRWSA members and customers, and Alliance members with consideration of how these groups can meet their cumulative future water demands throughout the planning horizon. It should be noted that demand projections for utilities other than Sarasota County Utilities were not available beyond 2025; therefore, a constant demand was assumed for these utilities from 2025 to 2050. These demands may be revised in future WSMPUs.

4.4.1 Utilities in Sarasota County

This section outlines a potential supply scenario for all utilities within Sarasota County. Utilities within Sarasota County include the Sarasota County Utility, the City of Sarasota, the City of Venice, the City of North Port, and the Englewood Water District. All of these utilities currently rely on their own sources for their water supply, aside from the County Utility and the City of North Port, who also purchase water from entities such as the PR/MRWSA and Manatee County.

The project team considered the cumulative demand of the five utilities to determine how their demands could be met by the sources available to them. In the event of a water supply deficit, a new regional source must be brought online. New sources include the range of possibilities outlined in TM3 - Water Supply Projects, which identified potential projects as noted in the Alliance *Regional System Planning and Engineering Study Assessment of Existing Supplies, Phase I* (Greeley and Hansen, 2003) and the *City of North Port Utility Master Plan* (Black and Veatch, 2004). The sources brought online will ultimately be at the decision of the local utility, as well as potential partner utilities.

Figure 4.5 illustrates the County's demand in the context of the total demand of utilities in Sarasota County, as well as existing and potential future supply sources. Although several supply scenarios could meet the demands of the utilities in Sarasota County, only one possible scenario is identified in this TM. This scenario is intended to provide insight to the water supply situation of the County as a whole. It should be noted that in all regional supply scenarios the Dona Bay Watershed was assumed to be online by 2013 at 5 mgd, with a 5 mgd expansion in 2018 for a total supply of 10 mgd. In the event that the Dona Bay Watershed is unable to yield 10 mgd, additional regional sources must be brought online.

Supply Scenario for Utilities in Sarasota County

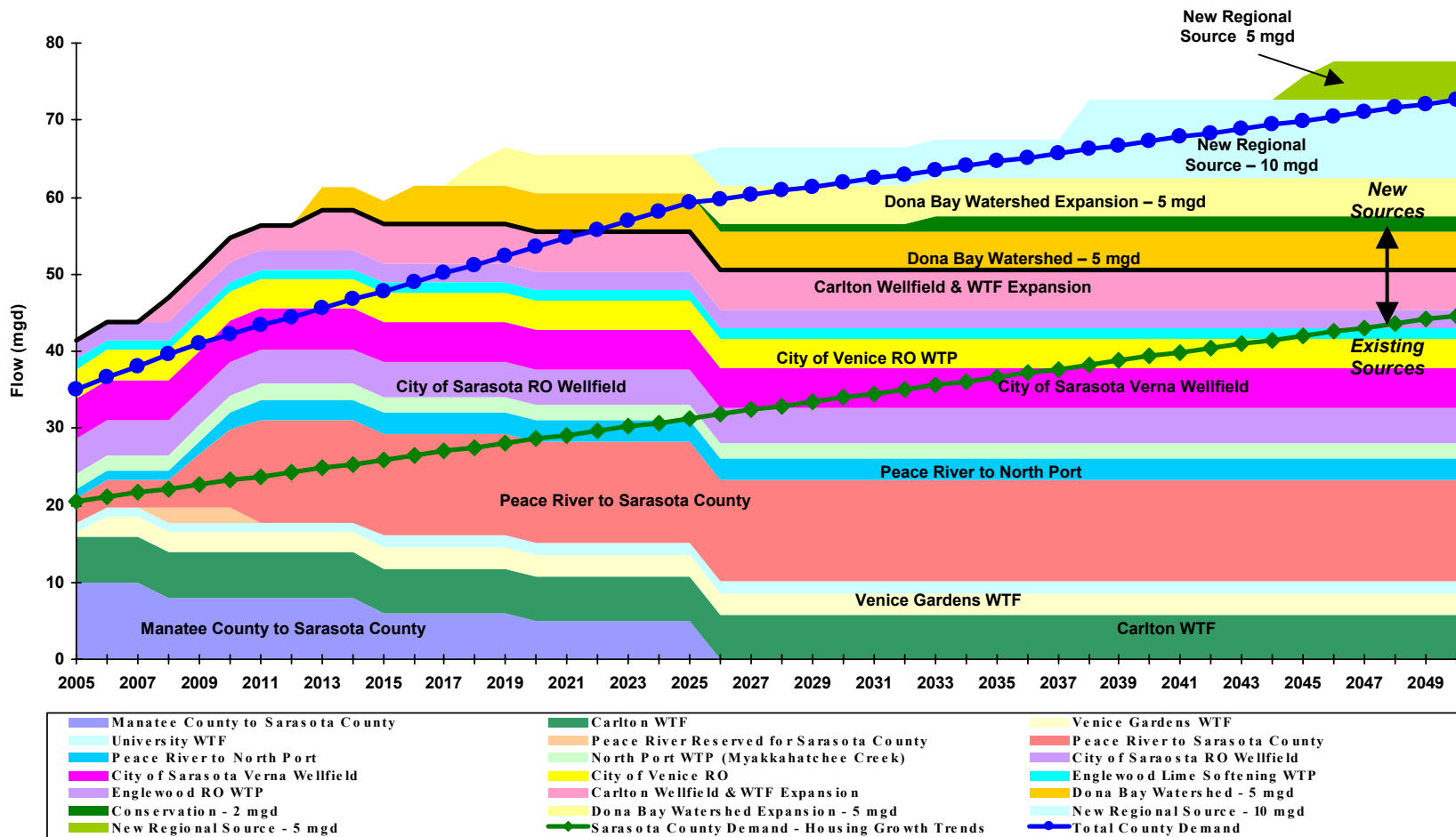


FIGURE 4.5

4.4.2 PR/MRWSA Members & Customers

This section outlines a potential supply scenario for members and customers of the PR/MRWSA. PR/MRWSA members and customers include Sarasota, Manatee, DeSoto, and Charlotte Counties and the City of North Port.

The project team considered the total demand of the five utilities to determine how their demands could best be met by the sources available to the individual utilities and the PR/MRWSA. In the event of a water supply deficit, a new regional source must be brought online. The PR/MRWSA is charged with providing water supply to meet their customers' water supply requests. Therefore, the PR/MRWSA likely would be the lead organization in coordinating the regional water supply and bringing new sources online to meet their customers' requests. Additionally, the individual members and customers can initiate supply projects that may benefit the PR/MRWSA members and customers as a whole. Potential projects for many of these utilities were identified in TM3 - Water Supply Projects, which summarized potential projects as noted in the *Alliance Regional System Planning and Engineering Study Assessment of Existing Supplies, Phase I* (Greeley and Hansen, 2003) and the *City of North Port Utility Master Plan* (Black and Veatch, 2004).

Figure 4.6 illustrates the County's demand in relation to the total demand of the PR/MRWSA members and customers, as well as existing and potential future supply sources. Although various supply scenarios are available to meet the demands of the PR/MRWSA members and customers, only one possible scenario is identified in this TM. This scenario is intended to provide insight to the water supply situation of the PR/MRWSA members and customers as a whole. It should be noted that in all regional supply scenarios the Dona Bay Watershed project was assumed to be online by 2013 at 5 mgd, with a 5 mgd expansion in 2018 for a total supply of 10 mgd. In the event that the Dona Bay Watershed is unable to yield 10 mgd, additional new regional sources must be brought online.

Supply Scenario for PR/MRWSA Members and Customers

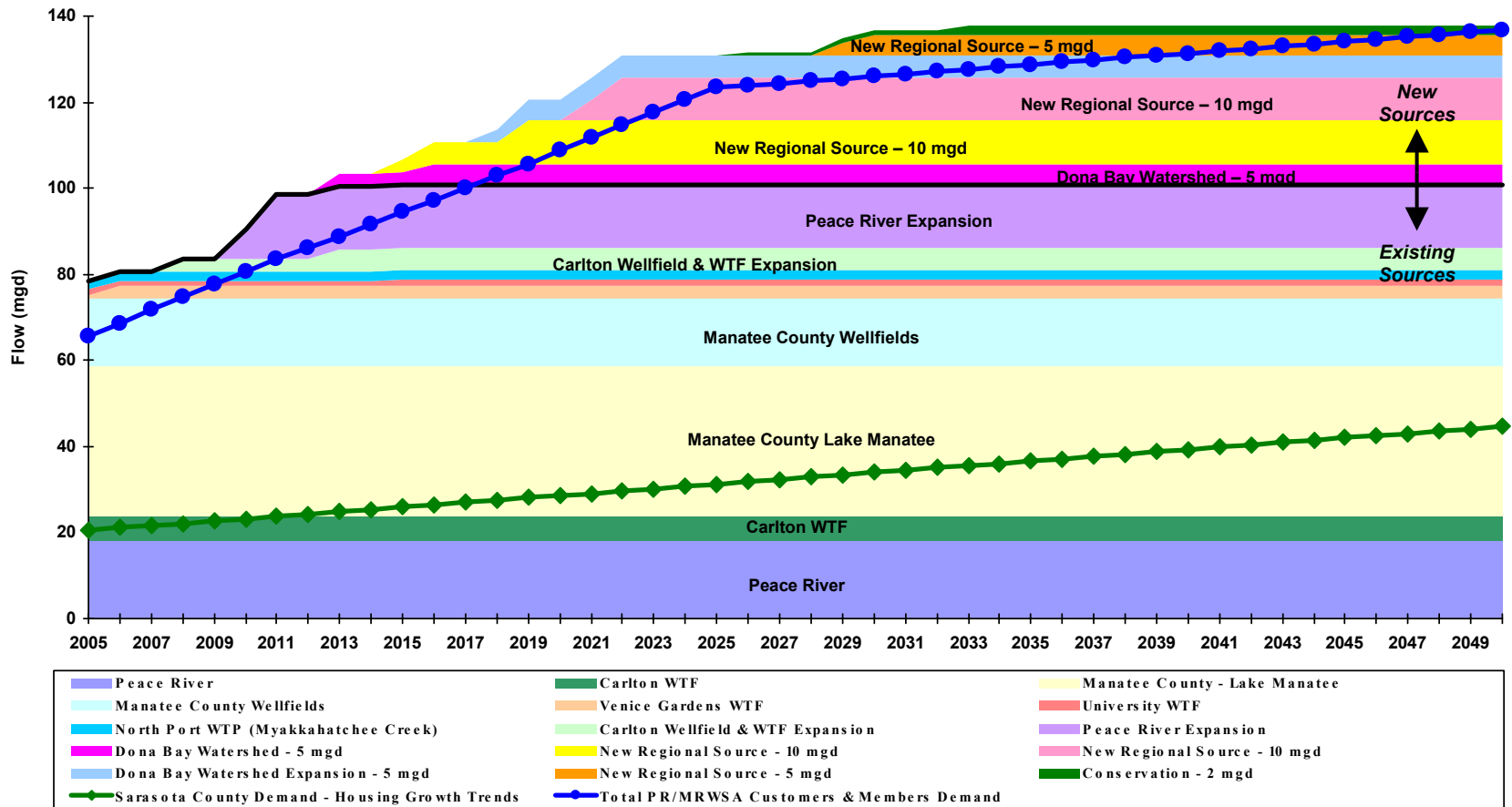


FIGURE 4.6

4.4.3 Alliance Members

This section outlines the potential supply scenario from a regional perspective for all Alliance members. The members of the Alliance include Charlotte, DeSoto, Manatee, and Sarasota Counties; the Cities of Arcadia, Bradenton, North Port, Palmetto, Punta Gorda, Sarasota, and Venice; the Town of Longboat Key; and the Englewood Water District.

The project team considered the total demand of all utilities to determine how their demands could be met by the sources available in the region. In the event of water supply deficits, new regional sources must be brought online. Potential future scenarios with chosen projects to meet Alliance demands were made available in the Alliance *Regional System Planning and Engineering Study, Phase II Future Supply Assessment and Prioritization* (Greeley and Hansen, 2004).

Figure 4.7 illustrates the County's demand in relation to the total demand of the Alliance members, as well as the existing supply sources throughout the region and probable future sources that could be developed by the County. Although various supply scenarios are available to meet the demands of the Alliance members, only one possible scenario is identified in this TM. This scenario is intended to provide insight to the water supply situation of the region as a whole.

Supply Scenario for Alliance Members

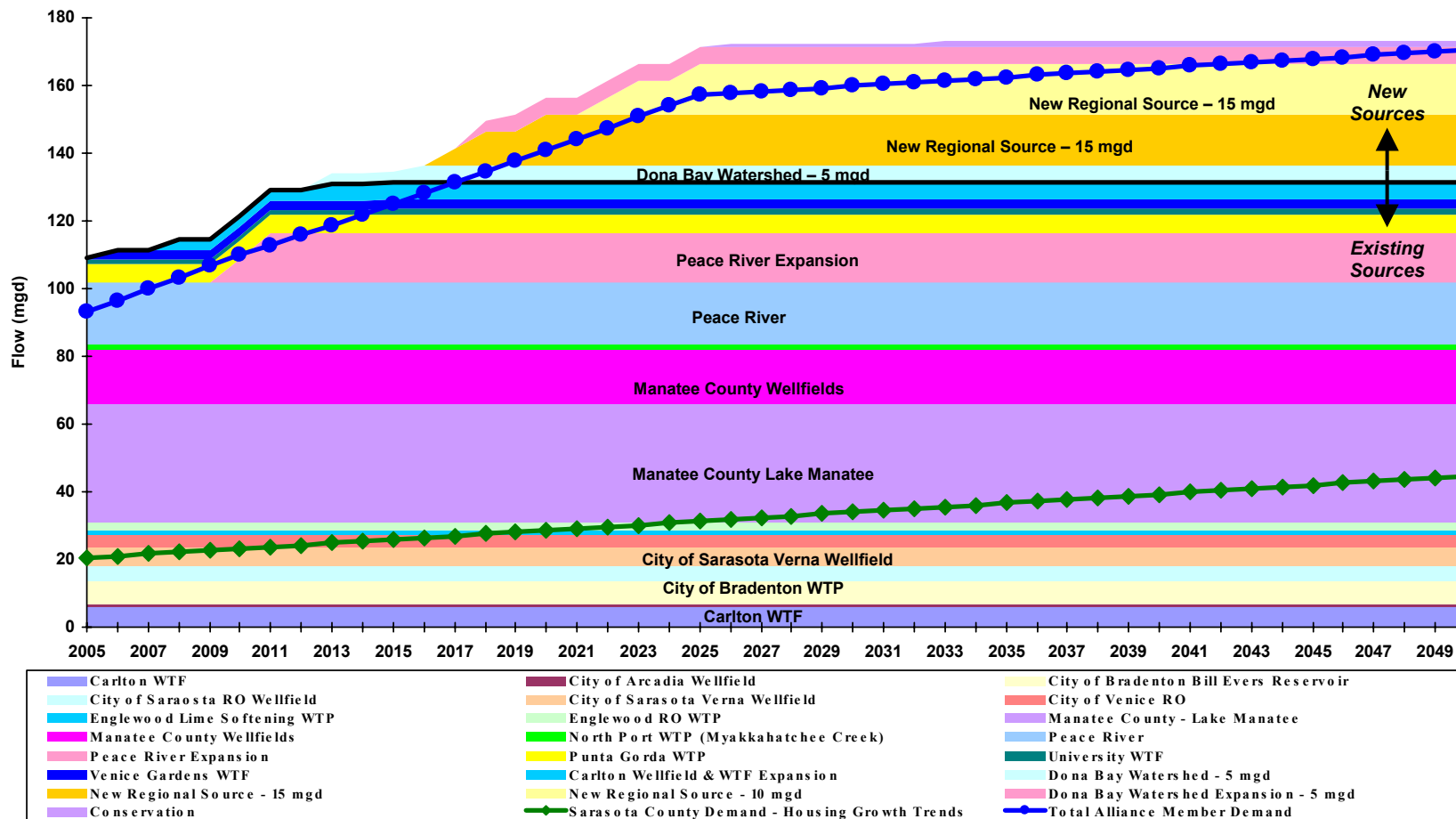


FIGURE 4.7

4.5 2050 WATER SUPPLY SCENARIOS SUMMARY

A summary of one of the possible water supply plans for each of the four water supply planning groups is provided in Table 4.2. The table identifies the sources and estimated total annual average capacity for each scenario. New supply sources or sources requiring expansions or upgrades are identified with an asterisk to indicate the projects that must be brought online to meet future demands.

Figure 4.8 provides timelines with supplies and demands for the expected water supply plan for each planning group. The timeline identifies key dates by which decisions for future sources must be made, new supplies being brought online, and projected available water and water demand for the four planning groups. It should be noted that all figures and tables contain projected demands that remain consistent from 2025 through 2050 for all utilities aside from Sarasota County. The remaining utilities have not published demand projections through 2050, and it was beyond the scope of this project to determine demand projections for each individual regional utility. Therefore, although the planning period indicated extends to 2050, the 2050 demands are the same as the 2025 demands except for Sarasota County.

In addition to new water supply, the County's WSMPU will identify key distribution system factors that will affect future supply to their water customers. The water distribution system and major County water assets were identified and cataloged in TM 2 - Water System Assets. This information was analyzed to determine key issues with regards to providing a reliable water source to the County's customers. The major treatment and distribution elements needed for supply based on the WSMP scenarios will be outlined in a subsequent TM, which will include the development of a 10-year capital improvements program.

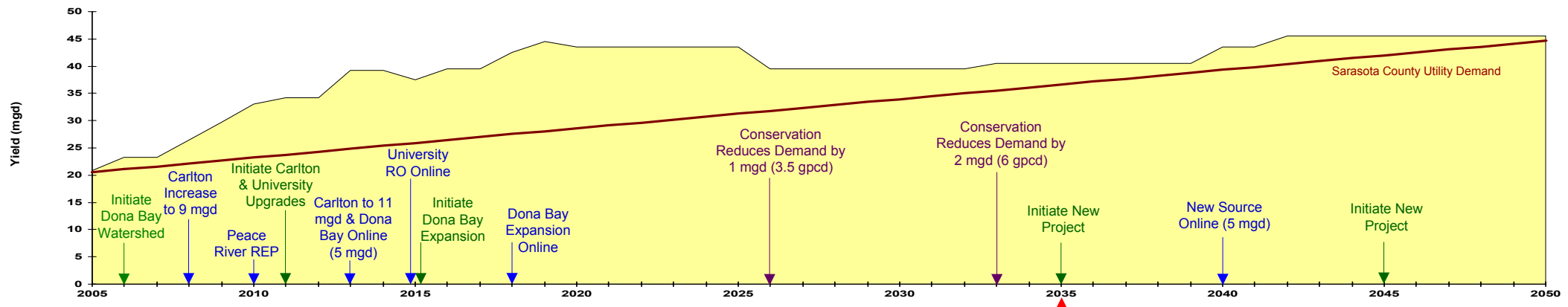
Table 4.2 Summary of Selected Water Supply Plans

Planning Group	Group Members	Total 2050 Annual Average Demand	Supply Sources and Annual Average Capacities (mgd)
Sarasota County Utilities	Sarasota County Utilities	44.7 mgd	*Carlton - 11 *Venice Gardens - 2.75 *University - 1.5 *PR/MRWSA - 13.225 Conservation - 2 *Dona Bay - 10 <u>*New Source - 5</u> Total - 45.475
Sarasota County	Sarasota County Utilities City of North Port City of Sarasota City of Venice Englewood Water District	72.6 mgd	*Carlton - 11 *Venice Gardens - 2.75 *University - 1.5 *PR/MRWSA - 15.925 City of North Port WTP - 2.08 Verna Wellfield - 5.2 City of Sarasota RO Wellfield - 4.5 City of Venice RO - 3.85 Englewood Lime Softening WTP - 1.25 Englewood RO WTP - 2.5 Conservation - 2 *Dona Bay - 10 <u>*New Regional Sources - 15</u> Total - 77.555
PR/MRWSA Members and Customers	Sarasota County Charlotte County DeSoto County Manatee County City of North Port	136.7 mgd	*Carlton - 11 *Venice Gardens - 2.75 *University - 1.5 *PR/MRWSA - 32.7 Lake Manatee - 34.9 Manatee Wellfields - 15.776 City of North Port WTP - 2.08 Conservation - 2 *Dona Bay - 10 <u>*New Regional Sources - 25</u> Total - 137.706
* Projects requiring new construction, expansions, or upgrades prior to being brought online.			

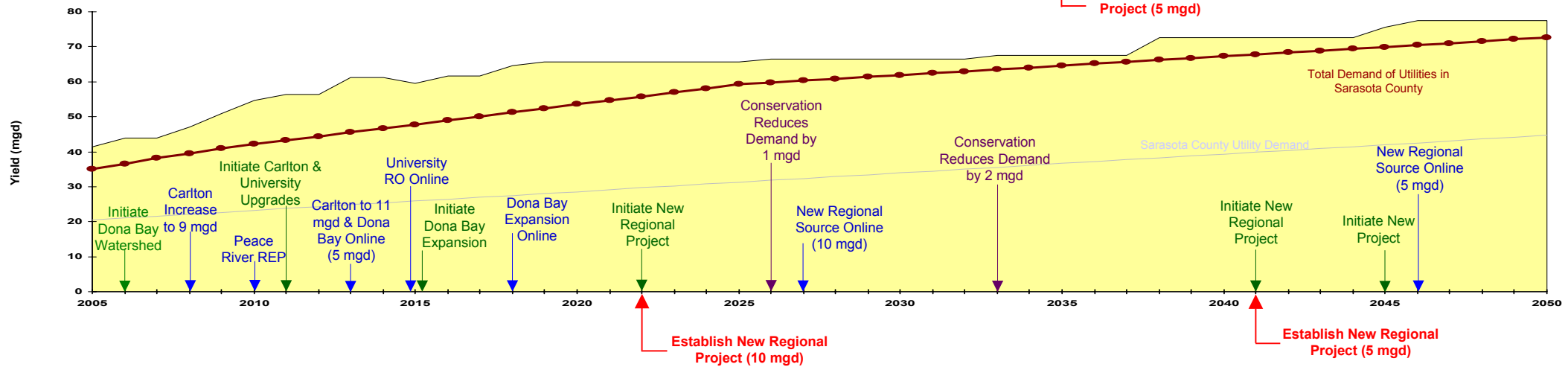
Table 4.2 Summary of Preferred Water Supply Plans

Planning Group	Group Members	Total 2050 Annual Average Demand	Supply Sources and Capacities (mgd)
Alliance Members	Sarasota County Charlotte County DeSoto County Manatee County City of Arcadia City of Bradenton City of North Port City of Palmetto City of Punta Gorda City of Sarasota City of Venice Englewood Water District Town of Longboat Key	170.5 mgd	*Carlton - 11 *Venice Gardens - 2.75 *University - 1.5 *PR/MRWSA - 32.7 Lake Manatee - 34.9 Manatee Wellfields - 15.776 City of Arcadia Wellfields - 1.017 City of Bradenton WTP - 6.95 City of North Port WTP - 2.08 City of Punta Gorda WTP - 5.358 City of Sarasota Wellfields - 9.7 City of Venice RO - 3.85 Englewood Water District WTPs - 3.75 Conservation - 2 *Dona Bay - 10 <u>*New Regional Sources - 30</u> Total - 173.331
* Projects requiring new construction, expansions, or upgrades prior to being brought online.			

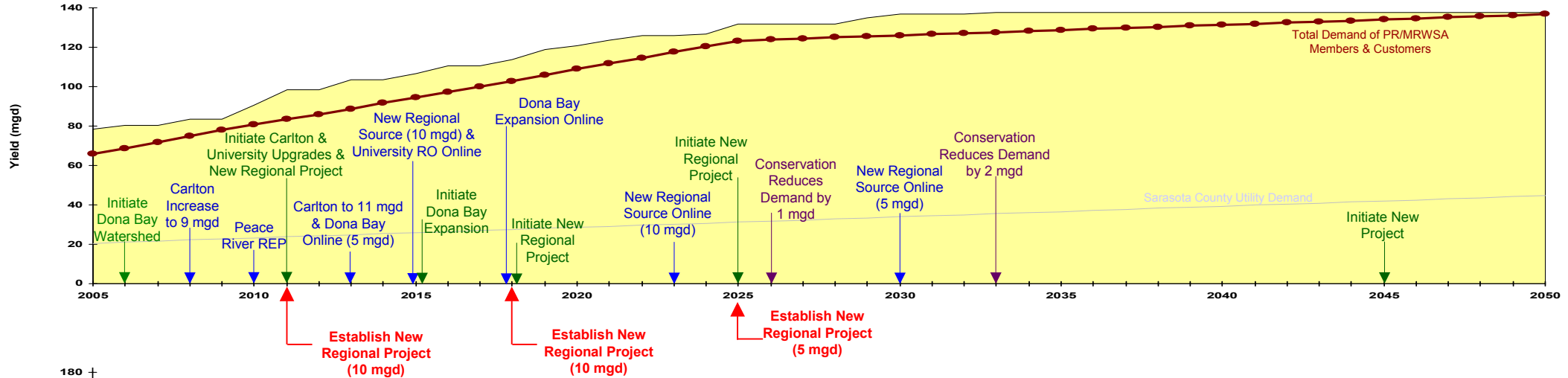
Sarasota County Utility



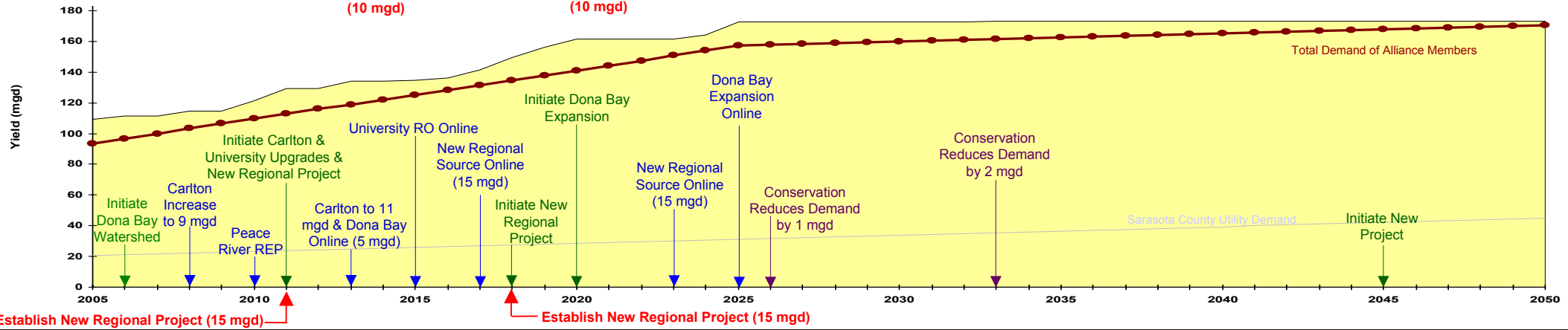
Utilities in Sarasota County



PR/MRWSA Members & Customers



Alliance Members



Demands, Sources, and Decisions Timelines



4.6 REFERENCES

Black and Veatch. 2004. City of North Port Utility Master Plan.

Greeley and Hansen. 2003. "Regional System Planning and Engineering Study
Assessment of Existing Supplies, Phase I Executive Summary."

Greeley and Hansen. 2004. "Regional System Planning and Engineering Study, Phase II
Future Supply Assessment and Prioritization."

DEMAND PROJECTION ADDENDUM

ADDENDUM

TO

Technical Memorandum No. 1 - Water Demand Projections

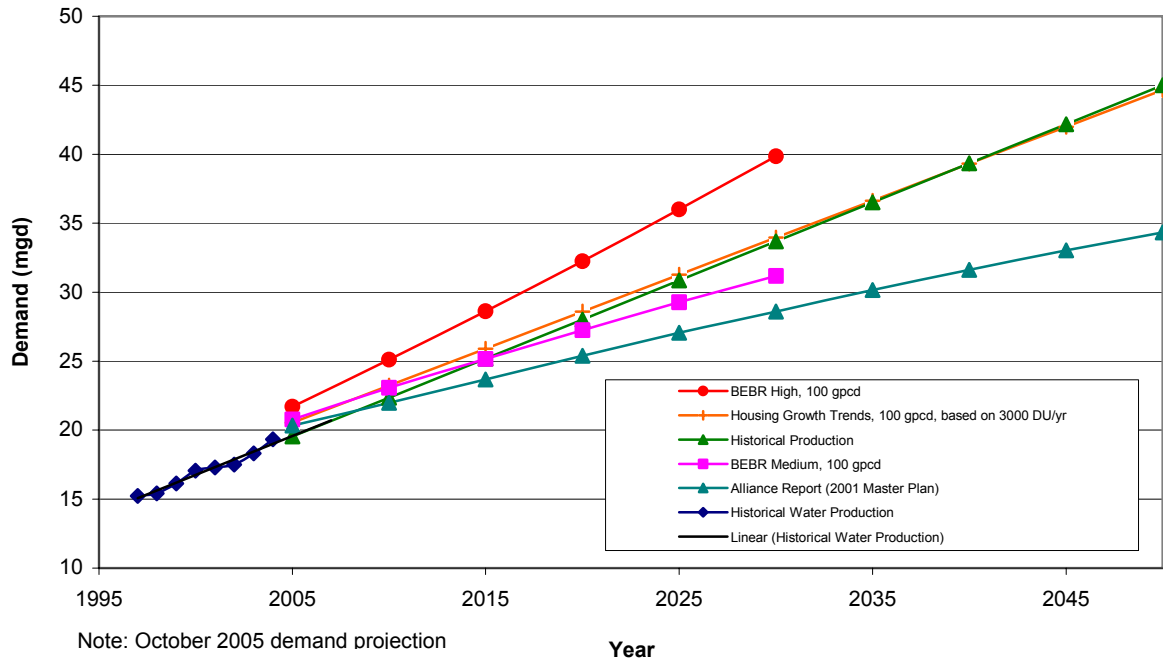
Sarasota County

November 4, 2005

Based on discussions with County staff in October 2005, the water demand projections presented in Technical Memorandum No. 1 - Water Demand Projections were modified due to recent permit and zoning changes. The housing growth demand projection methodology will still be used for remaining master planning activities; however, the number of housing units added per year was increased from 2,341 units per year to 3,000 units per year. This resulted in an increase in water demand of approximately 5 mgd in 2050. The updated demand projections that will be used for remaining master planning activities are as follows:

Year	Annual Average Daily Demand (mgd)	Peak Month Demand (mgd)
2010	23.2	27.9
2015	25.9	31.1
2020	28.6	34.3
2025	31.3	37.5
2030	34.0	40.7
2035	36.6	44.0
2040	39.3	47.2
2045	42.0	50.4
2050	44.7	53.6

Comparison of Sarasota County Average Daily Demand Projections



MEETING MINUTES



PROJECT MEETING MINUTES

Project Name: Water Supply Master Plan Update **Date:** 9/8/2005
Client: Sarasota County **Project Number:** 6873C.00
Prepared By: Laura Baumberger
Reviewed By: Robert Cushing
Subject: Water Supply Master Plan Update (WSMPU) Water Supply Planning Workshop
Attendees: Sarasota County: Dave Bullock, Jack Merriam, Gregory Rouse, Gail Miller, Michael Jones, Kathleen Schneider, Robert Kozash, Rob Lewis, Kenny Dotson, Evan Brown, John Czahoroski, Gene England, Theresa Connor, Dave Cash, George MacFarlane, John Ryan
Kimley Horn: Steve Suau
PBS&J: Pete Putman
McKim & Creed: Alex Dargham, Will Walter
Carollo Engineers: Bob Cushing, Laura Baumberger

The following is a summary of the discussions held at the Sarasota County WSMPU Water Supply Planning Workshop on September 7, 2005. This is our understanding of the subject matter covered in this meeting. If this differs with your understanding, please notify us.

- The group met to discuss Sarasota County Utilities future water supply and how it should be presented in the WSMPU.
- The demand projection methodologies were reviewed and discussed. The following comments were noted:
 - Redevelopment areas may change demand projections.
 - Changes in per capita use will change demands.
- The impact of regional water supply on the County's water supply plan was discussed. It was noted that in the future utilities might have limited ability to claim individual sources as their own; therefore, the water supply planning process must consider regional impacts and partners. The following comments were made:
- The WSMPU should consider scenarios with and without regional partners.
- In the scenarios including regional projects, the WSMPU should state "Regional Project" rather than identifying specific projects to be included as part of the County's WSMPU.
- The WSMPU should determine the potential to give a percentage of a certain supply to another regional utility, and then receive that portion of the supply back when the supply is needed.
- The County's major water supply project (within its own borders) is the Cow Pen Slough/Dona Bay Watershed project that is being developed by the County. This project is expected to supply from 5 to 10 mgd of potable water supply; however, the

yield is still somewhat of an unknown. The volume of potential storage also will impact the reliable yield of this supply. It is also somewhat unknown what portion of the project would be allocated to Sarasota County Utilities and what portion would go into the "regional pot."

- The EAR report is currently being developed. This document must show infrastructure plans including water supply through 2015.
- The County will schedule a meeting with SWFWMD to inform them of the County's initiatives to plan water supply and to develop new projects.
- The County Commissioners should be aware of both the regional perspective of water supply and the County's ability to develop projects under their control, namely the Cow Pen Slough project.
- County Utilities will prepare a workshop for the County Commissioners in November to discuss the regional interface, potential water supply projects (County and region), short-term CIP needs in the County's water system, the potential to increase the Carlton WUP, and the status of the demands/supplies of four utility groups:
 - Sarasota County Utilities alone
 - Sarasota County (all utilities within the County)
 - Peace River Authority members plus the City of North Port
 - Alliance members.
- Based on discussion and decisions made in the workshop, the WSMPU and Capital Improvements Program will be prepared accordingly.

Action Items

1. County will schedule a meeting with SWFWMD to discuss the County's initiatives to plan for future water supply and to develop new projects.
2. County will schedule a workshop with County Commissioners in November to discuss water supply issues.
3. Carollo will continue to prepare scenarios for the four utility groups outlined above. The scenarios will be presented in Draft TM4 - 2050 Water Supply Scenarios.