Planning for a Sustainable Water Supply: Preparing an Alternative Water Supply Plan

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Sustainability of water supplies for potable use in Florida is becoming an issue of increasing concern. While the St. Johns River Water Management District estimates that the Floridan Aquifer will be able to sustain Indian River County's demands through 2025, the county has taken a proactive approach to identify an alternative source of drinking water before the need is imminent. In the past several years, the county has experienced rapid growth with concomitant increases in demands for water.

The county began the process of expanding its North County Water Treatment Plant in 2004 to increase capacity from 3.53 million gallons per day (mgd) to 6.43 mgd. This partial expansion was originally to consist of the addition of two new reverse-osmosis (RO) treatment skids, but the county later amended the effort to include a third new RO skid in a new process bay, bringing the expanded capacity to 8.82 mgd.

The county currently relies on three production wells constructed in the Upper Floridan Aquifer (UFA). Full build-out would require the construction of six new UFA raw water production wells, each producing approximately 1.7 mgd for a combined total of 10.2 mgd to supplement the existing three wells onsite.

The projected shortfall between the 2025 maximum day combined withdrawal for the North and South County Water Treatment Plants (29.89 mgd) and the requested allocation in the consumptive use permit (CUP) currently on file with the water management district (19.21 mgd) is 10.68 mgd. It is anticipated that the combined water treatment plant capacity, upon completion of the current North County Plant expansion, will meet the county's demands through 2023. After 2023, an increase in UFA allocation or an alternative source would be required.

In 2006, a CUP application was submitted to the water management district for the six new wells and the corresponding increase in allocation. As the North County Plant expansion project has progressed toward construction, concerns developed from local groups and individual citizens regarding the potential negative impacts that increased pumping from the proposed additional wells may have on neighboring artesian flow wells, such as reduction of artesian pressure and increased chloride concentrations (upconing).

The concerned parties requested that the county reduce its reliance on the UFA and consider alternative water supplies to meet future demands. The county then decided to amend the CUP application and pursue only three new wells in the immediate future. Concurrently, alternative water supply sources were explored through the preparation of an Alternative Water Supply Master Plan (AWSP), prepared by the engineering firm CDM. This evaluation was intended to identify alternatives to constructing the final three wells to meet demands beyond 2023 and identify a long-term alternative supply to meet future demands.

Preparation of the AWSP began when the county conducted a public workshop with representatives from St. Johns River Water Management District, the South Florida Water Management District, the board of county commissioners, county staff, CDM staff, and members of the public to present and discuss potential supply options within the county, as well as provide a status update on the availability of water in the UFA. The result of the workshop was a list of possible alternatives to the county's current interim plan of increasing withdrawals from the UFA, including surficial aquifer, seawater desalination, and fresh surface water withdrawals/reservoirs.

CDM and the county then proceeded to prepare the AWSP to evaluate the feasibility of utilizing one of the identified sources for future supply. The evaluation consisted of identifying the pros and cons of each source, the treatment facilities/modifications required for each source, long-term sustainability, the schedule to implement each option, and the preparation of a budget-level cost estimate for each option.

At the conclusion of the evaluation, the county determined that the pursuit of a surface water source and the construction of a surface water treatment plant was the most feasible option from a cost and ease-of-implementation perspective. Upon completion of the AWSP, the county entered into discussions with the St. Johns River Water Management District to determine the most beneficial and reliable source available from which to draw surface water. The district maintains a series of water management and water catchment areas in the western portion of the county, as well as a number of canals that could provide surface water to such a facility. Since the completion of the AWSP, the county has also begun discussions with district staff to consider the use of the Lower Floridan Aquifer (LFA) as a supply source, with disposal of the concentrate byproduct into the boulder zone.

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In order to meet the anticipated date of 2023 for having the alternative source permitted and the associated facility designed, permitted, and constructed, the county intends to have the specific surface water source identified by mid 2012 (or make the decision to pursue the LFA) and begin construction of a surface water treatment plant (or LFA desalination facility) shortly thereafter.

The following summarizes the AWSP findings and the potential option of LFA desalination.

Alternatives Evaluated

Surficial Aquifer Withdrawal

The surficial aquifer in the county has been investigated in three significant reports: Crain, et al. (1975), Schiner, et al. (1988) and most recently by Toth and Huang (1998). These reports have evaluated the capacity of the Surficial Aquifer as well as its water quality.

Water quality was found by Crain, et al., to be highly variable in the Surficial Aquifer. The report indicates that outside of the drainage districts, chloride concentrations of the Surficial Aquifer are generally lower than 250 milligrams per liter (mg/l) and total dissolved solids are lower than 500 mg/l.

Chloride is high in the water from wells near the Indian River Lagoon and salt water intrusion is a threat along the lagoon. Within the drainage districts, the quality of the Surficial Aquifer water depends on the extent to which the Floridan Aquifer is used to irrigate. The Floridan Aquifer has concentra-

Continued on page 44

Table 1: Implementation Schedule for Evaluated Options

Option	Years to Implement	Actions Required
Continued use of UFA	2 to 3 (2011 to 2012)	CUP modification for increase in allocation
		Installation of 3 RO skids at existing N. County WTP
		Construction of final 3 wells at N. County WTP (9 total)
Surficial Aquifer System	6 to 8 (2015 to 2017)	Well site acquisition (approx. 60 wells required)
		Permitting (CUP, deep well, etc.)
		Modeling (surface water impacts)
		Design
		Construction of nanofiltration WTP, 60 wells and 1 deep injection well
Surface Water Reservoirs	6 to 10 (2015 to 2019)	Land acquisition for pipeline rights-of way
		Permitting
		Modeling (available capacity, reliability, surface water impacts)
		Design
		Construction of pipelines, WTP, and possibly ASR well
Seawater Desalination	6 to 10 (2015 to 2019)	Siting (both WTP and Ocean intake pipeline location)
		Land acquisition (pipeline and WTP)
		Feasibility Study (if Boulder Zone)
		Permitting (ocean intake, WTP Construction, Deep Well)
		Design
		Construction

Continued from page 42

tions of salts that are much higher than the surficial aquifer, so when crops are irrigated using Floridan Aquifer water, the salts are left behind after the applied water is consumed by evapotranspiration; consequently, the chloride and total dissolved solids concentrations are much higher in these areas.

Toth and Huang from the St. Johns River Water Management District investigated groundwater resources in Central Indian River County from the Brevard County line to the St. Lucie County line in an area generally west of the coast and east of Blue Cypress Lake, except for the northern part of the study area. This study was undertaken to find an alternate source of irrigation water for periods when surface water from the Upper St. Johns River Basin project would be unavailable.

The water management district drilled seven test holes and six wells in the Surficial Aquifer throughout the study area. The most productive portion of the Surficial Aquifer system in this area occurs in the upper 50 feet of the system and generally has a thickness of less than 30 feet.

Toth and Huang estimated the production rate of four-inch diameter wells. An evaluation of all the test well data indicated that the average reasonable production rate of a four-inch diameter well producing water from the study area averages about 74 gallons per minute (gpm), or 0.107 million gallons per day (mgd). At this production rate, approximately 14 wells would be needed to equal the production capacity of one 1,000-gpm production well that is constructed into the UFA.

Water quality for seven Surficial Aquifer wells sampled ranged from 49 mg/l chloride to 601 mg/l chloride. Toth and Huang indicated that the high value may be the result of infiltration of water being discharged from a nearby, free-flowing well withdrawing water from the Floridan Aquifer system.

They concluded that wells constructed should be expected to require considerable maintenance to avoid reduction in rates of discharge caused by sedimentation and biological and mineral encrustation of the filtration screens. In their opinion, the Surficial Aquifer system appears "to have limitations as an economically feasible source of water for citrus irrigation or frost-and-freeze protection in the study area.

There is believed to be an available quantity of water in the Surficial Aquifer, and there would be no negative impacts on neighboring agricultural UFA wells as a result of withdrawals; however, well production rates in this aquifer are low. Land acquisition for well sites and construction costs associated with so many production wells could be costly. Surficial aquifer wells also require additional maintenance activities and are more subject to drought conditions (due to recharge) and surface activities.

Implementation of a Surficial Aquifer treatment system and associated wells is estimated to be a six-to-eight-year process. Land acquisition for approximately 60 wells, permitting of the wells (with required modeling) and water treatment plant, and permitting/construction of a deep injection well for concentrate disposal all contribute to the lengthy lead time. This option, however, could still be implemented in advance of the 2023 deadline.

The action items required to implement this and the other options discussed in this article, as well as the projected implementation schedules, are provided in Table 1.

Seawater Desalination

Seawater desalination from open ocean or bay waters typically is not permitted by water management districts. Influent and effluent pipeline construction requires a 404 permit from the U.S. Army Corps of Engineers, and various Florida Department of Environmental Protection permits. Obtaining these required permits may be controversial and result in project delays.

An alternative to open ocean desalination is withdrawal from the Boulder Zone. The Boulder Zone is a deep aquifer (approximately 2,000 to 2,200 feet below land surface in Indian River County) in which the water quality characteristics are a near perfect match for seawater. This type of withdrawal can be less troublesome from an operations perspective because the intake does not face prospective fouling by sea life, nor does it require mitigation for issues such as sea grass destruction associated with intake/outfall pipes. Boulder Zone withdrawals, however, are more likely to be subject to water management district permitting.

For the purpose of the ASWP, Boulder Zone withdrawal was not evaluated further due to the costly nature of the feasibility evaluation, permitting and construction of the production wells, and the corresponding injection well for concentrate disposal. The Boulder Zone option is discussed later in this study.

Open ocean desalination provides for a potentially unlimited supply source that would meet demands through 2025 and well beyond. The treatment process for this source, however, is the most costly option available to the water supply industry. There is only one existing desalination facility in Florida (Tampa Bay Water), and it experienced a great deal of difficulty in start-up, although it is now operational.

The open ocean desalination option would require an intake pipeline to be routed from the proposed water treatment plant site across the Indian River Lagoon, terminating offshore in the Atlantic. Likewise, an outfall pipeline for disposing of concentrate would be required.

In most cases, desalination facilities of this nature are located in close proximity to existing power plants that rely on ocean outfall pipes for disposal of cooling water. The ability to share capacity of such a pipeline allows for significant cost savings related to concentrate disposal, although these pipelines are often the target of environmental groups and objections from the public pertaining to the impacts on sea life surrounding the pipes.

The cost estimate prepared for each alternative evaluated in the AWSP is summarized in Table 2. For the seawater desalination option, the cost estimate did not include the construction of the intake or outfall pipelines or the acquisition of rights-of-way for routing the pipelines.

Continued on page 46

Continued from page 44

The excessive cost associated with the treatment plant itself was adequate justification for dismissing this as a viable option for the county at the present time; however, the water management district prepared a study entitled, "Demineralization Concentrate Ocean Outfall Feasibility Study Phase 2-A – Conceptual Ocean Outfall Evaluation" that included a cost estimate for the intake pipeline assuming a span from the city of Vero Beach Water Treatment Plant (several miles southeast of the county's North County Plant) to the ocean. The estimate for the single pipeline in the district's report was approximately $62.8 million.

While the county could experience some cost savings on the second (outfall) pipeline during construction, an estimate of $62 million for the second pipeline is reasonable. This would bring the total construction cost estimate of intake/outfall pipes to approximately $125 million in addition to the cost of the treatment plant. The estimated construction cost (capital) for a 20-mgd seawater desalination plant is $115,436,000, bringing the total, including the intake and outfall pipes, to over $240 million.

Implementing a seawater desalination plant is a time-consuming process. Between permitting, design and construction of the WTP and associated pipelines, implementation could take from six to 10 years (i.e. year 2015 to 2019). Implementing this option has the potential to encroach on the county's 2023 deadline.

Table 2: Summary of Opinion of Probable Cost for Treatment Technologies Using Various Raw Water Sources

Raw Water Source/Treatment Method/Plant Capacity (mgd)	Raw Water Source	Concentrate Disposal	Capital Cost	Annual O&M Cost	Production Cost ($/1000 gallons)[4]
Current Costs of UFA Using Low Pressure RO - Actual Costs (FY 2007-2008)					
12.21 [1]	Groundwater	Surface Water Discharge	$1,551,882 [1]	$5,102,572	$2.05
Fresh Surface Water Using Microfiltration/Ultrafiltration					
5	Surface Water	N/A[2]	$14,191,000	$1,078,000	$2.10
10	Surface Water	N/A[2]	$24,397,000	$1,720,000	$1.57
15	Surface Water	N/A[2]	$33,064,000	$2,289,000	$1.36
20	Surface Water	N/A[2]	$41,025,000	$2,841,000	$1.22
Surficial Aquifer Using Nanofiltration					
5	Groundwater	Deep Injection Well (DIW)	$24,178,000	$1,646,000	$3.42
10	Groundwater	DIW	$33,576,000	$2,836,000	$2.34
15	Groundwater	DIW	$41,573,000	$3,913,000	$1.95
20	Groundwater	DIW	$50,188,000	$4,992,000	$1.75
Continued Use of UFA Using Low Pressure RO-New WTP and Wellfield					
5	Groundwater	DIW	$34,693,000	$1,758,000	$4.41
10	Groundwater	DIW	$48,579,000	$3,181,000	$3.04
15	Groundwater	DIW	$64,086,000	$4,526,000	$2.65
20	Groundwater	DIW	$79,077,000	$5,910,000	$2.42
Seawater RO Treatment					
5	Surface/Ground Water[3]	DIW	$39,429,000	$3,145,000	$5.95
10	Surface/Ground Water[3]	DIW	$64,094,000	$6,230,000	$4.77
15	Surface/Ground Water[3]	DIW	$92,828,000	$9,248,000	$4.48
20	Surface/Ground Water[3]	DIW	$115,436,000	$12,432,000	$4.18

[1] 12.21 mgd is combined WTP capacity; actual average production for the FY2007-2008 is projected to be 8.89 mgd. Production cost based on actual average production estimate of 8.89 mgd (3,246 mgy). Capital Cost estimate pertains to raw water supply costs.

[2] MF/UF do not produce a concentrate steam as with nanofiltration and RO systems. Residuals need to be removed from the backwash water and chemicals in the backwash solution may require neutralization prior to disposal.

[3] Costs include only treatment. Cost of an influent pipeline or deep well to the Boulder Zone as a source is not included. Deep Injection Well disposal would vary between $5.5 million and $11 million for the water treatment plant capacities presented.

[4] Annual O&M and production costs are based on average daily demand using a maximum daily demand/annual average daily demand ratio.

Surface Water/Reservoirs

There are significant freshwater resources within the county that potentially are available for use as a potable water supply. As a result of the U.S. Army Corps of Engineers Upper St. Johns River Basin Project, a number of water management and water conservation areas have been constructed within the county to capture and store freshwater that otherwise would be discharged to tide. These include:

- Blue Cypress Water Management Area – East
- Blue Cypress Water Management Area – West
- Blue Cypress Marsh Conservation Area
- Fort Drum Marsh Conservation Area
- St. Johns Water Management Area
- Fellsmere Water Management Area (to be constructed)

In addition to St. Johns River Water Management District reservoir projects, the district contracted jointly with the South Florida Water Management District for a study to establish the benefits and feasibility of reconnecting the Upper St. Johns River basin with the C-25 basin (located within the South Florida District) and establishing storage at that location.

The study, prepared by the engineering firm PBS&J, found that there is a statistically significant difference in rainfall between rainfall stations at Vero Beach and Fort Pierce, with up to 10 feet of cumulative difference in rainfall over a 35-year period between stations. This study also examined discharges to tide out of five different basins, including the St. Johns Water Control District, the Fort Pierce Farms Water Control District, the Indian River Farms Water Control District South Relief Canal and Main Relief Canal, and the S-50 that drains the South Water Management district's C-25 Canal.

The study showed that just three of the five control points (S-50, South Relief Canal, and Main Relief Canal) discharged millions of acre-feet of freshwater over the past 50 years from man-made ditches and channels. The median annual discharge for these three structures from 1965 to 2004 was 204,661 acre-feet (ac-ft). The minimum was 82,978 ac-ft and the maximum was 364,541 ac-ft.

From interviews of past reports, it appears that more than 22,000 acres of suitable land may be available for purchase in the study area to accommodate one or more large reservoir storage areas. The study also concluded that the network of drainage ditches and canals necessary to connect these flows to storage areas already exists. A simulation was conducted involving the filling of a 30,000-acre reservoir to a depth of 30 feet over a period of 40 years using available water from only the S-50 spillway pumped at a continuous rate of 1,000 cubic feet per second (cfs). This latter flow constitutes 93 percent of the available freshwater; this was not done as a practical exercise of the amount that could actually be stored, but of the amount of water that would be available from just one basin.

In addition to the surface water projects being developed by the two water management districts, a development project in northern St. Lucie County also presents a possible opportunity for a reservoir site. The Florida Conservancy and Development Group LLC applied to St. Lucie County for a Development of Regional Impact for a project known as Cloud Grove. The project would overlap both St. Lucie and Indian River Counties in the vicinity of the proposed reconnection.

Continued on page 48

Continued from page 46

The majority of the development would occur in the portion of the project site within St. Lucie County; however, there is a portion of the project site—approximately 1,400 acres—that lies just north of the county line in Indian River County. The suggestion has been made that the 1,400-acre parcel be considered for use as a reservoir.

As indicated previously, there is sufficient water available from C-25, the South Relief Canal, and the Main Relief Canal to fill a reservoir on the 1,400-acre parcel. This parcel would not provide the full storage capacity needed to meet the county's demands through 2025 and therefore would have to be supplemented with other projects throughout the county. The Cloud Grove project has been placed on hold by the developer since the AWSP was initially prepared.

The primary restraints on available supply will be the operational guidelines of the water conservation areas in the county, along with the existing and proposed minimum flows and levels at several surface water bodies in the county (and north in Brevard). Also, reliance on a water conservation or management area in the Upper Basin Project area would require lengthy and costly pipelines to convey the water to the treatment plant site (for the sake of this study, it was assumed that the new water treatment plant would be constructed on the existing North County Plant site). Permitting for the water treatment plant, proposed to be a microfiltration/ultrafiltration process followed by chlorination, is fairly straightforward and standard.

The AWSP concluded with a recommendation to the board of county commissioners that the county proceed in securing a permit to withdraw from a surface water source and move on to Phase II of the evaluation to identify the specific point of withdrawal. Since completion of the AWSP, the county has held numerous discussions with St. Johns River District to agree to a specific water body for use as the primary supply source in this endeavor.

Rather than focusing on the Upper Basin Project area, the district requested that the county explore the potential to withdraw from one of the drainage districts' canal systems or the C-54 canal. It was determined that none of the drainage districts could support a sustainable flow to meet projected demands and allow the districts to maintain water levels and flows needed by existing permitted users of the canals. The county then shifted its focus to the C-54 canal, which runs along the Indian River County-Brevard County line.

Continued Use of UFA

Continued use of the UFA as a supply source is a topic that has been discussed extensively with the St. Johns River District. While it is believed that the aquifer could sustain the county's demands through 2025, it could not meet the needs through build-out of the county, which is anticipated to occur well after 2025.

Reliance on the UFA, however, could provide for what has been referred to as the "bridge the gap" scenario, in which incremental increases to withdrawals would be permitted to meet demand between 2023 and the final implementation of the selected alternative source. Upon start-up of the alternative supply water treatment plant, withdrawals from the UFA would be reduced to the 2023 demand and the balance of raw water would be obtained via the alternative supply.

Though this option is not the most preferred by local objectors to the UFA withdrawals (primarily agricultural users that rely on artesian pressure in neighboring wells), it would provide the county with flexibility to implement the alternative and still meet the demand. The county has since conducted all six of the proposed wells (for a total of nine at the North County Plant), but the new wells remain unequipped (no pumps, power, or transmission piping).

The county intends to equip these wells with pumps to withdraw approximately half the design capacity during the "bridge the gap" transition period. These pumps can be upsized in the future if development patterns warrant additional flow prior to implementing the alternative supply source.

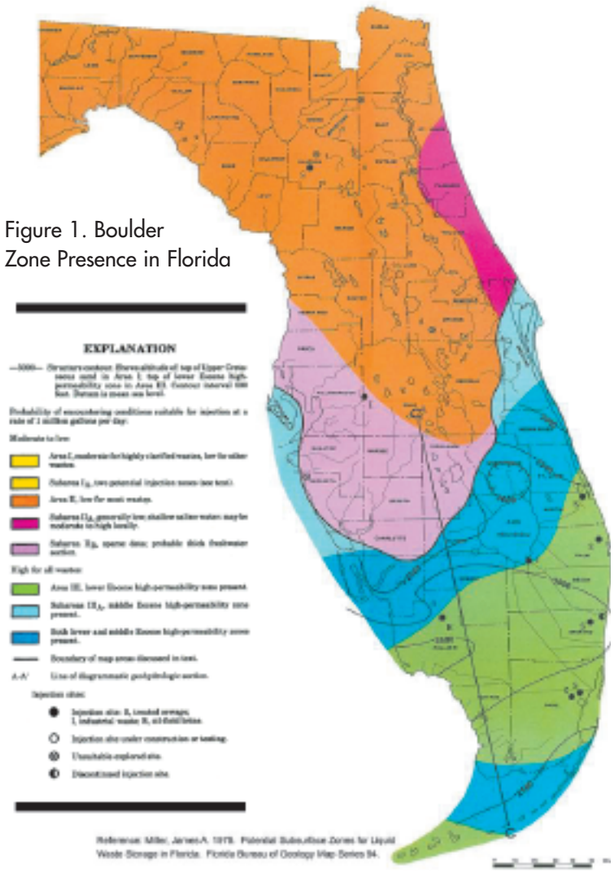

Figure 1. Boulder Zone Presence in Florida

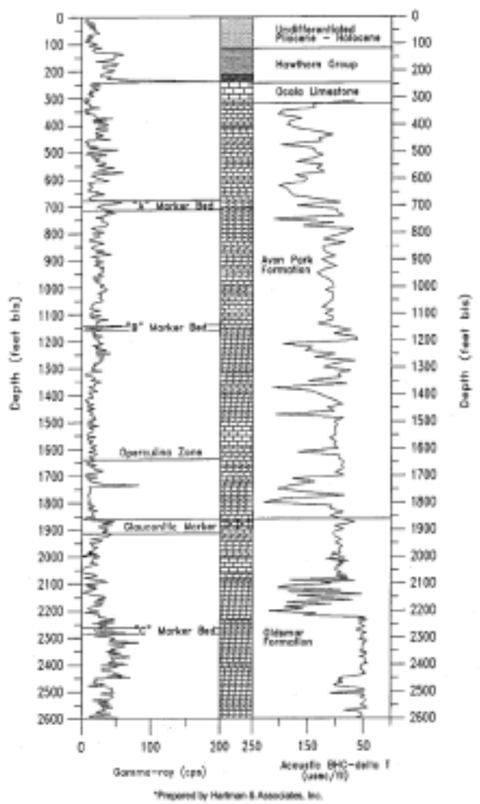

Figure 2. City of Palm Bay Geologic and Stratigraphic Exploratory Well

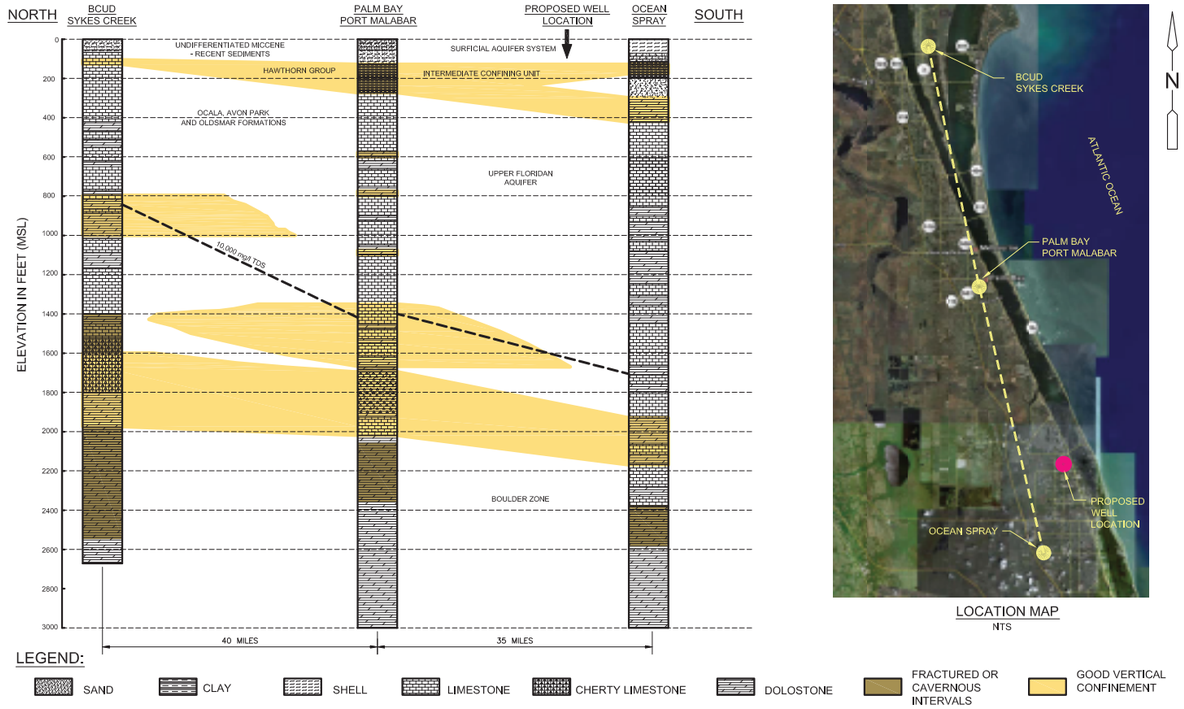

Figure 3. Hydrogeologic Cross Section Indian River County, FL

Boulder Zone/LFA Option

While the treatment technology for seawater desalination is essentially the same regardless of the source (open ocean vs. Boulder Zone), reliance on the LFA or Boulder Zone as a supply source eliminates the need for the costly intake and outfall pipes. Both the LFA and Boulder Zone are present in Indian River County.

The Boulder Zone, as depicted on Figure 1, is present from South Florida to the north through southern Brevard County. A production zone in the brackish LFA is believed to exist below the 10,000 mg/l Total Dissolved Solids Underground Source of Drinking Water (USDW) boundary but above the confining bed for the Boulder Zone.

One option for utilizing the LFA for drinking water supply would be to construct production wells into the UFA and discharge the concentrate into the Boulder Zone. The second scenario is a withdrawal from the Boulder Zone, which essentially contains seawater, and a discharge of the brine concentrate into the Boulder Zone at a distance from the withdrawal point that is beyond any significant cone of depression, such that modeling would indicate the distance is not an issue. The density of the concentrate, assuming that the source water is close to seawater in composition, would be approximately twice the density of seawater.

Figure 2 illustrates a section from the Palm Bay injection well (10 miles north of the county's North County Plant). The injection zone (Boulder Zone) is in the Oldsmar Formation from 2,100 to 2,600 feet. Of interest is that above this interval, in the lower Avon Park Formation, there appears to be an interval from 1,700 to 1,825 feet that is dolomitic and has acoustic characteristics similar to the injection zone.

A relatively faster acoustic interval separates the two zones, suggesting the possibility of confinement and indicating that the hydrogeology may be suitable for a production well in the Lower Avon Park Formation and an injection well in the Oldsmar Formation. The 10,000-mg/L Total Dissolved Solids USDW base was reported to be at 1,600 feet. Similar configurations have been found in Merritt Island and slightly farther away in two wells in north Broward County. Data immediately to the south of the county has not yet been reviewed.

The geology of the LFA is complex. Potentially it could be separated from the UFA above by an aquitard or an aquiclude. Figure 3, which is a cross section between Brevard County and southern Indian River County, suggests potential confinement but does not confirm it because of a lack of data in the vicinity of the North County Water Treatment Plant.

A highly respected published report by Frederick W. Meyer (Meyer, 1988) indicates that the LFA in southern Florida exhibits up to three individual high permeability dolomitic zones separated by less permeable dolostones and limestones. This is significant in that a production well could be cased in an upper permeable zone and the concentrate disposed of in the deepest permeable zone in a separate injection well.

The concentrate from this process would be very high in density and will have negative or neutral buoyancy when injected into a

Continued on page 50

Continued from page 49
saline water zone. In other words, it will not migrate upward because of having similar or greater density characteristics as the fluid it is being injected into. This use of LFA water, particularly if it is seawater, along with the confinement characteristics that the formation intervals likely possess, should provide additional assurance to the regulators of no upward migration and a resistance to lateral migration because of its greater density.

Developing an LFA source at the county's North County Water Treatment Plant would require a test well program to verify the presence or absence of confining beds and high permeability zones, as well as water quality. One of the intents of the test well program would be to test impact on water levels in wells in the UFA and, hopefully, demonstrate no impact on existing legal uses by virtue of withdrawals from the LFA.

Utilizing this deeper LFA containing highly saline water would eliminate the uncertainty of supply during drought periods that exists with a surface water supply. Utilizing the LFA would provide source water that would be free of the sea life and organics that have posed problems for desalination facilities such as the plant run by Tampa Bay Water.

The modeling effort that would be required to demonstrate the viability of an LFA/Boulder Zone system would be extensive. The primary challenge will be collecting enough data to obtain representative subsurface parameters and minimize risk. While there are concerns and uncertainties surrounding use of the LFA as a source of seawater, the county has suggested that this option should be maintained and further evaluated, especially considering the economics of the alternative projects (ocean desalination). Implementation of this option would closely match that of seawater desalination and is estimated to require between six and 10 years.

Conclusions

The purpose of the AWSP was to evaluate the potential raw water supply sources within the County that could serve as the future long-term water supply beyond the capacity of the current water treatment plants. The study examined the benefits and drawbacks of utilizing the surficial aquifer, seawater desalination, and surface water supplies in comparison to the current practice of pumping from the UFA.

Table 1 summarizes the costs associated with each option, as well as the actual production cost data for the existing process (UFA aquifer/nanofiltration treatment at the two treatment plants) budgeted for fiscal year 2007/2008. For comparison purposes, both the actual production costs for the current nanofiltration process (UFA aquifer) and the equivalent costs for building a new nanofiltration treatment plant with the associated wellfield are provided.

The county has been evaluating the potential for a surface water system as a result of the AWSP recommendations. In light of the fact that it was discovered that the drainage districts can not sustain the necessary demand, the C-54 has emerged as the most logical surface water supply source. The C-54 originates in the westernmost portion of the county but does not lie in the eastern portion of the county, where a connection to the water distribution system ideally would be located.

The St. Johns River Water Management District has indicated that the fact that the C-54 is located primarily in Brevard County will not preclude Indian River County from relying on the canal as a drinking water supply source. The county also still is considering the possibility of a combined LFA/Boulder Zone system. Available data and information for the area indicate that this is a potentially viable option and should not be dismissed.

The county will continue to rely on the original three UFA wells and the newly constructed six UFA wells to meet potable demands until such time that an appropriate alternative is identified, permitted, and implemented.