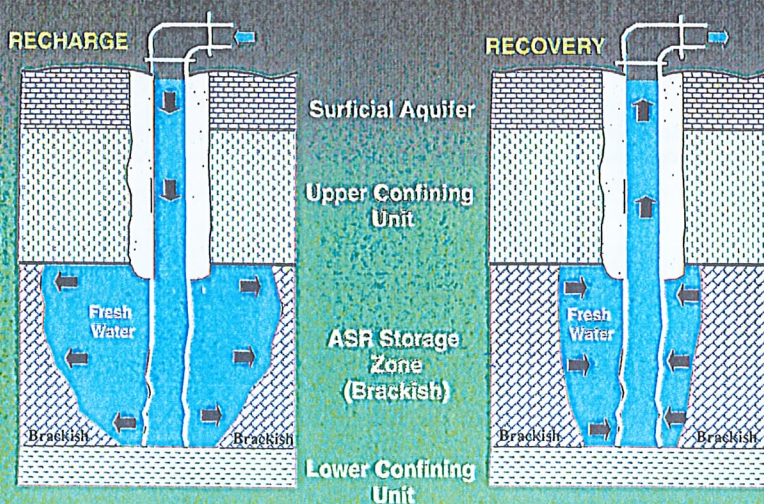


# Aquifer Storage and Recovery in the Comprehensive Everglades Restoration Plan (CERP)



## Aquifer Storage and Recovery Schematic



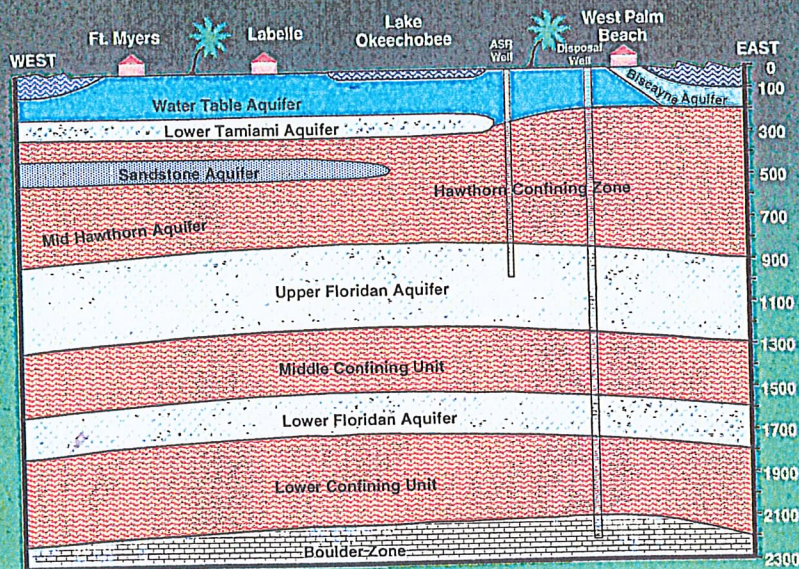
275,000 AF - avg. annual amount of water recovered from ASR in CERP

3' of W.L. elevation in Lake O.

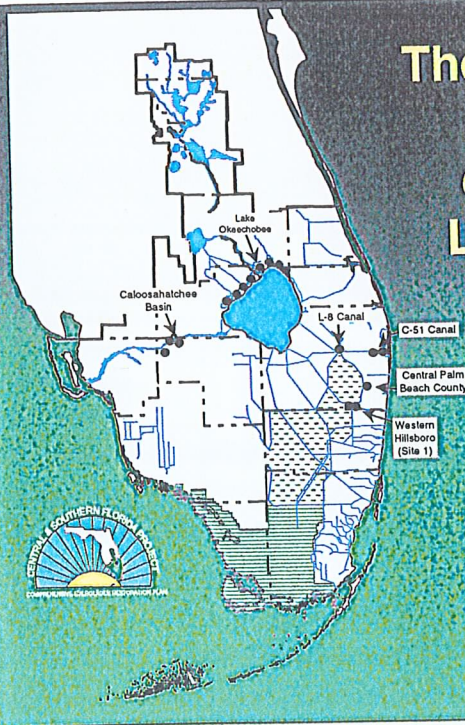
32% of all new water in CERP comes from ASR



## ASR Wells Tap a Shallower Zone in the Floridan Aquifer Than Deep Injection Wells



## The majority of CERP ASR capacity is centered around Lake Okeechobee



Site	Capacity (mgd)
Lake Okeechobee	1,000
Caloosahatchee	220
L-8 Basin	50
C-51 Basin	170
Central PBC	75
Western Hillsboro	150
<b>TOTAL</b>	<b>1,665</b>

Note mgd = million gallons per day



## **General Benefits of Aquifer Storage and Recovery**

- **Ability to conduct long-term (multi-year) storage and recover this stored water during droughts, presumably when reservoir levels would be low**
- **Not subjected to evapotranspiration and seepage losses**
- **Limited land requirements (acre or two per well) result in significant cost savings compared to reservoirs**
- **Wells can generally be located in areas of greatest water availability and/or need**

## **Major Points**

- **ASR facilities have been operating in Florida for over 20 years**
- **The ASR Pilot Projects (8-1/2-year duration) demonstrate our deliberate, methodical, science-based approach to ASR implementation**
- **Audubon of Florida and others support the ASR Pilot Projects**
- **The CERP assumes all water will meet water quality standards prior to ASR storage**

COMPREHENSIVE EVERGLADES RESTORATION PLAN

Comp Plan SFWMD UPDATE 1.0

SFWMD

LAST UPDATE: 7/30/01 at 1:41 PM

TASK	DUR	Start	Finish	Predecessor ID#	99	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19
SFWMD CERP	10622d	1/13/99	9/30/99																						
<b>PILOT PROJECTS</b>	3452d	8/10/00	11/1/13																						
<b>LAKE OKEECHOBEE ASR PILOT PROJECT</b>	2409d	8/10/00	11/3/09																						
PMP Development LO ASR Pilot	156d	8/10/00	3/15/01	32																					
Pilot Project Design Report LO ASR Pilot	553d	3/23/01	5/6/03	92																					
RE Verification LO ASR Pilot	5d	5/7/03	5/13/03	93																					
P&S LO ASR Pilot	130d	5/14/03	11/11/03	94																					
Construction LO ASR Pilot	780d	11/12/03	11/7/06	95,7																					
Operational Monitoring LO ASR Pilot	520d	11/8/06	11/4/08	96																					
Pilot Project Technical Data Report LO ASR Pilot	260d	11/5/08	11/3/09	97																					
<b>CALOOSAHATCHEE RIVER ASR PILOT PROJECT</b>	1925d	4/2/01	8/15/08																						
PMP Development Caloosahatchee R. ASR Pilot	105d	4/2/01	11/16/01	32FS+167d																					
Pilot Project Design Report Caloosahatchee R. ASR Pilot	715d	11/19/01	8/13/04	101																					
RE Verification Caloosahatchee R. ASR Pilot	5d	8/16/04	8/20/04	102																					
P&S Caloosahatchee R. ASR Pilot	375d	3/17/03	8/20/04	103FF																					
Construction Caloosahatchee R. ASR Pilot	300d	8/23/04	2/17/06	104,8																					
Operational Monitoring Caloosahatchee R. ASR Pilot	520d	2/20/06	2/15/08	105																					
Pilot Project Technical Data Report Caloosahatchee R. ASR Pilot	130d	2/18/08	8/15/08	106																					
<b>HILLSBORO IMPOUNDMENT &amp; ASR PILOT PROJECT</b>	2276d	8/10/00	4/30/09																						
PMP Development Hillsboro ASR Pilot	156d	8/10/00	3/15/01	32																					
Pilot Project Design Report Hillsboro ASR Pilot	890d	3/23/01	8/19/04	110																					
RE Verification Hillsboro ASR Pilot	5d	8/20/04	8/26/04	111																					
P&S Hillsboro ASR Pilot	131d	2/19/04	8/19/04	111FF																					
Construction Hillsboro ASR Pilot	475d	8/20/04	6/15/06	113,7																					
Operational Monitoring Hillsboro ASR Pilot	520d	6/16/06	6/12/08	114																					
Pilot Project Technical Data Report Hillsboro ASR Pilot	230d	6/13/08	4/30/09	115																					

CERP  
7/30/01

Task		Summary		Rolled Up Progress		Project Summary	
Progress		Rolled Up Task		Split			
Milestone		Rolled Up Milestone		External Tasks			

# AUDUBON OF FLORIDA

Florida State Office  
Everglades Conservation Office  
444 Brickell Avenue, Suite 350  
Miami, FL 33131

Tel: 305/371-6399  
Fax: 305/371-6398

RECEIVED

AUG 20 2001  
EXECUTIVE OFFICE

August 16, 2001

Mr. Henry Dean  
Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33406

Subject: Aquifer Storage and Recovery Pilot Projects,  
Comprehensive Everglades Restoration Plan

Dear Mr. Dean:

On behalf of Audubon of Florida, I am writing regarding our position on Aquifer Storage and Recovery (ASR) Pilot Projects associated with the Comprehensive Everglades Restoration Plan (CERP). Audubon supports the expeditious development, monitoring and evaluation of the ASR pilot projects and the ASR regional study. These projects are necessary to address the many significant concerns raised concerning this technology, including those raised by the National Academy of Sciences and the South Florida Ecosystem Restoration Task Force. Additionally, Audubon strongly supports the development of an Aquifer Management and Protection Plan, as well as contingency plans to account for potential ASR shortfalls.

#### Aquifer Management and Protection Plan Must Be Developed

As recommended by the Governor's Commission for a Sustainable South Florida, the South Florida Water Management District, in conjunction with the US Environmental Protection Agency and the US Army Corps of Engineers, "should develop an Aquifer Management and Protection Plan for the Floridan Aquifer. This plan should consider existing and proposed ASR facilities, existing permitted withdrawals for water supplies, potential artesian wells to support Biscayne Bay, and potential contamination from treated wastewater discharged through deep well injection."<sup>1</sup>

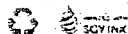
#### Contingency Plans Must Be Developed

Although we realize the potential for ASR to provide great benefits, Audubon strongly recommends the development of contingency plans to accommodate potential component performance shortfalls and delays in implementation. Contingency plans should be developed as part of the individual pilot projects and the regional study. If the ASR projects do not perform as anticipated, it will be necessary to have well-designed contingency plans ready for immediate implementation.

<sup>1</sup> Governor's Commission for a Sustainable South Florida, Report on the January 25, 1999 Draft Implementation Plan of the C&SE Project Restudy (March 3, 1999), at 2.



A STRONG ALLIANCE OF THE FLORIDA AND NATIONAL SOCIETIES IN PARTNERSHIP WITH 45 LOCAL AUDUBON CHAPTERS





Mr. Henry Derr  
Page Two

#### Address Concerns of the National Academy of Sciences Concerns

We support the conclusions of the National Academy of Sciences Committee on Restoration of the Greater Everglades Ecosystem (CROGEE), as articulated in the recently released *Aquifer Storage and Recovery in the Comprehensive Everglades Restoration Plan: A Critique of the Pilot Projects and Related Plans for ASR in the Lake Okechobee and Western Hillsboro Area*. The CROGEE concluded that:

1. regional analysis of the subsurface is crucial to evaluating the potential for success for CERP ASR components,
2. biogeochemical reactions in the subsurface and the potential impacts on receiving water bodies at the surface require further investigation and understanding, and
3. thorough monitoring and testing at pilot project sites is necessary to provide data to the referenced regional and water quality investigations.

#### Address the Concerns of the South Florida Ecosystem Restoration Task Force

We support the recommendations given by the Aquifer Storage and Recovery Issue Team of the South Florida Ecosystem Restoration Task Force as articulated in its July 1999 report to the South Florida Ecosystem Restoration Working Group. The team recommended further analyses of several technical issues relating to ASR implementation, including:

1. characterization of the quality of prospective source waters, spatial and temporal variability,
2. characterization of regional hydrogeology of the Upper Floridan Aquifer: hydraulic properties and water quality,
3. analysis of critical pressure for rock fracturing,
4. analysis of site and regional changes in head and patterns of flow,
5. analysis of water quality changes during movement and storage in the aquifer,
6. Aquifer Storage and Recovery potential effects on mercury bioaccumulation for ecosystem restoration projects, and
7. relationship between ASR storage interval properties and recovery rates and recharge volume.

There are many significant concerns that must be addressed prior to the full-scale implementation of the ASR components described in the CERP. The pilot projects and the regional study should address all of the technical concerns relating to ASR. This will prevent unnecessary impacts to the environment and existing water users that could result from improper implementation of ASR.

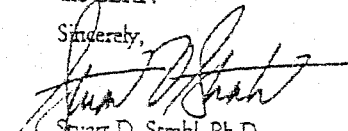
#### Continue Open and Informed Public Process

As stated at the August 2, 2001, Water Resource Advisory Commission meeting, implementation of the CERP ASR pilot projects is proceeding in a slow, methodical manner to answer the many questions concerning ASR. We understand that the US Environmental Protection Agency is committed to working with the State of Florida on its efforts towards the development of ASR projects that are protective of human health and the environment and are beneficial to the State. The failed ASR legislation from the 2001 Florida Legislative session was unnecessary for the implementation of the CERP ASR Pilot Projects, and served as a distraction from the real issues that must be addressed through the pilot projects and the regional study.

Mr. Henry Dean  
Page Three

Audubon strongly recommends that the CERP implementation process continue to be as open, inclusive and informed as possible at every stage to ensure a plan that continues to enjoy the broadest public support. Public outreach efforts must be active efforts to fully inform and engage all stakeholders. Special attention must be given to environmental justice issues and the concerns of minority communities around Lake Okeechobee. Additionally, all decisions regarding the implementation of ASR should be made in consideration of public comment. There are real concerns regarding large-scale implementation of ASR that must be acknowledged and addressed if we are to successfully implement the CERP.

Sincerely,



Stuart D. Strahl, Ph.D.  
President & CEO

Board of Directors

F.D. "Bud" Jordan  
Lawrence E. Cray, III  
Stella Boland  
Michael J. Brown, Jr.  
Leslie Carlson  
Mike Crook, C.P.A.  
Matt Kelly  
Timothy J. Kinane  
Max Quackenbush  
Edward R. Weinberg

August 13, 2001

Mr. Henry Dean  
Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33406

RECEIVED

AUG 17 2001  
EXECUTIVE OFFICE

**Subject: Support for Aquifer Storage and Recovery Projects,  
Comprehensive Everglades Restoration Plan**

Dear Mr. Dean:

On behalf of the St. Lucie River Initiative, Inc, I am writing this letter to express our support for the Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP).

Our mission is to see the St. Lucie River restored to good health. We have a plan, the Indian River Lagoon Restoration Plan (IRLP), which is on schedule to be authorized in WRDA 2002, and which when implemented will result in our goal being achieved.

A critical assumption, perhaps better stated as a foundation assumption, within the IRLP is that Lake Okeechobee is managed much differently in the future than it is today. This future Lake management regime depends upon the storage projected within the overall CERP using ASR. If ASR is not implemented, the adverse effects on Lake Okeechobee and the St. Lucie and Caloosahatchee Estuaries will be very significant.

The failed ASR legislation from the 2001 Florida Legislative session resulted in much negative media coverage regarding the ASR technology. The fate of microorganisms in aquifers, the subject of the failed ASR bill, requires further study. We fully support those studies, and encourage more rapid evaluation to the extent possible. On the other hand, we agree that if ASR is determined, based on these studies, to be a threat to future water resources, it must be dismissed as a storage alternative.

The sooner we know the answer, the better. There does not appear to be another storage technology available that can provide multi-year storage to alleviate drought conditions, as experienced by Florida during the last year and a half. ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, and as such may provide cost-effective benefits beyond traditional storage technologies such as reservoirs

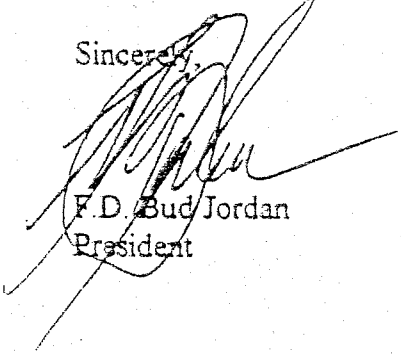


already proposed in CERP. However, if it is not going to work, more traditional storage and more extensive conservation measures must be designed and implemented as soon as possible within the overall Plan.

As presented at the August 2, 2001, Water Resource Advisory Commission meeting, implementation of the CERP ASR projects are proceeding in a slow, methodical manner to answer the many questions about applying this storage technology.

As a member of the Water Resource Advisory Commission to the South Florida Water Management District, we encourage you to continue your efforts with the U.S. Army Corps of Engineers to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration as outlined in the CERP. At the same time, we recommend that the alternatives be ready to go if those studies do not prove the safety and cost-effectiveness of the ASR component.

Sincerely,



F.D. Bud Jordan  
President



Ed. J. Day 2001

Miami, USA

August 27, 2001

Mr. Henry Dean  
Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33406

RECEIVED

SEP 1 2001  
SOUTH FLORIDA WATER MANAGEMENT DISTRICT

Re: **Aquifer Storage and Recovery Projects,  
Comprehensive Everglades Restoration Plan**

Dear Mr. Dean:

On behalf of Citizens for a Better South Florida, I am writing this letter to encourage the SFWMD to continue its evaluation of the Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP).

The failed ASR legislation from the 2001 Florida Legislative session resulted in much media coverage regarding the ASR technology. While the fate of microorganisms in aquifers - the subject of the failed ASR bill - requires further study, it appears that the potential benefits of ASR technology should be properly assessed. For example, there does not appear to be another storage technology available that can provide multi-year storage to alleviate drought conditions, as experienced by Florida during the last year and a half. Additionally, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits that complement traditional storage technologies such as reservoirs already proposed in CERP.

As presented at the August 2, 2001, Water Resource Advisory Commission meeting, implementation of the CERP ASR projects are proceeding in a slow, methodical manner to answer the many questions about applying this storage technology. I am aware that the current CERP ASR Program includes 333 ASR wells, and that nowhere in the world is ASR technology proposed at this scale. The ASR Issue Team and Committee for Restoration of the Greater Everglades Ecosystem (CROGEE) - both commissioned by the South Florida Ecosystem Restoration Task Force's Working Group - raised several technical issues that need to be addressed. The strategy of conducting ASR Pilot Projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin - combined with the ASR Regional Study to more fully evaluate the 333-well program and its effects on the environment and existing water users - appears to address these technical issues.



CITIZENS  
FOR A BETTER SOUTH FLORIDA




Mr. Henry Dean  
August 27, 2001  
Page 2 of 2

As a member of the Water Resource Advisory Commissions to the South Florida Water Management District, I encourage you to continue your efforts with the U.S. Army Corps of Engineers to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration as outlined in the CERP.

Sincerely yours,

*Citizens for a Better South Florida*



Nancy B. Pantoja, P.E.  
Board Member

NBP/ab



Florida Department of Agriculture and Consumer Services  
CHARLES H. BRONSON, Commissioner  
The Capitol • Tallahassee, FL 32399-0800

Please Respond to:

September 10, 2001

RECEIVED

Mr. Henry Dean  
Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33406

SEP 17 2001  
EXECUTIVE

Subject: Support for Aquifer Storage and Recovery Projects,  
Comprehensive Everglades Restoration Plan

Dear Mr. Dean:

I am writing this letter to express my support for the Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP).

The failed ASR legislation from the 2001 Florida Legislative session resulted in much negative media coverage regarding the ASR technology. While the fate of microorganisms in aquifers, a major focus of the failed ASR bill, requires further study, it appears that the potential benefits of ASR technology have been unfairly overlooked. For example, there does not appear to be another technology available that can provide multi-year storage to alleviate drought conditions, as experienced by Florida during the last year and a half. Additionally, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits that complement traditional storage technologies such as reservoirs already proposed in CERP.

As presented at the August 2, 2001, Water Resource Advisory Commission meeting, implementation of the CERP ASR projects are proceeding in a slow, methodical manner to answer the many questions about applying this storage technology. This is appropriate, given the importance of ASR to the success of Everglades restoration and the fact that nowhere in the world is ASR technology proposed at this scale.

The ASR Issue Team and Committee for Restoration of the Greater Everglades Ecosystem (CROGEE), both commissioned by the South Florida Ecosystem Restoration



Florida Agriculture and Forest Products


3.53 Billion for Florida's Economy



Task Force's Working Group, have raised technical issues that need to be resolved. The ongoing strategy of conducting ASR Pilot Projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, combined with the ASR Regional Study to more fully evaluate the total 333-well program and its effects on the environment and existing water users, is an excellent framework for addressing these technical issues. In this regard, I fully support, and encourage you to continue, your efforts with the U.S. Army Corps of Engineers to conduct the necessary data collection and scientific studies to fully evaluate the ASR technology for the benefit of Everglades Restoration as proposed by the CERP.

If there are any questions about this issue, please feel free to call me or contact Mr. Chuck Aller who is the Department's representative on the South Florida Water management District's Water Resource Advisory Commission.

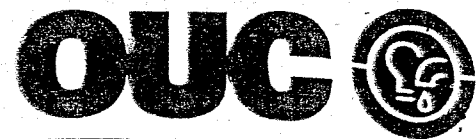
Sincerely,



CHARLES H. BRONSON  
COMMISSIONER OF AGRICULTURE

cc: Terry Rhodes  
Chuck Aller

Orlando Utilities Commission  
500 South Orange Avenue  
P.O. Box 3193  
Orlando, Florida 32802  
Phone: 407.423.9100  
Administrative Fax: 407.236.9616  
Purchasing Fax: 407.384.4141  
Website: www.ouc.com



*The Reliable One*

August 15, 2001

RECEIVED

Henry Dean, Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33406

AUG 21 2001  
EXECUTIVE OFFICE

**Subject: Support for Aquifer Storage and Recovery Projects,  
Comprehensive Everglades Restoration Plan**

On behalf of Orlando Utilities Commission, I am writing this letter to express our support for the Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP).

The failed ASR legislation from the 2001 Florida Legislative session resulted in much negative media coverage regarding the ASR technology. While the fate of microorganisms in aquifers – the subject of the failed ASR bill – requires further study, it appears that the potential benefits of ASR technology have been unfairly overlooked. For example, there does not appear to be another storage technology available that can provide multi-year storage to alleviate drought conditions, as experienced by Florida during the last year and a half. Additionally, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits that complement traditional storage technologies such as reservoirs already proposed in CERP.

As presented at the August 2, 2001, Water Resource Advisory Commission meeting, implementation of the CERP ASR projects are proceeding in a slow, methodical manner to answer the many questions about applying this storage technology. I am aware that the current CERP ASR Program includes 333 ASR wells, and that nowhere in the world is ASR technology proposed at this scale. The ASR Issue Team and Committee for Restoration of the Greater Everglades Ecosystem (CROGEE) – both commissioned by the South Florida Ecosystem Restoration Task Force's Working Group -- raised several technical issues that need to be addressed. The strategy of conducting ASR Pilot Projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin – combined with the ASR Regional Study to more fully evaluate the 333-well program and its effects on the environment and existing water users – appears to address these technical issues.



As a member of the Water Resource Advisory Commission to the South Florida Water Management District, I encourage you to continue your efforts with the U.S. Army Corps of Engineers to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration as outlined in the CERP.

Sincerely,

A handwritten signature in black ink, appearing to read "Rick Coleman". The signature is fluid and cursive, with a large initial "R" and "C".

Rick Coleman, P. E.  
Director, Water Engineering &  
Technical Services



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
 REGION 4  
 ATLANTA FEDERAL CENTER  
 81 FORSYTH STREET  
 ATLANTA, GEORGIA 30303-8960

MAR 7 2001

Ms. Mimi Drew  
 Director  
 Division of Water Resource Management  
 Florida Department of Environmental Protection  
 Twin Towers Office Building  
 2600 Blair Stone Road  
 Tallahassee, FL 32399-2400

OPTIONAL FORM 39 (7-99)

FAX TRANSMITTAL

1 of pages >

To	<i>Mimi Drew</i>	From	<i>Andrew Buntlett</i>
Dept / Agency	-	Phone #	<i>(404) 562-9478</i>
Fax #	<i>850 487 3618</i>	Fax #	

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

Dear Ms. Drew:

The Environmental Protection Agency (EPA), Region 4, has reviewed Florida Statute Section 120.542 concerning variances and waivers as it relates to the regulation of aquifer storage and recovery (ASR) wells under the Florida Department of Environmental Protection's (FDEP) underground injection control program. EPA has determined that FDEP may grant variances to its regulations for aquifer storage and recovery wells to allow these wells to inject fluids that may contain levels of total coliform that exceed primary drinking water standards, provided that such injection may not cause a public water system to violate any regulations promulgated in 40 CFR Section 141 or otherwise adversely affect the health of persons. Criteria for the variances must include a required demonstration of total coliform die-off within the spatial and temporal limits of the variance, as well as safeguards (such as monitoring and testing) with a requirement for modification or cessation of injection activity so as to not cause a public water system to violate any regulations promulgated in 40 CFR Section 141 or otherwise adversely affect the health of persons.

EPA is pleased to assist you in developing an effective approach towards the testing of the "raw" water ASR concept. Please do not hesitate to contact me or any of my staff if you have any questions.

Sincerely,

*Beverly H. Banister*  
 Beverly H. Banister, Director  
 Water Management Division

# THE NATIONAL ACADEMIES

*Advisers to the Nation on Science, Engineering, and Medicine*

National Academy of Sciences  
National Academy of Engineering  
Institute of Medicine  
National Research Council

Stephen D. Parker, Director  
Water Science and Technology Board  
Division on Earth and Life Studies  
*sdparker@nas.edu*

May 3, 2001

Editorial Page Editor  
The Miami Herald  
One Herald Plaza  
Miami FL 33132-1693

Dear Sir or Madam:

The article published in your May 2 edition, entitled "Water storage plan scrapped," contained references to a recent National Research Council report concerning aquifer storage and recovery (ASR) in the Everglades. This article mischaracterizes the findings of our report, giving readers the wrongful impression that the Research Council has taken a position on the general advisability of using ASR in Florida, and/or that it has urged Governor Bush against passage of a specific bill recently before the Florida legislature that would have permitted the underground recharge of untreated surface water under certain conditions.

The cited report (available on line at <http://books.nap.edu/catalog/10061.html>) actually had a much more limited scope. It evaluated draft plans of the South Florida Water Management District for the Lake Okeechobee and Southern Hillsboro ASR pilot projects and how well the pilot projects could improve understanding and design of the full-scale ASR components for the Comprehensive Everglades Restoration Project. The report was intended only to increase the value of the proposed ASR pilot project work in the context of Everglades restoration. We regret that it has been depicted as having already reached conclusions regarding the overall desirability of ASR as a component of the restoration effort, or the desirability of ASR for water supply applications throughout the state. The National Research Council is the operating arm of the National Academy of Sciences and National Academy of Engineering.

Sincerely,

Stephen D. Parker, Director  
Water Science and Technology Board  
National Research Council

A RESOLUTION OF THE SOUTHEAST FLORIDA UTILITY COUNCIL  
SUPPORTING IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY  
TECHNOLOGIES FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT  
AND PUBLIC WATER SUPPLIES AND EFFECTIVE IMMEDIATELY.

WHEREAS, the citizens and environment of South Florida will benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP)

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology;

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not impact public health and water supplies;

WHEREAS, there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half;

WHEREAS, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits beyond those achievable by above-ground reservoirs already proposed in CERP;

IT IS RESOLVED BY THE SOUTHEAST FLORIDA UTILITY COUNCIL THAT:

1. The Southeast Florida Utility Council supports ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District, and, to proceed in a cautious, methodical manner to answer the many questions about implementing ASR technology, including the concerns about the fate of microorganisms in aquifers;
2. The combined strategy of (a) conducting three CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and (b) evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address these technical issues; and,
3. The U.S. Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District are urged to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.



RESOLUTION OF THE BOARD OF  
COUNTY COMMISSIONERS OF  
PALM BEACH COUNTY, FLORIDA,  
SUPPORTING IMPLEMENTATION OF  
AQUIFER STORAGE AND  
RECOVERY TECHNOLOGIES FOR  
THE PURPOSE OF PROTECTING  
THE ENVIRONMENT AND PUBLIC  
WATER SUPPLIES

WHEREAS, the citizens and environment of South Florida will benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP); and

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology; and

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not negatively impact the environment, public health and water supplies; and

WHEREAS, there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half; and

WHEREAS, ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre of land per ASR well system, providing significant cost benefits beyond those achievable by above-ground reservoirs.

NOW, THEREFORE, BE IT RESOLVED BY THE BOARD OF COUNTY COMMISSIONERS OF PALM BEACH COUNTY, FLORIDA, that:

1. Palm Beach County supports ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District to implement this technology in an environmentally sound manner by first performing pilot studies to determine the feasibility of implementing surface water ASR technology, including answering the concerns about the fate of microorganisms in aquifers;

2. The combined strategy of conducting CERP ASR pilot projects at Lake Okechobee, the Caloosahatchee River, the Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, in conjunction with evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address outstanding technical issues.

3. The U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District are urged to perform the scientific studies necessary to properly and comprehensively evaluate ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.

The foregoing Resolution was offered by Commissioner Aaronson who moved its adoption. The motion was seconded by Commissioner Masiletti and upon being put to a vote, the vote was as follows:

Commissioner Warren H. Nawell, Chairman	- Aye
Commissioner Carol A. Roberts, Vice Chair	- Aye
Commissioner Karen T. Marcus	- Absent
Commissioner Mary McCarty	- Aye
Commissioner Burt Aaronson	- Aye
Commissioner Tony Masiletti	- Aye
Commissioner Addie Greene	- Absent

The Chair thereupon declared the Resolution duly passed and adopted this day of September 11, 2001.

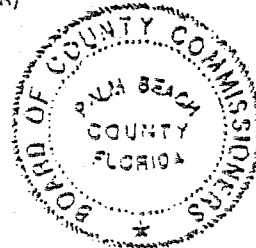
PALM BEACH COUNTY, FLORIDA,  
BY ITS BOARD OF COUNTY  
COMMISSIONERS

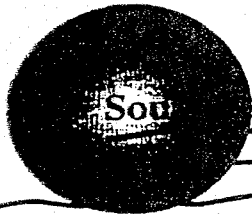
Dorothy H. Wilkan, Clerk

By: Linda C. Hickman  
(Deputy Clerk)

APPROVED AS TO FORM AND  
LEGAL SUFFICIENCY

By: Laura Buba  
Assistant County Attorney





**Southeast Florida Utility Council**

**A RESOLUTION OF THE SOUTHEAST FLORIDA UTILITY COUNCIL  
SUPPORTING IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY  
TECHNOLOGIES FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT  
AND PUBLIC WATER SUPPLIES AND EFFECTIVE IMMEDIATELY.**

WHEREAS, the citizens and environment of South Florida will benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP);

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology;

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not impact public health and water supplies;

WHEREAS, there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half;

WHEREAS, since ASR technology is not subject to evapotranspiration and requires only an acre or two per ASR well system, it provides significant cost-effective benefits beyond those achievable by above-ground reservoirs already proposed in CERP;

**IT IS RESOLVED BY THE SOUTHEAST FLORIDA UTILITY COUNCIL THAT:**

1. The Southeast Florida Utility Council supports ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District, to proceed in a cautious, methodical manner to answer the many questions about implementing ASR technology, including the concerns about the fate of microorganisms in aquifers;
2. The combined strategy of (a) conducting three CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and (b) evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address these technical issues; and,
3. The U.S. Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District are urged to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.

DATE: Aug. 28, 2001

Albert J. ... Chair  
SEFLUC

09-04-2001 1N

DRAFT RESOLUTION  
WATER RESOURCES ADVISORY COMMISSION

A RESOLUTION OF THE WATER RESOURCES ADVISORY COMMISSION SUPPORTING IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY PILOT PROJECTS FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT AND PUBLIC WATER SUPPLIES AND EFFECTIVE IMMEDIATELY.

WHEREAS, it is anticipated that the citizens and environment of South Florida could benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP);

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology;

WHEREAS, the National Academy of Sciences Committee on Restoration of the Greater Everglades Ecosystem (CROGEE), as articulated in the recently released *Aquifer Storage and Recovery in the Comprehensive Everglades Restoration Plan: A Critique of the Pilot Projects and Related Plans for ASR in the Lake Okeechobee and Western Hillsboro Area*, concluded that:

1. regional analysis of the subsurface is crucial to evaluating the potential for success for CERP ASR components,
2. biogeochemical reactions in the subsurface and the potential impacts on receiving water bodies at the surface require further investigation and understanding, and
3. thorough monitoring and testing at pilot project sites is necessary to provide data to the referenced regional and water quality investigations;

WHEREAS, the Aquifer Storage and Recovery Issue Team of the South Florida Ecosystem Restoration Task Force, as articulated in its July 1999 report to the South Florida Ecosystem Restoration Working Group, recommended further analyses of several technical issues relating to ASR implementation, including:

1. characterization of the quality of prospective source waters, spatial and temporal variability,
2. characterization of regional hydrogeology of the Upper Floridan Aquifer: hydraulic properties and water quality,
3. analysis of critical pressure for rock fracturing,
4. analysis of site and regional changes in head and patterns of flow,
5. analysis of water quality changes during movement and storage in the aquifer,
6. Aquifer Storage and Recovery potential effects on mercury bioaccumulation for ecosystem restoration projects, and
7. relationship between ASR storage interval properties and recovery rates and recharge volume:

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not impact public health and water supplies;

WHEREAS, ASR technology can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half;



WHEREAS, ASR technology may provide cost-effective benefits related to evapotranspiration or seepage losses and requires less land;

WHEREAS, there are many significant concerns that must be addressed prior to the full-scale implementation of the ASR components described in the CERP;

WHEREAS, the Governor's Commission for a Sustainable South Florida, in its *Report on the January 25, 1999 Draft Implementation Plan of the C&SF Project Restudy* (March 3, 1999), recommended that the South Florida Water Management District and the Florida Department of Environmental Protection, in conjunction with the US Environmental Protection Agency and the US Army Corps of Engineers, "should develop an Aquifer Management and Protection Plan for the Floridan Aquifer. This plan should consider existing and proposed ASR facilities, existing permitted withdrawals for water supplies, potential artesian wells to support Biscayne Bay, and potential contamination from treated wastewater,"

**IT IS RESOLVED BY THE WATER RESOURCES ADVISORY COMMISSION THAT:**

1. The Water Resources Advisory Commission supports the expeditious development, monitoring and evaluation of the ASR Pilot Projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and the ASR Regional Study to address the many significant concerns raised concerning this technology, including those raised by the National Academy of Sciences and the South Florida Ecosystem Restoration Task Force.
3. The U.S. Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District are urged to conduct all necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.
4. The U.S. Army Corps of Engineers and South Florida Water Management District should develop contingency plans to accommodate potential component performance shortfalls and delays in implementation. Contingency plans should be developed as part of the individual pilot projects and the regional study. If the ASR projects do not perform as anticipated, it will be necessary to have well-designed contingency plans ready for immediate implementation.
5. The CERP implementation process should continue to be as open, inclusive and informed as possible at every stage to ensure a plan that continues to enjoy the broadest public support. Public outreach efforts must be active efforts to fully inform and engage all stakeholders. Special attention must be given to environmental justice issues and the concerns of minority communities around Lake Okeechobee. Additionally, all decisions regarding the implementation of ASR should be made in consideration of public comment.

FLORIDA WILDLIFE FEDERATION RESOLUTION  
CONCERNING AQUIFER STORAGE AND RECOVERY (ASR) PROJECTS  
Adopted by FWF Board of Directors and  
House of Delegates on Sept. 9, 2001

A RESOLUTION OF THE FLORIDA WILDLIFE FEDERATION SUPPORTING COMPREHENSIVE SCIENTIFIC EVALUATION OF AQUIFER STORAGE AND RECOVERY PILOT PROJECTS FOR THE PURPOSE OF ASSESSING THE TECHNOLOGY'S EFFECTIVENESS AT PROTECTING THE ENVIRONMENT AND PUBLIC WATER SUPPLIES OF SOUTH FLORIDA.

WHEREAS, the citizens and environment of South Florida may benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP); however, it is a matter of great public interest that the effects and costs of this technology be rigorously evaluated; and

WHEREAS, the proposed CERP ASR components ultimately include 333 ASR wells, an unprecedented scale for implementation of this technology; and

WHEREAS, the National Academy of Sciences Committee on Restoration of the Greater Everglades Ecosystem (CROGEE), as articulated in the recently released Aquifer Storage and Recovery in the Comprehensive Everglades Restoration Plan: A Critique of the Pilot Projects and Related Plans for ASR in the Lake Okeechobee and Western Hillsboro Area, concluded that:

1. Regional analysis of the subsurface is crucial to evaluating the potential for success for CERP ASR components,
2. Biogeochemical reactions in the subsurface and the potential impacts on receiving water bodies at the surface require further investigation and understanding, and
3. Thorough monitoring and testing at pilot project sites is necessary to provide data to the referenced regional and water quality investigations; and

WHEREAS, the Aquifer Storage and Recovery Issue Team of the South Florida Ecosystem Restoration Task Force, as articulated in its July 1999 report to the South Florida Ecosystem Restoration Working Group, recommended further analyses of several technical issues relating to ASR implementation, including:

1. Characterization of the quality of prospective source water, spatial and temporal variability,
2. Characterization of regional hydrogeology of Upper Floridan Aquifer: hydraulic properties and water quality,
3. Analysis of critical pressure for rock fracturing,
4. Analysis of site and regional changes in head and patterns of flow,
5. Analysis of water quality changes during movement and storage in the aquifer,
6. Aquifer Storage and Recovery potential effects on mercury bioaccumulation for ecosystem restoration projects, and
7. Relationship between ASR storage interval properties and recovery rates and recharge volume; and

WHEREAS, further research is warranted to ensure that injection of surface waters into Florida's aquifers will not adversely impact public health and water supplies, specifically investigating groundwater contamination; and

WHEREAS, ASR may provide technology that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half, and may provide an additional tool to manage flooding to protect estuaries and other natural areas; and

WHEREAS, ASR technology is purported to provide cost-effective benefits relative to other storage options, related to evapotranspiration or seepage losses and requires less land; and

WHEREAS, there are many significant concerns that must be addressed prior to the full-scale implementation of the ASR components described in the CERP; and

WHEREAS, the Governor's Commission for a Sustainable South Florida, in its Report on the January 24, 1999 Draft Implementation Plan of the C&SF Project Restudy (March 3, 1999), recommended that the South Florida Water Management District, in conjunction with the U.S. Environmental Protection Agency and U.S. Army Corps of Engineers, "should develop an Aquifer Management and Protection Plan for the Floridan Aquifer. This plan should consider existing and proposed ASR facilities, existing permitted withdrawals for water supplies, potential artesian wells to support Biscayne Bay, and potential contamination from treated wastewater;" therefore

BE IT RESOLVED BY THE FLORIDA WILDLIFE FEDERATION THAT:

1. The Florida Wildlife Federation supports ongoing efforts by the U. S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District, to evaluate ASR pilot projects proceeding in a cautious, methodical manner to address the many questions about implementing ASR technology, including the concerns raised by the Aquifer Storage and Recovery Issue Team and the National Academy of Sciences; and
2. The pilot projects and the regional study shall address all of these concerns. The combined strategy of (a) conducting three CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and (b) evaluating on a continuing basis the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study as an appropriate way to address these technical issues; and
3. The U. S. Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District shall conduct the necessary data collection and scientific studies to evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP; and
4. The U. S. Army Corps of Engineers and South Florida Water Management District must develop contingency plans to accommodate potential component performance shortfalls and delays in implementation which shall also evaluate the costs and benefits of surface water storage on a temporary and permanent basis in the Everglades Agricultural Area (EAA) and throughout the Everglades basin exclusive of existing public conservation lands. Contingency plans shall be developed as part of the individual pilot projects and the regional study. If the ASR projects do not perform as anticipated, it will be necessary to have well-designed contingency plans ready for immediate implementation. The Federation believes that this contingency plan must include the option of purchasing additional water storage areas throughout the Everglades Basin.
5. The CERP implementation process should continue to be as open, inclusive and informed as possible at every stage to ensure a plan that continues to enjoy the broadest public support. Public outreach efforts must be active efforts to fully inform and engage all stakeholders. Research results concerning ASR need to be broadly disseminated to the public. Special attention must be given to environmental justice issues and the concerns of minority communities around Lake Okeechobee. Additionally, all decisions regarding the implementation of ASR should be made in consideration of public comment.

# CITY OF DELRAY BEACH

DELRAY BEACH  
FLORIDA



All-America City



CITY CLERK

100 N.W. 1st AVENUE DELRAY BEACH, FLORIDA 33414 (561) 243-7000

September 21, 2001

*Thomas Treets*

South Florida Water Management District  
3301 Gun Club Road  
West Palm Beach, FL 33416-4680

Dear Sir or Madam:

Enclosed please find a copy of the City of Delray Beach Resolution No. 58-01 passed at the regular Commission Meeting of September 19, 2001 supporting the implementation of aquifer storage and recovery technologies. If you have any questions, please contact our office at (561) 243-7050.

Sincerely,

Angela Wong  
Deputy City Clerk

Enclosure



RESOLUTION NO. 58-01

A RESOLUTION OF THE CITY COMMISSION OF THE CITY OF DELRAY BEACH, FLORIDA, SUPPORTING THE IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY TECHNOLOGIES FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT AND PUBLIC WATER SUPPLIES AND AN EFFECTIVE DATE.

WHEREAS, the citizens and environment of South Florida will benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP); and

WHEREAS, the proposed CERP ASR components include 333 ASR wells, and unprecedented scale for implementation of this technology; and

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not impact public health and water supplies; and

WHEREAS, there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half; and

WHEREAS, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits beyond those achievable by above-ground reservoirs already proposed in CERP; and

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COMMISSION OF THE CITY OF DELRAY BEACH, FLORIDA, AS FOLLOWS:

Section 1. That the Delray Beach City Commission hereby declares support for ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District, and, to proceed in a cautious, methodical manner to answer the many questions about implementing ASR technology, including the concerns about the fate of microorganisms in aquifers.

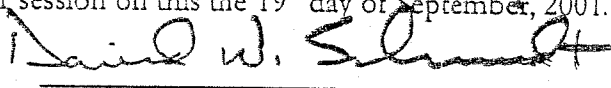
Section 2. The combined strategy of (a) conducting three CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and (b) evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address these technical issues.

Section 3. The U.S. Army Corps of Engineers, Florida Department of Environmental Protections, and South Florida Water Management District are urged to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.

Section 4. That the City Clerk is directed to distribute a copy of this resolution to the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, the South Florida Water Management District and Jeb Bush, Governor of the State of Florida.

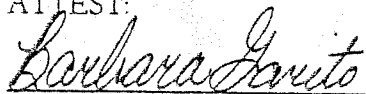
Section 5. That this resolution shall take effect immediately upon adoption.

PASSED AND ADOPTED in regular session on this the 19<sup>th</sup> day of September, 2001.



MAYOR

ATTEST:



City Clerk

**RESOLUTION NO. 01-03**

A RESOLUTION OF OF THE PALM BEACH COUNTY LEAGUE OF CITIES, INC. SUPPORTING THE IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY TECHNOLOGIES FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT AND PUBLIC WATER SUPPLIES; PROVIDING AN EFFECTIVE DATE; AND FOR OTHER PURPOSES

WHEREAS, the citizens and environment of South Florida may benefit from the implementation of Aquifer Storage and Recovery ("ASR") Projects associated with the Comprehensive Everglades Restoration Plan ("CERP"); and

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology; and

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers may not impact public health and water supplies; and

WHEREAS, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two (2) per ASR well system, it may provide significant cost-effective benefits beyond those achievable by above-ground reservoirs already proposed in CERP; and

WHEREAS, the Palm Beach County League of Cities, Inc., desires to support the implementation of ASR technologies for the purpose of protecting the environment and public water supplies.

NOW, THEREFORE, BE IT RESOLVED BY THE PALM BEACH COUNTY LEAGUE OF CITIES, INC., THAT:

SECTION 1: The foregoing recitals are true and correct.

SECTION 2: The Palm Beach County League of Cities, Inc. supports ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection ("FDEP"), and the South Florida Water Management District ("SFWMD"), to proceed in a cautious, methodical manner to answer the many questions about implementing ASR, including the concerns about the fate of microorganisms in aquifers.

SECTION 3: The combined strategy of (a) conducting three (3) CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River and the Western Hillsboro Basin, as well as a City of

West Palm Beach demonstration project, and (b) evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address these technical issues.

SECTION 4: The U.S. Army Corps of Engineers, the FDEP and the SFWMD are urged to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefits of Everglades Restoration and long-term regional water supplies as outlined in the CERP.

SECTION 5: The Palm Beach County League of Cities, Inc. requests that a copy of this Resolution be sent to all other municipalities in Palm Beach County asking for their support by adopting a similar resolution, and to such other entities as may be appropriate who will address this issue.

SECTION 6: This Resolution shall take effect immediately upon adoption by the Palm Beach County League of Cities, Inc.

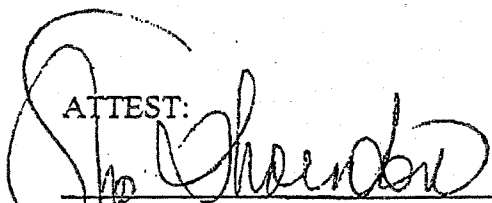
PASSED AND ADOPTED this 24<sup>th</sup> day of October, 2001.

THE PALM BEACH COUNTY LEAGUE OF  
CITIES, INC.

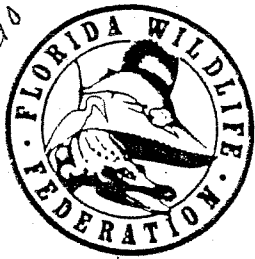
  
Kenneth Schultz, President

(SEAL)

ATTEST:

  
Mo Thornton, Secretary/Treasurer

D:\TRACT\BC League of Cities\Resolutions\Res 01-03.wpd



# FLORIDA WILDLIFE FEDERATION

*Affiliated With National Wildlife Federation*

Manley K. Fuller, III, President  
2545 Blairstone Pines Drive, Tallahassee, FL 32301  
Post Office Box 6870, Tallahassee, FL 32314-6870

Phone: (850) 656-7113  
Fax: (850) 942-4431  
e-mail: wildfed@aol.com  
website: www.flawildlife.org

RECEIVED

11/15/01  
EXECUTIVE OFFICE

November 5, 2001

Ms. Trudi K. Williams, Chair  
TKW Consulting Engineers, Inc.  
12553 New Brittany Blvd #32  
Ft. Myers, FL 33907

Dear Ms. Williams:

Florida Wildlife Federation supports Mr. Dean's decision to simultaneously plan for the contingency that Aquifer Storage and Recovery (ASR) will not prove feasible while thoroughly testing ASR in the vicinity of Lake Okeechobee with clean water. Because these test results are of critical importance to the success of CERP, the Federation strongly recommends that the test design and its implementation and assessment be peer reviewed by a disinterested group of highly qualified geologists, scientists and engineers. In defining the scope of peer review, the ability to predict future chemical and hydrostatic pressure effects is of particular importance because the test cannot be conducted under the same conditions that would obtain if all of the ASR wells were in place.

Sincerely,

Manley K. Fuller, III  
President

cc: SFWMD Board Members  
Henry Dean



NOV 28 2001  
EXECUTIVE OFFICE

Henry Dean  
Executive Director  
South Florida Water Management District  
3301 Gun Club Road  
P.O. Box 24680  
West Palm Beach, Florida 33416-4680

November 21, 2001

*Henry,*  
Dear Mr. Dean,

Thank you for your letter of November 6, 2001 regarding your decision to recommend that the District change its approach to addressing potential water quality issues in the development of Aquifer Storage and Recovery pilot wells. I appreciate your decision and thank you very much for your leadership on these issues. I believe that only by demonstrating the District's commitment to thorough scientific inquiry with respect to these and other technical issues will the public come to have confidence in future decisions to implement ASR on a wider scale. Generally speaking, I hope that your decision marks the beginning of an important shift in the public discourse about ASR in the Everglades. The decisions that we make in the course of Everglades restoration will be decisions that we ask our children and grandchildren to live with. It is therefore critical that the public have confidence that issues as important as ASR implementation will be thoroughly investigated without the taint of preconceived notion or political pressure.

I also appreciate your decision to recommend that the District not pursue the Palm Beach County demonstration project as a component of the ASR pilot program. I believe that Everglades restoration projects should, to the greatest extent possible, be kept within the rubric of CERP and the CERP authorization processes in order to ensure that such projects are developed in a way that fits into the overall programmatic goals of the CERP.



Thank you again for your leadership on these issues. I look forward to working with you in any way that I might be helpful to continue to work through the public's concerns about ASR, to develop a contingency plan, and to look for opportunities for broad non-governmental scientific participation in the ASR pilot and implementation programs.

Sincerely,



Shannon Estenoz  
Director  
Everglades Program  
South Florida Ecoregion

cc: Trudi Williams, SFWMD Governing Board  
Pat Gleason, SFWMD Governing Board  
April Gromnicki, Audubon of Florida  
Erin Deady, Audubon of Florida  
Jonathan Ullman, Sierra Club  
Suzy Ruhl, LEAF  
Frank Jackalone, Everglades Coalition

## AQUIFER STORAGE AND RECOVERY

### Commentary

by

Neil Aikenhead, President  
Aikenhead & Odom Consulting Engineers

A bill was proposed during the 2001 Florida legislative session to modify Aquifer Storage and Recovery (ASR) rules in order to allow this historically-proven method of storing water to be used for the Comprehensive Everglades Restoration Program (CERP).

The Florida Dept of Environmental Regulation (FDEP) rules for ASR requires chlorination or other treatment to reach drinking-water quality before injecting water into an aquifer. The intent of the proposed legislation was to modify the rule and avoid having to change stormwater into drinking water, with the goal of keeping large quantities of stormwater from being lost to tide.

In the area of the CERP, water falls on the earth, runs into canals, and seeps into the Biscayne Aquifer. Some of that is then pumped, chlorinated, and sent to the public for consumption. The ASR scenario takes a portion of that same water, puts it below a confining aquifer lying below the Biscayne Aquifer for a period of time, and pumps it back to the surface some time later. Again some of that would find its way into the Biscayne Aquifer, and again some of it would be chlorinated and served to the public.

Work previously done on ASR clearly demonstrated storage of water underground, in a light-less and oxygen-less environment, created die-off of bacteria and viruses. The confining aquifer below the Biscayne Aquifer would be a separation from the supply, and the ASR process would actually end up improving conditions in the Biscayne Aquifer. Your basic "win-win"!

Then an interesting thing happened. The environmental community took up a vociferous position against this environmental-friendly proposal! It would improve quality of water served to the public, increase base flow to the Everglades, keep enormous quantities of fresh water from being lost to tide, and have a measurable effect on the national debt by saving literally billions of dollars for the CERP. How could the friends of the environment be opposed to such a measure?

The hidden agenda nobody had foreseen on was land acquisition. If ASR couldn't be used efficiently for the CERP, a lot more land would have to be purchased. The improvements to the environment, the ultimate improved effectiveness of the CERP, the improvements to the public health, and the improvements to our national finances all took second place to having Federal and State dollars buying environmentally-desirable land.

The attack on the ASR proposed legislation was so vociferous and thorough that the legislators and agencies who originally backed the bill literally leapt out of it's way!

On September 10 I attended an American Ground Water Trust conference on ASR held in Orlando. There were several excellent technical presentations made on virtually every aspect of the subject by a variety of presenters. The most memorable event of the conference, however, was before and after two dissenting-view presentations. Immediately prior to those presentations the news media entered the room, set up, and proceeded to video tape those dissenting views. Immediately after those presenters were finished, the news media wrapped up their stuff and left.

And the following day, September 11, 2001, our entire world changed in a few seconds!

A month later I attended a Florida Engineering Society (FES) Conservation and Environmental Quality (CEQ) committee meeting. This committee oversees the State's environmental issues on behalf of the FES membership. It is an esteemed group of technocrats who stay current with Statewide environmental issues, debating and discussing their political and social aspects.

I was shocked to learn that FES, FDEP, the American Water Works Association (AWWA), and numerous other respected individuals and associations knowledgeable in the ASR issue all appear ready to "throw in the towel". The feeling is that no ASR action will be taken in the 2002 legislative session, and even attempts to obtain variances on the existing ASR rule are expected to meet significant, and presumed successful, opposition.

The industry seems ready to settle for a five year "study" before anything further is proposed with ASR for the CERP. The CERP would have to progress with no ASR, or ASR with treatment as a minimum, for at least five years. This will subtract billions of dollars from State and Federal budgets, which budgets are now severely strained by more disconcerting matters. If ASR is used, saving "only" millions, it will require tons of chemicals which will be unnecessarily injected into our environment, coupled with the associated production impacts for those chemicals.

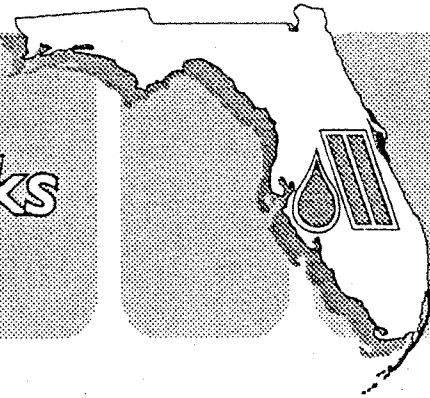
All so the Fed and State are required to buy more land. All at the direct monetary expense of each and every taxpayer. And all at the expense of the very environment which the environmental community claims to be protecting.

With billions of dollars and significant impacts to the environment and the public at stake, maybe the legislature should consider suspending the entire CERP for five years. Or at least until some equitable negotiated agreement is reached by those knowledgeable in the ASR issue.

At least there would be rational discussions between the parties. Stopping publication of blatantly false information would certainly be a positive result. How about improving the environment, providing better quality water to the public, and saving a billion or so dollars?

"United we stand"?

# Florida Section/ American Water Works Association



November 21, 2001

Patrick J. Gleason, Ph.D., P.G.  
Governing Board Member, SFWMD  
Camp Dresser & McKee, Inc,  
1601 Belvedere Road, Suite 211 South  
West Palm Beach, FL 33406

Dr. Gleason:

I am a member of the Florida Section of the American Water Works Association (FS/AWWA) and chairman of the FS/AWWA Utility Council. I am writing you regarding the support of the implementation of Aquifer Storage and Recovery (ASR) pilot projects for the purpose of protecting public water supplies and the environment.

The American Water Works Association is an international organization of professionals dedicated to providing safe drinking water for public use and consumption. The Association's sole purpose is to promote public health, safety and welfare through the improvement of the quality and quantity of water delivered to the public, and the development and furtherance of the understanding of the problems relating to this service. The FS/AWWA is the Florida section of the national group with a membership of approximately 2500 members. Members of the FS/AWWA produce over 95 percent of the potable water supply in Florida. We serve over 15,000,000 Floridians daily. The quality of potable water in Florida and the conservation efforts of our natural resources is unmatched by any state in the Nation.

We, as a section of the AWWA, support the South Florida Water Management District efforts in the identification and implementation of water resource development projects to ensure that sufficient water will be available for all existing and future users and natural systems. Aquifer Storage and Recovery (ASR) is considered vital for the Comprehensive Everglades Restoration Plan (CERP) and for water resource development. The proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology. Currently there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year.

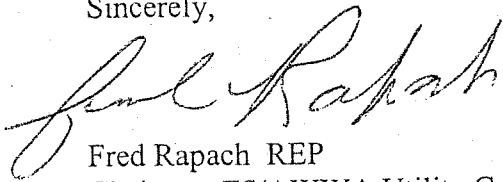
Page 2  
Re: ASR  
November 21, 2001

Unfortunately the public has not been well served by the volume of misinformation on ASR, scare tactics and half-truths have confused this issue. It is critical that ASR needs to regain public support with broader understanding of the science and demonstrated experience. The U.S. Environmental Protection Agency has committed to working with Florida to gather and assess the necessary information in order to implement a safe and effective raw-water ASR program. This is consistent with the FS/AWWA position paper on ASR requesting that the Water Management Districts pursue the utilization of ASR, and provide funding for research and demonstration projects for the storage of high quality untreated water.

The FS/AWWA supports the ongoing efforts by the U.S. Army Corps of Engineers, The Florida Department of Environmental Protection, and the South Florida Water Management District to proceed in a cautious, methodical scientific manner about answering questions regarding implementation of ASR Technology. The FS/AWWA supports such ASR pilot projects that are conducted to produce the necessary data collection and scientific studies to truly evaluate ASR technology for the benefit of Everglades Restoration and long-term regional water resource development. We appreciate your support of the FS/AWWA and look forward to working with you on future matters.

If you need any additional information, or would like to discuss this matter further, please do not hesitate to contact me at (561) 641-3429.

Sincerely,

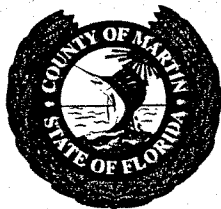
A handwritten signature in cursive script that reads "Fred Rapach". The signature is written in dark ink and is positioned above the typed name and title.

Fred Rapach REP  
Chairman FS/AWWA Utility Council

County Coalition for Responsible Management of Lake Okeechobee  
and St. Lucie and Caloosahatchee Estuaries



LEE BOARD  
OF COUNTY  
COMMISSIONERS



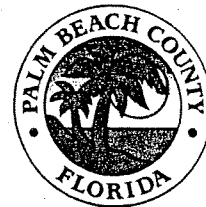
MARTIN BOARD  
OF COUNTY  
COMMISSIONERS



OKEECHOBEE BOARD  
OF COUNTY  
COMMISSIONERS



ST. LUCIE BOARD  
OF COUNTY  
COMMISSIONERS



PALM BEACH COUNTY  
BOARD OF COUNTY  
COMMISSIONERS

November 19, 2001

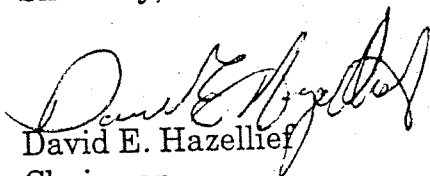
Patrick J. Gleason, Ph.D.  
Governing Board  
South Florida Water Management District  
P.O. Box 24680  
West Palm Beach, FL 33416-4680

Dear Dr. Gleason:

On behalf of the County Coalition, I would like to thank you and your staff for participating in our November 7, 2001 meeting. As you can tell by the participation of commissioners from all seven counties, elected official, and the public, there is tremendous interest in the management aspects of Lake Okeechobee.

Based on positive comments I have received on the effectiveness of open communication and dialogue, I would like this meeting to be an annual event and I would welcome your participation.

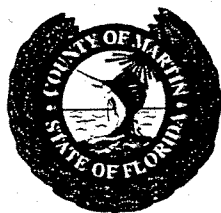
Sincerely,

  
David E. Hazellief  
Chairman

David E. Hazellief, Chairman



County Coalition for Responsible Management of Lake Okeechobee  
and St. Lucie and Caloosahatchee Estuaries



MARTIN BOARD  
OF COUNTY  
COMMISSIONERS

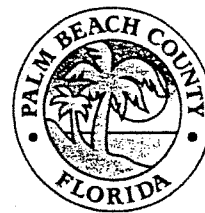
LEE BOARD  
OF COUNTY  
COMMISSIONERS



OKEECHOBEE BOARD  
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COMMISSIONERS



ST. LUCIE BOARD  
OF COUNTY  
COMMISSIONERS



PALM BEACH COUNTY  
BOARD OF COUNTY  
COMMISSIONERS

**RESOLUTION: November 7, 2001**

**WHEREAS**, The County Coalition was formed in order to expedite local, state and federal action to protect and improve the natural values and essential public uses of Lake Okeechobee, the St. Lucie Estuary, the Caloosahatchee Estuary, and Lake Worth Lagoon; and

**WHEREAS**, the Comprehensive Everglades Restoration Plan (CERP) proposes major roles for the Army Corps of Engineers and the South Florida Water Management District in Aquifer Storage and Recovery (ASR) as an integral part of the overall plan for protecting and restoring the ecology of South Florida and the Everglades; and

**WHEREAS**, ASR activity is centered around Lake Okeechobee and is of interest to the County Coalition; and

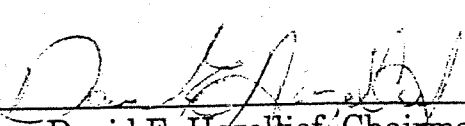
**WHEREAS**, there are specific benefits to ASR technology that are gained through continued research and pilot demonstration activities prior to full implementation;

**NOW, THEREFORE, BE IT RESOLVED BY THE COUNTY COALITION THAT:**

The County Coalition calls upon the Army Corps of Engineers and the South Florida Water Management District to continue conducting research and pilot demonstration projects on ASR and to implement appropriate water quality treatment prior to ASR storage.

**DULY PASSED AND ADOPTED THIS 7th DAY OF NOVEMBER, 2001.**

COUNTY COALITION

  
David E. Hazellief, Chairman

David E. Hazellief, Chairman



Public Works Department  
**Office of Environmental Services**  
2555 West Copans Road  
Pompano Beach, FL 33069  
(954) 831-0705 • FAX (954) 831-0708

6 December 2001

Henry Dean, Executive Director  
South Florida Water Management District  
P.O. Box 24680  
West Palm Beach, Fl. 33416-4680

RECEIVED  
DEC 11 2001  
11:20 AM  
OFFICE OF ENVIRONMENTAL SERVICES

Re: Hillsboro WPA Alternative ASR Concept

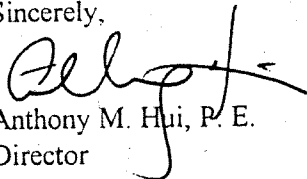
Dear Mr. Dean:

Enclosed are five copies of our concept paper proposing an alternative method of providing a moderate sized high quality ASR system for the Hillsboro WPA. The intent of the paper is to provide sufficient information on the concept for the appropriate organizations to begin discussions to determine the feasibility for implementation in the near term.

As we discussed, the removal of ASR from the Hillsboro WPA project has considerably reduced the water supply benefits that the project had been expected to provide for the urban area and the natural system. In addition, other revisions proposed for the WPA component of the CERP appeared to transfer water from a Broward County source without first providing an alternative source.

In proposing this concept it has been our hope that it would provide an opportunity for our organizations to demonstrate that we can, cooperatively, adapt our operations and the CERP programs as unexpected constraints occur during CERP implementation. By cooperating on such endeavors I believe that we can increase the interim benefits of the CERP and enhance the probability of an eventually successful CERP implementation. It would be appreciated if, after review, your staff would contact me to schedule discussions on this proposal.

Sincerely,



Anthony M. Hui, P. E.  
Director

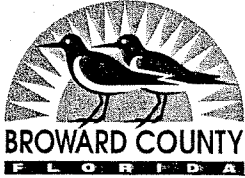
Enclosures (5)

cc: Richard Brossard  
Director of Public Works

Roy Reynolds  
Director of Water Management  
Office of Environmental  
Services

Steve Somerville  
Director of Planning and Environmental  
Protection

David Lee  
Director of Water Resources  
Planning and Environmental  
Protection



Public Works Department  
**Office of Environmental Services**  
2555 West Copans Road  
Pompano Beach, FL 33069  
(954) 831-0705 • FAX (954) 831-0708

# HILLSBORO WPA

# ALTERNATIVE ASR CONCEPT

BROWARD COUNTY OFFICE OF ENVIRONMENTAL SERVICES

NOVEMBER 16, 2001

BROWARD COUNTY BOARD OF COUNTY COMMISSIONERS — An Equal Opportunity Employer and Provider of Services

Josephus Eggelleton, Jr. Ben Graber Suzanne N. Gunzburger Kristin D. Jacobs Ilene Lieberman Lori Nance Parrish John E. Rodstrom, Jr. James A. Scott Diana Wasserman-Rubin

Visit us on the Internet: [www.broward.org](http://www.broward.org)

## HILLSBORO WATER PRESERVE AREA

### ALTERNATIVE ASR CONCEPT

**PURPOSE:** The purpose of this concept paper is to present a method of achieving a portion of the water supply benefit of the Hillsboro Water Preserve Area (WPA) on or before the original scheduled delivery date.

**BACKGROUND:** The Hillsboro WPA was originally proposed to include a retention area in combination with 30 ASR wells. A projected production capacity of 150mgd was included in the developmental modeling for both the Comprehensive Everglades Restoration Plan (CERP) and the Lower East Coast Regional Water Supply Plan (LECRWSP). Under the August, 1999, CERP schedule the Pilot project would have begun on 11-4-99 and been completed on 10-30-02, and the impoundment and ASR project would have begun on 10-30-03, and been completed on 10-19-11. The current proposed plan for the Water Preserve Areas indicates that ASR has been removed from the WPA components. The revised plan also proposes an accelerated schedule for the transfer of water from WCA-2, a Broward County supply source.

The predicted performance of both the LECRWSP and the CERP for northern Broward County, southern Palm Beach County and some natural areas was based, in part, on the expectation of 150mgd of water supply becoming available, from the ASR portion of the Hillsboro WPA. The predicted performance for central Broward County was also, partially, based on existing water availability derived from WCA-2. As proposed, the revised WPA plan does not contain an alternative method of replacing the scheduled ASR water deliveries nor does the revised plan include a proposal for an alternative water source to replace the water to be transferred from WCA-2.

**PROPOSAL:** Broward County Office of Environmental Services proposes the joint use of the Broward County North Regional Wellfield (NRW) in conjunction with the CERP Hillsboro WPA to provide a high quality source of groundwater for an intermediate size ASR component to achieve a portion of the originally projected water supply benefit.

The NRW consists of ten wells with a total withdrawal capacity of 20mgd and an additional 23 sites available for well construction, see Figure 1. Approximately 12 to 13mgd of the current withdrawal capacity could be made available as source water for an ASR system. Additional capacity could be provided by constructing wells within the available sites.

The general concept is to couple the Hillsboro WPA impoundment with the Biscayne Aquifer

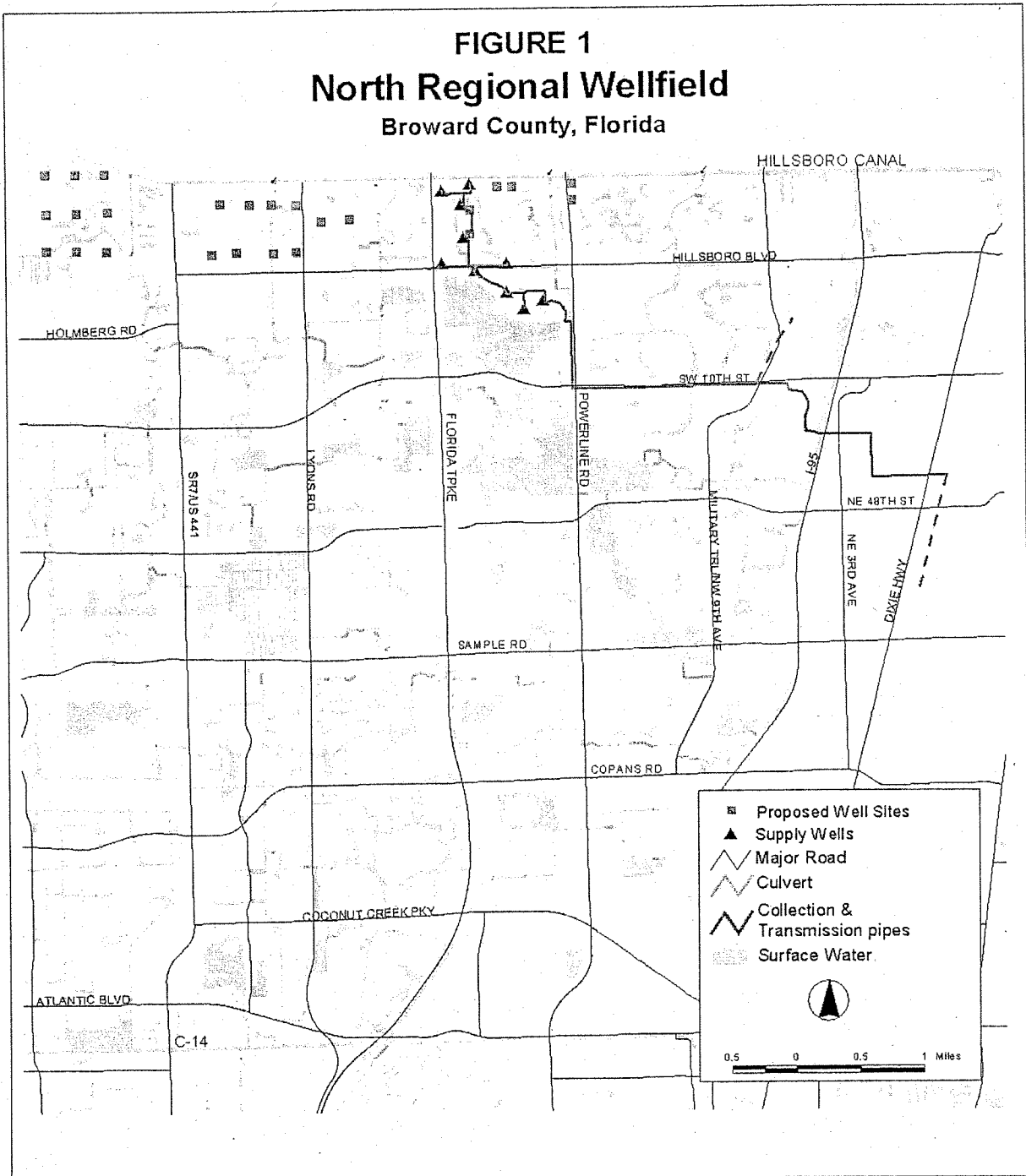
through the Hillsboro Canal, the local recharge infrastructure, Figure 2, and the NRW. During the storage portion of the ASR operation the Hillsboro WPA impoundment would provide the intermediate duration storage capacity to supply the local recharge system. Water stored in the Hillsboro WPA impoundment would be released into the Hillsboro Canal and conveyed eastward to the recharge pump stations located along the south bank of the Hillsboro Canal. The recharge pump stations would lift the water from the Hillsboro Canal into the NRW recharge canals. Water would be conveyed throughout the recharge system, as required to sustain Biscayne Aquifer water levels. Biscayne Aquifer supply wells would pump water directly from the Aquifer to the ASR injection wells. During recovery operations various options would be available for conveyance of the recalled water depending on the proposed use. One option would be to convey the water directly to utility treatment plants. Another option would be to discharge the water into the recharge and conveyance system. The conveyance system could deliver the water south to the C-14/C-13 basin boundary, a short distance west of State Road 7, east to I-95 and north to the Hillsboro Canal. From the Hillsboro Canal water could be accessed by users within Palm Beach County or moved westward into the natural system.

With modest improvements and interconnections in the local waterway systems, improved operational coordination of the local waterway systems and improved coordination of operations between the local waterway systems and the waterways of the Central & Southern Florida Project recovered water could be moved throughout Broward County.

**DISCUSSION:** Without the ASR function the Hillsboro WPA is not expected to have the capability of supplying water during dry seasons or droughts. This expectation was acknowledged during the WPA workshop when it was noted that the impoundment was expected to go dry during dry seasons. Discussions at the workshop indicated that the problems associated with large scale ASR and surface water ASR systems had necessitated the removal of ASR from the WPA components.

Modest sized ASR systems with high quality sources of supply have been permitted and have been operating successfully for several years. It is believed that through the cooperative efforts of the South Florida Water Management District, the Corps of Engineers and Broward County that the high quality water of the Biscayne Aquifer can be utilized to reduce the shortfall of the CERP water supply projects until the delayed water projects can be brought online.

**FIGURE 1**  
**North Regional Wellfield**  
 Broward County, Florida



Broward County Office of  
 Environmental Services  
 Water Management Division  
 Geographic Information System

November 08, 2001

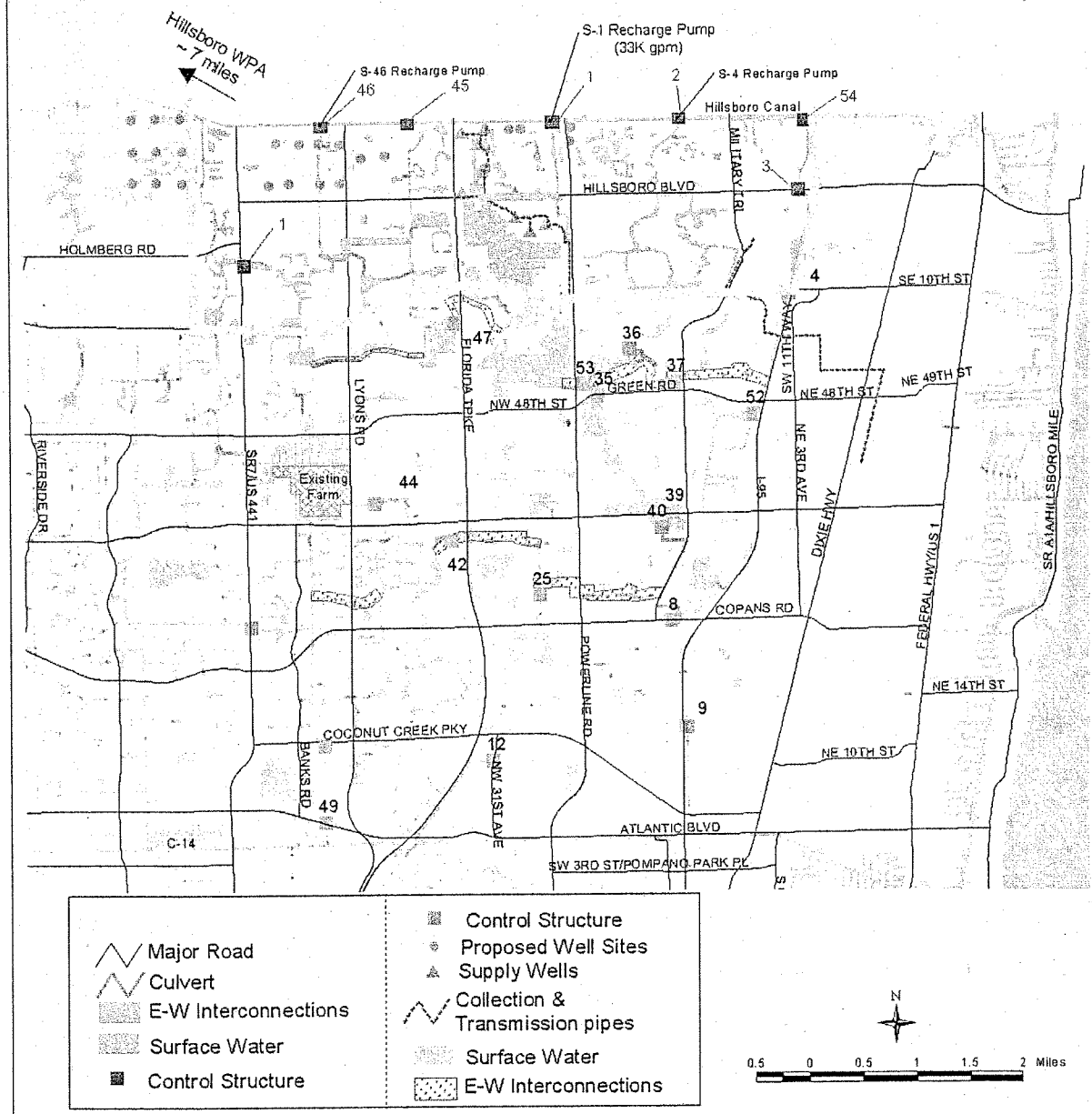
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## FIGURE 2

# North Regional Wellfield Recharge System

### Broward County, Florida



Broward County Office of  
Environmental Services  
Water Management Division  
Geographic Information System

November 08, 2001

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DRAFT  
LOCAL GOVERNMENT ORGANIZATION  
RESOLUTION

A RESOLUTION OF THE (INSERT LOCAL GOVERNMENTAL ORGANIZATION) SUPPORTING IMPLEMENTATION OF AQUIFER STORAGE AND RECOVERY TECHNOLOGIES FOR THE PURPOSE OF PROTECTING THE ENVIRONMENT AND PUBLIC WATER SUPPLIES AND EFFECTIVE IMMEDIATELY.

WHEREAS, the citizens and environment of South Florida will benefit from the implementation of Aquifer Storage and Recovery (ASR) Projects associated with the Comprehensive Everglades Restoration Plan (CERP);

WHEREAS, the proposed CERP ASR components include 333 ASR wells, an unprecedented scale for implementation of this technology;

WHEREAS, further research is warranted to ensure that injection of surface waters that may contain microorganisms into Florida's aquifers will not impact public health and water supplies;

WHEREAS, there does not appear to be another storage technology available that can provide multi-year storage to improve or manage for drought conditions, such as those experienced by Florida during the last year and a half;

WHEREAS, since ASR technology is not subject to evapotranspiration or seepage losses and requires only an acre or two per ASR well system, it provides significant cost-effective benefits beyond those achievable by above-ground reservoirs already proposed in CERP;

IT IS RESOLVED BY (insert Local Governmental Organization) THAT:

1. The (insert Local Governmental Organization) supports ongoing efforts by the U.S. Army Corps of Engineers, the Florida Department of Environmental Protection, and the South Florida Water Management District, and, to proceed in a cautious, methodical manner to answer the many questions about implementing ASR technology, including the concerns about the fate of microorganisms in aquifers;
2. The combined strategy of (a) conducting three CERP ASR pilot projects at Lake Okeechobee, Caloosahatchee River, and Western Hillsboro Basin, as well as a City of West Palm Beach demonstration project, and (b) evaluating the projected impacts of the proposed 333 ASR wells on the environment and existing water users through an ASR Regional Study, is an appropriate way to address these technical issues; and
3. The U.S. Army Corps of Engineers, Florida Department of Environmental Protection, and South Florida Water Management District are urged to conduct the necessary data collection and scientific studies to truly evaluate the ASR technology for the benefit of Everglades Restoration and long-term regional water supplies as outlined in the CERP.