From: Doug Leeper

To: (janicehowie@aol.com); Abdon Sidibie (asidibie@chronicle.online.com); Alex McPherson (aamcpherson@msn.com); Ann - 2 Hodgson (ahodgson@gmail.com); Ann Hodgson (ahodgson@audubon.org); Bernard Berauer (bfberauer@aol.com); Beverly Overa (boverly@tampabay.rr.com); Bill Garvin (wgarvin@tampabay.rr.com); Bob Caldwell (Bobcaldwell51@yahoo.com); Brack Barker (brack154@msn.com); Brad Rimbey (BWR.CRRC@tampabay.rr.com); Carl Mattthai (thebabesmimi@gmail.com); Casey, Emily (fcnwr@atlantic.net); Charles Dean (dean.charles.web@flsenate.gov); Charles Stonerock (katcha.stonerock3@gmail.com); Chris Safos (chrissafos@embarqmail.com); Czerwinski, Mike (mczerwin@tampabay.rr.com); Darlene Herth (2cetechnology21@gmail.com); Darrell Snedecor (president@citruscountyaudubon.com); Don Hiers (dhiers3@gmail.com); Douglas Dame (doug_dame@yahoo.com); Elaine Luther (barneyandcap@hotmail.com); Emily Casey (ecasey21@hotmail.com); Emma Knight (eknight@wetlandsolutionsinc.com); George Harbin (gharbin@tampabay.rr.com); George McClog (classof47@gmail.com); Gorgon O"Connor (gorgon_o@yahoo.com); Harry Steiner (harry109@aol.com); Helen Spivey (manatees@habitats.org); Jack Calbeck (calbeckj@citrus.k12.fl.us); jane Perrin (jcsperrinmd@sbcglobal.net); Jerry Morton (JerrMorton@aol.com); Jessie Gourlie (gourliej@thirdplanetwind.com); Jim Collins (jimmiekey22@yahoo.com); Jimmie Smith (Jimmie.Smith@myfloridahouse.gov); Joe Calamari; John Lord (jclord109@yahoo.com); John Mayo (freedomway1@gmail.com); Karen Johnstone (kjohns213@sbcglobal.net); Kim Caldwell (caldwell.kimberly@yahoo.com); Kim Dinkins (kim.dinkins@marioncountyfl.org); Linda Pierce (tpierce35@tampabay.rr.com); Linda Vanderveen (hernandoaudubon@yahoo.com); Mary Anne Lynn (mlynn1978@tampabay.rr.com); Matthew Corona (mcorona1@tampabay.rr.com); Max Rhinesmith (rhinesmith@webtv.net); "Amber Breland"; Andy Houston (ahouston@crystalriverfl.org); Art Yerian (Al.Yerian@dep.state.fl.us); "Ben Weiss"; "Beth Hovinde"; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us); Courtney Edwards (cedwards@savethemanatee.org); Dale Jones (Jones@MyFWC.com); Dana Bryan (dana.bryan@dep.state.fl.us); "Darrell Snedecor"; David Hamilton (countyadministrator@hernandocounty.us); David Hankla (david_hankla@fws.gov); Don Wright (wright@sura.org); Dusty McDevitt (mcdevitt@usgs.gov); Ed Call (marvin.call@MyFWC.com); Eric Nagid (eric.nagid@MyFWC.com); FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com); J. J. Kenney (jj.kenney@bocc.citrus.fl.us); Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us); Joyce_Kleen@fws.gov; Kandi Harper (kandi.harper@bocc.citrus.fl.us); Keith Ramos (Keith.Ramos@fws.gov); Kent Smith (kent.smith2@myfwc.com); Kevin Grimsley (kjgrims@usgs.gov); Michael Lusk (Michael_Lusk@fws.gov); Mitchell Newberger (mnewberger@verizon.net); Nick Robbins (Nick.Robbins@dep.state.fl.us); Nicole Adimey (Nicole_Adimey@fws.gov); Paul Thomas (paulw.thomas@MyFWC.com); Ron Mezich (ron.mezich@MyFWC.com); Shelly Yaun (shelly.yaun@dep.state.fl.us); Toby Brewer (Toby.Brewer@dep.state.fl.us); "Tracy Colson"; Wallace, Traci; "Adkins, Jim"; "Bitter, Jim"; "Bryant, Richard"; "Cantero, Vince"; "Carpenter, Paul"; "Daniels, Chase"; "Dueker, Duane"; "Gramling, Hugh"; "Harrelson, Cathy"; "Hubbell, Pete"; "Johnson, Eric"; "Johnson, Martyn"; "Keim, Robert"; "Kline, Allen"; "Knight, Bob"; "Knight, Robert"; "Knudson, Ross"; "Overa, Tom"; "Owen, Rick"; "Parrow, Liz"; Rolf Auermann (rauerman@tampabay.rr.com); "Rusnak, Teddi"; "Watkins, Priscilla"; "Watrous, Russell"; Al Grubman (grubman1@gmail.com); Bill Geiger (bgeiger@cityofbrooksville.us); Bill Pouder (bill.pouder@myfwc.com); Boyd Blihovde (Boyd_Blihovde@fws.gov); Brent Whitley (brentwhitley@sierra-properties.com); Brockway, Alys (abrockway@co.hernando.fl.us); Dennis D. Dutcher (Dennis3ds@aol.com); Frank DiGiovanni (administration@inverness-fl.gov); Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us); Hilliard, Dan (2buntings@comcast.net); Hoehn, Ted; Hope Corona (hopecorona@tampabay.rr.com); Jim Farley (jfarley682@aol.com); Katie Tripp (ktripp@savethemanatee.org); Norman Hopkins (norman@amyhrf.org); Rebecca Bays (rebecca.bays@bocc.citrus.fl.us); Richard Kane (rkane@usgs.gov); Richard Radacky (rradacky@cityofbrooksville.us); Ron Miller (rmille76@tampabay.rr.com); Sarah Tenison (cityofweekiwachee@yahoo.com); Sulllivan, Jack (jsullivan@carltonfields.com); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us); Whitey Markle (whmarkle@gmail.com)

Cc: Barbara Matrone; Bruce Wirth; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Lou Kavouras; Mark Barcelo; Mark Hammond; Marty Kelly; Mike Heyl; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez

Subject: Stakeholder Representatives Spring MFLs Workshop Announcement

Date: Wednesday, October 05, 2011 12:29:00 PM

Greetings:

At the request of the stakeholder representatives for the Southwest Florida Water Management District's Springs Coast Minimum Flows and Levels workshop series, I am pleased to announce that the stakeholder representatives will be holding a meeting later this month for continued discussion of data and methodological enhancements that may be used for establishing or reevaluating minimum flows for the Chassahowitzka, Crystal, Homosassa and Weeki Wachee River systems.

The meeting will begin at 1:30 P.M. on October 26, 2011 in room 280 of the Lecanto Government Building. The building is located at 3600 W Sovereign Path in Lecanto, Florida, 34461-7727.

As soon as it becomes available I will post an agenda for the meeting on the Springs Coast Minimum Flows workshop web page at the URL identified below.
Workshop Series Web Page at the Southwest Florida Water Management District Web Site:
http://www.WaterMatters.org/SpringsCoastMFL

I look forward to seeing you on October 26th.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From:	Alan Martyn Johnson
To:	J Weaver
Cc:	R Rodriguez; Doug Leeper
Subject:	Letter August 23, 2011from Mr. Rodriguez to Doug Leeper
Date:	Thursday, October 06, 2011 7:49:31 AM

Mr. Weaver,
Both you and Mr. Rodriguez have been mute on my e-mail of August 31, 2011 regarding the subject letter.

I did provided a reminder on September 14, 2011 which again both you and Mr. Rodriguez appear to have chosen to ignore.

While it is possible that you do not read all your e-mail, but have them filtered by someone, please be assured this is the last time I will e-mail you on the matter should you choose to remain silent. However, please understand that your silence will not be the end of the matter.

I frankly find it bad manners for Mr. Rodriguez to write the letter and request that it is posted on SWFWMD's Working Groups web site without having communicated with me directly, or having the courtesy to copy me. Further, for a Federal Government employee to use Federal Government Letterhead to name an individual, and comment judgmentally without specifically addressing the points of difference is very concerning.

Martyn Johnson

From: Jess D Weaver
To: Alan Martyn Johnson
Cc: R Rodriguez; Doug Leeper
Subject: Re: Letter August 23, 2011from Mr. Rodriguez to Doug Leeper
Date: Thursday, October 06, 2011 4:35:44 PM

Mr. Johnson,

I received your note of Oct. 6 and wanted to provide a brief response. While I do remember seeing earlier correspondence on this issue, I had hoped it would be resolved at the local level. Based on this follow up email, however, it appears that may not be the case. As such, I wanted to let you know that I'll be looking into this further and will ensure we get back to you with a response to your concerns.

Jess Weaver

Sent from my iPad

On Oct 6, 2011, at 7:50 AM, "Alan Martyn Johnson" <martynellijay@hotmail.com> wrote:

> Mr. Weaver,
> Both you and Mr. Rodriguez have been mute on my e-mail of August 31, 2011 regarding the subject letter.
>
> I did provided a reminder on September 14, 2011 which again both you and Mr. Rodriguez appear to have chosen to ignore.
>
> While it is possible that you do not read all your e-mail, but have them filtered by someone, please be assured this is the last time I will e-mail you on the matter should you choose to remain silent. However, please understand that your silence will not be the end of the matter.
>
> I frankly find it bad manners for Mr. Rodriguez to write the letter and request that it is posted on SWFWMD's Working Groups web site without having communicated with me directly, or having the courtesy to copy me. Further, for a Federal Government employee to use Federal Government Letterhead to name an individual, and comment judgmentally without specifically addressing the points of difference is very concerning.
>
> Martyn Johnson

From:	2buntings
To:	Doug Leeper
Subject:	Dr. Estevez/Mote
Date:	Thursday, October 13, 2011 5:45:23 PM

Hi Doug,

Did Dr. Estevez of Mote Marine do any work for the District on the Springs Coast MFL? If so are the documents available?

Thanks,

Dan

--
Dan Hilliard
Director
Withlacoochee Area Residents, Inc.(501.C3)
352/447-5434
WWW.WARINCONLINE.COM

From:	Doug Leeper
To:	"2buntings"
Cc:	Mike Heyl
Subject:	RE: Dr. Estevez/Mote
Date:	Friday, October 14, 2011 10:31:03 AM

Hi Dan:

With assistance from Mike Heyl, I've compiled a number of reports by Ernie Estevez and/or his colleagues that address your document request.

The files are compiled into a zipped file that I've placed on our FTP site for you to retrieve.

Directions for retrieving files from the FTP site may be found on the "How to Access our Anonymous FTP Server" page of the District web site at the following link:

http://www.swfwmd.state.fl.us/data/ftp/

The file that you want is named Estevez_Docs.zip and is stored in the public-outgoing folder. Here's a direct link to that folder. Using your browser to point to this folder may let you bypass the login procedure.

http://ftp.swfwmd.state.fl.us/pub/out/

Let me know if you have trouble downloading the zipped file or have questions concerning the supplied documents

Douglas A. Leeper
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1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

-----Original Message-----
From: 2buntings [mailto:2buntings@comcast.net]
Sent: Thursday, October 13, 2011 5:47 PM
To: Doug Leeper
Subject: Dr. Estevez/Mote

Hi Doug,

Did Dr. Estevez of Mote Marine do any work for the District on the Springs Coast MFL? If so are the documents available?

Thanks,

Dan

--
Dan Hilliard
Director
Withlacoochee Area Residents, Inc.(501.C3)
352/447-5434

From: Doug Leeper
To: Hilliard, Dan (2buntings@comcast.net)
Cc: Mike Heyl
Subject: Check the Mote Web Site
Date: Friday, October 14, 2011 10:33:03 AM

Dan – I forgot to mention that you may want to check the Mote Marine Laboratory web site for additional, relevant documents authored by E. Estevez, K. Dixon or others. I've downloaded a number of files from their site.

Douglas A. Leeper
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352-754-6885 (Fax)
doug.leeper@watermatters.org

Springs Coast Minimum Flows and Levels
Public Workshop Agenda
Wednesday, October 26, 2011
1:30 p.m.
Lecanto Government Building
3600 West Sovereign Path, Room 280
Lecanto, Florida 34461

*******All workshops are open to the public*******

SWFWMD – Southwest Florida Water Management District

1. Opening remarks – Brad Rimbey (*5 minutes*)

2. Coastal Springs MFL Hydrology topics by Dr. Todd R. Kincaid (*45 minutes*)

    1. The need for an accurate water budget and what that entails
    2. What we are learning at Spring Creek about saltwater intrusion in aquifers with coastal springs and conduits
    3. What we have learned about modeling in karst aquifers and the requirements of a reliable model

3. Coastal Springs MFL Ecology topics by Dr. Robert L. Knight (*60 minutes*)

    1. Effects of spring discharge on spring primary productivity and food chain support
    2. Definition of significant harm
    3. The idea of a conservative management strategy that assumes the worse until proven otherwise
    4. A spring recovery case history - Volusia Blue Spring
    5. Biological monitoring required to prevent "significant harm"

4. Coastal Springs MFL Testimony from Stakeholders (*5 minutes per individual)*

5. Public input *(3 minutes per individual)*

6. Identification of follow-up District actions - Brad Rimbey (*5 minutes*)

7. Adjournment - Brad Rimbey (*1 minute*)

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Todd Kincaid	GeoHydros
E. HOPE CORONA	
Bernard Berauer	Suncoast Sierra Club, Chassahowitzka River
Darcy Brune	Southwest FL Water Managment District
AL GRUZMAN	TOO FAR
Dennis Dutcher	united Waterfowlers
Brad Rimbey	Chassahowitzka River
Bob Knight	Florida Springs Institute
KAREN JOHNSTON	
Elizabeth Wright	
Priscilla Watkins	Homosassa River Alliance
Ron Basso	SWFWMD
Doug Leeper	SWFWMD
Mike CZERWINSKI	Michael C. Czerwinski, PA (Environmental Consulting)
BEV + TOM OVERA	—
Gloria & Stan Clewett	
Kevin Grimsley	USGS
Gary Williams	SWFWMD
KAREN ORR	CHASSAHOWITZKA RESIDENT
Darrell Snedeker	C C Audubon
Rebecca Bays	Commissioner
Dennis Blauer	Realtor

63 total

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ron Miller	Homosassa River Alliance
J.C. Rusnak	Citrus County Council
Carolyn Voyles	DEP
HANDI HARPER	Citrus County Planning Div
Kevin Smith	" " "

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ken Nash	Gulf Archaeology Research Inst.
DAN HILLIARD	W.A.R. INC.
Ed CALL	FFWCC
JANE PERRIN	at Chazy Co garage
Anike Heyl	SWFWMD
Cathy Harrelson	Gulf Restoration Network
BRENT WHITLEY	RESIDENT
Russell J Watras	FNPS Nature Coast
NORMAN HOPKINS	Amy H Kemley Foundation
MARTY Kelly	SWFWMD
Boyd Blitch	USFWS
James Green	citizen
Joyce Klein	USFWS
Whitey Markle	SSJ SIERRA CLUB
JIM WILLIAMS	HOMOSASSA
Ronald C. Duff	Chassahowitzka
J. J Kemley	BOCC
Janice Hobbie	Native Plant Society
Elaine Moore	Elaine Moore
Jim Bitter	
DANA BRYAN	FLORIDA STATE PARKS

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Helen Spivey	FFL League Conservation Ed Fund
Kate Tripp	South Main Club
Mark Hammond	SWFWMD
Doug Thaxp	SWFWMD Board
Cara Martin	SWFWMD
	Also (added by Debbie)
	Sid Flannery — SWFWMD
	Veronica Craw - SWFWMD

From: Brad Rimbey
To: Doug Leeper
Subject: Re: Draft Meeting Notes
Date: Tuesday, November 08, 2011 9:20:25 AM

Hi Doug,

Your meeting notes look fine although the truncated audio recording resulted in the loss of much of the discussion/questions which transpired after Dr. Kincaid's presentation. A minor point is that there was a comma instead of a period after "Dr" in several places (e.g. Dr, Kincaid instead of Dr. Kincaid).

In view of the missing discussion/questions, I request that the District add a "Comment" section to the Springs Coast MFL website. http://www.swfwmd.state.fl.us/projects/mfl/springs-coast-mfl.php . I have seen these "Comment" sections on the District's websites for "Hunt Evaluations" http://www.swfwmd.state.fl.us/recreation/hunt_evaluation.php and "Surplus Lands Assessment" http://www.swfwmd.state.fl.us/projects/surplus-lands/ .

Also, I would like to have copies of the audio recordings from all of the Springs Coast MFL workshops. You have already provided a CD of the audio from the July 18, 2011 workshop so I do not need that one. However, I would like to have the recordings from the June 8, Sept. 6, and Oct. 26.

Thanks again for your help on organizing these workshops.

Brad

> ----- Original Message -----
> From: Doug Leeper
> To: Brad Rimbey (BWR.CRRC@tampabay.rr.com)
> Cc: Marty Kelly
> Sent: Thursday, November 03, 2011 7:36 AM
> Subject: Draft Meeting Notes
>
> Morning Brad –
>
> I've drafted and attached some meeting notes for the October 26th stakeholder representatives spring MFLs workshop.
> Am hoping you can give them a quick look, and if you are OK with them, I will post the notes on the workshop web site, along with the slides shown by Dr. Knight and Dr. Kincaid (still need to hear about inclusion of the "extra" slides in Dr. Kincaid's Powerpoint file).
>
> Note that purple highlighting references the Kincaid slide issue, and will be removed from the "final" notes. Yellow and blue highlighting in the written statement from Martyn Johnson was in his original e-mail and will be retained.
>
> Also, I will be working on District responses to comments/questions raised during the workshop.
>
> Look forward to hearing from you soon.
>
> Thanks,
>
> Douglas A. Leeper

Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
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Brooksville, Florida 34604-6899
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352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: 2buntings
To: Brad Rimbey
Cc: Doug Leeper
Subject: Re: Draft Meeting Notes
Date: Tuesday, November 08, 2011 10:12:19 AM

Hi All,

I generally concur with Brad's review and suggestion regarding the ability to comment by stakeholders.

Thanks,

Dan

On 11/8/2011 9:20 AM, Brad Rimbey wrote:

> Hi Doug,
>
> Your meeting notes look fine although the truncated audio recording resulted in the loss of much of the discussion/questions which transpired after Dr. Kincaid's presentation. A minor point is that there was a comma instead of a period after "Dr" in several places (e.g. Dr, Kincaid instead of Dr. Kincaid).
>
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>
> Brad
>
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> From: Doug Leeper
> To: Brad Rimbey (BWR.CRRC@tampabay.rr.com)
> Cc: Marty Kelly
> Sent: Thursday, November 03, 2011 7:36 AM
> Subject: Draft Meeting Notes
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> Morning Brad –
>
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> Am hoping you can give them a quick look, and if you are OK with them, I will post the notes on the workshop web site, along with the slides shown by Dr. Knight and

Dr. Kincaid (still need to hear about inclusion of the “extra” slides in Dr. Kincaid’s Powerpoint file).

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Look forward to hearing from you soon.

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Douglas A. Leeper
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Resource Projects Department
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--
Dan Hilliard
Director
Withlacoochee Area Residents, Inc.(501.C3)
352/447-5434
WWW.WARINCONLINE.COM

MEETING NOTES

Stakeholder Representative's
Springs Coast Minimum Flows and Levels Public Workshop
Facilitated by the
Southwest Florida Water Management District

October 26, 2011
Lecanto, Florida

The fourth in a series of Springs Coast Minimum Flows and Levels Public Workshops was held between 1:30 and approximately 5:45 p.m. on October 26, 2011 in Room 240 at the Citrus County Lecanto Government Services Building in Lecanto, Florida. The workshop was requested and organized by stakeholder representatives that participated in the workshop series. Logistic support was provided by the Southwest Florida Water Management District. Stakeholder representatives, Southwest Florida Water Management District staff and a District Governing Board member that attended and contributed to the workshop are identified below. Commissioner J.J. Kenney, with the Citrus County Board of County Commissioners also participated in the meeting. A list of meeting participants who signed an attendance roster is attached to these meeting notes as Appendix A.

Stakeholder Representatives
Norman Hopkins, Amy H. Remley Foundation
Brad Rimbey, Chassahowitzka River Restoration Committee
Rebecca Bays, Citrus County
Carolyn Voyles, Florida Department of Environmental
Ed Call, Florida Fish and Wildlife Conservation Commission
Brent Whitley, Stakeholder Representative
Ron Miller, Save the Homosassa River Alliance
Katie Tripp, Save the Manatee Club
Al Grubman, TOOFAR
Dennis Dutcher, United Waterfowlers-Florida
Boyd Blihovde, United States Fish and Wildlife Service
Kevin Grimsley, United States Geological Survey
Dan Hilliard, Withlacoochee Area Residents
Whitey Markle, Sierra Club

District Representatives
Ron Basso, Staff
Darcy Brune, Staff
Veronica Craw, Staff
Sid Flannery, Staff
Mark Hammond, Staff
Mike Heyl, Staff
Marty Kelly, Staff
Doug Leeper, Staff
Cara Martin, Staff
Doug Tharp, Governing Board
Gary Williams, Staff

A copy of the agenda for the workshop, which was prepared by stakeholder representatives, is attached to these notes as Appendix B. Summaries of topics and issues discussed during the workshop are grouped below by agenda item. All notes were prepared by Mr. Doug Leeper, with the Southwest Florida Water Management District, based on review of audio recordings of the workshop, slides presented at the workshop, and handwritten notes recorded by Mr. Leeper during the meeting.

Opening Remarks

Mr. Doug Leeper opened the meeting at approximately 1:40 p.m. Following the introduction of District Governing Board member Doug Tharp and Citrus County Commissioners Rebecca Bays and J.J. Kenney, Mr. Leeper noted that the workshop was being held at the request of the Stakeholder Representatives with assistance provided by the District. Mr. Leeper and other meeting participants thanked Mr. Brad Rimbey for organizing the event and developing the agenda.

Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee, offered his gratitude to the District for its assistance with the workshop and it's work concerning development of minimum flows for the Chassahowitzka and Homosassa River systems, Mr. Rimbey proceeded to introduce Dr. Todd Kincaid, with GeoHydros, L.L.C., Global Underwater Explorers and the Hydrogeology Consortium as the first speaker of the day.

Coastal Spring MFL Hydrology Topics by Dr. Todd R. Kincaid

Dr. Todd Kincaid provided a presentation titled "*How Much is Too Much – Toward a Water Budget Approach to Management.*"

Dr. Kincaid started by noting that through the work on Wakulla Springs and the Santa Fe River systems to be discussed during his presentation he would be able to offer some insights that are applicable to the minimum flows and levels work being completed for the Springs Coast. Dr. Kincaid began his presentation with a dedication to a recently deceased colleague, Mr. Les Skiles. Dr. Kincaid proceed to outline his presentation, noting that spring loss may be attributed to reduced rainfall, too much extraction of groundwater, or rising sea levels. He noted that rising sea levels may not be expected to reduce the amount of groundwater or spring discharge, but rather may be expected to alter the location of the discharge. Dr. Kincaid noted that there is a trend in regional groundwater use that may lead to the loss of some springs. He noted that this may be prevented by improving public understanding of the issue, development of better groundwater models for use in management decisions, through collection of additional data to support model development, through reduction in groundwater withdrawals, and by establishment and enforcement of minimum flows and levels. He noted that an important component of groundwater studies involves development of a water budget for evaluating the amount of sustainable groundwater withdrawals, or "groundwater mining" for a region.

Dr. Kincaid then proceeded to discuss research that has been conducted in the vicinity of Wakulla Springs to highlight issues that may be applicable to other areas of karst geology. He noted that the Northwest Florida Water Management District is in the process of establishing minimum flows and levels for Wakulla Springs in the Florida panhandle. Important findings associated with this work include the identification of relatively rapid velocities or movement of groundwater in the area, and that flow reversals, and resultant saltwater intrusion, have been documented since 2006 in Spring Creek, which is a large spring system located south of Wakulla Springs, near the Gulf of Mexico. Dr. Kincaid noted that during these flow reversal events, salt water may travel rapidly inland up to three miles. Dr. Kincaid suggested that development of minimum flows for Wakulla Springs should consider the potential effects of saltwater intrusion and flow reversal in other area springs to best address regional and localized impacts of withdrawals on spring discharge. He emphasized that distance between withdrawal points and springs and more importantly the difference in hydraulic gradient between the two areas should be carefully evaluated. Dr. Kincaid also noted that there appears to be downward trends in groundwater levels in the vicinity of the springs.

Dr. Kincaid then discussed the general movement of groundwater in a karst environment such as that of the Wakulla Springs area, which includes caves and springs. He noted that withdrawal effects may be evident in wells throughout these types of groundwater basins, but may be difficult to detect in individual cave/spring systems. Dr. Kincaid suggested that additional data collection and analyses should be completed to support development of minimum flows for Wakulla Springs and other hydrogeologically connected systems.

Next, Dr. Kincaid focuses on assumptions and data needs associated with groundwater modeling, with emphasis on the special considerations needed to adequately model karst-dominated systems. He illustrated his points with examples of models used to characterize groundwater flow in the Santa Fe River area, in central Florida. He noted that a competent groundwater model should incorporate several key components, including known springs, swallets, caves, rivers, withdrawal locations and quantities and that the model must be geologically reasonable and well calibrated to groundwater levels, spring discharge and groundwater movement velocities. He noted that once a competent groundwater model is developed it may be used to evaluate or model pumping impacts.

Note: Audio recording of Dr. Kincaid's presentation was inadvertently discontinued approximately 45 minutes after initiation of the workshop. This error resulted from programming the recording device to store high quality, data-dense audio information, which limited the amount of information that could be stored on the media associated with the device. Dr. Kincaid's oral presentation describe above corresponded to the first 28 slides shown at the workshop and was recorded and reviewed for preparation of these meeting notes. Notes presented below for information presented by Dr. Kincaid in association with slide numbers 29 through 33 that were shown at the workshop were developed solely on the basis of review of the slides and handwritten notes taken by Mr. Leeper and may be less comprehensive than the notes prepared for the earlier portion of Dr. Kincaid's presentation.

Dr. Kincaid proceeded to note that the details of groundwater models are important, as these tools are often used for significant water management decisions. He noted that as a society, we have been using groundwater models to predict impacts of withdrawals since the 1970s and it is important to ensure that these models include or incorporate information concerning the karst geology that is common in our state.

Following Dr. Kincaid's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

- Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee noted that flows from only two springs in the Chassahowitzka River system are measured or gaged, and wondered what effects future withdrawals may have on ungaged springs within the system.

  Response: Dr. Kincaid noted that the work related to the Wakulla Springs and other nearby springs indicates that it is important to obtain and evaluate data on as many springs as possible in a region, as flow trends at one spring vent may not be representative of similar trends at other vents in a highly interconnected groundwater system. Dr. Kincaid added that it is important to establish minimum flows and levels for spring systems now, using the best available information, as the minimum flows and levels offer protection to the systems by defining caps or limits on withdrawals that affect flows to the springs.

- Commissioner Rebecca Bay, the stakeholder representative for Citrus County, expressed appreciation to Dr. Kincaid and others at the meeting for the ongoing discussion of minimum flows and level to be established for the Springs Coast, noting that she and other County

Commissioners, staff and the citizen's of the region are very interested in this process. She expressed regret that she would not be able to attend the remainder of the meeting due to another commitment, but noted that she will be available to all interested parties interested in further discussion of the minimum flows and level process.

Mr. Rimbey announced that the workshop would continue after a short break with a presentation by Dr. Robert Knight, with Wetland Solutions, Inc. and the Howard T. Odum Florida Springs Institute.

Coastal Spring MFL Ecology Topics by Dr. Robert L. Knight

Dr. Robert Knight provided a presentation titled "*Adequate Flows for Florida Springs: Ecosystem Considerations.*"

Note: Dr. Knight's presentation was purposefully not recorded based on the understanding that audio recording would be limited to 45 minutes and the identified need to record comments and discussion that were expected after his presentation. Notes prepared for information presented by Dr. Knight in association with his slide presentation were developed based on review of his slides and hand-written notes taken by Mr. Leeper during the presentation.

Dr. Knight began his presentation with an outline, indicating that he planned to address the importance of ecosystem-level assessments, indicators of spring impairment, concerns about existing methods for establishing minimum flows and levels for springs, and suggestions for assessment of springs impairment and recovery.

Dr. Knight suggested that assessments of ecosystem function, e.g., measures of productivity, are missing from most minimum flows and levels evaluations. He noted that like Dr. Kincaid's identification of the need for development and understanding of water budgets when developing minimum flows, it is also important to develop energetic budgets that account for the movement of materials and energy through living communities. Historical and more recent work directed toward quantifying and understanding ecosystem metabolism at Silver Springs and other Florida spring systems was highlighted by Dr. Knight, and used to illustrate energy budget concepts and relationships between system productivity and a variety of environmental factors. He noted that available flow records indicate that discharge in the past decade at many Florida springs has decreased from historical levels. Dr. Knight added that a recent study of several springs identified a direct, continuous (i.e., no threshold response evident) relationship between spring discharge and gross primary productivity, which is a measure of algal or plant growth rate. Dr. Knight emphasized that Florida spring systems are threatened by a number of stressors, and that evaluation of whole ecosystem responses, rather than measurement of single measures of impairment, could be used to better inform management decisions.

Dr. Knight then proceeded to discuss unique and beneficial qualities of Florida springs and highlighted indicators of spring impairment. He noted that many springs are classified as impaired water bodies, based on water quality characteristics. Decreased groundwater levels and spring flow reductions were also identified as issues affecting spring ecosystems. Dr. Knight illustrated the reduced flow issue by showing slides of White Springs, a north-Florida spring that was one a recreationally important landscape feature and which has now ceased flowing. Dr. Knight also noted that increasing concentrations of nitrate in groundwater systems is a problem for many spring systems, where higher nitrogen levels leads to increased algal production. Dr. Knight then discussed synergistic effects of reduced flows and increased nitrogen levels, noting these factors may lead to declining macrophyte coverage, reduced

photosynthetic efficiency, declines in native fish and turtle populations, and increased invasions by exotic species.

Dr. Knight turned his discussion to concerns about existing minimum flows and levels methods as applied to springs. He noted that the rules of the Florida Department of Environmental Protection include a number of water resource values that should be evaluated when developing minimum flows and levels. He emphasized that spring systems are quite diverse and this supports the need for evaluations that do not focus on single species. With regard to evaluating significant harm, he noted that the limited availability of baseline hydrologic and ecological data often precludes adequate characterization of changes that have or may occur as a result of water use. Similarly, information of groundwater pumping may be inadequate and models used to evaluate groundwater flow may be too simplistic or otherwise inadequate. He emphasized that "worst-case" scenarios should be evaluated when establishing minimum flows and levels. He noted that most springs of the state are classified as Outstanding Florida Waters and that springs with declining flows often exhibit water quality changes that may be considered "violations of Outstanding Florida Waters requirements." He noted that it may take fifteen years or more to achieve the nitrogen targets identified in Total Maximum Daily Loads and the Basin Management Action Plans that are developed to reduce nitrogen loading to spring/groundwater systems.

Dr. Knight also discussed methods that could be used to assess springs impairment and recovery. Identified factors to be considered or evaluated include measurement of sunlight, rainfall, groundwater recharge, inflow water quality, spring or river flows, plant communities, consumer assemblages, primary and secondary production and export/import rates for energy and matter. He noted that the relative constancy of many environmental variables makes spring systems nearly ideal for conducting replicated field-based mesocosm studies. Dr. Knight then discussed the Volusia Blue Springs Action Plan being implemented for recovery of spring flows at that central Florida spring. The plan includes extensive monitoring of water resource values and these ongoing efforts were highlighted.

In conclusion, Dr. Knight noted that a holistic approach is necessary for evaluation of spring systems, based on their complexity, and unique structures and processes. He indicated that in his opinion, a holistic approach has not been used for development of minimum flow recommendations for Springs Coast systems. With regard to springs management, he offered a Latin phrase "*primum nil nocer*", which translates to "first, do no harm." Dr. Knight noted that recovery of spring systems within the state is possible through reduction of nitrogen loading and restoration of flows. With regard to minimum flows development, he suggested that it may be better to do nothing, based on the availability of existing information on some spring systems. He opined that it would not be wise to allow water use to reduce spring flows to the limits established by minimum flows and levels rules, suggesting that perhaps it may be prudent to allow only some portion, perhaps half, of the identified, allowable reductions. He expressed concern that based on economic perspectives society may approve violation of adopted minimum flows and levels or call for changes that allow for additional flow reductions.

Following Dr. Knight's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

Note: Audio recordings of the comments and discussion following Dr. Knight's presentation were made, so the following notes were prepared based on review of the audio recordings and hand-written notes made by Mr. Leeper during the meeting.

- Ms. Hope Corona questioned how ecosystem and other levels of biological organization can be numerically quantified for the Chassahowitzka River system to support minimum flows development.

  Response: Dr. Knight noted that he hoped his presentation addressed the measurement of biological and ecosystem properties of spring ecosystems. He added that the University of Florida has completed several studies of the Chassahowitzka River and other nearby systems, and that this information should be part of minimum flow evaluations and may serve to characterize baseline environmental conditions. During his response Dr. Knight noted that plant control activities can confound analyses and interpretation of plant coverage/distribution data that are or will be collected for spring systems. He noted that salinity changes could account for changes in plant communities in tidally influenced river systems, although he indicated that he was not familiar with the data that are available for the Chassahowitzka River system. He did note, however, that he has seen published information that indicates that the Wachee well that is used to estimate flows in the Chassahowitzka River system has exhibited a three-foot decline in water levels and that this magnitude of groundwater lowering could be expected to be associated with a rise of the saltwater/freshwater interface in the aquifer on the order of 120 feet. Based on this information he indicated that it would be plausible to see increased salinities of the water discharged from some springs in the Chassahowitzka River system.

- Mr. Mike Czerwinski noted that there does not seem to be a direct relationship between nitrate levels and the growth of filamentous algae in spring systems.

  Response: Dr. Knight noted that a recent study by Stevenson and others indicated that although there does not appear to be a relationship between nitrogen concentrations and algal cover in Florida springs, there is a relationship between nitrogen levels and the thickness of algal mats in a number of our springs. He noted that there does appear to be a relationship between nitrate levels and dominance by filamentous algae, but other environmental factors and recreational impacts may be expected to affect the distribution of plants and algae in spring systems.

- Mr. Darrell Snedecor questioned whether establishing a minimum flow or level would be expected to affect nitrate concentrations in river/spring systems of the Springs Coast.

  Response: Dr. Knight noted that the response of spring ecosystems to nitrate loading is complex and high concentrations of nitrate could be expected to lead to shifts in vegetative communities. He indicated that whether or not a minimum flow or level is established may not have an impact on nitrate level being delivered to spring systems through groundwater discharge.

- Mr. Al Grubman, the stakeholder representative for TOOFAR, asked whether nitrate concentrations would be expected to increase with decreasing spring flows.

  Response: Dr. Knight noted that relationship between discharge and nitrate concentrations is not straightforward. In some springs there appears to be a direct relationship between flow and nitrate concentrations, while the reverse is true in other systems. He hypothesized that these seemingly contradictory responses may be a function of the depth of the source water being discharged from individual springs or spring vents.

- Mr. Dana Bryan remarked, based on reference to material presented by Dr. Kincaid, that if rainfall is constant and spring flow is dropping, any change in spring flows must be attributed to water withdrawals. Following on this point Mr. Bryan noted that there are historical flow records for the Homosassa River system that were not included in the District's 2010 draft report on recommended minimum flows for the river system. He noted that there appears to be no trend in rainfall for Citrus County over the past century. Mr. Bryan also noted that the District chose to establish a baseline flow record from 1995 through 2009 for the Homosassa system, and wonders how this more recent data should be combined with the historic data for analyses supporting development of minimum flow and levels.

  Response: Dr. Knight indicated that it would be appropriate to use historic flow records to construct a water balance for the spring system that could be used for development of minimum flows. He added that it may be appropriate to develop annual flow values when combining historic and more recently collected flow records to account for temporal variation in the frequency or data collection.

- Mr. Brad Rimbey noted that the District is developing minimum flows and levels on a "river-by-river" basis rather than for the Springs Coast as a whole. He questioned whether this is an appropriate approach.

  Response: Dr. Knight noted that there are practical reasons for establishing minimum flows for each system at a time. He indicated that it certainly seems reasonable to establish minimum flows for a river system and its surface watershed. He noted, however, that because groundwater basins may overlap, it may be reasonable to evaluate groundwater flows on a regional basis.

- Mr. Brad Rimbey noted that it is expected that water discharged from springs along the Springs Coast may turn more saline as permitted water withdrawals approach the limits established by any minimum flows or levels that are adopted for the region. He added that the District's analyses regarding proposed minimum flows for the Chassahowitzka and Homosassa River systems have not adequately addressed withdrawal impacts on freshwater components of the systems.

  Response: Dr. Knight noted that the scenario described by Mr. Rimbey argues for development of holistic ecosystem studies, including measurements of productivity. He cautioned, however, that studies supporting minimum flows and levels development are relatively expensive.

- Mr. Brent Whitley, a stakeholder representative, asked Dr. Knight about the work he completed for the St. Johns River Water Management District pertaining to water resource values considered for minimum flows and levels development.

  Response: Dr. Knight noted that he completed a report on human use and water resource values for Rock and Wekiva Springs for the St. Johns River Water Management District. He noted that most minimum flows and levels reports address these issues, although he indicated that he had not seen this topic addressed in the Southwest Florida Water Management District report on proposed minimum flows and levels for the Chassahowitzka River system. He noted that assessment of water resource values is often hampered by a lack of data. Dr. Knight added that this identified lack of data has led to the implementation of monitoring programs in the St. Johns River Water Management District, but he fears that

these programs may be curtailed as a result of budgetary constraints. He cautioned that we should consider the maxim, "do no harm" when establishing minimum flows and levels, as any rules associated with the minimum flows and levels may "outlive us." Dr. Knight added that he has concluded "that the Floridan aquifer is already overstressed" to the point where it can't support the populations in the springs as well as the people that are along them." He added that "we are overly optimistic in giving out permits" in reference to the issuance of water use permits by the state's water management districts, noting that "every permit is making the situation worse."

- Ms. Hope Corona noted that the District appears to be holding firm on the currently recommended minimum flows and levels for the Springs Coast and wonders how the minimum flows and levels may be modified to address the will of interested stakeholders and to also incorporate the data that has been presented by stakeholders for consideration by the District. She wondered how interested stakeholders can negotiate the allowable percentage of flow reductions downward. Ms. Corona also asked about the negotiated minimum flow and level that was developed for a spring system in the St. Johns River Water Management District.

  Response: Dr. Knight noted that the minimum flow and level that was ultimately determined for Volusia Blue Springs was based on a decision made by the Secretary of the Department of Environmental Protection. He noted that the decision was associated with a great deal of public pressure from the State Park Service, the Save the Manatee Club and others. He noted that the District's spring workshop series seems like an appropriate forum for discussion of minimum flows development, noting in jest as Dr. Kincaid did during his presentation, one alternative to negation and discussion of water-related issues that was used historically in the western United States was to "just shoot them."

- Mr. Norman Hopkins, the stakeholder representative for the Amy H. Remley Foundation, noted that the District's recommended minimum flows and levels are not absolute flow values, but rather relative, allowable percentage of flow reductions. He recommended that the District consider establishing some form of safety factor to account for uncertainty in minimum flow requirements when issuing water use permits.

  Response: Dr. Knight indicated that he thought Mr. Hopkins suggestion was a good, rational statement. He added that "we" should be wary of permitting water use and then later determining that the allowable withdrawals are causing adverse impacts. Dr. Knight offered this latter comment based on the acknowledgment that it can be very expensive to restore flows or levels to stressed systems, citing the restoration of the Everglades as an example.

- Mr. Boyd Blihovde, the stakeholder representative for the United States Fish and Wildlife Service's Chassahowitzka National Wildlife Refuge, asked for clarification about the minimum flows and levels that have been established for Volusia Blue Springs.

  Response: Dr. Knight noted that he understood that the minimum flows established for Volusia Blue Springs address recovery of flows for the river system over a twenty year period. He added that he had read recently that the District may be considering revision of the minimum flows. Mr. Dana Bryan contributed to the discussion, noting that the established minimum flows are not really a "recovery minimum flow." Rather, the minimum flows were established at historic flow values and are to be met over an extended time period to allow the St. Johns River Water Management District sufficient time to develop

alternative water supplies to offset the groundwater withdrawals that would be expected to impact flows from the spring.

- Mr. Dana Bryan noted that the minimum flows and levels law has been interpreted to allow for flow changes associated with natural climatic variation, but not for water-use impacts. Assuming that there has not been a decline in rainfall, the District assertion that withdrawal impacts have only minimally affected flows in the Homosassa River system seems incompatible with observed flow declines. He notes that in his experience, all District staff members are very professional, evaluate existing data to the best of their abilities and subject their analysis to independent peer-review. He added that it is appropriate for stakeholders to question the use and analysis of available data, and encourage staff or other professionals to reevaluate the data to support development of the best possible minimum flows and levels. He indicated that this is why he is focusing on the District's use of discharge data, believing that this may be a "vulnerability of their analysis", and wondered whether it may not be true that water use has not substantially impacted flows in the river system.

- Mr. Darrell Snedecor noted that many springs currently fail to meet water Outstanding Florida Water criteria. He added that the "do no harm" standard seems laughable, given the violation of existing laws or rules.

  Response: Dr. Knight noted "that we have gone way beyond what the law allows" and questioned who might advance a lawsuit concerning nitrate levels in groundwater systems. Brad Rimbey offered that "we will" in response to Dr. Knight, who countered that "somebody needs to if they care about enforcing the law". Dr. Knight noted that he has been recently discussed the planned installation of a new waste-water treatment plant near Fanning Springs with the Department of Environmental Protection, and learned from the Department that the plant appears to be in compliance with relevant water quality-related law.

- An unidentified workshop participant noted that Citrus County has four Outstanding Florida Waters and because of this, any work associated with minimum flows development should proceed with caution.

- Mr. Al Grubman noted that workshop discussions have focused primarily on the Chassahowitzka and Homosassa River systems. He added that both systems are Outstanding Florida Waters and both are on the impaired waters list associated with water quality violations. Knowing that these systems are currently stressed we should not allow any further withdrawals that will impact flows in these systems.

  Response: Mr. Brad Rimbey noted that Mr. Grubman's comments provided a good segue to the next agenda item for the workshop, which was general comments to be provided by stakeholders.

Coastal Springs MFL Testimony from MFL Stakeholders

Mr. Brad Rimbey indicated that this portion of the meeting would be dedicated to statements from stakeholder representatives.

- Mr. Ron Miller, the stakeholder representative for the Save the Homosassa River Alliance, thanked the District for holding the workshop series and Mr. Rimbey for organizing this

workshop. Mr. Miller suggested that the District should consider setting a cap on withdrawals in lieu of establishing minimum flows for Springs Coast river/spring systems. He noted that although some may pick and choose among laws related to water resource protection, the law that should be supported is the law that protects "our" Outstanding Florida Waters. Mr. Miller also noted that the Northern District Model needs improvement.

- Mr. Dennis Dutcher, the stakeholder representative for United Waterfowlers-Florida, read a prepared statement, which is included as Appendix C to these meeting notes. He thanked the District for holding the workshop series, and also thanked workshop participants for the contributions, and Mr. Rimbey for organizing the stakeholder representatives meeting. He noted that while it is important to characterize a water budget for human and non-human environmental needs, members of United Waterfowlers-Florida are concerned about allowing additional flow reductions from systems that are already stressed. Mr. Dutcher noted that there has been substantial loss of coastal wetlands in recent years due to sea level rise and asserted that a lack of fresh water flow to coastal regions of the Springs Coast is "the reason for the loss of overwintering waterfowl on the refuge", presumably in reference to the Chassahowitzka National Wildlife Refuge. He noted that establishing minimum flows and levels is a worthy approach to environmental protection, but emphasized that this effort should be coupled with enhanced conservation measures. With regard to establishment of minimum flows for the Springs Coast, Mr. Dutcher urged the District to "weigh the evidence shown that these systems are in peril" and noted that "a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh."

  Note: Audio recordings made during this portion of the workshop terminated during Mr. Dutcher's statement period outlined above. Notes presented below for the remainder of the stakeholder representative comments and the public input agenda item were prepared using handwritten notes made by Mr. Leeper during the meeting.

- Mr. Dan Hilliard, the stakeholder representative for the Withlacoochee Area Residents, began his presentation by asking whether those at the meeting thought any Florida water bodies were in better shape today than they were thirty years ago. He added that pristine waters are not abundant or may no longer exist within the state, noting that we "owe" quality water habitats to future generations. Mr. Hilliard recommended that if we cannot restore all habitats, we should at least protect what we currently have. He indicated that the Withlacoochee Area Residents have recently submitted written comments concerning proposed minimum flow and levels to the District and looked forward to continuing to work with the District to preserve our water resources. These written comments indicate that it is the opinion of the Withlacoochee Area Residents that "[s]takeholder requests for 0% flow reduction recommendations" are appropriate, given "questions and methodology related to the definition of significant harm."

- Dr. Katie Tripp, the stakeholder representative for the Save the Manatee Club, commented that she was surprised to learn some time age during a presentation by a St. Johns River Water Management District staff member that the state's water management districts are required to ensure water availability for *all* reasonable and beneficial uses. She added that it was the hope of the Save the Manatee Club that the input and discussion made during the spring workshop series has and will continue to make a difference with regard to the establishment of minimum flows and levels.

- Mr. Brad Rimbey noted that it was important to recognize the value of the District for the Springs Coast, despite any disagreements that may exist among stakeholders and the

organization. He offered that in these times of budgetary constraints, it may be appropriate for the District to consider reaching out to citizen groups for assistance with data collection that could enhance water management efforts in the region. He noted that this suggestion was being made to address a perceived insufficiency in data that are currently available for the Springs Coast systems.

Public Input

Mr. Brad Rimbey noted that this portion of the meeting would be dedicated to statements from other workshop participants.

- Mr. Ben Berauer read a prepared statement, which is included as Appendix D to these meeting notes. Mr. Berauer expressed appreciation to the District and stakeholders that have contributed to the discussions of minimum flows development for the Springs Coast. He noted, however, that the workshops have not adequately addressed several of his concerns, including: a lack of consideration for the Outstanding Florida Waters status of the systems being evaluated; a lack of accountability with regard to regulatory agency responsibilities for protection of Outstanding Florida Waters; incorporation of information pertaining to droughts and sea level rise; inadequate characterization of baseline flows; lack of consideration of known significant impacts associated with pollution, water use, reduced rainfall and other factors; lack of consideration of micro-environments, including smaller springs; increased negative impacts associated with nutrient pollution and reduced flows; and increased nutrient loading that may be expected from development associated with additional permitted water use. Mr. Berauer added that use of an allowable fifteen percent change in habitat as a significant harm threshold is inadequate, in particular for Outstanding Florida Waters.

- Ms. Cathy Harrelson noted that the aquifer systems in Pinellas County were severely depleted in the 1970s and since that time the residents of that region have been "taking your water" in assumed reference to withdrawals in counties north of Pinellas County. Ms. Harrelson commented that perhaps the development associated with increased water use may not be "worth it". Ms. Harrelson noted that she appreciated the acronym "MEL" which was introduced during the workshop, and stands for "Maximum extraction level". She also noted that it may not be appropriate to consider minimum flow rules for the Chassahowitzka and Homosassa River systems at the December 2011 Governing Board meeting, as this meeting is scheduled to be held in Haines City, far from the Springs Coast. She added that the public pressure concerning opposition to the currently proposed minimum flows for the Springs Coast should be exerted "further up the line", i.e. "beyond" the District.

  Comment: Mr. Leeper noted that the District's December Governing Board meeting is scheduled to be held in Haines City, and added that it would be appropriate to delay presentation of minimum flow rule amendments for the Chassahowitzka and Homosassa River systems to the Board until January, when the Board is expected to meet in Brooksville.

- Mr. Dana Bryan noted that the Division of State Parks is concerned about losing flows from several small springs that discharge into animal pen areas of the Ellie Schiller Homosassa Springs Wildlife State Park.

- Mr. Mike Czerwinski noted that it is important to ensure that the groundwater model and other models used for development and evaluation of minimum flows for the Springs Coasts

system are adequate. He suggested that the groundwater model used for the area should incorporate information on geologic fractures. Mr. Czerwinski suggested that it is not appropriate to use a groundwater well located near Weeki Wachee Springs to estimate discharge at other area springs and added that it would be useful to measure stage and discharge in Halls River and Little Spring, which is a possible contributor to flows in the Southeast Fork of the Homosassa River. In reference to a suggestion made at the meeting concerning citizen-based data collection, Mr. Czerwinski noted that there may be issues associated with use of these data and suggested, alternatively, the District investigate deployment of relatively inexpensive date sondes (i.e., automated, remote data collection devices).

- Ms. Hope Corona commented that the District needs to develop or otherwise acquire additional data sets, because it is her opinion that existing data are insufficient for establishing minimum flows and levels or maximum allowable water extractions for the Springs Coast.

- Mr. Martyn Johnson prepared written comments for the workshop that were read by Mr. Rimbey. In his written statement, which is included as Appendix E to these meeting notes, Mr. Johnson recommends that "serious consideration [be] given to a 5 year moratorium on any additional well/withdrawals from the aquifer". He questioned whether this recommendation has been given serious thought to this issue, and added that based on information supplied by the District, very few requests for issuance of a water-use permit in the northern portion of the District have been denied in recent years. In his statement, Mr. Johnson also asked whether the United States Geological Survey or the District could provide any information regarding data collection at the recently upgraded gage site in the Southeast Fork of the Homosassa River.

  Response: Mr. Kevin Grimsley, with the United States Geological Survey, noted that equipment used to measure water velocities was installed at the Southeast Fork gage site in September and that negative velocities were recorded at the site last week as a meteorological front passed through the area. Mr. Grimsley added that it would be approximately six months to one year before sufficient data have been obtained for development of a velocity index rating curve for the gage site.

- Ms. Janice Howie questioned whether a fifteen percent habitat-change standard was appropriate for establishing minimum flows and levels. She added that the tidal river / spring systems of the Springs Coast are already stressed and we should not consider allowing additional stress to these systems.

- Mr. Brad Rimbey noted that he understands the District's desire for uniformity in the application of significant harm thresholds for priority water bodies. However, he questions the utility of this approach for systems, like the Chassahowitzka River, with limited data sets. Mr. Rimbey also commented that: 1) if spring systems are "shutting down", i.e., ceasing to discharge water, from west to east in response to decreases rainfall or groundwater pumping; 2) if the District is only measuring discharge in springs located in the "east"; and 3) if the District will base compliance with adopted minimum flows and levels on eastern springs; then it may be possible that discharge may cease from smaller springs in the area and that these changes may not be quantified.

Identification of Follow-Up District Actions

This agenda item was not explicitly address during the workshop.

Adjournment

Mr. Rimbey adjourned the meeting at approximately 5:45 p.m.

Appendix A – Meeting Sign-In Sheets

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Todd Kincaid	GeoHydros
E. HERE CORONA	
Bernard Beraner	Suncoast Sierra Club, Chassahowitzka River
Darry Brune	Southwest FL Water Management District
Al Grubman	TOO FAR
Dennis Dutcher	united Waterfowlers
Brad Rimbey	Chassahowitzka River
Bob Knight	Florida Springs Institute
KAREN JOHNSTON	
Elizabeth Wright	
Priscilla Watkins	Homosassa River Alliance
Ron Basso	SWFWMD
Doug Leeper	SWFWMD
mike CZERWINSKI	Michael S. Czerwinski, PA Environmental Consultant
Bev + Tom Overa	—
Gloria & Stan Clewett	
Kevin Grimsley	USGS
Gary Williams	SWFWMD
KAREN ORR	CHASSAHOWITZKA RESIDENT
Darrell Snedeker	C C Audubon
Rebecca Bays	Commissioner
Dennis Blauer	Realtor

63 total

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ron Miller	Homosassa River Alliance
J.C. RUSNAK	Citrus County Council
Carolyn Voyles	DEP
HANDI HARPER	Citrus County Planning Div
Kevin Smith	" " "

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ken Nash	Gulf Archaeology Research Inst.
DAN HILLIARD	W.A.R. INC.
Ed CALL	FFWCC
JANE PERRIN	at Chazz Co gamp
Anike Heyl	SWFWMD
Cathy Harrelson	Gulf Restoration Network
BRENT WHITLEY	RESIDENT
Russell J Watrous	FNPS Nature Coast
NORMAN HOPKINS	Amy H Remley Foundation
MARTY Kelly	SWFWMD
Boyd Blihovde	USFWS
James Green	citizen
Joyce Kleen	USFWS
Whitey Markle	SSJ SIERRA CLUB
JIM WILLIAMS	HOMOSASSA
Ronald E. Daff	Chassahowitzka
J. J. Kenney	BOCC
Janice Hoehne	Native Plant Society
Elaine Moore	Elaine Moore
Jim Bitter	
DANA BRYAN	FLORIDA STATE PARKS

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Helen Spivey	FL League Conservation Ed Fund
Kate Tripp	South Mouth Club
Mark Hammond	SWFWMD
Doug Tharp	SWFWMD Board
Cara Martin	SWFWMD
	~~ALSO Ron Basso~~ [illegible])
	ALSO (ADDED BY D LEEPER)
	Sid Flannery - SWFWMD
	Veronica Craw - SWFWMD

Appendix B – Meeting Agenda

Springs Coast Minimum Flows and Levels
Public Workshop Agenda
Wednesday, October 26, 2011
1:30 p.m.
Lecanto Government Building
3600 West Sovereign Path, Room 280
Lecanto, Florida 34461

*******All workshops are open to the public*******

SWFWMD – Southwest Florida Water Management District

1. Opening remarks – Brad Rimbey (*5 minutes*)

2. Coastal Springs MFL Hydrology topics by Dr. Todd R. Kincaid (*45 minutes*)

    1. The need for an accurate water budget and what that entails
    2. What we are learning at Spring Creek about saltwater intrusion in aquifers with coastal springs and conduits
    3. What we have learned about modeling in karst aquifers and the requirements of a reliable model

3. Coastal Springs MFL Ecology topics by Dr. Robert L. Knight (*60 minutes*)

    1. Effects of spring discharge on spring primary productivity and food chain support
    2. Definition of significant harm
    3. The idea of a conservative management strategy that assumes the worse until proven otherwise
    4. A spring recovery case history - Volusia Blue Spring
    5. Biological monitoring required to prevent "significant harm"

4. Coastal Springs MFL Testimony from Stakeholders (*5 minutes per individual)*

5. Public input *(3 minutes per individual)*

6. Identification of follow-up District actions - Brad Rimbey (*5 minutes*)

7. Adjournment - Brad Rimbey (*1 minute*)

Appendix C – Written Statement by Mr. Dennis Dutcher, Stakeholder Representative for United Waterfowlers-Florida, Inc.

United Waterfowlers-Florida, Inc.
Stakeholder Statement, regarding Chassahowitzka MFL

Attention: Marty Kelly, Ecologic Evaluation Section

Mr. Kelly as per your request, here are the remarks from my outline to be included into the stakeholder comments regarding the Chassahowitzka MFL's from the October 26, 2011 meeting in Lecanto, Florida.

On behalf of United Waterfowlers-Florida, Inc. I would like to thank the District for holding these workshops with the stakeholders and members of the public outlining the tedious task and the science used to determine Minimum Flows and Level's for the Chassahowitzka River and springs system.

The subject has been well covered whey establishing MFL's are important in order to create a water budget for human needs that includes safeguards for wildlife and their habitat. However I have concerns, pulling flow from an already degraded and stressed system would be comparable to blood letting from a patient that is bleeding to death already.

The significance of sea level rise resulting in the subsidence of coastal marsh is pronounced on the West Coast of Florida causing habitat loss for wintering waterfowl not only in this area of the state but much of the West Coast of Florida has been affected to some degree.

Between the years 2004-2009 about 25,000 acres of salt marsh disappeared each year. Marine and estuarine intertidal wetlands in coastal regions have been lost 3 times faster than during previous study periods. 83% of these acres were lost to open water, predominantly through subsidence and sea-level rise. Wetland losses have increased 140% since 2004, with the Gulf Coast of Florida losing wetlands the size of a football field each day or about an acre per day.

Wetlands are among nature's most productive ecosystems providing habitat for a wide variety of waterfowl, fish and many other species of wildlife. Coastal Wetlands are highly productive and diverse and, as such merit special consideration. 66% of marine fish rely on coastal wetlands at some stage in their life cycle. Wetlands also provide important societal benefits such as filtering run off, decreasing the effects of storm serge and providing recreational opportunities such as hunting and fishing.

It is now understood by most that the reason for the loss of overwintering waterfowl on the refuge and this coastal area of the state is the lack of fresh water flowing into the near shore Gulf, wafting up from the aquifer in the coastal estuaries and seeping into the coastal marsh from a fully saturated aquifer. Further reducing flows from the spring shed will make recovering any coastal marsh more difficult if not impossible.

Setting MFL's may be one step in conserving water resources but not the only step that should be taken. As much as 50% of our drinking water is used to water lawns, add to that an average of 15% loss during the delivery of drinking water from the water treatment facilities, leaking

pipes and fixtures in homes and businesses, for a total of up to 65% waste of the natural resource. But, water is cheap!

If we look to some examples of how other states have addressed their water consumption needs we find it is not impossible to address. The State of California had a population increase of 60”% between the years1975-2000 yet their water consumption remained about the same, what do they know that we don’t? It would be prudent for the District to address the unlimited consumption of fresh water much of which is used to keep non-native grasses alive. While it is commendable the district is attempting to address MFL’s on the Springs Coast it is my request that you weigh the evidence shown that these systems are in peril, a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh.

Florida is a State in which tourism is a major part of the economy and many people choose to make their life here do so because of the recreational opportunities and natural beauty of the State much of which has to do with the aquatic resources, of which many of us feel quite possessive.

Thank you for the opportunity to serve as a stakeholder and provide input on a subject that is important to all of us.

Dennis D. Dutcher
SW Region Director-Member of the Board
United Waterfowlers-Florida, Inc.

Appendix D – Written Statement by Mr. Ben Berauer

Thank you for letting me provide my comments today. My name is Ben Berauer, and I am a resident of the village of Chassahowitzka, a member of the Chassahowitzka River Restoration Committee, the Nature Coast Coalition, and the Suncoast Group of the Sierra Club. I am a long time nature enthusiast and outdoors leader. I have explored the Chassahowitzka and other Florida rivers, and I have seen degradations that have already occurred in just the last couple of decades. I have seen the water in the Chassahowitzka springs change from potable to unfit for drinking, then our wells change from potable to unfit for drinking, and how septic use in the area, and across the spring shed have already degraded water quality. I see the existing degradation contributed to sea level rise, and am concerned about any permitted further degradations.

I appreciate the work done by SWFWMD. I also appreciate the opportunity given to the public and stakeholders during the process of reviewing and discussing the draft proposal for the Chassahowitzka River MFL report.

But I must say that these proceedings have not achieved the result that I was hoping for. Many here today, like I, are very concerned that the scientific studies and reports fall short of addressing the concerns we have.

Particularly, I do not think that there has been any change in the position that the the MFL proposals do not take into account any special status or protections for Outstanding Florida Waters. During the past few months I have heard shocking statements from SWFWMD that they are not responsible for accounting for OFWs or water quality, while DEP states they are not responsible for regulating OFWs for other than water quality. There seems to no consistent addressing for the mandate to provide special protections to our OFWs. I will not feel that the proposed MFLs for OFWs are adequate until they account for the mandated additional protections.

Discussions regarding how ongoing natural changes such as drought and sea level change have not in my humble opinion been factored in to the MFL proposal. I feel that a baseline for future water use should be premised not only on current flows and man's further withdrawals, but on the full historical history and trend accounting for natural and anthropogenic impacts on our springs and spring sheds. Our waters are known to be significantly impacted from pollution, water use, reduced precipitation, and other factors. As such I feel that defining significant harm as a further 15% reduction of water bodies or spring sheds as inadequate, particularly for OFWs.

As we race to a recommendation to the SWFWMD Governing Board, we have just started to look at affects of sea level rise, which has not been thoroughly reviewed, discussed, and incorporated into the MFL proposal.

Another major concern is that due to the limited data from limited monitoring sites, and limited focus to impacts to specific macro environments, there is little knowledge or prediction of what will occur on micro-environments, smaller springs, spring runs, and the flora and fauna surrounding them. We may see 100% degradation of many micro-environments since the affects of a 11% water flow reduction are not known at significant detail.

Nor does the analysis adequately take into account contributions to significant harm from affects

of possible increased nutrient pollution from reduced flow and greater permitted water use and resultant development.

Given these many inconsistencies between what is addressed by the modeling and analysis results and the broader concerns I still believe need to be addressed, I do not feel that the voice of the stakeholders and public have been adequately addressed. I do not feel the "one-size-fits-all" is appropriate for OFWs. I do not believe that the impacts of the proposed reduction in flow are adequately known to protect the river and spring system and its micro-environments. I respectfully submit that although efforts have been made to provide sound analysis and public input, the analysis is not adequate, and public concerns are not adequately addressed. If the current proposed MFL were adopted, I feel further work and a revision is immediately needed.

Appendix E – Written Statement by Mr. Martyn Johnson

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   "Review of the District's Well Construction Database indicates that ***213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years****, respectively."……"With regard to water-use permitting……* ***Fewer than ten of the hundreds of surface- and groundwater use permit*** *requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

2. As some may know the USGS installed the velocity monitoring unit under the bridge on Fishbowl Drive to monitor the stream velocity and discharge from the SE Fork of the Homosassa River.

   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

December 13, 2011

MEMORANDUM

TO: File

FROM: Doug Leeper, Chief Environmental Scientist, Ecologic Evaluation Section
Marty Kelly, Minimum Flows and Level Program Director, Ecologic Evaluation Section
Mike Heyl, Chief Environmental Scientist, Ecologic Evaluation Section
Ron Basso, P.G., Senior Professional Geologist, Hydrologic Evaluation Section

SUBJECT: District staff responses to issues and questions identified at the Stakeholder Representatives Springs Coast Minimum Flows and Levels Public Workshop held on October 26, 2011 in Lecanto, Florida

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This memorandum outlines responses and comments of Southwest Florida Water Management District staff concerning issues and questions identified at a Springs Coast Minimum Flows and Levels Public Workshop that was held on October 26, 2011 in Lecanto, Florida. The workshop was requested and organized by stakeholder representatives as a continuation of a series of District-sponsored workshops focused on discussion of data and methodological enhancements that may be implemented for development or reevaluation of minimum flows for the Chassahowitkza, Crystal, Homosassa and Weeki Wachee River systems. Minimum flows represent the limit at which further water withdrawals would be significantly harmful to the water resources or ecology of the area and are used in the District's regulatory and water-resource planning programs.

District staff provided logistic support for the October workshop, including the preparation of meeting notes that were made available to interested parties and which are included as Attachment 1 to this memorandum. Slides presented at the workshop by Dr. Todd Kincaid and Dr. Robert Knight are also included, as Attachments 2 and 3, respectively. The meeting notes serve as the basis for organization of the responses and comments included in the body of this memorandum, and along with the attached slides, provide context for staff responses and comments.

District staff and the District Governing Board appreciate the stakeholder representative's commitment and contributions to the workshop series and consideration of the data and methods used for development of minimum flows and levels for priority water bodies of the Springs Coast. Special acknowledgment is provided to Mr. Brad Rimbey, who was instrumental in the organization of the stakeholder's October workshop.

The District is continuing its review of technical and policy-level issues pertaining to the establishment of minimum flows and levels for Springs Coast priority water bodies. To provide sufficient time for this effort and for additional public review, and because the January Governing Board meeting will be held in Tampa rather than Brooksville, staff anticipates presenting rule amendments addressing minimum flows for the Chassahowitzka and Homosassa Rivers to the Governing Board at the February Board meeting, which is expected to be held in Brooksville.

Agenda Item: Coastal Spring MFL Hydrology Topics by Dr. Todd R. Kincaid

Staff is appreciative of the information and concepts outlined by Dr. Kincaid, although we believe that it is useful to offer a few responses to selected points made during his presentation

For example, consider the following italicized text, which is excerpted from the meeting notes attached to this memorandum.

> *Next, Dr. Kincaid focuse[d] on assumptions and data needs associated with groundwater modeling, with emphasis on the special considerations needed to adequately model karst dominated systems. He illustrated his points with examples of models used to characterize groundwater flow in the Santa Fe River area, in northern Florida. He noted that a competent groundwater model should incorporate several key components, including known springs, swallets, caves, rivers, withdrawal locations and quantities and that the model must be geologically reasonable and well calibrated to groundwater levels, spring discharge and groundwater movement velocities. He noted that once a competent groundwater model is developed it may be used to evaluate or model pumping impacts.*
>
> *Dr. Kincaid proceeded to note that the details of groundwater models are important, as these tools are often used for significant water management decisions. He noted that as a society, we have been using groundwater models to predict impacts of withdrawals since the 1970s and it is important to ensure that these models include or incorporate information concerning the karst geology that is common in our state.*

Staff agrees that competent hydrologic data are important and that water budgets play a key role in assessing groundwater-modeling results. Unfortunately, much of the buried karst activity is unmapped in the Northern District and cannot be explicitly simulated. The Northern District model accounts for this situation by integrating karst activity in the matrix with very high hydraulic conductivity values. The Northern District model's water budget is reported by groundwater basin and has been compared to previous modeling efforts and estimates of empirical data as a test of reasonableness. The District also has an estimated and metered monthly water use database for the period from 1992 through 2008 that is among the best in the state. The test of a good model fit for a calibrated model is that it reasonably matches aquifer water levels and fluxes (discharges). The Northern District model is calibrated to spring discharge, surficial and Upper Floridan aquifer well water levels, estimated baseflow (groundwater) contribution to rivers, and qualitatively to United States Geological Survey potentiometric surface maps and water budgets.

Dr. Kincaid indicated that equivalent porous media models which integrate karst activity within the bulk matrix are not suitable tools in karst-dominated systems. Staff believes that when considering the appropriateness of a modeling tool, it is important to question the purpose or goal of the modeling effort and the availability of data used for model development. For example, under certain local conditions or for certain areas, where adequate karst data is collected and mapped in a site-specific manner, dual porosity or dual permeability models may be advantageous to equivalent porous media models – particularly in assessing water quality concerns. However, in simulating large groundwater basins where the cumulative effect of all withdrawals may impact spring discharge and information on the geometry and distribution of buried karst features is limited, it is necessary to integrate these features into the matrix conductivity. Scanlon and others (2003)[1] in

[1] Scanlon, B.R., Mace, R.E., Barrett, M.E., and Smith, B., 2003, Can we simulate regional groundwater flow in a karst system using equivalent porous media models? Case study, Barton Springs Edwards aquifer, USA: Journal of Hydrology 276, pp.137-158.

their assessment of the Edwards karst aquifer in Texas concluded if average groundwater fluxes are the primary objective, equivalent porous media models are generally considered adequate for karst aquifers except in cases involving contaminant transport, wellhead, or springhead protection zones where dual conductivity (permeability) models are generally considered more appropriate (Quinlan and others, 1995[2], Scanlon and others, 2003). Wellhead or springhead protection zones are established for water quality safeguards.

District staff agrees that it would be useful to have additional data and information on buried karst features in the Springs Coast regions. However, due to the limitations concerning the spatial, vertical, and hydraulic characteristics of buried karst features in this area, we believe the use of the Northern District model as parameterized represents the best numerical model tool to evaluate the cumulative impact of groundwater withdrawals in the region. Equivalent porous media models are used by the St Johns River and Suwannee River Water Management Districts to evaluate water resource conditions and minimum flows and levels in karst terrains in their districts. In addition, these types of models have been used extensively by the United States Geological Survey in karst landscape across the state of Florida since the late-1970s.

With regard to the information presented in the eleventh slide shown by Dr. Kincaid's, titled "Groundwater Mining", staff notes that the groundwater elevation data shown do not clearly demonstrate downward trends in water levels, as suggested by the trend-lines depicted in the slide. It may be that there are downward groundwater trends in the region of Florida represented in the slide, but these trends are not apparent based on the data shown.

On his twenty-ninth slide, titled "The Geek Stuff Matters", Dr. Kincaid notes that:

- *We've been using groundwater flow models to predict impacts since the 1970's.*
  - *If those models were correct then we must have seen all our problems coming and chosen not to act.*
  - *The only other possibility is that we believed in models that were wrong.*
  - *If so, then we have been acting out of ignorance.*

Staff is not sure whether Dr. Kincaid considers these comments applicable to all or only a portion of Florida, but notes that state water use rules and regulations have evolved substantially since the 1970s. For example, water use permitting began in the mid-1970s in the Southwest Florida Water Management District, and during that era, rules allowed impacts on property owned by the applicant and permits were evaluated on an individual basis. In 1989, consumptive use permitting rules were adopted that included specific standards of harm for on-site as well as offsite wetlands, streams, lakes, and wells. In addition, cumulative impacts were and continue to be evaluated as part of the implementation of these rules.

Most complex numerical groundwater flow models were not developed until the 1980s or later when advancements in computer memory and processing speeds accelerated. Early models were handicapped by sparse information on groundwater systems. The District recognized regional water resource concerns with the establishment of the Northern Tampa Bay Water Use Caution Area and Southern Water Use Caution Areas in 1989. To address these concerns and

[2] Quinlan, J.F., Ray, J.A., and Schindel, G.M., 1995, Intrinsic limitations of standard criteria and methods for delineation of groundwater-source protection areas (springhead and wellhead protection areas) in carbonate terranes: Critical review, technically-sound resolution of limitations, and case study in a Kentucky karst, *in* Beck, B.F., ed., *Karst GeoHazards*: A.A. Balkema, pp. 525-536.

other water management issues, we accelerated our groundwater data collection program through the installation of monitor wells, geologic sampling, and aquifer hydraulic testing, beginning in the mid-1980s. As a result, the District now relies on a rich database for construction and calibration of regional groundwater flow models and analysis of historical data to support water management policies associated with the Southern Water Use Recovery Plan and Partnership Agreement with Tampa Bay Water member governments in the Northern Tampa Bay area. This database also supports the establishment of minimum flows and levels throughout the District.

In his summary slide (slide number 31, titled "Summary"), Dr. Kincaid notes that:

- *We are losing springs & mining groundwater.*

Staff notes that the only spring within the Southwest Florida Water Management District that has disappeared due to groundwater withdrawals is Kissengen Spring. This Polk County spring ceased continuous flow in 1950 due largely to unregulated phosphate-mine-associated water use prior to establishment of the District and initiation of our consumptive use permitting program. Staff also notes that a strict definition of "mining groundwater" is where groundwater withdrawals exceed annual recharge to the aquifer, and based on this definition, there is no "mining" of groundwater in the Northern District. In the spring's coast groundwater basin, average recharge to the Upper Floridan aquifer is about 14 inches per year, while current groundwater withdrawals are approximately one inch per year.

Following Dr. Kincaid's presentation, Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka Restoration Committee offered the following comments and questions about the measurement of discharge in the Chassahowitzka River system. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Rimbey's comments and a response from Dr. Kincaid that was provided at the meeting.

- *Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee noted that flows from only two springs in the Chassahowitzka River system are measured or gaged, and wondered what effects future withdrawals may have on ungaged springs within the system.*

  Response: Dr. Kincaid noted that the work related to the Wakulla Springs and other nearby springs indicates that it is important to obtain and evaluate data on as many springs as possible in a region, as flow trends at one spring vent may not be representative of similar trends at other vents in a highly interconnected groundwater system. Dr. Kincaid added that it is important to establish minimum flows and levels for spring systems now, using the best available information, as the minimum flows and levels offer protection to the systems by defining caps or limits on withdrawals that affect flows to the springs.

In response to these comments, staff notes that the District supports measurement of discharge, stage and water quality characteristics by the United States Geological Survey at a number of sites in the Chassahowitzka River and other Springs Coast systems. This effort includes the provision of matching of funds that were formerly provided to the Survey by the Florida Department of Environmental Protection, but which were discontinued in 2010 due to Departmental budget cuts. Data collection efforts by the District and the Survey are, of course, limited by both economic and technical factors. Where technically feasible and appropriate, and

within existing budgetary constraints, the District continues its efforts to address identified data collection gaps for Springs Coast systems. For example, the District is currently funding the use of acoustic Doppler instrumentation in the Southeast Fork of the Homosassa River to determine whether this approach may be better than using tide stage and water level at a well near Weeki Wachee to estimate discharge in the Southeast Fork. Similarly, the District is pursuing installation of a new gage site in Halls River for estimation of discharge in that system. In addition, groundwater flow modeling used to evaluate compliance with minimum flows and levels and other water management activities has been developed to evaluate effects of withdrawals on a number of smaller spring systems along the Springs Coast, including some with limited discharge information. Staff agrees with Dr. Kincaid's assertion that it is important to establish minimum flows and levels as soon as practical, using the best available information, and acknowledges that established minimum flows will become permitting criteria that can be used to evaluate current and proposed water withdrawals in the region.

Agenda Item: Coastal Spring MFL Ecology Topics by Dr. Robert L. Knight

Staff is appreciative of the information and concepts outlined by Dr. Robert Knight during his presentation at the workshop. However, staff believes it is appropriate to present responses to several comments and suggestions made by Dr. Knight near the end of his presentation, as outlined in the following italicized excerpt from the meeting notes attached to this memorandum.

> *In conclusion, Dr. Knight noted that a holistic approach is necessary for evaluation of spring systems, based on their complexity, and unique structures and processes. He indicated that in his opinion, a holistic approach has not been used for development of minimum flow recommendations for Springs Coast systems. With regard to springs management, he offered a Latin phrase "primum nil nocer", which translates to "first, do no harm." Dr. Knight noted that recovery of spring systems within the state is possible through reduction of nitrogen loading and restoration of flows. With regard to minimum flows development, he suggested that it may be better to do nothing, based on the availability of existing information on some spring systems. He opined that it would not be wise to allow water use to reduce spring flows to the limits established by minimum flows and levels rules, suggesting that perhaps it may be prudent to allow only some portion, perhaps half, of the identified, allowable reductions. He expressed concern that based on economic perspectives society may approve violation of adopted minimum flows and levels or call for changes that allow for additional flow reductions*

Although it is not clear what would constitute a "holistic approach" to minimum flows development, staff notes that the District has attempted to look at multiple criteria when identifying minimum flow recommendations. For example, attempts have been made to incorporate the evaluation of flow related changes in various salinity-based habitats, on abundances of plankton, nekton and benthic organisms, and on the availability of thermally-favorable habitat used by manatees during critically cold periods. One example of a whole-ecosystem approach, as outlined by Dr. Knight, would involve measurement of flow-related changes in biological productivity (*e.g.*, gross primary productivity, community respiration or net community productivity). It is not clear to staff how such an approach could be implemented for minimum flows development, due to the potentially limited reliability of available statistical models that may be used to predict productivity as a function of flow, and the possible lack of clear break-points in productivity measures that could be related to flows.

Staff agrees with the environmental ethic associated with the "first, do no harm" principle discussed by Dr. Knight. We note, however, that development of minimum flows and levels deals with a specific form of environmental "harm" that is according to the Florida Statutes considered "significant' and associated with water withdrawals. Based on this understanding of state law, the District has identified significant harm thresholds that can be associated with flow reductions caused by or predicted for water withdrawals. These significant harm criteria are used to develop allowable percentage of flow reductions for spring-dominated rivers and for other systems throughout the District. Staff understands proposals addressing the application of "safety factors", such as the halving of identified allowable percentage of flow reductions when developing minimum flow recommendations, but does not support these approaches for establishment of minimum flows and levels.

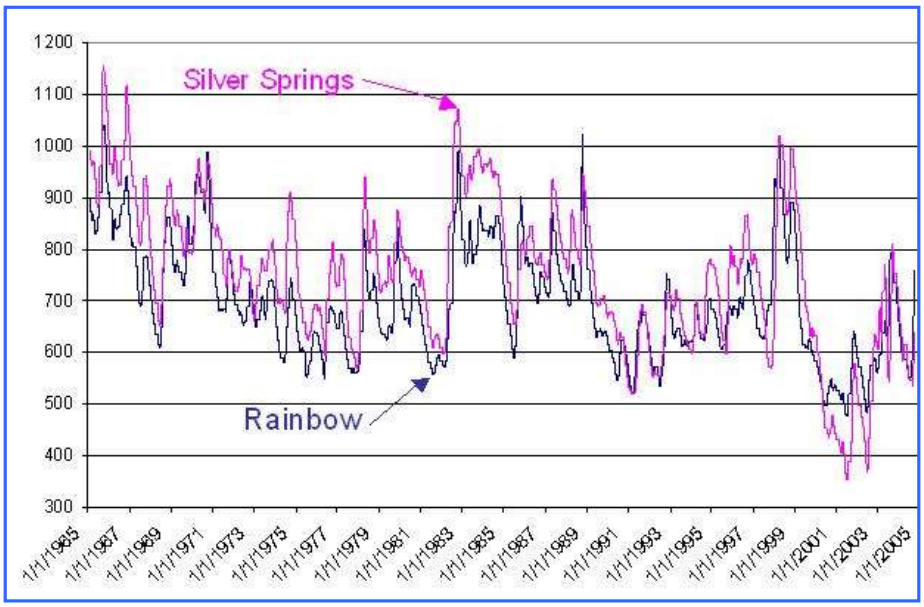
In addition to the general responses to Dr. Knight's presentation outlined above, staff believes that it is appropriate to comment on the plot included on the seventeenth slide shown during his presentation, titled "Spring Discharge Changes". This plot indicates that flows at 12 Florida springs were two to 32 percent lower in year 2000 as compared to period of record values for each respective spring. Staff notes that comparison of year 2000 spring discharge values with period-of-record flows is somewhat misleading since 2000 was the driest year in 108 years of rainfall record averaged from the Brooksville, Inverness, and Ocala National Weather Service rainfall stations (average for 2000 = 35.81 inches). It would be expected for nearly all area springs to show declines when comparing their average flows with this very dry year.

Staff also would like to offer information pertaining to points made by Dr. Knight in his twenty-ninth slide shown at the meeting, titled "Springs Problem – Part I". In this slide, he noted that:

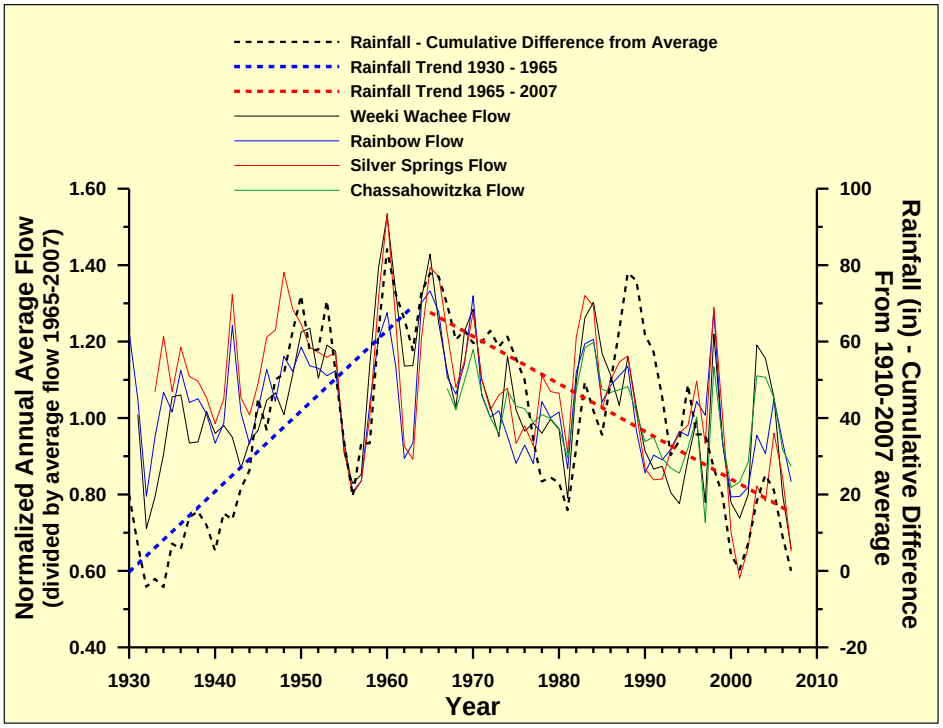
- *Groundwater resources are stressed:*
  - *Groundwater consumption is increasing*
  - *Groundwater levels are falling*
  - *Spring flows are declining*

In response to these assertions, staff notes that groundwater consumption in the Springs Coast area has actually declined slightly or remained flat since 2006. In the Northern Groundwater Basin, aquifer water levels and spring flows have declined largely due to low rainfall conditions occurring over the last 20 years.

The plot included on the thirtieth slide shown by Dr. Knight, titled "Sources of Impairments", is reproduced below and shows discharge or flows in two spring systems – Silver Springs and Rainbow Springs, from the mid-1960s through the late 2000s, with an apparent downward trend in flows depicted for the period shown. Dr. Knight clearly implied that much of the declining flow trend was attributable to groundwater withdrawals; however, this interpretation is misleading as shown when a more complete flow record is examined.



With regard to the apparent downward temporal trend in Rainbow Springs discharge during the past approximate 45 year period, it is interesting to look for trends in the set of measured flow records for the Rainbow River (Springs) system that extend back to the early portion of the twentieth century. As depicted in the figure below, flow records for Rainbow Springs and other west-central Florida spring systems show an apparent upward trend in flows for the earlier portion of the record, and an apparent downward trend in flows for the more recent data. The figure below also shows similar trends in rainfall for an area rainfall station, with rainfall depicted as the cumulative annual departure in inches from the annual average rainfall for a 97 year period ending in 2007. Staff notes that consideration of these long-term discharge records provides a much different perspective than that depicted in the plot shown for Rainbow and Silver Springs during the October workshop.



Plot of normalized annual average discharge for the Chassahowitzka, Weeki Wachee, Rainbow, and Silver Springs systems and cumulative rainfall departure in inches for the period from 1910 through 2007 for the Brooksville near Chinsegut National Oceanic and Atmospheric Administration station. Annual flows were divided by the average 1965-2007 flow for each system to accommodate variable periods of record.

In a table included on his thirtieth slide, Dr. Knight compared spring discharge values during the 10-year period from 2000-2009 with the period-of-record values for Silver Glen, Silver, and Rainbow Springs, and noted that Silver Glen flows for the ten-year period were one percent lower than the period of record flows while the ten-year flows for Silver and Rainbow Springs were, respectively, 32 and 15 percent lower than the period of record values. Dr. Knight attributed these differences largely to groundwater consumption. However, there is a 26.1-inch cumulative deficit in rainfall as measured at the Ocala National Weather Service station for the period 2000-2009. In addition, there is an issue with the recorded discharge at Silver Springs post-2000 when measured discharge was 100-150 cfs lower during the wet period of 2004-2005 as compared to 1997-98 – even though the Upper Floridan aquifer water level elevation near the spring was similar during these two periods. This issue has not been fully resolved by the United States Geological Survey or the St. Johns River Water Management District. Lastly, there is a major difference in the hydrogeology between the Rainbow/Silver Basins and Silver Glen areas. The springshed of the Silver and Rainbow springsheds are karst-dominated, largely unconfined with very high transmissivity and recharge. In contrast, the geology near Silver Glen spring is tightly-confined by an Intermediate Confining Unit which limits recharge to the Upper Floridan aquifer. While it is true there is very little groundwater withdrawn in the Silver Glen springshed, well-confined systems also tend to show little variation in Floridan aquifer water levels due to rainfall changes. Since spring discharge is driven by changes in Floridan aquifer water level elevation, this would mean little change in spring discharge.

With regard to the well water level trends depicted by Dr. Knight his thirty-second slide, titled "Declining Groundwater Levels In North Florida", staff notes that within the north-central Florida area, the greatest source of Floridan aquifer water level decline is in the Jacksonville Florida area and the Southern Water Use Caution Area of the Southwest Florida Water Management District. Within these two regions there are large groundwater extractions and a well-confined Floridan aquifer. This information concerning regional water level declines is supported by a recent United States Geological Survey review of water level changes in the Floridan aquifer which indicates that the greatest declines were associated with well-confined conditions in northeast Florida, the southern-third of our District, and parts of southeast Georgia (Williams and others, 2011[3]). In areas where the Upper Floridan aquifer is semi-confined or unconfined, long-term water level changes are largely associated with long-term rainfall changes, except near localized withdrawal centers.

Following Dr. Knight's presentation, Ms. Hope Corona asked how ecosystem and other levels of biological organization could be developed to support development of minimum flows. The italicized text below excerpted from the attached meeting notes includes a summary of Ms. Corona's question and a response from Dr. Knight that was offered at the meeting.

- *Ms. Hope Corona questioned how ecosystem and other levels of biological organization can be numerically quantified for the Chassahowitzka River system to support minimum flows development.*

  Response: Dr. Knight noted that he hoped his presentation addressed the measurement of biological and ecosystem properties of spring ecosystems. He added that the University of Florida has completed several studies of the Chassahowitzka River and other nearby systems, and that this information should be part of minimum flow evaluations and may serve to characterize baseline environmental conditions. During his response Dr. Knight noted that plant control activities can confound analyses and interpretation of plant coverage/distribution data that are or will be collected for spring systems. He noted that salinity changes could account for changes in plant communities in tidally influenced river systems, although he indicated that he was not familiar with the data that are available for the Chassahowitzka River system. He did note, however, that he has seen published information that indicates that the Wachee well that is used to estimate flows in the Chassahowitzka River system has exhibited a three-foot decline in water levels and that this magnitude of groundwater lowering could be expected to be associated with a rise of the saltwater/freshwater interface in the aquifer on the order of 120 feet. Based on this information he indicated that it would be plausible to see increased salinities of the water discharged from some springs in the Chassahowitzka River system.

Staff agrees that historical reports and more recent scientific studies implemented to support minimum flow evaluations can and should be used to characterize environmental conditions in priority water bodies identified for establishment of minimum flows and levels. Staff notes that information on vegetation in the Chassahowitzka River compiled for the District by Dr. Thomas Frazer and several of his colleagues with the University of Florida was reviewed, along with reports from other investigators on vegetation in this system, for preparation of the draft report on proposed minimum flows for the Chassahowitzka River system.

[3] Williams, L.J., Dausman, A.D., and Bellino, J.C. 2011, Relation of aquifer confinement and long-term groundwater-level decline in the Floridan aquifer system: Proceedings of the 2011 Georgia Water Resources Conference, April 11-13, 2011, Athens, Georgia.

Dr. Knight is correct in noting that discharge at the Chassahowitzka River a gage site (USGS No 02310650) is determined by the United States Geological Survey using water level measurements in a well near Weeki Wachee Springs, in conjunction with water level data at the river gage site. The Weeki Wachee deep well used to develop flow equations for the Chassahowitzka and many of the coastal spring systems is located about 13 miles south of Chassahowitzka spring. A linear regression of water levels from the Chassahowitzka 1 Deep well, located 1.5 miles to the east-northeast of Chassahowitzka main spring, indicates about 0.8 feet of decline since 1965. Based on Northern District model results and other statistical analyses, much of this decline is related to low rainfall conditions, especially after 1989. Review of chloride history from Chassahowitzka main spring shows increased salinity during the drought conditions of 1999-2001 and 2006-2010, but low chloride concentration during the wetter periods of 2004-2005. Chloride concentrations from Chassahowitzka 1 Deep well show a slight increase from 8 to 9 mg/l over the last 20 years. Chloride concentrations at the CSPR-3 well, located 0.3 miles north of the main spring, show no statistically significant change in chloride concentration since 1998. None of these data suggests a 120-foot rise in the level of the saltwater interface near Chassahowitzka Springs.

Mr. Mike Czerwinski commented that there does not seem to be a relationship between nitrate levels and the growth of filamentous algae in spring systems. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Czerwinski's question and a response from Dr. Knight that was provided at the meeting.

- *Mr. Mike Czerwinski noted that there does not seem to be a direct relationship between nitrate levels and the growth of filamentous algae in spring systems.*

  Response: Dr. Knight noted that a recent study by Stevenson and others indicated that although there does not appear to be a relationship between nitrogen concentrations and algal cover in Florida springs, there is a relationship between nitrogen levels and the thickness of algal mats in a number of our springs. He noted that there does appear to be a relationship between nitrate levels and dominance by filamentous algae, but other environmental factors and recreational impacts may be expected to affect the distribution of plants and algae in spring systems.

Staff concur that multiple factors likely influence the distribution of filamentous algae in Florida spring systems and are not aware of a practical approach that could be implemented to use filamentous algal abundance data to establish minimum flow recommendations. Staff adds that we assume that the study by Stevenson and others referred to by Dr. Knight is the 2007 report titled, "Ecological condition of algae and nutrients in Florida springs: the synthesis report" which was submitted to the Florida Department of Environmental Protection by R. Jan Stevenson, A. Pinowksa, A. Alberting and J. Sickman.

Mr. Darrell Snedecor asked whether having an established minimum flow or level would be expected to have an effect on nitrate concentrations in springs and rivers of the Springs Coast. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Snedecor's question and a response from Dr. Knight that was provided at the meeting.

- *Mr. Darrell Snedecor questioned whether establishing a minimum flow or level would be expected to affect nitrate concentrations in river/spring systems of the Springs Coast.*

Response: Dr. Knight noted that the response of spring ecosystems to nitrate loading is complex and high concentrations of nitrate could be expected to lead to shifts in vegetative communities.

He indicated that whether or not a minimum flow or level is established may not have an impact on nitrate level being delivered to spring systems through groundwater discharge.

Staff concurs with Dr. Knight's statements on this issue.

Mr. Al Grubman, the stakeholder representative for TOOFAR, questioned whether nitrate concentrations would be expected to increase with decreasing spring flows. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Grubman's question and a response from Dr. Knight that was provided at the meeting.

- *Mr. Al Grubman, the stakeholder representative for TOOFAR, asked whether nitrate concentrations would be expected to increase with decreasing spring flows.*

  Response: Dr. Knight noted that relationship between discharge and nitrate concentrations is not straightforward. In some springs there appears to be a direct relationship between flow and nitrate concentrations, while the reverse is true in other systems. He hypothesized that these seemingly contradictory responses may be a function of the depth of the source water being discharged from individual springs or spring vents.

Staff agrees with Dr. Knight's response to Mr. Grubman. The predominant cause of increasing nitrate in groundwater is anthropogenic loading on or near the land's surface from sources such as fertilizers, septic tank drainfields, spray fields, livestock, and atmospheric deposition. The increasing trend in nitrates at many spring sites is more a reflection of nitrate loading rather than flow declines.

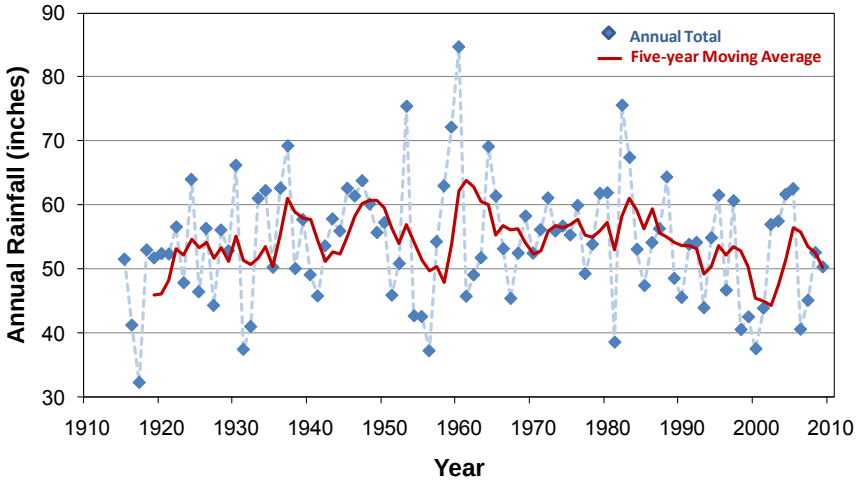
Mr. Dana Bryan commented on the use of historical discharge records for development of minimum flows for the Homosassa River system. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Bryan's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Dana Bryan remarked, based on reference to material presented by Dr. Kincaid, that if rainfall is constant and spring flow is dropping, any change in spring flows must be attributed to water withdrawals. Following on this point Mr. Bryan noted that there are historical flow records for the Homosassa River system that were not included in the District's 2010 draft report on recommended minimum flows for the river system. He noted that there appears to be no trend in rainfall for Citrus County over the past century. Mr. Bryan also noted that the District chose to establish a baseline flow record from 1995 through 2009 for the Homosassa system, and wonders how this more recent data should be combined with the historic data for analyses supporting development of minimum flow and levels.*

  Response: Dr. Knight indicated that it would be appropriate to use historic flow records to construct a water balance for the spring system that could be used for development of minimum flows. He added that it may be appropriate to develop annual flow values when combining historic and more recently collected flow records to account for temporal variation in the frequency or data collection.

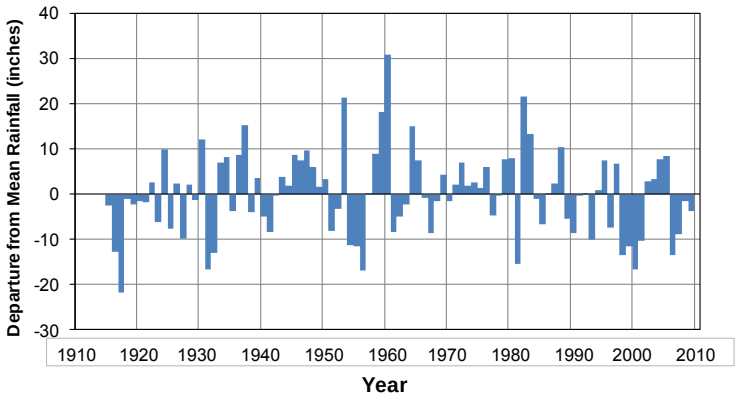
Staff acknowledges that in addition to the daily mean discharge records for sites in the Homosassa River system presented in the July 2010 draft report on proposed minimum flows for the Homosassa River system, discrete or instantaneously measured historical discharge measurements are available for the Homosassa River and Southeast Fork of the Homosassa River. These flow records are obviously important for enhancing our understanding of the hydrology of the Homosassa River system, and will be included in the revised report on proposed minimum flows for the system that is currently being developed. Staff agrees that summary statistics for a combination of these historical data with more recent daily mean records could be based on development of annual averages. Staff asserts, however, that the "historical" record should be excluded from the analyses used for developing the minimum flows recommendation, based on: the discontinuous nature of the record; differences between the instantaneously recorded "historic" record and the daily means record derived for the more recent period, *i.e.*, from the mid-1990s to the present; the presumed increased usefulness of relatively continuous daily records as compared to relatively discontinuous instantaneous measurements; and the determination that variability in the "historical" and more recent discharge records is consistent with available rainfall information and not indicative of a flow decline that may be attributed to anthropogenic activities.

Based on area-weighted regional records, annual rainfall in Citrus County ranged from 32.1 to 84.6 inches and averaged 54.0 inches from 1915 through 2009 (see the figure below). No statistically significant linear trend is evident for the full 95-year record for Citrus County rainfall, based on ordinary least squares regression analysis. Shorter-term trends are apparent in the time-series plot, especially when annual values are aggregated as moving-average values. For example, the figure below includes a red line depicting five-year moving average rainfall values, and clearly illustrates recent reductions in rainfall over the past twenty years, with the exception of the 2002 through 2005 period, when rainfall exceeded than the long-term average for four years in a row.



Area-weighted annual rainfall for Citrus County between 1915 and 2009 (data source: Southwest Florida Water Management District Rainfall Data Summaries web page at *http://www. swfwmd state.fl.us /data/ wmdbweb/rainfall_data_summaries. php*).

A plot of annual departure from the long-term average annual rainfall, as shown below, provides another means for identifying periods of above or below average rainfall. The latter two-thirds of the 1940s, for example, were relatively wet, as was the three year period from 1958 through 1960, when annual rainfall exceeded the long-term average by nine to 31 inches. In contrast, below average rainfall has been common during many of the past twenty years and rainfall in any given year during this period has not been more than 8.5 inches above average.



Annual departure from the mean annual rainfall of 54.0 inches for Citrus County from 1915 through 2009.

Multi-decadal periods of below or above average rainfall in our area have been shown by District staff to influence aquifer recharge and spring discharge. Historically, rainfall was much higher during the period prior to 1970 versus the post-1970 period due to the Atlantic Multidecadal Oscillation, which is a cyclical change in sea surface temperature in the northern Atlantic Ocean that affects rainfall over Florida and much of the North America. Since rainfall was much higher due to the Atlantic Multidecadal Oscillation during the pre-1970 period, nearly all long-term spring and river discharge records for peninsular Florida exhibit a declining trend over the last 70 years (Basso and Schultz 2003[4], Kelly 2004[5]). Examination of local rainfall data from the Brooksville, Inverness, and Ocala National Weather Service stations indicates a declining trend after 1970 that is more pronounced after 1989. Review of the 20-year moving average rainfall from these stations, as shown in the figure below, shows the driest period on record occurring in 2008, i.e., for the period from 1989-2008.

[4] *Basso, R. and R. Schultz. 2003. Long-term variation in rainfall and its effect on Peace River flow in West-Central Florida. Southwest Florida Water Management District. Brooksville, Florida.*

[5] *Kelly, M. 2004. Florida river flow patterns and the Atlantic Multidecadal Oscillation. Southwest Florida Water Management District. Brooksville, Florida.*

Twenty-year moving average rainfall for the Brooksville, Inverness, and Ocala National Weather Service stations. Horizontal lines represent the tenth, fiftieth and ninetieth exceedance percentiles of the twenty-year average values.

Mr. Brad Rimbey questioned whether the District's establishment of minimum flows for individual river systems along the Springs Coast, rather than for the system as a whole, was appropriate. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Rimbey's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Brad Rimbey noted that the District is developing minimum flows and levels on a "river-by-river" basis rather than for the Springs Coast as a whole. He questioned whether this is an appropriate approach.*

  Response: Dr. Knight noted that there are practical reasons for establishing minimum flows for each system at a time. He indicated that it certainly seems reasonable to establish minimum flows for a river system and its surface watershed. He noted, however, that because groundwater basins may overlap, it may be reasonable to evaluate groundwater flows on a regional basis.

Staff believes that it is most practical to develop minimum flows for individual water bodies along the Springs Coast, based on the unique characteristics of each system. Staff also notes that compliance with all regionally established minimum flows will minimize potential negative impacts of water use on the greater Springs Coast ecosystem. Staff notes, however, that the regional groundwater model used to evaluate withdrawal impacts provides information on discharge for all major springs in the region, and can therefore be used for evaluating impacts to both individual springs and the greater Springs Coast.

Mr. Brad Rimbey commented that the District's recommended minimum flows for the Chassahowitzka and Homosassa River systems have not adequately addressed potential impacts to freshwater portions of the systems. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Rimbey's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Brad Rimbey noted that it is expected that water discharged from springs along the Springs Coast may turn more saline as permitted water withdrawals approach the limits established by any minimum flows or levels that are adopted for the region. He added that the District's analyses regarding proposed minimum flows for the Chassahowitzka and Homosassa River systems have not adequately addressed withdrawal impacts on freshwater components of the systems.*

  Response: Dr. Knight noted that the scenario described by Mr. Rimbey argues for development of holistic ecosystem studies, including measurements of productivity. He cautioned, however, that studies supporting minimum flows and levels development are relatively expensive.

For establishing minimum flows for the Chassahowitzka and Homosassa River systems, the District attempted to develop empirical relationships for predicting changes in abundances of freshwater species as a function of flow. In some instances, these attempts were successful and the relationships were used to support minimum flow recommendations. The minimum flow analyses also included evaluation of changes to low salinity habitats that may be related to changes in flow, and where appropriate, this information was used to support minimum flow recommendations.

Mr. Brent Whitley indicated that he was interested in learning more about a project Dr. Knight had completed that addressed evaluation of minimum flows and levels and the water resource values identified in Florida Department of Environmental Protection rules pertaining to minimum flows and levels. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Whitley's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Brent Whitley, a stakeholder representative, asked Dr. Knight about the work he completed for the St. Johns River Water Management District pertaining to water resource values considered for minimum flows and levels development.*

  Response: Dr. Knight noted that he completed a report on human use and water resource values for Rock and Wekiva Springs for the St. Johns River Water Management District. He noted that most minimum flows and levels reports address these issues, although he indicated that he had not seen this topic addressed in the Southwest Florida Water Management District report on proposed minimum flows and levels for the Chassahowitzka River system. He noted that assessment of water resource values is often hampered by a lack of data. Dr. Knight added that this identified lack of data has led to the implementation of monitoring programs in the St. Johns River Water Management District, but he fears that these programs may be curtailed as a result of budgetary constraints. He cautioned that we should consider the maxim, "do no harm" when establishing minimum flows and levels, as any rules associated with the minimum flows and levels may "outlive us." Dr. Knight added that he has concluded "that the Floridan aquifer is already overstressed" to the point where it can't support the populations in the springs as well as the people that are along them." He added that "we are overly optimistic in giving out permits" in reference to the issuance of water use permits by the state's water management districts, noting that "every permit is making the situation worse."

Environmental factors listed in the Florida Water Resource Implementation Rule for consideration when establishing minimum flows and levels (Rule 40.473, Florida Administrative Code) are identified on page one of the November 2010 draft report on proposed minimum flows for the Chassahowitzka River system. These resource values are also included on page seven of the report in text addressing how the values were considered in the approach used to derive minimum flow recommendations for the river system. On page 70 of the draft minimum flows report, the District notes that potential changes in salinity-based habitats were an important component of the analyses supporting development of the minimum flow recommendations and that characterization of these habitats may serve as a "surrogate for wide variety of unquantified but important processes at work in the estuary." This statement advances, to some degree, staff's opinion that protection of salinity-based habitats provides for protection of a wide range of resource values in systems such as the Chassahowitzka River, where strong salinity gradients are ecologically important.

With regard to Dr. Knight's comments concerning the Floridan aquifer being "overstressed" staff notes that there are places in the state where water withdrawals, in combination with decreased rainfall and structural alterations to the landscape, have lowered the potentiometric surface of the Upper Floridan aquifer to the point where spring flows or other groundwater discharges to river systems have been substantially reduced. Available information indicates that this is not the case for much of the Springs Coast, except perhaps in localized areas of southwest Hernando and northeast Sumter Counties. Staff notes that groundwater withdrawal impacts are relatively minor throughout the region and withdrawals are projected to be sustainable throughout most of the region for the next 20-year water-use planning horizon. Factors influencing these observations and projections include the fact that the Floridan aquifer in the Northern Groundwater basin is largely unconfined, has some of the highest recharge rates in the state of Florida, is subjected to a relatively low magnitude of total groundwater withdrawals, and is very permeable due to abundant relict and recent karst activity.

Ms. Hope Corona questioned how interested stakeholders could best negotiate with the District to achieve a reduction in the allowable percentage of flows identified for minimum flows for Springs Coast systems. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Ms. Corona's comments and a response from Dr. Knight that was provided at the meeting.

- *Ms. Hope Corona noted that the District appears to be holding firm on the currently recommended minimum flows and levels for the Springs Coast and wonders how the minimum flows and levels may be modified to address the will of interested stakeholders and to also incorporate the data that has been presented by stakeholders for consideration by the District. She wondered how interested stakeholders can negotiate the allowable percentage of flow reductions downward. Ms. Corona also asked about the negotiated minimum flow and level that was developed for a spring system in the St. Johns River Water Management District.*

  Response: Dr. Knight noted that the minimum flow and level that was ultimately determined for Volusia Blue Springs was based on a decision made by the Secretary of the Department of Environmental Protection. He noted that the decision was associated with a great deal of public pressure from the State Park Service, the Save the Manatee Club and others. He noted that the District's spring workshop series seems like an appropriate forum for discussion of minimum flows development, noting in jest as Dr. Kincaid did during his presentation, one alternative to negation

and discussion of water-related issues that was used historically in the western United States was to "just shoot them."

Staff agrees that the information exchange associated with the Springs Coast Minimum Flows and Levels Public Workshops has been and continues to be beneficial to the minimum flows development process and may lead to revision of staff recommendations concerning minimum flow rules to be presented to the District Governing Board. In addition staff acknowledges that public input, including that associated with the workshops and occurring outside of the workshop forum, is information that Board members will find useful in their deliberations concerning the minimum flow rules.

Mr. Norman Hopkins suggested that it may be appropriate to implement some form of "safety factor" when establishing minimum flows to ensure that significant harm does not occur. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Hopkin's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Norman Hopkins, the stakeholder representative for the Amy H. Remley Foundation, noted that the District's recommended minimum flows and levels are not absolute flow values, but rather relative, allowable percentage of flow reductions. He recommended that the District consider establishing some form of safety factor to account for uncertainty in minimum flow requirements when issuing water use permits.*

  Response: Dr. Knight indicated that he thought Mr. Hopkins suggestion was a good, rational statement. He added that "we" should be wary of permitting water use and then later determining that the allowable withdrawals are causing adverse impacts. Dr. Knight offered this latter comment based on the acknowledgment that it can be very expensive to restore flows or levels to stressed systems, citing the restoration of the Everglades as an example.

Staff agrees that prevention of significant harm is typically more cost effective than restoration efforts that must be implemented to recovery minimum flows or levels in withdrawal-impacted water bodies. However, minimum flows are developed to be used in conjunction with the District's water resource planning and water use permitting programs to prevent flows from falling below significant harm thresholds, and compliance with established minimum flows is expected to be protective of the resources.

Mr. Boyd Blihovde asked about the development of minimum flows for Volusia Blue Springs in the St. Johns River Water Management District. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Blihovde's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Boyd Blihovde, the stakeholder representative for the United States Fish and Wildlife Service's Chassahowitzka National Wildlife Refuge, asked for clarification about the minimum flows and levels that have been established for Volusia Blue Springs.*

  Response: Dr. Knight noted that he understood that the minimum flows established for Volusia Blue Springs address recovery of flows for the river system over a twenty year period. He added that he had read recently that the District may be considering revision of the minimum flows. Mr. Dana Bryan contributed to the discussion, noting that the established minimum flows are not really a "recovery minimum flow." Rather, the minimum flows were established at historic flow values

and are to be met over an extended time period to allow the St. Johns River Water Management District sufficient time to develop alternative water supplies to offset the groundwater withdrawals that would be expected to impact flows from the spring.

Staff does not have any comment to offer regarding the development of minimum flows for Volusia Blue Springs.

Mr. Dana Bryan offered comments about relationships between spring discharge, rainfall and water use, suggesting that observed declines in discharge from springs in the Homosassa River system may be the associated with water withdrawals, based on the lack of a long-term decline in regional rainfall. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Bryan's comments.

- *Mr. Dana Bryan noted that the minimum flows and levels law has been interpreted to allow for flow changes associated with natural climatic variation, but not for water-use impacts. Assuming that there has not been a decline in rainfall, the District assertion that withdrawal impacts have only minimally affected flows in the Homosassa River system seems incompatible with observed flow declines. He notes that in his experience, all District staff members are very professional, evaluate existing data to the best of their abilities and subject their analysis to independent peer-review. He added that it is appropriate for stakeholders to question the use and analysis of available data, and encourage staff or other professionals to reevaluate the data to support development of the best possible minimum flows and levels. He indicated that this is why he is focusing on the District's use of discharge data, believing that this may be a "vulnerability of their analysis", and wondered whether it may not be true that water use has not substantially impacted flows in the river system.*

In response to Mr. Bryan's comments, staff notes that there is abundant information to suggest that rainfall in west-central Florida is not constant through time. Although there may not be a statistically significant declining, monotonic trend when the past 100 or so years of regional rainfall data are examined, a more complete examination of the data clearly reveals multi-decadal variations in rainfall and flow. As demonstrated with the preceding four figures included in this memorandum, spring flow inclines and declines are clearly evident in the flow record, and these periods of substantially disparate flows coincide with changes in rainfall patterns, i.e., with periods of above and below normal rainfall. Staff also notes that variation in spring discharge in the Homosassa River system is consistent with the regional rainfall patterns discussed on pages 11 through 12 of this memorandum. In addition, staff and consultants to the District have been engaged in the continued refinement of modeling tools and analyses supporting evaluations of withdrawal impacts to Springs Coast systems. Finally, staff notes that this type of work is an ongoing process and will be revisited, as necessary, to ensure development and compliance with appropriate minimum flows and levels.

Mr. Darrell Snedecor offered comments about water quality issues for the Springs Coast. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Snedecor's comments and a response from Dr. Knight that was provided at the meeting.

- *Mr. Darrell Snedecor noted that many springs currently fail to meet Outstanding Florida Water criteria. He added that the "do no harm" standard seems laughable, given the violation of existing laws or rules.*

Response: Dr. Knight noted "that we have gone way beyond what the law allows" and questioned who might advance a lawsuit concerning nitrate levels in groundwater systems. Brad Rimbey offered that "we will" in response to Dr. Knight, who countered that "somebody needs to if they care about enforcing the law". Dr. Knight noted that he has been recently discussing the planned installation of a new waste-water treatment plant near Fanning Springs with the Department of Environmental Protection, and learned from the Department that the plant appears to be in compliance with relevant water quality-related law.

Staff is aware of increasing nitrogen concentrations in some spring systems within the state, and is confident that the state water management districts, the Department of Environmental Protection and other stakeholders are working diligently throughout the state to address this issue.

A stakeholder, who was not identified by name, commented on the relative abundance of Outstanding Waters in Citrus County. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of her comments.

- *An unidentified workshop participant noted that Citrus County has four Outstanding Florida Waters and because of this, any work associated with minimum flows development should proceed with caution.*

Staff agrees with the unidentified stakeholder that careful data analysis and deliberation is necessary when establishing minimum flows and levels.

Mr. Al Grubman offered comments suggesting that no additional water-withdrawal related impacts should be allowed for the Chassahowitzka and Homosassa River systems. The italicized text below excerpted from the meeting notes attached to this memorandum includes a summary of Mr. Grubman's comments.

- *Mr. Al Grubman noted that workshop discussions have focused primarily on the Chassahowitzka and Homosassa River systems. He added that both systems are Outstanding Florida Waters and both are on the impaired waters list associated with water quality violations. Knowing that these systems are currently stressed we should not allow any further withdrawals that will impact flows in these systems.*

Staff acknowledges Mr. Grubman's comments.

Agenda Item: Coastal Springs MFL Testimony from MFL Stakeholders

Several stakeholder representatives provided comments during the workshop. The italicized text below excerpted from the meeting notes attached to this memorandum includes summaries of these comments and is followed by staff responses.

- *Mr. Ron Miller, the stakeholder representative for the Save the Homosassa River Alliance, thanked the District for holding the workshop series and Mr. Rimbey for organizing this workshop. Mr. Miller suggested that the District should consider setting a cap on withdrawals in lieu of establishing minimum flows for Springs Coast river/spring systems. He noted that although some may pick and choose among laws related to water resource protection, the law that should be*

supported is the law that protects "our" Outstanding Florida Waters. Mr. Miller also noted that the Northern District Model needs improvement.

Staff acknowledges Mr. Miller's comments and notes that minimum flows and levels do, in effect, serve to establish a limit or cap beyond which further water withdrawals would be significantly harmful to area water resources and ecology. Once incorporated into District rules, minimum flows and levels become one criterion used in the evaluation of requests for water use permits. Similarly, minimum flows and levels help identify withdrawal limits that are incorporated into water supply planning efforts.

- *Mr. Dennis Dutcher, the stakeholder representative for United Waterfowlers-Florida, read a prepared statement, which is included as Appendix C to these meeting notes. He thanked the District for holding the workshop series, and also thanked workshop participants for the contributions, and Mr. Rimbey for organizing the stakeholder representatives meeting. He noted that while it is important to characterize a water budget for human and non-human environmental needs, members of United Waterfowlers-Florida are concerned about allowing additional flow reductions from systems that are already stressed. Mr. Dutcher noted that there has been substantial loss of coastal wetlands in recent years due to sea level rise and asserted that a lack of fresh water flow to coastal regions of the Springs Coast is "the reason for the loss of overwintering waterfowl on the refuge", presumably in reference to the Chassahowitzka National Wildlife Refuge. He noted that establishing minimum flows and levels is a worthy approach to environmental protection, but emphasized that this effort should be coupled with enhanced conservation measures. With regard to establishment of minimum flows for the Springs Coast, Mr. Dutcher urged the District to "weigh the evidence shown that these systems are in peril" and noted that "a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh."*

Staff acknowledges Mr. Dutcher's comments and notes that the District is strongly committed to promoting water conservation efforts.

- *Mr. Dan Hilliard, the stakeholder representative for the Withlacoochee Area Residents, began his presentation by asking whether those at the meeting thought any Florida water bodies were in better shape today than they were thirty years ago. He added that pristine waters are not abundant or may no longer exist within the state, noting that we "owe" quality water habitats to future generations. Mr. Hilliard recommended that if we cannot restore all habitats, we should at least protect what we currently have. He indicated that the Withlacoochee Area Residents have recently submitted written comments concerning proposed minimum flow and levels to the District and looked forward to continuing to work with the District to preserve our water resources. These written comments indicate that it is the opinion of the Withlacoochee Area Residents that "[s]takeholder requests for 0% flow reduction recommendations" are appropriate, given "questions and methodology related to the definition of significant harm."*

Staff acknowledges Mr. Hilliard's comments and offers Tampa Bay as an example of water body that has seen some improvement over the past thirty years, as a result of substantial environmental restoration projects and other water management activities.

- *Dr, Katie Tripp, the stakeholder representative for the Save the Manatee Club, commented that she was surprised to learn some time age during a presentation by a St. Johns River Water Management District staff member that the state's water management districts are required to ensure water availability for all reasonable and beneficial uses. She added that it was the hope of*

the Save the Manatee Club that the input and discussion made during the spring workshop series has and will continue to make a difference with regard to the establishment of minimum flows and levels.

Staff acknowledges Dr. Tripp's comments and appreciates her sentiment regarding the utility of the public input process for minimum flows and levels development.

- *Mr. Brad Rimbey noted that it was important to recognize the value of the District for the Springs Coast, despite any disagreements that may exist among stakeholders and the organization. He offered that in these times of budgetary constraints, it may be appropriate for the District to consider reaching out to citizen groups for assistance with data collection that could enhance water management efforts in the region. He noted that this suggestion was being made to address a perceived insufficiency in data that are currently available for the Springs Coast systems.*

Staff acknowledges Mr. Rimbey's comments and will certainly evaluate all data collected and presented by non-District employees.

Agenda Item: Public Input

Several meeting participants provided comments during this portion of the workshop. The italicized text below excerpted from the meeting notes attached to this memorandum includes summaries of these comments and are followed by staff responses.

- *Mr. Ben Berauer read a prepared statement, which is included as Appendix D to these meeting notes. Mr. Berauer expressed appreciation to the District and stakeholders that have contributed to the discussions of minimum flows development for the Springs Coast. He noted, however, that the workshops have not adequately addressed several of his concerns, including: a lack of consideration for the Outstanding Florida Waters status of the systems being evaluated; a lack of accountability with regard to regulatory agency responsibilities for protection of Outstanding Florida Waters; incorporation of information pertaining to droughts and sea level rise; inadequate characterization of baseline flows; lack of consideration of known significant impacts associated with pollution, water use, reduced rainfall and other factors; lack of consideration of micro-environments, including smaller springs; increased negative impacts associated with nutrient pollution and reduced flows; and increased nutrient loading that may be expected from development associated with additional permitted water use. Mr. Berauer added that use of an allowable fifteen percent change in habitat as a significant harm threshold is inadequate, in particular for Outstanding Florida Waters.*

Staff acknowledges Mr. Berauer's comments and offers the following responses to the issues he has identified.

Concerns associated with Outstanding Florida Water (OFW) designations and minimum flows and levels development were discussed at previous Springs Coast minimum flows and levels workshops. During these discussions, it was noted that OFW regulations apply only to activities that cannot be conducted without a permit from the Florida Department of Environmental Protection and that directly or indirectly affect an OFW watercourse. It was also noted that a permit is not required from the Department for the District to set a minimum flow (or level) for a watercourse or other priority water body. The establishment of minimum flows and levels is similar to the establishment of an OFW, however, in that both of these processes provide for regulatory threshold criteria. With regard to minimum flows, Section 373.042(1)(a), Florida

Statutes, states that, "[t]he minimum flow for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area." Based on this statutory language, and in contrast to the statutory and regulatory language associated with establishing an OFW (*e.g.*, Section 403.061(27), Florida Statutes, Rules 62-4.242(2), 62-302.400(14), 62-302.700, Florida Administrative Code or F.A.C.), a minimum flow is not a no degradation of "existing ambient water quality" standard.

Outstanding Florida Water regulations apply to the permitting of surface water management systems or land use changes and their associated direct or indirect pollutant discharges, through programs such as those associated with the issuance of National Pollutant Discharge Elimination System or Environmental Resource permits. According to the Florida Department of Environmental Protection *Factsheet about Outstanding Florida Waters (OFW)*, the regulatory significance of the OFW designation is that, "[i]In general, DEP [the Department] cannot issue permits for ***direct*** discharges to OFWs that would lower ambient (existing) water quality" and similarly "…may not issue permits for ***indirect*** discharges that would significantly degrade a nearby waterbody designated as an OFW". From the District's perspective, upon establishment of a minimum flow, the protection of that flow rate becomes a condition of issuance for environmental resource permits (40D-4.301(1) (g), F.A.C.) and water use permits (40D-2.301(e), F.A.C.). Another condition associated with issuance of environmental resource permits requires that proposed activities "not adversely affect the quality of receiving waters....including any anti-degradation provisions of paragraphs 62-4.242(1) (a) and (b), subsections 62-4.242(2) and (3) and Rule 62-302.300, F.A.C." (ref. 40D-4.301(1) (e), F.A.C.). Environmental Resource Permit applicants must meet both conditions (and all other conditions for issuance) to receive a permit.

With regard to Mr. Berauer's opinion that there is a lack of accountability regarding water quality protection for Outstanding Florida Waters, staff notes that the District supports the Florida Department of Environmental Protection in their efforts to protect these resources and comply with established regulations and laws pertaining to OFWs.

With regard to Mr. Berauer's comments concerning consideration of drought, sea level rise, baseline flows, pollution, water use, and reduced rainfall, staff note that these factors, with the exception of "pollution" have and will continue to be incorporated into evaluations supporting minimum flows development for the Springs Coast. Similarly, staff has attempted to include smaller springs in evaluations of water-use impacts on system flows and correctly assumes that gaged flows used for a variety of minimum flow analyses capture flows originating from small, upstream spring vents. Staff notes that increased nutrient loading that may result from development associated with future additional permitted water use was not evaluated as part of the minimum flow determinations. Similarly, increased negative impacts associated with nutrient pollution were not determined to be useful for development of minimum flow recommendations for the Chassahowitzka and Homosassa River systems. Finally, staff acknowledges, but does not agree with Mr. Berauer's assertion concerning use of a fifteen percent change in habitat as a significant harm threshold for OFWs and other water bodies.

- *Ms. Cathy Harrelson noted that the aquifer systems in Pinellas County were severely depleted in the 1970s and since that time the residents of that region have been "taking your water" in assumed reference to withdrawals in counties north of Pinellas County. Ms. Harrelson commented that perhaps the development associated with increased water use may not be "worth it". Ms. Harrelson noted that she appreciated the acronym "MEL" which was introduced during the workshop, and stands for "Maximum extraction level". She also noted that it may not be*

appropriate to consider minimum flow rules for the Chassahowitzka and Homosassa River systems at the December 2011 Governing Board meeting, as this meeting is scheduled to be held in Haines City, far from the Springs Coast. She added that the public pressure concerning opposition to the currently proposed minimum flows for the Springs Coast should be exerted "further up the line", i.e. "beyond" the District.

Comment: Mr. Leeper noted that the District's December Governing Board meeting is scheduled to be held in Haines City, and added that it would be appropriate to delay presentation of minimum flow rule amendments for the Chassahowitzka and Homosassa River systems to the Board until January, when the Board is expected to meet in Brooksville.

Staff acknowledges Ms. Harrelson's comments, and as noted in the text above from the meeting notes, addressed her concerns regarding discussion of proposed minimum flows for the Chassahowitzka and Homosassa River systems at the December Governing Board meeting during the October workshop.

- *Mr. Dana Bryan noted that the Division of State Parks is concerned about losing flows from several small springs that discharge into animal pen areas of the Ellie Schiller Homosassa Springs Wildlife State Park.*

Staff acknowledges Mr. Bryan's comments.

- *Mr. Mike Czerwinski noted that it is important to ensure that the groundwater model and other models used for development and evaluation of minimum flows for the Springs Coasts system are adequate. He suggested that the groundwater model used for the area should incorporate information on geologic fractures. Mr. Czerwinski suggested that it is not appropriate to use a groundwater well located near Weeki Wachee Springs to estimate discharge at other area springs and added that it would be useful to measure stage and discharge in Halls River and Little Spring, which is a possible contributor to flows in the Southeast Fork of the Homosassa River. In reference to a suggestion made at the meeting concerning citizen-based data collection, Mr. Czerwinski noted that there may be issues associated with use of these data and suggested, alternatively, the District investigate deployment of relatively inexpensive date sondes (i.e., automated, remote data collection devices).*

Staff notes that transmissivity values, *i.e.*, groundwater flow rates, used for evaluating groundwater flow with the Northern District Model were adjusted to account for the karst geology of the modeled area (also see District response to Dr Kincaid's presentation above). With regard to measurement and estimation of discharge in Springs Coast river systems, the District considers the procedures used by the United States Geological Survey to be appropriate, but continues to support data collection enhancements that may improve characterization of discharge in the systems. For example, the District is currently funding the deployment of acoustic Doppler instrumentation in the Southeast Fork of the Homosassa River to determine whether use of this equipment may be an improvement over the use of river water level and water level at a well near Weeki Wachee to estimate river/spring discharge. Similarly, the District is pursuing installation of a new gage site in Halls River for estimation of discharge in that component of the Homosassa River system.

Staff does not currently plan to routinely measure discharge in the recently reconnoitered spring shown in the figure on the next page of this memorandum, which is assumed to be the "Little Spring" mention by Mr. Czerwinski at the workshop. Finally, with regard to Mr. Czerwinski's

suggestion concerning data collection efforts, staff will consider use of field-deployed, automated recording devices when planning future data collection efforts in Springs Coast rivers and springs.

Image provided by Dave DeWitt,
Southwest Florida Water Management District

- *Ms. Hope Corona commented that the District needs to develop or otherwise acquire additional data sets, because it is her opinion that existing data are insufficient for establishing minimum flows and levels or maximum allowable water extractions for the Springs Coast.*

Staff acknowledges Ms. Corona's suggestion and continues to support collection of additional environmental data on the Springs Coast and elsewhere in the District, but believes that available data are sufficient for establishing scientifically defensible minimum flows for the Chassahowitzka and Homosassa River systems.

- *Mr. Martyn Johnson prepared written comments for the workshop that were read by Mr. Rimbey. In his written statement, which is included as Appendix E to these meeting notes, Mr. Johnson recommends that "serious consideration [be] given to a 5 year moratorium on any additional well/withdrawals from the aquifer". He questioned whether this recommendation has been given serious thought to this issue, and added that based on information supplied by the District, very few requests for issuance of a water-use permit in the northern portion of the District have been denied in recent years. In his statement, Mr. Johnson also asked whether the United States Geological Survey or the District could provide any information regarding data collection at the recently upgraded gage site in the Southeast Fork of the Homosassa River.*

  Response: Mr. Kevin Grimsley, with the United States Geological Survey, noted that equipment used to measure water velocities was installed at the Southeast Fork gage site in September and that negative velocities were recorded at the site last week as a meteorological front passed through the area. Mr. Grimsley added that it would be approximately six months to one year before sufficient data have been obtained for development of a velocity index rating curve for the gage site.

Staff acknowledges Mr. Johnson's comments but does not support a five-year moratorium on the issuance or renewal of water use permits for area groundwater withdrawals. Staff does support the careful evaluation of all future renewals or issuances of water use permits in the Springs Coast area and elsewhere in the District. Staff notes that Mr. Grimsley addressed Mr. Johnson's questions about the ongoing efforts related to measurement of discharge in the Southeast Fork of the Homosassa River during the October workshop.

- *Ms. Janice Howie questioned whether a fifteen percent habitat-change standard was appropriate for establishing minimum flows and levels. She added that the tidal river / spring systems of the Springs Coast are already stressed and we should not consider allowing additional stress to these systems.*

Staff acknowledges Ms. Howie's comments but believes that use of an allowable fifteen percent change in habitats is appropriate for, and protective of priority water bodies on the Springs Coast and elsewhere in the District.

- *Mr. Brad Rimbey noted that he understands the District's desire for uniformity in the application of significant harm thresholds for priority water bodies. However, he questions the utility of this approach for systems, like the Chassahowitzka River, with limited data sets. Mr. Rimbey also commented that: 1) if spring systems are "shutting down", i.e., ceasing to discharge water, from west to east in response to decreases rainfall or groundwater pumping; 2) if the District is only measuring discharge in springs located in the "east"; and 3) if the District will base compliance with adopted minimum flows and levels on eastern springs; then it may be possible that discharge may cease from smaller springs in the area and that these changes may not be quantified.*

Staff acknowledges Mr. Rimbey's comments but believes that available data are sufficient for making minimum flow determinations and also believes that use of criteria based on up to a fifteen percent change in habitats is a relatively conservative approach for resource management and protection. Staff agrees that effects of future water use or climatic variation may be differentially expressed in spring vents distributed across the local landscape of the Springs Coast, and has attempted to incorporate potential spatial heterogeneity in discharge into the Northern District Model, which is the primary tool used for predicting variation in area spring discharge associated with water withdrawals. Unfortunately, discharge measurements associated with active spring vents and relict vents in the western portions of the tidal river systems of the Springs Coast are sparse and this lack of information limits our ability to predict response for these components of the groundwater system.

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Attachments (3)

Attachment 1

Meeting Notes for Stakeholder Representative's Springs Coast Minimum Flows and Levels Public Workshop Facilitated by the Southwest Florida Water Management District

MEETING NOTES

Stakeholder Representative's
Springs Coast Minimum Flows and Levels Public Workshop
Facilitated by the
Southwest Florida Water Management District

October 26, 2011
Lecanto, Florida

The fourth in a series of Springs Coast Minimum Flows and Levels Public Workshops was held between 1:30 and approximately 5:45 p.m. on October 26, 2011 in Room 240 at the Citrus County Lecanto Government Services Building in Lecanto, Florida. The workshop was requested and organized by stakeholder representatives that participated in the workshop series. Logistic support was provided by the Southwest Florida Water Management District. Stakeholder representatives, Southwest Florida Water Management District staff and a District Governing Board member that attended and contributed to the workshop are identified below. Commissioner J.J. Kenney, with the Citrus County Board of County Commissioners also participated in the meeting. A list of meeting participants who signed an attendance roster is attached to these meeting notes as Appendix A.

Stakeholder Representatives
Norman Hopkins, Amy H. Remley Foundation
Brad Rimbey, Chassahowitzka River Restoration Committee
Rebecca Bays, Citrus County
Carolyn Voyles, Florida Department of Environmental
Ed Call, Florida Fish and Wildlife Conservation Commission
Brent Whitley, Stakeholder Representative
Ron Miller, Save the Homosassa River Alliance
Katie Tripp, Save the Manatee Club
Al Grubman, TOOFAR
Dennis Dutcher, United Waterfowlers-Florida
Boyd Blihovde, United States Fish and Wildlife Service
Kevin Grimsley, United States Geological Survey
Dan Hilliard, Withlacoochee Area Residents
Whitey Markle, Sierra Club

District Representatives
Ron Basso, Staff
Darcy Brune, Staff
Veronica Craw, Staff
Sid Flannery, Staff
Mark Hammond, Staff
Mike Heyl, Staff
Marty Kelly, Staff
Doug Leeper, Staff
Cara Martin, Staff
Doug Tharp, Governing Board
Gary Williams, Staff

A copy of the agenda for the workshop, which was prepared by stakeholder representatives, is attached to these notes as Appendix B. Summaries of topics and issues discussed during the workshop are grouped below by agenda item. All notes were prepared by Mr. Doug Leeper, with the Southwest Florida Water Management District, based on review of audio recordings of the workshop, slides presented at the workshop, and handwritten notes recorded by Mr. Leeper during the meeting.

Opening Remarks

Mr. Doug Leeper opened the meeting at approximately 1:40 p.m. Following the introduction of District Governing Board member Doug Tharp and Citrus County Commissioners Rebecca Bays and J.J. Kenney, Mr. Leeper noted that the workshop was being held at the request of the Stakeholder Representatives with assistance provided by the District. Mr. Leeper and other meeting participants thanked Mr. Brad Rimbey for organizing the event and developing the agenda.

Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee, offered his gratitude to the District for its assistance with the workshop and it's work concerning development of minimum flows for the Chassahowitzka and Homosassa River systems, Mr. Rimbey proceeded to introduce Dr. Todd Kincaid, with GeoHydros, L.L.C., Global Underwater Explorers and the Hydrogeology Consortium as the first speaker of the day.

Coastal Spring MFL Hydrology Topics by Dr. Todd R. Kincaid

Dr. Todd Kincaid provided a presentation titled "*How Much is Too Much – Toward a Water Budget Approach to Management.*"

Dr. Kincaid started by noting that through the work on Wakulla Springs and the Santa Fe River systems to be discussed during his presentation he would be able to offer some insights that are applicable to the minimum flows and levels work being completed for the Springs Coast. Dr. Kincaid began his presentation with a dedication to a recently deceased colleague, Mr. Les Skiles. Dr. Kincaid proceed to outline his presentation, noting that spring loss may be attributed to reduced rainfall, too much extraction of groundwater, or rising sea levels. He noted that rising sea levels may not be expected to reduce the amount of groundwater or spring discharge, but rather may be expected to alter the location of the discharge. Dr. Kincaid noted that there is a trend in regional groundwater use that may lead to the loss of some springs. He noted that this may be prevented by improving public understanding of the issue, development of better groundwater models for use in management decisions, through collection of additional data to support model development, through reduction in groundwater withdrawals, and by establishment and enforcement of minimum flows and levels. He noted that an important component of groundwater studies involves development of a water budget for evaluating the amount of sustainable groundwater withdrawals, or "groundwater mining" for a region.

Dr. Kincaid then proceeded to discuss research that has been conducted in the vicinity of Wakulla Springs to highlight issues that may be applicable to other areas of karst geology. He noted that the Northwest Florida Water Management District is in the process of establishing minimum flows and levels for Wakulla Springs in the Florida panhandle. Important findings associated with this work include the identification of relatively rapid velocities or movement of groundwater in the area, and that flow reversals, and resultant saltwater intrusion, have been documented since 2006 in Spring Creek, which is a large spring system located south of Wakulla Springs, near the Gulf of Mexico. Dr. Kincaid noted that during these flow reversal events, salt water may travel rapidly inland up to three miles. Dr. Kincaid suggested that development of minimum flows for Wakulla Springs should consider the potential effects of saltwater intrusion and flow reversal in other area springs to best address regional and localized impacts of withdrawals on spring discharge. He emphasized that distance between withdrawal points and springs and more importantly the difference in hydraulic gradient between the two areas should be carefully evaluated. Dr. Kincaid also noted that there appears to be downward trends in groundwater levels in the vicinity of the springs.

Dr. Kincaid then discussed the general movement of groundwater in a karst environment such as that of the Wakulla Springs area, which includes caves and springs. He noted that withdrawal effects may be evident in wells throughout these types of groundwater basins, but may be difficult to detect in individual cave/spring systems. Dr. Kincaid suggested that additional data collection and analyses should be completed to support development of minimum flows for Wakulla Springs and other hydrogeologically connected systems.

Next, Dr. Kincaid focuses on assumptions and data needs associated with groundwater modeling, with emphasis on the special considerations needed to adequately model karst-dominated systems. He illustrated his points with examples of models used to characterize groundwater flow in the Santa Fe River area, in central Florida. He noted that a competent groundwater model should incorporate several key components, including known springs, swallets, caves, rivers, withdrawal locations and quantities and that the model must be geologically reasonable and well calibrated to groundwater levels, spring discharge and groundwater movement velocities. He noted that once a competent groundwater model is developed it may be used to evaluate or model pumping impacts.

Note: Audio recording of Dr. Kincaid's presentation was inadvertently discontinued approximately 45 minutes after initiation of the workshop. This error resulted from programming the recording device to store high quality, data-dense audio information, which limited the amount of information that could be stored on the media associated with the device. Dr. Kincaid's oral presentation describe above corresponded to the first 28 slides shown at the workshop and was recorded and reviewed for preparation of these meeting notes. Notes presented below for information presented by Dr. Kincaid in association with slide numbers 29 through 33 that were shown at the workshop were developed solely on the basis of review of the slides and handwritten notes taken by Mr. Leeper and may be less comprehensive than the notes prepared for the earlier portion of Dr. Kincaid's presentation.

Dr. Kincaid proceeded to note that the details of groundwater models are important, as these tools are often used for significant water management decisions. He noted that as a society, we have been using groundwater models to predict impacts of withdrawals since the 1970s and it is important to ensure that these models include or incorporate information concerning the karst geology that is common in our state.

Following Dr. Kincaid's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

- Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee noted that flows from only two springs in the Chassahowitzka River system are measured or gaged, and wondered what effects future withdrawals may have on ungaged springs within the system.

  Response: Dr. Kincaid noted that the work related to the Wakulla Springs and other nearby springs indicates that it is important to obtain and evaluate data on as many springs as possible in a region, as flow trends at one spring vent may not be representative of similar trends at other vents in a highly interconnected groundwater system. Dr. Kincaid added that it is important to establish minimum flows and levels for spring systems now, using the best available information, as the minimum flows and levels offer protection to the systems by defining caps or limits on withdrawals that affect flows to the springs.

- Commissioner Rebecca Bay, the stakeholder representative for Citrus County, expressed appreciation to Dr. Kincaid and others at the meeting for the ongoing discussion of minimum flows and level to be established for the Springs Coast, noting that she and other County

Commissioners, staff and the citizen's of the region are very interested in this process. She expressed regret that she would not be able to attend the remainder of the meeting due to another commitment, but noted that she will be available to all interested parties interested in further discussion of the minimum flows and level process.

Mr. Rimbey announced that the workshop would continue after a short break with a presentation by Dr. Robert Knight, with Wetland Solutions, Inc. and the Howard T. Odum Florida Springs Institute.

Coastal Spring MFL Ecology Topics by Dr. Robert L. Knight

Dr. Robert Knight provided a presentation titled "*Adequate Flows for Florida Springs: Ecosystem Considerations.*"

Note: Dr. Knight's presentation was purposefully not recorded based on the understanding that audio recording would be limited to 45 minutes and the identified need to record comments and discussion that were expected after his presentation. Notes prepared for information presented by Dr. Knight in association with his slide presentation were developed based on review of his slides and hand-written notes taken by Mr. Leeper during the presentation.

Dr. Knight began his presentation with an outline, indicating that he planned to address the importance of ecosystem-level assessments, indicators of spring impairment, concerns about existing methods for establishing minimum flows and levels for springs, and suggestions for assessment of springs impairment and recovery.

Dr. Knight suggested that assessments of ecosystem function, e.g., measures of productivity, are missing from most minimum flows and levels evaluations. He noted that like Dr. Kincaid's identification of the need for development and understanding of water budgets when developing minimum flows, it is also important to develop energetic budgets that account for the movement of materials and energy through living communities. Historical and more recent work directed toward quantifying and understanding ecosystem metabolism at Silver Springs and other Florida spring systems was highlighted by Dr. Knight, and used to illustrate energy budget concepts and relationships between system productivity and a variety of environmental factors. He noted that available flow records indicate that discharge in the past decade at many Florida springs has decreased from historical levels. Dr. Knight added that a recent study of several springs identified a direct, continuous (i.e., no threshold response evident) relationship between spring discharge and gross primary productivity, which is a measure of algal or plant growth rate. Dr. Knight emphasized that Florida spring systems are threatened by a number of stressors, and that evaluation of whole ecosystem responses, rather than measurement of single measures of impairment, could be used to better inform management decisions.

Dr. Knight then proceeded to discuss unique and beneficial qualities of Florida springs and highlighted indicators of spring impairment. He noted that many springs are classified as impaired water bodies, based on water quality characteristics. Decreased groundwater levels and spring flow reductions were also identified as issues affecting spring ecosystems. Dr. Knight illustrated the reduced flow issue by showing slides of White Springs, a north-Florida spring that was one a recreationally important landscape feature and which has now ceased flowing. Dr. Knight also noted that increasing concentrations of nitrate in groundwater systems is a problem for many spring systems, where higher nitrogen levels leads to increased algal production. Dr. Knight then discussed synergistic effects of reduced flows and increased nitrogen levels, noting these factors may lead to declining macrophyte coverage, reduced

photosynthetic efficiency, declines in native fish and turtle populations, and increased invasions by exotic species.

Dr. Knight turned his discussion to concerns about existing minimum flows and levels methods as applied to springs. He noted that the rules of the Florida Department of Environmental Protection include a number of water resource values that should be evaluated when developing minimum flows and levels. He emphasized that spring systems are quite diverse and this supports the need for evaluations that do not focus on single species. With regard to evaluating significant harm, he noted that the limited availability of baseline hydrologic and ecological data often precludes adequate characterization of changes that have or may occur as a result of water use. Similarly, information of groundwater pumping may be inadequate and models used to evaluate groundwater flow may be too simplistic or otherwise inadequate. He emphasized that "worst-case" scenarios should be evaluated when establishing minimum flows and levels. He noted that most springs of the state are classified as Outstanding Florida Waters and that springs with declining flows often exhibit water quality changes that may be considered "violations of Outstanding Florida Waters requirements." He noted that it may take fifteen years or more to achieve the nitrogen targets identified in Total Maximum Daily Loads and the Basin Management Action Plans that are developed to reduce nitrogen loading to spring/groundwater systems.

Dr. Knight also discussed methods that could be used to assess springs impairment and recovery. Identified factors to be considered or evaluated include measurement of sunlight, rainfall, groundwater recharge, inflow water quality, spring or river flows, plant communities, consumer assemblages, primary and secondary production and export/import rates for energy and matter. He noted that the relative constancy of many environmental variables makes spring systems nearly ideal for conducting replicated field-based mesocosm studies. Dr. Knight then discussed the Volusia Blue Springs Action Plan being implemented for recovery of spring flows at that central Florida spring. The plan includes extensive monitoring of water resource values and these ongoing efforts were highlighted.

In conclusion, Dr. Knight noted that a holistic approach is necessary for evaluation of spring systems, based on their complexity, and unique structures and processes. He indicated that in his opinion, a holistic approach has not been used for development of minimum flow recommendations for Springs Coast systems. With regard to springs management, he offered a Latin phrase "*primum nil nocer*", which translates to "first, do no harm." Dr. Knight noted that recovery of spring systems within the state is possible through reduction of nitrogen loading and restoration of flows. With regard to minimum flows development, he suggested that it may be better to do nothing, based on the availability of existing information on some spring systems. He opined that it would not be wise to allow water use to reduce spring flows to the limits established by minimum flows and levels rules, suggesting that perhaps it may be prudent to allow only some portion, perhaps half, of the identified, allowable reductions. He expressed concern that based on economic perspectives society may approve violation of adopted minimum flows and levels or call for changes that allow for additional flow reductions.

Following Dr. Knight's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

Note: Audio recordings of the comments and discussion following Dr. Knight's presentation were made, so the following notes were prepared based on review of the audio recordings and hand-written notes made by Mr. Leeper during the meeting.

- Ms. Hope Corona questioned how ecosystem and other levels of biological organization can be numerically quantified for the Chassahowitzka River system to support minimum flows development.

  Response: Dr. Knight noted that he hoped his presentation addressed the measurement of biological and ecosystem properties of spring ecosystems. He added that the University of Florida has completed several studies of the Chassahowitzka River and other nearby systems, and that this information should be part of minimum flow evaluations and may serve to characterize baseline environmental conditions. During his response Dr. Knight noted that plant control activities can confound analyses and interpretation of plant coverage/distribution data that are or will be collected for spring systems. He noted that salinity changes could account for changes in plant communities in tidally influenced river systems, although he indicated that he was not familiar with the data that are available for the Chassahowitzka River system. He did note, however, that he has seen published information that indicates that the Wachee well that is used to estimate flows in the Chassahowitzka River system has exhibited a three-foot decline in water levels and that this magnitude of groundwater lowering could be expected to be associated with a rise of the saltwater/freshwater interface in the aquifer on the order of 120 feet. Based on this information he indicated that it would be plausible to see increased salinities of the water discharged from some springs in the Chassahowitzka River system.

- Mr. Mike Czerwinski noted that there does not seem to be a direct relationship between nitrate levels and the growth of filamentous algae in spring systems.

  Response: Dr. Knight noted that a recent study by Stevenson and others indicated that although there does not appear to be a relationship between nitrogen concentrations and algal cover in Florida springs, there is a relationship between nitrogen levels and the thickness of algal mats in a number of our springs. He noted that there does appear to be a relationship between nitrate levels and dominance by filamentous algae, but other environmental factors and recreational impacts may be expected to affect the distribution of plants and algae in spring systems.

- Mr. Darrell Snedecor questioned whether establishing a minimum flow or level would be expected to affect nitrate concentrations in river/spring systems of the Springs Coast.

  Response: Dr. Knight noted that the response of spring ecosystems to nitrate loading is complex and high concentrations of nitrate could be expected to lead to shifts in vegetative communities. He indicated that whether or not a minimum flow or level is established may not have an impact on nitrate level being delivered to spring systems through groundwater discharge.

- Mr. Al Grubman, the stakeholder representative for TOOFAR, asked whether nitrate concentrations would be expected to increase with decreasing spring flows.

  Response: Dr. Knight noted that relationship between discharge and nitrate concentrations is not straightforward. In some springs there appears to be a direct relationship between flow and nitrate concentrations, while the reverse is true in other systems. He hypothesized that these seemingly contradictory responses may be a function of the depth of the source water being discharged from individual springs or spring vents.

- Mr. Dana Bryan remarked, based on reference to material presented by Dr. Kincaid, that if rainfall is constant and spring flow is dropping, any change in spring flows must be attributed to water withdrawals. Following on this point Mr. Bryan noted that there are historical flow records for the Homosassa River system that were not included in the District's 2010 draft report on recommended minimum flows for the river system. He noted that there appears to be no trend in rainfall for Citrus County over the past century. Mr. Bryan also noted that the District chose to establish a baseline flow record from 1995 through 2009 for the Homosassa system, and wonders how this more recent data should be combined with the historic data for analyses supporting development of minimum flow and levels.

  Response: Dr. Knight indicated that it would be appropriate to use historic flow records to construct a water balance for the spring system that could be used for development of minimum flows. He added that it may be appropriate to develop annual flow values when combining historic and more recently collected flow records to account for temporal variation in the frequency or data collection.

- Mr. Brad Rimbey noted that the District is developing minimum flows and levels on a "river-by-river" basis rather than for the Springs Coast as a whole. He questioned whether this is an appropriate approach.

  Response: Dr. Knight noted that there are practical reasons for establishing minimum flows for each system at a time. He indicated that it certainly seems reasonable to establish minimum flows for a river system and its surface watershed. He noted, however, that because groundwater basins may overlap, it may be reasonable to evaluate groundwater flows on a regional basis.

- Mr. Brad Rimbey noted that it is expected that water discharged from springs along the Springs Coast may turn more saline as permitted water withdrawals approach the limits established by any minimum flows or levels that are adopted for the region. He added that the District's analyses regarding proposed minimum flows for the Chassahowitzka and Homosassa River systems have not adequately addressed withdrawal impacts on freshwater components of the systems.

  Response: Dr. Knight noted that the scenario described by Mr. Rimbey argues for development of holistic ecosystem studies, including measurements of productivity. He cautioned, however, that studies supporting minimum flows and levels development are relatively expensive.

- Mr. Brent Whitley, a stakeholder representative, asked Dr. Knight about the work he completed for the St. Johns River Water Management District pertaining to water resource values considered for minimum flows and levels development.

  Response: Dr. Knight noted that he completed a report on human use and water resource values for Rock and Wekiva Springs for the St. Johns River Water Management District. He noted that most minimum flows and levels reports address these issues, although he indicated that he had not seen this topic addressed in the Southwest Florida Water Management District report on proposed minimum flows and levels for the Chassahowitzka River system. He noted that assessment of water resource values is often hampered by a lack of data. Dr. Knight added that this identified lack of data has led to the implementation of monitoring programs in the St. Johns River Water Management District, but he fears that

these programs may be curtailed as a result of budgetary constraints. He cautioned that we should consider the maxim, "do no harm" when establishing minimum flows and levels, as any rules associated with the minimum flows and levels may "outlive us." Dr. Knight added that he has concluded "that the Floridan aquifer is already overstressed" to the point where it can't support the populations in the springs as well as the people that are along them." He added that "we are overly optimistic in giving out permits" in reference to the issuance of water use permits by the state's water management districts, noting that "every permit is making the situation worse."

- Ms. Hope Corona noted that the District appears to be holding firm on the currently recommended minimum flows and levels for the Springs Coast and wonders how the minimum flows and levels may be modified to address the will of interested stakeholders and to also incorporate the data that has been presented by stakeholders for consideration by the District. She wondered how interested stakeholders can negotiate the allowable percentage of flow reductions downward. Ms. Corona also asked about the negotiated minimum flow and level that was developed for a spring system in the St. Johns River Water Management District.

  Response: Dr. Knight noted that the minimum flow and level that was ultimately determined for Volusia Blue Springs was based on a decision made by the Secretary of the Department of Environmental Protection. He noted that the decision was associated with a great deal of public pressure from the State Park Service, the Save the Manatee Club and others. He noted that the District's spring workshop series seems like an appropriate forum for discussion of minimum flows development, noting in jest as Dr. Kincaid did during his presentation, one alternative to negation and discussion of water-related issues that was used historically in the western United States was to "just shoot them."

- Mr. Norman Hopkins, the stakeholder representative for the Amy H. Remley Foundation, noted that the District's recommended minimum flows and levels are not absolute flow values, but rather relative, allowable percentage of flow reductions. He recommended that the District consider establishing some form of safety factor to account for uncertainty in minimum flow requirements when issuing water use permits.

  Response: Dr. Knight indicated that he thought Mr. Hopkins suggestion was a good, rational statement. He added that "we" should be wary of permitting water use and then later determining that the allowable withdrawals are causing adverse impacts. Dr. Knight offered this latter comment based on the acknowledgment that it can be very expensive to restore flows or levels to stressed systems, citing the restoration of the Everglades as an example.

- Mr. Boyd Blihovde, the stakeholder representative for the United States Fish and Wildlife Service's Chassahowitzka National Wildlife Refuge, asked for clarification about the minimum flows and levels that have been established for Volusia Blue Springs.

  Response: Dr. Knight noted that he understood that the minimum flows established for Volusia Blue Springs address recovery of flows for the river system over a twenty year period. He added that he had read recently that the District may be considering revision of the minimum flows. Mr. Dana Bryan contributed to the discussion, noting that the established minimum flows are not really a "recovery minimum flow." Rather, the minimum flows were established at historic flow values and are to be met over an extended time period to allow the St. Johns River Water Management District sufficient time to develop

alternative water supplies to offset the groundwater withdrawals that would be expected to impact flows from the spring.

- Mr. Dana Bryan noted that the minimum flows and levels law has been interpreted to allow for flow changes associated with natural climatic variation, but not for water-use impacts. Assuming that there has not been a decline in rainfall, the District assertion that withdrawal impacts have only minimally affected flows in the Homosassa River system seems incompatible with observed flow declines. He notes that in his experience, all District staff members are very professional, evaluate existing data to the best of their abilities and subject their analysis to independent peer-review. He added that it is appropriate for stakeholders to question the use and analysis of available data, and encourage staff or other professionals to reevaluate the data to support development of the best possible minimum flows and levels. He indicated that this is why he is focusing on the District's use of discharge data, believing that this may be a "vulnerability of their analysis", and wondered whether it may not be true that water use has not substantially impacted flows in the river system.

- Mr. Darrell Snedecor noted that many springs currently fail to meet water Outstanding Florida Water criteria. He added that the "do no harm" standard seems laughable, given the violation of existing laws or rules.

  Response: Dr. Knight noted "that we have gone way beyond what the law allows" and questioned who might advance a lawsuit concerning nitrate levels in groundwater systems. Brad Rimbey offered that "we will" in response to Dr. Knight, who countered that "somebody needs to if they care about enforcing the law". Dr. Knight noted that he has been recently discussed the planned installation of a new waste-water treatment plant near Fanning Springs with the Department of Environmental Protection, and learned from the Department that the plant appears to be in compliance with relevant water quality-related law.

- An unidentified workshop participant noted that Citrus County has four Outstanding Florida Waters and because of this, any work associated with minimum flows development should proceed with caution.

- Mr. Al Grubman noted that workshop discussions have focused primarily on the Chassahowitzka and Homosassa River systems. He added that both systems are Outstanding Florida Waters and both are on the impaired waters list associated with water quality violations. Knowing that these systems are currently stressed we should not allow any further withdrawals that will impact flows in these systems.

  Response: Mr. Brad Rimbey noted that Mr. Grubman's comments provided a good segue to the next agenda item for the workshop, which was general comments to be provided by stakeholders.

Coastal Springs MFL Testimony from MFL Stakeholders

Mr. Brad Rimbey indicated that this portion of the meeting would be dedicated to statements from stakeholder representatives.

- Mr. Ron Miller, the stakeholder representative for the Save the Homosassa River Alliance, thanked the District for holding the workshop series and Mr. Rimbey for organizing this

workshop. Mr. Miller suggested that the District should consider setting a cap on withdrawals in lieu of establishing minimum flows for Springs Coast river/spring systems. He noted that although some may pick and choose among laws related to water resource protection, the law that should be supported is the law that protects "our" Outstanding Florida Waters. Mr. Miller also noted that the Northern District Model needs improvement.

- Mr. Dennis Dutcher, the stakeholder representative for United Waterfowlers-Florida, read a prepared statement, which is included as Appendix C to these meeting notes. He thanked the District for holding the workshop series, and also thanked workshop participants for the contributions, and Mr. Rimbey for organizing the stakeholder representatives meeting. He noted that while it is important to characterize a water budget for human and non-human environmental needs, members of United Waterfowlers-Florida are concerned about allowing additional flow reductions from systems that are already stressed. Mr. Dutcher noted that there has been substantial loss of coastal wetlands in recent years due to sea level rise and asserted that a lack of fresh water flow to coastal regions of the Springs Coast is "the reason for the loss of overwintering waterfowl on the refuge", presumably in reference to the Chassahowitzka National Wildlife Refuge. He noted that establishing minimum flows and levels is a worthy approach to environmental protection, but emphasized that this effort should be coupled with enhanced conservation measures. With regard to establishment of minimum flows for the Springs Coast, Mr. Dutcher urged the District to "weigh the evidence shown that these systems are in peril" and noted that "a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh."

  Note: Audio recordings made during this portion of the workshop terminated during Mr. Dutcher's statement period outlined above. Notes presented below for the remainder of the stakeholder representative comments and the public input agenda item were prepared using handwritten notes made by Mr. Leeper during the meeting.

- Mr. Dan Hilliard, the stakeholder representative for the Withlacoochee Area Residents, began his presentation by asking whether those at the meeting thought any Florida water bodies were in better shape today than they were thirty years ago. He added that pristine waters are not abundant or may no longer exist within the state, noting that we "owe" quality water habitats to future generations. Mr. Hilliard recommended that if we cannot restore all habitats, we should at least protect what we currently have. He indicated that the Withlacoochee Area Residents have recently submitted written comments concerning proposed minimum flow and levels to the District and looked forward to continuing to work with the District to preserve our water resources. These written comments indicate that it is the opinion of the Withlacoochee Area Residents that "[s]takeholder requests for 0% flow reduction recommendations" are appropriate, given "questions and methodology related to the definition of significant harm."

- Dr. Katie Tripp, the stakeholder representative for the Save the Manatee Club, commented that she was surprised to learn some time age during a presentation by a St. Johns River Water Management District staff member that the state's water management districts are required to ensure water availability for *all* reasonable and beneficial uses. She added that it was the hope of the Save the Manatee Club that the input and discussion made during the spring workshop series has and will continue to make a difference with regard to the establishment of minimum flows and levels.

- Mr. Brad Rimbey noted that it was important to recognize the value of the District for the Springs Coast, despite any disagreements that may exist among stakeholders and the

organization. He offered that in these times of budgetary constraints, it may be appropriate for the District to consider reaching out to citizen groups for assistance with data collection that could enhance water management efforts in the region. He noted that this suggestion was being made to address a perceived insufficiency in data that are currently available for the Springs Coast systems.

Public Input

Mr. Brad Rimbey noted that this portion of the meeting would be dedicated to statements from other workshop participants.

- Mr. Ben Berauer read a prepared statement, which is included as Appendix D to these meeting notes. Mr. Berauer expressed appreciation to the District and stakeholders that have contributed to the discussions of minimum flows development for the Springs Coast. He noted, however, that the workshops have not adequately addressed several of his concerns, including: a lack of consideration for the Outstanding Florida Waters status of the systems being evaluated; a lack of accountability with regard to regulatory agency responsibilities for protection of Outstanding Florida Waters; incorporation of information pertaining to droughts and sea level rise; inadequate characterization of baseline flows; lack of consideration of known significant impacts associated with pollution, water use, reduced rainfall and other factors; lack of consideration of micro-environments, including smaller springs; increased negative impacts associated with nutrient pollution and reduced flows; and increased nutrient loading that may be expected from development associated with additional permitted water use. Mr. Berauer added that use of an allowable fifteen percent change in habitat as a significant harm threshold is inadequate, in particular for Outstanding Florida Waters.

- Ms. Cathy Harrelson noted that the aquifer systems in Pinellas County were severely depleted in the 1970s and since that time the residents of that region have been "taking your water" in assumed reference to withdrawals in counties north of Pinellas County. Ms. Harrelson commented that perhaps the development associated with increased water use may not be "worth it". Ms. Harrelson noted that she appreciated the acronym "MEL" which was introduced during the workshop, and stands for "Maximum extraction level". She also noted that it may not be appropriate to consider minimum flow rules for the Chassahowitzka and Homosassa River systems at the December 2011 Governing Board meeting, as this meeting is scheduled to be held in Haines City, far from the Springs Coast. She added that the public pressure concerning opposition to the currently proposed minimum flows for the Springs Coast should be exerted "further up the line", i.e. "beyond" the District.

  Comment: Mr. Leeper noted that the District's December Governing Board meeting is scheduled to be held in Haines City, and added that it would be appropriate to delay presentation of minimum flow rule amendments for the Chassahowitzka and Homosassa River systems to the Board until January, when the Board is expected to meet in Brooksville.

- Mr. Dana Bryan noted that the Division of State Parks is concerned about losing flows from several small springs that discharge into animal pen areas of the Ellie Schiller Homosassa Springs Wildlife State Park.

- Mr. Mike Czerwinski noted that it is important to ensure that the groundwater model and other models used for development and evaluation of minimum flows for the Springs Coasts

system are adequate. He suggested that the groundwater model used for the area should incorporate information on geologic fractures. Mr. Czerwinski suggested that it is not appropriate to use a groundwater well located near Weeki Wachee Springs to estimate discharge at other area springs and added that it would be useful to measure stage and discharge in Halls River and Little Spring, which is a possible contributor to flows in the Southeast Fork of the Homosassa River. In reference to a suggestion made at the meeting concerning citizen-based data collection, Mr. Czerwinski noted that there may be issues associated with use of these data and suggested, alternatively, the District investigate deployment of relatively inexpensive date sondes (i.e., automated, remote data collection devices).

- Ms. Hope Corona commented that the District needs to develop or otherwise acquire additional data sets, because it is her opinion that existing data are insufficient for establishing minimum flows and levels or maximum allowable water extractions for the Springs Coast.

- Mr. Martyn Johnson prepared written comments for the workshop that were read by Mr. Rimbey. In his written statement, which is included as Appendix E to these meeting notes, Mr. Johnson recommends that "serious consideration [be] given to a 5 year moratorium on any additional well/withdrawals from the aquifer". He questioned whether this recommendation has been given serious thought to this issue, and added that based on information supplied by the District, very few requests for issuance of a water-use permit in the northern portion of the District have been denied in recent years. In his statement, Mr. Johnson also asked whether the United States Geological Survey or the District could provide any information regarding data collection at the recently upgraded gage site in the Southeast Fork of the Homosassa River.

  Response: Mr. Kevin Grimsley, with the United States Geological Survey, noted that equipment used to measure water velocities was installed at the Southeast Fork gage site in September and that negative velocities were recorded at the site last week as a meteorological front passed through the area. Mr. Grimsley added that it would be approximately six months to one year before sufficient data have been obtained for development of a velocity index rating curve for the gage site.

- Ms. Janice Howie questioned whether a fifteen percent habitat-change standard was appropriate for establishing minimum flows and levels. She added that the tidal river / spring systems of the Springs Coast are already stressed and we should not consider allowing additional stress to these systems.

- Mr. Brad Rimbey noted that he understands the District's desire for uniformity in the application of significant harm thresholds for priority water bodies. However, he questions the utility of this approach for systems, like the Chassahowitzka River, with limited data sets. Mr. Rimbey also commented that: 1) if spring systems are "shutting down", i.e., ceasing to discharge water, from west to east in response to decreases rainfall or groundwater pumping; 2) if the District is only measuring discharge in springs located in the "east"; and 3) if the District will base compliance with adopted minimum flows and levels on eastern springs; then it may be possible that discharge may cease from smaller springs in the area and that these changes may not be quantified.

Identification of Follow-Up District Actions

This agenda item was not explicitly address during the workshop.

Adjournment

Mr. Rimbey adjourned the meeting at approximately 5:45 p.m.

Appendix A – Meeting Sign-In Sheets

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Todd Kincaid	GeoHydros
E. HERE CORONA	
Bernard Beraner	Suncoast Sierra Club, Chassahowitzka River
Darry Brune	Southwest FL Water Management District
Al Grubman	TOO FAR
Dennis Dutcher	united Waterfowlers
Brad Rimbey	Chassahowitzka River
Bob Knight	Florida Springs Institute
KAREN JOHNSTON	
Elizabeth Wright	
Priscilla Watkins	Homosassa River Alliance
Ron Basso	SWFWMD
Doug Leeper	SWFWMD
mike CZERWINSKI	Michael S. Czerwinski, PA Environmental Consultant
Bev + Tom Overa	—
Gloria & Stan Clewett	
Kevin Grimsley	USGS
Gary Williams	SWFWMD
KAREN ORR	CHASSAHOWITZKA RESIDENT
Darrell Snedeker	C C Audubon
Rebecca Bays	Commissioner
Dennis Blauer	Realtor

63 total

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ron Miller	Homosassa River Alliance
J.C. RUSNAK	Citrus County Council
Carolyn Voyles	DEP
HANDI HARPER	Citrus County Planning Div
Kevin Smith	" " "

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ken Nash	Gulf Archaeology Research Inst.
DAN HILLIARD	W.A.R. INC.
Ed CALL	FFWCC
JANE PERRIN	at Chazz Co camp
Anike Heyl	SWFWMD
Cathy Harrelson	Gulf Restoration Network
BRENT WHITLEY	RESIDENT
Russell J Watrous	FNPS Nature Coast
NORMAN HOPKINS	Amy H Remley Foundation
MARTY Kelly	SWFWMD
Boyd Blihovde	USFWS
James Green	citizen
Joyce Kleen	USFWS
Whitey Markle	SSJ SIERRA CLUB
JIM WILLIAMS	HOMOSASSA
Ronald C. Pratt	Chassahowitzka
J. J. Kenney	BOCC
Janice Hobbie	Native Plant Society
Elaine Moore	Florist Moore
Jim Bitter	
DANA BRYAN	FLORIDA STATE PARKS

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Helen Spivey	FL League Conservation Ed Fund
Kate Tripp	South Marsh Club
Mark Hammond	SWFWMD
Doug Tharp	SWFWMD Board
Cara Martin	SWFWMD
	ALSO Ron Basso (… Blanchard)
	ALSO (ADDED BY D LEEPER)
	Sid Flannery — SWFWMD
	Veronica Craw — SWFWMD

Appendix B – Meeting Agenda

Springs Coast Minimum Flows and Levels
Public Workshop Agenda
Wednesday, October 26, 2011
1:30 p.m.
Lecanto Government Building
3600 West Sovereign Path, Room 280
Lecanto, Florida 34461

*******All workshops are open to the public*******

SWFWMD – Southwest Florida Water Management District

1. Opening remarks – Brad Rimbey (*5 minutes*)

2. Coastal Springs MFL Hydrology topics by Dr. Todd R. Kincaid (*45 minutes*)

    1. The need for an accurate water budget and what that entails
    2. What we are learning at Spring Creek about saltwater intrusion in aquifers with coastal springs and conduits
    3. What we have learned about modeling in karst aquifers and the requirements of a reliable model

3. Coastal Springs MFL Ecology topics by Dr. Robert L. Knight (*60 minutes*)

    1. Effects of spring discharge on spring primary productivity and food chain support
    2. Definition of significant harm
    3. The idea of a conservative management strategy that assumes the worse until proven otherwise
    4. A spring recovery case history - Volusia Blue Spring
    5. Biological monitoring required to prevent "significant harm"

4. Coastal Springs MFL Testimony from Stakeholders (*5 minutes per individual)*

5. Public input *(3 minutes per individual)*

6. Identification of follow-up District actions - Brad Rimbey (*5 minutes*)

7. Adjournment - Brad Rimbey (*1 minute*)

Appendix C – Written Statement by Mr. Dennis Dutcher, Stakeholder Representative for United Waterfowlers-Florida, Inc.

United Waterfowlers-Florida, Inc.
Stakeholder Statement, regarding Chassahowitzka MFL

Attention: Marty Kelly, Ecologic Evaluation Section

Mr. Kelly as per your request, here are the remarks from my outline to be included into the stakeholder comments regarding the Chassahowitzka MFL's from the October 26, 2011 meeting in Lecanto, Florida.

On behalf of United Waterfowlers-Florida, Inc. I would like to thank the District for holding these workshops with the stakeholders and members of the public outlining the tedious task and the science used to determine Minimum Flows and Level's for the Chassahowitzka River and springs system.

The subject has been well covered whey establishing MFL's are important in order to create a water budget for human needs that includes safeguards for wildlife and their habitat. However I have concerns, pulling flow from an already degraded and stressed system would be comparable to blood letting from a patient that is bleeding to death already.

The significance of sea level rise resulting in the subsidence of coastal marsh is pronounced on the West Coast of Florida causing habitat loss for wintering waterfowl not only in this area of the state but much of the West Coast of Florida has been affected to some degree.

Between the years 2004-2009 about 25,000 acres of salt marsh disappeared each year. Marine and estuarine intertidal wetlands in coastal regions have been lost 3 times faster than during previous study periods. 83% of these acres were lost to open water, predominantly through subsidence and sea-level rise. Wetland losses have increased 140% since 2004, with the Gulf Coast of Florida losing wetlands the size of a football field each day or about an acre per day.

Wetlands are among nature's most productive ecosystems providing habitat for a wide variety of waterfowl, fish and many other species of wildlife. Coastal Wetlands are highly productive and diverse and, as such merit special consideration. 66% of marine fish rely on coastal wetlands at some stage in their life cycle. Wetlands also provide important societal benefits such as filtering run off, decreasing the effects of storm serge and providing recreational opportunities such as hunting and fishing.

It is now understood by most that the reason for the loss of overwintering waterfowl on the refuge and this coastal area of the state is the lack of fresh water flowing into the near shore Gulf, wafting up from the aquifer in the coastal estuaries and seeping into the coastal marsh from a fully saturated aquifer. Further reducing flows from the spring shed will make recovering any coastal marsh more difficult if not impossible.

Setting MFL's may be one step in conserving water resources but not the only step that should be taken. As much as 50% of our drinking water is used to water lawns, add to that an average of 15% loss during the delivery of drinking water from the water treatment facilities, leaking

pipes and fixtures in homes and businesses, for a total of up to 65% waste of the natural resource. But, water is cheap!

If we look to some examples of how other states have addressed their water consumption needs we find it is not impossible to address. The State of California had a population increase of 60”% between the years1975-2000 yet their water consumption remained about the same, what do they know that we don’t? It would be prudent for the District to address the unlimited consumption of fresh water much of which is used to keep non-native grasses alive. While it is commendable the district is attempting to address MFL’s on the Springs Coast it is my request that you weigh the evidence shown that these systems are in peril, a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh.

Florida is a State in which tourism is a major part of the economy and many people choose to make their life here do so because of the recreational opportunities and natural beauty of the State much of which has to do with the aquatic resources, of which many of us feel quite possessive.

Thank you for the opportunity to serve as a stakeholder and provide input on a subject that is important to all of us.

Dennis D. Dutcher
SW Region Director-Member of the Board
United Waterfowlers-Florida, Inc.

Appendix D – Written Statement by Mr. Ben Berauer

Thank you for letting me provide my comments today. My name is Ben Berauer, and I am a resident of the village of Chassahowitzka, a member of the Chassahowitzka River Restoration Committee, the Nature Coast Coalition, and the Suncoast Group of the Sierra Club. I am a long time nature enthusiast and outdoors leader. I have explored the Chassahowitzka and other Florida rivers, and I have seen degradations that have already occurred in just the last couple of decades. I have seen the water in the Chassahowitzka springs change from potable to unfit for drinking, then our wells change from potable to unfit for drinking, and how septic use in the area, and across the spring shed have already degraded water quality. I see the existing degradation contributed to sea level rise, and am concerned about any permitted further degradations.

I appreciate the work done by SWFWMD. I also appreciate the opportunity given to the public and stakeholders during the process of reviewing and discussing the draft proposal for the Chassahowitzka River MFL report.

But I must say that these proceedings have not achieved the result that I was hoping for. Many here today, like I, are very concerned that the scientific studies and reports fall short of addressing the concerns we have.

Particularly, I do not think that there has been any change in the position that the the MFL proposals do not take into account any special status or protections for Outstanding Florida Waters. During the past few months I have heard shocking statements from SWFWMD that they are not responsible for accounting for OFWs or water quality, while DEP states they are not responsible for regulating OFWs for other than water quality. There seems to no consistent addressing for the mandate to provide special protections to our OFWs. I will not feel that the proposed MFLs for OFWs are adequate until they account for the mandated additional protections.

Discussions regarding how ongoing natural changes such as drought and sea level change have not in my humble opinion been factored in to the MFL proposal. I feel that a baseline for future water use should be premised not only on current flows and man's further withdrawals, but on the full historical history and trend accounting for natural and anthropogenic impacts on our springs and spring sheds. Our waters are known to be significantly impacted from pollution, water use, reduced precipitation, and other factors. As such I feel that defining significant harm as a further 15% reduction of water bodies or spring sheds as inadequate, particularly for OFWs.

As we race to a recommendation to the SWFWMD Governing Board, we have just started to look at affects of sea level rise, which has not been thoroughly reviewed, discussed, and incorporated into the MFL proposal.

Another major concern is that due to the limited data from limited monitoring sites, and limited focus to impacts to specific macro environments, there is little knowledge or prediction of what will occur on micro-environments, smaller springs, spring runs, and the flora and fauna surrounding them. We may see 100% degradation of many micro-environments since the affects of a 11% water flow reduction are not known at significant detail.

Nor does the analysis adequately take into account contributions to significant harm from affects

of possible increased nutrient pollution from reduced flow and greater permitted water use and resultant development.

Given these many inconsistencies between what is addressed by the modeling and analysis results and the broader concerns I still believe need to be addressed, I do not feel that the voice of the stakeholders and public have been adequately addressed. I do not feel the "one-size-fits-all" is appropriate for OFWs. I do not believe that the impacts of the proposed reduction in flow are adequately known to protect the river and spring system and its micro-environments. I respectfully submit that although efforts have been made to provide sound analysis and public input, the analysis is not adequate, and public concerns are not adequately addressed. If the current proposed MFL were adopted, I feel further work and a revision is immediately needed.

Appendix E – Written Statement by Mr. Martyn Johnson

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   "Review of the District's Well Construction Database indicates that ***213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years****, respectively."……"With regard to water-use permitting……* ***Fewer than ten of the hundreds of surface- and groundwater use permit*** *requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

2. As some may know the USGS installed the velocity monitoring unit under the bridge on Fishbowl Drive to monitor the stream velocity and discharge from the SE Fork of the Homosassa River.

   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

Attachment 2

Slides Presented by Dr. Todd Kincaid at the Stakeholder Representative's Springs Coast Minimum Flows and Levels Public Workshop Facilitated by the Southwest Florida Water Management District

How Much is Too Much?

Toward A Water Budget Approach to Management

MFL Workshop

October 26, 2011

Lecanto, Florida

Todd Kincaid, Ph.D.

GeoHydros, LLC

Global Underwater Explorers

Hydrogeology Consortium

Dedicated to Wes Skiles

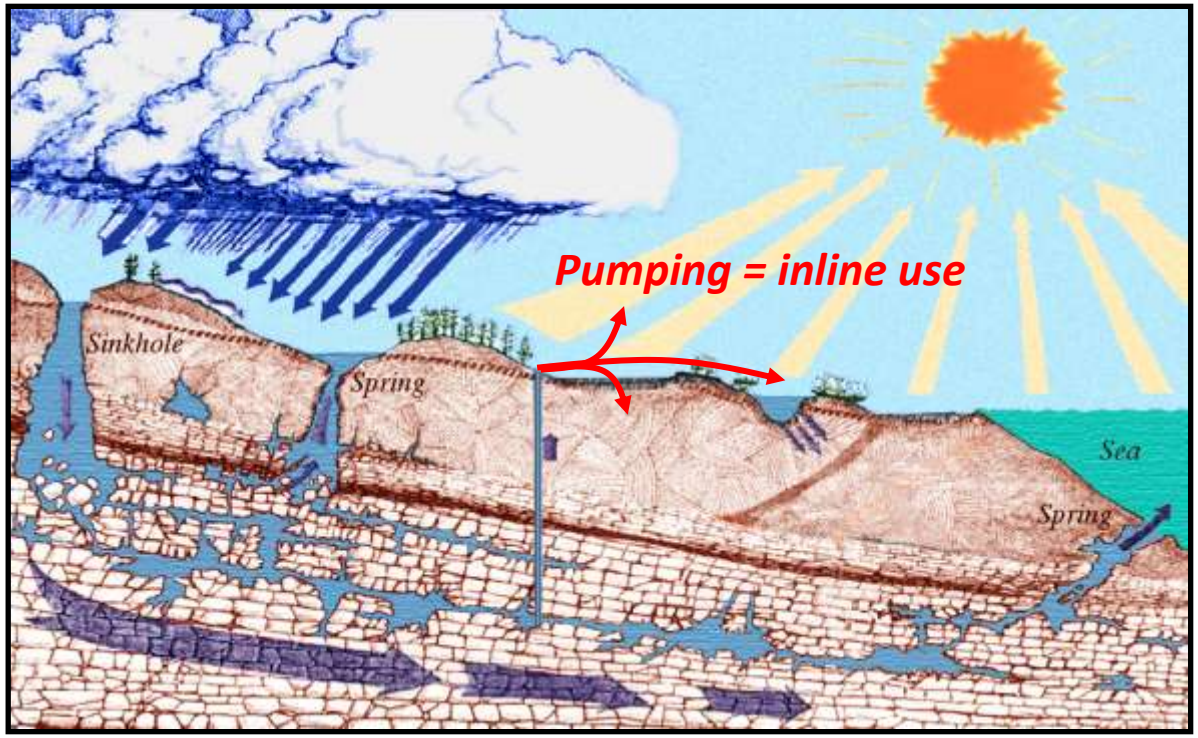
- He taught us a lot about the aquifer
- After 30 years, most of us finally believe him
- Would want us to act and stop studying
- Given that we're in water restrictions now and seeing our springs dry up here in the Suwannee River Basin. *I think its time we do so.*

Bottom Line

- We're loosing springs right now and have been for some time.
- Why?
  - Less recharge (rainfall)
  - Too much extraction (pumping)
  - *Rising sea level (alone would only change spring locations)*
- Do we take action?
  - No = goodbye springs
  - Yes = maybe we can keep some
- What actions can we take?
  - Make more rain
  - Reduce pumping (establish & enforce MFLs)
- How can we take effective action?
  - Improved public understanding
  - Better analyses (models) that address karst
  - More data and prolonged data records

Hydrologic Cycle

How much groundwater do we have?



Water Budget

- Sustainable
  total use = recharge
- Surplus Storage
  total use < recharge
- Declining Storage
  total use > recharge
- ***Just like your check book***

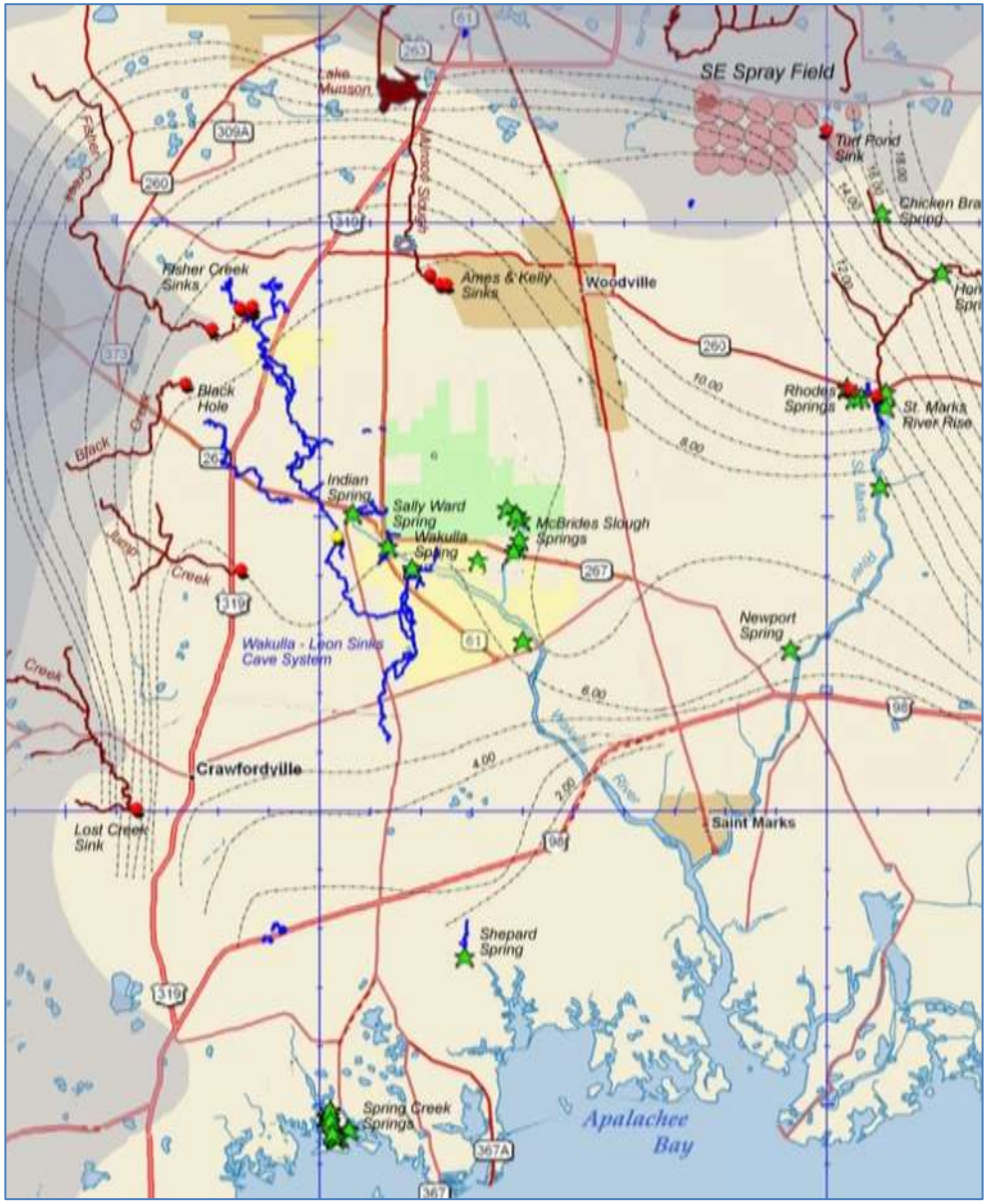
- Water is in constant motion moving from rain to the sea.
- Many different users (humans, plants, animals, rivers, streams, springs, estuaries, etc).
- Groundwater withdrawals intercept part of that flow and return it along a different path (typically surface flow).
- Quality & Quantity are impacted by how much we use, how we impact the quality of recharge, and how the water flows underground.

Significance of a Water Budget

Inputs – Outputs = Change in Storage

- How do you know how much money you can spend?
  - Income
  - Expenses
  - Balance = surplus money = available cash to spend
  - *Credit – provides immediate benefit but adds to fixed expenses*
- Water availability is governed by the same basic rules
  - Income = recharge *(must be estimated)*
  - Expenses = all discharge and extractions *(can be measured)*
  - Available cash = storage
- One difference
  - There is no such thing as a water surplus
  - Every drop of water that recharges the aquifer flows eventually to springs, rivers, lakes, or the sea
  - Management falls to deciding which uses will be impacted by new extractions & devising creative ways of recycling the extracted water
- Our problem is that we don't effectively measure income or expenses

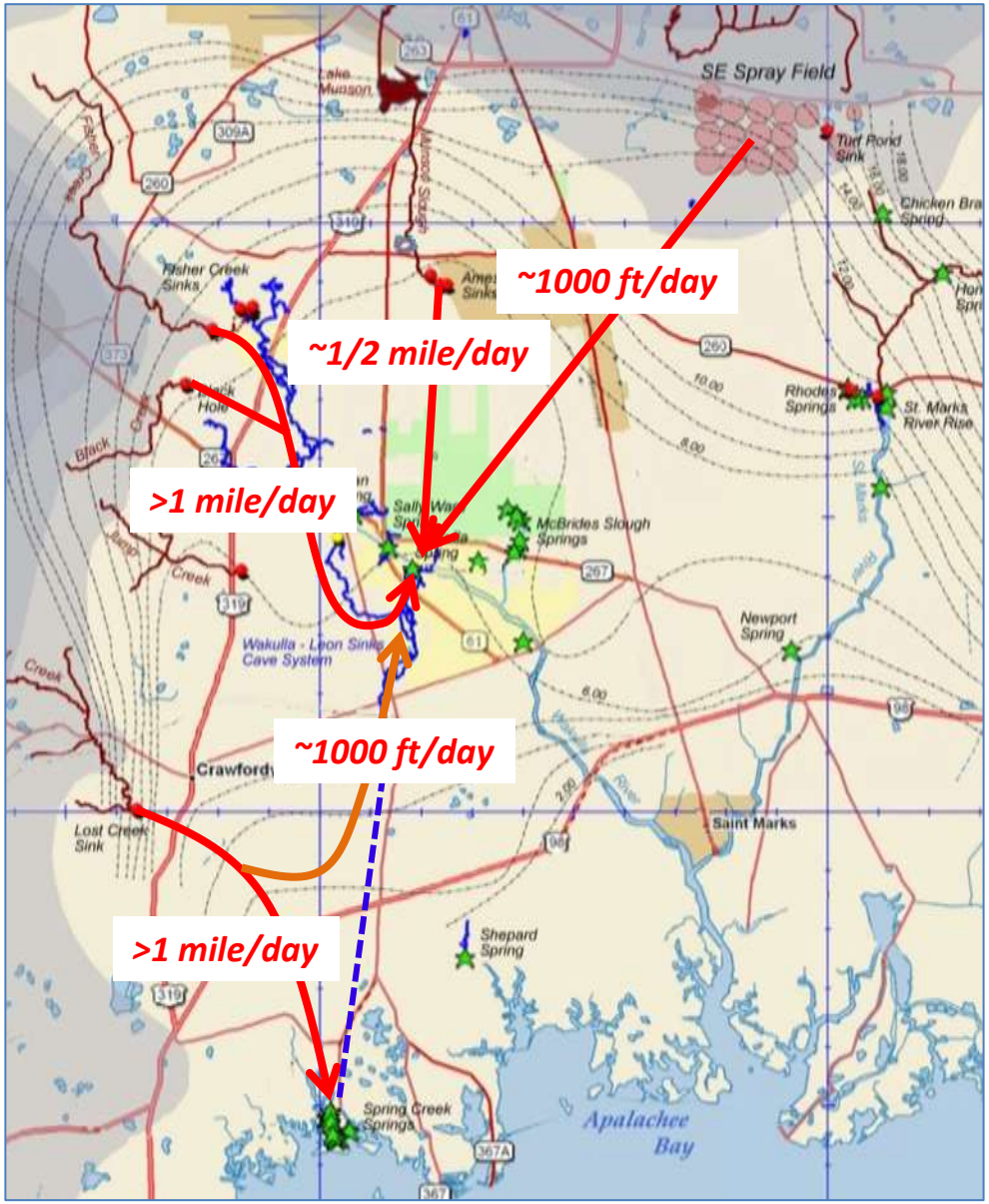
Learning from Wakulla



Western Woodville Karst Plain

- >75 km (46 miles) of mapped underwater caves
- 2 of the largest springs in Florida (Wakulla & Spring Creek)
- Several sinking streams (swallets)
- Trying to get a MFL set for Wakulla
- District wants to address Wakulla independently

Learning from Wakulla

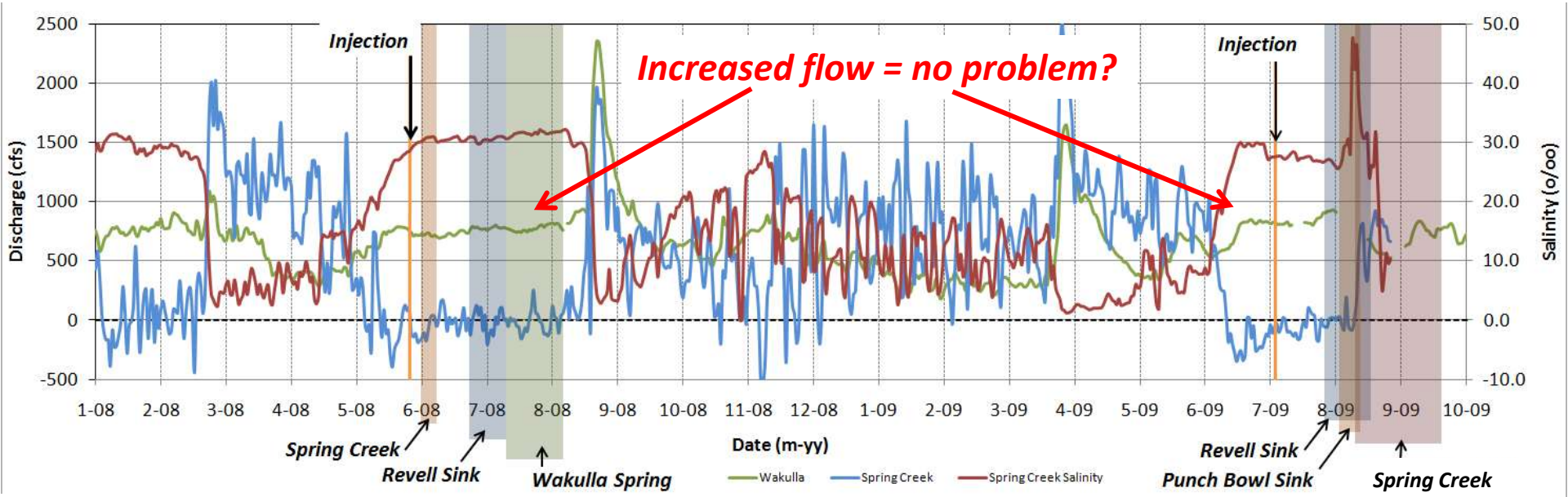


Western Woodville Karst Plain

- Flow is fast in caves and in surrounding aquifer (caves too small to map)
- Wakulla & Spring Creek are connected
- Spring Creek began reversing for appreciable durations in 2006
- Spring Creek reverses now every summer for weeks - months
- We're loosing the largest spring in Florida & the associated fresh water that flows to the Gulf of Mexico estuaries

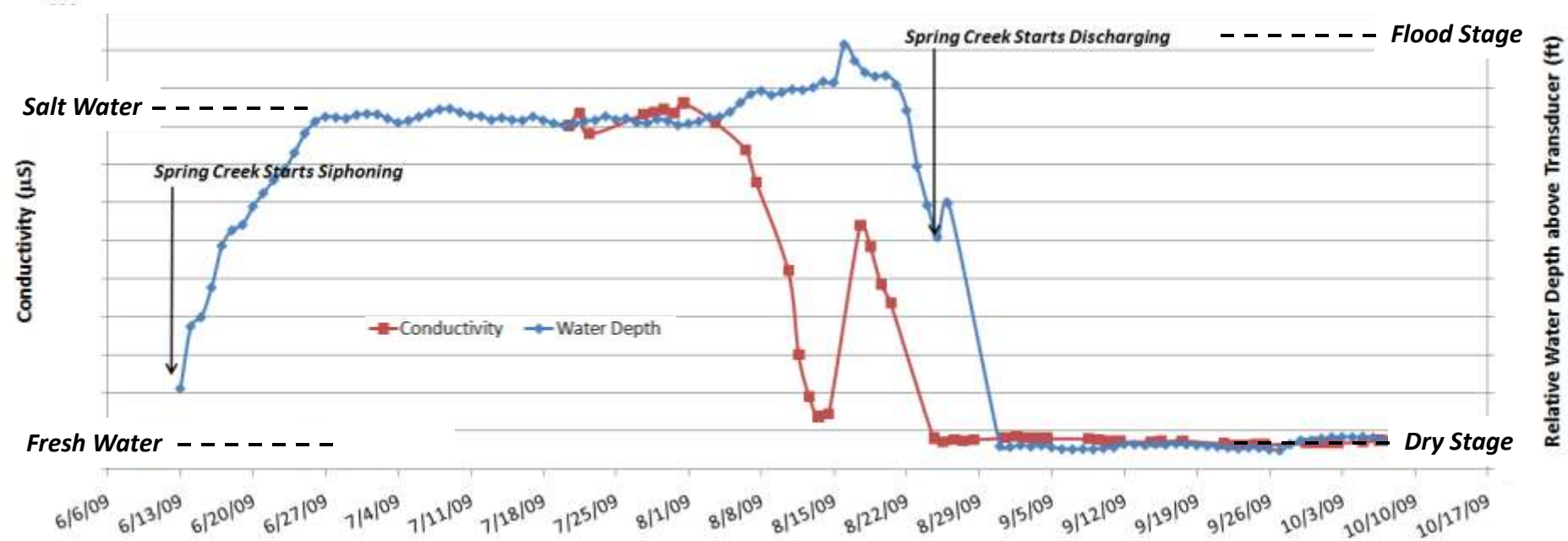
Wakulla / Spring Creek Flows

- Composite Spring Creek flow & salinity (USGS).
- Summers 2007-2010: Spring Creek stops flowing / salinities rise to sea water levels.
- When Spring Creek stops flowing, Wakulla Spring flow increases
- When Spring Creek is flowing, Lost Creek water flows rapidly to Spring Creek.
- When spring Creek stops flowing, Lost Creek water flows slowly to Wakulla Spring.



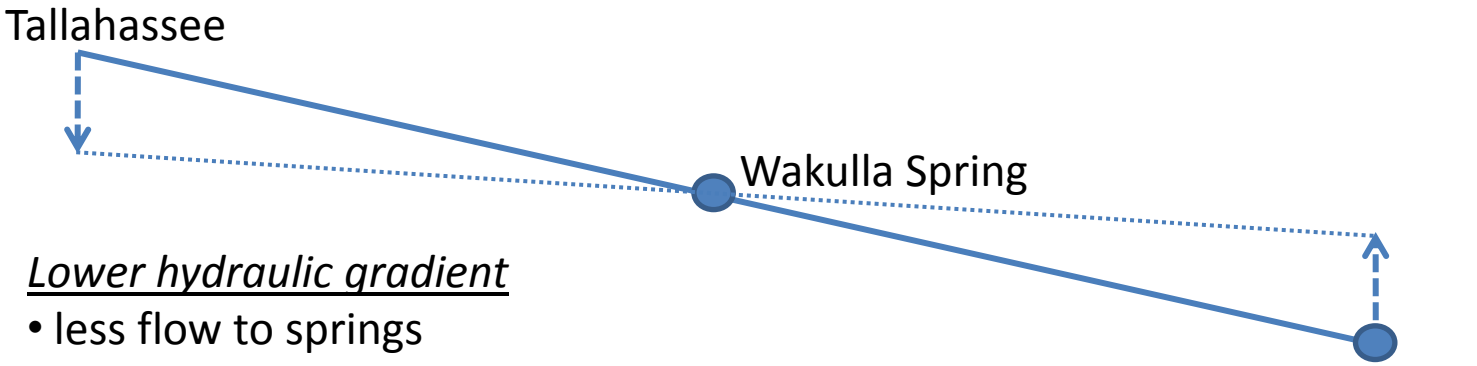
Consequences of Reversals…

- When Spring Creek stops flowing, water backs up into the aquifer matrix in the southern part of the WKP.
- Salt water travels rapidly for long distances (>= 2 miles to Punch Bowl Sink) in days.
- Sinkhole water levels rise to flood stage.
- When Spring Creek starts flowing, water levels drop precipitously and water in conduits returns to fresh water conductivities.



Drivers…

- Pumping reduces groundwater levels in the north (aquifer pressure)
- Gradient (slope of the water table) is getting shallower
- It so shallow in the dry periods that high tide reverses the flow direction at Spring Creek.

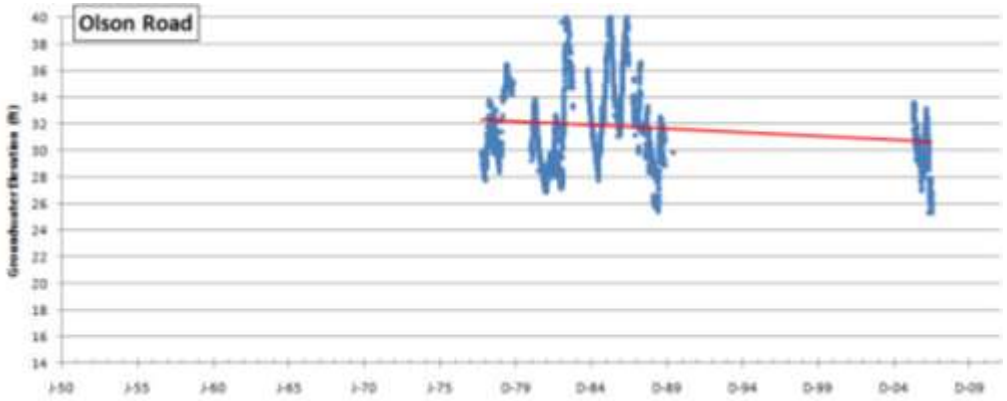


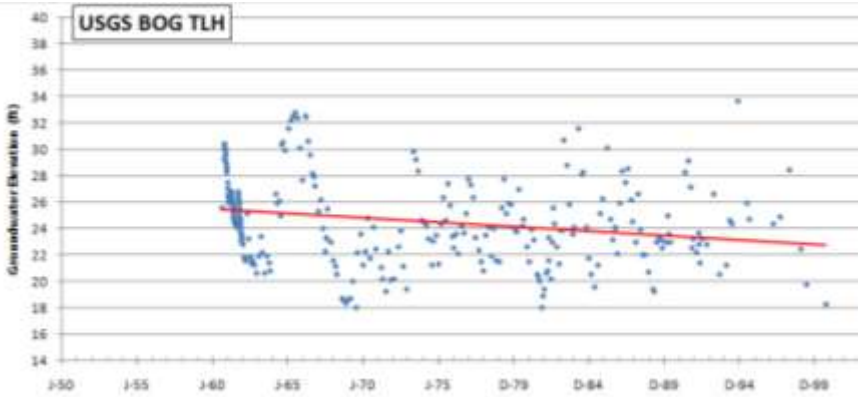
Lower hydraulic gradient
- less flow to springs
- more salt water intrusion

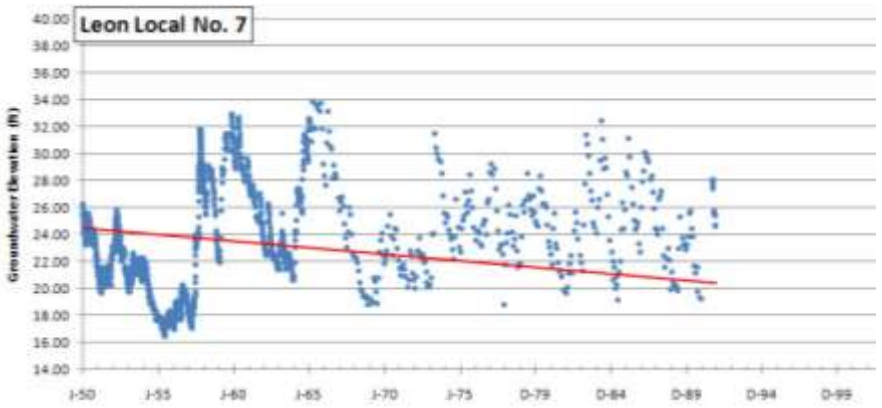
Changing water levels
- depressed conditions in north
- deeper unsaturated zone
- elevated conditions in south
- reduced unsaturated zone

Groundwater Mining

- Groundwater levels have been declining since the 1970's (*USGS & NWFWMD)*
- Extractions are rising

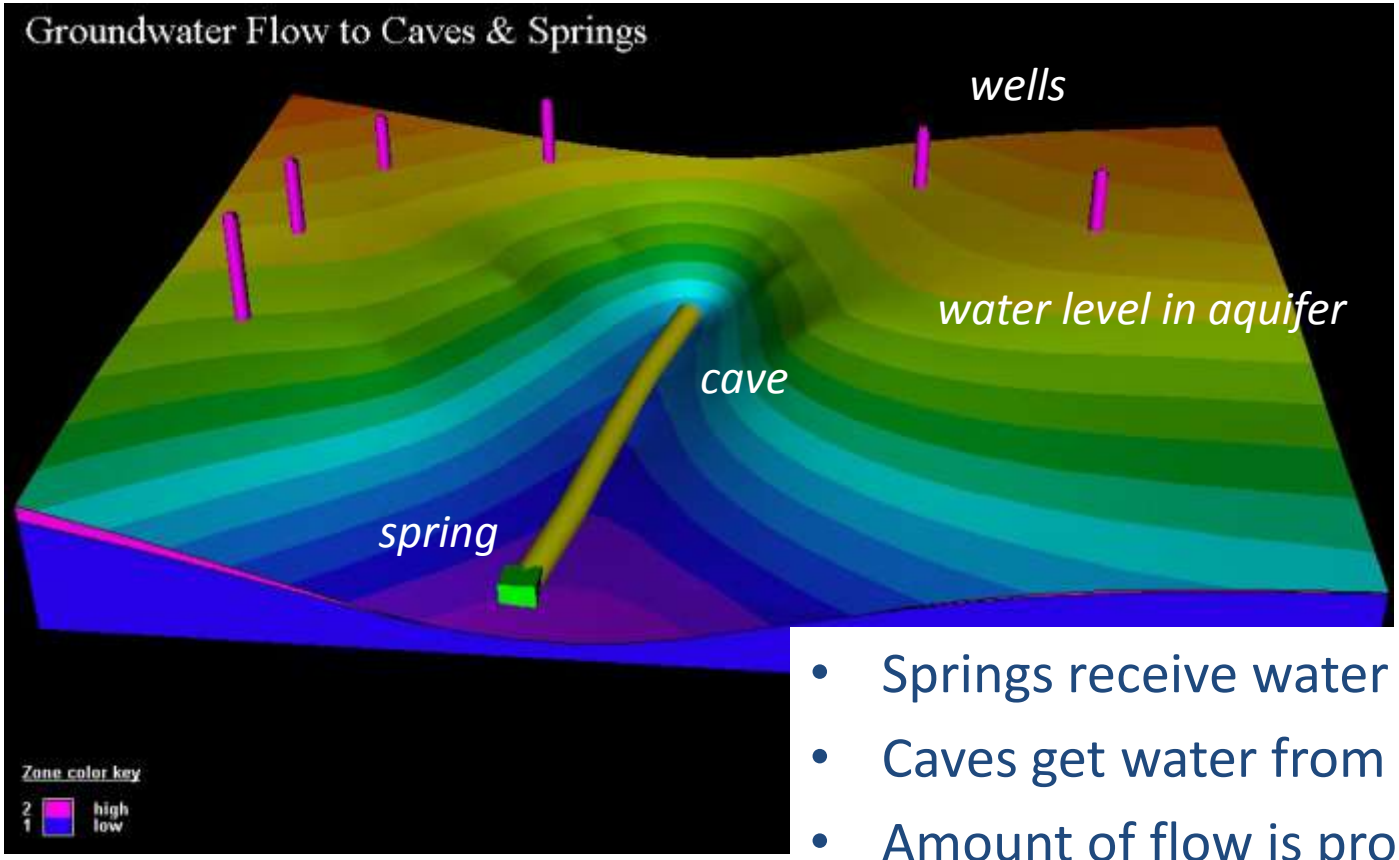






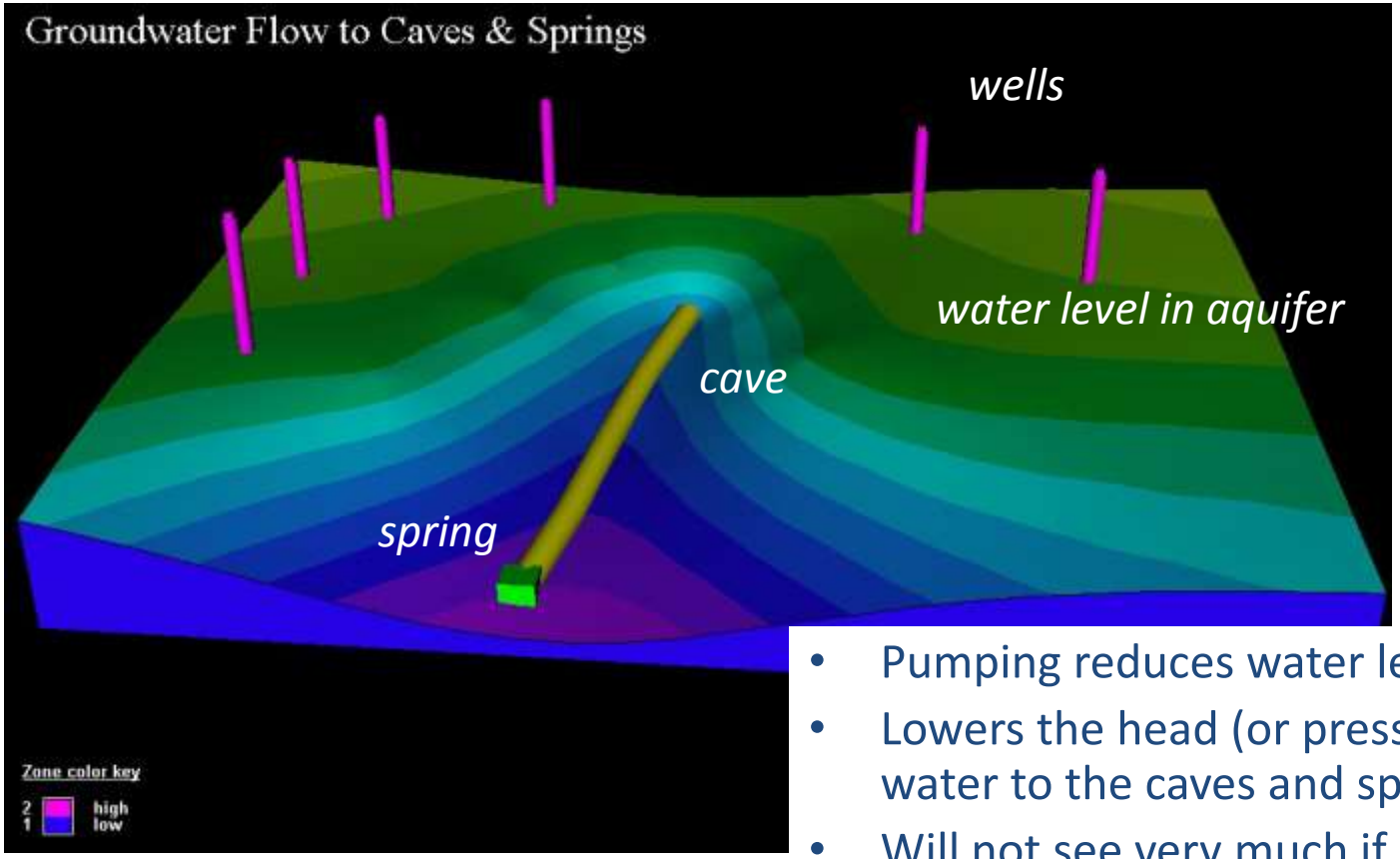
GeoHydros

Flow to Caves & Springs



- Springs receive water from caves
- Caves get water from the aquifer
- Amount of flow is proportional to the gradient from the aquifer to the cave

Flow to Caves & Springs



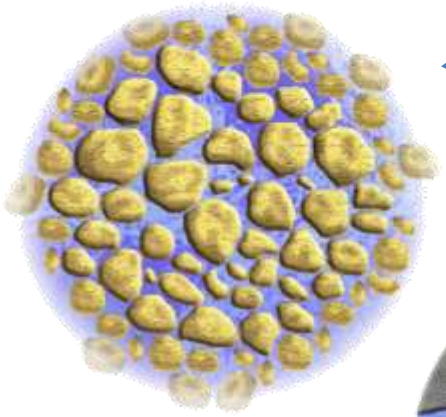
- Pumping reduces water level in the aquifer
- Lowers the head (or pressure) that drives water to the caves and springs
- Will not see very much if any change in head in the trough where the cave is located

The Bottom Line for Wakulla …

- Wakulla & Spring Creek Must be addressed collectively
- If trends continue (groundwater level declines):
  - the duration of Spring Creek reversals will increase,
  - the coastal ecosystem will decline due to salt water intrusion, and
  - water clarity at Wakulla will continue to decline.
- Reducing upland groundwater pumping in the Wakulla Springshed would raise groundwater levels and reduce the duration of Spring Creek reversals.
- Protecting Wakulla's flow and clarity requires that we:
  - identify and map the sprngshed boundaries
  - define Wakulla's groundwater budget
  - determine how extractions impact that budget
- To do these things we need to:
  - continue and expand data collection (flows and levels)
  - develop better predictive models that simulate what we know to be the key hydrologic features: caves, springs, swallets
  - educate the public on where their spring water comes from
  - convince our water resource managers to use better tools and maintain a balanced groundwater budget

Predicting Impacts (Modeling)

Porous Media



sand / sandstone
easy to characterize
simplest math

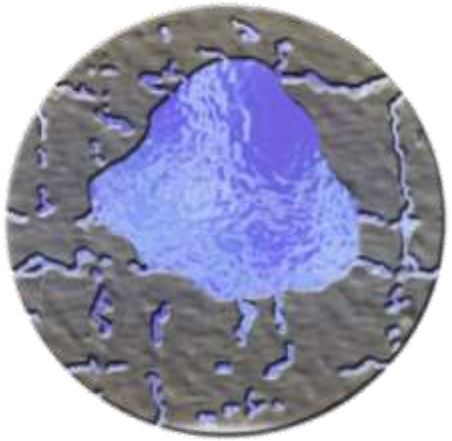
Most commonly assumed

Fractered Rock

hard rocks (shale, granite, etc)
can map from surface
harder to characterize
more difficult math

Most commonly true

Karst (Conduits)

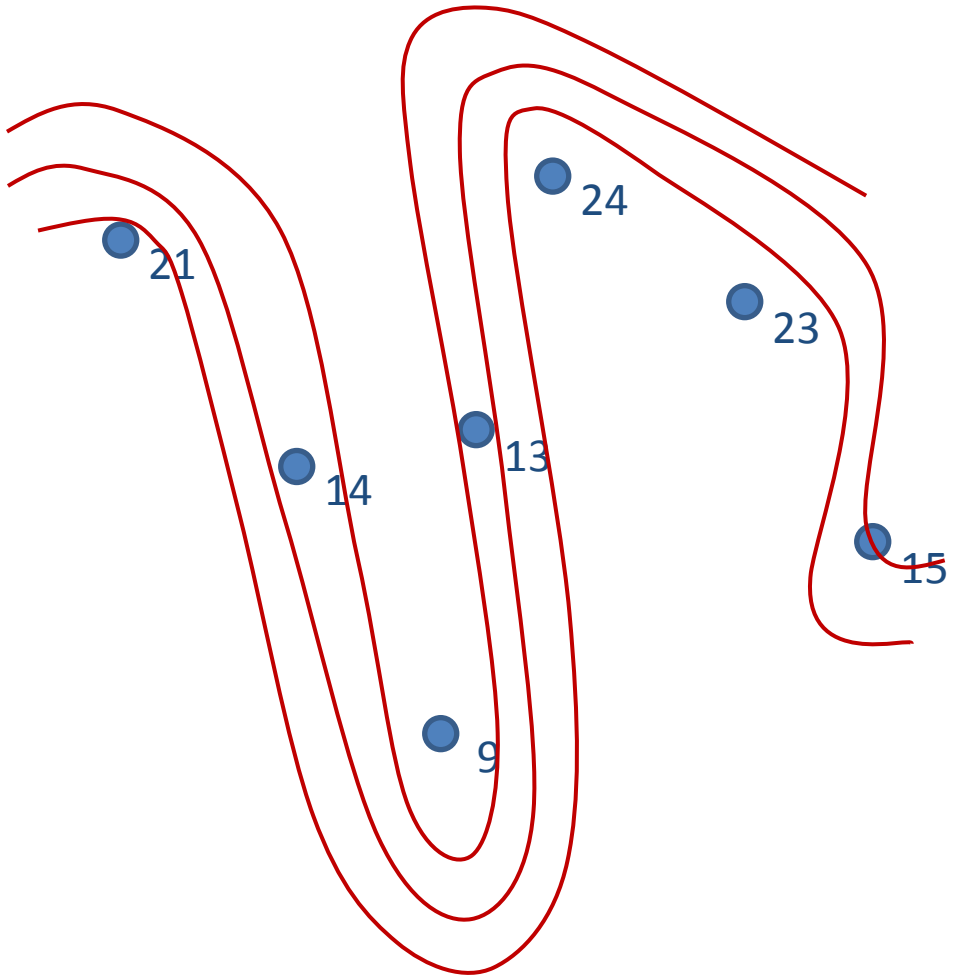


Limestone (Floridan Aquifer)
cannot typically be mapped
hardest to characterize
most difficult math

Start with an accurate conceptualization

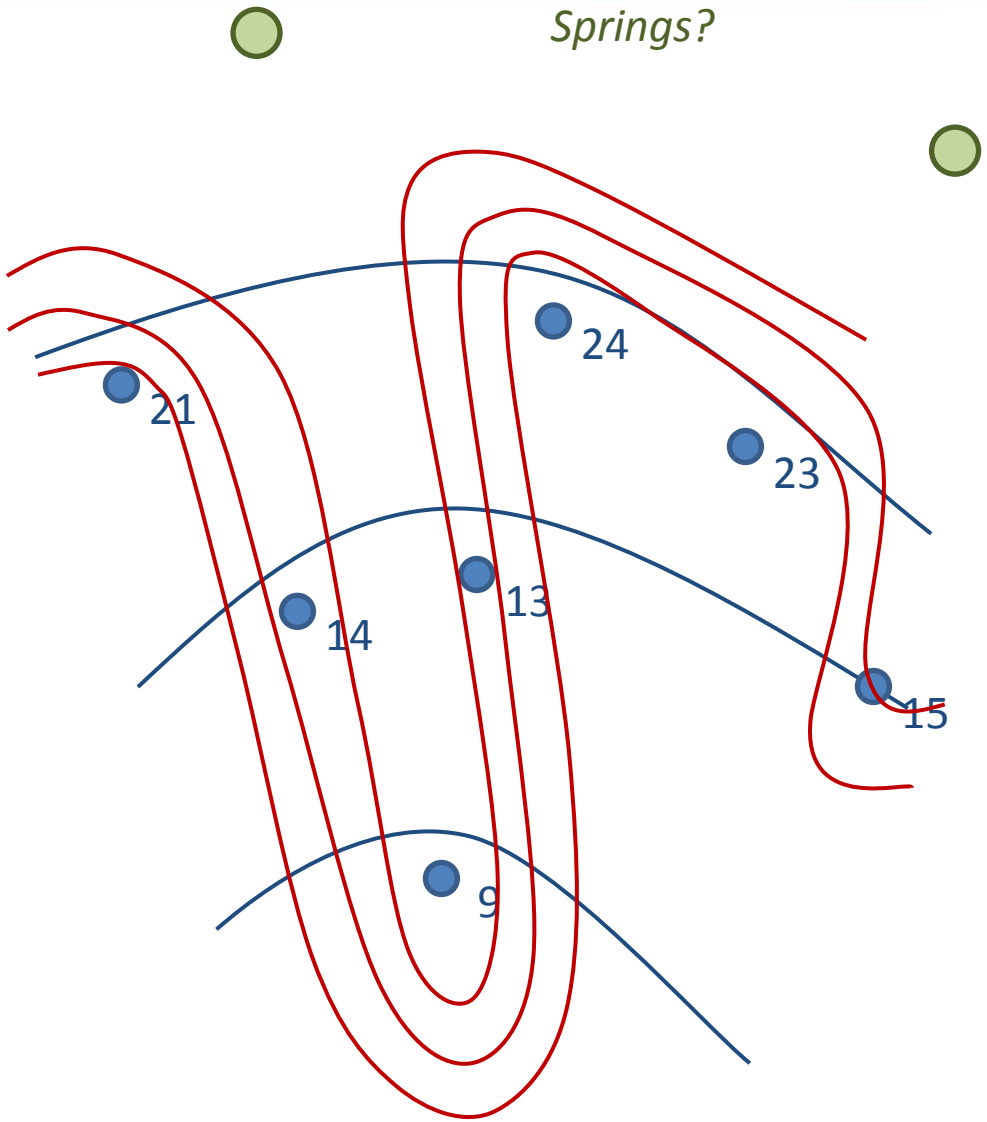
Impact of Assumptions: *Head Potentials*

- Assumptions are necessary. We always make assumptions.
- We make assumptions in our thinking as well as our mathematics.
- It is critical to recognize what assumptions are being made and rather or not they are valid for the problem being addressed.
- The assumptions we make often reflect our biases about how we think the world works.
- Think about the prevalence of assumptions of isotropy and homogeneity …
  - Groundwater models
  - Pumping test analysis
  - Potentiometric surface contouring



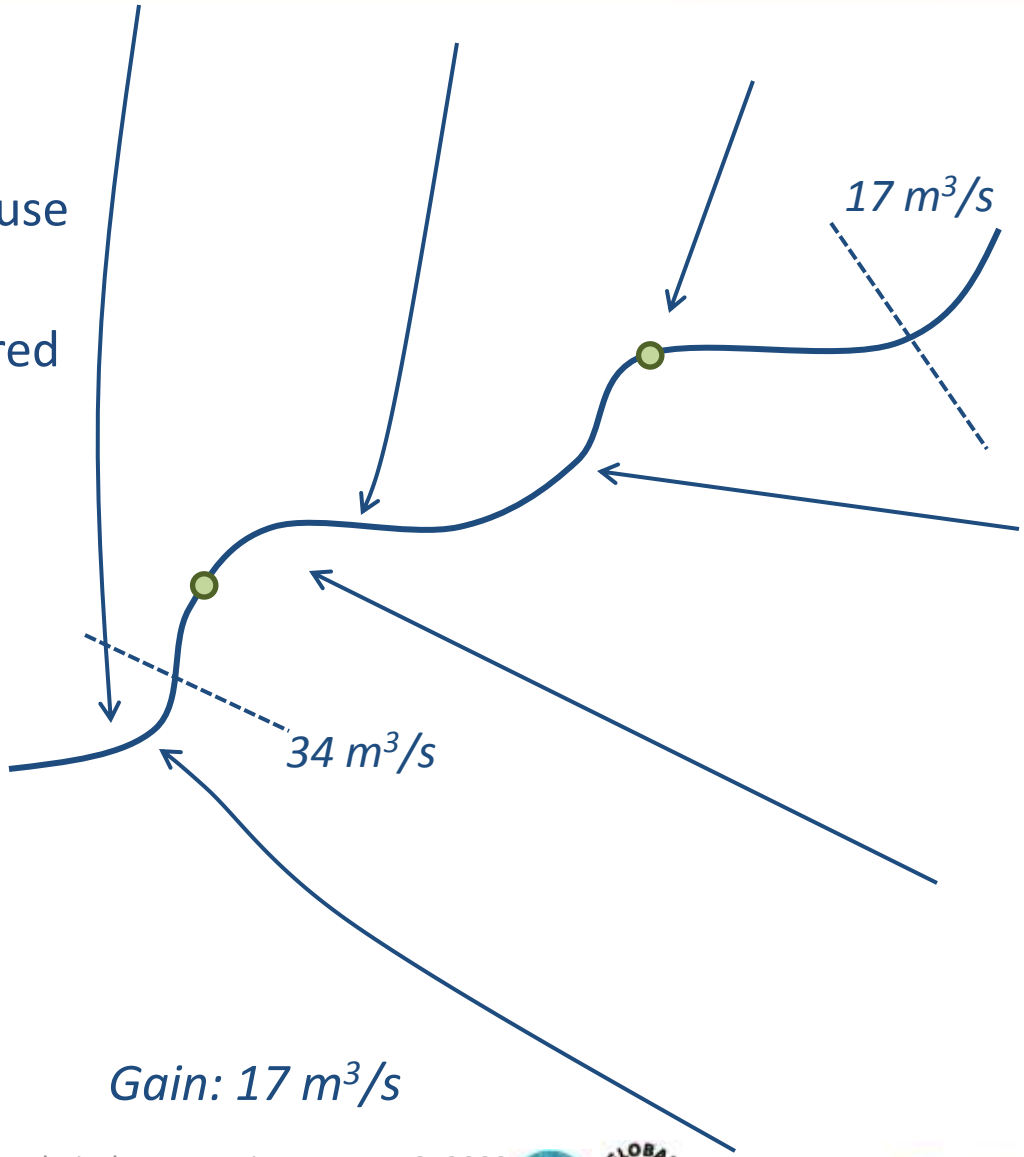
Impact of Assumptions: *Head Potentials*

- Sand or Karst?
- How would you tell the difference?
- Data must be evaluated in context of regional setting.



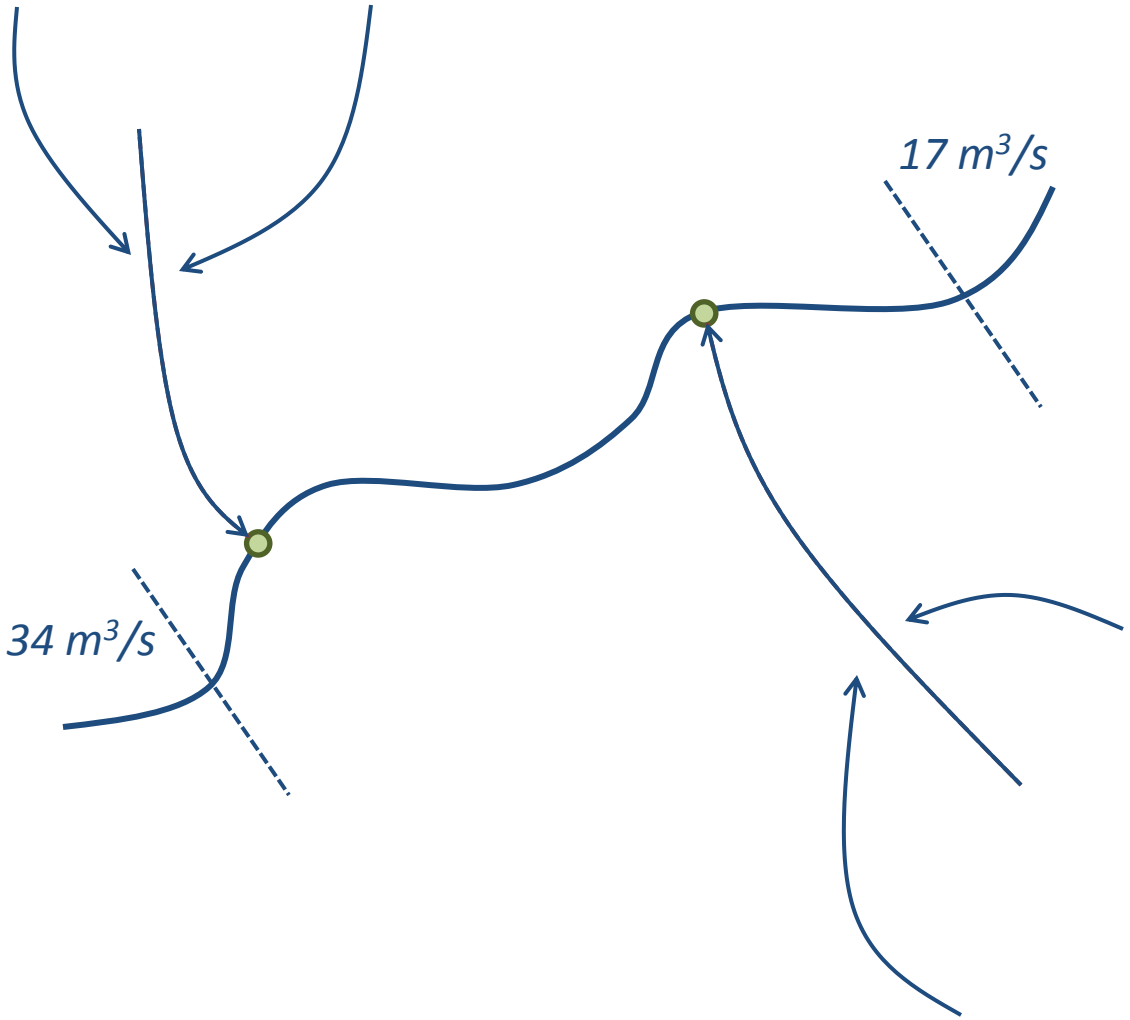
Impact of Assumptions: *Flows*

- View springs as part of river
  Standard approach
- flow to river is simulated as diffuse
- Assumed correct if simulated aggregate flow matches measured gain in the river
- But…
  Does this simulate reality?
- What is purpose of the model?
  - Gross flow to river? or..
  - Simulate flow patterns and velocities?



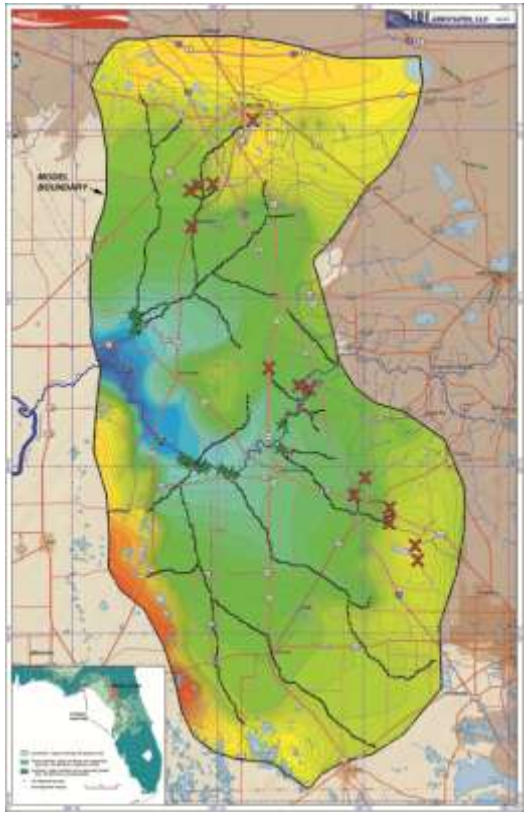
Impact of Assumptions: *Flows*

- View as discrete discharges responsible for majority of measured gain.
- Recognize that large discrete discharges are only possible via discrete high-K pathways.
- Force flow to river through discrete locations
- Will produce dramatically different flow patterns and velocities.



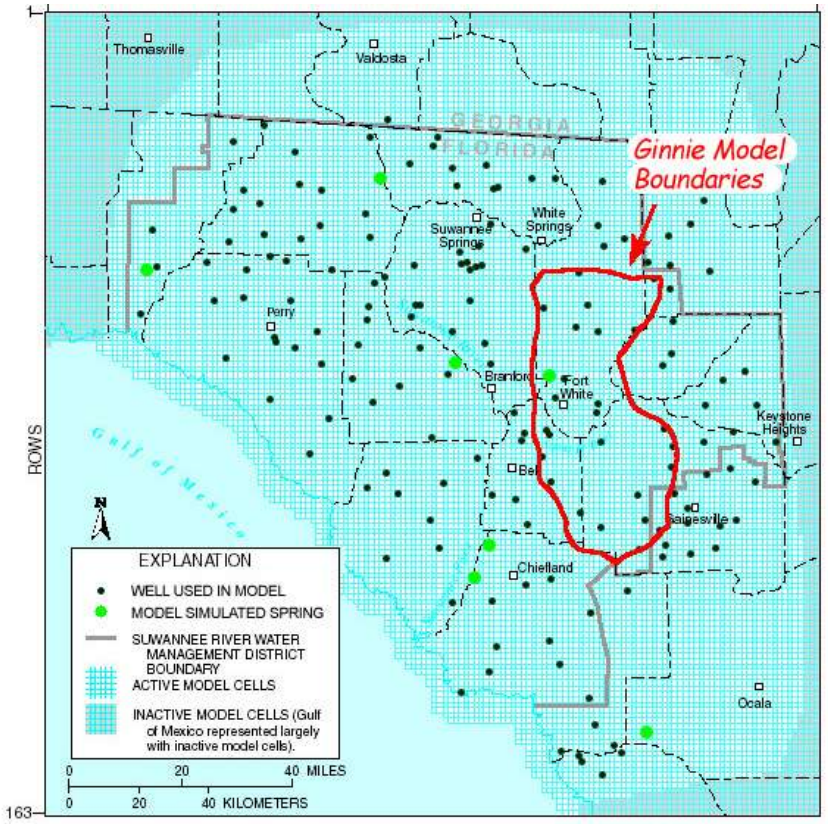
Modeling Matters…

Karst Model



- 13 springs
- 14 swallets
- conduits
- element size ~5 -100 ft

Porous Media Model

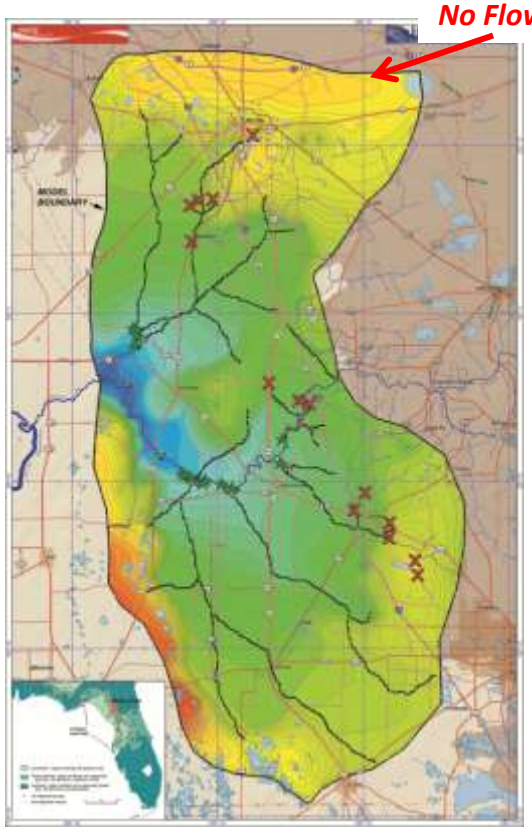


- 1 spring
- 0 swallets
- 0 conduits
- element size ~1 mile

GeoHydros

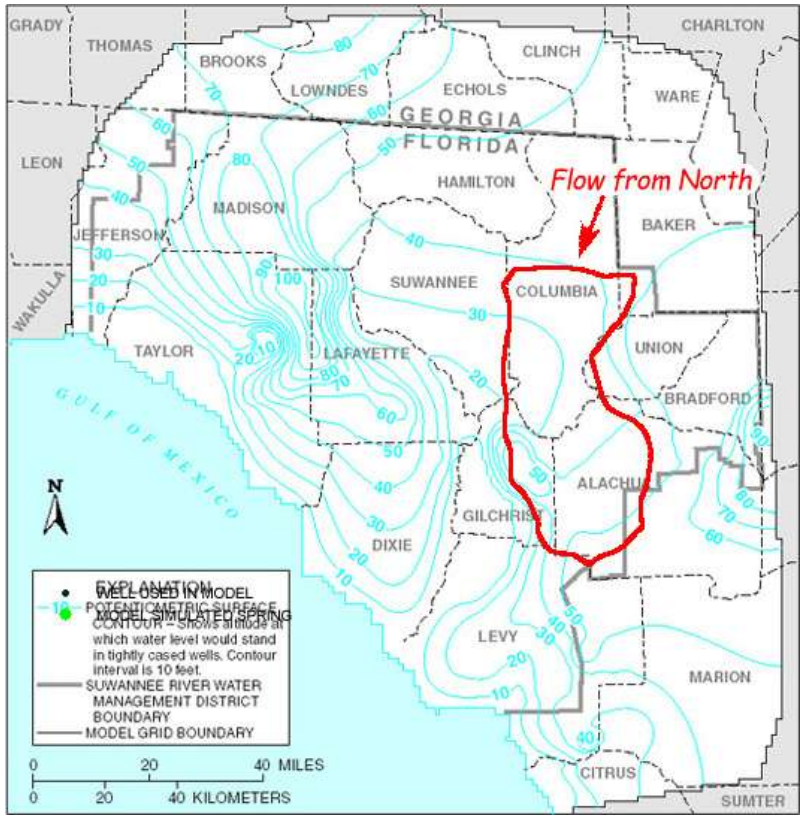
Battle of the Models

Karst Model

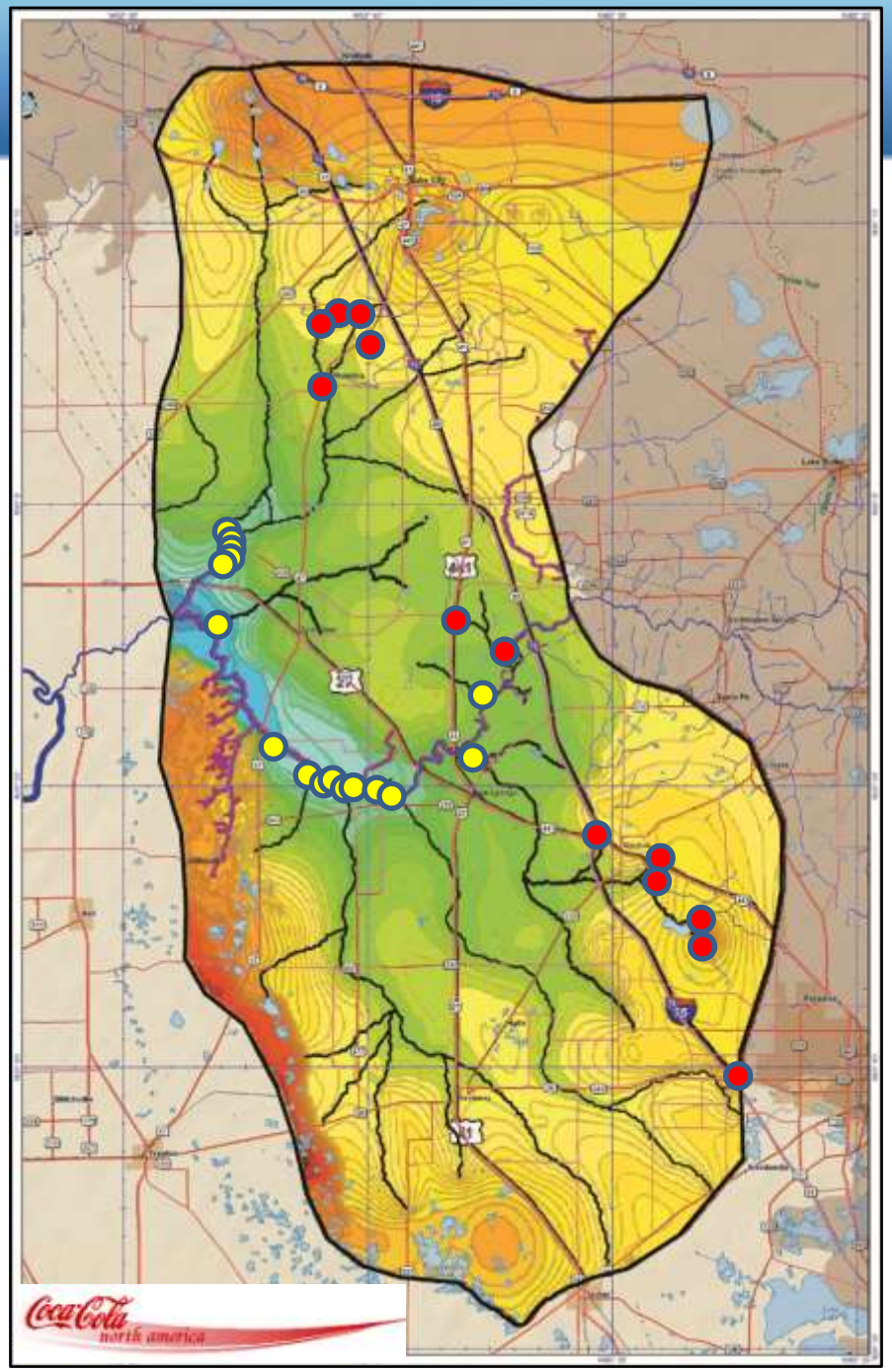


- closed to flow from north
- predicts less water available
- predicts large springsheds
- low rock permeability + conduits

Porous Media Model



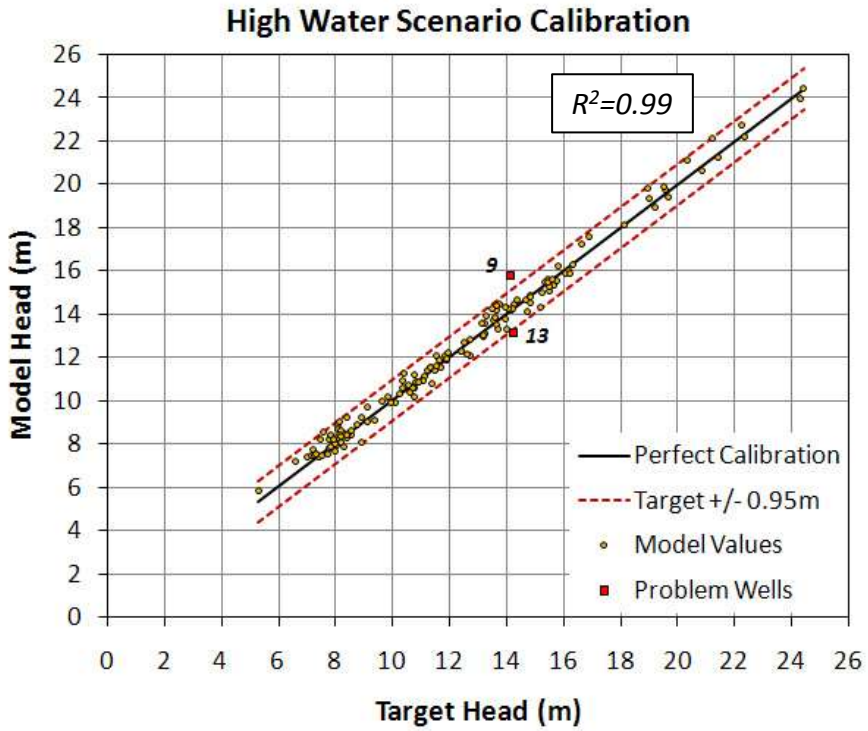
- open to flow from north
- predicts more water available
- predicts small springsheds
- high rock permeability

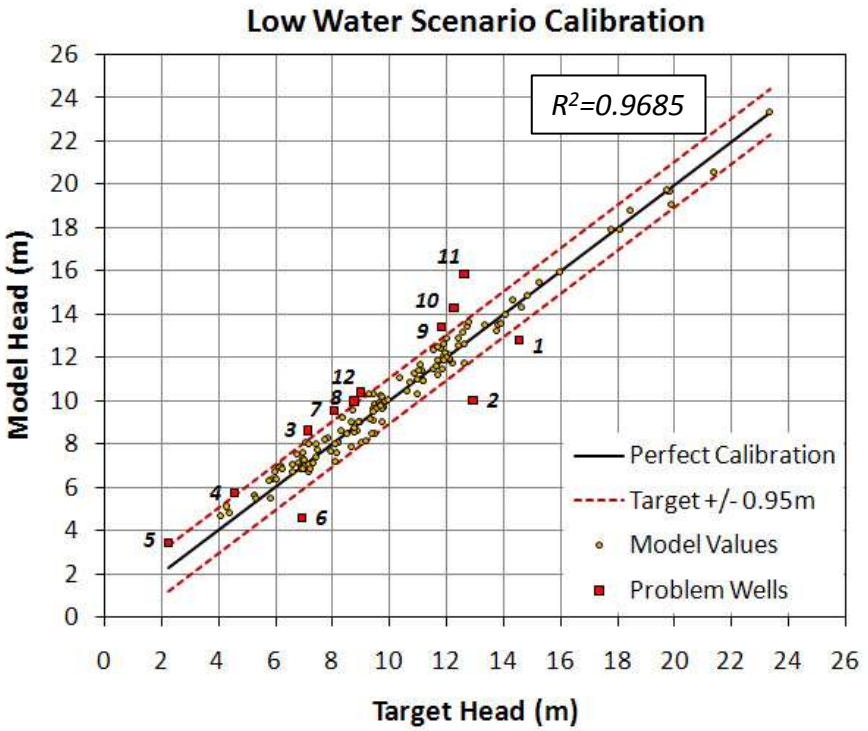


Key Components

- Springs
- Swallets
- Caves (mapped, traced, inferred)
- Rivers (discharge)
- Extractions (wells)
- Must be geologically reasonable
- Must match data
  - groundwater levels
  - spring discharges
  - traced velocities

Model Calibration: *Groundwater Levels*



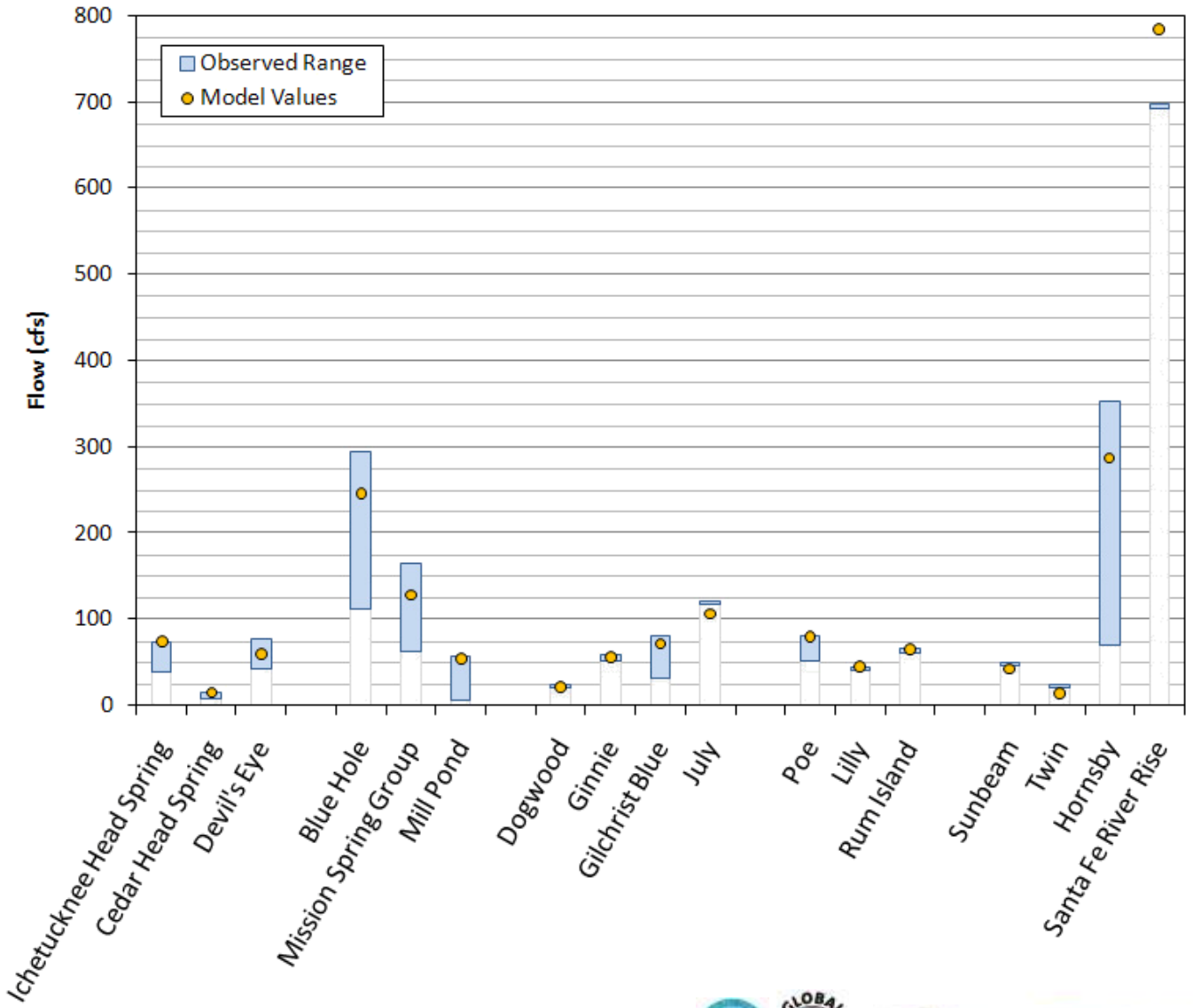


- Plots show how well the model simulates known groundwater levels.
- Perfect match would be the black line.
- All points within the red dashed lines are “calibrated.”
- Could not achieve this good of a match if it were not for including the conduits.
- Even the points that fall outside the red lines are close to target levels.
- Additional small adjustments to the conduit locations could probably get all points within range.
- Those adjustments will not significantly impact the model predictions.

Model Calibration: *Spring Flows*

High Water Simulation

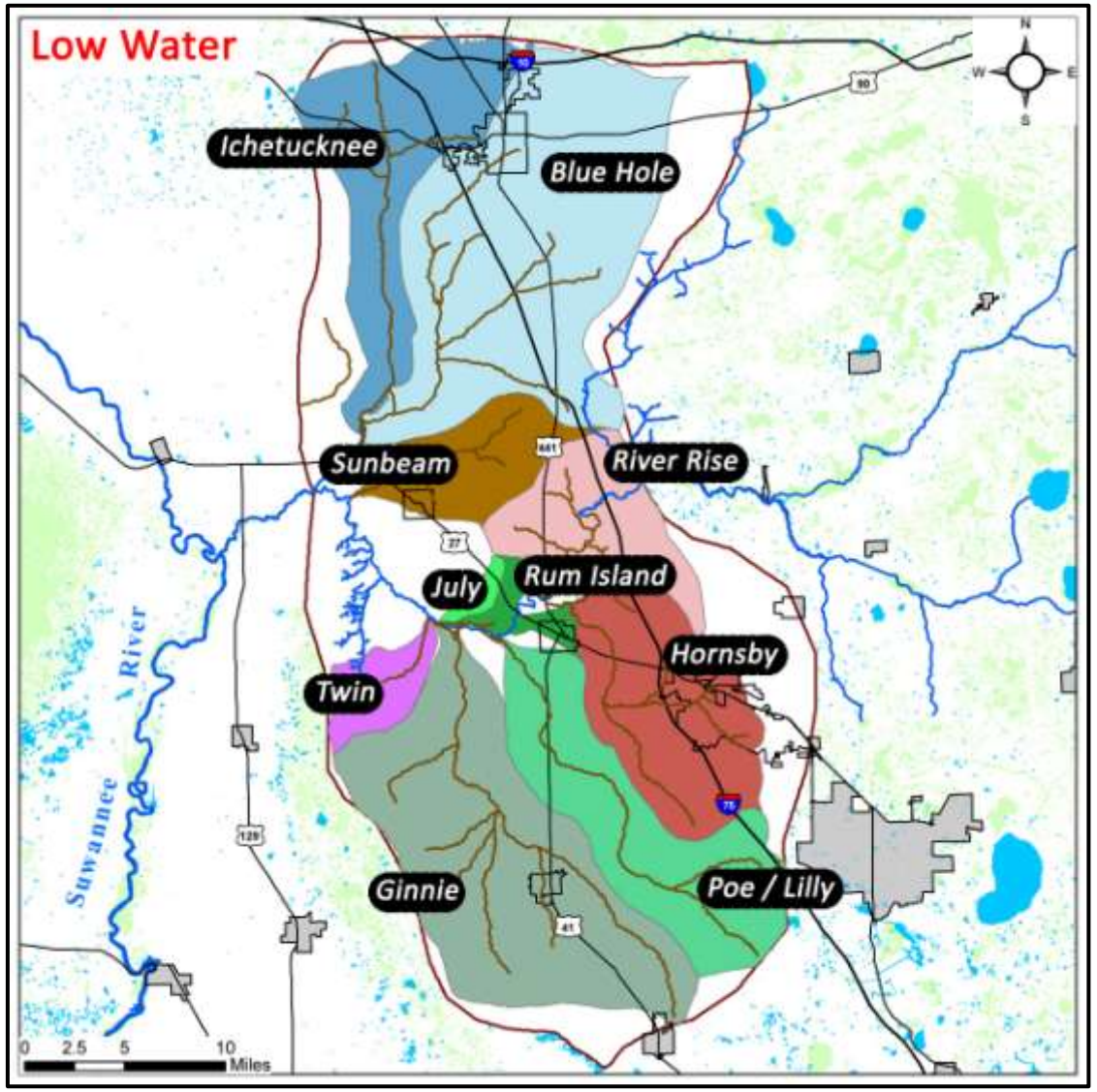
- Data for 17 springs
- Model within observed range at 13
- Model very close at 3
- Over estimated Santa Fe River Rise
- Does not impact groundwater flow because the conduit is mostly surface water



Modeled Springsheds

- Defined from forward particle track analysis
- Boundaries change between high water & low water conditions

Spring Group	High (km^2)	Low (km^2)
Ginnie / Blue	395	414
Blue Hole Group	377	488
Hornsby	274	210
Ichetucknee	248	222
Poe / Lilly	237	241
River Rise	116	134
Sunbeam	80	103
Twin	29	49
Rum Island	24	26
July	12	11



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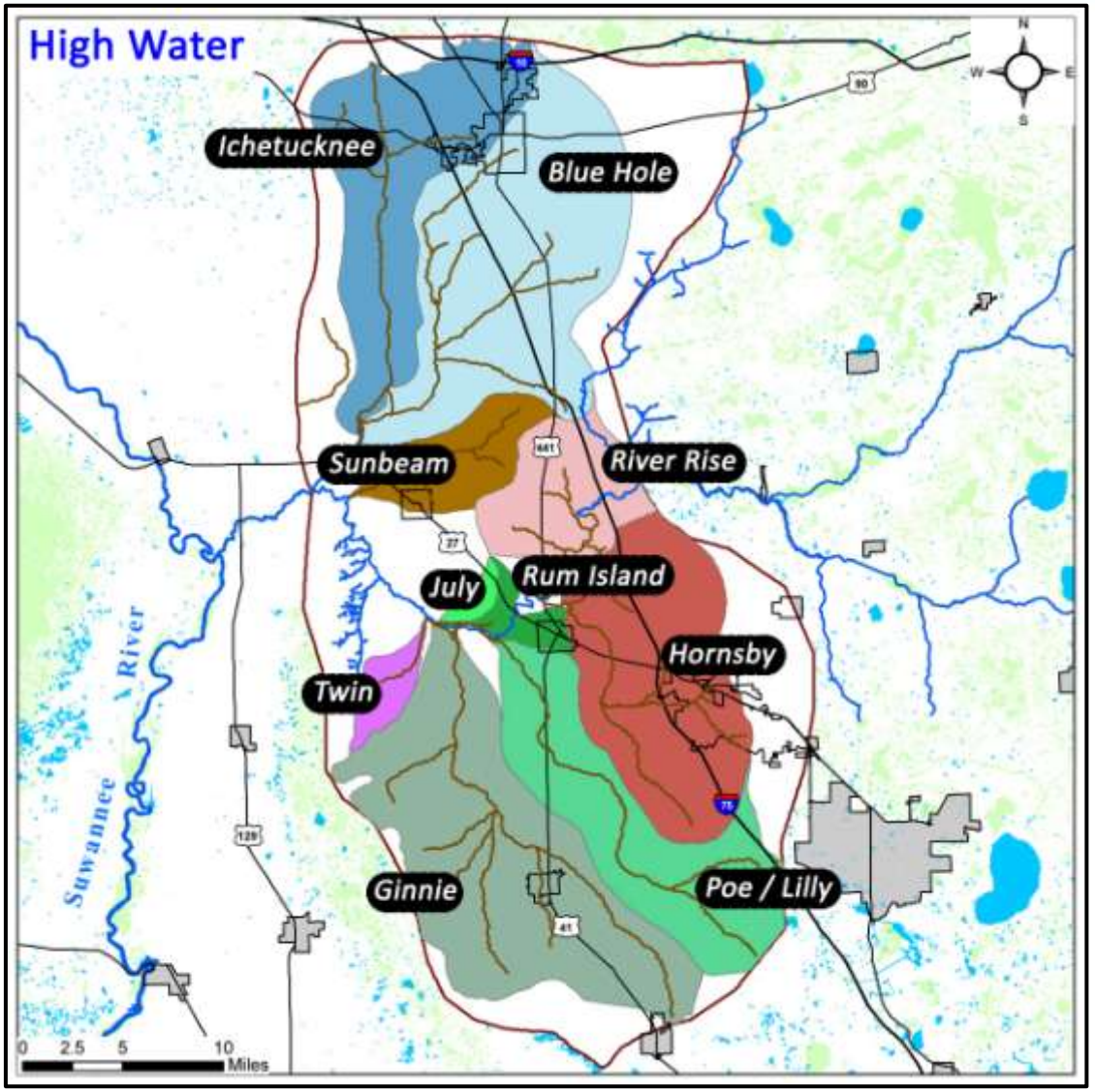
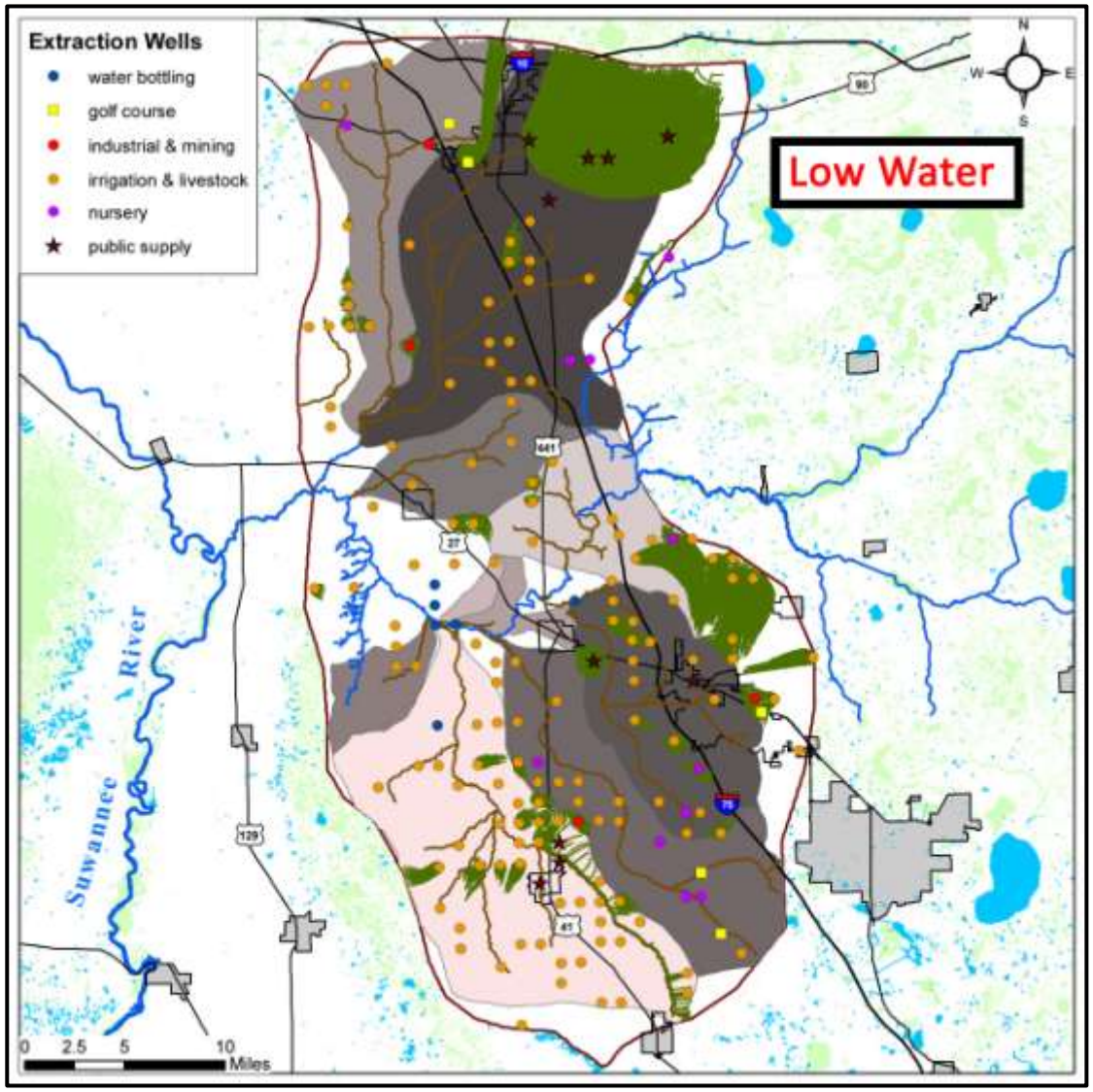


Modeled Pumping Impacts

- Pumping diminishes spring flows within the impacted springsheds.
- Particle tracking shows that pumping impacts the size and shape of the springsheds.
- Model simulates impacts to flows & springsheds.
- Example: Lake City
  - Average rate: 4.5 MGD
  - No pumping springsheds
    - Ichetucknee: 248-222 km^2
    - Blue Hole: 377-488 km^2
  - Pumping springsheds
    - Ichetucknee: 245-222 km^2
    - Blue Hole: 316-377 km^2
  - Reductions
    - Ichetucknee: -1% / 0%
    - Blue Hole: -19% / -30%



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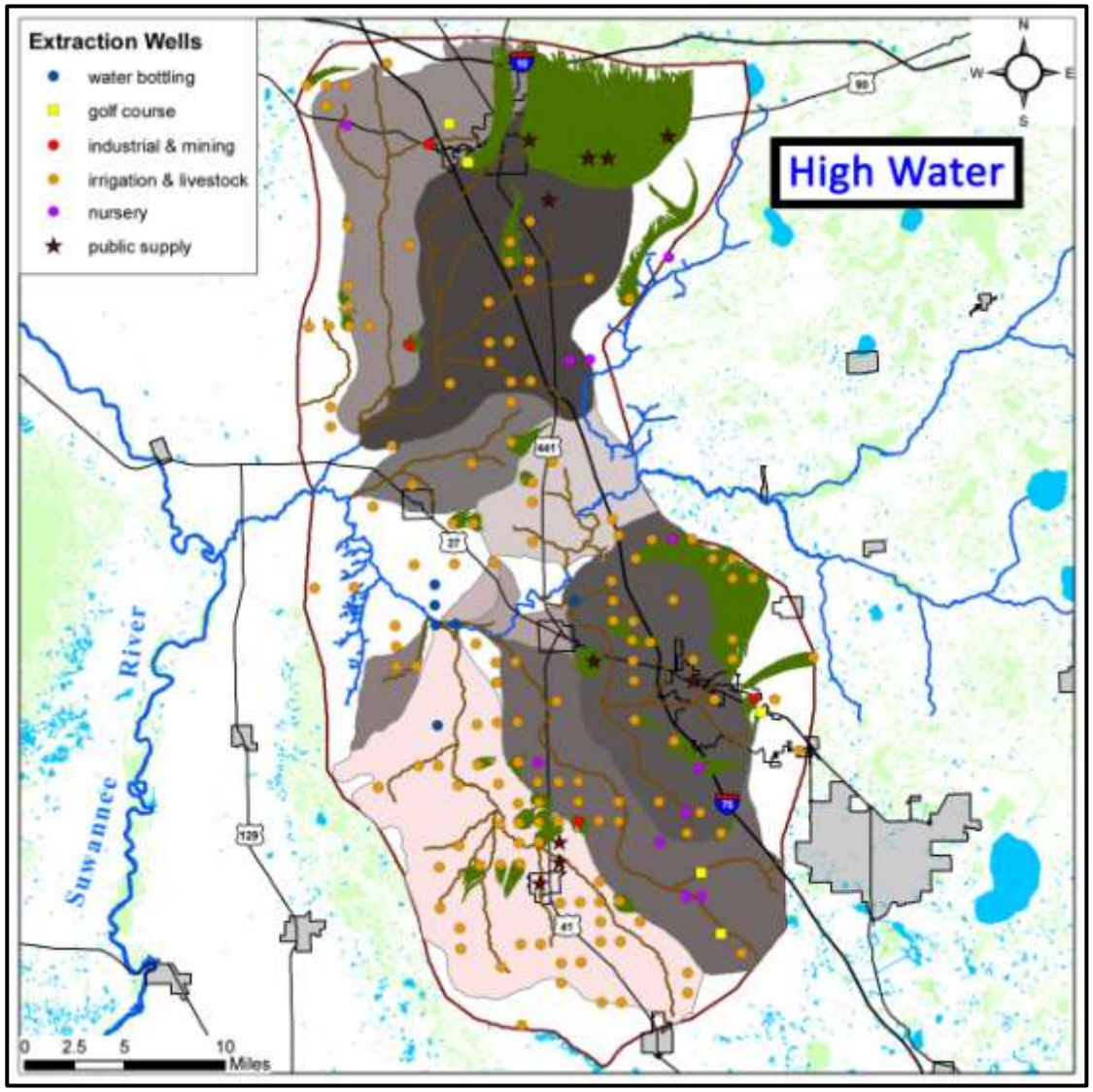


The Geek Stuff Matters

- Most decisions are based on models (i.e. how will the applicant's extraction impact flows)
- Can be said that all models are wrong
- But… Some models are way more wrong than others
- No such thing as a model that is good for quantity assessments but not for flow path and travel times – its either good or its bad.
- We've been using groundwater flow models to predict impacts since the 1970's.
  - If those models were correct then we must have seen all our problems coming and chosen not to act.
  - The only other possibility is that we believed in models that were wrong.
  - If so, then we have been acting out of ignorance.
- Now that we believe that caves, springs, and swallets exist, our models need to honor their existence.
- To not do so – to continue using models that are demonstrably wrong –
  is to be "willfully" ignorant.

No Karst in my County…

Beneath the Pink Underwear

Water pollution is more serious than the WASD plan would have you believe

BY STEVEN DUDLEY
steven.dudley@miaminewtimes.com

miaminewtimes.com | originally published: June 5, 2003

Alex Barrera

- *No caves*
- *No big springs*
- *No sinking streams*
- *Can still have conduit flow!*

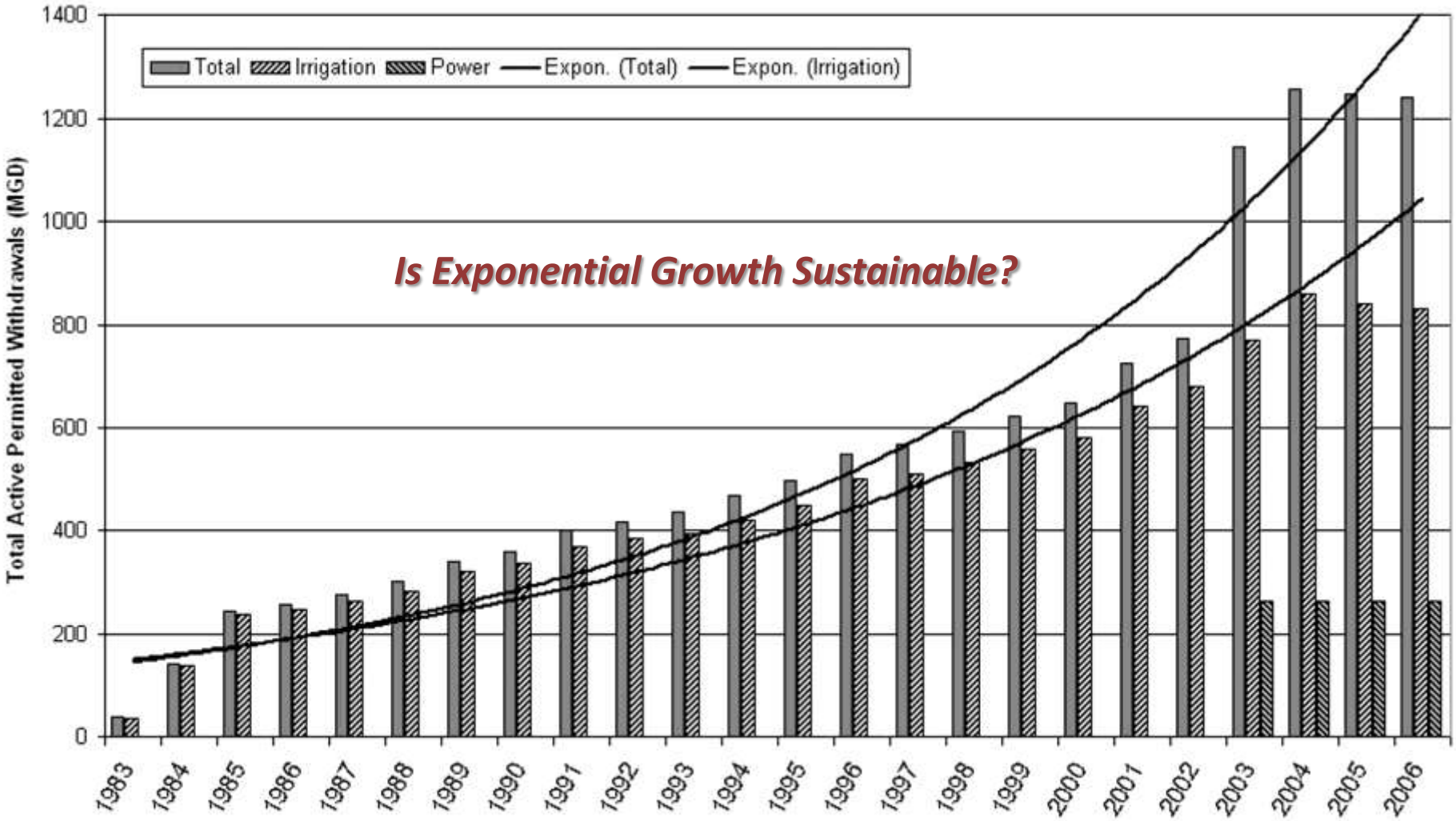
- Quarries located close to Northern Miami-Dade well field
- Potential source of contamination to the wells
- Conventional wisdoms "models" state that groundwater travel times are slow (many days)
- Dye tracing – on the other hand – showed that travel times are hours: *1.5 orders of magnitude higher!*
- *Problem was that the trace was designed assuming the slower rate and as a result the wells were flooded with red dyed water turning people's underwear pink*
- Lesson: limestone + rain = karst
- Adequate protection measures must be based on accurate conceptualizations "models"

Summary

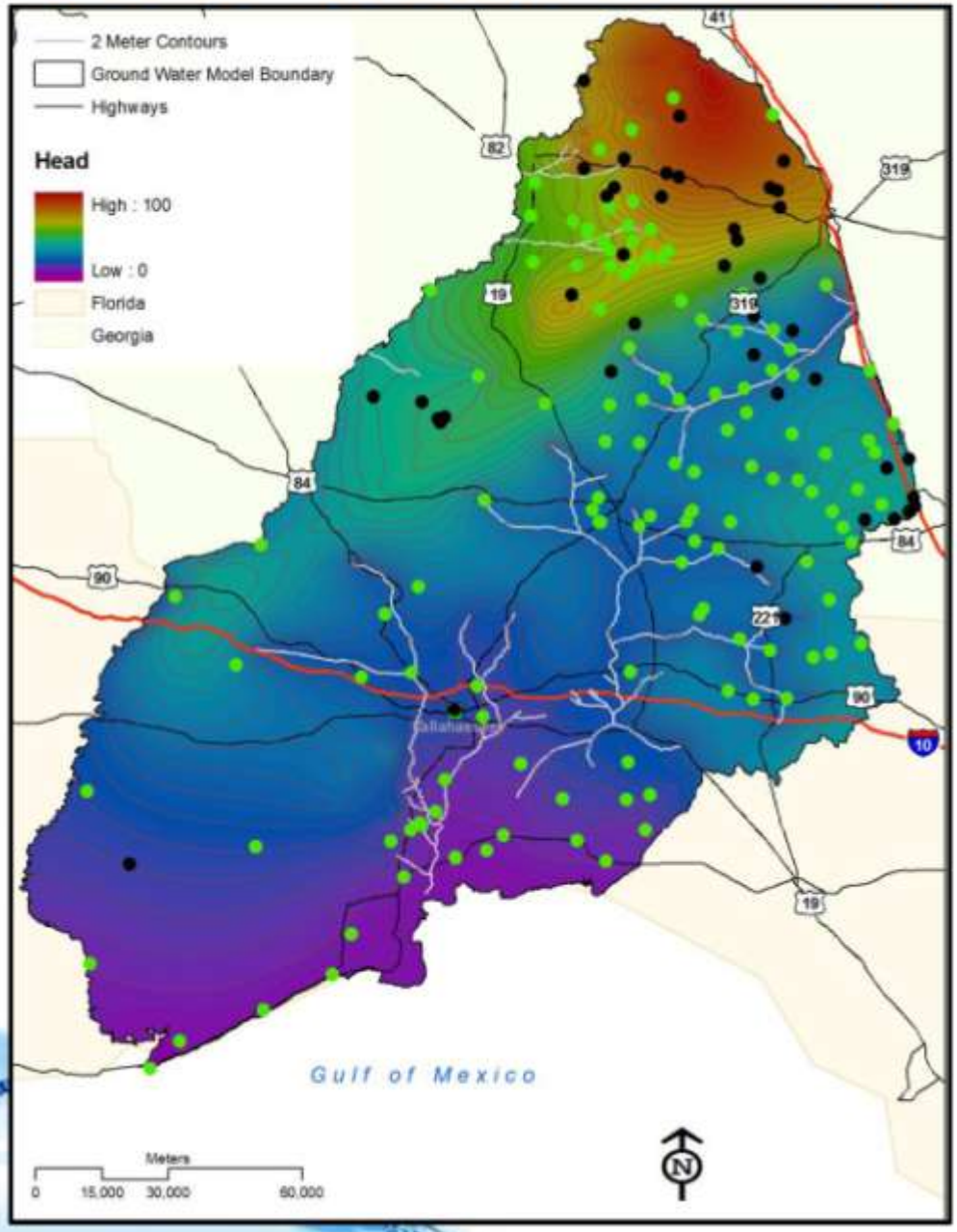
- We are loosing springs & mining groundwater.
- Pumping is at least part of the reason.
- In order to adequately predict impacts, we need to establish reasonable water budgets and use models that are designed to include the key components of karst aquifers.
- We need more public involvement because the devil lies in the detail *(not enough to do studies and make models – they must be good).*
- We need to sustain and expand monitoring programs (wells, springs, rivers).
- We need to set limits to groundwater pumping *(we cannot keep pumping more water).*

We're Using Too Much

About 1250 MGD by 2006 (~1950 cfs = ~1/2 base flow at Wilcox)



Model Results: Groundwater Levels



- Green dots mark wells that fall within the calibration range.
- Black dots mark wells that fall outside of the calibration range.
- Black dots near conduts can be brought into calibration through continued manipulation of conduit locations and parameter settings.

GeoHydros

Attachment 3

Slides Presented by Dr. Robert Knight at the Stakeholder Representative's Springs Coast Minimum Flows and Levels Public Workshop Facilitated by the Southwest Florida Water Management District

Adequate Flows for Florida's Springs:

Ecosystem Considerations

Robert L. Knight, Ph.D.

Howard T. Odum FLORIDA SPRINGS INSTITUTE

Presentation Outline

- Importance of Ecosystem-Level Assessment
- Indicators of Springs Impairment
- Concerns About Existing MFL Methods as Applied to Springs
- Suggestions for Assessment of Springs Impairment and Recovery

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Importance of Ecosystem-Level Assessment

Howard T. Odum
FLORIDA
SPRINGS
INSTITUTE

Howard T. Odum and Florida Springs Ecology

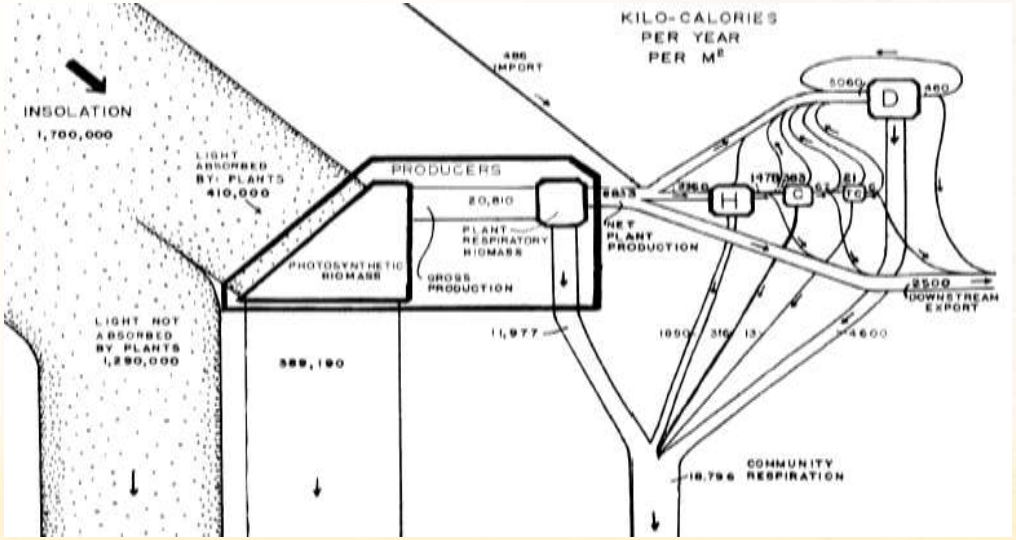
Founder of Systems Ecology and author of:

- Trophic Structure and Productivity of Silver Springs, Florida (Ecological Monographs 1957)
- Primary Production Measurements in Eleven FL Springs… (L&O 1957)

Silver Springs Ecosystem Study (Odum 1957)

Key Conclusions:

- Springs are ideal study ecosystems due to their relatively constant chemistry, clarity, and flows
- Spring ecology is complex and finely tuned to maximize the rates of primary productivity and community respiration (ecosystem metabolism)



Need for Ecosystem-Level Measures

- Response of single species and species groups does not reflect the overall ecosystem response
- Need sensitive system-level measures with predictable and repeatable responses to stress

Ecosystem Metabolism

Ecology: The scientific study of organisms and their environment, including the movement of materials and energy through living communities. Ecosystem or community metabolism includes:

- Gross Primary Productivity (GPP)
- Community Respiration (CR)
- Net Ecosystem Productivity (NEP) = GPP - CR

Economic Analogy

Economics: Economics is the social science that studies the production, distribution, and consumption of goods and services. Important economic indicators include:

Gross National Product (Gross Income) – a measure of a country's (company's) overall economic output (production or sales)

Consumption (Expenses) – goods and services (costs) utilized in production

Net Profit – gross income minus expenses

Silver Springs Biomass Pyramid (Odum 1957)

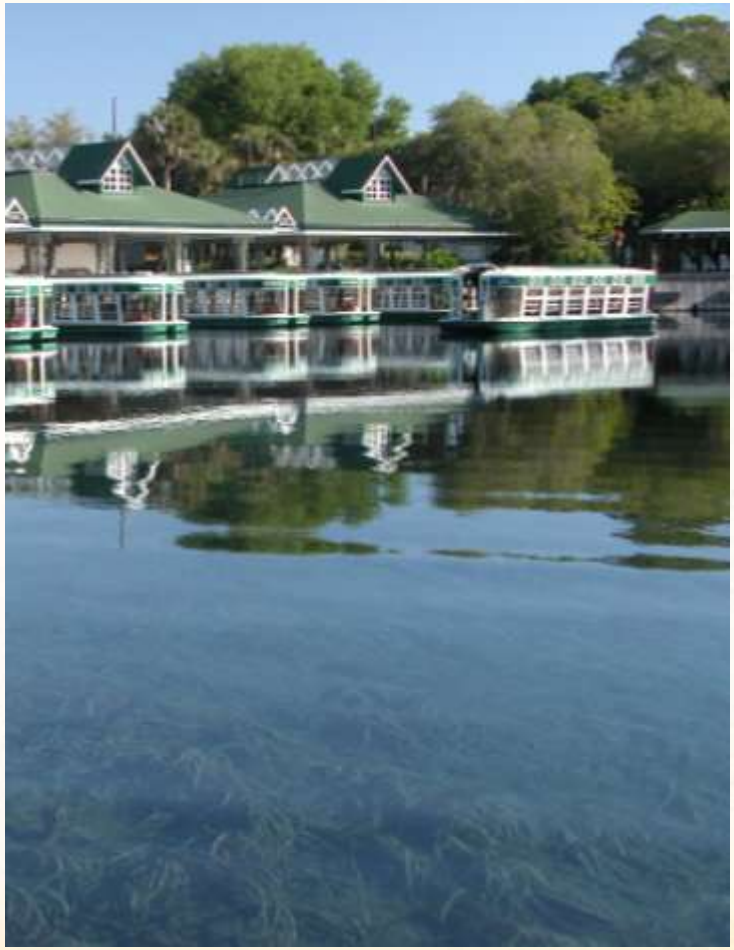
Top Consumers
Bass, Birds, and Alligators = 1.53 g/m² (14 lbs/ac)

1º Consumers
Fish and Midges = 10.7 g/m²
(97 lbs/ac)

Herbivores
Turtles, Snails, Mullet = 36.8 g/m²
(335 lbs/ac)

Silver Springs Ecosystem Metabolism (1952-55)

- Ecosystem Metabolism Measured from Main Boil to 1,200-m Station:
  - Gross Primary Productivity = 6,390 g/m^2/y (57,100 lbs/ac/yr)
  - Community Respiration = 6,000 g/m^2/y (53,600 lbs/ac/y)
  - Net Community Productivity = 768 g/m2/y (6,900 lbs/ac/y)



Upstream-Downstream Dissolved Oxygen (DO) Change Method

$$\Delta DO = GPP - CR \pm D \pm A$$

where:

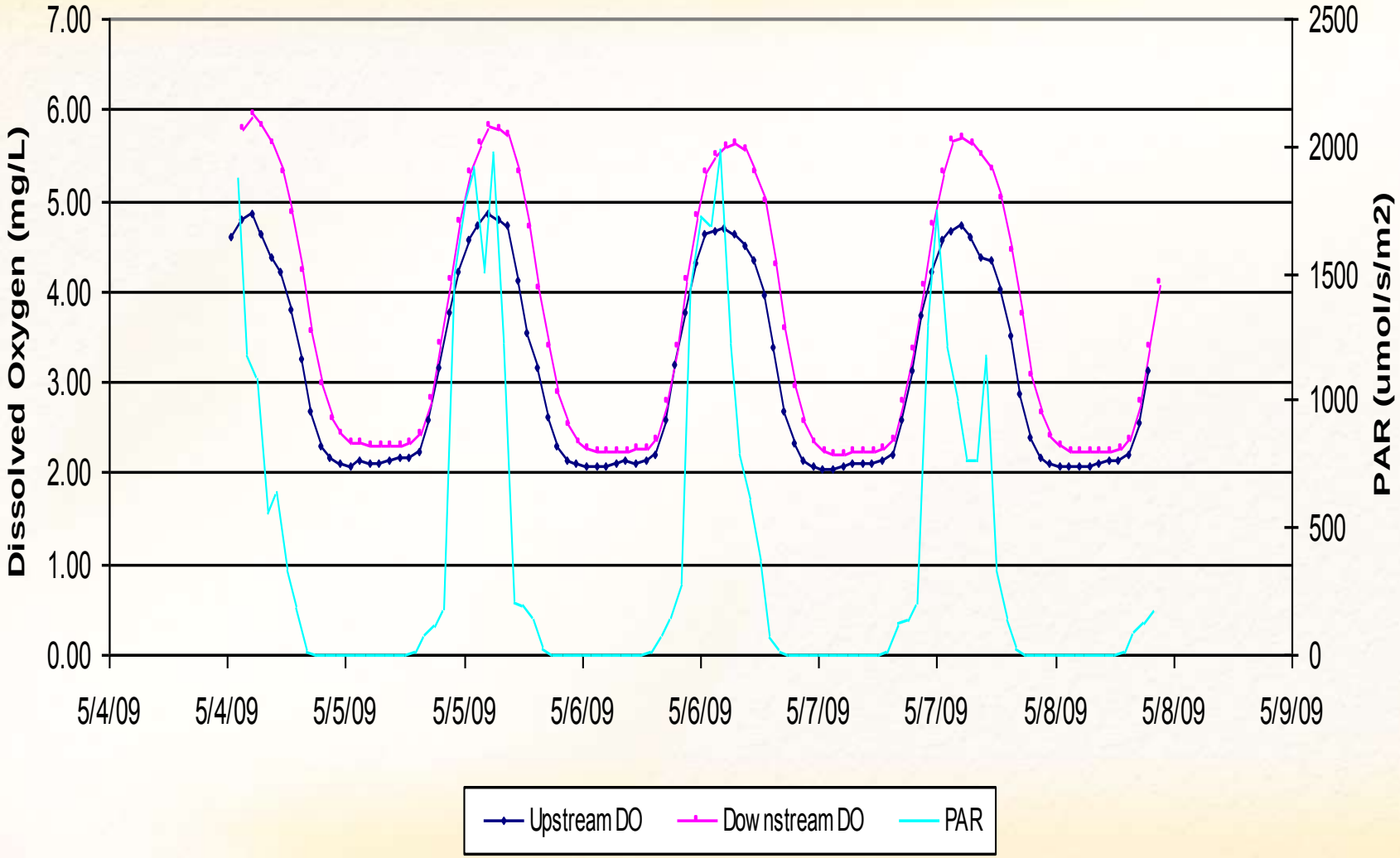
GPP = gross primary productivity

CR = community respiration

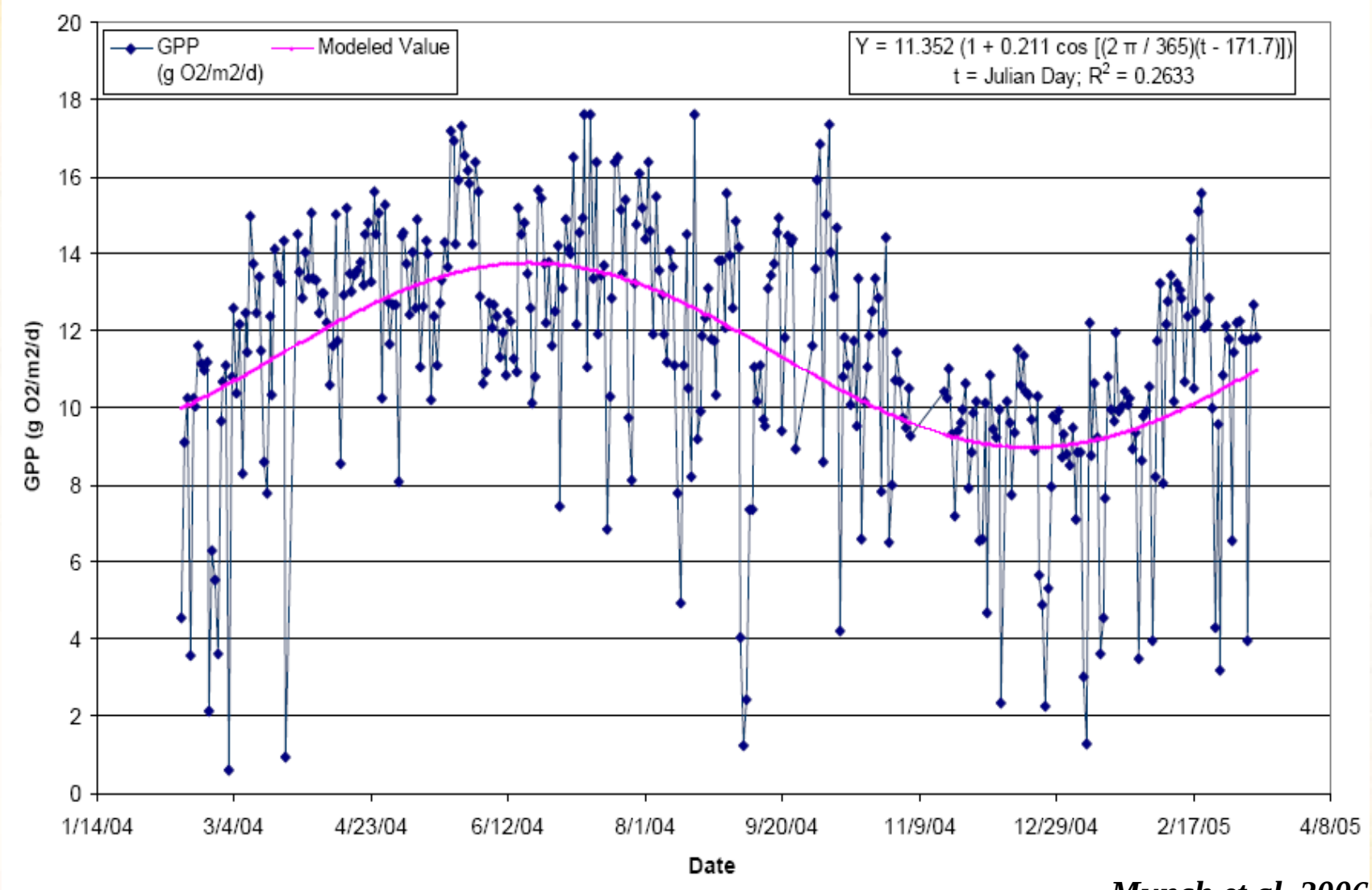
D = DO diffusion

A = DO accrual

Upstream-Downstream Dissolved Oxygen (DO) Changes (Silver Springs)



Silver Springs Daily GPP (2004-5)



Munch et al. 2006

Ecosystem Metabolism Comparison (1953 – 2005)

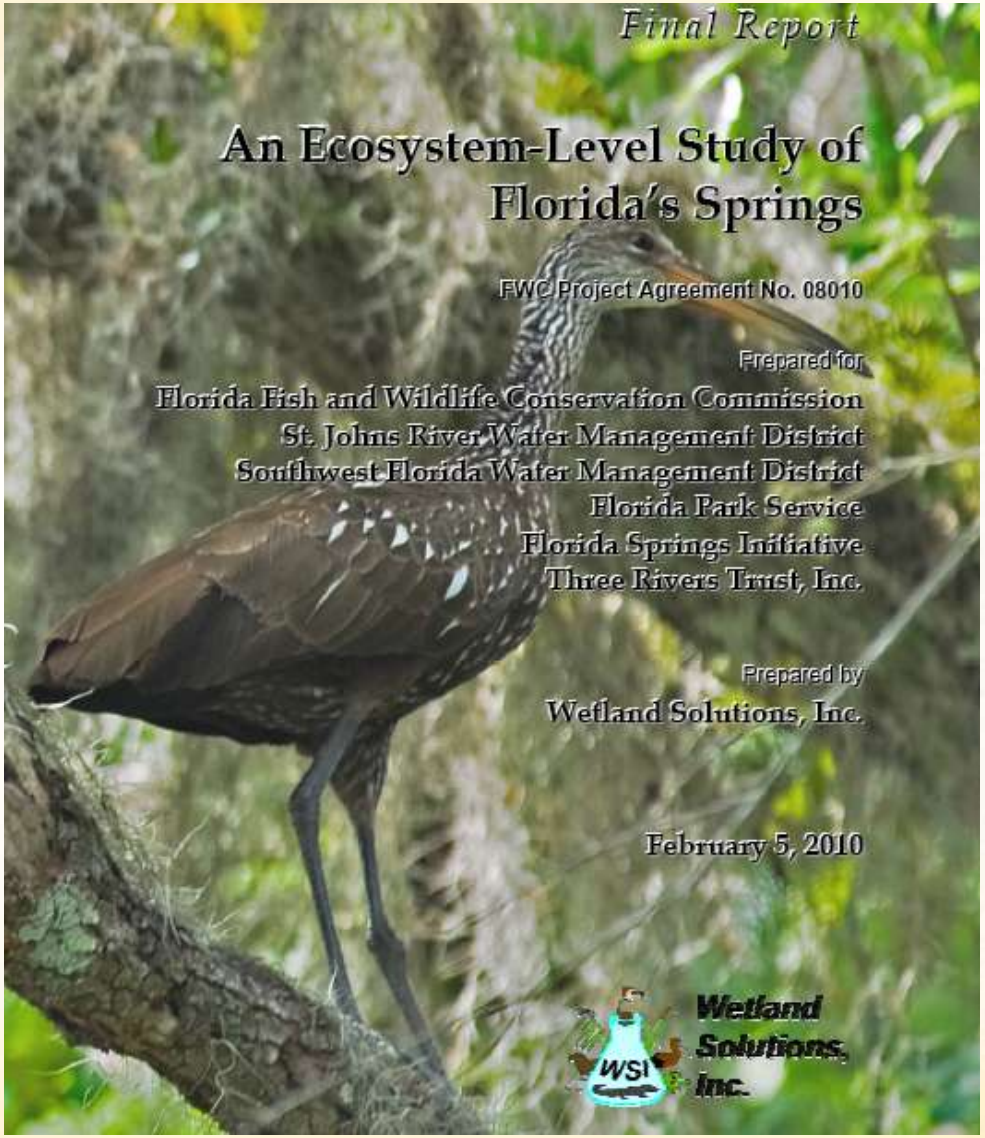
Silver Springs

Odum (1957)		Knight (1980)		WSI (this study)	
Date	GPP ($gO_2/m^2/d$)	Date	GPP ($gO_2/m^2/d$)	Date	GPP ($gO_2/m^2/d$)
2/19/1953	12.4	8/31/1978	19.3	Feb-04	8.2
3/7/1953	14.0	10/5/1978	13.6	Mar-04	11.4
3/25/1953	17.5	12/13/1978	7.8	Apr-04	13.2
1/7/1954	10.1	3/7/1979	10.7	May-04	13.9
5/23/1954	24.4	4/15/1979	16.8	Jun-04	12.7
7/12/1955	12.1	5/16/1979	23.4	Jul-04	13.6
8/11/1955	19.7	6/19/1979	20.7	Aug-04	12.3
		7/17/1979	11.2	Sep-04	10.9
		8/15/1979	17.1	Oct-04	11.7
				Nov-04	9.8
				Dec-04	8.5
				Jan-05	8.6
				Feb-05	11.1
				Mar-05	10.8
Average	15.7		15.6		11.2

Munch et al. 2006

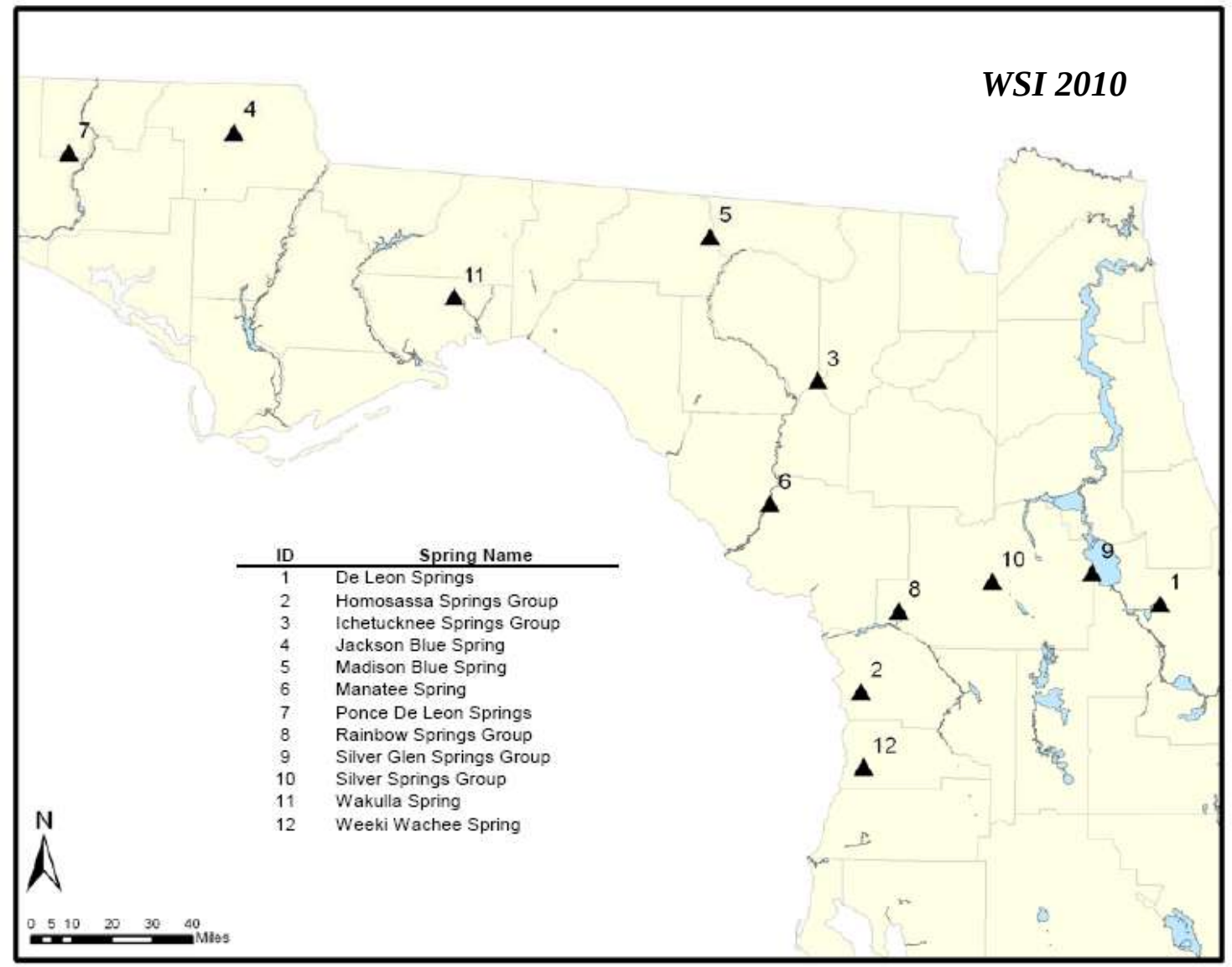
Florida Spring Ecosystem Study

- Funded by FWC, DEP, SJRWMD, SWFWMD, TRT
- Comparison of Ecosystem Structure and Function at 12 Springs



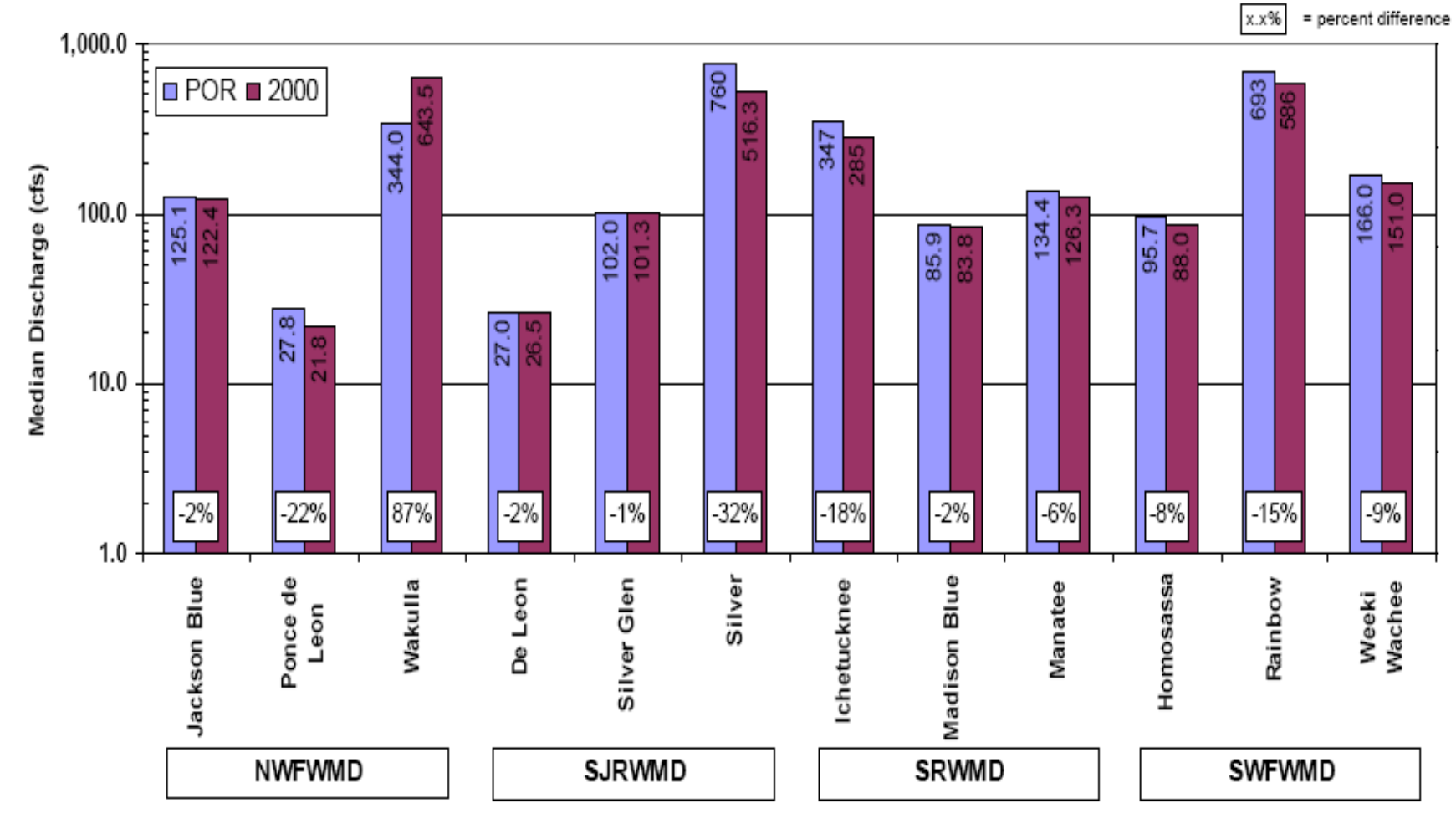
WSI 2010

Spring Ecosystem Study



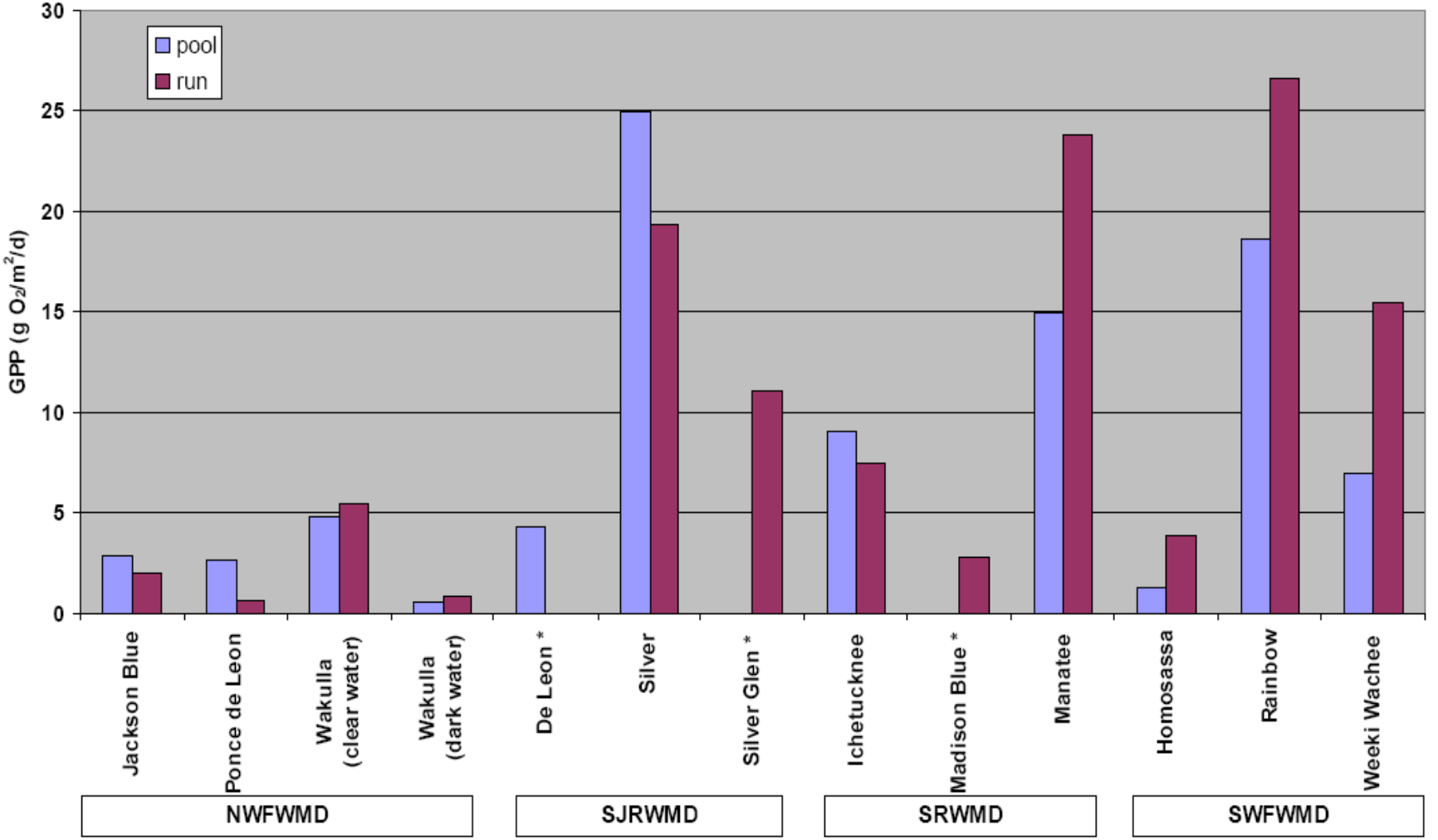
ID	Spring Name
1	De Leon Springs
2	Homosassa Springs Group
3	Ichetucknee Springs Group
4	Jackson Blue Spring
5	Madison Blue Spring
6	Manatee Spring
7	Ponce De Leon Springs
8	Rainbow Springs Group
9	Silver Glen Springs Group
10	Silver Springs Group
11	Wakulla Spring
12	Weeki Wachee Spring

Spring Discharge Changes



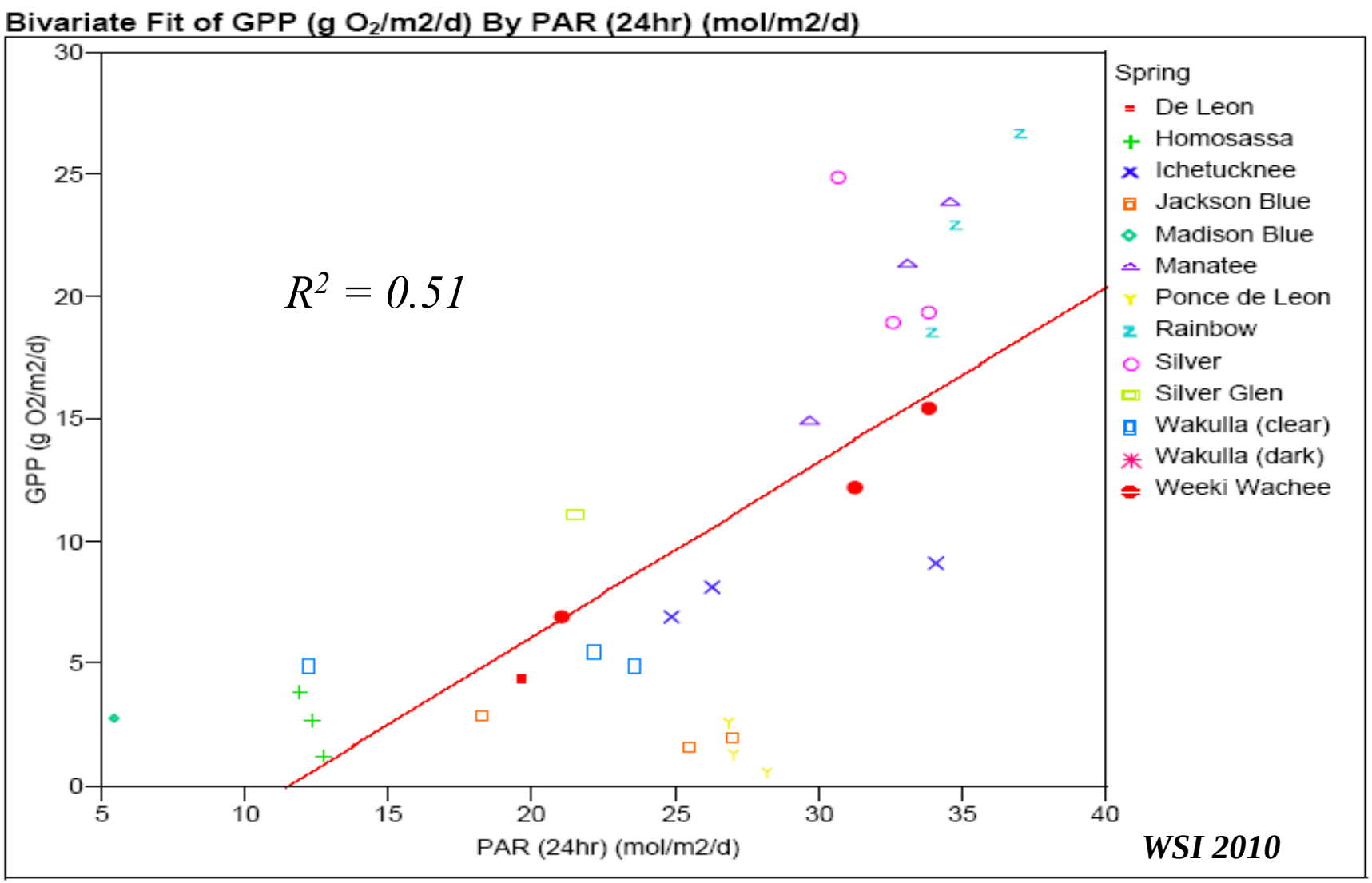
WSI 2010

Gross Primary Productivity

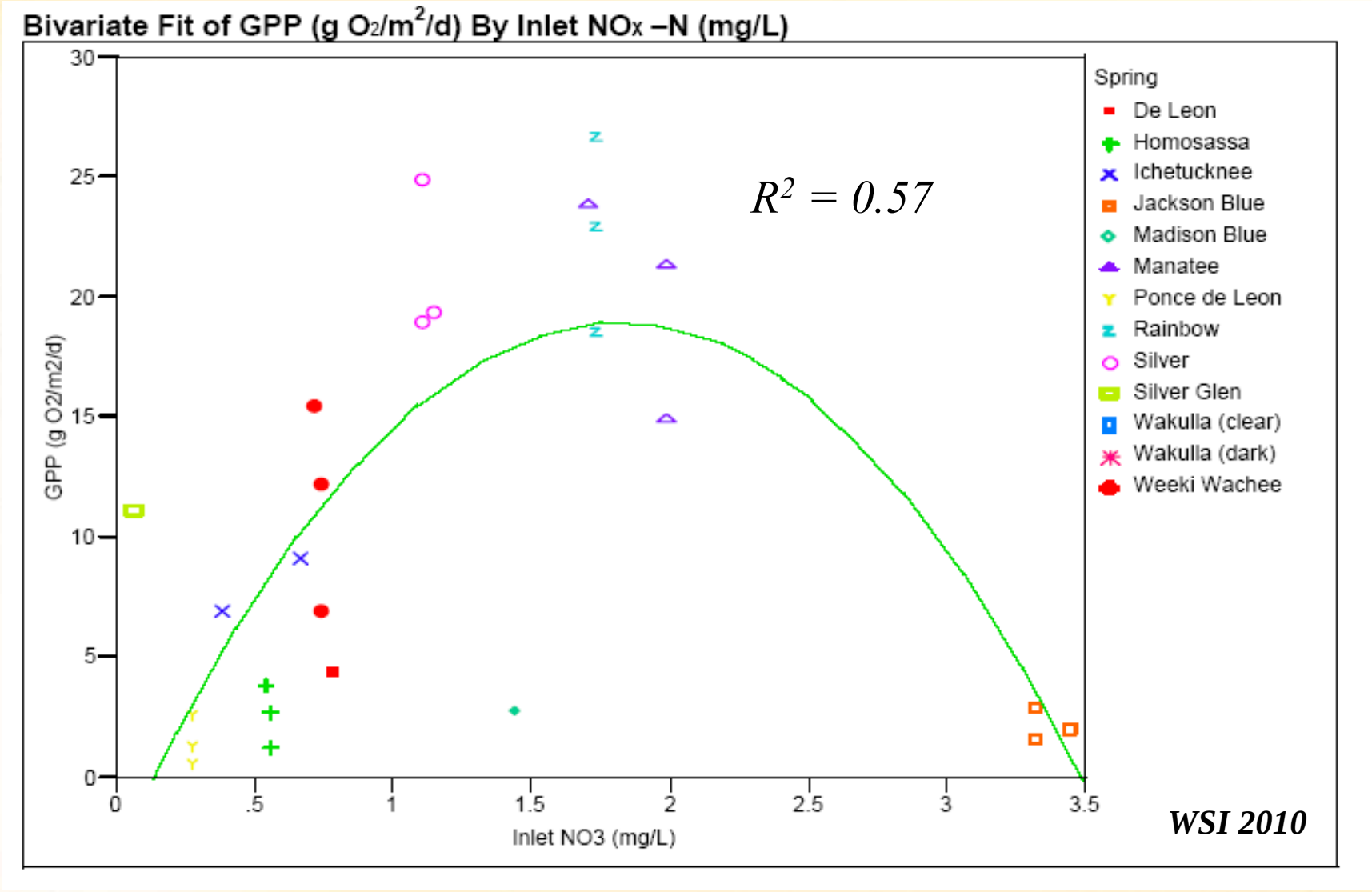


WSI 2010

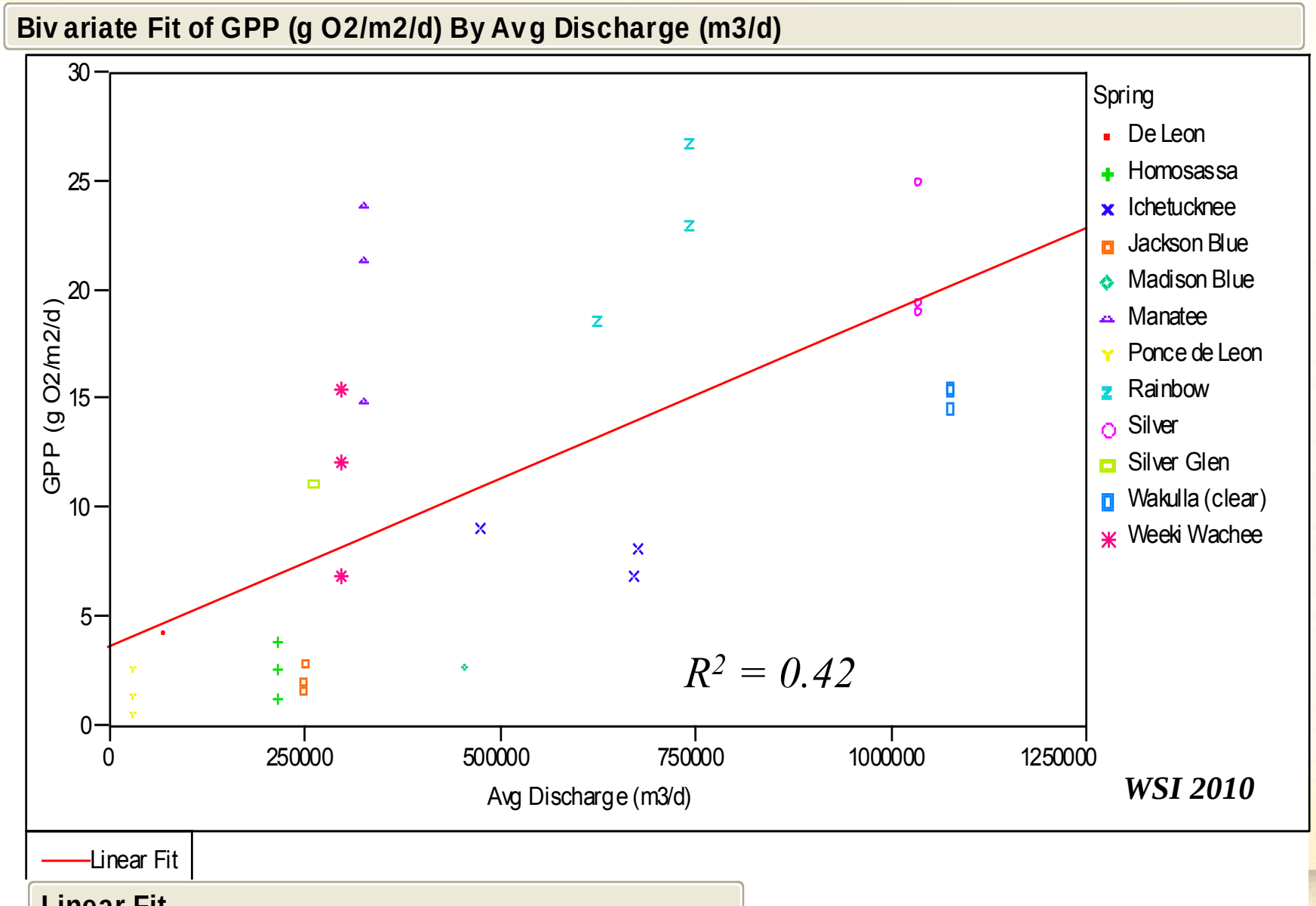
Solar Radiation vs. GPP



NO_3-N vs. GPP


Bivariate Fit of GPP (g O2/m2/d) By Inlet NOx –N (mg/L)
GPP (g O2/m2/d)
Inlet NO3 (mg/L)
0
5
10
15
20
25
30
0
.5
1
1.5
2
2.5
3
3.5
R² = 0.57
Spring
De Leon
Homosassa
Ichetucknee
Jackson Blue
Madison Blue
Manatee
Ponce de Leon
Rainbow
Silver
Silver Glen
Wakulla (clear)
Wakulla (dark)
Weeki Wachee
WSI 2010

Discharge vs. GPP



Conclusions

- Springs are threatened by a variety of stressors
- Single measures of impairment give ambiguous answers
- Whole ecosystem response is sensitive to change and may provide improved management decisions

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Indicators of Springs Impairments

Howard T. Odum
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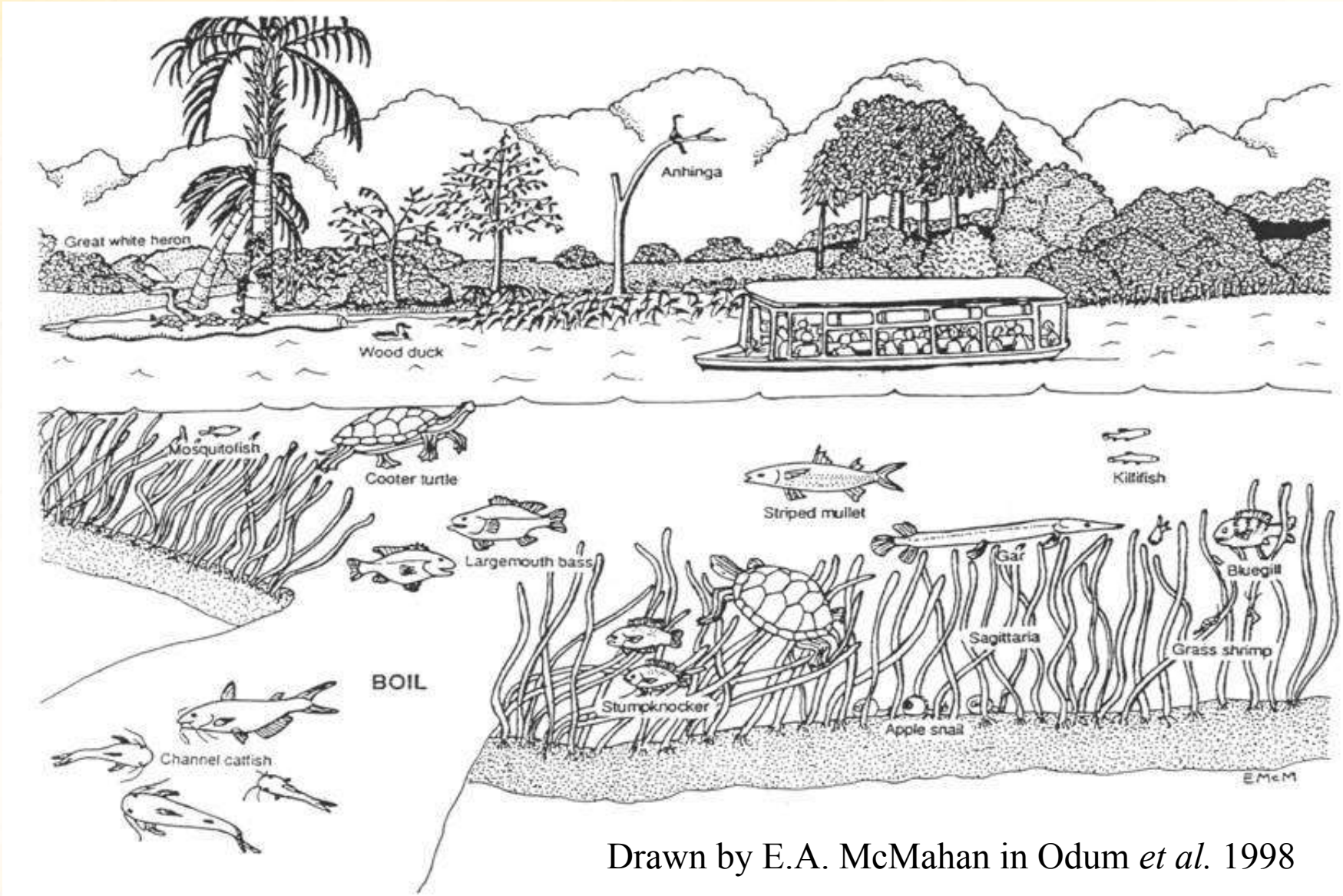
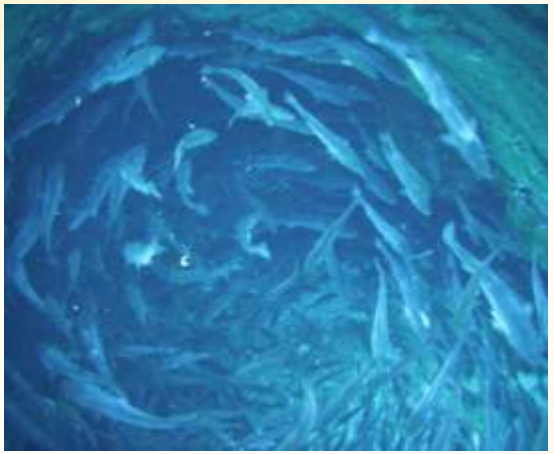
Healthy Springs Structure



Drawn by E.A. McMahan in Odum *et al.* 1998

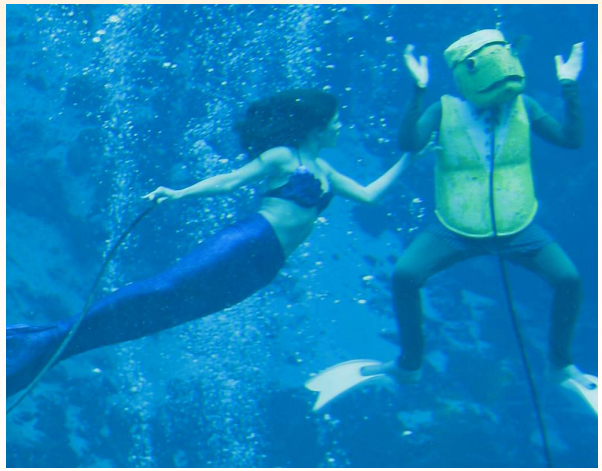
Springs Support a Unique Ecology

Florida's springs are essential habitat for a diverse and unique assemblage of plants and wildlife



Springs Provide Economic Benefits

The direct economic value of Florida's largest springs is estimated to be over $300,000,000 per year



Springs Inspire Aesthetic Appreciation

Springs are the soul of Florida – they inspire the mind, they cool the body, and they nourish the spirit

Impaired Water Bodies (FDEP 2009)

- Volusia Blue
- DeLeon
- Jackson Blue
- Silver Springs
- Rainbow
- Weeki Wachee
- Fanning
- Manatee
- Wakulla
- Etc.

Silver

Jackson Blue

Weeki Wachee

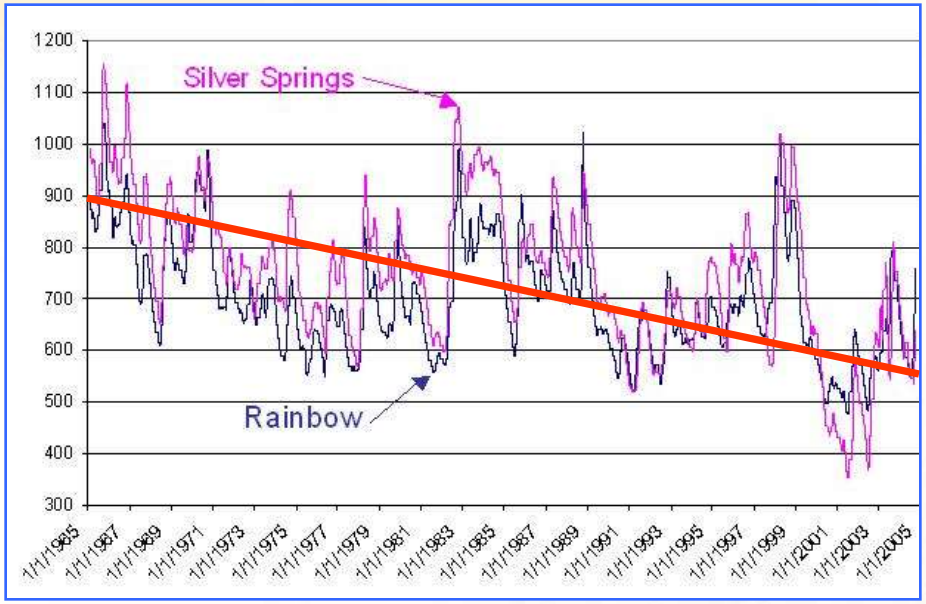
Rainbow

Springs Problem – Part I

- Groundwater resources are stressed:
  - Groundwater consumption is increasing
  - Groundwater levels are falling
  - Spring flows are declining

Sources of Impairments

- Flow Reductions
  - *Silver Springs*
  - *Rainbow Springs*



Spring	POR Flow (cfs)	2000-2009 (cfs)	% Change
Silver Glen	102	101	-1
Rainbow	693	586	-15
Silver	760	516	-32

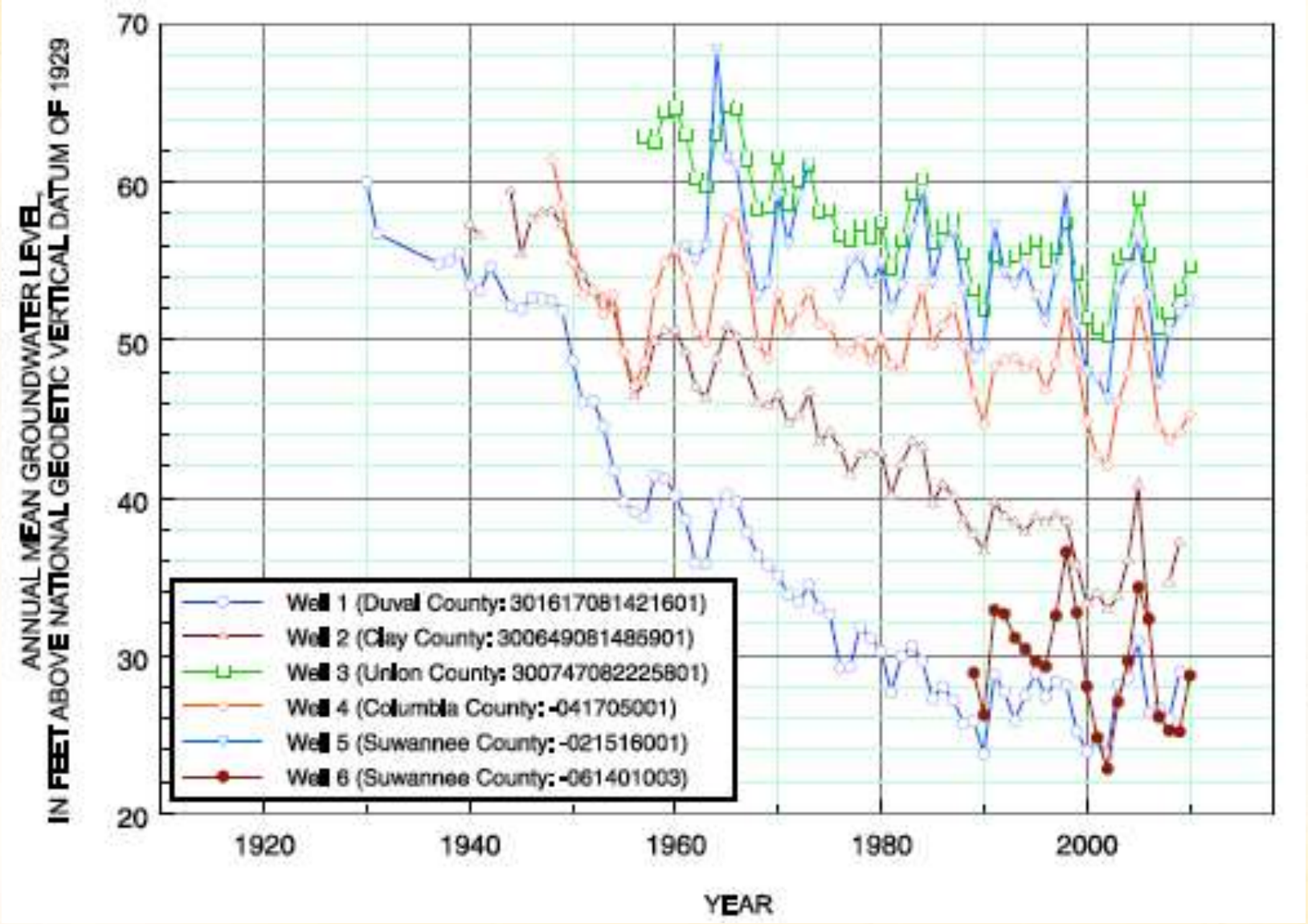
Increasing Groundwater Uses

Agriculture

Residential

Golf Course

Declining Groundwater Levels in North Florida (Grubbs 2011)



White Springs on the Suwannee River in the 1920s
(from Scott et al. 2004)

72 cfs

White Springs on the Suwannee River 2011
(photo by John Moran)

Declining flows since 1960s

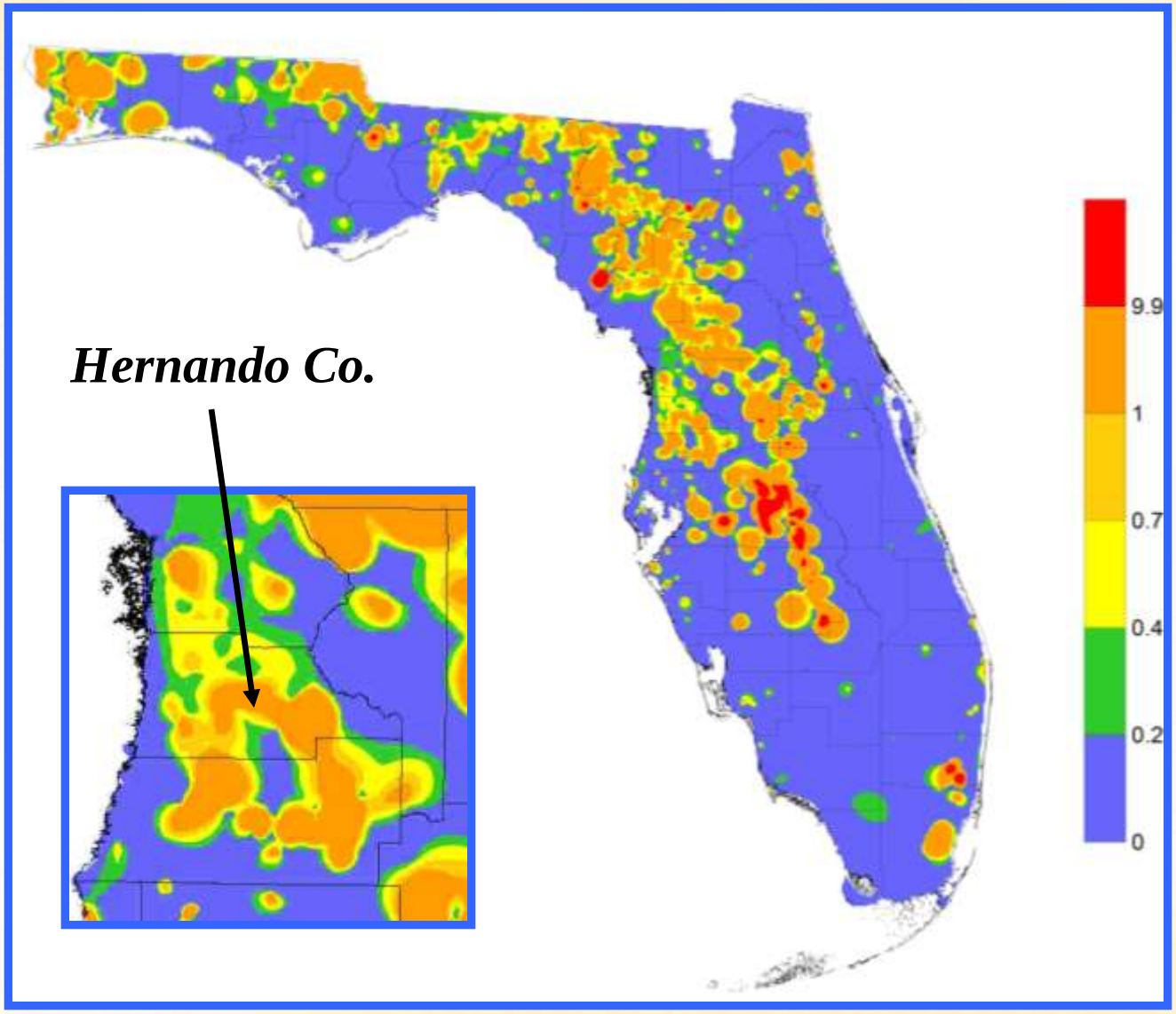
Springs Problem – Part 2

- GW nitrate nitrogen levels are increasing:
  - Nitrate contamination is wide-spread in the Floridan Aquifer
  - Springs are sensitive to elevated nitrate

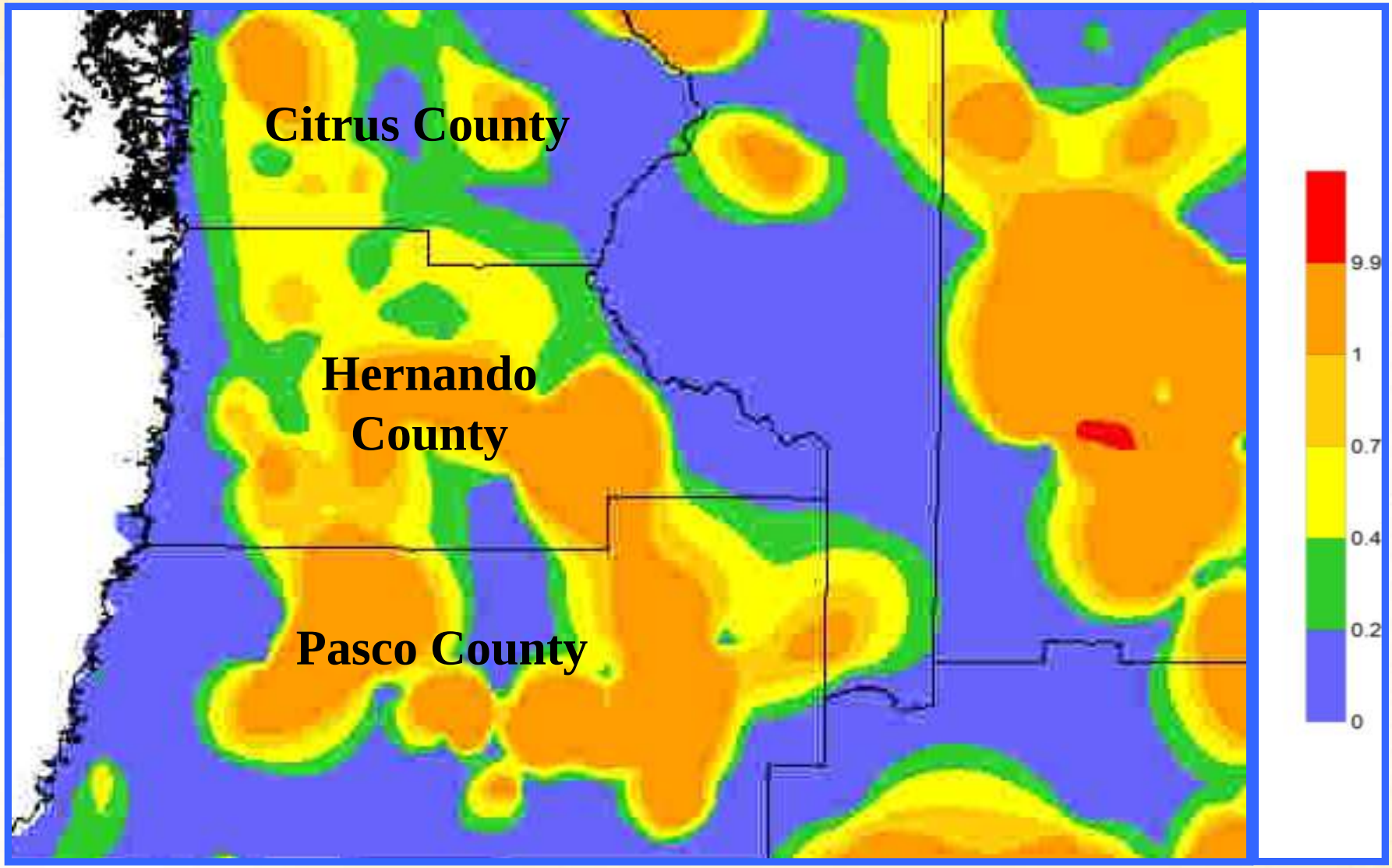
Nitrogen Sources

Agricultural and Urban Development are Resulting in Elevated Nitrate Nitrogen Concentrations throughout North and Central Florida (and Many Other Areas of the U.S.)

Groundwater Nitrate Concentrations (mg/L)



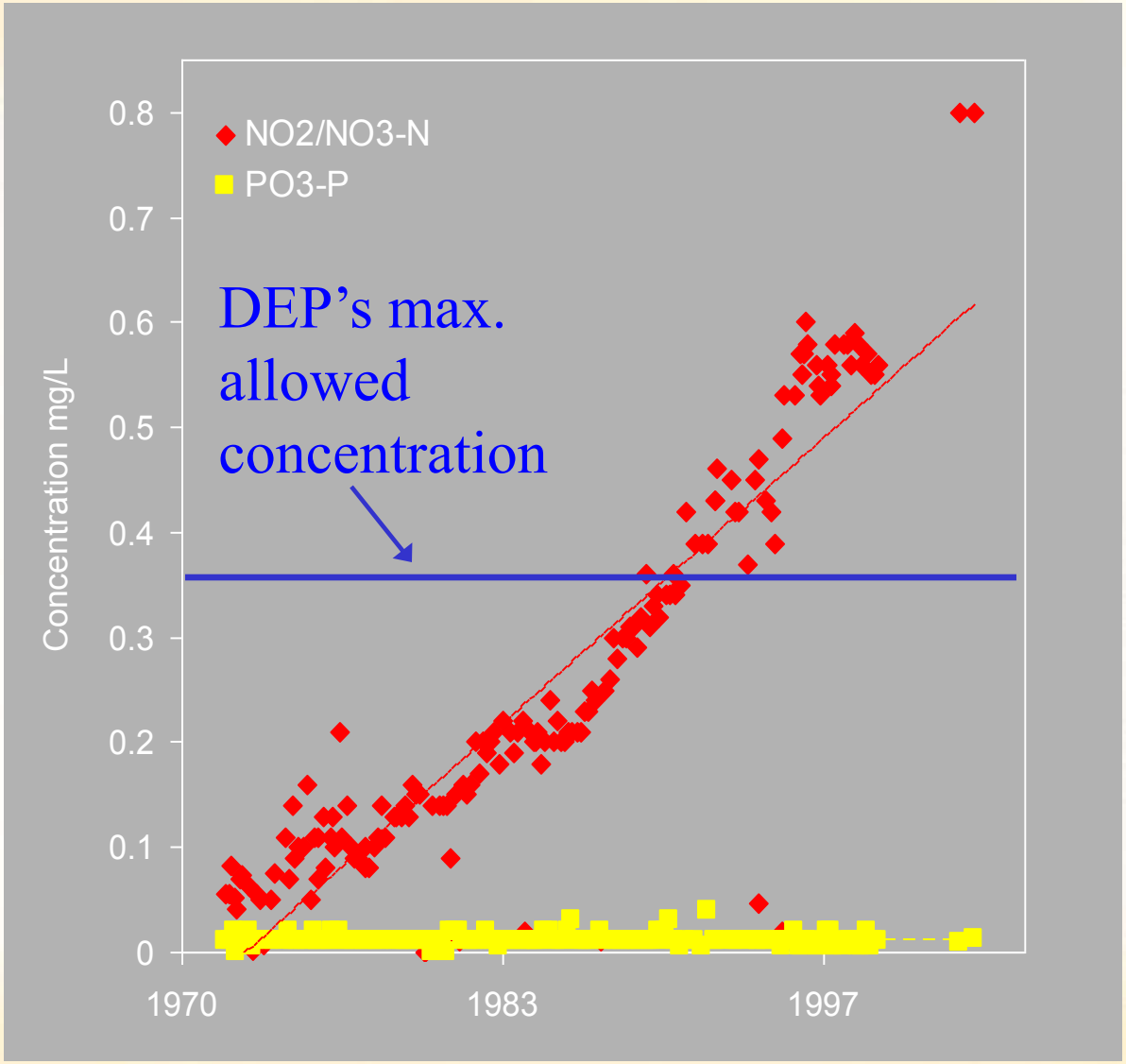
Springs Coast Groundwater Nitrate-N (mg/L)



Weeki Wachee Springs Nitrate

Weeki Wachee Springs:

Nitrate increase = 1,500% since 1970



Frydenburg 2008

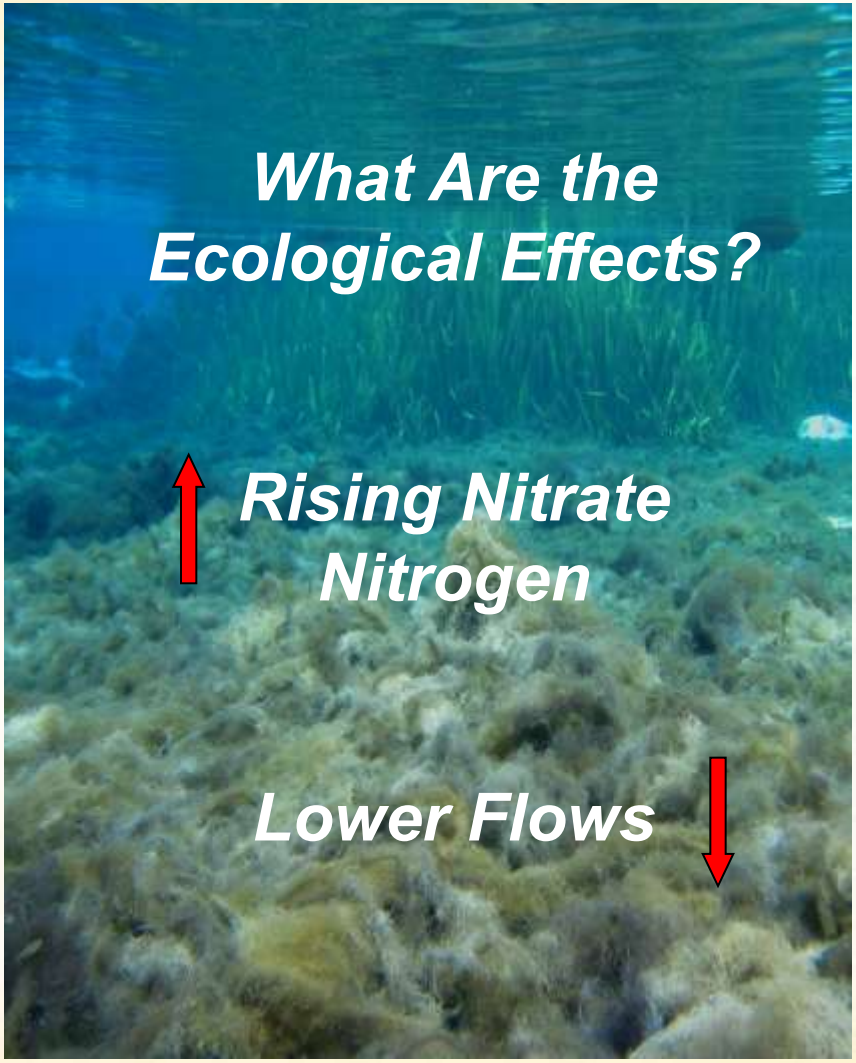
Nitrogen in Springs = More Algae

Weeki Wachee, circa 1950s

Weeki Wachee 2001

Springs Impairment

- Synergistic Effects of Decreasing Flows and Increasing Nitrate
  - Increased algal densities,
  - Declining macrophyte cover,
  - Reduced photosynthetic efficiencies
  - Declining native fish and turtle populations
  - Invasions by exotic fish and wildlife species, etc.



Adequate Flows for Florida's Springs:

Concerns About Existing MFL Methods as Applied to Springs

John Moran Photo

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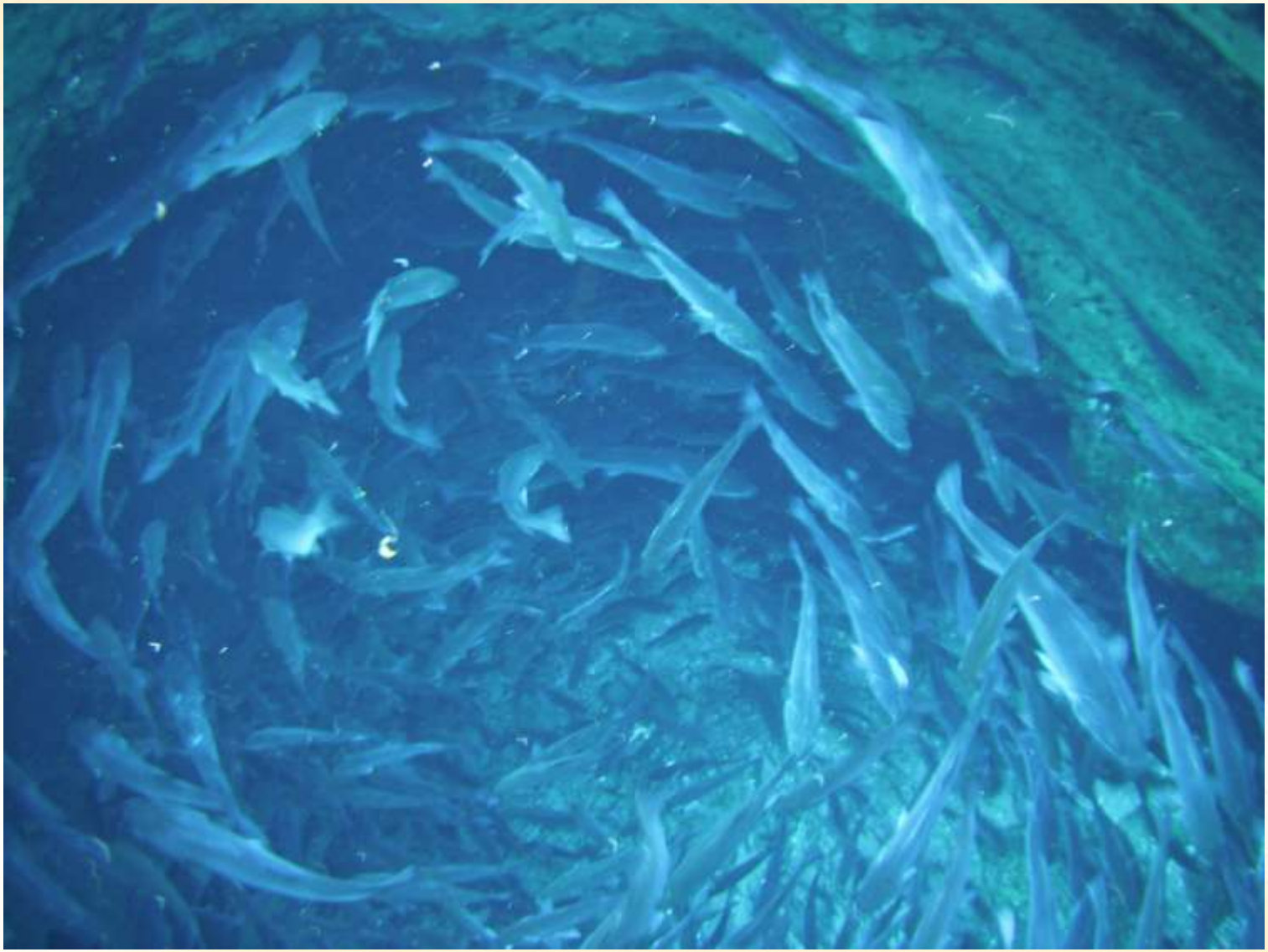
Ten Water Resource Values

1. Recreation in and on the water
2. Fish and wildlife habitats and passage of fish
3. Estuarine resources
4. Transfer of detrital material
5. Maintenance of freshwater storage and supply
6. Aesthetic and scenic attributes
7. Filtration and absorption of nutrients and other pollutants
8. Sediment loads
9. Water quality
10. Navigation

Chapter 62-40.473, F.A.C.

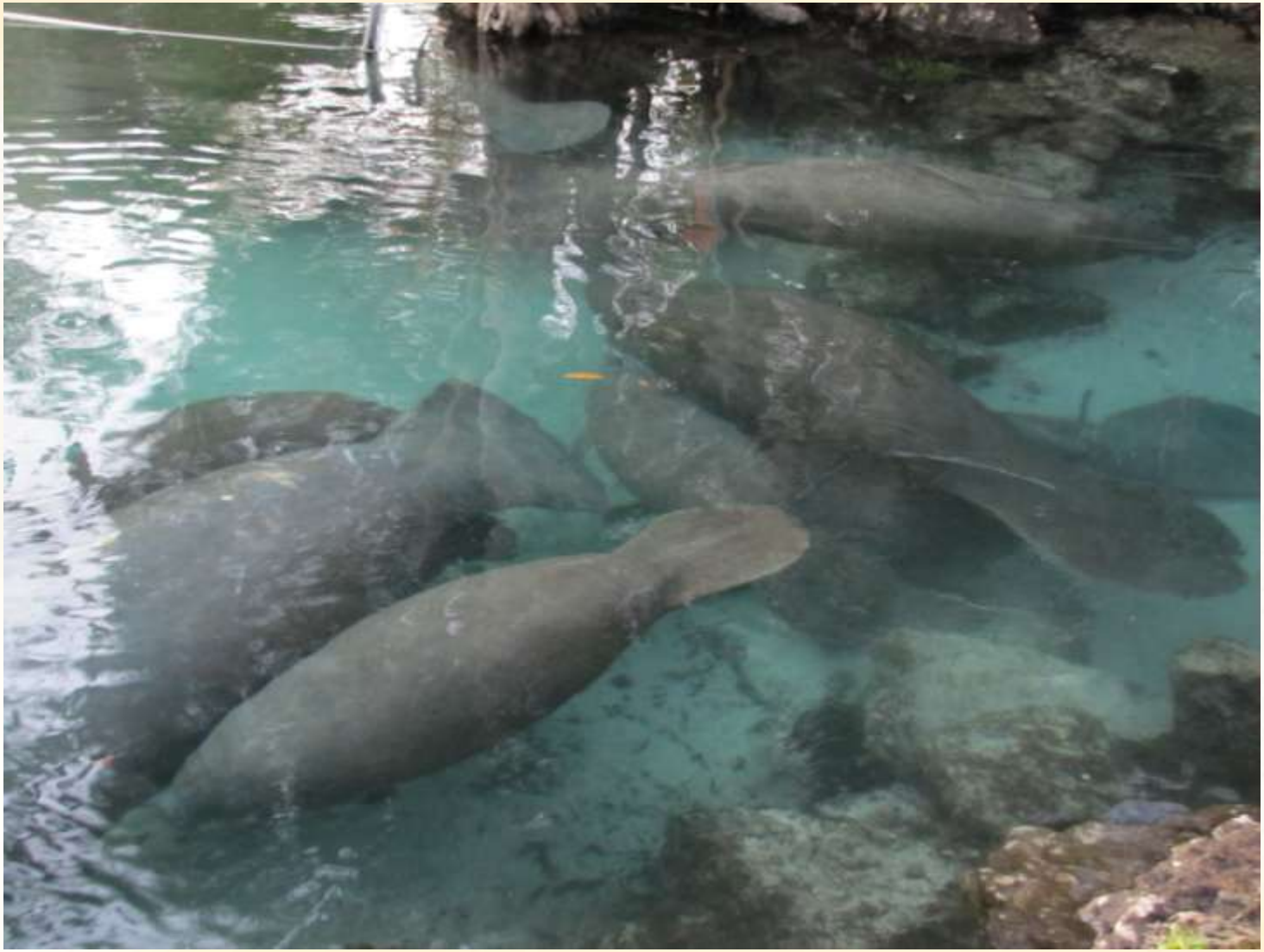
Rainbow Springs – Plant Diversity

Silver Glen Spring – Marine Fish



Ichetucknee Springs – Loggerhead Musk Turtle

Three Sisters Springs - Manatees



Weeki Wachee Springs – Tourist Attraction

Ichetucknee Springs - Tubing

Alexander Springs – Recreational Scuba Diving

Wekiwa Spring - Kayaking

Significant Harm Uncertainties

- Historic vs. Current Conditions
  - *We typically do not have an adequate baseline to assess how flows and levels have already declined*
  - *We are also often lacking historical or even current data concerning the ecological structure and function of the spring resource*

Bruce Mozert, Silver Springs, circa 1950s

Significant Harm Uncertainties

- Worst-Case Scenarios
  - *Groundwater pumping is typically greatest under the most extreme drought conditions*
  - *This "adding-insult-to-injury" puts a double-impact on the hydrology and ecology of springs*

Margaret Ross Tolbert's

"Sirenia"

Significant Harm Uncertainties

- Groundwater Withdrawals
  - *Recorded groundwater withdrawals are a poor estimate of total groundwater use because of inadequate flow-monitoring thresholds*
  - *Groundwater models are too simplistic given the true nature of karst geology, and existing data are often inadequate for calibration*

Bruce Mozert, Silver Springs, circa 1950s

Significant Harm Uncertainties

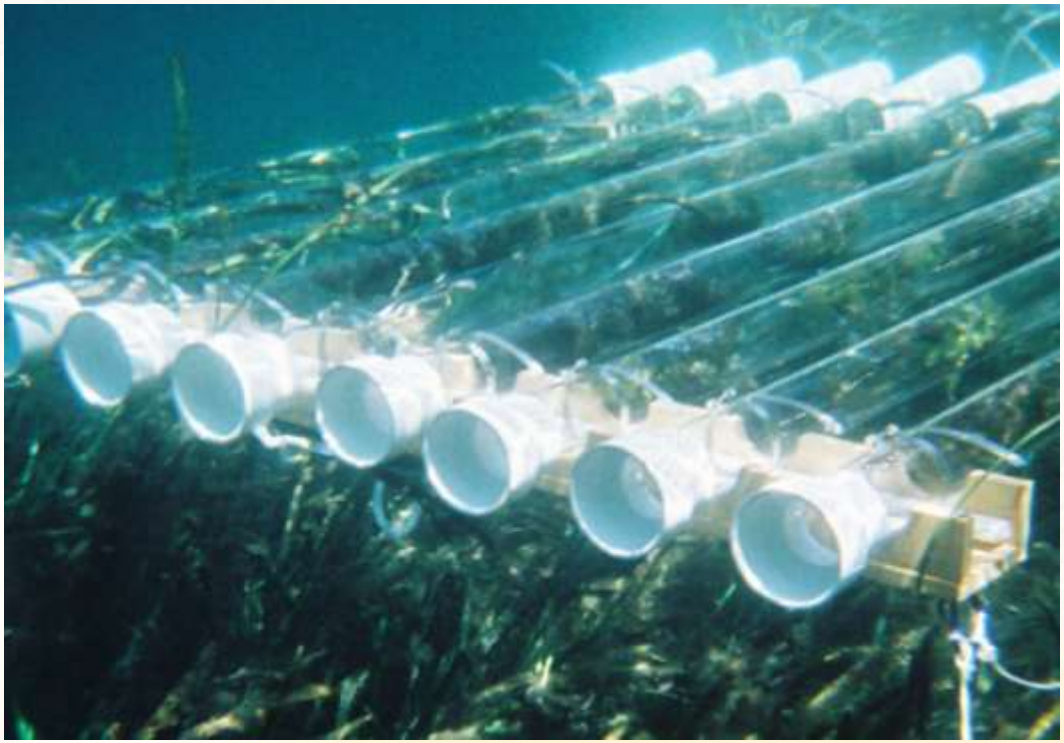
- Outstanding Florida Waters
  - *The standard is* **"no degradation"**
  - *Springs with declining flows often have: increasing temperature, specific conductance, and nitrate; and decreasing dissolved oxygen and water clarity-* **All violations of OFW requirements!**

Wes Skiles photo

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Assessment of Springs Impairment and Recovery



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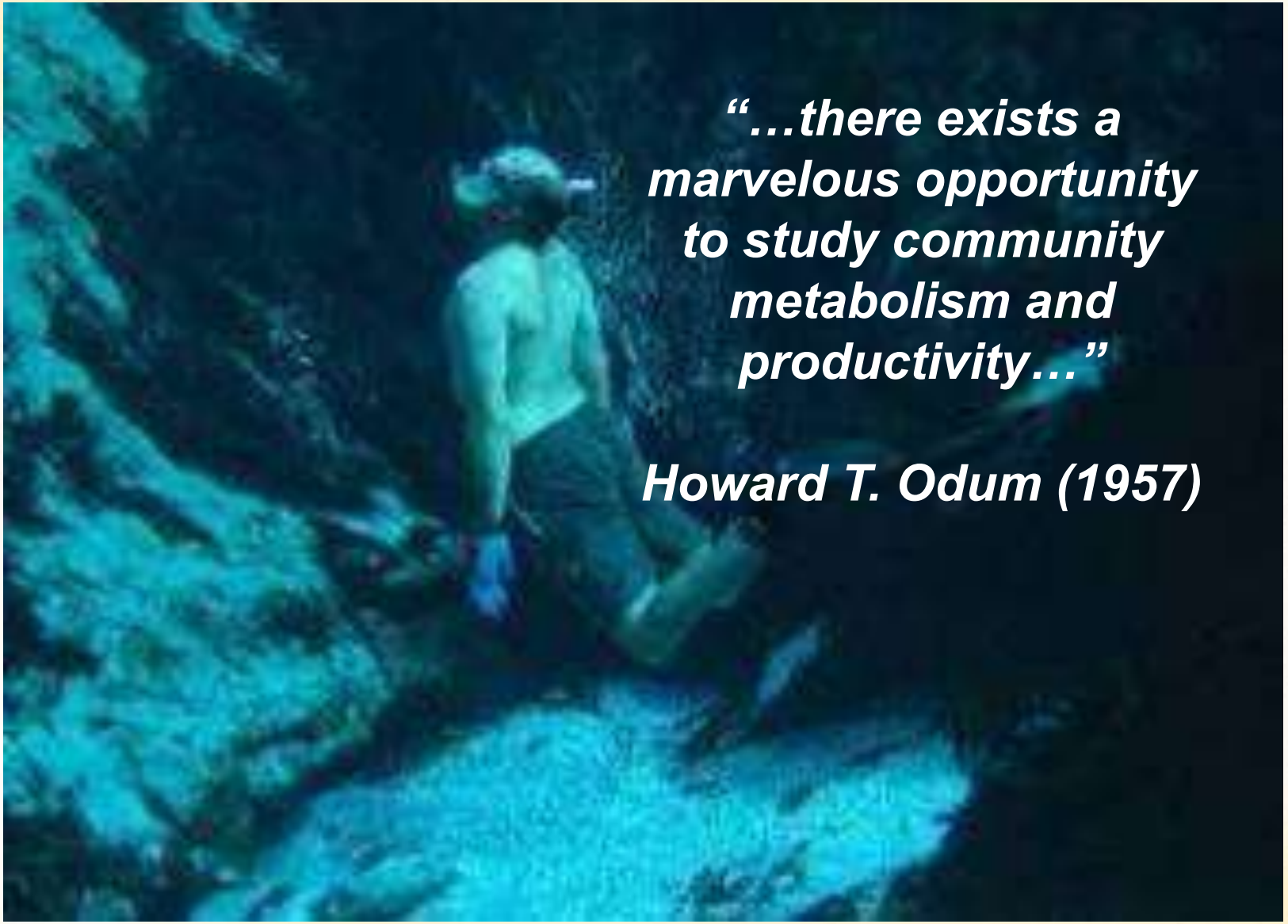
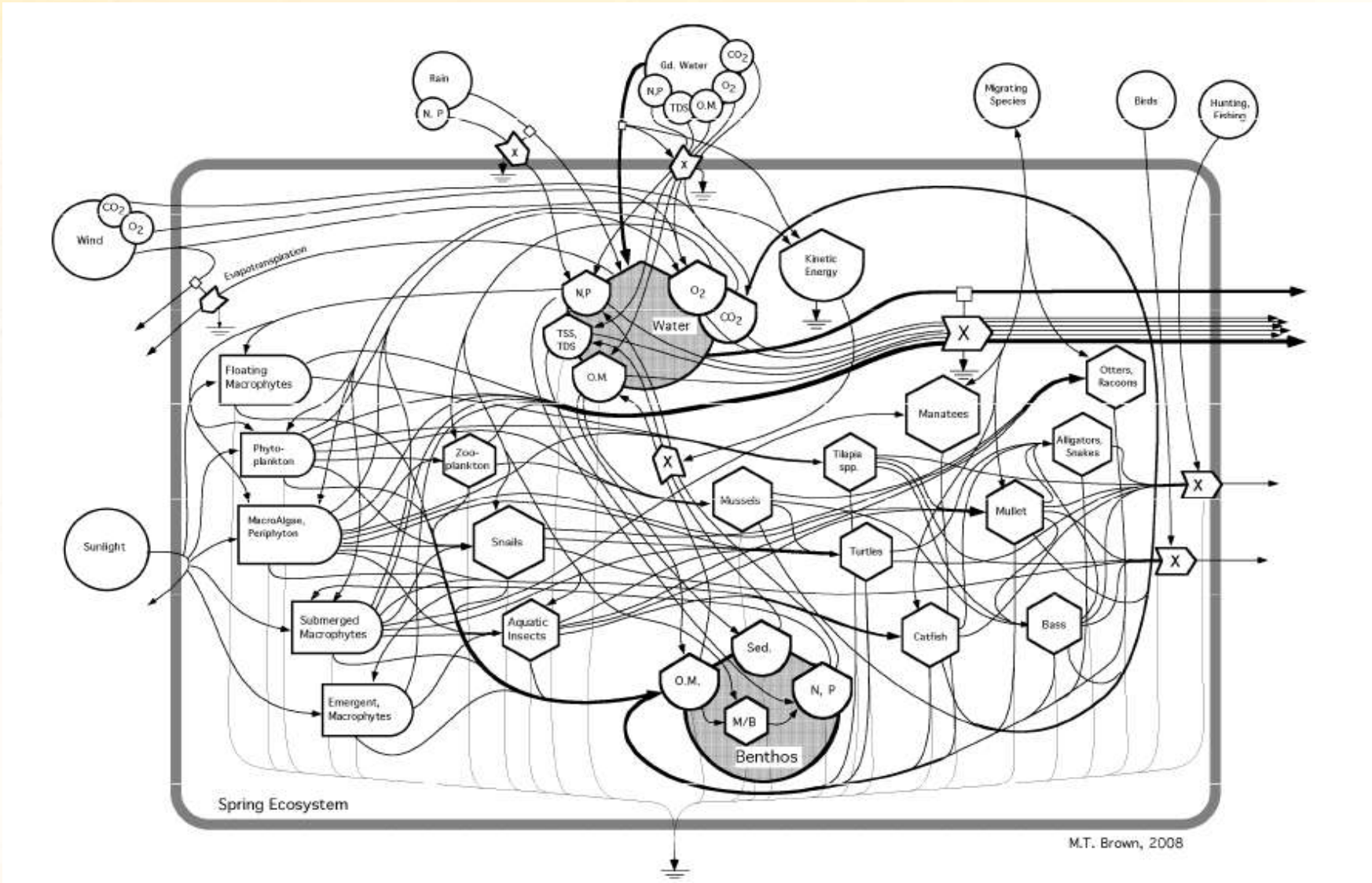
Florida's Springs



Springs Ecosystem Model (Brown 2008)

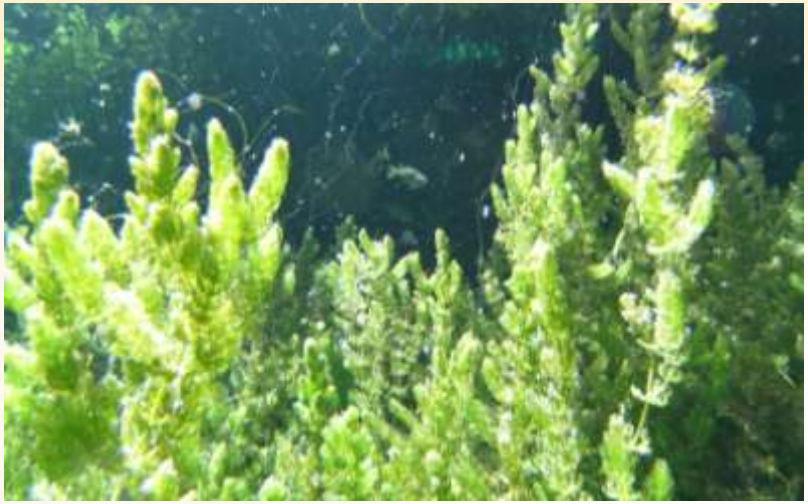


Springs Assessment

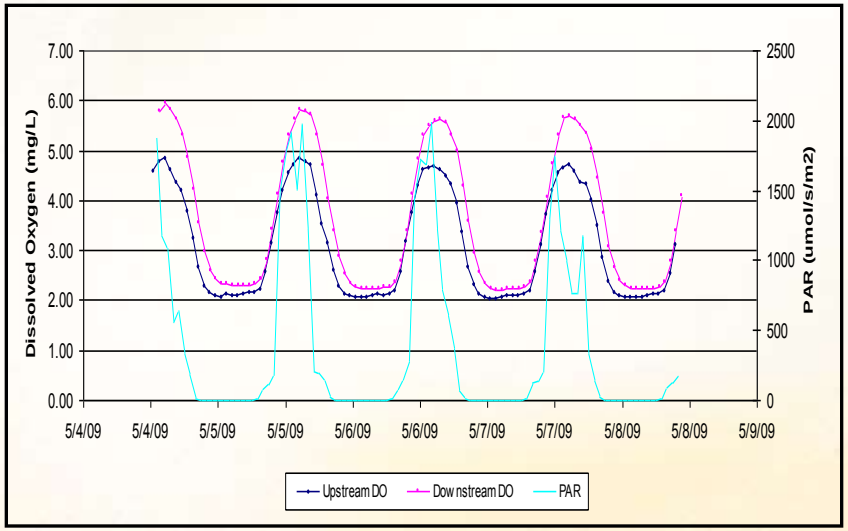
- External Forcing Functions
  - *Sunlight*
  - *Rainfall/recharge*
  - *Inflow quality*
- Key Structural Components
  - *Water flow and quality*
  - *Plant community*
  - *Consumers*
- Key Functions (Rates)
  - *Primary production*
  - *Secondary production*
  - *Export/import*

John Moran photo

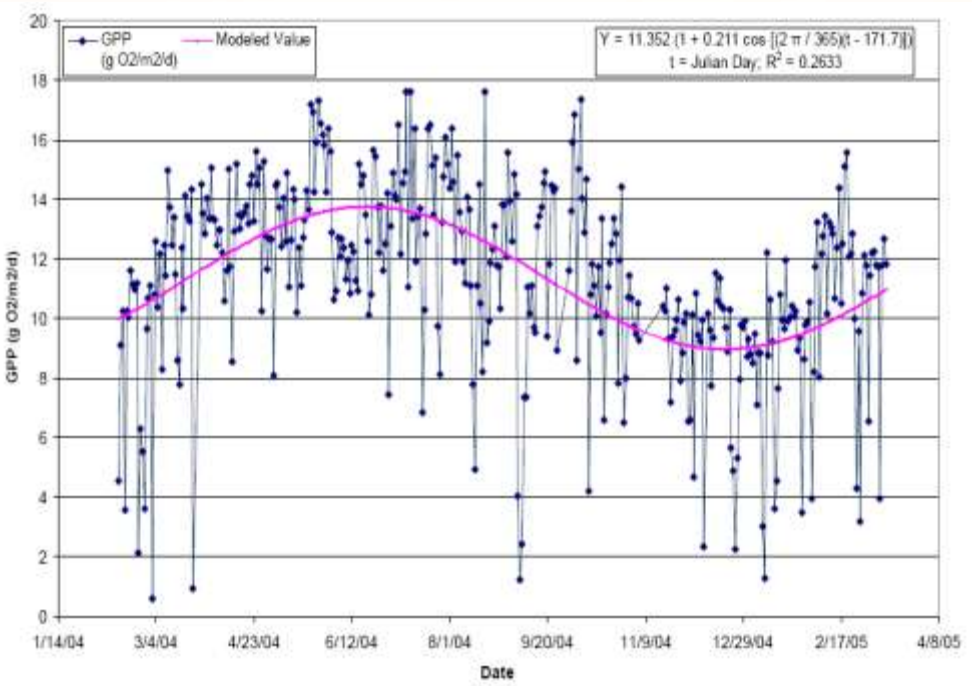
Gross Primary Production



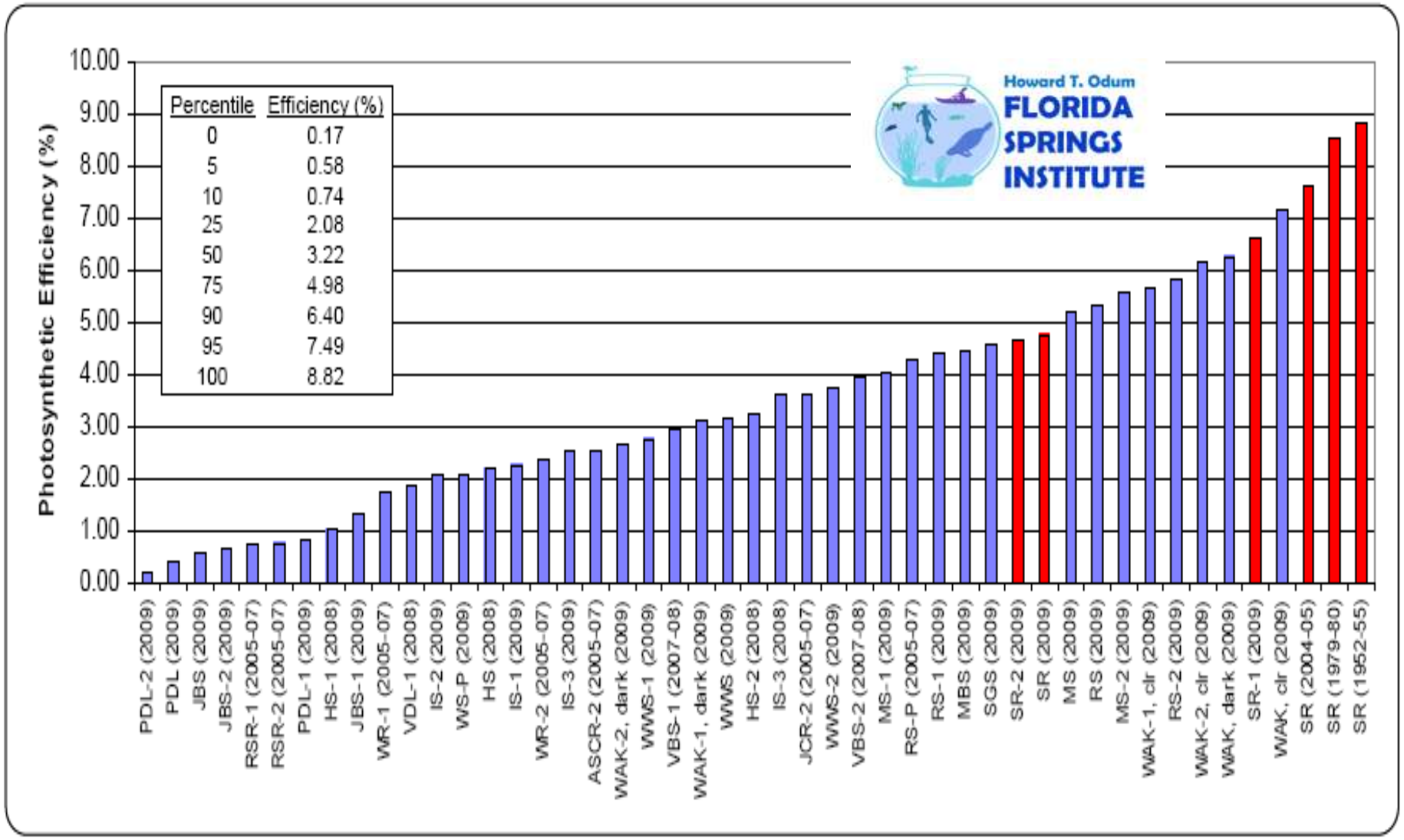
Dissolved Oxygen



GPP

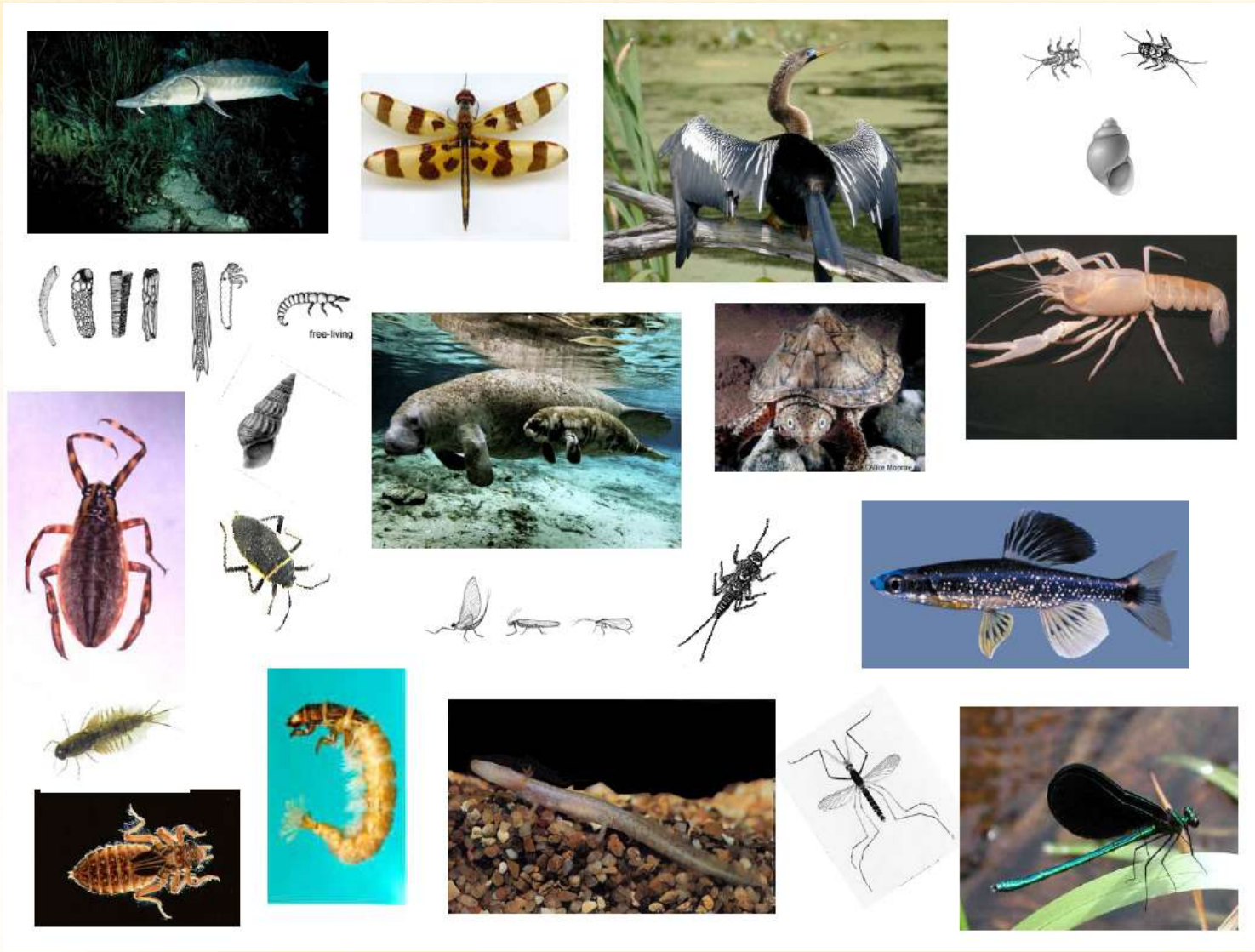


Springs Photosynthetic Efficiency



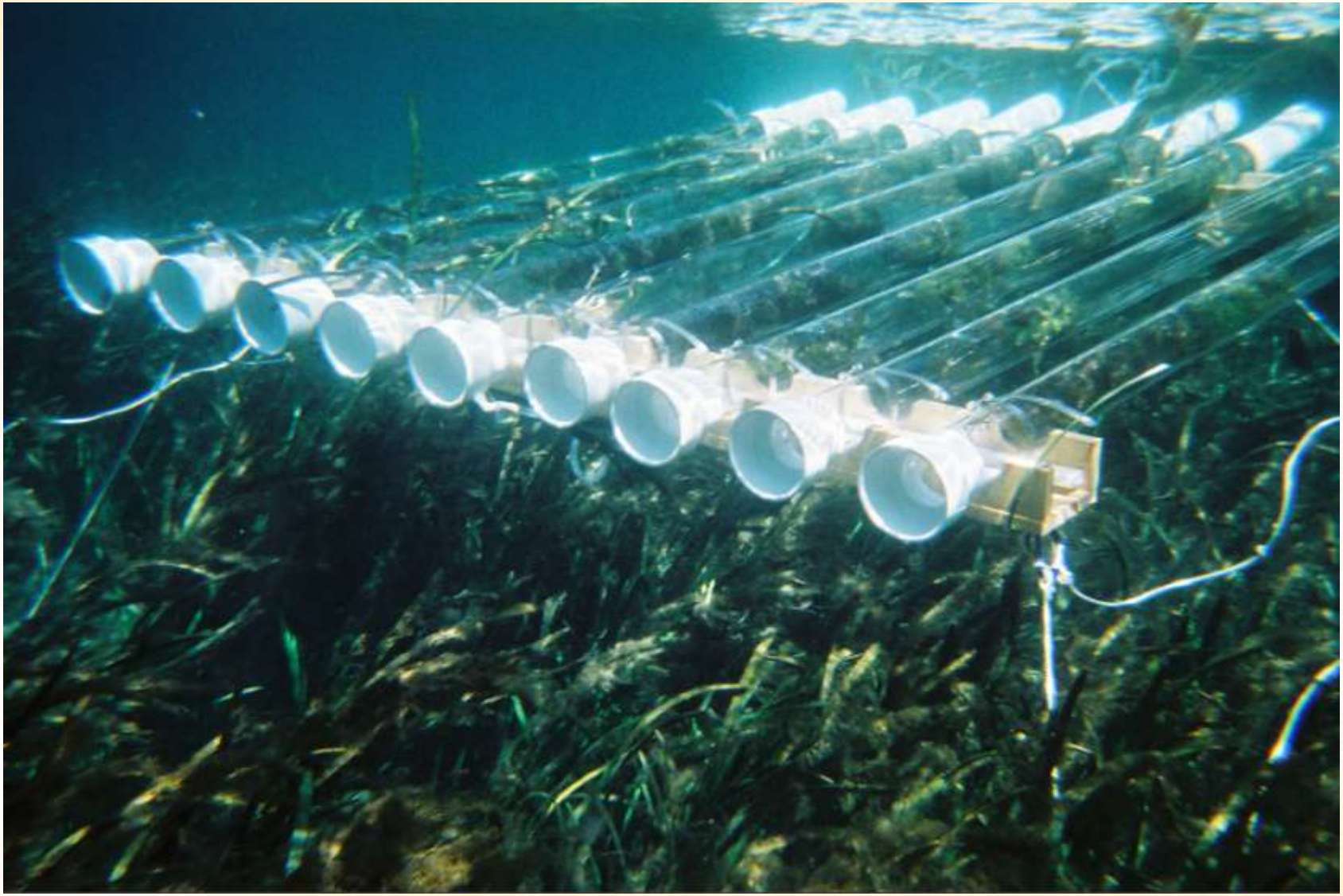
Percentile	Efficiency (%)
0	0.17
5	0.58
10	0.74
25	2.08
50	3.22
75	4.98
90	6.40
95	7.49
100	8.82

Stream Condition Indicators



Steve Walsh, USGS

Replicated Spring Mesocosm Studies



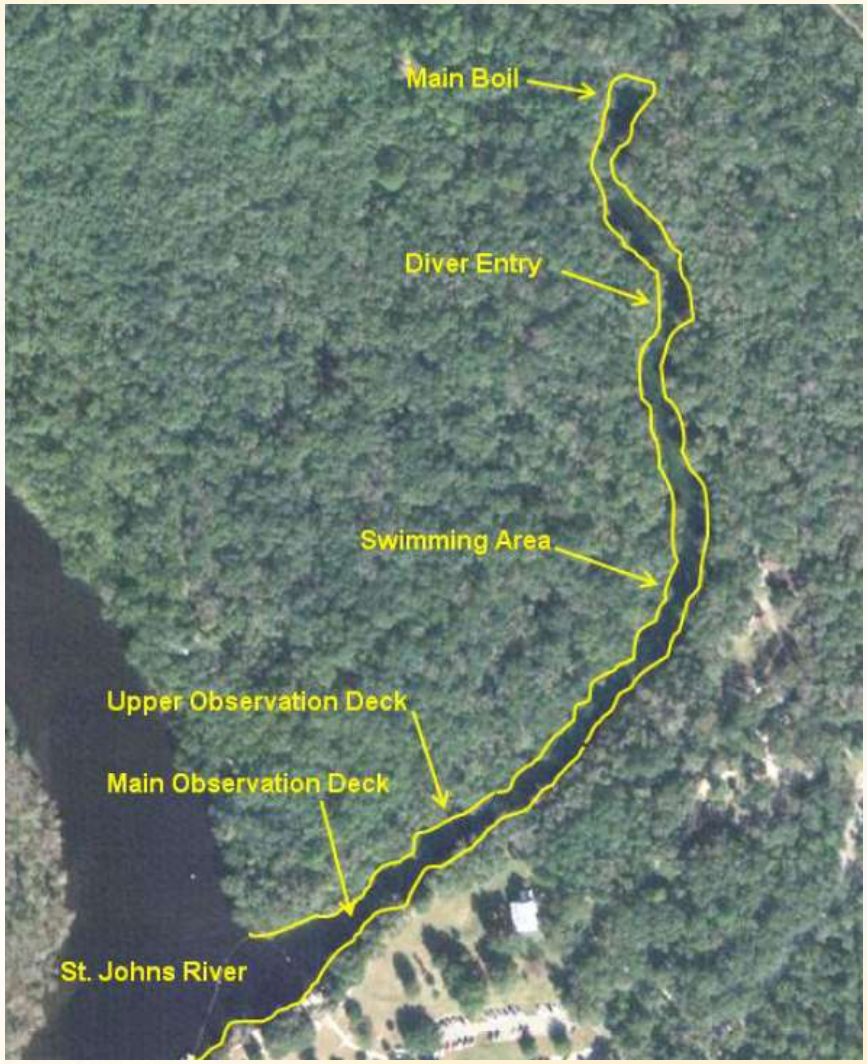
Volusia Blue Spring Action Plan; Assessing Springs Recovery

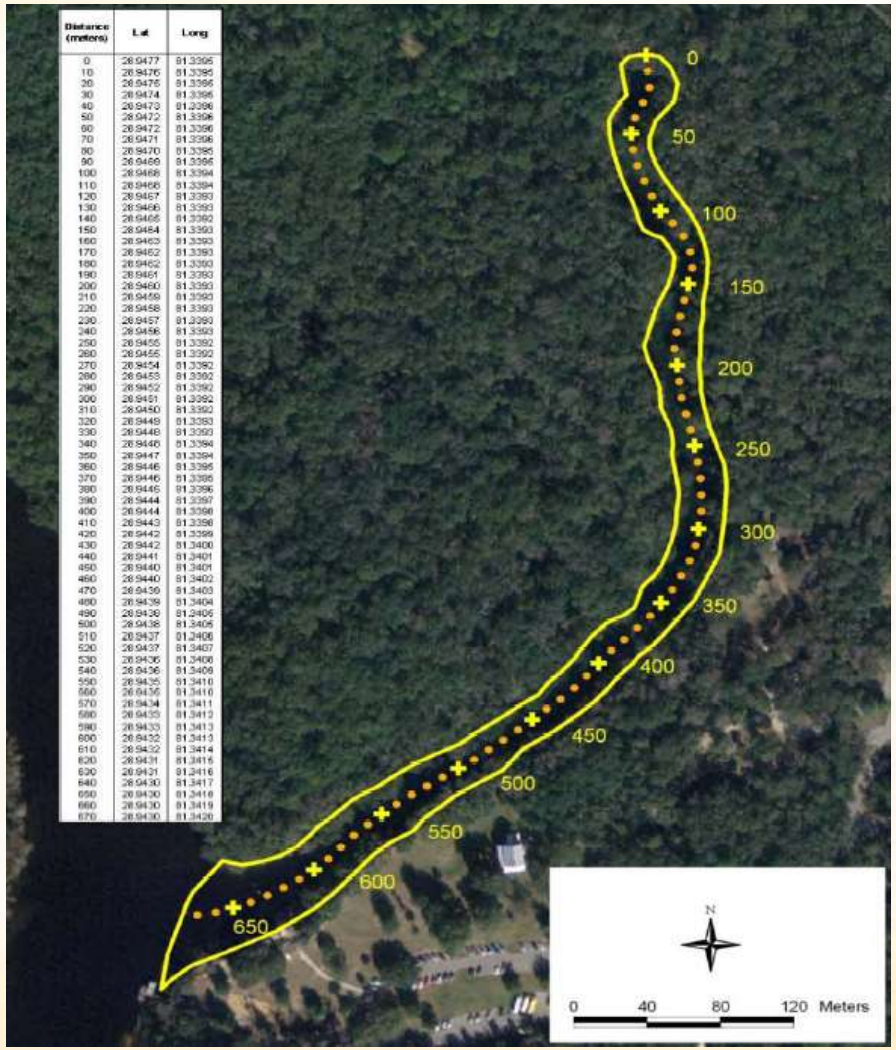
Water Resource Values Monitoring

- Collaboration
  - SJRWMD
  - FDEP Park Service
  - FWC
  - USGS
- Ecosystem Monitoring
  - Hydrology
  - Water quality
  - Plants
  - Invertebrates
  - Fish / Turtles
  - Manatees
  - Ecosystem Metabolism
  - Human use

Volusia Blue Spring Action Plan

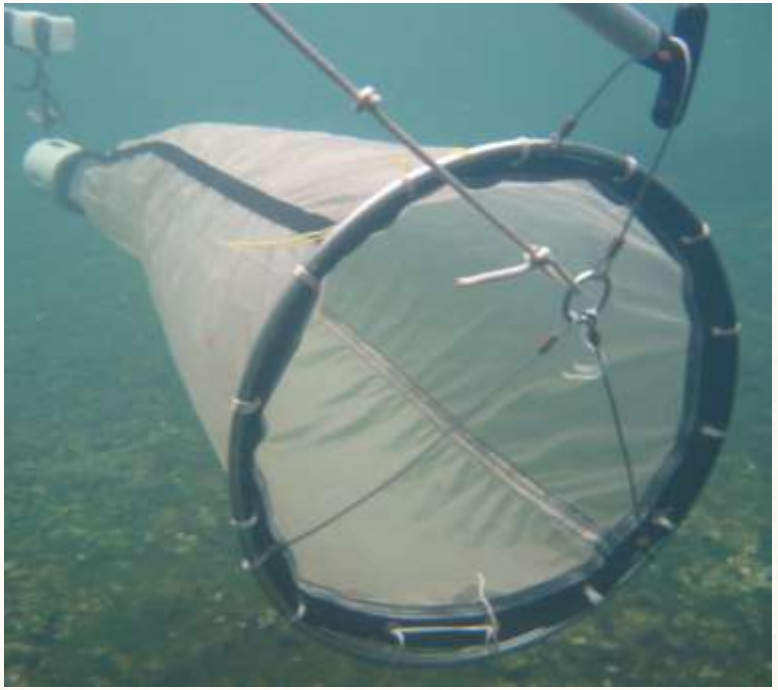
Blue Spring





Distance (meters)	Lat	Long
0	28.9477	81.3395
10	28.9476	81.3395
20	28.9476	81.3396
30	28.9474	81.3396
40	28.9473	81.3396
50	28.9472	81.3396
60	28.9472	81.3396
70	28.9471	81.3396
80	28.9470	81.3395
90	28.9469	81.3396
100	28.9468	81.3394
110	28.9468	81.3394
120	28.9467	81.3393
130	28.9466	81.3393
140	28.9466	81.3392
150	28.9464	81.3393
160	28.9463	81.3393
170	28.9462	81.3393
180	28.9462	81.3393
190	28.9461	81.3393
200	28.9460	81.3393
210	28.9459	81.3393
220	28.9458	81.3393
230	28.9457	81.3393
240	28.9456	81.3393
250	28.9455	81.3392
260	28.9455	81.3392
270	28.9454	81.3392
280	28.9453	81.3392
290	28.9452	81.3392
300	28.9451	81.3392
310	28.9450	81.3392
320	28.9449	81.3393
330	28.9448	81.3393
340	28.9446	81.3394
350	28.9447	81.3394
360	28.9446	81.3395
370	28.9446	81.3396
380	28.9445	81.3396
390	28.9444	81.3397
400	28.9444	81.3398
410	28.9443	81.3398
420	28.9442	81.3399
430	28.9442	81.3400
440	28.9441	81.3401
450	28.9440	81.3401
460	28.9440	81.3402
470	28.9439	81.3403
480	28.9439	81.3404
490	28.9438	81.3405
500	28.9438	81.3405
510	28.9437	81.3406
520	28.9437	81.3407
530	28.9436	81.3408
540	28.9436	81.3408
550	28.9435	81.3410
560	28.9435	81.3410
570	28.9434	81.3411
580	28.9433	81.3412
590	28.9433	81.3413
600	28.9432	81.3413
610	28.9432	81.3414
620	28.9431	81.3416
630	28.9431	81.3416
640	28.9430	81.3417
650	28.9430	81.3418
660	28.9430	81.3419
670	28.9430	81.3420

WSI Monitoring Plant Productivity and Export



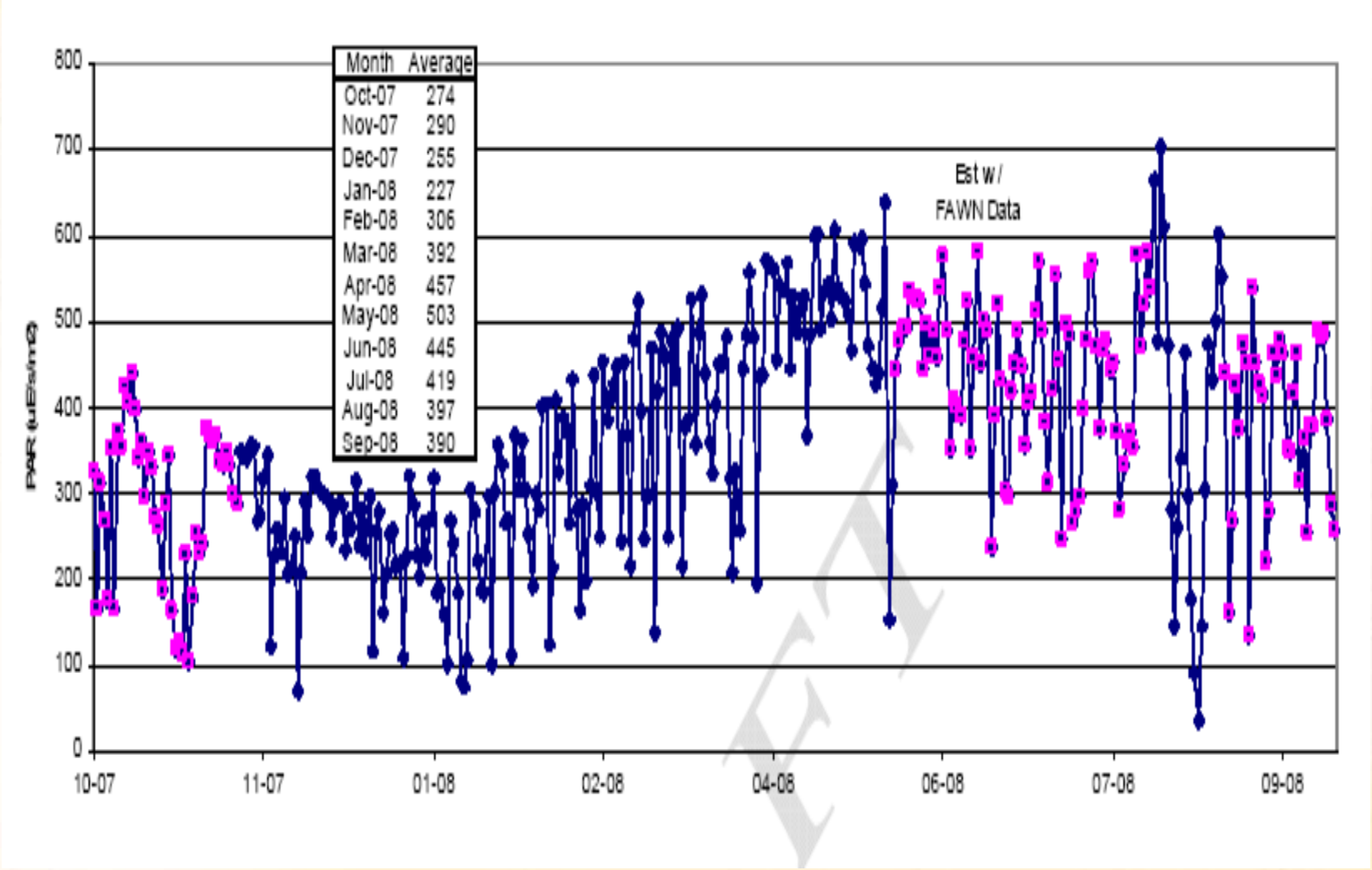
Volusia Blue Spring WRV Assessment Methods

Stetson Fish and Turtle Sampling

Volusia Blue Spring WRV Assessment Methods

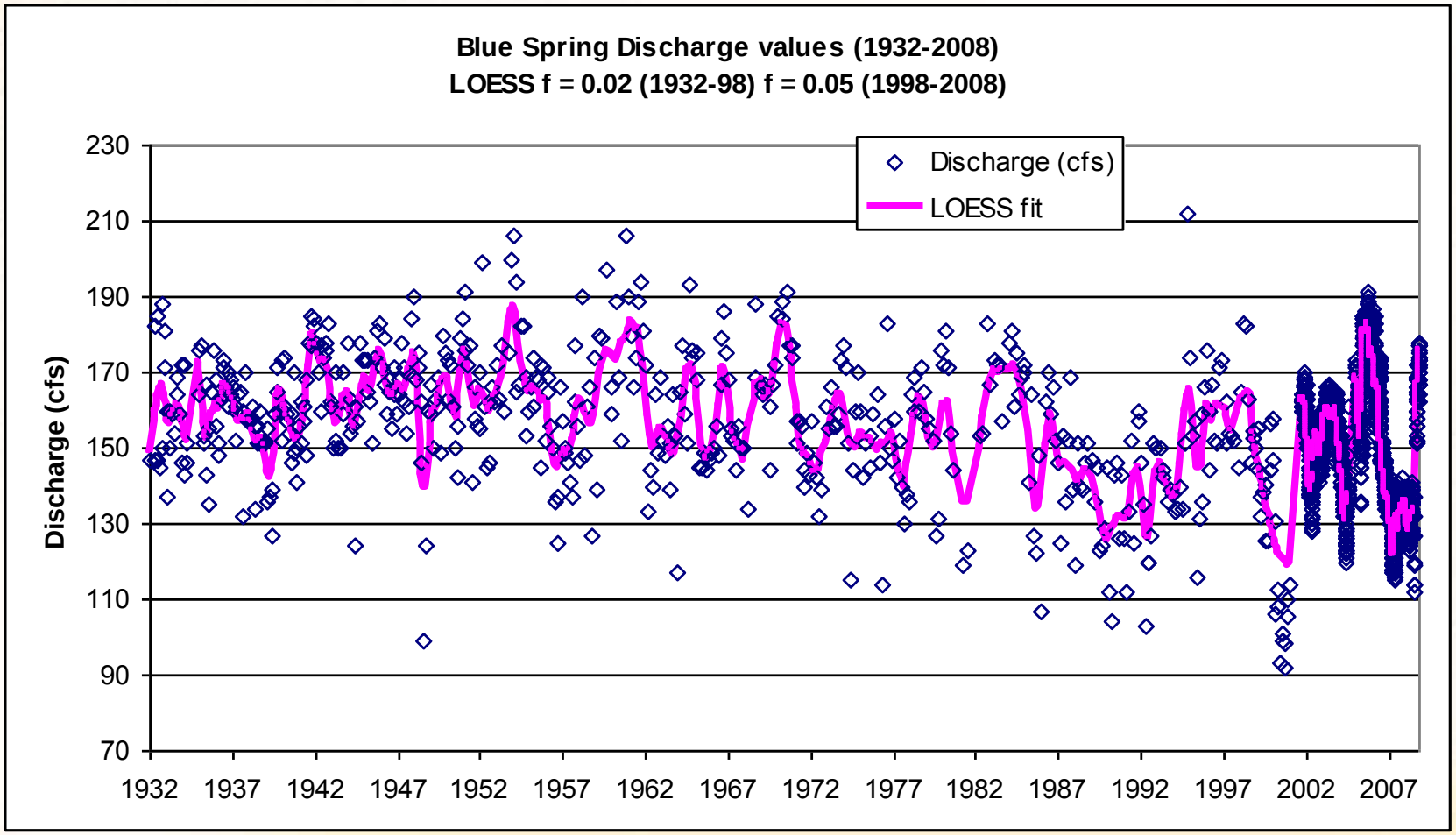
FDEP Daily Manatee Counts

Blue Spring Solar Inputs

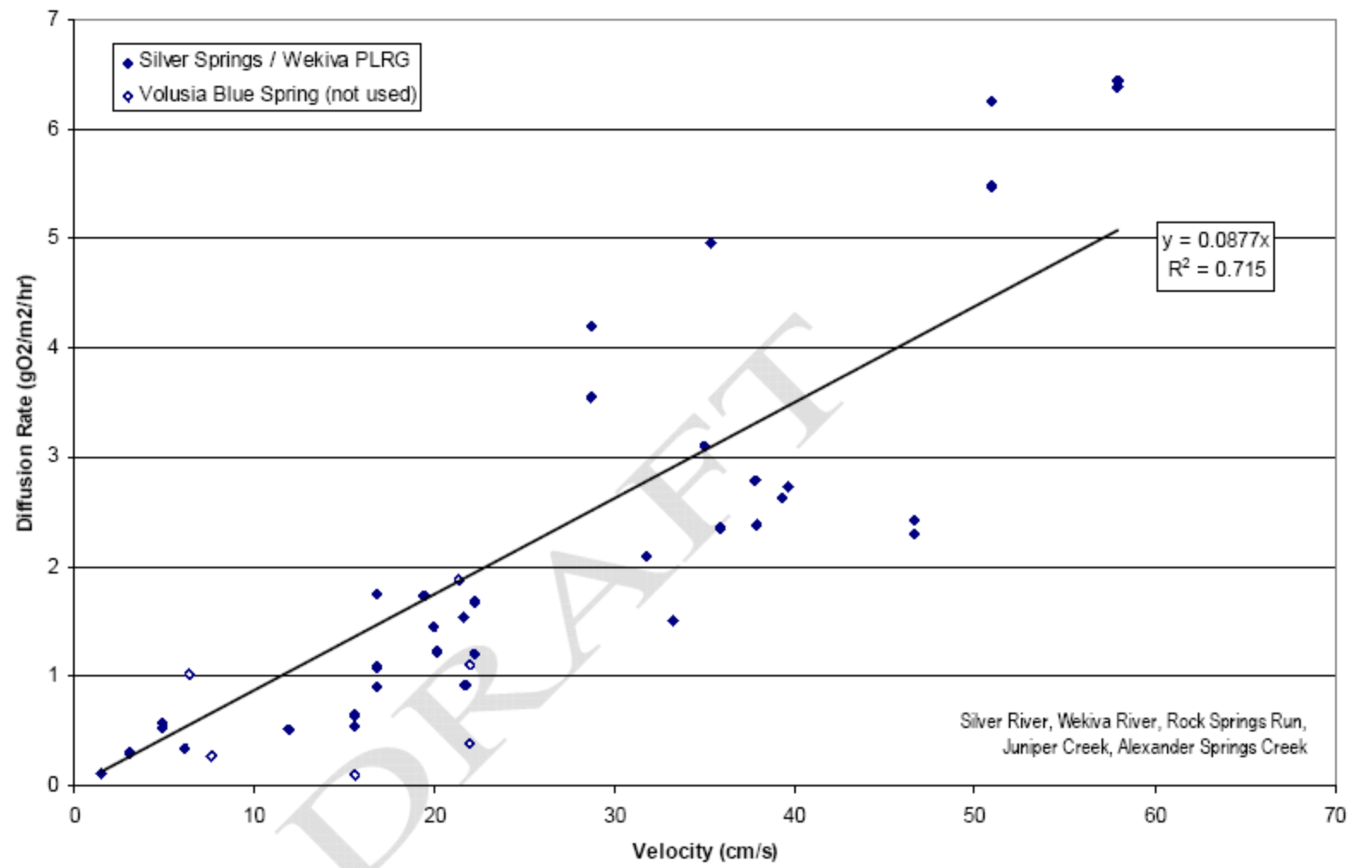


Blue Spring Hydrology

(1932-2008 USGS data, LOESS-locally weighted scatterplot smoothing)

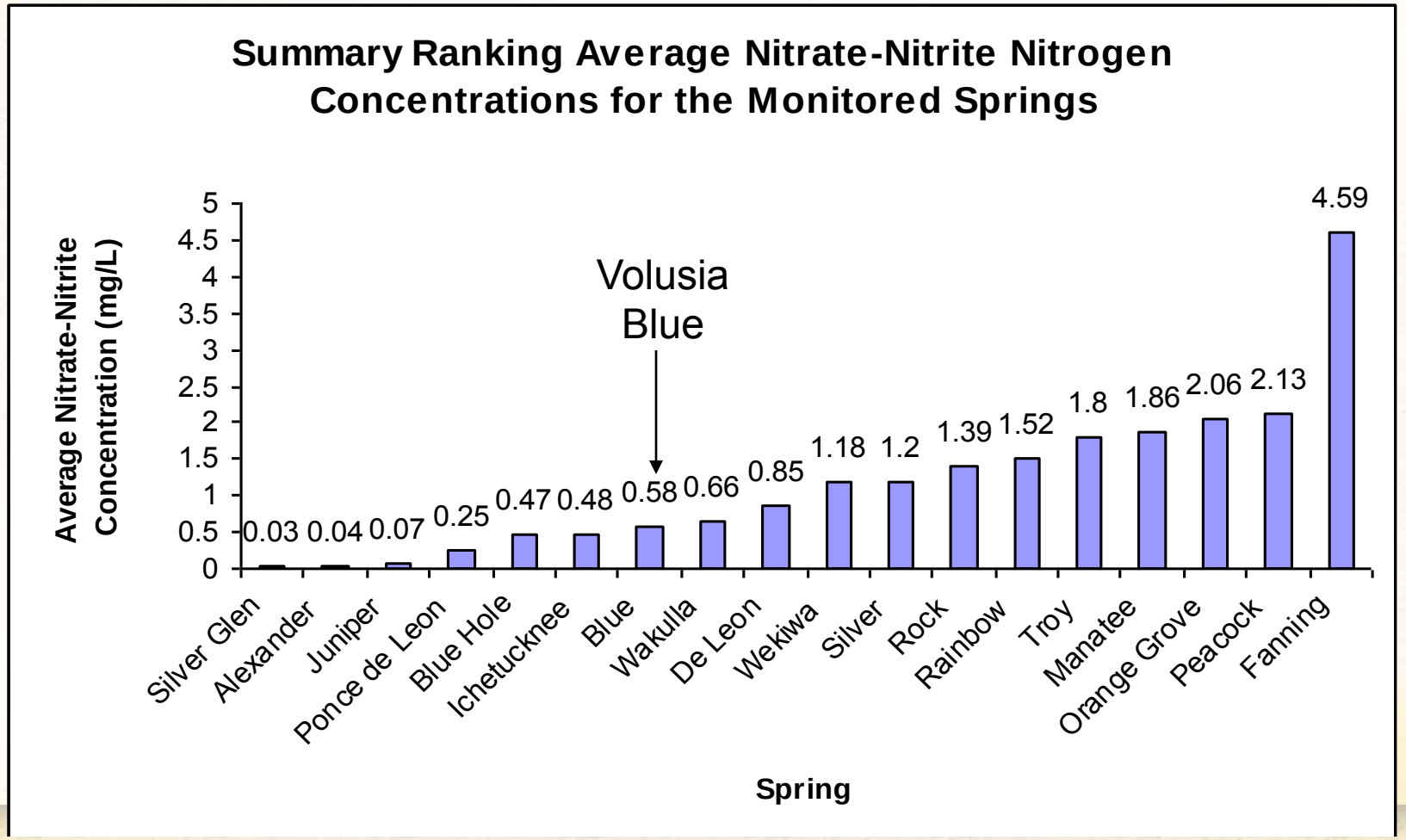


Spring Oxygen Diffusion Rates



Volusia Blue Spring Action Plan

Nitrate-Nitrogen (2000-2007)
Average 0.40 mg/L (0.21 to 1.13 mg/L)

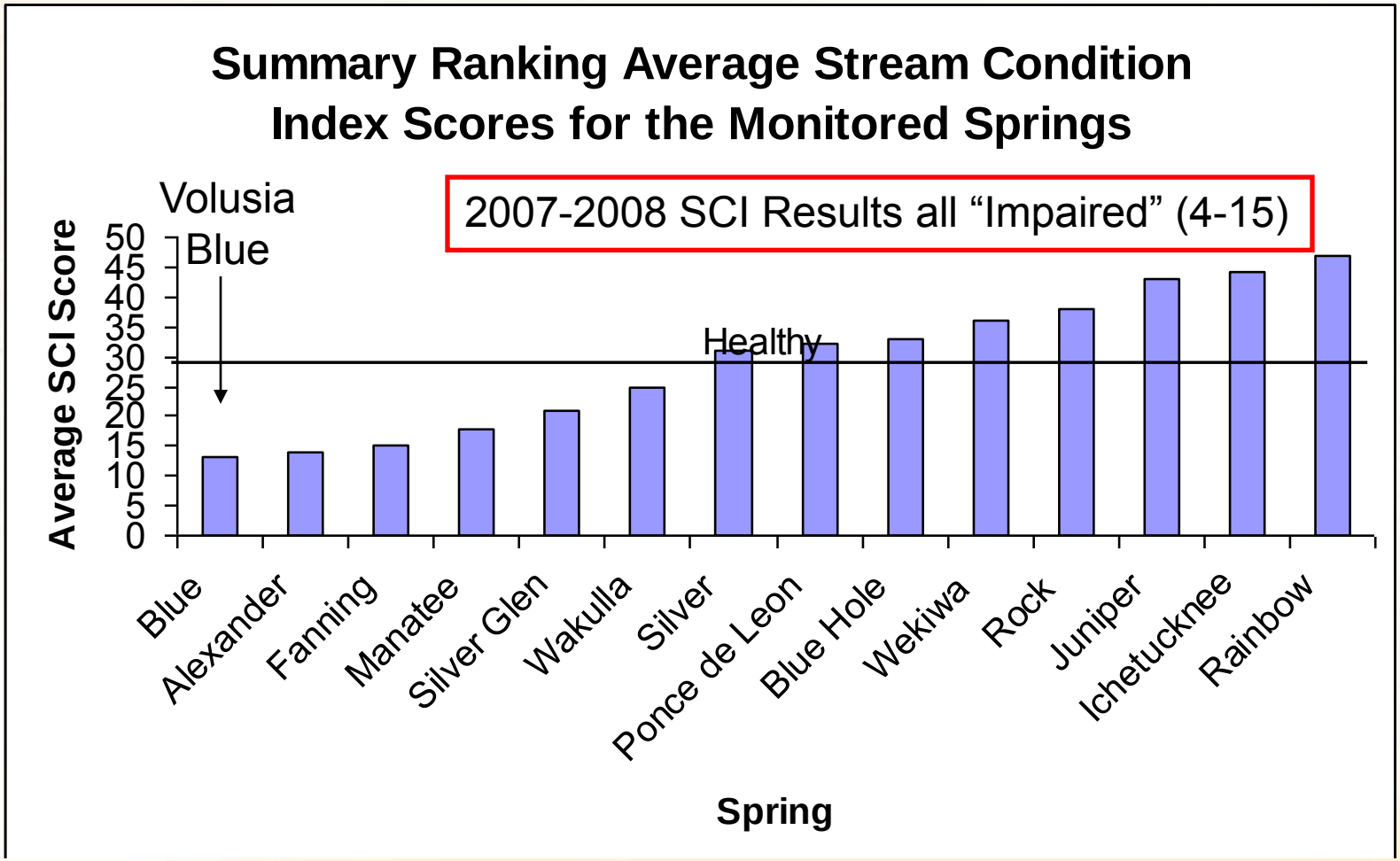


Nitrate-N Assimilation (2007-2008)

- Upstream: 2.64 kg/ha/d
- Downstream: 22.9 kg/ha/d

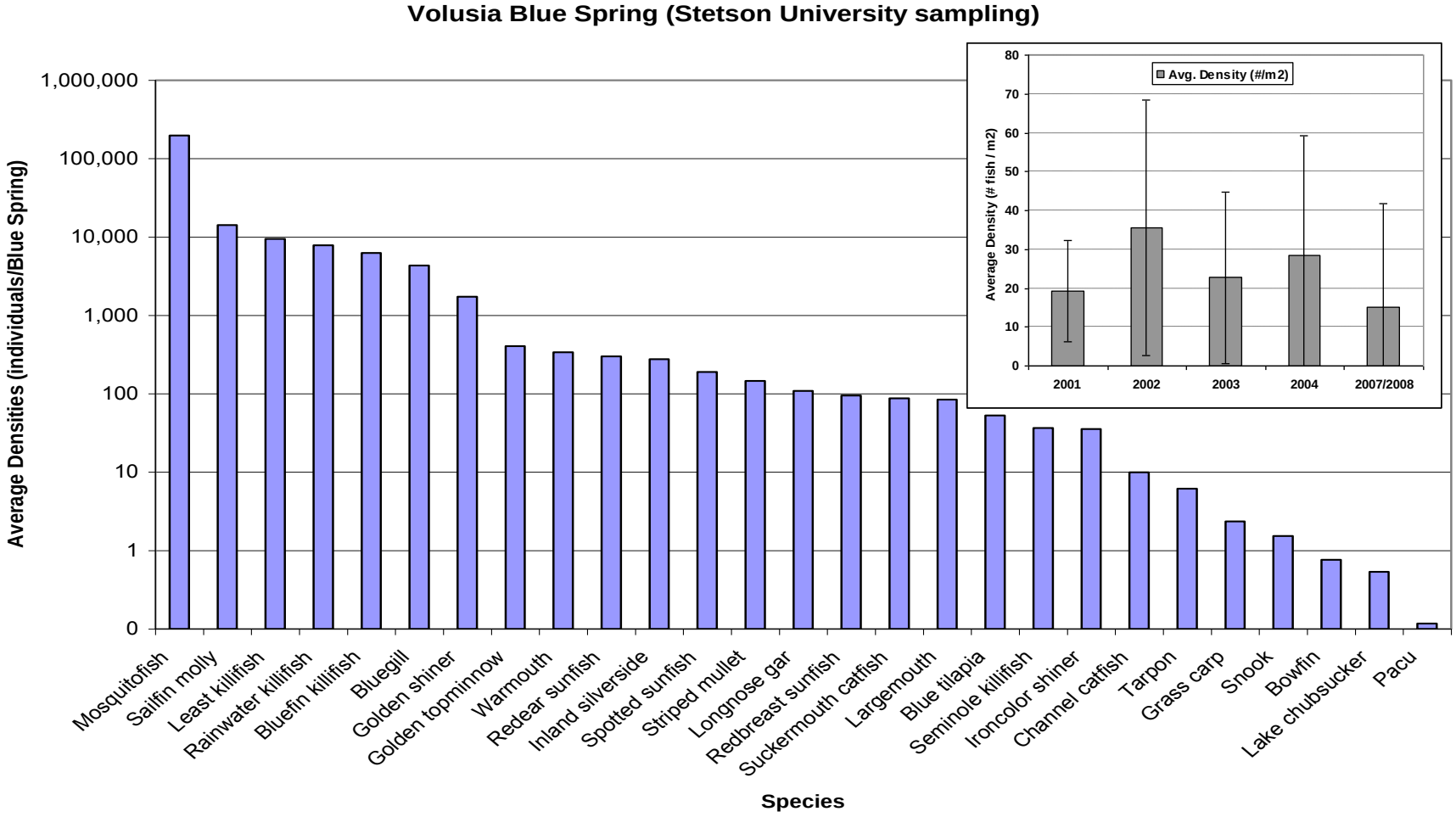
Volusia Blue Spring Action Plan

Stream Condition Index (2000-2007)



Blue Spring Fish Community

- 27 species, including several exotic species.

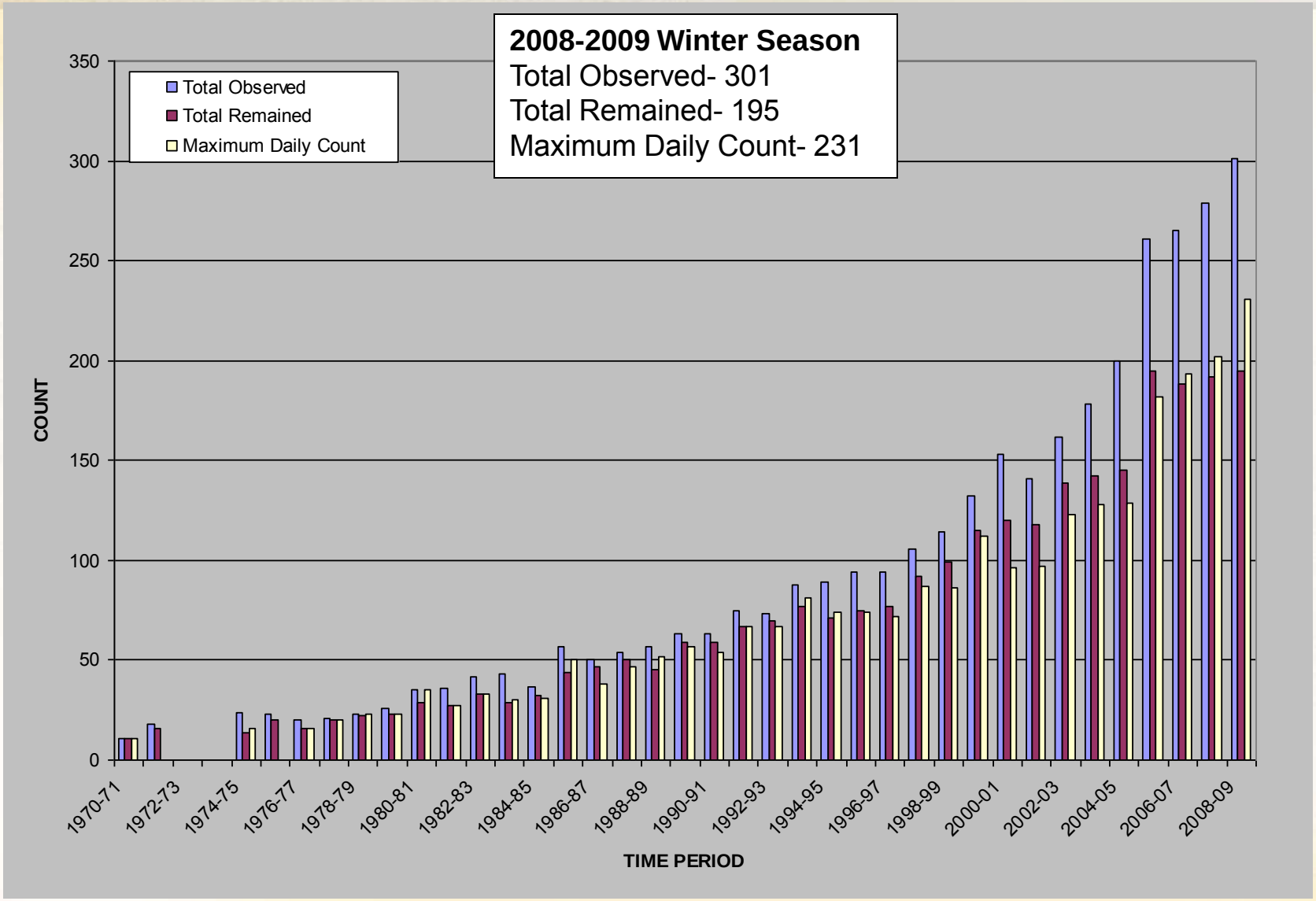


Blue Spring Turtle Community

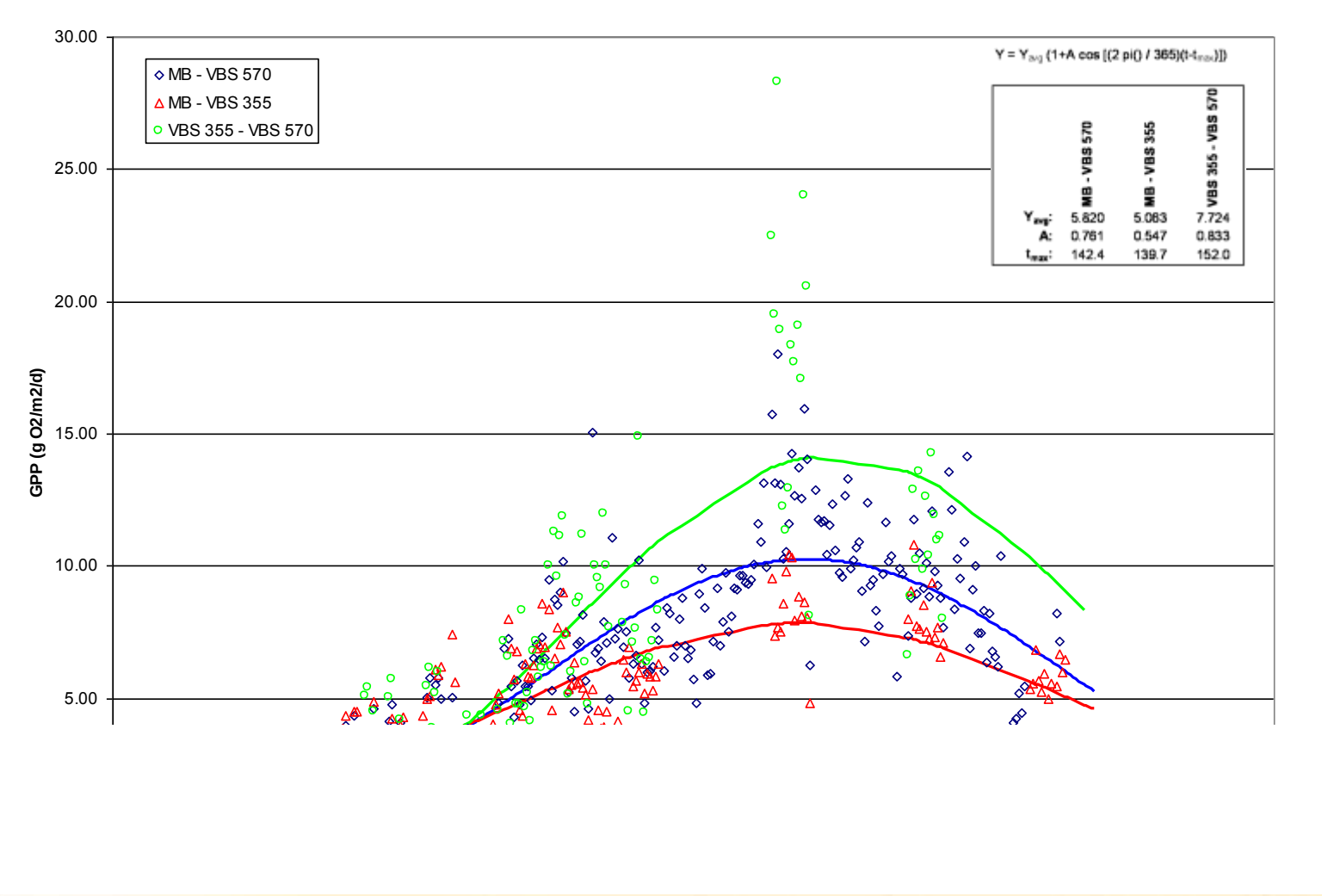
- Turtle biomass estimates (2007-2008) in kg/ha. Average is about 54 g/m^2.

Species	Survey Date			
	Oct-07	Mar-08	Apr-08	Oct-08
Peninsula Cooter (*Pseudemys floridana*)	1068	--	536	220
Florida Red-bellied Turtle (*Pseudemys nelsoni*)	189	89	--	36
Loggerhead Musk Turtle (*Sternotherus minor*)	2.4	--	--	15
Combined Total	1259	89	536	271

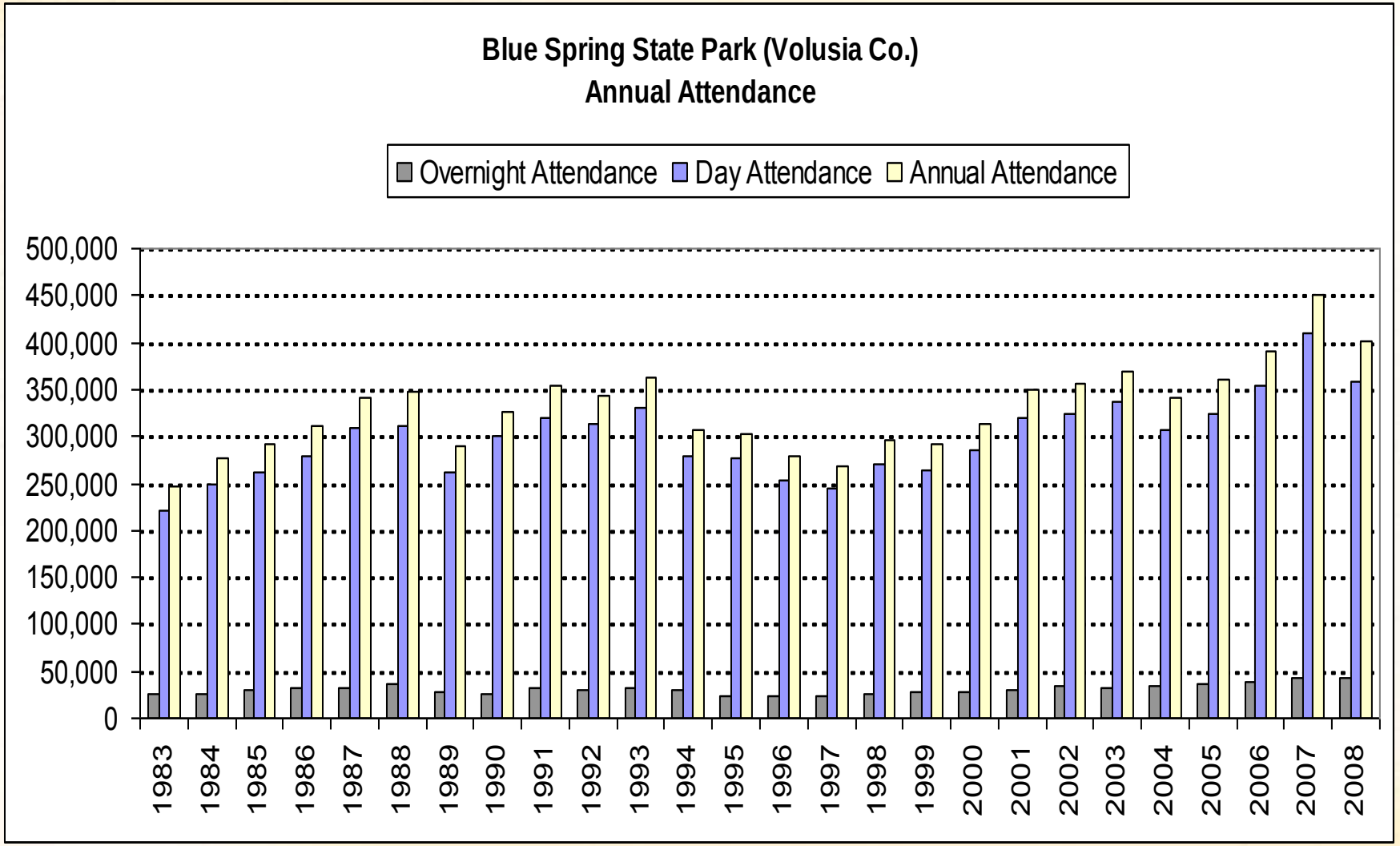
Blue Spring Manatee Numbers



Blue Spring Gross Primary Production (2007-08)



Human Use at Blue Spring



Volusia Blue Spring Action Plan

Summary of Key Findings

- Blue Spring State Park is very popular with the public with over 500,000 visitors per year
- Water quality varies with spring discharge - higher salts are associated with lower flows
- Algal mat thickness is greatest upstream near the boil
- SCI indicates “impaired” conditions, and is lower under lower flow conditions

Summary of Key Findings

- The spring run supports a diverse and relatively large and population of fish and turtles
- Manatee use continues to increase (over 300 individuals in 2010)
- Ecosystem productivity is low in Blue Spring compared to other Florida springs

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

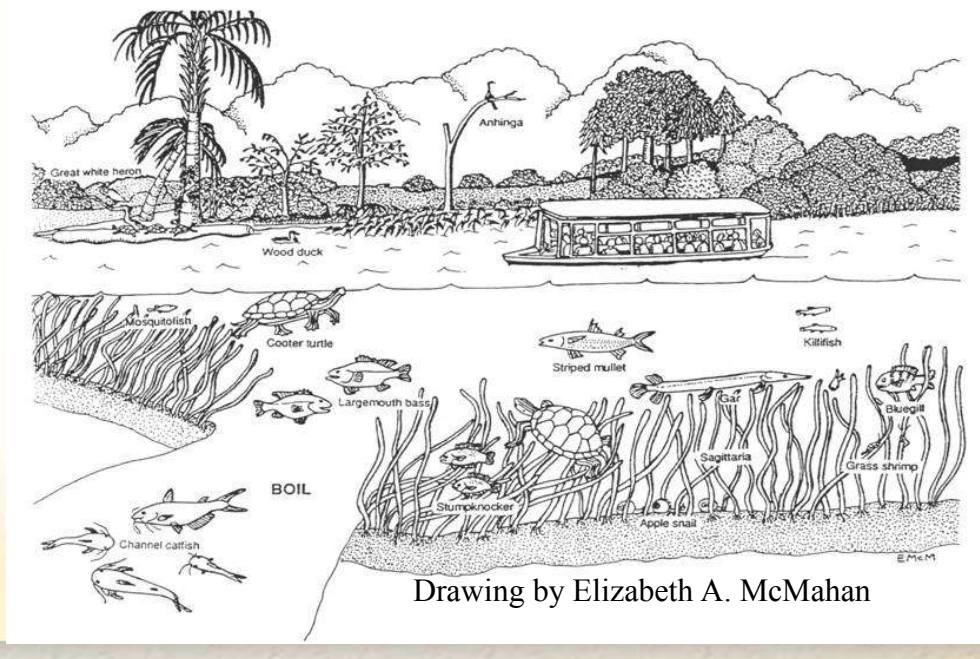
Conclusions and Recommendations

Howard T. Odum
FLORIDA
SPRINGS
INSTITUTE

Springs are Ecosystems

- Springs and spring runs represent a unique class of aquatic ecosystems with distinct structures and processes.
- Due to their complexity, a holistic approach to spring studies is necessary to understand and manage anthropogenic effects on these ecosystems.

Silver Springs Ecosystem (Odum et al. 1998)



Drawing by Elizabeth A. McMahan

Flow is One of the Most Important Forcing Functions

- H.T. Odum hypothesized that ecosystem metabolism is a function of current velocity
- A non-flowing spring is a sinkhole (stagnant water, low productivity for wildlife)
- Recent work supports the relationship between overall spring discharge and gross primary productivity

Dr. Odum at Silver Springs 1979

“Primum Nil Nocere”

(“First, do no harm”)

This Latin maxim is one of the principal precepts of medical ethics. Another way to state it is that "given an existing problem, it may be better to do nothing, than to risk causing more harm than good.“

THIS IS ALSO GOOD ADVICE FOR SPRINGS MANAGERS!

Recovery is an Option

Springs Protection Goal: Reduce the N Load and Restore the Flow

QUESTIONS?

Bruce Mozert, Silver Springs, circa 1950s

Florida Springs Institute

Howard T. Odum
FLORIDA
SPRINGS
INSTITUTE

Founded May 2010
www.floridaspringsinstitute.org

Florida's Eden
www.FloridasEden.org

Howard T. Odum
at Silver Springs
1979

From:	Bob Knight
To:	Doug Leeper
Subject:	RE: SWFWMD Staff Response to Spring MFLs Stakeholder Workshop Comments
Date:	Thursday, December 15, 2011 8:24:02 AM

Doug

Thank you for preparing this meeting summary and responses.

Best wishes,

Bob

From: Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]
Sent: Thursday, December 15, 2011 6:29 AM
To: (janicehowie@aol.com); Abdon Sidibie (asidibie@chronicle.online.com); Alex McPherson (aamcpherson@msn.com); Ann - 2 Hodgson (ahodgson@gmail.com); Ann Hodgson (ahodgson@audubon.org); Bernard Berauer (bfberauer@aol.com); Beverly Overa (boverly@tampabay.rr.com); Bill Garvin (wgarvin@tampabay.rr.com); Bob Caldwell (Bobcaldwell51@yahoo.com); Brack Barker (brack154@msn.com); Brad Rimbey (BWR.CRRC@tampabay.rr.com); Carl Mattthai (thebabesmimi@gmail.com); Casey, Emily (fcnwr@atlantic.net); Charles Dean (dean.charles.web@flsenate.gov); Charles Stonerock (katcha.stonerock3@gmail.com); Chris Safos (chrissafos@embarqmail.com); Czerwinski, Mike (mczerwin@tampabay.rr.com); Darlene Herth (2cetechnology21@gmail.com); Darrell Snedecor (president@citruscountyaudubon.com); Don Hiers (dhiers3@gmail.com); Douglas Dame (doug_dame@yahoo.com); Elaine Luther (barneyandcap@hotmail.com); Emily Casey (ecasey21@hotmail.com); Emma Knight (eknight@wetlandsolutionsinc.com); George Harbin (gharbin@tampabay.rr.com); George McClog (classof47@gmail.com); Gorgon O'Connor (gorgon_o@yahoo.com); Harry Steiner (harry109@aol.com); Helen Spivey; Jack Calbeck (calbeckj@citrus.k12.fl.us); jane Perrin (jcsperrinmd@sbcglobal.net); Jerry Morton (JerrMorton@aol.com); Jessie Gourlie (gourliej@thirdplanetwind.com); Jim Collins (jimmiekey22@yahoo.com); Jimmie Smith (Jimmie.Smith@myfloridahouse.gov); Joe Calamari; John Lord (jclord109@yahoo.com); John Mayo (freedomway1@gmail.com); Karen Johnstone (kjohns213@sbcglobal.net); Kim Caldwell (caldwell.kimberly@yahoo.com); Kim Dinkins (kim.dinkins@marioncountyfl.org); Linda Pierce (tpierce35@tampabay.rr.com); Linda Vanderveen (hernandoaudubon@yahoo.com); Mary Anne Lynn (mlynn1978@tampabay.rr.com); Matthew Corona (mcorona1@tampabay.rr.com); Max Rhinesmith (rhinesmith@webtv.net); Amber Breland; Andy Houston (ahouston@crystalriverfl.org); Art Yerian (Al.Yerian@dep.state.fl.us); Ben Weiss; Beth Hovinde; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us); Courtney Edwards (cedwards@savethemanatee.org); Dale Jones (Jones@MyFWC.com); Dana Bryan (dana.bryan@dep.state.fl.us); Darrell Snedecor; David Hamilton (countyadministrator@hernandocounty.us); David Hankla (david_hankla@fws.gov); Don Wright (wright@sura.org); Dusty McDevitt (mcdevitt@usgs.gov); Ed Call (marvin.call@MyFWC.com); Eric Nagid (eric.nagid@MyFWC.com); FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com); J. J. Kenney (jj.kenney@bocc.citrus.fl.us); Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us); Joyce_Kleen@fws.gov; Kandi Harper (kandi.harper@bocc.citrus.fl.us); Keith Ramos (Keith.Ramos@fws.gov); Kent Smith (kent.smith2@myfwc.com); Kevin Grimsley (kjgrims@usgs.gov); Michael Lusk (Michael_Lusk@fws.gov); Mitchell Newberger (mnewberger@verizon.net); Nick Robbins (Nick.Robbins@dep.state.fl.us); Nicole Adimey (Nicole_Adimey@fws.gov); Paul Thomas (paulw.thomas@MyFWC.com); Ron Mezich (ron.mezich@MyFWC.com); Shelly Yaun (shelly.yaun@dep.state.fl.us); Toby Brewer (Toby.Brewer@dep.state.fl.us); Tracy Colson; Wallace, Traci; Adkins, Jim; Bitter, Jim; Bryant, Richard; Cantero, Vince; Carpenter, Paul; Daniels, Chase; Dueker, Duane; Gramling, Hugh; Harrelson, Cathy; Hubbell, Pete; Johnson, Eric; Johnson, Martyn; Keim, Robert; Kincaid, Todd; Kline, Allen; Knight, Bob; Knight, Robert; Knudson, Ross; Overa, Tom; Owen, Rick; Parrow, Liz; Rolf Auermann (rauerman@tampabay.rr.com); Rusnak, Teddi; Watkins, Priscilla; Watrous, Russell; Wilson, Roger; Al

Grubman (grubman1@gmail.com); Bill Geiger (bgeiger@cityofbrooksville.us); Bill Pouder (bill.pouder@myfwc.com); Boyd Blihovde (Boyd_Blihovde@fws.gov); Brent Whitley (brentwhitley@sierra-properties.com); Brockway, Alys (abrockway@co.hernando.fl.us); Dennis D. Dutcher (Dennis3ds@aol.com); Frank DiGiovanni (administration@inverness-fl.gov); Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us); Hilliard, Dan (2buntings@comcast.net); Hoehn, Ted; Hope Corona (hopecorona@tampabay.rr.com); Jim Farley (jfarley682@aol.com); Katie Tripp (ktripp@savethemanatee.org); Norman Hopkins (norman@amyhrf.org); Rebecca Bays (rebecca.bays@bocc.citrus.fl.us); Richard Kane (rkane@usgs.gov); Richard Radacky (rradacky@cityofbrooksville.us); Ron Miller (rmille76@tampabay.rr.com); Sarah Tenison (cityofweekiwachee@yahoo.com); Sulllivan, Jack (jsullivan@carltonfields.com); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us); Whitey Markle (whmarkle@gmail.com)
Cc: Barbara Matrone; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Lou Kavouras; Mark Barcelo; Mark Hammond; Marty Kelly; Mike Heyl; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez; Kenneth R. Herd; Amy K. Harroun
Subject: SWFWMD Staff Response to Spring MFLs Stakeholder Workshop Comments

Greetings:

I'm writing today to let you know that a memorandum outlining Southwest Florida Water Management District staff responses to comments and questions raised during the Stakeholder Representative's October 26, 2011 Springs Coast Minimum Flows and Levels Public Workshop are now posted under the heading *Background Information and Reports* on the workshop web page of the District web site at:

http://www.WaterMatters.org/SpringsCoastMFL

The workshop web page now also includes a "Submit Comments" button that facilitates submission of comments concerning the data and methods that were discussed during the workshop series and which have been or could be used to establish minimum flows for Springs Coast water bodies.

I am also writing to inform you that the District is continuing its review of technical and policy-level issues pertaining to the establishment of minimum flows and levels for Springs Coast priority water bodies. To provide sufficient time for this effort and for additional public review, and because the January Governing Board meeting will be held in Tampa rather than Brooksville, staff currently anticipates presenting rule amendments addressing minimum flows for the Chassahowitzka and Homosassa Rivers to the Governing Board at the February Board meeting, which is expected to be held in Brooksville.

Please feel free to contact me directly if you have any questions concerning the newly posted staff response memorandum, the workshop comments button, the schedule for development of Springs Coast minimum flows, or other water management issues.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street

Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

How Much is Too Much?

Toward A Water Budget Approach to Management

MFL Workshop
October 26, 2011
Lecanto, Florida

Todd Kincaid, Ph.D.
GeoHydros, LLC
Global Underwater Explorers
Hydrogeology Consortium

1

Dedicated to Wes Skiles

- He taught us a lot about the aquifer
- After 30 years, most of us finally believe him
- Would want us to act and stop studying
- Given that we're in water restrictions now and seeing our springs dry up here in the Suwannee River Basin. *I think its time we do so.*

2

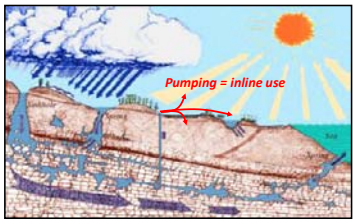
Bottom Line

- We're loosing springs right now and have been for some time.
- Why?
  - Less recharge (rainfall)
  - Too much extraction (pumping)
  - *Rising sea level (alone would only change spring locations)*
- Do we take action?
  - No = goodbye springs
  - Yes = maybe we can keep some
- What actions can we take?
  - Make more rain
  - Reduce pumping (establish & enforce MFLs)
- How can we take effective action?
  - Improved public understanding
  - Better analyses (models) that address karst
  - More data and prolonged data records

3

Hydrologic Cycle

How much groundwater do we have?



Water Budget

- Sustainable
  total use = recharge
- Surplus Storage
  total use < recharge
- Declining Storage
  total use > recharge
- ***Just like your check book***

- Water is in constant motion moving from rain to the sea.
- Many different users (humans, plants, animals, rivers, streams, springs, estuaries, etc).
- Groundwater withdrawals intercept part of that flow and return it along a different path (typically surface flow).
- Quality & Quantity are impacted by how much we use, how we impact the quality of recharge, and how the water flows underground.

4

Significance of a Water Budget

Inputs – Outputs = Change in Storage

- How do you know how much money you can spend?
  - Income
  - Expenses
  - Balance = surplus money = available cash to spend
  - *Credit – provides immediate benefit but adds to fixed expenses*
- Water availability is governed by the same basic rules
  - Income = recharge *(must be estimated)*
  - Expenses = all discharge and extractions *(can be measured)*
  - Available cash = storage
- One difference
  - There is no such thing as a water surplus
  - Every drop of water that recharges the aquifer flows eventually to springs, rivers, lakes, or the sea
  - Management falls to deciding which uses will be impacted by new extractions & devising creative ways of recycling the extracted water
- Our problem is that we don't effectively measure income or expenses

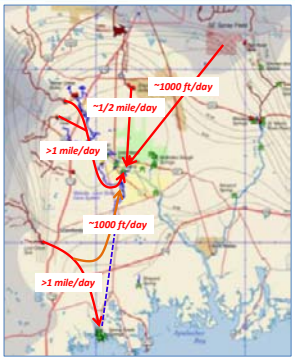
5

Learning from Wakulla

Western Woodville Karst Plain

- >75 km (46 miles) of mapped underwater caves
- 2 of the largest springs in Florida (Wakulla & Spring Creek)
- Several sinking streams (swallets)
- Trying to get a MFL set for Wakulla
- District wants to address Wakulla independently

Learning from Wakulla

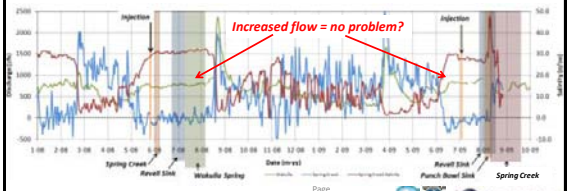


Western Woodville Karst Plain

- Flow is fast in caves and in surrounding aquifer (caves too small to map)
- Wakulla & Spring Creek are connected
- Spring Creek began reversing for appreciable durations in 2006
- Spring Creek reverses now every summer for weeks - months
- We're loosing the largest spring in Florida & the associated fresh water that flows to the Gulf of Mexico estuaries

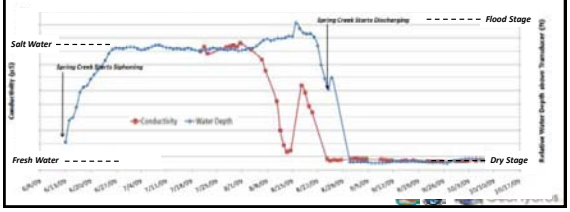
Wakulla / Spring Creek Flows

- Composite Spring Creek flow & salinity (USGS).
- Summers 2007-2010: Spring Creek stops flowing / salinities rise to sea water levels.
- When Spring Creek stops flowing, Wakulla Spring flow increases
- When Spring Creek is flowing, Lost Creek water flows rapidly to Spring Creek.
- When spring Creek stops flowing, Lost Creek water flows slowly to Wakulla Spring.



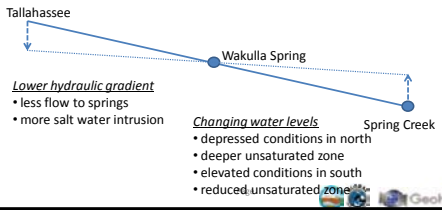
Consequences of Reversals…

- When Spring Creek stops flowing, water backs up into the aquifer matrix in the southern part of the WKP.
- Salt water travels rapidly for long distances (>= 2 miles to Punch Bowl Sink) in days.
- Sinkhole water levels rise to flood stage.
- When Spring Creek starts flowing, water levels drop precipitously and water in conduits returns to fresh water conductivities.



Drivers…

- Pumping reduces groundwater levels in the north (aquifer pressure)
- Gradient (slope of the water table) is getting shallower
- It so shallow in the dry periods that high tide reverses the flow direction at Spring Creek.



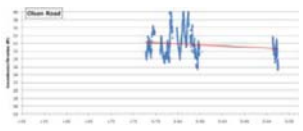
Lower hydraulic gradient
- less flow to springs
- more salt water intrusion

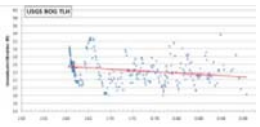
Changing water levels
- depressed conditions in north
- deeper unsaturated zone
- elevated conditions in south
- reduced unsaturated zone

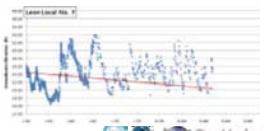
10

Groundwater Mining

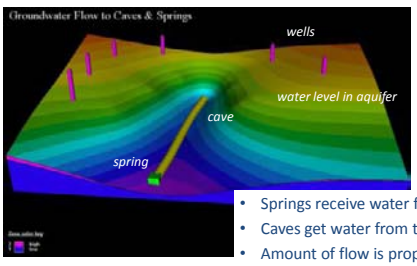
- Groundwater levels have been declining since the 1970's (*USGS & NWFWMD)*
- Extractions are rising







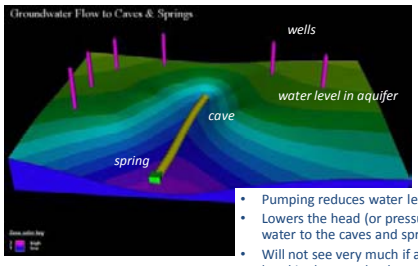
Flow to Caves & Springs



- Springs receive water from caves
- Caves get water from the aquifer
- Amount of flow is proportional to the gradient from the aquifer to the cave

12

Flow to Caves & Springs



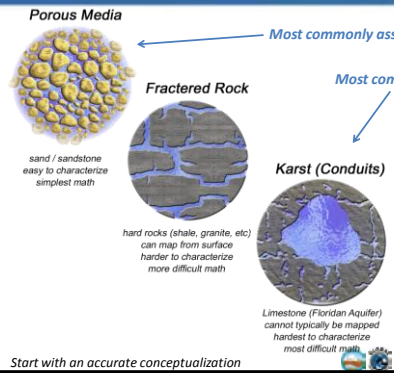
- Pumping reduces water level in the aquifer
- Lowers the head (or pressure) that drives water to the caves and springs
- Will not see very much if any change in head in the trough where the cave is located

13

The Bottom Line for Wakulla …

- Wakulla & Spring Creek Must be addressed collectively
- If trends continue (groundwater level declines):
  - the duration of Spring Creek reversals will increase,
  - the coastal ecosystem will decline due to salt water intrusion, and
  - water clarity at Wakulla will continue to decline.
- Reducing upland groundwater pumping in the Wakulla Springshed would raise groundwater levels and reduce the duration of Spring Creek reversals.
- Protecting Wakulla's flow and clarity requires that we:
  - identify and map the sprngshed boundaries
  - define Wakulla's groundwater budget
  - determine how extractions impact that budget
- To do these things we need to:
  - continue and expand data collection (flows and levels)
  - develop better predictive models that simulate what we know to be the key hydrologic features: caves, springs, swallets
  - educate the public on where their spring water comes from
  - convince our water resource managers to use better tools and maintain a balanced groundwater budget

Predicting Impacts (Modeling)

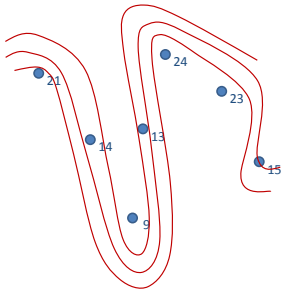


Start with an accurate conceptualization

15

Impact of Assumptions: *Head Potentials*

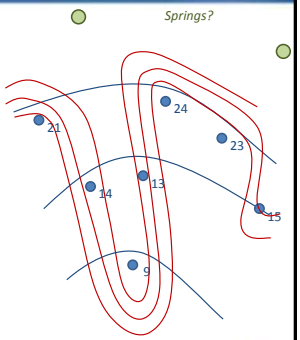
- Assumptions are necessary. We always make assumptions.
- We make assumptions in our thinking as well as our mathematics.
- It is critical to recognize what assumptions are being made and rather or not they are valid for the problem being addressed.
- The assumptions we make often reflect our biases about how we think the world works.
- Think about the prevalence of assumptions of isotropy and homogeneity …
  - Groundwater models
  - Pumping test analysis
  - Potentiometric surface contouring



16

Impact of Assumptions: *Head Potentials*

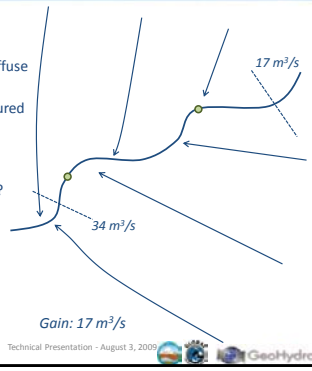
- Sand or Karst?
- How would you tell the difference?
- Data must be evaluated in context of regional setting.



17

Impact of Assumptions: *Flows*

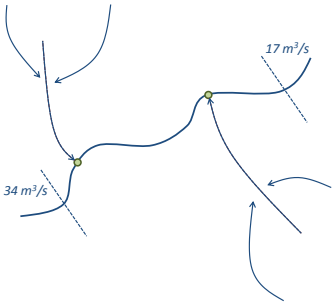
- View springs as part of river *Standard approach*
- flow to river is simulated as diffuse
- Assumed correct if simulated aggregate flow matches measured gain in the river
- But… Does this simulate reality?
- What is purpose of the model?
  - Gross flow to river? or..
  - Simulate flow patterns and velocities?



18

Impact of Assumptions: *Flows*

- View as discrete discharges responsible for majority of measured gain.
- Recognize that large discrete discharges are only possible via discrete high-K pathways.
- Force flow to river through discrete locations
- Will produce dramatically different flow patterns and velocities.



19

Modeling Matters…

Karst Model

- 13 springs
- 14 swallets
- conduits
- element size ~5 -100 ft

Porous Media Model

- 1 spring
- 0 swallets
- 0 conduits
- element size ~1 mile

20

Battle of the Models

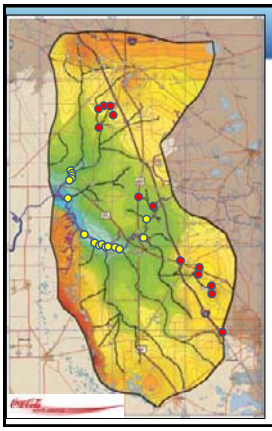
Karst Model

- closed to flow from north
- predicts less water available
- predicts large springsheds
- low rock permeability + conduits

Porous Media Model

- open to flow from north
- predicts more water available
- predicts small springsheds
- high rock permeability

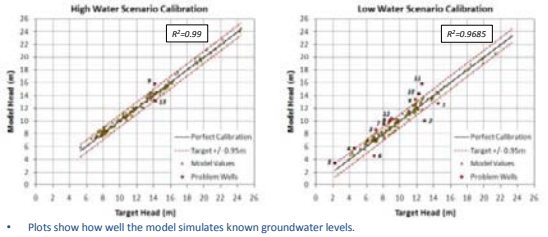
21



Key Components

- Springs
- Swallets
- Caves (mapped, traced, inferred)
- Rivers (discharge)
- Extractions (wells)
- Must be geologically reasonable
- Must match data
  - groundwater levels
  - spring discharges
  - traced velocities

Model Calibration: *Groundwater Levels*



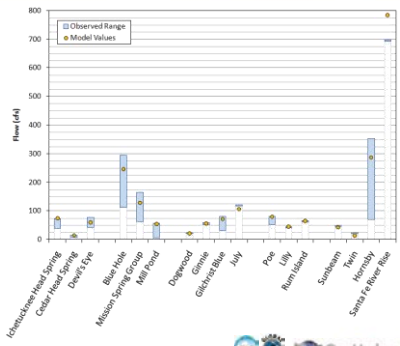
- Plots show how well the model simulates known groundwater levels.
- Perfect match would be the black line.
- All points within the red dashed lines are "calibrated."
- Could not achieve this good of a match if it were not for including the conduits.
- Even the points that fall outside the red lines are close to target levels.
- Additional small adjustments to the conduit locations could probably get all points within range.
- Those adjustments will not significantly impact the model predictions.

23

Model Calibration: *Spring Flows*

High Water Simulation

- Data for 17 springs
- Model within observed range at 13
- Model very close at 3
- Over estimated Santa Fe River Rise
- Does not impact groundwater flow because the conduit is mostly surface water

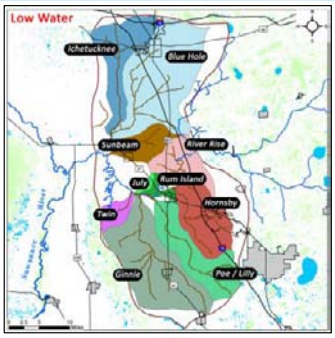


24

Modeled Springsheds

- Defined from forward particle track analysis
- Boundaries change between high water & low water conditions

Spring Group	High (km^2)	Low (km^2)
Ginnie / Blue	395	414
Blue Hole Group	377	488
Hornsby	274	210
Ichetucknee	248	222
Poe / Lilly	237	241
River Rise	116	134
Sunbeam	80	103
Twin	29	49
Rum Island	24	26
July	12	11



25

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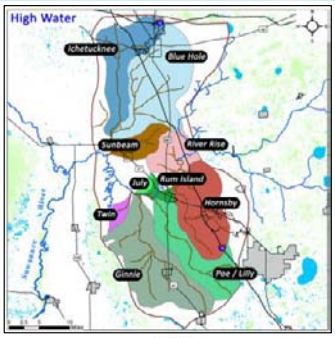
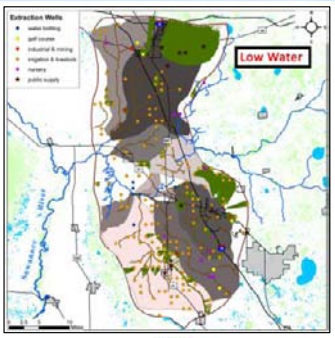


26

Modeled Pumping Impacts

- Pumping diminishes spring flows within the impacted springsheds.
- Particle tracking shows that pumping impacts the size and shape of the springsheds.
- Model simulates impacts to flows & springsheds.
- Example: Lake City
  - Average rate: 4.5 MGD
  - No pumping springsheds
    - Ichetucknee: 248-222 km^2
    - Blue Hole: 377-488 km^2
  - Pumping springsheds
    - Ichetucknee: 245-222 km^2
    - Blue Hole: 316-377 km^2
  - Reductions
    - Ichetucknee: -1% / 0%
    - Blue Hole: -19% / -30%



27

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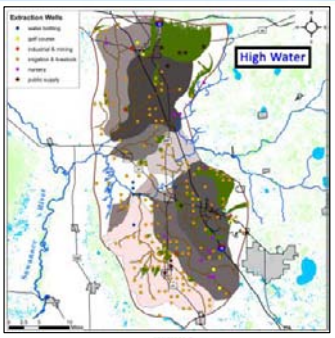


28

The Geek Stuff Matters

- Most decisions are based on models (i.e. how will the applicant's extraction impact flows)
- Can be said that all models are wrong
- But… Some models are way more wrong than others
- No such thing as a model that is good for quantity assessments but not for flow path and travel times – its either good or its bad.
- We've been using groundwater flow models to predict impacts since the 1970's.
  - If those models were correct then we must have seen all our problems coming and chosen not to act.
  - The only other possibility is that we believed in models that were wrong.
  - If so, then we have been acting out of ignorance.
- Now that we believe that caves, springs, and swallets exist, our models need to honor their existence.
- To not do so – to continue using models that are demonstrably wrong –
  is to be "willfully" ignorant.

29

No Karst in my County…

Beneath the Pink Underwear
Water pollution is more serious than the WASD plan would have you believe
BY STEVEN DUBLEY
steven.dudley@miamitimes.com
miamitimes.com | originally published: June 1, 2003

- *No caves*
- *No big springs*
- *No sinking streams*
- *Can still have conduit flow!*

- Quarries located close to Northern Miami-Dade well field
- Potential source of contamination to the wells
- Conventional wisdoms "models" state that groundwater travel times are slow (many days)
- Dye tracing – on the other hand – showed that travel times are hours: *1.5 orders of magnitude higher!*
- *Problem was that the trace was designed assuming the slower rate and as a result the wells were flooded with red dyed water turning people's underwear pink*
- Lesson: limestone + rain = karst
- Adequate protection measures must be based on accurate conceptualizations "models"

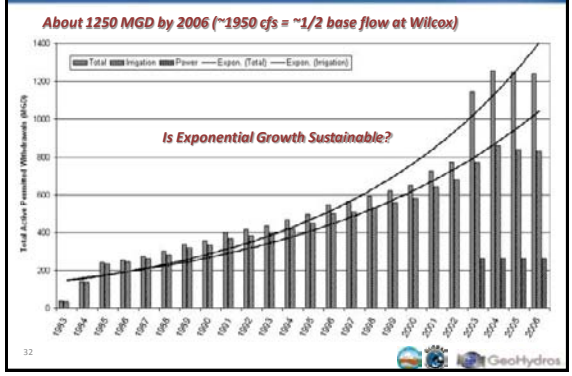
30

Summary

- We are loosing springs & mining groundwater.
- Pumping is at least part of the reason.
- In order to adequately predict impacts, we need to establish reasonable water budgets and use models that are designed to include the key components of karst aquifers.
- We need more public involvement because the devil lies in the detail *(not enough to do studies and make models – they must be good).*
- We need to sustain and expand monitoring programs (wells, springs, rivers).
- We need to set limits to groundwater pumping *(we cannot keep pumping more water).*

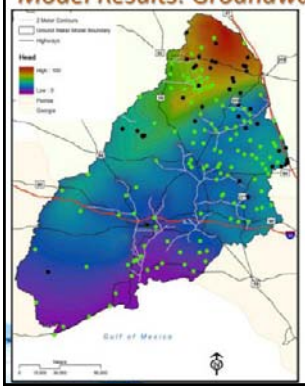
31

We're Using Too Much



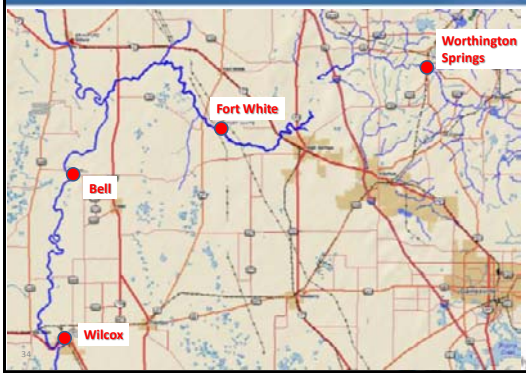
32

Model Results: Groundwater Levels



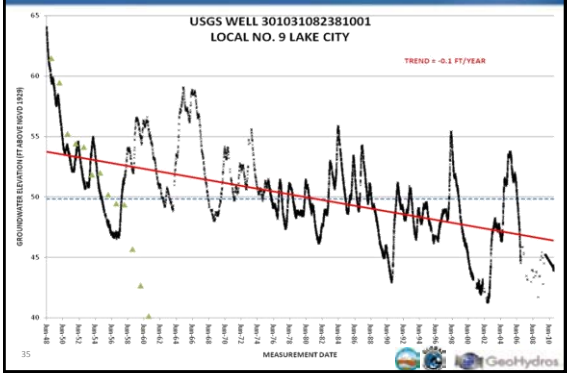
- Green dots mark wells that fall within the calibration range.
- Black dots mark wells that fall outside of the calibration range.
- Black dots near conduts can be brought into calibration through continued manipulation of conduit locations and parameter settings.

A Look at River Flows



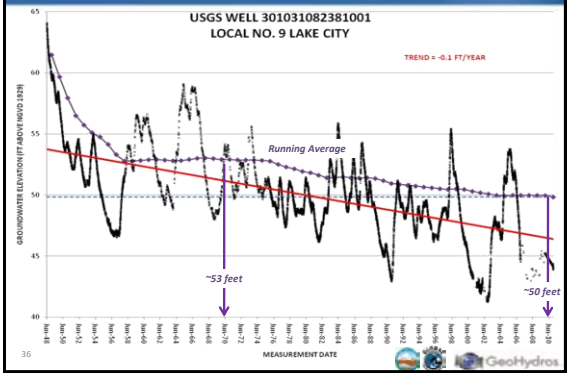
34

Mining Groundwater



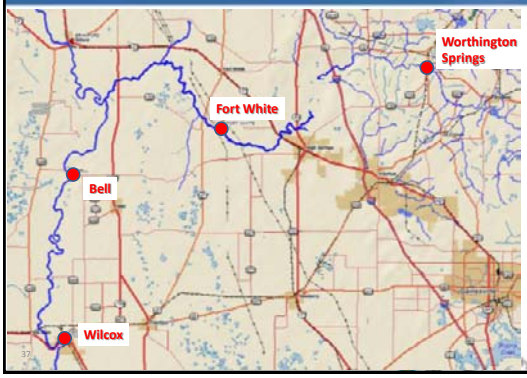
35

Mining Groundwater



36

A Look at River Flows



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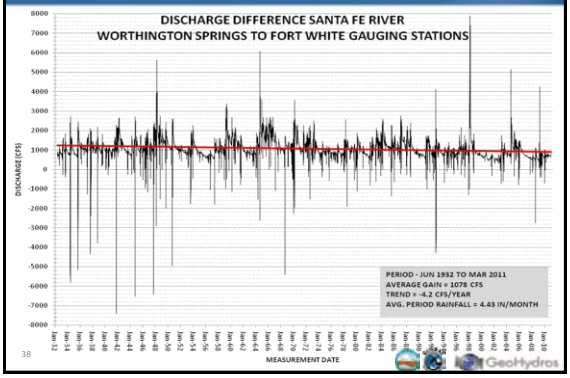
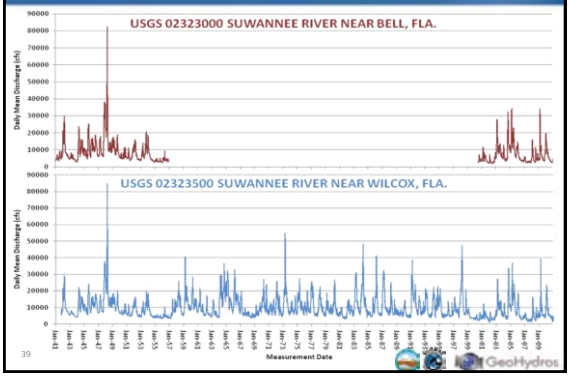
A Look at River Flows



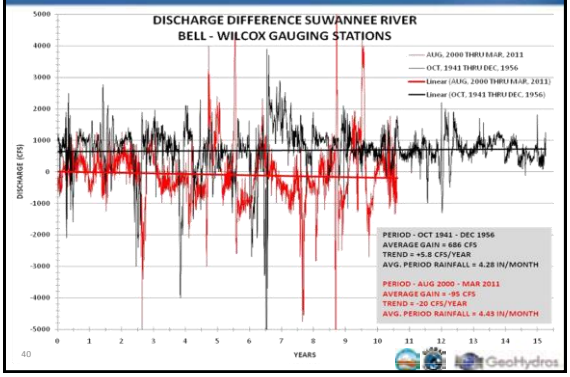
38

A Look at Suwannee River Flows



39

A Look at River Flows

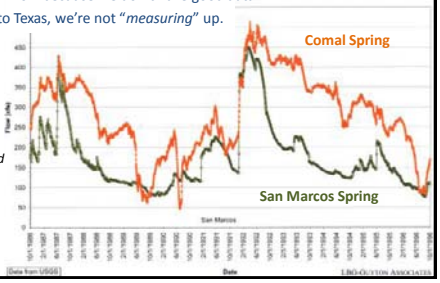


40

What Have We Lost?

- Know we've lost substantial river flow
- Presume that the loss is in spring flows
- Which ones?
- Don't really know because we don't have good data.
- Compared to Texas, we're not "*measuring*" up.

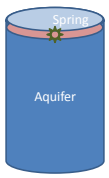
Continuous Record 1986 - 1996



41

Inadequate Impact Assessments

- Aquifer Pumping Tests
  - Commonly used to assess "impact" of extraction
  - Solely focuses on levels *not* flows
  - Typically only addresses nearby wells
- Aquifer is typically so transmissive that water level reductions due to pumping are tiny or unobservable
- Regardless of changes in level, all of the extracted water (minus whatever is returned) is taken from one or more springs.

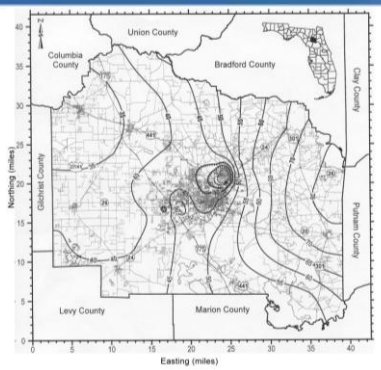


Small reduction in level could dry up the spring

Thanks John Good

42

Gainesville's Water?

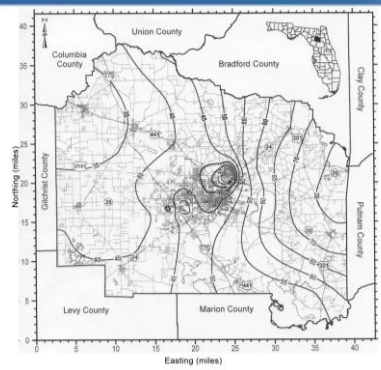


May 2000

43

GeoHydros

Gainesville's Water?

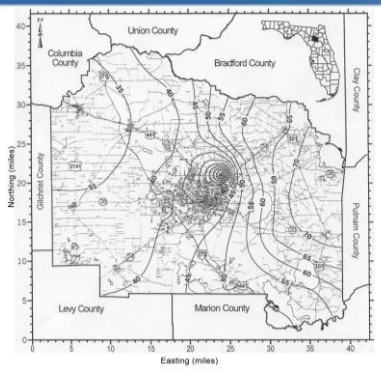


Sept. 2000

44

GeoHydros

Gainesville's Water?

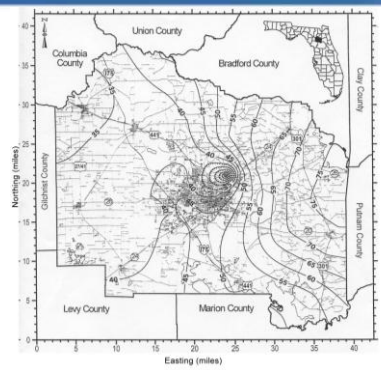


May 2001

45

GeoHydros

Gainesville's Water?



Sept. 2001

46

GeoHydros

The Springs Don't Care …

- Water is valuable to us and to the ecosystems
- If its cheap or free it will be wasted
- There is no longer enough for everyone to use as they please
- Riparian vs. First in Time (east vs. west)
- Water Use – bad or good – judge by consumption alone
- The springs don't care what we use their water for
  - Tomatoes
  - Houses
  - Lawns
  - Beer
  - Bottled water
- Ideally, water users should have a long-term stake in the water quantity and quality

47

GeoHydros

Where do we go from here?

- We need more data
  - spring flows
  - stream flows
  - Groundwater levels (thank you Alachua County)
- We need this data forever
  - Sorry Connie and Kathryn
  - i.e. Texas
- Make all users monitor extraction
- Encourage reuse and recharge
- Get public engaged
  - i.e. Texas radio stations
  - Tiered rate systems
- Need to build and use better models
- Find a way to make all this happen now!
  - Level loggers are ~$500 - $1000
  - USGS ~$25K per year per flow station

48

GeoHydros

The Floridan Aquifer

- 27 (>1/3) of the largest springs in North America discharge from the Floridan Aquifer
- Average discharge from those springs > 6.5 billion gpd
- All of those springs discharge from mapped underwater cave systems
- >90% of inhabitants use groundwater from Floridan Aquifer
- Conduit-dominated flow in unconfined sections
- Less known under confining layer

49

GeoHydros

Problems

- We're using too much water - Mining water from the aquifer
- We 're not adequately measuring / monitoring our water supply
- We're not adequately measuring / monitoring consumption
- We're using the wrong tests to evaluate consumption & impacts
- We're not adequately reporting our water status
- We're not adequately educating ourselves on how we interact with our aquifer
- We haven't clearly defined what we want in terms of water availability – competing objectives (environmental vs. social)

50

GeoHydros

October 26, 2011 **Springs Coast Minimum Flows and Levels**

Adequate Flows for Florida's Springs:

Ecosystem Considerations

Robert L. Knight, Ph.D.

Howard T. Odum FLORIDA SPRINGS INSTITUTE

Presentation Outline

- Importance of Ecosystem-Level Assessment
- Indicators of Springs Impairment
- Concerns About Existing MFL Methods as Applied to Springs
- Suggestions for Assessment of Springs Impairment and Recovery

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Importance of Ecosystem-Level Assessment

Howard T. Odum FLORIDA SPRINGS INSTITUTE

Howard T. Odum and Florida Springs Ecology

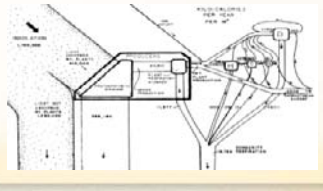
Founder of Systems Ecology and author of:

- Trophic Structure and Productivity of Silver Springs, Florida (Ecological Monographs 1957)
- Primary Production Measurements in Eleven FL Springs… (L&O 1957)

Silver Springs Ecosystem Study (Odum 1957)

Key Conclusions:

- Springs are ideal study ecosystems due to their relatively constant chemistry, clarity, and flows
- Spring ecology is complex and finely tuned to maximize the rates of primary productivity and community respiration (ecosystem metabolism)



Need for Ecosystem-Level Measures

- Response of single species and species groups does not reflect the overall ecosystem response
- Need sensitive system-level measures with predictable and repeatable responses to stress

Ecosystem Metabolism

Ecology: The scientific study of organisms and their environment, including the movement of materials and energy through living communities. Ecosystem or community metabolism includes:

- Gross Primary Productivity (GPP)
- Community Respiration (CR)
- Net Ecosystem Productivity (NEP) = GPP - CR

Economic Analogy

Economics: Economics is the social science that studies the production, distribution, and consumption of goods and services. Important economic indicators include:

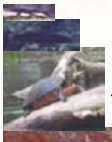
Gross National Product (Gross Income) – a measure of a country's (company's) overall economic output (production or sales)

Consumption (Expenses) – goods and services (costs) utilized in production

Net Profit – gross income minus expenses

Silver Springs Biomass Pyramid (Odum 1957)

Top Consumers
Bass, Birds, and Alligators = 1.53 g/m² (14 lbs/ac)



1° Consumers
Fish and Midges = 10.7 g/m²
(97 lbs/ac)

Herbivores
Turtles, Snails, Mullet = 36.8 g/m²
(335 lbs/ac)

Primary Producers
Sagittaria/Aufwuchs = 809 g/m²
(7,400 lbs/ac)

Silver Springs Ecosystem Metabolism (1952-55)

•Ecosystem Metabolism Measured from Main Boil to 1,200-m Station:

- •Gross Primary Productivity = 6,390 g/m^2/y (57,100 lbs/ac/yr)
- •Community Respiration = 6,000 g/m^2/y (53,600 lbs/ac/y)
- •Net Community Productivity = 768 g/m2/y (6,900 lbs/ac/y)

Upstream-Downstream Dissolved Oxygen (DO) Change Method

$\Delta DO = GPP - CR \pm D \pm A$

where:

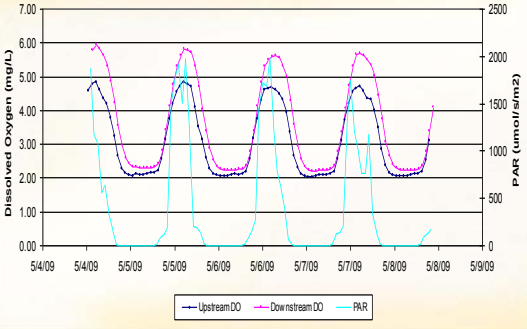
GPP = gross primary productivity

CR = community respiration

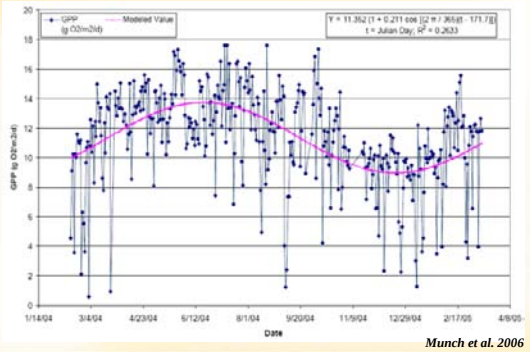
D = DO diffusion

A = DO accrual

Upstream-Downstream Dissolved Oxygen (DO) Changes (Silver Springs)



Silver Springs Daily GPP (2004-5)



Munch et al. 2006

Ecosystem Metabolism Comparison (1953 – 2005)

Silver Springs

Odum (1957)		Knight (1980)		WSI (this study)	
Date	GPP ($gO_2/m^2/d$)	Date	GPP ($gO_2/m^2/d$)	Date	GPP ($gO_2/m^2/d$)
2/19/1953	12.4	8/31/1978	19.3	Feb-04	8.2
3/7/1953	14.0	10/5/1978	13.6	Mar-04	11.4
3/25/1953	17.5	12/13/1978	7.8	Apr-04	13.2
1/7/1954	10.1	3/7/1979	10.7	May-04	13.9
5/23/1954	24.4	4/15/1979	16.8	Jun-04	12.7
7/12/1955	12.1	5/16/1979	23.4	Jul-04	13.6
8/11/1955	19.7	6/19/1979	20.7	Aug-04	12.3
		7/17/1979	11.2	Sep-04	10.9
		8/15/1979	17.1	Oct-04	11.7
				Nov-04	9.8
				Dec-04	8.5
				Jan-05	8.6
				Feb-05	11.1
				Mar-05	10.8
Average	15.7		15.6		11.2

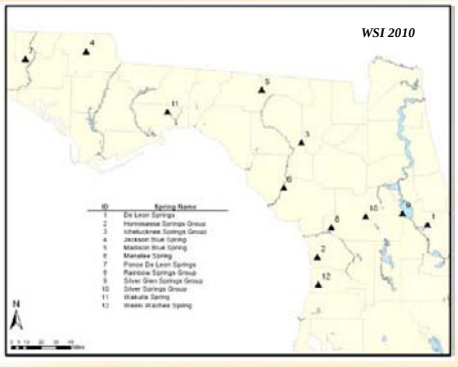
Munch et al. 2006

Florida Spring Ecosystem Study

- Funded by FWC, DEP, SJRWMD, SWFWMD, TRT
- Comparison of Ecosystem Structure and Function at 12 Springs

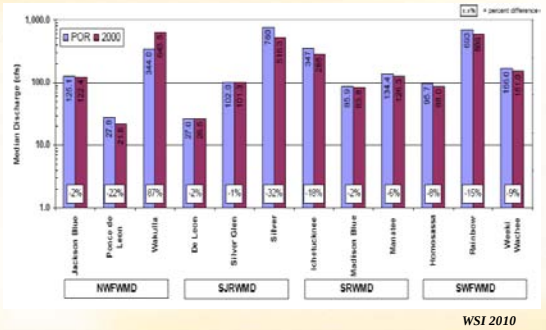
WSI 2010

Spring Ecosystem Study



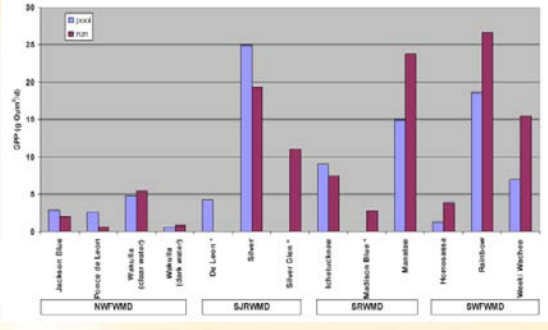
WSI 2010

Spring Discharge Changes



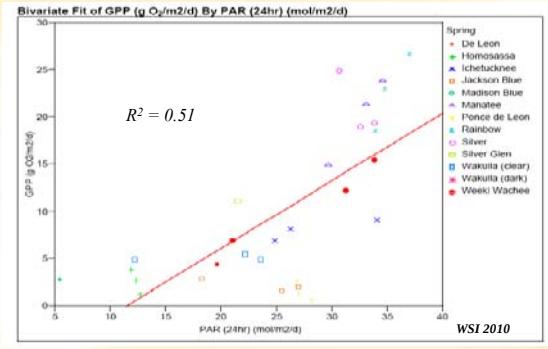
WSI 2010

Gross Primary Productivity

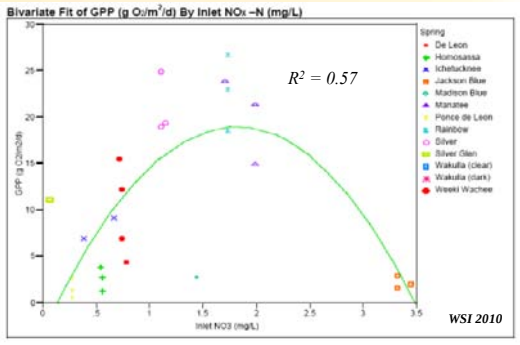


WSI 2010

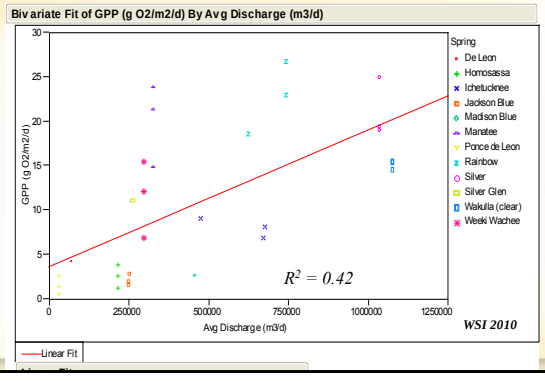
Solar Radiation vs. GPP



NO_3-N vs. GPP



Discharge vs. GPP



Conclusions

- Springs are threatened by a variety of stressors
- Single measures of impairment give ambiguous answers
- Whole ecosystem response is sensitive to change and may provide improved management decisions

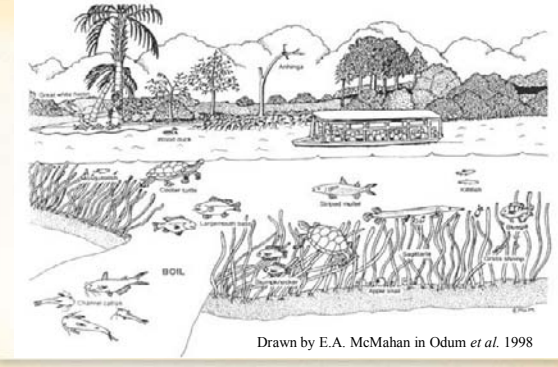
Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Indicators of Springs Impairments

Howard T. Odum FLORIDA SPRINGS INSTITUTE

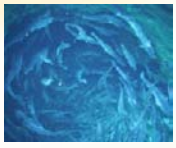
Healthy Springs Structure



Drawn by E.A. McMahan in Odum *et al.* 1998

Springs Support a Unique Ecology

Florida's springs are essential habitat for a diverse and unique assemblage of plants and wildlife

Springs Provide Economic Benefits

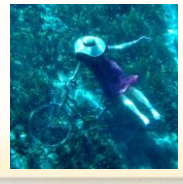
The direct economic value of Florida's largest springs is estimated to be over $300,000,000 per year




Springs Inspire Aesthetic Appreciation

Springs are the soul of Florida – they inspire the mind, they cool the body, and they nourish the spirit






Impaired Water Bodies (FDEP 2009)

- Volusia Blue
- DeLeon
- Jackson Blue
- Silver Springs
- Rainbow
- Weeki Wachee
- Fanning
- Manatee
- Wakulla
- Etc.


Silver


Jackson Blue


Weeki Wachee


Rainbow

Springs Problem – Part I

- Groundwater resources are stressed:
  - Groundwater consumption is increasing
  - Groundwater levels are falling
  - Spring flows are declining


Sources of Impairments

- Flow Reductions
  - *Silver Springs*
  - *Rainbow Springs*

Spring	POR Flow (cfs)	2000-2009 (cfs)	% Change
Silver Glen	102	101	-1
Rainbow	693	586	-15
Silver	760	516	-32

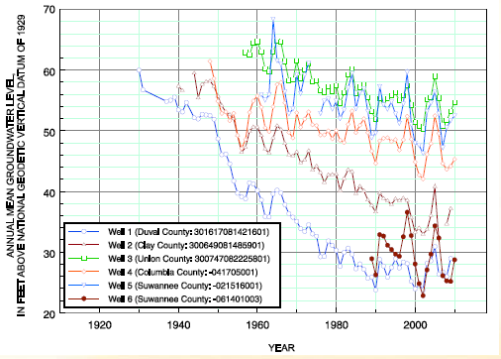
Increasing Groundwater Uses

Agriculture

Residential

Golf Course

Declining Groundwater Levels in North Florida (Grubbs 2011)



White Springs on the Suwannee River in the 1920s

(from Scott et al. 2004)

72 cfs

White Springs on the Suwannee River 2011

(photo by John Moran)

Declining flows since 1960s

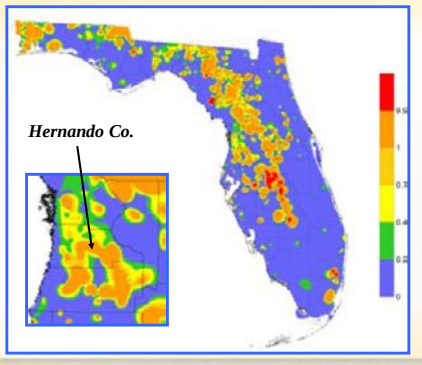
Springs Problem – Part 2

- GW nitrate nitrogen levels are increasing:
  - Nitrate contamination is wide-spread in the Floridan Aquifer
  - Springs are sensitive to elevated nitrate

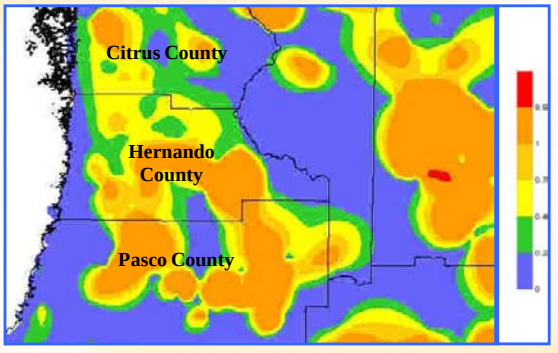
Nitrogen Sources

Agricultural and Urban Development are Resulting in Elevated Nitrate Nitrogen Concentrations throughout North and Central Florida (and Many Other Areas of the U.S.)

Groundwater Nitrate Concentrations (mg/L)



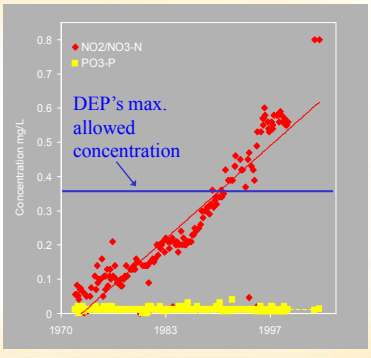
Springs Coast Groundwater Nitrate-N (mg/L)



Weeki Wachee Springs Nitrate

Weeki Wachee Springs:

Nitrate increase = 1,500% since 1970



Frydenburg 2008

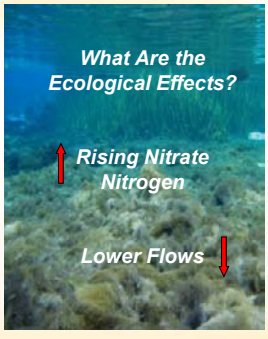
Nitrogen in Springs = More Algae

Weeki Wachee, circa 1950s

Weeki Wachee 2001

Springs Impairment

- Synergistic Effects of Decreasing Flows and Increasing Nitrate
  - Increased algal densities,
  - Declining macrophyte cover,
  - Reduced photosynthetic efficiencies
  - Declining native fish and turtle populations
  - Invasions by exotic fish and wildlife species, etc.



Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Concerns About Existing MFL Methods as Applied to Springs

John Moran Photo

Howard T. Odum FLORIDA SPRINGS INSTITUTE

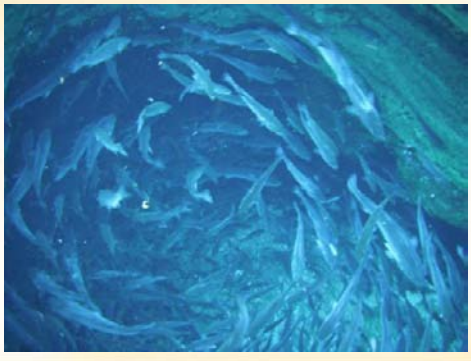
Ten Water Resource Values

1. Recreation in and on the water
2. Fish and wildlife habitats and passage of fish
3. Estuarine resources
4. Transfer of detrital material
5. Maintenance of freshwater storage and supply
6. Aesthetic and scenic attributes
7. Filtration and absorption of nutrients and other pollutants
8. Sediment loads
9. Water quality
10. Navigation

Chapter 62-40.473, F.A.C.

Rainbow Springs – Plant Diversity

Silver Glen Spring – Marine Fish



Ichetucknee Springs – Loggerhead Musk Turtle

Three Sisters Springs - Manatees

Weeki Wachee Springs – Tourist Attraction

Ichetucknee Springs - Tubing

Alexander Springs – Recreational Scuba Diving

Wekiwa Spring - Kayaking

Significant Harm Uncertainties

- Historic vs. Current Conditions
  - *We typically do not have an adequate baseline to assess how flows and levels have already declined*
  - *We are also often lacking historical or even current data concerning the ecological structure and function of the spring resource*

Bruce Mozert, Silver Springs, circa 1950s

Significant Harm Uncertainties

- Worst-Case Scenarios
  - *Groundwater pumping is typically greatest under the most extreme drought conditions*
  - *This "adding-insult-to-injury" puts a double-impact on the hydrology and ecology of springs*

Margaret Ross Tolbert's "Sirenia"

Significant Harm Uncertainties

- Groundwater Withdrawals
  - *Recorded groundwater withdrawals are a poor estimate of total groundwater use because of inadequate flow-monitoring thresholds*
  - *Groundwater models are too simplistic given the true nature of karst geology, and existing data are often inadequate for calibration*

Bruce Mozert, Silver Springs, circa 1950s

Significant Harm Uncertainties

- Outstanding Florida Waters
  - *The standard is* **"no degradation"**
  - *Springs with declining flows often have: increasing temperature, specific conductance, and nitrate; and decreasing dissolved oxygen and water clarity-* **All violations of OFW requirements!**

Wes Skiles photo

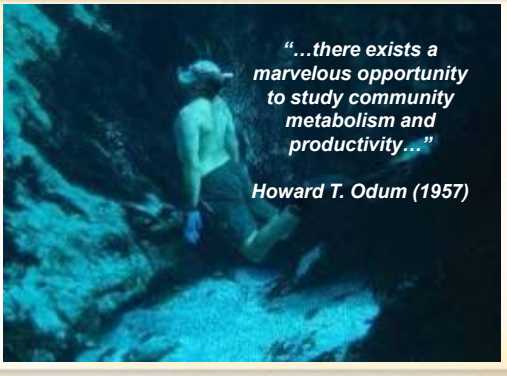
Springs Coast Minimum Flows and Levels

Adequate Flows for Florida's Springs:

Assessment of Springs Impairment and Recovery

Howard T. Odum FLORIDA SPRINGS INSTITUTE

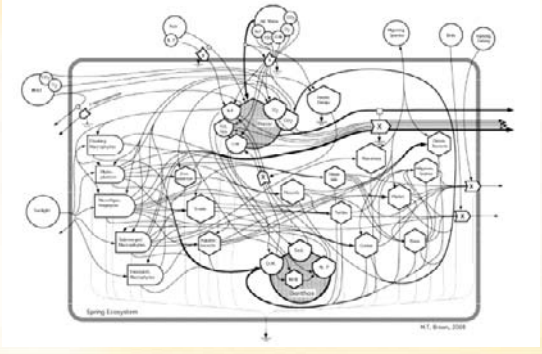
Florida's Springs



"…there exists a marvelous opportunity to study community metabolism and productivity…"

Howard T. Odum (1957)

Springs Ecosystem Model (Brown 2008)



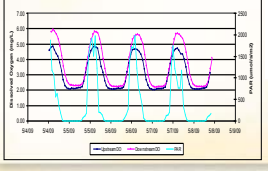
Springs Assessment

- External Forcing Functions
  - *Sunlight*
  - *Rainfall/recharge*
  - *Inflow quality*
- Key Structural Components
  - *Water flow and quality*
  - *Plant community*
  - *Consumers*
- Key Functions (Rates)
  - *Primary production*
  - *Secondary production*
  - *Export/import*

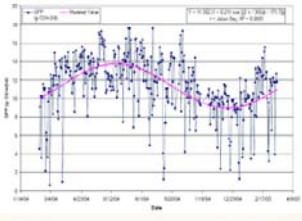
John Moran photo

Gross Primary Production

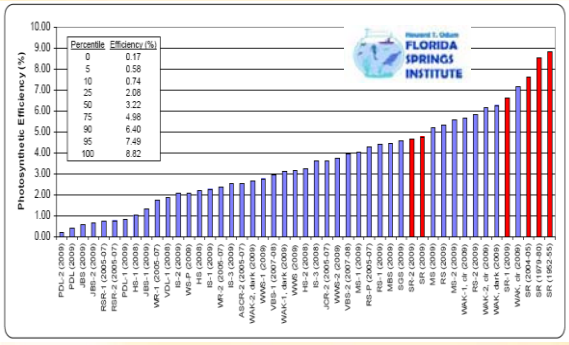
Dissolved Oxygen



GPP



Springs Photosynthetic Efficiency



Stream Condition Indicators

Steve Walsh, USGS

Replicated Spring Mesocosm Studies

Volusia Blue Spring Action Plan

Water Resource Values Monitoring

Collaboration
- SJRWMD
- FDEP Park Service
- FWC
- USGS

- Ecosystem Monitoring
  - Hydrology
  - Water quality
  - Plants
  - Invertebrates
  - Fish / Turtles
  - Manatees
  - Ecosystem Metabolism
  - Human use

Volusia Blue Spring Action Plan

Blue Spring

Volusia Blue Spring WRV Assessment Methods

WSI Monitoring Plant Productivity and Export

Volusia Blue Spring WRV Assessment Methods

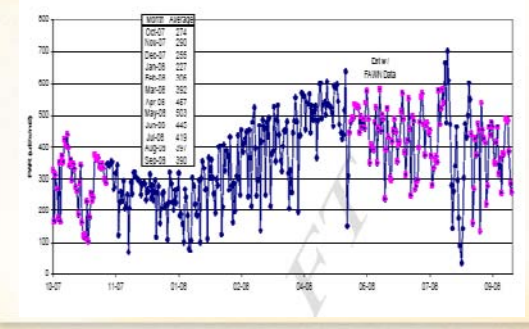
Stetson Fish and Turtle Sampling

Volusia Blue Spring WRV Assessment Methods

FDEP Daily Manatee Counts

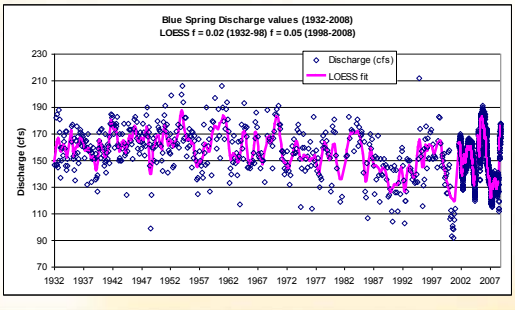
Volusia Blue Spring Action Plan

Blue Spring Solar Inputs

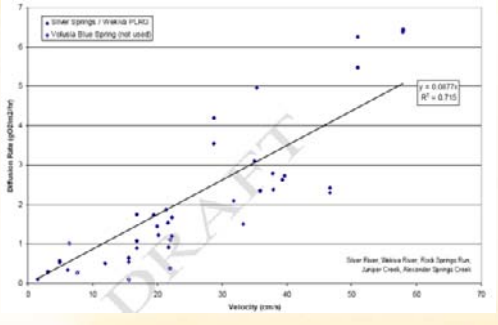


Blue Spring Hydrology

(1932-2008 USGS data, LOESS-locally weighted scatterplot smoothing)

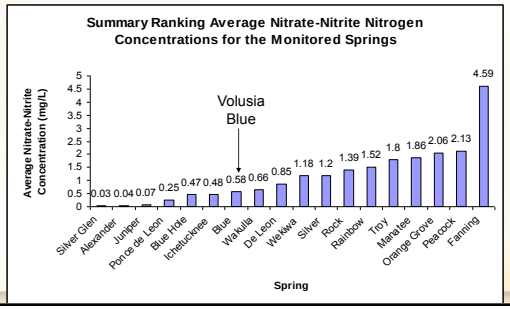


Spring Oxygen Diffusion Rates



Volusia Blue Spring Action Plan

Nitrate-Nitrogen (2000-2007)
Average 0.40 mg/L (0.21 to 1.13 mg/L)



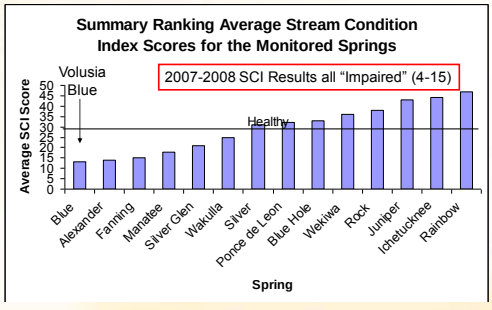
Volusia Blue Spring

Nitrate-N Assimilation (2007-2008)

- Upstream: 2.64 kg/ha/d
- Downstream: 22.9 kg/ha/d

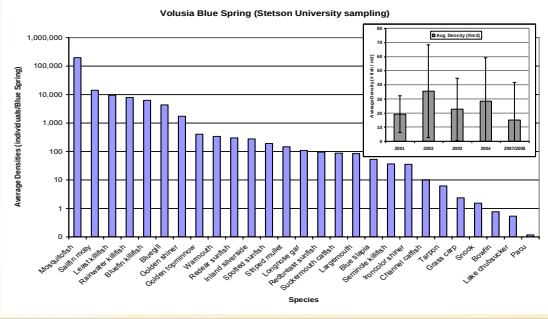
Volusia Blue Spring Action Plan

Stream Condition Index (2000-2007)



Blue Spring Fish Community

- 27 species, including several exotic species.

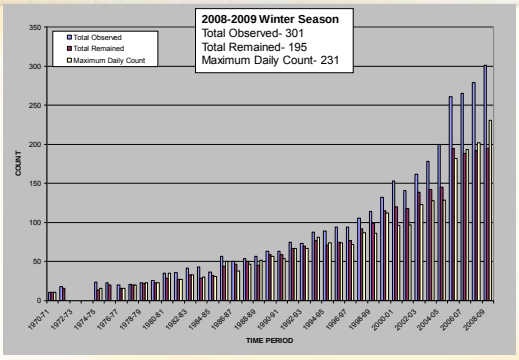


Blue Spring Turtle Community

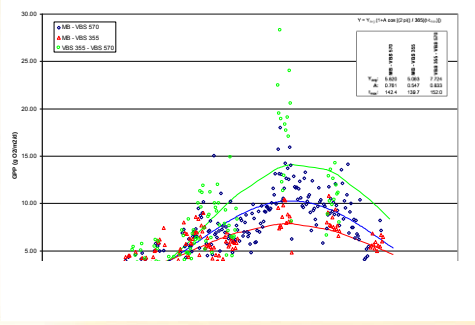
- Turtle biomass estimates (2007-2008) in kg/ha. Average is about 54 g/m².

Species	Survey Date			
	Oct-07	Mar-08	Apr-08	Oct-08
Peninsula Cooter (*Pseudemys floridana*)	1068	--	536	220
Florida Red-bellied Turtle (*Pseudemys nelsoni*)	189	89	--	36
Loggerhead Musk Turtle (*Sternotherus minor*)	2.4	--	--	15
Combined Total	1259	89	536	271

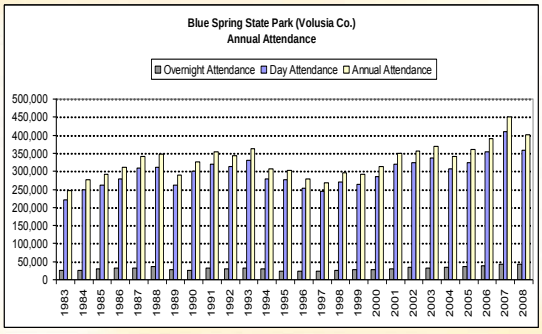
Blue Spring Manatee Numbers



Blue Spring Gross Primary Production (2007-08)



Human Use at Blue Spring



Volusia Blue Spring Action Plan

Summary of Key Findings

- Blue Spring State Park is very popular with the public with over 500,000 visitors per year
- Water quality varies with spring discharge - higher salts are associated with lower flows
- Algal mat thickness is greatest upstream near the boil
- SCI indicates “impaired” conditions, and is lower under lower flow conditions

Volusia Blue Spring Action Plan

Summary of Key Findings

- The spring run supports a diverse and relatively large and population of fish and turtles
- Manatee use continues to increase (over 300 individuals in 2010)
- Ecosystem productivity is low in Blue Spring compared to other Florida springs

Springs Coast Minimum Flows and Levels

Adequate Flows for Florida’s Springs:

Conclusions and Recommendations

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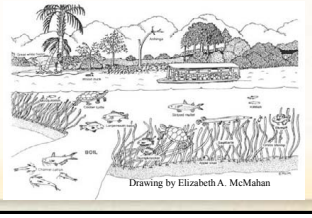
Springs are Ecosystems

- Springs and spring runs represent a unique class of aquatic ecosystems with distinct structures and processes.
- Due to their complexity, a holistic approach to spring studies is necessary to understand and manage anthropogenic effects on these ecosystems.

Silver Springs Ecosystem (Odum et al. 1998)



Flow is One of the Most Important Forcing Functions

- H.T. Odum hypothesized that ecosystem metabolism is a function of current velocity
- A non-flowing spring is a sinkhole (stagnant water, low productivity for wildlife)
- Recent work supports the relationship between overall spring discharge and gross primary productivity

Dr. Odum at Silver Springs 1979

"Primum Nil Nocere"

("First, do no harm")

This Latin maxim is one of the principal precepts of medical ethics. Another way to state it is that "given an existing problem, it may be better to do nothing, than to risk causing more harm than good."

THIS IS ALSO GOOD ADVICE FOR SPRINGS MANAGERS!

Recovery is an Option

Springs Protection Goal: Reduce the N Load and Restore the Flow

QUESTIONS?

Bruce Mozert, Silver Springs, circa 1950s

Florida Springs Institute

Howard T. Odum FLORIDA SPRINGS INSTITUTE

Founded May 2010
www.floridaspringsinstitute.org

Florida's Eden
www.FloridasEden.org

Howard T. Odum at Silver Springs 1979

From:	Marty Kelly
To:	Doug Leeper
Subject:	FW: Copy of my statement made at Tuesday"s MFL public meeting
Date:	Thursday, October 27, 2011 8:12:17 AM
Attachments:	Final meeting personal statement.rtf ATT00001.htm

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Doug,

Ben's comments for inclusion in the meeting record.

From: Ben Berauer [mailto:bfberauer@aol.com]
Sent: Wednesday, October 26, 2011 7:18 PM
To: Marty Kelly
Subject: Copy of my statement made at Tuesday's MFL public meeting

Mr. Kelly,
Here is the statement I made at the conclusion of the MFL meeting, as you requested. I appreciate being able to make it at the meeting, and your asking for it.
Ben Berauer

Thank you for letting me provide my comments today. My name is Ben Berauer, and I am a resident of the village of Chassahowitzka, a member of the Chassahowitzka River Restoration Committee, the Nature Coast Coalition, and the Suncoast Group of the Sierra Club. I am a long time nature enthusiast and outdoors leader. I have explored the Chassahowitzka and other Florida rivers, and I have seen degradations that have already occurred in just the last couple of decades. I have seen the water in the Chassahowitzka springs change from potable to unfit for drinking, then our wells change from potable to unfit for drinking, and how septic use in the area, and across the spring shed have already degraded water quality. I see the existing degradation contributed to sea level rise, and am concerned about any permitted further degradations.

I appreciate the work done by SWFWMD. I also appreciate the opportunity given to the public and stakeholders during the process of reviewing and discussing the draft proposal for the Chassahowitzka River MFL report.

But I must say that these proceedings have not achieved the result that I was hoping for. Many here today, like I, are very concerned that the scientific studies and reports fall short of addressing the concerns we have.

Particularly, I do not think that there has been any change in the position that the the MFL proposals do not take into account any special status or protections for Outstanding Florida Waters. During the past few months I have heard shocking statements from SWFWMD that they are not responsible for accounting for OFWs or water quality, while DEP states they are not responsible for regulating OFWs for other than water quality. There seems to no consistent addressing for the mandate to provide special protections to our OFWs. I will not feel that the proposed MFLs for OFWs are adequate until they account for the mandated additional protections.

Discussions regarding how ongoing natural changes such as drought and sea level change have not in my humble opinion been factored in to the MFL proposal. I feel that a baseline for future water use should be premised not only on current flows and man's further withdrawals, but on the full historical history and trend accounting for natural and anthropogenic impacts on our springs and spring sheds. Our waters are known to be significantly impacted from pollution, water use, reduced precipitation, and

other factors. As such I feel that defining significant harm as a further 15% reduction of water bodies or spring sheds as inadequate, particularly for OFWs.

As we race to a recommendation to the SWFWMD Governing Board, we have just started to look at affects of sea level rise, which has not been thoroughly reviewed, discussed, and incorporated into the MFL proposal.

Another major concern is that due to the limited data from limited monitoring sites, and limited focus to impacts to specific macro environments, there is little knowledge or prediction of what will occur on micro-environments, smaller springs, spring runs, and the flora and fauna surrounding them. We may see 100% degradation of many micro-environments since the affects of a 11% water flow reduction are not known at significant detail.

Nor does the analysis adequately take into account contributions to significant harm from affects of possible increased nutrient pollution from reduced flow and greater permitted water use and resultant development.

Given these many inconsistencies between what is addressed by the modeling and analysis results and the broader concerns I still believe need to be addressed, I do not feel that the voice of the stakeholders and public have been adequately addressed. I do not feel the "one-size-fits-all" is appropriate for OFWs. I do not believe that the impacts of the proposed reduction in flow are adequately known to protect the river and spring system and its micro-environments. I respectfully submit that although efforts have been made to provide sound analysis and public input, the analysis is not adequate, and public concerns are not adequately addressed. If the current proposed MFL were adopted, I feel further work and a revision is immediately needed.

From:	Marty Kelly
To:	Doug Leeper
Subject:	FW: Chass MFL Comments
Date:	Friday, October 28, 2011 9:12:39 AM
Attachments:	United Waterfowlers, stakeholder statement.doc

From: Dennis3ds@aol.com [mailto:Dennis3ds@aol.com]
Sent: Friday, October 28, 2011 7:36 AM
To: Marty Kelly
Cc: Hitchco@bellsouth.net
Subject: Chass MFL Comments

Mr. Kelly,
Per your request, attached are the comments from the October 26th meeting I made to the District.

Thanks,
Dennis

Dennis D. Dutcher
United Waterfowlers - Florida, Inc.
South West Region Director / Board Member
863.667.1833 / 863.602.0113
www.unitedwaterfowlersfl.org

United Waterfowlers-Florida, Inc.
Stakeholder Statement, regarding Chassahowitzka MFL

Attention: Marty Kelly, Ecologic Evaluation Section

Mr. Kelly as per your request, here are the remarks from my outline to be included into the stakeholder comments regarding the Chassahowitzka MFL's from the October 26, 2011 meeting in Lecanto, Florida.

On behalf of United Waterfowlers-Florida, Inc. I would like to thank the District for holding these workshops with the stakeholders and members of the public outlining the tedious task and the science used to determine Minimum Flows and Level's for the Chassahowitzka River and springs system.

The subject has been well covered whey establishing MFL's are important in order to create a water budget for human needs that includes safeguards for wildlife and their habitat. However I have concerns, pulling flow from an already degraded and stressed system would be comparable to blood letting from a patient that is bleeding to death already.

The significance of sea level rise resulting in the subsidence of coastal marsh is pronounced on the West Coast of Florida causing habitat loss for wintering waterfowl not only in this area of the state but much of the West Coast of Florida has been affected to some degree.

Between the years 2004-2009 about 25,000 acres of salt marsh disappeared each year. Marine and estuarine intertidal wetlands in coastal regions have been lost 3 times faster than during previous study periods. 83% of these acres were lost to open water, predominantly through subsidence and sea-level rise. Wetland losses have increased 140% since 2004, with the Gulf Coast of Florida losing wetlands the size of a football field each day or about an acre per day.

Wetlands are among nature's most productive ecosystems providing habitat for a wide variety of waterfowl, fish and many other species of wildlife. Coastal Wetlands are highly productive and diverse and, as such merit special consideration. 66% of marine fish rely on coastal wetlands at some stage in their life cycle. Wetlands also provide important societal benefits

such as filtering run off, decreasing the effects of storm serge and providing recreational opportunities such as hunting and fishing.

It is now understood by most that the reason for the loss of overwintering waterfowl on the refuge and this coastal area of the state is the lack of fresh water flowing into the near shore Gulf, wafting up from the aquifer in the coastal estuaries and seeping into the coastal marsh from a fully saturated aquifer. Further reducing flows from the spring shed will make recovering any coastal marsh more difficult if not impossible.

Setting MFL's may be one step in conserving water resources but not the only step that should be taken. As much as 50% of our drinking water is used to water lawns, add to that an average of 15% loss during the delivery of drinking water from the water treatment facilities, leaking pipes and fixtures in homes and businesses, for a total of up to 65% waste of the natural resource. But, water is cheap!

If we look to some examples of how other states have addressed their water consumption needs we find it is not impossible to address. The State of California had a population increase of 60"% between the years1975-2000 yet their water consumption remained about the same, what do they know that we don't? It would be prudent for the District to address the unlimited consumption of fresh water much of which is used to keep non-native grasses alive. While it is commendable the district is attempting to address MFL's on the Springs Coast it is my request that you weigh the evidence shown that these systems are in peril, a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh.

Florida is a State in which tourism is a major part of the economy and many people choose to make their life here do so because of the recreational opportunities and natural beauty of the State much of which has to do with the aquatic resources, of which many of us feel quite possessive.

Thank you for the opportunity to serve as a stakeholder and provide input on a subject that is important to all of us.

Dennis D. Dutcher
SW Region Director-Member of the Board
United Waterfowlers-Florida, Inc.

From:	Alan Martyn Johnson
To:	bwr.crrc@tampabay.rr.com
Cc:	Doug Leeper; Ron Miller; Al Grubman; Norman Hopkins; Dana Bryan; Brent Whitley
Subject:	RE: MFLs Workshop Presentations and Chloride Conc File Posted on Web Site
Date:	Saturday, October 22, 2011 8:48:29 AM
Attachments:	Public Input Statement from Martyn Johnson.doc

Brad,
Thanks for sharing the e-mail that the Agenda has been posted.

Unfortunately, I will not be able to attend the meeting as I have commitments in Atlanta thru the end of next week.

I have attached a word document with a public input statement (also copied below) which I would appreciate being presented on my behalf.
Thanks,
Martyn
P.S. Should be in FL early November.

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   *"Review of the District's Well Construction Database indicates that **213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years**, respectively."……"With regard to water-use permitting……. **Fewer than ten of the hundreds of surface- and groundwater use permit** requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

2. As some may know the USGS installed the velocity monitoring unit under the bridge on Fishbowl Drive to monitor the stream velocity and discharge from the SE Fork of the Homosassa River.

   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   "Review of the District's Well Construction Database indicates that ***213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years****, respectively."……"With regard to water-use permitting……* ***Fewer than ten of the hundreds of surface- and groundwater use permit*** *requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

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   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

From: Doug Leeper
To: Brad Rimbey (BWR.CRRC@tampabay.rr.com)
Cc: Marty Kelly
Subject: Draft Meeting Notes
Date: Thursday, November 03, 2011 8:36:07 AM
Attachments: Draft Meeting Notes-26oct2011 Stake Rep Springs Coast MFLs Wkshp.pdf

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Morning Brad –

I've drafted and attached some meeting notes for the October 26th stakeholder representatives spring MFLs workshop.
Am hoping you can give them a quick look, and if you are OK with them, I will post the notes on the workshop web site, along with the slides shown by Dr. Knight and Dr. Kincaid (still need to hear about inclusion of the "extra" slides in Dr. Kincaid's Powerpoint file).

Note that purple highlighting references the Kincaid slide issue, and will be removed from the "final" notes. Yellow and blue highlighting in the written statement from Martyn Johnson was in his original e-mail and will be retained.

Also, I will be working on District responses to comments/questions raised during the workshop.

Look forward to hearing from you soon.

Thanks,

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

MEETING NOTES

Stakeholder Representative's
Springs Coast Minimum Flows and Levels Public Workshop
Facilitated by the
Southwest Florida Water Management District

October 26, 2011
Lecanto, Florida

The fourth in a series of Springs Coast Minimum Flows and Levels Public Workshops was held between 1:30 and approximately 5:45 p.m. on October 26, 2011 in Room 240 at the Citrus County Lecanto Government Services Building in Lecanto, Florida. The workshop was requested and organized by stakeholder representatives that participated in the workshop series. Logistic support was provided by the Southwest Florida Water Management District. Stakeholder representatives, Southwest Florida Water Management District staff and a District Governing Board member that attended and contributed to the workshop are identified below. Commissioner J.J. Kenney, with the Citrus County Board of County Commissioners also participated in the meeting. A list of meeting participants who signed an attendance roster is attached to these meeting notes as Appendix A.

Stakeholder Representatives
Norman Hopkins, Amy H. Remley Foundation
Brad Rimbey, Chassahowitzka River Restoration Committee
Rebecca Bays, Citrus County
Carolyn Voyles, Florida Department of Environmental
Ed Call, Florida Fish and Wildlife Conservation Commission
Brent Whitley, Stakeholder Representative
Ron Miller, Save the Homosassa River Alliance
Katie Tripp, Save the Manatee Club
Al Grubman, TOOFAR
Dennis Dutcher, United Waterfowlers-Florida
Boyd Blihovde, United States Fish and Wildlife Service
Kevin Grimsley, United States Geological Survey
Dan Hilliard, Withlacoochee Area Residents
Whitey Markle, Sierra Club

District Representatives
Ron Basso, Staff
Darcy Brune, Staff
Veronica Craw, Staff
Sid Flannery, Staff
Mark Hammond, Staff
Mike Heyl, Staff
Marty Kelly, Staff
Doug Leeper, Staff
Cara Martin, Staff
Doug Tharp, Governing Board
Gary Williams, Staff

A copy of the agenda for the workshop, which was prepared by stakeholder representatives, is attached to these notes as Appendix B. Summaries of topics and issues discussed during the workshop are grouped below by agenda item. All notes were prepared by Mr. Doug Leeper, with the Southwest Florida Water Management District, based on review of audio recordings of the workshop, slides presented at the workshop, and handwritten notes recorded by Mr. Leeper during the meeting.

Opening Remarks

Mr. Doug Leeper opened the meeting at approximately 1:40 p.m. Following the introduction of District Governing Board member Doug Tharp and Citrus County Commissioners Rebecca Bays and J.J. Kenney, Mr. Leeper noted that the workshop was being held at the request of the Stakeholder Representatives with assistance provided by the District. Mr. Leeper and other meeting participants thanked Mr. Brad Rimbey for organizing the event and developing the agenda.

Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee, offered his gratitude to the District for its assistance with the workshop and it's work concerning development of minimum flows for the Chassahowitzka and Homosassa River systems, Mr. Rimbey proceeded to introduce Dr, Todd Kincaid, with GeoHydros, L.L.C., Global Underwater Explorers and the Hydrogeology Consortium as the first speaker of the day.

Coastal Spring MFL Hydrology Topics by Dr. Todd R. Kincaid

Dr, Todd Kincaid provided a presentation titled "*How Much is Too Much – Toward a Water Budget Approach to Management.*"

Dr. Kincaid started by noting that through the work on Wakulla Springs and the Santa Fe River systems to be discussed during his presentation he would be able to offer some insights that are applicable to the minimum flows and levels work being completed for the Springs Coast. Dr. Kincaid began his presentation with a dedication to a recently deceased colleague, Mr. Les Skiles. Dr. Kincaid proceed to outline his presentation, noting that spring loss may be attributed to reduced rainfall, too much extraction of groundwater, or rising sea levels. He noted that rising sea levels may not be expected to reduce the amount of groundwater or spring discharge, but rather may be expected to alter the location of the discharge. Dr. Kincaid noted that there is a trend in regional groundwater use that may lead to the loss of some springs. He noted that this may be prevented by improving public understanding of the issue, development of better groundwater models for use in management decisions, through collection of additional data to support model development, through reduction in groundwater withdrawals, and by establishment and enforcement of minimum flows and levels. He noted that an important component of groundwater studies involves development of a water budget for evaluating the amount of sustainable groundwater withdrawals, or "groundwater mining" for a region.

Dr. Kincaid then proceeded to discuss research that has been conducted in the vicinity of Wakulla Springs to highlight issues that may be applicable to other areas of karst geology. He noted that the Northwest Florida Water Management District is in the process of establishing minimum flows and levels for Wakulla Springs in the Florida panhandle. Important findings associated with this work include the identification of relatively rapid velocities or movement of groundwater in the area, and that flow reversals, and resultant saltwater intrusion, have been documented since 2006 in Spring Creek, which is a large spring system located south of Wakulla Springs, near the Gulf of Mexico. Dr. Kincaid noted that during these flow reversal events, salt water may travel rapidly inland up to three miles. Dr. Kincaid suggested that development of minimum flows for Wakulla Springs should consider the potential effects of saltwater intrusion and flow reversal in other area springs to best address regional and localized impacts of withdrawals on spring discharge. He emphasized that distance between withdrawal points and springs and more importantly the difference in hydraulic gradient between the two areas should be carefully evaluated. Dr. Kincaid also noted that there appears to be downward trends in groundwater levels in the vicinity of the springs.

Dr. Kincaid then discussed the general movement of groundwater in a karst environment such as that of the Wakulla Springs area, which includes caves and springs. He noted that withdrawal effects may be evident in wells throughout these types of groundwater basins, but may be difficult to detect in individual cave/spring systems. Dr, Kincaid suggested that additional data collection and analyses should be completed to support development of minimum flows for Wakulla Springs and other hydrogeologically connected systems.

Next, Dr. Kincaid focuses on assumptions and data needs associated with groundwater modeling, with emphasis on the special considerations needed to adequately model karst-dominated systems. He illustrated his points with examples of models used to characterize groundwater flow in the Santa Fe River area, in central Florida. He noted that a competent groundwater model should incorporate several key components, including known springs, swallets, caves, rivers, withdrawal locations and quantities and that the model must be geologically reasonable and well calibrated to groundwater levels, spring discharge and groundwater movement velocities. He noted that once a competent groundwater model is developed it may be used to evaluate or model pumping impacts.

Note: Audio recording of Dr. Kincaid's presentation was inadvertently discontinued approximately 45 minutes after initiation of the workshop. This error resulted from programming the recording device to store high quality, data-dense audio information, which limited the amount of information that could be stored on the media associated with the device. Dr. Kincaid's oral presentation describe above corresponded to the first 28 slides shown at the workshop and was recorded and reviewed for preparation of these meeting notes. Notes presented below for information presented by Dr. Kincaid in association with slide numbers 29 through 31 that were shown at the workshop were developed solely on the basis of review of the slides and handwritten notes taken by Mr. Leeper and may be less comprehensive than the notes prepared for the earlier portion of Dr. Kincaid's presentation.

Dr. Kincaid proceeded to note that the details of groundwater models are important, as these tools are often used for significant water management decisions. He noted that as a society, we have been using groundwater models to predict impacts of withdrawals since the 1970s and it is important to ensure that these models include or incorporate information concerning the karst geology that is common in our state.

Following Dr. Kincaid's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

- Mr. Brad Rimbey, the stakeholder representative for the Chassahowitzka River Restoration Committee noted that flows from only two springs in the Chassahowitzka River system are measured or gaged, and wondered what effects future withdrawals may have on ungaged springs within the system.

  Response: Dr. Kincaid noted that the work related to the Wakulla Springs and other nearby springs indicates that it is important to obtain and evaluate data on as many springs as possible in a region, as flow trends at one spring vent may not be representative of similar trends at other vents in a highly interconnected groundwater system. Dr. Kincaid added that it is important to establish minimum flows and levels for spring systems now, using the best available information, as the minimum flows and levels offer protection to the systems by defining caps or limits on withdrawals that affect flows to the springs.

- Commissioner Rebecca Bay, the stakeholder representative for Citrus County, expressed appreciation to Dr. Kincaid and others at the meeting for the ongoing discussion of minimum flows and level to be established for the Springs Coast, noting that she and other County

Commissioners, staff and the citizen's of the region are very interested in this process. She expressed regret that she would not be able to attend the remainder of the meeting due to another commitment, but noted that she will be available to all interested parties interested in further discussion of the minimum flows and level process.

Mr. Rimbey announced that the workshop would continue after a short break with a presentation by Dr. Robert Knight, with Wetland Solutions, Inc. and the Howard T. Odum Florida Springs Institute.

Coastal Spring MFL Ecology Topics by Dr. Robert L. Knight

Dr, Robert Knight provided a presentation titled "*Adequate Flows for Florida Springs: Ecosystem Considerations.*"

Note: Dr. Knight's presentation was purposefully not recorded based on the understanding that audio recording would be limited to 45 minutes and the identified need to record comments and discussion that were expected after his presentation. Notes prepared for information presented by Dr. Knight in association with his slide presentation were developed based on review of his slides and hand-written notes taken by Mr. Leeper during the presentation.

Dr. Knight began his presentation with an outline, indicating that he planned to address the importance of ecosystem-level assessments, indicators of spring impairment, concerns about existing methods for establishing minimum flows and levels for springs, and suggestions for assessment of springs impairment and recovery.

Dr. Knight suggested that assessments of ecosystem function, e.g., measures of productivity, are missing from most minimum flows and levels evaluations. He noted that like Dr. Kincaid's identification of the need for development and understanding of water budgets when developing minimum flows, it is also important to develop energetic budgets that account for the movement of materials and energy through living communities. Historical and more recent work directed toward quantifying and understanding ecosystem metabolism at Silver Springs and other Florida spring systems was highlighted by Dr. Knight, and used to illustrate energy budget concepts and relationships between system productivity and a variety of environmental factors. He noted that available flow records indicate that discharge in the past decade at many Florida springs has decreased from historical levels. Dr. Knight added that a recent study of several springs identified a direct, continuous (i.e., no threshold response evident) relationship between spring discharge and gross primary productivity, which is a measure of algal or plant growth rate. Dr. Knight emphasized that Florida spring systems are threatened by a number of stressors, and that evaluation of whole ecosystem responses, rather than measurement of single measures of impairment, could be used to better inform management decisions.

Dr. Knight then proceeded to discuss unique and beneficial qualities of Florida springs and highlighted indicators of spring impairment. He noted that many springs are classified as impaired water bodies, based on water quality characteristics. Decreased groundwater levels and spring flow reductions were also identified as issues affecting spring ecosystems. Dr. Knight illustrated the reduced flow issue by showing slides of White Springs, a north-Florida spring that was one a recreationally important landscape feature and which has now ceased flowing. Dr. Knight also noted that increasing concentrations of nitrate in groundwater systems is a problem for many spring systems, where higher nitrogen levels leads to increased algal production. Dr. Knight then discussed synergistic effects of reduced flows and increased nitrogen levels, noting these factors may lead to declining macrophyte coverage, reduced

photosynthetic efficiency, declines in native fish and turtle populations, and increased invasions by exotic species.

Dr. Knight turned his discussion to concerns about existing minimum flows and levels methods as applied to springs. He noted that the rules of the Florida Department of Environmental Protection include a number of water resource values that should be evaluated when developing minimum flows and levels. He emphasized that spring systems are quite diverse and this supports the need for evaluations that do not focus on single species. With regard to evaluating significant harm, he noted that the limited availability of baseline hydrologic and ecological data often precludes adequate characterization of changes that have or may occur as a result of water use. Similarly, information of groundwater pumping may be inadequate and models used to evaluate groundwater flow may be too simplistic or otherwise inadequate. He emphasized that "worst-case" scenarios should be evaluated when establishing minimum flows and levels. He noted that most springs of the state are classified as Outstanding Florida Waters and that springs with declining flows often exhibit water quality changes that may be considered "violations of Outstanding Florida Waters requirements." He noted that it may take fifteen years or more to achieve the nitrogen targets identified in Total Maximum Daily Loads and the Basin Management Action Plans that are developed to reduce nitrogen loading to spring/groundwater systems.

Dr. Knight also discussed methods that could be used to assess springs impairment and recovery. Identified factors to be considered or evaluated include measurement of sunlight, rainfall, groundwater recharge, inflow water quality, spring or river flows, plant communities, consumer assemblages, primary and secondary production and export/import rates for energy and matter. He noted that the relative constancy of many environmental variables makes spring systems nearly ideal for conducting replicated field-based mesocosm studies. Dr. Knight then discussed the Volusia Blue Springs Action Plan being implemented for recovery of spring flows at that central Florida spring. The plan includes extensive monitoring of water resource values and these ongoing efforts were highlighted.

In conclusion, Dr. Knight noted that a holistic approach is necessary for evaluation of spring systems, based on their complexity, and unique structures and processes. He indicated that in his opinion, a holistic approach has not been used for development of minimum flow recommendations for Springs Coast systems. With regard to springs management, he offered a Latin phrase "*primum nil nocer*", which translates to "first, do no harm." Dr. Knight noted that recovery of spring systems within the state is possible through reduction of nitrogen loading and restoration of flows. With regard to minimum flows development, he suggested that it may be better to do nothing, based on the availability of existing information on some spring systems. He opined that it would not be wise to allow water use to reduce spring flows to the limits established by minimum flows and levels rules, suggesting that perhaps it may be prudent to allow only some portion, perhaps half, of the identified, allowable reductions. He expressed concern that based on economic perspectives society may approve violation of adopted minimum flows and levels or call for changes that allow for additional flow reductions.

Following Dr. Knight's presentation, stakeholder representatives and other workshop participants offered the following comments and questions.

Note: Audio recordings of the comments and discussion following Dr. Knight's presentation were made, so the following notes were prepared based on review of the audio recordings and hand-written notes made by Mr. Leeper during the meeting.

- Ms. Hope Corona questioned how ecosystem and other levels of biological organization can be numerically quantified for the Chassahowitzka River system to support minimum flows development.

  Response: Dr. Knight noted that he hoped his presentation addressed the measurement of biological and ecosystem properties of spring ecosystems. He added that the University of Florida has completed several studies of the Chassahowitzka River and other nearby systems, and that this information should be part of minimum flow evaluations and may serve to characterize baseline environmental conditions. During his response Dr. Knight noted that plant control activities can confound analyses and interpretation of plant coverage/distribution data that are or will be collected for spring systems. He noted that salinity changes could account for changes in plant communities in tidally influenced river systems, although he indicated that he was not familiar with the data that are available for the Chassahowitzka River system. He did note, however, that he has seen published information that indicates that the Wachee well that is used to estimate flows in the Chassahowitzka River system has exhibited a three-foot decline in water levels and that this magnitude of groundwater lowering could be expected to be associated with a rise of the saltwater/freshwater interface in the aquifer on the order of 120 feet. Based on this information he indicated that it would be plausible to see increased salinities of the water discharged from some springs in the Chassahowitzka River system.

- Mr. Mike Czerwinski noted that there does not seem to be a direct relationship between nitrate levels and the growth of filamentous algae in spring systems.

  Response: Dr. Knight noted that a recent study by Stevenson and others indicated that although there does not appear to be a relationship between nitrogen concentrations and algal cover in Florida springs, there is a relationship between nitrogen levels and the thickness of algal mats in a number of our springs. He noted that there does appear to be a relationship between nitrate levels and dominance by filamentous algae, but other environmental factors and recreational impacts may be expected to affect the distribution of plants and algae in spring systems.

- Mr. Darrell Snedecor questioned whether establishing a minimum flow or level would be expected to affect nitrate concentrations in river/spring systems of the Springs Coast.

  Response: Dr. Knight noted that the response of spring ecosystems to nitrate loading is complex and high concentrations of nitrate could be expected to lead to shifts in vegetative communities. He indicated that whether or not a minimum flow or level is established may not have an impact on nitrate level being delivered to spring systems through groundwater discharge.

- Mr. Al Grubman, the stakeholder representative for TOOFAR, asked whether nitrate concentrations would be expected to increase with decreasing spring flows.

  Response: Dr. Knight noted that relationship between discharge and nitrate concentrations is not straightforward. In some springs there appears to be a direct relationship between flow and nitrate concentrations, while the reverse is true in other systems. He hypothesized that these seemingly contradictory responses may be a function of the depth of the source water being discharged from individual springs or spring vents.

- Mr. Dana Bryan remarked, based on reference to material presented by Dr. Kincaid, that if rainfall is constant and spring flow is dropping, any change in spring flows must be attributed to water withdrawals. Following on this point Mr. Bryan noted that there are historical flow records for the Homosassa River system that were not included in the District's 2010 draft report on recommended minimum flows for the river system. He noted that there appears to be no trend in rainfall for Citrus County over the past century. Mr. Bryan also noted that the District chose to establish a baseline flow record from 1995 through 2009 for the Homosassa system, and wonders how this more recent data should be combined with the historic data for analyses supporting development of minimum flow and levels.

  Response: Dr. Knight indicated that it would be appropriate to use historic flow records to construct a water balance for the spring system that could be used for development of minimum flows. He added that it may be appropriate to develop annual flow values when combining historic and more recently collected flow records to account for temporal variation in the frequency or data collection.

- Mr. Brad Rimbey noted that the District is developing minimum flows and levels on a "river-by-river" basis rather than for the Springs Coast as a whole. He questioned whether this is an appropriate approach.

  Response: Dr. Knight noted that there are practical reasons for establishing minimum flows for each system at a time. He indicated that it certainly seems reasonable to establish minimum flows for a river system and its surface watershed. He noted, however, that because groundwater basins may overlap, it may be reasonable to evaluate groundwater flows on a regional basis.

- Mr. Brad Rimbey noted that it is expected that water discharged from springs along the Springs Coast may turn more saline as permitted water withdrawals approach the limits established by any minimum flows or levels that are adopted for the region. He added that the District's analyses regarding proposed minimum flows for the Chassahowitzka and Homosassa River systems have not adequately addressed withdrawal impacts on freshwater components of the systems.

  Response: Dr. Knight noted that the scenario described by Mr. Rimbey argues for development of holistic ecosystem studies, including measurements of productivity. He cautioned, however, that studies supporting minimum flows and levels development are relatively expensive.

- Mr. Brent Whitley, a stakeholder representative, asked Dr. Knight about the work he completed for the St. Johns River Water Management District pertaining to water resource values considered for minimum flows and levels development.

  Response: Dr. Knight noted that he completed a report on human use and water resource values for Rock and Wekiva Springs for the St. Johns River Water Management District. He noted that most minimum flows and levels reports address these issues, although he indicated that he had not seen this topic addressed in the Southwest Florida Water Management District report on proposed minimum flows and levels for the Chassahowitzka River system. He noted that assessment of water resource values is often hampered by a lack of data. Dr. Knight added that this identified lack of data has led to the implementation of monitoring programs in the St. Johns River Water Management District, but he fears that

these programs may be curtailed as a result of budgetary constraints. He cautioned that we should consider the maxim, "do no harm" when establishing minimum flows and levels, as any rules associated with the minimum flows and levels may "outlive us." Dr. Knight added that he has concluded "that the Floridan aquifer is already overstressed" to the point where it can't support the populations in the springs as well as the people that are along them." He added that "we are overly optimistic in giving out permits" in reference to the issuance of water use permits by the state's water management districts, noting that "every permit is making the situation worse."

- Ms. Hope Corona noted that the District appears to be holding firm on the currently recommended minimum flows and levels for the Springs Coast and wonders how the minimum flows and levels may be modified to address the will of interested stakeholders and to also incorporate the data that has been presented by stakeholders for consideration by the District. She wondered how interested stakeholders can negotiate the allowable percentage of flow reductions downward. Ms. Corona also asked about the negotiated minimum flow and level that was developed for a spring system in the St. Johns River Water Management District.

  Response: Dr. Knight noted that the minimum flow and level that was ultimately determined for Volusia Blue Springs was based on a decision made by the Secretary of the Department of Environmental Protection. He noted that the decision was associated with a great deal of public pressure from the State Park Service, the Save the Manatee Club and others. He noted that the District's spring workshop series seems like an appropriate forum for discussion of minimum flows development, noting in jest as Dr. Kincaid did during his presentation, one alternative to negation and discussion of water-related issues that was used historically in the western United States was to "just shoot them."

- Mr. Norman Hopkins, the stakeholder representative for the Amy H. Remley Foundation, noted that the District's recommended minimum flows and levels are not absolute flow values, but rather relative, allowable percentage of flow reductions. He recommended that the District consider establishing some form of safety factor to account for uncertainty in minimum flow requirements when issuing water use permits.

  Response: Dr. Knight indicated that he thought Mr. Hopkins suggestion was a good, rational statement. He added that "we" should be wary of permitting water use and then later determining that the allowable withdrawals are causing adverse impacts. Dr. Knight offered this latter comment based on the acknowledgment that it can be very expensive to restore flows or levels to stressed systems, citing the restoration of the Everglades as an example.

- Mr. Boyd Blihovde, the stakeholder representative for the United States Fish and Wildlife Service's Chassahowitzka National Wildlife Refuge, asked for clarification about the minimum flows and levels that have been established for Volusia Blue Springs.

  Response: Dr. Knight noted that he understood that the minimum flows established for Volusia Blue Springs address recovery of flows for the river system over a twenty year period. He added that he had read recently that the District may be considering revision of the minimum flows. Mr. Dana Bryan contributed to the discussion, noting that the established minimum flows are not really a "recovery minimum flow." Rather, the minimum flows were established at historic flow values and are to be met over an extended time period to allow the St. Johns River Water Management District sufficient time to develop

alternative water supplies to offset the groundwater withdrawals that would be expected to impact flows from the spring.

- Mr. Dana Bryan noted that the minimum flows and levels law has been interpreted to allow for flow changes associated with natural climatic variation, but not for water-use impacts. Assuming that there has not been a decline in rainfall, the District assertion that withdrawal impacts have only minimally affected flows in the Homosassa River system seems incompatible with observed flow declines. He notes that in his experience, all District staff members are very professional, evaluate existing data to the best of their abilities and subject their analysis to independent peer-review. He added that it is appropriate for stakeholders to question the use and analysis of available data, and encourage staff or other professionals to reevaluate the data to support development of the best possible minimum flows and levels. He indicated that this is why he is focusing on the District's use of discharge data, believing that this may be a "vulnerability of their analysis", and wondered whether it may not be true that water use has not substantially impacted flows in the river system.

- Mr. Darrell Snedecor noted that many springs currently fail to meet water Outstanding Florida Water criteria. He added that the "do no harm" standard seems laughable, given the violation of existing laws or rules.

  Response: Dr. Knight noted "that we have gone way beyond what the law allows" and questioned who might advance a lawsuit concerning nitrate levels in groundwater systems. Brad Rimbey offered that "we will" in response to Dr. Knight, who countered that "somebody needs to if they care about enforcing the law". Dr. Knight noted that he has been recently discussed the planned installation of a new waste-water treatment plant near Fanning Springs with the Department of Environmental Protection, and learned from the Department that the plant appears to be in compliance with relevant water quality-related law.

- An unidentified workshop participant noted that Citrus County has four Outstanding Florida Waters and because of this, any work associated with minimum flows development should proceed with caution.

- Mr. Al Grubman noted that workshop discussions have focused primarily on the Chassahowitzka and Homosassa River systems. He added that both systems are Outstanding Florida Waters and both are on the impaired waters list associated with water quality violations. Knowing that these systems are currently stressed we should not allow any further withdrawals that will impact flows in these systems.

  Response: Mr. Brad Rimbey noted that Mr. Grubman's comments provided a good segue to the next agenda item for the workshop, which was general comments to be provided by stakeholders.

Coastal Springs MFL Testimony from MFL Stakeholders

Mr. Brad Rimbey indicated that this portion of the meeting would be dedicated to statements from stakeholder representatives.

- Mr. Ron Miller, the stakeholder representative for the Save the Homosassa River Alliance, thanked the District for holding the workshop series and Mr. Rimbey for organizing this

workshop. Mr. Miller suggested that the District should consider setting a cap on withdrawals in lieu of establishing minimum flows for Springs Coast river/spring systems. He noted that although some may pick and choose among laws related to water resource protection, the law that should be supported is the law that protects "our" Outstanding Florida Waters. Mr. Miller also noted that the Northern District Model needs improvement.

- Mr. Dennis Dutcher, the stakeholder representative for United Waterfowlers-Florida, read a prepared statement, which is included as Appendix C to these meeting notes. He thanked the District for holding the workshop series, and also thanked workshop participants for the contributions, and Mr. Rimbey for organizing the stakeholder representatives meeting. He noted that while it is important to characterize a water budget for human and non-human environmental needs, members of United Waterfowlers-Florida are concerned about allowing additional flow reductions from systems that are already stressed. Mr. Dutcher noted that there has been substantial loss of coastal wetlands in recent years due to sea level rise and asserted that a lack of fresh water flow to coastal regions of the Springs Coast is "the reason for the loss of overwintering waterfowl on the refuge", presumably in reference to the Chassahowitzka National Wildlife Refuge. He noted that establishing minimum flows and levels is a worthy approach to environmental protection, but emphasized that this effort should be coupled with enhanced conservation measures. With regard to establishment of minimum flows for the Springs Coast, Mr. Dutcher urged the District to "weigh the evidence shown that these systems are in peril" and noted that "a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh."

  Note: Audio recordings made during this portion of the workshop terminated during Mr. Dutcher's statement period outlined above. Notes presented below for the remainder of the stakeholder representative comments and the public input agenda item were prepared using handwritten notes made by Mr. Leeper during the meeting.

- Mr. Dan Hilliard, the stakeholder representative for the Withlacoochee Area Residents, began his presentation by asking whether those at the meeting thought any Florida water bodies were in better shape today than they were thirty years ago. He added that pristine waters are not abundant or may no longer exist within the state, noting that we "owe" quality water habitats to future generations. Mr. Hilliard recommended that if we cannot restore all habitats, we should at least protect what we currently have. He indicated that the Withlacoochee Area Residents have recently submitted written comments concerning proposed minimum flow and levels to the District and looked forward to continuing to work with the District to preserve our water resources. These written comments indicate that it is the opinion of the Withlacoochee Area Residents that "[s]takeholder requests for 0% flow reduction recommendations" are appropriate, given "questions and methodology related to the definition of significant harm."

- Dr, Katie Tripp, the stakeholder representative for the Save the Manatee Club, commented that she was surprised to learn some time age during a presentation by a St. Johns River Water Management District staff member that the state's water management districts are required to ensure water availability for *all* reasonable and beneficial uses. She added that it was the hope of the Save the Manatee Club that the input and discussion made during the spring workshop series has and will continue to make a difference with regard to the establishment of minimum flows and levels.

- Mr. Brad Rimbey noted that it was important to recognize the value of the District for the Springs Coast, despite any disagreements that may exist among stakeholders and the

organization. He offered that in these times of budgetary constraints, it may be appropriate for the District to consider reaching out to citizen groups for assistance with data collection that could enhance water management efforts in the region. He noted that this suggestion was being made to address a perceived insufficiency in data that are currently available for the Springs Coast systems.

Public Input

Mr. Brad Rimbey noted that this portion of the meeting would be dedicated to statements from other workshop participants.

- Mr. Ben Berauer read a prepared statement, which is included as Appendix D to these meeting notes. Mr. Berauer expressed appreciation to the District and stakeholders that have contributed to the discussions of minimum flows development for the Springs Coast. He noted, however, that the workshops have not adequately addressed several of his concerns, including: a lack of consideration for the Outstanding Florida Waters status of the systems being evaluated; a lack of accountability with regard to regulatory agency responsibilities for protection of Outstanding Florida Waters; incorporation of information pertaining to droughts and sea level rise; inadequate characterization of baseline flows; lack of consideration of known significant impacts associated with pollution, water use, reduced rainfall and other factors; lack of consideration of micro-environments, including smaller springs; increased negative impacts associated with nutrient pollution and reduced flows; and increased nutrient loading that may be expected from development associated with additional permitted water use. Mr. Berauer added that use of an allowable fifteen percent change in habitat as a significant harm threshold is inadequate, in particular for Outstanding Florida Waters.

- Ms. Cathy Harrelson noted that the aquifer systems in Pinellas County were severely depleted in the 1970s and since that time the residents of that region have been "taking your water" in assumed reference to withdrawals in counties north of Pinellas County. Ms. Harrelson commented that perhaps the development associated with increased water use may not be "worth it". Ms. Harrelson noted that she appreciated the acronym "MEL" which was introduced during the workshop, and stands for "Maximum extraction level". She also noted that it may not be appropriate to consider minimum flow rules for the Chassahowitzka and Homosassa River systems at the December 2011 Governing Board meeting, as this meeting is scheduled to be held in Haines City, far from the Springs Coast. She added that the public pressure concerning opposition to the currently proposed minimum flows for the Springs Coast should be exerted "further up the line", i.e. "beyond" the District.

  Comment: Mr. Leeper noted that the District's December Governing Board meeting is scheduled to be held in Haines City, and added that it would be appropriate to delay presentation of minimum flow rule amendments for the Chassahowitzka and Homosassa River systems to the Board until January, when the Board is expected to meet in Brooksville.

- Mr. Dana Bryan noted that the Division of State Parks is concerned about losing flows from several small springs that discharge into animal pen areas of the Ellie Schiller Homosassa Springs Wildlife State Park.

- Mr. Mike Czerwinski noted that it is important to ensure that the groundwater model and other models used for development and evaluation of minimum flows for the Springs Coasts

system are adequate. He suggested that the groundwater model used for the area should incorporate information on geologic fractures. Mr. Czerwinski suggested that it is not appropriate to use a groundwater well located near Weeki Wachee Springs to estimate discharge at other area springs and added that it would be useful to measure stage and discharge in Halls River and Little Spring, which is a possible contributor to flows in the Southeast Fork of the Homosassa River. In reference to a suggestion made at the meeting concerning citizen-based data collection, Mr. Czerwinski noted that there may be issues associated with use of these data and suggested, alternatively, the District investigate deployment of relatively inexpensive date sondes (i.e., automated, remote data collection devices).

- Ms. Hope Corona commented that the District needs to develop or otherwise acquire additional data sets, because it is her opinion that existing data are insufficient for establishing minimum flows and levels or maximum allowable water extractions for the Springs Coast.

- Mr. Martyn Johnson prepared written comments for the workshop that were read by Mr. Rimbey. In his written statement, which is included as Appendix E to these meeting notes, Mr. Johnson recommends that "serious consideration [be] given to a 5 year moratorium on any additional well/withdrawals from the aquifer". He questioned whether this recommendation has been given serious thought to this issue, and added that based on information supplied by the District, very few requests for issuance of a water-use permit in the northern portion of the District have been denied in recent years. In his statement, Mr. Johnson also asked whether the United States Geological Survey or the District could provide any information regarding data collection at the recently upgraded gage site in the Southeast Fork of the Homosassa River.

  Response: Mr. Kevin Grimsley, with the United States Geological Survey, noted that equipment used to measure water velocities was installed at the Southeast Fork gage site in September and that negative velocities were recorded at the site last week as a meteorological front passed through the area. Mr. Grimsley added that it would be approximately six months to one year before sufficient data have been obtained for development of a velocity index rating curve for the gage site.

- Ms. Janice Howie questioned whether a fifteen percent habitat-change standard was appropriate for establishing minimum flows and levels. She added that the tidal river / spring systems of the Springs Coast are already stressed and we should not consider allowing additional stress to these systems.

- Mr. Brad Rimbey noted that he understands the District's desire for uniformity in the application of significant harm thresholds for priority water bodies. However, he questions the utility of this approach for systems, like the Chassahowitzka River, with limited data sets. Mr. Rimbey also commented that: 1) if spring systems are "shutting down", i.e., ceasing to discharge water, from west to east in response to decreases rainfall or groundwater pumping; 2) if the District is only measuring discharge in springs located in the "east"; and 3) if the District will base compliance with adopted minimum flows and levels on eastern springs; then it may be possible that discharge may cease from smaller springs in the area and that these changes may not be quantified.

Identification of Follow-Up District Actions

This agenda item was not explicitly address during the workshop.

Adjournment

Mr. Rimbey adjourned the meeting at approximately 5:45 p.m.

Appendix A – Meeting Sign-In Sheets

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Todd Kincaid	GeoHydros
E. Herf Corona	
Bernard Beraner	Suncoast Sierra Club, Chassahowitzka River
Darry Brune	Southwest FL Water Management District
Al Grubman	TOO FAR
Dennis Dutcher	united Waterfowlers
Brad Rimbey	Chassahowitzka River
Bob Knight	Florida Springs Institute
KAREN JOHNSTON	
Elizabeth Wright	
Priscilla Watkins	Homosassa River Alliance
Ron Basso	SWFWMD
Doug Leeper	SWFWMD
mike CZERWINSKI	Michael S. Czerwinski, PA Environmental Consultant
Bev + Tom Overa	—
Gloria + Stan Clewett	
Kevin Grimsley	USGS
Gary Williams	SWFWMD
KAREN ORR	CHASSAHOWITZKA RESIDENT
Darrell Snedeker	C C Audubon
Rebecca Bays	Commissioner
Dennis Blauer	Realtor

63 total

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ron Miller	Homosassa River Alliance
J.C. RUSNAK	Citrus County Council
Carolyn Voyles	DEP
HANDI HARPER	Citrus County Planning Div
Kevin Smith	" " "

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Ken Nash	Gulf Archaeology Research Inst.
DAN HILLIARD	W.A.R. INC.
Ed CALL	FFWCC
JANE PERRIN	at Chazzy Co gamp
Anike Heyl	SWFWMD
Cathy Harrelson	Gulf Restoration Network
BRENT WHITLEY	RESIDENT
Russell J Watrous	FNPS Nature Coast
NORMAN HOPKINS	Amy H Remley Foundation
MARTY Kelly	SWFWMD
Boyd Blihovde	USFWS
James Green	citizen
Joyce Kleen	USFWS
Whitey Markle	SSJ SIERRA CLUB
JIM WILLIAMS	HOMOSASSA
Ronald E. Daff	Chassahowitzka
J. J. Kenney	BOCC
Janice Hobbie	Native Plant Society
Elaine Moore	Robert Moore
Jim Bitter	
DANA BRYAN	FLORIDA STATE PARKS

Springs Coast Stakeholders MFL Workshop
October 26, 2011

NAME (PRINT)	COMPANY
Helen Spivey	FL League Conservation Ed Fund
Kate Tripp	South Moat Club
Mark Hammond	SWFWMD
Doug Thaxp	SWFWMD Board
Cara Martin	SWFWMD

ALSO (ADDED BY DLEEPER)
Sid Flannery – SWFWMD
Veronica Crow - SWFWMD

Appendix B – Meeting Agenda

Springs Coast Minimum Flows and Levels
Public Workshop Agenda
Wednesday, October 26, 2011
1:30 p.m.
Lecanto Government Building
3600 West Sovereign Path, Room 280
Lecanto, Florida 34461

*******All workshops are open to the public*******

SWFWMD – Southwest Florida Water Management District

1. Opening remarks – Brad Rimbey (*5 minutes*)

2. Coastal Springs MFL Hydrology topics by Dr. Todd R. Kincaid (*45 minutes*)

    1. The need for an accurate water budget and what that entails
    2. What we are learning at Spring Creek about saltwater intrusion in aquifers with coastal springs and conduits
    3. What we have learned about modeling in karst aquifers and the requirements of a reliable model

3. Coastal Springs MFL Ecology topics by Dr. Robert L. Knight (*60 minutes*)

    1. Effects of spring discharge on spring primary productivity and food chain support
    2. Definition of significant harm
    3. The idea of a conservative management strategy that assumes the worse until proven otherwise
    4. A spring recovery case history - Volusia Blue Spring
    5. Biological monitoring required to prevent "significant harm"

4. Coastal Springs MFL Testimony from Stakeholders (*5 minutes per individual)*

5. Public input *(3 minutes per individual)*

6. Identification of follow-up District actions - Brad Rimbey (*5 minutes*)

7. Adjournment - Brad Rimbey (*1 minute*)

Appendix C – Written Statement by Mr. Dennis Dutcher, Stakeholder Representative for United Waterfowlers-Florida, Inc.

United Waterfowlers-Florida, Inc.
Stakeholder Statement, regarding Chassahowitzka MFL

Attention: Marty Kelly, Ecologic Evaluation Section

Mr. Kelly as per your request, here are the remarks from my outline to be included into the stakeholder comments regarding the Chassahowitzka MFL's from the October 26, 2011 meeting in Lecanto, Florida.

On behalf of United Waterfowlers-Florida, Inc. I would like to thank the District for holding these workshops with the stakeholders and members of the public outlining the tedious task and the science used to determine Minimum Flows and Level's for the Chassahowitzka River and springs system.

The subject has been well covered whey establishing MFL's are important in order to create a water budget for human needs that includes safeguards for wildlife and their habitat. However I have concerns, pulling flow from an already degraded and stressed system would be comparable to blood letting from a patient that is bleeding to death already.

The significance of sea level rise resulting in the subsidence of coastal marsh is pronounced on the West Coast of Florida causing habitat loss for wintering waterfowl not only in this area of the state but much of the West Coast of Florida has been affected to some degree.

Between the years 2004-2009 about 25,000 acres of salt marsh disappeared each year. Marine and estuarine intertidal wetlands in coastal regions have been lost 3 times faster than during previous study periods. 83% of these acres were lost to open water, predominantly through subsidence and sea-level rise. Wetland losses have increased 140% since 2004, with the Gulf Coast of Florida losing wetlands the size of a football field each day or about an acre per day.

Wetlands are among nature's most productive ecosystems providing habitat for a wide variety of waterfowl, fish and many other species of wildlife. Coastal Wetlands are highly productive and diverse and, as such merit special consideration. 66% of marine fish rely on coastal wetlands at some stage in their life cycle. Wetlands also provide important societal benefits such as filtering run off, decreasing the effects of storm serge and providing recreational opportunities such as hunting and fishing.

It is now understood by most that the reason for the loss of overwintering waterfowl on the refuge and this coastal area of the state is the lack of fresh water flowing into the near shore Gulf, wafting up from the aquifer in the coastal estuaries and seeping into the coastal marsh from a fully saturated aquifer. Further reducing flows from the spring shed will make recovering any coastal marsh more difficult if not impossible.

Setting MFL's may be one step in conserving water resources but not the only step that should be taken. As much as 50% of our drinking water is used to water lawns, add to that an average of 15% loss during the delivery of drinking water from the water treatment facilities, leaking

pipes and fixtures in homes and businesses, for a total of up to 65% waste of the natural resource. But, water is cheap!

If we look to some examples of how other states have addressed their water consumption needs we find it is not impossible to address. The State of California had a population increase of 60”% between the years1975-2000 yet their water consumption remained about the same, what do they know that we don’t? It would be prudent for the District to address the unlimited consumption of fresh water much of which is used to keep non-native grasses alive. While it is commendable the district is attempting to address MFL’s on the Springs Coast it is my request that you weigh the evidence shown that these systems are in peril, a sapient decision to reduce flows by 0% could help mitigate the damage to the habitat of the refuge and coastal marsh.

Florida is a State in which tourism is a major part of the economy and many people choose to make their life here do so because of the recreational opportunities and natural beauty of the State much of which has to do with the aquatic resources, of which many of us feel quite possessive.

Thank you for the opportunity to serve as a stakeholder and provide input on a subject that is important to all of us.

Dennis D. Dutcher
SW Region Director-Member of the Board
United Waterfowlers-Florida, Inc.

Appendix D – Written Statement by Mr. Ben Berauer

Thank you for letting me provide my comments today. My name is Ben Berauer, and I am a resident of the village of Chassahowitzka, a member of the Chassahowitzka River Restoration Committee, the Nature Coast Coalition, and the Suncoast Group of the Sierra Club. I am a long time nature enthusiast and outdoors leader. I have explored the Chassahowitzka and other Florida rivers, and I have seen degradations that have already occurred in just the last couple of decades. I have seen the water in the Chassahowitzka springs change from potable to unfit for drinking, then our wells change from potable to unfit for drinking, and how septic use in the area, and across the spring shed have already degraded water quality. I see the existing degradation contributed to sea level rise, and am concerned about any permitted further degradations.

I appreciate the work done by SWFWMD. I also appreciate the opportunity given to the public and stakeholders during the process of reviewing and discussing the draft proposal for the Chassahowitzka River MFL report.

But I must say that these proceedings have not achieved the result that I was hoping for. Many here today, like I, are very concerned that the scientific studies and reports fall short of addressing the concerns we have.

Particularly, I do not think that there has been any change in the position that the the MFL proposals do not take into account any special status or protections for Outstanding Florida Waters. During the past few months I have heard shocking statements from SWFWMD that they are not responsible for accounting for OFWs or water quality, while DEP states they are not responsible for regulating OFWs for other than water quality. There seems to no consistent addressing for the mandate to provide special protections to our OFWs. I will not feel that the proposed MFLs for OFWs are adequate until they account for the mandated additional protections.

Discussions regarding how ongoing natural changes such as drought and sea level change have not in my humble opinion been factored in to the MFL proposal. I feel that a baseline for future water use should be premised not only on current flows and man's further withdrawals, but on the full historical history and trend accounting for natural and anthropogenic impacts on our springs and spring sheds. Our waters are known to be significantly impacted from pollution, water use, reduced precipitation, and other factors. As such I feel that defining significant harm as a further 15% reduction of water bodies or spring sheds as inadequate, particularly for OFWs.

As we race to a recommendation to the SWFWMD Governing Board, we have just started to look at affects of sea level rise, which has not been thoroughly reviewed, discussed, and incorporated into the MFL proposal.

Another major concern is that due to the limited data from limited monitoring sites, and limited focus to impacts to specific macro environments, there is little knowledge or prediction of what will occur on micro-environments, smaller springs, spring runs, and the flora and fauna surrounding them. We may see 100% degradation of many micro-environments since the affects of a 11% water flow reduction are not known at significant detail.

Nor does the analysis adequately take into account contributions to significant harm from affects

of possible increased nutrient pollution from reduced flow and greater permitted water use and resultant development.

Given these many inconsistencies between what is addressed by the modeling and analysis results and the broader concerns I still believe need to be addressed, I do not feel that the voice of the stakeholders and public have been adequately addressed. I do not feel the "one-size-fits-all" is appropriate for OFWs. I do not believe that the impacts of the proposed reduction in flow are adequately known to protect the river and spring system and its micro-environments. I respectfully submit that although efforts have been made to provide sound analysis and public input, the analysis is not adequate, and public concerns are not adequately addressed. If the current proposed MFL were adopted, I feel further work and a revision is immediately needed.

Appendix E – Written Statement by Mr. Martyn Johnson

Public Input Statement from Martyn Johnson
To
Springs Coast MFL Working Group Meeting October 26, 2011

I am not able to attend the meeting in person, but would appreciate if the following can be read as public input on my behalf.

Two comments/questions.

1. At the September 6 meeting I asked if we all agreed that some deterioration has already occurred in the rivers. No one disagreed. I followed with the question: Do we know for sure why deterioration is happening?
   As we are not sure I suggested that Actions Speak Louder Than Works and that there should be serious consideration given to a 5 year moratorium on any additional well/withdrawals from the aquifer. This would provide time to better understand the situation.
   I would like to know if anyone has given serious thought to the suggestion.

   As background to the numbers of Well Permits and Water Use Permits the following is an extract from a reply sent by SWFWMD early in 2011.

   "Review of the District's Well Construction Database indicates that ***213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years****, respectively."……"With regard to water-use permitting……* ***Fewer than ten of the hundreds of surface- and groundwater use permit*** *requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."*

2. As some may know the USGS installed the velocity monitoring unit under the bridge on Fishbowl Drive to monitor the stream velocity and discharge from the SE Fork of the Homosassa River.

   Can USGS or SWFWMD provide the panel any information regarding the data collected since operation started. Indications that I can see are that data started to be collected about September 9, 2011.

From: Ron Miller
To: Doug Leeper
Subject: Fw: Amendment 4: One Year Later
Date: Thursday, October 20, 2011 11:18:19 AM

Hi Doug,

Here is an interesting map.

Best regards,
Ron

From: Florida Hometown Democracy
Sent: Thursday, October 20, 2011 12:09 AM
To: flhometown@yahoo.com
Subject: Amendment 4: One Year Later

> It has been almost one year since Amendment 4 was defeated by a tidal wave of money and lies.
>
> One of our messages was that Florida has lots and lots of future growth on the books that could be built immediately.
>
> Another message of ours was that most new residential development is a black hole of expense for taxpayers.
>
> Our opponents said “Prove it”!
>
> So a few of us spent the past year getting the facts and numbers together. It has been a huge job because Florida government has never wanted to organize this information in a way that is easily obtained and understood. Wonder why?
>
> Another concern that came out during the campaign is our

drinking water supply. How much drinking water do we have? What happens when we run out of cheap, easily accessible drinking water?

Surprise: The government doesn't want you to know. That's why it hasn't bothered to put together a map showing the status of our state's drinking water supply.

So we did, and here it is:

Soon we will be launching a new interactive website that will reveal the true costs of over-development to you the taxpayer. ...Stay tuned!

Best wishes,

Lesley Blackner

From: Doug Leeper
To: "Ron Miller"
Cc: Ron Basso; Mike Heyl; Marty Kelly; Mark Barcelo
Subject: RE: Amendment 4: One Year Later
Date: Thursday, October 20, 2011 12:57:59 PM

Thanks Ron – I'll share your e-mail (and the map) with some of my colleagues here at the District.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Ron Miller [mailto:rmille76@tampabay.rr.com]
Sent: Thursday, October 20, 2011 11:20 AM
To: Doug Leeper
Subject: Fw: Amendment 4: One Year Later

Hi Doug,

Here is an interesting map.

Best regards,
Ron

From: Florida Hometown Democracy
Sent: Thursday, October 20, 2011 12:09 AM
To: flhometown@yahoo.com
Subject: Amendment 4: One Year Later

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So we did, and here it is:

Soon we will be launching a new interactive website that will reveal the true costs of over-development to you the taxpayer. ...Stay tuned!

Best wishes,

Lesley Blackner

From:	Richard L Kane
To:	Doug Leeper
Cc:	Kevin J Grimsley; Richard L Kane
Subject:	workshop letters
Date:	Monday, October 24, 2011 8:25:31 AM

Hi Doug, got you phone message. Please do not remove the letters from the web site. We are working on a formal letter to Mr. Johnson from head quarters.
In regards to his latest request about the velocity meter at SE Fork. We will address this at the workshop. The velocity meter is in, we collected measurement last week following the storm event. We did note the velocity did go into reversal during the extreme high tide.

Richard L. Kane
Associate Center Director for Data
U. S. Geological Survey
Florida Water Science Center
10500 University Center Dr., Suite 215
Tampa, Fl. 33612
rkane@usgs.gov
(813-498-5057)
FAX (813-498-5001)
Cell 813-918-1275

From: Mike Heyl
To: Marty Kelly; Doug Leeper
Subject: FW: Chassahowitzka Comments
Date: Monday, October 24, 2011 9:10:48 AM
Attachments: District_Response_SMC.pdf
SMC_Tripp.pdf

Fyi.

MGH
==========
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
==========
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)
--------- Note : District Limit for Incoming Email is 5 Megabytes -------
An ftp site is available for larger attachments : http://ftp.swfwmd.state.fl.us/
This email consists of 100% recycled electrons. Consider the environment before printing
==========

From: Katie Tripp [mailto:ktripp@savethemanatee.org]
Sent: Monday, October 24, 2011 9:01 AM
To: Mike Heyl
Cc: ktripp@savethemanatee.org
Subject: FW: Chassahowitzka Comments

Thank you for your responses, Mike. I wanted to follow up on a few points:

Response #3, states that the District agrees that flow reduction has occurred, and that nitrate concentrations are increasing, "but the MFL statute requires that the MFL be established based on the impact of withdrawals and there is no evidence that nitrate concentration is related to flow." Are there other programs within the District that look more holistically at these systems and consider the cumulative impacts of multiple factors and multiple decisions that are being made? Is there a consideration that while reduced flows may not be the cause of increased nitrate concentrations, that reduced flows + increased nitrate concentrations + other stressors (i.e. sea level rise) cumulatively result in negative environmental consequences? If not, and if all of the departments are working independently, the likelihood of resultant environmental harm increases.

I am surprised at your #6 response that "The thermal refuge evaluation could have been done with no knowledge of the manatee usage…" Gathering all available aerial survey, telemetry, photo ID, and other relevant manatee data ARE needed. The District cannot calculate packing density without understanding how manatees use this habitat. You need real world data that show where manatees are (or where they are not) to determine the size of available habitat here. Not all segments of the river are created equal- manatees have habitat preferences.

Your response to #10 is puzzling. As I understand the original MFL report, manatees were one of the species whose habitat needs were examined to determine appropriate levels of flow reduction in the Chassahowitzka system. However, when your modeling showed that the river provided no refuge from chronic cold conditions, your response was, "the fact that something is naturally absent from a particular system is not sufficient reason for not establishing an MFL." I was not arguing that you should not set an MFL, I was stating that the data presented by the

District show that the currently proposed MFL is insufficient. This is also a case where actual manatee data should have been consulted to determine if the model was accurately depicting the habitat. Were there any manatees sighted in the system during the period of 2002 that was modeled? Were there any sightings in 2009 or 2010 when even colder conditions were experienced? The reality is that some manatees appear to use Chassahowitzka, even during critically cold periods. By ignoring that, and relying on a model to tell you that there is no chronic cold habitat here, therefore flows can be reduced without consequences to manatees (because our model tells us they shouldn't be here) is flawed, and could result in take of this endangered species, in violation of both the federal Endangered Species Act and Marine Mammal Protection Act.

Your response to #15 is also concerning, acknowledging that much is unknown about karst connections and the source of waters discharged from the Chassahowitzka springs, but stating that the District doesn't know how to implement the Peer Review Panels' suggestion to define the MFL with factors beyond just a single cfs measurement. A cost of $1.2 million to establish and maintain discharge measurements for 5 years at 7 new locations is described as "cost-prohibitive." If the District cannot afford to monitor the environmental impacts of their actions, it should not be allowed to tamper with this system by reducing flows.

Thanks again for your reply.

Katie Tripp, Ph.D.
Director of Science and Conservation
Save the Manatee Club
500 N. Maitland Ave.
Maitland, FL 32751
Office:407-539-0990
e-mail: ktripp@savethemanatee.org

From: Mike Heyl [mailto:Mike.Heyl@swfwmd.state.fl.us]
Sent: Friday, October 21, 2011 12:21 PM
To: Katie Tripp Ph. D. (ktripp@savethemanatee.org)
Subject: Chassahowitzka Comments

Katie – Attached, please find your original inquiry and the District's response. Again, I apologize for the lengthy delay.

MGH
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)

business purposes.

Save the Manatee® Club
The Voice For Manatees For More Than 25 Years

December 17, 2010

To Michael G. Heyl, M.S., Chief Environmental Scientist, Project Manager

Sent via e-mail to mike.heyl@swfwmd.state.fl.us

Re: Chassahowitzka River System Recommended Minimum Flows and Levels- November 2010

Dear Mr. Heyl,

I have reviewed the subject document in its entirety, including the comments from the Peer Review Panel , the FWC and DEP, and the District's responses to these agencies' comments. One of the two scenarios used to justify the proposed 11% reduction of flow under the new MFL regime was acute thermal refuge for manatees (the other being fish/invert community). An 11% reduction in flow was found to reduce the volumetric thermal refuge for manatees by 15%- an arbitrary figure that appears in multiple MFL reports from the District. (Note: "a more or less arbitrary management decision" is the term the Peer Review Panel used to describe this practice.) The District stands behind this figure because it has been accepted by its Peer Review Panel. However, other credible scientists from a variety of agencies, including commenting agencies on this document- FWC, DEP, and USFWS have questioned the use of this figure. I read similar concerns when recently reviewing the Homosassa River MFL, and believe the District should find a better metric that will not continually be called in to question by agencies and citizens who review their work.

1.)

While I support the establishment of MFLs to understand the level of withdrawal at which ecosystems would begin to experience significant harm, I think it is folly to manage a system at its MFL and purposefully allow withdrawals that would take flows to the established MFL. Managing at the borderline of significant harm is inadequate to protect Florida's unique environments, like the Chassahowitzka River.

2.)

Even though the study area is described as being "nearly devoid of urbanization", there has been a statistically significant decline in annual average flow from 1967-2007. Climate and natural conditions are provided as the explanation for this decline, although certainly the 0.7 cfs reduction in flow resulting from estimated water use in the region in 2005 is accountable for a portion of this decline [0.7 cfs = 0.4522 mgd = 165 million gallons per year]. Even in the absence of permitted surface water withdrawals, the River has experienced a significant reduction in flow as well as significant input of nitrate and nitrite from inorganic fertilizers applied within the spring recharge area. Without any reductions in flow, the River is already challenged by reduced flows and nutrient pollution. These nutrient problems can only be expected to worsen as development in the region is facilitated by the water supply generated in part by the withdrawals proposed in this report. Unfortunately, the models

3.)

500 N. Maitland Ave. • Maitland, FL 32751 • (407) 539-0990 • Fax (407) 539-0871 • www.savethemanatee.org

used here do not take any possible natural variations into account, which, if considered, could result in further limiting the levels of proposed future withdrawals.

The introduction of the manatee analyses (5.4.1) identifies watercraft and red tide as threats to the species, but fails to immediately mention the significant mortality that can result from exposure to
4.) suboptimal water temperature, and the fact that protection of warm water habitat is among the most important management strategies for recovering this endangered marine mammal. The FWC also expressed this in their comment letter to the District, stating, "Warm-water habitat is considered the limiting factor for the manatee population in Florida. Warm-water habitat for manatees provided by natural spring systems is therefore critical to the recovery of this species into the future, and FWC therefore does not support a loss of warm-water habitat."

The description of both the statewide manatee population and the number of manatees that utilize the spring network in Citrus County needs to be updated, as discussed in the USFWS letter from Mr. Blihovde to the District. The duration of cold weather experienced during the winter of 2010 provided new data with regard to the estimated minimum manatee population for Citrus County and
5.) the state. These updated figures are among the data improvements that should be included in the next version of this report. In addition, the record-breaking levels of cold-related manatee mortality that were observed last winter further highlight the critical importance of manatee winter habitat, including Chassahowitzka.

In assessing the level of manatee use of the Chassahowitzka system, the District claims to have used the best available science, but all that is documented within the report is spotty survey data for the River, conducted by the USFWS. While the USFWS has a long-running aerial survey program that has
6.) provided ample data regarding the manatee population to the north in Homosassa and Crystal River, as the MFL report acknowledges, "the Chassahowitzka River is infrequently included in those surveys." Despite the much lower survey effort (4 vs. 23 / year), and the fact that no data are available for the months of September through December (1/3 of the year), the District still relied on the "low" counts of manatees in the River to support an 11% reduction of flow. I am curious whether the District approached the USFWS about increasing their survey effort in Chassahowitzka in anticipation of the need to set an MFL for the River. Furthermore, the District appears to have relied solely on these aerial survey data to inform their decision-making process although there are a number of manatees that have been documented in the River as part of GPS tagging, rehabilitation monitoring, and Photo ID studies over the years. Data on these manatees is available from FWC, USGS Sirenia Project, and Sea to Shore Alliance and would have greatly informed the decision-making process for the District.

The Statute requiring the District to establish MFLs requires that the "best available information" be used to do this. In the case of the manatee, the best available information does not appear to have been utilized, but should be before moving forward with this plan. Another example was raised by FWC in their comments, with regard to salinity profiles. The District used data published in
7.) 1989, but FWC has data available from 2005-2007 that are more current, and thus would have been more representative of the "best available information" and more appropriate to use in this case.

Recovery of the manatee will be in large part contingent on the ability to safeguard and enhance natural warm water habitat like the springs at Chassahowitzka. None of these necessary safeguards have been employed at Chassahowitzka and FWC describes the warm water habitat here as "marginal." Therefore, the District cannot fairly compare these springs with those of Crystal River and draw the
8.) conclusion that these springs are less important or valuable to the manatee population. For example, manatees in Chassahowitzka lack sanctuaries and are subject to harassment at all times of the year.

Manatees being fed by kayakers is well-documented and even appears on You Tube videos posted on the internet. In the St. Johns Region, manatees are known to make greater use of sites that are protected from human activity than those that are not. It is quite possible that the same is true at Chassahowitzka. Furthermore, Kings Bay is protected by manatee speed zones in the winter months, while Chassahowitzka is not. Even in the summer, Chassahowitzka is not blanketed by speed zones, which could limit manatee usage of the area during these other times of year as well. In addition, manatee access to certain springs here is limited by tide to the extent that manatees can be trapped outside the spring and unable to fully benefit from the warm water, or they can get trapped once they are inside the spring and must wait for a favorable rise in tide in order to leave. At other sites, sediment removal has improved manatee access to springs, a management action that could certainly be undertaken at Chassahowitzka to increase manatee access and encourage increased use. Differences in habitat quality and protection do affect manatee use of various springs, a factor that does not appear to have been considered by the District.

With regard to manatee food selection and the importance of abundant and readily available SAV, the District appears to have once again relied on a single and outdated report instead of consulting with manatee experts for more recent information. During briefer, more mild cold fronts, manatees may forage further away from warm water sites if they believe they can do so with risking over-exposure to cold water. However, during colder periods, manatees will not wander nearly as far from the warm water site, choosing instead to forage as nearby as possible, even eating grass off of the bank as was evidenced last winter in canals in Brevard County that serve as secondary warm water refuges. The presence of abundant SAV in close proximity to warm water sites is of definite benefit to manatees and any changes in the ecosystem that made this SAV less readily available would be considered a detriment to the local population. It is for these reasons that areas including the St. Johns River and
9.) Crystal River have developed summer-winter aquatic plant management plans that restrict spraying of vegetation in areas of manatee aggregations during the winter months- in order to protect forage near the springs. Chassahowitzka has no such plan, and the County recently placed notice in the local paper that herbiciding of hydrilla on the Chassahowitzka River would occur during the week beginning 12/6/10. Once again, the management here is very different than it is to the north in Homosassa and Crystal River, which helps explain why manatees appear to use the Chassahowitzka River differently.

It is unclear how the District determined that any flow reductions were acceptable given that a documented cold event from 2002, when input to the model, generated results showing no habitat would be available to meet the chronic criteria for manatee thermal refuge. If data from the coldest
10.) periods of 2010 were modeled, the failure of the habitat would be even more significant as these conditions surpassed the "worst case" that was previously modeled. Therefore, I do not see how any allowable decrease in thermal refuge could be permitted, let alone a 15% loss of volume.

Knowing the value of spring habitat for the recovery of the manatee population, we do not support any reduction in the volume or area of the spring flow at Chassahowitzka and believe that
11.) management initiatives should be taken by other agencies (FWC, USFWS) to improve the quality of habitat here for manatees.

I am uncertain how the return interval factors into the District's calculations for the manatee thermal refuge, but while it is true that the natural manatee lifespan can exceed 60 years, data collected in the 1990s, which is unfortunately among the best available data, found that manatees were dying at the average age of 7.7 years. The USGS Sirenia Project, with their mark-recapture and survival rate
12.) work, might also be able to shed light on this issue and help ensure that the best data are incorporated into the model with regard to current typical manatee life expectancy.

Also of concern is the manner in which the plankton tow fish/invertebrate abundance data were
13.) dismissed and assumed to be hypersensitive. I have read the similar concerns expressed by FWC and DEP in their comments. While the District has tried to justify that these particular results are unreasonable and do not represent likely real-world outcomes of the proposed flow reduction, the questionable nature of these results leads me to question other modeling data that were used to direct decision-making. For example, if certain modeled outcomes were hypersensitive, could others have been hyposensitive? And what if there is a true impact on fish/invertebrates that was then ignored by the District because the model somehow overstated that impact? The report gives the impression that the District cherry picked the use of modeling results that supported their desired outcome. In addition, the Peer Review Panel has questioned: the short calibration period for the model and whether the validation requirements have been satisfied; the time step used in the EFDC model; the exclusion of the estuarine marsh from the model simulations; boundary conditions; temperature calibration; the absence of quantitative uncertainty analyses on the models used for flow recommendations; and the inability of the regression equation to address the contribution of saline spring discharges to the river, which unfortunately leaves readers such as myself to question the validity of any of the data or recommendations that are set forth in this report.

Of similar concern were the modeled results for *Vallisneria*, a preferred food for manatees, but the District did not trust the model results claiming "the curve is too restrictive to rely on the results" and stating that the response does not seem reasonable. I'm certain the residents of Kings Bay, to the north, would also have said that the "No Name Storm" of 1993, which brought salt water into the Bay, and ravaged the *Vallisneria* beds, which have still not recovered, and may never recover, may have thought that the possibility of such an event would "not seem reasonable." Residents along canals of the Bay who have increasing numbers of barnacles growing on their dock pilings and who see stingrays
14.) swim pas their docks might also have once thought such scenarios "unreasonable." DEP also raised concerns for *Vallisneria* in their comments, which were dismissed by the District. Even if the District can show that reduced flows are not likely to affect *Vallisneria*, can they speak to changing salinities or increased nitrate pollution and their effects? Related to these concerns is an issue that was also raised by DEP in their comments- the potential for increased algal growth in the system if flows were reduced. The District did not have an answer, which is concerning. Species like *Lyngbya* appear to thrive in disturbed aquatic ecosystems and prevent growth of desired SAV like *Vallisneria*. The District really should have a better understanding of what their proposed withdrawals could mean with regard to possible expansion of problematic algae. If we attempt to oversimplify these very complex systems which are influenced by multiple factors, we are very likely to underestimate the potential impacts of our actions when considered in concert with natural events such as storm surge, sea level rise, and the interconnectivity of the aquifer, which are beyond our control. What is within our control is the additional stress we place on the river through allowable withdrawals, and I believe that an 11% flow reduction is beyond what is reasonable and prudent for this system.

Even if the District lowers its proposed percentage of flow reduction for the Chassahowitzka, which I believe it should, the many influences on this system, which are mentioned in the Peer Review Report, stress that managing simply to a cfs target will be inadequate. I would like to reiterate what was stated in the Review Report,

> "the lack of detailed knowledge about the hydrogeology of the contributing springs, which seem to behave differently from each other and vary in water quality, would suggest that any MFL expressed in cfs alone may be somewhat inadequate, or at least requires careful monitoring
15.) during implementation. Especially if groundwater withdrawals on the inland side of the aquifer,

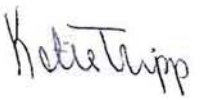
seawater intrusion into the artesian formation on the Gulf side, or other potential impacts (e.g., increased nitrogen and other pollutants) can affect the water quality of the Chassahowitzka ecosystem in the future, weakening the value and accuracy of the MFL as the District goes forward with water management in this area."

The Peer Review Panel also notes that each individual first or second magnitude spring, in addition to the River and estuary may require separate MFLs to improve management. This detailed approach might better serve the District in protecting the aquatic resources in this system and should be investigated. DEP expressed concern for how each the creeks and springs would be monitored to ensure their continued health in the absence of individual MFLs, but unfortunately, the District only plans to examine discharge from Main #1 and #2 to assess compliance, assuming the results here will be representative of the rest of the system. The District has stated that it will revisit the MFLs in the future and incorporate new data, but has made to commitment to better understanding and documenting the conditions within the individual components of the Chassahowitzka system, which will greatly limit the effectiveness of any monitoring plan.

16.)

Thank you for the opportunity to provide comment. I look forward to seeing how these remarks are incorporated into the District's revised report.

Sincerely,



Katie Tripp, Ph.D.

Director of Science and Conservation

October 21, 2011

Dr. Tripp,

Thank you for your comments regarding the proposed minimum flow and level and I apologize for the lengthy delay in responding. To facilitate the response, I have numbered the paragraphs in your correspondence (see attached).

1. When the legislature enacted the minimum flow and level (MFL) statute (section 373.042 F.S.), they did not define 'significant harm'. Presently the Southwest Florida Water Management District's approach to significant harm is loss of 15 percent of habitat (volume, bottom area, shoreline length in contact with specified salinity, acute or thermal refuge), or biological resource (abundance of fish/invertebrates, mollusks, benthic diversity, submersed aquatic vegetation density, etc.). The value was originally proposed by the upper Peace River peer review panel (Gore et al. 2002). All seventeen subsequent peer review panels have accepted it and most have been supportive. None has proposed a different metric or value, although the peer review panel for the upper Hillsborough River (Cichra et al. 2007) recommended that the District undertake a study to validate its continued use. In response, the District has contracted with the University of Florida and a private consulting firm to search the literature (peer-reviewed and grey) for studies that have quantified the impact of flow diversion on ecologic resources. In addition to the literature study, the District has initiated a long-term controlled diversion study. While there does not appear to be a universally recognized threshold representing 'significant harm' in the peer-reviewed literature and much of the literature on environmental flows is taken from systems (e.g., Murray-Darling in Australia, San Francisco Bay, Caspian Sea in Russia) that have withdrawals in excess of 50 percent, impoundments or both. Exceptions include recommendations for limiting diversion to 20 percent (Dunbar et al. 1998) based on habitat loss, 30 percent habitat loss based on historical low flows (Jowett 1993) or 20 percent reduction in historical commercial harvest (Powell et al. 2002). More recently, the Nature Conservancy (Richter et al. 2011) proposed a presumptive standard of 10 percent reduction over natural flows for 'high level' protection and up to a 20 percent reduction for 'moderate level' of protection.

2. Comment noted.

3. The District agrees that a reduction in flow has occurred and that it is largely due to changes in rainfall. The District also agrees that nitrate concentrations are increasing, but the MFL statute requires that the MFL be established based on the impact of withdrawals and there is no evidence that nitrate concentration is related to flow.

The comment about 'the models used here do not take any possible natural variations in account' is not understood. The groundwater model used to assess the impact of withdrawals explicitly includes changes in the form of variable rainfall.

4. The report will be edited to emphasize the importance of warm water habitat.

5. The discussion on manatee population has been re-written to incorporate Mr. Blilhovde comments. The United States Fish and Wildlife Service (USFWS) aerial survey results have been updated through the 2010 annual survey.

6. There is clearly a disagreement about how well the USFWS aerial surveys represent manatee usage of the Chassahowitzka and the report has been edited to reflect this disagreement. However, the more important facets of the thermal refuge MFL is that a) it is independent of the number of animals using the Chassahowitzka and b) it is limited to an evaluation of critically cold conditions. The District did not set a 'minimum usage' threshold before including a thermal refuge MFL in the mix and the District made no attempt to model the number of animals using the Chassahowitzka during the summer or winter. The thermal refuge evaluation could have been done with no knowledge of the manatee usage and the information presented was intended to be qualitative in nature. In essence, there was nothing to be gained by requesting the USFWS to perform more aerial surveys and the modeling results indicate that even with a 15% reduction, there is ample acute thermal refuge in the Chassahowitzka.

7. See prior comment regarding the use of 'best available information' for setting the thermal refuge MFL. With regard to salinity, some clarification about which data sets were used for which MFL components is warranted. The salinity and thermal habitat MFLs were modeled using hourly salinity reported by the United States Geological Survey (USGS) for the headspring complex of Main and all contributions upstream (but excluding flows from Crab Creek). This is the only location of continuous discharge or conductivity (from which salinity can be calculated) measurements.

In order to represent the entire system in the model, average values of salinity and discharge for Crab Creek, Potter Creek, Baird, Blue Run and Beteejay Spring were input to the hydrodynamic model at the appropriate node. Some of the data was from 1989 when the USGS completed an extensive evaluation of the Chassahowitzka system (Yobbi and Knochenmus 1989). All of these discharges are tidally influenced and both the salinity and the discharge vary with tide stage. It is necessary to average the results in order to obtain a representative value. Figure 1 illustrates this fact. If you were to sample at high tide on October 15, 2011, you might obtain a conductivity

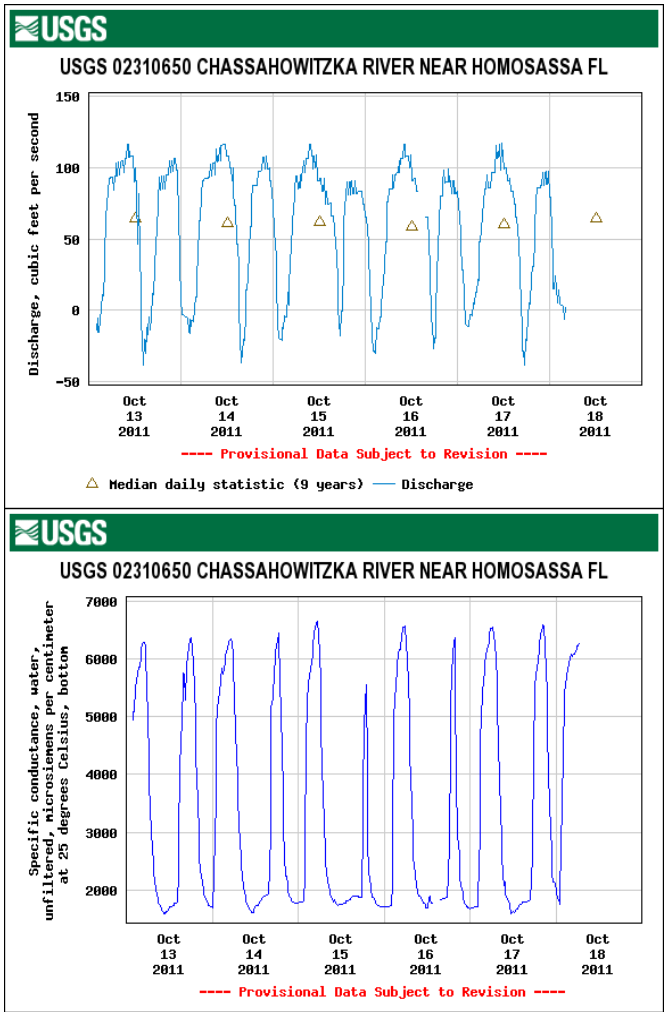


Figure 1. Chassahowitzka head springs discharge and conductivity.

of 6,500 umho/cm and a postitive (downstream) discharge of 115 cfs. However, if you sampled later in the day on a low tide you might observe a negative (upstream) discharge of 25 cfs and a conductivity of 1,800 umho/cm. While the District has more recent salinity results for several of these springs, we do not have recent concurrent discharge measurements and the District felt that the appropriate way to represent these springs was to use the average historical values published by the USGS.

8. and 9. Comments noted. The District agrees that the issues raised are important, but not related to 'significant harm' resulting from additional withdrawals.

10. The fact that some systems do not naturally provide suitable thermal refugia is undeniable, and under the conditions simulated, a refuge from chronic cold conditions was not identified in the Chassahowitzka. However, the fact that something is naturally absent in a particular system is not sufficient reason for not establishing an MFL in accordance with the dictates of the MFL statute.

11. Comments noted. In addition, it should be noted that the District supports management activities for improving manatee habitat quality by other agencies.

12. The District does not support using an assumed manatee life expectancy less than 50 years, even if the lower expectancy is considered the best estimate. Maintaining the joint probability approach used to establish the worst conditions in 50 years based on climate and hydrology is far, far more protective than reducing the return interval to eight years. An analogy would be to build stormwater system to an eight-year return interval. On average, the system would flood once every nine years. In contrast, a system designed and built to a 50-yr return interval would only flood once every 50 years, offering far more protection than the lesser system.

13. The District did not have a 'desired outcome' for the evaluation of the Chassahowitzka MFL. The fish/invertebrate section of the report has been re-written to address an over-sight (explained below), but the conclusions have not changed. The following clarification/explanation is taken from the District's response (in blue text) to the Florida Fish and Wildlife Concervation Commission (FWC) comments about the peer review draft of the MFL report.

This comment is in reference to the discussion contained in Section 7.1 of the peer review draft. This section and Table 7-1 will be re-written in the final report to correct a number of errors. First of all, the response for F. grandis was erroneously omitted from the final analysis. Second, the consultants (USF and FWC) treated flow data differently in developing their response regression. FWC added a one to the flow, while USF did not. In the initial draft that was circulated internal to the District, flow was erroneously transformed for both the plankton tow and the fish/invertebrate seine and trawl. The text and table contained in this section unfortunately reflects a mix of correct (seine and trawl) and incorrect (plankton tow) transformations of flow. The table that follows includes all taxa from Tables 5-5 and 5-6 that met the original criteria and were promoted to evaluation, plus the sub-set selected for the MFL determination. Table 7-1 will be corrected in the final report.

If all taxa identified in Tables 5-5 and 5-6 are retained, the resource median is 11.1 percent flow reduction, but for reasons described in the discussion beginning on paragraph 4 of page 73 and extending onto page 74, the District feels that the hypersensitive responses based on seasonal results should not be included in the establishment of a non-seasonal MFL determination (See response to FDEP comment 20). Excluding these taxa results in a median resource reduction of 11.5 percent. However, the recommended MFL will not be changed in the final report because the most conservative MFL then becomes is 11 percent for the acute thermal refuge for the manatees.

Taxa	Type of Regression	Flow Reduction (%)		
		As Presented in Peer Draft	All Taxa (corrected)	As Presented In Final Report
Plankton Net				
Anchoa mitchilli juveniles	Linear	1.0	2.6	2.6
Hargeria rapax	Linear	1.9	3.5	3.5
Dipterans, chironomid larvae	Linear	2.3	3.9	3.9
Seine and Trawl				
Farfantepenaeus duorarum (S)	Quadratic	17.2	17.2	17.2
Farfantepenaeus duorarum (T)	Quadratic	15.2	15.2	15.2
Fundulus grandis	Quadratic		11.9	11.9
Lucania parva	Quadratic	11.1	11.1	11.1
Lucania goodei	Linear		0.9	
Poecilia latipinna	Quadratic	13.3	13.3	13.3
Lepomis punctatus	Linear		1.6	
Lagodon rhomboides	Quadratic		17.9	
Median for resource		**11.1**	**11.1**	**11.5**

The peer review panel (Panel) included comments about the model calibration and the District will give weight to those comments in future MFL modeling evaluations including the re-evaluation of the Chassahowitzka MFL. However, the Panel determined that the modeling was adequate as evidenced by their concluding comment from page 21 of their peer-review report: *As a result, the Panel concludes that the application of the calibrated model to evaluate thermal and salinity habitats is appropriate and can be used to help determine a MFL for the Chassahowitzka River System*.

Other supportive Panel comments from the report include:

> *The panel finds that the EFDC is an adequate hydrodynamic model code to apply to the Chassahowitzka River to address the issues of interest here. (Page 12). The data along with bathymetric data for the Chassahowitzka Bay obtained from NOAA resulted in the development of a good physical representation of the modeled length, area and volume of the system. (Page 13). The panel believes that there were sufficient data available to calibrate the model . . . (page 13). '. . . the Panel agrees that the modeling study utilized all the data available, generated adequate regressions to fill in missing data, and the data were adequate for concluding the modeling study, including the synthesized time series data used for determining critical three-day cold events for Manatee during 1967-2007 baseline period. (Page 13). The Panel finds that the assumptions made in setting the boundary conditions and the data employed are appropriate for this simulation effort. (Page 17). The*

Panel finds that the data utilized for setting boundary conditions and assessing the impact of flow reductions are appropriate and best available. (Page 17). ' . . . . the Panel concludes that the salinity calibration is adequate for estimating relative differences due to reduced freshwater inflows. (Page 19). The Panel finds that the model does reproduce the cooling and warming trends very well and, thus, the temperature calibration is considered to be adequate. (Page 20).

14. The District acknowledges the impact that acute events such as the 'No Name Storm' and chronic events – such as sea level rise and extended droughts can have on estuarine flora and fauna. The District also acknowledges the inland migration of barnacles throughout the Springs Coast and an increase in nitrate concentration in many of the area spring systems. However, the District believes that these changes and historical changes in *Vallisneria americana* coverage are largely unrelated to withdrawals. The relationship found between salinity and the density of *V. americana* predicts a 15% decrease in density with a 0.2 ppt increase in salinity. The same regression also predicts the near extirpation (95% loss) of this taxa when the salinity is increased from 3.1 ppt to 5.2 ppt., but *V. americana* is generally accepted to be tolerant of salinity up to 10 ppt. and healthy plants have been observed in salinity as high as 20 ppt in the Caloosahatchee River. The South Florida Water Management District Caloosahatchee minimum flow and level (Chapter 40E-8. F.A.C.) is based on maintaining *V. americana* in the river as evidenced by the salinity limits imposed:

> **40E-8.221 Minimum Flows and Levels: Surface Waters.**
>
> The MFLs contained in this Part identify the point at which further withdrawals would cause significant harm to the water resources, or ecology, of the area as applicable, pursuant to Sections 373.042 and 373.0421, F.S. It is the District's intent to correct or prevent the violation of these MFLs through management of the water resources and implementation of a recovery strategy.
>
> (2) Caloosahatchee River. A minimum mean monthly flow of 300 CFS is necessary to maintain sufficient salinities at S-79 in order to prevent a MFL exceedance. A MFL exceedance occurs during a 365 day period, when:
>
> (a) A 30-day average salinity concentration exceeds 10 parts per thousand at the Ft. Myers salinity station (measured at 20% of the total river depth from the water surface at a location of latitude 263907.260, longitude 815209.296; or
>
> (b) A single, daily average salinity exceeds a concentration of 20 parts per thousand at the Ft. Myers salinity station. Exceedance of either paragraph (a) or (b), for two consecutive years is a violation of the MFL.

Given the documented salinity tolerance of *Vallisneria*, it would be reasonable to expect more widespread occurrence in the Chassahowitzka system than currently exists. It appears that other stressors are affecting the distribution of this plant in the river . The District feels that establishing the MFL based on observed *V. americana* salinity/density relationships ignores the literature that implies the response is inadequately characterized by salinity alone.

Regarding your inquiry about *Lyngbya*, work conducted by Stevenson et al. (2007) indicates that the abundance of *Lyngbya wollei* does not relate well to either the water column nitrogen or phosphorus concentrations in the Florida springs surveyed (29 first and second magnitude

springs), but as you suggested, it does appear to be related to human activities (and sediment phosphorus concentrations). While an abundance/nutrient relationship was not found in the field observations, Stevenson goes on to report that laboratory algal assays resulted in increased growth rates when nitrogen concentrations were increased. The study concluded:

> *13. In many springs, nitrogen reductions may be the only practical restoration strategy because natural phosphorus concentrations may be higher than the concentrations that constrain algal growth. (Page 6)*

As previously stated, management of nutrients, especially of anthropogenic origin, is not an MFL function. The District agrees that nitrogen concentration of Chassahowitzka spring water is increasing, but it does not appear to be related to flow (See section 4.3 in the MFL report).

15. The District agrees with the Peer Review Panel's report that much is unknown about the karst connections and the source of waters discharged from the various springs in the Chassahowitzka system. While the Panel's suggestion is valid, it is unclear how it should be implemented. Presumably, it would require both discharge and water quality measurements on the contributing springs. From 1992 until 10/2011, the District monitored the water quality of Chassahowitzka Main, Ruth Spring, Potter's Creek Spring, Crab Spring, Chassahowitzka #1, Baird Spring, Blue Run and Betee Jay Spring quarterly. Except for the gage just downstream from the Chassahowitzka Main spring, the remaining springs are not monitored for discharge. Also, because all are tidally affected, traditional stage/discharge techniques cannot be used. It is conservatively estimated that it would cost $1.2M to establish and maintain discharge measurements for five years at seven new locations within the river system, and this amount may be considered cost-prohibitive.

16. See prior comment. You are correct that compliance will be assessed based on discharge from Main Spring and upstream contributions, as this is the only location in the river where discharge is measured. However, the elements and analytical techniques used in the re-evaluation have not been identified at this time. As you are aware, the District conducted a series of stakeholder meetings earlier this year to solicit suggestions on how to better use the existing data, or new methods to include in a re-evaluation.

Thank you again for your input, participation in the stakeholder's meeting and continued interest in the development of the Chassahowitzka MFL.

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From: Hope
To: Doug Leeper
Subject: Re: Chassahowitzka Modeling Report Posted on MFLs Web Site
Date: Tuesday, October 25, 2011 3:14:15 AM

Hi Doug,

I think I finally got my computer able to "surf" the web again (apparently I am missing some critical "add-ons" or something). I was so bummed that my systemic poison ivy kept me from the last MFL meeting; everyone that I know who attended the last MFL meeting told me that "Doug's sea level rise presentation is a must see." I've been trying to locate it on the site, but I can't find it. Could you send me the direct link to your presentation? Is it a slide show? Do I need to download a special program to view it?

On a personal note: I am discouraged nearly to the point of despondency, with the in-our-face corporate *coup d'état* of our state government. When the government is oligarchy, how can the citizen hope to appeal? I just read a forwarded email from some folks in the SRWMD area who are reporting that proceeds from the sale of SRWMD "surplus" lands are being used to fund shady purchases of "conservation easements" at above market prices on lands belonging to wealthy, connected friends of the current political regime. Have you heard anything about this? Is it true?

It's like we're back in feudal times, where the rich and powerful steal from the poor to give to the rich; continually eroding the real "wealth" and independence of the "citizens" (slaves) in what is certainly no longer a democracy. How long will the 99% allow this robbery and enslavement to continue? There is no democracy, no real "free market" when the corporate state writes all the laws to benefit the corporations, and eliminates all the laws and regulations that should protect the citizens and the collective resources of the land?

Thanks, again, for listening....and for sending me the link to your sea level rise presentation from the meeting I missed. I feel like Job sometimes; the oozing poison ivy "pox" dripping down over my swollen shut eyes and bandaged-wrapped legs seemed almost "biblical" in its ability to "redirect" my activities and keep me trapped and isolated for a while. The next "plague" of computer crashes seemed an additional "message" from the cosmos to adjust my "focus" in life.

So, what's the cosmos saying to Hope, "Greed always wins....just stop trying.....all hope is lost?" I resist that message; I believe that there are

more "good" and "honest" people than "greedy" and "evil" ones. I have faith that truth will be uncovered, criminal deeds revealed, and justice will prevail. Florida's miserable 4 years "wandering" in the desert of despotism, will end; we'll recover our stolen lands, banish our despots, and embark upon a more egalitarian time with ethical leaders whose decisions are based on the will of the electorate (not the wealthy or corporate benefactors), and the laws are crafted to protect (not exploit) our natural resources and citizens. Historically, good usually prevails: Moses led the Israelites out of Egyptian slavery; the Holocaust ended; most tyrants are deposed; most corrupt governments are overthrown; it's just a matter of time....and the rise of the "Occupy Florida" movement gives me hope that the fed-up electorate are beyond ready to provoke change and reclaim their rights as citizens of a democracy.

Feel free to say something encouraging and optimistic.....you seem like you might be one of the "good" people, but I also fear that you, like many people in state government, may be being pressured to "toe the party line," and defend a process that is fundamentally corrupt; forced to use data that is flawed and incomplete, in order to "arrive" at a pre-determined result or "target number" demanded by those poised to exploit the resource for their own profit. This thing doesn't have to be a "run away train." Together, the "good" and "honest" people can stand up against the corrupt, wealthy, and powerful. It's "*our*" Florida to save. We *can* save it together. The greedy and powerful don't have to win here.

I still believe that, working together, we (the citizens and the government) can have an "outcome" that, like Boyd Blihovde suggested, "you (SWFWMD) can live with and the people and wildlife can live with."

I appreciate your hard work; your exemplification of the "Sunshine law," and your willingness to work with "we the people" in the pursuit of environmental and civil justice.

Thanks again,
Hope

> ----- Original Message -----
> From: Doug Leeper
> To: kwatson@hsweng.com ; Al Grubman (grubman1@gmail.com) ; Bill Geiger (bgeiger@cityofbrooksville.us) ; Bill Pouder (bill.pouder@myfwc.com) ; Boyd Blihovde (Boyd_Blihovde@fws.gov) ; Brad Rimbey (BWR.CRRC@tampabay.rr.com) ; Brent Whitley (brentwhitley@sierra-properties.com) ; Brockway, Alys (abrockway@co.hernando.fl.us) ; Dennis D. Dutcher (Dennis3ds@aol.com) ; Frank DiGiovanni (administration@inverness-fl.gov) ; Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us) ; Helen Spive ; Hilliard, Dan (2buntings@comcast.net) ; Hoehn, Ted ; Hope Corona (hopecorona@tampabay.rr.com) ; Jim Farley

(jfarley682@aol.com) ; Katie Tripp (ktripp@savethemanatee.org) ; Norman Hopkins (norman@amyhrf.org) ; Rebecca Bays (rebecca.bays@bocc.citrus.fl.us) ; Richard Kane (rkane@usgs.gov) ; Richard Radacky (rradacky@cityofbrooksville.us) ; Ron Miller (rmille76@tampabay.rr.com) ; Sarah Tenison (cityofweekiwachee@yahoo.com) ; Sulllivan, Jack (jsullivan@carltonfields.com) ; Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us) ; Whitey Markle (whmarkle@gmail.com) ; (janicehowie@aol.com) ; Abdon Sidibie (asidibie@chronicle.online.com) ; Alex McPherson (aamcpherson@msn.com) ; Ann - 2 Hodgson (ahodgson@gmail.com) ; Ann Hodgson (ahodgson@audubon.org) ; Bernard Berauer (bfberauer@aol.com) ; Beverly Overa (boverly@tampabay.rr.com) ; Bill Garvin (wgarvin@tampabay.rr.com) ; Bob Caldwell (Bobcaldwell51@yahoo.com) ; Brack Barker (brack154@msn.com) ; Carl Mattthai (thebabesmimi@gmail.com) ; Casey, Emily (fcnwr@atlantic.net) ; Charles Dean (dean.charles.web@flsenate.gov) ; Charles Stonerock (katcha.stonerock3@gmail.com) ; Chris Safos (chrissafos@embarqmail.com) ; Czerwinski, Mike (mczerwin@tampabay.rr.com) ; Darlene Herth (2cetechnology21@gmail.com) ; Darrell Snedecor (president@citruscountyaudubon.com) ; Don Hiers (dhiers3@gmail.com) ; Douglas Dame (doug_dame@yahoo.com) ; Elaine Luther (barneyandcap@hotmail.com) ; Emily Casey (ecasey21@hotmail.com) ; Emma Knight (eknight@wetlandsolutionsinc.com) ; George Harbin (gharbin@tampabay.rr.com) ; George McClog (classof47@gmail.com) ; Gorgon O'Connor (gorgon_o@yahoo.com) ; Harry Steiner (harry109@aol.com) ; Jack Calbeck (calbeckj@citrus.k12.fl.us) ; jane Perrin (jcsperrinmd@sbcglobal.net) ; Jerry Morton (JerrMorton@aol.com) ; Jessie Gourlie (gourliej@thirdplanetwind.com) ; Jim Collins (jimmiekey22@yahoo.com) ; Jimmie Smith (Jimmie.Smith@myfloridahouse.gov) ; Joe Calamari ; John Lord (jclord109@yahoo.com) ; John Mayo (freedomway1@gmail.com) ; Karen Johnstone (kjohns213@sbcglobal.net) ; Kim Caldwell (caldwell.kimberly@yahoo.com) ; Kim Dinkins (kim.dinkins@marioncountyfl.org) ; Linda Pierce (tpierce35@tampabay.rr.com) ; Linda Vanderveen (hernandoaudubon@yahoo.com) ; Mary Anne Lynn (mlynn1978@tampabay.rr.com) ; Matthew Corona (mcorona1@tampabay.rr.com) ; Max Rhinesmith (rhinesmith@webtv.net) ; Amber Breland ; Andy Houston (ahouston@crystalriverfl.org) ; Art Yerian (Al.Yerian@dep.state.fl.us) ; Ben Weiss ; Beth Hovinde ; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us) ; Courtney Edwards (cedwards@savethemanatee.org) ; Dale Jones (Jones@MyFWC.com) ; Dana Bryan (dana.bryan@dep.state.fl.us) ; Darrell Snedecor ; David Hamilton (countyadministrator@hernandocounty.us) ; David Hankla (david_hankla@fws.gov) ; Don Wright (wright@sura.org) ; Dusty McDevitt (mcdevitt@usgs.gov) ; Ed Call (marvin.call@MyFWC.com) ; Eric Nagid (eric.nagid@MyFWC.com) ; FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com) ; J. J. Kenney (jj.kenney@bocc.citrus.fl.us) ; Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us) ; Joyce_Kleen@fws.gov ; Kandi Harper (kandi.harper@bocc.citrus.fl.us) ; Keith Ramos (Keith.Ramos@fws.gov) ; Kent Smith (kent.smith2@myfwc.com) ; Kevin Grimsley (kjgrims@usgs.gov) ; Michael Lusk (Michael_Lusk@fws.gov) ; Mitchell Newberger (mnewberger@verizon.net) ; Nick Robbins (Nick.Robbins@dep.state.fl.us) ; Nicole Adimey (Nicole_Adimey@fws.gov) ; Paul Thomas (paulw.thomas@MyFWC.com) ; Ron Mezich (ron.mezich@MyFWC.com) ; Shelly Yaun (shelly.yaun@dep.state.fl.us) ; Toby Brewer (Toby.Brewer@dep.state.fl.us) ; Tracy Colson ; Wallace, Traci ; Adkins, Jim ; Bitter, Jim ; Bryant, Richard ; Cantero, Vince ; Carpenter, Paul ; Daniels, Chase ; Dueker, Duane ; Gramling, Hugh ; Harrelson, Cathy ; Hubbell, Pete ; Johnson, Eric ; Johnson, Martyn ; Keim, Robert ; Kline, Allen ; Knight, Bob ; Knight, Robert ; Knudson, Ross ; Overa, Tom ; Owen, Rick ; Parrow, Liz ; Rolf Auermann (rauerman@tampabay.rr.com) ; Rusnak, Teddi ; Watkins, Priscilla ; Watrous, Russell ; Wilson, Roger
Cc: Barbara Matrone ; Cara S. Martin ; Chris Zajac ; Darcy A. Brune ; Dave Dewitt ; Doug Leeper ; Gary E. Williams ; Jay Yingling ; Karen Lloyd ; Ken Weber ; Lou Kavouras ; Mark Barcelo ; Mark Hammond ; Marty Kelly ; Mike Heyl ; Paul Williams ; Robyn O. Felix ; Ron Basso ; Sid Flannery ; Veronica Craw ; Xinjian Chen ; Yassert Gonzalez
Sent: Monday, October 24, 2011 7:44 AM
Subject: Chassahowitzka Modeling Report Posted on MFLs Web Site

Greetings:

I'm writing today to let you know that a report on salinity habitat modeling for the

Chassahowitzka River system based on sea level conditions for year 2030 has been posted to the Southwest Florida Water Management District's Springs Coast Minimum Flows and Levels Public Workshop web page at:

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The report is titled *Sea Level Rise Simulations of the Chassahowitzka River – Part Five*, and was prepared for the District by Dynamic Solutions, LLC.

A similar report for the Homosassa River system is being completed and will be posted soon.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

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http://www.pctools.com
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From: Doug Leeper
To: "Hope"
Bcc: Marty Kelly; Mike Heyl; Sid Flannery
Subject: RE: Chassahowitzka Modeling Report Posted on MFLs Web Site
Date: Tuesday, October 25, 2011 8:21:07 AM

Hope:

Here's a direct link to an Adobe PDF version of the slides that I showed at the July 18th workshop. This set of slides includes my presentation on sea level rise, and should be readily viewable if you have downloaded the Adobe Reader software that is available for free on the internet.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/1968/SWFWMD_SLIDES_SHOWN_AT_MEETING_-_Springs_Coast_MFLs_Publ_Wrkshp_18jul2011.pdf

Also, here's are direct links to the slides that I presented at the September 6th and June 8th workshops.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/2002/SWFWMD_Presentation_for_September_6_2011_MFLs_Workshop.pdf
http://www.swfwmd.state.fl.us/files/database/site_file_sets/1871/Slides_Springs_Coast_MFLs_Public_Workshop_08jun2011.pdf
Note that the Springs Coast Minimum Flows and Levels Public Workshop web page also includes the slides shown by other presenters at the workshops, additional information about the workshops, and links to numerous documents containing background or supporting information. The workshop web page may be found at:

http://www.WaterMatters.org/SpringsCoastMFL

With regard to your questions concerning the sale of surplus lands in the St. Johns River Water Management District, I would note that I have not heard or read anything about this matter.

Finally, thanks for your words of encouragement and appreciation regarding my efforts and those of others that are directed toward development of minimum flows for the Springs Coast area. I believe that the District and interested stakeholders are benefitting from the ongoing exchange of information on this issue and also believe that the end result or our efforts will be protective of our valuable natural resources.

Douglas A. Leeper
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352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Hope [mailto:hopecorona@tampabay.rr.com]
Sent: Tuesday, October 25, 2011 3:14 AM
To: Doug Leeper
Subject: Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

Hi Doug,

I think I finally got my computer able to "surf" the web again (apparently I am missing some critical "add-ons" or something). I was so bummed that my systemic poison ivy kept me from the last MFL meeting; everyone that I know who attended the last MFL meeting told me that "Doug's sea level rise presentation is a must see." I've been trying to locate it on the site, but I can't find it. Could you send me the direct link to your presentation? Is it a slide show? Do I need to download a special program to view it?

On a personal note: I am discouraged nearly to the point of despondency, with the in-our-face corporate *coup d'état* of our state government. When the government is oligarchy, how can the citizen hope to appeal? I just read a forwarded email from some folks in the SRWMD area who are reporting that proceeds from the sale of SRWMD "surplus" lands are being used to fund shady purchases of "conservation easements" at above market prices on lands belonging to wealthy, connected friends of the current political regime. Have you heard anything about this? Is it true?

It's like we're back in feudal times, where the rich and powerful steal from the poor to give to the rich; continually eroding the real "wealth" and independence of the "citizens" (slaves) in what is certainly no longer a democracy. How long will the 99% allow this robbery and enslavement to continue? There is no democracy, no real "free market" when the corporate state writes all the laws to benefit the corporations, and eliminates all the laws and regulations that should protect the citizens and the collective resources of the land?

Thanks, again, for listening....and for sending me the link to your sea level rise presentation from the meeting I missed. I feel like Job sometimes; the oozing poison ivy "pox" dripping down over my swollen shut eyes and bandaged-wrapped legs seemed almost "biblical" in its ability to "redirect" my activities and keep me trapped and isolated for a while. The next "plague" of computer crashes seemed an additional "message" from the cosmos to adjust my "focus" in life.

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Cc: Barbara Matrone ; Cara S. Martin ; Chris Zajac ; Darcy A. Brune ; Dave Dewitt ; Doug Leeper ; Gary E. Williams ; Jay Yingling ; Karen Lloyd ; Ken Weber ; Lou Kavouras ; Mark Barcelo ; Mark Hammond ; Marty Kelly ; Mike Heyl ; Paul Williams ; Robyn O. Felix ; Ron Basso ; Sid Flannery ; Veronica Craw ; Xinjian Chen ; Yassert Gonzalez
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Subject: Chassahowitzka Modeling Report Posted on MFLs Web Site

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The report is titled *Sea Level Rise Simulations of the Chassahowitzka River – Part Five*, and was prepared for the District by Dynamic Solutions, LLC.

A similar report for the Homosassa River system is being completed and will be posted soon.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
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Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

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http://www.pctools.com
=======

From: Doug Leeper
To: "Hope"
Bcc: Marty Kelly; Mike Heyl; Sid Flannery
Subject: Follow Up Response
Date: Tuesday, October 25, 2011 8:32:34 AM

Hope –

After reading the response to your e-mail that I just sent, I noticed that you were asking about land deals in the Suwannee River Water Management District, not the St. Johns River Water Management District.

My response is the same – have not heard or read anything about land sales by the Suwannee River District either – just wanted to clarify that…

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
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352-754-6885 (Fax)
doug.leeper@watermatters.org

From:	MAD MAX
To:	Doug Leeper
Subject:	Re: Chassahowitzka Modeling Report Posted on MFLs Web Site
Date:	Tuesday, October 25, 2011 8:36:42 AM

DUDE, What are u yakking about-year 2030? I am More concerned with being allowed to hike into 3 sisters springs for a swim. instead of waiting another damn Year .for permission to walk on our TAXPAYER lands we, incl me, gave donations $$$ to buy. They? are trying to turn it into damn tourist look-don't touch-park like fishbowl Homosassa. 3 sisters should stay wilderness, but then fat folks won't visit it. arrrrgggggghhhh MAX

From: Doug Leeper
To: "MAD MAX"
Bcc: Marty Kelly; Mike Heyl; Sid Flannery; Gary E. Williams; Veronica Craw
Subject: RE: Chassahowitzka Modeling Report Posted on MFLs Web Site
Date: Tuesday, October 25, 2011 9:02:46 AM

Max –

Thanks for the e-mail. It's always good to hear stakeholders opinions regarding management of our springs.

The modeling we are doing for year 2030 conditions is an attempt to evaluate how future sea level rise will affect salinities in the river/spring systems of the Springs Coast. This information will help the Southwest Florida Water Management District establish the best protective minimum flows for the systems.

Douglas A. Leeper
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doug.leeper@watermatters.org

From: MAD MAX [mailto:rhinesmith@webtv.net]
Sent: Tuesday, October 25, 2011 1:50 AM
To: Doug Leeper
Subject: Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

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From:	2buntings
To:	Blake Guillory
Cc:	Mark Hammond; Marty Kelly; Doug Leeper; Ron Basso; Mike Heyl; Sid Flannery; Steve Edmonds; Dave Berkley; Rodney Walters; Jack McCarthy; jlmsvc@aol.com; gary moss; Bob Currier; Don Wright; brad; ron miller; Rebecca.Bays@bocc.citrus.fl.us; jim bitter; Katie Tripp; Helen; Charles Brennan; Teddi Rusnak; Emily Casey; Jan Howie; Cathy Harrelson; Bob Knight; kincaid@geohydros.com; Cara S. Martin; Carolyn.Voyles@dep.state.fl.us; Emilio Vergara; Mickey Newberger; estevez@mote.org
Subject:	WAR, Inc_Springs Coast MFL
Date:	Tuesday, October 25, 2011 9:27:30 AM
Attachments:	WAR-MFL Position-Final.pdf

Dear Mr. Guillory,

Please find attached our contribution to the subject process under development by SWFWMD.

We are very appreciative of the outreach and courtesy extended by the District for this review. WAR has been involved in similar review for the Withlacoochee River for several years and as a result was invited to participate as a Stakeholder in the Springs Coast MFL rule development. We have a deep interest in this process and our supreme desire is to maintain or enhance waters of the state through regulation by the District and Department. WAR submitted the petition for designation of the Lower Withlacoochee River as an Outstanding Florida Water in 1987 and saw it through to successful conclusion in 1989.

Our involvement in water resource issues is compelled by our mission statement: *To implement civic action to promote the common good of residents of the community with a focus on public awareness and responsible stewardship of regional water resources; the basis for all the natural systems that define Florida's Nature Coast.*

Thank you for your review of our concerns and recommendations.

Sincerely,

Dan Hilliard
Director
WAR,Inc.(501.C3)
352/447-5434

Withlacoochee Area Residents, Inc.
PO Box 350
Inglis, Florida 34449-0350

25 October 2011

To: Mr. Blake Guillory
Executive Director
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Fl 34604
blake.guillory@watermatters.org

From: Dan Hilliard
Director
W.A.R., Inc.
PO Box 350
Inglis, Fl 34449
2buntings@comcast.net

Subject: MFL determinations by SWFWMD for Springs Coast river systems

INTRODUCTION

The Withlacoochee Area Residents, Inc (WAR) has reviewed data provided by the SWFWMD (District) via presentations and District online resources applicable to ongoing technical review of minimum flows and levels (MFL) determination(s) as appropriate to three Springs Coast systems; the Weeki Wachee, Chassahowitzka, Homosassa Rivers inclusive. The following commentary may be applicable to other determinations in the region. WAR's response is generally global in nature although it does, on certain points, present to specific river components within the framework of this review.

WAR is deeply appreciative of the District's commitment and the courtesy extended to stakeholders in this very important review. The coastal springs and river courses which define this region are of very high economic value. Indeed, they are all designated as Outstanding Florida Waters (OFW(s)) and thus provided special protections by Florida Statute and Administrative Code. Large components of the estuarine system these water bodies support are also identified as OFWs. Numerous preserves or sanctuaries comprise a large portion of coastal estuaries and inshore waters related to these river systems.

Such waters and other State coastal resources contributed in excess of $580 Billion dollars to Florida's gross product according to the Florida Department of Environmental Protection (Department) 2008 Integrated Water Quality Assessment (305b/303d). A narrower scope of review for economic contribution of inland waters suggests amounts in the range of $20 Billion which we suspect to be very conservative. Economic activities founded on such resources that define this region are of critical importance to the public Health, Safety and Welfare.

WAR recognizes the legislative mandate that prompts the District's action concerning the subject systems. We are mindful of the District's Areas of Responsibility (AOR), likewise required by statute. Protection of the

citizen's water resources is intrinsic to our future prosperity. We are of the considered opinion the District has sufficient direction, latitude and expertise to satisfy these requirements and protect the water resources under review. The debate which has followed this process centers not on the need to be compliant with statute, but rather in the fashion of doing so.

STAKEHOLDER INPUT

There are several issues put forth by Stakeholders in this process that will be addressed in the following order.
1. Reconciliation between technical review/draft recommendations with protection of Outstanding Florida Waters
2. Water quality/habitat reduction impacts
3. Analytical methodology/Data Quality
4. Disparity between draft recommendations and Stakeholder recommendations.

OFW/MFL RECONCILIATION

Reconciling protection of OFW designated water bodies with impacts supported by the MFL determination process revolves around interpretation of various provisions of statute and code. Several Stakeholders have argued supremacy of the OFW provisions of Chapter 62-302.700 over Chapter 40D-8 FAC which establishes the framework for the District's approach to compliance with Chapter 373.042 FS. We are of the understanding that certain legal processes exist to resolve statutory conflict should it exist. As stated in Chapter 373 FS and understood to apply to scrutiny of other regulatory provisions, one or more elements of statute or code may not render other such provisions moot.

In response to public input (Heyl to Tripp, 10/11) the District has stated:

"… the MFL statute requires that the MFL be established based on the impact of withdrawals and there is no evidence that nitrate concentration is related to flow.", and

"…management of nutrients, especially of anthropogenic origin, is not an MFL function."

On the first part, it is not clear such is the case. It is reasonable to conclude that most if not all groundwater withdrawal which comes from a specific basin and contributes to reduced system flow will in fact be returned to the basin via wastewater treatment processes (septic systems and/or spray fields for treatment facilities), or by agricultural irrigation and lawn maintenance. In small part, reduced system flow will contribute to increased loiter time in river systems and may contribute to increased abundance of algae or other species responsive to nitrogen input. On a broader scope, such water use will compound nutrient loads to spring head discharge. This contention is clearly supported by discussion about water quality in the District's Homosassa River Peer Review MFL Draft (2010). Primacy of total load or concentration is another debate but the end result degrades the system.

On the second part, whether or not nutrient management considerations are part of the MFL function is perhaps a District policy. Management of such issues may fall on other divisions of the District than MFL staff, but investigation of these issues clearly falls within their purview. Inasmuch as the District has reviewed water quality indices in these proceedings in significant detail we conclude they are significant. Distinction between or exclusion of water quality metrics in this process is not understood by this organization. We do recognize the intent of the MFL process, but again, the definition of significant harm is the prevailing issue in this matter.

The District seeks to determine thresholds of significant harm in this process and rationalized determination which directly contributes to quantifiable degradation of water bodies should be examined. Analysis and projection of nutrient loading scenarios will contribute to greater strength of the final recommendations.

For the sake of clarity, definition of the following words is provided to limit the scope of meaning found in discussion of topical legal citations. Definition source is the Merriam-Webster Dictionary, emphasis added.

Protect: transitive verb
1 *a*: to cover or shield from exposure, injury, **damage**, or **destruction:** guard *b* **:** defend 1c <*protect* the goal> 2**: to maintain the status or integrity** of especially through financial or legal guarantees: as *a*: to save from contingent financial loss *b*: to foster or shield from infringement or restriction <salesmen with *protected* territories> <*protect* one's rights>; ***specifically:*** to restrict competition for (as domestic industries) by means of tariffs or trade controls

Permit: verb
Transitive verb: **\per·mit·ted,** per·mit·ting\
1: to consent to expressly or formally <*permit* access to records>
2: to give leave: **authorize**
3: to make possible <the design *permits* easy access>
Intransitive verb
1**:** to give an opportunity **:** allow <if time *permits*>
Permit: noun \pər-ˌmitˈ\
— **per·mit·tee** *noun*
— **per·mit·ter** *noun*
1 **:** a written warrant or license granted by one having authority <a gun *permit*>
2 **:** permission

The Florida Constitution, ARTICLE II SECTION 7. Natural resources and scenic beauty.—
(a) It shall be the policy of the state to conserve and protect its natural resources and scenic beauty. Adequate provision shall be made by law for the abatement of air and water pollution and of excessive and unnecessary noise and for the conservation and protection of natural resources.

Some Stakeholders have taken the position that draft recommendations by the District for the systems under review are inconsistent with Article II, Section 7 of the Constitution. Indeed, Section 7 states clearly that natural resources are to be protected and water resources are central to this debate. Though conceptually broad, this policy is not qualified by exception or specific provision.

Chapter 40D-8 is applied by the District to the MFL process and attendant to the process is a requirement for the District to define "significant harm", due to the legislature's failure to do so. The District has consistently applied an impact benchmark to definition of significant harm such that no more than 15% of habitat in a given river system is degraded, and from this comes philosophical divisions. The argument is simple: On one part there is a view of perceived need to provide for potable water to support future development and on the other there is a desire to protect intrinsically valuable resources on behalf of current citizens of the state. Ch 373.042 (1)(a) stipulates not only that future water withdrawals not be harmful to water resources, but to the ecology of a system as well. The latter is a primary source of contention in this discussion inasmuch as numerous Stakeholders find the 15% standard applied in technical review to be excessive on one hand, and on the other, nebulous in context of estuarine ecosystems.

Chapter 373.042 FS clearly requires the Department and Governing Board to consider, and at their discretion, provide for protection of non-consumptive uses in this process. Such uses would reasonably include the protection of Outstanding Florida Waters due to their economic value and the value of ecological communities they support.

62-302.700(5) F.A.C. states "*The Commission may designate a water of the State as a Special Water after making a finding that the waters are of exceptional recreational or ecological significance and a finding that the environmental, social, and economic benefits of the designation outweigh the environmental, social, and economic costs."*

In other words, the OFW designation means that Commission has determined that the benefit of preserving these waters outweighs the cost of that preservation. This means that the District must promote alternative water sources when it knows groundwater pumping in an OFW's springshed will degrade the OFW. With the OFW designation, the Commission has determined that there is a societal interest in preserving these waters that exceeds the economic cost. The District must consider the OFW designation when defining "significant harm".

Reference is made to economic value of these resources several times in this discussion. This issue is acutely in the thoughts of various Stakeholder groups and/or individuals. Not only do these river systems provide great value to ecological communities associated with freshwater and estuarine environments, they support very substantial economic activity. Citrus County's economy in particular is largely defined by such systems as the Homosassa River and Crystal River. A segment of these economic activities includes residential and commercial development, eco-tourism, fishing, photography, boating, hotels, restaurants, transportation and medical care. A recent article in the Citrus Chronicle suggested between 75,000 and 100,000 visitors per year come to Crystal River for the sole purpose of interaction with manatees. The catalyst for this activity is not derived from analytical water quality summaries, but instead by the perception of clean waters (springs) and abundant wildlife supported by their ambient water quality. We are aware that the visual gauge of water quality is a matter of perception by the beholder, but much judgment is rendered on that simple litmus. More important is the ecological communities supported by these waters. Upon the simple visual litmus used by the public hangs the future of water based economies in the local region. Hanging in the balance is tourism demand, and thus value. A very large component of tax roll value for local governments is founded on water front properties, both residential and commercial. These are resources worthy of protection. The District has not given consideration to this aspect of the process even though empowered to do so because it has defined significant harm.

Another aspect of this consideration is found in the severe costs associated with implementation of Chapter 40D-80 FAC or broader recovery/restoration actions as enumerated in Chapter 373 FS. The plethora of impaired water bodies in the state and recovery plans already in place speak volumes about the success Florida has had in management of the resource. We do not take this lightly, nor belittle the task of restoring these waters, for it is surely daunting. It is however a hideously expensive proposition which results from shortcomings of legislative policy and perhaps, in days gone by, ignorance. The real cost is a blade with two sharp edges. On one hand is the cost of restoration, and on the other, the costs of lost economic benefit across the broad scope which otherwise accrues from the resource. We are relatively confident that the larger index rests with the expense of lost benefit.

In Charlotte County v. SWFWMD, Case No. 94-5742RP 1997, Administrative Law Judge J. Stephen Menton's decision stated, in part: "*The establishment of minimum flows and levels does not have to be based on precise historical averages. The statute seeks to prevent "significant" harm to the water resources. Preventing any and all measurable impact to the water resources is not the stated legislative goal and some impact is an unavoidable element of achieving beneficial use of the water resources for human activity. Thus, the establishment of MFLs is highly infused with policy considerations and requires a balancing of* ***societal interest*** *in order to decide what impacts are significant*." -Emphasis added-

The power to insert societal interest into the definition of 'significant harm' is provided by the District's latitude in defining the term. Further, there is ample provision and precedent found in statute, code and case history. As previously stated, the Department and Governing Board are required to consider non-consumptive uses. Non-consumptive uses reasonably encompass societal interest. By extension this authorizes economic impact analysis. Chapter 62-302.700 (4) (e) requires such analysis in the process of designating waters of the state as Outstanding Florida Waters. We strongly suggest such review by the District is appropriate to this process.

We note that all of the systems under review are designated OFWs and each is on the Impaired Waters List (303d). This differs from the Peer Review Draft for "*Recommended Minimum Flows for the Homosassa River*", Leeper et al. 2010 discussion which references dated information suggesting the Homosassa River was not on the 303d list. All coastal water bodies from Weeki Wachee to the Withlacoochee River inclusive are so listed. We note that petitions and recommendations which led to OFW designation for these systems enumerated broad arrays of productive ecological communities which are dependent upon high quality waters. Water quality metrics for each of these systems were evaluated and adopted as part of this process. These standards include nutrient values for nitrogen/nitrate and phosphate. An example of both documents is found in the District's Library for the Lower Withlacoochee River.

EPA 2010 303d Watershed Assessment, Tracking & Environmental Results
http://iaspub.epa.gov/tmdl_waters10/attains_impaired_waters.impaired_waters_list?p_state=FL&p_cycle=2010

WATER QUALITY/HABITAT IMPACTS

Ch 62-302.700 FAC Special Protection, Outstanding Florida Waters, Outstanding National Resource Waters.

"(1) It shall be the Department policy to afford the highest protection to Outstanding Florida Waters and Outstanding National Resource Waters. No degradation of water quality, other than that allowed in subsections 62-4.242(2) and (3), F.A.C., ***is to be permitted in Outstanding Florida Waters*** *and Outstanding National Resource Waters, respectively, notwithstanding any other Department rules that allow water quality lowering."* -Emphasis added-

It is clear that actions by the State or other parties may not sanction degradation of waters designated as OFW other than under provisions of Ch62-4.242(2) and (3) FAC. The MFL determinations underway do not directly impact water quality of these waters, but they do provide foundation for future permit approval within defined parameters, and thus become part of a coordinated process which establishes and promotes specific identified harm to these systems. It is often said by officials of the Department and District that the agencies "regulate by permit". The Department and District do not regulate all water use as a matter of policy and Rule. However, the agencies have legal authority to act against non-permitted activities which impinge on

water supply and water quality, and they will do so with alacrity when appropriate. As surely as the people are bound by these regulations, so too are the Department and District. It is not clear to this organization the District has sufficient data for groundwater quality within each basin, or computer models to evaluate and assure future water use permits will meet not only the public interest test in the B.O.R., but standards in Chapter 62-302.700 FAC.

As a component of the citation above it is specified that no degradation of water quality is to be permitted in OFWs. As indicated earlier in the definition, "permitted" is a transitive verb, not a noun. The purpose of protecting water quality is to support existing ecologic communities in these waters. Water quality in and of itself is an abstract with little meaning until interaction with ecologic communities occurs. In the circumstances of the Springs Coast MFL determination, the evaluation of water quality is in effect reduced to salinity modification by the District and it is not clear this is conceptually appropriate technical review of the best available data. Withdrawals of ground water from each basin to provide for public demand will, without doubt, compound documented increasing nutrient load trends in the systems due to increased use of septic systems; residential fertilizer use and/or waste treatment facility spray fields. This is a known cause and effect relationship and should be examined as part of the definition of significant harm.

One component of water quality apparently not examined by the District in this process is sulfate (SO4) concentrations. Natural background for SO4 in oceans of the world is in the range of 2,712 mg/l (Stumm and Morgan, 1981). SO4 concentration varies as a ratio to salinity, ie. 2.7:35. Analytical summaries submitted to FDEP Bureau of Mining and Mineral Resources for the area of Waccasassa Bay (Kincaid 2009) support a finding that natural background for SO4 in those waters has a mean value of 2130 mg/l. SO4 concentrations are frequent water quality metrics for mining operations because of potential environmental and ground water quality impacts offsite.

We note discussion in both the Chassahowitzka and Homosassa River MFL Drafts about breakpoints in various taxa or benthic communities attributed to salinity. While the former indicated no significant breakpoints, several were noted for the Homosassa River. From the executive summary of the latter document:

"*Flow reductions of 2.7 percent or less from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa. Similar or increased sensitivity to flow reductions was predicted for many taxa across the range of baseline flows, in particular for baseline flows less than the median flows.*"

We characterize the discussion of disparity for this response in comparison to other findings in the Draft as speculative or unexplained, and suggest the possibility that SO4 may be responsible in part or whole. Further, it is not clear why these responses appear to have been set aside. The Draft recommended threshold for significant harm is 5% flow reduction, approximately twice the value which precipitated -15% predicted abundances as referenced above.

Chapter 62-40.473, F.A.C. provides additional guidance for the establishment of minimum flows and levels, requiring that "consideration shall be given to the protection of water resources, natural seasonal fluctuations in water flows, and environmental values associated with coastal, estuarine, aquatic and wetland ecology, including: a) recreation in and on the water; b) fish and wildlife habitats and the passage of fish; c) estuarine resources; d) transfer of detrital material; e) maintenance of freshwater storage and supply; f) aesthetic and scenic attributes; g) filtration and absorption of nutrients and other pollutants; h) sediment loads; i) water quality; and j) navigation."

Examination of the complexities of protecting estuarine resources is brought into sharp focus by Dr. Estevez, Mote Marine: (*A Review and Application of Literature Concerning Freshwater Flow Management in Riverine Estuaries, 2000*). Within the document it is stated:

"The Florida Department of Environmental Protection (1999) defined "indicator" as a physical, biological or hydrological parameter used to represent a water body function. An indicator should be simpler and easier to measure than a more inclusive assessment of water body functions. For example ... "salinity may be measured as an indicator of the habitat functions provided by an estuary. Predicting or measuring the change to ... salinity from changes in water levels or flows is much simpler than attempting to directly measure changes in habitat use." Worth (1998) recommended the establishment of a minimum suite of biological metrics for monitoring that would be required as a basis for setting MFLs in estuaries.

Despite the Department's encouragement to use simple indicator criteria as proxies for living resources, approaches taken to define significant or unacceptable harm turn back to criteria that are strongly ecological in nature. A state "conventions subcommittee" writing on impacts to natural systems proposed that significant harm occurs when, "anthropogenic effects on hydrology that have caused, or are expected to cause, directly or indirectly, singly or cumulatively, by their extensiveness, intensity, duration, or frequency, one or more of the following for more than five years: 1) local or regional extirpation of one or more native species, 2) ... reduction in abundance or reproductive success of a listed ... species, 3) ... reduction in abundance or reproductive success of a keystone species, 4) .. . reduction in abundance or reproductive success of a commercially or recreationally significant species, and 5) replacement of the dominant species group of flora or fauna such that another species or group of species becomes dominant or a significant increase occurs in the abundance or productivity of a nuisance, exotic, or uncharacteristic species" (Lowe, 1994).

Although this definition has not been adopted by districts "due to concerns of practicality in implementing such a broad definition" (Worth, 1998), it is the best operationalized definition for harm to emerge on a statewide basis, to date. The definition might be made less unworkably broad if constrained to a particular set of indicators drawn for living resources and tailored to local conditions as needed in the case of estuaries."

We perceive that Dr. Estevez is generally supportive of Florida's MFL process, but his work indicates that policy may often supersede science in this process. Whether the District has subsequently adopted the broad definition described above is not clear, but the strong reliance upon spatial dislocation of isohaline values in the current review gives pause. It is not clear that Chapter 62-302.700 provisions provide for habitat modification, or in simpler terms, the inshore dislocation of estuarine ecosystems at the expense of freshwater systems. In context of this discussion it is assumed that although the District is guided by Chapter 40D FAC in its operations, it is in fact a component of FDEP and as such obligated to conform to the same regulations as the Department, i.e. Chapter 373 FS, Ch 403 FS, and Chapter 62 FAC. In fact Chapter 373.016 (5) specifically allows the Department to delegate such authority to the District.

In conclusion to the referenced document, Dr. Estevez states (emphasis added):

"The question of freshwater inflows to riverine estuaries is a good scientific question, as well as an important one for coastal resource management. ***Fresh water is an integral part of the definition of an estuary and so deserves primacy in all aspects of estuarine ecology, as a matter of first principles.*** *Changes to inflows have harmed many estuaries in the world, and have the potential to harm more. We seek to learn enough about*

estuaries to restore damaged ones and protect natural ones, but to do so will require the development of insights and tools not presently available."

Estuarine systems are highly sensitive to modifications of salinity. This is recognized by Dr. Estevez in numerous works and by District Staff. Very slight spatial or temporal changes of salinity can precipitate rapid modification of the affected system. Information provided by the District in the Stakeholder discussions indicates a distinct disconnect, however, in that analysis of impacts caused by reductions in system flow stand independent of those projected by sea level rise. Chapter 373.016 (2) requires both the Department and Governing Board take into account cumulative impacts on water resources. District staff has advised the Stakeholders that withdrawals and sea level rise have not been analyzed in such fashion (Stakeholders Conference 7-18-11). Lacking such review it is not clear the Governing Board will render decision on the proposed rule(s) based on the best available information.

WAR recognizes that forecasts of sea level rise (SLR) are based on historical record and in fact the District has supplied data with three trend scenarios. "*Implications of sea level rise and wetland creation and management in Florida"* - Estevez 1987 discusses such issues and highlights not only impacts but management strategies. With that said, SLR forecast is somewhat speculative, as are population growth forecasts. One suggests pending modification of ecologic systems over the long term is likely, and the other projects demand for the resource which ultimately leads to the consumption related impacts rationalized by this process. However, SLR is projected at very slow rates, whereas growth is disproportionately quicker. Once water use permits are issued, the District's ability to modify consumption authorization is severely constrained by legal issues, regardless of consequences. Much groundwater withdrawal within the subject basins does not fall within jurisdiction of the District such as residential wells. However, residential and commercial development will certainly reinforce and compound the increasing trend of nutrient loads to these water bodies. SLR and basin ground water withdrawals will each have characteristic impacts and each is predictable and interrelated. Independent technical review of each aspect in a standalone mode is of questionable value and possibly misleading. As such, we urge the District to reconsider this matter and incorporate these components into cumulative impact analysis.

The District has expended substantial funds through contracts with qualified experts to generate hydrodynamic models which examine impacts from both flow reductions and SLR. Lacking incorporation into cumulative impact analysis, the purpose for which SLR was examined independently in these hydrodynamic models remains unclear.

ANALYTICAL METHODOLOGY

WAR finds in general terms the District staff has been diligent in this process. We recognize the enormity of the task and dependency upon data sets which are sometimes sparsely populated. However, questions have been raised by Stakeholders for both the Chassahowitzka and Homosassa Rivers which remain open.

1. It is our understanding that review of information related to impacts on blue crab populations and species vitality in the region of the Chassahowitzka River estuary is inconclusive. The reason for such adjudication is unclear, but a potential impact on the whooping crane population which winters in the Chassahowitzka National Wildlife Refuge is significant. Inasmuch as whooping cranes are a listed species and to certain degree dependent upon vitality of the blue crab population, we are of the opinion this element of technical review should be clarified. Information contained in the FWCC document "Review of the Biology and Population

Dynamics of the Blue Crab, *Callinectes sapidus,* in Relation to Salinity and Freshwater Inflow" Crowley et al. 2011, presents relevant discussion about estuarine salinity and species vitality.

2. The draft rules propose that withdrawals from the two basins will not cause significant harm at reductions of 11% of flow for the Chassahowitzka River and 5% for the Homosassa River. We note the disparity of these determinations as well as the inverse relationship to flow volume in comparison of the two systems. Likewise the razor thin threshold between mean flow and significant harm as defined by the District is extraordinarily narrow for the Homosassa River. We question whether hydrodynamic models are sufficiently accurate to support such fine determination in the case of the Homosassa River.

3. The volume of flow for the Chassahowitzka system is relatively low. There is indication of long term substantial decline in system flow which the District suggests is a result of corresponding reduction of rainfall in the historical record. Lack of flow related breakpoints are presumed because the spring(s) discharge mildly saline water from undetermined sources and thus there is no clear definition of fresh to saltwater conditions. The taking of ground water from the basin at potentiometric elevations not contaminated with chlorides may exacerbate this circumstance. The 11% reduction in flow recommended for this system in the Draft is a substantial portion of current discharge, yet in terms of beneficial use up gradient, relatively small. In other words, does the potential benefit outweigh specified harm?

4. Discussion of species abundance and response to reduced flows in the Drafts is not wholly understood. It appears the analysis is in part posits a linear correlation between flows and abundance. Where the confusion arises is whether or not the given species abundance responds as a linear function of population base, or geometric function. Ecological communities are generally prolific in reproduction as matters of necessity for most reviewed in these processes are building blocks at or near the bottom of the food chain. Does loss of 15% of juveniles for a given species predict a corresponding 15% of total population, or 20%? May we expect 30% population reductions, or even more?

5. While recognizing findings by the Peer Review panel for the Homosassa River MFL determine it consistent with statute and code, there are objections within that are somewhat critical. Specific components follow:

The first tier of comments/questions are based on extracted commentary from "***SCIENTIFIC REVIEW OF THE RECOMMENDED MINIMUM FLOWS FOR THE HOMOSASSA RIVER SYSTEM"-Hackney 2010***

a. **Question #1** - "Is the District's threshold of a maximum 15% change of resource within the system a reasonable approach? **Yes**, while it may be somewhat arbitrary, setting a quantifiable threshold provides a means to evaluate the impact that reductions in discharge would have on fish and invertebrates, salinity-based habitats, and the extent of thermal refuge for the Florida manatee. <u>While reasonable, many of the r2 values were low (but significant) and only positive relationships were examined. Both positive and negatives ones should be examined if the goal is to not dramatically change the community structure of the entire system."</u>

b. **Question 2** - "Was there an adequate data base for development of the regression model? **Yes**, the salinity, tide stage, and discharge records for gage sites in the river and the salinity measurements made by SWFWMD and other agencies provided an adequate data base for the empirical regression models developed to describe salinity in the main channel of the Homosassa River. **Yes**, for most of the biological response measures (plankton, fishes, and manatees). <u>The benthic analysis was incomplete, however. There were also considerable data sets for SAV and EAV that seemed to contradict each other."</u>

c. **Question 5** - "Was the data collection approach adequate to determine the past and present natural resources on the river system? **Yes**, with respect to flow, this approach is quite adequate to conclude that present-day spring and river discharges can be considered baseline or natural flows [also, please see response to the next question concerning water quality]. The approach assumed that present-day flow records were representative of past, or baseline, conditions based largely on the determination using a numerical groundwater flow (Basso 2010) that groundwater pumping in the Northern District of SWFWMD has reduced historical spring flows in the Homosassa River system by an insignificant amount (approximately 1 percent). With respect to many natural components, the answer was **no**. There were some data for SAV/EAV and water quality from earlier reports, but not much else besides those. Obtaining data on past resources that are not considered of economic value is often difficult. Data collected as part of the current MFL document will serve as a baseline for future modification of MFL evaluations."

WAR is of the opinion the underscored sentence above should end with 'yes'.

d. **Question 7** - "Was the weight of evidence enough to convince the panel that the recommended MFL satisfied the Florida Statute establishing the MFL requirement? Generally, **yes**, it would satisfy the statute, but because of the variability and low predictability of input data, there could be problems with the accuracy of the predictions."

e." We feel the District should take a multivariate approach as illustrated in their analyses in the appendices using Primer statistics. The goal of the MFL process is to do no "significant harm", which in many cases is a professional judgment call. The suggested multivariate approach outlined at the end of this document (The sections on Chapters 4 & 5) would improve the ability to make predictions of potential outcomes based on flow reductions. These outcomes would be more holistic and at the heart of the MFL process."

It is not clear the District has followed or responded to this recommendation and clarification is requested. Specific reference to the multivariate approach is found in "Chapters 4 & 5", pages 27-28 of the Peer Review.

Chassahowitzka MFL Peer Review - ***SCIENTIFIC REVIEW OF THE CHASSAHOWITZKA RIVER SYSTEM RECOMMENDED MINIMUM FLOWS AND LEVELS - Powell et al 2010***

"The Panel notes that reported chloride levels in the springs vary by an order of magnitude (SWFWMD 2010, Table 2.5) suggesting that the ultimate origin of their water could be from very different parts of the Floridan Aquifer. This concerns the Panel if modest changes in future aquifer pumping rates can potentially alter the amount and proportion of salts discharged from these springs. Unfortunately, the District's simple regression equation of river flow and water levels may be too inaccurate during low flow periods to adequately address the potential contribution of saline waters in spring discharges to the river. This means that the spring flow MFL may have to be adjusted in the future as the District goes forward with its regional water management duties and responsibilities."

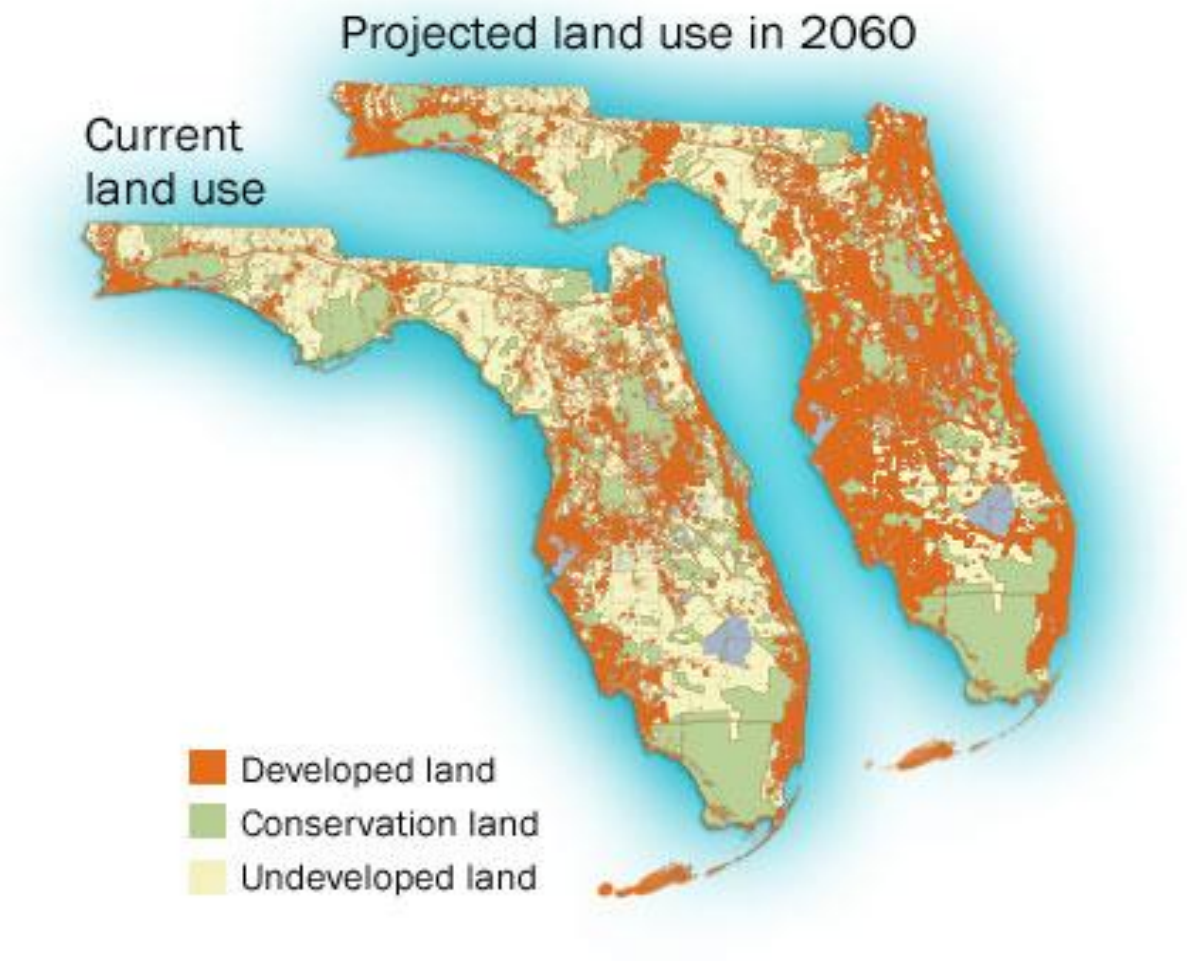
WAR suggests that such critique should prompt great caution in making this determination. The Chassahowitzka River discharges directly into a National Wildlife Refuge. Chapter 62-302.700(9)(b)(4)

DISPARITY BETWEEN DRAFT AND STAKEHOLDER RECOMMENDATIONS

The District staff has recommended in draft form, reductions of flow in the subject systems of 11% and 5% for Chassahowitzka and Homosassa Rivers respectively. Vocal Stakeholders have countered with requests for no reductions for both systems. Central to this debate is the concept of "significant harm" and degradation of Outstanding Florida Waters which are described by the State as having great value beyond that of water supply. The District has presented findings based on best available data, but questions stand about the quality and application of that information.

CONCLUSIONS AND RECOMMENDATIONS

The District is compelled to develop these rules by Florida statute and administer mandated Areas of Responsibility. One of these mandates requires the District to plan for water supply in the form of 20 year plans. The Northern Region of the District's jurisdiction is located within a larger area projected to be central to the state's next development boom (Wildlife 2060 - FWCC/1000 Friends of Florida, 2010). Notably, a great concentration of this development will occur in the Springs Coast Region and I-75 corridor north of I-4. This is presented as a graphic form below.



The question arises then; will future water use permit applications within the subject basins satisfy the public interest test found in the District's Basis of Review? The answer is not clear and should be examined in the analytical processes under discussion.

Basis of Review (BOR)

3.2.3 Public Interest Test.

In determining whether a regulated activity located in, on, or over surface waters or wetlands, is not contrary to the public interest or, if such an activity significantly degrades or is within an Outstanding Florida Water, that the regulated activity is clearly in the public interest, the District shall consider and balance, and an applicant must address, the following criteria:

a. Whether the regulated activity will adversely affect the public health, safety, or welfare or the property of others;

b. Whether the regulated activity will adversely affect the conservation of fish and wildlife, including endangered or threatened species, or their habitats;

c. Whether the regulated activity will adversely affect navigation or the flow of water or cause harmful erosion or shoaling;

d. Whether the regulated activity will adversely affect the fishing or recreational values or marine productivity in the vicinity of the activity;

e. Whether the regulated activity will be of a temporary or permanent nature;

f. Whether the regulated activity will adversely affect or will enhance significant historical and archaeological resources under the provisions of section 267.061, F.S.; and

g. The current condition and relative value of functions being performed by areas affected by the proposed regulated activity.

In very general terms we estimate the limits of water supply supported by the Drafts will allow for the withdrawal of about 11,000,000 GPD and support a per capita consumption of 150 GPD for about 79,000 residents. This represents about 54% of the current Citrus County population. In context of current state population estimates, neither the supply nor demand is truly significant. The preceding graphic (pg 9) projects population growth and regional density over the next 50 years, a parameter which greatly exceeds statutory requirements for water planning, but at the same time illustrates the severe regional demands expected on the resource. Population in Florida has increased about eightfold since 1950 and it is not unreasonable to expect another doubling over the next 50 years. If past is prologue, such speculation may be conservative in the extreme. The next questions: Will the stipulated degradation of the Springs Coast Rivers provide adequate supply for this growth and is it rational from an economic perspective? WAR is at best, skeptical on both points.

While conceptually supportive of the requirement for MFL rules for Florida water bodies, there remains an open question about what constitutes “significant harm”. The peer reviews for both Chassahowitzka and Homosassa Rivers describe the 15% of harm litmus as arbitrary or somewhat arbitrary. Peer review panels for both drafts have found the Drafts consistent with statute, yet provided technical criticism on the basis that natural systems could be better protected with revisions of process. It is our opinion this criticism should be taken to heart by the District and protection of the resource(s) be established as a first priority for economic reasons. It is not required that the District rationalize withdrawals in every MFL determination. Each of these systems has been degraded over long periods of time, and more recently they have all been designated as impaired waters despite fairly recent designation as OFWs. In fact the District has the authority to initiate a recovery action plan as a first determination.

WAR contends the District has latitude to evaluate this rule with the addition of economic impact analysis and recommends the District do so. Such constraints are required by statute to designate water bodies as OFW and it is illogical to degrade these systems without comprehensive analysis. The legal basis for doing so is

found in the act of defining "significant harm" by the District, this in lieu of statutory definition. We recommend the District incorporate economic analysis in this process for these systems, and also reconcile the rule with statutory provisions related to Outstanding Florida Waters.

There is no question whatsoever that subsequent issuance of water use permits to support residential or commercial development will contribute to increased nutrient loads at springs in the respective basins. This will occur without the development of the rule of course, but the potential for regulating such impacts by implementation of the rule is greater if such considerations are incorporated. It is not clear the District has the technical data base to evaluate such impacts on a case by case basis. If a basin supply is regulated simply as a single source it is imperative the outflow nutrient loads be analyzed. Otherwise a circumstance clearly exists that state issued permits will contribute to degradation of OFW. WAR recommends technical evaluation of this issue as a component of the definition of significant harm. A reasonable benchmark for such evaluation would exist in comparison between zero withdrawal and Draft suggested withdrawal limits of ground water in each basin.

WAR concludes that Stakeholders requests for 0% flow reduction recommendations for these reviews are justified due to questions and methodology related to the definition of significant harm. District staff has stated repeatedly that future review of these determinations may lead to modification of the rule. We are of the opinion such modification may allow for increased or decreased minimum flow authorizations. Proactive protection is cheaper than retroactive restoration. Credible objections exist and the process can be improved. Until such time as questions and/or recommendations by Peer Review Panels and Stakeholders are fully addressed, and deeper understanding of the nature of these systems is established, we respectfully do not find the present "best available data" sufficient to make a determination otherwise without putting extraordinarily valuable resources at risk.

Lastly, in this process we suggest the over-arching priority for implementation of the Rule(s) should be fidelity to the residents of the District's jurisdiction, who along with the balance of the State's populace are joint owners of the resource. Growth is certain and the District is compelled to plan for that eventuality. However, the degree to which growth occurs is somewhat speculative and uncertain. Robust and plentiful alternative water supply sources exist and in some cases have been adopted by regional water supply authorities for long range planning purposes. Florida's water resources are finite and we urge all parties to pursue economies of efficiency, alternative supplies and management philosophy intent on preserving the quality of our most valuable resource. Thank you for your review of our position on this very important matter.

Respectfully submitted for W.A.R., Inc.,

Dan Hilliard
Director
352/447-5434

CC: -See email distribution
W.A.R. Inc Executive Board
SWFWMD Staff Members
Stakeholders

From: Hope
To: Doug Leeper
Subject: Thank you. Re: Chassahowitzka Modeling Report Posted on MFLs Web Site
Date: Tuesday, October 25, 2011 11:46:10 AM

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From: Doug Leeper
To: Hope
Sent: Tuesday, October 25, 2011 8:21 AM
Subject: RE: Chassahowitzka Modeling Report Posted on MFLs Web Site

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Here's a direct link to an Adobe PDF version of the slides that I showed at the July 18th workshop. This set of slides includes my presentation on sea level rise, and should be readily viewable if you have downloaded the Adobe Reader software that is available for free on the internet.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/1968/SWFWMD_SLIDES_SHOWN_AT_MEETING_-_Springs_Coast_MFLs_Publ_Wrkshp_18jul2011.pdf

Also, here's are direct links to the slides that I presented at the September 6th and June 8th workshops.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/2002/SWFWMD_Presentation_for_September_6_2011_MFLs_Workshop.pdf
http://www.swfwmd..state.fl.us/files/database/site_file_sets/1871/Slides_Springs_Coast_MFLs_Public_Workshop_08jun2011.pdf
Note that the Springs Coast Minimum Flows and Levels Public Workshop web page also includes the slides shown by other presenters at the workshops, additional information about the workshops, and links to numerous documents containing background or supporting information.. The workshop web page may be found at:

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With regard to your questions concerning the sale of surplus lands in the St. Johns River Water Management District, I would note that I have not heard or read anything about this matter.

Finally, thanks for your words of encouragement and appreciation regarding my efforts and those of others that are directed toward development of minimum flows for the Springs Coast area. I believe that the District and interested stakeholders are benefitting from the ongoing exchange of information on this issue and also believe that the end result or our efforts will be protective of our valuable natural resources.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
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Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Hope [mailto:hopecorona@tampabay.rr.com]
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To: Doug Leeper
Subject: Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

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It's like we're back in feudal times, where the rich and powerful steal from the poor to give to the rich; continually eroding the real "wealth" and independence of the "citizens" (slaves) in what is certainly no longer a democracy. How long will the 99% allow this robbery and enslavement to continue? There is no democracy, no real "free market" when the corporate state writes all the laws to benefit the corporations, and eliminates all the laws and regulations that should protect the citizens and the collective resources of the land?

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I still believe that, working together, we (the citizens and the government) can have an "outcome" that, like Boyd Blihovde suggested, "you (SWFWMD) can live with and the people and wildlife can live with."

I appreciate your hard work; your exemplification of the "Sunshine law," and your willingness to work with "we the people" in the pursuit of environmental and civil justice.

Thanks again,
Hope

----- Original Message -----
From: Doug Leeper
To: kwatson@hsweng.com ; Al Grubman (grubman1@gmail.com) ; Bill Geiger (bgeiger@cityofbrooksville.us) ; Bill Pouder (bill.pouder@myfwc.com) ; Boyd Blihovde (Boyd_Blihovde@fws.gov) ; Brad Rimbey (BWR.CRRC@tampabay.rr.com) ; Brent Whitley (brentwhitley@sierra-properties.com) ; Brockway, Alys (abrockway@co.hernando.fl.us) ; Dennis D. Dutcher (Dennis3ds@aol.com) ; Frank DiGiovanni (administration@inverness-fl.gov) ; Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us) ; Helen Spive ; Hilliard, Dan (2buntings@comcast.net) ; Hoehn, Ted ; Hope Corona (hopecorona@tampabay.rr.com) ; Jim Farley (jfarley682@aol.com) ; Katie Tripp (ktripp@savethemanatee.org) ; Norman Hopkins (norman@amyhrf.org) ; Rebecca Bays (rebecca.bays@bocc.citrus.fl.us) ; Richard Kane (rkane@usgs.gov) ; Richard Radacky (rradacky@cityofbrooksville.us) ; Ron Miller (rmille76@tampabay.rr.com) ; Sarah Tenison (cityofweekiwachee@yahoo.com) ; Sulllivan, Jack (jsullivan@carltonfields.com) ; Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us) ; Whitey Markle (whmarkle@gmail.com) ; (janicehowie@aol.com) ; Abdon Sidibie (asidibie@chronicle.online.com) ; Alex McPherson (aamcpherson@msn.com) ; Ann - 2 Hodgson (ahodgson@gmail.com) ; Ann Hodgson (ahodgson@audubon.org) ; Bernard Berauer (bfberauer@aol.com) ; Beverly Overa (boverly@tampabay.rr.com) ; Bill Garvin (wgarvin@tampabay.rr.com) ; Bob Caldwell (Bobcaldwell51@yahoo.com) ; Brack Barker (brack154@msn.com) ; Carl Mattthai (thebabesmimi@gmail.com) ; Casey, Emily (fcnwr@atlantic.net) ; Charles Dean (dean.charles.web@flsenate.gov) ; Charles Stonerock (katcha.stonerock3@gmail.com) ; Chris Safos (chrissafos@embarqmail.com) ; Czerwinski, Mike (mczerwin@tampabay.rr.com) ; Darlene Herth (2cetechnology21@gmail.com) ; Darrell

Snedecor (president@citruscountyaudubon.com) ; Don Hiers (dhiers3@gmail.com) ; Douglas Dame (doug_dame@yahoo.com) ; Elaine Luther (barneyandcap@hotmail.com) ; Emily Casey (ecasey21@hotmail.com) ; Emma Knight (eknight@wetlandsolutionsinc.com) ; George Harbin (gharbin@tampabay.rr.com) ; George McClog (classof47@gmail.com) ; Gorgon O'Connor (gorgon_o@yahoo.com) ; Harry Steiner (harry109@aol.com) ; Jack Calbeck (calbeckj@citrus.k12.fl.us) ; jane Perrin (jcsperrinmd@sbcglobal.net) ; Jerry Morton (JerrMorton@aol.com) ; Jessie Gourlie (gourliej@thirdplanetwind.com) ; Jim Collins (jimmiekey22@yahoo.com) ; Jimmie Smith (Jimmie..Smith@myfloridahouse.gov) ; Joe Calamari ; John Lord (jclord109@yahoo.com) ; John Mayo (freedomway1@gmail.com) ; Karen Johnstone (kjohns213@sbcglobal.net) ; Kim Caldwell (caldwell.kimberly@yahoo.com) ; Kim Dinkins (kim.dinkins@marioncountyfl.org) ; Linda Pierce (tpierce35@tampabay.rr.com) ; Linda Vanderveen (hernandoaudubon@yahoo.com) ; Mary Anne Lynn (mlynn1978@tampabay.rr.com) ; Matthew Corona (mcorona1@tampabay.rr.com) ; Max Rhinesmith (rhinesmith@webtv.net) ; Amber Breland ; Andy Houston (ahouston@crystalriverfl.org) ; Art Yerian (Al.Yerian@dep.state.fl.us) ; Ben Weiss ; Beth Hovinde ; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us) ; Courtney Edwards (cedwards@savethemanatee.org) ; Dale Jones (Jones@MyFWC.com) ; Dana Bryan (dana.bryan@dep.state.fl.us) ; Darrell Snedecor ; David Hamilton (countyadministrator@hernandocounty.us) ; David Hankla (david_hankla@fws.gov) ; Don Wright (wright@sura.org) ; Dusty McDevitt (mcdevitt@usgs.gov) ; Ed Call (marvin.call@MyFWC.com) ; Eric Nagid (eric.nagid@MyFWC.com) ; FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com) ; J. J. Kenney (jj.kenney@bocc.citrus.fl.us) ; Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us) ; Joyce_Kleen@fws.gov ; Kandi Harper (kandi.harper@bocc.citrus.fl.us) ; Keith Ramos (Keith.Ramos@fws.gov) ; Kent Smith (kent.smith2@myfwc.com) ; Kevin Grimsley (kjgrims@usgs.gov) ; Michael Lusk (Michael_Lusk@fws.gov) ; Mitchell Newberger (mnewberger@verizon.net) ; Nick Robbins (Nick.Robbins@dep.state.fl.us) ; Nicole Adimey (Nicole_Adimey@fws.gov) ; Paul Thomas (paulw.thomas@MyFWC.com) ; Ron Mezich (ron.mezich@MyFWC.com) ; Shelly Yaun (shelly.yaun@dep.state.fl.us) ; Toby Brewer (Toby.Brewer@dep.state.fl.us) ; Tracy Colson ; Wallace, Traci ; Adkins, Jim ; Bitter, Jim ; Bryant, Richard ; Cantero, Vince ; Carpenter, Paul ; Daniels, Chase ; Dueker, Duane ; Gramling, Hugh ; Harrelson, Cathy ; Hubbell, Pete ; Johnson, Eric ; Johnson, Martyn ; Keim, Robert ; Kline, Allen ; Knight, Bob ; Knight, Robert ; Knudson, Ross ; Overa, Tom ; Owen, Rick ; Parrow, Liz ; Rolf Auermann (rauerman@tampabay.rr.com) ; Rusnak, Teddi ; Watkins, Priscilla ; Watrous, Russell ; Wilson, Roger
Cc: Barbara Matrone ; Cara S. Martin ; Chris Zajac ; Darcy A. Brune ; Dave Dewitt ; Doug Leeper ; Gary E. Williams ; Jay Yingling ; Karen Lloyd ; Ken Weber ; Lou Kavouras ; Mark Barcelo ; Mark Hammond ; Marty Kelly ; Mike Heyl ; Paul Williams ; Robyn O. Felix ; Ron Basso ; Sid Flannery ; Veronica Craw ; Xinjian Chen ; Yassert Gonzalez
Sent: Monday, October 24, 2011 7:44 AM
Subject: Chassahowitzka Modeling Report Posted on MFLs Web Site

Greetings:

I'm writing today to let you know that a report on salinity habitat modeling for the Chassahowitzka River system based on sea level conditions for year 2030 has been posted to the Southwest Florida Water Management District's Springs Coast Minimum Flows and Levels Public Workshop web page at:

http://www.WaterMatters.org/SpringsCoastMFL

The report is titled *Sea Level Rise Simulations of the Chassahowitzka River – Part Five*, and was prepared for the District by Dynamic Solutions, LLC.

A similar report for the Homosassa River system is being completed and will be posted soon.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

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(Email Guard: 7.0.0.26, Virus/Spyware Database: 6.18580)
http://www.pctools.com
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From: Doug Leeper
To: "Hope"
Cc: Marty Kelly; Mike Heyl
Subject: Response to Question about Sea Level Rise Modeling
Date: Wednesday, October 26, 2011 9:54:04 AM

Hope:

I'm glad we were able to talk this morning about the recently completed sea level rise and salinity habitat modeling for the Chassahowitzka River system.

I hope our discussion also addressed the question posed in your recent e-mail. The slides you refer to from my July 18th presentation were shown to provide a conceptual overview for how the District's modeling of future sea level rise conditions could be factored into minimum flow recommendations. The basic idea is to determine allowable percent of flow reductions based on existing baseline conditions and baseline conditions associated with various sea level rise scenarios to identify an appropriate percent of flow reduction that may be incorporated into our minimum flow recommendation.

See you later today.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
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doug.leeper@watermatters.org

From: Hope [mailto:hopecorona@tampabay.rr.com]
Sent: Tuesday, October 25, 2011 11:46 AM
To: Doug Leeper
Subject: Thank you. Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

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> To: Hope
> Sent: Tuesday, October 25, 2011 8:21 AM
> Subject: RE: Chassahowitzka Modeling Report Posted on MFLs Web Site
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----- Original Message -----
From: Doug Leeper
To: kwatson@hsweng.com ; Al Grubman (grubman1@gmail.com) ; Bill Geiger (bgeiger@cityofbrooksville.us) ; Bill Pouder (bill.pouder@myfwc.com) ; Boyd Blihovde (Boyd_Blihovde@fws.gov) ; Brad Rimbey (BWR.CRRC@tampabay.rr.com) ; Brent Whitley (brentwhitley@sierra-properties.com) ; Brockway, Alys (abrockway@co.hernando.fl.us) ; Dennis D. Dutcher (Dennis3ds@aol.com) ; Frank DiGiovanni (administration@inverness-fl.gov) ; Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us) ; Helen Spive ; Hilliard, Dan (2buntings@comcast.net) ; Hoehn, Ted ; Hope Corona (hopecorona@tampabay.rr.com) ; Jim Farley (jfarley682@aol.com) ; Katie Tripp (ktripp@savethemanatee.org) ; Norman Hopkins (norman@amyhrf.org) ; Rebecca Bays (rebecca.bays@bocc.citrus.fl.us) ; Richard Kane (rkane@usgs.gov) ; Richard Radacky (rradacky@cityofbrooksville.us) ; Ron Miller (rmille76@tampabay.rr.com) ; Sarah Tenison (cityofweekiwachee@yahoo.com) ; Sullivan, Jack (jsullivan@carltonfields.com) ; Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us) ; Whitey Markle (whmarkle@gmail.com) ; (janicehowie@aol.com) ; Abdon Sidibie (asidibie@chronicle.online.com) ; Alex McPherson (aamcpherson@msn.com) ; Ann - 2 Hodgson (ahodgson@gmail.com) ; Ann Hodgson (ahodgson@audubon.org) ; Bernard Berauer (bfberauer@aol.com) ; Beverly Overa (boverly@tampabay.rr.com) ; Bill Garvin (wgarvin@tampabay.rr.com) ; Bob Caldwell (Bobcaldwell51@yahoo.com) ; Brack Barker (brack154@msn.com) ; Carl Mattthai (thebabesmimi@gmail.com) ; Casey, Emily (fcnwr@atlantic.net) ; Charles Dean (dean.charles.web@flsenate.gov) ; Charles Stonerock (katcha.stonerock3@gmail.com) ; Chris Safos (chrissafos@embarqmail.com) ; Czerwinski, Mike (mczerwin@tampabay.rr.com) ; Darlene Herth (2cetechnology21@gmail.com) ; Darrell Snedecor (president@citruscountyaudubon.com) ; Don Hiers (dhiers3@gmail.com) ; Douglas Dame (doug_dame@yahoo.com) ; Elaine Luther (barneyandcap@hotmail.com) ; Emily Casey (ecasey21@hotmail.com) ; Emma Knight (eknight@wetlandsolutionsinc.com) ; George Harbin (gharbin@tampabay.rr.com) ; George McClog (classof47@gmail.com) ; Gorgon O'Connor (gorgon_o@yahoo.com) ; Harry Steiner (harry109@aol.com) ; Jack Calbeck (calbeckj@citrus.k12.fl.us) ; jane Perrin (jcsperrinmd@sbcglobal.net) ; Jerry Morton (JerrMorton@aol.com) ; Jessie Gourlie (gourliej@thirdplanetwind.com) ; Jim Collins (jimmiekey22@yahoo.com) ; Jimmie Smith (Jimmie..Smith@myfloridahouse.gov) ; Joe Calamari ; John Lord (jclord109@yahoo.com) ; John Mayo (freedomway1@gmail.com) ; Karen Johnstone (kjohns213@sbcglobal.net) ; Kim Caldwell (caldwell.kimberly@yahoo.com) ; Kim Dinkins (kim.dinkins@marioncountyfl.org) ; Linda Pierce (tpierce35@tampabay.rr.com) ; Linda Vanderveen (hernandoaudubon@yahoo.com) ; Mary Anne Lynn (mlynn1978@tampabay.rr.com) ; Matthew Corona (mcorona1@tampabay.rr.com) ; Max Rhinesmith (rhinesmith@webtv.net) ; Amber Breland ; Andy Houston (ahouston@crystalriverfl.org) ; Art Yerian (Al.Yerian@dep.state.fl.us) ; Ben Weiss ; Beth Hovinde ; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us) ; Courtney Edwards (cedwards@savethemanatee.org) ; Dale Jones (Jones@MyFWC.com) ; Dana Bryan (dana.bryan@dep.state.fl.us) ; Darrell Snedecor ; David Hamilton (countyadministrator@hernandocounty.us) ; David Hankla (david_hankla@fws.gov) ; Don Wright (wright@sura.org) ; Dusty McDevitt (mcdevitt@usgs.gov) ; Ed Call (marvin.call@MyFWC.com) ; Eric Nagid (eric.nagid@MyFWC.com) ; FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com) ; J. J. Kenney (jj.kenney@bocc.citrus.fl.us) ; Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us) ; Joyce_Kleen@fws.gov ; Kandi Harper (kandi.harper@bocc.citrus.fl.us) ; Keith Ramos (Keith.Ramos@fws.gov) ; Kent Smith (kent.smith2@myfwc.com) ; Kevin Grimsley (kjgrims@usgs.gov) ; Michael Lusk (Michael_Lusk@fws.gov) ; Mitchell Newberger (mnewberger@verizon.net) ; Nick Robbins (Nick.Robbins@dep.state.fl.us) ; Nicole Adimey (Nicole_Adimey@fws.gov) ; Paul Thomas (paulw.thomas@MyFWC.com) ; Ron Mezich (ron.mezich@MyFWC.com) ; Shelly Yaun (shelly.yaun@dep.state.fl.us) ; Toby Brewer (Toby.Brewer@dep.state.fl.us) ; Tracy Colson ; Wallace, Traci ; Adkins, Jim ; Bitter, Jim ; Bryant, Richard ; Cantero, Vince ; Carpenter, Paul ; Daniels, Chase ; Dueker, Duane ; Gramling, Hugh ; Harrelson, Cathy ; Hubbell, Pete ; Johnson, Eric ; Johnson, Martyn ; Keim, Robert ; Kline, Allen ; Knight, Bob ; Knight, Robert ; Knudson, Ross ; Overa, Tom ; Owen, Rick ; Parrow, Liz ; Rolf Auermann (rauerman@tampabay.rr.com) ; Rusnak, Teddi ; Watkins, Priscilla ; Watrous, Russell ; Wilson, Roger
Cc: Barbara Matrone ; Cara S. Martin ; Chris Zajac ; Darcy A. Brune ; Dave Dewitt ; Doug Leeper ; Gary E. Williams ; Jay Yingling ; Karen Lloyd ; Ken Weber ; Lou Kavouras ; Mark Barcelo ; Mark Hammond ; Marty Kelly ; Mike Heyl ; Paul Williams ; Robyn O. Felix ; Ron Basso ; Sid Flannery ; Veronica Craw ; Xinjian Chen ; Yassert Gonzalez
Sent: Monday, October 24, 2011 7:44 AM
Subject: Chassahowitzka Modeling Report Posted on MFLs Web Site

Greetings:

I'm writing today to let you know that a report on salinity habitat modeling for the Chassahowitzka River system based on sea level conditions for year 2030 has been posted to the Southwest Florida Water Management District's Springs Coast Minimum Flows and Levels Public Workshop web page at:

http://www.WaterMatters.org/SpringsCoastMFL

The report is titled *Sea Level Rise Simulations of the Chassahowitzka River – Part Five*, and was prepared for the District by Dynamic Solutions, LLC.

A similar report for the Homosassa River system is being completed and will be posted soon.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

Citrus County Chronicle - Opinion - Letter
Oct. 26, 2011

Thanks, Chronicle

As president of the Homosassa River Alliance, I want to thank the Chronicle for its excellent coverage of Save Our Waters Week and its recent editorial pointing out the frightening assault on our local waterways. Let us hope that they will serve as a wake-up call to all of our citizens of what is going on.

I have attended all of the stakeholders meetings currently being conducted by the **Southwest Florida Water Management District** in regard to minimum flows and levels on our local waterways. It is like following Alice through her looking glass, where up becomes down, black becomes white and fiction becomes fact.

We are being asked to believe that it is OK to do further damage to already seriously impaired waterways; it is OK to ignore existing laws which say that no further damage can be done to these waterways; it is OK to ignore the fact that two primary fish species, the black bass and the bream, have completely disappeared from the Homosassa River in the last five years; it is OK to ignore the vast body of evidence that tells us these water bodies, which are the life blood of recreational and economic life, are being systematically destroyed for the benefit of outside interests which have no other interest in our community than to drain the water right out from under us.

Strangely silent in all of this either individually or as a body is our Board of County Commissioners. Please keep up your good work. The bully pulpit is yours.

Jim C. Bitter
Homosassa

Citrus County Chronicle - Opinion - Letter
Oct. 26, 2011

Weigh in on water

At 1:30 p.m. Wednesday, Oct 26, the **Southwest Florida Water Management District** is holding a Spring Coast Minimum Flows and Levels Public Workshop to discuss development or re-evaluation of minimum flows and levels for the Chassahowitzka, Crystal, Homosassa and Weeki Wachee river systems. The meeting will be held in Room 280 at the Lecanto Government Building.

SWFWMD has invited the stakeholders to bring experts to discuss this project. In that regard Brad Rimby has invited Dr. Todd Kincad and Dr.Robert Knight, both experts in local hydrology and our coastal springs, to make the case for the protecting our springs and rivers. The public will also participate in the following discussions.

This is your chance to let your voice be heard.

Hope to see you there.

Ron Miller
Homosassa

From: Hope
To: Doug Leeper
Subject: Chassahowitzka Re: Response to Question about Sea Level Rise Modeling
Date: Wednesday, October 26, 2011 11:10:15 AM

Thanks Doug, I appreciate your time in helping me correctly read the charts in the Dynamic Solutions report, which, as we both agree, does not take into consideration the probable changes in spring flow chemistry, nor the potential effects of sea level rise on the surrounding fresh water ecosystems (the spring run systems, hydric hammocks, riverine swamps, deciduous hardwoods, littoral zones, and other primarily fresh water systems affected by saturated soils and chemistry/biology thereof).

I am presently reading WAR's 25 October 2011 "MFL Position - final," and see that they raise similar concerns about the current MFL process's ability to monitor and predict changes to our springs coasts ecosystems.

I gather that, based on what you're reading in Mr. Knight's outline, that he too may have some suggestions regarding on-going monitoring of the "health" of the springs coast ecosystems.

I don't think there have been any comprehensive field investigations of the Chassahowitzka system that have documented baseline ecological community compositions and present conditions. I think this needs to be done. Chassahowitzka is a very diverse and complex ecosystem, with numerous micro-communities that inter-relate. Perhaps a few key "keystone" habitats within our greater Chassahowitzka ecosystem could be identified and monitored annually or semi-annually in order to accurately report any changes to the system.

I think there needs to be some kind of **biological survey and mapping system** in place that could be **referenced, updated, and monitored**. I'm thinking GIS with overlays and links to supporting documentation. Dan at FNAI tells me there are few "incidence reports" for our area, which speaks to the lack of biological surveying, investigation, and reporting yet done for this amazingly diverse and listed species-rich area.

Even the "lay people" in our Chassahowitzka community are noticing visible changes in the biological composition of some of the most sensitive areas of our tenuous fresh water habitats. Rapid changes in shoreline and canopy vegetation on Potter Creek are obvious. Per our previous conversations, perhaps analysis of soils chemistry and microbiology could reveal some of the underlying, and perhaps more mathematically definable, changes in chemistry and salinity to these saturated soils that provoke the visual clues, so that they could better "plug into" the existing models presently available. I think that there may be a way, in the future, to relate the actual, observable changes in habitat to the models you're using IF we do the initial documentation and can show a relationship between actual habitat (soils, vegetation, canopy) in the terrestrial communities surrounding the spring runs and river, to the existing data which is (sadly) primarily main channel waters.

I envision a GIS overlay, similar to but better than the LULC (land use land cover) or Soils analysis layers that would accurately show the habitats and micro-habitats in this incredibly diverse Chassahowitzka River and Coastal Swamps Sanctuary ecosystem. Similar to the Property Appraiser data base programs, if the habitats were monitored annually or even seasonally, then one could use the system to "turn on" layers that would show "historic" as well as "present" conditions; for example one might chose the "July 2011" map, or the "February 2012" map, and turn on desired "layers" which might include "listed species occurrences" or "salinity" or "SO4 levels in soils" or "mast production at monitored stations" or whatever other data the various contributors to the process may feel are relevant to the monitoring and maintenance of a healthy springs coast ecosystem.

It's do-able. As a former field biologist for lands slated for development, I am familiar with many of the tools and processes that would be required, and it's not terribly expensive, even in the private sector. :)

Just my thoughts.

Thanks for listening. I appreciate your calmness, compassion, and kind treatment of the "public" (people like me who occasionally call SWFWMD looking for.....hope.)

Thanks again,

bambi-ologist at large,
Hope Corona

----- Original Message -----
From: Doug Leeper
To: Hope
Cc: Marty Kelly ; Mike Heyl
Sent: Wednesday, October 26, 2011 9:54 AM
Subject: Response to Question about Sea Level Rise Modeling

Hope:

I'm glad we were able to talk this morning about the recently completed sea level rise and salinity habitat modeling for the Chassahowitzka River system.

I hope our discussion also addressed the question posed in your recent e-mail. The slides you refer to from my July 18th presentation were shown to provide a conceptual overview for how the District's modeling of future sea level rise conditions could be factored into minimum flow recommendations. The basic idea is to determine allowable percent of flow reductions based on existing baseline conditions and baseline conditions associated with various sea level rise scenarios to identify an appropriate percent of flow reduction that may be incorporated into our minimum flow recommendation.

See you later today.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Hope [mailto:hopecorona@tampabay..rr.com]
Sent: Tuesday, October 25, 2011 11:46 AM
To: Doug Leeper
Subject: Thank you. Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

Thanks Doug. It's downloading for me in pdf. Got it.
So, viewing the sea level slides, does it not indicate that a 4% to 5% flow reduction would cause the 15% harm if sea level rise is as predicted?
h

----- Original Message -----
From: Doug Leeper
To: Hope
Sent: Tuesday, October 25, 2011 8:21 AM
Subject: RE: Chassahowitzka Modeling Report Posted on MFLs Web Site

Hope:

Here's a direct link to an Adobe PDF version of the slides that I showed at the July 18th workshop. This set of slides includes my presentation on sea level rise, and should be readily viewable if you have downloaded the Adobe Reader software that is available for free on the internet.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/1968/SWFWMD_SLIDES_SHOWN_AT_MEETING_-_Springs_Coast_MFLs_Publ_Wrkshp_18jul2011.pdf

Also, here's are direct links to the slides that I presented at the September 6th and June 8th workshops.

http://www.swfwmd.state.fl.us/files/database/site_file_sets/2002/SWFWMD_Presentation_for_September_6_2011_MFLs_Workshop.pdf
http://www.swfwmd..state.fl.us/files/database/site_file_sets/1871/Slides_Springs_Coast_MFLs_Public_Workshop_08jun2011.pdf
Note that the Springs Coast Minimum Flows and Levels Public Workshop web page also includes the slides shown by other presenters at the workshops, additional information about the workshops, and links to numerous documents containing background or supporting

information.. The workshop web page may be found at:

http://www.WaterMatters.org/SpringsCoastMFL

With regard to your questions concerning the sale of surplus lands in the St.. Johns River Water Management District, I would note that I have not heard or read anything about this matter.

Finally, thanks for your words of encouragement and appreciation regarding my efforts and those of others that are directed toward development of minimum flows for the Springs Coast area. I believe that the District and interested stakeholders are benefitting from the ongoing exchange of information on this issue and also believe that the end result or our efforts will be protective of our valuable natural resources.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Hope [mailto:hopecorona@tampabay..rr.com]
Sent: Tuesday, October 25, 2011 3:14 AM
To: Doug Leeper
Subject: Re: Chassahowitzka Modeling Report Posted on MFLs Web Site

Hi Doug,

I think I finally got my computer able to "surf" the web again (apparently I am missing some critical "add-ons" or something). I was so bummed that my systemic poison ivy kept me from the last MFL meeting; everyone that I know who attended the last MFL meeting told me that "Doug's sea level rise presentation is a must see." I've been trying to locate it on the site, but I can't find it. Could you send me the direct link to your presentation? Is it a slide show? Do I need to download a special program to view it?

On a personal note: I am discouraged nearly to the point of despondency, with the in-our-face corporate *coup d'état* of our state government. When the government is oligarchy, how can the citizen hope to appeal? I just read a forwarded email from some folks in the SRWMD area who are reporting that proceeds from the sale of SRWMD "surplus" lands are being used to fund shady purchases of "conservation easements" at above market prices on lands belonging to wealthy, connected friends of the current political regime. Have you heard anything about this? Is it true?

It's like we're back in feudal times, where the rich and powerful steal from the poor to give to the rich; continually eroding the real "wealth" and independence of the "citizens" (slaves) in what is certainly no longer a democracy. How long will the 99% allow this robbery and enslavement to continue? There is no democracy, no real "free market" when the corporate state writes all the laws to benefit the corporations, and eliminates all the laws and regulations that should protect the citizens and the collective resources of the land?

Thanks, again, for listening....and for sending me the link to your sea level rise presentation from the meeting I missed. I feel like Job sometimes; the oozing poison ivy "pox" dripping down over my swollen shut eyes and bandaged-wrapped legs seemed almost "biblical" in its ability to "redirect" my activities and keep me trapped and isolated for a while. The next "plague" of computer crashes seemed an additional "message" from the cosmos to adjust my "focus" in life.

So, what's the cosmos saying to Hope, "Greed always wins....just stop trying.....all hope is lost?" I resist that message; I believe that there are more "good" and "honest" people than "greedy" and "evil" ones. I have faith that truth will be uncovered, criminal deeds revealed, and justice will prevail. Florida's miserable 4 years "wandering" in the desert of despotism, will end; we'll recover our stolen lands, banish our despots, and embark upon a more egalitarian time with ethical leaders whose decisions are based on the will of the electorate (not the wealthy or corporate benefactors), and the laws are crafted to protect (not exploit) our natural resources and citizens. Historically, good usually prevails: Moses led the Israelites out of Egyptian slavery; the Holocaust ended; most tyrants are deposed; most corrupt governments are overthrown; it's just a matter of time....and the rise of the "Occupy Florida" movement gives me hope that the fed-up electorate are beyond ready to provoke change and

reclaim their rights as citizens of a democracy.

Feel free to say something encouraging and optimistic.....you seem like you might be one of the "good" people, but I also fear that you, like many people in state government, may be being pressured to "toe the party line," and defend a process that is fundamentally corrupt; forced to use data that is flawed and incomplete, in order to "arrive" at a pre-determined result or "target number" demanded by those poised to exploit the resource for their own profit. This thing doesn't have to be a "run away train." Together, the "good" and "honest" people can stand up against the corrupt, wealthy, and powerful. It's "*our*" Florida to save. We *can* save it together. The greedy and powerful don't have to win here.

I still believe that, working together, we (the citizens and the government) can have an "outcome" that, like Boyd Blihovde suggested, "you (SWFWMD) can live with and the people and wildlife can live with."

I appreciate your hard work; your exemplification of the "Sunshine law," and your willingness to work with "we the people" in the pursuit of environmental and civil justice.

Thanks again,
Hope

----- Original Message -----
From: Doug Leeper
To: kwatson@hsweng.com ; Al Grubman (grubman1@gmail.com) ; Bill Geiger (bgeiger@cityofbrooksville.us) ; Bill Pouder (bill.pouder@myfwc.com) ; Boyd Blihovde (Boyd_Blihovde@fws.gov) ; Brad Rimbey (BWR.CRRC@tampabay.rr.com) ; Brent Whitley (brentwhitley@sierra-properties.com) ; Brockway, Alys (abrockway@co.hernando.fl.us) ; Dennis D. Dutcher (Dennis3ds@aol.com) ; Frank DiGiovanni (administration@inverness-fl.gov) ; Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us) ; Helen Spive ; Hilliard, Dan (2buntings@comcast.net) ; Hoehn, Ted ; Hope Corona (hopecorona@tampabay.rr.com) ; Jim Farley (jfarley682@aol.com) ; Katie Tripp (ktripp@savethemanatee.org) ; Norman Hopkins (norman@amyhrf.org) ; Rebecca Bays (rebecca.bays@bocc.citrus.fl.us) ; Richard Kane (rkane@usgs.gov) ; Richard Radacky (rradacky@cityofbrooksville.us) ; Ron Miller (rmille76@tampabay.rr..com) ; Sarah Tenison (cityofweekiwachee@yahoo.com) ; Sulllivan, Jack (jsullivan@carltonfields.com) ; Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us) ; Whitey Markle (whmarkle@gmail.com) ; (janicehowie@aol.com) ; Abdon Sidibie (asidibie@chronicle.online.com) ; Alex McPherson (aamcpherson@msn.com) ; Ann - 2 Hodgson (ahodgson@gmail.com) ; Ann Hodgson (ahodgson@audubon.org) ; Bernard Berauer (bfberauer@aol.com) ; Beverly Overa (boverly@tampabay.rr.com) ; Bill Garvin (wgarvin@tampabay.rr.com) ; Bob Caldwell (Bobcaldwell51@yahoo.com) ; Brack Barker (brack154@msn.com) ; Carl Mattthai (thebabesmimi@gmail.com) ; Casey, Emily (fcnwr@atlantic.net) ; Charles Dean (dean.charles.web@flsenate.gov) ; Charles Stonerock (katcha.stonerock3@gmail.com) ; Chris Safos (chrissafos@embarqmail.com) ; Czerwinski, Mike (mczerwin@tampabay.rr.com) ; Darlene Herth (2cetechnology21@gmail.com) ; Darrell Snedecor (president@citruscountyaudubon.com) ; Don Hiers (dhiers3@gmail.com) ; Douglas Dame (doug_dame@yahoo.com) ; Elaine Luther (barneyandcap@hotmail.com) ; Emily Casey (ecasey21@hotmail.com) ; Emma Knight (eknight@wetlandsolutionsinc.com) ; George Harbin (gharbin@tampabay.rr.com) ; George McClog (classof47@gmail.com) ; Gorgon O'Connor (gorgon_o@yahoo.com) ; Harry Steiner (harry109@aol.com) ; Jack Calbeck (calbeckj@citrus.k12.fl.us) ; jane Perrin (jcsperrinmd@sbcglobal.net) ; Jerry Morton (JerrMorton@aol.com) ; Jessie Gourlie (gourliej@thirdplanetwind.com) ; Jim Collins (jimmiekey22@yahoo.com) ; Jimmie Smith (Jimmie..Smith@myfloridahouse.gov) ; Joe Calamari ; John Lord (jclord109@yahoo.com) ; John Mayo (freedomway1@gmail.com) ; Karen Johnstone (kjohns213@sbcglobal.net) ; Kim Caldwell (caldwell.kimberly@yahoo.com) ; Kim Dinkins (kim.dinkins@marioncountyfl.org) ; Linda Pierce (tpierce35@tampabay.rr.com) ; Linda Vanderveen (hernandoaudubon@yahoo.com) ; Mary Anne Lynn (mlynn1978@tampabay.rr.com) ; Matthew Corona (mcorona1@tampabay.rr.com) ; Max Rhinesmith (rhinesmith@webtv.net) ; Amber Breland ; Andy Houston (ahouston@crystalriverfl.org) ; Art Yerian (Al.Yerian@dep.state.fl..us) ; Ben Weiss ; Beth Hovinde ; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us) ; Courtney Edwards (cedwards@savethemanatee.org) ; Dale Jones (Jones@MyFWC.com) ; Dana Bryan (dana.bryan@dep.state.fl.us) ; Darrell Snedecor ; David Hamilton (countyadministrator@hernandocounty.us) ; David Hankla (david_hankla@fws.gov) ; Don Wright (wright@sura.org) ; Dusty McDevitt (mcdevitt@usgs.gov) ; Ed Call (marvin.call@MyFWC.com) ; Eric Nagid (eric.nagid@MyFWC.com) ; FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com) ; J. J. Kenney (jj.kenney@bocc.citrus.fl.us) ; Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us) ; Joyce_Kleen@fws.gov ; Kandi Harper (kandi.harper@bocc.citrus.fl.us) ; Keith Ramos (Keith.Ramos@fws.gov) ; Kent Smith (kent.smith2@myfwc.com) ; Kevin Grimsley (kjgrims@usgs.gov) ; Michael Lusk (Michael_Lusk@fws.gov) ; Mitchell Newberger (mnewberger@verizon.net) ; Nick Robbins (Nick.Robbins@dep.state.fl.us) ; Nicole Adimey (Nicole_Adimey@fws.gov) ; Paul Thomas (paulw.thomas@MyFWC.com) ; Ron Mezich (ron.mezich@MyFWC.com) ; Shelly Yaun (shelly.yaun@dep.state.fl.us) ; Toby Brewer (Toby.Brewer@dep.state.fl.us) ; Tracy Colson ; Wallace, Traci ; Adkins, Jim ; Bitter, Jim ; Bryant, Richard ; Cantero, Vince ; Carpenter, Paul ; Daniels, Chase ; Dueker, Duane ; Gramling, Hugh ; Harrelson, Cathy ; Hubbell, Pete ; Johnson, Eric ; Johnson, Martyn ; Keim, Robert ; Kline, Allen ; Knight, Bob ; Knight, Robert ; Knudson, Ross ; Overa, Tom ; Owen, Rick ; Parrow, Liz ; Rolf Auermann (rauerman@tampabay.rr.com) ; Rusnak, Teddi ; Watkins, Priscilla ; Watrous, Russell ; Wilson, Roger
Cc: Barbara Matrone ; Cara S., Martin ; Chris Zajac ; Darcy A. Brune ; Dave Dewitt ; Doug Leeper ; Gary E. Williams ; Jay Yingling ; Karen Lloyd ; Ken Weber ; Lou Kavouras ; Mark Barcelo ; Mark Hammond ; Marty Kelly ; Mike Heyl ; Paul Williams ; Robyn O. Felix ; Ron Basso ; Sid Flannery ; Veronica Craw ; Xinjian Chen ; Yassert Gonzalez
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The report is titled *Sea Level Rise Simulations of the Chassahowitzka River – Part Five*, and was prepared for the District by Dynamic

Solutions, LLC.

A similar report for the Homosassa River system is being completed and will be posted soon.

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Resource Projects Department, Southwest Florida Water Management District
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Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From:	Alan Martyn Johnson
To:	J Weaver
Cc:	R Rodriguez; Doug Leeper
Subject:	RE: Planned evaluation
Date:	Friday, October 28, 2011 8:42:53 AM

Mr. Weaver,
Thank you for your e-mail.
This is a quantum leap from the position Mr. Rodriguez expressed in his August 23 letter to Doug Leeper.

I appreciate you taking the time to review the questions I have raised and as a result deciding to use valuable funds on what appears to be an extensive and formal review.

Hopefully, the complexities will not be as great as they appear and the expenditure will be less than you anticipate.

For example:

1. SE Fork 02310688
   I assume you, USGS, have reviewed the data from the Acoustic unit installed early September. This must be providing some insight into the accuracy of the calculated discharge methodology which was the subject of my concern in my public input statement for the July 18, 2011 Working Group Meeting. Hopefully, this will simplify the need for extensive outside review.

   I have noted since the unit became operational the calculated discharge for the 30 minutes after each hour (15 minute after each hour I assume is the Velocity Meter transmission) is using a ds/dt for a 30 minute interval which causes some very high and very low numbers from the 418.14 multiplier e.g.
   10/18 13:30 discharge 120cfs resulting from a 0.16 change in gage height, and
   10/27 02:30 discharge -1.1 cfs resulting from a 0.14 change in gage height

2. Homosassa River at Homosassa 02310700
   Surely it does not take an outside review to find where the equation generating Vm from Vi came from and if it is valid or not. With all the gage sites USGS has with stream velocity measurement there has to be an easy explanation. *Take the Bagley Cove site on Crystal River 02310747 there is no manipulation of the velocity. But, I do understand that a review is scheduled/underway for this site.*

Those were the concerns that were in my statement. Open and honest dialogue should have had those points settled by now. Unfortunately Mr. Rodriguez letter of August 23, 2011 was counter productive.
You have some good people in the Tampa Office they may need some direction and ability regarding how to handle critique; questions honestly ask and answered.

As you are well aware, discharge data for the Homosassa River along with other rivers in the area is being used to make major decisions regarding the environment and water withdrawals from the aquifer. Southwest Florida Water Management District (SWFWMD) has given the data to various consulting companies to recommend/develop Minimum Flows. It is

important to assure that when consultants/SWFWMD conclude that significant harm can occur as a result of 5% drop in spring discharge:
- The data used to analyze the situation and make such predictions needs to be accurate,
- The flow measurements must be capable of quantify incremental drops as they occur.

I appreciate you deciding to have a comprehensive review and hope it will cover accuracy assessments of Homosassa, Chassahowitzka (where there are similar concerns) and provide some direction to monitoring the Crystal River which is going to be a difficult and complex task.

The aim is simply to get those involved to look more critically at the data and hopefully focus more on the withdrawals from the aquifer. If we do not fully understand the why there has been serious deterioration in the Coastal Springs River over recent years there is no way these rivers will continue to be classified as Outstanding Florida Waters.

Bluntly, there are hundreds of Water Use Permits being issued; all the studies in the world will not reverse the reality of:
IF WE CONTINUE TO SUCK IT WE WILL....destroy it.

Thanks again for taking the time to review the matter and deciding to have an outside review.
Martyn Johnson

From: jdweaver@usgs.gov
Subject: Planned evaluation
CC: rrodrigu@usgs.gov
To: martynellijay@hotmail.com
Date: Wed, 26 Oct 2011 08:29:12 -0400

Mr. Johnson,

As promised, I have looked into the questions you brought up in your Aug. 31 email, as well as other pieces of correspondence between you and the USGS Florida Water Science Center.

Because of the complexities involved in the issues being discussed, I have requested an outside review from the USGS Office of Surface Water (OSW), Office of Groundwater (OGW), and the National Research Program. Each of these entities is uniquely positioned to provide an unbiased review of the data, consider your concerns and to respond to the questions you are asking. The OSW and OGW provide technical leadership and serve quality assurance and quality control functions for USGShydrologic science.

The review being undertaken is a big investment of time and effort on our part. As such, I would anticipate it may require a few months to finish. We will share our findings with you and respond to the questions you

previously asked as soon as the review is complete.

Jess D. Weaver

Phone: 770-409-7701
Cell: 678-524-6030

Citrus County Chronicle
Oct. 27, 2011

Activists: Hands Off Our Water

Stakeholders group wants to stop water withdrawals

By Abdon Sidibe

In the often murky politics of Florida water, fed by the chasm between urban and rural needs, one thing is aquamarine clear to opponents of a water management plan in Citrus County — they want it dead in the water and would pile on if necessary.

Officials of the **Southwest Florida Water Management District, or Swiftmud**, which unveiled a plan to tap into flows of Chassahowitzka and Homosassa rivers, are receptive and continue to be willing to listen to input.

Wednesday, in what could be a last-ditch effort by a working group of stakeholders comprised of activists, government environmental officials, private citizens and politicians, opponents brought in two experts to expand on their case against the Swiftmud plan.

Hydrogeologist Todd Kincaid laid out a study done in the Wakulla Springs/Tallahassee area, and longtime area researcher and environmental scientist Robert Knight spoke about damage to spring-fed areas.

Last June, Swiftmud announced the beginning of a consultative period to gauge reaction to its plan to withdraw up to 5 percent from the Homosassa River and up to 11 percent from the Chassahowitzka.

In subsequent workshops, opposition to the plan has been steady and pretty much on course — withdrawal of water from already depleted waterways will be devastating to the marine life and would allow for more salt water intrusion into the aquifer system. And there's suspicion that water removed from here will be transferred to more populated and thirsty locales further south.

Swiftmud is on record that it wants to listen and weigh all manner of data before making a final recommendation.

"And that is still the plan," said Darcy Brune of Swiftmud. "We want to look at all the factors and information people have to present before a decision is made."

She said she was unsure about the exact date of a decision, but it will happen after the Swiftmud board has a chance to thoroughly examine all the information.

However, stakeholder Brad Rimbey of the Chassahowitzka River Restoration Committee said the only thing good about this plan is if it's dead.

"The whole idea behind the MFLs is to help restore and prevent the further degradation of these rivers, especially since they are on the list of Outstanding Florida Waters (OFW)," Rimbey said.

Forty-one of the state's 1,700 rivers and some lakes and lake chains have been designated as OFWs. In Citrus, the Homosassa, Chasshowitzka and Withlacoochee rivers have been so designated.

The designation also means, according to Rimbey, that Swiftmud cannot allow discharges to OFWs that would lower ambient (existing) water quality.

"And, it is clear if they withdraw 11 percent out of the Chassahowitzka, there will be more saltwater intrusion and that would degrade the water quality," he said.

Rimbey thinks Swiftmud ought just withdraw the plan and try to come up with a plan that should be helping restore some of the marine life and water flow the rivers enjoyed in the past.

In his presentation Wednesday, Kincaid shared data from a study which clearly demonstrated correlation between increased withdrawals of water in Tallahassee and the increased intrusion of salt water into Spring Creek from the Gulf.

"The simple answer is, we shouldn't permit more than we can allocate," he said.

Knight, the other expert, buttressed his points about the effects of ecological impairment at springs by giving the example of Silver Springs, which he had studied for a long time.

He said a year-long study revealed dwindling productivity in the springs and the growth of algae which, in turn, is driving down the number of visitors to the once-pristine attraction.

Rimbey said after the workshop he hopes the latest presentations helped change officials' minds. He said if all fails, they may take the next step of legal action.

"Hope it never comes to that, but it may be the only way to settle it."

Chronicle reporter A.B. Sidibe can be reached at (352) 564-2925 or at asidibe@chronicleonline.com.

From: Doug Leeper
To: "Douglas Dame"
Bcc: Marty Kelly; Sid Flannery; Mike Heyl
Subject: RE: Springs Coast Minimum Flows Workshops - Mailing Address Request
Date: Wednesday, May 11, 2011 1:02:47 PM

Mr. Dame:

Thanks for providing your mailing address, your words of encouragement, and suggestions for future public workshops.

In response to your question about near-shore regions of the Springs Coast, I would note that modeling of salinity changes in the marsh and sea grass habitats adjacent to the mouths of coastal rivers of the Springs Coast has not, for the most part, been included in the analyses supporting minimum flows development for the spring-flow dominated rivers of the area. Our salinity-habitat modeling has focused primarily on the lower salinity zones in the river channels that we know are directly related and sensitive to changes in spring discharge. By protecting these most sensitive habitats, we believe that the downstream habitats that are more influenced by the Gulf and localized circulation patterns should experience even less change. I should note, however, that our analyses have included evaluations of the potential effects of flow reductions on fish and invertebrate species that are resident in the river systems and those that use the systems and near-shore areas for spawning and feeding. I should also note that we agree that additional investigation of potential impacts of flow reductions on near-shore areas of the Springs Coast is a subject that may warrant further consideration in the future.

Thanks again for your support.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

From: Douglas Dame [mailto:doug_dame@yahoo.com]
Sent: Monday, May 09, 2011 2:47 PM
To: Doug Leeper
Subject: Re: Springs Coast Minimum Flows Workshops - Mailing Address Request

Mr. Leeper:

Keep up the good work !

I wish the District was putting even more resources into this important science to inform policy-making, but under the circumstances very happy that you all are able to keep going.

===> Douglas Dame

5718 Riverside Dr
Yankeetown, FL 34498

I have a Q, which you can skip if the answer is very complicated or long .... Do/will the plans for studies of these coastal spring-fed systems include much evaluation of the impact of these freshwater flows on the super productive near-shore marine nursery areas, etc ?

(Background for the question: The impression I got from a workshop on the Chas was that the working assumption, more or less, was that that the size&volume of the "brackish transition zone" (so to speak) in the Chas would be be relatively stable, it'd just move upstream or downstream in the the river channel based on changing conditions. This makes sense to me if I think of the river as an irregular tube connecting a source of 0ppm water to a source of 28-35ppm salt water ... the mixing options are limited and constrained. But as a total amateur, I'm not sure that also going to be true in more open estuarine areas, where the mixing options are much more complex. Reductions in the volume of outflowing fresh water could ... arguably ... significantly affect the volume and area of low-salinity regimes on a wide-spread basis, with a resulting impact on the productivity of the near-shore areas ... areas that are very important biologically, for recreation, economically, and for quality of life.)

And a suggestion for future public workshops: stress the limitations of your authority. At the workshops I have attended, the public has done much gnashing of teeth about environmental concerns, which are legitimate, but outside of the scope of what you can do, per my understanding. You could even have a second slide show running all the time during a public workshop, flipping between slides of "What the District is Empowered to Do" and "What the District is NOT empowered to do."

regards

Doug Dame
until recently, Councilman, Town of Yankeetown

From: Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>
To: "eric.nagid@MyFWC.com" <eric.nagid@MyFWC.com>; "kent.smith2@myfwc.com" <kent.smith2@myfwc.com>; "doug_dame@yahoo.com" <doug_dame@yahoo.com>; "gourliej@thirdplanetwind.com" <gourliej@thirdplanetwind.com>; "janicehowie@aol.com" <janicehowie@aol.com>; "rbkeim@gmail.com" <rbkeim@gmail.com>; "aamcpherson@msn.com" <aamcpherson@msn.com>; "JerrMorton@aol.com" <JerrMorton@aol.com>; "rhinesmith@webtv.net" <rhinesmith@webtv.net>; "chrissafos@embarqmail.com" <chrissafos@embarqmail.com>
Sent: Mon, May 9, 2011 11:17:06 AM
Subject: Springs Coast Minimum Flows Workshops - Mailing Address Request

Greetings:

I'm writing to request contact information for distribution of material related to the Southwest Florida Water Management District's plans for a series of public workshops on minimum flows for the Chassahowitzka, Crystal, Homosassa and Weeki Wachee river systems of the Springs Coast. The workshops will focus on existing data and minimum-flows methods, additional data collection or analyses that could be implemented to enhance minimum flows development, and minimum flows compliance for the four spring-dominated systems. As you know, minimum flows are limits at which further water withdrawals would cause significant harm to the water resources or ecology of the area, and are used in the District's permitting programs.

The District is in the process of sending letters concerning the workshop to individuals who have previously contacted us with regard to minimum flows development for Springs Coast systems. Although we have your e-mail on file, we would appreciate your providing a mailing address that can be used for distribution of the workshop announcement.

Please feel free to contact me if you have any questions regarding the planned workshops.

Douglas A. Leeper, Chief Environmental Scientist
Resource Projects Department, Southwest Florida Water Management District
2379 Broad Street, Brooksville, FL 34604-6899
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272
Fax: 352-754-6885
E-Mail: doug.leeper@watermatters.org
Web Site: watermatters.org

Citrus County Chronicle - Opinion - Editorial
Nov. 5, 2011

Keep Water a Resource, Not a Commodity

THE ISSUE:
Water district plan could cut flow in local rivers.
OUR OPINION:
Scrap the plan and save the rivers.

Our rivers and springs are the jewels of our state. Fed by a vast aquifer system, Florida's natural waters are the source of water for homes, businesses, agriculture and recreation, and they support a natural habitat that is a significant part of what makes Florida such a great place to live and visit.

But these waters have come under increasing pressure from a growing population and from agricultural uses that tap into the aquifer that underlies Florida and serves as the source of most of the state's water.

Four decades ago, leaders realized that waters of the state were a vital resource **and passed legislation to create five water management boards** to "manage these resources in a manner to ensure their sustainability." The geographic boundaries of these districts were determined by watersheds and other natural, hydrologic and geographical features.

These water management districts were given broad powers to regulate water use, and a later constitutional amendment gave these districts the authority to levy property taxes to fund their activities. However, while recognizing that the state's waters were a valuable resource, the enabling legislation for water districts also directed these districts to "encourage the use of water from sources nearest the area of use or application wherever practical."

In 2003, a report from a business and industry group recommended a statewide board with authority to pipe water from "water rich" areas in North Florida to "water poor" areas to the south. This report caused a firestorm of protest, including resolutions in more than 30 counties opposing the plan. It was eventually dropped.

However, the current direction of our water management district's "minimum flows and levels" examination of local waters has re-ignited this issue and has caused concern that policies developed under this program could lead to permanent damage to the county's springs and rivers.

The Minimum Flows and Levels (MFL) program was originally meant to safeguard waters of the state, and was placed into law when many natural systems were being diverted or pumped at a rate that would destroy them. By statute, the minimum flow is "the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area."
Our water management district has defined "significant harm" as being a 15 percent loss of habitat or other resources. Under this definition, a 5 percent reduction could be allowed in flow of the Homosassa River, and an 11 percent reduction could be allowed in the Chassahowitzka River.

The concern is if these reductions would be allowed, they would then set the stage for withdrawals from the watershed of the rivers so long as these withdrawals do not exceed the "significant harm" threshold. This policy is an open invitation to come and pump so long as the use does not reach the "significant harm" threshold.

We believe this policy could lead to irreparable damage to the system of coastal springs and rivers that provide much of our unique and beautiful environment. Knowing when withdrawals from the river or aquifer will harm a system is not an exact science, and the 15 percent threshold is an arbitrary number.

Our rivers and springs are not commodities to be bought and sold. They are a precious resource to be protected. The original mission of our water management districts was to protect these resources. We urge officials to keep to that mission and scrap any plan to make these resources a commodity.

From:	Doug Leeper
To:	Lou Kavouras
Cc:	Marty Kelly; Mike Heyl; Cara S. Martin
Subject:	Chass & Homosassa MFLs Petition
Date:	Tuesday, November 15, 2011 9:25:57 AM
Attachments:	Chass & Homo MFLs Petition from JHowie 08nov2011.pdf

Hi Lou:

I found the attached petition in my mail box yesterday and would like your advice on how best to handle the document.

The petition expresses opposition to proposed minimum flows for the Chassahowitzka and Homosassa River systems.

My plan is to respond via e-mail to the sender of the petition, Ms. Janice Howie, whom I have met at our recent Spring Coast MFLs workshops. In the e-mail I will: 1) acknowledge receipt of the petition; 2) thank Ms. Howie for sending it to us; 3) note that the document will be included in the appendices of revised MFLs reports for the two river systems, along with the other input we have received; and 4) indicate that all public input will be available for review by Governing Board members.

Do you think I need to do something else with the petition, as it is addressed to the District Governing Board and was copied to Blake Guillory and me?

Thanks,

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

November 8, 2011

To the Governing Board of the South West Florida Water Management District:

Re: MFL proposals for the Chassahowitzka and Homosassa Rivers

We the undersigned urge you to **not accept** the Minimum Flow Level (MFL) proposals that the South West Florida Water Management District (SWFWMD) staff will recommend for your approval. While we recognize that a great deal of work and expense went into determining these proposals, we feel that these will do serious damage to the Chassahowitzka and Homosassa Rivers. These rivers and the springs that feed them are unique Florida treasures that have important economic and recreational significance for their communities.

- The current proposal to withdraw 11% of the flow from the Chassahowitzka and 5% of the flow from the Homosassa would by SWFWMD's determination, degrade these rivers and their environments up to 15%, causing "significant harm" to them. This 15% figure is not a scientific one, and is not acceptable.
- Both the Chassahowitzka and the Homosassa been given "Outstanding Florida Waterways" status by the state of Florida, and as such are entitled to special protections by the Florida Statute and Administrative Code. The proposed MFLs are in conflict with that protection.
- The research that was done in determining the MFLs was not adequate in that it did not determine how these withdrawals will affect the perimeters of the springsheds, including smaller springs, swallets and caves, nor was the gross primary productivity determined. The latter is necessary to accurately measure the effects of lower flow on the life in the rivers.

Since these studies would be costly in a time of shrinking budgets, we urge you to **keep the MFLs at their current levels** and revisited this issue in the future.

cc. to Blake Guillory, Executive Director and Doug Leeper, Chief Environmental Scientist.

NAME	CITY and COUNTY	E-MAIL or PHONE
1. John L Howie	New Port Richey	johnhowie2@aol.com
2. Janice L. Howie	New Port Richey	janicehowie@aol.c
3. Gorjon O'Connor #	Hudson	
4. Michael ANDERSON	Dade City	(352) 521-3183
5. Joan Anderson	Bayonet Point	(727) 868-3297
6. Anna DeGrandchamp	Hudson (Pasco)	(727) 389-8810
7. Jerry DeGrandchamp	Hudson (Pasco)	(727) 808-1528
8. Richard STAUFFER	ARIPEA (PASCO)	352-584-7116
9. C.A. Taylor	Inverness	sicktaylor@wildblue.net
10. BARBARA BOWEN	NEW PORT RICHEY, FL	bbowen32@VERIZON.NET
11. Anne-Marie Rokopuk	Port Richey (Pasco)	(727) 847-2310
12. BOB + ANN SCHMIDT	N.P.R. - PASCO	USCHMIDTNME@YAHOO.COM
13. Kathryn PIERSON	Spring Hill - Hernando	352-666-8701
14. BARBARA DeBIK	" "	(352) 556-3940
15. RITA GRANT	Brooksville HERNANDO	727 365 4147
16. Linda Gibbons	NPR PASCO	727 845-1497

To the Governing Board of SWFWMD:

	NAME	CITY and COUNTTY	PHONE or E-MAIL
17.	Mary Goodenough	Port Richey	(727) 264-7560.
18.	[illegible]	Land O Lakes	813 996 7692
19.	Patricia J Watson	LOL	(813) 996-7692
20.	Walter Simpson	Amherst NY	(716) 839-0062
21.	Nan Simpson	Amherst, NY	(716) 839-0062
22.	Wm V Branan	Crystal River FL	352 228 0910
23.	Marcie Clutter	Inverness FL	352 419-2461
24.	Doris Boreiss	Pasco County New Port Richey	727-842-3133
25.	Reita Riggory	Zephyrhills, FL	813-788-8393
26.	Darnella Schul	NPR, FL PASCO	(937) 241-7760
27.	Susan Beach Vaughn	Bayonet Pt, fl - PASCO	727-863-0531
28.	Sharon Holding	New Port Richey FL	727-843-9771
29.	Peggy Hatcher	Wesley Chapel, Pasco	813-991-4812
30.	Kathy Sanborn	Wesley Chapel Pasco	813-991-7956
31.	Maria Valentin	New Port Richey, Pasco	727-379-6227
32.	Gail Parsons	Odessa	813-920-2730
33.	Jack Kussro	Port Richey, FL	727-868-3069
34.	[illegible]	Land O Lakes FL	813-996-1597
35.	[illegible]	NEW PORT RICHEY PASCO COUNTY	7278481318
36.	Terry Donovan	LAND O'LAKES PASCO COUNTY	813-949-6659
	Corrina Goodnow	LUTZ PASCO COUNTY	8139498924
	Julie Wert	Aripeka FL Pasco	727-863-1363

Ms. Janice L. Howie
5500 Leahy Ln
New Prt Rchy, FL 34652-3133

TAMPA FL 335
SAINT PETERSBURG FL
NOV 2011 PM 3 L

Doug Leeper
Chief Environmental Scientist
SWFWMD
Brooksville, FL 34604-6899

RECEIVED
NOV 10 2011

3460466899

From:	Lou Kavouras
To:	Doug Leeper; Executive
Cc:	Marty Kelly; Mike Heyl; Cara S. Martin
Subject:	RE: Chass & Homosassa MFLs Petition
Date:	Tuesday, November 15, 2011 10:31:40 AM

Hi Doug – Your response plan is solid. Please copy the GB and Blake on your email response – let me know if you need their addresses. We will log it in to the correspondence tracking system and assign it to you. Anything addressed to the GB or ED is logged in for tracking and archiving. Let me know if you have any further questions. Thanks. – Lou.

Lou Kavouras
Southwest Florida Water Management District
1-352-796-7211 (x4604)

From: Doug Leeper
Sent: Tuesday, November 15, 2011 9:26 AM
To: Lou Kavouras
Cc: Marty Kelly; Mike Heyl; Cara S. Martin
Subject: Chass & Homosassa MFLs Petition

Hi Lou:

I found the attached petition in my mail box yesterday and would like your advice on how best to handle the document.

The petition expresses opposition to proposed minimum flows for the Chassahowitzka and Homosassa River systems.

My plan is to respond via e-mail to the sender of the petition, Ms. Janice Howie, whom I have met at our recent Spring Coast MFLs workshops. In the e-mail I will: 1) acknowledge receipt of the petition; 2) thank Ms. Howie for sending it to us; 3) note that the document will be included in the appendices of revised MFLs reports for the two river systems, along with the other input we have received; and 4) indicate that all public input will be available for review by Governing Board members.

Do you think I need to do something else with the petition, as it is addressed to the District Governing Board and was copied to Blake Guillory and me?

Thanks,

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899

1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From:	Doug Leeper
To:	"janicehowie@aol.com"
Cc:	"albert@conservationfoundation.com"; "bkbeswick@aol.com"; "carlosb@medallionhome.com"; "dtharp@embarqmail.com"; "jadams@abbeyadams.com"; "judyw1@tampabay.rr.com"; "michael@2riversranch.net"; "neilcombee@yahoo.com"; "senft1hp2u@aol.com"; "todd@pressmaninc.com"; "hgramling@tbwg.org"; "jclosshe@tampabay.rr.com"; "rmaggard@tampabay.rr.com"; Blake Guillory
Bcc:	Barbara Matrone; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Lou Kavouras; Mark Barcelo; Mark Hammond; Marty Kelly; Mike Heyl; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez
Subject:	Petition Concerning Chassahowitzka and Homosassa MFLs
Date:	Tuesday, November 15, 2011 1:06:14 PM
Attachments:	Petition from JHowie and Others 08nov2011.pdf

Ms. Howie:

Thank you for your recent submission regarding the currently proposed minimum flows and levels for the Chassahowitzka and Homosassa River systems. The Southwest Florida Water Management District received the petition you sent via the U.S. Mail and appreciates your concern and that of the other 37 individuals who signed the document.

A scanned copy of the petition is attached to this e-mail and will be included, along with other public input we have received on the proposed minimum flows and levels, in the appendices of revised minimum flows and levels reports that the District is preparing for the two river systems. The specific comments outlined in the petition will be reviewed by staff as we develop final recommendations regarding minimum flow rule amendments that will be presented to the District Governing Board. Please note that all public input, including the petition you submitted, will be available for review by Governing Board members.

Please feel free to contact me if you have additional comments or questions related to the development of minimum flows and levels or other water management issues.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From:	Marty Kelly
To:	Mike Heyl; Doug Leeper
Cc:	Mark Hammond
Subject:	FW: MFL Question
Date:	Friday, December 02, 2011 2:44:07 PM

Guys,

Just an FYI –

From: Gordon.Lisa-Perras@epamail.epa.gov [mailto:Gordon.Lisa-Perras@epamail.epa.gov]
Sent: Friday, December 02, 2011 9:47 AM
To: Marty Kelly
Subject: RE: MFL Question

Marty,
Great and thanks for the quick reply. I'll give you a call Monday morning probably around 10ish.
I appreciate your help as we're getting a lot of questions on the Chassahowitzka MFL and it will be great to run thse questions past you and get your thoughts.
Looking forward to talking to you.
Lisa Perras Gordon, Environmental Scientist

Water Quality Planning Branch

Water Protection Division

U.S. Environmental Protection Agency

Atlanta, Georgia

(404) 562-9317

RE: MFL Question
Marty Kelly to: Lisa-Perras Gordon 12/01/2011 04:12 PM

Lisa,
I'm out of pocket all day tomorrow, but in pretty much all next week but Wednesday.
Our number is 352/796-7211 ext. 4235
Marty

-----Original Message-----

From: Gordon.Lisa-Perras@epamail.epa.gov [mailto:Gordon.Lisa-Perras@epamail.epa.gov]
Sent: Thursday, December 01, 2011 3:43 PM
To: Marty Kelly
Subject: MFL Question

Marty,

Mary Davis suggested that I call you to ask you a question that we've

gotten here at EPA about SWFWMD's MFLs. I'm afraid I could find your
email on-line, but not your phone number. Was wondering if you had time
to talk either this week or next? If so, just let me know your number
and a good time to call. I'm in tomorrow until about 3 and then in all
next week except for Tuesday.

Looking forward to talking to you,

Lisa Perras Gordon, Environmental Scientist
Water Quality Planning Branch
Water Protection Division
U.S. Environmental Protection Agency
Atlanta, Georgia
(404) 562-9317

From:	Brent Whitley
To:	Marty Kelly; Mike Heyl; Doug Leeper; Ron Basso
Cc:	martynellijay@hotmail.com; grubman1@gmail.com; BWR.CRRC@tampabay.rr.com; 2buntings@comcast.net; cathyharrelson@gmail.com; rmille76@tampabay.rr.com; whmarkle@gmail.com; bknight@floridaspringsinstitute.org; Peter Hubbell; sonnyvergara@bellsouth.net; Mark Hammond; mnewberger@verizon.net; eprgroupqueen@mac.com; ekelly@tnc.org; senft1hp2u@aol.com; hgramling@tbwg.org; dtharp@embarqmail.com; Albert@sarasoaconservation.org; neilcombee@yahoo.com; todd@pressmaninc.com; rasjudy@tampabay.rr.com; jadams@abbeyadams.com; CarlosB@Medallionhome.com; michael@2riversranch.net; jclosshe@tampabay.rr.com; Eric.Shaw@dep.state.fl.us; johnncms@tampabay.rr.com; blogan@atlantic.net; Bobby Lue; Blake Guillory; fritzlandwater@tampabay.rr.com; Rebecca.Bays@bocc.citrus.fl.us; abrockway@co.hernando.fl.us; bev.chuck2@verizon.net; dmanson@floridah2olaw.com; Herschel.Vinyard@dep.state.fl.us; gwkuhl@gmail.com; tforsgren@ccaflorida.org; jbitter@tampabay.rr.com; JJ.Kenney@bocc.citrus.fl.us; Joe.Meek@bocc.citrus.fl.us; Julie.Espy@dep.state.fl.us; jvarn@fowlerwhite.com; mcorona1@tampabay.rr.com; mczerwinski@mgcenvironmental.com; bgeiger@cityofbrooksville.us; Boyd_Blihovde@fws.gov; Dennis3ds@aol.com; ted.hoehn@MyFWC.com; jfarley682@aol.com; ktripp@savethemanatee.org; norman@amyhrf.org; rkane@usgs.gov; Carolyn.Voyles@dep.state.fl.us; Clark Hull; danmorgan@tampabay.rr.com; Dana Gaydos; Cliff Manuel; greg.holder@myFWC.com; ladyfishlori@yahoo.com; Dave.Mulholland@MyFWC.com; masonwilliam@bellsouth.net; Paul Williams; RGehring@pascocountyfl.net; rschenck@vzw.blackberry.net; jnvacha@ci.brooksville.fl.us
Subject:	Springs Coast MFLs must be conservative
Date:	Thursday, December 01, 2011 4:56:41 PM

Marty, Mike, Ron, and Doug,

Thanks to each of you for working with the Stakeholders for the Springs Coast Working Group in assisting in the coordination of the October 26th workshop in Lecanto. I realize this has been a long and tedious process for each of you and that we as a group have garnered much of your time in seeking information, data and responses to our questions as to the basis for the upcoming proposal for the MFL's for the four Springs Systems on the Nature Coast. However, given the sensitivity of the ecology of these systems, the desire on the part of the Stakeholders to be fully informed as they review your efforts, and the potential for immeasurable negative impact to the economy of the Nature Coast if the springs systems collapse, makes it imperative that we work together to be certain that we do not go down an irreversible path.

I trust that you each listened with interest to the presentations by Dr. Kincaid and Dr. Knight at the October Workshop. I thought it interesting that when it was decided that the Stakeholders would have the opportunity to present expert witness testimony that we would be so fortunate to get these two respected gentleman to voluntarily make presentations that were so insightful and objective. I think it is safe to say that they are experts and offered some very meaningful food for thought as you analyze your data in preparing the recommended proposals for the MFLs. With that said, I do not want you to think in any way I am belittling your expertise and/or your ability to analyze the "best information available" because I have been assured by many outside the District that you are all imminently qualified as scientists and biologists. Nevertheless, I am concerned that your efforts to utilize this "best information available" to construct a model for the purpose of developing another MFL, has led you down a narrow minded path that ignores some fundamental facts and common sense issues. Therefore, I want you to strongly consider the following.

I do not think we, as members of the Springs Coast Working Group and stakeholders, are calling into question your science that has made the determination that a proposed MFL is going to cause 15% Significant Harm to the ecology of the systems. Yes, quite frankly, I think we all believe that this proposed drawdown is going to cause **at least** 15% Significant Harm or "DESTRUCTION to the River", as Mickey Newberger phrases it. We do question your support that this level of harm is OK

and that by referencing decisions from other jurisdictions and even other, unrelated scientific analyses which have recognized that this level of harm is acceptable somehow provides justification to your proposal. Both Dr. Kincaid and Dr. Knight suggest that an **MFL SHOULD** be set; better to do something than nothing and then let rampant withdrawals in the spring sheds continue. However, what I implore you to do and trust that you will do, is be cautious and conservative as both the good Doctors recommended. Both stated that there is NOT enough data to know with certainty that these proposed MFLs will only cause 15% Significant Harm to the habitat and that likely there will not be sufficient monitoring to insure that we do not tip the scales beyond that. Once we go too far, recovery may never bring us back. Why would you want to intentionally inflict this much harm? Both experts feel there is sufficient data based on the failing ecologies of other springs systems to support that the Springs Coast systems are RAPIDLY DETERIORATING, and piling on more harm is an unreasonable approach to protecting these unique natural resources.

Below are some bullet points from a letter I sent Dave Moore in March of this year suggesting just such a conservative approach in regards to the Chassahowitzka proposed MFL. I have highlighted the specific reference. Sorry to bore you with this again but I am sending this email to others who may not have seen that first letter and I still feel there is merit to this content that is worth revisiting.

1. **Lower MFL allowable drawdown** - According to Ron Brasso's presentation at the workshop, the water needs for the 2030 BEBR projections would in effect create a 2.3% drawdown of the natural flow. Why not set the MFL at that 2.3% and review it every 5 years to see what affect this has on the ecology as the drawdown increases from the current .7% caused by groundwater pumpage. That would build a 20 year data set. You would think we might learn something about these unique systems in that time frame.
2. **Monitoring** - Create a specific comprehensive monitoring program that goes far further than Mike Heyl suggested was the plan that is to continue to monitor flow, salinity etc., but not biological. Use a system of aerial photographs like being required of the Desalination Plant in Tampa Bay to assess the sea and river grass habitats. While I realize these monitoring programs are costly when it comes to biological counts, etc, just how much is this worth to the entire Coastal economy?
3. **Economic Assessment** - Consider an economic assessment of what the continued decline of these spring systems is likely to do to the local economies, many of which depend on the health of the fisheries and clear water springs. You may find there is a greater than 15% significant harm to humans. How do we treat that?
4. **Partnership with the community** - Take ownership of the River as part of the refuge since you actually **OWN** most of it. Become a partner with the Chassahowitzka Restoration Committee and initiate a recovery of sorts along with the upcoming effort to clean and dredge the headwater systems to restore the quality of the water body. Genuinely work with the Port Authority and the FWC to stop innocent but destructive prop-scarring of the River bottom by those untrained on the River. The management plan suggested 20 years ago to put in some simple non-invasive channel markers. This is still not done and the destruction by prop scarring continues. The community would provide support and labor to this effort.
5. **Alternative Water Supply Plan** - Simply put, work to develop a water supply plan for the region that does not rely on groundwater thus allowing the drawdown of these

systems and in effect, create a **Bank** of water supply for the District to issue **Water Use Permits** (bet you never thought you would hear that from a developer).

Finally, and to coin a phrase from the latest political agenda of right-sizing the Water Management Districts – "We want to get the Districts back to their core responsibilities." I thought that is an interesting way to assess and focus the direction of water management. I wondered what those core responsibilities are, so I looked into it. You might recognize this:

Mission Statement

The mission of the Southwest Florida Water Management District (SWFWMD) is to manage water and related natural resources to ensure their continued availability while <u>maximizing environmental, economic and recreational benefits.</u> To identify the critical programmatic areas necessary to fulfill our crucial mission, the SWFWMD created a strategic planning program intended to provide information to our stakeholders and guidance to our staff regarding our pathway toward <u>superior stewardship of our water resources.</u>

So I ask you gentleman, as you plan to propose the willing destruction of 15% of the ecology and habitat of the Chassahowitzka River and the other Springs Coast Systems, all Outstanding Florida Waters I might add, does that fall within the guidance of the Mission Statement and returning to your core values?

While I realize you have a responsibility to develop potential water resources to ensure their continued availability, I do not think I stand alone when I say that **<u>maximizing environmental, economic and recreational benefits</u> should at least carry equal weight to your scientific analysis when you prepare your recommendations for MFLs of systems that provide <u>these exact societal benefits for the citizens of this District</u>** and that if the **habitats** of these rivers could speak for themselves they would be screaming for protections. Actually, and now that I think about it as I ride the Chassahowitzka, I realize the habitat is already screaming.

Take heed, Gentlemen and may you recommend wisely with an eye toward the future for our children and theirs.

With regards,

Brent Whitley

From:	Espy, Julie
To:	Marty Kelly
Cc:	Brad Rimbey; Doug Leeper; Mike Heyl; Ron Basso; Dave Dewitt
Subject:	RE: Chronicle article on impaired waters
Date:	Thursday, December 08, 2011 10:40:15 AM

Thank you, Marty. This is very helpful. We will review this information and make the appropriate changes.

Thanks for taking the time to evaluate this!

Julie Espy
Environmental Administrator
Watershed Assessment Section
2600 Blair Stone Rd. MS3555
Tallahassee, FL 32399
850-245-8416
julie.espy@dep.state.fl.us

From: Marty Kelly [mailto:Marty.Kelly@swfwmd.state.fl.us]
Sent: Thursday, December 08, 2011 10:33 AM
To: Espy, Julie
Cc: Brad Rimbey; Doug Leeper; Mike Heyl; Ron Basso; Dave Dewitt
Subject: RE: Chronicle article on impaired waters

Julie,

Sorry for taking so long to respond, but I have consulted with staff and here is our collective view.

For minimum flows and levels purposes, we think it is appropriate to include Bluebird Springs and the springs that contribute flows to Hidden River within the greater Homosassa River system.

Bluebird Springs and Hidden River are located in a United States Geological Survey surface water drainage basin that is separate from the basin that contains other components of the Homosassa River system (Direct Runoff to Gulf vs. the Homosassa River basin), but review of available springshed boundary information and several published reports suggests that it is reasonable to include them within the Homosassa River system. Springshed and spring location maps are shown in Figures 2-3 and 2-6, respectively, in the draft Homosassa River minimum flows and levels report (Leeper et al. 2010), and these figures support grouping with the Homosassa system. Examination of springshed boundaries included in Department of Environmental Protection GIS layers also supports the grouping of Bluebird and Hidden River springs in the greater Homosassa River system. Hidden River is grouped with Homosassa River springs in United States Geological Survey (e.g., Cherry et al. 1970, Knochenmus and Yobbi 2001) and District (e.g., Jones et al. 2011, Champion and Starks 2001) reports. Bluebird Springs is not mentioned in most reports that include information on Citrus County springs, although Scott et al. (2004) note that the Bluebird Spring run "travels an unknown distance westward virtually parallel to the Homosassa River and is presumed to eventually enter the river".

In summary, our staff are of the opinion that Hidden River and Bluebird Spring should be

associated with Homosassa (WBID 1345), rather than with Chassahowitzka (WBID 1348). Otter Creek is in the correct Planning Unit – Homosassa, although the WBID number is still a 1348-series. It might be advisable to revise the Homosassa Planning Unit boundary to include Hidden River Springs and Bluebird Spring, and also change the WBID designation of Otter Creek, Bluebird Spring and Hidden River to a 1345 series.

Julie, I hope this information is helpful, and I appreciate you contacting us regarding this matter.

Marty

Brad,
Thanks, also for copying me on this.
Marty

Documents Cited

Champion, K.M. and Starks, R. 2001. The hydrology and water quality of springs in west-central Florida. Southwest Florida Water Management District. Brooksville, Florida.

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From: Espy, Julie [mailto:Julie.Espy@dep.state.fl.us]
Sent: Thursday, November 17, 2011 9:43 AM
To: Brad Rimbey@CRRC
Cc: Dan Hilliard; Ron Miller; Marty Kelly; Kurisko, Paul
Subject: RE: Chronicle article on impaired waters

Brad,
Thanks for the additional info. Our planning unit designations are just boundaries primarily used to assist in breaking the state into smaller units. Unless the water management district is using our

planning unit boundaries to define the areas they are designating for reduced flow, there really is no connection between the two as I see it. I agree that pollutant loading and flow are integrally related, but our planning unit boundaries do not create an obstacle for pollutant source identification or pollutant load reductions. When TMDLs are developed to address pollutant loading, they look at flows from all sources associated with a WBID.

That being said, we have followed up on this and based on information we have received from our springs folks the source of these springs lies within the Chassahowitzka River planning unit but the water that flows from the springs goes to the Homosassa River. So for the assessment of flow they may more accurately be associated with the Homosassa River, but for an assessment of water quality the sources of pollutants would be the Chassahowitzka area.

Marty, do have any input here? I'm not sure how you determined the groupings for both rivers, but if we need to change our planning unit boundary, we can.

Julie Espy
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850-245-8416
julie.espy@dep.state.fl.us

From: Brad Rimbey@CRRC [mailto:BWR.CRRC@tampabay.rr.com]
Sent: Wednesday, November 16, 2011 6:19 PM
To: Espy, Julie
Cc: Dan Hilliard; Ron Miller; Marty.Kelly@swfwmd.state.fl.us
Subject: Re: Chronicle article on impaired waters

Hi Julie,

After thinking about this, I think it does make a difference whether DEP's impaired springs grouping is consistent with SWFWMD's MFL springs grouping. As was discussed in the Nov 7, 2011 meeting in Homosassa, the relationship between pollutant concentration and spring flow rate is integrally related.

Since SWFWMD is proposing to reduce the spring flow rate of the Chassahowitzka spring system unilaterally by 11% and reduce the spring flow rate of the Homosassa spring system unilaterally by 5%, it follows that DEP and SWFWMD need to be on the same page as to which spring flows are to be degraded by SWFWMD's proposed amounts.

I am copying Marty Kelly at SWFWMD with this email in case he would like to contribute an opinion.

Brad W. Rimbey for the
Chassahowitzka River Restoration Committee

> ----- Original Message -----
> From: Espy, Julie
> To: Brad Rimbey@CRRC
> Cc: Ron Miller
> Sent: Tuesday, November 15, 2011 9:02 AM
> Subject: RE: Chronicle article on impaired waters

Hi Brad,
Thank you for the link to the article in the Chronicle. In response to your question, while it would be best for our grouping to match that of the MFL our planning unit designation does not have any real significance with regard to assessment or restoration. We will follow up with our springs group here and the water management district to determine if we need to change anything. Thank you for bringing this to our attention.

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Please take a few minutes to share your comments on the service you received from the department by clicking on this link DEP Customer Survey.
From: Brad Rimbey@CRRC [mailto:BWR.CRRC@tampabay.rr.com]
Sent: Monday, November 14, 2011 3:59 PM
To: Espy, Julie
Cc: Ron Miller
Subject: Fw: Chronicle article on impaired waters

Hi Julie,

It was nice to meet you at last week's meeting in Homosassa. I was reading the Chronicle's coverage of the meeting at http://www.chronicleonline.com/content/dep-explains-impaired-water-body-restoration-plan and I have a question.

Both Bluebird and Hidden River Springs are listed as part of the Chassahowitzka group in the article. However, according to the SWFWMD MFL grouping, both Bluebird and Hidden River should be associated with the Homosassa Group. The source of the Chronicle's information appears to be DEP.
http://www.dep.state.fl.us/water/watersheds/assessment/docs/303d/group5/revised/spct-vl-c2-rev.pdf

This link shows the location of these springs
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Should the DEP impaired waters group listing of Bluebird and Hidden River be consistent with the SWFWMD MFL grouping?

Brad W. Rimbey for the
Chassahowitzka River Restoration Committee

and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

From: Ron Miller
To: Marty Folk
Subject: Please add the Bluebird Spring And Hidden River to the SWFWMD model.
Date: Thursday, December 08, 2011 2:44:23 PM

Hi Marty,

Interesting information. Please add the Bluebird Springs and Hidden River to the SWFWMD water management model. Bluebird Springs is especially interesting since a Citrus County Park is based on these waters.

Ron

From: mailto:BWR.CRRC@tampabay.rr.com
Sent: Thursday, December 08, 2011 12:53 PM
To: Dan Hilliard ; Ron Miller
Subject: Fw: Chronicle article on impaired waters

FYI

----- Original Message -----
From: Marty Kelly
To: Espy, Julie
Cc: Brad Rimbey ; Doug Leeper ; Mike Heyl ; Ron Basso ; Dave Dewitt
Sent: Thursday, December 08, 2011 10:32 AM
Subject: RE: Chronicle article on impaired waters

Julie,

Sorry for taking so long to respond, but I have consulted with staff and here is our collective view.

For minimum flows and levels purposes, we think it is appropriate to include Bluebird Springs and the springs that contribute flows to Hidden River within the greater Homosassa River system.

Bluebird Springs and Hidden River are located in a United States Geological Survey surface water drainage basin that is separate from the basin that contains other components of the Homosassa River system (Direct Runoff to Gulf vs. the Homosassa River basin), but review of available springshed boundary information and several published reports suggests that it is reasonable to include them within the Homosassa River system. Springshed and spring location maps are shown in Figures 2-3 and 2-6, respectively, in the draft Homosassa River minimum flows and levels report (Leeper et al. 2010), and these figures support grouping with the Homosassa system. Examination of springshed boundaries included in Department of Environmental Protection GIS layers also supports the grouping of Bluebird and Hidden River springs in the greater Homosassa River system. Hidden River is grouped with Homosassa River springs in United States Geological Survey (e.g., Cherry et al. 1970, Knochenmus and Yobbi 2001) and District (e.g., Jones et al. 2011, Champion and Starks 2001) reports. Bluebird Springs is not mentioned in most reports that include information on Citrus County springs, although Scott et al. (2004) note that the Bluebird Spring run

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Brad W. Rimbey for the
Chassahowitzka River Restoration Committee

> ----- Original Message -----
> From: Espy, Julie
> To: mailto:Rimbey@CRRC

Cc: Ron Miller
Sent: Tuesday, November 15, 2011 9:02 AM
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Brad W. Rimbey for the
Chassahowitzka River Restoration Committee

From:	Mike Heyl
To:	Gordon.Lisa-Perras@epamail.epa.gov
Cc:	Marty Kelly; Doug Leeper
Subject:	Chassahowitzka MFL / Agency Comments
Date:	Monday, December 12, 2011 7:40:46 AM
Attachments:	Dept. of Interior Ltr.pdf

Lisa – Marty asked me about agency responses to our proposed MFL as it pertains to manatee habitat. Florida Department of Environmental Protection did not address the issue, but Florida Fish and Wildlife Conservation Commission made the following statement in their comments"

"The proposed MFL would decrease the amount of potential warm-water habitat that may currently be available at certain tidal and flow conditions to the West Indian manatee (Trichechus manatus latirostris). Warm-water habitat is considered the limiting factor for the manatee population in Florida. Warm-water habitat for manatees provided by natural spring systems is therefore critical to the recovery of this species into the future, and FWC therefore does not support a loss of warm-water habitat (FWC Florida Manatee Management Plan, 2007). For the purposes of establish an MFL for the Chassahowitzka, however, this is not likely to become an issue since the Chassahowitzka River is used primarily as warm-season habitat and the possible loss of a small portion of the marginal warm-water habitat that may be periodically available should not have a significant effect upon the survival of the West Indian manatee."

The comment was included in a letter addressed to Marty and dated June 7, 2010.

The US Fish and Wildlife Service provided comments on November 15, 2010 and included these comments regarding manatee use of the Chassahowitzka.

- "Information used to evaluate impacts to manatees is dated and incomplete. The latest minimum count of manatees in Florida includes 5,076 manatees. See http://research.myfwc.com/features/view_article.asp?id=15246 . Recent information regarding manatees in northwest Florida can be found in the Service's 5-year Status Review. See: http://www.fws.gov/northflorida/Manatee/2007%20-yr%20Review/2007-Manatee-5-Year-Review-Final-color-signed.pdf

- A better review of existing information regarding manatee use of the Chassahowitzka River is also warranted. While there is some use of the Chassahowitzka River springs by manatees during the winter, the river is used extensively during the warmer months as a foraging area. Impacts to manatee preferred SAV should be considered in the identification of the MF."

USFWS suggestions have been incorporated into the current MFL report. For the record, the aerial count data used in both the Chassahowitzka and Homosassa MFL determinations was provided by USFWS staff. Local residents contend that the aerial count data underestimates manatee use of

the Chassahowitzka River.

The Chassahowitzka and Homosassa approach to evaluating manatee habitat was developed for the Weeki Wachee MFL. Attached is a letter from the USFWS regarding the application for the Weeki Wachee MFL.

MGH
==========
Michael G. Heyl - Chief Environmental Scientist
Mike.Heyl@SWFWMD.state.fl.us or Mike.Heyl@WaterMatters.org
==========
SWFWMD/Ecologic Evaluation (7:00 am - 3:30 pm)
7601 U.S. Highway 301 1-813-985-7481 Ext 2211
Tampa, Fl. 33637-6759 1-813-987-6747 (Fax)
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United States Department of the Interior

U. S. FISH AND WILDLIFE SERVICE

7915 BAYMEADOWS WAY, SUITE 200
JACKSONVILLE, FLORIDA 32256-7517

IN REPLY REFER TO:

July 24, 2008

Martin Kelly
Southwest Water Management District
2379 Broad Street
Brooksville, FL 34604-6899

Dear Mr. Kelly,

The U.S. Fish and Wildlife Service (Service) would like to thank you for the recent meeting with you and your staff regarding the proposed minimum levels and flows (MFL) for the Weeki Wachee River system. The Service has reviewed the draft technical report, *Weeki Wachee River System Recommended Minimum Flows and Levels,* prepared by the Southwest Water Management District (District). The District proposes for both the wet and dry season flows of the Weeki Wachee system to be maintained at 90% of the baseline annual flows adjusted for anthropogenic impacts; this recommendation results in a MFL established at 10% reduction in historically measured flow regimes. Several resources were considered for determining the proposed MFL including habitat areas and volumes associated with salinity, submerged aquatic vegetation and thermal refuge for manatees in the estuary and lower riverine sections of the system. Conservative estimates were used on several important factors when determining the availability of the thermal refuge for the manatees to be used in the MFL calculations.

The Service has authority and responsibility to protect and conserve the Florida manatee under two Federal laws, the Endangered Species Act of 1973 (ESA) and the Marine Mammal Protection Act of 1972 (MMPA). Natural springs, by their dependable provision of natural warm water, are an important habitat element for the recovery of the manatee. Accordingly, we place great emphasis on maintaining flows sufficient to provide warm water for both the current and future populations of manatees. Our current status review of the Florida manatee (West Indian Manatee 5-Year Review, 2007) clearly defines "the establishment of MFLs for natural springs to guarantee sufficient manatee winter habitat" as a critical component to the recovery of the Florida manatee.

Based on the current manatee use of Weeki Wachee system, the proposed MFL will provide adequate warm water refuge habitat. More importantly, it will afford enough estimated thermal refuge to support the entire northwest population of manatees, as well as substantial population growth at high flow conditions. We support continual annual monitoring of this system to ensure the target MFL is being maintained and manatee

warm water habitat is not compromised. We would appreciate annual monitoring reports and notices regarding any changes to the MFL once it is established.

Thank you for taking the time to discuss this MFL and for our opportunity to review and comment on your work. We believe your proposed MFL has taken manatees into consideration to meet the current federal statutes as well as the mutual state and federal goals to provide a secure future for this unique resource.

Sincerely,

Dave L. Hankla
Field Supervisor

From:	Gordon.Lisa-Perras@epamail.epa.gov
To:	Marty Kelly
Cc:	Doug Leeper; Karen Lloyd; Mike Heyl
Subject:	Re: Chassahowitzka MFL / Agency Comments
Date:	Monday, December 12, 2011 5:43:08 PM

Marty,

Thanks so much for this information. This definitely will be of great use. I appreciate you helping out so much even though its your last week of work.

Karen,

Great talking to you today, thanks for the call. I asked Susan Hansen to pull out Mr. Newberger's letter so that I can send that to you. Will try to get you that by tomorrow.

Look forward to working with you guys as we learn more about your program.

Lisa Perras Gordon, Environmental Scientist
Water Quality Planning Branch
Water Protection Division
U.S. Environmental Protection Agency
Atlanta, Georgia
(404) 562-9317

From: Marty Kelly <Marty.Kelly@swfwmd.state.fl.us>
To: Lisa-Perras Gordon/R4/USEPA/US@EPA
Cc: Mike Heyl <Mike.Heyl@swfwmd.state.fl.us>, Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>, Karen Lloyd <Karen.Lloyd@swfwmd.state.fl.us>
Date: 12/12/2011 01:36 PM
Subject: FW: Chassahowitzka MFL / Agency Comments

Lisa,

I'm forwarding Mike's email, since he said he got an "undelivered" message. Please see Mike's response below.

Also, please note that this is my last week of employment with the SWFWMD. So I would like to suggest that questions related to Chassahowitzka MFL in particular should be addressed to Mike, but would request that you also copy Doug, who is working on Spring Coast MFL issues including the Homosassa and Crystal River. Any response from your agency is likely to apply to other Spring Coast systems. Should you have a legal question, you may want to contact Karen Lloyd.

As I mentioned previously, District staff have met with USFWS staff from the Chassahowitzka National Wildlife Refuge on numerous occasions to discuss the Chassahowitzka, Homosassa and Crystal River MFLs. Mr. Boyd Blihovde, the Deputy Refuge Manager, was a stakeholder representative on the Springs Coast MFLs Working group.

Thanks,
Marty

From: Mike Heyl
Sent: Monday, December 12, 2011 7:41 AM
To: Gordon.Lisa-Perras@epamail.epa.gov
Cc: Marty Kelly; Doug Leeper
Subject: Chassahowitzka MFL / Agency Comments

Lisa – Marty asked me about agency responses to our proposed MFL as it

pertains to manatee habitat. Florida Department of Environmental Protection did not address the issue, but Florida Fish and Wildlife Conservation Commission made the following statement in their comments"

"The proposed MFL would decrease the amount of potential warm-water habitat that may currently be available at certain tidal and flow conditions to the West Indian manatee (Trichechus manatus latirostris). Warm-water habitat is considered the limiting factor for the manatee population in Florida. Warm-water habitat for manatees provided by natural spring systems is therefore critical to the recovery of this species into the future, and FWC therefore does not support a loss of warm-water habitat (FWC Florida Manatee Management Plan, 2007). For the purposes of establish an MFL for the Chassahowitzka, however, this is not likely to become an issue since the Chassahowitzka River is used primarily as warm-season habitat and the possible loss of a small portion of the marginal warm-water habitat that may be periodically available should not have a significant effect upon the survival of the West Indian manatee."

The comment was included in a letter addressed to Marty and dated June 7, 2010.

The US Fish and Wildlife Service provided comments on November 15, 2010 and included these comments regarding manatee use of the Chassahowitzka.

- "Information used to evaluate impacts to manatees is dated and incomplete. The latest minimum count of manatees in Florida includes 5,076 manatees. See http://research.myfwc.com/features/view_article.asp?id=15246 . Recent information regarding manatees in northwest Florida can be found in the Service's 5-year Status Review. See: http://www.fws.gov/northflorida/Manatee/2007%20-yr%20Review/2007-Manatee-5-Year-Review-Final-color-signed.pdf

- A better review of existing information regarding manatee use of the Chassahowitzka River is also warranted. While there is some use of the Chassahowitzka River springs by manatees during the winter, the river is used extensively during the warmer months as a foraging area. Impacts to manatee preferred SAV should be considered in the identification of the MF."

USFWS suggestions have been incorporated into the current MFL report. For the record, the aerial count data used in both the Chassahowitzka and Homosassa MFL determinations was provided by USFWS staff. Local residents contend that the aerial count data underestimates manatee use of the Chassahowitzka River.

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[attachment "Dept. of Interior Ltr.pdf" deleted by Lisa-Perras Gordon/R4/USEPA/US]

From:	Lisa-Perras Gordon
To:	Doug Leeper; Karen Lloyd; Mike Heyl
Cc:	Susan Hansen
Subject:	Re: Chassahowitzka MFL / Agency Comments
Date:	Friday, December 16, 2011 4:59:26 PM
Attachments:	2011 Feb Mitchell Newberger to O"Neil letter.pdf

Hi all,

I spoke with Karen earlier in the week about all of us continuing to talk about Mr. Newberger's questions. I look forward to learning more about Florida's MFLs and the work you are doing. In the meanwhile, here is the letter that was forwarded to our office for response.

Thanks so much for sending the letter below.

Have a great holiday - will talk to you after the new year.

Lisa Perras Gordon, Environmental Scientist
Water Quality Planning Branch
Water Protection Division
U.S. Environmental Protection Agency
Atlanta, Georgia
(404) 562-9317
(See attached file: 2011 Feb Mitchell Newberger to O'Neil letter.pdf)

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To: Lisa-Perras Gordon/R4/USEPA/US@EPA
Cc: Mike Heyl <Mike.Heyl@swfwmd.state.fl.us>, Doug Leeper <Doug.Leeper@swfwmd.state.fl.us>, Karen Lloyd <Karen.Lloyd@swfwmd.state.fl.us>
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[attachment "Dept. of Interior Ltr.pdf" deleted by Lisa-Perras Gordon/R4/USEPA/US]

MITCHELL A. NEWBERGER
820 Newberger Road
Lutz, Florida 33549
Phone: (813) 310-4147

February 14, 2011

Honorable Robert O'Neil
United States District Attorney
Middle District of Florida

Dear Mr. O'Neil,

The Southwest Florida Water Management District (SWFMD) is considering adopting a rule in the near future that will partially destroy the Chassahowitzka River system and subsequently the Homosassa and Crystal River.

The proposed rule will conduct withdrawals from the springshed that will reduce the flow and partially degrade the river. This appears to be in direct conflict with the Federal Clean Water Act (CWA). SWFMD's position is that they are exempt from the CWA but they will not furnish the statutory or case law to me that provide them with this exemption.

It is most disconcerting and in my opinion a violation of the public trust that SWFWMD will not provide me with the authority that exempts them from the CWA .

I would appreciate a review of this matter to determine if such an exemption is valid. If I can be of further assistance please do not hesitate to call me.

Sincerely,

Mitchell A. Newberger

MITCHELL A. NEWBERGER
820 Newberger Road
Lutz, Florida 33549
Phone: (813) 310-4147

February 7, 2011

David Moore, Director
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604

Dear Mr. Moore:

Thank you for having Mr. Heyl respond to my letters of November 5, 2010 and November 30, 2010. I received the letter on December 28, 2010. These letters were directed to you as the Executive Director. I certainly hope you are reviewing these written communications in that you are ultimately responsible. I would appreciate it if you can find the time to affix your signature to matters of this magnitude.

I find no reason to apply any correction to my letters except I was not aware that .7% was already being withdrawn from the springshed with SWFWMD approval. The present withdrawal of .7% or approximately 750,000 gallons per day is a contributing factor to the irreparable damage incurred on my property and those at the 2.9 mile mark on the river. Further withdrawals according to permits issued will exceed 33,000,000 gallons per day. This will only increase the salinity and SWFWMD'S liability, regardless of your argument on sea level rise. I am also familiar with your limits of liability and the Claims Bill Process.

I have reviewed the exchange of some letters between your staff supporting the 15% kill of the river and those opposed to such an end result. It becomes more evident that MFL'S and science, as you are using it, reveal your efforts to utilize Florida Water Law to circumvent the Federal Clean Water Act. SWFWMD has clearly documented that they are going to conduct withdrawals from the Chassahowitzka River Springshed and that such Activity will partially Degrade the river 15%.

On your proposed MFL dated Nov 2010, you have admitted clearly that the science on which you conclude the 15% harm as "not significant" is inadequate and discretionary. You make no attempt to provide the board with the best information available which clearly would not be just science, but would include options if it became a policy decision. You have given the board no option but to adopt a rule that is by your own admission flawed. Furthermore, you established the MFL based on readings taken during a 4-5 year historic drought, not the 81 historic readings, since 1930, that are available.

As per Sea Grant Law and Policy Journal Vol.2 No.2 (winter 2009/2010), it is pointed out that D.E.P. counsel indicates that in some permit programs the term measurable is used to determine the meaning of the term "significant". I would submit to you that 15% is measurable and that you have quantified same thus it is significant. Nov. 2010 MFL recommends that the board adopt an amount that, by your own admission, is measurable. You are using 15% as a quantified number to justify activities that result in a reduction in stream flow on the Chassahowitzka River.

The bottom line is similar to what I encountered with Citrus County over the Sewer issue and that is whether SWFMWD is consistent with the Federal Clean Water Act. (CWA)

<u>The following are the primary issues:</u>

The Federal Clean Water Act (CWA) 33U.S.C.

1987 Anti –Degradation CWA amendment

1993 OFW designation of the Chassahowitzka River and established Water Quality.

Florida Statute 403.061(7) any rule adopted pursuant to this act shall be consistent with the provisions of Federal law.

Article II Section 7 of the Florida Constitution requires abatement of water pollution not augmentation that will result in degradation and a 15% reduction of flow by WUP activities.

<u>F.A.C 62-302-300 Findings, Intent and antidegredation policy for surface waters</u> (14) states: Existing uses and level of water quality necessary to protect the existing uses shall be fully maintained and protected. Such uses may be different or more extensive than the designated use.(15) Pollution which causes or contributes to new violations of water quality standards or to continuation of existing violations is harmful to the waters of this state and shall not be allowed.

1994 U.S. Supreme Court Decision (511 U.S. 700) (128 L.ED. 2nd 716) (14) including but not limited to the following:

A. Stream flow reduction can constitute pollution
B. Pollution is man-made man induced alteration of the chemical, physical, biological and radiological integrity of water and encompasses the effects of reduced water quantity.
C. Activities not merely discharges must comply with state water quality standards.
D. No activity is allowable under EPA Anti-degradation regulation which could partially or completely eliminate any existing use.CFR 131.12(4.4.2) (511 U.S. 717(12)

1987 U.S. Supreme Court 479 U.S. 481,494 "A state law is pre-empted if it interferes with the methods by which the federal statute was designed to reach that goal."

1993 U.S. Supreme Court 507 U.S. 658,663 "Thus where a state conflicts with, or frustrates federal law the former must give way".

1941 U.S. Supreme Court Decision; Conflict can be found when the state law "stands as an obstacle to the accomplishment and execution of the full purposes and objectives of Congress".

The U.S. Congress made clear that the broad purpose in enacting the Clean Water Act was to **"Restore and maintain the chemical, physical and biological integrity of the Nation's waters".**

The District's proposed activity will blatantly interfere with, frustrate and conflict with the full purpose and objectives of Congress by degrading not restoring the Chassahowitzka River.

The Districts plan is to withdraw 15% of the water from the Chassahowitzka springshed resulting in a reduced flow emitting from the Chassahowitzka springs. Dr. Dale Griffin, PHD.MSPH with USGS was the lead scientist with Dr. Joan Rose on the Chassahowitzka River septic tank study. E-mails from Dr. Griffin dated 11-30-10; 12-03-10 and 12-15-10 indicated the result will be reduced water quality with serious impact upon the ecology of the river. This will include migration of the saltwater interface inland and that the microbial ecology (base of the food chain) would be effected to include how a reduction in flow may facilitate the spread of aquatic microbial pathogens (fish bird, blue crab, pathogens etc.).

Dr. Griffin's statement raises serious questions regarding the endangered whooping crane and the reduction of stream flow impacting their primary food source, the blue crab.

Dr. Griffin took issue with the peer review by stating in an E-mail dated November 30, 2010 that the papers used for peer review are agency reports not peer-reviewed publications and

are dated and the section justifying the reduction is fatally flawed. He further stated that it looks like someone is just using these papers as an excuse to set min. flow and these references are a weak argument.

Tom Green laugh, P.G. of the Florida Geological Survey D.E.P. Hydrogeology section, Tallahassee, FL, in an e-mail dated December 22, 2010, says that 15% is significant.

The CWA and CFR 131.12 (4.3) REQIIRE THE STATE ANTIDEGREDATION policy and implementation are consistent with the components detailed in 40 CFR 131.12.and it should go without saying that state anti-degradation policy must be consistent with Federal case law.

Water quality standards are applicable to all waters and in all situations, regardless of **Activity or source of Degradation**. CFR131.12 (4.6)

The failure of the states to comply with the spirit, intent and goals of the act especially the clause—"restore and maintain the chemical, physical and biological integrity of the nation's waters" and the provision of 303, prompted Congress to incorporate the 1987 anti-degradation amendment into the act.

The intent of the 1987 amendment was and is to protect existing uses and to provide for a means to assess activities that may lower water quality in high quality waters. SWFWMD appears to be attempting to accomplish what the 1987 amendment was designed to prevent.

There are thousands of pages online and in libraries involving Florida springs initiatives, studies and other papers that cost the taxpayers millions of dollars, none of which talk of further degradation but only of restoration, recovery and maintaining.

The bottom line here is that SWFMWD is considering adopting a rule that will reduce the flow of the Chassahowitzka River which is a man induced activity that will cause pollution of the river thus is not consistent with the Federal Clean Water Act, including but not limited to the following reasons:

1. Reduce quantity of water flowing from the springs that will partially reduce stream flow by15%, which is significant
2. Reduce Water Quality from 1993 OFW level by the activity of withdrawal
3. Introduce microbial pathogens into the Chassahowitzka River by lowering stream flow
4. Jeopardize and modify the Whooping Crane habitat and food supply i.e.; blue crabs

5. Will degrade not restore the river as required the CWA
6. Will totally destroy the fresh water fishery by escalating salt water intrusion.
7. Will eliminate 15% of fish, habitat, the eco system and the environment at a minimum.
8. Will not restore and maintain the chemical, physical and biological integrity of the nation's waters as required by law but will degrade and damage same.
9. Will frustrate the overall goals of the Federal Clean Water Act
10. Will escalate the destruction of Florida's only coastal hardwood swamp whether present damage is encroachment or intrusion.

On January 20, 2011, I met with your legal counsel Ms. Karen Lloyd and submitted an e-mail for confirmation of our discussion in a timely manner.

On February 3, which was eleven days later I received an e-mail from Ms. Lloyd in which she refused to confirm the points upon which we disagree. I am sure the e-mails are available for your review and would urge that you do so. Failure to respond is clearly a violation of Public Trust.

Based on her failure to confirm our disagreements I can only conclude that you have no statutory or case law to show that SWFWMD is exempt from the CWA to conduct the proposed Activity (withdrawals) in the springshed of the Chassahowitzka River. This activity will result in a 15% kill and Partial Degradation of the river system and therefore be inconsistent with the CWA.

SWFMD will be knowingly and willfully controlling these activities.

I will restate the questions and again request a proper response:

1. SWFWMD can issue WUP's to conduct activities that result in the withdrawal of water from what SWFWMD has identified as the Chassahowitzka Springshed. This activity will knowingly reduce the flow of the Chassahowitzka River 15% over an unknown period of time resulting in an estimated 15% destruction of the river.

2. SWFWMD has also adopted a discretionary policy that a kill of 15% or below, i.e. 11% is not "significant harm" and that such policy is not supported by case law or EPA approval.
3. That you take the position that salt is not pollution or a pollutant.
4. That the Federal Clean Water Act is not applicable to the above stated activities.

I respectfully request that you and/or SWFWMD inform me if the above is not your position and if so clarify before I move forward.

It is my position that the Federal Clean Water Act provides the statutory basis for state water quality standards and is governed by 40 CFR 131. Please quote me the authority under which SWFWMD is exempted from the Federal Clean Water which includes the 1987 Antidegredation Amendment in relation to the above discussed issues; and the authority that allows "significant harm" to be set at 15%).

In the end, if I am wrong it becomes a concerned citizen error. If you are wrong on an issue of this gravity, the fallout will be much greater. If you are, in fact correct, SWFWMD clearly has an unbridled authority to destroy the spring fed rivers of the Suncoast, leaving the Federal Clean Water Act, along with the Congress of the United States a toothless tiger.

Sincerely,

Mitchell A. Newberger

Citrus County Chronicle
Dec. 26, 2011

Some Resist Proposed MFLs for Coastal Rivers

By Jim Hunter

Citrus County is more than halfway through the process mandated by the Florida legislature in 1997 for water managers to set minimum flows and levels for all major bodies of water in the state.

Some citizens and environmental groups, including The Homosassa River Alliance, Friends of the Chassahowitzka, TOOFAR and the Withlacoochee Area Residents, have opposed the currently recommended minimum flows and levels (MFLs), which would allow 5 percent reduction flow in the Homosassa and 15 percent in the Chassahowitzka.

The idea was to set minimum levels below which rivers, lakes or springs and their ecologies would be significantly damaged. That level would be used in planning, water management systems and permitting regarding withdrawals that could affect the area's water resources.

The **Southwest Florida Water Management District (sometimes called Swiftmud)** and the four other water districts in the state were ordered to set Minimum Flows and levels, or MFLs. The district oversees permitting in 16 counties of large public, commercial, industrial, and agricultural withdrawals of water from wells or surface waters.

To date, 181 bodies of water have MFLs in the district. In Citrus, MFLs for the Floral City, Inverness and Hernando pools of the Tsala Apopka Lake chain have been adopted, as well as Fort Cooper Lake.

The data collection and analysis for the Homosassa River system and the Chassahowitzka River system have been done, but the district staff's draft recommendations for MFLs has not yet been finalized and adopted by the water district's governing board. Those two proposed MFLs have met with resistance from the environmental community in the county.

The only other remaining MFLs to be done in Citrus County will be for the King's Bay springs/Crystal River system and the lower Withlacoochee River system that runs through the county forming its eastern and northern border on its way to the gulf. Those MFLs are slated to be developed in 2012.

At this point, the extensive data gathering and modeling studies on the Homosassa and Chassahowitzka rivers and springs systems are finished, and scientific peer reviews have endorsed the studies' methodology and recommendations. The public point of view has been taken through a series of meetings with a group of local citizen stakeholders, the Springs Coast MFL Working Group.

Some citizens and environmental groups, including The Homosassa River Alliance, Friends of the Chassahowitzka, TOOFAR and the Withlacoochee Area Residents, have opposed the currently recommended MFLs, which would allow 5 percent reduction flow in the Homosassa and 15 percent in the Chassahowitzka.

Ron Miller, longtime Citrus County environmental activist and member of the Homosassa River Alliance, said the groups believe the MFLs should not allow any reduction. "There is no room to take water out. It's already a depleted system," he said of the Homosassa.

"The River Alliance position is that they (the water district) base it all on a hypothetical model that has flaws." He said there are just too many complicating variables and unknowns to allow percentage withdrawals of such a sensitive resource based on a questionable mathematical model.

The study itself said, he noted, that just a 1 percent reduction in flow of the Homosassa would mean the loss of half the bass in the river. A 2 percent reduction would result in the loss of the larger blue crabs in the river, or 15 percent. "It's incredibly complex, incredibly sensitive," he said of the river system. Allowing any percentage reduction of flow is simply harming the river, he said.

Miller said the only way to set a figure is use a specific number in relation to withdrawals in a watershed and after that nothing would be allowed. He was not sure if the county itself had the authority to do that but felt that might be the best way to go about it.

He said the district had asked for public input and had gotten it, saying it would use that input to make modifications in the proposed MFLs. "The ball's now in Swiftmud's court," he said. "We'll see what they do."

Water district Ecologic Evaluation Section Manager Marty Kelly said the water district staff is mulling over the public input and issues raised at those meetings. "We're still considering what our recommendations might be, he said."

A staff response to issues raised at the last work group meeting was scheduled to be posted on the district Web site last week.

The water district staff will issue its final report by mid-January and the recommended MFLs for the two rivers will go to the governing board of the district for adoption in late February. Any changes from the draft would be made public with the final report, Kelly said, but he did not discuss what that might be. “We are still kicking around some stuff internally,” he said.

Al Grubman, president of TOOFAR, a citizen environmental group dedicated to water issues and education, said his group sided with the Homosassa River Alliance in contending that just reducing the recommended MFLs a few percent to compromise isn’t sufficient.

The bottom line was, “Every drop taken is reducing those two rivers,” he said.

Water district spokesman Michael Molligan said the situation is made more complicated in that constitutes “significant harm” is not specifically defined in the law. “We are trying to set a reasonable standard.” he said.

The Chassahowitzka study, for example, illustrates the problem of the definition of “significant harm, noting the law on creating MFLs gives little guidance concerning identification of generally applicable thresholds associated with changes in flows or levels, either in the primary or secondary scientific and resource management literature. The definition of “significant harm, the report said, “often becomes a policy decision rather than a technical decision.”

Molligan said and the percentage of loss of habitat used in the Chassahowitzka modeling has been used in other locations. The modeling uses the best data and scientific methods available, he said, and and the scientific peer reviews have confirmed that, agreeing with the recommendations. “If we are way off base, they will tell us.” He said MFLs are ongoing processes, and can be modified if better data is obtained.

At present, the Citrus environmental groups are waiting to see what if any changes may have been made in the proposals in the final report that will go to the district governing board in February. That will determine, as a number of environmental group members have said, whether they want to consider going to court over the issue.

MINIMUM FLOWS AND LEVELS

Information about Minimum Flows and Levels (MFLs) in Citrus County:

+ General MFL info: To get more information on MFLs go to the water district Web page at: www.swfwmd.state.fl.us/projects/mfl/.

+ Springs Coast Working group info: To get information, including background information and reports, on the Springs Coast MFL working group, go to: www.swfwmd.state.fl.us/projects/mfl/springs-coast-mfl.php. The water district manager contact for the Springs Coast Working group is: Doug Leeper, chief environmental scientist resource projects (doug.leeper@watermatters.org or 800-423-1476 , ext. 4272).

+ To make comments on MFLs: To make comments on the Citrus County MFLs for the Chassahowitzka River System and Springs (includes Chassahowitzka Main, Chassahowitzka No.1, Crab Creek, Potter, Ruth and Blind Springs) or the Homosassa River System and Springs (includes Halls River Springs, Southeast Fork Homosassa River Springs, Homosassa Main Springs, Hidden River Springs) go to the water district’s website at www.swfwmd.state.fl.us/projects/mfl/comments.php.

Jim Hunter can be reached at jimhunter.chronicle@gmail.com.

From:	dennisblauer@tampabay.rr.com
To:	Marty Kelly; Mark Barcelo
Cc:	djb5767@tampabay.rr.com; dennisblauer@tampabay.rr.com; emoore11@tampabay.rr.com
Subject:	mfls Chassahowitzka River
Date:	Monday, December 26, 2011 7:39:38 AM

As a concerned waterway user and water consumer in West Central Florida, Homosassa area, i wholeheartedly disagree with a 15% reduction in flow being allowed to happen on the Chassahowitzka River. This pristine river has already been significantly degraded in the twenty years i've been recreating on it. Where there used to be flowing green grasses, there is only black muck. Where aquamarine pools used to indicate springs, there are murky, uninviting cavities. If you allow a 15% reduction in flow on this river, you will contribute to this river's degradation and decrease the quality of life for me and many others. Instead of a river known for life supporting oases, it will become a fetid flow from swampy anuses.

With the development happening at a nearby crossroads (98 & 19) Chassahowitzka could easily be developed into a showcase of what's right about Florida! But in order for it to happen, the Chassahowitzka River MUST be protected from actions like flow reduction.

Instead, please establish an ambitious standard to protect this glorious treasure, allowing NO reduction in flow, thereby shifting the efforts to water conservation which will be important for Florida, regardless, in the coming years.

i beg of you, do not allow this proposed 15% reduction in flow to happen!

Dennis Blauer

From:	Alan Martyn Johnson
To:	Doug Leeper
Cc:	Ron Miller; Al Grubman; Brad Rimbey; Ron Basso; Marty Kelly; Norman Hopkins; J Weaver; R Rodriguez; Kevin J Grimsley
Subject:	Homosassa MFL"s
Date:	Tuesday, January 03, 2012 12:59:45 PM

Doug,
It has been some 15 months since you started a process seeking public input regarding the MFL's for the Homosassa River. In a series of public meetings and forming a working group you have heard from members of the public and various stakeholder representatives. In the meetings Chassahowitzka, Crystal River and the Homosassa were involved. The question now is how will all this be incorporated in what is presented to the SWFWMD Board regarding the Chassahowitzka and Homosassa Rivers. I have heard comments about some of the older flow data being incorporated in the report, but it will not influence the data used in the 'all controlling' Northern District Model. I have heard that all the e-mails letters and presentations will be in 'appendices', but I doubt the Board will read these. So what will be presented?

Will a revised draft report or final report be published prior to presentation to the Board?
Will public input regarding major increase in barnacle growth as evidence of harm be included?
Will some preliminary analysis of acoustic doppler flow data SE Fork be included?
Will the USGS review of flow measurements/methodology in the Homosassa be mentioned?

In the Executive Summary page 20 of the July 12, 2010 Peer-Review Draft the wording includes:

Estimated combined discharge past United States Geological Survey (USGS) gages in the Homosassa Main Spring run and the Southeast Fork of the Homosassa River has averaged 152 cubic feet per second (cfs) for the period from 1995 through 2009
……..
Declines in flow to the system associated with groundwater withdrawals were estimated to be approximately 2.3 cfs, including a 1 cfs decline in the springs contributing to flow past the USGS gages in the Homosassa Main Springs run and Southeast Fork. This 1 cfs change in flow was considered insignificant as compared to the estimated average flow of 152 cfs for the two sites, so available flow records for the sites were considered representative of baseline conditions for evaluation of minimum flow criteria. Because break-points in ecological responses were not observed, a fifteen percent loss of resource or habitat was adopted as representative of significant harm.
The most sensitive resource responses to modeled flow reductions were exhibited by fish and invertebrate plankton and nekton, i.e., free-floating and actively swimming organisms. Flow reductions of 2.7 percent or less from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa. Similar or increased sensitivity to flow reductions was predicted for many taxa across the range of baseline flows, in particular for baseline flows less than the median flows.
……..…
Modeled responses of a number of salinity-based habitats in the Homosassa River main channel were also relatively sensitive to flow reductions. Flow reductions of less than five percent were associated with more than fifteen percent reductions in selected salinity-based habitats determined from isohalines with salinities of 2, 3, 5 and 12.
……
Based on review of resource and habitat-based criteria, the recommended minimum flows for the Homosassa River system are defined as a five percent reduction from baseline flows. Given the minimal existing withdrawal impacts on flow, the recommended minimum flows are

a five percent reduction from combined flows measured on a daily basis at the USGS gauge sites in the Homosassa Springs run and Southeast Fork of the Homosassa River.

Reminder: Few believe the 2.3 cfs is an accurate reflection of groundwater withdrawal reduction.

I am hoping that a 'new' Executive Summary will rely less on estimates to develop a defined answer.
Hopefully, through all the meetings/discussion we better recognize the legal requirement to set MFL's was a good concept when it was first enacted. To truly protect the future, minimum levels in the aquifer controlled by strict limits on groundwater withdrawals may be much more effective as a proactive approach for protecting Outstanding Florida Waters along the Spring Coast and all the economic activities which rely on water as a resource.

DECEMBER 13 Memo
Thanks to all who put the efforts into documenting and responding to the October workshop. I have read the December 13 memo posted on the web site. I have a number of comments and questions. For ease of reference I have numbered them.

1. **Semantics over shadow the real issues and cloud the facts.**

December 13 Memo page 4

Staff also notes that a strict definition of "mining groundwater" is where groundwater withdrawals exceed annual recharge to the aquifer, and based on this definition, there is no "mining" of groundwater in the Northern District. In the spring's coast groundwater basin, average recharge to the Upper Floridan aquifer is about 14 inches per year, while current groundwater withdrawals are approximately one inch per year.

Where does this strict definition come from? From my search it does not appear to have made it to the web yet. Sucking water out of the aquifer using power pumps sure sounds like a form of mining which is; *removing minerals* (resources) *from the ground, the process or business of removing minerals* (resources) *from the ground*. Semantics water is not a mineral, but it certainly is a valuable resource for which the equilibrium is moving in the wrong direction.

The facts in the statement. Over 7% of the water making it into the aquifer is being pumped out. This is 7% that does not provide the driving force to push water through the ground to the springs.
No pumping is equilibrium.
Looking at the often quoted Weeki Wachee Well it is clear that the water table has been declining. Similar is true for the Lecanto well mentioned in the July 2010 report.

Graph of DAILY Elevation above NGVD 1929, feet, ,Tampa DCP data

NOTE: IF THE USGS GRAPH DOES NOT COPY INTO THE E-MAIL; it is the presentation quality graph of daily data on the USGS web site for Weeki Wachee Well 1970-present..

Can the decline in well level all be attributed to rainfall? Take 2003 and 2004, both years saw high rainfall due to hurricanes and the water table increased to over 23 feet both years, but look how quickly the levels dropped to just over 16 feet. Compare that drop to what happened in the early 80's. Was spring flow lower in the 80's so the water table dropped more slowly? Or, could increased groundwater withdrawals be the difference?

It is always so easy to get apples and oranges mixed, but where do the 14 and 1 inch come from.
Specifically in the quote from page 4, the origin of the *average* 14 inches recharge is not referenced and similarly for the *current* one inch associated with withdrawals.
Appreciated this data may be combined from a number reports.

Looking in the Homosassa reviews, recharge is not mentioned in the July 12, 2010 Draft Review.
In the Appendices to the Review it is stated (page 338 of the pdf file under 2.0 Hydrogeologic Conditions):
The highest recharge rates to the UFA occur in west-central Hernando and Citrus Counties with values ranging between 10 and 25 inches per year (Sepulveda, 2002).
And further (on page 340):

The United States Geological Survey (USGS) developed a water budget for the basin for calendar years 1997 and 1998 (Knochenmus and Yobbi, 2001). According to Knochenmus and Yobbi's calculations, average annual values for the following water budget components were:
Rainfall = 52 inches (in)/yr,
Evapotranspiration = 32 in/yr,
Springflow = 12.5 in/yr,
Groundwater Withdrawals = 0.6 in/yr,
Groundwater Outflow = 6.7 in/yr and
Change in Storage = 0.2 in/yr
Based on the USGS water budget, net recharge to the UFA averaged 20 in/yr for the two-year period. As a percentage of recharge, groundwater withdrawals averaged about three percent of annual recharge.

QUESTION: **PLEASE EXPLAIN WHERE THE AVERAGE 14 INCHES RECHARGE AND CURRENT 1 INCH WITHDRAWAL FIGURES COME FROM.**

2. **Groundwater Withdrawals**

December 13 Memo page 6
In response to these assertions, staff notes that groundwater consumption in the Springs Coast area has actually declined slightly or remained flat since 2006. In the Northern Groundwater Basin, aquifer water levels and spring flows have declined largely due to low rainfall conditions occurring over the last 20 years.

Something does not seem to add up. Early 2011 the following was a response to a question about new wells:
"Review of the District's Well Construction Database indicates that 213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years, respectively."……"With regard to water-use permitting……. Fewer than ten of the hundreds of surface- and groundwater use permit requests received by the Brooksville Regulation Department during the past three years were not issued.
Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties."

QUESTION A: **WITH ALL THESE NEW WELLS AND WATER USE PERMITS HOW CAN CONSUMPTION HAVE DECLINED/REMAINED FLAT?** Some data to support the statement would be useful.

QUESTION B: How many well construction permits and water use permits were issued during 2011 and how many were rejected. Same basis as pervious data would be helpful.

3. **Rainfall; the giver or the excuse.**

December 13 Memo page 6
In response to these assertions, staff notes that groundwater consumption in the Springs Coast area has actually declined slightly or remained flat since 2006. In the Northern Groundwater Basin, aquifer water levels and spring flows have declined largely due to low rainfall conditions occurring over the last 20 years.

December 13 Memo page 20

Staff acknowledges Mr. Miller's comments and notes that minimum flows and levels do, in effect, serve to establish a limit or cap beyond which further water withdrawals would be significantly harmful to area water resources and ecology. Once incorporated into District rules, minimum flows and levels become one criterion used in the evaluation of requests for water use permits. Similarly, minimum flows and levels help identify withdrawal limits that are incorporated into water supply planning efforts.

December 13 Memo page 25

Staff acknowledges Mr. Johnson's comments but does not support a five-year moratorium on the issuance or renewal of water use permits for area groundwater withdrawals. Staff does support the careful evaluation of all future renewals or issuances of water use permits in the Springs Coast area and elsewhere in the District.

Actions Speak Louder Than Words.
Sooner or later it will be recognized water management must deal with the rainfall as it occurs. Rainfall is income, you have to deal with the income you have this year.

The growers who tonight (January 3, 2012) will spray tremendous quantities of water from the aquifer on their crops are drawing from limited resources. It appears later rather than sooner attention will be paid to limiting water withdrawals; but for right now water use permits are issued to anyone who submits the correct paperwork. Moreover, when the circumstances are 'such'(like tonight's freeze) the limits will be waived….this highly probable for MFL's also The information regarding well construction and water use permits requested earlier combined with declines at wells in the area over the next few days will help validate if actions speak louder than words.

4, Discharge Measurements

December 13 Memo page 24 and 25

Staff notes that Mr. Grimsley addressed Mr. Johnson's questions about the ongoing efforts related to measurement of discharge in the Southeast Fork of the Homosassa River during the October workshop.

Response: Mr. Kevin Grimsley, with the United States Geological Survey, noted that

equipment used to measure water velocities was installed at the Southeast Fork gage site in September and that negative velocities were recorded at the site last week as a meteorological front passed through the area. Mr. Grimsley added that it would be approximately six months to one year before sufficient data have been obtained for development of a velocity index rating curve for the gage site.

The USGS real time data indicates data from the acoustic doppler flow measuring equipment was operational early September with data collected at 15 minutes past each hour, 24 readings each day. With over 2500 readings some preliminary indication of how this equipment correlates with the calculated discharge data must be possible. The equations for the calculated data were developed by regression analysis of far less data than 2500 measurements.
It is noteworthy that since installation of the acoustic doppler unit, calculated data at the 30 minutes past the hour intervals is being calculated using a dS/dt(change in stage height) component in the formula for 30 minutes rather than for 15 minutes.
At 05:30 on October 19, 2011 the calculated figure was -0.27 cfs; this was calculated using a stage height change of 0.1 (2.67 to 2.77) multiplied by the equation constant of 418.14 or a contribution of -41.8 cfs the next two calculated reading were at 05:45 am of 20 cfs (stage change 2.77 to 2.82) and 06:00 am of 20 cfs (stage change 2.82 to 2.87) both these stage changes result in contribution of -20.91 cfs. Realizing this is more detail than most of you need lets just say this was/is not the only occurrence. Presumably this difference in calcultion will be addressed when the data approval process takes place.

Date/Time	Calculated Discharge	Stage Change
10/19 05:30	-0.27 cfs	0,1
10/27 02:30	-1.1 cfs	0,14
11/22 14:30	-3.0 cfs	0.14
11/27 03:30	-0.17cfs	0.13
11/28 03:30	-3.8 cfs	0.13

On October 19/20, 2011 USGS conducted Field Measurements Acoustic Doppler data collection was suspended from 08:30 until 15:30 allowing 15 minute dS/dt calculated component to be reported. Calculated versus field measurement discharge is shown in the following table.

Number	Date	Time	Stream flow (ft^3/s)	Calculated Flow Real Time Data (ft^3/s)	
180	2011-10-20	05:51	76.2	64	84%
179	2011-10-20	05:24	75.4	59	78%
178	2011-10-19	14:46:30	68.2	51	75%
177	2011-10-19	14:18:30	59.0	51	86%
176	2011-10-19	13:46	59.8	55	92%
175	2011-10-19	13:25	55.8	46	82%
174	2011-10-19	12:54:30	50.6	50	99%
173	2011-10-19	12:26:30	55.8	49	88%
172	2011-10-19	11:59	52.9	45	85%
171	2011-10-19	11:25:30	49.8	49	98%

170	2011-10-19	10:51	43.8	44	100%
169	2011-10-19	10:24	45.2	52	115%

SUMMARY/CONCLUSION

With over 15 months of review the difference between estimated data and a defined MFL should be better understood. Also, the methods by with measurement/monitor compliance will be handled should be more confidently understood and scientifically verifiable.

Protecting and managing a resource as valuable as water to the future economy of the Springs Coast and the ecology of Outstanding Florida Waters in the area is a responsibility that will be assessed in the future. May be if some of the long term residents are respected when they say harm is already evident in the Homosassa River (major increase in barnacle growth, reduced fish population and noticeable flow reductions) the task will be easier.

From:	Doug Leeper
To:	"dennisblauer@tampabay.rr.com"
Cc:	Mike Heyl; Mark Barcelo
Bcc:	Amy K. Harroun; Barbara Matrone; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Kenneth R. Herd; Lou Kavouras; Mark Hammond; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez
Subject:	Response to Comments on Chassahowitzka Minimum Flows
Date:	Monday, January 09, 2012 12:02:00 PM

Mr. Blauer:

I'm writing to thank you for recent comments concerning development of minimum flows for the Chassahowitzka River system. Your comments (see below) were directed to my boss, Marty Kelly, who has recently retired. I have been granted access to his e-mail account and seeing your e-mail in his in-box, I thought it would be appropriate to respond to your input.

Please note that all comments on proposed minimum flows for the river system will be reviewed by staff and made available to the District Governing Board for their consideration when they discuss rule amendments pertaining to the minimum flows.

Thanks again for your comments. Please contact me or my colleague Mike Heyl (mike.heyl@watermatters.org) if you have any additional comments or questions concerning development of minimum flows or other water management issues.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

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From: dennisblauer@tampabay.rr.com
To: Marty Kelly; Mark Barcelo
Cc: djb5767@tampabay.rr.com; dennisblauer@tampabay.rr.com; emoore11@tampabay.rr.com
Subject: mfls Chassahowitzka River
Date: Monday, December 26, 2011 7:39:38 AM

As a concerned waterway user and water consumer in West Central Florida, Homosassa area, I wholeheartedly disagree with a 15% reduction in flow being allowed to happen on the Chassahowitzka River. This pristine river has already been significantly degraded in the twenty years i've been recreating on it. Where there used to be flowing green grasses, there is only black muck. Where aquamarine pools used to indicate springs, there are murky, uninviting cavities. If you allow a 15% reduction in flow on this river, you will contribute to this river's degradation and decrease the quality of life for me and many others. Instead of a river known for life supporting oases, it will become a fetid flow from swampy anuses.

With the development happening at a nearby crossroads (98 & 19) Chassahowitzka could easily be

developed into a showcase of what's right about Florida! But in order for it to happen, the Chassahowitzka River MUST be protected from actions like flow reduction.

Instead, please establish an ambitious standard to protect this glorious treasure, allowing NO reduction in flow, thereby shifting the efforts to water conservation which will be important for Florida, regardless, in the coming years.

i beg of you, do not allow this proposed 15% reduction in flow to happen!

Dennis Blauer
<><><><><><><><><><><>

From: Ron Miller
To: Doug Leeper
Subject: MFL Plans?
Date: Friday, January 13, 2012 3:10:41 PM

Hi Doug,

Things on the Springs Coast MFL front have been quiet for a while. What are your plans for the next step?

Hope all is well with you.

Ron

From: Doug Leeper
To: "Ron Miller"
Subject: RE: MFL Plans?
Date: Friday, January 13, 2012 3:58:00 PM

Ron – Your e-mail was prescient, as I was working on the minimum flows status update e-mail that was just sent out…

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Ron Miller [mailto:rmille76@tampabay.rr.com]
Sent: Friday, January 13, 2012 3:11 PM
To: Doug Leeper
Subject: MFL Plans?

Hi Doug,

Things on the Springs Coast MFL front have been quiet for a while. What are your plans for the next step?

Hope all is well with you.

Ron

From: Doug Leeper
To: Martyn Johnson (martynellijay@hotmail.com)
Cc: Ron Basso; Mike Heyl
Subject: Response to E-Mails
Date: Friday, January 13, 2012 4:07:00 PM

Hi Martyn:

I'm writing to let you know that I am quite a bit behind in responding to e-mails, but rest assured I expect to soon find time to review and respond to your recent inquiries.

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: Doug Leeper
To: Hilliard, Dan (2buntings@comcast.net)
Cc: Ron Basso; Mike Heyl
Subject: Response to WAR Letter
Date: Friday, January 13, 2012 4:10:00 PM

Dan – Just wanted to let you know that I am still behind with regard to development of a response document to the letter concerning the Springs Coast minimum flows you sent to the District on behalf of the Withlacoochee Area Residents. This task is still on my radar…

Douglas A. Leeper
Chief Environmental Scientist
Resource Projects Department
Southwest Florida Water Management District
2379 Broad Street
Brooksville, Florida 34604-6899
1-800-423-1476, ext. 4272 (FL only)
352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

January 25, 2011

MEMORANDUM

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on January 10, 2011 regarding recommended minimum flows for the Homosassa River system

---

This memorandum was produced to document two e-mails submitted to the Southwest Florida Water Management District by Mr. Martyn Johnson on January 10, 2011. The e-mails generally concern development of minimum flows for the Homosassa River system, and specifically address the discussion that ensued during the rule development public workshop on the proposed minimum flows that was held in Lecanto on January 6, 2011. With regard to potential flow reductions associated with establishment of minimum flows for the river system, Mr. Johnson asks in his correspondence that the District "*[p]lease consider recommending and approving the setting of minimum flows at NO FURTHER REDUCTION at this point in time.*"

Excerpts from Mr. Johnson's first e-mail that include specific questions addressed to staff are reproduced below in italics, and followed by staff responses. Development of staff responses to Mr. Johnson's second e-mail was considered unnecessary, as the correspondence did not include any direct questions and was apparently provided for information purposes only. Mr. Johnson's two e-mails are reproduced in their entirety as attachments to this memorandum, to provide context for his perspective on the currently recommended minimum flows for the Homosassa River system.

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Excerpt No. 1 from Mr. Johnson's E-Mail (Attachment A)

"While the presentation regarding low rainfalls over the last 20 years or more was certainly highly important to changes, it should not be used as a defense for withdrawals having little or no influence. At one point, later in the meeting, Doug commenting that flows would increase ***when*** *rainfall increases. The analytical mind in me says this should have been* ***if*** *rainfall increases. Moreover, if rainfall levels should return to those of the 50s, 60s, and 70s, how long will it take for the river to recover? Recovery is by nature a much longer time frame than destruction."*

Staff Response to Excerpt No. 1

Staff agrees that Mr. Leeper should have noted that flows in the Homosassa River system may be expected to increase if rainfall increases. Staff expects that the response time for changes in flows in the river system as a function of changes in rainfall may be observed on a seasonal or shorter-term basis.

Excerpt No. 2 from Mr. Johnson's First E-Mail (Attachment A)

"An issue that was touched on in questions a number of times was about granting well permits. Questions about the new well field, Chassahowitzka, were frequent. One member of the audience asked if SWFWMD ever refused permits. This question became lost among all the others, and unfortunately, it was never answered. (This is not a criticism, as Doug fielded a lot of questions very well). So, let me ask the question in writing: how many well permit applications has SWFWMD received and how many have actually been denied? A timeframe of your choosing needs to be attached to that question.
From people who have some knowledge of the Citrus County permits for small domestic wells, all appear to be granted providing appropriate paperwork and fees are filed. I plan on following up with the County regarding this matter."

Staff Response to Excerpt No. 2

The District issues both well construction permits and water-use permits for groundwater withdrawals. Issuance of well construction permits ensures that wells are properly constructed to protect water resources. Water use permits are issued to allow for legal withdrawal of specific quantities of ground or surface water for limited periods of time in accordance with permit conditions. Water use permits are required for groundwater withdrawals if the planned withdrawal involves more than 100,000 gallons per day, or the outside diameter of the planned well is six inches in diameter or larger, or the total withdrawal capacity associated a planned system of withdrawal points is one or more million gallons per day. Similar requirements apply to the need for a permit associated with a surface withdrawal, although the size threshold for the outside diameter of the withdrawal pipe is four inches, rather than six inches. Withdrawals associated with personal domestic use for an individual residence are typically below the threshold that requires issuance of a water use permit, but if an individual withdrawal involves a well, a well construction permit is required prior to installation of the well.

With regard to well construction permitting, staff reviews permit requests to ensure that the proposed construction activity is in compliance with District and Florida Department of Environmental Protection rules addressing well construction and water use permitting. Permits are issued if the proposed construction activity meets rule requirements and any necessary water use permitting conditions are also met. In the instances when well construction meets rule criteria and a water use permit is required, but is to be denied, the request for a well construction permit is also denied. Review of the District's Well Construction Database indicates that 213 and 941 permits were issued for withdrawals in Citrus County during the past year and past three years, respectively. A total of seven well construction permits evaluated last year were determined to not meet conditions for issuance and were, therefore, not issued. These seven permits were not formally denied, but could be if the permit requestors cannot meet the conditions for issuance and do not withdraw their permit requests.

With regard to water-use permitting, staff reviews permit requests to ensure that any requested withdrawal is reasonable and beneficial, does not impact an existing legal user and is in the public interest and meets other requirements in District rules. This review process may involve or result in reductions in the quantity of water that may be withdrawn, restrictions on the period during which withdrawals may occur, relocation of the proposed withdrawal site, requirements for environmental

monitoring, and identification and use of alternative water sources (*e*.g., surface water vs. groundwater). Fewer than ten of the hundreds of surface- and groundwater use permit requests received by the Brooksville Regulation Department during the past three years were not issued. Note that this department of the District handles water use permitting for withdrawals in the northern portion of the District, which includes Citrus County, Hernando County, Pasco County, Sumter County, and portions of Lake, Levy and Marion counties. In the instances when a permit was not issued, the parties requesting the permits withdrew their request in response to District initiation of the denial process, or failed to respond to a District request for additional information that was needed for review of the requested permits. In addition to these cases, a number of parties in the Department service area were dissuaded from applying for a water use permit during the past three years, based on initial communications with staff regarding the possibility or feasibility of issuance of a permit associated with the requested withdrawal.

DAL
Attachments: Attachment A - Four page e-mail from Mr. Martyn Johnson dated January 10, 2011
Attachment B - One page e-mail from Mr. Martyn Johnson dated January 10, 2011

Attachment A
Four Page Attachment to January 25, 2011 Memorandum on Questions and Comments Submitted by Mr. Martyn Johnson on January 10, 2011

From: Alan Martyn Johnson
To: Doug Leeper; Ron Basso
Subject: Lecanto Workshop Homosassa Minumum Flows
Date: Monday, January 10, 2011 11:24:24 AM

Doug and Ron,
I would like to follow up on a few points from last Thursday evenings workshop in Lecanto. But, first a Thank You to both of you for a good professional job in front of an audience who are deeply concerned by the deterioration they have witnessed in the Homosassa River over the years.

Skeptical audience
Notable were comments from long time residents who have seen the river on a daily basis for over 50 years and those from former government employees who patrolled the waterways for over 20 years. They stated that the river has changed/deteriorated; flows have reduced, vegetation has changed, fish and wildlife have changed. They and others frequently mentioned recent and major barnacle growths where they were never seen before. There is clear observed evidence of salt water intrusion/salinity increases and the associated negative impact on this unique river.
The scientific studies and data analyses can be interpreted in many ways, as can the intent of statute No 373.042., passed in 1972. Underlying these is the fact that almost four percent of the rainfall on Citrus County (770 sq mls.), after subtracting evapotranspiration, (52 inches minus 32 inches evapotranspiration and without considering surface run-off) over is now pumped out of the ground. In the 70's the withdrawals were just over one percent on the same basis. While four percent may not appear that high, people are skeptical about this having no impact. A skepticism that is further enhanced by suggesting that there is limited or no lateral flow in the aquifer to areas where large drops in the aquifer levels have been recorded (brown shaded areas on the presented slide). Skepticism that is fueled by comments that this area is like the Saudi Arabia for Florida water; a very worrying concept that we have heard at both workshops .
You heard a number of questions about why has almost 40 years delay in setting minimum flows and levels occurred since the legislation passed. And why levels for the baseline for significant harm should not be from the time legislation was passed. There was due reason to pass the legislation in 1972. Regarding the delay, 'We did not have the data' is an argument, but not one that appeared to convince many who attended the workshop.
While the presentation regarding low rainfalls over the last 20 years or more was certainly highly important to changes, it should not be used as a defense for withdrawals having little or no influence. At one point, later in the meeting, Doug commenting that flows would increase **when** rainfall increases. The analytical mind in me says this should have been **if** rainfall increases. Moreover, if rainfall levels should return to those of the 50s, 60s, and 70s, how long will it take for the river to recover? Recovery is by nature a much longer time frame than destruction.

Modeling

Ron did a good job at explaining the Northern District Model, despite the many questions and interruptions during his presentation. Nevertheless, the quote he mentioned near the end of his presentation, 'paraphrasing', that models are never right, but are often useful, is apropos. There was an emphasis on the vertical sections of the model but little explanation of transition from one column to adjacent ones, a critical factor in how water moves in the aquifer to the springs.

Well Permits

An issue that was touched on in questions a number of times was about granting well permits. Questions about the new well field, Chassahowitzka, were frequent. One member of the audience asked if SWFWMD ever refused permits. This question became lost among all the others, and unfortunately, it was never answered. (This is not a criticism, as Doug fielded a lot of questions very well). So, let me ask the question in writing: how many well permit applications has SWFWMD received and how many have actually been denied? A timeframe of your choosing needs to be attached to that question.

From people who have some knowledge of the Citrus County permits for small domestic wells, all appear to be granted providing appropriate paperwork and fees are filed. I plan on following up with the County regarding this matter.

Spring Water Quality

Later in the meeting a few questions were asked about spring water quality and how it is changing. One comment was regarding the deterioration of the spring that was historically used as the Homosassa drinking water source, and how it has 'gone bad' in recent years. I was unaware of that fact until the workshop. It is strong evidence of how the spring water quality is changing for the worse. Concerning that this was not mentioned in the report.

You may recall my mention about how critical the quality of water from the SE Fork is, with its significantly lower salinity; and how devastating some catastrophic collapse in the caverns feeding these springs could be to the river. **I appreciated Doug's quick thinking that maybe a minimum flow for each of the critical spring groups may be worth considering in the proposal, rather than simply a minimum flow for the combined springs.** That thought from Doug spoke volumes of the professionalism and genuine concerns regarding the task you are undertaking.

Spring Flow Measurements

Finally, I would like you to pass on my apology to your colleague at the back of the room for disagreeing with him about flow variations from the springs with tidal level. It was late in the meeting, and there was little point in detailed discussion at that time. But let me expand here.

The USGS discharge figure from the three main springs is a calculated figure from the equation:

$Q = 90.8162 + 3.823(GW) – 20(GH)$

GH at the site is recorded every 15 minutes, GW at Weeki Wachee is one figure for the day. This equation is a mathematical best fit, not an empirical measurement of stream flow or measurements in the three vents. It is a leap of faith to say 96 gage height measurements and one aquifer level are 96 measurements of discharge each day…there are **96 calculated discharge** which as commented by Fulcher and quoted in the draft report are subject to a 15% standard error.

I have to point out to your colleague that measuring flow in the channel exiting the springs (about 100 feet from the spring vents) is not easy in the channel that is roughly 50 feet wide, 4 feet deep subject to a regular level change of about 1-1.5 ft. Just assuming a steady 80 cfs this equates to a velocity of between 0.3 and 0.4 ft/sec on high versus low tide even assuming laminar flow which is certainly not true. In connection with this a brief review of the accuracy and use of Acoustic Doppler Current Profilers was undertaken.
FYI for your colleague the two most recent field measurements at the Homosassa Springs Site are:

2010-12-08 @ 16:11:30 94.2 cfs

Calculated results in the record are:	@16:00	92 cfs
	@16:15	92 cfs

2010-10-13 @ 14:54:30 83.1 cfs

Calculated results in the record are:	@14:45	71cfs
	@15:00	72 cfs
	@15:15	73 cfs

Did I select these figures to make a point? No they are simply the two that are easily referenced in the USGS real time data records that are on line. Please feel free to double check these in case I have made a typographical error.
Looking at the SE Fork field measurements in the same way:

2010-12-09 @16:21 55.1 cfs

Calculated results in the record are:	@16:15	66 cfs
	@16:30	66 cfs

2010-10-06	@14:14	51.3 cfs
	@14:21	44.8 cfs
	@14:29	49.2 cfs
	@14:34	44.8 cfs

Calculated results in the record are:	@14:15	61 cfs
	@14:30	52 cfs
	@14:45	52 cfs

Note; the equation used by USGS for SE Fork is different.

I have no doubt that USGS try to do the best they can, but knowing how the data is derived avoids leaps of faith to present/believe the data as absolute measurements.

Looking carefully at all this I ask myself why is the aquifer level at Weeki Wachee used as the head for spring flow in the equations; it is not even in the Homosassa Groundwater Basin. Yes I know more questions than answers, but blind acceptance of data is dangerous.

In Summary
Doug, Ron, your Staff and SWFWMD Board,
You have a difficult task to perform in setting minimum flows. The data, while the best available, has:

- intrinsic errors which cannot be ignored,
- assumptions in both data analyses and modeling,
- limited results showing the situation when the legislation was passed,
- limited results confirming the observed deterioration e.g. barnacles

· no way of predicting the future critical areas such as rainfall
· averages…….as opposed to tends in chemical analyses (being addressed)

It is clear that the Homosassa River has deteriorated possibly to the point that irreparable harm has already occurred. Recovery is certainly dependent on IF rainfall returns to the levels seen 20+ years ago. Further increasing withdrawals of groundwater without increased rainfall and better/more accurate science is taking unnecessary risks.
Please consider recommending and approving the setting of minimum flows at NO FURTHER REDUCTION at this point in time. As pointed out in the letter from the Homosassa River Alliance hundreds of millions of dollars have been invested to protect the river system. To not recognize the delicate balance of the unique river system in the decision making process to allow more groundwater withdrawals may prove to be irresponsible. This area is not Saudi Arabia…there is unique ecology to protect, not a barren terrain with a resource below. But, that is the task you have, responsible management. By comments and questions I trust we help make the management decisions more informed and more responsibly balanced.

Thank you for allowing us the opportunity to be involved.

Martyn Johnson

Attachment B
One Page Attachment to January 25, 2011 Memorandum on Questions and Comments Submitted by Mr. Martyn Johnson on January 10, 2011

From: Alan Martyn Johnson
To: Doug Leeper; Ron Basso
Subject: Follow Up to e-mail sent a few minutes ago
Date: Monday, January 10, 2011 12:16:15 PM

I have just followed up on the well used by the Homosassa Special Water District that was commented on at Thursdays workshop as having 'gone bad'.

THIS WELL WAS 'CAPPED' ABOUT 20 YEARS AGO, THEREFORE IT IS VERY UNDERSTANDABLE WHY IT WAS NOT MENTIONED IN THE REPORT. MY APOLOGY FOR NOT CHECKING THIS BEFORE SENDING THE E-MAIL.

I did however learn that the wells in use are considered to have a 5 year travel time at depths of 330-340 feet. Initial though is that it takes the aquifer a long time to react with travel at inches per day!!!

Martyn Johnson

From:	Alan Martyn Johnson
To:	Doug Leeper; Marty Kelly; Ron Basso; Ron Miller; Al Grubman; Brad Rimbey; Norman Hopkins; Brent Whitley; Dana Bryan; Kevin J Grimsley; rkane; R Rodriguez; J Weaver; robert.knight@bocc.citrus.fl.us; rebecca.bays@bocc.citrus.fl.us
Subject:	Chassahowitzka Discharge Jan 2010 thru Dec 2011
Date:	Thursday, January 12, 2012 12:33:39 PM
Attachments:	Chass Discharge Jan 2010 Dec 2011.xls

A few days ago I shared some data regarding discharge for the Homosassa River system.

Although I have not been as involved with the Chassahowitzka I took the time to look at the last two years data for Chassahowitzka in the same way.

The Executive Summary of the Chassahowitzka November 2010 Draft Report states:

- The median flow of the Chassahowitzka River based on estimated and measured flows for the baseline period (1967-2007) used for determination of the minimum flows recommended in this report was 63 cubic feet per second (cfs).

- Therefore, it is recommended that the minimum flow for the Chassahowitzka River system (including all contributing springs and associated creeks) be maintained at 89 percent of the baseline flow.

The attached spreadsheet shows the daily mean discharge data as reported by USGS for the Chassahowitzka Gage Site 02310650 from Jan 1, 2010 thru Dec 31, 2011. For days on which mean discharge is reported (712 days) 46% of the days were at or below the recommended MFL and only 10% of the days was flow above the baseline.

When reviewing this data I recalled a question I asked late August 2011 about the equation used to calculate the discharge for the Chass as the equation in the Yobbi and Knochenmus Report did not match the reported results.

I was told the USGS does not share the equations.

In the spreadsheet you will note for 08/13/2011 thru 08/18/2011 the entries are P Eqp .

Although in no way conclusive, it is possible that someone made a change in the equation used to calculate discharge in mid August 2011.

So, I compared reported data before and after 08/13/2011. The data is in the spreadsheet; before 52% of the days discharge was at/below the recommended MFL after it was 16%. Similarly, for days discharge was at/above the base line 7% before and 28% after.

A part of these higher calculated discharges are due to levels in the Weeki Wachee well being slightly higher during the latter months of 2011; particularly October 2011. This is also evident in the Homosassa data shared the other day, but the figures for the Chassahowitzka are much more than appears to be related to Weeki Wachee well levels alone.

This deserves comment/explanation from SWFWMD/USGS.

The point of this e-mail is to draw attention to the fact the calculated discharge into the

Chassahowitzka has frequently been below the recommended MFL during the last two years. The data source is the same as used to develop the recommended minimum flow which results in significant harm.

As always comments and corrections welcome.

Martyn

From: 2buntings
To: Doug Leeper
Subject: Re: Response to WAR Letter
Date: Friday, January 13, 2012 4:44:22 PM

Doug,

Never doubted that. We are, if nothing else, patient.

Appreciate the notice in your other email regarding the change in schedule with the Governing Board re: Springs Coast MFL.

Dan

On 1/13/2012 4:10 PM, Doug Leeper wrote:

> Dan – Just wanted to let you know that I am still behind with regard to development of a response document to the letter concerning the Springs Coast minimum flows you sent to the District on behalf of the Withlacoochee Area Residents. This task is still on my radar…
>
> Douglas A. Leeper
> Chief Environmental Scientist
> Resource Projects Department
> Southwest Florida Water Management District
> 2379 Broad Street
> Brooksville, Florida 34604-6899
> 1-800-423-1476, ext. 4272 (FL only)
> 352-796-7211, ext. 4272
> 352-754-6885 (Fax)
> doug.leeper@watermatters.org
>
>

--
Dan Hilliard
Director
W.A.R. Inc.(501.C3)
352/447-5434
WWW.WARINCONLINE.COM

From: cathyharrelson@gmail.com on behalf of Cathy Harrelson
To: Doug Leeper
Subject: Re: Update - Chassahowitzka and Homosassa Minimum Flows
Date: Friday, January 13, 2012 7:38:30 PM

Doug,
Thank you for this status update. By the way, I was looking for a way to contact the members of the Governing Board. Their contact information is not on the SWFWMD website. I assume this information is public record? Would you have any idea where it might be found?

Thanks again for keeping us informed.

Sincerely,
Cathy Harrelson
Florida Organizer
Gulf Restoration Network
cathy@healthygulf.org
727-415-8805

http://healthygulf.org/

On Fri, Jan 13, 2012 at 3:55 PM, Doug Leeper <Doug.Leeper@swfwmd.state.fl.us> wrote:

> Greetings:
>
> I'm writing to provide an update on the status of minimum flows development for the Chassahowitzka and Homosassa River systems by the Southwest Florida Water Management District. The District would like to make it as convenient as possible for the stakeholders to review final reports and attend the Governing Board meeting where the information will be presented. To provide staff the necessary time to consider public concerns, complete revisions, and provide stakeholders an opportunity to review the revised reports, District staff will not be presenting the proposed minimum flows rule amendments to the District Governing Board until April.
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>
> Please feel free to contact me directly if you have any questions concerning the updated schedule for development of minimum flows for the Chassahowitzka and Homosassa River systems, or other water management issues.

Douglas A. Leeper

Chief Environmental Scientist

Resource Projects Department

Southwest Florida Water Management District

2379 Broad Street

Brooksville, Florida 34604-6899

1-800-423-1476, ext. 4272 (FL only)

352-796-7211, ext. 4272

352-754-6885 (Fax)

doug.leeper@watermatters.org

--

From: Doug Leeper
To: "cathyharrelson@gmail.com"
Cc: Lou Kavouras
Subject: RE: Update - Chassahowitzka and Homosassa Minimum Flows
Date: Tuesday, January 17, 2012 8:49:00 AM

Hi Cathy:

Thanks for your continued interest in the development of minimum flows on the Springs Coast. Regarding your questions about contacting the District Governing Board members, you may address e-mail correspondence to executive@watermatters.org, and note in the body or subject line of the e-mail that you are directing the communication to the Governing Board. For correspondence through the U.S. Mail, you can address letters to the Governing Board Chair, Mr. H. Paul Senft, Jr.

Using either the e-mail or written-letter approach outlined above, you can be sure that your correspondence will be directed to all Board members and appropriate staff.

Let me know if you have any further questions regarding communications with the Governing Board or other water management issues.

Douglas A. Leeper
Chief Environmental Scientist
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Brooksville, Florida 34604-6899
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352-796-7211, ext. 4272
352-754-6885 (Fax)
doug.leeper@watermatters.org

From: cathyharrelson@gmail.com [mailto:cathyharrelson@gmail.com] **On Behalf Of** Cathy Harrelson
Sent: Friday, January 13, 2012 7:38 PM
To: Doug Leeper
Subject: Re: Update - Chassahowitzka and Homosassa Minimum Flows

Doug,
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doug.leeper@watermatters.org

--

From: Beverly Overa
To: Doug Leeper
Subject: RE: Update - Chassahowitzka and Homosassa Minimum Flows
Date: Sunday, January 15, 2012 10:20:13 AM

Doug,
Thank you for the heads-up. Wise decision on the time issue.

Beverly Overa
boverly@tampabay.rr.com

From: Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]
Sent: Friday, January 13, 2012 3:55 PM
To: Al Grubman (grubman1@gmail.com); Bill Geiger (bgeiger@cityofbrooksville.us); Bill Pouder (bill.pouder@myfwc.com); Boyd Blihovde (Boyd_Blihovde@fws.gov); Brad Rimbey (BWR.CRRC@tampabay.rr.com); Brent Whitley (brentwhitley@sierra-properties.com); Brockway, Alys (abrockway@co.hernando.fl.us); Dennis D. Dutcher (Dennis3ds@aol.com); Frank DiGiovanni (administration@inverness-fl.gov); Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us); Helen Spive; Hilliard, Dan (2buntings@comcast.net); Hoehn, Ted; Hope Corona (hopecorona@tampabay.rr.com); Jim Farley (jfarley682@aol.com); Katie Tripp (ktripp@savethemanatee.org); Norman Hopkins (norman@amyhrf.org); Rebecca Bays (rebecca.bays@bocc.citrus.fl.us); Richard Kane (rkane@usgs.gov); Richard Radacky (rradacky@cityofbrooksville.us); Ron Miller (rmille76@tampabay.rr.com); Sarah Tenison (cityofweekiwachee@yahoo.com); Sulllivan, Jack (jsullivan@carltonfields.com); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us); Whitey Markle (whmarkle@gmail.com); (janicehowie@aol.com); Abdon Sidibie (asidibie@chronicle.online.com); Alex McPherson (aamcpherson@msn.com); Ann - 2 Hodgson (ahodgson@gmail.com); Ann Hodgson (ahodgson@audubon.org); Bernard Berauer (bfberauer@aol.com); Beverly Overa (boverly@tampabay.rr.com); Bill Garvin (wgarvin@tampabay.rr.com); Bob Caldwell (Bobcaldwell51@yahoo.com); Brack Barker (brack154@msn.com); Carl Mattthai (thebabesmimi@gmail.com); Casey, Emily (fcnwr@atlantic.net); Charles Dean (dean.charles.web@flsenate.gov); Charles Stonerock (katcha.stonerock3@gmail.com); Chris Safos (chrissafos@embarqmail.com); Czerwinski, Mike (mczerwin@tampabay.rr.com); Darlene Herth (2cetechnology21@gmail.com); Darrell Snedecor (president@citruscountyaudubon.com); Don Hiers (dhiers3@gmail.com); Douglas Dame (doug_dame@yahoo.com); Elaine Luther (barneyandcap@hotmail.com); Emily Casey (ecasey21@hotmail.com); Emma Knight (eknight@wetlandsolutionsinc.com); George Harbin (gharbin@tampabay.rr.com); George McClog (classof47@gmail.com); Gorgon O'Connor (gorgon_o@yahoo.com); Harry Steiner (harry109@aol.com); Jack Calbeck (calbeckj@citrus.k12.fl.us); jane Perrin (jcsperrinmd@sbcglobal.net); Jerry Morton (JerrMorton@aol.com); Jessie Gourlie (gourliej@thirdplanetwind.com); Jim Collins (jimmiekey22@yahoo.com); Jimmie Smith (Jimmie.Smith@myfloridahouse.gov); Joe Calamari; John Lord (jclord109@yahoo.com); John Mayo (freedomway1@gmail.com); Karen Johnstone (kjohns213@sbcglobal.net); Kim Caldwell (caldwell.kimberly@yahoo.com); Kim Dinkins (kim.dinkins@marioncountyfl.org); Linda Pierce (tpierce35@tampabay.rr.com); Linda Vanderveen (hernandoaudubon@yahoo.com); Mary Anne Lynn (mlynn1978@tampabay.rr.com); Matthew Corona (mcorona1@tampabay.rr.com); Max Rhinesmith (rhinesmith@webtv.net); Amber Breland; Andy Houston (ahouston@crystalriverfl.org); Art Yerian (Al.Yerian@dep.state.fl.us); Ben Weiss; Beth Hovinde; Brad Thorpe (brad.thorpe@bocc.citrus.fl.us); Courtney Edwards (cedwards@savethemanatee.org); Dale Jones (Jones@MyFWC.com); Dana Bryan (dana.bryan@dep.state.fl.us); Darrell Snedecor; David Hamilton (countyadministrator@hernandocounty.us); David Hankla (david_hankla@fws.gov); Don Wright (wright@sura.org); Dusty McDevitt (mcdevitt@usgs.gov); Ed Call (marvin.call@MyFWC.com); Eric Nagid (eric.nagid@MyFWC.com); FFWCC MFLs Review E-Mail Address (fwcconservationplanningservices@myfwc.com); J. J. Kenney (jj.kenney@bocc.citrus.fl.us); Jennene Norman-Vacha (jnvacha@ci.brooksville.fl.us); Joyce_Kleen@fws.gov; Kandi Harper (kandi.harper@bocc.citrus.fl.us); Keith Ramos (Keith.Ramos@fws.gov); Kent Smith

(kent.smith2@myfwc.com); Kevin Grimsley (kjgrims@usgs.gov); Michael Lusk (Michael_Lusk@fws.gov); Mitchell Newberger (mnewberger@verizon.net); Nick Robbins (Nick.Robbins@dep.state.fl.us); Nicole Adimey (Nicole_Adimey@fws.gov); Paul Thomas (paulw.thomas@MyFWC.com); Ron Mezich (ron.mezich@MyFWC.com); Shelly Yaun (shelly.yaun@dep.state.fl.us); Toby Brewer (Toby.Brewer@dep.state.fl.us); Tracy Colson; Wallace, Traci; Adkins, Jim; Bitter, Jim; Bryant, Richard; Cantero, Vince; Carpenter, Paul; Daniels, Chase; Dueker, Duane; Gramling, Hugh; Harrelson, Cathy; Hubbell, Pete; Johnson, Eric; Johnson, Martyn; Keim, Robert; Kincaid, Todd; Kline, Allen; Knight, Bob; Knight, Robert; Knudson, Ross; Overa, Tom; Owen, Rick; Parrow, Liz; Rolf Auermann (rauerman@tampabay.rr.com); Rusnak, Teddi; Tarochinoe, Joseph; Watkins, Priscilla; Watrous, Russell; Wilson, Roger
Cc: Amy K. Harroun; Barbara Matrone; Cara S. Martin; Chris Zajac; Darcy A. Brune; Dave Dewitt; Doug Leeper; Gary E. Williams; Jay Yingling; Karen Lloyd; Ken Weber; Kenneth R. Herd; Laura Donaldson; Lou Kavouras; Mark Barcelo; Mark Hammond; Mike Heyl; Paul Williams; Robyn O. Felix; Ron Basso; Sid Flannery; Veronica Craw; Xinjian Chen; Yassert Gonzalez
Subject: Update - Chassahowitzka and Homosassa Minimum Flows

Greetings:

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doug.leeper@watermatters.org

From: Voyles, Carolyn
To: Doug Leeper
Subject: Springs Coast Update
Date: Monday, January 16, 2012 2:10:13 PM

Hi Doug!

What is going on with the Springs Coast issues? Have you made any decisions about your approach?

I hope all is well.

Thanks.

Carolyn Voyles
Office of Water Policy
FL Dept. of Environmental Protection
3900 Commonwealth Blvd., MS 46
Tallahassee, FL 32399-3000
(850) 245-3150 (office)
(850) 245-3145 (fax)

From:	cathyharrelson@gmail.com on behalf of Cathy Harrelson
To:	Doug Leeper
Cc:	Lou Kavouras
Subject:	Re: Update - Chassahowitzka and Homosassa Minimum Flows
Date:	Tuesday, January 17, 2012 10:20:31 AM

Thank you, Doug. I was hoping to meet with the members individually, but I'll start with email correspondence. I appreciate your help.

Sincerely,

Cathy Harrelson
Florida Organizer
Gulf Restoration Network
cathy@healthygulf.org
727-415-8805

http://healthygulf.org/

On Tue, Jan 17, 2012 at 8:49 AM, Doug Leeper <Doug.Leeper@swfwmd.state.fl.us> wrote:

> Hi Cathy:
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Sent: Friday, January 13, 2012 7:38 PM
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From: Doug Leeper
To: "cathyharrelson@gmail.com"
Bcc: Lou Kavouras; Lou Kavouras
Subject: Board Member Contact Info Follow-Up
Date: Tuesday, January 17, 2012 10:43:00 AM

Cathy –

After reading your most recent e-mail, I contacted Dianna Brass, an Administrative Supervisor with the District's Board and Executive Services Department, to learn more about how one would go about directly contacting individual Governing Board members. Dianna indicated that you may give her or one of her colleagues in the Executive Department a call to obtain contact information for individual Governing Board members. To reach Dianna or another helpful person in her department, call the District at 1-800-423-1476, and ask for Dianna specifically, or simply ask to speak with someone in the Executive Department.

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Subject: Re: Update - Chassahowitzka and Homosassa Minimum Flows

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From: cathyharrelson@gmail.com on behalf of Cathy Harrelson
To: Doug Leeper
Subject: Re: Board Member Contact Info Follow-Up
Date: Tuesday, January 17, 2012 11:10:04 AM

Thanks Doug. I've found over the years that a face to face meeting can be pretty useful. I'll give Dianna/her department a call. Again I appreciate your help.
Cathy

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From: cathyharrelson@gmail.com on behalf of Cathy Harrelson
To: Doug Leeper
Subject: Re: Board Member Contact Info Follow-Up
Date: Tuesday, January 17, 2012 11:12:32 AM

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From: Doug Leeper
To: "cathyharrelson@gmail.com"
Bcc: Dianna Brass; Lou Kavouras
Subject: RE: Board Member Contact Info Follow-Up
Date: Tuesday, January 17, 2012 12:28:00 PM

Cathy:

I believe you are correct with regard to meeting with District Governing Board members individually; the Board does operate in the "Sunshine"

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