

September 27, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning a water quality change/event in the  
Homosassa Main Springs Run

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This memorandum documents correspondence between Mr. Mike Czerwinski, Mr. Dave DeWitt and Mr. Doug Leeper, and others regarding a change in water quality in the Homosassa main spring run. Copies of electronic mails associated with this issue are attached to this memorandum.

DAL  
Attachments

**From:** [Dave Dewitt](#)  
**To:** [Doug Leeper](#)  
**Subject:** FW: Homosassa fissure  
**Date:** Thursday, June 23, 2011 9:19:58 AM  
**Attachments:** [DSC02234.jpg](#)

---

Doug, this in from Homosassa, they think this fracture in the spring pool is new, and there apparently is water springing from it. I didn't notice it before, but I'm not aware of every crack and block of rock in the spring pool, so I will take their word for it. There are other spring vents in the open pool, other than the main cave tunnels that we sample, and if this is a new vent, it probably is just diverting discharge from one or more of the other spring vents that make up the headsprings.

David J. DeWitt, P.G.  
Water Quality Monitoring Program  
Resource Data and Restoration Department  
Southwest Florida Water Management District  
2379 Broad Street, Brooksville, Florida 34604  
352-796-7211, ext. 4512  
fax. 352-540-6056

---

**From:** David DeWitt [mailto:[dewitt.fl@gmail.com](mailto:dewitt.fl@gmail.com)]  
**Sent:** Wednesday, June 22, 2011 6:31 PM  
**To:** Dave Dewitt  
**Subject:** Fwd: Homosassa fissure

----- Forwarded message -----

**From:** **Bryan, Dana** <[Dana.Bryan@dep.state.fl.us](mailto:Dana.Bryan@dep.state.fl.us)>  
**Date:** Mon, Jun 20, 2011 at 4:12 PM  
**Subject:** Homosassa fissure  
**To:** "Cutts, William" <[William.Cutts@dep.state.fl.us](mailto:William.Cutts@dep.state.fl.us)>, "Harrington, Debra" <[Debra.Harrington@dep.state.fl.us](mailto:Debra.Harrington@dep.state.fl.us)>, "Hicks, Richard W." <[Richard.W.Hicks@dep.state.fl.us](mailto:Richard.W.Hicks@dep.state.fl.us)>, David DeWitt <[dewitt.fl@gmail.com](mailto:dewitt.fl@gmail.com)>, "Greenhalgh, Tom" <[Tom.Greenhalgh@dep.state.fl.us](mailto:Tom.Greenhalgh@dep.state.fl.us)>, "Maddox, Gary" <[Gary.Maddox@dep.state.fl.us](mailto:Gary.Maddox@dep.state.fl.us)>, "Means, Guy" <[Guy.Means@dep.state.fl.us](mailto:Guy.Means@dep.state.fl.us)>, "Arthur, Jonathan" <[Jonathan.Arthur@dep.state.fl.us](mailto:Jonathan.Arthur@dep.state.fl.us)>, "Owen, Richard" <[Richard.Owen@dep.state.fl.us](mailto:Richard.Owen@dep.state.fl.us)>

See below

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Florida Department of Environmental Protection  
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---

**From:** Yerian, Art  
**Sent:** Monday, June 20, 2011 4:10 PM  
**To:** Bryan, Dana  
**Cc:** Cutts, William; Harrington, Debra; Hicks, Richard W.; 'David DeWitt'; Greenhalgh, Tom; Maddox, Gary; Means, Guy; Arthur, Jonathan; Owen, Richard  
**Subject:** RE: other dive pics

It is located in front of the fishbowl. You can feel the water coming out and the inside edge is still white were it has opened. It is about 15/20ft. long crack. Art

*Art Yerian*

Art Yerian, Park Manager  
Ellie Schiller Homosassa Springs  
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Homosassa, Florida 34446-1168

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**Cc:** Cutts, William; Harrington, Debra; Hicks, Richard W.; 'David DeWitt'; Greenhalgh, Tom; Maddox, Gary; Means, Guy; Arthur, Jonathan; Owen, Richard  
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This is interesting news! Where is the crack? Is it a new vent?

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**From:** Yerian, Art  
**Sent:** Monday, June 20, 2011 4:03 PM  
**To:** Owen, Richard  
**Cc:** Cutts, William; Bryan, Dana  
**Subject:** FW: other dive pics

FYI – This photo shows the crack that opened when the spring water turned red for several days.



*Art Yerian*

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**From:** Doug Leeper  
**To:** [Ron Miller \(rmiller76@tampabay.rr.com\)](mailto:Rmiller76@tampabay.rr.com); [Czerwinski, Mike \(mczerwin@tampabay.rr.com\)](mailto:Czerwinski.Mike (mczerwin@tampabay.rr.com)); [Bill Garvin \(wgarvin@tampabay.rr.com\)](mailto:Bill.Garvin (wgarvin@tampabay.rr.com)); [Richard Kane \(rkane@usgs.gov\)](mailto:Richard.Kane (rkane@usgs.gov))  
**Cc:** [Kevin Grimsey \(kjgrims@usgs.gov\)](mailto:Kevin.Grimsey (kjgrims@usgs.gov)); [Ron Basso](#); [Marty Kelly](#); [Dave Dewitt](#)  
**Subject:** FW: Homosassa fissure  
**Date:** Friday, June 24, 2011 8:32:14 AM  
**Attachments:** [DSC02234.jpg](#)

---

FYI – Some follow-up information regarding our previous communications about the water-quality “event” that occurred in early March at Homosassa Springs.

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  
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E-Mail: [doug.leeper@watermatters.org](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

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**From:** Dave Dewitt  
**Sent:** Thursday, June 23, 2011 9:20 AM  
**To:** Doug Leeper  
**Subject:** FW: Homosassa fissure

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**From:** Doug Leeper  
**To:** [Dave Dewitt](#)  
**Subject:** New Homosassa System Spring  
**Date:** Friday, June 24, 2011 8:41:13 AM

---

Dave – thanks again for the e-mail regarding the potentially new fissure in the Homosassa spring bowl.

I'd like to ask another favor. Could you please provide the powerpoint slide/map that shows the location of the newest spring you discussed during our meeting yesterday. I hope to include the site in the springs location map to be included in the updated version of the Homosassa MFLs report that I'm currently developing.

Thanks

Douglas A. Leeper, Chief Environmental Scientist  
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Web Site: [watermatters.org](http://watermatters.org)

**From:** [Michael G. Czerwinski](#)  
**To:** [Doug Leeper](#); ["Ron Miller"](#); ["Bill Garvin"](#); ["Richard Kane"](#)  
**Cc:** ["Kevin Grimsely"](#); [Ron Basso](#); [Marty Kelly](#); [Dave Dewitt](#)  
**Subject:** RE: Homosassa fissure  
**Date:** Monday, June 27, 2011 4:57:19 PM

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Doug and David  
great photo, thanks for your great efforts in keeping us informed.



---

**From:** Doug Leeper [mailto:[Doug.Leeper@swfwmd.state.fl.us](mailto:Doug.Leeper@swfwmd.state.fl.us)]  
**Sent:** Friday, June 24, 2011 8:32 AM  
**To:** Ron Miller ([rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)); Czerwinski, Mike ([mczerwin@tampabay.rr.com](mailto:mczerwin@tampabay.rr.com)); Bill Garvin ([wgarvin@tampabay.rr.com](mailto:wgarvin@tampabay.rr.com)); Richard Kane ([rkane@usgs.gov](mailto:rkane@usgs.gov))  
**Cc:** Kevin Grimsely ([kjgrims@usgs.gov](mailto:kjgrims@usgs.gov)); Ron Basso; Marty Kelly; Dave Dewitt  
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September 27, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning a minimum flows recommendation from Mr.  
Chris Safos

---

This memorandum documents correspondence associated with comments on minimum flow recommendations submitted by Mr. Chris Safos. Copies of electronic mails associated with this issue are attached to this memorandum.

DAL  
Attachments

**From:** [chris safos](#)  
**To:** [Doug Leeper](#)  
**Subject:** Re: Agenda for SWFWMD Minimum Flows Workshop  
**Date:** Friday, July 01, 2011 3:40:21 PM

---

thank you for the notice.i strongly oppose lowering water flows in our rivers.thank you,chris safos

----- Original Message -----

From: [Doug Leeper](#)

To: [Al Yerian \(Al.Yerian@dep.state.fl.us\)](#) ; [Andy Houston \(ahouston@crystalriverfl.org\)](#) ; [Bill Geiger \(bgeiger@cityofbrooksville.us\)](#) ; [Brad Thorpe \(brad.thorpe@bocc.citrus.fl.us\)](#) ; [Courtney Edwards \(cedwards@savethemanatee.org\)](#) ; [Dale Jones \(Jones@MyFWC.com\)](#) ; [Dana Bryan \(Dana.Bryan@dep.state.fl.us\)](#) ; [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 \(fwccconservationplanningservices@myfwc.com\)](#) ; [Frank DiGiovanni \(fdigiovanni@invernessfl.gov\)](#) ; [Greenwood, Kathleen \(Kathleen.Greenwood@dep.state.fl.us\)](#) ; [Hoehn, Ted](#) ; [J. J. Kenney \(jj.kenney@bocc.citrus.fl.us\)](#) ; [Jennene Norman-Vacha \(jnvacha@ci.brooksville.fl.us\)](#) ; [Joyce Kleen@fws.gov](#) ; [Kandi Harper \(kandi.harper@bocc.citrus.fl\)](#) ; [Keith Ramos \(Keith.Ramos@fws.gov\)](#) ; [Kent Smith \(kent.smith2@myfwc.com\)](#) ; [Kevin Grimsely \(kjgrims@usgs.gov\)](#) ; [Nick Robbins \(Nick.Robbins@dep.state.fl.us\)](#) ; [Nicole Adimey \(Nicole\\_Adimey@fws.gov\)](#) ; [Paul Thomas \(paulw.thomas@MyFWC.com\)](#) ; [Ron Mezich \(ron.mezich@MyFWC.com\)](#) ; [Shelley Yaun \(Shelley.Yaun@dep.state.fl.us\)](#) ; [Toby Brewer \(Toby.Brewer@dep.state.fl.us\)](#) ; [Wallace, Traci \(priswat@tampabay.rr.com\)](#) ; [Bob Knight \(bknight@wetlandsolutionsinc.com\)](#) ; [Boyd Blihovde \(Boyd\\_Blihovde@fws.gov\)](#) ; [Friends of Crystal River State Parks \(cso@crystalriverstateparks.org\)](#) ; [Friends of the Weeki Wachee Springs State Park \(weekiwacheefriends@gmail.com\)](#) ; [Mitchell Newberger \(mnewberger@verizon.net\)](#) ; [Paul Carpenter \(paul.carp@verizon.net\)](#) ; [Richard Bryant \(rangerb@bellsouth.net\)](#) ; [Richard Radacky \(rradacky@cityofbrooksville.us\)](#) ; [Robert Keim \(rbkeim@gmail.com\)](#) ; [Rolf Auermann \(rauerman@tampabay.rr.com\)](#) ; [Ron Miller \(rmille76@tampabay.rr.com\)](#) ; [Sally Smith-Adams \(sally\\_smith\\_adams@hotmail.com\)](#) ; [Sandra Cleducies \(scleducies@aol.com\)](#) ; [Teddi Rusnak \(tcrusnak@tampabay.rr.com\)](#) ; [Thomas Pierce \(tpierce35@tampabay.rr.com\)](#) ; [Tom Overa \(tovera1@tampabay.rr.com\)](#) ; [Vince Cantero \(vince.cantero@bocc.citrus.fl.us\)](#) ; [Amy K. Harroun](#) ; [Barbara Matrone](#) ; [Cara S. Martin](#) ; [Chris Zajac](#) ; [Darcy A. Brune](#) ; [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](#) ; [Al Grubman \(grubman1@gmail.com\)](#) ; [Bill Pouder \(bill.pouder@myfwc.com\)](#) ; [Brad Rimbey \(BWR.CRRC@tampabay.rr.com\)](#) ; [Brent Whitley \(brentwhitley@sierra-properties.com\)](#) ; [Brockway, Alys \(abrockway@co.hernando.fl.us\)](#) ; [Dennis D. Dutcher \(Dennis3ds@aol.com\)](#) ; [Helen Spivey \(manatees@habitats.org\)](#) ; [Hilliard, Dan \(2buntings@comcast.net\)](#) ; [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 \(rkane@usgs.gov\)](#) ; [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 Matthai \(thebabesmimi@gmail.com\)](#) ; [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](#)

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Sent: Friday, July 01, 2011 3:08 PM

Subject: Agenda for SWFWMD Minimum Flows Workshop

Greetings:

Thanks for your recent participation and/or interest in the Southwest Florida Water Management District's Springs Coast Minimum Flows and Levels Public Workshop series. Attached is the tentative agenda for the next workshop, which is scheduled for July 18, 2011.

I will be out of the office for the next two weeks, so I would appreciate your copying Barbara Matrone ([barbara.matrone@watermatters.org](mailto:barbara.matrone@watermatters.org)) and Marty Kelly ([marty.kelly@watermatters.org](mailto:marty.kelly@watermatters.org)) on any e-mail correspondence you may send to me between today and the eighteenth. This will ensure that any pressing concerns you may have are addressed in a timely manner. If you would prefer to speak with Barbara or Marty, please call 1-800-423-1476. Barbara's extension is 4233 and Marty's is 4235.

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](mailto:doug.leeper@watermatters.org)

Web Site: [watermatters.org](http://watermatters.org)

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**From:** Doug Leeper  
**To:** [Mike Heyl](#); [Jay Yingling](#); [Yassert Gonzalez](#); [Marty Kelly](#)  
**Subject:** FW: Agenda for SWFWMD Minimum Flows Workshop  
**Date:** Friday, July 01, 2011 4:39:00 PM

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FYI – forwarded this e-mail as it appears to contain a comment on proposed MFLs.

Douglas A. Leeper, Chief Environmental Scientist  
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2379 Broad Street, Brooksville, FL 34604-6899  
Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272  
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**From:** chris safos [<mailto:chrissafos@embarqmail.com>]  
**Sent:** Friday, July 01, 2011 3:40 PM  
**To:** Doug Leeper  
**Subject:** Re: Agenda for SWFWMD Minimum Flows Workshop

thank you for the notice.i strongly oppose lowering water flows in our rivers.thank you,chris safos

----- Original Message -----

**From:** [Doug Leeper](#)  
**To:** [Al Yerian \(Al.Yerian@dep.state.fl.us\)](#); [Andy Houston \(ahouston@crystalriverfl.org\)](#); [Bill Geiger \(bgeiger@cityofbrooksville.us\)](#); [Brad Thorpe \(brad.thorpe@bocc.citrus.fl.us\)](#); [Courtney Edwards \(cedwards@savethemanatee.org\)](#); [Dale Jones \(Jones@MyFWC.com\)](#); [Dana Bryan \(Dana.Bryan@dep.state.fl.us\)](#); [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 \(fwcconservationplanningservices@myfwc.com\)](#); [Frank DiGiovanni \(fdigiovanni@invernessfl.gov\)](#); [Greenwood, Kathleen \(Kathleen.Greenwood@dep.state.fl.us\)](#); [Hoehn, Ted](#); [J. J. Kenney \(jj.kenney@bocc.citrus.fl.us\)](#); [Jennene Norman-Vacha \(jnvacha@ci.brooksville.fl.us\)](#); [Joyce Kleen@fws.gov](#); [Kandi Harper \(kandi.harper@bocc.citrus.fl\)](#); [Keith Ramos \(Keith.Ramos@fws.gov\)](#); [Kent Smith \(kent.smith2@myfwc.com\)](#); [Kevin Grimsely \(kjgrims@usgs.gov\)](#); [Nick Robbins \(Nick.Robbins@dep.state.fl.us\)](#); [Nicole Adimey \(Nicole\\_Adimey@fws.gov\)](#); [Paul Thomas \(paulw.thomas@MyFWC.com\)](#); [Ron Mezich \(ron.mezich@MyFWC.com\)](#); [Shelley Yaun \(Shelley.Yaun@dep.state.fl.us\)](#); [Toby Brewer \(Toby.Brewer@dep.state.fl.us\)](#); [Wallace, Traci \(priswat@tampabay.rr.com\)](#); [Bob Knight \(bknight@wetlandsolutionsinc.com\)](#); [Boyd Blihovde \(Boyd\\_Blihovde@fws.gov\)](#); [Friends of Crystal River State Parks \(cso@crystalriverstateparks.org\)](#); [Friends of the Weeki Wachee Springs State Park \(weekiwacheefriends@gmail.com\)](#); [Mitchell Newberger \(mnewberger@verizon.net\)](#); [Paul Carpenter \(paul.carp@verizon.net\)](#); [Richard Bryant \(rangerrb@bellsouth.net\)](#); [Richard Radacky \(rradacky@cityofbrooksville.us\)](#); [Robert Keim \(rbkeim@gmail.com\)](#); [Rolf Auermann \(rauerman@tampabay.rr.com\)](#); [Ron Miller \(rmille76@tampabay.rr.com\)](#); [Sally Smith-Adams \(sally\\_smith\\_adams@hotmail.com\)](#); [Sandra Cleducies \(scleducies@aol.com\)](#); [Teddi Rusnak \(tcrusnak@tampabay.rr.com\)](#); [Thomas Pierce \(tpierce35@tampabay.rr.com\)](#); [Tom Overa \(tovera1@tampabay.rr.com\)](#); [Vince Cantero \(vince.cantero@bocc.citrus.fl.us\)](#); [Amy K. Harroun](#); [Barbara Matrone](#); [Cara S. Martin](#); [Chris Zajac](#); [Darcy A. Brune](#); [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](#); [Al Grubman \(grubman1@gmail.com\)](#); [Bill Pouder \(bill.pouder@myfwc.com\)](#); [Brad Rimbey \(BWR.CRRC@tampabay.rr.com\)](#); [Brent Whitley \(brentwhitley@sierra-properties.com\)](#); [Brockway,](#)



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Sent: Friday, July 01, 2011 3:08 PM

Subject: Agenda for SWFWMD Minimum Flows Workshop

Greetings:

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I will be out of the office for the next two weeks, so I would appreciate your copying Barbara Matrone ([barbara.matrone@watermatters.org](mailto:barbara.matrone@watermatters.org)) and Marty Kelly ([marty.kelly@watermatters.org](mailto:marty.kelly@watermatters.org)) on any e-mail correspondence you may send to me between today and the eighteenth. This will ensure that any pressing concerns you may have are addressed in a timely manner. If you would prefer to speak with Barbara or Marty, please call 1-800-423-1476. Barbara's extension is 4233 and Marty's is 4235.

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
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September 27, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence concerning water use permitting and groundwater  
modeling submitted by Mr. Ron Miller.

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This memorandum documents various correspondence associated with questions concerning water withdrawals and groundwater modeling that were originally submitted by Mr. Ron Miller on July 8, 2011. Copies of electronic mails associated with this original correspondence are attached to this memorandum.

DAL  
Attachments

**From:** [Ron Miller](#)  
**To:** [Doug Leeper](#); [Barbara Matrone](#); [Marty Kelly](#); [Ron Basso](#)  
**Cc:** [Priscilla Watkins](#); [Jim Bitter](#); [Ron Schultz](#); [Bill Garvin](#); [Tom Clark](#); [Brad Rimby](#); [Brent Whitley](#); [Rebecca Bays](#); [Mike Cerwinski](#)  
**Subject:** Springs Coast MFL Workshop  
**Date:** Friday, July 08, 2011 12:19:10 PM

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Dear Mr. Leeper,

Here are some questions regarding the establishment of the Homosassa Springs and River Minimum Flows and Levels. The questions reference the items you have listed for the July 18th Springs Coast MFL Workshop. It would be helpful if answers to these questions would be posted on the Internet prior to July 18th.

**Item 4 on the agenda --- Water Use Permitting**

Please provide a table and map of all of the water withdrawal permits in the Homosassa Springs Springshed.

**Item 5 on the Agenda --- Groundwater and Withdrawal Modeling**

These questions are with regard to the the Northern District Model (NDM).

- A.** How does the model represent the underground flows including the fast flowing deep cracks and channels of the limestone foundation?
- B.** How is the interaction with the salt water interface modeled?
- C.** How is rainfall and water seepage from outside the area modeled?
- D.** How does the model account for the delay between the time of the increasing rain fall and the time of increased spring flow?
- E.** What are the model calibration methods and what data supports the agency claim of 2% prediction accuracy?
- F.** What are the actual measured and predicted flows for the Homosassa Springs Group flows for conditions that represent 1946, 1966, 1970, 1979, 1990, 2010 and 2030?
- G.** Does the model show that the drawdown of underground water alters the relative flows between the Weeki Wachee, Chassahowitzka, Homosassa and Crystal River Rivers?
- H.** Does the model show that you can control different percent flow draw downs independently across the four above mentioned springsheds?

I. What happens to the Homosassa Springs when the Chassahowitzka is drawn down by 11%?

J. What happens to the Bluebird Springs when the Chassahowitzka is drawn down by 11%.

Thank you,

Ron Miller

[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)

352 628-6066

**From:** [Ron Basso](#)  
**To:** [Ron Miller](#); [Doug Leeper](#); [Barbara Matrone](#); [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#); [Jim Bitter](#); [Ron Schultz](#); [Bill Garvin](#); [Tom Clark](#); [Brad Rimby](#); [Brent Whitley](#); [Rebecca Bays](#); [Mike Cerwinski](#); [Mark Barcelo](#); [Paul Williams](#)  
**Subject:** RE: Springs Coast MFL Workshop  
**Date:** Wednesday, July 13, 2011 2:12:18 PM  
**Attachments:** [Response to Mr Miller.docx](#)

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Mr. Miller:

Please find attached my response to your email request sent on Friday of last week. I attempted to be brief recognizing that some of the technical issues are complex and may require further explanation. If you still have questions after review of this response please feel free to contact me directly or I can address any outstanding issues at the workshop on the 18<sup>th</sup>.

Ron Basso, P.G.  
Senior Professional Geologist  
Hydrologic Evaluation Section  
Southwest Florida Water Management District  
ph 1-800-423-1476 (in state)  
ph 352-796-7211, ext. 4291 (outside state)  
FAX 352-797-5799

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**From:** Ron Miller [mailto:rmille76@tampabay.rr.com]  
**Sent:** Friday, July 08, 2011 12:19 PM  
**To:** Doug Leeper; Barbara Matrone; Marty Kelly; Ron Basso  
**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Bill Garvin; Tom Clark; Brad Rimby; Brent Whitley; Rebecca Bays; Mike Cerwinski  
**Subject:** Springs Coast MFL Workshop

Dear Mr. Leeper,

Here are some questions regarding the establishment of the Homosassa Springs and River Minimum Flows and Levels. The questions reference the items you have listed for the July 18th Springs Coast MFL Workshop. It would be helpful if answers to these questions would be posted on the Internet prior to July 18th.

#### **Item 4 on the agenda --- Water Use Permitting**

Please provide a table and map of all of the water withdrawal permits in the Homosassa Springs Springshed.

## **Item 5 on the Agenda --- Groundwater and Withdrawal Modeling**

These questions are with regard to the the Northern District Model (NDM).

- A.** How does the model represent the underground flows including the fast flowing deep cracks and channels of the limestone foundation?
- B.** How is the interaction with the salt water interface modeled?
- C.** How is rainfall and water seepage from outside the area modeled?
- D.** How does the model account for the delay between the time of the increasing rain fall and the time of increased spring flow?
  
- E.** What are the model calibration methods and what data supports the agency claim of 2% prediction accuracy?
  
- F.** What are the actual measured and predicted flows for the Homosassa Springs Group flows for conditions that represent 1946, 1966, 1970, 1979, 1990, 2010 and 2030?
  
- G.** Does the model show that the drawdown of underground water alters the relative flows between the Weeki Wachee, Chassahowitzka, Homosassa and Crystal River Rivers?
  
- H.** Does the model show that you can control different percent flow draw downs independently across the four above mentioned springsheds?
  
- I.** What happens to the Homosassa Springs when the Chassahowitzka is drawn down by 11%?
  
- J.** What happens to the Bluebird Springs when the Chassahowitzka is drawn down by 11%.

Thank you,

Ron Miller

[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)

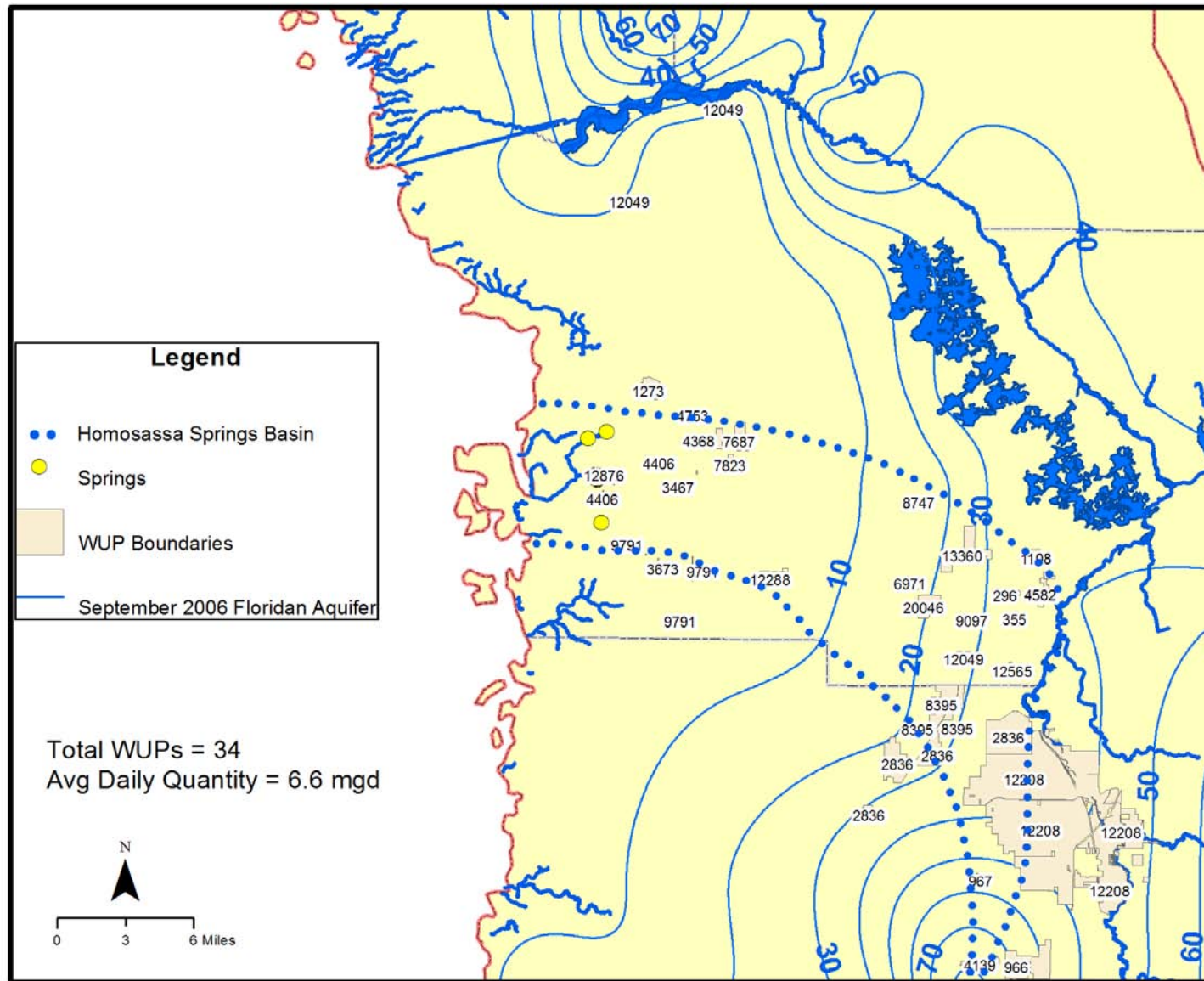
352 628-6066



**Response to Mr. Miller's email request:**

**1. Item 4 on the agenda --- Water Use Permitting**

Please provide a table and map of all of the water withdrawal permits in the Homosassa Springs Springshed.



WUP_PERMIT	WUP_REVISI	PERMITTEE_	WATER_USE_	OWNED_PROP	AVG DAILY PERMITTED_GPD
296	2	Ray A Morris	AGRICULTURAL	37	11,100
355	2	L Norman And Linda L Adams	AGRICULTURAL	18	22,600
967	3	Hickory Hills Land Company, ATTN: Robert Thomas	AGRICULTURAL	93	68,100
1108	4	Z2F Citrus & Cattle LLC	AGRICULTURAL	105	99,000
1273	4	Post Oak Ranch LLC	AGRICULTURAL	533	61,500
2226	3	Edwin O'Neal	AGRICULTURAL	20	27,450
2836	3	United States Dept Of Agriculture	AGRICULTURAL	3817	21,400
4139	3	Aam Family Ltd Partnership	AGRICULTURAL	51	58,500
4582	2	Thomas W. & Mary L. Harrison	AGRICULTURAL	280	31,800
5091	3	Toby John & Joanna Caulfeild	AGRICULTURAL	20	300
6966	4	Larry W & Ruth A Davis	AGRICULTURAL	48	29,400
6971	2	John W & Margaret R White	AGRICULTURAL	51	30,900
7687	7	Crystal River Quarries Inc	AGRICULTURAL	460	62,050
8747	1	William Hunt	AGRICULTURAL	14	2,900
12146	1	Edwin E. and Barbara A. Harbour	AGRICULTURAL	20	9,280
12208	0	Board Of Trst'S Improv'T Tst Fnd Fdep-Div Of Rec & Parks Bureau	AGRICULTURAL	21639	143,400
12288	2	M & B Products	AGRICULTURAL	322	497,277
12565	0	Professional Horticultural Services	AGRICULTURAL	80	385,700
13360	0	Throgmartin-Henke Ranch &	AGRICULTURAL	0	231,500
20046	0	Pinewoods Plantation Nursery Inc	AGRICULTURAL	489	123,160
9115	1	Tru Gas Of Florida, Inc.	INDUSTRIAL AND COMMERCIAL	1	1,000
12049	1	Citrus Co Bocc	INDUSTRIAL AND COMMERCIAL	33	2,500
4368	2	Citrus County School Board	PUBLIC SUPPLY	160	161,000
4406	7	Homosassa Special Water District	PUBLIC SUPPLY	10	960,000
4753	3	Constate Utilities Inc	PUBLIC SUPPLY	1	81,200
7823	2	Central Florida Community College	PUBLIC SUPPLY	87	11,800
8395	3	Board Of Tst Internal Improv Tst Fund Of The State Of Florida	PUBLIC SUPPLY	1116	5,900
9097	2	Tarawood Utilities LLC	PUBLIC SUPPLY	5	99,600
9791	7	Citrus County Water Resources De c/o Robert Knight Director	PUBLIC SUPPLY	2	2,064,000
13290	0	Citrus Co Dept Of Public Works Glenn Mccracken Pe	PUBLIC SUPPLY	19	9,400
966	4	Hickory Hills LLC	RECREATION/AESTHETIC	2766	775,000
3467	2	Gibraltar Mausoleum Of Florida	RECREATION/AESTHETIC	40	45,400
3673	5	Suntacc & Company, Inc.	RECREATION/AESTHETIC	250	456,000
12876	1	Board Of Trustees Internal Imp & Homosassa Springs Wildlife Prk	RECREATION/AESTHETIC	203	12,600

Total: 6,602,717

There are a total of 34 water use permits within or near the Homosassa springshed as of December 2010. Total average daily permitted quantities for groundwater use is 6.6 mgd. They break down as follows:

WUP Type	No. of Permits	Avg Daily Quantity (mgd)
Agriculture	20	1.92
Industrial/Commercial	2	0.003
Mining	0	0
Public Supply	8	3.39
Recreation	4	1.29

There are 134 water use permitted wells within or near the Homosassa springshed. Total average daily permitted quantity from all 134 wells is 6.32 mgd. Slight differences in the total occur because some of the WUPs under the same permit number have parcels that are within and outside the springshed (i.e. 2836, 9791, 12049). A few of the permits include quantities outside the springshed and thus the permitted total is slightly higher than the sum of the wells.

Estimated and metered water use in the springshed for 2005 was 3.7 mgd from 143 wells.

## **2. Item 5 on the Agenda --- Groundwater and Withdrawal Modeling**

These questions are with regard to the Northern District Model (NDM).

**A.** How does the model represent the underground flows including the fast flowing deep cracks and channels of the limestone foundation?

The NDM contains a finite-difference grid that consists of 182 columns and 275 rows of 2,500 ft uniformly spaced cells. The NDM is fully 3-Dimensional with top and bottom elevations specified for each model layer. Topographic elevations were assigned to the top of model layer 1 from a digital elevation model provided by SWFWMD, based on the USGS 30m National Elevation Dataset. The Florida Geological Survey supplied elevation data for all other layers in the model.

The NDM consists of seven layers that represent the primary geologic and hydrogeologic units including: 1. Surficial Sands; 2. Intermediate Confining Unit (ICU); 3. Suwannee Limestone; 4. Ocala Limestone; 5. upper Avon Park Formation; 6. Middle Confining Unit (MCU) I and MCU II; and 7. lower Avon Park Formation or Oldsmar Formation. The UFA is composed of the Suwannee Limestone, Ocala Limestone, and Upper Avon Park; the Lower Floridan aquifer (LFA) is composed of the permeable parts of both the lower Avon Park and the Oldsmar Formation. Due to the permeability contrasts between the units, each unit is simulated as a discrete model layer rather than using one model layer to represent a thick sequence of permeable units (e.g., UFA).

The NDM was calibrated to steady-state 1995 calendar year conditions and transient conditions from 1996 through 2002 using monthly stress periods. The model has recently been extended through 2006 (Version 3.0). This model is unique for west-central Florida in that it is the first regional flow model that represents the groundwater system as fully three-dimensional. Prior modeling efforts, notably Ryder (1985), Sepulveda (2002), and Knowles and others (2002), represented the groundwater system as quasi-three-dimensional.

The numerical model simulates hydrogeologic conditions through assignment of aquifer parameters that are based on aquifer performance testing, other hydraulic tests, prior knowledge, and geologic characteristics. A conceptual model of the system was developed prior to construction of the NDM whereby field data and other data from reports were analyzed to more fully understand the physical system. NDM parameters were adjusted within reasonable ranges based the hydrogeology of the system during the calibration process. Localized

karst features such as cracks, conduits, or channels in the subsurface are integrated in the model over a 2,500 ft cell size through equivalent porous media parameterization in the model.

**B. How is the interaction with the salt water interface modeled?**

The NDM simulates the fresh groundwater flow system within its domain. The potential movement of solutes (salts and minerals) can only be addressed through a transport model which is a completely different code. The District simulated the movement of the saline water interface in a separate saltwater intrusion model that is described at the end of the NDM report (Hydrogeologic, 2008). Detailed information on the model calibration is included in the 2008 report by Hydrogeologic, Inc., titled *Groundwater Flow and Saltwater Intrusion Model for the Northern District Water Resources Assessment Project Area, Version 1.0*. A subsequent version (2.0) was completed in 2010.

**C. How is rainfall and water seepage from outside the area modeled?**

The active domain of the NDM includes all of the Northern West-Central Florida Ground-Water Basin (NWCFGWB) of the Floridan aquifer. In addition, most of Lake County outside the NWCFGWB is also included in the model to assess water use near the SWFWMD eastern boundary. A groundwater basin has well-defined boundaries in a lateral direction with a definable bottom. Rainfall that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin.

Rainfall is converted to recharge in the model based on the following equation:

$$\text{Rainfall} - \text{ET} - \text{Runoff} = \text{Recharge}$$

Recharge is calculated outside the model based on radar-estimated rainfall, runoff, and evapotranspiration rates calculated based on land cover and water table depth. Once calculated, recharge is applied to layer 1 of the model. A detailed explanation is given in *Groundwater Flow and Saltwater Intrusion Model for the Northern District Water Resources Assessment Project Area, Version 1.0*, Hydrogeologic, Inc. 2008.

**D. How does the model account for the delay between the time of the increasing rain fall and the time of increased spring flow?**

The groundwater flow model simulates changes in aquifer levels, baseflow, and spring flow due to variations in stress. The principle stress components are recharge and pumping. The model is calibrated to the 1995 through 2006 period by matching well water levels and measured or estimated flows. Water budget values were calculated on a basin-wide basis for the 1995 steady-state and 1996-2006 transient models (Version 3.0). These values were generally consistent with empirical water budget estimates and previous models of the area. If the model simulates variations in aquifer head and flows consistent with observed values, then it provides confidence that the model is adequately accounting for variations in spring flow due to rainfall.

**E. What are the model calibration methods and what data supports the agency claim of 2% prediction accuracy?**

I'm not sure the agency claimed a "2% prediction accuracy", only that the model matches observed spring flows within two percent during the calibration period. The NDM calibration methods consisted of automatic and manual best-fit parameter adjustments to minimize aquifer head and flow error. General calibration statistics were to achieve a 10% or less match in observed versus simulated total flows for baseflow and spring flow. A mean error close to 0 ft and a mean absolute error of 4 ft were targeted for the Northern West-Central Florida Groundwater Basin observation wells in each aquifer.

In the 1995 steady-state model simulated flows for the Homosassa and Chassahowitzka group springs were generally within two percent of the observed (estimated) values. I've attached Table 4.7 from version 2.0 of the NDM that shows the difference between model simulated and observed flow rates for the nature coast

**Table 4.7**  
**Steady-State Simulated and Observed Spring Discharge Rates (cfs)**

Spring	Magnitude	County	Group	Simulated Flow (cfs)	Observed Flow (cfs)	Residual (Observed-Simulated)	Percent Error
Magnesia Springs	3	Alachua	1	0.00	5.00	5.00	100
Crystal River Group	1	Citrus	22	330.35	350.00	19.65	6
Manatee Sanctuary Spring	1	Citrus	23	94.40	100.00	5.60	6
Halls River Head Main Spg	1	Citrus	30	99.24	102.00	2.76	3
Citrus Unnamed Spring	1	Citrus	51	98.03	100.00	1.97	2
Homosassa 1 Spring	2	Citrus	36	70.21	72.00	1.79	2
Se Fork Homosassa Spg	2	Citrus	37	41.93	43.00	1.07	2
Potters Creek Spring	2	Citrus	46	13.71	14.00	0.29	2
Crab Spring	2	Citrus	49	34.00	35.00	1.00	3
Chassahowitzka Main Spg	2	Citrus	50	63.70	65.00	1.30	2
Sulfur Springs	3	Citrus	13	0.00	5.00	5.00	100
Citrus-Blue Spring	3	Citrus	16	0.00	5.00	5.00	100
Tarpon Spring	3	Citrus	19	4.66	5.00	0.34	7
House Spring	3	Citrus	20	4.62	5.00	0.38	8
Hunters Spring	3	Citrus	21	0.00	5.00	5.00	100
Middle Springs	3	Citrus	24	0.00	5.00	5.00	100
Three Sisters Run Spg 2	3	Citrus	25	0.00	5.00	5.00	100
Three Sisters Run Spring	3	Citrus	26	0.00	5.00	5.00	100
Idiots Delight Spring	3	Citrus	27	0.00	5.00	5.00	100
Halls River 1 Spring	3	Citrus	31	4.88	5.00	0.12	2
Belcher Spring	3	Citrus	32	4.74	5.00	0.26	5
Abdoney Spring	3	Citrus	33	4.88	5.00	0.12	2
Mcclain Spring	3	Citrus	34	4.88	5.00	0.12	2
Trotter 1	3	Citrus	35	4.88	5.00	0.12	2
Pumphouse Spring	3	Citrus	38	4.88	5.00	0.12	2
Hidden River Head Spring	3	Citrus	39	6.26	7.00	0.74	11
Baird Spring	3	Citrus	52	2.95	3.00	0.05	2
Salt Creek Springs	4	Citrus	48	0.39	0.40	0.01	2
Weeki Wachee Spring	1	Hernando	65	137.61	148.00	10.39	7
Hernando Unnamed 10	2	Hernando	56	18.84	19.00	0.16	1
Blind Spring	2	Hernando	58	43.00	43.00	0.00	0
Mud Spring	2	Hernando	61	8.09	17.00	8.91	52
Salt Spring	2	Hernando	62	22.43	22.00	-0.43	-2
Jenkins Creek Spring	2	Hernando	64	15.06	15.00	-0.06	0
Betee Jay Spring	3	Hernando	53	6.95	7.00	0.05	1
Ryle Creek Spring	3	Hernando	54	7.95	8.00	0.05	1
Blue Run Spring	3	Hernando	55	4.96	5.00	0.04	1
Hernando Unnamed 08	3	Hernando	57	5.00	5.00	0.00	0
Hospital Hole	3	Hernando	63	5.04	5.00	-0.04	-1
Bobhill Spg Nr Aripeka	3	Hernando	68	2.04	2.00	-0.04	-2
Palm Island Spring	3	Hernando	69	5.00	5.00	0.00	0
Magnolia Spring	3	Hernando	70	1.01	1.00	-0.01	-1
Hernando Unnamed 02	4	Hernando	66	0.83	0.70	-0.13	-19
Boat Spring	4	Hernando	67	0.40	0.40	0.00	-1
Sulphur Spgs At Sul Spgs	2	Hillsborough	86	25.01	25.00	-0.01	0
Lettuce Lake Spring	3	Hillsborough	87	8.10	8.00	-0.10	-1
Six Mile Creek Spring	3	Hillsborough	88	1.01	1.00	-0.01	-1
Lowry Park Spring	3	Hillsborough	89	5.01	5.00	-0.01	0
Eureka Springs	3	Hillsborough	91	1.02	1.00	-0.02	-2

springs.

**F.** What are the actual measured and predicted flows for the Homosassa Springs Group flows for conditions that represent 1946, 1966, 1970, 1979, 1990, 2010 and 2030?

Flows are not measured for most of the springs within the Homosassa Springs Group. The NDM matches estimated or observed flows for 1995 and on a monthly basis from 1996 through 2006 for the Chassahowitzka main spring and Homosassa 1 spring (in Version 3.0). Once a model is calibrated, there are no further adjustments to aquifer parameters. Future scenarios are run by simply altering well withdrawals to fit a given condition (ex. 2030). There are no modeled flows outside the 1995-2006 period except for the non-pumping and 2030 prediction scenarios. Table 2 shows the predicted spring discharge rates in the 2030 simulation. Homosassa No. 1 spring's continuous discharge record starts in 1995. There are no continuously measured flows prior to 1995.

Table 2. Predicted Homosassa Spring group discharge under non-pumping and 2030 conditions.

Spring Name	Discharge for Non-Pumping Scenario (cfs)	Discharge for 2030 Pumping Scenario (cfs)	Difference (cfs)	Percent Difference
Abdoney Spring	4.98	4.87	-0.11	-2.13
Belcher Spring	4.98	4.77	-0.21	-4.29
Halls River 1 Spring	5.00	4.90	-0.10	-2.07
Halls River Head Main Spg	102.11	99.76	-2.35	-2.31
Hidden River Head Spring	6.61	6.05	-0.56	-8.47
Homosassa 1 Spring	71.65	70.16	-1.49	-2.07
Mcclain Spring	4.98	4.87	-0.11	-2.13
Pumphouse Spring	4.97	4.87	-0.10	-2.10
Trotter 1	4.97	4.87	-0.10	-2.02
Total	210.2	205.12	-5.13	-2.44

**G.** Does the model show that the drawdown of underground water alters the relative flows between the Weeki Wachee, Chassahowitzka, Homosassa and Crystal River Rivers?

The NDM is used as a predictive tool to model impact to all 93 springs in the domain. Groundwater withdrawn in the entire Northern West-Central groundwater Basin can impact spring discharge. However, the magnitude and proximity of withdrawals to the spring vent directly influences the potential impact to spring flow. The closer the withdrawal and greater the pumpage causes a larger decline in flow compared to a withdrawal much further away. Predicted impact to Weeki Wachee spring is much greater than the other springs due to relatively large groundwater withdrawals for Hernando County utilities and Cross Bar wellfield within the springshed. The drawdown in the Upper Floridan aquifer water level and spring discharges from 93 springs have been modeled for 2005 and 2030 conditions (when compared to a "pumps off" condition) to note change due to all withdrawals.

**H.** Does the model show that you can control different percent flow draw downs independently across the four above mentioned springsheds?

Not sure what you mean here. Predicted impacts vary amongst the four main spring groups due primarily to the proximity and magnitude of well withdrawals to each spring network, aquifer parameters near the springs, and variation in recharge to the Upper Floridan aquifer near each spring.

**I.** What happens to the Homosassa Springs when the Chassahowitzka is drawn down by 11%?

Since the allowable flow has been proposed at five percent for Homosassa Spring it is likely that this will limit groundwater withdrawals in the area so that impacts to Chassahowitzka will never reach 11%.

**J.** What happens to the Bluebird Springs when the Chassahowitzka is drawn down by 11%?

Bluebird springs is not actively simulated in the NDM. If Bluebird Springs is close to the Chassahowitzka Springs group, it's likely it'll be affected in a similar way.



**From:** [Dave Dewitt](#)  
**To:** [Ron Basso](#)  
**Cc:** [Roberta Starks](#); [Doug Leeper](#)  
**Subject:** RE: Springs Coast MFL Workshop  
**Date:** Monday, July 11, 2011 4:15:35 PM  
**Attachments:** [Bluebird Spring 1944-2011.pdf](#)

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Ron, I spoke with Roberta and she's cool with me attending the meeting to help field questions. I will cancel my field work for that day, and will also talk to Doug about what to expect.

We have limited data on Bluebird Springs, it is relatively small and is associated with Homosassa and the SE Fork of the Homosassa River. We started sampling a small spring vent (670752) in 2007 and the District also installed a staff gage near another surface water site (670403) at the request of the Homosassa River Alliance group. Levels are monitored by volunteers and the data is not stored in the WMIS. Attached historical aerial has an approximate location in 1944 for the Bluebird Spring. It's now a county park, and the water body there appears to be mostly excavated with the material used to fill in the surrounding swamp. It's not much of a spring, but the area residents have worked with the county to improve and maintain it, so there is local interest in it. It has also been determined by DEP to be water-quality impaired for nutrients, algal mats, etc., which isn't surprising.

David J. DeWitt, P.G.  
Water Quality Monitoring Program  
Resource Data and Restoration Department  
Southwest Florida Water Management District  
2379 Broad Street, Brooksville, Florida 34604  
352-796-7211, ext. 4512  
fax. 352-540-6056

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**From:** Ron Basso  
**Sent:** Monday, July 11, 2011 9:32 AM  
**To:** Dave Dewitt  
**Cc:** Roberta Starks  
**Subject:** FW: Springs Coast MFL Workshop

Dave:

I could use your help at the next springs workshop in Lecanto on the 18<sup>th</sup> at 1:30. Do you think you can come up to be available to answer citizen questions on the nature coast springs, particularly with respect to water quality? I will be providing a presentation on groundwater and modeling. I have attached an agenda. BTW, do you know anything about Bluebird springs?

Ron Basso, P.G.  
Senior Professional Geologist  
Hydrologic Evaluation Section  
Southwest Florida Water Management District



ph 1-800-423-1476 (in state)  
ph 352-796-7211, ext. 4291 (outside state)  
FAX 352-797-5799

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**From:** Marty Kelly  
**Sent:** Friday, July 08, 2011 3:46 PM  
**To:** Ron Basso; Gary E. Williams  
**Cc:** Mark Hammond; Mark Barcelo  
**Subject:** FW: Springs Coast MFL Workshop

Guys,

Please see below – responses will likely be requested at the meeting if not made available before.  
Please let me know if you can handle these.

Thanks

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**From:** Ron Miller [mailto:rmille76@tampabay.rr.com]  
**Sent:** Friday, July 08, 2011 12:19 PM  
**To:** Doug Leeper; Barbara Matrone; Marty Kelly; Ron Basso  
**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Bill Garvin; Tom Clark; Brad Rimby; Brent Whitley; Rebecca Bays; Mike Cerwinski  
**Subject:** Springs Coast MFL Workshop

Dear Mr. Leeper,

Here are some questions regarding the establishment of the Homosassa Springs and River Minimum Flows and Levels. The questions reference the items you have listed for the July 18th Springs Coast MFL Workshop. It would be helpful if answers to these questions would be posted on the Internet prior to July 18th.

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Thank you,

Ron Miller

[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)

352 628-6066

**From:** [Ron Miller](#)  
**To:** [Ron Basso](#); [Doug Leeper](#); [Barbara Matrone](#); [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#); [Jim Bitter](#); [Ron Schultz](#); [Bill Garvin](#); [Tom Clark](#); [Brad Rimby](#); [Brent Whitley](#); [Rebecca Bays](#); [Mike Cerwinski](#); [Mark Barcelo](#); [Paul Williams](#)  
**Subject:** Re: Springs Coast MFL Workshop  
**Date:** Thursday, July 14, 2011 9:16:59 PM

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Dear Mr. Basso,

Thank you very much for your quick and detailed response to my questions. I'm sure you spent a good deal of thought on these items and I appreciate that.

I have a few comments/thoughts that you may want to discuss on Monday: A visualization of the aquifer karst features would be helpful to better understand the model. If the saltwater intrusion reference is on line please make that available. When do you plan to add the missing spring features such as the Bluebird Springs to the model? Bluebird is of interest in Citrus County since it is the site of a County Park.

Thanks again and I'll see you on Monday,  
Ron Miller

**From:** [Ron Basso](#)  
**Sent:** Wednesday, July 13, 2011 2:12 PM  
**To:** [Ron Miller](#) ; [Doug Leeper](#) ; [Barbara Matrone](#) ; [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#) ; [Jim Bitter](#) ; [Ron Schultz](#) ; [Bill Garvin](#) ; [Tom Clark](#) ; [Brad Rimby](#) ; [Brent Whitley](#) ; [Rebecca Bays](#) ; [Mike Cerwinski](#) ; [Mark Barcelo](#) ; [Paul Williams](#)  
**Subject:** RE: Springs Coast MFL Workshop

Mr. Miller:

Please find attached my response to your email request sent on Friday of last week. I attempted to be brief recognizing that some of the technical issues are complex and may require further explanation. If you still have questions after review of this response please feel free to contact me directly or I can address any outstanding issues at the workshop on the 18<sup>th</sup>.

Ron Basso, P.G.  
Senior Professional Geologist  
Hydrologic Evaluation Section  
Southwest Florida Water Management District  
ph 1-800-423-1476 (in state)  
ph 352-796-7211, ext. 4291 (outside state)  
FAX 352-797-5799

---

**From:** Ron Miller [mailto:[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)]

**Sent:** Friday, July 08, 2011 12:19 PM

**To:** Doug Leeper; Barbara Matrone; Marty Kelly; Ron Basso

**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Bill Garvin; Tom Clark; Brad Rimby; Brent Whitley; Rebecca Bays; Mike Cerwinski

**Subject:** Springs Coast MFL Workshop

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- F.** What are the actual measured and predicted flows for the Homosassa Springs Group flows for conditions that represent 1946, 1966, 1970, 1979, 1990, 2010 and 2030?
- G.** Does the model show that the drawdown of underground water alters the relative flows between the Weeki Wachee, Chassahowitzka, Homosassa and Crystal River Rivers?
- H.** Does the model show that you can control different percent flow

draw downs independently across the four above mentioned  
springsheds?

I. What happens to the Homosassa Springs when the Chassahowitzka is  
drawn down by 11%?

J. What happens to the Bluebird Springs when the Chassahowitzka is  
drawn down by 11%.

Thank you,

Ron Miller

[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)

352 628-6066

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**From:** [Brad Rimbey](#)  
**To:** [Ron Miller](#); [Ron Basso](#); [Doug Leeper](#); [Barbara Matrone](#); [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#); [Jim Bitter](#); [Ron Schultz](#); [Bill Garvin](#); [Tom Clark](#); [Brent Whitley](#); [Rebecca Bays](#); [Mike Cerwinski](#); [Mark Barcelo](#); [Paul Williams](#)  
**Subject:** Re: Springs Coast MFL Workshop  
**Date:** Friday, July 15, 2011 8:50:37 AM

---

Ron,

The NDM saltwater intrusion documents which Mr. Basso referenced are on the Records Request DVD-R that I gave you after the last public workshop. They are in the folder named "DVD-R Chassahowitzka PRR Rimbey 5-2011\Rimbey Request\Model Reports". They are too large to email.

Brad Rimbey

----- Original Message -----

**From:** [Ron Miller](#)  
**To:** [Ron Basso](#) ; [Doug Leeper](#) ; [Barbara Matrone](#) ; [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#) ; [Jim Bitter](#) ; [Ron Schultz](#) ; [Bill Garvin](#) ; [Tom Clark](#) ; [Brad Rimby](#) ; [Brent Whitley](#) ; [Rebecca Bays](#) ; [Mike Cerwinski](#) ; [Mark Barcelo](#) ; [Paul Williams](#)  
**Sent:** Thursday, July 14, 2011 9:16 PM  
**Subject:** Re: Springs Coast MFL Workshop

Dear Mr. Basso,

Thank you very much for your quick and detailed response to my questions. I'm sure you spent a good deal of thought on these items and I appreciate that.

I have a few comments/thoughts that you may want to discuss on Monday: A visualization of the aquifer karst features would be helpful to better understand the model. If the saltwater intrusion reference is on line please make that available. When do you plan to add the missing spring features such as the Bluebird Springs to the model? Bluebird is of interest in Citrus County since it is the site of a County Park.

Thanks again and I'll see you on Monday,  
Ron Miller

**From:** [Ron Basso](#)  
**Sent:** Wednesday, July 13, 2011 2:12 PM  
**To:** [Ron Miller](#) ; [Doug Leeper](#) ; [Barbara Matrone](#) ; [Marty Kelly](#)  
**Cc:** [Priscilla Watkins](#) ; [Jim Bitter](#) ; [Ron Schultz](#) ; [Bill Garvin](#) ; [Tom Clark](#) ; [Brad Rimby](#) ; [Brent Whitley](#) ; [Rebecca Bays](#) ; [Mike Cerwinski](#) ; [Mark Barcelo](#) ; [Paul Williams](#)  
**Subject:** RE: Springs Coast MFL Workshop

Mr. Miller:

Please find attached my response to your email request sent on Friday of last week. I attempted to be brief recognizing that some of the technical issues are complex and may require further explanation. If you still have questions after review of this response please feel free to contact

me directly or I can address any outstanding issues at the workshop on the 18<sup>th</sup>.

Ron Basso, P.G.  
Senior Professional Geologist  
Hydrologic Evaluation Section  
Southwest Florida Water Management District  
ph 1-800-423-1476 (in state)  
ph 352-796-7211, ext. 4291 (outside state)  
FAX 352-797-5799

---

**From:** Ron Miller [mailto:rmille76@tampabay.rr.com]  
**Sent:** Friday, July 08, 2011 12:19 PM  
**To:** Doug Leeper; Barbara Matrone; Marty Kelly; Ron Basso  
**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Bill Garvin; Tom Clark; Brad Rimby; Brent Whitley; Rebecca Bays; Mike Cerwinski  
**Subject:** Springs Coast MFL Workshop

Dear Mr. Leeper,

Here are some questions regarding the establishment of the Homosassa Springs and River Minimum Flows and Levels. The questions reference the items you have listed for the July 18th Springs Coast MFL Workshop. It would be helpful if answers to these questions would be posted on the Internet prior to July 18th.

**Item 4 on the agenda --- Water Use Permitting**

Please provide a table and map of all of the water withdrawal permits in the Homosassa Springs Springshed.

**Item 5 on the Agenda --- Groundwater and Withdrawal Modeling**

These questions are with regard to the the Northern District Model (NDM).

- A.** How does the model represent the underground flows including the fast flowing deep cracks and channels of the limestone foundation?
- B.** How is the interaction with the salt water interface modeled?
- C.** How is rainfall and water seepage from outside the area modeled?
- D.** How does the model account for the delay between the time of the increasing rain fall and the time of increased spring flow?

**E.** What are the model calibration methods and what data supports the agency claim of 2% prediction accuracy?

**F.** What are the actual measured and predicted flows for the Homosassa Springs Group flows for conditions that represent 1946, 1966, 1970, 1979, 1990, 2010 and 2030?

**G.** Does the model show that the drawdown of underground water alters the relative flows between the Weeki Wachee, Chassahowitzka, Homosassa and Crystal River Rivers?

**H.** Does the model show that you can control different percent flow draw downs independently across the four above mentioned springsheds?

**I.** What happens to the Homosassa Springs when the Chassahowitzka is drawn down by 11%?

**J.** What happens to the Bluebird Springs when the Chassahowitzka is drawn down by 11%.

Thank you,

Ron Miller

[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)

352 628-6066

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**Marty Kelly**

**From:** Marty Kelly  
**Sent:** Monday, July 11, 2011 9:43 AM  
**To:** Ron Basso; Mike Heyl; Gary E. Williams; Paul Williams  
**Subject:** FW: Bluebird Springs  
**Attachments:** Group5\_Bluebird Spring\_final.pdf

Guys,  
Please see attachment also; here is some info that was provided to Doug regarding Bluebird Springs by Mr. Miller. Some of the info was provided by Mike Czerwinski – who apparently is collecting data with respect to Sugarmill Woods Wellfield (see below).  
Thanks,  
Marty

**From:** Doug Leeper  
**Sent:** Thursday, June 30, 2011 3:23 PM  
**To:** Ron Miller (rmille76@tampabay.rr.com)  
**Cc:** Czerwinski, Mike (mczerwin@tampabay.rr.com); Julie.Espy@dep.state.fl.us  
**Subject:** Bluebird Springs

Ron:

Thanks for your e-mails regarding Bluebird Springs. Thanks also to July Espy and Mike Czerwinski for their comments regarding proliferation of algae in the spring bowl and run. Seems that the information you and your LAKEWATCH colleagues are collecting will be of use to all who are interested in protecting the resources of the Homosassa region.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

[illegible]

**From:** Ron Miller [<mailto:rmiller76@tampabay.rr.com>]  
**Sent:** Wednesday, June 29, 2011 5:01 PM  
**To:** Michael G. Czerwinski; Rolf Auermann  
**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Tom Clark; Bill Garvin; Rolf Auermann; Susan Coffin; Dave Dewitt; Julie Epsy; Doug Leeper; Al Grubman; Art Yerian; Veronica Craw; Robert Knight; Brent Whitley  
**Subject:** Re: Bluebird Springs water quality

Hi Mike,

Yes, we do read the water depth on a SWFWMD depth gage. Today it was slightly higher than last month: 1.67 vs 1.6 feet.

The BB readings range from 1.5 to 2.3 feet.

Rolf: would you email your file of BB data to Mike.

Thanks,

[illegible]

Ron

Mike

◆ Wetland Delineation ◆ Water Quality Studies  
◆ Gopher Tortoise Relocation ◆ Phase I ESA's  
◆ Environmental Impact Assessment ◆ Permitting  
◆ Listed Species & Habitat Assessments & Mapping  
◆ Now Offering Urban & Regional Planning

[illegible]

Julie Espy

Environmental Administrator  
Watershed Assessment Section  
2600 Blair Stone Rd. MS3555  
Tallahassee, FL 32399  
850-245-8416  
[julie.espy@dep.state.fl.us](mailto:julie.espy@dep.state.fl.us)

*The Department of Environmental Protection values your feedback as a customer. DEP Secretary Herschel T. Vinyard Jr. is committed to continuously assessing and improving the level and quality of services provided to you. Please take a few minutes to comment on the quality of service you received. Simply click on [this link to the DEP Customer Survey](#). Thank you in advance for completing the survey.*

[illegible]

**From:** Ron Miller [<mailto:rmille76@tampabay.rr.com>]

**Sent:** Wednesday, June 29, 2011 12:31 PM

**To:** Dave DeWitt; Mike Cerwinski; Espy, Julie; Doug Leeper; Al Grubman; Yerian, Art; Veronica Craw; Robert Knight; Brent Whitley

**Cc:** Priscilla Watkins; Jim Bitter; Ron Schultz; Tom Clark; Bill Garvin; Rolf Auermann; Susan Coffin

**Subject:** Bluebird Springs water quality

Hi all,

Today we tested Bluebird Springs. The Sechii Depth at the Main Spring (site #4) was only 2.5 feet. We have been testing these springs under the Florida Lakewatch Program since 2005. At site #4 the spring is about 17 feet deep and normally we can see the Sechii Disc to a depth of 10 to 14 feet. Today the entire spring area was covered with a high level of algae. We think the poor conditions today may be due to very low or no flow in the Bluebird Main Spring. At a nearby site (site #2) the Sechii disc was visible on the bottom at 5 feet.

Please go to [www.homosassariveralliance.org](http://www.homosassariveralliance.org) to find a map of Bluebird Springs with the above mentioned sites and related Lakewatch data.

This is very alarming and should be checked out by FDEP and/or SWFWMD.

Ron  
352-628-6066

**Marty Kelly**

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**From:** Gary E. Williams  
**Sent:** Monday, July 11, 2011 9:28 AM  
**To:** Marty Kelly; Ron Basso; Paul Williams  
**Cc:** Mark Hammond; Mark Barcelo; Mike Heyl  
**Subject:** RE: Springs Coast MFL Workshop

Here's some basic info in Bluebird from Bulletin 66 Springs of Florida. I think it is probably a 3<sup>rd</sup> mag

### **Bluebird Springs**

**Location** – Lat. 28° 47' 20.38" N, Long. 82° 34' 46.26" W (NE¼ NW¼ NW¼ sec. 34, T. 19 S, R. 17 E). Bluebird Spring is located in a municipal park off CR 490 (Yulee Drive) 0.9 mi (1.5 km) southeast of Homosassa Springs. From the intersection of US 19/98 and CR 490 head southwest on CR 490 approximately 0.7 miles (1.1 km) to the intersection with Bluebird Springs Lane. Head south (left) on Bluebird Springs Lane approximately 0.2 miles (0.3 km) to the springs.

**Description** – Bluebird Springs has been enhanced with concrete walls creating a squareshaped spring pool near the vent. This portion of the spring pool measures 75 ft (22.9 m) east to west. The overall spring pool is approximately 120 ft (36.6 m) wide and 225 ft (68.6 m) long. Water issues from a limestone fissure. Depth over the fissure is 15 ft (4.6 m). The spring bottom consists of sand, detritus, and limestone. The spring water is clear with a greenish hue. Algae are abundant on all substrates in the slow-moving spring. Another spring vent is approximately 150 ft (45.7 m) east of the main vent, up a short, narrow run which converges with flow from the main vent. Limestone crops out near spring vents, otherwise, the bottom is sandy with aquatic vegetation common. Their combined flow travels south and west 280 ft (85.3 m) through a 100 ft (30.5 m) wide run with grassy lawn along its banks. It narrows to about 15 ft (4.6 m) wide and 3 ft (0.9 m) deep then enters low, swampy woodlands and flows under a dense forest canopy. From this point, the spring run travels an unknown distance westward virtually parallel to the Homosassa River and is presumed to eventually enter the river. The area is a developed county park with facilities and picnic tables; however, no swimming is allowed in the springs. There was not enough flow to create boils on the spring surface in March 2003.



**Figure 20. Bluebird Springs (photo by R. Means).**

---

**Gary E. Williams, Ph.D.**

Resource Projects Department  
Southwest Florida Water Management District  
2379 Broad Street  
Brooksville, Florida 34604  
ph: 352.796.7211 x4286 fax: 352.797.5806  
website: [www.watermatters.org](http://www.watermatters.org)

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**From:** Marty Kelly

**Sent:** Monday, July 11, 2011 9:09 AM

**To:** Ron Basso; Gary E. Williams; Paul Williams

**Cc:** Mark Hammond; Mark Barcelo; Mike Heyl

**Subject:** RE: Springs Coast MFL Workshop

Thanks,

Ron – I meant to copy Paul Williams on the previous email. Sorry, Gary if you found this confusing. Maybe Mike knows something about Bluebird (but may not be a 2<sup>nd</sup> mag spring in any case).

Marty

May 14, 2012

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Electronic mail correspondence from/to Martyn Johnson and others concerning flow  
measurements on the Springs Coast

---

This memorandum documents various correspondence associated with questions concerning flow measurement that were originally submitted by Mr. Martyn Johnson. Copies of electronic mails and other documents associated with this correspondence are attached.

DAL  
Attachments

**From:** [Alan Martyn Johnson](#)  
**To:** [Doug Leeper](#); [norman@amyhrf.org](#); [bwr.crrc@tampabay.rr.com](#); [hopecorona@tampabay.rr.com](#); [rebecca.bays@bocc.citrus.fl.us](#); [rradacky@cityofbrooksville.us](#); [jfarley682@aol.com](#); [administration@inverness-fl.gov](#); [cityofweekiwachee@yahoo.com](#); [kathleen.greenwood@dep.state.fl.us](#); [bill.pouder@myfwc.com](#); [ted.hoehn@myfwc.com](#); [abrockway@co.hernando.fl.us](#); [brentwhitley@sierra-properties.com](#); [Ron Miller](#); [manatees@habitats.org](#); [grubman1@gmail.com](#); [dennis3ds@aol.com](#); [boyd\\_blihovde@fws.gov](#); [rkane](#); [2buntings@comcast.net](#); [whmarkle@gmail.com](#); [jsullivan@carltonfields.com](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Friday, July 29, 2011 8:26:41 AM

---

Doug,

Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?

Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: [Doug.Leeper@swfwmd.state.fl.us](#)  
To: [norman@amyhrf.org](#); [BWR.CRRc@tampabay.rr.com](#); [hopecorona@tampabay.rr.com](#); [rebecca.bays@bocc.citrus.fl.us](#); [rradacky@cityofbrooksville.us](#); [jfarley682@aol.com](#); [administration@inverness-fl.gov](#); [cityofweekiwachee@yahoo.com](#); [Kathleen.Greenwood@dep.state.fl.us](#); [bill.pouder@myfwc.com](#); [ted.hoehn@MyFWC.com](#); [abrockway@co.hernando.fl.us](#); [brentwhitley@sierra-properties.com](#); [rmille76@tampabay.rr.com](#); [manatees@habitats.org](#); [grubman1@gmail.com](#); [Dennis3ds@aol.com](#); [Boyd\\_Blihovde@fws.gov](#); [rkane@usgs.gov](#); [2buntings@comcast.net](#); [whmarkle@gmail.com](#); [jsullivan@carltonfields.com](#)  
CC: [martynellijay@hotmail.com](#)  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identified as follows:

[Correspondence from Mr. Martyn Johnson](#); and



Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

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November 2, 2010

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section;  
Ron Basso, Senior Professional Geologist/Engineer, Hydrologic Evaluation Section; and  
Roberta Starks, Water Quality Monitoring Program Manager, Water Quality Monitoring  
Program Section; Southwest Florida Water Management District

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 26, 2010  
regarding recommended minimum flows for the Homosassa River system

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This memorandum documents an October 26, 2010 e-mail submitted to the District by Mr. Martyn Johnson concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Johnson raises a number of questions and offers comments regarding information included in the District report titled *Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft*, and the report titled *Scientific Review of Recommended Minimum Flows for the Homosassa River System*, which outlines findings from a peer-review panel voluntarily convened by the District for review of the recommended minimum flows report. For convenience, the District's report on the recommended minimum flows is referred to in the remainder of this memorandum as the "Homosassa recommended minimum flows report".

In his e-mail, Mr. Johnson also requested information concerning the schedule for upcoming activities associated with establishment of minimum flows for the system. An e-mail response was sent to Mr. Johnson on October 27, 2010 indicating that staff plans to present the peer-review panel's report to the Governing Board at the November 16, 2010 Board meeting and hopes to present draft rule language associated with recommended minimum flows for the river system to the Board at their December 14, 2010 meeting. A second e-mail, with a copy of this memorandum attached, was sent to Mr. Johnson on November 2, 2010.

Mr. Johnson's e-mail is reproduced as an attachment to this memorandum, to provide context for his perspective on the currently recommended minimum flows for the Homosassa River system. Excerpted portions of Mr. Johnson's e-mail are provided below, along with staff responses.

Excerpt No. 1 with Questions

1. Water Chemistry

The report does not attempt to discuss the differences in chemistry of the water from each of the springs, or the changes over any time period. For clarity I am not here talking about river salinity. There are obviously some critical factors to be looked at much more carefully. The peer review summarizes this very succinctly in their comment "perplexing". It is not just perplexing I would suggest that having ,springs' in close proximity that have such different chemical characteristics should alert the critical balance that exists. The brackish nature of a large portion of the flow into the river indicates elution of saltwater intrusion from vents in close proximity to vents carrying freshwater from the aquifer. This must be critical to the future, so why is it not considered in a study that is intended to prevent further harm? Additionally, why are springs such as Bear Spring, Banana Spring, Alligator Spring etc not referenced in any chemical analysis data?

Staff Response to Excerpt No. 1

Information on water quality/chemistry parameters for springs of the Homosassa River system is briefly addressed on pages 68 through 72 of the Homosassa recommended minimum flows report. Temporal

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 26, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 2

November 2, 2010

trends in measured and modeled salinity for the Homosassa River are presented for a short, model-calibration period in Figure 2-36 of the report. Temporal trends in river salinity are also provided in the 2010 report by HSW Engineering, Inc. titled *A Modeling Study of the Relationships of Freshwater Flow with Salinity and Thermal Characteristics of the Homosassa River*, which is included as Appendix A to the Homosassa recommended minimum flows report (see Figures 2-24, 2-25, 2-26, 2-32, 3-5, 3-6, 3-10, and 3-11 in Appendix A). With regard to water-quality characteristics of springs in the Homosassa River system, staff would like to provide the following, brief summary of District monitoring efforts in the region, and other relevant activities.

Since 1993, the District has monitored nutrient, major ion and trace metal concentrations and measured field water-quality parameters at seven springs in the Homosassa Spring Group/Complex on a quarterly basis, and at two additional springs on an annual basis (see Table 1 below). Priority pollutant scans for organic compounds, pesticides, trace metals, and bacteria are conducted for samples collected from select springs in July of every other year. Nitrogen isotopes are similarly measured in select springs once every other year in July, on an alternating cycle with the priority pollutant scans. Additional springs in the Homosassa Group were irregularly monitored for water quality in the mid-1990s because they are low-discharge springs that have water quality similar to a larger, nearby spring. These springs include Abdoney, Belcher, Halls River Spring No. 1, Homosassa River Spring No. 1, McClain, and Trotter #1. In October 2010, the Florida Department of Environmental Protection (FDEP) attempted to monitor these spring sites for Total Maximum Daily Load (TMDL) assessment purposes, so some data may be available within the next year from those efforts. In reference to Mr. Johnson's question regarding inclusion of water chemistry information for Bear Spring, Banana Spring and Alligator Spring in the Homosassa recommended minimum flows report, staff notes that we are not aware of any available water chemistry data for these springs.

**Table 1. Information on Homosassa River System Springs Routinely Sampled by the District.**

Spring Name	Monitoring Frequency	Tidal System
Homosassa #1	Quarterly	Yes
Homosassa #2	Quarterly	Yes
Homosassa #3	Quarterly	Yes
Trotter Main	Quarterly	No
Halls River Head	Quarterly	Yes
Pumphouse	Yearly	No
Bluebird	Yearly	No
Hidden River Head	Quarterly	Yes
Hidden River #2	Quarterly	Yes

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 26, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 3

November 2, 2010

The initial objective of the District's spring water quality monitoring effort was to investigate nutrients, particularly nitrate, in groundwater discharging from springs to Surface Water Improvement and Management (SWIM) Program priority water bodies. In addition to the Homosassa Group, the District also monitors water quality at springs in the following groups: Aripeka, Weeki Wachee, Storch, Chassahowitzka, Gulf Hammock, Rainbow, Panasoffkee, Gum Slough, Crystal (Pasco Co.), Kings Bay, Lithia/Buckhorn; and at selected springs in Pinellas and Sarasota Counties

For tidally influenced springs, every attempt is made to collect water quality samples when tidal stage is the lowest. All samples are collected from within the spring vent via a peristaltic pump to reduce any influence from surface water. These protocols assist with determining contributions of Upper Floridan aquifer water quality to spring pools, runs, rivers, and receiving estuarine waters.

Data from the District Springs Network have been used in internal reports which investigate the origin of nitrates discharged from springs. The data have also been used by the FDEP and the Florida Geological Survey for reporting on the status and/or trends of nutrients as well as other parameters, including saline indicators, and for TMDL assessments. All District data have been loaded to the FDEPs statewide STORET database, and are also available from the District's Water Management Information System database.

The 2009 Florida Geological Survey Bulletin No. 69 by Copeland and others titled *Regional and Statewide Trends in Florida's Spring and Well Groundwater Quality (1992-2003)* includes information on water quality trends in the Homosassa River system. Increases in several water quality constituents are reported for Hidden River Head Spring, Hidden River No. 2 Spring, Homosassa No. 1 Spring, Homosassa No. 2 Spring, Homosassa No. 3 Spring, Pumphouse Spring and Trotter Main Spring. Available flow data from the United States Geological Survey (USGS) Homosassa Springs at Homosassa, FL gage site from late-1995 through early 2003 were used by the report authors to identify a decreasing trend in flows at the site. Based on analysis of data from throughout the state, Copeland and his colleagues note that many of the observed water-quality trends are related to lack of rainfall, movement of water from deeper portions of the aquifer systems underlying the state, water-use during drought periods, and land-use activities.

The District concurs with the statement in Florida Geological Society Bulletin 69 that flows in many Florida springs, including those of the Homosassa River system, have been declining. However, the District believes that flow declines since the 1960's are predominately related to climatic variation and are, for the most part, impacted much less by groundwater withdrawals. Support for this position is discussed in the 2010 memorandum by Basso included as Appendix B to the Homosassa recommended minimum flows report and in the 2008 report *Groundwater Flow and Saltwater Intrusion Model for the Northern District Water Resources Assessment Project Area*, which was prepared for the District by HydroGeoLogic, Inc. (additional information on this model is also provided in Staff Responses to Excerpts 3, 4 and 5 below). Within the northern portion of the District, water budget information developed using the regional groundwater flow component of the Northern District Model indicates that the increase in groundwater withdrawals (+0.1 inches/yr) during a very dry year (2000) was very small

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 26, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 4

November 2, 2010

compared to the reduction in recharge (-7.2 inches/yr). Therefore, the vast majority of drought impact on spring discharge in the modeled area is related to decreases in rainfall. Additionally, two scenarios were run using the Northern District saltwater intrusion model. Based on current and future groundwater demand, little to no saltwater intrusion is predicted in coastal portions of Citrus, Hernando, and Levy Counties over the next 50 years.

#### Excerpt No. 2 with Questions

2. Spring below Viewing Platform in State Park

I am not 100% sure how this spring is reference in the report. Please confirm what designation this spring has. I think it is Homosassa River Spring No.1.

As I understand the flow from this vent is not assessed in the discharges monitored from the gage stations 02310678 Homosassa Springs and 0231688 SE Fork.

No mention is made in the report of the decline and now virtually no flow from the spring located at the viewing platform in the State Park. 10 years ago this „vent“ had a major flow with numerous fish in the clear water. Today no flow is evident. Why is this not mentioned?

#### Staff Response to Excerpt No. 2

The spring addressed in Mr. Johnson's question is referred to in the Homosassa recommended minimum flows report as Homosassa River No. 1 Spring. Discharge from this spring is not included in the flows measured at the USGS Homosassa Springs and Southeast Fork stream-flow gauging stations; the spring is located downstream from these sites, near the covered viewing platform in the state park in the vicinity of the confluence of the Homosassa River and Southeast Fork. Little is known regarding discharge from the Homosassa River No. 1 Spring vent. In a 1997 report titled *Water-Quality and Hydrology of the Homosassa, Chassahowitzka, Weeki Wachee, and Aripeka Spring complexes, Citrus and Hernando Counties, Florida*, Jones and his coauthors note that “[t]he actual vent of the spring is small, very little flow is discernable near the vent, and there is no evidence of a boil or slick on the surface”. They further note that “[t]he water quality of the spring probably changes significantly over a tidal cycle.” In a subsequent 2001 report titled *The Hydrology and Water Quality of Select Springs in the Southwest Florida Water Management District*, Champion and Starks note that no discharge measurements are available for the spring. Staff believes that the lack of discharge measurements understandably precludes development of conclusions regarding temporal changes or trends in flows emanating from the Homosassa River No. 1 Spring vent. Staff will consider adding text to page 29 of the Homosassa recommended minimum flows report that indicates “little discernable flow” has been reported for the spring.

#### Excerpt No. 3 with Questions

3. Pumping from the Aquifer

At the meeting and in the report a pumped withdrawal for 2005 of 438.1 mgd is mentioned. I do not find any breakdown of this figure; a point also raised in the peer review. My best interpretation is that this figure is for the entire Northern District and is derived in the „Model“. What are the known facts about pumping volumes and locations? In Appendix B it is stated that the effect on the flows, shown in Table 2-4, translate to a decrease in flow of 2.3 cfs for the combined Homosassa River System. It is worrying that such detailed predictions are made when there is no raw flow data from the various springs in the Southeast Fork and flow in the Halls River is “CALCULATED” (*The statistical analysis and graphing of this calculated flow are clear indications that this is in error. The report even has a single sentence questioning this but goes right ahead to use the data anyway I think you have to agree that these mathematical assumptions highly questionable..*) Further, the 2.3 cfs reduction in flow predicted by this pumping translates to about 1.4 mgd which is 0.32% of the total pumping figure. Does this not indicate an almost unsupportable reliance on mathematical assumptions?

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Additionally, is there some reasoning behind the fact that no flow monitor is installed at the Halls River gage station? Possibly someone realized that this water is so saline it was not of critical importance, but the reasoning, or long term oversight needs to be addresses, because the calculated flow for Halls River are by all commentary and analysis questionable.

### Staff Response to Excerpt No. 3

The 2005 average annual groundwater withdrawal of 438.1 million gallons per day (mgd) identified on page 54 of the Homosassa recommended minimum flows report and presented at the recent rule development public workshop is associated with the Northern District Model domain. Although not depicted in the main body of the Homosassa recommended minimum flows report, the model domain is identified graphically in Figure 9 of the 2010 memorandum by Basso on predicted groundwater withdrawal impacts to Homosassa Springs that is included as Appendix B to the report. This representation of the Northern District Model domain was also included in the slide-show presented at the rule development public workshop held in Homosassa on October 13, 2010. In addition to the model domain figure, a map showing Upper Floridan aquifer groundwater withdrawals in the vicinity of the Homosassa Springs group during 2005 is included as Figure 3 in Basso's memorandum was also shown at the public workshop. The map uses variously-colored and sized circles to represent the magnitude and spatial distribution of groundwater withdrawals in the vicinity of the river system in 2005.

The identified 438.1 mgd groundwater withdrawal for 2005 is based on the District estimated and metered water use for 2005. It includes both permitted pumping from individual wells and estimates of domestic well water use. The withdrawal rate represents the total amount of groundwater withdrawn in the Northern District model domain, which includes all of the Northern West-Central Florida Ground-Water Basin (NWCFGWB) of the Upper Floridan aquifer. In addition, most of Lake County and parts of Marion County outside the NWCFGWB are also included in the model to assess water use near the District's eastern boundary. Withdrawals included in the model from the Suwannee River and St. Johns River Water Management Districts are based on information from those two agencies. All the well construction information contained in the District estimated and metered database is used to assign withdrawals into layers in the Northern District Model. Accurate well locations and well construction details are required for water use permits and in well construction completion reports for domestic wells.

For modeling and other hydrologic analyses, a groundwater basin is considered to have well-defined boundaries in lateral directions, and a definable bottom. Precipitation that falls within a groundwater basin provides recharge to the aquifer within that basin. Groundwater does not flow laterally between groundwater basins or outside of a basin. The Northern District Model is a regional groundwater flow model that is calibrated under steady-state and transient conditions. Modeled flow for springs in the Homosassa Springs Group was within one percent of observed flow in the steady-state version of the model. Estimates of observed springflow were made for all of the springs that are currently ungaged. Information on ungaged flows was obtained from a 2002 USGS report by Sepulveda titled *Simulation of Ground-Water Flow in the Intermediate and Floridan Aquifers Systems in Peninsular Florida*. District staff uses the best information available at the time of minimum flow assessment to determine the level

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of existing impact to a water resource feature, and this information was and is considered the best available for evaluation of impacts to spring discharge in the Homosassa River system.

Staff is not sure what is meant by Mr. Johnson's assertion regarding "*almost unsupportable reliance on mathematical assumptions*" when withdrawal impacts on spring flow translate into only "*0.32% of the total pumping figure.*" Assuming that he is suggesting that the predicted spring flow reduction simulated in the model is too low based on 438.1 mgd of groundwater withdrawn over a 10,000 square mile area, we can offer the following information that may be helpful to understanding the withdrawal impact assessment completed for the Homosassa River system.

Factors that play a role in determining reductions in spring flow due to groundwater pumping include the distance of the withdrawal from the spring location, the magnitude of withdrawals near the spring, the geology of the area, and the recharge to the Upper Floridan aquifer. Groundwater withdrawals lower water levels in the aquifer which decreases storage, and may reduce lateral groundwater outflow to the coast, surface water runoff, spring discharge, and evapotranspiration. Water that is removed from an aquifer is essentially offset by changes in aquifer storage, lateral outflow, runoff, spring discharge, and evapotranspiration. The decline in storage (i.e., the lowering of the Upper Floridan aquifer water level) and changes in spring discharge are simulated by the Northern District Model. The change in water level at each withdrawal location is largely predicated on the aquifer's transmissive (permeable) properties, the magnitude of the aquifer storage coefficient, and the amount of recharge that reaches the aquifer. In this case, the predicted lowering in the Upper Floridan aquifer water level at the Homosassa Group Springs location was less than 0.1 feet due to all withdrawals in the model domain. This resulted in a predicted reduction in modeled spring discharge of one percent. The groundwater flow system in Citrus County is less vulnerable to the impacts of withdrawals because the Upper Floridan aquifer is mostly unconfined, has very high recharge rates, is very permeable, and groundwater withdrawals are relatively low in magnitude and dispersed.

In anticipation of developing minimum flows and levels for the Homosassa River system, the District coordinated with the USGS beginning in 2006 to measure gage height, salinity and water temperature at the previously operated Halls River gage site located at the County Road 490A bridge. This recent data collection effort, which was discontinued in September 2009, was implemented to support modeling efforts for the Homosassa River system and to obtain information on salinities in Halls River. Measurement of discharge was not initiated at the site in 2006 because at that time staff believed that the period needed to develop procedures for determining discharge at the site and for subsequent collection of discharge measurement would yield a discharge record that would be of marginal use for the minimum levels development process, given the scheduling constraints associated with timely establishment of minimum flows for the river system. Staff also arrived at their decision regarding measurement of discharge at the Halls River gage site knowing that discharge was (and is) being measured at the nearby Homosassa River gage site located downstream of the confluence of the Halls and Homosassa Rivers.

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Staff agrees that development of a long-term discharge record for Halls River at the USGS Halls River gage site or another site in the river would be advantageous for characterization of flows in the Homosassa River system. For work supporting development of the recommended minimum flows for the Homosassa River system, discharge for Halls River was estimated by subtracting flows at the Homosassa Springs and Southeast Fork gage sites from the flows reported at the downstream Homosassa River gage site. Uncertainties associated with this approach are acknowledged in the Homosassa recommended minimum flows report and the 2010 report by HSW Engineering, Inc. titled *A Modeling Study of the Relationships of Freshwater Flow with Salinity and Thermal Characteristics of the Homosassa River*, which is included as Appendix A to the Homosassa recommended minimum flows report. Staff will continue to evaluate future approaches for development of an adequate discharge record for Halls River. Factors to be considered for this effort may include development of an adequate procedure for accounting for tidal influences, evaluation of the feasibility of measuring discharge at a site upstream from the existing Halls River gage site, and budgetary constraints.

#### Excerpt No. 4 with Questions

##### 4. Water Table Changes

The report hardly mentions the changes in the water table inland. Brief reference is made to the decline at the Lecanto 2 well, almost dismissing the statistically significant decline as „easily“ explained by rainfall deficit from average rainfall. The fact is that rainfalls have declined and are thus influencing water table and spring flows. Further brief mention is made of the well at Weeki Wachee and Homosassa Well 3, but no data is included in the report about changes at these wells.

There must be a lot of other information/data about the water table that is relevant to the driving force for spring water flow. I can only assume that water table data is in the Northern District Model (without such data to build the model surely it is questionable), but why is it not in the report? Water table and the resulting hydrostatic pressure is the sole driving force for spring flows and suppressing saltwater intrusion. Do I have to assume that all these wells show decline in the water table?

#### Staff Response to Excerpt No. 4

Information regarding water withdrawals and aquifers in the vicinity of the Homosassa River system is addressed on pages 53 through 55 in the Homosassa recommended minimum flows report and in the 2010 memorandum by Basso on predicted groundwater withdrawal impacts to Homosassa Springs that is included as Appendix B to the report.

District staff agrees that declining rainfall over the last 40 years has and continues to exert a major influence on the water table elevation and spring flows in the vicinity of the Homosassa River system. Many wells are monitored for water levels in Citrus County and in the vicinity of the Homosassa Spring Group. The Lecanto 2 well was selected because it has one of the longest periods of measurements of all the monitoring wells. Data from this well begins in 1965. Statistical analysis of rainfall and Upper Floridan aquifer water level history shows a strong correlation between long-term rainfall deficits and reduced water levels in the aquifer in western Citrus County. The geology in this area consists of surficial sand overlying several hundred feet of limestone that comprises the Upper Floridan aquifer. In some instances, a thin layer of clay separates the surficial sand from the underlying aquifer system. In most of Citrus County, however, the Upper Floridan aquifer is unconfined and thus its water level is highly dependent on rainfall variation.

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The Northern District Model was calibrated by matching water levels from 295 wells within the model domain. Baseflow from major rivers and spring flow from 93 springs was also matched during the calibration process. The recharge applied in the model was also derived based on radar estimated rainfall, land use, soils, and depth to water table information. Detailed information on the model calibration is included in the 2008 report by HydroGeoLogic, Inc., titled *Groundwater Flow and Saltwater Intrusion Model for the Northern District Water Resources Assessment Project Area*. This report was supplied to the scientific panel that recently completed an independent, peer- review of the technical work associated with development of the District's recommended minimum flows for the Homosassa River system.

With regard to Mr. Johnson's comments concerning the USGS Weeki Wachee Well near Weeki Wachee, FL and Homosassa Well 3 near Homosassa, FL, staff note that these sites were identified in the Homosassa recommended minimum flows report due to their use in the calculation of discharge for the Homosassa Springs, Southeast Fork and Hidden River gage sites. Because the USGS routinely measures discharge at these gage sites to update rating curves for use of the well information, analysis of trends in water levels for the identified wells was not considered necessary to support the analyses outlined in the Homosassa recommended minimum flows report.

#### Excerpt No. 5 with Questions

5. Homosassa Springs Ground-Water Basin

In the report mention is made of the Homosassa Springs Ground-Water Basin. How is this basin area of 270-300 square miles derived? Is it from contour mapping? From the diagram in the report a significant portion appears to be only the source of surface water run off into the river.

How many well permits has SWFWMD issued in each of the last ten years in this geographical area. And, What is the metered and estimated pumping from these wells? What is the typical depth of these wells and has it changed during the last ten years?

The omission of such data from the report does not add to but appears to detract from the purpose of the Statute requiring that minimum flows are set to prevent further harm.

I fully recognize that SWFWMD are tasked with this legal requirement, but also recognize that SWFWMD are the ones issuing the permits. The purpose of the Statute is prevention.

#### Staff Response to Excerpt No. 5

The groundwater basin for the Homosassa River system as depicted in Figure 2-6 of the Homosassa recommended minimum flows report was develop based on a map presented by Knochenmus and Yobbi in a 2001 USGS report titled *Hydrology of the Coastal Springs Ground-Water Basin and Adjacent Parts of Pasco, Hernando, and Citrus Counties*. For the Homosassa recommended minimum flows report, the area of the ground-water basin was approximated in an electronic geographic information system file using ESRI ArcMap software. The basin boundary was originally identified by Knochenmus and Yobbi from flow analysis of potentiometric surface elevation mapping of the Upper Floridan aquifer. It is an approximate boundary based on the flow field as measured twice per year by the USGS. In their 2001 report, Knochenmus and Yobbi developed a water budget for the basin for calendar years 1997 and 1998. According to their calculations, average annual values for the following water budget components were:



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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 Upper Floridan aquifer averaged 20 in/yr for the two-year period. As a percentage of recharge, groundwater withdrawals averaged about three percent of annual recharge.

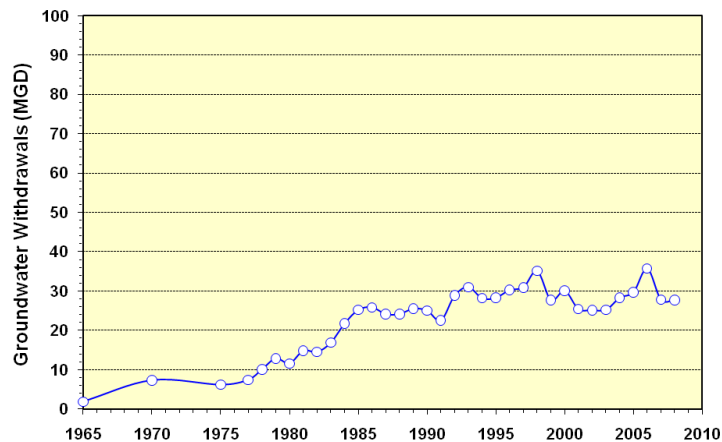
Although the groundwater basin boundary for the Homosassa River system approximates the area within the Upper Floridan aquifer that contributes to spring discharge, it may be thought of more as a source area of recharge to the springs that could potentially impact the water quality of discharge from the system springs. It is not the only area where groundwater withdrawals may contribute to spring flow reductions. Groundwater withdrawals outside this immediate area can also add to spring flow decline by lowering aquifer water levels in this area – this is why the District simulates pumping changes over the entire groundwater basin of the Upper Floridan aquifer to evaluate impacts to the Homosassa Springs Group – and thus derives a much more conservative assessment of withdrawal impacts. All the well construction information contained in the District estimated and metered database is used to assign withdrawals into layers in the Northern District Model. Well construction details are required for water use permits and in well construction completion reports for domestic wells. Nearly all of the well withdrawals occur in the Upper Floridan aquifer in this basin.

Rather than focusing solely on the contributing area for Homosassa River system springs, water use in Citrus County may also be reviewed to characterize groundwater pumping in the vicinity of the Homosassa River system. Figure 1, on the next page of this memorandum, illustrates historic groundwater withdrawals from the Upper Floridan aquifer in Citrus County from 1965 through 2008, with 2008 being the most recent year with available data from District water-use estimate reports. Groundwater withdrawals in Citrus County were 29.7 mgd in 2005, the year which was used to model withdrawal impacts to the Homosassa River system with the Northern District Model. More recently, in 2008, withdrawals in the county were 27.7 mgd.

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**Figure 1. Historical groundwater use in Citrus County, 1965 through 2008 (sources: Southwest Florida Water Management District Water Use Estimate Reports; and the 2004 USGS report by R. Marella titled *Water Withdrawals, Use, Discharge, and Trends in Florida, 2000*)**

As noted above in the Staff Response to Excerpt number 3, information on metered and estimated water use for 2005 in the vicinity of the Homosassa River system is presented in Chapter 2 and Appendix B of the Homosassa recommended minimum flows report. As part of this information, Basso notes that “[g]roundwater withdrawn within a five-mile radius of Homosassa 1 Spring vent [the main spring pool] is relatively low and was 1.3 million gallons per day (mgd) in 2005. Ground water withdrawn within a 10-mile radius of the spring was 8.2 mgd in 2005.” The Northern District Model has also been used to simulate withdrawal impacts to spring flow due to projected 2030 water demand as part of the District’s 2010 regional water supply planning process. Predicted spring flow reductions at the Homosassa Springs Group is estimated at 2.4 percent, based on projected total groundwater withdrawals of 576.1 mgd in the model domain.

Staff disagrees with Mr. Johnson’s assertions that omission of information on the number of area well permits issued by the District in the past ten years, the metered and estimated pumping from these wells, the typical depth of the wells and temporal variation in the depth of these wells “...appears to detract from the purpose of the Statute requiring that minimum flows are set to prevent significant harm”. Staff believes that the information outlined in the Homosassa recommended minimum flows report supports adherence to statutory requirements regarding establishment of minimum flows.

#### Excerpt No. 6 with Questions

##### 6. Has Harm Already Been Done

It is disappointing that the report and the peer review, which raises this specific point, have not taken into account the valuable observations of local residents. At the meeting you heard from long time residents who tried to explain the damage that has already been done to the river. They reported changes in flow, changes in fish and vegetation and clearly pointed out the increase in barnacles to points very close to the few freshwater springs.

I have known the river for about 9 years and can clearly attest to the fact that significant changes have occurred.

-Flow at the spring below the viewing platform that I mentioned earlier

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- Decrease in fish in the river
- Decrease and change in the vegetation in the river

These observations are far more telling than mathematical models or mathematical attempts to filter data from the flow gages, and must be addressed in any presentation to your Board. SWFWMD will bear the responsibility for not considering these as further deterioration occurs. I also have to agree that pumping of freshwater from the aquifer is not the only factor that is causing deterioration, but it is one of the factors that is easier to control in the short term than factors such as farming practices and poor sewerage planning that take years to reverse.

#### Staff Response to Excerpt No. 6

With regard to Mr. Johnson's presumptive question – "*Has Harm Already Been Done*" – staff notes that the purpose for establishing minimum flows is to identify the limit at which further water withdrawals would be significantly harmful to the water resources or ecology of the area (Section 373.042(1)(a), Florida Statutes). Staff acknowledges changes have occurred in the Homosassa River system, but believe the recommended minimum flows adequately address the goal of preventing significant harm to the system that may result from excessive water withdrawals.

Staff notes that the District has been actively involved in the exchange of information with local residents and other interested parties with regard to the development of recommended minimum flows for the Homosassa River system. Staff addressed the Save the Homosassa River Alliance at alliance meetings in January 2008 and March 2010 to discuss the minimum flows development process. More recently, staff presented the draft report on recommended minimum flows to the Governing Board at their public meeting held in July 2010 and subsequently made the report available to all interested parties by posting the document on the District web site. In August 2010, a printed copy of the report was hand-delivered to the office of the Park Manager at the Ellie Schiller Homosassa Springs Wildlife State Park, and staff presented information on the recommended minimum flows to staff with the Chassahowitzka National Wildlife Refuge and members of the Citrus County Task Force of the Citrus-Hernando Waterways Restoration Council at a Council meeting open to the public. In October 2010, staff facilitated a public-input rule development workshop in Homosassa that was well attended by local interested parties. In addition to participating in these open-forum governmental meetings and meetings with various individuals, staff has made the peer-review panel's findings (report) regarding the District's currently recommended minimum flows available on the District web site, and has been involved in responding to numerous public inquiries and comments regarding flow recommendations for Homosassa River system.

Based on the interactions summarized above, staff has gained an understanding of a wide variety of personal observations, concerns and recommendations advanced by individuals interested in the Homosassa River system. This information has and will continue to be considered by staff with regard to potential revision of the currently recommended minimum flows, and will continue to be documented as appendices to the final, revised version of the report on minimum flows for the Homosassa River system that will be presented to the Governing Board for their consideration as part of the process of establishing minimum flows for this priority river system.

DAL

Attachment: E-mail from Mr. Martyn Johnson dated October 26, 2010

## **Two Page Attachment to November 1, 2010 Memorandum on Comments Submitted by Mr. Martyn Johnson on October 26, 2010**

**From:** Alan Martyn Johnson

**To:** Doug Leeper

**Subject:** Minimum Flow Homosassa River System

**Date:** Tuesday, October 26, 2010 9:48:44 AM

Doug,

I attended the workshop and have since read and studied the report appendices and most recently the peer review. Due to my traveling I have not had a chance to write you until now, but I have a number of questions/concerns.

1. Water Chemistry

The report does not attempt to discuss the differences in chemistry of the water from each of the springs, or the changes over any time period. For clarity I am not here talking about river salinity. There are obviously some critical factors to be looked at much more carefully. The peer review summarizes this very succinctly in their comment "perplexing". It is not just perplexing I would suggest that having „springs“ in close proximity that have such different chemical characteristics should alert the critical balance that exists. The brackish nature of a large portion of the flow into the river indicates elution of saltwater intrusion from vents in close proximity to vents carrying freshwater from the aquifer. This must be critical to the future, so why is it not considered in a study that is intended to prevent further harm? Additionally, why are springs such as Bear Spring, Banana Spring, Alligator Spring etc not referenced in any chemical analysis data?

2. Spring below Viewing Platform in State Park

I am not 100% sure how this spring is reference in the report. Please confirm what designation this spring has. I think it is Homosassa River Spring No.1.

As I understand the flow from this vent is not assessed in the discharges monitored from the gage stations 02310678 Homosassa Springs and 0231688 SE Fork.

No mention is made in the report of the decline and now virtually no flow from the spring located at the viewing platform in the State Park. 10 years ago this „vent“ had a major flow with numerous fish in the clear water. Today no flow is evident. Why is this not mentioned?

3. Pumping from the Aquifer

At the meeting and in the report a pumped withdrawal for 2005 of 438.1 mgd is mentioned. I do not find any breakdown of this figure; a point also raised in the peer review. My best interpretation is that this figure is for the entire Northern District and is derived in the „Model“. What are the known facts about pumping volumes and locations? In Appendix B it is stated that the effect on the flows, shown in Table 2-4, translate to a decrease in flow of 2.3 cfs for the combined Homosassa River System. It is worrying that such detailed predictions are made when there is no raw flow data from the various springs in the Southeast Fork and flow in the Halls River is "CALCULATED" (*The statistical analysis and graphing of this calculated flow are clear indications that this is in error. The report even has a single sentence questioning this but goes right ahead to use the data anyway I think you have to agree that these mathematical assumptions highly questionable..*) Further, the 2.3 cfs reduction in flow predicted by this pumping translates to about 1.4 mgd which is 0.32% of the total pumping figure. Does this not indicate an almost unsupportable reliance on mathematical assumptions?

Additionally, is there some reasoning behind the fact that no flow monitor is installed at the Halls River gage station? Possibly someone realized that this water is so saline it was not of critical importance, but the reasoning, or long term oversight needs to be addresses, because the calculated flow for Halls River are by all commentary and analysis questionable.

4. Water Table Changes

The report hardly mentions the changes in the water table inland. Brief reference is made to the decline at the Lecanto 2 well, almost dismissing the statistically significant decline as „easily“ explained by rainfall deficit from average rainfall. The fact is that rainfalls have declined and are thus influencing water table and spring flows. Further brief mention is made of the well at Weeki Wachee and Homosassa Well 3, but no data is included in the report about changes at these wells.

There must be a lot of other information/data about the water table that is relevant to the driving force for spring water flow. I can only assume that water table data is in the Northern District Model (without such data to build the model surely it is questionable), but why is it not in the report? Water table and the resulting hydrostatic pressure is the sole driving force for spring flows and suppressing saltwater intrusion. Do I have to assume that all these wells show decline in the water table?

5. Homosassa Springs Ground-Water Basin

In the report mention is made of the Homosassa Springs Ground-Water Basin. How is this basin area of 270-300 square miles derived? Is it from contour mapping? From the diagram in the report a significant portion appears to be only the source of surface water run off into the river.

How many well permits has SWFWMD issued in each of the last ten years in this geographical area. And, What is the metered and estimated pumping from these wells? What is the typical depth of these wells and has it changed during the last ten years?

The omission of such data from the report does not add to but appears to detract from the purpose of the Statute requiring that minimum flows are set to prevent further harm.

I fully recognize that SWFWMD are tasked with this legal requirement, but also recognize that SWFWMD are the ones issuing the permits. The purpose of the Statute is prevention.

6. Has Harm Already Been Done

It is disappointing that the report and the peer review, which raises this specific point, have not taken into account the valuable observations of local residents. At the meeting you heard from long time residents who tried to explain the damage that has already been done to the river. They reported changes in flow, changes in fish and vegetation and clearly pointed out the increase in barnacles to points very close to the few freshwater springs.

I have known the river for about 9 years and can clearly attest to the fact that significant changes have occurred.

-Flow at the spring below the viewing platform that I mentioned earlier

-Decrease in fish in the river

-Decrease and change in the vegetation in the river

These observations are far more telling than mathematical models or mathematical attempts to filter data from the flow gages, and must be addressed in any presentation to your Board. SWFWMD will bear the responsibility for not considering these as further deterioration occurs. I also have to agree that pumping of freshwater from the aquifer is not the only factor that is causing deterioration, but it is one of the factors that is easier to control in the short term than factors such as farming practices and poor sewerage planning that take years to reverse.

-

Doug,

I know that you and your team have worked hard on this project and in compiling the report must have found it difficult to avoid putting in every shred of scientific study that has been generated, all with good intent over many years. But, the observable evidence is clear from long term residents...it can't be ignored.

I look forward to some answers to my specific questions and would appreciate if you could inform me about the date of the meeting with the Board that you said was a public hearing. I have many more specific comments and questions noted on the report, but thought I would see what responses are to these points.

Martyn Johnson  
404-731-6187

**From:** [Richard L Kane](#)  
**To:** [Alan Martyn Johnson](#); [Doug Leeper](#)  
**Cc:** [Richard L Kane](#); [Kevin J Grimsley](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Friday, July 29, 2011 8:59:08 AM

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Doug we are planning to send you a rebuttal to Mr. Johnson's letter explaining why we feel that the discharge data is correct within the stated accuracy of the publish record. We would also like this posted on the web site. Also we are not interested in participating in another committee, on flow measurements. We would be happy to meet personally with Mr. Johnson and you, in our office in Tampa, where we can go over in depth all of our ratings and computation procedures.

---

Richard L. Kane  
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Cell 813-918-1275

**From:** Alan Martyn Johnson <[martynellijay@hotmail.com](mailto:martynellijay@hotmail.com)>  
**To:** Doug Leeper <[doug.leeper@swfwmd.state.fl.us](mailto:doug.leeper@swfwmd.state.fl.us)>, <[norman@amyhrf.org](mailto:norman@amyhrf.org)>, <[bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com)>, <[hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com)>, <[rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us)>, <[rradack@cityofbrooksville.us](mailto:rradack@cityofbrooksville.us)>, <[jfarley682@aol.com](mailto:jfarley682@aol.com)>, <[administration@inverness-fl.gov](mailto:administration@inverness-fl.gov)>, <[cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com)>, <[kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us)>, <[bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com)>, <[ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com)>, <[abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us)>, <[brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com)>, Ron Miller <[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)>, <[manatees@habitats.org](mailto:manatees@habitats.org)>, <[grubman1@gmail.com](mailto:grubman1@gmail.com)>, <[dennis3ds@aol.com](mailto:dennis3ds@aol.com)>, <[boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov)>, [rkane@usgs.gov](mailto:rkane@usgs.gov), <[2buntings@comcast.net](mailto:2buntings@comcast.net)>, <[whmarkle@gmail.com](mailto:whmarkle@gmail.com)>, <[jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)>  
**Date:** 07/29/2011 08:26 AM  
**Subject:** RE: Public Input for Spring Workshop

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Doug,  
Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?  
Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rrackack@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identifies as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

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  
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E-Mail: [doug.leeper@watermatters.org](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

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November 2, 2010

**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 October 28, 2010  
regarding recommended minimum flows for the Homosassa River system

---

This memorandum documents an October 28, 2010 e-mail submitted to the Southwest Florida Water Management District (SWFWMD) by Mr. Martyn Johnson concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Johnson recommends that minimum flows be established for the system that allow no change from current flow conditions and raises questions addressing flow measurement in the river system, evaluation of compliance with the minimum flows that are to be established for the system, and potential change in the designation of the Homosassa River as an Outstanding Florida Water.

Mr. Johnson's e-mail is reproduced as a three-page attachment to this memorandum, to provide context for his perspective on the currently recommended minimum flows for the Homosassa River system. Excerpted portions of Mr. Johnson's e-mail are included below, along with staff responses.

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**1. Excerpted Questions Concerning Flows at the United States Geological Survey Homosassa Springs and Southeast Fork Homosassa Springs Gage Sites**

**Question 1:** Are the calculated flows are still being „confirmed“ by the Acoustic Doppler Current Profiler on a quarterly basis at both these locations?

**Question 2:** Are the results from the ADCP directly comparable to the Price A-A current meters originally used?

The difference between NVGD29 and NGVD88 in this area is stated as 0.81 feet, so where is the 2.99 from? *I recognize that the report does make mention of these Gauge Datum inconsistencies.*

**Question 3:** Why is the  $dS/dt$  (change in river stage during a 15-minute period, in ft.) in one equation to such a large multiplier and not in the other? There appears to be a significant difference in the methodology used, see comment below.

**Question 4:** Why is the ground water level at the Weeki Watchee Well used and not the Lecanto Well 2? The Weeki Watchee Well does not appear to be in the Homosassa Groundwater Basin and in the *Water Use Impacts on Spring Discharge* the modeling done by Basso references the Lecanto well not the Weeki Wachee Well.

**Staff Response to No. 1 Excerpts**

For development of the recommended minimum flows for the Homosassa River system, District staff and consultants to the District used discharge and other data collected and reported by the United States Geological Survey (USGS) for the Homosassa Springs and Southeast Fork gage sites and other



SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 28, 2010  
regarding recommended minimum flows for the Homosassa River system

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gage or well sites. These data were evaluated prior to inclusion in our analyses, to determine whether they represented the best available information for establishing the recommended minimum flows. As part of this process, staff was required to make assumptions regarding the quality of these data, which were obtained using standard procedures. Incidentally, the District typically acknowledges issues associated with data collected using standard procedures when seeking independent, peer-review of data and methods used for establishing minimum flows and levels by including the following, or similar text in agreements developed with peer-review panelists.

***Note: The reviewers are not expected to provide independent review of standard procedures used as part of institutional programs that have been established for the purpose of collecting data, such as the USGS and SWFWMD hydrologic monitoring networks.***

It should be noted that the evaluation and use of data obtained from the USGS for development of recommended minimum flows for the Homosassa River system and the responses outlined in this memorandum represent the opinions and judgment of District staff, which may differ from those of the Survey. Staff also notes that additional information pertaining to sites monitored by the USGS in the Homosassa River system may be obtained from Mr. Richard Kane, with the Survey's Hydrologic Data Section in Tampa. Mr. Kane can be reached by telephone at 813-975-8620, extension 131, or by e-mail at [rkane@usgs.gov](mailto:rkane@usgs.gov).

With regard to Mr. Johnson's Questions 1 concerning measurement of flows at the Homosassa Springs and Southeast Fork gages, staff understands that quarterly flow measurements are currently obtained by the USGS to develop rating curves for calculating discharge at these sites. With regard to Question 2 pertaining to comparability of the flow measurements made with an acoustic Doppler current profiler and Price-AA current meters, staff suggests that Mr. Johnson contact the USGS Tampa office to learn more about this data collection issue.

In response to Mr. Johnson's question regarding the 2.99 foot factor used to calculate water surface elevations at the Homosassa Springs gage, staff note that this factor was provided by the USGS and further note that gage correction factor are routinely used to convert gage height values (i.e., water level readings) to elevations relative to defined vertical control datums such as NGVD29 or NAVD88. Staff notes that in the vicinity of the Homosassa River system, an approximate 0.81 foot conversion factor may be appropriate for converting elevation values from NGDV29 to NAVD88, and vice versa. Staff also notes that the 2.99 factor used by the USGS indicates that the gage at this site may not be considered direct-read, i.e., gage-height values measured at the site do not directly correspond with elevations associated with a vertical control datum.

In response to Questions 3 and 4 raised by Mr. Johnson, staff suggests that Mr. Johnson contact the USGS to discuss development of equations used to determine discharge at the gage sites in the Homosassa River system.

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 28, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 3

November 2, 2010

## 2. Excerpted Comments Concerning Discharge Reported for the United States Geological Survey Homosassa Springs and Southeast Fork Gage Sites

Assuming the equations have not changed during the periods that these site have been continually monitored at these sites (some 6 or more years) the standard error quoted by Mr. Fulcher (who's discussion May 1, 2009 is not included in the Appendices) of 15% appears to be rather large. From the way this is presented in the Appendix it is not clear if this error analysis has only been conducted for the Homosassa Springs 02310678, but no similar analysis is directly referenced for the SE Fork. While I am no expert, I do have a technical background and was involved in high level technical management of a large multinational corporation for over 25 years, from that point of view I would have to question the accuracy of these mathematical models and their relation to reality over extended time periods. These models do give indications of relative flow over time.

### Staff Response to No. 2 Excerpts

On Page B-3 included of Appendix A to the Homosassa recommended minimum flow report, HSW Engineering, Inc. report that the standard error for the rating curve that is used to measure discharge at the Southeast Fork gage site is slightly higher than the error reported for the Homosassa Springs rating curve. The discharge reported by the Survey for these sites is considered best available information for characterization of flows in upstream portions of the Homosassa River system.

## 3. Excerpted Questions Concerning Baseline Flows for the Homosassa River System

I raise these questions to get a better understanding of what the data presented really means. At the meeting you were somewhat elusive about what figures SWFWMD want to use as the baseline flow.

- A. What is the baseline flow that SWFWMD are suggesting should not decline more than 5%?
- B. Which gauges and calculations will be used?
- C. What time intervals will be used to make the comparison?

### Staff Responses to Excerpts No. 3

Baseline flows used to develop the allowable five percent flow reduction associated with the recommended minimum flows for the Homosassa River system were derived by combining daily mean flows reported by the USGS for the Homosassa Springs and Southeast Fork gage sites for two distinct periods: calendar year 2007 and from October 18, 1995 through May 13, 2009. The shorter baseline period was used for evaluating potential flow-related changes in plankton/nekton abundances, and potential flow-related changes in salinity-based habitats using empirical-regression and hydrodynamic models. The longer baseline period was used for evaluating potential flow-related changes in plankton/nekton abundances, and potential flow-related changes in salinity-based habitats using empirical-regression models. Staff notes that for some dates during the longer benchmark period, combined flows were based on estimates when flows were not available for one or the other gage sites. The estimates were developed using simple regressions based on reported discharge for the two sites.

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 28, 2010  
regarding recommended minimum flows for the Homosassa River system

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Based on modeling results derived using the baseline flows, staff is in the process of developing rule language that expresses the recommended minimum flows for the Homosassa River system as 95% of its natural flow. Natural flow may be defined as the flow that would exist in the absence of water withdrawals. For evaluation of compliance with the proposed minimum flows, staff anticipates use of the Northern District Model or some yet to be developed model, to evaluate impacts of current and proposed water withdrawals. These compliance analyses may be expected to be similar to those outlined in pages 53 through 55 and Appendix B in the District report titled *Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft*. The analyses will involve comparison of modeled spring discharge values for scenarios that include and exclude existing and/or proposed withdrawals. The comparisons will be made to ensure that 95% of the natural flows predicted for the scenario without water withdrawals are maintained for the scenarios that include existing or proposed withdrawals.

#### 4. Excerpted Questions Concerning Flows at the United States Geological Survey Homosassa River Gage Site

However, in reviewing the various methods of analyzing this data I was disappointed that no attempt appears to have been made to analyze:

1. The time (hours) of outflow versus the time (hours) of inflow at this site including how that has changed since 1984, and
2. The relationship of the null point of flow to the tide level (gage height).

Such analysis of data could be very valuable in determining the changes that have occurred in the ability and amount of higher salinity waters getting into the critical areas of the river upstream of kilometer 9. Such analysis could give a clear indication of the tidal level (gage height) that prevents outflow past MacRea's. This data which as I understand has been collected continually since 1984 (as shown in Table 2-2 in the report.) would give a much clearer picture of what has happened over a long period of time. It may also prove to be a better method of assessing the flow from Halls River which as I mentioned in my earlier email looks to be very speculative, particularly when considering that the flow from the spring at the viewing platform may not have been accounted for. It is all about flow and water quality.

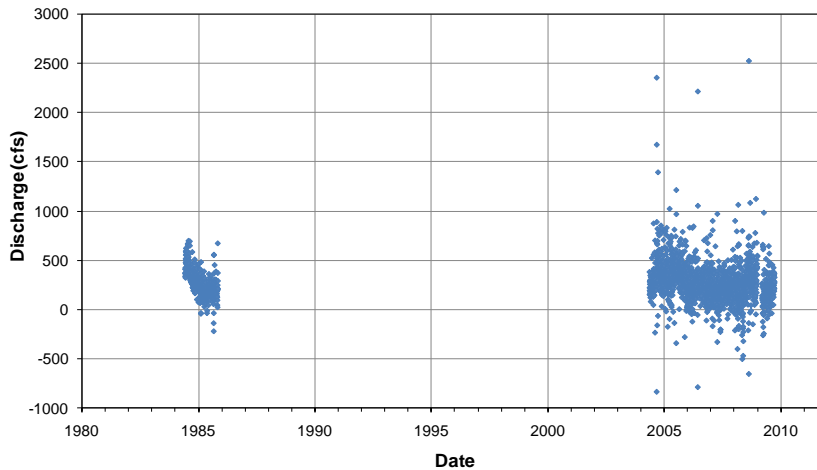
#### Staff Responses to Excerpts No. 4

Staff appreciates Mr. Johnson's recommendations regarding analysis of temporal changes in estuarine flushing, but notes that record for unfiltered or tidally filtered discharge data at the USGS Homosassa River gage site are, unfortunately, relatively continuous only since 2004, and earlier records are limited to unfiltered discharge values available from the mid-1980s. The rather discontinuous unfiltered discharge record for the gage site is shown in Figure 1, on the next page of this memorandum. The limited amount of discharge data collected prior to 2004 indicates that the analyses suggested by Mr. Johnson are unlikely to yield much useful information.

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on October 28, 2010 regarding recommended minimum flows for the Homosassa River system

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November 2, 2010



**Figure 1. Approved daily mean discharge reported by the United States Geological Survey for the Homosassa River at Homosassa, FL gage site (data were obtained from the USGS in March 2010).**

#### 5. Excerpted Questions Concerning Outstanding Florida Water Classification of the River System

How long will it be before the classification changes? Quote **The entire Homosassa River is classified as an Outstanding Florida Water (Florida Department of Environmental Protection 1996), a State designation associated with enhanced water quality protection criteria.** Unquote.

#### Staff Responses to Excerpts No. 5

Staff has no information regarding future changes regarding classification of the Homosassa River as an Outstanding Florida Water. We suspect that this designation will not be changed in the foreseeable future.

DAL

Attachment: E-mail from Mr. Martyn Johnson dated October 28, 2010

**Three Page Attachment to November 1, 2010 Memorandum on Questions and Comments Submitted by Mr. Martyn Johnson on October 28, 2010**

**From:** Alan Martyn Johnson  
**To:** Doug Leeper  
**Subject:** Homosassa River Minimum Flow  
**Date:** Thursday, October 28, 2010 4:17:18 PM

Doug,  
Thanks for acknowledging receipt of my earlier e-mail.

At the meeting you indicated that you would take comments until the end of the month; as that is rapidly approaching I have some specific questions and comments about the various flows and how they are analyzed.

**Flow Rates at Homosassa Springs 02310678 & Southeast Fork 02310688**

I do understand that the flows at these monitoring stations are calculated flows based on equations B-1 and B-2.

**Question 1:** Are the calculated flows are still being „confirmed“ by the Acoustic Doppler Current Profiler on a quarterly basis at both these locations?

**Question 2:** Are the results from the ADCP directly comparable to the Price A-A current meters originally used?

Additionally, I find it somewhat interesting that the equations B-1 and B-2 differ fairly significantly in there nature, but find not explanation:

***Homosassa Springs at Homosassa (02310678):***

$$Q = 90.8162 + 3.823(GW) - 20.3771(GH) \quad (B-1)$$

*GW being NVGD29 and GH being 2.99 ft below NGVD88*

***SE Fork Homosassa Spring at Homosassa (02310688):***

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt) \quad (B-2)$$

*GW and GH being NVGD29*

The difference between NVGD29 and NGVD88 in this area is stated as 0.81 feet, so where is the 2.99 from? *I recognize that the report does make mention of these Gauge Datum inconsistencies.*

**Question 3:** Why is the dS/dt (change in river stage during a 15-minute period, in ft.) in one equation to such a large multiplier and not in the other? There appears to be a significant difference in the methodology used, see comment below.

**Question 4:** Why is the ground water level at the Weeki Watchee Well used and not the Lecanto Well 2? The Weeki Watchee Well does not appear to be in the Homosassa Groundwater Basin and in the ***Water Use Impacts on Spring Discharge*** the modeling done by Basso references the Lecanto well not the Weeki Wachee Well.

**Comment:**

Assuming the equations have not changed during the periods that these site have been continually monitored at these sites (some 6 or more years) the standard error quoted by Mr. Fulcher (who's discussion May 1, 2009 is not included in the Appendices) of 15% appears to be rather large. From the way this is presented in the Appendix it is not clear if this error analysis has only been conducted for the Homosassa Springs 02310678, but no similar analysis is directly referenced for the SE Fork. While I am no expert, I do have a technical background and was involved in high level technical management of a large multinational corporation for over 25 years, from that point of view I would have to question the accuracy of these mathematical models and their relation to reality over extended time periods. These models do give indications of relative flow over time.

Doug,  
I raise these questions to get a better understanding of what the data presented really means.

At the meeting you were somewhat elusive about what figures SWFWMD want to use as the baseline flow.

So let me ask the question again.

- A. What is the baseline flow that SWFWMD are suggesting should not decline more than 5%?
- B. Which gauges and calculations will be used?
- C. What time intervals will be used to make the comparison?

#### Flow at Homosassa River 02310700

Here I have much more confidence that the figures are actual flows directly related to stream velocity and cross sectional area.

*Discharge at this station is currently determined using the index-velocity method and the following equations:*

$$Q = Vm(A) \text{ (B-3)}$$

$$Vm = 0.00902154 + 0.9019Vi + 0.12138Vi2 + 0.045375(GH) \text{ (B-4)}$$

*In which*

*Q = river discharge, in cfs.*

*A = area of channel cross section at the gauge, in ft<sup>2</sup>.*

*Vm = average velocity in the channel cross section at the gauge, in ft/s.*

*Vi = average velocity in channel measured during a 2-minute period by an “uplooking” acoustic velocity meter anchored on the channel bottom near the gauge, in ft/s.*

*GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29 (see follow section regarding gauge datum).*

*Discharge measurements are now made quarterly using an ADCP to characterize the rating.*

However, in reviewing the various methods of analyzing this data I was disappointed that no attempt appears to have been made to analyze:

1. The time (hours) of outflow versus the time (hours) of inflow at this site including how that has changed since 1984, and
2. The relationship of the null point of flow to the tide level (gage height).

Such analysis of data could be very valuable in determining the changes that have occurred in the ability and amount of higher salinity waters getting into the critical areas of the river upstream of kilometer 9. Such analysis could give a clear indication of the tidal level (gage height) that prevents outflow past MacRea's. This data which as I understand has been collected continually since 1984 (as shown in Table 2-2 in the report.) would give a much clearer picture of what has happened over a long period of time. It may also prove to be a better method of assessing the flow from Halls River which as I mentioned in my earlier email looks to be very speculative, particularly when considering that the flow from the spring at the viewing platform may not have been accounted for. It is all about flow and water quality.

From the Volume and Area data of the river upstream from kilometer 9 and 11 the replenishment rates can be calculated. I quickly looked at the NAVD88 = 0 data which shows the replenishment time using the current flow rates mentioned in the report.

To kilometer 11 it is just over 12 hours (which begs the question we are all asking “Why are we seeing barnacles past the narrower channel just upstream of the confluence with Halls River”).

To kilometer 9 it is just over 24 hours.

I did not attempt to look at the average gage levels to correct the volumes, but would expect this to be a relatively easy correlation for someone given the raw data.

Doug,

It may appear that some of my questions are attempts to bring the data into question, I can assure you my intent is to better understand the data. Then to help in whatever small way I can to protect the river, which I have clearly seen deteriorate in the short time I have known it.

How long will it be before the classification changes? Quote **The entire Homosassa River is classified as an Outstanding Florida Water (Florida Department of Environmental Protection 1996), a State designation associated with enhanced water quality protection criteria.** Unquote.

I trust this statement never has to be revised.

SWFWMD have a vital role to play by not giving license to withdraw more water from the aquifer that feed these vital springs. This is started by setting the minimum flow no lower than it is today (using a method that is clearly documented). My personal opinion is that flows are already reduced below the minimum level and significant harm is being done. As mentioned before I can fully appreciate that pumping alone is not the only factor influencing the condition of the river, but setting the minimum flow which is required by Statue is a NOW issue. Please consider presenting to the Board that no further reductions in flow in the river can be considered, at least until there is a better understanding. Recovery is a long hard process.

I look forward to some answers to my questions/comments and trust that you understand t I have looked at the report in detail. Also, I trust my questions and comments are at least constructively thought provoking for both you and your staff.

Thanks for the opportunity to ask questions and express opinion.

Martyn Johnson

**From:** Doug Leeper  
**To:** ["Richard L Kane"](#)  
**Cc:** [Marty Kelly](#); [Mike Heyl](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Monday, August 01, 2011 10:36:00 AM

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Thanks for the update, Richard. I look forward to your rebuttal document for posting on the workshop web site.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

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**From:** Richard L Kane [<mailto:rkane@usgs.gov>]  
**Sent:** Friday, July 29, 2011 8:59 AM  
**To:** Alan Martyn Johnson; Doug Leeper  
**Cc:** Richard L Kane; Kevin J Grimsley  
**Subject:** RE: Public Input for Spring Workshop

Doug we are planning to send you a rebuttal to Mr. Johnson's letter explaining why we feel that the discharge data is correct within the stated accuracy of the publish record. We would also like this posted on the web site. Also we are not interested in participating in another committee, on flow measurements. We would be happy to meet personally with Mr. Johnson and you, in our office in Tampa, where we can go over in depth all of our ratings and computation procedures.

---

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](mailto:rkane@usgs.gov)  
(813-498-5057)  
FAX (813-498-5001)  
Cell 813-918-1275

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**From:** Alan Martyn Johnson <[martynelljay@hotmail.com](mailto:martynelljay@hotmail.com)>  
**To:** Doug Leeper <[doug.leeper@swfwmd.state.fl.us](mailto:doug.leeper@swfwmd.state.fl.us)>, <[norman@amyhrf.org](mailto:norman@amyhrf.org)>, <[bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com)>, <[hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com)>, <[rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us)>, <[rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us)>, <[jfarley682@aol.com](mailto:jfarley682@aol.com)>, <[administration@inverness-fl.gov](mailto:administration@inverness-fl.gov)>, <[cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com)>, <[kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us)>, <[bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com)>, <[ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com)>, <[abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us)>, <[brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com)>, Ron Miller <[rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com)>, <[manatees@habitats.org](mailto:manatees@habitats.org)>, <[grubman1@gmail.com](mailto:grubman1@gmail.com)>, <[dennis3ds@aol.com](mailto:dennis3ds@aol.com)>, <[boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov)>, rkane <[rkane@usgs.gov](mailto:rkane@usgs.gov)>, <[2buntings@comcast.net](mailto:2buntings@comcast.net)>, <[whmarkle@gmail.com](mailto:whmarkle@gmail.com)>, <[jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)>  
**Date:** 07/29/2011 08:26 AM  
**Subject:** RE: Public Input for Spring Workshop

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Doug,

Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?

Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rradacky@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identified as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
2379 Broad Street, Brooksville, FL 34604-6899  
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November 3, 2010

**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 November 2, 2010  
regarding recommended minimum flows for the Homosassa River system

---

This memorandum documents a November 2, 2010 e-mail submitted to the Southwest Florida Water Management District by Mr. Martyn Johnson concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Johnson requests that staff “[p]lease do the right thing and recommend no further reduction in flow *HOWEVER AND WHEREVER SWFWMD MEASURE IT at least until there is a better understanding.*” Mr. Johnson also poses questions concerning upcoming Governing Board agenda items associated with development of minimum flows for the river system, and asks about documentation associated with meetings where minimum flows issues have been discussed.

Excerpted portions of Mr. Johnson’s e-mail are reproduced below, along with staff responses to his questions. Mr. Johnson’s entire e-mail is reproduced as a one-page attachment (Attachment A) to this memorandum, to provide context for his perspective on the currently recommended minimum flows for the Homosassa River system. A second attachment (Attachment B, two pages) that includes summary information for a recent public workshop on recommended minimum flows for the river system is also provided to support staff’s response to one of Mr. Johnson’s questions.

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Excerpted Request Concerning District Governing Board Meetings where the Recommended Minimum Flows will be Addressed

*1. Please advise the location and times of the meetings (Nov 16 and Dec 14) with the Board, and which of these are open to the public.*

Staff Response

The November 16, 2010 and December 14, 2010 meetings of the Governing Board of the Southwest Florida Water Management District will begin at 9:00 A.M. at the District Headquarters, which is located at 2379 Broad Street, Brooksville, Florida 34604. All Governing Board meetings are open to the public. Here’s some general information regarding the Board meetings that is typically included in the informational notebooks used at the Board meetings.

- Viewing of the Board meeting will be available through the District’s web site: ([www.WaterMatters.org](http://www.WaterMatters.org)) -- follow directions at the web site to use internet streaming.
- Public input will be taken only at the meeting location.

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 2, 2010  
regarding recommended minimum flows for the Homosassa River system

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November 3, 2010

- Public input for issues not listed on the published agenda will be heard shortly after the meeting begins
- Unless specifically stated, scheduled items will not be heard at a time certain.
- At the discretion of the Board, items may be taken out of order to accommodate the needs of the Board and the public.
- The meeting will recess for lunch at a time to be announced.
- The current Governing Board agenda and minutes of previous meetings are on the District's web site: [www.WaterMatters.org](http://www.WaterMatters.org)

Please note that staff anticipate presenting the peer-review panel's report to the Governing Board at the Board's November 16, 2010 meeting as a consent item, and plan to present draft rule amendments and a final report associated with recommended minimum flows for the river system to the Board as a discussion item at the December 14, 2010 Board meeting.

#### Excerpted Questions Concerning Meeting Notes and Minutes

*2. Are the Appendices containing public comment which will be presented/given to the Board, open to the public review?*

*While I note all the times you and your staff have presented the information to the public/various bodies, I also noted that at the meeting that I attended no notes/minutes were taken by Staff.*

*Was this true for all other 'presentations'. I assume that sign-in sheets were kept as a matter of record that the meeting occurred, correct?*

#### Staff Response

All documents and other forms of data associated with development of minimum flows for the Homosassa River system are available for public review. These documents include summary memoranda that have been prepared to record public input on recommended minimum flows and other matters related to the river system.

With regard to Mr. Johnson's questions concerning documentation of meetings where minimum flows for the Homosassa River system have been discussed, staff notes that Mr. Doug Leeper took notes during the District-sponsored public workshop that was held in Homosassa on October 13, 2010, and prepared a summary of the public comments and discussion at the meeting. This summary was included in an e-mail prepared by Mr. Leeper on October 15, 2010 that is attached to this memorandum (see Attachment B). Staff notes that a sign-in sheet was made available at the October public workshop and the sheet has been retained by the District.

In addition to the information that is available for the recent public workshop, summary information pertaining to staff's July 27, 2010 presentation of the draft report on proposed minimum flows for the Homosassa River system to the District Governing Board is available in the meeting agenda, summary notebook and minutes available from the Meeting Information web page of the District web site at:

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 2, 2010  
regarding recommended minimum flows for the Homosassa River system

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November 3, 2010

<http://www.swfwmd.state.fl.us/calendar/meetingfiles/>

Staff notes that information pertaining to presentations on recommended minimum flows for the Homosassa River system planned for the November and December Board meetings will also be available from the Meeting Information web page.

Summary information pertaining to staff's August 9, 2010 presentation to the Citrus Task Force of the Citrus/Hernando Waterways Restoration Council on development of minimum flows for the Homosassa River system and other area water bodies is also available from the District web site. An agenda and meeting minutes for the event are available from the Citrus County Task Force page at:

<http://www.swfwmd.state.fl.us/projects/waterways/citrus.php>

Meeting agenda, notes or minutes are not available from the District for several meetings where recommended minimum flows for the Homosassa River system were presented by staff. These events include January 2008 and March 2010 meetings of the Save the Homosassa River Alliance, where District staff were invited speakers, and a September 2010 meeting organized by the Florida Department of Environmental Protection, which involved discussion of minimum flows and levels development throughout the state. Similarly, meeting notes or minutes are not available for an August 2010 meeting between District staff and staff at the Chassahowitzka National Wildlife Refuge. Although meeting summary information is not available for the meetings highlighted in this paragraph, presentation materials used by staff at the meetings are available for review, upon request. Presentation materials are also available for two recent (September and October 2010) staff meetings where recommended minimum flows for the Homosassa River system were discussed.

DAL

Attachments: A) One page e-mail from Mr. Martyn Johnson dated November 2, 2010  
B) Two page e-Mail from Mr. Doug Leeper dated October 15, 2010

## Attachment A

### **One Page Attachment to November 3, 2010 Memorandum on Questions and Comments Submitted by Mr. Martyn Johnson on November 2, 2010**

***Note: The e-mail string associated with Mr. Johnson's e-mail is not reproduced here.***

**From:** Alan Martyn Johnson

**To:** Doug Leeper

**Cc:** Marty Kelly; Sid Flannery; Mike Heyl; Mark Barcelo; Ron Basso; Karen Lloyd; Jay Yingling; Cara S. Martin

**Subject:** RE: Response to Questions on Homosassa Minimum Flows

**Date:** Tuesday, November 02, 2010 7:40:02 PM

Doug,

Thanks for the two e-mails sent today.

I have just finished a first quick read of the responses to my two e-mails of questions/comments. Some interesting reading, I will review and comment following some further investigations. I really appreciate that 'Staff' took time to address these questions/comments.

1. Please advise the location and times of the meetings (Nov 16 and Dec 14) with the Board, and which of these are open to the public.

2. Are the Appendices containing public comment which will be presented/given to the Board, open to the public review?

While I note all the times you and your staff have presented the information to the public/various bodies, I also noted that at the meeting that I attended no notes/minutes were taken by Staff.

Was this true for all other 'presentations'. I assume that sign-in sheets were kept as a matter of record that the meeting occurred, correct?

I appreciate that SWFWMD's task is dictated by Statue, but I have a basic disconnect with "why it is so difficult for a clear unambiguous flow at a specific point/time to be established". I foresee that this lack of clarity will be the downfall of what was intended to be good legislation.

Sorry if that comment was so negative, but time will show if my observation is correct. You and your Staff will be able to look back on what you have done. Please do the right thing and recommend no further reduction in flow HOWEVER AND WHEREVER SWFWMD MEASURE IT at least until there is a better understanding. You must admit there is a significant reliance on mathematical models and assumptions.

Thanks,

Martyn Johnson

## Attachment B

### **Two Page Attachment to November 3, 2010 Memorandum on Questions and Comments Submitted by Mr. Martyn Johnson on November 2, 2010**

**From:** Doug Leeper  
**To:** Mark Hammond  
**Cc:** Marty Kelly; Mark Barcelo; Ron Basso; Sid Flannery; Karen Lloyd; Cara S. Martin  
**Subject:** Summary of Homosassa MFLs Public Workshop  
**Date:** Friday, October 15, 2010 10:23:00 AM

Mark:

With support from the Hydrologic Evaluation Section and the Community and Legislative Affairs Department, the Ecologic Evaluation Section recently conducted a rule development public workshop on proposed minimum flows for the Homosassa River system in Citrus County. A brief summary of the meeting is provided below.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

### **Rule Development Public Workshop on Proposed Minimum Flows for the Homosassa River System in Citrus County, Florida**

A public workshop on proposed minimum flows for the Homosassa River system was held at the Homosassa Civic Club in Homosassa on October 13, 2010 from 6:30 to 9:15 P.M. The workshop was advertised in the Florida Administrative Weekly, local newspapers, and on the District's web site. In addition, local government staff and officials were notified of the meeting and a press release was made available to the regional media. Ron Basso, Sid Flannery, Doug Leeper and Cara Martin represented the District at the workshop and were joined by 27 other individuals, including Withlacoochee River Basin Board member Al Grubman.

The District's currently recommended minimum flows for the Homosassa River system allow for up to a five percent reduction in flows. A number of meeting attendees indicated that they would prefer that flows in the river system not be permitted to be reduced beyond existing conditions. Others did not express support for the District's recommended minimum flows, nor did they offer alternative minimum flow recommendations. Several meeting participants are members of the Save the Homosassa River Alliance and indicated that their group would soon be meeting to discuss a response to the District's recommended minimum flows. With regard to specific comment on the recommended minimum flows, staff indicated that the District welcomes comment from the Alliance and from individuals, and that comments may be submitted by contacting the District via e-mail, fax, mail, telephone, or in person. Comments and questions discussed during the workshop are summarized below.

### Comments/Questions

1. Several meeting participants suggested that flows in the river system should not be allowed to be reduced beyond the flows associated with existing conditions. It appeared that the recommendation for not allowing any flow reductions was based on personal observations of declining flow trends and upstream salinity increases that are assumed to be related to natural climatic variation and/or human impacts on flows.
2. Several meeting participants indicated that they have observed what they consider to be degradation of the river over the past several decades. Noted changes include decreased water quality, loss of vegetation and increased upstream distribution of organisms, such as barnacles, that are considered tolerant of moderate to higher salinities.
3. One attendee asked if the recommended minimum flows were sufficient for protecting manatees that utilize the river system.
4. With regard to use of the Northern District Model for evaluating existing withdrawal impacts on river system flows, one meeting participant suggested that it may be more appropriate to evaluate only the effects of withdrawals located near the river, rather than the effects of withdrawals throughout the large, model domain.
5. A few meeting participants questioned how the District plans to evaluate compliance with the recommended minimum flows. They expressed concern that the minimum flow recommendations may not be sufficiently protective of flows in the river system during drought periods.
6. One attendee asked whether it would be appropriate to increase the number of streamflow gauging sites in the river system, in particular on Halls River.
7. Other water management issues discussed during the meeting included water-use planning that has been conducted by the Withlacoochee Regional Water Supply Authority, the location of currently planned wellfields in the Withlacoochee River Basin, springshed protection legislation, the local-sources first policy regarding water use and nutrient loading in the Homosassa groundwater basin and other springsheds.



**From:** Doug Leeper  
**To:** [Marty Kelly](#)  
**Subject:** Advice re response to MJohnson  
**Date:** Monday, August 01, 2011 10:43:00 AM

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Marty - I plan to respond to Mr. Johnson's inquiries as follows.

- Will pull his submission that includes data only
- 1. Will put an edited version of Kevin's presentation on our site once I receive it from R. Kane
- 2. No plans for a Flow Measurement Working Committee – Rkane has offered to meet with Mr. Johnson and District
- 3. Request for funding for the enhanced SE Fork instrumentation is still in the budget???
- Budget to be finalized in August???
- 

Any advice???

Douglas A. Leeper, Chief Environmental Scientist  
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Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Friday, July 29, 2011 8:27 AM  
**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); rkane; [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)  
**Subject:** RE: Public Input for Spring Workshop

Doug,

Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?

Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rradacky@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

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The documents are identifies as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

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December 17, 2010

**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 November 15, 2010  
regarding recommended minimum flows for the Homosassa River system

---

This memorandum documents a November 15, 2010 e-mail submitted to the Southwest Florida Water Management District by Mr. Martyn Johnson concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Johnson requests “...*that the Board consider no further reductions in flow.*” Excerpted portions of Mr. Johnson’s e-mail are reproduced below in italics, along with staff responses to his questions and comments. Mr. Johnson’s entire e-mail is reproduced as a three-page attachment 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

*“Responses to October 26, 2010 e-mail*

**Question 1**

*The response misses the point that data shown in the Table 2-6 page 70 are shown as mean values for data collected from 1992 thru 2009. Trends in these analysis results from quarterly monitoring of the individual springs should be considered. In the Peer Review the comments on page 20 make this point with their inability to understand the large variations between springs in close proximity.*

*Quote*

*Table 2.8 in Leeper et al. (2010) indicated that the estimated salinity of water coming from different springs varies from 0.1-3.9 ppt, even though they are spatially close. This is perplexing. How can this happen if they are using the same groundwater sources, and we could not find sufficient evidence suggesting why this is occurring nor how this may be influenced differentially by water withdrawals. Is it possible that water withdrawal in one location could only influence the very low salinity springs and thus, elevate the contribution of the high salinity spring water into the system? Ratios of ions in the saline springs (Table 2.6) argues that this is dilute seawater and not just water with high solids derived from minerals in the rock strata through which the springs flow.*

*Unquote*

*Has this question been answered/addressed?”*

Staff Response to Excerpt No. 1

Numerous reports prepared by the District, the Florida Department of Environmental Protection and the Florida Geological Survey have documented the status and trends in nutrient concentrations and other water quality parameter for springs of the Homosassa River system and elsewhere in Florida. Several of these reports are mentioned on page 68 of the draft minimum flows report, although Bulletin 69 of the Florida Geological Survey, which was authored by Copeland and others and published in 2009, and

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 15, 2010  
regarding recommended minimum flows for the Homosassa River system

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December 17, 2010

which includes information on trends in various water quality constituents for several springs of the Homosassa River System, was not included in the report. This oversight will be addressed in the revised version of the report. Staff is unsure, however, how this information may be expected to significantly contribute to the evaluation of flow reductions for the river system.

As noted on page 68 of the draft report on proposed minimum levels for the Homosassa River system, the District and the United States Geological Survey have previously documented significant variability in water quality parameters for springs of the system. This complexity in water quality is likely the result of diverse flow paths for water moving through bedrock, tidal effects and the mixing of saltwater with freshwater. On page 11 of their report the peer-review panel that considered the District's currently recommended minimum flows for the Homosassa River system provide a brief summary of the factors that may account for the observed variation in the chemistry of water discharged from individual springs/vents in the Homosassa River system, citing a 2001 United States Geological Survey publication by Knochenmus and Yobbi as follows: *"[d]ifferences in water quality among springs are attributed to the depth of individual spring vents, the proximity of a spring to the Gulf of Mexico, and the transient location of the saltwater-freshwater interface, which creates a zone of mixing that changes seasonally and diurnally (Knochenmus and Yobbi 2001)."* Staff agrees with the panel's assertion that the observed slightly brackish water discharging from the springs is very dilute seawater, but there is no indication that "fossil" seawater is responsible for the brackish water conditions observed in the Homosassa Springs group. The brackish spring discharge is a result of mixing of saline groundwater with fresh water within the dynamic subsurface mixing zone known as the fresh/saltwater interface. Karst formations in the carbonate rocks, and preferential flow through subsurface conduits developed along fractures in the bedrock, results in the heterogeneity of observed water chemistry in the coastal springs.

It may be possible that a groundwater withdrawal at one location nearby an individual spring could affect that spring and reduce the percentage of freshwater flow, but it would take a sizeable localized withdrawal to effect the relative contribution of fresh to saline water from a group of springs and cause salinity changes to the system overall, which is not likely.

Staff agrees that a better understanding of groundwater hydraulics and more data collection is needed to further assess future potential impacts to springs of the Homosassa River system, although the source of saline water in the coastal margin of the Upper Floridan aquifer is understood to be from the occurrence of modern saline groundwater in the coastal transitional mixing zone or subsurface interface, and not connate or fossil water.

#### Excerpt No. 2

##### ***"Question 2***

*Thanks for confirming the spring designation etc. I have contacted the State Park to see if they have any additional observations from personnel who see this part of the river daily. I do not agree with the comment staff are planning to add. There was a definite flow, quite strong as it kept the vent open, and*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 15, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 3

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*now there is no discernable flow. The marked change is the critical point. I also asked Park Management if they have any observations about other springs in the park that are not sampled."*

#### Staff Response to Excerpt No. 2

Staff acknowledges Mr. Johnson comment and welcomes additional input regarding anecdotal or other information pertaining to discharge from the spring vent referred to as Homosassa River Spring No. 1.

#### Excerpt No. 3

##### ***"Question 3***

*The figure 438.1 cfs is mathematically derived from the model that uses many assumptions e.g. watering of lawns from private wells that are not metered. There are many of these types of wells. Quoting a figure of 438.1 implies a degree of accuracy that does not exist. Hence my comment "almost unsupportable reliance on mathematical assumptions". Reliance on other assumption in the model is apparently used to predict the flows change shown in Table 2-4 on page 55 of the report. Apparently there is no empirical data regarding the flow from each of the springs in the South East Fork, but the model assigns an equal flow from each spring (a mathematical assumption) and then somehow predicts twice the drop in flow from Belcher Spring (presumably from another mathematical assumption). Such accuracy and detail has to be questioned, particularly when viewed with the information that even combined empirical flow measurements have a standard error of 15% or higher.*

*I stand by my comment and trust staff understands the point I was trying to make. There is a disconnect between the modeled predictions and reality.*

*I appreciate that there are thoughts to monitoring flow from Halls River. I am sure you are aware that there is a narrow point well back from the Halls River Bridge where the flow is quite strong and primarily downstream even when the tide is coming in."*

#### Staff Response to Excerpt No. 3

Staff acknowledges Mr. Johnson's comments.

#### Excerpt No. 4

##### ***"Question 4***

*I have looked at the data from USGS on a number of the wells in the area. Lecanto, Homosassa and Weeki Wachee I studied at great length. A consistent trend is clear that levels in all these wells are dropping. Reference to such trends should be a much more prominent consideration in the decision process to set minimum flow. Water level in the aquifer is the primary driving force of flow from the various springs. The declining trend is can not be dismissed by discussion of declining rainfall or compounded deficits in rainfall.*

*The last sentence of the response is difficult to understand. Please explain what updates are made to what rating curves. Flows are calculated from equations B-1, B-2 etc; have these changed over time?*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 15, 2010  
regarding recommended minimum flows for the Homosassa River system

Page 4

December 17, 2010

*Quote*

*..... report due to their use in the calculation of discharge for the Homosassa Springs, Southeast Fork and Hidden River gage sites. Because the USGS routinely measures discharge at these gage sites to update rating curves for use of the well information, analysis of trends in water levels for the identified wells was not considered necessary to support the analyses outlined in the Homosassa recommended minimum flows report.*

*Unquote."*

Staff Response to Excerpt No. 4

Staff notes that modeling with the Northern District model indicates that there is an approximate one percent decline in spring discharge in the Homosassa River system associated with groundwater withdrawals in the region. Withdrawal impacts have also been associated with less than a 0.25 foot reduction in the potentiometric surface of the Upper Floridan aquifer in most of the northern portion of the Northern District Model domain and less than a 0.1 foot drawdown in the aquifer near the Homosassa River system. As discussed by Basso in his 2010 memorandum that is included as Appendix B to the Homosassa River minimum flows report, observed trends in area wells such as the Lecanto 2 Upper Florida Aquifer well, are consistent with climatic influences. Staff notes, however, that withdrawal impacts on spring discharge and well water levels are more pronounced in areas to the south of the Homosassa River system, including the region of Hernando County where the Weeki Wachee Well near Weeki Wachee, FL is located.

With regard to measurement of discharge at the United States Geological Survey gage sites in the Homosassa River, staff presumes that the Survey routinely updates rating curves that are used to calculate discharge at gage sites in the Homosassa River system. As suggested previously, staff encourages Mr. Johnson to contact the United States Geological Survey to learn more about measurement and reporting of discharge and other hydrologic parameters for the Homosassa Springs, Southeast Fork and Hidden River gage sites.

Excerpt No. 5

*"Question 5*

*Thanks for the explanation. I agree that the aquifer system is interlinked in many ways. It is interesting to note the balance of the budget for the 1997-1998 years was a positive increase in storage which is reflected in levels at many of the wells I looked at. May be this type of budget should be done annually. This may then explain the levels that have dropped so significantly since 2005. For example at the Weeki Wachee Well levels of 20-22 feet above sea level were seen regularly in the early 80's, mid 90's and in 2004, 2005, but since then have maxed out at no more than 15 ft and seen historic lows of 10 feet.*

*The usage figures you provided for Citrus County are interesting. The spikes in 1998 and 2006 which appear to be over 15% above the pre and post years are particularly interesting. Is there some explanation? 1998 and 2006, I think, were both low rainfall years."*

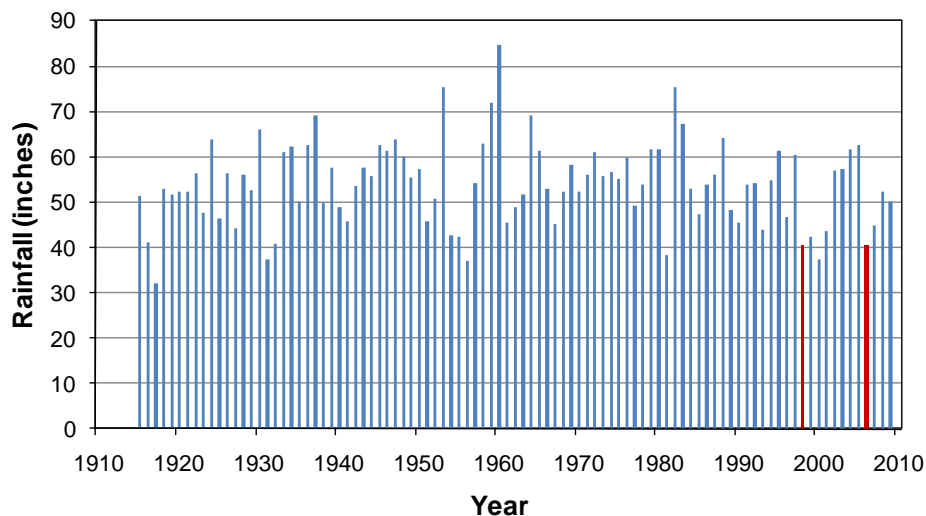
SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 15, 2010 regarding recommended minimum flows for the Homosassa River system

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#### Staff Response to Excerpt No. 5

Staff notes that water-use impacts have been documented for groundwater levels in the vicinity of the United States Geological Survey's Weeki Wachee Well near Weeki Wachee, FL (see the 2001 United States Geological Survey Report by Knochenmus and Yobbi titled "*Hydrology of the Coastal Springs Ground-Water Basin and Adjacent Parts of Pasco, Hernando, and Citrus Counties*"). With regard to information on historical groundwater use in Citrus County shown in Figure 1 in the November 2, 2010 memorandum from Leeper, Basso and Starks provided to Mr. Johnson, staff notes that the relatively high withdrawals for 1998 and 2006 identified by Mr. Johnson do correspond with years of relatively low rainfall. The figure below shows annual rainfall totals for Citrus County from 1915 through 2009, based on summary data provided on the Hydrologic Data – Rainfall Data Summaries page of the District web site at: [http://www.swfwmd.state.fl.us/data/wmdbweb/rainfall\\_data\\_summaries.php](http://www.swfwmd.state.fl.us/data/wmdbweb/rainfall_data_summaries.php). Rainfall totals for 1998 and 2006 are shown in red to distinguish these values from the totals for the other years.



#### Excerpt No. 6

*"Question 6 and responses to my October 28 e-mail*

*I am for my own interest following up with USGS to better understand the flow measurements, and find out when the stream velocity data at Homosassa River Site 02310700 started.*

*I appreciate that SWFWMD have a Statue task to perform, and that it is not an easy one. I appreciate the lengths that you and your staff have gone to in performing this task and as I understand the minimum flow reduction of 5% is lower and unprecedented compared to other recommendations made. However, I still believe that the reality is that there has already been significant harm since the Statue was written. It could be argued that the time the Statue was enacted, was the point in time at which the intent of the Statue became valid. The Statue 373.042 (1) a. does not define the point in time that the significant harm*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on November 15, 2010  
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*is measured from, but the report appears to assume that further withdrawals and harm start from a point much later. As far as I can understand the Statue does not address how the minimum flows are to be monitored for compliance. However, the concept of using the Northern District Model to 'monitor' compliance with the minimum flows and in turn the ecological impact on the river is very worrying. I am sorry, but I see the model as some theoretical exercise detached from the reality of what is being observed. Even more worrying is the thought that it can be viewed as a shield to justify increased pumping of well water."*

Staff Response to Excerpt No. 6

Staff does not agree with Mr. Johnson's assertion regarding District assumptions concerning the timing of potential withdrawal impacts on flows in the Homosassa River system. Based on recent regional water-use information, staff has determined that the effect of withdrawals on flows in the Homosassa River system is on the order of one percent. Historical impacts of groundwater withdrawals, including those that occurred in the 1970s following passage of the initial legislation requiring establishment of minimum flows and levels, would be expected to be much less than recent influences, based on estimates of historical water use in the area.

Staff also does not agree with Mr. Johnson's opinion that use of the Northern District Model for evaluating compliance with minimum flows established for the Homosassa River system may "...be viewed as a shield to justify increased pumping of well water." Rather, staff views use of the model as an integral component of the District's statutory requirement to implement establishment of minimum flows and levels for the Homosassa River system and evaluate compliance with established minimum flows to prevent significant harm to the water resources and ecology of the area.

Excerpt No. 7

*"Finally I would like to add another comment for consideration regarding the Thermal Refuge for the manatee.*

*The predictions of water temperature are all well and good, but the balance of the refuge for temperature and the combined need for a food source are not addressed. In the report and appendices I note the information about changes in SAV and EAV. Coupling these with the reduction in area for manatee thermal refuge requires someone with knowledge about manatee feeding requirements during these periods when they need the thermal refuge. From my observations the manatees eat significant amounts of submerged vegetation and I see this significantly declining in the head waters of the river."*

Staff Response to Excerpt No. 7

Mr. Johnson is correct in noting that incorporation of information on aquatic plant species abundances in the Homosassa River system into a modeling approach for evaluation of habitat suitability for manatees during critical cold periods would require substantial understanding of the foraging behavior and nutritional requirements of the animals using warm-water refuge areas of the system. Staff notes that implementation of such an approach to support development of minimum flow recommendations would also require establishment of defensible, quantitative relationships between river flows and plant



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distribution, abundance and/or growth. Numerous investigators have commented on the potential effects of various chemical and physical factors on aquatic vegetation in the Homosassa River (as summarized on pages 95 through 99 in the draft minimum flows report), although no reliable, predictive models have been developed to relate inflows to attributes of individual aquatic plant species and/or the vegetative community of the river system. Furthermore, manatees may have foraging preferences or nutritional requirements that can lead to extensive forays outside thermal refuge areas, and these complex behaviors would certainly complicate attempts to incorporate vegetation information into models that could be used to relate spring discharge to favorable manatee habitat. For example, in support of a Florida Marine Research Institute study published in 1990, Rathburn and others examined movement of manatees along the west coast of Florida, and report that "[a]s a result of our radio-tracking studies, we learned that manatees in both the Homosassa and Crystal Rivers frequently left the warm headwaters during the coldest months to feed on *Ruppia maritima* and *Potamogeton pectinatus* downriver, despite the abundance of other plants near or in the warm water."

DAL

Attachment: Three page e-mail from Mr. Martyn Johnson dated November 15, 2010

**Three Page Attachment to December 17, 2010 Memorandum on Questions  
and Comments Submitted by Mr. Martyn Johnson on November 15, 2010**

**From:** Alan Martyn Johnson  
**To:** Doug Leeper  
**Subject:** Minimum Flows for Homosassa River  
**Date:** Monday, November 15, 2010 7:50:09 AM

Doug,

As mentioned in my last e-mail I have some comments regarding the responses sent in your two memorandums November 2, 2010. I have also followed up on a number of points with USGS, DEP and Homosassa State Park.

Responses to October 26, 2010 e-mail

**Question 1**

The response misses the point that data shown in the Table 2-6 page 70 are shown as mean values for data collected from 1992 thru 2009. Trends in these analysis results from quarterly monitoring of the individual springs should be considered. In the Peer Review the comments on page 20 make this point with their inability to understand the large variations between springs in close proximity.

Quote

*Table 2.8 in Leeper et al. (2010) indicated that the estimated salinity of water coming from different springs varies from 0.1-3.9 ppt, even though they are spatially close. This is perplexing. How can this happen if they are using the same groundwater sources, and we could not find sufficient evidence suggesting why this is occurring nor how this may be influenced differentially by water withdrawals. Is it possible that water withdrawal in one location could only influence the very low salinity springs and thus, elevate the contribution of the high salinity spring water into the system? Ratios of ions in the saline springs (Table 2.6) argues that this is dilute seawater and not just water with high solids derived from minerals in the rock strata through which the springs flow.*

Unquote

Has this question been answered/addressed?

The information in the response about salinity etc in the river or other locations sampled was not the point. But, I did appreciate the information about sampling times and methods which support the accuracy of spring water samplings and highlight the dramatic difference of Homosassa Spring 3 versus 1 & 2 that are all in very close proximity.

**Question 2**

Thanks for confirming the spring designation etc. I have contacted the State Park to see if they have any additional observations from personnel who see this part of the river daily. I do not agree with the comment staff are planning to add. There was a definite flow, quite strong as it kept the vent open, and now there is no discernable flow. The marked change is the critical point. I also asked Park Management if they have any observations about other springs in the park that are not sampled.

**Question 3**

The figure 438.1 cfs is mathematically derived from the model that uses many assumptions e.g. watering of lawns from private wells that are not metered. There are many of these types of wells. Quoting a figure of 438.1 implies a degree of accuracy that does not exist. Hence my comment “almost

*unsupportable reliance on mathematical assumptions*". Reliance on other assumption in the model is apparently used to predict the flows change shown in Table 2-4 on page 55 of the report. Apparently there is no empirical data regarding the flow from each of the springs in the South East Fork, but the model assigns an equal flow from each spring (a mathematical assumption) and then somehow predicts twice the drop in flow from Belcher Spring (presumably from another mathematical assumption). Such accuracy and detail has to be questioned, particularly when viewed with the information that even combined empirical flow measurements have a standard error of 15% or higher.

I stand by my comment and trust staff understands the point I was trying to make. There is a disconnect between the modeled predictions and reality.

I appreciate that there are thoughts to monitoring flow from Halls River. I am sure you are aware that there is a narrow point well back from the Halls River Bridge where the flow is quite strong and primarily downstream even when the tide is coming in.

#### Question 4

I have looked at the data from USGS on a number of the wells in the area. Lecanto, Homosassa and Weeki Wachee I studied at great length. A consistent trend is clear that levels in all these wells are dropping. Reference to such trends should be a much more prominent consideration in the decision process to set minimum flow. Water level in the aquifer is the primary driving force of flow from the various springs. The declining trend is can not be dismissed by discussion of declining rainfall or compounded deficits in rainfall.

The last sentence of the response is difficult to understand. Please explain what updates are made to what rating curves. Flows are calculated from equations B-1, B-2 etc; have these changed over time?  
Quote

*..... report due to their use in the calculation of discharge for the Homosassa Springs, Southeast Fork and Hidden River gage sites. Because the USGS routinely measures discharge at these gage sites to **update rating curves for use of the well information**, analysis of trends in water levels for the identified wells was not considered necessary to support the analyses outlined in the Homosassa recommended minimum flows report.*

Unquote.

#### Question 5

Thanks for the explanation. I agree that the aquifer system is interlinked in many ways. It is interesting to note the balance of the budget for the 1997-1998 years was a positive increase in storage which is reflected in levels at many of the wells I looked at. May be this type of budget should be done annually. This may then explain the levels that have dropped so significantly since 2005. For example at the Weeki Wachee Well levels of 20-22 feet above sea level were seen regularly in the early 80's, mid 90's and in 2004, 2005, but since then have maxed out at no more than 15 ft and seen historic lows of 10 feet.

The usage figures you provided for Citrus County are interesting. The spikes in 1998 and 2006 which appear to be over 15% above the pre and post years are particularly interesting. Is there some explanation? 1998 and 2006, I think, were both low rainfall years.

#### Question 6 and responses to my October 28 e-mail

I am for my own interest following up with USGS to better understand the flow measurements, and find out when the stream velocity data at Homosassa River Site 02310700 started.

I appreciate that SWFWMD have a Statue task to perform, and that it is not an easy one. I appreciate the lengths that you and your staff have gone to in performing this task and as I understand the minimum flow reduction of 5% is lower and unprecedented compared to other recommendations made. However, I still believe that the reality is that there has already been significant harm since the Statue was written. It could be argued that the time the Statue was enacted, was the point in time at which the intent of the Statue became valid. The Statue 373.042 (1) a. does not define the point in time that the significant harm is measured from, but the report appears to assume that further withdrawals and harm start from a point much later. As far as I can understand the Statue does not address how the minimum flows are to be monitored for compliance. However, the concept of using the Northern District Model to 'monitor' compliance with the minimum flows and in turn the ecological impact on the river is very worrying. I am sorry, but I see the model as some theoretical exercise detached from the reality of what is being observed. Even more worrying is the thought that it can be viewed as a shield to justify increased pumping of well water.

Doug,

Finally I would like to add another comment for consideration regarding the Thermal Refuge for the manatee.

The predictions of water temperature are all well and good, but the balance of the refuge for temperature and the combined need for a food source are not addressed. In the report and appendices I note the information about changes in SAV and EAV. Coupling these with the reduction in area for manatee thermal refuge requires someone with knowledge about manatee feeding requirements during these periods when they need the thermal refuge. From my observations the manatees eat significant amounts of submerged vegetation and I see this significantly declining in the head waters of the river.

I will be following this situation and trust that the Board recognizes the importance of the Homosassa Springs and River to the State and region in both ecological and economic areas. The Statue mentions the importance to the State and region, and I ask again that the Board consider no further reduction in flow.

Thanks for listening and the responses you and your staff have shared.

Martyn Johnson

**From:** [Brent Whitley](#)  
**To:** [Doug Leeper](#)  
**Subject:** RE: Attachment  
**Date:** Friday, July 29, 2011 10:36:46 AM

---

Doug, just out of curiosity, isn't it possible that gauges in short term intervals like he described be influenced by boat traffic? I would think that in the situation at Chassahowitzka where the water in the vicinity of the measuring station is so shallow and the width of the stream at that point is very narrow that boats moving in and out even at idle speeds could impact the short intervals. For example, 3-4 consecutive vessels idling out and thus pushing water in must have some impact on flow measurement. Obviously I really do not know but long term data would overcome this concern he has.

Brent

---

**From:** Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]  
**Sent:** Thursday, July 28, 2011 2:31 PM  
**To:** Norman Hopkins; Brad Rimbey; Hope Corona; Rebecca Bays; Richard Radacky; Jim Farley; Frank DiGiovanni; Sarah Tenison; Greenwood, Kathleen; Bill Pouder; Hoehn, Ted; Brockway, Alys; Brent Whitley; Ron Miller; Helen Spivey; Al Grubman; Dennis D. Dutcher; Boyd Blihovde; Richard Kane; Hilliard, Dan; Whitey Markle; 'jsullivan@carltonfields.com'  
**Cc:** martynellijay@hotmail.com  
**Subject:** Attachment

Forgot the attachment – here it is.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

February 15, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: November 2010 correspondence between Martyn Johnson and Kevin Grimsley  
concerning flow measurement in the Homosassa River system

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This memorandum documents e-mail correspondence between Mr. Martyn Johnson and Mr. Kevin Grimsley (with the United States Geological Survey) from November 2010. The correspondence concerns measurement of flows by the United States Geological Survey at sites in the Homosassa River system. The correspondence was copied to District staff and is documented here for its relevance to the development of minimum flows for the river system.

DAL

Attachments: A – E-mail from Kevin Grimsley to Martyn Johnson, dated November 15, 2010  
B – E-mail from Martyn Johnson to Kevin Grimsley, dated November 16, 2010  
C – E-mail from Kevin Grimsley to Martyn Johnson, dated November 17, 2010

## Attachment A

### E-Mail from Kevin Grimsley to Martyn Johnson, with E-mail String

To: martynellijay@hotmail.com  
CC: rkane@usgs.gov  
Subject: Re: Spring and River Flow Measurements Homosassa  
From: kjgrims@usgs.gov  
Date: Mon, 15 Nov 2010 16:48:03 -0500

Mr. Johnson,  
Richard Kane has asked me to respond to your questions regarding some of our gages and procedures in the Homosassa River area. For clarity, I have responded in blue text directly following each of the questions below. Please let us know if you need any further information. Thank you.

\*\*\*\*\*

Kevin Grimsley, P.E.  
Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

\*\*\*\*\*

----- Forwarded by Richard L Kane/WRD/USGS/DOI on 11/12/2010 07:52 AM -----

From: Alan Martyn Johnson <martynellijay@hotmail.com>  
To: <rkane@usgs.gov>  
Date: 11/05/2010 09:00 AM  
Subject: Spring and River Flow Measurements Homosassa

I was given your name as a contact by Doug Leeper from SWFWMD.

I have been reviewing the SWFWMD Report for establishing Minimum Flows for the Homosassa River. Following review of the report I asked a number of question and made some comments. Doug suggested that I contact you to get a better understanding of the flow measuring.

I will repeat the questions/comments as sent to Doug, and hope that you are somewhat aware of SWFWMD's responsibility as context for the questions.

I would much appreciate any input you can provide.

Thanks,

Martyn Johnson

#### **Quote**

#### **Flow Rates at Homosassa Springs 02310678 & Southeast Fork 02310688**

I do understand that the flows at these monitoring stations are calculated flows based on equations B-1 and B-2.

**Question 1:** Are the calculated flows are still being „confirmed” by the Acoustic Doppler Current Profiler on a quarterly basis at both these locations?

**Measurements are made at least quarterly using the appropriate measurement equipment based on flow conditions. An ADCP is the meter used in many cases. Question**

**2:** Are the results from the ADCP directly comparable to the Price A-A current meters originally used?

**Comparison measurements have been made between ADCPs and AA meters by our office and for over a decade by the national USGS staff that have firmly established that the two meters produce comparable results. Under certain circumstances, an ADCP is more accurate than a AA meter because the AA meter has to assume a standard velocity profile whereas the ADCP does not.**

Additionally, I find it somewhat interesting that the equations B-1 and B-2 differ fairly significantly in there nature, but find not explanation:

***Homosassa Springs at Homosassa (02310678):***

$Q = 90.8162 + 3.823(GW) - 20.3771(GH) \text{ (B-1)}$   
*GW being NVGD29 and GH being 2.99 ft below NGVD88*  
**SE Fork Homosassa Spring at Homosassa (02310688):**  
 $Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt) \text{ (B-2)}$

To: martynellijay@hotmail.com  
CC: rkane@usgs.gov  
Subject: Re: Spring and River Flow Measurements Homosassa  
From: kjgrims@usgs.gov  
Date: Mon, 15 Nov 2010 16:48:03 -0500

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Kevin Grimsley, P.E.  
Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

\*\*\*\*\*

----- Forwarded by Richard L Kane/WRD/USGS/DOI on 11/12/2010 07:52 AM -----

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To: <rkane@usgs.gov>

Date: 11/05/2010 09:00 AM

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***SE Fork Homosassa Spring at Homosassa (02310688):***

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt) \text{ (B-2)}$$

*GW and GH being NVGD29*

The difference between NVGD29 and NGVD88 in this area is stated as 0.81 feet, so where is the 2.99 from? I recognize that the report does make mention of these Gauge Datum inconsistencies.

**The 2.99 value was never intended to represent a difference between the NGVD '29 and NAVD '88 datums. 2.99 ft represents the difference between the arbitrary gage datum at which the data is collected and the NAVD '88 vertical datum. For reasons having to do with how we collect and process our data, it is common practice to use an arbitrary gage datum to collect the data and then use a datum statement (2.99 ft below NAVD '88) to reference that data to an elevation.**

**Question 3:** Why is the  $dS/dt$  (change in river stage during a 15-minute period, in ft.) in one equation to such a large multiplier and not in the other? There appears to be a significant difference in the methodology used, see comment below.

**The gage height change comes into play at 0231688 (SE Fork) because the flow actually becomes significantly negative during high tides. The change of rate of stage can be thought of as a surrogate for velocity in that it gives an indication of the direction of flow (negative rate of change correlates to positive flow, positive rate of change correlates to negative flow).**

**There is no rate of change of stage component at 02310688 (Homosassa Springs) because there is no occurrence of negative net flow at the site. There has been some bidirectional flow noted along the edges of the channel at high tides, but overall net flow has always remained positive. It should not be concerning at all that the rate of change of stage component is significant at one station and not at another.**

**Question 4:** Why is the ground water level at the Weeki Watchee Well used and not the Lecanto Well? The Weeki Watchee Well does not appear to be in the Homosassa Groundwater Basin and in the *Water Use Impacts on Spring Discharge* the modeling done by Basso references the Lecanto well not the Weeki Watchee Well.

**Weeki Watchee well was selected as the index groundwater site by Dann Yobbi and Lari Knochemus because it is the oldest operating ground-water station in the study area detailed in WRIR 01-4230, which encompasses the Coastal Springs Ground-Water Basin as well as adjacent areas of Pasco and Hernando Counties. The well is useful for the computation of continuous discharge because of the length of its period of record and because it is monitored for real-time data. To my knowledge we do not have as lengthy a period of record for any other well in the area. The well was intended to serve as a regional indicator of groundwater conditions rather than a specific indicator for each spring system being studied.**

**Comment:**

Assuming the equations have not changed during the periods that these site have been continually monitored at these sites (some 6 or more years) the standard error quoted by Mr. Fulcher (who's discussion May 1, 2009 is not included in the Appendices) of 15% appears to be rather large.

**The USGS does not compute a true statistical error associated with our computed discharge values so the 15% error attributed to comments by Mr. Fulcher was not**

determined by a statistical analysis. I do agree with an estimated range of 10 to 15% error however, and do not consider that to be “rather large”. When you consider that the direct discharge measurements themselves have errors in the 3-7% range and that those measurements are then used to “calibrate” a regression equation that has its own uncertainties plus those of the two continuous water level measurements that are used in the regression, 10-15% is as good as I believe can be expected.

I do understand that it’s hard to grasp conceptually how 2 water level readings (one from a well) can accurately relate to discharge in a river. It’s much clearer to see how a direct measurement of velocity in the river (such as 02310700) works to produce discharge.

Logistically however, a continuous velocity gage is not always possible. What should give you confidence in the accuracy of the discharge produced by these regressions, is that they have always been based on real flow measurements that define the “reality” of flow at that station and that we continue to make more measurements in order verify the regression. If at some point our measurements start to deviate from the current regression, a new one will be developed that more accurately matches our latest measurements.

### Quote

Flow at Homosassa River 02310700

Here I have much more confidence that the figures are actual flows directly related to stream velocity and cross sectional area.

*Discharge at this station is currently determined using the index-velocity method and the following equations:*

$$Q = Vm(A) \text{ (B-3)}$$

$$Vm = 0.00902154 + 0.9019Vi + 0.12138Vi^2 + 0.045375(GH) \text{ (B-4)}$$

*In which*

*Q = river discharge, in cfs.*

*A = area of channel cross section at the gauge, in ft<sup>2</sup>.*

*Vm = average velocity in the channel cross section at the gauge, in ft/s.*

*Vi = average velocity in channel measured during a 2-minute period by an "uplooking" acoustic velocity meter anchored on the channel bottom near the gauge, in ft/s.*

*GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29 (see follow section regarding gauge datum).*

*Discharge measurements are now made quarterly using an ADCP to characterize the rating.*

However, in reviewing the various methods of analyzing this data I was disappointed that no attempt appears to have been made to analyze:

1. The time (hours) of outflow versus the time (hours) of inflow at this site including how that has changed since 1984, and

2. The relationship of the null point of flow to the tide level (gage height).

Such analysis of data could be very valuable in determining the changes that have occurred in the ability and amount of higher salinity waters getting into the critical areas of the river upstream of kilometer 9. Such analysis could give a clear indication of the tidal level (gage height) that prevents outflow past MacRea's. This data which as I understand has been collected continually since 1984 (as shown in Table 2-2 in the report.) would give a much clearer picture of what has happened over a long period of time. It may also prove to be a better method of assessing the flow from Halls River which as I mentioned in my earlier email looks to be very speculative, particularly when considering that the flow from the spring at the viewing platform may not have been accounted for. It is all about flow and water quality.

From the Volume and Area data of the river upstream from kilometer 9 and 11 the replenishment rates can be calculated. I quickly looked at the NAVD88 =0 data which shows the replenishment time using the current flow rates mentioned in the report.

To kilometer 11 it is just over 12 hours (which begs the question we are all asking "Why are we seeing barnacles past the narrower channel just upstream of the confluence with Halls River").

To kilometer 9 it is just over 24 hours.

I did not attempt to look at the average gage levels to correct the volumes, but would expect this to be a relatively

easy correlation for some someone given the raw data.

Doug,

It may appear that some of my questions are attempts to bring the data into question, I can assure you my intent is to better understand the data. Then to help in whatever small way I can to protect the river, which I have clearly seen deteriorate in the short time I have known it.

**Unquote**

**These particular issues are outside the scope of our involvement with SWFWMD in this area.**

## Attachment B

E-Mail from Martyn Johnson to Kevin Grimsley

*Note: E-mail string deleted by Doug Leeper, SWFWMD*

**From:** Alan Martyn Johnson  
**To:** kjgrims@usgs.gov  
**Cc:** rkane@usgs.gov; Doug Leeper  
**Subject:** RE: Spring and River Flow Measurements Homosassa  
**Date:** Tuesday, November 16, 2010 11:37:53 AM

Kevin,

Thanks for your responses to my questions. I have just now read them, you have answered my questions and expanded my understanding of the available data.  
Thanks for taking the time.

On the last point regarding null flow time intervals, as I put it.  
Has Stream Velocity (raw data) been monitored continually at Homosassa River Site 02310700 for the period 1984- present?

I understand that the idea of looking at the time interval between the no flow (stream velocity zero) out and in is probably somewhat outside the box, but do you think this could be of value in assessing changes of flow over time?

My thought is that if the time intervals were studied against tide levels it may help understand how flushing and ingress times have trended over an expanded time period. This may also help explain why barnacle growth upstream has increased significantly over recent years. Data may look something like this (NUMBERS IN THE TABLE ARE FOR ILLUSTRATION PURPOSES ONLY no factual basis):

Year/Quarter Mean Outflow

Time

Mean Inflow

Time

Av. Outflow

for 2 Sigma

Low Tide

Av. Inflow for 2

Sigma High

Tide

1984	7hrs 18mins	5hrs 02mins	7 hr 50mins	5 hr 5mins
1985	7hrs 10mins	5hrs 11mins	7 hr 46mins	5 hr 8mins
1986	7hrs 05mins	5hrs 03mins	7 hr 57mins	5 hr 10mins
1987	7hrs 12mins	5hrs 00mins	7 hr 55mins	5 hr 7mins
2006	6hrs 48mins	5hrs 34mins	7 hr 20mins	5 hr 50mins
2007	6hrs 50mins	5hrs 33mins	7 hr 23mins	5 hr 55mins
2008	6hrs 55mins	5hrs 35mins	7 hr 18mins	5 hr 54mins

I did look at the actual data for the last few days, selecting the times closest to zero stream velocity, (data from USGS web site) it looks like this (copied from Excel spreadsheet, so trust the columns are understandable) :

Date	Time of no flow	Flow Direction	Flow Hrs	Mins	Flow Hrs	Inflow	Outflow
11-Nov	2:00	7:45	Inflow	5:45	5.75	5.75	
	7:45	17:30	Outflow	9:45	9.75	9.75	
	17:30	21:45	Inflow	4:15	4.25	4.25	
	21:45	4:00	Outflow	6:15	6.25	6.25	
12-Nov	4:00	9:00	Inflow	5:00	5.00	5.00	
	9:00	18:45	Outflow	9:45	9.75	9.75	
	18:45	23:00	Inflow	4:15	4.25	4.25	
	23:00	5:00	Outflow	6:00	6.00	6.00	
13-Nov	5:00	10:30	Inflow	5:30	5.50	5.50	
	10:30	18:15	Outflow	6:45	6.25	6.25	
	18:15	0:00	Inflow	5:45	5.45	5.45	
14-Nov	0:00	5:45	Outflow	5:45	5.45	5.45	
	5:45	11:30	Inflow	5:45	5.45	5.45	
	11:30	18:45	Outflow	7:15	7.25	7.25	
	18:45	1:45	Inflow	7:00	7.00	7.00	
15-Nov	1:45	8:00	Outflow	6:15	6.25	6.25	
	8:00	13:00	Inflow	5:00	5.00	5.00	
	13:00	18:45	Outflow	5:45	5.75	5.75	
	18:45	3:00	Inflow	8:15	8.25	8.25	
	55.90				62.70		
	Average	Flow Interval					
	5.59				6.97		

Over this short timeframe the plus minus selection of the 15 minute time intervals (which I did manually) must be considered when looking at the numbers, but you can see the significant differences from day to day due to a combination of stage level and possible wind direction.

Just strikes me that looking at this raw data in this way over a quarterly and/or annual basis would tell us all a lot about how the river flows have changed and if there is significant increases in the time intervals that higher salinity water is flowing into the upper reaches of the Homosassa. And it is data that is not subject to any assumptions or best estimates in a mathematical equation.

Thanks for giving this idea the once over from an expert point of view.

Much appreciate your time.

Thanks,

Martyn Johnson

## Attachment C

E-Mail from Kevin Grimsley to Martyn Johnson

*Note: E-mail string deleted by Doug Leeper, SWFWMD*

**From:** Kevin J Grimsley  
**To:** Alan Martyn Johnson  
**Cc:** Doug Leeper; rkane@usgs.gov  
**Subject:** RE: Spring and River Flow Measurements Homosassa  
**Date:** Wednesday, November 17, 2010 4:53:11 PM

Mr. Johnson,

We only have velocity data from May 2004 to present. The velocity meters we are using are a fairly recent technology. If we did have velocity data for the earlier time period, then we would be able to compute discharge values which would tell us much more than the duration of flow in each direction could. Also if you were only looking at the duration of flow in each direction as you suggest, then the magnitude of that flow would not be accounted for which could cause significant errors.

I understand your line of questioning and how it relates to the minimum flow determinations made by SWFWMD, but as I stated in the previous email these issues of long-term trends and data analysis are outside the scope of the USGS involvement in this project. I do hope that I've helped answer your questions.

\*\*\*\*\*

Kevin Grimsley, P.E.  
Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

\*\*\*\*\*

**From:** Doug Leeper  
**To:** ["Brent Whitley"](#)  
**Cc:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#); [Richard Kane \(rkane@usgs.gov\)](#); [Kevin Grimsely \(kjgrims@usgs.gov\)](#)  
**Subject:** RE: Attachment  
**Date:** Monday, August 01, 2011 10:56:00 AM

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Brent –

Thanks for your comments. I've copied Richard Kane and Kevin Grimsley with the USGS, to see what they think about potential effects of boat traffic on river stage measurements. Seems like a reasonable effect to me, although there probably is not much boat traffic moving past the gage at the Fishbowl Drive Bridge (there is, however, often a lot of boating activity downstream from the gage site - perhaps boat wakes could propagate upstream??).

FYI - Richard and Kevin are currently working on a summary response to Mr. Johnson's submission.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Brent Whitley [<mailto:BrentWhitley@Sierra-Properties.com>]  
**Sent:** Friday, July 29, 2011 10:37 AM  
**To:** Doug Leeper  
**Subject:** RE: Attachment

Doug, just out of curiosity, isn't it possible that gauges in short term intervals like he described be influenced by boat traffic? I would think that in the situation at Chassahowitzka where the water in the vicinity of the measuring station is so shallow and the width of the stream at that point is very narrow that boats moving in and out even at idle speeds could impact the short intervals. For example, 3-4 consecutive vessels idling out and thus pushing water in must have some impact on flow measurement. Obviously I really do not know but long term data would overcome this concern he has.

Brent

---

**From:** Doug Leeper [<mailto:Doug.Leeper@swfwmd.state.fl.us>]  
**Sent:** Thursday, July 28, 2011 2:31 PM  
**To:** Norman Hopkins; Brad Rimbey; Hope Corona; Rebecca Bays; Richard Radack; Jim Farley; Frank DiGiovanni; Sarah Tenison; Greenwood, Kathleen; Bill Pouder; Hoehn, Ted; Brockway, Alys; Brent Whitley; Ron Miller; Helen Spivey; Al Grubman; Dennis D. Dutcher; Boyd Blihovde; Richard Kane; Hilliard, Dan; Whitey Markle; [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)  
**Cc:** [martynellijay@hotmail.com](mailto:martynellijay@hotmail.com)  
**Subject:** Attachment

Forgot the attachment – here it is.

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  
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Web Site: [watermatters.org](http://watermatters.org)

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January 24, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section  
Ron Basso, Senior Professional Geologist/Engineer, Hydrologic Evaluation Section  
Southwest Florida Water Management District

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010  
regarding recommended minimum flows for the Homosassa River system

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This memorandum documents an e-mail submitted to the Southwest Florida Water Management District by Mr. Martyn Johnson on December 24, 2010 concerning development of minimum flows for the Homosassa River system. With regard to potential flow reductions associated with establishment of minimum flows for the river system, Mr. Johnson notes that “[a]nything that results in further reduction in the flows of freshwater into the river is very likely to have serious consequences to the river and its associated value both economically and ecologically.” Excerpted portions of Mr. Johnson’s e-mail are reproduced below in italics, along with staff responses to his questions and comments. Mr. Johnson’s entire e-mail is reproduced as a four-page attachment 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 1 from Mr. Johnson’s E-Mail**

***“Excerpt 1***

***Water Chemistry - Bulletin 69***

*Although Bulletin 69 does add some information regarding the trends and statistics of chemical analyses for the springs in the Homosassa system (Homosassa Springs 1, 2, 3, Pump House Spring and Trotter Spring and Hidden River) it covers 1991 – 2003.*

*The figures in Table 20, Sequence A: show positive trends in many key parameters from 1991 -2003, notable exceptions Pump House and Trotter (other than nitrate). Table 22 Sequence B: shows few positive trends for 1991-1997.*

*Given that the trends are more positive in the period Sequence A than in Sequence B it highlights the need to look at the trends for years since 2003.*

**Can the analyses results from all samplings summarized in Table 2-6 of the Peer Review Draft July 2010 be made available?** *Bulletin 69 does show all results 1991-2003 in the Appendices.*

*The point is we have been observing harmful changes to the Homosassa River in recent years e.g. barnacle growth in the upper reaches. There needs to be clear understanding if the trends mentioned in Bulletin 69 are continuing from 2003 to present and how much of a factor these trends may be.*

***Has the question been answered.***

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010  
regarding recommended minimum flows for the Homosassa River system

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*Regarding the comments from staff about sizable localized withdrawals; I hope this generalization is true as SWFWMD have the responsibility to prevent such withdrawals from occurring. The peer-review question was more specifically directed at the ratio of the water from the low salinity springs. I would speculate these waters originate from much further away and as the exact routing of these waters thru the aquifer are not known; **Is it not possible that any well drilled could hit /draw from the 'vein' feeding these springs which are primarily in the SE Fork?"***

#### **Staff Response to Excerpt 1**

With regard to Mr. Johnson's comments concerning water quality data for the Homosassa River system, staff notes that the District data summarized in the draft minimum flows report will be included in the appendices of the revised version of the report. In addition, electronic files containing the data will be provided directly to Mr. Johnson.

With regard to Mr. Johnson's question concerning the impact of wells on spring flows, staff notes that it is possible that very large withdrawals close to the Homosassa Main Spring or springs of the Southeast Fork would have substantially more impact on flow than the current distribution of pumping. As noted in a previous response to Mr. Johnson, it would take a very large localized withdrawal to affect the relative contribution of fresh to saline water from a group of springs and cause salinity changes to the system overall, and expectations for this occurring are low.

Finally, staff notes that groundwater withdrawals associated with individual water use permit requests are evaluated for their potential impact on area water resources, including springs. Any well that is six inches in diameter or greater, can withdraw 100,000 gallons per day or greater, or has the capacity to withdraw 1,000,000 gallons per day requires a water use permit from the District. Groundwater flow modeling associated with any requested water use that could affect the flows in the river system and environmental monitoring that would be associated with the permits would ensure that the District fulfills its mission to allow responsible water-use while affording protection to natural resources and other existing legal users of the resources.

#### **Excerpt 2 from Mr. Johnson's E-Mail**

##### **"Declines in aquifer levels (Excerpt 4/5)**

*Again I see the reliance on the model. The model if it is any value must consider the actual annual rainfall as a real input. IMHO it is pointless to talk about cumulative rainfall deficit. The rain that fell is the rain that fell, no one can change that. The reality is that the actual levels in the aquifer are dropping, as evident from recorded well levels. The water level in the aquifer is the driving force to actual spring flows. Therefore, actual changes in well levels should feature prominently in any discussion/decision regarding Minimum Flows. Regarding staff's comment re Lecanto 2, let us be clear this is the only comment in the report regarding the downward trend/s of well in the area; the statistical significance is not quantified and is dismissed as being consistent with regional rainfall patterns. In my opinion that is insufficient coverage of this important factor.*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010  
regarding recommended minimum flows for the Homosassa River system

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*I note that the Statue addresses both flow and level of groundwater in the aquifer, but I am not aware of where these minimum levels of groundwater in the aquifer are addressed. Presumably these are subject of other studies/reports."*

**Staff Response to Excerpt 2**

The Northern District Model was calibrated by matching water levels from 295 wells within the model domain. Baseflow from major rivers and spring flow from 93 springs was also matched during the calibration process. The recharge applied in the model was also derived based on radar estimated rainfall, land use, soils, and depth to water table information. Detailed information on the model calibration is included in a 2008 report by HydroGeoLogic, Inc., titled *Groundwater Flow and Saltwater Intrusion Model for the Northern District Water Resources Assessment Project Area*. This report was supplied to the scientific panel that recently completed an independent, peer-review of the technical work associated with development of the District's recommended minimum flows for the Homosassa River system.

Staff agrees that there has been a long term decline in rainfall and that spring flows have responded to this decline through lower than average flows under current conditions. Water levels within the Floridan aquifer also mimic this long-term decline in rainfall. The Lecanto 2 well was shown in the District's draft Homosassa River minimum flows report because it has the longest period of record (since the mid-1960s) of water levels in the immediate area. The District monitors many more wells and while they generally have shorter records, they show a long-term decline similar to Lecanto 2.

Staff acknowledges Mr. Johnson's comments regarding declines in potentiometric levels of the Floridan aquifer system in west-central Florida and his opinion regarding discussion of this information in the draft minimum flows report for the Homosassa River system. The District did address the statistical significance of the long-term decline at the Lecanto 2 well in the following excerpt from Mr. Basso's technical memorandum contained within the report....*"Simple linear regression of the monthly water levels since 1965 shows a statistically significant downward trend of -0.048 ft/year or about -2.1 ft. for the period 1965-2009."* While additional shorter-term water level hydrographs of wells in the Floridan aquifer could be shown in the report they would only serve to reiterate the point that there have been long-term declines in the Floridan aquifer water levels in this area. All of the District analyses, however, indicate that this is almost entirely due to long-term decline in rainfall. Staff will consider the inclusion of additional information on well levels in the revised version of the minimum flows report.

The District has established minimum aquifer levels for the Floridan aquifer system in regions of the District where significant impacts to water resource have been associated with groundwater withdrawals. Reports outlining this work are available on the Minimum Flows and Levels (Environmental Flows) Documents and Reports page of the District web site at:  
[http://www.swfwmd.state.fl.us/projects/mfl/mfl\\_reports.php](http://www.swfwmd.state.fl.us/projects/mfl/mfl_reports.php).

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010 regarding recommended minimum flows for the Homosassa River system

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**Excerpt 3 from Mr. Johnson's E-Mail**

***"Excerpt 5***

*I did not need the diagram highlighted in red to show the rainfalls, but thanks.*

*What I was hoping for was an explanation of who/where was water usage so much more in those years when rainfall was low, and possibly what was done to control usage in 1999, 2000, 2001 which were also low rainfall years. Such information could help understand how SWFWMD crosslink data that you have to make recommendations."*

**Staff Response to Excerpt 3**

When rainfall is low, water use typically increases for public supply due to outdoor residential lawn irrigation and agricultural use. The District also applies water shortage rules during droughts that limit outdoor home irrigation to one or two days per week which helps to offset increased demand during dry times.

Information on historical water use in the vicinity of the Homosassa River system is available in the July 2005 District Water Management Plan, the December 2010 Draft Southwest Florida Water Management District Regional Water Supply Plan – Northern Planning Region, the 2012-2016 Southwest Florida Water Management District Strategic Plan, and estimated water use reports prepared for the period from 1998 through 2008. The District also maintains an electronic database of estimated and metered water use within our District from 1992 through 2006. This database includes both metered and estimated water use from both water use permits and estimates of domestic well water use.

Most of the reports identified in the previous paragraph include information on District water conservation activities associated with public outreach/education, incentive programs, and implementation of water-use regulation rules and programs. Links to the reports are provided below along with a link to the District's Water Conservation Page, which includes a wealth of information pertaining to water conservation efforts.

July 2005 District Water Management Plan and Appendices

<http://www.swfwmd.state.fl.us/about/watermanagementplan/>

<http://www.swfwmd.state.fl.us/about/watermanagementplan/dwmp-appendix.pdf>

December 2010 Draft Southwest Florida Water Management District Regional Water Supply Plan – Northern Planning Region

[http://www.swfwmd.state.fl.us/documents/plans/RWSP/drafts/NPR-Public-Draft-4\\_20\\_10.pdf](http://www.swfwmd.state.fl.us/documents/plans/RWSP/drafts/NPR-Public-Draft-4_20_10.pdf)

2012-2016 Southwest Florida Water Management District Strategic Plan

[http://www.swfwmd.state.fl.us/files/database/site\\_files/StrategicPlan.pdf](http://www.swfwmd.state.fl.us/files/database/site_files/StrategicPlan.pdf)

Estimated Water Use Reports for Various Years/Time Periods, filed under the General Reports heading

<http://www.swfwmd.state.fl.us/documents/index.php#reports>

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Water Conservation Page of the District Web Site  
<http://www.swfwmd.state.fl.us/conservation/>

**Excerpt 4 from Mr. Johnson's E-Mail**

***"Excerpt 6***

*I do not understand how staff came to their answer talking about withdrawals.*

*I was trying to ascertain/understand the starting point/date for 15% further harm and starting date/flow used as a base for the 5% reduction (mentioned in the July report). Also, I was pointing out that no mention is made about how compliance will be monitored other than by the model. The condition of the Homosassa River was, by all reasonable accounts, better in 1970, when the legislation was first enacted than in recent years and with some 25 mg/d less withdrawals in Citrus County.*

*Additionally, the figure quoted in the reply*

*"Based on recent regional water-use information, staff has determined that the effect of withdrawals on flows in the Homosassa River system is on the order of one percent." appear to be at odds with:*

*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*

*I read that to say that groundwater withdrawals are close to 5% of the spring flow. Of course I may be missing something as I am not sure what Groundwater Outflow is and possibly incorrectly assume it to be surface run off.*

*Note; The 12.5 inches per year over 292 square miles does, as I am sure you are aware, have close agreement with the annual mean tidally adjusted outflow of 272 cfs at Homosassa River Site (possibly that is where the 12.5 inches derived from).*

*I assume the concept used in the various reports and model is that water if not withdrawn from wells would have been spring flow. However, I question if that is totally true as flow to the springs is aquifer level driven which I assume to be less efficient than mechanical extraction by pumps in numerous wells. Many of these pumps are in small wells in locations such as Sugar Mill Woods and similar developments that are not metered. Presumably these withdrawals are factored by some assumed usage and the number of known wells.*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010  
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*It is recognized that some of the withdrawals do return into the ground, generally these carry higher TDS due to evaporation/transpiration in the case of irrigation use and additives from commercial and domestic use.*

**Staff Response to Excerpt 4**

Staff acknowledges Mr. Johnson's comments and notes that the assertion that *"the effect of withdrawals on flows in the Homosassa River system is on the order of one percent"* is not inconsistent with the water budget information for the system presented by Knochenmus and Yobbi (2001). The estimated one percent effect of groundwater withdrawals on spring discharge in the Homosassa River system is based on comparison of discharge values associated with modeled scenarios under pumping and non-pumping conditions. Comparison of the values for springflow and groundwater withdrawals presented by the United States Geological Survey simply provides a means for evaluating the relative magnitude of components of the water budget; it does not provide a means for evaluating the effect of withdrawals on spring flow.

When evaluating a water budget for the Homosassa Springs basin, all of the groundwater withdrawn from the area cannot be assigned toward a reduction in spring flow. Groundwater withdrawals lower water levels in the aquifer which decreases storage, reduces lateral groundwater outflow to the coast, surface water runoff, spring discharge, and evapotranspiration. Water that is removed from an aquifer is essentially offset by changes in aquifer storage, lateral outflow, runoff, spring discharge, and evapotranspiration. The decline in storage, *i.e.*, the lowering of the Upper Floridan aquifer water level, and changes in spring discharge are simulated by the Northern District model. Changes in water levels due to withdrawals are largely predicated on the aquifers transmissive (permeable) properties, the magnitude of the aquifer storage coefficient, and the amount of recharge that reaches the aquifer.

The water level elevation of the Floridan aquifer at the spring vents in the Homosassa River system is the driving head that controls spring discharge. For the 2005-withdrawal scenario that was evaluated for the river system with the Northern District Model, the predicted lowering in the Upper Floridan aquifer water level due to all withdrawals in the model domain at the locations that make up the numerous springs of the system was less than 0.1 feet. This resulted in a predicted reduction in modeled spring discharge of approximately one percent. The groundwater flow system in Citrus County is less vulnerable to the impacts of withdrawals because the Upper Floridan aquifer is mostly unconfined, has very high recharge rates, is very permeable, and groundwater withdrawals are relatively low in magnitude and dispersed.

**Excerpt 5 from Mr. Johnson's E-mail**

***"Excerpt 7***

*We agree.*

*But, the observed evidence is that during the cold months the manatee are consuming more and more of the vegetation (SAV is possibly the more correct term) in the upper reaches as the years pass. Possibly*

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on December 24, 2010  
regarding recommended minimum flows for the Homosassa River system

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*this is not the documented science that we would like to support decisions, but it is evidence that is extremely important to decision making.*

*As touched on earlier in this e-mail. Possibly such input could be gained by interviewing long term residents using a standardized question and answer survey. As I have commented before the comments made by human observation are not included in the report. Noted comments to file from the various meetings are lost in the mass of scientific data, but those firsthand observations over many years get to the heart of the matter much more succinctly."*

**Staff Response to Excerpt 5**

Staff acknowledges Mr. Johnson's comments regarding manatees, submersed aquatic vegetation and implementation of a survey for compiling information on observations made by local residents. The District does not currently anticipate conducting a survey of long-term residents regarding environmental change in the Homosassa River system. The District is, however, considering the creation of a stakeholders group to assist in the identification of monitoring and data collection efforts that will support compliance evaluations and potential re-evaluation of minimum flows that are adopted for the river system.

DAL

Attachment: Four page e-mail from Mr. Martyn Johnson dated December 24, 2010

**Four Page Attachment to January 24, 2011 Memorandum on Questions and  
Comments Submitted by Mr. Martyn Johnson on December 24, 2010**

**From:** Alan Martyn Johnson  
**To:** Doug Leeper  
**Cc:** Marty Kelly; Sid Flannery; Mike Heyl; Mark Barcelo; Ron Basso; Karen Lloyd; Jay Yingling; Yassert Gonzalez; Cara S. Martin; rkane@usgs.gov; kjgrims@usgs.gov  
**Subject:** Homosassa MFLs  
**Date:** Friday, December 24, 2010 9:13:11 AM

Doug,

Thanks for your e-mails of November 22 and December 17. Unless I hear to the contrary I hope to be at the January 6 workshop. I would like to express my appreciation that you and SWFWMD are taking the time to hear further public input. I would really like to see some form of survey of long term residents so that anecdotal observations, as staff has referred to them, can better be transformed to firsthand knowledge and used in the decision making process.

I have read and thought about the comments in your December 15, 2010 memo to file attached to the December 17 e-mail. I would like to comment as follows:

**Excerpt 1**

**Water Chemistry - Bulletin 69**

Although Bulletin 69 does add some information regarding the trends and statistics of chemical analyses for the springs in the Homosassa system (Homosassa Springs 1, 2, 3, Pump House Spring and Trotter Spring and Hidden River) it covers 1991 – 2003.

The figures in Table 20, Sequence A: show positive trends in many key parameters from 1991 -2003, notable exceptions Pump House and Trotter (other than nitrate). Table 22 Sequence B: shows few positive trends for 1991-1997.

Given that the trends are more positive in the period Sequence A than in Sequence B it highlights the need to look at the trends for years since 2003.

**Can the analyses results from all samplings summarized in Table 2-6 of the Peer Review Draft July 2010 be made available?** Bulletin 69 does show all results 1991-2003 in the Appendices.

The point is we have been observing harmful changes to the Homosassa River in recent years e.g. barnacle growth in the upper reaches. There needs to be clear understanding if the trends mentioned in Bulletin 69 are continuing from 2003 to present and how much of a factor these trends may be.

**Has the question been answered.**

Regarding the comments from staff about sizable localized withdrawals; I hope this generalization is true as SWFWMD have the responsibility to prevent such withdrawals from occurring. The peer-review question was more specifically directed at the ratio of the water from the low salinity springs. I would speculate these waters originate from much further away and as the exact routing of these waters thru the aquifer are not known; **Is it not possible that any well drilled could hit /draw from the 'vein' feeding these springs which are primarily in the SE Fork?**



**Excerpt 2**

As you are aware I have asked for input from the Park. I will certainly share if such should materialize.

**Excerpt 3**

Thank you for acknowledging my comments, presumably staff are thinking about these when looking at the NDM (the model).

**Excerpt 4****Flow/Discharge Calculations**

As you are aware I have asked the USGS if the rating curves/equations have changed over time.

**Declines in aquifer levels (Excerpt 4/5)**

Again I see the reliance on the model. The model if it is any value must consider the actual annual rainfall as a real input. IMHO it is pointless to talk about cumulative rainfall deficit. The rain that fell is the rain that fell, no one can change that. The reality is that the actual levels in the aquifer are dropping, as evident from recorded well levels. The water level in the aquifer is the driving force to actual spring flows. Therefore, actual changes in well levels should feature prominently in any discussion/decision regarding Minimum Flows. Regarding staff's comment re Lecanto 2, let us be clear this is the only comment in the report regarding the downward trend/s of well in the area; the statistical significance is not quantified and is dismissed as being consistent with regional rainfall patterns. In my opinion that is insufficient coverage of this important factor.

I note that the Statue addresses both flow and level of groundwater in the aquifer, but I am not aware of where these minimum levels of groundwater in the aquifer are addressed. Presumably these are subject of other studies/reports.

**Excerpt 5**

I did not need the diagram highlighted in red to show the rainfalls, but thanks.

What I was hoping for was an explanation of who/where was water usage so much more in those years when rainfall was low, and possibly what was done to control usage in 1999, 2000, 2001 which were also low rainfall years. Such information could help understand how SWFWMD crosslink data that you have to make recommendations.

**Excerpt 6**

I do not understand how staff came to their answer talking about withdrawals.

I was trying to ascertain/understand the starting point/date for 15% further harm and starting date/flow used as a base for the 5% reduction (mentioned in the July report). Also, I was pointing out that no mention is made about how compliance will be monitored other than by the model. The condition of the Homosassa River was, by all reasonable accounts, better in 1970, when the legislation was first enacted than in recent years and with some 25 mg/d less withdrawals in Citrus County.

Additionally, the figure quoted in the reply

*"Based on recent regional water-use information, staff has determined that the effect of withdrawals on flows in the Homosassa River system is on the order of one percent."*

appear to be at odds with:

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

I read that to say that groundwater withdrawals are close to 5% of the spring flow. Of course I may be missing something as I am not sure what Groundwater Outflow is and possibly incorrectly assume it to be surface run off.

Note; The 12.5 inches per year over 292 square miles does, as I am sure you are aware, have close agreement with the annual mean tidally adjusted outflow of 272 cfs at Homosassa River Site (possibly that is where the 12.5 inches derived from).

I assume the concept used in the various reports and model is that water if not withdrawn from wells would have been spring flow. However, I question if that is totally true as flow to the springs is aquifer level driven which I assume to be less efficient than mechanical extraction by pumps in numerous wells. Many of these pumps are in small wells in locations such as Sugar Mill Woods and similar developments that are not metered. Presumably these withdrawals are factored by some assumed usage and the number of known wells.

It is recognized that some of the withdrawals do return into the ground, generally these carry higher TDS due to evaporation/transpiration in the case of irrigation use and additives from commercial and domestic use.

#### **Excerpt 7**

We agree.

But, the observed evidence is that during the cold months the manatee are consuming more and more of the vegetation (SAV is possibly the more correct term) in the upper reaches as the years pass. Possibly this is not the documented science that we would like to support decisions, but it is evidence that is extremely important to decision making.

As touched on earlier in this e-mail. Possibly such input could be gained by interviewing long term residents using a standardized question and answer survey. As I have commented before the comments made by human observation are not included in the report. Noted comments to file from the various meetings are lost in the mass of scientific data, but those firsthand observations over many years get to the heart of the matter much more succinctly.

#### **In conclusion.**

I hope that someone starts looking at reality and not relying so heavily on the model.

The Homosassa River is a valuable and rare resource for Florida, its future is no doubt very delicate as evidenced by changes over the years, scientifically documented and human observation. Everything

possible should be done to protect the river. Anything that results in further reduction in the flows of freshwater into the river is very likely to have serious consequences to the river and its associated value both economically and ecologically.

Thanks for allowing me to again make comments.

Martyn Johnson

**From:** [Brent Whitley](#)  
**To:** [Doug Leeper](#)  
**Subject:** RE: Attachment  
**Date:** Monday, August 01, 2011 11:37:46 AM

---

THX.

---

**From:** Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]  
**Sent:** Monday, August 01, 2011 10:56 AM  
**To:** Brent Whitley  
**Cc:** Marty Kelly; Mike Heyl; Ron Basso; Richard Kane (rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov)  
**Subject:** RE: Attachment

Brent –

Thanks for your comments. I've copied Richard Kane and Kevin Grimsley with the USGS, to see what they think about potential effects of boat traffic on river stage measurements. Seems like a reasonable effect to me, although there probably is not much boat traffic moving past the gage at the Fishbowl Drive Bridge (there is, however, often a lot of boating activity downstream from the gage site - perhaps boat wakes could propagate upstream??).

FYI - Richard and Kevin are currently working on a summary response to Mr. Johnson's submission.

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---

**From:** Brent Whitley [mailto:BrentWhitley@Sierra-Properties.com]  
**Sent:** Friday, July 29, 2011 10:37 AM  
**To:** Doug Leeper  
**Subject:** RE: Attachment

Doug, just out of curiosity, isn't it possible that gauges in short term intervals like he described be influenced by boat traffic? I would think that in the situation at Chassahowitzka where the water in the vicinity of the measuring station is so shallow and the width of the stream at that point is very narrow that boats moving in and out even at idle speeds could impact the short intervals. For example, 3-4 consecutive vessels idling out and thus pushing water in must have some impact on flow measurement. Obviously I really do not know but long term data would overcome this concern he has.

Brent

---

**From:** Doug Leeper [mailto:Doug.Leeper@swfwmd.state.fl.us]  
**Sent:** Thursday, July 28, 2011 2:31 PM

**To:** Norman Hopkins; Brad Rimbey; Hope Corona; Rebecca Bays; Richard Radacky; Jim Farley; Frank DiGiovanni; Sarah Tenison; Greenwood, Kathleen; Bill Pouder; Hoehn, Ted; Brockway, Alys; Brent Whitley; Ron Miller; Helen Spivey; Al Grubman; Dennis D. Dutcher; Boyd Blihovde; Richard Kane; Hilliard, Dan; Whitey Markle; 'jsullivan@carltonfields.com'  
**Cc:** martynellijay@hotmail.com  
**Subject:** Attachment

Forgot the attachment – here it is.

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Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272  
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Web Site: [watermatters.org](http://watermatters.org)

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IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

February 15, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: December 2010 correspondence between Martyn Johnson and Dana Bryan, FDEP  
concerning spring flow in the Homosassa River system

---

This memorandum documents an e-mail correspondence between Mr. Martyn Johnson and Mr. Dana Bryan (with the Florida Department of Environmental Protection) from December 2010. The correspondence concerns measurement discharge from a spring vent near or within the Homosassa Springs state park. The correspondence was copied to District staff and is documented here for its relevance to the development of minimum flows for the river system.

DAL

Attachment: E-mail from Martyn Johnson to Dana Bryan, dated December 15, 2010

## Attachment

### E-Mail from Martyn Johnson to Dana Bryan

**From:** Alan Martyn Johnson  
**To:** Dana Bryan  
**Cc:** Doug Leeper  
**Subject:** Homosassa River Minimum Flow Rates  
**Date:** Wednesday, December 15, 2010 10:59:51 AM

Dana,

Did you get any follow up comments from people at the Homosassa State Park regarding their observations of any changes at the various springs over time. You may recall that I was particularly interested in the spring at the overlook platform that I personally have seen change from a good clearly significant flow to the current no noticable flow.

A number of long time residents fully agree with my observation, but it would be useful to have input from the park on this and the other springs within the park.

SWFWMD dismiss my comments stating there was only negligible flow from this spring. They appear to miss the point about the flow having stopped.

Any comments that you have from the park management or long time volunteers would be appreciated.

Thanks,

Merry Christmas and Best Wishes for the New Year.  
Martyn Johnson

**From:** Doug Leeper  
**To:** ["Alan Martyn Johnson"](#)  
**Bcc:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Monday, August 01, 2011 4:00:00 PM

---

Martyn:

Sorry you weren't able to stay for the July 18<sup>th</sup> Springs Coast Minimum Flows and Levels Public Workshop.

Here are brief responses to the comments/questions included in your July 29<sup>th</sup> e-mail.

- Per your recommendation, I'll request that the "data sheet" you provided to me at the beginning of the workshop be pulled from our web page.
- I hope to put Kevin Grimsley's slide presentation on our web site – the USGS has policies regarding publication of materials – Richard, Kevin and I are awaiting approval for release of the slides file.
- We don't plan on forming a flow measurement working group. Richard Kane has offered to meet with you and me at the Survey's Tampa office and I would be more than happy to participate in such a meeting.
- Funding for installation of new instrumentation at the USGS SE Fork site is still in the District's proposed FY2010 budget. The District Governing Board is expected to approve a final budget at their September meeting.

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Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Friday, July 29, 2011 8:27 AM  
**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradack@cityofbrooksville.us](mailto:rradack@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); [rkane](mailto:rkane); [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)  
**Subject:** RE: Public Input for Spring Workshop

Doug,

Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a



stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?

Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rradacky@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identifies as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

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February 15, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: December 2010 correspondence between Martyn Johnson, Kevin Grimsley and Richard Kane concerning flow measurement in the Homosassa River system

---

This memorandum documents e-mail correspondence between Mr. Martyn Johnson, Mr. Kevin Grimsley and Mr. Richard Kane) from December 2010. The correspondence concerns measurement of flows by the United States Geological Survey at sites in the Homosassa River system. The correspondence was copied to District staff and is documented here for its relevance to the development of minimum flows for the river system.

DAL

Attachments: A – E-mail from Martyn Johnson to Kevin Grimsley, dated December 15, 2010  
B – E-mail from Richard Kane to Martyn Johnson, dated December 15, 2010  
C – E-mail from Kevin Grimsley to Martyn Johnson, dated December 17, 2010  
D – E-mail from Martyn Johnson to Kevin Grimsley, dated December 20, 2010

**Attachment A**  
**E-Mail from Martyn Johnson to Kevin Grimsley**

**From:** Alan Martyn Johnson  
**To:** kjgrims@usgs.gov  
**Cc:** Doug Leeper; rkane@usgs.gov  
**Subject:** Homosassa River Flows  
**Date:** Wednesday, December 15, 2010 6:37:45 PM

Kevin,

While I understand the direct scope of the USGS involvement in this project, the use of data originating from USGS by SWFWMD is of significant importance to the task that SWFWMD are legislated to perform by the State of Florida. That is why I am reviewing such data in an attempt to fully understand it to make meaningful commentary on the matter.

Couple of points I would like to share with you from previous e-mails.

Firstly, regarding your Nov 15 answer to my question 3 (copied below for ease of reference). A number of long term residents have been asked if they have ever noticed negative flow under the bridge at SE Fork (02310688)...they have never observed such a situation. They all agree that flow at this location is always down stream. The calculated data of flows at this site are always positive. May I ask that this explanation/formula be given some further consideration before such data is presented in early January.

QUOTE

**Question 3:** Why is the  $dS/dt$  (change in river stage during a 15-minute period, in ft.) in one equation to such a large multiplier and not in the other? There appears to be a significant difference in the methodology used, see comment below.

**The gage height change comes into play at 0231688 (SE Fork) because the flow actually becomes significantly negative during high tides. The change of rate of stage can be thought of as a surrogate for velocity in that it gives an indication of the direction of flow (negative rate of change correlates to positive flow, positive rate of change correlates to negative flow).**

**There is no rate of change of stage component at 02310688 (Homosassa Springs) because there is no occurrence of negative net flow at the site. There has been some bidirectional flow noted along the edges of the channel at high tides, but overall net flow has always remained positive. It should not be concerning at all that the rate of change of stage component is significant at one station and not at another.**

END QUOTE

Secondly on the thought that I had about times between the zero flow conditions at the Homosassa River site 02310700 I had the chance to discuss this with some students at Georgia Tech who took it to one of their professors. The thought along with a diagram that was returned to me is that there must be a clear relationship because there are two finite situations:

1. If there were no flow from the springs the inflow and out flow times at the above site 'MacReas' would be the same for any high/low tide combination. Assumptions are that

there is no other exit or entry to the upper reach of the Homosassa River from this site.  
2. If the flow from the springs were increased there would be a spring flow that would only result in out flow at 02310700; this would range from zero flow at high tide to a maximum flow at low tide. Probably I should say Gage Height rather than tide.

While these situations are theoretical they do represent defined ends of a potential mathematical formula derived from a differential that a small decrease in the flow from situation 2 would result in a small time where inflow would result at 02310700. While the professor did not claim to be a hydrologist he did give some ideas about how to look at the data. And he offered to find the name of someone who he thinks is at University of Texas Austin who may specialize in this area.

Is there any way that I/we can access or be supplied with the data from this site since 2004? The on-line information is limited to the last 120 days and this will be looked at as a starting point.

Kevin, this request for data is not one I would expect you to spend time on, it is more a question of can it be accessed.

I thought the presentation of the two finite situation did make sense. Any professional commentary is welcome.

Thanks,  
Merry Christmas and All the Best for the New Year.

Martyn Johnson

## Attachment B

### E-Mail from Richard Kane to Martyn Johnson

*Note: e-mail string deleted by Doug Leeper, SWFWMD*

**From:** Richard L Kane  
**To:** Alan Martyn Johnson  
**Cc:** Doug Leeper; kjgrims@usgs.gov  
**Subject:** Re: Homosassa River Flows  
**Date:** Wednesday, December 15, 2010 9:43:55 PM

Martyn in regards to your request for the data back to 2004, yes that can be made available. All of the daily values data is available on NWISWEB and you can download it directly. You can either go to the real time sites and then choose the daily values data from the drop down menu, Also you can retrieve the instantaneous data for discharge (for period of record) from the same site. If however you need instantaneous data from other parameters (gage height, water quality, velocity) you will need to request that data. We normally charge a small fee for retrievals that we have to do, to recover our cost. That can sometime be waived for small requests that only take a few minutes to process.

<http://waterdata.usgs.gov/fl/nwis/si>

[http://ida.water.usgs.gov/ida/available\\_records.cfm?sn=02310688](http://ida.water.usgs.gov/ida/available_records.cfm?sn=02310688)

---

Richard L. Kane  
Chief Hydrologic Data Section, Tampa  
U. S. Geological Survey  
Florida Water Science Center  
10500 University Center Dr., Suite 215  
Tampa, Fl. 33612  
rkane@usgs.gov  
(813-975-8620, ext. 131)  
FAX (813-975-0839)  
Cell 813-918-1275

## Attachment C

### E-Mail from Kevin Grimsley to Martyn Johnson

*Note: e-mail string deleted by Doug Leeper, SWFWMD*

**From:** Kevin J Grimsley  
**To:** Alan Martyn Johnson  
**Cc:** Doug Leeper; rkane@usgs.gov  
**Subject:** Re: Homosassa River Flows  
**Date:** Friday, December 17, 2010 10:42:54 AM

Martyn,

First let me say that you're absolutely right, the total flow at SE fork does not completely reverse. That was a poor choice of wording on my part so let me clarify. While the total net flow at SE fork does not reverse, the negative flow components (bidirectional flow) are much more significant at the SE fork gage than they are at Homosassa Springs. I suspect this is mainly because there's simply more positive flow coming from the main spring, so the backpressure caused by a rising tide affects it less. When bidirectional flow occurs, the negative component is typically on the bottom (because water with a higher salinity is more dense) so this is not something that someone observing from above would probably notice.

In the end however, there are many different variables that can be significant at one station and not at another for a myriad of reasons. These equations were developed by starting with the simplest case, a single variable, and evaluating the discharge resulting from that equation against the known discharge measurements. From there, other variables were added to the equation and evaluated in an iterative process until the equation that best fit the discharge measurements was found. So the fact that the rate of change of stage variable does not appear in the final equation used at Homosassa Springs doesn't mean that there was a change in methodology, it just means that the addition of that variable didn't help the equation fit the measurements at that station.

The reality is that the regression equation at SE fork matches the discharge measurements better with the rate of change of stage variable than without it. We're always evaluating how well our equations match our new measurements as we make them throughout the year, but as part of preparing this email I made a quick evaluation of how the equation matched all the measurements over the past 5 years. The average difference between the SE fork regression equation and our measurements was less than 3 percent which shows an excellent correlation.

Regarding the second section of your email, while I certainly agree that there is some relationship between the duration of flows in each direction and the net flow, I stand by my previous concern that looking only at the duration of flow in each direction would not account for the magnitude of those flows. The station could easily flow for 6 hours in each direction but with an average positive velocity of 3 feet per second and average negative velocity of 2 feet per second. This would obviously result in 50% more positive flow than negative.

Lastly, as Richard said in his email most of our data is available for download through the website and data that you can't find there can be requested. We take great pride in our data and continue to welcome any questions and comments about how it has been collected and computed. I must reiterate, however, that questions regarding how USGS data has or has not been used and interpreted to look at longer term trends or other issues related to the proposed minimum flow recommendations are better directed to SWFWMD. The USGS has simply not been involved beyond providing the data itself so we cannot provide insight into how that data was used.

I hope I've helped answer your questions. Merry Christmas to you as well.

Kevin

\*\*\*\*\*

Kevin Grimsley, P.E.

Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

---

## Attachment D

### E-Mail with Attached JPEG File from Martyn Johnson to Kevin Grimsley

*Note: e-mail string deleted by Doug Leeper, SWFWMD*

**From:** Alan Martyn Johnson  
**To:** kjgrims@usgs.gov  
**Cc:** Doug Leeper; rkane@usgs.gov  
**Subject:** RE: Homosassa River Flows  
**Date:** Monday, December 20, 2010 9:46:45 AM  
**Attachments:** 2010-12-19-1844-04.jpg

Kevin,  
Thanks for the response.

### Homosassa River Flows

On the subject of flows at the Homosassa River Site 02310700, we agree that the data on actual flow velocity and the computation of net flow since this was started is good and useful data.

The idea of trying to look at flow times in each direction was raised hoping that velocity data was available for a much more extended period than the calculated net flow. Although I understand your point about the difference regarding 3 ft/sec and 2 ft/sec the differences at this Site are not that pronounced. Anyway, let us leave that point to the students who have got a Christmas break interest over and above parties!!

### SE Fork Flow

Regarding the SE Fork Site 02310688; I and another resident (he was born in Homosassa some 60 years ago) regularly kayak to and along the SE Fork. We are confident that there is no reverse (bidirectional) flow under the Fishbowl Drive bridge. Vegetation SAV and fallen leaves can clearly be seen „bouncing“ along the bottom under the bridge, even at high tide. With a stream velocity of about one foot per second and a flow from the various springs that can generate a rise of about 0.4 feet in 15 minute (this is from flow of about 60cfs and an area of about 3 acres of water upstream of the bridge) which is over ten times the normal gage height change rate, I do not see the reverse flow being a reality.

The specific conductance data also does not support bidirectional flow.

We have looked carefully at the conductivity data increases from normal that occasionally are detected. From what we can see the times when conductivity increases above the norm (~900) are associated with gage height rises of over 0.04 ft per 15 minute monitoring interval, and usually with gage heights over 1 ft.. Why we asked ourselves.

Looking at the location of the monitoring site we speculate that the reason may be eddy currents set up along the concrete wall immediately downstream of the monitor. This could draw main springs water (conductivity ~4500) past the monitor in a „vortex“ created by the main flow from the SE Fork trying to pass the rising water. The curve in the river, we think, adds to this speculation being valid.

I noted above increased conductivity is usually associated with gage heights over one foot. An example of an exception to this can be seen November 29 starting at 9:00am. Conductivity did rise slightly (~1200 from normal ~900) even at low gage height, but look at



the rate of increase in gage height they are 0.07, 0.06, 0.05 ft per 15 min interval.

The attached diagram may help you understand our speculation. This diagram was traced from an aerial view. Just thought you may be interested in these thoughts from people who see the river regularly.

#### Equations for discharge calculation

Regarding the equations used to calculate the discharge, there is no question that this must be an iterative process to find the best match. I appreciate that you took the time to crosscheck the calculated discharge with the last 5 years empirical measurements. The agreement of less than 3 percent is excellent and significantly better than commented on by Dave Fulcher (USGS-Tampa) on May 1, 2009 and contained in the SWFWMD Report.

Re Homosassa Springs

#### *Quote*

*According to Mr. Fulcher, the standard error of the rating is approximately 15 percent, and no shifts have been applied during the rating analysis.*

#### *End Quote*

And Re SE Fork

#### *Quote*

*The rating is maintained and average daily flow is calculated using the same methods as for the*

*Homosassa Springs station, although the standard error of the SE Fork station's rating is somewhat higher.*

#### *End Quote*

If you still have the data you checked we would be interested in looking at it. If you do not still have it no problem.

One final point if I may.

Have the equations used to calculate the flow at the three sites changed over time?

Homosassa Springs at Homosassa (02310678):

$$Q = 90.8162 + 3.823(\text{GW}) - 20.3771(\text{GH})$$

In which

Q = spring discharge measurement, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

Weeki Wachee Well at Weeki Wachee (283201082315601) on the day of the

discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gauge height of the river stage recorded at the time of the discharge

measurement used for the rating, in feet relative to a gauge datum that is 2.99 feet

below NAVD88.

SE Fork Homosassa Spring at Homosassa (02310688):

:

$$Q = 18.63 + 3.31(\text{GW}) - 10.31(\text{GH}) - 418.14(\text{dS/dt})$$

In which

Q = spring discharge, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

283201082315601 (Weeki Wachee at Weeki Wachee) on the day of the discharge measurement used for the rating, in ft

NGVD29.

GH = 15-minute gauge height of the river recorded at the time of the discharge

measurement used for the rating, in ft NGVD29.

$dS/dt$  = change in river stage during a 15-minute period, in ft.

Homosassa River at Homosassa (02310700):

:

$$Q = V_m(A) \text{ (B-3)}$$

$$V_m = 0.00902154 + 0.9019V_i + 0.12138V_{i2} + 0.045375(GH)$$

In which

$Q$  = river discharge, in cfs.

$A$  = area of channel cross section at the gauge, in ft<sup>2</sup>.

$V_m$  = average velocity in the channel cross section at the gauge, in ft/s.

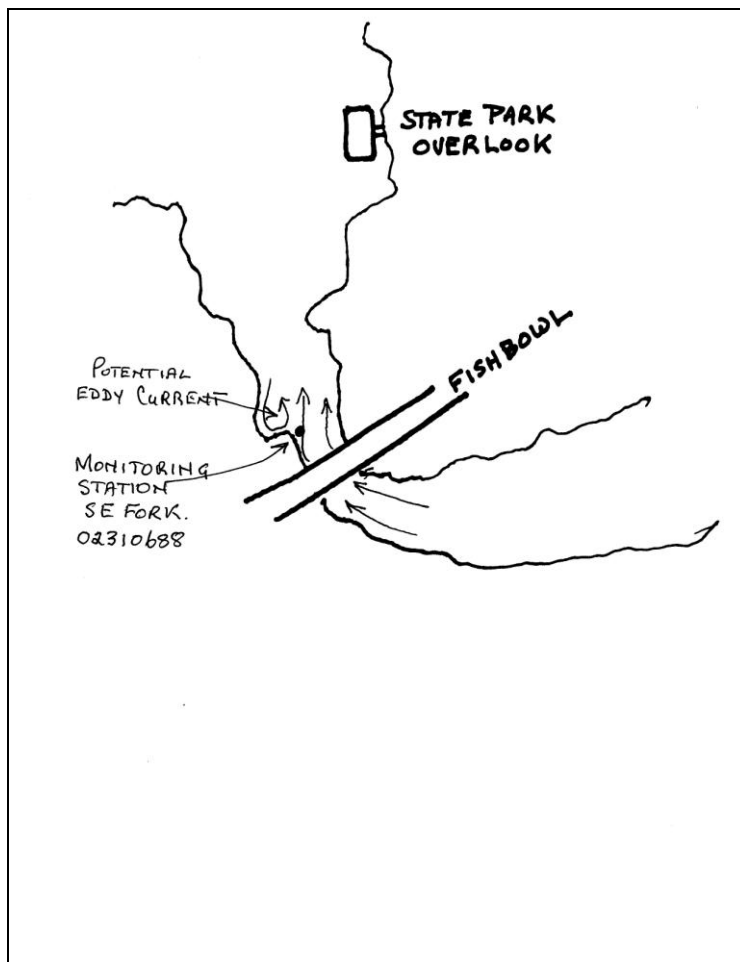
$V_i$  = average velocity in channel measured during a 2-minute period by an "uplooking" acoustic velocity meter anchored on the channel bottom near the gauge, in ft/s.

$GH$  = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29 (see follow section regarding gauge datum).

Kevin,

Really appreciate the time you have spent on my questions. The work and data available from USGS is amazing. I trust you appreciate the comments and interest in these e-mails; we are simply interested in protecting the Homosassa River from further deterioration.

Martyn



**From:** [Marty Kelly](#)  
**To:** [Doug Leeper](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Monday, August 01, 2011 4:46:10 PM

---

Doug,

Typo, I know. But the funding for gages is in the FY2012 Budget (not 2010).

---

**From:** Doug Leeper  
**Sent:** Monday, August 01, 2011 4:00 PM  
**To:** Alan Martyn Johnson  
**Subject:** RE: Public Input for Spring Workshop

Martyn:

Sorry you weren't able to stay for the July 18<sup>th</sup> Springs Coast Minimum Flows and Levels Public Workshop.

Here are brief responses to the comments/questions included in your July 29<sup>th</sup> e-mail.

- Per your recommendation, I'll request that the "data sheet" you provided to me at the beginning of the workshop be pulled from our web page.
- I hope to put Kevin Grimsley's slide presentation on our web site – the USGS has policies regarding publication of materials – Richard, Kevin and I are awaiting approval for release of the slides file.
- We don't plan on forming a flow measurement working group. Richard Kane has offered to meet with you and me at the Survey's Tampa office and I would be more than happy to participate in such a meeting.
- Funding for installation of new instrumentation at the USGS SE Fork site is still in the District's proposed FY2010 budget. The District Governing Board is expected to approve a final budget at their September meeting.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Friday, July 29, 2011 8:27 AM  
**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); [rkane](mailto:rkane); [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)  
**Subject:** RE: Public Input for Spring Workshop

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The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?

Do you have any thoughts about the idea of a Flow Measurements Working Committee?

Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rradacky@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identified as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
2379 Broad Street, Brooksville, FL 34604-6899  
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IMPORTANT NOTICE: All E-mail sent to or from this address are public record and archived. The Southwest Florida Water Management District does not allow use of District equipment and E-mail facilities for non-District business purposes.

January 28, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: E-Mail submitted by Mr. Martyn Johnson regarding discharge measurements in the  
Homosassa River system

---

This memorandum documents correspondence between Mr. Martyn Johnson and Mr. Doug Leeper regarding discharge measurements for sited in the Homosassa River system.

Mr. Johson's e-mail, which was submitted on January 23, 2011, and an e-mail response sent to Mr. Johnson on January 28, 2011 are attached.

DAL

Attachments: Attachment A - E-Mail from Mr. Martyn Johnson, dated January 23, 2011  
Attachment B - E-Mail to Mr. Martyn Johnson, dated January 28, 2011

## Attachment A

### E-Mail from Mr. Johnson, Dated January 23, 2011

**From:** Alan Martyn Johnson  
**To:** Doug Leeper; Ron Basso; Kevin J Grimsley; rkane@usgs.gov  
**Cc:** rmill76@tampabay.rr.com; Dana Bryan  
**Subject:** Homosassa Flow Concerns  
**Date:** Sunday, January 23, 2011 6:39:31 PM  
**Attachments:** Low Water Flow Data Jan13 and 14.xls  
Homosassa River Data.xls

#### **DISCHARGE FROM SE FORK USGS 02310688**

Following observations made during kayak trips into the SE Fork on January 13 and 14, 2011, when the water levels were very low, I have looked at some of the data on flows and have very big concerns about the accuracy of the flow data.

Water levels on January 13 and 14 were low to the extent that discharge from Pumphouse Spring and Trotter Spring were clearly above the water level in the main stream to the extent that water was flowing down 'waterfalls'. Flow from these two springs was much much stronger than from the other springs in the fork. Abdoney Spring was also discharging from above the level of water in the main stream and was the third strongest flow but no where near Pumphouse and Trotter.

Given these observations it was clear that the only driving force for flow was the head in the aquifer. This led me to see what the calculated flows were. In studying the data extracted from the USGS real time records and presented in the attached spreadsheet (Low Water Flow...) it is clear that the equation used must be questioned. As you will see in the data there are times when calculated discharge changes very significantly. Such changes can not be true in a situation where the discharge is not affected by conditions in the river. It could be argued that this was an unusual situation with water levels so low. I agree that it was an unusual situation with water levels so low the conductivity sensor was at times above water with no conductivity recorded. I suggest that it is not unusual when we look at discharge data, the  $ds/dt$  multiplier appears to be far too large. Allow me to explain further.

You will recall in earlier correspondence I asked why the multiplier for the  $ds/dt$  (change in river stage) was so high. On the spreadsheet (Sheet 2 SE Fork Equation) I have shown the influence the  $ds/dt$  factor has on the water held in the pool upstream of the SE Fork gage site 02310688 as a result in stage increase/decrease. These show minimal changes in flow, compared to the figures resulting from the large multiplier used in the equation.

I would strongly suggest this clearly gives concern to erroneous calculation/equation of discharge from the SE Fork.

Also, given the observed uninhibited flows from these spring vents Jan 13 & 14, it only adds to the comments I have made about assumptions used in the modeling of flows as presented in Table 2-4 of the July 2010 report.

#### *Notes:*

- 1. Data from the Homosassa Springs site for the same time period was included on the spreadsheet simply for comparison.*
- 2. The reference made in WRIR 01-4230 by Yobbi and Knochemus on page 16 "Additionally, a single explanatory variable (spring flow from a nearby spring in the complex) was used in the regression models to estimate flow at two tidal springs (Unnamed Tributary to Chassahowitzka River and Southeast Fork of the Homosassa River)." Is noted as possible origin of the equation; however, the SE Fork is not truly tidal as there is no reverse flow as mentioned and supported in previous e-mails.*

### Eddy Current at Gage Site 02310688

In an earlier e-mail I speculated that there was a possibility of eddy currents causing the occasional increase in conductivity readings at this site. Since that speculation I have carefully observed the flow at the gage site. Regularly, in fact most of the time, a thin layer of flow can be observed going upstream along the concrete seawall towards the instruments location. This observation is made by watching small clumps of weed that can easily be tracked in the water. Most of the time the flow is captured (*typically the flow can be seen going about 4 feet upstream along the seawall and is less than 6 inches wide*) by the main outflow before it reaches the instrument location. I have not yet seen weed reach the plastic tubes. Why is this happening? Previously I had suggested that it was the flow changing direction as it goes under the bridge...close observation shows that a stack of riprap concrete immediately upstream of the instrument location causes a major shift in the flow. I wish I had

#### Componets in the equation used to calculate discharge from SE

##### Fork

Fixed Multiplier Date GW Multiplier Time GH Multiplier ds/dt  
Q in cfs 18.63 3.31 1/13/2011 12.51 10.31 6:15 -0.78 418.14  
6:30 -0.81 -0.03  
6:45 -0.81 0  
7:00 -0.83 -0.02  
1/14/2011 12.5 14:00 -0.98 0.01  
14:15 -0.96 0.02  
14:30 -0.91 0.05  
14:45 -0.88 0.03  
15:00 -0.88 0

photographs to show this. But, there is nothing like looking at this firsthand.

### DISCHARGE DATA HOMOSASSA RIVER USGS 02310700

On the subject of discharge calculation I find some of the data reported from the Homosassa River site perplexing. I have attached a spreadsheet (Homosassa River) in which I have shown the implied cross section of the river from the discharge volume and stream velocity. While I understand that the cross section area will change with stage height this does not appear to explain the wide variation of the *implied cross sectional area* in the spreadsheet. I do not know the exact location of the Acoustic Doppler Current Profiler (ADCP) but would estimate the river width at that point to be about 200 feet, and would assume that the stream velocity reported is the average stream velocity.

There are even occasions where an inflow is shown when the stream velocity is outward, agreed these few situations are at times when flow direction is changing. However, these provide further indication that discharge results are subject to some mathematical treatment other than simple logic.

I would appreciate if someone can explain what other factors are use to make this calculation. I was under the impression that data from this site was:

$$\text{Stream Velocity} \times \text{Cross Section Area (for stage height)} = \text{Discharge}$$

### Summary

Given the funds that are spent on developing models, often using regression analysis which use flow data, to predict the ecological future of this river I think it critical that the very basis of the flow measurements are fully understood. May be the gaps are only in my understanding, but somewhere I am not getting the logic. I hope those spending the monies and making the decisions are.

Observations, comments and questions with the best of intent.

Martyn Johnson

#### Reference:

SE Fork Homosassa Spring at Homosassa (02310688):

The current rating curve for the spring discharge reported at this station is represented by the equation:

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(ds/dt)$$

In which

Q = spring discharge, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

283201082315601 (Weeki Wachee at Weeki Wachee) on the day of the discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29.

ds/dt = change in river stage during a 15-minute period, in ft.



For anyone not able to open the first spreadsheet.

**Componenets in the equation used to calculate discharge from SE Fork**

		Fixed	Multiplier	Date	GW	Multiplier	Time	GH	Multiplier	ds/dt	
	Q in cfs	18.63	3.31	1/13/2011	12.51	10.31	6:15	-0.78	418.14		
							6:30	-0.81		-0.03	
							6:45	-0.81		0	
							7:00	-0.83		-0.02	
				1/14/2011	12.5		14:00	-0.98		0.01	
							14:15	-0.96		0.02	
							14:30	-0.91		0.05	
							14:45	-0.88		0.03	
							15:00	-0.88		0	
											cfs Change in 15 minutes
Date	Time	Q Calc cfs									
1/13/2011	6:30	<b>80.9334</b>	18.63	41.4081		-8.3511			-12.544		
1/13/2011	6:45	<b>68.3892</b>	18.63	41.4081		-8.3511			0		-15%
1/13/2011	7:00	<b>76.9582</b>	18.63	41.4081		-8.5573			-8.3628		13%
1/14/2011	14:00	<b>65.9274</b>	18.63	41.375		-10.1038			4.1814		
1/14/2011	14:15	<b>61.5398</b>	18.63	41.375		-9.8976			8.3628		-7%
1/14/2011	14:30	<b>48.4801</b>	18.63	41.375		-9.3821			20.907		-21%
1/14/2011	14:45	<b>56.5336</b>	18.63	41.375		-9.0728			12.5442		17%
1/14/2011	15:00	<b>69.0778</b>	18.63	41.375		-9.0728			0		22%

**Water storage/discharge due to stage change SE Fork**

Estimated area of SE Fork pool	3	acres	Average flow	60	cfs					
								cfs at gage site		Frequency*
								Decrease	Increase	ds/dt
Volume	ds/dt	cf in 15 mins	cf flow/15 min	Time to discharge storage						
for	0.01	1306.8	54000	0.4				58.5	61.5	15%
	0.02	2613.6		0.7				57.1	62.9	30%
	0.03	3920.4		1.1				55.6	64.4	25%
	0.04	5227.2		1.5				54.2	65.8	10%
	0.05	6534		1.8				52.7	67.3	10%
	0.06	7840.8		2.2				51.3	68.7	2%
	0.07	9147.6		2.5				49.8	70.2	1%

Frequency ds/dt is percent of times this change is seen both negative and positive.

Positive changes are seen approx 45% of the time versus negative 55%,

Zero chang is seen about 5% of time reported.

## Attachment B

### E-Mail to Mr. Johnson, Dated January 28, 2011

**From:** Doug Leeper

**To:** "Alan Martyn Johnson"

**Bcc:** Marty Kelly; Sid Flannery; Mike Heyl; Ron Basso; Mark Barcelo; Yassert Gonzalez; Jay Yingling; Cara S. Martin; Karen Lloyd; Richard Kane(rkane@usgs.gov); Kevin Grimsely (kjgrims@usgs.gov)

**Subject:** RE: Homosassa Flow Concerns

**Date:** Friday, January 28, 2011 4:10:00 PM

Martyn:

Thanks for your recent e-mail regarding reported discharge at the USGS Southeast Fork Homosassa Spring at Homosassa Springs, FL and Homosassa River at Homosassa, FL gage sites. In response to your e-mail, I spoke with Richard Kane and Kevin Grimsley and can offer the following comments regarding the points raised in your e-mail.

First, it should be noted that the published method for used for evaluating flows at the Southeast Fork gage is considered adequate for estimating daily mean discharge at the site. The method is used to develop 96 daily estimates of discharge, which are then averaged to derive mean daily values. Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.

With regard to the Homosassa River gage issues, it should be noted that the method used by the USGS for estimating discharge at the site involves measurement of index velocity values, conversion of index velocity values to cross-sectional mean velocity values, and multiplication of the cross-sectional mean velocities by cross-section area values. Your derivation of "implied" cross-section area values from data obtained from the USGS site suggests that the cross-section area at the Homosassa River gage site is quite variable, even with consideration given to area changes associated with tidal fluctuations. As it turns out, the velocity data you obtained from the USGS web site are the index velocity values rather than the cross-sectional mean values that would be expected to yield more stable "implied" cross section areas based on division into the reported discharge values.

I hope this information is of some help.

Douglas A. Leeper, Chief Environmental Scientist

Resource Projects Department, Southwest Florida Water Management District

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Web Site: [watermatters.org](http://watermatters.org)

**From:** Doug Leeper  
**To:** [Marty Kelly](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Tuesday, August 02, 2011 7:32:00 AM

---

Thanks for catching my error

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
2379 Broad Street, Brooksville, FL 34604-6899  
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**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); rkane; [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)

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---

From: Doug.Leeper@swfwmd.state.fl.us

To: [norman@amyhrf.org](mailto:norman@amyhrf.org); [BWR.CRRc@tampabay.rr.com](mailto:BWR.CRRc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [Kathleen.Greenwood@dep.state.fl.us](mailto:Kathleen.Greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@MyFWC.com](mailto:ted.hoehn@MyFWC.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); [rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com); [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [Dennis3ds@aol.com](mailto:Dennis3ds@aol.com); [Boyd\\_Blihovde@fws.gov](mailto:Boyd_Blihovde@fws.gov); [rkane@usgs.gov](mailto:rkane@usgs.gov); [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)

CC: [martynellijay@hotmail.com](mailto:martynellijay@hotmail.com)

Date: Thu, 28 Jul 2011 14:25:24 -0400

Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion

in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identified as follows:

Correspondence from Mr. Martyn Johnson; and  
Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

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  
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Web Site: [watermatters.org](http://watermatters.org)

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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

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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.

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on January 10, 2011  
regarding recommended minimum flows for the Homosassa River system

Page 2

January 25, 2011

**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

SUBJECT: Questions and Comments submitted by Mr. Martyn Johnson on January 10, 2011  
regarding recommended minimum flows for the Homosassa River system

Page 3

January 25, 2011

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 Minimum 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 evening's 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 trends 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

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**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

February 3, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Communications associated with comments on minimum flows for the Homosassa  
River System submitted by Mr. Martyn Johnson on January 26, 2011

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This memorandum addresses correspondences associated with two e-mails submitted to the District by Mr. Martyn Johnson on January 26, 2011. Mr. Johnson's original e-mails, responses from the District and a follow-up e-mail from Mr. Johnson submitted on February 3, 2011 are attached to this memorandum.

DAL

Attachments: A - One page e-mail submitted to the District by Mr. Martyn Johnson, dated January 26, 2011  
B - One page e-mail submitted to the District by Mr. Martyn Johnson, dated January 26, 2011  
C - Two page e-mail sent to Mr. Martyn Johnson, dated January 28, 2011  
D - One page e-mail sent to Mr. Martyn Johnson, dated January 28, 2011  
E - One page e-mail submitted to the District by Mr. Martyn Johnson, dated February 3, 2011

**Attachment A**  
**One Page Attachment to Memorandum Addressing Comments**  
**Regarding Minimum Flows for the Homosassa River System Submitted by Mr. Martyn Johnson**

**E-Mail Submitted to the District by Mr. Johnson on January 26, 2011**

**From:** Alan Martyn Johnson

**To:** Doug Leeper

**Cc:** Ron Basso; Mark Barcelo; Marty Kelly; Sid Flannery; Mike Heyl; Cara S. Martin; Jay Yingling; Yassert Gonzalez; Karen Lloyd

**Subject:** RE: Response to Comments on Homosassa Minimum Flows

**Date:** Wednesday, January 26, 2011 8:40:35 AM

Doug,

Thanks for your e-mails of Jan 24 and 25. I have reviewed these briefly.

In my initial reading I do not find the information on water chemistry that would allow trends to be reviewed.

The Excel file with the statistical analyses of the water chemistry parameters from the various springs does not provide the dates of the samplings and individual results necessary to look at trends.

While the ranges and standard deviation provide some added insight they do not show trends as did the data presented in Bulletin 69 upto 2003. Preliminary review of the standard deviations and ranges in parameters such as calcium, magnesium, sodium, chloride and TDS from the various springs (particulary those with more samplings) only heightens my concern that the positive trends noted in Bulletin 69 may be continuing.

At this stage I have only compared a few parameters at four springs with more numerous samplings (Homosassa Spring 1 & 3, Hidden River Head Spring and Pumphouse) to those in Bulletin 69; *not easy and not scientific*, but some of the ranges appears to indicate continued positive trends (*maximums clearly higher than visually scanning the results in Bulletin 69, agreed maximums can be dangerous eg the TDS of 23300 for Halls River...clearly an error in sampling or analysis or reporting*).

Positive trends i.e. deteriorating quality of water entering the river from the springs is important to consider along with flow.

I would appreciate if the raw data with sampling dates can be made available. Even more useful would be line graphs to show the trends for some of the major parameters.

I appreciate the time and efforts you and the staff take to address the concerns presented in my e-mails.

Thanks,  
Martyn Johnson

**Attachment B**  
**One Page Attachment to Memorandum Addressing Comments**  
**Regarding Minimum Flows for the Homosassa River System Submitted by Mr. Martyn Johnson**

**E-Mail Submitted to the District by Mr. Johnson on January 26, 2011**

**From:** Alan Martyn Johnson

**To:** Doug Leeper

**Cc:** Ron Basso; Mark Barcelo; Marty Kelly; Sid Flannery; Mike Heyl; Cara S. Martin; Jay Yingling; Yassert Gonzalez; Karen Lloyd

**Subject:** RE: Response to Comments on Homosassa Minimum Flows

**Date:** Wednesday, January 26, 2011 9:16:05 AM

Doug,

As follow up to my message a few minutes ago. I forgot to mention that it appeared that the data in your excel file (number of samples) included the samples from Bulletin 69; which is why I looked at maximums.

Please confirm if data from 1993 - 2003 is included.

Thanks,

Martyn Johnson



**Attachment C**  
**Two Page Attachment to Memorandum Addressing Comments**  
**Regarding Minimum Flows for the Homosassa River System Submitted by Mr. Martyn Johnson**

**E-Mail Sent to Mr. Johnson on January 28, 2011**

**From:** Doug Leeper

**To:** "Alan Martyn Johnson"

**Bcc:** Marty Kelly; Sid Flannery; Mike Heyl; Ron Basso; Mark Barcelo; Cara S. Martin; Yassert Gonzalez; Jay Yingling; Karen Lloyd

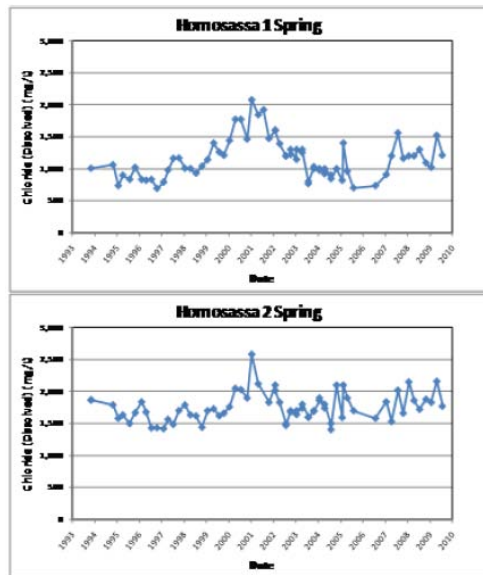
**Subject:** RE: Response to Comments on Homosassa Minimum Flows

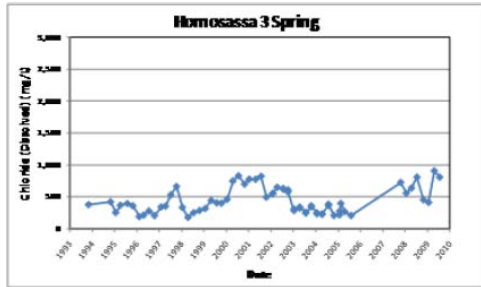
**Date:** Friday, January 28, 2011 9:00:00 AM

**Attachments:** SWFWMD Homo Springs WQ Data from MINITAB File 26jan2011.xlsx

Martyn:

I reviewed the Excel file I sent to you recently and note that the sample collection dates are included on the "WMIS and EDMS – USE THIS" sheet, but not on the "Spring Summary Stats from Minitab" sheet. Data on this sheet could be sorted by site and date to examine temporal trends for specific analytes. However, to make these types of analyses easier, I created the attached Excel file that includes sheets showing the "raw" data and summary stats for the spring data. The data on the "raw" data sheet can be easily filtered/sorted by date, site and analyte for plotting purposes. Here are examples of time-series plot of dissolved chloride concentrations for the Homosassa 1, 2 and 3 Spring sites.





Let me know if you have any questions pertaining to the attached data file.

Sincerely,

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

**E-Mail Sent to Mr. Johnson on January 28, 2011**

Thanks,  
Martyn Johnson

**Attachment E**  
**One Page Attachment to Memorandum Addressing Comments**  
**Regarding Minimum Flows for the Homosassa River System Submitted by Mr. Martyn Johnson**

**E-Mail Submitted to the District by Mr. Johnson on February 3, 2011**

*Note: string of previous e-mails not reproduced here*

**From:** Alan Martyn Johnson  
**To:** Doug Leeper  
**Subject:** RE: Response to Comments on Homosassa Minimum Flows  
**Date:** Thursday, February 03, 2011 11:07:46 AM

Doug,

Thanks for sharing the raw data. Much appreciated. I have limited computer access for the next 10 days, but will look at the data when I have full computer access. I also saw your reply on the flow measurements and will try to respond tomorrow with my comments.

Thanks,  
Martyn

**From:** [Marty Kelly](#)  
**To:** [Doug Leeper](#)  
**Subject:** FW: New gages and additional matching dollars  
**Date:** Monday, August 01, 2011 10:58:50 AM

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fyi

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**From:** Marty Kelly  
**Sent:** Wednesday, July 27, 2011 9:36 AM  
**To:** Mike Heyl; Xinjian Chen  
**Subject:** FW: New gages and additional matching dollars

Should have copied you two on this as well.

---

**From:** Marty Kelly  
**Sent:** Wednesday, July 27, 2011 9:31 AM  
**To:** 'Richard L Kane'  
**Cc:** Sid Flannery  
**Subject:** RE: New gages and additional matching dollars

Richard,

This works to the District's advantage and should work since it does not exceed the total that I currently have budgeted for FY2012. This assumes that my FY2012 budget gets through as is – just more paranoid this year than usual.

Will you be sending me a “new” FY2012 JFA and amended FY2011 agreement? The new FY2012 match from SWFWMD will total \$572,300, correct?

Thanks,

Marty

---

**From:** Richard L Kane [mailto:[rkane@usgs.gov](mailto:rkane@usgs.gov)]  
**Sent:** Wednesday, July 27, 2011 9:19 AM  
**To:** Marty Kelly  
**Cc:** Sid Flannery; Richard L Kane  
**Subject:** New gages and additional matching dollars

Marty, yesterday my Admin officer let me know that we had an additional \$20,000 (+/-) to spend before Sep. 30. These funds had been set aside for new gage at Leslie-Heffner Dam but they were cancelled by SWFWMD Executive review. Sid Flannery last week requested the cost for a new gage on Bullfrog Creek for next year, possibly. I would like to propose that we amend the FY 11 JFA and I will add in the \$20,000 and then begin the installation of the new index velocity gages at SE Fork and Halls River. I will then reduce the FY 12 JFA agreement that we are working on by the same amount which hopefully would free up dollars for you to add the gage at Bullfrog. The JFA's would look something like this (the \$20,000 is not exact there may be some change involved):

FY 11 Amended

USGS Share       \$35,000 (I added \$20,000 to the current \$15,000)  
SWFWMD Share \$558,000 (no change)

FY 12

USGS Share       \$74,500  
SWFWMD Share \$538,000       (reduced by \$20,000)

New gage on Bullfrog Creek approximate cost:  
Stage and Top and Bottom Specific Conductance  
O&M \$18,300  
Installation \$16,000 (this depends on the location)  
Total new \$34,300

FY 12 JFA with Bullfrog Creek added in:  
USGS Share \$74,500  
SWFWMD Share \$372,300

---

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:** Doug Leeper  
**To:** ["martynellijay@hotmail.com"](mailto:martynellijay@hotmail.com)  
**Bcc:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#)  
**Subject:** Correction for FY Funding Information  
**Date:** Tuesday, August 02, 2011 7:35:00 AM

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Martyn – here's a correction for the e-mail I sent yesterday.

- Funding for installation of new instrumentation at the USGS SE Fork site is still in the District's proposed FY201<sup>2</sup> budget. The District Governing Board is expected to approve a final budget at their September meeting.

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
2379 Broad Street, Brooksville, FL 34604-6899  
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February 15, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: E-mail from Martyn Johnson to Kevin Grimsley, concerning flow measurement in the  
Homosassa River system

---

This memorandum documents e-mail correspondence between Mr. Martyn Johnson and Mr. Kevin Grimsley from December 2010 and early January 2011. The correspondence concerns measurement of flows by the United States Geological Survey at sites in the Homosassa River system. The correspondence was copied to District staff and is documented here for its relevance to the development of minimum flows for the river system.

DAL

Attachment: E-Mail correspondence between Mr. Martyn Johnson and Mr. Kevin Grimsley, December 2010 and early January 2011



## Attachment

### E-Mail from Kevin Grimsley to Martyn Johnson, with E-mail String

**From:** Kevin J Grimsley  
**To:** Alan Martyn Johnson  
**Cc:** Doug Leeper; rkane@usgs.gov  
**Subject:** RE: Homosassa River Flows  
**Date:** Tuesday, January 04, 2011 4:35:34 PM

Martyn,

I apologize for taking so long to get back to you. The equations used to calculate flow at the three stations in question have not changed. The equations continue to be evaluated using new measurements as they're made. Those evaluations have shown that the equations continue to be accurate so there's been no reason to change them.

\*\*\*\*\*

Kevin Grimsley, P.E.  
Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

\*\*\*\*\*

From: Alan Martyn Johnson <martynellijay@hotmail.com>  
To: <kjgrims@usgs.gov>  
Cc: Doug Leeper <doug.leeper@swfwmd.state.fl.us>, <rkane@usgs.gov>  
Date: 12/20/2010 09:45 AM  
Subject: RE: Homosassa River Flows

Kevin,

Thanks for the response.

Homosassa River Flows

On the subject of flows at the Homosassa River Site 02310700, we agree that the data on actual flow velocity and the computation of net flow since this was started is good and useful data.

The idea of trying to look at flow times in each direction was raised hoping that velocity data was available for a much more extended period than the calculated net flow. Although I understand your point about the difference regarding 3 ft/sec and 2 ft/sec the differences at this Site are not that pronounced. Anyway, let us leave that point to the students who have got a Christmas break interest over and above parties!!

SE Fork Flow

Regarding the SE Fork Site 02310688; I and another resident (he was born in Homosassa some 60 years ago) regularly kayak to and along the SE Fork. We are confident that there is no reverse (bidirectional) flow under the Fishbowl Drive bridge. Vegetation SAV and fallen leaves can clearly be seen 'bouncing' along the bottom under the bridge, even at high tide. With a stream velocity of about one foot per second and a flow from the various springs that can generate a rise of about 0.4 feet in 15 minute (this is from flow of about 60cfs and an area of about 3 acres of water upstream of the bridge) which is over ten times the normal gage height change rate, I do not see the reverse flow being a reality.

The specific conductance data also does not support bidirectional flow.

We have looked carefully at the conductivity data increases from normal that occasionally are detected. From what we can see the times when conductivity increases above the norm (~900) are associated with gage height rises of over 0.04 ft per 15 minute monitoring interval, and usually with gage heights over 1 ft.. Why we asked ourselves.

Looking at the location of the monitoring site we speculate that the reason may be eddy currents set up along the concrete wall immediately downstream of the monitor. This could draw main springs water (conductivity ~4500) past the monitor in a 'vortex' created by the main flow from the SE Fork trying to pass the rising water. The curve in the river, we think, adds to this speculation being valid.

I noted above increased conductivity is usually associated with gage heights over one foot.

An example of an exception to this can be seen November 29 starting at 9:00am.

Conductivity did rise slightly (~1200 from normal ~900) even at low gage height, but look at the rate of increase in gage height they are 0.07, 0.06, 0.05 ft per 15 min interval.

The attached diagram may help you understand our speculation. This diagram was traced from an aerial view. Just thought you may be interested in these thoughts from people who see the river regularly.

Equations for discharge calculation

Regarding the equations used to calculate the discharge, there is no question that this must be an iterative process to find the best match. I appreciate that you took the time to crosscheck the calculated discharge with the last 5 years empirical measurements. The agreement of less than 3 percent is excellent and significantly better that commented on by Dave Fulcher (USGS-Tampa) on May 1, 2009 and contained in the SWFWMD Report.

Re Homosassa Springs

*Quote*

*According to Mr. Fulcher, the standard error of the rating is approximately 15 percent, and no shifts have been applied during the rating analysis.*

*End Quote*

And Re SE Fork

*Quote*

*The rating is maintained and average daily flow is calculated using the same methods as for the*

*Homosassa Springs station, although the standard error of the SE Fork station's rating is somewhat higher.*

*End Quote*

If you still have the data you checked we would be interested in looking at it. If you do not still have it no problem.

One final point if I may.

Have the equations used to calculate the flow at the three sites changed over time?

Homosassa Springs at Homosassa (02310678):

$Q = 90.8162 + 3.823(GW) - 20.3771(GH)$

In which

Q = spring discharge measurement, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

Weeki Wachee Well at Weeki Wachee (283201082315601) on the day of the discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gage height of the river stage recorded at the time of the discharge

measurement used for the rating, in feet relative to a gauge datum that is 2.99 feet below NAVD88.

#### SE Fork Homosassa Spring at Homosassa (02310688):

:

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

In which

Q = spring discharge, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

283201082315601 (Weeki Wachee at Weeki Wachee) on the day of the discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29.

dS/dt = change in river stage during a 15-minute period, in ft.

#### Homosassa River at Homosassa (02310700):

:

$$Q = V_m(A) (B-3)$$

$$V_m = 0.00902154 + 0.9019V_i + 0.12138V_{i2} + 0.045375(GH)$$

In which

Q = river discharge, in cfs.

A = area of channel cross section at the gauge, in ft<sup>2</sup>.

V<sub>m</sub> = average velocity in the channel cross section at the gauge, in ft/s.

V<sub>i</sub> = average velocity in channel measured during a 2-minute period by an "uplooking" acoustic velocity meter anchored on the channel bottom near the gauge, in ft/s.

GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29 (see follow section regarding gauge datum).

Kevin,

Really appreciate the time you have spent on my questions. The work and data available from USGS is amazing. I trust you appreciate the comments and interest in these e-mails; we are simply interested in protecting the Homosassa River from further deterioration.

Martyn

To: martynellijay@hotmail.com

CC: doug.leeper@swfwmd.state.fl.us; rkane@usgs.gov

Subject: Re: Homosassa River Flows

From: kjgrims@usgs.gov

Date: Fri, 17 Dec 2010 10:42:34 -0500

Martyn,

First let me say that you're absolutely right, the total flow at SE fork does not completely reverse. That was a poor choice of wording on my part so let me clarify. While the total net flow at SE fork does not reverse, the negative flow components (bidirectional flow) are much more significant at the SE fork gage than they are at Homosassa Springs. I suspect this is mainly because there's simply more positive flow coming from the main spring, so the backpressure caused by a rising tide affects it less. When bidirectional flow occurs, the negative component is typically on the bottom (because water with a higher salinity is more dense) so this is not something that someone observing from above would probably notice.

In the end however, there are many different variables that can be significant at one station and not at another for a myriad of reasons. These equations were developed by starting with the simplest case, a single variable, and evaluating the discharge resulting from that equation against the known discharge measurements. From there, other variables were added to the equation and evaluated in an iterative process until the equation that best fit the discharge measurements was found. So the fact that the rate of change of stage variable does not appear in the final equation used at Homosassa Springs doesn't mean that there was a change in methodology, it just means that the addition of that variable didn't help the equation fit the measurements at that station.

The reality is that the regression equation at SE fork matches the discharge measurements better with

the rate of change of stage variable than without it. We're always evaluating how well our equations match our new measurements as we make them throughout the year, but as part of preparing this email I made a quick evaluation of how the equation matched all the measurements over the past 5 years. The average difference between the SE fork regression equation and our measurements was less than 3 percent which shows an excellent correlation.

Regarding the second section of your email, while I certainly agree that there is some relationship between the duration of flows in each direction and the net flow, I stand by my previous concern that looking only at the duration of flow in each direction would not account for the magnitude of those flows. The station could easily flow for 6 hours in each direction but with an average positive velocity of 3 feet per second and average negative velocity of 2 feet per second. This would obviously result in 50% more positive flow than negative.

Lastly, as Richard said in his email most of our data is available for download through the website and data that you can't find there can be requested. We take great pride in our data and continue to welcome any questions and comments about how it has been collected and computed. I must reiterate, however, that questions regarding how USGS data has or has not been used and interpreted to look at longer term trends or other issues related to the proposed minimum flow recommendations are better directed to SWFWMD. The USGS has simply not been involved beyond providing the data itself so we cannot provide insight into how that data was used.

I hope I've helped answer your questions. Merry Christmas to you as well.

Kevin

\*\*\*\*\*

Kevin Grimsley, P.E.

Supervisory Hydrologist

USGS, Florida Water Science Center

10500 University Center Drive, Suite 215

Tampa, FL 33612

kjgrims@usgs.gov

813-975-8620 x159[attachment "2010-12-19-1844-04.jpg" deleted by Kevin J

Grimsley/WRD/USGS/DOI]

**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  $V_m$  from  $V_i$  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 USGS hydrologic 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

**From:** Doug Leeper  
**To:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#); [Mark Barcelo](#); [Richard Kane \(rkane@usgs.gov\)](#); [Kevin Grimsley \(kjgrims@usgs.gov\)](#)  
**Subject:** FW: Planned evaluation  
**Date:** Monday, October 31, 2011 8:06:05 AM

---

FYI

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Chief Environmental Scientist  
Resource Projects Department  
Southwest Florida Water Management District  
2379 Broad Street  
Brooksville, Florida 34604-6899  
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---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Friday, October 28, 2011 8:43 AM  
**To:** J Weaver  
**Cc:** R Rodriguez; Doug Leeper  
**Subject:** RE: Planned evaluation

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Jess D. Weaver

Phone: 770-409-7701  
Cell: 678-524-6030

**From:** [Alan Martyn Johnson](#)  
**To:** [Doug Leeper](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Tuesday, August 02, 2011 8:38:26 AM

---

Doug,

Was just reading your message from yesterday when your correction re 2012 v 2010 budget year arrived.

Thanks for the responses.

I have read Richards e-mail from last week. I would welcome the opportunity to meet, but possibly some response to my e-mails of Feb 16, 2011 re Homosassa River Flows, and Feb 19, 2011 re SE Fork Flows would be as productive as a starting point. I did note the March 1, 2011 info that you got from Kevin, but that did not answer the big questions in my mind.

If I am lucky enough to win big on the lottery I will personally rent a flow measuring device for USGS and yourselves to look at the flows from the SE Fork. Honestly, I would; two companies offered rental units when I was looking at these devices..not cheap.

Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.

I will be interested to see a rebuttal that explains how the flow measurements vary so dramatically and how good data can be made from bad.

At the risk of repeating myself again.....The flow data are the basis of all these studies and I am simply trying to assure that they are accurate. It is a long time since those 'regression' analyses were done and I still have questions about why the driving force is considered to be the Weeki Wachee Well some 18.7 miles away and not in the Homosassa Basin, when the Lecanto North Well some 9 miles away and at a much lower level was not used in the 'regression' analysis. Agreed the Lecanto Well is also not in the Homosassa Basin as drawn on the maps I have seen, but it is much closer to the basin. Just more food for thought. I will share some additional information on this later.

Doug,

A more general question about the working group panel, do they meet to discuss the issues. Or put another way what is their modus operandi other than attending the 'public' meetings?

Appreciate you keeping up with all the e-mails.

Thanks,  
Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: martynellijay@hotmail.com  
Date: Mon, 1 Aug 2011 16:00:07 -0400  
Subject: RE: Public Input for Spring Workshop

Martyn:

Sorry you weren't able to stay for the July 18<sup>th</sup> Springs Coast Minimum Flows and Levels Public Workshop.

Here are brief responses to the comments/questions included in your July 29<sup>th</sup> e-mail.

- Per your recommendation, I'll request that the "data sheet" you provided to me at the beginning of the workshop be pulled from our web page.
- I hope to put Kevin Grimsley's slide presentation on our web site – the USGS has policies regarding publication of materials – Richard, Kevin and I are awaiting approval for release of the slides file.
- We don't plan on forming a flow measurement working group. Richard Kane has offered to meet with you and me at the Survey's Tampa office and I would be more than happy to participate in such a meeting.
- Funding for installation of new instrumentation at the USGS SE Fork site is still in the District's proposed FY2010 budget. The District Governing Board is expected to approve a final budget at their September meeting.

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  
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Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]

**Sent:** Friday, July 29, 2011 8:27 AM

**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); [rkane](mailto:rkane); [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)

**Subject:** RE: Public Input for Spring Workshop

Doug,

Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?  
Do you have any thoughts about the idea of a Flow Measurements Working Committee?  
Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

From: Doug.Leeper@swfwmd.state.fl.us  
To: norman@amyhrf.org; BWR.CRRRC@tampabay.rr.com; hopecorona@tampabay.rr.com; rebecca.bays@bocc.citrus.fl.us; rradacky@cityofbrooksville.us; jfarley682@aol.com; administration@inverness-fl.gov; cityofweekiwachee@yahoo.com; Kathleen.Greenwood@dep.state.fl.us; bill.pouder@myfwc.com; ted.hoehn@MyFWC.com; abrockway@co.hernando.fl.us; brentwhitley@sierra-properties.com; rmille76@tampabay.rr.com; manatees@habitats.org; grubman1@gmail.com; Dennis3ds@aol.com; Boyd\_Blihovde@fws.gov; rkane@usgs.gov; 2buntings@comcast.net; whmarkle@gmail.com; jsullivan@carltonfields.com  
CC: martynellijay@hotmail.com  
Date: Thu, 28 Jul 2011 14:25:24 -0400  
Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identifies as follows:  
*Correspondence from Mr. Martyn Johnson*; and  
*Second correspondence from Mr. Martyn Johnson*.

Please let me know if you have any problems accessing the documents.

Douglas A. Leeper, Chief Environmental Scientist  
Resource Projects Department, Southwest Florida Water Management District  
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February 11, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Comments submitted by Mr. Martyn Johnson regarding discharge measurements for  
the Homosassa River system

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This memorandum documents correspondence between Mr. Martyn Johnson and Mr. Doug Leeper, with the Southwest Florida Water Management District regarding discharge measurements and development of minimum flows for the Homosassa River system.

Mr. Johnson's e-mail, which was submitted on February 5, 2011, and an e-mail response sent to Mr. Miller on February 11, 2011 are attached.

DAL

Attachments: Attachment A - E-Mail from Mr. Martyn Johnson, dated February 5, 2011  
Attachment B - E-Mail to Mr. Martyn Johnson, dated February 11, 2011

**Attachment A**  
**to Memorandum on Comments submitted by Mr. Martyn Johnson**  
**regarding discharge measurements for the Homosassa River system**

**E-Mail from Mr. Johnson, Dated February 5, 2011**

**From:** Alan Martyn Johnson  
**To:** Doug Leeper; Kevin J Grimsley; rkane  
**Subject:** RE: Homosassa Flow Concerns  
**Date:** Saturday, February 05, 2011 10:46:24 AM

Doug,

I appreciate your following up on my concerns about reported cfs discharges.

**SE Fork**

The explanation for the SE Fork that averaging the 96 calculated discharges over a 24 hour period makes the data good as a *mean daily value* appears to be playing with numbers and words. The **actual daily mean discharge** you refer to is obtained from the same data set. Therefore, it is not surprising average and mean correspond well as the data set is basically cyclic..

Sorry, but that explanation does not give me confidence.

Lets face it the equation used for the calculation exaggerating the impact of  $dS/dT$ .

The SE Fork DOES NOT experience reverse flow, and you must agree that changes in discharge rate over a 15 minute interval of -15% then +13% and -7%, -21%, +17%, +22% (as shown in cells M17 thru M25 on the spreadsheet I previously shared) are hard to believe.

Kevin commented on the reverse flow in his November 15 e-mail

**The gage height change comes into play at 0231688 (SE Fork) because the flow actually becomes significantly negative during high tides.**

I am sure that Kevin's comment was made from behind a desk looking at the equation being used. I am sure at the time he did not consider it necessary to make a field trip to verify the actual situation...he knew that such a factor is frequently used when reverse flow is the case. But, now given the input I have provided someone should have the intellectual ability to ask if erroneous data has been generated since Yobbi and Knochenmus (or whoever) came up with the equation. Errors when recognized are much better corrected internally than through some outside investigation.

**Homosassa River**

Regarding the Homosassa River 02130700 I was uncertain about the stream velocity reported being  $V_m$  or  $V_i$ . You will note that I commented about *There are even occasions where an inflow is shown when the stream velocity is outward*. I did run a spreadsheet using the equation B-4 and will share that when I am next home. For right now please consider these calculated  $V_m$  for a series of  $V_i$  velocities and different gage heights.

Velocity

GH -1.5 -1.0 -0.5 0 0.5 1.0 1.5

0.7 -1.03896 -0.73974 -0.37982 0.040784 0.522079 1.064064 1.666739

0 -1.07072 -0.7715 -0.41158 0.009022 0.490317 1.032302 1.634977

-0.7 -1.10249 -0.80326 -0.44335 -0.002274 0.458554 1.000539 1.603214

-1.0 -1.1161 -0.81687 -0.45696 -0.03635 0.444942 0.986927 1.589602

-1.5 -1.13879 -0.83956 -0.47965 -0.05904 0.422254 0.964239 1.566914

The equation B-4 attempts to correct the velocity and the gage height in go. The results as you see provide some major differences in the  $V_m$  for in-flow versus out-flow for the same velocity  $V_i$  from the acoustic velocity meter eg compare -1.5 ft/sec with 1.5 ft/sec for gage height -0.7 ft. Surely there has to be a question about this.

The  $V_m$  changes as the GH changes are in the right direction but appear to be small. I did consider the situation looking at the change of 2.2 ft GH if the river is 200 feet wide this would result in a cross section area difference of 440 sq. ft which compared to the roughly 1600 sq ft is much more change than the columns above suggest.

I would have thought the cross section area could fairly accurately be corrected for gage height.

For example;

Water levels on January 13 and 14 were low to the extent that discharge from Pumphouse Spring and Trotter Spring were clearly above the water level in the main stream to the extent that water was flowing down 'waterfalls'. Flow from these two springs was much much stronger than from the other springs in the fork. Abdoney Spring was also discharging from above the



level of water in the main stream and was the third strongest flow but no where near Pumphouse and Trotter. Given these observations it was clear that the only driving force for flow was the head in the aquifer. This led me to see what the calculated flows were. In studying the data extracted from the USGS real time records and presented in the attached spreadsheet (Low Water Flow...) it is clear that the equation used must be questioned. As you will see in the data there are times when calculated discharge changes very significantly. Such changes can not be true in a situation where the discharge is not affected by conditions in the river.

It could be argued that this was an unusual situation with water levels so low. I agree that it was an unusual situation with water levels so low the conductivity sensor was at times above water with no conductivity recorded. I suggest that it is not unusual when we look at discharge data, the ds/dt multiplier appears to be far too large. Allow me to explain further.

You will recall in earlier correspondence I asked why the multiplier for the ds/dt (change in river stage) was so high. On the spreadsheet (Sheet 2 SE Fork Equation) I have shown the influence the ds/dt factor has on the water held in the pool upstream of the SE Fork gage site 02310688 as a result in stage increase/decrease. These show minimal changes in flow, compared to the figures resulting from the large multiplier used in the equation.

I would strongly suggest this clearly gives concern to erroneous calculation/equation of discharge from the SE Fork.

Also, given the observed uninhibited flows from these spring vents Jan 13 & 14, it only adds to the comments I have made about assumptions used in the modeling of flows as presented in Table 2-4 of the July 2010 report.

Notes:

1. Data from the Homosassa Springs site for the same time period was included on the spreadsheet simply for comparison.
2. The reference made in WRIR 01-4230 by Yobbi and Knochemus on page 16 "Additionally, a single explanatory variable (spring flow from a nearby spring in the complex) was used in the regression models to estimate flow at two tidal springs (Unnamed Tributary to Chassahowitzka River and Southeast Fork of the Homosassa River)." Is noted as possible origin of the equation; however, the SE Fork is not truly tidal as there is no reverse flow as mentioned and supported in previous e-mails.

#### **Eddy Current at Gage Site 02310688**

In an earlier e-mail I speculated that there was a possibility of eddy currents causing the occasional increase in conductivity readings at this site. Since that speculation I have carefully observed the flow at the gage site. Regularly, in fact most of the time, a thin layer of flow can be observed going upstream along the concrete seawall towards the instruments location. This observation is made by watching small clumps of weed that can easily be tracked in the water. Most of the time the flow is captured (typically the flow can be seen going about 4 feet upstream along the seawall and is less than 6 inches wide) by the main outflow before it reaches the instrument location. I have not yet seen weed reach the plastic tubes. Why is this happening? Previously I had suggested that it was the flow changing direction as it goes under the bridge...close observation shows that a stack of riprap concrete immediately upstream of the instrument location causes a major shift in the flow. I wish I had photographs to show this. But, there is nothing like looking at this firsthand.

#### **DISCHARGE DATA HOMOSASSA RIVER USGS 02310700**

On the subject of discharge calculation I find some of the data reported from the Homosassa River site perplexing. I have attached a spreadsheet (Homosassa River) in which I have shown the implied cross section of the river from the discharge volume and stream velocity. While I understand that the cross section area will change with stage height this does not appear to explain the wide variation of the implied cross sectional area in the spreadsheet.

I do not know the exact location of the Acoustic Doppler Current Profiler (ADCP) but would estimate the river width at that point to be about 200 feet, and would assume that the stream velocity reported is the average stream velocity.

There are even occasions where an inflow is shown when the stream velocity is outward, agreed these few situations are at times when flow direction is changing. However, these provide further indication that discharge results are subject to some mathematical treatment other than simple logic.

I would appreciate if someone can explain what other factors are use to make this calculation. I was under the impression that data from this site was:

Stream Velocity x Cross Section Area (for stage height) = Discharge

#### **Summary**

Given the funds that are spent on developing models, often using regression analysis which use flow data, to predict the ecological future of this river I think it critical that the very basis of the flow measurements are fully understood. May be the gaps are only in my understanding, but somewhere I am not getting the logic. I hope those spending the monies and making the decisions are.

#### **Componets in the equation used to calculate discharge from SE**

##### **Fork**

Fixed Multiplier Date GW Multiplier Time GH Multiplier ds/dt  
Q in cfs 18.63 3.31 1/13/2011 12.51 10.31 6:15 -0.78 418.14

6:30 -0.81 -0.03

6:45 -0.81 0

7:00 -0.83 -0.02

1/14/2011 12.5 14:00 -0.98 0.01

14:15 -0.96 0.02

14:30 -0.91 0.05

14:45 -0.88 0.03

15:00 -0.88 0

cfs Change

Date Time

Q Calc

cfs

in 15

minutes

1/13/2011 6:30 **80.9334** 18.63 41.4081 -8.3511 -12.544

1/13/2011 6:45 **68.3892** 18.63 41.4081 -8.3511 0 **-15%**

1/13/2011 7:00 **76.9582** 18.63 41.4081 -8.5573 -8.3628 **13%**

1/14/2011 14:00 **65.9274** 18.63 41.375 -10.1038 4.1814

1/14/2011 14:15 **61.5398** 18.63 41.375 -9.8976 8.3628 **-7%**

1/14/2011 14:30 **48.4801** 18.63 41.375 -9.3821 20.907 **-21%**

1/14/2011 14:45 **56.5336** 18.63 41.375 -9.0728 12.5442 **17%**

1/14/2011 15:00 **69.0778** 18.63 41.375 -9.0728 0 **22%**

#### **Water storage/discharge due to stage change SE Fork**

Estimated area of SE Fork pool 3 acres Average flow 60 cfs

cfs at gage site Frequency\*

ds/dt

cf in 15

mins

cf flow/15

min Time to discharge storage Decrease Increase ds/dt

Volume

for 0.01 1306.8 54000 0.4 58.5 61.5 15%

0.02 2613.6 0.7 57.1 62.9 30%

0.03 3920.4 1.1 55.6 64.4 25%

0.04 5227.2 1.5 54.2 65.8 10%

0.05 6534 1.8 52.7 67.3 10%

0.06 7840.8 2.2 51.3 68.7 2%

0.07 9147.6 2.5 49.8 70.2 1%

Frequency ds/dt is percent of times this change is seen both negative and positive.

Positive changes are seen approx 45% of the time versus negative 55%,

Observations, comments and questions with the best of intent.

Martyn Johnson

Reference:

SE Fork Homosassa Spring at Homosassa (02310688):

The current rating curve for the spring discharge reported at this station is represented by the equation:

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)$$

In which

Q = spring discharge, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

283201082315601 (Weeki Wachee at Weeki Wachee) on the day of the discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gauge height of the river recorded at the time of the discharge

measurement used for the rating, in ft NGVD29.

dS/dt = change in river stage during a 15-minute period, in ft.

For anyone not able to open the first spreadsheet.

Zero change is seen about 5% of time reported.

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**Attachment B**  
**to Memorandum on Comments submitted by Mr. Martyn Johnson**  
**regarding discharge measurements for the Homosassa River system**

**E-Mail to Mr. Johnson, Dated February 11, 2011**

**Note: e-mail string deleted by Doug Leeper**

**From:** Doug Leeper  
**To:** "Alan Martyn Johnson"  
**Bcc:** Marty Kelly; Sid Flannery; Mike Heyl; Ron Basso; Mark Barcelo; Cara S. Martin; Karen Lloyd; Yassert Gonzalez; Jay Yingling; Kevin Grimsely (kjgrims@usgs.gov); Richard Kane (rkane@usgs.gov); Granville Kinsman  
**Subject:** RE: Homosassa Flow Concerns  
**Date:** Friday, February 11, 2011 3:55:13 PM

Martyn:

Thanks for your additional comments regarding discharge measurements at the Homosassa River and Southeast Fork Homosassa Springs gage sites. I have discussed the issues you've raised with staff from the United States Geological Survey, and have been assured that data for the sites has and continues to be collected and reported in accordance with accepted Survey standards. Staff therefore continues to support use of these data as "best available information" for development of minimum flow recommendations for the Homosassa River system.

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Web Site: [watermatters.org](http://watermatters.org)

**From:** Doug Leeper  
**To:** ["Alan Martyn Johnson"](#)  
**Bcc:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#); [Cara S. Martin](#); [Darcy A. Brune](#); [Jay Yingling](#); [Yassert Gonzalez](#); [Karen Lloyd](#); [Richard Kane \(rkane@usgs.gov\)](#); [Kevin Grimsely \(kjgrims@usgs.gov\)](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Wednesday, August 03, 2011 10:20:16 AM  
**Attachments:** [MJohnson\\_Portfolio1.pdf](#)

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Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based on e-mails that are sent to me and those that I am copied on.

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Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [\[mailto:martynellijay@hotmail.com\]](mailto:martynellijay@hotmail.com)  
**Sent:** Tuesday, August 02, 2011 8:37 AM  
**To:** Doug Leeper  
**Subject:** RE: Public Input for Spring Workshop

Doug,  
Was just reading your message from yesterday when your correction re 2012 v 2010 budget year arrived.

Thanks for the responses.

I have read Richards e-mail from last week. I would welcome the opportunity to meet, but possibly some response to my e-mails of Feb 16, 2011 re Homosassa River Flows, and Feb 19, 2011 re SE Fork Flows would be as productive as a starting point. I did note the March 1, 2011 info that you got from Kevin, but that did not answer the big questions in my mind.

If I am lucky enough to win big on the lottery I will personally rent a flow measuring device for USGS and yourselves to look at the flows from the SE Fork. Honestly, I would; two companies offered rental units when I was looking at these devices..not cheap.

Richard/USGS and/or SWFWMD may be able to find a suitable unit that is available short term. Surely somewhere there is a maintenance workshop that cleans/maintains the vast number of units that USGS has. Collecting flow data for say 3 months would help assure that this budgeted unit is a validated expenditure. The 3 month data would not have to be fed to the USGS Real Time Data system it could be collected using an on site recorder and reviewed say monthly. Just an idea to progress matters in an orderly constructive framework. Any thoughts from yourself or Richard regarding trying to find /install a 'test' unit would be appreciated.

I will be interested to see a rebuttal that explains how the flow measurements vary so dramatically and how good data can be made from bad.

At the risk of repeating myself again.....The flow data are the basis of all these studies and I am simply trying to assure that they are accurate. It is a long time since those 'regression' analyses were done and I still have questions about why the driving force is considered to be the Weeki Wachee Well some 18.7 miles away and not in the Homosassa Basin, when the Lecanto North Well some 9 miles away and at a much lower level was not used in the 'regression' analysis. Agreed the Lecanto Well is also not in the Homosassa Basin as drawn on the maps I have seen, but it is much closer to the basin. Just more food for thought. I will share some additional information on this later.

Doug,

A more general question about the working group panel, do they meet to discuss the issues. Or put another way what is their modus operandi other than attending the 'public' meetings?

Appreciate you keeping up with all the e-mails.

Thanks,

Martyn

---

From: [Doug.Leeper@swfwmd.state.fl.us](mailto:Doug.Leeper@swfwmd.state.fl.us)  
To: [martynellijay@hotmail.com](mailto:martynellijay@hotmail.com)  
Date: Mon, 1 Aug 2011 16:00:07 -0400  
Subject: RE: Public Input for Spring Workshop

Martyn:

Sorry you weren't able to stay for the July 18<sup>th</sup> Springs Coast Minimum Flows and Levels Public Workshop.

Here are brief responses to the comments/questions included in your July 29<sup>th</sup> e-mail.

- Per your recommendation, I'll request that the "data sheet" you provided to me at the beginning of the workshop be pulled from our web page.
- I hope to put Kevin Grimsley's slide presentation on our web site – the USGS has policies regarding publication of materials – Richard, Kevin and I are awaiting approval for release of

the slides file.

- We don't plan on forming a flow measurement working group. Richard Kane has offered to meet with you and me at the Survey's Tampa office and I would be more than happy to participate in such a meeting.
- Funding for installation of new instrumentation at the USGS SE Fork site is still in the District's proposed FY2010 budget. The District Governing Board is expected to approve a final budget at their September meeting.

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Web Site: [watermatters.org](http://watermatters.org)

---

**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Friday, July 29, 2011 8:27 AM  
**To:** Doug Leeper; [norman@amyhrf.org](mailto:norman@amyhrf.org); [bwr.crrc@tampabay.rr.com](mailto:bwr.crrc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [kathleen.greenwood@dep.state.fl.us](mailto:kathleen.greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@myfwc.com](mailto:ted.hoehn@myfwc.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); Ron Miller; [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [dennis3ds@aol.com](mailto:dennis3ds@aol.com); [boyd\\_blihovde@fws.gov](mailto:boyd_blihovde@fws.gov); rkane; [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)  
**Subject:** RE: Public Input for Spring Workshop

Doug,  
Thanks for posting my public input comments on the web site. The comments would have taken about three minutes to make; the allotted public input time.

The second document which shows the USGS calculated flows for the SE Fork for a couple of days was intended for individual discussion, should someone have had questions or wanted hard data to understand my comments. The document is not easy to understand as a stand alone document and was never intended as such.

I will be happy to explain the numbers if someone is interested. But, may I suggest that such a mass of numbers serves little purpose on the web site and I would recommend that you remove it.

Do you intend to put Kevin's presentation on the web site?  
Do you have any thoughts about the idea of a Flow Measurements Working Committee?  
Do you have any update on the budget to install an acoustic flow measuring device at the SE Fork?

Martyn

---

**From:** [Doug.Leeper@swfwmd.state.fl.us](mailto:Doug.Leeper@swfwmd.state.fl.us)  
**To:** [norman@amyhrf.org](mailto:norman@amyhrf.org); [BWR.CRRc@tampabay.rr.com](mailto:BWR.CRRc@tampabay.rr.com); [hopecorona@tampabay.rr.com](mailto:hopecorona@tampabay.rr.com); [rebecca.bays@bocc.citrus.fl.us](mailto:rebecca.bays@bocc.citrus.fl.us); [rradacky@cityofbrooksville.us](mailto:rradacky@cityofbrooksville.us); [jfarley682@aol.com](mailto:jfarley682@aol.com); [administration@inverness-fl.gov](mailto:administration@inverness-fl.gov); [cityofweekiwachee@yahoo.com](mailto:cityofweekiwachee@yahoo.com); [Kathleen.Greenwood@dep.state.fl.us](mailto:Kathleen.Greenwood@dep.state.fl.us); [bill.pouder@myfwc.com](mailto:bill.pouder@myfwc.com); [ted.hoehn@MyFWC.com](mailto:ted.hoehn@MyFWC.com); [abrockway@co.hernando.fl.us](mailto:abrockway@co.hernando.fl.us); [brentwhitley@sierra-properties.com](mailto:brentwhitley@sierra-properties.com); [rmille76@tampabay.rr.com](mailto:rmille76@tampabay.rr.com); [manatees@habitats.org](mailto:manatees@habitats.org); [grubman1@gmail.com](mailto:grubman1@gmail.com); [Dennis3ds@aol.com](mailto:Dennis3ds@aol.com); [Boyd\\_Blihovde@fws.gov](mailto:Boyd_Blihovde@fws.gov); [rkane@usgs.gov](mailto:rkane@usgs.gov); [2buntings@comcast.net](mailto:2buntings@comcast.net); [whmarkle@gmail.com](mailto:whmarkle@gmail.com); [jsullivan@carltonfields.com](mailto:jsullivan@carltonfields.com)

CC: [martynellijay@hotmail.com](mailto:martynellijay@hotmail.com)

Date: Thu, 28 Jul 2011 14:25:24 -0400

Subject: Public Input for Spring Workshop

Greetings:

At the Springs Coast Minimum Flows and Level workshop last week, several stakeholder representatives asked that I provide, via e-mail, copies of two documents submitted by Mr. Martyn Johnson for inclusion in the public input portion of the workshop.

The first of the documents is attached to this file. The second is too large to send via e-mail. I have posted scanned, electronic versions of both documents under the "Background Information and Reports" heading at the bottom of the Springs Coast MFL Working Group page of the District web site at:

<http://www.WaterMatters.org/SpringsCoastMFL>

The documents are identified as follows:

Correspondence from Mr. Martyn Johnson; and

Second correspondence from Mr. Martyn Johnson.

Please let me know if you have any problems accessing the documents.

Douglas A. Leeper, Chief Environmental Scientist

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**From:** Doug Leeper  
**To:** ["martynellijay@hotmail.com"](mailto:martynellijay@hotmail.com)  
**Bcc:** [Marty Kelly](#); [Mike Heyl](#); [Ron Basso](#); [Cara S. Martin](#); [Darcy A. Brune](#); [Jay Yingling](#); [Yassert Gonzalez](#); [Karen Lloyd](#); [Richard Kane \(rkane@usgs.gov\)](#); [Kevin Grimsely \(kjgrims@usgs.gov\)](#)  
**Subject:** Correspondence Portfolio\_2  
**Date:** Wednesday, August 03, 2011 10:20:44 AM  
**Attachments:** [MJohnson\\_Portfolio2.pdf](#)

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Portfolio document 2 of 3 attached.

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February 14, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: E-mail from Martyn Johnson to Kevin Grimsley, concerning flow measurement in the  
Homosassa River system

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This memorandum documents an e-mail concerning measurement of flows by the United States Geological Survey at sites in the Homosassa River system. The e-mail was sent by Mr. Martyn Johnson to Mr. Kevin Grimsley and is documented here for its relevance to the development of minimum flows for the river system.

Mr. Johnson's e-mail is attached to this memorandum.

DAL

Attachments: E-Mail from Mr. Martyn Johnson to Mr. Kevin Grimsley, dated February 14, 2011

## Attachment

### February 14, 2011 E-Mail from Mr. Johnson to Mr. Grimsley

**From:** Alan Martyn Johnson  
**To:** Kevin J Grimsley  
**Cc:** Doug Leeper; rkane  
**Date:** Monday, February 14, 2011 12:49:54 PM

Kevin,

Just a quick note to say I appreciated the time we got to discuss the flows issues on Friday at the park.

A few minutes after I left (and the sun finally showed) I went back to where you were parked to show you what I was talking about with the stack of concrete at the gage site for the SE Fork. Unfortunately you had already left, but may be you took the opportunity to look...hope your thought process was quicker than mine.

I do have some additional thoughts about how to look at the 'averaging' of SE Fork data (re my e-mail comment about making good data from questionable data) and will share those when I have put them into a more presentable format.

Regarding the measurements Ray and yourself made at the Homosassa Springs site I looked at the calculated discharge figures around that time Friday they show 93 cfs compared to the 102-104 cfs you measured.

As mentioned I had made previous comparisons that I had shared with Doug after a workshop meeting in Lecanto

#### *Quote*

*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.*

*End Quote*

All these figures do fall within the 15% standard error as made in the commentary by Mr. Fulcher contained in SWFWMD's report on Minimum Flows, but it is noteworthy that all these field measurements are higher than the calculated flow (agree 2010-10-13 for all purposes is the same). As I mentioned I can only see the real-time data going back 120 days.

Kevin, again thanks for explaining the efforts that have been put into reviewing my comments and answering my questions. As you may have recognized I do feel my concerns are genuine with regard to the ways in which data is used to predict the future of a unique river.

And as you may expect I have reviewed your explanation about the relationship  $V_m$  versus  $V_i$  at the Homosassa River Site and have some additional thoughts, which I will share when I have a chance.

Martyn

February 16, 2011

**MEMORANDUM**

TO: File

FROM: Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section,  
Southwest Florida Water Management District

SUBJECT: Correspondence between Martyn Johnson, Kevin Grimsley and Doug Leeper, concerning  
flow measurement in the Homosassa River system

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This memorandum documents e-mail correspondence between Mr. Martyn Johnson, Doug Leeper (with the Southwest Florida Water Management District) and Kevin Grimsley (with the United States Geological Survey) concerning measurement of flows in the Homosassa River by the United States Geological Survey. The e-mails and data attached to the e-mails are documented here for their relevance to the development of minimum flows for the Homosassa River system.

DAL

Attachments: A – February 15, 2011 e-mail from Martyn Johnson to Doug Leeper, with e-mail string  
B – Data associated with February 15, 2011 e-mail from Martyn Johnson to Doug Leeper  
C – February 15, 2011 e-mail from Kevin Grimsley to Martyn Johnson  
D – Data associated with February 15, 2011 e-mail from Kevin Grimsley to Martyn Johnson  
E – February 15, 2011 e-mail from Doug Leeper to Martyn Johnson and Kevin Grimsley

## **Attachment A**

**February 15, 2011 E-Mail from Martyn Johnson to Doug Leeper, with E-mail String**

**From:** [Alan Martyn Johnson](#)  
**To:** [Doug Leeper](#)  
**Cc:** [Kevin J Grimsley](#); [rkane](#)  
**Subject:** RE: Homosassa Flow Concerns  
**Date:** Tuesday, February 15, 2011 3:13:03 PM  
**Attachments:** [Homosassa River 02130700 Vm versus Vi.xls](#)

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Doug,

Attached as promised is the spreadsheet mentioned in an earlier e-mail where I used the Stream Velocity  $V_i$  reported in the Real-Time Data and the equation B-4 from the report to obtain  $V_m$ ,  $V_m$  is shown in column F of the spreadsheet. This  $V_m$  value should give a constant Area value if the equation B-3 ( $Q = V_m \times A$ ) is being used. The values in column G are not constant implying that there is some other factor being used. As you will see the lowest value is about 78% of the highest.

Any explanation would be welcome.

As mentioned in my e-mail yesterday to Kevin I do have some additional thoughts to share on both the SE Fork and the Homosassa River site that I will tidy up for ease of review as I get time.

Martyn

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From: Doug.Leeper@swfwmd.state.fl.us  
To: martynellijay@hotmail.com  
Date: Fri, 28 Jan 2011 16:10:30 -0500  
Subject: RE: Homosassa Flow Concerns

Martyn:

Thanks for your recent e-mail regarding reported discharge at the USGS Southeast Fork Homosassa Spring at Homosassa Springs, FL and Homosassa River at Homosassa, FL gage sites. In response to your e-mail, I spoke with Richard Kane and Kevin Grimsley and can offer the following comments regarding the points raised in your e-mail.

First, it should be noted that the published method for used for evaluating flows at the Southeast Fork gage is considered adequate for estimating daily mean discharge at the site. The method is used to develop 96 daily estimates of discharge, which are then averaged to derive mean daily values. Individual discrete discharge estimates may exhibit moderate variation from actual physical conditions at the site, but the average of the composited discrete measurements made over a 24-hour period has been shown to correspond well with actual daily mean discharge.

With regard to the Homosassa River gage issues, it should be noted that the method used by the USGS for estimating discharge at the site involves measurement of index velocity values, conversion of index velocity values to cross-sectional mean velocity values, and multiplication of the cross-sectional mean velocities by cross-section area values. Your derivation of "implied" cross-section area values from data obtained from the USGS site suggests that the cross-section area at the Homosassa River gage site is quite variable, even with consideration given to area changes associated with tidal fluctuations. As it turns out, the velocity data you obtained from the USGS web site are the index velocity values rather than the cross-sectional mean values that would be expected to yield more stable "implied" cross section areas based on division into the reported discharge values.

I hope this information is of some help.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)

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**From:** Alan Martyn Johnson [<mailto:martynellijay@hotmail.com>]  
**Sent:** Sunday, January 23, 2011 6:39 PM  
**To:** Doug Leeper; Ron Basso; Kevin J Grimsley; [rkane@usgs.gov](mailto:rkane@usgs.gov)  
**Cc:** [rmill76@tampabay.rr.com](mailto:rmill76@tampabay.rr.com); Dana Bryan  
**Subject:** Homosassa Flow Concerns

## DISCHARGE FROM SE FORK USGS 02310688

Following observations made during kayak trips into the SE Fork on January 13 and 14, 2011, when the water levels were very low, I have looked at some of the data on flows and have very big concerns about the accuracy of the flow data.

Water levels on January 13 and 14 were low to the extent that discharge from Pumphouse Spring and Trotter Spring were clearly above the water level in the main stream to the extent that water was flowing down 'waterfalls'. Flow from these two springs was much much stronger than from the other springs in the fork. Abdoney Spring was also discharging from above the level of water in the main stream and was the third strongest flow but no where near Pumphouse and Trotter.

Given these observations it was clear that the only driving force for flow was the head in the aquifer. This led me to see what the calculated flows were. In studying the data extracted from the USGS real time records and presented in the attached spreadsheet (Low Water Flow...) it is clear that the equation used must be questioned. As you will see in the data there are times when calculated discharge changes very significantly. Such changes can not be true in a situation where the discharge is not affected by conditions in the river.

It could be argued that this was an unusual situation with water levels so low. I agree that it was an unusual situation with water levels so low the conductivity sensor was at times above water with no conductivity recorded. I suggest that it is not unusual when we look at discharge data, the ds/dt multiplier appears to be far too large. Allow me to explain further. You will recall in earlier correspondence I asked why the multiplier for the ds/dt (change in river stage) was so high. On the spreadsheet (Sheet 2 SE Fork Equation) I have shown the influence the ds/dt factor has on the water held in the pool upstream of the SE Fork gage site 02310688 as a result in stage increase/decrease. These show minimal changes in flow, compared to the figures resulting from the large multiplier used in the equation.

I would strongly suggest this clearly gives concern to erroneous calculation/equation of discharge from the SE Fork.

Also, given the observed uninhibited flows from these spring vents Jan 13 & 14, it only adds to the comments I have made about assumptions used in the modeling of flows as presented in Table 2-4 of the July 2010 report.

### Notes:

1. Data from the Homosassa Springs site for the same time period was included on the spreadsheet simply for comparison.
2. The reference made in WRIR 01-4230 by Yobbi and Knochemus on page 16 "Additionally, a single explanatory variable (spring flow from a nearby spring in the complex) was used in the regression models to estimate flow at two tidal springs (Unnamed Tributary to Chassahowitzka River and Southeast Fork of the Homosassa River)." Is noted as possible origin of the equation; however, the SE Fork is not truly tidal as there is no reverse flow as mentioned and supported in previous e-mails.

## Eddy Current at Gage Site 02310688

In an earlier e-mail I speculated that there was a possibility of eddy currents causing the occasional increase in conductivity readings at this site. Since that speculation I have carefully observed the flow at the gage site. Regularly, in fact most of the time, a thin layer of flow can be observed going upstream along the concrete seawall towards the instruments location. This observation is made by watching small clumps of weed that can easily be tracked in the water. Most of the time the flow is captured (*typically the flow can be seen going about 4 feet upstream along the seawall and is less than 6 inches wide*) by the main outflow before it reaches the instrument location. I have not yet seen weed reach the plastic tubes. Why is this happening? Previously I had suggested that it was the flow changing direction as it goes under the bridge...close observation shows that a stack of riprap concrete immediately upstream of the instrument location causes a major shift in the flow. I wish I had photographs to show this. But, there is nothing like looking at this firsthand.

## DISCHARGE DATA HOMOSASSA RIVER USGS 02310700

On the subject of discharge calculation I find some of the data reported from the Homosassa River site perplexing. I have attached a spreadsheet (Homosassa River) in which I have shown the implied cross section of the river from the discharge volume and stream velocity. While I understand that the cross section area will change with stage height this does not appear to explain the wide variation of the *implied cross sectional area* in the spreadsheet.

I do not know the exact location of the Acoustic Doppler Current Profiler (ADCP) but would estimate the river width at that point to be about 200 feet, and would assume that the stream velocity reported is the average stream velocity.

There are even occasions where an inflow is shown when the stream velocity is outward, agreed these few situations are at times when flow direction is changing. However, these provide further indication that discharge results are subject to some mathematical treatment other than simple logic.

I would appreciate if someone can explain what other factors are use to make this calculation. I was under the impression that data from this site was:

$$\text{Stream Velocity} \times \text{Cross Section Area (for stage height)} = \text{Discharge}$$

## Summary

Given the funds that are spent on developing models, often using regression analysis which use flow data, to predict the ecological future of this river I think it critical that the very basis of the flow measurements are fully understood. May be the gaps are only in my understanding, but somewhere I am not getting the logic. I hope those spending the monies and making the decisions are.

Observations, comments and questions with the best of intent.  
Martyn Johnson

Reference:

SE Fork Homosassa Spring at Homosassa (02310688):

The current rating curve for the spring discharge reported at this station is represented by the equation:

$$Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(ds/dt)$$

In which

Q = spring discharge, in cfs.

GW = maximum daily groundwater level measured at the Floridan aquifer monitor well

283201082315601 (Weeki Wachee at Weeki Wachee) on the day of the discharge measurement used for the rating, in ft NGVD29.

GH = 15-minute gauge height of the river recorded at the time of the discharge measurement used for the rating, in ft NGVD29.

ds/dt = change in river stage during a 15-minute period, in ft.

For anyone not able to open the first spreadsheet.

Componets in the equation used to calculate discharge from SE Fork

		Fixed	Multiplier	Date	GW	Multiplier	Time	GH	Multiplier	ds/dt	
	Q in cfs	18.63	3.31	1/13/2011	12.51	10.31	6:15	-0.78	418.14		
							6:30	-0.81		-0.03	
							6:45	-0.81		0	
							7:00	-0.83		-0.02	
				1/14/2011	12.5		14:00	-0.98		0.01	
							14:15	-0.96		0.02	
							14:30	-0.91		0.05	
							14:45	-0.88		0.03	
							15:00	-0.88		0	
											cfs Change in 15 minutes
Date	Time	Q Calc cfs									
1/13/2011	6:30	80.9334	18.63	41.4081		-8.3511			-12.544		
1/13/2011	6:45	68.3892	18.63	41.4081		-8.3511			0		-15%
1/13/2011	7:00	76.9582	18.63	41.4081		-8.5573			-8.3628		13%
1/14/2011	14:00	65.9274	18.63	41.375		-10.1038			4.1814		
1/14/2011	14:15	61.5398	18.63	41.375		-9.8976			8.3628		-7%
1/14/2011	14:30	48.4801	18.63	41.375		-9.3821			20.907		-21%
1/14/2011	14:45	56.5336	18.63	41.375		-9.0728			12.5442		17%
1/14/2011	15:00	69.0778	18.63	41.375		-9.0728			0		22%

Water storage/discharge due to stage change SE Fork

Estimated area of SE Fork pool	3	acres	Average flow	60	cfs	cfs at gage site		Frequency*
	ds/dt	cf in 15 mins	cf flow/15 min	Time to discharge storage		Decrease	Increase	ds/dt
Volume for	0.01	1306.8	54000	0.4		58.5	61.5	15%
	0.02	2613.6		0.7		57.1	62.9	30%
	0.03	3920.4		1.1		55.6	64.4	25%
	0.04	5227.2		1.5		54.2	65.8	10%
	0.05	6534		1.8		52.7	67.3	10%
	0.06	7840.8		2.2		51.3	68.7	2%
	0.07	9147.6		2.5		49.8	70.2	1%

Frequency ds/dt is percent of times this change is seen both negative and positive.

Positive changes are seen approx 45% of the time versus negative 55%,

Zero change is seen about 5% of time reported.

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E-mail facilities for non-District business purposes.



## **Attachment B**

**Data Associated with February 15, 2011 E-Mail from Martyn Johnson to Doug Leeper**

# Homosassa River USGS 02130700

Date / Time	Gage height, feet	Strea velocity, ft/s	Dis-charge, ft3/s (not filtrd. for tide)
01/13/2011 00:00 EST	-1.9	0.2	151
01/13/2011 00:15 EST	-1.91	0.21	164
01/13/2011 00:30 EST	-1.92	0.25	217
01/13/2011 00:45 EST	-1.93	0.28	256
01/13/2011 01:00 EST	-1.95	0.24	200
01/13/2011 01:15 EST	-1.95	0.24	200
01/13/2011 01:30 EST	-1.97	0.23	185
01/13/2011 01:45 EST	-1.99	0.21	157
01/13/2011 02:00 EST	-2	0.18	117
01/13/2011 02:15 EST	-2.01	0.2	142
01/13/2011 02:30 EST	-2.02	0.2	141
01/13/2011 02:45 EST	-2.04	0.23	179
01/13/2011 03:00 EST	-2.06	0.25	203
01/13/2011 03:15 EST	-2.07	0.3	268
01/13/2011 03:30 EST	-2.08	0.35	334
01/13/2011 03:45 EST	-2.1	0.28	239
01/13/2011 04:00 EST	-2.12	0.3	263
01/13/2011 04:15 EST	-2.13	0.33	302
01/13/2011 04:30 EST	-2.15	0.31	273
01/13/2011 04:45 EST	-2.16	0.32	286
01/13/2011 05:00 EST	-2.19	0.31	269
01/13/2011 05:15 EST	-2.2	0.3	255
01/13/2011 05:30 EST	-2.22	0.31	266
01/13/2011 05:45 EST	-2.23	0.33	291
01/13/2011 06:00 EST	-2.25	0.29	237
01/13/2011 06:15 EST	-2.26	0.33	288
01/13/2011 06:30 EST	-2.28	0.32	273
01/13/2011 06:45 EST	-2.3	0.3	245
01/13/2011 07:00 EST	-2.31	0.33	283
01/13/2011 07:15 EST	-2.33	0.32	268

Note:

1. If Column D is Vi.
2. Formula  $Q = V_m \times \text{Area}$  where  $V_m = 0.00902154 + 0.9019 \times V_i + 0.12138 \times V_i \times V_i + 0.045375 \text{ (GH)}$

from

Discharge divided by  $V_m$

$V_m$	
0.10804424	1397.57566
0.117107148	1400.426898
0.15496279	1400.336171
0.183495982	1395.125916
0.143987778	1389.006781
0.143987778	1389.006781
0.133490792	1385.863379
0.113477148	1383.538472
0.084546252	1383.857915
0.10305299	1377.931878
0.10259924	1374.279186
0.130314542	1373.599579
0.14861029	1365.988856
0.19658949	1363.246835
0.24517559	1362.288962
0.175782232	1359.636849
0.19432074	1353.432475
0.223218072	1352.937051
0.202718908	1346.692337
0.212048852	1348.745807
0.200903908	1338.948568
0.19069074	1337.243749
0.199542658	1333.048295
0.218680572	1330.708061
0.178686848	1326.34272
0.217319322	1325.238811
0.206603852	1321.369361
0.18615324	1316.119988
0.215050572	1315.969529
0.204335102	1311.571029

01/13/2011 07:30 EST	-2.35	0.3	240
01/13/2011 07:45 EST	-2.36	0.29	227
01/13/2011 08:00 EST	-2.38	0.31	250
01/13/2011 08:15 EST	-2.39	0.28	211
01/13/2011 08:30 EST	-2.42	0.33	271
01/13/2011 08:45 EST	-2.43	0.39	347
01/13/2011 09:00 EST	-2.44	0.37	320
01/13/2011 09:15 EST	-2.46	0.34	280
01/13/2011 09:30 EST	-2.48	0.36	303
01/13/2011 09:45 EST	-2.49	0.36	302
01/13/2011 10:00 EST	-2.51	0.41	363
01/13/2011 10:15 EST	-2.53	0.42	374
01/13/2011 10:30 EST	-2.55	0.45	409
01/13/2011 10:45 EST	-2.56	0.4	345
01/13/2011 11:00 EST	-2.58	0.42	368
01/13/2011 11:15 EST	-2.59	0.43	379
01/13/2011 11:30 EST	-2.61	0.28	191
01/13/2011 11:45 EST	-2.63	0.37	300
01/13/2011 12:00 EST	-2.64	0.33	249
01/13/2011 12:15 EST	-2.65	0.32	236
01/13/2011 12:30 EST	-2.67	0.33	246
01/13/2011 12:45 EST	-2.68	0.3	209
01/13/2011 13:00 EST	-2.69	0.32	232
01/13/2011 13:15 EST	-2.7	0.44	378
01/13/2011 13:30 EST	-2.71	0.34	255
01/13/2011 13:45 EST	-2.73	0.29	193
01/13/2011 14:00 EST	-2.73	0.36	277
01/13/2011 14:15 EST	-2.75	0.37	287
01/13/2011 14:30 EST	-2.75	0.39	311
01/13/2011 14:45 EST	-2.76	0.39	310
01/13/2011 15:00 EST	-2.77	0.32	225
01/13/2011 15:15 EST	-2.77	0.32	225
01/13/2011 15:30 EST	-2.77	0.27	165
01/13/2011 15:45 EST	-2.78	0.31	212
01/13/2011 16:00 EST	-2.78	0.23	118
01/13/2011 16:15 EST	-2.78	0.24	129
01/13/2011 16:30 EST	-2.77	0.19	72
01/13/2011 16:45 EST	-2.76	0.15	27
01/13/2011 17:00 EST	-2.75	0.13	4.3
01/13/2011 17:15 EST	-2.74	0.09	-41
01/13/2011 17:30 EST	-2.72	0.08	-51
01/13/2011 17:45 EST	-2.7	0.01	-129
01/13/2011 18:00 EST	-2.68	-0.05	-195
01/13/2011 18:15 EST	-2.66	-0.02	-161

0.18388449	1305.167173
0.173695598	1306.884012
0.192282658	1300.169254
0.162623482	1297.475601
0.210059322	1290.111752
0.268963188	1290.139378
0.248626462	1287.071366
0.218076568	1283.952708
0.236906388	1278.986196
0.236452638	1277.21138
0.285313268	1272.285732
0.294432222	1270.241407
0.32374974	1263.321478
0.27304234	1263.540299
0.292163472	1259.568821
0.301760452	1255.963124
0.152640982	1251.302222
0.240005212	1249.972855
0.200076822	1244.521967
0.189815102	1243.315192
0.198715572	1237.95029
0.16891074	1237.339911
0.188000102	1234.041884
0.306844208	1231.895503
0.206732818	1233.476148
0.156906848	1230.02917
0.225562638	1228.040257
0.234560212	1223.566425
0.254443188	1222.276778
0.253989438	1220.523194
0.184370102	1220.371403
0.184370102	1220.371403
0.135694392	1215.967717
0.174132658	1217.462608
0.096737042	1219.801614
0.106326528	1213.243792
0.059075608	1218.77713
0.02180259	1238.384981
0.003538612	1215.16572
-0.033151782	1236.735932
-0.041469628	1229.81571
-0.104459822	1234.924563
-0.15737501	1239.078555
-0.129665408	1241.657297

01/13/2011 18:30 EST	-2.63	-0.01	-149
01/13/2011 18:45 EST	-2.61	-0.05	-193
01/13/2011 19:00 EST	-2.59	-0.01	-148
01/13/2011 19:15 EST	-2.56	-0.08	-225
01/13/2011 19:30 EST	-2.53	-0.05	-191
01/13/2011 19:45 EST	-2.5	-0.07	-213
01/13/2011 20:00 EST	-2.47	-0.06	-201
01/13/2011 20:15 EST	-2.44	-0.09	-234
01/13/2011 20:30 EST	-2.41	-0.1	-245
01/13/2011 20:45 EST	-2.37	-0.11	-256
01/13/2011 21:00 EST	-2.33	-0.13	-278
01/13/2011 21:15 EST	-2.3	-0.13	-277
01/13/2011 21:30 EST	-2.26	-0.15	-300
01/13/2011 21:45 EST	-2.22	-0.2	-357
01/13/2011 22:00 EST	-2.19	-0.19	-345
01/13/2011 22:15 EST	-2.15	-0.19	-345
01/13/2011 22:30 EST	-2.11	-0.19	-344
01/13/2011 22:45 EST	-2.08	-0.22	-379
01/13/2011 23:00 EST	-2.05	-0.22	-379
01/13/2011 23:15 EST	-2.02	-0.17	-320
01/13/2011 23:30 EST	-1.99	-0.15	-296
01/13/2011 23:45 EST	-1.97	-0.16	-307
01/14/2011 00:00 EST	-1.96	-0.1	-235
01/14/2011 00:15 EST	-1.94	-0.06	-185
01/14/2011 00:30 EST	-1.94	-0.03	-148
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01/14/2011 16:15 EST	-2.28	0.08	-28

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01/18/2011 08:30 EST	-0.21	0.69	1,200
01/18/2011 08:45 EST	-0.25	0.71	1,230
01/18/2011 09:00 EST	-0.28	0.7	1,200
01/18/2011 09:15 EST	-0.32	0.71	1,210
01/18/2011 09:30 EST	-0.36	0.74	1,260
01/18/2011 09:45 EST	-0.39	0.76	1,290
01/18/2011 10:00 EST	-0.43	0.78	1,310
01/18/2011 10:15 EST	-0.47	0.78	1,300
01/18/2011 10:30 EST	-0.51	0.8	1,330
01/18/2011 10:45 EST	-0.55	0.8	1,320
01/18/2011 11:00 EST	-0.59	0.78	1,280
01/18/2011 11:15 EST	-0.63	0.77	1,250
01/18/2011 11:30 EST	-0.67	0.72	1,150
01/18/2011 11:45 EST	-0.71	0.79	1,270
01/18/2011 12:00 EST	-0.75	0.83	1,330
01/18/2011 12:15 EST	-0.79	0.8	1,260
01/18/2011 12:30 EST	-0.82	0.85	1,350
01/18/2011 12:45 EST	-0.85	0.82	1,290
01/18/2011 13:00 EST	-0.88	0.83	1,300
01/18/2011 13:15 EST	-0.91	0.76	1,170
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01/18/2011 13:45 EST	-0.95	0.67	1,000
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01/18/2011 14:30 EST	-0.91	0.03	-8.2
01/18/2011 14:45 EST	-0.87	-0.23	-375
01/18/2011 15:00 EST	-0.83	-0.15	-263
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01/18/2011 18:45 EST	-0.6	0.54	846
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01/18/2011 19:15 EST	-0.65	0.49	751

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01/18/2011 22:30 EST	-0.96	0.35	474
01/18/2011 22:45 EST	-0.95	0.09	77
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01/18/2011 23:30 EST	-0.86	-0.27	-429
01/18/2011 23:45 EST	-0.82	-0.39	-589
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01/19/2011 00:15 EST	-0.72	-0.44	-656
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01/19/2011 00:45 EST	-0.6	-0.52	-762
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01/19/2011 01:45 EST	-0.3	-0.49	-727
01/19/2011 02:00 EST	-0.23	-0.48	-714
01/19/2011 02:15 EST	-0.16	-0.51	-756
01/19/2011 02:30 EST	-0.09	-0.54	-798
01/19/2011 02:45 EST	-0.03	-0.54	-799
01/19/2011 03:00 EST	0.03	-0.53	-786
01/19/2011 03:15 EST	0.08	-0.58	-856
01/19/2011 03:30 EST	0.13	-0.5	-744
01/19/2011 03:45 EST	0.16	-0.54	-801
01/19/2011 04:00 EST	0.19	-0.43	-642
01/19/2011 04:15 EST	0.2	-0.39	-583
01/19/2011 04:30 EST	0.21	-0.29	-431
01/19/2011 04:45 EST	0.2	-0.19	-275
01/19/2011 05:00 EST	0.19	-0.1	-132
01/19/2011 05:15 EST	0.17	0.02	64
01/19/2011 05:30 EST	0.15	0.09	180
01/19/2011 05:45 EST	0.12	0.17	314
01/19/2011 06:00 EST	0.09	0.2	362
01/19/2011 06:15 EST	0.07	0.26	464

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 1850.465301  
 1837.926897  
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 1833.069035  
 1825.144225  
 1820.342562

01/19/2011 06:30 EST	0.05	0.29	514
01/19/2011 06:45 EST	0.03	0.41	726
01/19/2011 07:00 EST	0	0.43	757
01/19/2011 07:15 EST	-0.03	0.48	843

0.283049348	1815.937764
0.400565768	1812.436454
0.419281702	1805.468725
0.468538242	1799.212795

Max	1799.212795
Min	1397.57566
	0.776770632



## Attachment C

**February 15, 2011 E-Mail from Kevin Grimsley to Martyn Johnson**

***Note: E-mail string deleted by Doug Leeper***

**From:** Kevin J Grimsley  
**To:** Alan Martyn Johnson  
**Cc:** Doug Leeper; rkane  
**Subject:** RE: Homosassa Flow Concerns  
**Date:** Tuesday, February 15, 2011 4:45:03 PM

Martyn,

It seems that you're unaware that there is a separate equation that computes an area value. That computed area is then multiplied by the computed Vm to obtain Q. I assume you're getting all your equations from the SWFWMD minimum flow report so perhaps it was accidentally omitted there.

The stage-area rating (as we call it) for station 02310700 is:

Channel Cross-sectional Area (ft<sup>2</sup>) = 0.9749 \* GH<sup>2</sup> + 214.94 \* GH + 1806.4

Where:

GH = Gage Height (feet)

I hope this clarifies this issue. Everything in your spreadsheet looks to be correct. I added a column to calculate the area using the rating equation provided. The small differences seen between those areas and the ones you've already calculated are simply due to the rounding that's been applied to the data before display on our website. The original calculations use unrounded numbers from within our internal database.

\*\*\*\*\*

Kevin Grimsley, P.E.  
Supervisory Hydrologist  
USGS, Florida Water Science Center  
10500 University Center Drive, Suite 215  
Tampa, FL 33612  
kjgrims@usgs.gov  
813-975-8620 x159

\*\*\*\*\*

## **Attachment D**

**Data Associated with February 15, 2011 E-Mail from Kevin Grimsley to Martyn Johnson**

***Note: The data file was not attached to original e-mail (see Attachment C),  
so Kevin Grimsley sent a second e-mail with the file attached***

# Homosassa River USGS 02130700

		Stream	
	Gage height, feet	velocity, ft/s	Discharge, ft <sup>3</sup> /s (not filtrd. for tide)
Date / Time			
01/13/2011 00:00 EST	-1.9	0.2	151
01/13/2011 00:15 EST	-1.91	0.21	164
01/13/2011 00:30 EST	-1.92	0.25	217
01/13/2011 00:45 EST	-1.93	0.28	256
01/13/2011 01:00 EST	-1.95	0.24	200
01/13/2011 01:15 EST	-1.95	0.24	200
01/13/2011 01:30 EST	-1.97	0.23	185
01/13/2011 01:45 EST	-1.99	0.21	157
01/13/2011 02:00 EST	-2	0.18	117
01/13/2011 02:15 EST	-2.01	0.2	142
01/13/2011 02:30 EST	-2.02	0.2	141
01/13/2011 02:45 EST	-2.04	0.23	179
01/13/2011 03:00 EST	-2.06	0.25	203
01/13/2011 03:15 EST	-2.07	0.3	268
01/13/2011 03:30 EST	-2.08	0.35	334
01/13/2011 03:45 EST	-2.1	0.28	239
01/13/2011 04:00 EST	-2.12	0.3	263
01/13/2011 04:15 EST	-2.13	0.33	302
01/13/2011 04:30 EST	-2.15	0.31	273
01/13/2011 04:45 EST	-2.16	0.32	286
01/13/2011 05:00 EST	-2.19	0.31	269
01/13/2011 05:15 EST	-2.2	0.3	255
01/13/2011 05:30 EST	-2.22	0.31	266
01/13/2011 05:45 EST	-2.23	0.33	291
01/13/2011 06:00 EST	-2.25	0.29	237
01/13/2011 06:15 EST	-2.26	0.33	288
01/13/2011 06:30 EST	-2.28	0.32	273
01/13/2011 06:45 EST	-2.3	0.3	245
01/13/2011 07:00 EST	-2.31	0.33	283
01/13/2011 07:15 EST	-2.33	0.32	268
01/13/2011 07:30 EST	-2.35	0.3	240
01/13/2011 07:45 EST	-2.36	0.29	227
01/13/2011 08:00 EST	-2.38	0.31	250
01/13/2011 08:15 EST	-2.39	0.28	211
01/13/2011 08:30 EST	-2.42	0.33	271

Note:

1. If Column D is Vi.

2. Formula  $Q = V_m \times \text{Area}$  where  $V_m = 0.00902154 + 0.9019 \times V_i + 0.12138 \times V_i \times V_i + 0.045375 \text{ (GH)}$   
Area A

Vm	from Discharge divided by Vm	Area from Rating
0.10804424	1397.57566	1401.53339
0.117107148	1400.426898	1399.42113
0.15496279	1400.336171	1397.30907
0.183495982	1395.125916	1395.19721
0.143987778	1389.006781	1390.97406
0.143987778	1389.006781	1390.97406
0.133490792	1385.863379	1386.75169
0.113477148	1383.538472	1382.5301
0.084546252	1383.857915	1380.4196
0.10305299	1377.931878	1378.30929
0.10259924	1374.279186	1376.19918
0.130314542	1373.599579	1371.97954
0.14861029	1365.988856	1367.76069
0.19658949	1363.246835	1365.65155
0.24517559	1362.288962	1363.54261
0.175782232	1359.636849	1359.32531
0.19432074	1353.432475	1355.10879
0.223218072	1352.937051	1353.00082
0.202718908	1346.692337	1348.78548
0.212048852	1348.745807	1346.67809
0.200903908	1338.948568	1340.35712
0.19069074	1337.243749	1338.25052
0.199542658	1333.048295	1334.0379
0.218680572	1330.708061	1331.93188
0.178686848	1326.34272	1327.72043
0.217319322	1325.238811	1325.615
0.206603852	1321.369361	1321.40472
0.18615324	1316.119988	1317.19522
0.215050572	1315.969529	1315.09076
0.204335102	1311.571029	1310.88243
0.18388449	1305.167173	1306.67489
0.173695598	1306.884012	1304.5714
0.192282658	1300.169254	1300.36502
0.162623482	1297.475601	1298.26213
0.210059322	1290.111752	1291.9546

01/13/2011 08:45 EST	-2.43	0.39	347
01/13/2011 09:00 EST	-2.44	0.37	320
01/13/2011 09:15 EST	-2.46	0.34	280
01/13/2011 09:30 EST	-2.48	0.36	303
01/13/2011 09:45 EST	-2.49	0.36	302
01/13/2011 10:00 EST	-2.51	0.41	363
01/13/2011 10:15 EST	-2.53	0.42	374
01/13/2011 10:30 EST	-2.55	0.45	409
01/13/2011 10:45 EST	-2.56	0.4	345
01/13/2011 11:00 EST	-2.58	0.42	368
01/13/2011 11:15 EST	-2.59	0.43	379
01/13/2011 11:30 EST	-2.61	0.28	191
01/13/2011 11:45 EST	-2.63	0.37	300
01/13/2011 12:00 EST	-2.64	0.33	249
01/13/2011 12:15 EST	-2.65	0.32	236
01/13/2011 12:30 EST	-2.67	0.33	246
01/13/2011 12:45 EST	-2.68	0.3	209
01/13/2011 13:00 EST	-2.69	0.32	232
01/13/2011 13:15 EST	-2.7	0.44	378
01/13/2011 13:30 EST	-2.71	0.34	255
01/13/2011 13:45 EST	-2.73	0.29	193
01/13/2011 14:00 EST	-2.73	0.36	277
01/13/2011 14:15 EST	-2.75	0.37	287
01/13/2011 14:30 EST	-2.75	0.39	311
01/13/2011 14:45 EST	-2.76	0.39	310
01/13/2011 15:00 EST	-2.77	0.32	225
01/13/2011 15:15 EST	-2.77	0.32	225
01/13/2011 15:30 EST	-2.77	0.27	165
01/13/2011 15:45 EST	-2.78	0.31	212
01/13/2011 16:00 EST	-2.78	0.23	118
01/13/2011 16:15 EST	-2.78	0.24	129
01/13/2011 16:30 EST	-2.77	0.19	72
01/13/2011 16:45 EST	-2.76	0.15	27
01/13/2011 17:00 EST	-2.75	0.13	4.3
01/13/2011 17:15 EST	-2.74	0.09	-41
01/13/2011 17:30 EST	-2.72	0.08	-51
01/13/2011 17:45 EST	-2.7	0.01	-129
01/13/2011 18:00 EST	-2.68	-0.05	-195
01/13/2011 18:15 EST	-2.66	-0.02	-161
01/13/2011 18:30 EST	-2.63	-0.01	-149
01/13/2011 18:45 EST	-2.61	-0.05	-193
01/13/2011 19:00 EST	-2.59	-0.01	-148
01/13/2011 19:15 EST	-2.56	-0.08	-225
01/13/2011 19:30 EST	-2.53	-0.05	-191
01/13/2011 19:45 EST	-2.5	-0.07	-213
01/13/2011 20:00 EST	-2.47	-0.06	-201
01/13/2011 20:15 EST	-2.44	-0.09	-234
01/13/2011 20:30 EST	-2.41	-0.1	-245
01/13/2011 20:45 EST	-2.37	-0.11	-256

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01/13/2011 22:15 EST	-2.15	-0.19	-345
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-0.276708422	1525.071037	1526.50163
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-0.30462051	1552.751652	1552.00196
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01/18/2011 05:15 EST	0.19	0.18	340	0.183917502	1848.654947	1847.27379
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01/18/2011 05:45 EST	0.14	0.29	527	0.287133098	1835.385762	1836.51071
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01/18/2011 06:45 EST	0.02	0.52	927	0.511738192	1811.47316	1810.69919
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01/18/2011 23:15 EST	-0.89	-0.19	-321

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0.398501708	1661.222491	1660.69159
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0.446518378	1648.308415	1647.87826
0.465622728	1640.813375	1641.47422
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01/19/2011 01:00 EST	-0.53	-0.57	-829	-0.489673848	1692.963599	1692.75565
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01/19/2011 02:00 EST	-0.23	-0.48	-714	-0.406360758	1757.059426	1757.01537
01/19/2011 02:15 EST	-0.16	-0.51	-756	-0.426636522	1772.000195	1772.03456
01/19/2011 02:30 EST	-0.09	-0.54	-798	-0.446693802	1786.458635	1787.0633
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01/19/2011 03:30 EST	0.13	-0.5	-744	-0.40568471	1833.936507	1834.35868
01/19/2011 03:45 EST	0.16	-0.54	-801	-0.435350052	1839.898712	1840.81536
01/19/2011 04:00 EST	0.19	-0.43	-642	-0.347731048	1846.254465	1847.27379
01/19/2011 04:15 EST	0.2	-0.39	-583	-0.315182562	1849.721623	1849.427
01/19/2011 04:30 EST	0.21	-0.29	-431	-0.232792652	1851.433008	1851.58039
01/19/2011 04:45 EST	0.2	-0.19	-275	-0.148882642	1847.092423	1849.427
01/19/2011 05:00 EST	0.19	-0.1	-132	-0.07133341	1850.465301	1847.27379
01/19/2011 05:15 EST	0.17	0.02	64	0.034821842	1837.926897	1842.96797
01/19/2011 05:30 EST	0.15	0.09	180	0.097981968	1837.072715	1838.66294
01/19/2011 05:45 EST	0.12	0.17	314	0.171297422	1833.069035	1832.20684
01/19/2011 06:00 EST	0.09	0.2	362	0.19834049	1825.144225	1825.7525
01/19/2011 06:15 EST	0.07	0.26	464	0.254897078	1820.342562	1821.45058
01/19/2011 06:30 EST	0.05	0.29	514	0.283049348	1815.937764	1817.14944
01/19/2011 06:45 EST	0.03	0.41	726	0.400565768	1812.436454	1812.84908
01/19/2011 07:00 EST	0	0.43	757	0.419281702	1805.468725	1806.4
01/19/2011 07:15 EST	-0.03	0.48	843	0.468538242	1799.212795	1799.95268

Max  
Min

1799.212795  
1397.57566

0.776770632

## Attachment E

### **E-Mail from Doug Leeper to Martyn Johnson and Kevin Grimsley**

**From:** Doug Leeper  
**To:** "Alan Martyn Johnson"; Kevin Grimsley (kjgrims@usgs.gov)  
**Subject:** RE: Homosassa Flow Concerns  
**Date:** Wednesday, February 16, 2011 9:19:10 AM

Martyn and Kevin:

Thanks, Martyn, for you recent e-mail regarding discharge measurement and reporting for the USGS Homosassa River at Homosassa, FL gage site. And thanks Kevin, for responding to Martyn with information concerning calculation of channel cross-section area for the Homosassa River site as a function of gage height.

Incidentally, I'm currently working with HSW Engineering, Inc. on the revision of their 2010 report that was included in the draft Homosassa minimum flows report as Appendix A. This is fortuitous, as we should be able to incorporate the equation used for deriving channel cross-section area at the Homosassa River gage site into the revised report.

Thanks again to both of you.

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](mailto:doug.leeper@watermatters.org)  
Web Site: [watermatters.org](http://watermatters.org)



**From:** [Alan Martyn Johnson](#)  
**To:** [Doug Leeper](#)  
**Cc:** [Kevin J. Grimsley; rkane](#)  
**Subject:** RE: Public Input for Spring Workshop  
**Date:** Thursday, August 04, 2011 8:54:58 AM  
**Attachments:** [Weeki Wachee and Lecanto Wells Aug 4.xls](#)  
[Field Measurements Percent change Aug4.xls](#)

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Doug,

Appreciate you complying the various pieces of correspondence in such an orderly manner. I have them all but not as neatly presented, excellent job. This would certainly help in a meeting with Richard and Kevin.

As you know I am a part time resident in Homosassa and will not be back there until early next month, according to present plans. As I mentioned in my e-mail some response to my e-mails of February would help prepare for a meeting.

In addition to those e-mails I have this morning updated an Excel spreadsheet that I had started back in March when I got your e-mail of March 1 with the graph from Kevin.

#### SE FORK HOMOSASSA FIELD MEASUREMENTS ANALYSIS

The file is attached.

As you will see I have primarily looked at the Field Measurements that are multiple measurements on the same day with the aim of getting an idea about how flows change in the SE Fork. The data in black is direct copy of the data from USGS. The blue data collates the various data from the same day and attempts to calculate the percentage changes of flow in a 15 minute interval in order to compare this to the variations in the calculated flows that I have generally questioned.

As can be seen in the red bordered section the percentage changes are generally gradual and in line with the Gage Height and Gage Height Changes i.e. logical.

#### Notes:

- 1. The Gage Height Changes in Column M do not correspond to the changes in Column I; this is the data USGS has. Column T shows the changes as calculated from Column I.*
- 2. I have highlighted the data for 2010-10-06 which looks suspect; may I suggest that someone recheck data entry for this date.*
- 3. I have also highlighted the data for 2000-12-13. This data reports a gage change of 0.88 ft from 1:00 to 5:30 (assume this is am). This is an unusually high rate of change in four and half hours, with 0.74 ft change in just three hours from 1:00 to 4:00. I can only speculate that there must have been something special happening at this time to get someone out in the early hours, particularly as they had been there the day before. The low flow rates are logical for such a rapid rise in gage height.*
- 4. All data is treated the same i.e. as if it were instantaneous data at the time the measurement is reported. I can only assume that the fact that Duration (Column N) of any individual measurement may have some influence; some measurements are 0.2 hrs some 0.5 hrs with a number of others in the mix e.g. for March 8, 2005 I46A-E the figures are 0.7, 0.5, 0.45, 0.3, 0.3. Possibly the UNSP notation has some meaning here. You may recall a previous comment I made about reviewing the Standard Operating Procedures.*

Bottom Line. This analysis of the field measurement data appears to support the questions I have raised about the 15 minute interval calculated data. Most of the changes in the field measurements are gradual and logical.

#### WELL LEVELS ANALYSIS AND WHICH IS THE DRIVING FORCE

Well Level Analysis file attached.

The other day I mentioned that out of curiosity I had taken a look at the well levels at Weeki Wachee and Lecanto North to try to understand a little more. As I mentioned I have long questioned why the Weeki Wachee Well level is used in the calculation of flows for the springs in Homosassa when it is not in the Homosassa Basin. Lecanto North is also not in the Homosassa Basin but much closer to the drawn boundary and half the distance from the Homosassa springs: Lecanto North is a long monitored well. As you can see on the graphs from the two wells, they react very similarly over the years to what I assume is rainfall/recharge although the pattern is hard to correlate when looking at the rainfall figures for Citrus and Hernando.

The number of data points in any year is not consistent so no time scale is shown on the graphs.

On the second sheet I cullet the data to get matching (or closely matching) dates, and then looked at the deviations from average. It confirms what I have heard talk of Weeki Wachee Well is in serious decline and Lecanto North is not too far behind.

Taking these thoughts/observations to the flows in the SE Fork Homosassa it is concerning that the declines seen in the YELLOW BARS for Lecanto North have become strongly negative in about the same timeframe (starting about 2005) that residents have noted the changes re barnacle growth and nature of weed growth.

#### HOW DOES THE NORTHERN DISTRICT MODEL ACCOUNT FOR WATER FROM WEEKI WACHEE GETTING TO/INFLUENCING FLOWS IN THE HOMOSASSA SPRINGS, PARTICULARLY THE SE FORK?

More food for thought.

Martyn

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From: Doug.Leeper@swfwmd.state.fl.us  
To: martynellijay@hotmail.com  
Date: Wed, 3 Aug 2011 10:20:19 -0400  
Subject: RE: Public Input for Spring Workshop

Martyn:

I'd like to reiterate that I think it would be extremely useful to schedule a meeting with Richard Kane and Kevin Grimsley to discuss your concerns with flow measurement in the Homosassa River system. As indicated previously, I welcome the opportunity to participate in such a meeting. In support of this potential meeting I've compiled correspondence between you, Richard, Kevin and me into three Adobe PDF portfolio documents, anticipating that it may be reasonable to review these correspondences prior to a face-to-face meeting. The first of the portfolio documents is attached to this e-mail. I'll send the other two as attachments to additional e-mails.

In response to your question about interactions between stakeholder representatives and others that participate in the District's Springs Coast Minimum Flows and Levels workshops, I would note that I have no specific information regarding interaction of these folks outside of the workshop setting. I assume, however, that workshop participants discuss minimum flows and levels issues outside of the scheduled workshop periods, based on e-mails that are sent to me and those that I am copied on.

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**Subject:** Correspondence Portfolio\_3  
**Date:** Wednesday, August 03, 2011 10:21:26 AM  
**Attachments:** [MJohnson\\_Portfolio3.pdf](#)

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Portfolio document 3 of 3 attached.

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