## **Appendix W**

Correspondence and other relevant documents associated with stakeholder input and public outreach concerning development of proposed minimum flows for the Homosassa River system and the District's Springs Coast Minimum Flows and Levels Public Workshop series.

**Note:** This appendix included relevant documents pertaining to stakeholder input and information requests. All correspondence and associated documents are maintained as public records by the Southwest Florida Water Management District and are available upon request.

#### April 18, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Presentation of minimum flows and levels at the January 2008 meeting of the Save the Homosassa River Alliance

This memorandum documents a presentation on minimum flows and levels made by Sid Flannery, Chief Environmental Scientist with the District, to the Save the Homosassa River Alliance in January 2008.

#### Attachment

Slides for January 2008 Save the Homosassa River Alliance meeting

#### (F.S. 373.042)

Minimum flows are "the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area"

#### **Translated**

How much water can be removed for water supply without damaging the ecology of a river or its receiving estuary

#### Fresh vs. Estuarine

#### Fresh Water

- Fish Passage
- Floodplain Inundation
- Wet Perimeter
- Woody Snags
- Fish/Life Cycle

#### Estuarine

- Fish/Invertebrate Use
- Salinity Habitat
- Benthic Community
- Sea Grass
- Manatee Use
- Shoreline
- Water Quality



#### Typical tidal MFL study elements

- Structural alterations, previous withdrawals
- Bathymetry
- Salinity
- Shoreline and submerged vegetation
- Benthic invertebrates
- Fish
- Thermal refuge for Manatees
- Water quality















































#### Study elements – Homosassa River

- Bathymetry
- Salinity
- Shoreline and submerged vegetation
- Benthic invertebrates
- Fish
- Thermal refuge for Manatees
- Groundwater springflow relationships

#### **Minimum Flow Rule Schedule**

- Weeki Wachee, Chassahowitzka 2008
- Homosassa 2009
- Crystal River 2010

#### Minimum Flow Rule Process

- Homosassa River scheduled for 2009
- Conduct research 2007-2008
- Draft report for peer review and public, Spring 2009
- Peer review reports to Gov. Board, summer 2009
- District replies to Peer review, public hearing
- Board action

May 20, 2011

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Presentation of minimum flows and levels at the May 2008 Citrus Task Force meeting

This memorandum documents a presentation on minimum flows and levels made by Sid Flannery, Chief Environmental Scientist with the District, to the Citrus Task Force in May 2008. The meeting agenda and minutes are included as attachments.

#### Attachment A

Agenda for May 2008 Citrus Task Force meeting

#### Citrus County Task Force Meeting Agenda

#### May 12, 2008 3:00 p.m.

#### Lecanto Government Building 3600 West Sovereign Path, Room 166 Lecanto, Florida 34461

#### \*\*\*\*All meetings are open to the public\*\*\*\*

- 1. Call to Order and Roll Call
- 2. Pledge of Allegiance
- 3. Approval of the March 10, 2008 Minutes
- 4. Pump-out Station on Homosassa River Update Chair Moberley
- 5. Website Chair Moberley
- Update on Minimum Flows and Levels (relationship with Crystal River/Lake Rousseau) -Sid Flannery - Southwest Florida Water Management District (SWFWMD)
- 7. Task Force Position Regarding Crystal River and Lake Rousseau Activities in this Year's Annual Report – Chair Moberley
- Beneficial Use of Dredged Material Allen Martin, Florida Fish and Wildlife Conservation Commission
- 9. Morrison Pool/Sinks
- 10. Sources of Chlorophyll "a" in Kings Bay: Results of a Two-year Study by the University of South Florida - Veronica Craw – SWFWMD
- 11. Agenda and Location for Next Meeting
- 12. Public Input
- 13. Status Reports (no presentations)
  - a. Water Quality Monitoring
  - b. Tussock Spoil Site Access
  - c. Diagnostic Survey of Sediments and Vegetation in the Tsala Apopka Chain-Of-Lakes
- 14. Goals, Objectives, Actions, Projects, and Schedules (information only)
  - a. Improve Fisheries Habitat
  - b. Maintain or Improve Water Quality
  - c. Restore Historic Connections
  - d. Improve Marsh Habitat
  - e. Develop Restoration Plans
- 15. Adjournment

The District does not discriminate based on disability. Anyone requiring reasonable accommodations under the Americans with Disability Act should call 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4226; TDD: 1-800-231-6103 (Florida only); Fax: 1-352-797-5806.

If you have any questions concerning this meeting, please call 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4227. If a party decides to appeal any decision made with respect to any matter considered at a meeting, that party will need a record of the proceedings, and for such purpose that party may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which they appear is to be based.

#### Attachment B

Minutes for May 2008 Citrus Task Force meeting

### **APPROVED**

MINUTES OF THE MEETING

#### Citrus County Task Force of the Citrus/Hernando Waterways Restoration Council

May 12, 2008

The Citrus County Task Force met at 3:05 p.m. on May 12, 2008, at the Lecanto Government Building, Lecanto, Florida.

#### Task Force

Members Present Michael Moberley, Chair Sandra Clodwick, Secretary Carl Bertoch, Member Michael Czerwinski, Member Ken Frink, Member Wayne Sawyer, Member Technical Advisory Group Members Present Judy Ashton, FDEP Mark Edwards, Citrus Co. Bruce Hasbrouck, FDOT Jerry Krummrich, FFWCC Philip Rhinesmith, SWFWMD SWFWMD Staff Members Present Mark Hammond Veronica Craw Jimmy Brooks Sid Flannery

Task Force Members Absent George Miskimen, Member

<u>Technical Advisory</u> <u>Group Members Absent</u> Colonel Paul L. Grosskruger, USACE Bo Rooks, WRBB Sam Lyons, CRBB Recording Secretary

Josie Guillen, SWFWMD

 SWFWMD – Southwest Florida Water Management District
 FFWCC – Florida Fish and Wildlife Conservation Commission

 FDEP – Florida Department of Environmental Protection
 FDOT – Florida Department of Transportation

 CRBB – Coastal Rivers Basin Board Member
 USACE – United States Army Corp of Engineers

 WRBB – Withlacoochee River Basin Board Member
 USACE – United States Army Corp of Engineers

A list of others present who signed the attendance roster is filed in the permanent files of the Task Force. The numbers preceding the items listed below correspond with the published agenda.

#### 1. Call to Order and Roll Call

Chair Michael Moberley convened the meeting.

#### 2. Pledge of Allegiance

Chair Moberley led the Pledge of Allegiance.

#### 3. Approval of Minutes

Following consideration, Mr. Carl Bertoch moved, seconded by Mr. Wayne Sawyer to approve the March 10, 2008 meeting minutes.

#### 4. <u>Pump-Out Station on Homosassa River Update</u>

Chair Moberley addressed the Task Force members (members) regarding the installation of a waste pump-out station on the Homosassa River. Chair Moberley has explored some options the last couple of months and tentatively arranged with McRaes Fishing Resort to have the pump-out station on the Homosassa River. Chair Moberley also spoke to Gary Bartell with Citrus County and Judy Ashton with FDEP. Judy stated FDEP would be able to fund 75 percent of the cost and perhaps Citrus County Board of County Commissioners would fund 25 percent. A quote will need to be done on the system. Chair Moberley spoke to Gary Bartell and Gary Madoff (also with Citrus County), regarding the 25 percent funding and perhaps there may be avenues to explore. Since the county is installing public restrooms at McRaes' and a lift station, the members thought it would be a good idea to also install a pump-out station while this work was being done. McRaes Fishing Resort, FDEP and Citrus County all agree that installing the pump-out station is a good idea. Chair Moberley will follow-up with the county to put this plan into action.

Ms. Judy Ashton with FDEP stated to the members the price for a pump-out station ranges from \$1,500 - \$30,000. FDEP also funds pump-out vessels up to \$50,000. FDEP will fund 75 percent of the cost. The 75 percent includes construction, installation, renovation, purchase of pump-out equipment, holding tanks, pump-out boats, dump stations, educational materials and signs, reimbursement of all sewage lines to connect to the pump-out equipment to the boat slips or to a dock or holding tank as well as sewage lines connecting pump-out equipment to a sewage treatment plant. Equipment installation can include electrical, pipes, and labor.

Chair Moberley stated to the Task Force members with economic times the way they are, the legislative will most likely not appropriate any funding for projects this year. Chair Moberley continued saying to the Task Force members that they need to be creative and to come up with projects that do not cost any money. Chair Moberley will be presenting to the members some no cost ideas later in the meeting.

#### 5. <u>Website</u>

Chair Moberley stated that Mr. Jim Hunter had suggested to Chair Moberley to set up a website (a clearing house) to provide information from other agencies and volunteers performing work in Citrus County which can also offer hyperlinks to the other groups/agencies within the county. Chair Moberley is encouraging the idea of the website to the members to education the public. Chair Moberley introduced Mr. Richard Patz to give a brief discussion on the website. Mr. Patz would explore the possibility of having a website, a small grant to fund the website, or donation of funds.

Mr. Patz stated there are a large number of stakeholders in Citrus County related to waterways, navigation, fisheries, etc. Mr. Patz stated that there probably is not a central clearing house that anyone can gain access to and require the necessary information. Mr. Patz stated he would need to study this to determine if the theory has merit. If so, Mr. Patz will inform the members his recommendation as to what the Task Force might consider doing. Mr. Patz stated to the members he has experience writing and getting grants in the area.

Chair Moberley entertained a motion for Mr. Patz explore the option of a website and report back to the members. Mr. Ken Frink moved to accept the motion. Mr. Sawyer seconded the motion. Motion passes unanimously.

#### 6. Update on Minimum Flows and Levels (relationship with Crystal River/Lake Rousseau)

Mr. Sid Flannery with SWFWMD gave a presentation explaining what Minimum Flow is and translating how much water can be removed for water supply without damaging the ecology of a river or its receiving estuary? Mr. Flannery included the Minimum Flow rule schedule for the next few years. Mr. Flannery further explained fresh versus estuarine minimum flow studies.

#### 7. <u>Task Force Position Regarding Crystal River and Lake Rousseau Activities in this</u> <u>Year's Annual Report</u>

Chair Moberley stated to the members that there is a great need in Citrus County and one of them being Three Sisters. Chair Moberley asked Mr. Dale Jones from FFWCC to discuss the possibility of using the \$150,000 the legislative granted to the Task Force towards Three Sisters.

Mr. Jones stated he does not know the exact details of the funds, but will research and get back to the members in about two weeks.

Chair asked the members, "What is our position regarding Crystal River and Lake Rousseau for our annual report?"

Mr. Bertoch asked the Chair what needs to be done about the work on Tsala Apopka? Is it a lack of funds? Chair Moberley responded that the members needed to be creative whether it be education or to have a campaign to gather the public to get permits to clean up a small amount of lake shore. Chair Moberley stated we need to continue to see what the Task Force can do for Tsala Apopka.

Mr. Michael Czerwinski stated part of the Task Force's objective is to take in response from the public and identify potential restoration plans. There are a number of issues for instances Crystal River/Kings Bay which are somewhat unresolved. It has been identified that there are problems with Lyngbya, salinity issues, and Lyngbya dredging.

Ms. Sandra Clodwick stated the Bureau of Invasive Plant Management has been transferred from FDEP to FFWCC, which could possibility be an asset to Lake Rousseau and would like some information on it. Ms. Clodwick would like to see FFWCC give a better balance concerning the invasive plant control.

Chair Moberley is directing the members on projects to be included in the report to the legislature which would require funding and also work on projects that do not require any funding. This way, if the legislature does not grant us funding for the projects, the Task Force is still moving ahead on certain projects.

#### 8. Beneficial Use of Dredged Material

Mr. Allen Martin with FFWCC gave a presentation on the potential beneficial use alternatives for dredged sediments from Florida lakes. Mr. Martin stated what the background, goals, showed the study areas of 10 lakes FFWCC is focusing on,

sediment management options, categories of beneficial uses, such as: Engineering, Agricultural, Industrial/Commercial, Environmental Enhancement, and Recreational. Mr. Martin continued by stating the environmental enhancements, sediment characterization, and the characteristics of the lakes.

#### 9. Morrison Pool/Sinks

No presentation given since Mr. Sawyer was satisfied with the current status of the Morrison Pool.

#### 10. <u>Sources of Chlorophyll a in Kings Bay: Results of a Two-year Study by the</u> <u>University of South Florida</u>

Ms. Veronica Craw from SWFWMD gave a presentation on the nutrients and water quality of Kings Bay. Ms. Craw stated reduced water clarity was identified as a primary management issue in the Kings Bay SWIM Plan. Suspended solids were the primary cause of decreased clarity. The solids were primarily Chlorophyll. Twelve sites distributed throughout Kings Bay were sampled every other month from Oct 2005 – Nov 2007. The identity and bio-volume of chlorophyll sources were determined for each sample. The University of South Florida determined that Phytoplankton was the primary source of Chlorophyll a in Kings Bay and Diatoms were the dominant group of phytoplankton.

#### 11. Agenda and Location for Next Meeting

Update on the Pump-out Station on the Homosassa River Update on the Clearing House Website Update on the Clemson Study Update on FFWCC Hardwood Reduction in Flying Eagle Update on Marion County Swales Ordinance Update on FFWCC Spoil Site Funding for Three Sisters

The location of the next meeting will be at the Lecanto Government Building.

#### 12. Public Input

 Mr. Duane Brooks, citizen, questioned the Three Sisters Springs, "Do we know how much that man wants for those springs? We'll have to wait and see what he wants for it."

Mr. Brooks stated there was an article in the paper about an ex-commissioner regarding the lake system. According to the article the ex-commissioner suggested taking the money from money currently being used to build a desalination plant and put the efforts into cleaning our lakes. It would mean to take 4 feet of sediment out and be replaced by 4 feet of water, which would result in 25 billion gallons of water in the lake system. The ex-commissioner should have done this 10-12 years ago.

In regards to clean up, it would be easier to install a seawall instead of giving \$500 to the Corp of Engineers. It would keep pollutants from going into the lake.

 Mr. Tom Kane, citizen, said the quality in Kings Bay has gone down hill in terms of clarity, diversity and quantity. Mr. Kane proposed to corner off 3-4 different places and see if we can restore that section of the bay. Mr. Kane suggested to keep plant eaters off of it, provide a nursery area for young marine species, allow the plants to grow, and provide oxygen to clean out some of the areas.

Mr. Czerwinski suggested to Mr. Kane to attend the next Kings Bay Working Group meeting and bring his proposal to them as well.

#### Discussion Items (not on the agenda) from the Members

Chair Moberley informed the members that Dr. George Miskimen submitted a letter of resignation dated May 15, 2008. Meetings can be held, but until the position is filled, no action can be taken.

Mr. Ken Frink asked the members to review the documents (which was passed out earlier) from Marion County Land Development Code and give copies to the TAG to bring back some suggestions. Mr. Frink stated it is a low cost effort. Mr. Frink suggested copies of the documents be sent to the governing agencies (county, cities) which will be one step towards this effort.

Mr. Czerwinski showed an aerial photo of an area formerly known as Roscow Farms. This area is a 140 acre site with 70 - 300 linear feet of shoreline that is completely dry, as much as 25 acres of restoration. The landowner wants to mow and disk approximately 150 feet of the shoreline while it is still dry. Mr. Czerwinski is looking into getting some funding to get equipment at the site.

#### 13. Status Reports

No presentations were made. The current Water Quality Monitoring report was mailed to the Task Force members in their agenda packet and was also available for the public at the meeting.

#### 14. <u>Goals, Objectives, Actions, Projects, and Schedules</u> No action taken.

#### 15. Adjournment

There being no further business or announcements presented before the Task Force, the meeting was adjourned at 5:07 p.m.

April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Presentation of minimum flows and levels at the March 2010 meeting of the Save the Homosassa River Alliance

This memorandum documents a presentation on minimum flows and levels made by Doug Leeper, Chief Environmental Scientist with the District, to the Save the Homosassa River Alliance in March 2010.

Hello Ms. Watkins,

Miki Renner forwarded to our section your request about the Homosassa River minimum flows report. We are working on the report now and plan to have a draft report in May. All District minimum flows reports go out for independent scientific peer review, in which we send the report to three to four scientists not affiliated with SWFWMD to review the methods, analyses, and conclusions in the report. We normally make the report available to the public when it goes out for scientific peer review, which should be in June. I will be sure to contact you when that happens. It could be sooner, and if that is the case, I will let you know.

We met before when I spoke to the Homosassa River Alliance. We have done considerable analyses on the Homosassa since that time. If your organization would like a presentation about an update of the minimum flows analysis at this time, please let me know.

Best regards,

Sid Flannery Senior Environmental Scientist Southwest Florida Water Management District Brooksville, FL 34609-6899 phone: 352-796-7211, ext. 4277 email: sid.flannery@swfwmd.state.fl.us Priscilla,

March 11 will work fine. Doug Leeper of SWFWMD staff will be attending as well. We'll keep in contact about the location, slide screen, etc.

Sid

Michael S. (Sid) Flannery Senior Environmental Scientist Southwest Florida Water Management District Brooksville, FL 34609-6899 phone: 352-796-7211, ext. 4277 email: <u>sid.flannery@swfwmd.state.fl.us</u>

From: Priscilla Watkins [mailto:priswat@tampabay.rr.com] Sent: Thursday, February 04, 2010 5:12 PM To: Sid Flannery Subject: RE: Homosassa minimum flows

that sounds good. Would you be able to come to our March 11th meeting at 7PM? We would love to know about the studies and possible conclusions from you. Priscilla

From: Sid Flannery [mailto:Sid.Flannery@swfwmd.state.fl.us]
Sent: Monday, February 01, 2010 8:18 AM
To: priswat@tampabay.rr.com
Cc: Marty Kelly; Doug Leeper; Miki Renner
Subject: Homosassa minimum flows

Hello Ms. Watkins,

Miki Renner forwarded to our section your request about the Homosassa River minimum flows report. We are working on the report now and plan to have a draft report in May. All District minimum flows reports go out for independent scientific peer review, in which we send the report to three to four scientists not affiliated with SWFWMD to review the methods, analyses, and conclusions in the report. We normally make the report available to the public when it goes out for scientific peer review, which should be in June. I will be sure to contact you when that happens. It could be sooner, and if that is the case, I will let you know.

We met before when I spoke to the Homosassa River Alliance. We have done considerable analyses on the Homosassa since that time. If your organization would like a presentation about an update of the minimum flows analysis at this time, please let me know. Best regards,

Sid Flannery Senior Environmental Scientist Southwest Florida Water Management District Brooksville, FL 34609-6899 phone: 352-796-7211, ext. 4277 email: <u>sid.flannery@swfwmd.state.fl.us</u>

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# What is Significant Harm?

- Not defined by State law
- Defined or implicit in standards or thresholds
  used to establish minimum flows and levels
- Standards or thresholds are specific to water resource type and value

#### Significant Harm Standards and Thresholds for Flowing Water Systems

- May establish low flow thresholds for rivers
- Usually develop standards that are associated with no more than a 15% reduction in resource of concern
  - 15% reduction in abundance
  - 15% reduction in availability of habitat
- Resource reductions are associated with percent-of-flow reductions that define allowable withdrawal impacts





#### **Process for Establishing Minimum Flows and Levels**

- Priority List and Schedule developed
- Methods, flows or levels are developed and peer-reviewed
- Workshops are held for public input
- Recovery or prevention strategies developed, as necessary
- Governing Board adopts flows, levels and strategies into District rules (Chapters 40D-8 and 40D-80, Florida Administrative Code)







#### Tidal River Minimum Flows Study Elements

- Withdrawal impacts
- Structural alterations
- Bathymetry
- Shoreline and submersed vegetation
- Benthic invertebrates
- Fish and invertebrate plankton and nekton
- General salinity habitats
- Thermal refuge for manatees









































Source: HSW Engineering, Inc. (2010)

#### Timeline for Establishing Minimum Flows for the Homosassa River System

- Complete draft report and present to the District Governing Board, peer-review panel and public in June 2010
- Public workshop in July or August 2010
- Peer-review report presented to Governing Board in October 2010
- Staff response to peer-review presented to Governing Board in November 2010
- Rule presented to Governing Board in December 2010

#### Schedule for Establishing Minimum Flows for Other Nearby Systems

#### 2010

- Gum Springs Group
- Chassahowitzka River System and Springs
- Rainbow Springs
- Upper and Middle Withlacoochee River System

#### <u>2011</u>

- Crystal River System and Kings Bay Springs
- Lower Withlacoochee River System

# Contact InformationName: Douglas A. LeeperTitle: Chief Environmental ScientistMail: Southwest Florida Water Mgmt. District<br/>2379 Broad St.<br/>Brooksville, FL 34604-6899Phone: 1-800-423-1476 or 352-796-7211<br/>Extension 4272F-Mail: doug.leeper@swfwmd.state.fl.usWeb Site: www.swfwmd.state.fl.us or<br/>watermatters.org

April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Jason Hood and Al Grubman regarding Homosassa River System MFLs

This memorandum documents correspondence between Jason Hood (SWFWMD) and Al Grubman regarding minimum flows development for the Withlacoochee and Homosassa River systems.

DAL Attachment Mr. Grubman,

I enjoyed speaking with you on the phone this morning. I have attached the links that we discussed over the phone at the end of this email. As you requested, I will make sure that Doug Leeper notifies, if he has not done so already, the Homosassa River Alliance (HRA) that the *Recommended Minimum FLows for the Homosassa River System* Peer Review Draft report is on the internet. I will also make sure that he sets up a presentation to the HRA at a prudent time.

As we discussed, we will come sit down with you and your folks to discuss the Upper and Middle Withlacoochee MFLs upon your request.

Below is a link to all of the SWFWMD's MFL reports:

http://www.swfwmd.state.fl.us/projects/mfl/mfl\_reports.html

Below is a link directly to the Upper and Middle Withlacoochee MFL Report (Peer Review Draft):

http://www.swfwmd.state.fl.us/projects/mfl/reports/WithlacoocheeMFLReport.pdf

Below is a link directly to the Homosassa River MFL Report (Peer Review Draft):

http://www.swfwmd.state.fl.us/projects/mfl/reports/PeerReviewDraftHomosassaRiverMFLsReport2010-07-12.pdf

Take Care,

Jason

Jason Hood Environmental Scientist Ecologic Evaluation Section Southwest FL Water Mgt. District (352) 796-7211 (EXT. 4192) (Office) (352) 279-0324 (Cell) April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and Dan Hilliard regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and Dan Hilliard regarding minimum flows development for the Homosassa River system.

DAL Attachment Greetings Dan:

The Southwest Florida Water Management District is in the process of developing minimum flows for the Homosassa River system. As currently defined by state law, the minimum flow for a given watercourse "shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042(1)(a), Florida Statutes). Minimum flows are incorporated into District rules (Chapter 40D-8, Florida Administrative Code), and are used for water resource planning and regulatory purposes, including the evaluation of water-use permit applications.

A draft report entitled, "Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft" that summarizes the proposed levels for the Homosassa River system is posted under the heading "River Systems and Spring" on the Minimum Flows and Levels (Environmental Flows) Documents and Reports page of the District's web site at world wide web Uniform Resource Locator (URL) listed below. Printed copies of the documents are also available, upon request.

#### http://www.swfwmd.state.fl.us/projects/mfl/mfl\_reports.html

Additional information pertaining to adoption of minimum flows is also available from the District's Minimum Flows and Levels (Environmental Flows) Projects & Programs web page at:

#### http://www.swfwmd.state.fl.us/projects/mfl/

To develop the best minimum flows and levels for use in its regulatory programs, the Southwest Florida Water Management District subjects recommended minimum flows and levels and the methods used for

their development to independent, scientific review. The peer-review process for the proposed minimum flows for the Homosassa River system has been initiated and is expected to be completed in early October 2010. If warranted, findings from the peer-review panel will be used to modify the proposed minimum flows.

To further support review of the proposed minimum flows for the Homosassa River system, the District will host a rule development public workshop on this issue. This workshop has not yet been scheduled, but may be expected to occur in late August or early September. I'll provide additional workshop information in a subsequent e-mail once the meeting has been scheduled.

Finally, I urge you to read and evaluate the report associated with the proposed minimum flows for the Homosassa River system, and to contact me with any questions or comments you may have regarding our recommended minimum flows. I would request that any written comments or

questions on the report be forwarded to my be the end of October 2010. I anticipate presenting peer-review findings, public comment and staff response to these inputs to the District Governing Board at their November 2010 board meeting and hope to present rule amendments associated with the recommended flows to the Board for their consideration in December 2010.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and FDEP staff regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and FDEP staff regarding minimum flows development for the Homosassa River system.

DAL Attachment

From:	Doug Leeper
То:	Llewellyn, Janet (Janet.Llewellyn@dep.state.fl.us); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us); Swihart,
	Tom (Tom.Swihart@dep.state.fl.us); Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us)
Cc:	Marty Kelly
Subject:	Printed Copies of Homosassa MFLs Report
Date:	Friday, July 30, 2010 8:56:20 AM

Greetings:

Note that we will be sending ten printed copies of the proposed Homosassa MFLs report to you as soon as they are available.

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

#### April 18, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Files related to the July 2010 Governing Board presentation of the draft report on proposed minimum flows for the Homosassa River system

This memorandum documents a presentation to the District Governing Board concerning a draft report on proposed minimum flows for the Homosassa River system.

DAL Attachments

# Governing Board Meeting

# *Agenda and Meeting Information*

July 27, 2010

9:00 a.m.

# District Headquarters

2379 Broad Street • Brooksville, Florida (352) 796-7211 • 1-800-423-1476

> Southwest Florida Water Management District

Weeki Wachee River

WATER MATTERS.ORG • 1-800-423-1476


Southwest Florida Water Management District 2379 Broad Street, Brooksville, Florida 34604-6899 (352) 796-7211 or 1-800-423-1476 (FL only) TDD only 1-800-231-6103 (FL only) On the Internet at: WaterMatters.org

An Equal Opportunity Employer

MEETING NOTICE

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Director at 2379 Broad Street, Brooksville, FL 34604-6899; telephone (352) 796-7211, ext. 4702, or 1-800-423-1476 (FL only), ext. 4702; TDD (FL only) 1-800-231-6103; or email to ADACoordinator@swfwmd.state.fl.us.

**AGENDA** 

# **GOVERNING BOARD MEETING**

# **JULY 27, 2010**

# 9:00 a.m.

𝗇 All meetings are open to the public. ≪

- Viewing of the Board meeting will be available at each of the District offices and through the District's web site (www.watermatters.org) -- follow directions to use internet streaming.
- Public input will be taken only at the meeting location.
- 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

#### **CONVENE PUBLIC HEARING AND MEETING (TAB A)** 9:00 А.М.

- 1. Call to Order
- Pledge of Allegiance and Invocation
- 3. Additions/Deletions to Agenda
- 4. District Recognition Florida Nursery, Growers and Landscape Association for Landscape Challenge
- 5. Employee Recognition
- 6. Public Input for Issues Not Listed on the Published Agenda

**Bartow Service Office** 170 Century Boulevard Bartow, Florida 33830-7700

Sarasota Service Office 6750 Fruitville Road Sarasota, Florida 34240-9711 (863) 534-1448 or 1-800-492-7862 (FL only) (941) 377-3722 or 1-800-320-3503 (FL only)

Tampa Service Office 7601 US Highway 301 North Tampa, Florida 33637-6759 (813) 985-7481 or 1-800-836-0797 (FL only)

## **CONSENT AGENDA** (TAB B)

All matters listed under the Consent Agenda are considered routine and action will be taken by one motion, second of the motion and approval by the Board. If discussion is requested by a Board member, that item(s) will be deleted from the Consent Agenda and moved to the appropriate Committee or Report for consideration.

### Finance & Administration Committee

- 7. Budget Transfer Report
- 8. Board Policy No. 190-2, Information Security

## **Executive Director's Report**

9. Approve Governing Board June 29, 2010 Meeting Minutes

## FINANCE & ADMINISTRATION COMMITTEE (TAB C)

#### **Discussion Items**

- 10. Consent Item(s) Moved for Discussion
- 11. Fiscal Year 2011 Budget Update and Adoption of Proposed District and Basin Millage Rates (45 minutes)

#### Submit & File Report

12. Fiscal Year 2010 Third Quarter Financial Report

#### **Routine Reports**

- 13. Treasurer's Report, Payment Register, and Contingency Reserves
- 14. Management Services Significant Activities

## **REGULATION COMMITTEE** (TAB D)

#### **Discussion Items**

- 15. January 2010 Freeze Event
  - a. Update on Rulemaking Amending 40D-3.600, Florida Administrative Code (F.A.C.), to Expand North and South Dover Areas Having Special Well Construction Standards *(10 minutes)*
  - b. Status of Voluntary Payments by Agricultural Industry Representatives of Well Repairs Outside Permittee Mitigation Areas, Discussion of Litigation Options on District-Paid Repairs and of Outstanding Well Liability Cases in Legal *(20 minutes)*
  - c. Initiate Rulemaking to Amend 40D-2, 40D-8 and 40D-80, F.A.C., to Establish a Water Use Caution Area in the Dover/Plant City Area and Associated Water Use Permitting Requirements, Minimum Level and Recovery Strategy (30 minutes)
- 16. Denials Referred to the Governing Board (0 minutes)

#### Submit & File Report

17. Individual Permits Issued by District Staff

#### Routine Reports

- 18. Southern Water Use Caution Area Quantities
- 19. Overpumpage Report
- 20. E-Permitting Metrics: Online vs. Paper Applications
- 21. Resource Regulation Significant Initiatives

## **RESOURCE MANAGEMENT COMMITTEE** (TAB E)

#### Discussion Items

- 22. Hydrologic Conditions Status Report (15 minutes)
- 23. Utility Outreach Program (15 minutes)

## Submit & File Reports

- 24. Proposed Minimum Flows Update for the Homosassa River Prior to Independent Scientific Peer Review
- 25. Proposed Minimum Flows Update for the Upper and Middle Withlacoochee River Prior to Independent Scientific Peer Review

#### Routine Reports

- 26. Florida Forever Funding
- 27. Minimum Flows and Levels
- 28. Structure Operations

# Resource Management Committee July 27, 2010

#### Submit & File Report

#### Proposed Minimum Flows Update for the Homosassa River Prior to Independent Scientific Peer Review (B222)

#### Purpose

To present, for information only, the recommended minimum flows for the Homosassa River system and summarize the methodologies used to develop the recommendation.

#### Background/History

The Homosassa River system is located on the west coast of Florida in Citrus County, and for purposes of establishing minimum flows, consists of the Homosassa River (including the southeast fork of the Homosassa River), Halls River, Hidden River and springs associated with the rivers, including at least 19 named or identified springs or vents. The Homosassa River is designated an "Outstanding Florida Water," and much of the land and waters within the greater Homosassa River system are contained in state or federal preserves or refuges. The Homosassa River originates in the Homosassa main springs pool in the Ellie Schiller Homosassa Springs State Wildlife Park west of the community of Homosassa and flows eight miles to the Gulf of Mexico, bisecting the community of Homosassa Springs along its course. Halls River originates at Halls River head spring and flows three and one half miles to join the Homosassa River about seven miles upstream from the gulf. Hidden River also originates from a spring pool and flows one and one third miles toward the gulf before disappearing into a sink that probably contributes discharge to the Homosassa River. The Homosassa and Halls rivers receive a small amount of surface runoff from their 56-square mile watershed, and similarly the Hidden River receives some runoff from its watershed. The majority of flow in the system arises, however, from the continuous spring discharge derived from the approximate 270-square mile springshed. Spring discharge to the system exhibits only moderate seasonal variation, with lower flows in summer when tidal stage is highest. Estimated combined discharge past United States Geological Survey (USGS) gages in the Homosassa main springs run and the southeast fork of the Homosassa River has averaged 152 cubic feet per second (cfs) for the period from 1995 through 2009.

#### Purpose/Approach

The purpose for establishing minimum flows for the Homosassa River system is to ensure that flow of freshwater is sufficient to prevent significant harm to natural and human-use resource values associated with the system, in accordance with state law. To develop recommended minimum flows, a number of ecological resources were evaluated for sensitivity to reduced flows using both numeric models and empirical regressions. Resources evaluated included the amount of salinity-based habitats, fish and invertebrates, shoreline vegetation and thermal-refuge habitat for the West Indian manatee. Because spring discharge and consequently river flow in the system are relatively constant, minimum flow criteria were not evaluated on a seasonal basis. Declines in flow to the system associated with groundwater withdrawals were estimated to be approximately 2.3 cfs, including a 1 cfs decline in the springs contributing to flow past the USGS gages in the Homosassa main springs run and southeast fork. This 1 cfs change in flow was considered insignificant as compared to the estimated average flow of 152 cfs for the two sites, so available flow records for the sites were considered representative of baseline conditions for evaluation of minimum flow criteria. Because break-points in

ecological responses were not observed, a 15 percent loss of resource or habitat was adopted as representative of significant harm.

Based on review of resource and habitat-based criteria, the recommended minimum flows for the Homosassa River system are defined as a five percent reduction from baseline flows. Given the minimal existing withdrawal impacts on flow, the recommended minimum flows are a five percent reduction from combined flows measured on a daily basis at the USGS gage sites in the Homosassa springs run and southeast fork of the Homosassa River.

The data, methodologies and models used to develop the recommended minimum flows are summarized in the report "*Recommended Minimum Flows for the Homosassa River System*," which is attached as an exhibit to this recap.

#### Benefits/Costs

The recommended minimum flows were developed to ensure that natural and human-use resource values associated with the Homosassa River system are protected from significant harm that could result from consumptive water use.

The next step toward establishing the minimum flows involves peer review of the recommended minimum flows by an independent scientific panel. The panel will conduct their review and report to the Governing Board at a future meeting. Following a favorable peer review report, staff will return to the Board with proposed rule language to establish minimum flows for the Homosassa River system.

#### Staff Recommendation:

#### See Report

This item is submitted for the Committee's information, and no action is required.

<u>Presenter</u>: Doug Leeper, Chief Environmental Scientist, Resource Projects Department











### Tidal River Minimum Flows Study Elements

- · Withdrawal impacts
- Structural alterations
- Bathymetry
- Shoreline and submersed vegetation
- Benthic invertebrates
- Fish and invertebrate plankton and nekton
- Salinity-based habitats
- Thermal refuge volume for manatees

#### Florida Statutes, Section 373.042 - Minimum Flows and Levels -

The <u>minimum flow</u> for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

The <u>minimum water level</u> shall be the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources of the area.

#### Recommended Minimum Flows

A five percent reduction in baseline flows measured as combined daily mean flow past the USGS Homosassa Springs at Homosassa Springs, FL and Southeast Fork Homosassa Springs at Homosassa Springs, FL



#### MINUTES OF THE MEETING

#### GOVERNING BOARD SOUTHWEST FLORIDA WATER MANAGEMENT DISTRICT

BROOKSVILLE, FLORIDA

JULY 27, 2010

The Governing Board of the Southwest Florida Water Management District (SWFWMD) met for its regular meeting at 9:02 a.m. on July 27, 2010, at the District's headquarters in Brooksville. The following persons were present:

Board Members Present Ronald E. Oakley, Chair Hugh Gramling, Vice Chair H. Paul Senft, Secretary Douglas B. Tharp, Treasurer Jeffrey M. Adams, Member Carlos Beruff, Member Jennifer E. Closshey, Member Neil Combee, Member Albert G. Joerger, Member Todd Pressman, Member Maritza Rovira-Forino, Member Judith C. Whitehead, Member

Board Member(s) Absent Bryan K. Beswick, Member <u>Staff Members</u> David L. Moore, Executive Director William S. Bilenky, General Counsel Lou Kavouras, Deputy Executive Director Richard S. Owen, Deputy Executive Director Eugene A. Schiller, Deputy Executive Director Bruce C. Wirth, Deputy Executive Director

<u>Board's Administrative Support</u> LuAnne Stout, Administrative Coordinator Tahla Paige, Senior Administrative Assistant

A list of others present who signed the attendance roster is filed in the permanent records of the District. This meeting was available for viewing through internet streaming. Approved minutes from previous meetings can be found on the District's Web site (www.WaterMatters.org).

## **Public Hearing**

#### 1. Call to Order

Chair Oakley called the meeting to order and opened the public hearing. Mr. Senft noted a quorum was present.

#### 2. Pledge of Allegiance and Invocation

Chair Oakley led the Pledge of Allegiance to the Flag of the United States of America. Mr. Bilenky offered the invocation.

#### Public Hearing

Chair Oakley introduced each member of the Governing Board. He noted that the Board's meeting was recorded for broadcast on government access channels, and public input was only taken during the meeting onsite.

Chair Oakley stated that anyone wishing to address the Governing Board concerning any item listed on the agenda or any item that does not appear on the agenda should fill out and submit a speaker's card. To assure that all participants have an opportunity to speak, a member of the public may submit a speaker's card to comment on agenda items only during today's meeting. If the speaker wishes to address the Board on an issue not on today's agenda, a speaker's card

may be submitted for comment during "Public Input." Chair Oakley stated that comments would be limited to three minutes per speaker, and, when appropriate, exceptions to the three-minute limit may be granted by the Chair. He also requested that several individuals wishing to speak on the same issue/topic designate a spokesperson.

#### 3. Additions/Deletions to Agenda

Chair Oakley noted for the record that there are no changes to the agenda. (Track 1 - 00:00/04:40)

#### 4. <u>District R ecognition – Florida N ursery, G rowers and Landsc ape Association</u> <u>Recognizes District for Landscape Challenge</u>

Mr. Michael Molligan, Director, Communications Department, said the Florida Nursery, Growers and Landscape Association (FNGLA) recognized the District for its support of the Landscape Challenge, an event that encourages landscape best management practices that protect water resources. On April 16, the District's first Landscape Challenge event was held at the Pay it Forward Farm (PIFF) in Pasco County. Ms. Merry Mott, FNGLA Director of Industry Certifications, addressed the Board and noted that also here today was Ms. Christine Collins of PIFF. Ms. Mott said that Ms. Collins and the District's Senior Communications Coordinator Sylvia Durell were hosts of the April 2010 landscape challenge in Spring Hill. The Landscape Challenge is unique among the industries' professional programs in providing hands-on instruction in a competitive format that allows participating teams from professional landscape maintenance companies and government facilities departments to demonstrate their real-world application of skills learned. Messrs. Kris Miller, Steve Noble, Silas Rooker and Jesse Stephens from the District's Facilities & Construction Services Section represented the District in the Challenge and won third place out of seven teams. Ms. Mott presented a plaque to the District. Mr. Gramling complimented District staff, FNGLA and other industry entities for the tremendous partnership forged for conservation and water quality in the landscaping industry. (Track 1 - 04:40/11:00)

This item was presented for the Board's information, and no action was required.

#### 5. Employee Recognition

Mr. Moore recognized staff members who have achieved milestones of 20 years or greater.

Milestone	Employee Name	Title	Department	Office Location
Retirement	Tim Bailey	Field Operations Supervisor	Operations	Tampa
25 Vooro	Rick Judd	Lead Tradesworker	Operations	Brooksville
25 Tears	Dan Roche	Senior Heavy Equipment Operator	Operations	Tampa
20 Years	Joe Oros	Senior Prof Geologist/Engineer	Bartow Regulation	Bartow

Mr. Mike Holtkamp, Director, Operations Department, provided a brief history of Mr. Tim Bailey's 37 years of service and presented him a plaque in honor of his retirement. (Track /1 - 11:00/22:23)

This item was presented for the Board's information, and no action was required.

# Consent Agenda

#### Finance & Administration Committee

- <u>Budget Transfer Report</u> Staff recommended to approve the Budget Transfer Report covering all budget transfers for June 2010.
- 8. <u>Board Policy No. 190-2, Information Security</u> Staff recommended to approve Board Policy 190-2, Information Security.

#### Executive Director's Report

9. <u>Approve Governing Board June 29, 2010 Meeting Minutes</u> Staff recommended to approve the minutes.

Following consideration, **Ms. Closshey moved, seconded by Ms. Rovira-Forino, to approve the Consent Agenda as presented. Motion carried unanimously.** (Track 2 – 00:00/00:40)

6. <u>Public Input for Issues Not Listed on the Published Agenda</u> Chair Oakley noted that no requests to speak were submitted. (Track 2 – 00:40/00:57)

Chair Oakley relinquished the gavel to Finance and Administration Committee Chair Tharp.

## **Finance and Administration Committee**

#### **Discussion Items**

10. Consent Item(s) Moved for Discussion - None

#### 11. <u>Fiscal Y ear 2011 B udget U pdate and Adoption of P roposed D istrict and B asin</u> <u>Millage Rates</u>

Committee Chair Tharp said today the Governing Board needs to adopt proposed millage rates for the General Fund and the Basins. The Basin Boards met in June and adopted proposed millage rates for recommendation to the Governing Board. These millage rates will be used by the property appraisers to develop the Notices of Proposed Property Taxes that will be mailed to homeowners in August. After the proposed millage rates are adopted, the millage rates can be lowered but not raised. Before adopting the proposed millage rates, staff will present an update of the recommended fiscal year (FY) 2011 budget, focusing on proposed changes since the last meeting on June 29, 2010. Staff will also provide an overview of the Program Budget that was postponed from the June meeting.

Committee Chair Tharp said the update will highlight the July 1, 2010 Certifications of Taxable Value that were received from the District's 16-county property appraisers, and the revised estimate of ad valorem revenue for FY2011; along with other revenue and expenditure adjustments in the General Fund and changes to Basin budgets. Last month, the Board requested further discussion of District staffing and staff will be prepared at the August Board meeting to provide a presentation. Staff will also provide an update in August of the District's Long-Range Water Supply and Water Resource Development Funding Plan through 2030, along with any other topics of interest requested today.

Committee Chair Tharp urged Board members to contact Mr. Schiller or Ms. Linda Pilcher, Assistant Director of the Finance Department, to discuss any budget matters between meetings. He pointed out that, by July 21, the District had received 100.2 percent of the proposed budget meaning the funds are already available to fulfill the FY2010 budget. (Track 3 - 00:00/02:42)

Mr. Schiller provided an overview of the proposed fiscal year budget. He said staff is recommending approval of the required resolution for the adoption of proposed millage rates for FY2011. He noted that budget updates will be provided monthly for the Governing Board's consideration through adoption in September. The budget calendar shows the next action is the August 1 Budget report to the Governor. This report will reflect the budget as presented to the Board today. Although not shown on calendar for August 5, he and Ms. Pilcher, along with Mr. David Rathke and Ms. Colleen Thayer of the District's Community and Legislative Affairs Department, will meet in Tallahassee with the Governor's staff and staff from the Senate and House to review the District's tentative budget. In August, the Basin Boards will adopt final millage rates and budgets for recommendation to the Governing Board. At the August 24 Governing Board meeting, staff will provide an update of the District's Long-Range Water Supply and Water Resource Development Funding Plan through 2030, and present additional information regarding staffing. Based upon the Long-Range Funding Plan, the Governing Board may wish to consider any adjustments in the General Fund millage at the August 24 meeting.

Mr. Schiller summarized the impact of the July 1 Certifications of Taxable Values the District received from the 16-county property appraisers. For the District's General Fund, based on declining property values and assuming the same millage rate as FY2010, ad valorem revenue will be \$12.9 million (10.8 percent) less than FY2010; in comparison, last year the tax base declined by 11.6 percent. For the Basins, based on declining property values and a reduction in the millage rate for the Hillsborough River and Pinellas-Anclote River Basins, ad valorem revenue will be \$9.7 million (14.2 percent) less than FY2010; combined ad valorem revenue will be \$22.6 million or 12 percent less than FY2010 at this point in time, subject to final decisions.

Mr. Schiller then provided a brief update on the recommended changes to the budget since the Board's last meeting. Except for the Basins, there are few changes at this point, and he identified the changes that have been made to the Budget, by Fund, since June 29. The District-wide budget as of this date is \$282.9 million, an increase of \$7.0 million since June 29. This is primarily due to \$6.1 million in additional balances from prior year for the Basins related to canceled projects, projects completed under budget and interest earnings in excess of budget. The General Fund budget has increased by \$597,000. This primarily relates to the re-allocation of \$791,000 in prior year state trust funds for water supply resource development projects. These increases are offset by \$194,000 in expenditure reductions. (Track 3 - 02:42/08:55)

In summary at this point in time, Mr. Schiller said the District's budget is down \$16 million from FY2010. This is primarily due to (1) \$22 reduction in ad valorem revenue compared to FY2010; and (2) \$9 million reduction in state (\$8 million) and federal (\$1 million) funding. The impact of these decreases in revenue is lessened by a \$15 million increase in balances available from prior years mainly due to the cancellation of the City of Tampa projects. Finally, this budget includes \$166 million (59 percent of total budget), including the District's cooperative funding programs, that will be contracted out and directly benefit private industry, in these difficult times. These funds will be leveraged with an estimated match of \$84 million by cooperator partners for a total potential investment of \$250 million (Water Supply and Resource Development (WSRD)/Cooperative Funding – \$95.3 million plus Outsourcing – \$85.8 million, less WSRD/Cooperative Funding/Surface Water Improvement and Management (SWIM) in outsourcing – \$14.9 million equals \$166.2 million). (Track 3 – 08:55/10:30)

Mr. Schiller said at the last meeting there was discussion regarding the District's encumbrance balances which are starting to decline over the last couple of years and staff expects this trend to continue. As staff has previously discussed with the Governing and Basin Boards, the District enters into legal contracts to fund operations, Cooperative Funding and other projects, and the funds are encumbered or set aside at that time. Encumbered funds cannot be utilized for other purposes until the project is cancelled, the contract scope is reduced, or the project is completed under budget. The District requires the cooperators to set aside their funding within their annual budgets. In governmental accounting, encumbered funds cannot be used for other purposes. If the funds become available, they can be added to fund balance and used for other projects. Alternatively, the Governing and Basin Boards could consider reductions in millage depending upon long-range funding requirements. Reserves are funds encumbered for future projects and constitute funds set aside consistent with the District's successful pay-as-you-go philosophy. The District's approach of setting aside any revenue from increases in taxable value has worked well in good times to ramp up for projects, as well as to provide adequate funds to address District priorities in a time of declining revenues. The District is well positioned to finance core priorities until the economic climate improves.

Mr. Schiller said that, as of June 15, the District has \$614 million in encumbrances (\$479 million for ongoing projects (General Fund \$313 million and Basins \$166 million) and \$135 million in WSRD Reserves (General Fund \$108 million and Basins \$27 million). Basin encumbrances are approximately equal to the 2005/2006 levels. General Fund encumbrances are \$166 million. This includes major projects such as \$50 million for the Lake Hancock land acquisitions; \$20 million for Tampa Bay Water System Configuration II; \$14 million for the Southwest Polk County-Tampa Electric Company project; and \$11 million for Peace River Manasota Regional Water Supply Authority Regional Loop System. (Track 3 - 10:30/14:08)

Mr. Schiller said the Balances from Prior Years are used as a source of funding for new projects. All balance forward dollars are re-budgeted by the Governing and Basin Boards, in a pay-as-you-go system. Fiscal years 2003, 2004, 2005, 2006 and 2007 are more typical of the District's traditional levels of balance forward. The significant increases since FY2008 are unprecedented and relate to the cancellation of major projects that had been funded at least in part over multiple years, and to project bids below estimates in these weak economic times. For example, of the \$40 million in Basin Balances for FY2009, \$13.3 million is due to the cancellation of the Tampa Bay Regional Reclaimed Water Project which impacted six basins. This allowed them to re-budget the funds for other purposes. Another example of the \$55.1 million in Basin Balances for FY2011 is \$25 million due to the cancellation of three Hillsborough River Basin cooperative funding projects by the City of Tampa. These funds have been re-purposed for other current projects and reserves for future projects. Finally, due to fewer requests for funding combined with higher than normal balance forwards and an extension in the timeline for new water supply and other long-range funding requirements through 2030, both the Hillsborough and Pinellas-Anclote River Basins are recommending reducing their millage rates for FY2011. While there will be a lag time over the next couple of years as the economy and cooperator budgets stabilize, these higher levels of balances from prior years are not expected to continue long-term. (Track 3 – 14:08/18:30)

Discussion ensued regarding outsourced dollar details, operating expenses, reserve and revenue dollars, balance forward funds, cash flow, balance between the growth of capital and expenses, projects declining, millage reduction, cooperative funding percentages, ad valorem valuations, ecosystem acquisitions, future impacts such as numeric criteria

standards, and regional funding. Mr. Moore said staff will address the Board's concerns at the August meeting. (Track 3 – 00:18:30/01:11:40)

Mr. Schiller noted that the District's revenue budget's peak years were FY2007 and FY2008. In FY2009, FY2010 and continuing into FY2011, ad valorem revenue reflects the fall of the real estate market, with declining property values and limited new construction. Property values are expected to stabilize and bottom-out by FY2012. Total District revenues are now at the FY2005 through FY2006 levels. Finally, as ad valorem revenues have decreased and the District has held the line or reduced operating expenses, combined with higher than normal balance forwards, the District has been able to create a stable financial climate while continuing to meet its highest priorities, without bonded debt. (Track 3 - 01:11:40/01:14:46)

Mr. Beruff requested a chart showing the capital amounts on June 30 from FY2001 through FY2010 and outsourcing dollars annualized for that same ten-year period. Mr. Schiller said the best representative date is fiscal year end which is September 30. Mr. Beruff agreed. Mr. Schiller then introduced Mr. Mazur. (Track 3 – 01:14:46/01:20:03)

Mr. Roy Mazur, Director, Planning Department, presented the FY2011 budget by statutorily defined program categories which are how the budget is submitted by all the water management districts to the Office of the Governor. The information was prepared by allocating each activity among Areas of Responsibility (AOR) using the best estimates. (Track 4 - 00:00/07:26)

Mr. Schiller said staff is recommending to approve Resolution No. 10-11, Adoption of Proposed District and Watershed Basin Millage Rates for Fiscal Year 2011.

Proposed District Millage Rate	0.3866 mill
Proposed Watershed Basin Millage Rates	
Alafia River Basin	0.2163 mill
Hillsborough River Basin	0.2300 mill
Coastal Rivers Basin	0.1885 mill
Pinellas-Anclote River Basin	0.2900 mill
Withlacoochee River Basin	0.2308 mill
Peace River Basin	0.1827 mill
Manasota Basin	0.1484 mill

Following consideration, Mr. Gramling moved, seconded by Ms. Closshey, to approve Resolution 10-11, Adoption of Proposed District and Watershed Basin Millage Rates for Fiscal Y ear 2011, as pr esented. M otion car ried unanimously. (Track 4 - 07:26/09:37)

Committee Chair Tharp thanked staff for their work since the budget is an arduous task. He said the discussion today was extremely beneficial, and he thanked the Board members for their input.

#### Submit & File Report

The following item was submitted for the Committee's information, and no action was required. 12. **Fiscal Year 2010 Third Quarter Financial Report** 

#### **Routine Reports**

The following items were provided for the Committee's information, and no action was required.

- 13. Treasurer's Report, Payment Register, and Contingency Reserves
- 14. Management Services Significant Activities

Finance and Administration Committee Chair Tharp relinquished the gavel to Chair Oakley since the order of consideration was altered to hear Item 35. (Track 4 – 07:26/09:59)

## **General Counsel's Report**

#### Discussion Item

# 35. Initiation of L itigation – WUP N o. 20010392. 005 – Milmack, Inc. (Oakwood G olf Club) – Polk County

Ms. Amy C. Wells, Staff Attorney, Office of General Counsel, said on June 29, 2010, District staff presented this matter to the Governing Board and requested authorization to initiate litigation against Milmack, Inc. (permittee) and any other appropriate parties to obtain compliance, a monetary penalty, and recovery of District enforcement costs, court costs, and attorney's fees. Representatives from the permittee and the owners of the surrounding development, Oakwood Land Company, also provided public comment. The Governing Board requested that this item be deferred to its July 27, 2010 meeting to allow the permittee an additional opportunity to work with District staff. Governing Board members also expressed an expectation that the permittee make substantial progress toward resolving this matter by the July Board meeting.

Ms. Wells said there is no additional information to indicate that staff should change its original recommendation. Staff is recommending that the Board authorize initiation of litigation against the permittee and any other appropriate parties to obtain compliance, a monetary penalty, and recovery of District enforcement costs, court costs and attorneys' fees.

Mr. Brian S. Starford, P.G., Director, Bartow Regulation Department, provided an overview of staff's actions since the Board's last meeting. On June 30, 2010, District staff met with the permittee and its representatives to discuss what items need to be completed prior to the next Governing Board meeting. Those items were outlined in a letter dated July 1, 2010, and included the following: installation of a meter on the surface water withdrawal and submittal of meter reading data, in accordance with Special Condition 7 of the permit; establishment of appropriate acreages for fairways, tees, and greens for each of the permittee's 18 golf course holes; and submittal of an application for permit modification, if the permittee can demonstrate justification for an increased quantity. District staff also committed to providing staff to perform leak detection and to perform an irrigation audit on the permittee's irrigation system, and to provide recommendations the permittee could employ to improve the system's efficiency. No leaks were detected, the irrigation audit was done, and the acreages calculated approximately.

Following consideration, Ms. Rovira-Forino m oved, seconded by Mr. Beruff, to authorize i nitiation of litigation against the permittee and any other appropriate parties to obtain compliance, a monetary penalty, and recovery of District enforcement costs, court costs and attorneys' fees. (Track 5 - 00:00/17:36)

In response to Mr. Senft's question, Mr. Starford said he could not confirm whether the District had received information that the meter was ordered/installed. Mr. Adams said the irrigation appears outdated and questioned what is the District's ultimate goal: to win the litigation or work with someone who is trying to work with staff. (Track 5 - 17:25/20:50)

Mr. Dan O'Neal, golf professional and general manager of Oakwood Golf Club, said he has renovated and built six different golf courses. He said he has over 40 years

experience as a golf pro and superintendent. Mr. O'Neal said the meter was installed yesterday and the Club has done everything requested by the District. The Club is not being given credit for 116.8 acres – not allotted enough water. Mr. O'Neal claimed that the Bartow Service Office mandated in 2004 to allow a developer to remove dirt to allow his property to drain onto the Club property. He believed this created a situation where seven holes were under water for over a year and these areas had to be rebuilt. Now the Club is facing a fine and the fairways are brown due to the reduction of water. The Club is doing what it can to stay in business and comply with the permit. Mr. O'Neal said he is requesting water usage for 116.8 acres. (Track 5 - 20:50/25:55)

Mr. Ron Mackail, representing Oakwood Golf Club, said the meter was installed late yesterday. Regarding establishing appropriate acreage for fairways, tees and greens, Mr. MacKail said he called the Bartow Service Office to ask how staff establishes acreage but did not receive that information until today when Mr. Starford provided his overview. He read from the July 21, 2010, letter sent by staff which stated that the method to calculate acreages was not appropriate. He claimed the Club has received a letter stating that the course's management was very good. He said the amount of pumpage from December 31, 2008, was 337,500 gallons per day (gpd). He said he calculates the amount to be 238,500 gpd. He said the permit goes back to 2003 when the course was built which comes to 164.53 acres. He asked how the permit went from 164.53 acres to 97 acres. The number of gallons reported from 1994 through 2000 shows historically the consistency of pumpage since the beginning. Mr. MacKail said he does not understand what changed. (Track 5 – 25:55/34:15)

In response to Ms. Closshey's inquiry, Mr. Bilenky said the Board is a policy-setting body. In response to Mr. Senft's question, Mr. Starford said the original permit was evaluated in 1993 and subsequent modifications were made in 2003 when Southern Water Use Caution rules went into effect.

Mr. Bilenky said the District pursues litigation when there may not be recovery of the penalties because, once the District has a judgment for a permit, it places the District in a higher category for recovery as a judgment creditor. Penalties are not based upon staff's efforts or duration of working with the permittee but upon the quantity of overpumping versus quantity of the permit. Penalties are based not on what the applicant is doing but what he should be doing under rules that are applied to all permittees of like consideration. Ms. Wells said the District's proposed penalty to the permittee was calculated based upon four months of overpumping for at least five years. Mr. Bilenky said technical staff was first involved to bring permittee into compliance before sending the file to his office in the beginning of 2009. (Track 5 - 34:15/41:23)

Mr. Pressman asked to see Mr. McKail's permit. Ms. Rovira-Forino noted that, in her records, the first report of overpumpage was in 2008. Ms. Closshey said the Board is setting a precedence and policy about staff handling permittees that are not in compliance. She said there are permits on the overpumpage report showing two or four months, not five years. Mr. Senft noted that staff has been working with the permittee for several years and staff has not been given proof the meter was installed. He noted there needs to be attention to detail. Mr. Adams said he appreciated the additional information provided today.

In response to Mr. Pressman's question, Mr. Owen said the first permit was probably based upon the owner's calculation of acres. He said the first Southern Water Use Caution Area rules altered all permits for efficiencies. Mr. Owen said the golf course

superintendents were vetted for over a year and involved in the public meetings. He said all permittees were notified of modifications. Mr. Gramling said the Board is giving the General Counsel the authority to begin the process.

Mr. Gramling called the question and the motion carried unanimously. (Track 5 - 41:23/47:17)

Chair O akley t hen as ked t he B oard t o v ote on t he m otion approving t he st aff recommendation. Motion carried unanimously. (Track 5 - 47:17/48:17)

At this time, the Board meeting recessed to provide a lunch break and reconvened at 12:33 p.m.

Chair Oakley relinquished the gavel to Regulation Committee Chair Beruff.

## **Regulation Committee**

#### Discussion Items

#### 15. January 2010 Freeze Event

a. Update on Rulemaking Amending 40D-3.600, Florida Administrative Code (F.A.C.), t o E xpand North and S outh D over Areas Having S pecial Well Construction Standards

Mr. Owen said, in 2002, the District adopted Rule 40D-3.600, F.A.C., which sets forth special well construction standards for potable wells in and around the Dover-Plant City area, to address potential impacts to such wells as a result of significant groundwater use by the surrounding agricultural community during frost/freeze events. At the May 2010 Governing Board meeting, the Board authorized the initiation of rulemaking and approved proposed amendments to Rule 40D-3.600, F.A.C., to expand the North and South Dover Areas. This expansion is based on the effectiveness of the required casing depths in preventing well impacts, as demonstrated during the extensive freeze events of January 2010. The amendments also clarify that the well construction standards required by the rule extend to both new and modified or repaired wells.

A notice of rule development was published in the Florida Administrative Weekly on June 4, 2010, and the proposed rule amendments were published on June 11, 2010. Interested persons had 21 days, or until July 2, 2010, to submit comments or objections, request a public hearing or provide a proposal for a lower cost alternative to the proposed amendments. No public comments or request for a public hearing have been received, nor has any proposal for a lower cost alternative been submitted. The rule amendments were also provided to the Joint Administrative Procedures Committee (JAPC) for review and comment on June 11, 2010. To date, no comments or objections have been received from JAPC. Staff intends to file the amendments with the Department of State following the July Board meeting, and anticipates that the expanded North and South Dover areas will be effective in August 2010. (Track 6 – 00:00/02:45)

This item was presented for the Committee's information, and no action was required.

b. <u>Status of Voluntary Payments by Agricultural Industry Representatives of Well</u> <u>Repairs Outside Permittee Mitigation Areas, Discussion of Litigation Options on</u> <u>District-Paid Repairs and of Outstanding Well Liability Cases in Legal</u>

Mr. Bilenky noted there remain three distinct groups of impacted citizens. Of the three, only the first group of impacted citizens, those for which the District expended funds pursuant to its Executive Director's Emergency Order of January 27, 2010, will require a Board vote seeking authority on how to proceed. Ms. Adrienne Vining, Staff Attorney, Office of General Counsel, provided a status report of all claims.

Class II Homeowners – There were a number of wells that were outside any mitigation circle and as a result, there were no identifiable responsible permittees. Repairs were undertaken by the homeowners who incurred expenses in the aggregate amount of \$41,953.72. Thirty-eight homeowners accounted for the expenditures or an average of approximately \$1,100.00. Only two of the expenditures exceeded \$2,000. Voluntary contributions to reimburse the costs of remediation have been made by the Department of Agriculture and Consumer Services; Florida Strawberry Growers Association; Florida Citrus Mutual, Inc.; Tampa Bay Wholesale Growers, LLA; Florida Blueberry Growers' Association; and the Florida Tropical Fish Farms Association, Inc.

Class III Homeowners – Those homeowners within an identified mitigation area of a permittee who self mitigated. Sixty-five litigation files were sent to legal and nine were resolved without recourse to any formal proceeding, leaving 56 remaining that have not been resolved. These cases constitute a total liability of \$114,950.00 of which \$26,258.00 was paid by the District to drill three new wells using funds authorized by the Governing Board under the Emergency Order.

Class I Homeowners (Emergency Order Citizens) - There was a group of citizens who were outside a mitigation area of any permittee or who had adversely impacted wells where the permittee was refusing (for whatever reason) to remediate a well, and by the date of the Board meeting, the homeowners were still without potable water. The Board authorized the Executive Director to execute an emergency order to meet an immediate risk to public health safety or welfare as a result of the impacts to individual wells caused by the pumping of ground water for frost freeze protection in the vicinity of Dover, Florida. The Emergency Order was issued on January 27, 2010. The District incurred emergency expenditures of \$78,300.10 for remediation of homeowner wells for which there is no responsible permittee. District staff has requested each homeowner repay the District in the event of receipt of insurance coverage or other recovery. Based upon the fact that public funds were expended pursuant to an emergency order for health safety and welfare and the staff has made a reasonable effort to obtain reimbursement from the affected homeowners without success, the only method remaining is for the District to seek recovery through litigation. In light of the facts that these homeowners were unable to remediate on their own accord and the cost of pursuing 20 individual recoveries through county and circuit court would probably cost more than would be recovered, District staff recommends that the Board direct the staff that it would not be in the public interest to expend additional public funds to seek recovery through litigation of these claims.

Staff recommended the District-incurred emergency expenditures of \$78,300.10 for remediation of homeowner wells for which there is no responsible permittee; and that, as to those claims arising under "class I homeowners," the Board direct staff that it would not be in the public interest to expend additional public funds to seek recovery through litigation of these claims. Following consideration, **Mr. T harp m oved**,

seconded by Ms. Rovira-Forino, to approve the staff recommendation as presented. Motion carried unanimously. (Track 6 - 02:45/19:38)

Mr. Moore said he thanks staff for their hard work in following up with each homeowner. Mr. Owen said staff will provide a status report at the next meeting.

c. <u>Initiate Rulemaking to Amend 40D-2, 40D-8 and 40D-80, F.A.C., to Establish a</u> <u>Water Use Caution Area in the Dover/Plant City Area and Associated Water Use</u> Permitting Requirements, Minimum Level and Recovery Strategy

Ms. Alba E. Más, P.E., Director, Tampa Regulation Department, said in June District staff completed its sessions with the Technical Work Group and provided the Governing Board with an overview of staff's resulting Management Strategy for freeze protection in the Dover/Plant City area. The Board concurred with each of the elements of the Management Strategy as recommended by staff, either at the June meeting or in previous meetings, including seeking state and federal funding, expansion of the area subject to special well construction standards, a revised process for allocating investigation and remediation of well complaints, enhanced communications, local government planning and coordination, optimizing water use for freeze protection, enhanced data collection, and alternative freeze protection methods. The Board also concurred with implementation of an incentive-based, cooperatively funded program to reduce freeze protection quantities (tailwater recovery ponds, covers and foam; including use of the District's Facilitating Agricultural Resource Management Systems (FARMS) program to provide up to 75 percent of the costs).

One component of the Management Strategy that staff did not seek concurrence with at the June meeting is the development of regulatory strategies to limit and reduce groundwater pumpage in the Dover/Plant City area for freeze protection. Although several approaches have been evaluated and discussed with the Technical Work Group, a final recommendation had not been developed by staff. The next steps in implementing the Management Strategy are outreach/stakeholder meetings in July and August; initiation of rulemaking at the July Governing Board meeting and rule adoption scheduled for the November Governing Board meeting.

The actions taken were to reduce significantly the risk of sinkhole development and well problems that occurred during the January 2010 frost-freeze event in eastern Hillsborough County. The goal is to limit additional groundwater withdrawals in an area that experiences the greatest aquifer drawdown resulting from pumping during a freeze event and to reduce the use of groundwater currently permitted by 20 percent over the next ten years through incentive-based programs.

The draft action plan includes reduce the risk of sinkhole development and well problems, 20-percent reduction in withdrawals to keep aquifer levels 10 feet above sea level during freeze events, use an incentive based approach with a 10-year implementation, protect existing investments to the greatest extent practical, stabilize and reverse long-term aquifer level declines, enhance data collection networks to monitor progress, enhance outreach as an event approaches, during and after, and revise well mitigation allocation procedure. Required rule amendments to accomplish the action plan include declaring a water use caution area (256-square-mile area for FARMS and model, 30-foot drawdown contour for annual average and crop protection quantities), establishing minimum aquifer level for frost/ freeze event (10 feet above sea level at DV-1), developing a recovery strategy, and revising permitting criteria.

The new rules will require meters on Small General Water Use Permits and automated meter reading devices on all permits with frost-freeze protections, significantly constrain new groundwater quantities, require investigation of alternative methods of protection, modify complaint investigation criteria, use of the Florida Automated Weather Network (FAWN), and enhance use of tools like the FARMS program to address recovery in the area.

Rulemaking is necessary to implement the regulatory components of the Management Strategy, including the limitations on groundwater for freeze protection to be discussed at the July meeting, the complaint allocation process, and those aspects of alternative freeze protection methods and data collection that will be requirements for permittees. Staff will prepare draft rules for discussion at public workshops in August and September. Draft final rules will be presented to the Board for review and discussion at its October Board meeting with a request for approval planned for the November Governing Board. If there are no requests for hearings or objections from the Joint Administrative Procedures Committee, this will allow the rules to be effective at the beginning of January 2011.

Staff recommended to concur with the establishment of a Water Use Caution Area and minimum flows and levels in the Dover/Plant City area; and approve initiation of rulemaking to amend 40D-1, 40D-2, 40D-8 and 40D-80, F.A.C., to establish a Water Use Caution Area in the Dover/Plant City area and associated water use permitting requirements, a minimum aquifer level and associated recovery strategy.

Following consideration, Ms. Closshey moved, seconded by Mr. Senft, to approve the staff recommendation as presented. (Track 7 - 00:00/24:32)

Mr. Gramling said that, under the FARMS Program to receive cooperative funding, the District is only paying for capital expense items. He said that, as the variations are developed, the District continues to stay engaged and only do capital items. Ms. Closshey voiced her agreement. Mr. Bilenky noted that one of the enhancements is the length of time permittees have to respond. He said, if unable to have rules adopted in time, staff is considering emergency rules should another frost-freeze event occur. Mr. Gramling said a reasonableness clause is needed if due diligence has been done by the permittee. Mr. Owen said staff is considering a number of improved procedures for incorporation. Mr. Gramling said it needs to be in an enforceable format.

Motion carried unanimously. (Track 7 – 24:32/28:26)

16. Denials Referred to the Governing Board

There were no requests for applications or petitions referred to the Governing Board for final action.

#### Submit & File Report

The following item was submitted for the Committee's information, and no action was required.

#### 17. Individual Permits Issued by District Staff

#### Routine Reports

The following items were provided for the Committee's information, and no action was required.

- 18. Southern Water Use Caution Area Quantities
- 19. Overpumpage Report

#### 20. E-Permitting Metrics: Online vs. Paper Applications

Mr. Owen noted a new report was included to inform the Board of staff's goals for online permitting. By the end of FY2012, staff's goal is to have achieved a minimum of 85 percent application rate for electronic permitting.

#### 21. <u>Resource Regulation Significant Initiatives</u> (Track 7 – 28:26/30:06)

Regulation Committee Chair Beruff relinquished the gavel to Resource Management Committee Chair Joerger.

## **Resource Management Committee**

#### **Discussion Items**

#### 22. Hydrologic Conditions Status Report

Mr. Granville Kinsman, Manager, Hydrologic Data Section, said although June marks the start of the official four-month rainy season (June through September), rainfall during the month consisted of widely scattered showers, resulting in generally drier-than-average conditions. Drier conditions were especially evident in the northern region of the District. Storms that developed during the month generally tended to be stationary, and often delivered extreme amounts of rainfall in a short period of time in localized areas. The provisional District-wide 12-month rainfall accumulation shows a surplus of approximately 0.78 inch above the long-term average. The 24- and 36-month cumulative rainfall deficits improved during June, ending the month approximately 4.0 and 8.27 inches, respectively, below the historic average. The regionally inconsistent character of June rainfall resulted in locally different responses in hydrologic indicators. Groundwater levels and streamflow conditions posted declines in many areas, but all ended the month within statistical normal ranges. Regional lake levels ended the month at the low-end of the annual normal range in the Tampa Bay region, while remaining at below-normal levels in the Northern, Polk Uplands and Lake Wales Ridge regions. NOAA climate forecasts continue to indicate above-normal rainfall during the wet season (June through September) based on a predicted above-average Hurricane Season. Staff will continue to closely monitor conditions in accordance with the District's updated Water Shortage Plan, including any necessary supplemental analysis of pertinent data. (Track 8 – 00:00/13:02)

This item was presented for the Committee's information, and no action was required.

#### 23. Utility Outreach Program

Kenneth R. Herd, P.E., Water Supply Program Director, Resource Projects Department, provided an overview of the District's Utility Outreach Program. The District initiated a Utility Outreach Program to help accomplish the goals and objectives of the District's public water supply related strategic initiatives. The Outreach Program involves proactively working with the 193 water supply utilities within the District on water supply planning and management to assist local governments and utilities in developing and implementing programs to reduce their per capita water use and expand their use of reclaimed water and other alternative sources. Through this collaborative process, the District will inform utilities of key programs and resources, assist in identifying and developing water conservation related programs, and enable the District to better understand specific challenges the utilities face. A Utility Reference Manual was completed in June 2010 that concisely describes key District programs, the benefits to utilities, and where to obtain more information. Outreach teams for the Northern Region, Heartland Region, Tampa Bay Region, and the Southern Region were developed to be

consistent with the updated District's regional water supply planning process. (Track 9 - 00:00/19:30)

This item was presented for the Committee's information, and no action was required.

#### Submit & File Reports

The following items were submitted for the Committee's information, and no action was required.

- 24. <u>Proposed Minimum Flows Update for the Homosassa River Prior to Independent</u> <u>Scientific Peer Review</u>
- 25. Proposed Minimum Flows Update for the Upper and Middle Withlacoochee River Prior to Independent Scientific Peer Review

#### Routine Reports

The following items were provided for the Committee's information, and no action was required.

- 26. Florida Forever Funding
- 27. Minimum Flows and Levels
- 28. Structure Operations
- 29. <u>Watershed Management Program and Federal Emergency Management Agency Map</u> <u>Modernization</u>
- 30. Significant Water Supply and Resource Development Projects (Track 9 – 19:30/19:39)

Resource Management Committee Chair Joerger relinquished the gavel to Outreach and Planning Committee Vice Chair Closshey.

## Outreach and Planning Committee

Discussion Items - None

#### Submit & File Reports – None

#### Routine Reports

The following items were provided for the Committee's information, and no action was required.

- 31. Comprehensive Plan Amendment and Related Reviews
- 32. Development of Regional Impact Reviews
- 33. Speakers Bureau
- 34. Significant Activities
  - Ms. Kavouras said the 2012 Strategic Plan update began last month. In July, the strategic team held its first meeting. The focus of this year's update will be natural systems and water quality strategic initiatives.
  - Ms. Kavouras said it is never too early to teach water conservation to children. The District received the Community Partners of Excellence Award at the June 24, 2010 Headstart/Early Headstart Volunteer Appreciation Banquet. Staff has been working with the Hillsborough County Headstart Schools providing education grants, everything from water conservation curriculum which helps with science and math scores to water wise landscaping.
  - Ms. Kavouras said the District has been certifying several Florida Water Star<sup>™</sup> Gold homes. Three homes have received Aurora Awards from the Southeast Builders Conference. This is a prestigious award presented to home builders and granted in areas of water wise home, green construction and go green categories.

 Ms. Kavouras noted that each Board member received an outreach card for the Water PRO program for restaurants. When visiting a restaurant that does not participate, she asked that they leave the card with a manager who can visit the website to learn more. (Track 10 – 00:00/03:10)

Outreach & Planning Committee Vice Chair Closshey relinquished the gavel to Chair Oakley.

## **General Counsel's Report**

#### Submit & File Reports – None

#### **Routine Reports**

The following items were provided for the Committee's information, and no action was required.

- 36. Litigation Report
- 37. Rulemaking Update

(Track 11 – 00:00/00:17)

## **Committee Reports**

#### 38. Basin Board Education Committee Meeting

Ms. Rovira-Forino said the meeting was held on July 14, 2010, and included updates on the "Get Outside" campaign, water conservation month (April), bus wraps and the airport promotion; Starkey exhibits ribbon-cutting report; "Skip a Week" campaign results; Tampa Bay Estuary Program education efforts; and Water PRO outreach cards. The workshop for an overview of District education programs will be Thursday, September 16, 2010 at the Tampa Service Office.

#### 39. Basin Board Land Resources Committee Meeting

Mr. Joerger said the Committee met jointly for the second time with the Land Use Stakeholders at the Lecanto Government Center on July 14, 2010. Topics discussed included FY2011 meeting dates, land use and management plans, hunting, recreation monitoring, and multiple use/revenue generation analysis.

#### 40. Industrial Advisory Committee Meeting

Ms. Closshey said the meeting was held on July 20, 2010. Topics discussed included updates on South Pasture Mine Extension Project in Hardee County, integrated water use permitting, rulemaking, Plant City/Dover frost/freeze protection status, hydrologic conditions/drought and water shortage plan, numeric nutrient criteria, and Water Use Condition Data – Permit Information Center.

#### 41. Public Supply Advisory Committee Meeting

Mr. Senft said the meeting was held on July 20, 2010. Topics discussed included the Central Florida Coordination Area, hydrologic conditions/drought, water shortage restrictions and water shortage plan, frost/freeze protection status, hydrologic conditions/drought and water shortage plan, numeric nutrient criteria, Water Use Condition Data – Permit Information Center, and rulemaking.

#### 42. Well Drillers Industry Advisory Committee Meeting

Mr. Oakley said the meeting was held on July 21, 2010. Topics discussed included Hillsborough County pump inspections, limiting groundwater quantities and consideration of a more equitable approach for assigning well mitigation responsibility in the Dover Area, changes to the Department of Environmental Protection Minimum Construction Requirement per Chapter 62-532, F.A.C.; introduction to the new State of Florida Well Construction Permit and Well Completion Report forms and modifications/enhancements to the WMIS Well Construction Portal, and how to use the District's Permit Map Viewer. (Track 11 - 00:17/08:20)

## **Executive Director's Report**

#### 43. Executive Director's Report

 Mr. Moore said one of the Permitting Summer School panel discussions was water management-where it has come from and where it is heading-and emphasis was on the needs for legislative change. He and Mr. Senft attended a two-day workshop in the MyRegion.org area with experts from around the country to develop a work plan relative to the Orlando general area. He said the two common threads in discussions were conservation (consistent approaches by the five districts, per capita calculations, permit renewal quantity reductions remove incentive) and funding (eligible for state or district alternative supply funding dollars, restoration of funding state wide). Legislative change to further encourage the development of multi-jurisdictional entities to address issues. Other concerns discussed included permit durations, conjunctive uses, districts wear too many hats creating conflicts of interest and should either be a regulatory or a funding entity, collaborative efforts creating stakeholder teams, and clarity of mission for each district. Mr. Moore noted that, if Board members want to receive the presentation, they should send their request by email to Ms. Kavouras. Mr. Senft said the MyRegion.org workshop stressed thinking regionally across district lines and water plans for regions such as Tampa to Daytona area as a super region. He said a topic of concern was the statewide stormwater rule and the fact that it does not deal directly with stormwater draining into wetlands. Mr. Senft said harvesting stormwater and using it as a source was discussed as well. He noted that, at both events, this District is recognized and complimented for its method of funding, basins, advisory committees and other ways issues are handled. Mr. Tharp said he attended a session at the Permitting Summer School on conservation and there are many opportunities to think out of the box to introduce new innovative ideas. He said he felt the sessions were valuable and it should be mandatory for new Board members. (Track 11 – 08:20/20:25)

In response to Ms. Closshey's questions, Mr. Wirth said the desalination plant is on standby since water is available from surface water sources. Mr. Moore said the plant is not idle and water is circulating. Ms. Closshey requested a status report at next month's meeting.

## Chair's Report

#### 44. Chair's Report

- Chair Oakley thanked staff for their work in dealing with the items presented today.
- Chair Oakley noted the announcements listed on the agenda and that next month's meeting is in Wauchula.

There being no further business to come before the Board, Chair Oakley adjourned the meeting until the next regularly scheduled meeting. (Track 11 - 20:25/23:25)

The meeting was adjourned at 2:18 p.m.

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Director, 2379 Broad Street, Brooksville, Florida 34604-6899; telephone (352) 796-7211, ext. 4702 or 1-800-423-1476 (FL only), ext. 4702; TDD (FL only) 1-800-231-6103; or email to ADACoordinator@swfwmd.state.fl.us.

#### April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and various interested parties regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and interested parties regarding minimum flows development for the Homosassa River system. Attached e-mail was sent to support review of a draft document on the proposed minimum flows.

From:	Long Leeper
To:	"Alan Grubman"; Joyce Kleen@fws.gov; "oriswat@tampabay.rr.com"; "traci.wallace@MyFWC.com";
	"ted.hoehn@MvFWC.com"; "eric.nagid@MvFWC.com"; "Michael_Lusk@fws.gov"; "Smith_Kent"; "Kraus_Adimey_
	Nicole"; "Ramos, Keith"; "Mezich, Ron"; kwatson@hsweng.com; "Liewellyn, Janet"; "Vovies, Carolyn"; "Swihart,
	Tom": "Greenwood, Kathleen"
Ca	Marty Kelly; Ski Flannery
Subject:	Proposed Minimum Flows for the Homosassa River System
Date:	Friday, July 30, 2010 9:42:47 AM

#### Greetings:

David Lance

The Southwest Florida Water Management District is in the process of developing minimum flows for the Homosassa River system. As currently defined by state law, the minimum flow for a given watercourse "shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042(1)(a), Florida Statutes). Minimum flows are incorporated into District rules (Chapter 40D-8, Florida Administrative Code), and are used for water resource planning and regulatory purposes, including the evaluation of water-use permit applications.

A draft report entitled, "Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft" that summarizes the proposed levels for the Homosassa River system is posted under the heading "River Systems and Spring" on the Minimum Flows and Levels (Environmental Flows) Documents and Reports page of the District's web site at world wide web Uniform Resource Locator (URL) listed below. Printed copies of the documents are also available, upon request.

#### http://www.swfwmd.state.fl.us/projects/mfl/mfl\_reports.html

Additional information pertaining to adoption of minimum flows is also available from the District's Minimum Flows and Levels (Environmental Flows) Projects & Programs web page at:

#### http://www.swfwmd.state.fl.us/projects/mfl/

To develop the best minimum flows and levels for use in its regulatory programs, the Southwest Florida Water Management District subjects recommended minimum flows and levels and the methods used for

their development to independent, scientific review. The peer-review process for the proposed minimum flows for the Homosassa River system has been initiated and is expected to be completed in early October 2010. If warranted, findings from the peer-review panel will be used to modify the proposed minimum flows.

To further support review of the proposed minimum flows for the Homosassa River system, the District will host a rule development public workshop on this issue. This workshop has not yet been scheduled, but may be expected to occur in late August or early September. I'll provide additional workshop information in a subsequent e-mail once the meeting has been scheduled.

Finally, I urge you to read and evaluate the report associated with the proposed minimum flows for

### April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Sid Flannery and Priscilla Watkins regarding Homosassa River System MFLs

This memorandum documents correspondence between Sid Flannery (SWFWMD) and Priscilla Watkins regarding minimum flows development for the Homosassa River system. Attached e-mail was sent to support review of a draft document on the proposed minimum flows.

From:	Sid Flannery
To:	Priscila Watkins
Cc	Doug Leeper
Subject:	draft Homosassa minimum flows report
Date:	Thursday, July 29, 2010 10:55:22 AM

#### Ms. Watkins,

I sent to you in today's US mail three copies of the <u>draft</u> minimum flows report for the Homosassa River. This is the <u>draft</u> report that is going out for peer review. We will keep you informed of when the District expects to receive the report of the peer review panel. That will likely take a couple of months. Don't hesitate to contact me or Doug Leeper at the District if you have any questions about the draft report.

Sid Flannery Senior Environmental Scientist Southwest Florida Water Management District Brooksville, FL 34609-6899 phone: 352-796-7211, ext. 4277 email: sid.flannery@swfwmd.state.fl.us April 29, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and USFWS staff regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and Michael Lusk (USFWS) regarding minimum flows development for the Homosassa River system. Also included are slides shown at a meeting between SWFMWD and USFWS staff.

DAL Attachments

From:	Doug Leeper
To:	"Michael Lusk@fws.gov"
Cc	Marty Kelly; Mike Heyl
Subject:	Homosassa and Chassahowitzka River Minimum Flows
Date:	Friday, July 30, 2010 9:51:23 AM

Mr. Lusk:

As a follow-up to the e-mail I just sent to you regarding minimum flows that have been proposed for the Homosassa River system, I'd like to let you know that Mike Heyl and I are available to meet and/or discuss the minimum flows that have recently been proposed for the Homosassa and Chassahowitzka River systems.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org Frans To: Co: Subject Date: Attache Doug Leaper <u>"Hitse Link (Mark Cool"</u> <u>Hitse Link ( Mark Kale): Sid Benneny Xinian Chan</u> Ris: Nenceasas and Chasashowittis River Mininum Rows Nonday, August 60, 2010 12:19-30 PM

Mike:

A meeting at 1 PM on Thursday, August 12 at the Chestahowitska NWR Complex in Crystal River will work for Mike and I. It's possible that our boss, Marty Kelly will also join us – I haven't spoken with him yet regarding his schedule.

#### Look forward to meeting you.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Streat, Brookoville, R. 34604-6599 Telephone: 1-800-423-1476, est. 4272 (FLonky) or 352-796-7211, est. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org

From: Michael\_Lusk@fres.gov [mailto:Michael\_Lusk@fres.gov] Sent: Monday, August 02, 2010 11:21 AM To: Doug Leoper Subject: RE: Honocasa and Chassahowitzka River Minimum Flows

How about 1 PM on August 12 at our office here in CR? If you have not seen the Three Sisters Springs property, Id like for you to see that and explain how we are concerned about minimum flows and the management of that property. If that works for you, let me know and III put it on our schedule.

Michael Lusk Refuge Manager Chassahowitzka NWR Complex Chassahowitzka NWR Complex 1502 SE Kings Bay Dr. Crystal River, FL 34429 Phone: (352) 563 - 2088 Fax: (352) 795 - 7961 Email: Michael\_Lusk@fws.gov

"Doug Leeper «Doug Leeper@swfwmd state.fl.us»

Dong Leeper Deng Leepergrowfromd.state.flas Subjectif: Homosana and Chasadowitzia River Minimum Flows

Mike:

Here are a few potential meeting dates/times.

August 12, 1:00 PM August 18, 9:30 AM or 1:00 PM August 19, 1:00 PM August 20, 9:30 AM of 1:00 PM

We could meet at our Brooksville Office or at your office in Crystal River. Let me know what will work for you.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brookwille, FL 34604-6899 Telephone: 1-800-423-1476, ext: 4272 (FL only) or 352-796-7211, ext: 4272 Fax: 352-754-6885 E-Mail: dogs.leepen@ustermatters.org Web Site: watermatters.org

From: Michael Lusk@fur.gov [<u>mailto:Michael Lusk@fur.gov]</u> Sent: Friday, July 30, 2010 6-48 PM To: Dong Leeper Co: Mary Kally, Mike Heyt Boyd Bihovde@fur.gov; Joyce, Kleen@fur.gov Subject: Ro: Homosassa and Chassahowitzka River Minimum Flows

## Proposed Minimum Flows for the Homosassa and Chassahowitzka River Systems

Doug Leeper Mike Heyl Sid Flannery

Southwest Florida Water Management District

Chassahowitzka National Wildlife Refuge Crystal River, Florida

August 23, 2010



The **minimum flow** for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

The **minimum water level** shall be the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources of the area.

## Regulatory Use of Minimum Flows and Levels

- Water Resource Planning
- Water-Use Permitting
- Environmental Resource
  Permitting



## Minimum Flows and Levels Process

- Priority List and Schedule developed and updated annually
- Methods and flows/levels are developed and peer-reviewed
- Workshops held for public input
- Recovery or prevention strategies developed, as necessary
- Governing Board adopts flows or levels into District rules (Chapter 40D-8, Florida Administrative Code).
- Recovery strategies are included in regional water supply plans in in some case incorporated into District rules (Chapter 40D-80, Florida Administrative Code)

#### Tidal River Minimum Flows Study Elements

- · Withdrawal impacts
- Structural alterations
- Bathymetry
- Shoreline and submersed vegetation
- Benthic invertebrates
- Fish and invertebrate plankton and nekton
- Salinity-based habitats
- Thermal refuges for manatees

























#### **Recommended Minimum Flows**

#### Homosassa River System

A five percent reduction in baseline flows measured as combined daily mean flow past the USGS Homosassa Springs at Homosassa Springs, FL and Southeast Fork Homosassa Springs at Homosassa Springs, FL gages

#### Chassahowitzka River System

An eleven percent reduction in baseline flows past the USGS Chassahowitzka River near Homosassa, FL gage



	Со	ntac	act Information
Name:	Dougla	as A.	A. Leeper
Title:	Chief I	Enviro	ironmental Scientist
Mail:	South 2379 E Brooks	west   Broad sville,	t Florida Water Mgmt. District ad St. e, FL 34604-6899
Phone:	1-800- Extens	423- sion 4	3-1476 or 352-796-7211 4272
E-Mail:	doug.	leepe	per@swfwmd.state.fl.us
Web Si	te: w	/ww.s	<u>.swfwmd.state.fl.us</u> or rmatters.org



axon or Pseudo-Species	Benchmark Period	Baseline Flow* (cfs)	Baseline Abundance (number/ channel or number/ 100m <sup>2</sup> )	85% of Baseline Abundance (number/ channel or number/ 100m <sup>2</sup> )	Flow Associated with 85% of Baseline Abundance (cfs)	Percent of Flow Reduction Associated with 85% of Baseline Abundance (%)
Plankton-Net Captured			(number/ channel)	(number/ channel)		
Hargeria rapaxe	2007	130	67,242	57,155	128.1	1.4
	1995-2009	150	333,722	283,683	147.8	1.4
Lucanie parve postflexion larvae*	2007	130	1,407	1,196	128.2	1.4
	1995-2009	150	7,467	6,339	147.9	1.4
Ostracods, podocopid <sup>9</sup>	2007	130	31,031	26,376	128.2	1.3
	1995-2009	150	172,563	148,678	148.0	1.3
Acartía tonsa <sup>a</sup>	2007	130	1,294,494	1,100,319	128.6	1.1
	1995-2009	150	11,345,444	9,643,627	148.40	1.1
Eurytemora affinis <sup>e</sup>	2007	130	2,849	2,421	128.9	0.8
	1995-2009	150	49,686	42,233	148.8	0.8
Seine-Net Captured			(number/ 100m <sup>2</sup> )	(number/ 100m <sup>2</sup> )		
Palaemonetes intermedius <sup>a</sup>	2007	130	11.4	9.7	127.5	1.9
	1995-2009	150	35.8	30.4	146.9	2.1
Callinectus sapidus; c30 mm in lanothr	2007	130	1.4	1.2	129.1	0.7
Communication	1995-2009	150	16.1	13.7	148.3	1.1

Tannor Parala Iproin	Banchmark Parkel	Esselite Fast" (ch)	Reading Alexanderse	195 Decrease from Baseline Alemánico	Row Januaria with BY of Banalice Roundance (th)	Personi d Fan Reductor Imani viti 10% of East Residence (N
Collectionspiller						
s30mm inlangtr*	2007		us.		1.462	
Tonision pandar	1990.3008	12	u	13	1465	17
	2007	130	u	13	1077	U
Louispave	1992248				1854	
	200		101	2.2		
Camboola hallowah?	1992.248		200.1	2016	12.3	
	200					**
Panala laipiwa'	1000 2008	100		24	1383	14
	1000				1481	11
Syngradius assured	3007	120		14	1174	
	1880.33/8	100	17		1477	11
Lepania panalaka P	3007	120		11	1383	
	1999-2009	10	144	13.6	147.6	14
Merupinus salmoides'	2007	130	84	7.2	1264	1.0
	1990-2008	192	79.2	67.5	148.4	
Meropiena salmoidea*	2007	130	40	3.4	1292	44
	1995-2009	180	12.3	78.0	145.8	4.8
Legendon themiliation?	2007	130	4.0	7.6	1284	12
	1999-2008	180	63.1	45.1	1480	1.3
Leisatowas aandhanoo"	2007	130	-	NA.	84	NA
	1999-2008	180	083	88.4	1483	4.6
Transidies Contared			(number) 100m1)	(number) 100m/)		
Californius application	2007	130	61	0.1	1294	44
	1995-2008	180	60	0.7	1470	2.0
Syspectra anna?	2007	130	0.2	0.3	1283	64
	1990-2009	192	13	14	147.0	10

alinity-Based Habitat	Per Associated with 1	Percent-of-Flow Reduction Associated with 15% Reductions in Habitat from Median Baseline Conditions			
	Hydrodynamic Model 2007 Benchmark Period	Regression Model 2007 Benchmark Period	Regression Model 1935-2009 Benchmerk Period		
Bottom Area					
Salinity s 2 Based on Bottom Isohaline Location	<5	NM	NM		
Salinity s 2 Based on Water-Column Average Isoheline Location	<5	NM	NM		
Salinity ≤ 3 Based on Bottom Isohaline Location	5 - 10 (9.4)	< 5	< 5		
Salinity < 3 Based on Water-Column Average Isofeline Location	5 - 10 (9.1)	<5	< 5		
Salinity ≤ 5 Based on Bottom Isohaline Location	15	> 30	5 - 10 (6.3)		
Salinity ≤ 5 Based on Water-Column Average Isohaline Location	10-15	20	5 - 10 (7.0)		
Salinity s 12 Based on Bottom Isohaline Location	25	20	10		
Salinity s 12 Based on Water-Column Average Isohaline Location	25 - 30	30	10 – 15		
Water Volume					
Salinity < 2	<5	NM	NM		
Salinity ≤ 3	10	5 - 10 (5.3)	< 5		
Salinity s 5	15	20 - 25	5 - 10 (6.9)		
Salinity s 12	20 - 25	25	10 - 15		
Natural Shoreline Length					
Salinity s 2	NA	NM	NM		
Salinity ≤ 3	20 - 25	10 - 15	10 - 15		
Salinity ≤ 5	15 - 20	> 30	> 30		
Salinity s 12	NA	5	5		

Cold Condition	Flow Scenario	River Kilometer	Volume (m <sup>3</sup> )	Volumetric Change (m <sup>2</sup> )	Relative Chang (%)
Chronic	Baseline	11.46	64,566	NA	NA
	5% Reduction	11.53	64,153	412	1
	10% Reduction	11.58	63,859	707	1
	15% Reduction	11.67	63,144	1,422	2
	20% Reduction	11.73	62,632	1,934	3
	25% Reduction	11.84	58,191	6,375	10
	30% Reduction	12.10	30,901	33,665	52
Acute	Baseline	9.56	112,288	NA	NA
	5% Reduction	9.69	103,212	9,075	8
	10% Reduction	10.00	87,749	24,539	22
	15% Reduction	10.34	73,881	38,407	34















May 19, 2011

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Information on minimum flows and levels presentation to the Citrus County Task Force of the Citrus/Hernando Waterways Restoration Council

This memorandum documents information pertaining to a presentation on minimum flows and levels provided by Doug Leeper, a Chief Environmental Scientist with the District that was made to the Citrus Task Force on August 9, 2010.

DAL

Attachments:

s: A - Agenda for the August 9, 2010 Meeting of the Citrus Task Force

B - Slides prepared by Doug Leeper for an August 9, 2010 presentation to the Citrus Task Force C – Approved Minutes for the August 9, 2010 Meeting of the Citrus Task Force
# Attachment A

Agenda for the August 9, 2010 Meeting of the Citrus Task Force

## Citrus County Task Force Meeting Agenda

## August 9, 2010 2:00 p.m.

#### Lecanto Government Building 3600 West Sovereign Path, Room 166 Lecanto, Florida 34461

#### \*\*\*\*All meetings are open to the public\*\*\*\*

SWFWMD – Southwest Florida Water Management District      FFWCC – Florida Fish and Wildlife Conservation Commis        FDEP – Florida Department of Environmental Protection      FDOT – Florida Department of Transportation		FFWCC – Florida Fish and Wildlife Conservation Commission FDOT – Florida Department of Transportation
TAG – Technical Advisory Group    USACOE – United States Army Corp. of Engineers		
1.	Call to Order and Roll Call	
2.	Pledge of Allegiance	
3.	Approval of the June 14, 2010 Minutes	
4.	Flying Eagle Prescribed Burns – Philip Rhinesmith, a. Public Input	SWFWMD
5.	Oil Spill - Jamie Arleo, FDEP a. Public Input	
6.	Minimum Flows – Doug Leeper, SWFWMD a. Public Input	
7.	Summary of the July TAG Meeting – Allen Martin, Fa. Public Input	FWCC
8.	Advertising Notices for Task Force Meetings – Veron a. Public Input	nica Craw, SWFWMD
9.	Report to the Legislature – Task Force Members	
10.	Election of Officers a. Chair b. Secretary	
11.	Agenda for Next Meeting – Tuesday, September 14	4 and/or Monday, October 11
12.	Public Input	

13. Adjournment

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Director, 2379 Broad Street, Brooksville, Florida 34604-6899; 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4702; TDD (Florida only) 1-800-231-6103; or email to <u>ADACcordinator@swfwmd.state.fl.us</u>.

If you have any questions concerning this meeting, please call 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4227. If a party decides to appeal any decision made with respect to any matter considered at a meeting, that party will need a record of the proceedings, and for such purpose that party may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which they appear is to be based.

#### www.watermatters.org/waterways

# Attachment B

Slides prepared by Doug Leeper for an August 9, 2010 presentation to the Citrus Task Force

#### Minimum Flows and Levels Update

Douglas A. Leeper Jason L. Hood

Southwest Florida Water Management District

Citrus / Hernando Waterways Restoration Council Citrus County Task Force Lecanto, Florida

August 9, 2010

#### Florida Statutes, Section 373.042 - Minimum Flows and Levels -

The **minimum flow** for a given watercourse shall be the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area.

The **minimum water level** shall be the level of groundwater in an aquifer and the level of surface water at which further withdrawals would be significantly harmful to the water resources of the area.

Regulatory Use of Minimum Flows and Levels

- Water Resource Planning
- Water-Use Permitting
- Environmental Resource
  Permitting



#### Minimum Flows and Levels Process

- Priority List and Schedule developed and updated annually
- Methods and flows or levels are developed and peer-reviewed
- · Workshops held for public input
- Recovery or prevention strategies developed, as necessary
- Governing Board adopts flows or levels into District rules (Chapter 40D-8, Florida Administrative Code).
- Recovery strategies are included in regional water supply plans in in some case incorporated into District rules (Chapter 40D-80, Florida Administrative Code)

#### Priority Schedule – Northern Systems

#### 2010

Chassahowitzka River system and springs, Gum Springs group, Homosassa River system and spring, Upper and Middle Withlacoochee River system (Green Swamp), Rainbow Springs

#### 2011

Crystal River system and Kings Bay Spring, Lower Withlacoochee River system, Bonable Lake, Little Bonable Lake, Tiger Lake

#### 2013

Tooke Lake, Whitehurst Pond

#### Status

#### Peer-Review Completed Chassahowitzka River system and springs

#### **Peer-Review Ongoing**

Homosassa River system and spring Upper and Middle Withlacoochee River system (Green Swamp)

#### **Data Collection Ongoing**

Crystal River system and Kings Bay Spring, Lower Withlacoochee River system, Gum Springs group, Rainbow Springs, Bonable Lake, Little Bonable Lake, Tiger Lake, Tooke Lake, Whitehurst Pond

#### Tidal River Minimum Flows Study Elements

- Withdrawal impacts
- Structural alterations
- Bathymetry
- Shoreline and submersed vegetation
- Benthic invertebrates
- Fish and invertebrate plankton and nekton
- Salinity-based habitats
- Thermal refuge volume for manatees







#### **Recommended Minimum Flows**

#### **Chassahowitzka River System**

An eleven percent reduction in baseline flows past the USGS Chassahowitzka River near Homosassa, FL gage

#### **Homosassa River System**

A five percent reduction in baseline flows measured as combined daily mean flow past the USGS Homosassa Springs at Homosassa Springs, FL and Southeast Fork Homosassa Springs at Homosassa Springs, FL gages

#### Freshwater River Minimum Flows Study Elements

- · Withdrawal impacts
- Structural alterations
- Wetted perimeter (stream bottom)
- Fish passage over shoals
- Instream habitats for fish and invertebrates
- Floodplain vegetation and inundation
- Inundation of woody habitats







#### Recommended Minimum Flows

#### Upper and Middle Withlacoochee River System (Green Swamp)

Season-specific percent reductions in baseline flows past the USGS Withlacoochee River near Holder, FL, Withlacoochee River at Wysong Dam at Carlson, FL, and Withlacoochee River at Croom, FL gages





	Contact Information
Name:	: Douglas A. Leeper
Title:	Chief Environmental Scientist
Mail:	Southwest Florida Water Mgmt. District 2379 Broad St. Brooksville, FL 34604-6899
Phone	: 1-800-423-1476 or 352-796-7211 Extension 4272
E-Mail	: doug.leeper@swfwmd.state.fl.us
Web S	tite: <u>www.swfwmd.state.fl.us</u> or watermatters.org







# Attachment C

Approved Minutes for the August 9, 2010 Meeting of the Citrus Task Force

#### MINUTES OF THE MEETING

# Citrus County Task Force of the Citrus/Hernando Waterways Restoration Council

August 9, 2010

The Citrus County Task Force met at 2:00 p.m., August 9, 2010 at the Lecanto Government Building, Lecanto, Florida.

Task Force	Technical Advisory	<b>Recording Secretary</b>
<u>Members Present</u>	Group Members Present	Josie Guillen, SWFWMD
Carl Bertoch, Member	Katasha Cornwell, FDOT	
Michael Czerwinski, Member	Mark Edwards, Citrus Co.	
Eric Latimer, Member	Domenic LetoBarone, FDEP	
Michael Moberley, Chair	Allen Martin, FFWCC	
Wayne Sawyer, Member	Philip Rhinesmith, SWFWMD	

# <u>Task Force</u> Members Absent

Sandra Clodwick, Secretary Ken Frink, Member (Resigned)

# Technical Advisory Group Members Absent

Bill Bachschmidt, WRBB Colonel Alfred Pantano, USACOE

SWFWMD – Southwest Florida Water Management District	FFWCC – Florida Fish and Wildlife Conservation Commission
FDEP – Florida Department of Environmental Protection	FDOT – Florida Department of Transportation
CRBB – Coastal Rivers Basin Board Member	USACOE – United States Army Corp of Engineers
WRBB – Withlacoochee River Basin Board Member	TAG – Technical Advisory Group

A list of others present who signed the attendance roster is filed in the permanent files of the Task Force. The numbers preceding the items listed below correspond with the published agenda.

#### 1. Call to Order and Roll Call

Chair Moberley convened the meeting. Ms. Josie Guillen called the roll and noted a quorum was present.

#### 2. Pledge of Allegiance

Chair Moberley led the Pledge of Allegiance.

#### 3. Approval of Minutes

Following consideration, Mr. Carl Bertoch moved, seconded by Mr. Wayne Sawyer to approve the June 14, 2010 meeting minutes. Motion carried unanimously. The motion will need to be reaffirmed at the next scheduled meeting since the task force is not fully constituted due to the resignation of Mr. Ken Frink.

#### Other Business/Topics of Discussion not on the Agenda

Ms. Veronica Craw stated to the members since the task force is not fully constituted, they can take provisional action and reaffirm the action at the next scheduled meeting.

#### 4. Flying Eagle Prescribed Burns

Mr. Philip Rhinesmith, SWFWMD, filling in for Mr. Kevin Love, stated no new acreage has been burned since the last update from Mr. Love. Mr. Rhinesmith stated the conditions have not warranted any prescribe burns. Mr. Rhinesmith stated, staff has achieved some upland prescribed fire application at both Potts Preserve and Flying Eagle, but no wetland marsh fires because of the wet conditions.

#### Public Input

Mr. Al Grubman, TOO FAR, asked Mr. Rhinesmith if the high priority is still the same on Mr. Love's list as in the past.

Mr. Chester Bradshaw, citizen, stated you can put all the fire you want in the lake system, do the dredging of the muck sediment, but the important issue the task force needs to look at is to try and restore the natural water flow through the lake system. Mr. Bradshaw requested the Task Force put their efforts into the things that will make a difference with the lake.

#### 5. <u>Oil Spill</u>

Commander David Burns, United States Coast Guard, gave a presentation on Coast Guard's efforts to track the oil from the Deepwater Horizon oil spill. Commander Burns first gave some history on sector lines of demarcation of the Coast Guard Florida Peninsular Command Post-Branch St. Petersburg. Commander Burns reviewed the various agencies responsibilities including Emergency Operations of the various counties for responding to oil spills. Commander Burns showed a graphic depicting a list of governmental agency responders and their responsibilities. Commander Burns next showed a map depicting the topography of the deep Gulf and explained the remote possibility of oil making its way to the shallow water areas along the Nature Coast. Commander Burns next showed several photos and he and Mr. Dominick Letobarone of FDEP described the "Trigger Zones" along the flight paths. The thought was that if oil was detected crossing these zones there would be a response from Command Post -Branch St. Petersburg. FDEP initiated the collection of baseline data from Taylor to Collier counties and have analyzed samples collected from the Gulf. This information is available on several agency websites. Only one sample (tar ball) was found in this area and was not tied to the Deepwater Horizon event. Additionally, Shoreline Cleanup Assessment Techniques (SCAT) were overseen by the FDEP and Coast Guard.

Chair Moberly asked if there were specific methods to clean mangrove and marsh areas. Commander Burns suggested that their efforts are focused on keeping the oil from entering these areas.

#### Public Input

Mr. Norman Hopkins, representing the Amy Remley Foundation commended the timely baseline sampling by FDEP. Mr. Hopkins wanted to know if there was any danger of oil contamination through the freshwater springs offshore, from water contaminated with oil being forced through fractures into the springs. Commander Burns responded by saying he has no comment on the subject. Dominick Letobarone from FDEP stated that many agencies are participating in a natural resource damage assessment team to look at these types of questions. Mr. Hopkins said there were links on the Amy Remley website to many of the agencies mentioned during the presentation.

#### 6. Minimum Flows

Mr. Doug Leeper, SWFWMD, stated that minimum flows and levels (MFLs) have been established for several waterbodies. In Citrus County, MFLs have been established for the Tsala Apopka Chain of Lakes and Fort Cooper Lake. Mr. Leeper stated MFLs will be established for the Chassahowitzka River System, Homosassa River System, Upper and Middle Withlacoochee River Systems. Mr. Leeper stated next year the MFLs will be established for Crystal River/Kings Bay and the Lower Withlacoochee River. Mr. Leeper stated staff applies different procedures depending if the river system is a tidal system or a freshwater system. Mr. Leeper explained the process of the MFLs. A priority list and schedule is developed and updated annually. Methods and flows or levels are developed and peer-reviewed. Mr. Leeper stated workshops are held for public input, recovery or prevention strategies are developed, as necessary. Mr. Leeper stated the SWFWMD Governing Board adopts the flows or levels into the SWFWMD rules, Chapter 40D-8, Florida Administrative Code. Mr. Leeper stated the recovery strategies are included in the regional water supply plans (in some cases it is incorporated into the SWFWMD rules). Mr. Leeper showed the members the priority schedule in the northern systems for 2010-2013. Mr. Leeper stated which systems were completed and ongoing by peer-review, and ongoing data collection.

#### Public Input

Mr. Grubman, stated when the Withlacoochee Regional Water Supply Authority is looking to take water, their consultant establishes a proxy MFLs. Mr. Grubman addressed Mr. Leeper on how he feels about it and how it relates to what he is doing.

Mr. Norman Hopkins, Amy Remley Foundation, stated he admires what is being done scientifically to assess the MFLs. Mr. Hopkins stated most of the public does not understand what is happening. Mr. Hopkins stated that the public does understand, for an example, when a consultant states they want to move water into a reservoir and it can be taken from those waterbodies with MFLs which are far below the actual levels in the waterbody. Mr. Hopkins stated because the public does not understand, a suggestion would be to have a policy statement either from the task force or from another body to illustrate how the MFLs which have been scientifically evaluated are actually applied in practical issues.

#### 7. Summary of the July TAG Meeting

Mr. Allen Martin, FFWCC, stated the reason the TAG met was to discuss the in-lake disposal. Mr. Martin stated FFWCC staff put together some information to come to a conclusion of either getting a permit to do the work or a letter from the USACOE. Mr. Martin stated the scientific evidence shows no reason in-lake disposal cannot or should not be used, but it is agreed that upland storage could be utilized whenever practical. Mr. Martin stated the TAG discussed different methods on how projects can be done. It was determined that FFWCC is not able to pursue a system permit for Tsala Apopka, unless a policy changed. Mr. Martin stated the TAG thought they should look at projects working under the assumption and realization that in-lake is not an option for disposal, but to look for upland disposal options instead.

#### Public Input

None.

#### Other Business/Topics of Discussion not on the Agenda

Chair Moberley stated there were emails going back and forward among the members that border violating the Sunshine Law. Chair Moberley is concerned about this and expressed the types of issues that can be violated. Chair Moberley asked the members in the future to be more careful when corresponding via email.

#### 10. Election of Officers

The Election of Officers was tabled until the Task Force is fully constituted.

#### 9. **Report to the Legislature**

Chair Moberley asked the members since the legislation has not given us any funds, do we want to submit the same report as last year's? Mr. Bertoch asked what about endorsing a specific request of a project(s) that the various agencies are making? Chair Moberley's concern is since the Task Force is not fully constituted, how will it affect approving the report to the legislature. Ms. Craw stated that the members can take provisional action. Mr. Bertoch suggested adding a statement to the report adopting MFLs to require the water management districts to combine their thought processes.

#### 8. Advertising Notices for Task Force Meetings

Ms. Craw clarified to the members the costs of advertising the meetings and changing/adding future meeting dates. Ms. Craw stated the advertising of the meetings does not need to be noticed in the 16 county SWFWMD jurisdiction. The advertising will continue in the Citrus County newspaper to meet the noticing requirements which includes any deviation from the 2011 published meeting dates.

#### 11. Agenda for Next Meeting

Report to the Legislature

#### Other Business/Topics of Discussion not on the Agenda

Mr. Michael Czerwinski stated the 305(B) reports and the 303(D) list are where water quality is being obtained. Mr. Czerwinski showed the members the current phosphorous levels in Florida waters from 1970 – 2005. Mr. Czerwinski stated the draft report was just issued. The report will show what is going on with water quality in Florida, how to control nutrients in the state of Florida, and stormwater controls, etc. Mr. Czerwinski stated the next objective is to move on to the springs, specifically Kings Bay. Mr. Czerwinski suggested designating some restoration projects whether they come from the agencies or from the public. Mr. Czerwinski stated the focus is to get the attention of the legislature or the agencies to express concern on which restoration project to fund.

#### 12. Public Input

None.

#### 13. Adjournment

There being no further business or announcements presented before the Task Force, the meeting was adjourned at 4:15 p.m.

April 30, 2012

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Presentation on MFLs Status for FDEP Meeting

This memorandum documents a presentation on minimum flows and levels for the Homosassa River and other systems provided by Doug Leeper, a Chief Environmental Scientist with the District. The presentation was made at a meeting hosted by the Department of Environmental Protection on September 16, 2010.

DAL

Attachment: Slides used for the meeting

Update on Currently Proposed and Soon to be Proposed Minimum Flows and Levels in the Southwest Florida Water Management District

> Doug Leeper Jason Hood Jon Morales



Minimum Flows and Levels and Other Protection Strategies in Florida Fanning Springs State Park September 16, 2010





















#### Recommended Minimum Flows for the Lower Myakka River



Withdrawals cannot exceed excess flows from the upper river sub-basin (capped at 130 cfs) when gaged flows are < 400 cfs. When gaged flows are < 400 cfs, withdrawals can include excess flows plus 10% of remaining gaged flows.

Source: Flannery et al. 2010





#### **Contact Information**

Name: Douglas A. Leeper

- Title: Chief Environmental Scientist
- Mail: Southwest Florida Water Mgmt. District 2379 Broad St. Brooksville, FL 34604-6899
- Phone: 1-800-423-1476 or 352-796-7211 Extension 4272
- E-Mail: doug.leeper@swfwmd.state.fl.us

Web Site: <u>www.swfwmd.state.fl.us</u> or <u>watermatters.org</u>

October 1, 2010	
MEMORANDUM	
TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section
SUBJECT:	Response to questions and comments submitted by Mr. Ron Miller regarding recommended minimum flows for the Homosassa River system

This memorandum was developed to address questions and comments submitted on September 23, 2010 by Mr. Ron Miller, with the Save the Homosassa River Alliance, regarding the Southwest Florida Water Management District's recommended minimum flows for the Homosassa River system. Most of the questions and comments submitted by Mr. Miller pertain to information contained in the draft District report entitled, "Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft". The questions and comments included in Mr. Miller's original submission were developed by several individuals and are reproduced in italics in the body of this memorandum. Staff responses to the questions and comments are also provided.

# Questions and Comments on the Homosassa Minimum Flows Study Submitted by Mr. Ron Miller on September 23, 2010 (in italics) and Staff Responses

# *Question/Comment 1. I am concerned that the report doesn't address changes in vegetation along the river, nor the changes/environmental impacts/effects of the Halls River. Brian Thompson*

Response: The vegetative assemblage and changes in vegetation in the Homosassa River system, including Halls River, are discussed on page 61 and pages 94 through 100 in the Southwest Florida Water Management District's report titled "Recommended Minimum Flows for the Homosassa River System; July 12, 2010 Peer-Review Draft". Rationale associated with consideration of salinity zones for protection of vegetation and other characteristics or attributes of the river system is discussed in the report on pages 127 through 130. Additional information pertaining to vegetation of the system is provided in a report titled "Vegetation Mapping of the Homosassa River in Support of Minimum Flows and Levels Establishment, Final – January 2009", which was prepared for the District by PBS&J and is included as Appendix E to the draft minimum flows report.

# Question/Comment 2. FGS Bulletin 31 states "From 1931 to 1974 the main spring had an average discharge of 106 cfs for 90 measurements". Why aren't 90 measurements considered valid and reliable? Doesn't the period of record used in this report (1995-2010) ignore an apparent significant loss of discharge from earlier years? Dana Bryan, Environmental Policy Coordinator, FDEP

Response: The historical discharge information referenced by Rosenau, Faulkner, Hendry and Hull in the 1977 publication "Springs of Florida" (Bulletin No. 31 of the Florida Bureau of Geology) is maintained by

Page 2 October 1, 2010

the United States Geological Survey in their National Water Information System Water Quality Database. The database currently includes 115 discharge records collected between October 1930 and September 1978 for the Survey's Homosassa Springs at Homosassa Springs, FL gage site. One hundred eleven of these records are reported as instantaneous measurements, meaning they were recorded at one time during the day. It is well known that flows from Homosassa Springs are affected by tides, so instantaneous measurements can vary considerably depending on the tide stage when they were recorded. In contrast, the daily mean records from 1995 through 2010 that are included in the draft report for the Homosassa River system are based on up to 96 discharge estimates within each day, providing much better tidally-averaged values. The differences in how the discharge values in the Water Quality Database and the mean daily values reported in the draft minimum flows report suggest that the records may not be directly comparable.

The records included in the draft report are classified by the United States Geological Survey as "approved" for publication, following agency processing and review, and "provisional", *i.e.*, subject to revision. Of these records, only approved data were used for data summaries and analyses associated with development of the recommended minimum flows for the Homosassa River system. The records in the Survey's water quality database are coded as "historical" data rather than "reviewed and accepted" data. The differences in how the discharge records were derived, *i.e.*, as instantaneous or daily mean values, and the data quality coding attributed to the records by the United States Geological Survey suggest that a higher level of confidence may be attributed to the daily mean discharge records described in the draft report on recommended minimum flows for the Homosassa River system.

Despite the differences between the two discharge data sets (*i.e.*, the "historical" records from the Survey's Water Quality Database and the "daily means" records included in the draft report), it is useful to compare the records with respect to each other and long-term regional rainfall patterns. The figure below shows both the "historical" and "daily means" discharge records for the Homosassa Springs at Homosassa Springs, FL gage site.



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The mean and median for the 115 discharge measurements in the "historical" record are 116.5 and 115 cubic feet per second (cfs), respectively. The "daily means" discharge record includes 4,975 entries, with mean and median values of 89 and 88 cfs. Only about eleven percent of the "historical" discharge values are greater than the maximum of 141 cfs included in the "daily means" data set, indicating that the majority of the "historical" discharge measurements are not notably different than the daily mean discharge values recorded since 1995. The "historical" discharges of 280 and 234 cfs that were recorded on November 1965 and October 1966, respectively, are, however, substantially higher than the more recent daily mean values.

Observed variation in discharge measurements for the Homosassa Springs site is consistent with longterm regional rainfall patterns. The figure below, reproduced from the 2010 technical memorandum by Ron Basso (a Senior Professional Geologist/Engineer with the District) that is included as Appendix B in the draft report on proposed minimum flows for the Homosassa River system, shows annual departure in mean annual rainfall from the average rainfall for the Brooksville, Inverness and Ocala National Weather Service stations for the period from 1930 through 2008. The period of relatively higher "historical" discharge around 1965 (shown in the figure above) corresponds with above average annual rainfall totals for 1965 and the preceding year. The decreasing trend in "historical" discharge values from the 1965/1966 period through the 1970s corresponds with a relatively large number of years in the late-1960s and 1970s with below average annual rainfall. Discharge patterns for the more recent "daily means" records correspond with a period of generally below average rainfall, except for the period from 2000 through 2004, when rainfall was above average and discharge exhibited an increasing trend.



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Collectively, available "historical" and "daily means" discharge records for the Homosassa Springs gage site and long-term rainfall records do not suggest an "apparent loss of discharge from earlier years" as suggested by Mr. Bryan. The "historical" discharge measurements available from the United States Geological Survey are, however, useful for characterization of the Homosassa River system, and in retrospect, should have been included in the draft report on proposed minimum flows for the system.

Question/Comment 3. The [sic] all aspects of this report consistently show the Homosassa to be very sensitive to fresh water flow losses. In fact the Fish and Invertebrate section shows flow reductions of .6 % to 2.7% were associated with 15% reductions in each of the twenty species analyzed. That means the 5% flow loss recommended by this report would result in well over 30% reduction in each species. This is double or more than the level you have set for preventing significant harm. Why not stay with your original criteria and, as a practical matter, recommend retaining 100% of the current flow? Ron Miller

Response: To support development of minimum flows for the Homosassa River system, relationships between organism abundance and flow were investigated for 117 planktonic and nektonic fish and invertebrate pseudo-species by Peebles, MacDonald, Burghart, Guenther, Matheson and McMichael and discussed in a 2009 report titled "Freshwater Inflow Effects on Fish and Invertebrate Use of the Homosassa River Estuary", which is included as Appendix H to the draft minimum flows report. Of the taxa investigated, 68 exhibited significant relationships between abundances and flow. Of these, a total of 20 psuedo-species exhibited a positive relationship to flow, *i.e.*, their abundance was directly proportional to flow. Regression models relating flow to abundance for fourteen of these taxa accounted for less than fifty percent of the observed variation in abundances (adjusted coefficients of determination were less than 0.5), and four of the remaining six models were developed based on seven or fewer samples. These results suggest that application of the models should be made cautiously and with some skepticism. For example, review of confidence bands associated with the regression models developed for the planktonic and nektonic taxa (see pages I-1 through I-6 in Appendix H of the draft report) suggests that changes in flow on the order of one to three percent would likely not yield statistically significantly different predicted abundances for most taxa.

Given the limited sample size used to develop many of the regression models, the limited range of river flows used for model development, heterogeneous organism distributions and potential bias associated with the sampling gear employed, it seems plausible that the derived regression models may not be the best tools for identifying percent-of-flow reductions for development of minimum flow recommendations. Staff is, however, unwilling to simply ignore the results from the exploratory analysis of relationships between plankton, nekton and flow in the Homosassa River system. Given that some organisms in the Homosassa River system may exhibit sensitive responses to change in flows, we believe that these organisms would be minimally impacted through implementation of flow reductions of up to five percent, the limit or threshold incorporated into the recommended minimum flows for the system. Staff also notes that retention of one hundred percent of baseline flow conditions does not seem practical, as this would potentially mean that no withdrawals could be permitted within the approximate 270-290 square mile ground-water basin that supports flows in the river system.

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# Question/Comment 4. It is important to retain all discharge from the springs and the spring runs into which the Homosassa Springs Wildlife State Park animal habitats are integrated. Dana Bryan, Environmental Policy Coordinator, FDEP

Response: The recommended 95% retention of baseline flows for the Homosassa River system applies to the Homosassa River, Halls River, Hidden River and all associated springs.

#### *Question/Comment 5. A very disconcerting paragraph is included in the report:*

#### Page 134

Some pseudo-species, *e.g.*, blue crabs (*Callinectus sapidus*) greater than 30 mm in length, exhibited increasingly sensitive responses to flow reductions from progressively lower baseline flow percentiles (Table I-8 in Appendix I). The regression equation used to predict baseline abundance for one pseudo-species, spot (*Leiostomus xanthurus*), indicated that for at least half the time, the sampled size-class for this fish would not be expected to occur in the shallow portions of the Homosassa River that were sampled with the seine net – predicted baseline abundance at the median flow for the 2007 benchmark periods was less than zero (Table 5-2). Lack of occurrence of the fish from shallow regions of the river was similarly predicted for the longer 1995 through 2010 benchmark period, based on the twentieth percentile flow for the period (Table I-20, Appendix I). **Baseline relative abundances less than zero were predicted for nine additional pseudo-species** based on lower (tenth to thirtieth percentile) baseline flows for the 2007 benchmark period and a single pseudo-species for the tenth percentile baseline flow for the 1995 through 2009 benchmark period.

# This tells me that if the flow is reduced in the Homosassa many of the species, as we know them today, will disappear. Is this not well past significant harm? Ron Miller

The excerpted text above indicates that based on abundances predicted using the derived abundanceflow regression models, several of the pseudo species evaluated would not be present in the river system under baseline low flow conditions. This means that if the statistical regressions are assumed to be completely accurate and precise, the pseudo-species in question would not be found in the system during periods of low flow, even in the absence of withdrawal-induced flow reductions. This suggests that many of the evaluated pseudo-species are frequently eliminated from the river system or the regression models poorly characterize the relationship between flows and abundances of these organisms. Assuming that the regression models are reasonable tools for predicting organism abundances, it may be possible that many taxa are routinely eliminated from the Homosassa River and subsequently recolonize the system from contiguous estuarine or marine habitats, backwater areas of freshwater habitat within the upper reaches of the system, or emigration from other sources. However, as noted in the staff response to question number 3 raised by Mr. Miller (see above), there are several

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reasons why the derived regression models may not be the best tools for predicting organism abundances in the Homosassa River as a function of inflow. Given the potential uncertainties associated with development of the regression models for nektonic and planktonic fish and invertebrates, staff contends that modeled changes in salinity zones are more useful for identifying environmental effects of flow reductions in the river system and development of recommended minimum flows.

Question/Comment 6. Salinity-based habitats near the top of the river are very sensitive to flow reductions. Flow reductions of less than five percent were associated with more than fifteen percent reductions in salinity-based habitats at river stations with salinities of 2, 3, 5 and 12. Salinities of 2, 3 and 5 occur in the upper river, especially near the springs while a salinity of 12 can often be found several miles down-river. Oligohaline zones (Salinity between .5 and 5. Ppt) are a fundamental part of the estuary and oceanic habitat web, providing required breeding grounds and sources of food for a large number of fish and other organisms. Statewide, oligohaline resources are increasingly limited in quality and expanse. Preservation and restoration of oligohaline resources has become a state priority. It is critical to protect the oligohaline character of the Homosassa? Ron Miller

Response: Retention of 100% of baseline flows in the Homosassa River system may be expected to promote persistence of the oligohaline zones (areas with salinities between 0.5 and 5) associated with these flows. However, establishment of minimum flows involves identifying limits at which further withdrawals would be significantly harmful to the water resources or ecology of the area. This suggests that some change to ecosystem attributes may be permissible, with respect to establishment of minimum flows.

For the analyses supporting the District's proposed minimum flows for the Homosassa River system, changes in river bottom area, water-column volume and shoreline length associated with salinities less than five were evaluated for various flow reduction scenarios. In all cases, flow reductions greater than the recommended allowable five-percent reduction were associated with fifteen percent reductions in the availability of these low to moderate salinity habitats. The recommended minimum flows are, therefore, expected to prevent significant harm to oligohaline habitats of the Homosassa River system.

# Question/Comment 7. Page 160-161 - the baseline flow statistics were not calculated due to the limited period of flow records available. Despite having no baseline flow statistics the 5% recommendation is made with another recommendation for future review and revision. Is this really acceptable? Priscilla Watkins

Response: Minimum flow rule recommendations from the District often include identification of minimum five- and ten-year mean and median values for reported annual average discharge at selected streamflow gauging stations. These long-term hydrologic statistics may be used to assess whether flows within a river system or segment remain above the flow rates that are expected to occur with implementation of the recommended minimum flows. Based on the limited availability of measured

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discharge data for the Homosassa River system, staff do not believe that it is currently appropriate to develop long-term hydrologic statistics for the Homosassa River system.

Routine measurement of daily mean discharge at the United States Geological Survey's Homosassa gage was initiated in October 1995 and data collection at the Southeast Fork gage was initiated in October 2000. Based on combined discharge records for these two sites that have been approved by the Survey, no ten-year statistics and only four five-year statistics could be calculated for identification of minimum long-term mean and median discharge values. Use of a longer (1995 through 2009) record that includes statistically-derived estimates for discharge past the Southeast Fork gage based on discharge at the Homosassa Springs gage would permit calculation of three ten-year means and medians and eight five-year means and medians that could be used to identify long-term minimum mean and median discharge values. Attempts to develop a larger set of annual discharge estimates through exploration of statistical relationships between available discharge records and long-term water level records available for the United States Geological Survey's Weeki Wachee Well near Weeki Wachee, FL were unsuccessful. Collectively, this information suggests that available discharge records are insufficient for development of long-term hydrologic statistics for the Homosassa River system.

Although staff does not believe development of long-term hydrologic statistics is currently appropriate for the river system, we do acknowledge that continued accumulation of discharge records for the Homosassa Springs and Southeast Fork gage sites will permit future development of long-term hydrologic statistics that may be used for assessing flows with respect to minimum flows that are established for the system. Staff will continue to support the review of any minimum flows that are adopted for the system in the future, pending acquisition of additional data and development of new approaches for determining minimum flows for tidally influenced river systems.

\_\_\_\_\_

October 6, 2010	
MEMORANDUM	
TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section
SUBJECT:	Response to questions and comments submitted by Mr. Ron Miller on September 30, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum was developed to address questions and comments submitted to the District on September 30, 2010 by Mr. Ron Miller regarding the currently recommended minimum flows for the Homosassa River system. The questions and comments included in Mr. Miller's original submission are reproduced in italics below along with staff responses.

\_\_\_\_\_

# Questions and Comments on the Homosassa Minimum Flows Study Submitted by Mr. Ron Miller on September 30, 2010 and Staff Responses

**Questions/Comments:** How will the Homosassa River minimum flow level be documented and what corrective action will be taken? The recommended minimum flows for the Homosassa River system are defined as a five percent reduction from the baseline flows. This will be calculated as a five percent reduction from the baseline flows. This will be calculated as a five percent reduction from the baseline flows. The mean daily discharge sites in the Homosassa Springs run and the Southeast Fork of the Homosassa River. The mean daily discharge statistics of these USGS gauges are shown in Table 2-3 and the record of daily mean discharge in the Homosassa Springs run and SE Fork are shown in Figures 2-13 and 2-15 respectively. While the daily mean discharge may be constant over a long period of time, the data in Figures 2-13 and 2-15 shows that there are many times where that daily mean has decreased more than five percent below the baseline of 89 cfs and 61 cfs in the Homosassa Springs run and SE fork respectively. When the flows go below the 5% flow decrease limit, how will this be documented, who will be notified and what corrective action will be taken? - Submitted by Ron Miller

**Response:** Following approval by the District Governing Board, the minimum flows for the Homosassa River system will be incorporated into District rules pertaining to minimum flows and levels (Chapter 40D-8, Florida Administrative Code). The established minimum flows will then become one of the criteria used by District Regulatory Department staff for evaluating water use and environmental resource permit requests.

State law requires that a recovery or prevention strategy be expeditiously implemented for water bodies where existing flows or levels are currently below, or projected within the next 20 years to fall below applicable established minimum flows or levels. Because the recommended minimum flows for the Homosassa River system allow up to a five percent reduction in mean daily baseline flows, and predicted impacts based on existing water use are estimated to be about one percent of baseline flows, there is currently no need for a strategy to recovery of flows in the Homosassa River system. Review of projected demand for the region through the District's Regional Water Supply Planning process similarly

indicates that area water demand for the coming 20-year period is not expected to reduce flows in the system below the recommended minimum flows.

The recommended minimum flows have been developed to allow for up to a five percent reduction in daily mean flow as recorded at the United States Geological Survey gage sites at Homosassa Springs and the Southeast Fork of the Homosassa River. This identified percent-of-flow reduction is not associated singularly with the median or any other particular flow at the respective gage sites. Rather the permitted flow reduction is associated with mean daily flows, which are expected to naturally vary from day to day, seasonally and over multi-year periods. Given this natural variability in flows, it is highly likely that mean daily flows past the Homosassa Springs and Southeast Fork gages on any given day will be higher or lower than the respective 89 cubic feet per second and 61 cubic feet per second flows identified for the sites by Mr. Miller. This natural variation in flows does not mean that the recommended minimum flows are not being met. The recommended minimum flows were developed to identify allowable percentage changes in flows; when flows are higher the allowable five percent reduction amounts to a larger allowable daily reduction, in terms of absolute volume, and when flows are lower, the allowable five percent reduction may be equated with a smaller allowable daily reduction. So, in addition to expected natural variation in daily mean flows, the absolute amount of flow reduction allowed under the five percent flow reduction associated with the recommended minimum flows may also vary.

Minimum flow rule recommendations from the District often include identification of minimum fiveand ten-year mean and median values for reported annual average discharge at selected streamflow gauging stations. These long-term hydrologic statistics may contribute to assessments regarding whether flows within a river system or segment remain above the flow rates that are expected to occur with implementation of the recommended minimum flows. Based on the limited availability of measured discharge data for the Homosassa River system, staff does not believe that it is currently appropriate to develop long-term hydrologic statistics for the Homosassa River system. Continued compilation of discharge records for these gage sites may, at some point, permit development of hydrologic statistics that adequately characterize expected flow variation within the system. Staff will continue to support collection of data to support this goal, with the expectation that it will provide ancillary information regarding whether minimum flows are being met in the Homosassa River system.

The primary approach for evaluating compliance with the minimum flows that are ultimately established for the Homosassa River system is expected to involve modeling of the effects of water withdrawals on discharge to the system. For example, the Northern District Model could be used as described on pages 53 through 55 in the July 12, 2010 draft report on recommended minimum flows for the river system to compare discharge to the system for model scenarios that exclude and include current and projected water use estimates. Differences in discharge, expressed as a percent change from the no-withdrawal scenario would provide results that could, for example, be directly compared to the current minimum flow recommendation, which allows for up to a five percent reduction in baseline flows. An alternative modeling approach used for evaluating minimum flows compliance could involve development and use of statistical models that relate discharge in the system to other hydrologic variables, such as rainfall or groundwater levels.

Results from minimum flows and levels compliance analyses for the Homosassa River system will be included in the annual update on minimum flows and levels compliance that is presented to the District Governing Board. If necessary, strategies to recover or prevent diminution of flows in the system will be developed and implemented. These strategies could include reductions in withdrawals, implementation

of conservation efforts, redistribution of withdrawals to minimize effects on discharge, development of alternative water supplies, augmentation of flows, or other yet to be determined approaches. In accordance with state law, any necessary recovery strategies would be included in the District's regional water supply planning process and could be incorporated into the District rules pertaining to minimum flows and levels recovery (Chapter 40D-80, Florida Administrative Code).

May 20, 2011

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Minimum flows and levels presentation to the Citrus County Task Force of the Citrus/Hernando Waterways Restoration Council by Mr. Carl Bertoch

This memorandum documents a presentation concerning minimum flows and levels development for the Homosassa River system that was made to the Citrus County Task Force by Mr. Carl Bertoch on October 11, 2010.

# Attachment A

Agenda for the October 11, 2010 Meeting of the Citrus Task Force

# Citrus County Task Force Meeting Agenda

# October 11, 2010 2:00 p.m.

#### Lecanto Government Building 3600 West Sovereign Path, Room 166 Lecanto, Florida 34461

\*\*\*\*All meetings are open to the public\*\*\*\*

SWFWMD – Southwest Florida Water Management District	FFWCC – Florida Fish and Wildlife Conservation Commission
FDEP – Florida Department of Environmental Protection	FDOT – Florida Department of Transportation
TAG – Technical Advisory Group	USACOE – United States Army Corp. of Engineers

- 1. Call to Order and Roll Call
- 2. Pledge of Allegiance
- 3. **Review** the August 9, 2010 Minutes
- 4. Review of Statutory Mandates for Minimum Flows and Levels Carl Bertoch, Citizen
- 5. **<u>Review</u>** the Report to the Legislature
- 6. Agenda Items for Next Meeting January 10, 2011
- 7. Public Input
- 8. Adjournment

The Southwest Florida Water Management District (District) does not discriminate on the basis of disability. This nondiscrimination policy involves every aspect of the District's functions, including access to and participation in the District's programs and activities. Anyone requiring reasonable accommodation as provided for in the Americans with Disabilities Act should contact the District's Human Resources Director, 2379 Broad Street, Brooksville, Florida 34604-6899; 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4702; TDD (Florida only) 1-800-231-6103; or email to <u>ADACoordinator@swfwmd.state.fl.us</u>.

If you have any questions concerning this meeting, please call 1-352-796-7211 or 1-800-423-1476 (Florida only), extension 4227. If a party decides to appeal any decision made with respect to any matter considered at a meeting, that party will need a record of the proceedings, and for such purpose that party may need to ensure that a verbatim record of the proceedings is made, which record includes the testimony and evidence upon which they appear is to be based.

#### www.watermatters.org/waterways

# Attachment B

Approved Minutes for the October 11, 2010 Meeting of the Citrus Task Force

## MINUTES OF THE MEETING

# Citrus County Task Force of the Citrus/Hernando Waterways Restoration Council

October 11, 2010

The Citrus County Task Force met at 2:00 p.m., October 11, 2010 at the Lecanto Government Building, Lecanto, Florida.

#### Task Force Members Present

Robert Christensen, Member Sandra Clodwick, Secretary Michael Czerwinski, Member Eric Latimer, Member Michael Moberley, Chair Wayne Sawyer, Member <u>Technical Advisory</u> <u>Group Members Present</u> Mark Edwards, Citrus Co. Allen Martin, FFWCC Philip Rhinesmith, SWFWMD Charles Thompson, FDEP Recording Secretary Josie Guillen, SWFWMD

<u>Task Force</u> <u>Members Absent</u> Vacant, Member

# Technical Advisory Group Members Absent Bill Bachschmidt, WRBB

Katasha Cornwell, FDOT Colonel Alfred Pantano, USACOE

SWFWMD – Southwest Florida Water Management District	FFWCC – Florida Fish and Wildlife Conservation Commission
FDEP – Florida Department of Environmental Protection	FDOT – Florida Department of Transportation
CRBB – Coastal Rivers Basin Board Member	USACOE – United States Army Corp of Engineers
WRBB – Withlacoochee River Basin Board Member	TAG – Technical Advisory Group

A list of others present who signed the attendance roster is filed in the permanent files of the Task Force. The numbers preceding the items listed below correspond with the published agenda.

#### No audio available for items 1 – 3 & 5

#### 1. Call to Order and Roll Call

Chair Moberley convened the meeting. Ms. Josie Guillen called the roll and noted a quorum was present; however, the Task Force was not fully constituted due to the resignation of a member.

#### 2. Pledge of Allegiance

Chair Moberley led the Pledge of Allegiance.

#### 3. Review the August 9, 2010 Minutes

No changes to the August 9, 2010 minutes; however, the minutes could not be approved since the Task Force was not fully constituted.

#### 5. **Review the Report to the Legislature**

Mr. Philip Rhinesmith, SWFWMD, showed the members the final changes and additions to the report to the legislature. Because the Task Force was not fully constituted, the updates to the report could not be approved. The report is subject to confirmation upon proper constitution of the Council.

#### 4. **Review of Statutory Mandates for Minimum Flows and Levels**

Mr. Carl Bertoch, citizen, gave a presentation on the legislative side of the Minimum Flows and Levels (MFL) Program. The water management districts are required, by Section 373.042, Florida Statutes, to develop a priority list of water bodies for which they will establish minimum flow and levels. Each year the districts update their list and submit them to the FDEP for review and approval. While the assignment of the development of the MFL rule to the water management districts satisfied their legislative requirement, in truth, it really did not solve the problem. If you look at the MFL's of the Homosassa River as an example, there is plenty of scientific information to support the proposed MFL. However, if the District says no to a withdrawal that would have an adverse affect on the Homosassa, it will likely go to administrative hearing because of the abstract nature of the study, historic flows, etc. Past development over the last 40 years has certainly had an impact of flows. There are possibly as many as 40,000 vacant platted lots in Citrus County. The question is how the agency and Citrus County will deal with the vested status of these developments. The impacts that withdrawals have on the River from providing water to these lots isn't addressed in the development of the MFL. The District needs to consider how to address these undeveloped lots and platted, vested subdivisions in the MFL. There is a responsibility to provide services to these lots while protecting the River.

## Other Business/Topics of Discussion not on the Agenda

Mr. Michael Czerwinski stated he is going to attend the next Kings Bay Association meeting to formulate and produce an action plan for the dredging and restoration of the bay. Mr. Czerwinski suggested to the Members to have a joint meeting with the Kings Bay Association so the members can introduce what is important in the Kings Bay region.

## 6. Agenda for Next Meeting

Lake Rousseau Tussock Management Presentation Electric Shock – POWAR Burning Update Water Quality Recap Election of Officers

#### 7. Public Input

Captain Ray Wright, Nature Coast Bass Club, asked the Members "if there is anything that can be done to bring the fishery back to where it used to be?" After much discussion, Mr. Wright will contact Mr. Allen Martin with FFWCC.

Mr. Martin stated that FFWCC has data on all the fisheries. Mr. Martin stated that during the last couple of years they have intensified their sampling. Mr. Martin stated that FFWCC is constantly working to make habitat improvements. Mr. Martin stated FFWCC is looking to see if it is beneficial to stock the fishery in the Van Ness area.

Mr. Duane Brooks, citizen, stated they have the minimum flows and levels and he cannot see what good it would do for him to go to a meeting when their minds are already made up. Mr. Brooks stated there is nothing he can say to make them change it. Mr. Brooks stated there is a hatchery at Parson's Point that they do not use. TOOFAR tried to get it for Fishing for Success and Dr. Canfield was going to stock it, but the attorney's blocked it for insurance purposes. Mr. Brooks stated if you leave the Wysong Dam up you would have a Wysong lake behind it. What goes through Croom has to go through Holder. Mr. Brooks stated if you have water circulating in the lake system, let it go into Two Mile Prairie. When there is too much water, the water goes in the sinkhole back into the aquifer. Mr. Brooks stated they cleaned the lake park area around his house after the first drought. When the rains came, blue gills, bass, mud fish began to spawn for about a year. It now has muck and looks like a dead area.

#### 8. Adjournment

There being no further business or announcements presented before the Task Force, the meeting was adjourned at 3:27 p.m.

#### October 21, 2010

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system

Ms. Mary Ann Poole, with the Florida Fish and Wildlife Commission, submitted a letter to the District on October 11, 2010 outlining the Commission's comments of the District's draft report titled "Recommended Minimum Flows for the Homosassa River system, July 12, 2010 Peer-Review Draft". Staff appreciates the time and effort expended by the Commission to provide constructive comments on the draft report and recommended minimum flows and is pleased to note that Ms. Poole acknowledges in her letter that the District "...has done a commendable job of developing the conservative MFL for the Homosassa River system". To facilitate continued interaction with the Commission on the important task of establishing minimum flows and levels, staff responses to the comments and suggestions raised by the Commission are summarized in this memorandum. Portions of Ms. Poole's letter are reproduced in italics below, along with staff responses to the Commission's comments and suggestions. Ms. Poole's letter is also attached to this memorandum in its entirety, to provide a full context for the Commission's perspective on the recommended minimum flows.

#### Excerpt #1, from Page 2 of Ms. Poole's Letter:

The proposed SWFWMD's minimum flow level would result in a 5% reduction in flow for the Homosassa River System, which would produce an estimated 1% reduction in chronically cold manatee habitat and an 8% reduction in acute warm-water habitat. After reviewing the recommended plan, we could not determine if the SWFWMD's plan considers the potential of an historic reduction in the spring discharges prior to 1994. Studies including Karst Environmental Services (1992) and Rosenau et al. (1977), as cited in the MFL document and appendices, suggest greater discharges than the information reported in the proposed minimum flow. We are concerned that reductions in historic spring flows, which may have already affected manatee warm-water habitat, were not included in the estimated 2.3-cubic feet per second (cfs) decline in flows to this system. We recommend that the SWFWMD clarify the evaluation process of the historic spring discharge data and what effects, if any, there has been in addition to the reported 2.3-cfs diminution of overall flow and l-cfs decline in spring flow.

#### Staff Response to Excerpt #1:

Staff acknowledges that mention of the historical discharge information referenced by Rosenau, Faulkner, Hendry and Hull in the 1977 publication "Springs of Florida" (Bulletin No. 31 of the Florida Bureau of Geology) would enhance the draft report on recommended minimum flows for the Homosassa River system. Staff asserts, however, that the "historical" record may be excluded from the analyses used for developing the minimum flows recommendation, based on the discontinuous nature of the record, differences between the "historic" record and the daily means record derived for the more recent period, *i.e.*, from the mid-1990s to the present, and the determination that variability in the SUBJECT: Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system

Page 2 October 21, 2010

"historical" and more recent discharge records is consistent with available rainfall information and not indicative of a flow decline that may be attributed to anthropogenic activities. With respect to discharge assessments reported by Karst Environmental Services in their 1992 report on the hydrology of the Homosassa Main Spring, staff notes that only an "apparent decrease in discharge..." was described in the draft copy of the report that was available for review, and effects of rainfall or climate variability on spring discharge were not addressed as part of the study.

The "historical" discharge record for Homosassa Springs is maintained by the United States Geological Survey in their National Water Information System Water Quality Database. The database currently includes 115 discharge records collected between October 1930 and September 1978 for the Survey's Homosassa Springs at Homosassa Springs, FL gage site. One hundred eleven of these records are reported as instantaneous measurements, meaning they were recorded at one time during the day. It is well documented that discharge from Homosassa Springs is affected by tides, so instantaneous measurements can vary considerably depending on the tide stage when they were recorded. In contrast, the daily mean records from 1995 through 2010 that are included in the draft minimum flows report for the Homosassa River system are based on up to 96 discharge estimates for each day, and represent much better tidally-averaged values. The differences in how the discharge values in the Water Quality Database and the mean daily values reported in the draft minimum flows report suggest that the "historical" and more recent discharge records may not be directly comparable.

The discharge records included in the draft report on recommended minimum flows for the Homosassa River system are classified by the United States Geological Survey as "approved" for publication, following agency processing and review, and "provisional", *i.e.*, subject to revision. Of these records, only approved data were used for data summaries and analyses associated with development of the recommended minimum flows for the Homosassa River system. The records in the Survey's water quality database are coded as "historical" data rather than "reviewed and accepted" data. The differences in how the discharge records were derived, *i.e.*, as instantaneous or daily mean values, and the data quality coding attributed to the records by the United States Geological Survey suggest that a higher level of confidence may be attributed to the daily mean discharge records described in the current draft minimum flows report.

Despite the differences between the "historical" discharge records from the Survey's Water Quality Database and the "daily means" records included in the draft report, it is useful to compare the records with respect to each other and long-term regional rainfall patterns. The figure below shows both the "historical" and "daily means" discharge records for the Homosassa Springs at Homosassa Springs, FL gage site.

SUBJECT: Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system

Page 3 October 21, 2010



The mean and median for the 115 discharge measurements in the "historical" record are 116.5 and 115 cubic feet per second (cfs), respectively. The "daily means" discharge record includes 4,975 entries, with mean and median values of 89 and 88 cfs. As one may presume based on the record sample sizes, a composite discharge record that includes both "historical" and "daily means" discharge records yields mean and median values similar to those of the "daily means" record (mean = 90 cfs, median = 89 cfs). Also, only about eleven percent of the "historical" discharge values are greater than the maximum of 141 cfs included in the "daily means" data set, indicating that the majority of the "historical" discharge measurements are not notably different than the daily mean discharge values recorded since 1995. The "historical" discharges of 280 and 234 cfs that were recorded on November 1965 and October 1966, respectively, are, however, substantially higher than the more recent daily mean values.

Observed variation in discharge measurements for the Homosassa Springs site is consistent with longterm regional rainfall patterns. The figure below, reproduced from the 2010 technical memorandum by Ron Basso (a Senior Professional Geologist/Engineer with the District) that is included as Appendix B in the draft report on proposed minimum flows for the Homosassa River system, shows annual departure in mean annual rainfall from the average rainfall for the Brooksville, Inverness and Ocala National Weather Service stations for the period from 1930 through 2008. The period of relatively higher "historical" discharge around 1965 (shown in the figure above) corresponds with above average annual rainfall totals for 1965 and the preceding year. The decreasing trend in "historical" discharge values from the 1965/1966 period through the 1970s corresponds with a relatively large number of years in the late-1960s and 1970s with below average annual rainfall. Discharge patterns for the more recent "daily means" records correspond with a period of generally below average rainfall, except for the period from 2002 through 2004, when rainfall was above average and discharge exhibited an increasing trend.
SUBJECT: Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system



October 21, 2010



Collectively, available "historical" and "daily means" discharge records for the Homosassa Springs gage site and long-term rainfall records are not suggestive of substantial reductions in historic spring flows and resultant impacts on warm-water habitat available to manatees and other system characteristics related to spring discharge. Given this information, staff believes that the water withdrawal impact assessment completed with the Northern District Model as discussed in the draft recommended minimum flow report on pages 53 through 55 and in more detail in Appendix B of the report are sufficient for characterization of existing withdrawal impacts on the river system. Staff acknowledges that "historical" discharge measurements available from the United States Geological Survey are, however, useful for characterization of the Homosassa River system and anticipates incorporating this information into subsequent versions of the report on minimum flows for the system.

#### Excerpt #2, from Page 2 of Ms. Poole's Letter:

On page 98, paragraph one, the report states: "Interestingly, mean salinity values in the Homosassa River for the more recently sampled period were lower than those for the earlier period, prompting Frazer and his collaborators to note that' ... factors other than an increase in salinity underlie the observed declines in the frequency of occurrence and general downstream decline of submersed aquatic vegetation (SA V).' Given that nitrate and soluble reactive phosphorus concentrations were substantially higher during the more recent period, they note that the observed changes in the Homosassa and other studied rivers could be indicative of increasing eutrophication associated with increased nutrient SUBJECT: Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system

Page 5 October 21, 2010

loading." The Frazer study indicates an increase in periphyton by 85% but the SWFWMD report does not indicate how this compares to other systems nor does it include the Frazer study in the appendix. The question concerning how detrimental to SAV the periphyton loading is cannot be answered with the provided information. Our observations of this system indicate that water clarity reduction due to phytoplankton was not an issue. We are not sure that eutrophication is the likely explanation for reductions in SAV abundance. The water is still quite clear and earlier statements in the report indicate that both nitrogen and phosphorus are present in very low concentrations. More likely salinity is the issue but we recommend that the SWFWMD should look at antecedent salinity rather than salinity at the time of sampling.

### Staff Response to Excerpt #2:

Staff acknowledges the Commission's comments in the excerpted text above and concurs that salinity is likely an important factor influencing the distribution of vegetation in the Homosassa River system. Based on the assumption that salinity patterns influence the distribution of plants and other organisms and also affect a variety of physical, chemical and biological processes in the river system, staff chose to model changes in salinity-based habitats or zones as a function of changes in flow, to aid in the development of minimum flow recommendations for the Homosassa River system.

Staff also agrees that evaluation of dynamic tidal systems, such as the Homosassa River system, should include assessment of salinity and other factors associated with sampling events and also include consideration of antecedent conditions. Understanding of the importance of preceding conditions has factored heavily in the decision by the District and its consultants to develop flow-abundance and flow-distribution relationships for planktonic and nektonic organisms using various time-periods for compiling input flow variables. These and other assessments of relationships between biological structure or processes and antecedent flows or other variables are, however, complicated by identification of appropriate temporal scales for characterization of antecedent conditions. Because Frazer and his colleagues sampled the Homosassa and other area river systems over multiple years during the late 1990s and again in the early to mid-2000s, confounding factors associated with assessment of antecedent conditions were, to some degree, minimized. Staff cannot be sure, however, that flow or salinity conditions prior to those occurring during the time periods sampled by Frazer and others were not primary factors influencing the observed vegetative patterns.

Staff notes that the 2001 and 2006 reports by Frazer and his colleagues that are discussed on pages 97 and 98 of the draft Homosassa River system minimum flows and levels report were not included as appendices to the report because the studies were not completed explicitly to support the minimum flows development process. Printed copies of these reports are available from the District Library and electronic versions of the reports are available for viewing and downloading from the District Library Catalog link on the District's Documents and Publications web page.

SUBJECT: Response to comments submitted by Ms. Mary Ann Poole of the Florida Fish and Wildlife Conservation Commission on October 11, 2010 regarding recommended minimum flows for the Homosassa River system

Page 6 October 21, 2010

### Excerpt #3, from Page 3 of Ms. Poole's Letter:

On page 116, paragraph two, the report references "oligohaline rainwater killifish." Rainwater killifish are not oligohaline as they can exist in salinities that are anywhere from freshwater to hypersaline. It is the habitat that matters to them. In this system, the good habitat is in the oligohaline zone, which is where they were found. This does not make the species "oligohaline."

### Staff Response to Excerpt #3:

Staff agrees with the Commission's comments regarding the rainwater killifish and will remove the term "oligohaline" as a descriptor for this species in subsequent versions of the report on minimum flows for the Homosassa River.

### Excerpt #4, from Page 3 of Ms. Poole's Letter:

On page 160, paragraph three, the report states: "Despite this variation in the quality of the regression models, predicted responses of all evaluated planktonic and nektonic pseudo-species or taxa exhibited similar sensitivity to flow reductions. It is possible that the very sensitive modeled responses of these organisms to flow reductions are a function of the relatively stable flow conditions of the spring-dominated system." We strongly agree with this statement. The stability and constant flow of these spring-fed systems seems to be quite important.

#### Staff Response to Excerpt #4:

Staff duly notes the Commission's comments regarding the reported biological responses to the relative stability in flows in the Homosassa River system.

## Excerpt #5, from Page 3 of Ms. Poole's Letter:

Overall, we find that the SWFWMD has done a commendable job of developing the conservative MFL for the Homosassa River system. We recommend that the following be addressed in the final MFL document:

- the SWFWMD should clarify the evaluation process of the historic spring discharge data and what effects, if any, there have been in addition to the reported 2.3-cfs diminution of overall flow and 1-cfs decline in spring flow;
- the SWFWMD should look at antecedent salinity rather than salinity at the time of sampling, as described on page 98; and
- remove "oligohaline" from the reference to "oligohaline rainwater killifish" on page 116.

#### Staff Response to Excerpt #5:

Staff appreciates these recommendations and has hopefully addressed the Commission's concerns in the responses presented above for excerpts #1 through #3 from Ms. Poole's letter.

DAL

Attachment (1): Letter dated October 11, 2010, from Ms. Mary Ann Poole to Mr. Marty Kelly



Florida Fish and Wildlife Conservation Commission

Commissioners Rodney Barreto Chairman Miami

Richard A. Corbett Vice Chairman Tampa

Kathy Barco Jacksonville

Ronald M. Bergeron Fort Lauderdale

Dwight Stephenson Delray Beach

Kenneth W. Wright Winter Park

Brian S. Yablonski Tallahassee

Executive Staff Nick Wiley Executive Director

Greg Holder Assistant Executive Director

Karen Ventimiglia Deputy Chief of Staff

Office of Planning and Policy Coordination **Nancy Linehan** Director (850) 487-3794 (850) 410-5265 FAX (850) 410-5272 (850) 922-5679 FAX

Managing fish and wildlife resources for their long-term well-being and the benefit of people.

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MyFWC.com

October 11, 2010

Mr. Marty Kelly Ecologic Evaluation Southwest Florida Water Management District 7601 U.S. Highway 301 Tampa, FL 33637-6759 <u>marty.kelly@swfwmd.state.fl.us</u>

RE: Homosassa River Recommended Minimum Flows and Levels, July 2010 Draft, Southwest Florida Water Management District, Citrus County

Dear Mr. Kelly:

The Division of Habitat and Species Conservation, Habitat Conservation Scientific Services Section of the Florida Fish and Wildlife Conservation Commission (FWC) has coordinated our agency's review of the Southwest Florida Water Management District's (SWFWMD) Homosassa River Recommended Minimum Flows and Levels (MFL) draft report and provides the following comments and recommendations.

#### SWFWMD MFL Overview

The Homosassa River system is located in the SWFWMD's Coastal Rivers Basin on the west coast of Florida in Citrus County, and includes the Homosassa River, Southeast Fork of the Homosassa River, Halls River, Hidden River and springs associated with the rivers, including at least 19 named or identified springs or vents. The Homosassa River flows eight miles to the Gulf of Mexico from the Homosassa Main Springs Pool in the Ellie Schiller Homosassa Springs State Wildlife Park. The SWFWMD evaluated the amount of salinity-based habitats, fish and invertebrates, and thermal-refuge habitat for manatees in the development of the MFL. Due to a relatively constant spring discharge and river flow, seasonal minimum flow criteria were not evaluated. Flows were evaluated using the United States Geological Survey (USGS) gages in the Homosassa Main Spring run and the Southeast Fork of the Homosassa River for the period from 1995 through 2009. Flow reductions of 2.7% or less from median baseline conditions were associated with 15% reductions in predicted abundances of individual pseudospecies or taxa (fish and invertebrate plankton and nekton). Flow reductions between 5 and 10% were predicted to reduce favorable manatee habitat by 15% percent for a recent cold period. Flow reductions of less than 5% were associated with more than 15% reductions in selected salinity-based habitats determined from isohalines with salinities of 2, 3, 5 and 12. The SWFWMD recommends that the minimum flows for the Homosassa River system be defined as a five percent reduction from combined baseline flows as measured on a daily basis at the USGS gauge sites in the Homosassa Springs run and Southeast Fork of the Homosassa River.

#### **Potentially Affected Resources**

Warm-water habitat is considered the limiting factor for the manatee population in Florida and increased manatee dependency on spring systems for winter warm-water refugia is expected. Over 100 manatees currently use the Homosassa River System during the winter months with most of the use in the vicinity of the Main Spring. Considerable effort has been expended by the Department of Environmental Protection – State Parks, the FWC, and the U.S. Fish and Wildlife Service to improve the available warm-water habitat at Homosassa Springs. In 2006 a river restoration project was conducted to remove accumulated sediments immediately below the Main Spring. This effort restored the spring run/river bed to historic depths and enhanced access to this area for marine species including manatees. In addition, the state park will also open the Main Spring to the wild manatee population during the winter of 2010/11. Both of these efforts have increased warm-water habitat for manatees in the Homosassa River system and will be an asset to the expected increase manatee use in this system.

#### **Comments and Recommendations**

The proposed SWFWMD's minimum flow level would result in a 5% reduction in flow for the Homosassa River System, which would produce an estimated 1% reduction in chronically cold manatee habitat and an 8% reduction in acute warm-water habitat. After reviewing the recommended plan, we could not determine if the SWFWMD's plan considers the potential of an historic reduction in the spring discharges prior to 1994. Studies including Karst Environmental Services (1992) and Rosenau et al. (1977), as cited in the MFL document and appendices, suggest greater discharges than the information reported in the proposed minimum flow. We are concerned that reductions in historic spring flows, which may have already affected manatee warm-water habitat, were not included in the estimated 2.3-cubic feet per second (cfs) decline in flows to this system. We recommend that the SWFWMD clarify the evaluation process of the historic spring discharge data and what effects, if any, there has been in addition to the reported 2.3-cfs diminution of overall flow and 1-cfs decline in spring flow.

On page 98, paragraph one, the report states: "Interestingly, mean salinity values in the Homosassa River for the more recently sampled period were lower than those for the earlier period, prompting Frazer and his collaborators to note that '... factors other than an increase in salinity underlie the observed declines in the frequency of occurrence and general downstream decline of submersed aquatic vegetation (SAV).' Given that nitrate and soluble reactive phosphorus concentrations were substantially higher during the more recent period, they note that the observed changes in the Homosassa and other studied rivers could be indicative of increasing eutrophication associated with increased nutrient loading." The Frazer study indicates an increase in periphyton by 85% but the SWFWMD report does not indicate how this compares to other systems nor does it include the Frazer study in the appendix. The question concerning how detrimental to SAV the periphyton loading is cannot be answered with the provided information. Our observations of this system indicate that water clarity reduction due to phytoplankton was not an issue. We are not sure that eutrophication is the likely explanation for reductions in SAV abundance. The water is still quite clear and earlier statements in the report indicate that both nitrogen and phosphorus are present in very low concentrations. More likely salinity is the issue but we recommend that the SWFWMD should look at antecedent salinity rather than salinity at the time of sampling.

On page 116, paragraph two, the report references "oligohaline rainwater killifish." Rainwater killifish are not oligohaline as they can exist in salinities that are anywhere from freshwater to hypersaline. It is the habitat that matters to them. In this system, the good habitat is in the oligohaline zone, which is where they were found. This does not make the species "oligohaline."

On page 160, paragraph three, the report states: "Despite this variation in the quality of the regression models, predicted responses of all evaluated planktonic and nektonic pseudo-species or taxa exhibited similar sensitivity to flow reductions. It is possible that the very sensitive modeled responses of these organisms to flow reductions are a function of the relatively stable flow conditions of the spring-dominated system." We strongly agree with this statement. The stability and constant flow of these spring-fed systems seems to be quite important.

#### Summary

Overall, we find that the SWFWMD has done a commendable job of developing the conservative MFL for the Homosassa River system. We recommend that the following be addressed in the final MFL document:

- the SWFWMD should clarify the evaluation process of the historic spring discharge data and what effects, if any, there have been in addition to the reported 2.3-cfs diminution of overall flow and 1-cfs decline in spring flow;
- the SWFWMD should look at antecedent salinity rather than salinity at the time of sampling, as described on page 98; and
- remove "oligohaline" from the reference to "oligohaline rainwater killifish" on page 116.

If you or your staff has any specific questions regarding our comments, I encourage them to contact Mr. Theodore Hoehn at 850-488-3831 or email at <u>ted.hoehn@myFWC.com</u>.

Sincerely,

MaryAna Poole

Mary Ann Poole Commenting Program Administrator

map/tsh ENV 1-3-2 Homosassa River System MFL\_2976\_100710.doc cc: Ms. Carolyn Voyles, DEP, Office of Water Policy, Carolyn.Voyles@dep.state.fl.us

> Mr. Douglas Leeper, SWFWMD Ecologic Evaluation, Douglas.Lepeper@SWFWMD.state.fl.us

April 30, 2012

### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	October 2011 Rule Development Public Workshop on Proposed Minimum Flows for the Homosassa River System

This memorandum documents communications and other public correspondence associated with a rule development public workshop on proposed minimum flows for the Homosassa River system that was hosted the Southwest Florida Water Management District on October 13, 2011.

DAL

Attachments

From:	Doug Leeper
То:	<u>Greenwood, Kathleen (Kathleen Greenwood@dep.state.fl.us);</u> <u>Llewellyn, Janet (Janet.Llewellyn@dep.state.fl.us);</u> Swihart, Tom (Tom.Swihart@dep.state.fl.us); Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us);
	<u>"priswat@tampabay.rr.com";</u> "grubman1@gmail.com"; Michael Lusk (Michael Lusk@fws.gov); Joyce Kleen@fws.gov; "ted.hoehn@MyFWC.com"; "eric.nagid@MyFWC.com"
Cc:	Mark Hammond; Marty Kelly; Mark Barcelo; Cara S. Martin; Robyn O. Felix; Karen Lloyd; Albert A. Gagne; Paul Williams; Miki Renner; Barbara Matrone
Subject:	SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System
Date:	Thursday, September 09, 2010 9:38:17 AM

Greetings:

I am writing to inform you that the Southwest Florida Water Management District will be hosting a rule development public workshop next month on proposed minimum flows for the Homosassa River system in Citrus County, Florida. Minimum flows are defined as "...the the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042, Florida Statutes). Minimum flows are adopted by the District Governing Board into Chapter 40D-8, Florida Administrative Code, and are used for regulatory purposes, including review of water-use permits.

Here's the pertinent information for the workshop.

**What:** Rule development public workshop on proposed minimum flows for the Homosassa River system in Citrus County, Florida

When: October 13, 2010; 6:30 P.M.

Where: Homosassa Civic Club; 5530 South Mason Creek Road, Homosassa, Florida 34448-4408

The workshop will include an overview of the process used to develop the proposed minimum flows and serve as an opportunity for interested parties to provide input on the flow recommendations. Public comment received during and following the workshop will be used to modify the minimum flows, as appropriate, and upon request, made available to the District Governing Board when staff present recommended levels to the Board for adoption into the Florida Administrative Code. Staff anticipates presenting the levels to the Board at their December 14, 2010 meeting, which will be held at the District Headquarters located at 2379 Broad Street, Brooksville, Florida 34604.

A draft report outlining the proposed minimum flows for the Homosassa River system is posted under the heading "River Systems and Springs" on the Minimum Flows and Levels (Environmental Flows) Documents and Reports page of the District web site at the following Uniform Resource Locator (URL) on the World Wide Web.

http://www.swfwmd.state.fl.us/projects/mfl/reports/PeerReviewDraftHomosassaRiverMFLsReport2010-07-12.pdf

Appendices for the draft report are posted at:

http://www.swfwmd.state.fl.us/projects/mfl/reports/Appendices-PeerReviewDraftHomosassaRiverMFLsReport2010-07-12.pdf

Please contact me if you have any questions or comments concerning the upcoming workshop or the proposed minimum flows for the Homosassa River system.

Sincerely,

Douglas A. Leeper Chief Environmental Scientist Resource Projects Department Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899 Phone: 352-796-7211, ext. 4272; 1-800-423-1476, ext. 4272; or SUNCOM 628-4272 Fax: 352-754-6885 E-Mail: doug.leeper@swfwmd.state.fl.us District Web Site: http://www.swfwmd.state.fl.us

From: To:	<u>Josie Guillen</u> <u>Eric Latimer (enrique.latimer@pgnmail.com); Mike Czerwinski (mczerwin@tampabay.rr.com); Mike Moberley</u> (mike@seetropical.com): Sandra Clodwick (sclodwick@aol.com): wsawyer1@tampabay.rr.com
Cc:	Doug Leeper; Mark Hammond
Subject:	Public Workshop Announcement
Date:	Thursday, September 09, 2010 9:26:45 AM

### Good Morning.

Below is a meeting announcement from Mr. Doug Leeper of our staff. Mr. Leeper addressed the Task Force at the August meeting and you asked Mr. Leeper to keep you apprised of developments related to establishing minimum flows for the Homosassa River system. If you have any questions regarding the workshop or any other minimum flows and levels issues, please contact Mr. Leeper.

### Thank you.

### PUBLIC WORKSHOP ANNOUNCEMENT

The Southwest Florida Water Management District will be hosting a rule development public workshop next month on proposed minimum flows for the Homosassa River system in Citrus County, Florida. Minimum flows are defined as "...the the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042, Florida Statutes). Minimum flows are adopted by the District Governing Board into Chapter 40D-8, Florida Administrative Code, and are used for regulatory purposes, including review of water-use permits.

Here's the pertinent information for the workshop.

**What:** Rule development public workshop on proposed minimum flows for the Homosassa River system in Citrus County, Florida

When: October 13, 2010; 6:30 P.M.

Where: Homosassa Civic Club; 5530 South Mason Creek Road, Homosassa, Florida 34448-4408

The workshop will include an overview of the process used to develop the proposed minimum flows and serve as an opportunity for interested parties to provide input on the flow recommendations. Public comment received during and following the workshop will be used to modify the minimum flows, as appropriate, and upon request, made available to the District Governing Board when staff present recommended levels to the Board for adoption into the Florida Administrative Code. Staff anticipates presenting the levels to the Board at their December 14, 2010 meeting, which will be held at the District Headquarters located at 2379 Broad Street, Brooksville, Florida 34604.

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Appendices for the draft report are posted at:

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Please contact Doug Leeper if you have any questions or comments concerning the upcoming workshop or the proposed minimum flows for the Homosassa River system. Contact information for Doug is provided below.

Douglas A. Leeper Chief Environmental Scientist Resource Projects Department Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899 Phone: 352-796-7211, ext. 4272; 1-800-423-1476, ext. 4272; or SUNCOM 628-4272 Fax: 352-754-6885 E-Mail: doug.leeper@swfwmd.state.fl.us

# Josie Guillen

Administrative Assistant Resource Projects Department Southwest Florida Water Management District 2379 Broad Street Brooksville, Florida 34604-6899 (352) 796-7211, ext. 4227 Southwest Florida Water Management District home page Hi Doug,

I am with the Homosassa River Alliance and we are very much interested in your study on the Homosassa MFLs. Let me know if you need any help in regard to the below workshop. We will try to get a good turnout for that meeting.

Some of us have been reviewing the study report and we have a few questions. If you are interested I'll send in guestions as they come up.

Ron

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

From: **Doug Leeper** < Doug.Leeper@swfwmd.state.fl.us>

Date: Thu, Sep 9, 2010 at 9:38 AM

Subject: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System To: "Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us)"

<Kathleen.Greenwood@dep.state.fl.us>, "Llewellyn, Janet (Janet.Llewellyn@dep.state.fl.us)" < Janet.Llewellyn@dep.state.fl.us>, "Swihart, Tom (Tom.Swihart@dep.state.fl.us)"

< Tom.Swihart@dep.state.fl.us>, "Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us)" < Carolyn.Voyles@dep.state.fl.us>, "priswat@tampabay.rr.com" < priswat@tampabay.rr.com>, "grubman1@gmail.com" < grubman1@gmail.com>, "Michael Lusk (<u>Michael\_Lusk@fws.gov</u>)'

<<u>Michael\_Lusk@fws.gov</u>>, "Joyce\_Kleen@fws.gov" <Joyce\_Kleen@fws.gov>, "ted.hoehn@MyFWC.com" <<u>ted.hoehn@myfwc.com</u>>, "eric.nagid@MyFWC.com" <eric.nagid@myfwc.com>

Cc: Mark Hammond <<u>Mark.Hammond@swfwmd.state.fl.us</u>>, Marty Kelly

<<u>Marty.Kelly@swfwmd.state.fl.us</u>>, Mark Barcelo <<u>Mark.Barcelo@swfwmd.state.fl.us</u>>, "Cara S. Martin" < Cara.Martin@swfwmd.state.fl.us >, "Robyn O. Felix"

<<u>Robyn.Felix@swfwmd.state.fl.us</u>>, Karen Lloyd <<u>Karen.Lloyd@swfwmd.state.fl.us</u>>, "Albert A. Gagne" <<u>Albert.Gagne@swfwmd.state.fl.us</u>>, Paul Williams

<<u>Paul.Williams@swfwmd.state.fl.us</u>>, Miki Renner <<u>Miki.Renner@swfwmd.state.fl.us</u>>, Barbara Matrone < Barbara.Matrone@swfwmd.state.fl.us>

Greetings:

I am writing to inform you that the Southwest Florida Water Management District will be hosting a rule development public workshop next month on proposed minimum flows for the Homosassa River system in Citrus County, Florida. Minimum flows are defined as "...the the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042, Florida Statutes). Minimum flows are adopted by the District Governing Board into Chapter 40D-8, Florida Administrative Code, and are used for regulatory purposes, including review of water-use permits.

Here's the pertinent information for the workshop.

What: Rule development public workshop on proposed minimum flows for the Homosassa River system in Citrus County, Florida When: October 13, 2010; 6:30 P.M.

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Sincerely,

Douglas A. Leeper Chief Environmental Scientist Resource Projects Department Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899 Phone: 352-796-7211, ext. 4272; 1-800-423-1476, ext. 4272; or SUNCOM 628-4272 Fax: 352-754-6885 E-Mail: doug.leeper@swfwmd.state.fl.us District Web Site: http://www.swfwmd.state.fl.us

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Mr. Miller:

I look forward to seeing you and the rest of the members of the Alliance at the workshop on October 13<sup>th</sup>. Please feel free to call me or forward any questions you may have regarding the draft report on proposed minimum flows for the Homosassa River system or other water management issues.

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

From: Ron Miller [mailto:rmille76@tampabay.rr.com]
Sent: Wednesday, September 22, 2010 11:24 AM
To: Doug Leeper
Cc: Priscilla Watkins; Jim Bitter; Al Grubman
Subject: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System

Hi Doug,

I am with the Homosassa River Alliance and we are very much interested in your study on the Homosassa MFLs. Let me know if you need any help in regard to the below workshop. We will try to get a good turnout for that meeting.

Some of us have been reviewing the study report and we have a few questions. If you are interested I'll send in questions as they come up.

Ron

From: Doug Leeper < Doug.Leeper@swfwmd.state.fl.us>

<sup>-----</sup> Forwardedmessage------

Date: Thu, Sep 9, 2010 at 9:38 AM

Subject: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System

To: "Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us)"

<sup>&</sup>lt;<u>Kathleen.Greenwood@dep.state.fl.us</u>>, "Llewellyn, Janet (<u>Janet.Llewellyn@dep.state.fl.us</u>)"

<sup>&</sup>lt;<u>Janet.Llewellyn@dep.state.fl.us</u>>, "Swihart, Tom (<u>Tom.Swihart@dep.state.fl.us</u>)"

<sup>&</sup>lt;<u>Tom.Swihart@dep.state.fl.us</u>>, "Voyles, Carolyn (<u>Carolyn.Voyles@dep.state.fl.us</u>)"

<<u>Carolyn.Voyles@dep.state.fl.us</u>>, "priswat@tampabay.rr.com" <<u>priswat@tampabay.rr.com</u>", "grubman1@gmail.com" <<u>grubman1@gmail.com</u>" <<u>Michael\_Lusk@fws.gov</u>)" <<u>Michael\_Lusk@fws.gov</u>>, "Joyce\_Kleen@fws.gov" <<u>Joyce\_Kleen@fws.gov</u>>, "ted.hoehn@MyFWC.com" <<u>ted.hoehn@myfwc.com</u>>, "eric.nagid@MyFWC.com"

<eric.nagid@myfwc.com>

Cc: Mark Hammond <<u>Mark.Hammond@swfwmd.state.fl.us</u>>, Marty Kelly

<<u>Marty.Kelly@swfwmd.state.fl.us</u>>, Mark Barcelo <<u>Mark.Barcelo@swfwmd.state.fl.us</u>>,

"Cara S. Martin" <<u>Cara.Martin@swfwmd.state.fl.us</u>>, "Robyn O. Felix"

<<u>Robyn.Felix@swfwmd.state.fl.us</u>>, Karen Lloyd <<u>Karen.Lloyd@swfwmd.state.fl.us</u>>,

"Albert A. Gagne" <<u>Albert.Gagne@swfwmd.state.fl.us</u>>, Paul Williams

<<u>Paul.Williams@swfwmd.state.fl.us</u>>, Miki Renner <<u>Miki.Renner@swfwmd.state.fl.us</u>>, Barbara Matrone <<u>Barbara.Matrone@swfwmd.state.fl.us</u>>

Greetings:

I am writing to inform you that the Southwest Florida Water Management District will be hosting a rule development public workshop next month on proposed minimum flows for the Homosassa River system in Citrus County, Florida. Minimum flows are defined as "...the the limit at which further withdrawals would be significantly harmful to the water resources or ecology of the area" (Section 373.042, Florida Statutes). Minimum flows are adopted by the District Governing Board into Chapter 40D-8, Florida Administrative Code, and are used for regulatory purposes, including review of water-use permits.

Here's the pertinent information for the workshop.

What: Rule development public workshop on proposed minimum flows for the Homosassa River system in Citrus County, FloridaWhen: October 13, 2010; 6:30 P.M.Where: Homosassa Civic Club; 5530 South Mason Creek Road, Homosassa, Florida 34448-4408

The workshop will include an overview of the process used to develop the proposed minimum flows and serve as an opportunity for interested parties to provide input on the flow recommendations. Public comment received during and following the workshop will be used to modify the minimum flows, as appropriate, and upon request, made available to the District Governing Board when staff present recommended levels to the Board for adoption into the Florida Administrative Code. Staff anticipates presenting the levels to the Board at their December 14, 2010 meeting, which will be held at the District Headquarters located at 2379 Broad Street, Brooksville, Florida 34604.

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Please contact me if you have any questions or comments concerning the upcoming workshop or the proposed minimum flows for the Homosassa River system.

Sincerely,

Douglas A. Leeper Chief Environmental Scientist Resource Projects Department Southwest Florida Water Management District 2379 Broad Street Brooksville, FL 34604-6899 Phone: 352-796-7211, ext. 4272; 1-800-423-1476, ext. 4272; or SUNCOM 628-4272 Fax: 352-754-6885 E-Mail: doug.leeper@swfwmd.state.fl.us District Web Site: http://www.swfwmd.state.fl.us

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From:	James Bitter
То:	Ron Miller; Doug Leeper
Cc:	Priscilla Watkins; Al Grubman
Subject:	Re: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System
Date:	Wednesday, September 22, 2010 3:43:39 PM

Ron: I have given Rochelle Kaiser of the Beacon a heads up and she will use any input we have. Also we should get Mulligan involved for maximum publicity. We need a good turn out on this one. I have an appointment with the VA at 1PM that day so may be a little late getting back. I would like to see the members of the Alliance steering committee wearing name badges.

Original Message
From: Ron Miller
Cc: <u>Priscilla Watkins</u> ; <u>Jim Bitter</u> ; <u>Al Grubman</u> Sent: Wednesday, September 22, 2010 11:24 AM Subject: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System
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<ul> <li>Forwarded message</li> <li>From: Doug Leeper &lt; Doug.Leeper@swfwmd.state.fl.us&gt;</li> <li>Date: Thu, Sep 9, 2010 at 9:38 AM</li> <li>Subject: SWFWMD Public Workshop on Proposed Minimum Flows - Homosassa River System</li> <li>To: "Greenwood, Kathleen (Kathleen.Greenwood@dep.state.fl.us)"</li> <li><kathleen.greenwood@dep.state.fl.us>, "Lewellyn, Janet (Janet.Llewellyn@dep.state.fl.us)"</kathleen.greenwood@dep.state.fl.us></li> <li><janet.llewellyn@dep.state.fl.us>, "Swihart, Tom (Tom.Swihart@dep.state.fl.us)"</janet.llewellyn@dep.state.fl.us></li> <li><tom.swihart@dep.state.fl.us>, "Voyles, Carolyn (Carolyn.Voyles@dep.state.fl.us)"</tom.swihart@dep.state.fl.us></li> <li><carolyn.voyles@dep.state.fl.us>, "Priswat@tampabay.rr.com" &lt; priswat@tampabay.rr.com&gt;,</carolyn.voyles@dep.state.fl.us></li> <li>"grubman1@gmail.com" &lt; grubman1@gmail.com&gt;, "Michael Lusk (Michael Lusk@fws.gov)"</li> <li><michael lusk@fws.gov="">, "Joyce Kleen@fws.gov" &lt; Joyce Kleen@fws.gov&gt;,</michael></li> <li>"ted.hoehn@MyFWC.com" &lt; ted.hoehn@myfwc.com&gt;, "eric.nagid@MyFWC.com"</li> <li><eric.nagid@myfwc.com></eric.nagid@myfwc.com></li> <li>C: Mark Hammond@swfwmd.state.fl.us&gt;, "Robyn O. Felix"</li> <li><robyn.felix@swfwmd.state.fl.us>, Karen Lloyd &lt; Karen.Lloyd@swfwmd.state.fl.us&gt;, "Albert</robyn.felix@swfwmd.state.fl.us></li> <li>A. Gagne" &lt; Albert.Gagne@swfwmd.state.fl.us&gt;, Paul Williams</li> <li><paul.williams@swfwmd.state.fl.us>, Miki Renner &lt; Miki.Renner@swfwmd.state.fl.us&gt;,</paul.williams@swfwmd.state.fl.us></li> </ul>
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No virus found in this incoming message. Checked by AVG - www.avg.com I am using the Free version of <u>SPAMfighter</u>. SPAMfighter has removed 452 of my spam emails to date.

Do you have a <u>slow PC?</u> Try free scan!

# Agency to set river's minimum flows

#### By Special to the Chronicle

The Southwest Florida Water Management District (SWFWMD) is in the process of setting Minimum Flows and Levels (MFL) for the Homosassa River. The MFL is the limit at which further water withdrawals will cause significant harm to the water resources and the environment.

The MFL will be used in future water withdrawal permitting. Setting a minimum flow to minimize environmental damage requires considerable research, especially for rivers that feed coastal estuaries. Citrus County estuaries, known to be among the most productive in Florida, are a key part of the Florida Forever Coastal Springs Greenway, which has the goal of conserving essential habitat and spawning grounds and nurseries for a large and diverse range of fish, invertebrates, birds and manatees.

The recommended maximum flow reduction for the Homosassa River system is 5 percent. SWFWMD will host a public workshop to review the recommendation at 6:30 p.m. Oct. 13 at the Homosassa Civic Club (5530 S. Mason Creek Road).

Public comment will be used to modify the minimum flows, as appropriate. Clearly setting the MFL is important for the future of the Homosassa. The public's input will be significant for the future of the river.

A report on this work for the Homosassa River system is posted on the SWFWMD website at <u>www.swfwmd.state.fl.us</u>. Click on Projects & Programs; then MFLs; then Reports.

Resources evaluated in this

report included:

1) salinity-based habitats,

2) fish and Invertebrates, and

3) thermal-refuge for manatees.

This report shows the salinity-based habitats in the Homosassa are very sensitive to flow reductions, especially near the Springs. The salinity goes from 0.5 to 5 ppt (parts per thousand) at the Springs to 33 ppt at the Gulf.

Low-salinity zones such as those found in the mid to upper reaches of the Homosassa River are a fundamental part of the estuary web of life, providing critical breeding grounds and sources of food for a large variety of fish and other organisms. Flow reductions of more than 5 percent were associated with significant reductions in salinity-based habitats at river locations with salinities of up to 12 ppt. A salinity of 12 ppt can be found several miles down-river, about midway to the Gulf.

SWFWMD studied fish, crabs, shrimp, bugs and other critters. Of course, SWFWMD couldn't analyze every fish that lives in these waters, but it did analyze 20 representative species, including killifish, grass shrimp, blue crabs, mollies, sunfish, largemouth bass, pinfish and bugs. Flow reductions of only 2.7 percent were associated with significant reductions in each of the 20 species analyzed. The very sensitive response of these organisms to flow reductions is consistent with the salinity sensitivity mentioned above.

SWFWMD studies of the thermal-refuge habitat for manatees showed the volume of habitat available to manatees during cold conditions is also very sensitive to flow reduction. Flow reductions between 5 and 10 percent reduced favorable manatee habitat by 15 percent. However, the study states the volume of thermally favorable habitat available is large enough to handle several thousand manatees (each manatee gets 3.1 cubic meters of space) while about 150 manatees use the river.

SWFWMD combined the studies and is making the following recommendation: "The minimum flow for the Homosassa River system is defined as 5 percent reduction from combined flows measured on a daily basis at the USGS gauge sites in the Homosassa Springs run and Southeast Fork of the Homosassa River."

This is a loss of 7.6 cfs (cubic feet per second) and reduces the flow from a baseline (at these stations) of 152 cfs to144.4 cfs.

Call Ron Miller, director of the Homosassa River Alliance, at 628-6066 for more information.

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# Southwest Florida Water Management District Rule Development Public Workshop

Proposed Minimum Flows for the Homosassa River System

October 13, 2010 Homosassa, Florida

Contact Information (Optional) Name Mailing address and/or e-mail address and/or phone number Bill GARVIN WGARVIN @TAMPARAY IRR. COM JONRT GARVINI jrngarvin (a) tampabay .rr. com THOMAS CLARK Hiller C timpalen JIM BITTER CHARLES TONEROS 11440 W WATERWAY Dr. Honosussa 34448 Rof Ausuncus less Cornett HKK JIM # Michel Collins Jimmickey 22@ YAhoo. com Seri Sneder HRA Ron Miller ARA Dory Wither HRA Bub Jeevas NRA KulerLin PArrow Km Omkins marian county - on file

# Southwest Florida Water Management District Rule Development Public Workshop

Proposed Minimum Flows for the Homosassa River System

October 13, 2010

Homosassa, Florida Contact Information (Optional) Name Mailing address and/or e-mail address and/or phone number 4381 S. Blue Water Point mi McChesney Homosassa, EL 3444 4381, S. Blue Water Point Muson Homusassa FL 34448 6270 S. BANYON DE HOMOSASSA, FL. 3448 WSpring cove Rd Homosarra 39907 9415 arbene Her IP 9415 W. Spring Cover Ad Honosasse 3444 Dontiers dhiers 3 @ q mail. com Eyce Kleen Michael G. Czerwinski PA. ENVIronmental Consultants 2716 S. Lecanto Hwy Lecanto FL 34461 Michael G. GERMASKI 5306 5. Running Dr. Homosasta FL 34448 352-621-1667 Betty Blachous DOUG LEGPER, SID FLANNERY, RON PSAUDO, STAFF: CAKA MAKAN

ALSO : AL GRUBMAN, WITHLACOULTEE RIVER BASIN BOARD MEABER









# What is Significant Harm?

- Not defined by state law
- Defined or implicit in District standards or thresholds used to establish minimum flows and levels
- Standards or thresholds are specific to water resource type and value

#### Examples

- Preventing cypress wetland degradation in lake basins Preventing or slowing rate of saltwater intrusion into
- aquifers Preventing more than a 15% decline in habitat availability in river segments

### Minimum Flows and Levels Considerations

- Florida Administrative Code, Chapter 62-40.473 -

Shall consider natural seasonal fluctuations and environmental values, including:

- · Recreation in and on the water
- Fish and wildlife habitats and the passage of fish
- Estuarine resources
- Transfer of detrital material
- Maintenance of freshwater storage and supply
- Aesthetic and scenic attributes
- Filtration and absorption of nutrients and other pollutants
- Sediment loads
- · Water quality
- Navigation

#### Regulatory Use of Minimum Flows and Levels

- Water-Use Permitting
- Environmental Resource
   Permitting
- Water Resource Planning





## Process for Establishing Minimum Flows and Levels

- Priority List and Schedule developed
- Methods, flows or levels developed and peer-reviewed
- Workshops held for public input
- Recovery or prevention strategies developed, as necessary
- Governing Board adopts minimum flows and levels into Chapter 40D-8, Florida Administrative Code
- Necessary recovery strategies included in Regional Water Supply Plan and in some cases adopted into Chapter 40D-80, Florida Administrative Code

#### Tidal River Minimum Flows - Study Elements -

- Defining the system
- Baseline flows and salinity evaluations
- Evaluation of withdrawal impacts on flows
- Evaluation of structural alterations
- Bathymetric mapping
- Shoreline and vegetation mapping
- Benthic invertebrate evaluations
- Planktonic and nektonic fish and invertebrate evaluations
- Salinity-based habitat modeling
- · Thermal habitat modeling for manatees

















Baseline Flows and Salinity - Flows Summary Table -							
Statistic (cfs or N)	Homosassa Springs at Homosassa Springs FL	SE Fork Homosassa Spring at Homosassa Springs FL	Combined Homosassa and SE Fork Springs	Halls River	Homosassa River at Homosassa FL (tidally filtered)	Hidden River near Homosass a FL	
Maximum	141	100	240	1,995	2,090	25.0	
75 <sup>th</sup> Percentile	98	68	165	200	350	11	
Median	88	60	147	108	251	8.0	
25th Percentile	79	53	131	28	167	4.6	
Minimum	34	23	57	-765	-636	1.3	
Mean	89	61	149	129	272	8.0	
Standard Deviation	14	11	26	181	183	4.4	
Number (N) of daily Records	4,975	3,123	3,102	1,662	1,774	2,063	



































Sa	Salinity-Based Habitat Modeling						
	Salinity-Based Habitat	Associated with 1	Percent-of-Flow Reduction Associated with 15% Reductions in Habitat from Median Baseline Conditions				
		Hydrodynamic Model 2007 Benchmark Period	Regression Model 2007 Benchmark Period	Regression Model 1935-2009 Benchmerk Period			
	Bottom Area						
	Salinity s 2 Based on Bottom Isohaline Location	<5	NM	NM	1		
	Salinty s 2 Based on Water-Column Average Isohaline Location	<5	NM	NM			
	Salinity < 3 Based on Bottom Isohaline Location	5 - 10 (9.4)	< 5	< 5	1		
	Salinty s 3 Based on Water-Column Average Isohaline Location	5 - 10 (9.1)	< 5	<5			
	Salinity s 5 Based on Bottom Isohaline Location	15	> 30	5 - 10 (6.3)			
	Salinty < 5 Based on Water-Column Average Isohaline Location	10 – 15	20	5 - 10 (7.0)			
	Salinity < 12 Based on Bottom Isohaline Location	25	20	10			
	Salinity s 12 Based on Water-Column Average Isohaline Location	25 - 30	30	10 - 15			
	Water Volume						
	Salinity s 2	<5	NM	NM			
	Salinity ≤ 3	10	5 - 10 (5.3)	< 5			
	Salinity s 5	15	20 - 25	5 - 10 (6.9)			
	Salinity s 12	20 - 25	25	10 - 15			
	Natural Shoreline Length						
	Salinity 5.2	NA	NM	NM			
	Salinty s 3	20 - 25	10 - 15	10 - 15			
	Salinty s 5	15 - 20	> 30	> 30			
1.00	Salinity s 12	NA	5	5			





#### Thermal Habitat Modeling for Manatees

- Results -

- Flow reduction between 5-10% associated with a 15% reduction in favorable refuge habitat during critically cold four-hour period
- •Flow reduction between 25-30% associated with a15% reduction in favorable refuge habitat during critically cold three-day period







	Co	ontact Information		
Name:	Doug	las A. Leeper		
Title:	Chief	Environmental Scientist		
Mail:	South 2379 Brook	west Florida Water Mgmt. District Broad St. sville, FL 34604-6899		
Phone	: 1-800 Exten	-423-1476 or 352-796-7211 sion 4272		
E-Mail: doug.leeper@swfwmd.state.fl.us				
Web S	ite:	www.swfwmd.state.fl.us or watermatters.org		















































ND Model – Predicted changes in Discharge (Current Conditions)						
Spring Name	Discharge for Non-Pumping Scenario (cfs)	Discharge for 2005 Pumping Scenario (cfs)	Difference (cfs)	Percent Difference		
Abdoney Spring	4.98	4.93	-0.05	-0.9		
Belcher Spring	4.98	4.89	-0.10	-2.0		
Halls River 1 Spring	5.00	4.95	-0.05	-0.9		
Halls River Head Main Spg	102.11	101.06	-1.05	-1.0		
Hidden River Head Spring	6.61	6.35	-0.26	-4.0		
Homosassa 1 Spring	71.65	70.98	-0.67	-0.9		
Mcclain Spring	4.98	4.93	-0.05	-0.9		
Pumphouse Spring	4.97	4.92	-0.05	-0.9		
Trotter 1	4.97	4.93	-0.05	-0.9		
Total	210.2	207.9	-2.31	-1.1		

ND Model – Predicted changes in Discharge (2030)						
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		










































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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 Web Site: 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:	Czerwinski, Mike (mczerwin@tampabay.rr.com)
Cc:	Ron Basso; Sid Flannery; Cara S. Martin
Subject:	Adobe PDF of Homosassa MFLs Workshop Slides
Date:	Friday, October 15, 2010 10:53:22 AM

Mike:

Thanks for your input at the recent public workshop on proposed minimum flows for the Homosassa River system. In response to your request for the slides used at the meeting, I have converted my Powerpoint file to an Adobe PDF file and put both the Powerpoint and Adobe PDF versions of the slides on our FTP site for you to retrieve.

To retrieve the files, go to the following web page and click on the link under the heading "Browse our FTP site for download only"

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

The files you want are located in the directory: http://ftp.swfwmd.state.fl.us/pub/outgoing

And are named: SWFWMD\_Slides\_Homosassa\_MFLs\_Wrkshp\_13oct2010.ppt SWFWMD\_Slides\_Homosassa\_MFLs\_Wrkshp\_13oct2010.pdf

Let me know if you have trouble retrieving the files.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org April 30, 2012

# MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and Katie Tripp regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and Katie Tripp, regarding minimum flows development for the Homosassa River system.

From:	Doug Leeper
To:	"ktripp@savethemanatee.org"
Ca	Marty Kelly
Date:	Thursday, October 28, 2010 2:39:01 PM
Attachments:	SWFWMD Response to FFWCC Comments on Homosassa MFLs with Letter Attchmnt.pdf

Ms. Tripp:

It was a pleasure to speak with you today regarding the District's report on recommended minimum flows for the Homosassa River system. I look forward to receiving your written comments on our draft report.

As promised, I've attached a copy of the memorandum that was developed in response to comments on the recommended minimum flows that were submitted by the Florida Fish and Wildlife Conservation Commission.

Also, as we discussed, here's a link to the report of the independent peer-review panel that evaluated the District's recommended minimum flows report.

#### http://www.swfwmd.state.fl.us/projects/mfl/reports/homosassa\_peer\_review.pdf

Please feel free to contact me if you have additional questions or comments.

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

Doug Leeper
"ktripp@savethemanatee.org"
Homosassa Minimum Flows Info from SWFWMD
Thursday, October 28, 2010 2:42:12 PM
SWFWMD Response to FFWCC Comments on Homosassa MFLs with Letter Attchmnt.pdf

Ms. Tripp – I notices I previously sent this e-mail without a subject line. In the event that your email program filters out unidentified e-mails, I'm re-sending this...

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

From: Doug Leeper Sent: Thursday, October 28, 2010 2:39 PM To: 'ktripp@savethemanatee.org' Cc: Marty Kelly Subject:

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Ms. Tripp:

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Please feel free to contact me if you have additional questions or comments.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org April 30, 2012

# MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Correspondence between Doug Leeper and Mike Czerwinski regarding Homosassa River System MFLs

This memorandum documents correspondence between Doug Leeper (SWFWMD) and Mike Czerwinski regarding minimum flows development for the Homosassa River system.

From:	Doug Leeper
To:	Czerwinski, Mike (mczerwin@tampabay.rr.com)
Subject: Date:	Ron Basso; Sid Hannery; Cara S. Martin Adobe PDF of Homosassa MFLs Workshop Sildes Friday, October 15, 2010 10:53:22 AM

Mike:

Thanks for your input at the recent public workshop on proposed minimum flows for the Homosassa River system. In response to your request for the slides used at the meeting, I have converted my Powerpoint file to an Adobe PDF file and put both the Powerpoint and Adobe PDF versions of the slides on our FTP site for you to retrieve.

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And are named: SWFWMD\_Slides\_Homosassa\_MFLs\_Wrkshp\_13oct2010.ppt SWFWMD\_Slides\_Homosassa\_MFLs\_Wrkshp\_13oct2010.pdf

Let me know if you have trouble retrieving the files.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org 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<br/>regarding recommended minimum flows for the Homosassa River system

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

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trends in measured and modeled salinity for the Homosassa River are presented for a short, modelcalibration 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.

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

Table 1.	Information on	Homosassa	River	System	Springs	Routinely	<pre>Sampled</pre>	by the	District
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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

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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 withdrawl 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 aquifers 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 Statue 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 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 webs 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 withdrawl 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 Statue 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 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.

# <u>1. Excerpted Questions Concerning Flows at the United States Geological Survey Homosassa Springs and</u> <u>Southeast Fork Homosassa Springs Gage Sites</u>

**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

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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 <u>rkane@usgs.gov</u>.

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.

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# 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 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.

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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, July12, 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.

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

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.

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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.

# <u>Three Page Attachment to November 1, 2010 Memorandum on Questions and Comments Submitted</u> 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)(B-1)GW being NVGD29 and GH being 2.99 ft below NGVD88SE Fork Homosassa Spring at Homosassa (02310688):Q = 18.63 + 3.31(GW) - 10.31(GH) - 418.14(dS/dt)(B-2)GW and GH being NVGD29(B-2)

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) (B-3) Vm = 0.00902154 + 0.9019Vi + 0.12138Vi2 + 0.045375(GH) (B-4)

In which

Q = river discharge, in cfs. A = area of channel cross section at the gauge, in ft2. 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 meteranchored on the channel bottom near the gauge, in ft/s.<math>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.

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

October	18,	2010
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# MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section
SUBJECT:	Response to comments submitted by Mr. Rolf Auermann on October 17, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum was developed to address comments in an e-mail submitted to the District on October 17, 2010 by Mr. Rolf Auermann regarding information used to develop the currently recommended minimum flows for the Homosassa River system. The comments included in Mr. Auermann's original submission are reproduced below along with staff's response.

\_\_\_\_\_

# Comments on Hydrologic Data Used for the Homosassa Minimum Flows Study Submitted by Mr. Rolf Auermann on October 17, 2010, and Staff Response

# **Original E-Mail Submission:**

From:Rolf AuermannTo:Doug LeeperCc:Al Grubman; Ron MillerSubject:Homosassa River Flow measurementsDate:Sunday, October 17, 2010 3:29:59 PM

# Dear Doug,

I attended the SWFWMD presentation this last week regarding the flow measurements in the Homosassa River. The presentation showed continuous flow measurements from before the year 2000 and up to the present. Please have a look at our Lakewatch data, which is in conflict with the data being presented.

www.homosassariveralliance.org/lakewatch.cfm .

I contacted the USGS in 2009 and requested the 2008 Homosassa River Flow data and other info. I was told that there was no data available for 2008 and that new changes in the mathematical calculation and physical configuration had been made. The new more accurate type of data has been posted since January, 2009.

Sincerely, Rolf Auermann October 17, 2010

# **Response:**

Staff does not believe there is any conflict in the discharge data for the Homosassa Springs at Homosassa Springs, FL (Site Number 02310678) gage site that were presented at the public workshop held on October 13, 2010 at the Homosassa Civic Center and the discharge data presented at the Save the Homosassa River Alliance web site identified by Mr. Auermann. Staff believes that presentation of two types of discharge data for the site at the workshop may have led to some confusion regarding the records that were used to develop the District's recommended minimum flows for the Homosassa River system. The two discharge records presented at the meeting are discussed below in an attempt to clarify any concerns regarding data discrepancies.

The current daily mean discharge record for the Homosassa Springs at Homosassa Springs, FL site available from the United States Geological Survey's National Water Information System Web Interface includes several thousand discharge values for the period from October 18, 1995 through October 17, 2010. This record is not continuous – there are days for which no mean daily discharge values are reported – and the record includes discharge values that have been approved for publication by the Survey and values that are classified as provisional and subject to revision. Discharge values from this record that were collected through March 16, 2010 were presented in slides shown at the public workshop. Staff discussed use of these data in the analyses supporting the current minimum flow recommendation for the Homosassa River system, including use of only values that are classified as "approved for publication". At the meeting staff also presented discharge records available for the site from the United States Geological Survey's National Water Information System Water Quality Database. The database currently includes 115 "historical" discharge records collected between October 1930 and September 1978 at the Homosassa Springs at Homosassa Springs, FL gage site. Staff explained that these "historical" records are for the most part, reported as instantaneous measurements, meaning they were recorded at one time during the day. It is well known that flows from Homosassa Springs are affected by tides, so instantaneous measurements can vary considerably depending on the tide stage when they were recorded. In contrast, the daily mean records from 1995 through 2010 that are included in the draft report for the Homosassa River system and presented at the public workshop are based on up to 96 discharge estimates within each day, providing much better tidally-averaged values. At the public workshop, staff noted that the "historical" discharge values were presented along with the daily means discharge record in response to questions and comments that had previously been submitted regarding the discharge record used for developing the District's minimum flow recommendations for the Homosassa River system. They further noted that the "historical" records were presented for informational purposes only, and were not used for analyses supporting the minimum flow recommendations.

October 26, 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. Ron Miller on October 25, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum documents an October 25, 2010 e-mail submitted to the District by Mr. Ron Miller, with the Save the Homosassa River Alliance, concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Miller asks about the time-line for activities associated with establishment of minimum flows for the system and also recommends that the District consider allowing no reductions in flows when establishing the minimum flows. An e-mail response was sent to Mr. Miller indicating that staff plans to present the peer-review report titled *Scientific Review of Recommended Minimum Flows for the Homosassa River System* to the Governing Board at their November 16, 2010 meeting and hopes to present rule language associated with recommended minimum flows to the Board at their December 14, 2010 meeting. A copy of this memorandum was attached to the e-mail sent to Mr. Miller.

Mr. Miller's e-mail is reproduced below, to provide context for his comments on the currently recommended minimum flows for the Homosassa River system.

# E-Mail Submitted to the District by Mr. Ron Miller on October 25, 2010

From: Ron Miller To: Doug Leeper Subject: Homosassa MFL presentation Date: Monday, October 25, 2010 6:25:55 PM

Hi Doug,

Have you firmed up the date for your presentation of the Homosassa MFL study to the SWFWMD Governing Board?

I thought the Peer Review comments were very good... I mean they did a good job and so did your team. This study is a very good start to understand the complexities of the Homosassa. We think the sensitivity of the Homosassa that you have observed is the reason that so many people have seen so much change over the years. We still have concerns about the historical data and we still think you should target zero flow reduction to protect the Homosassa River System.

Ron

DAL

October 25, 2010

# MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Comments submitted by Mr. William Garvin on October 23, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum documents the October 23, 2010 submission by Mr. William Garvin of three e-mails concerning development of minimum flows for the Homosassa River system. In his e-mails and six accompanying photographs, Mr. Garvin outlines recent observations of barnacle distribution in the upper reach of the Homosassa River and an associated canal. He notes that barnacle fouling in the canal at his residence has been a problem during the past three of the ten years he has lived along the river.

Based on Mr. Garvin's recommendation that "no further water withdrawals could be tolerated by the plant life for a healthy river environment", it may be inferred that he does not support the District's current minimum flow recommendation, which would allow up to a five percent reduction in baseline or natural flows in the system.

Mr. Garvin's e-mails and associated photographs are reproduced as attachments to this memorandum, to provide a full context for Mr. Gavin's perspective on the currently recommended minimum flows for the Homosassa River system.
#### Attachments to October 25, 2010 Memorandum on Comments Submitted by Mr. William Garvin

From: Bill Garvin To: Cara S. Martin; Doug Leeper Cc: Ron Miller; Jim Bitter Subject: MFL Trash Can Date: Saturday, October 23, 2010 5:51:49 PM Attachments: WCG\_3269.JPG Barnacles, Homosassa River, 038, 13 Oct 10 © William Garvin.JPG

Good Day,

As noted at your presentation my wife and I recovered a trashcan on 18 September 2010 (Save Our Waters Week) loaded with barnacles. The trash can was 2,263 Feet from the Main Spring in the Homosassa Springs Wildlife State Park, GPS location of the trash can N 28° 48.011 W 82° 35.720 Attached images will show only one handle of the trashcan it was indeed loaded with barnacles both inside and out. We still have the can and can supply it to you if needed.

I believe with salt water that close to the spring no further water withdrawals could be tolerated by the plant life for a healthy river environment. Already bass and brim stay in the South West Branch as there is fresher water there than in the main river. We have lived here for ten years and until three years ago we did not have a problem with barnacles. Two years ago we had to have our boat removed and have the bottom scrapped of barnacles and coated with an anti-fowling paint, up till that time we just got algae on the bottom of the boat.

William Garvin 4380 S. Blue Water Point Homosassa, FL 34448-3900 352-628-4685



From: Bill Garvin To: Cara S. Martin; Doug Leeper Subject: MF&L Check Valve Date: Saturday, October 23, 2010 5:55:20 PM Attachments: Barnacles, Homosassa River, 048, 14 Oct 10 © William Garvin.JPG Barnacles, Homosassa River, 038, 13 Oct 10 © William Garvin.JPG

Good Day,

As noted at your presentation I removed a check valve from my irrigation system on 30 July 2010. We irrigate form our canal (Blue Water Canal). The check valve was loaded with barnacles. The valve is 1,525 Feet from the Main Spring in the Homosassa Springs Wildlife State Park, GPS location of the check valve is N 28° 47.876 W 82° 35.568 Attached images will show the barnacles.

I believe with salt water that close to the spring no further water withdrawals could be tolerated by the plant life for a healthy river environment. Already bass and brim stay in the South West Branch as there is fresher water there than in the main river. We have lived here for ten years and until three years ago we did not have a problem with barnacles. Two years ago we had to have our boat removed and have the bottom scrapped of barnacles and coated with an anti-fowling paint, up till that time we just got algae on the bottom of the boat.

William Garvin 4380 S. Blue Water Point Homosassa, FL 34448-3900 352-628-4685



From: Bill Garvin To: Cara S. Martin; Doug Leeper Cc: Ron Miller; Jim Bitter Subject: MF&L Ladder Date: Saturday, October 23, 2010 9:09:54 PM Attachments: Barnacles, Homosassa River, 050, 23 Oct 10 © William Garvin.JPG Barnacles, Homosassa River, 055, 23 Oct 10 © William Garvin.JPG

Good Day,

I just removed a ladder from my seawall to put a coating of a preservative (Wood Rx) on it on 22 October 2010. The bottom step, the lowest step the underside of it was covered with barnacles. The ladder is homemade and made of pressure treated wood. The ladder is 1,526 Feet from the Main Spring in the Homosassa Springs Wildlife State Park, GPS location of the ladder is N 28° 47.884 W 82° 35.569 Attached images will show the barnacles.

I believe with salt water that close to the spring no further water withdrawals could be tolerated by the plant life for a healthy river environment. Already bass and brim stay in the South West Branch as there is fresher water there than in the main river. We have lived here for ten years and until three years ago we did not have a problem with barnacles. Two years ago we had to have our boat removed and have the bottom scrapped of barnacles and coated with an anti-fowling paint, up till that time we just got algae on the bottom of the boat.

William Garvin 4380 S. Blue Water Point Homosassa, FL 34448-3900 352-628-4685



October 27, 2010

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Comment submitted by Mr. Bill Garvin on October 27, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum documents an October 27, 2010 e-mail submitted to the District by Mr. William Garvin concerning development of minimum flows for the Homosassa River system. In his e-mail, Mr. Garvin asks whether staff has reviewed the 2009 report by Tom Frazer and others titled *Year 2 – Annual Progress Report – Increased Nutrient Loading of Spring-fed Coastal Rivers: Effects on Habitat and Faunal Communities* and suggests that the document should be included in the District's minimum flows study of the river system. I responded to Mr. Garvin via e-mail on October 27, 2010, thanking him for bringing the report to my attention and noted that I would acknowledge the ongoing study and interim report in the revised report on recommended minimum flows for the Homosassa River system.

Mr. Garvin's e-mail is reproduced below, to provide context for his comments on the currently recommended minimum flows for the Homosassa River system.

## E-Mail Submitted to the District by Mr. Bill Garvin on October 27, 2010

From: Bill Garvin To: Cara S. Martin; Doug Leeper Subject: MF&L Date: Wednesday, October 27, 2010 11:27:14 AM Attachments: U of F SWG Annual Report\_18 August 2009.pdf

Good Morning,

I did not know if you had seen the report from the work that the University of Florida did on the Homosassa River. It is the two year report the final will not be finished until December. I thought it should be included in the material for MFL. As you will be able to see the study is in conjunction with FWC. Thank You,

Bill Garvin-----

#### January 3, 2011

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Florida Department of Environmental Protection questions and comments regarding recommended minimum flows for the Homosassa River system submitted by Ms. Carolyn Voyles on November 15, 2010

This memorandum documents a November 15, 2010 e-mail submitted to the Southwest Florida Water Management District by Mr. Carolyn Voyles, of the Florida Department of Environmental Protection Office of Water Policy, concerning development of minimum flows for the Homosassa River system. Ms. Voyles' e-mail includes an attachment with comments from the Department regarding information outlined in the draft District report titled *Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Pee-Review Draft*. Ms. Voyles original e-mail and the associated document containing the Department's comments are included in their entirety as attachments to this memorandum. Individual comments from the Department are reproduced below in the body of this memorandum, along with staff responses to the comments.

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Comment No. 1

"We are concerned about the benchmark periods selected to establish the baseline flows. Data available from 1931-1974 show the spring discharge historically was much higher than the flows used in the models:

- The draft MFL report states (p. 48): "Mean daily discharge reported by the USGS for the Homosassa Springs at Homosassa FL gage site is derived by averaging 96 daily discharge estimates based on fifteen-minute interval gage heights at the spring and hourly groundwater levels at the Weeki Wachee Well near Weeki Wachee FL site. Discharge at the Homosassa Springs gage site has varied only moderately during the period of record (Figure 2-13), with approved mean daily discharge values ranging from 34 to 141 cfs and average and median values of 89 and 88 cfs, respectively (Table 2-3)."
- By comparison, FGS Bulletin 31 states: "From 1931 to 1974 the main spring had an average discharge of 106 ft<sup>3</sup>/sec for 90 measurements." The average discharge for these 90 measurements (106 cfs) is 16% higher than the benchmark average discharge used in the MFL proposal (89 cfs). FGS Bulletin 31 also states: "...the Southeast Fork of Homosassa Springs had an average discharge of 69.1 ft<sup>3</sup>/sec for 89 measurements." The average discharge for these 89 measurements (69.1cfs) is 13% higher than the benchmark used in the draft MFL report (61 cfs).
- The proposed MFL is based on the combined discharge of the main spring and the Southeastern Fork springs. The combined discharge for the historic period (1931-1974) is 175.1 cfs, which is 16.7% higher than the combined benchmark (1995-2007) of 150 cfs used in the model.

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The historical flow data are not mentioned in the report, and this omission leads the reader to believe that the only existing data are from the 1995-2009 period. We recommend the District expand the report's data discussion and address these points:

- Discuss the 1931-1974 data.
- Describe why the District selected one data set over the other as the benchmark period.
- Discuss possible reasons why the flow has declined from historical levels. Is there any reason to believe the 16% decrease is due to withdrawals? Have climate patterns remained stable or changed over this time period?
- Address the issue of significant harm. Whether or not the older data set is used as a benchmark, it still seems that a 5% allowable withdrawal would result in a 21.7% discharge loss. Might significant harm already have occurred?

We have read SWFWMD's response to the FWC on this same issue, and recommend the District incorporate much of that discussion into the final report."

## Staff Response to Comment No. 1 - Bulleted Points 1 and 2

Staff acknowledges that mention of the historical discharge information referenced by Rosenau and others in their 1977 publication "Springs of Florida" (Bulletin No. 31 of the Florida Bureau of Geology) would enhance the draft report on recommended minimum flows for the Homosassa River system. This information will be included in the revised version of the report.

Staff asserts, however, that the "historical" record may be excluded from the analyses used for developing the minimum flows recommendation, based on the discontinuous nature of the record, differences between the "historic" record and the daily means record derived for the more recent period, *i.e.*, from the mid-1990s to the present, and the determination that variability in the "historical" and more recent discharge records is consistent with available rainfall information and not indicative of a flow decline that may be attributed to anthropogenic activities.

The "historical" discharge record for Homosassa Springs is maintained by the United States Geological Survey in their National Water Information System Water Quality Database. The database currently includes 115 discharge records collected between October 1930 and September 1978 for the Survey's Homosassa Springs at Homosassa Springs, FL gage site. One hundred eleven of these records are reported as instantaneous measurements, meaning they were recorded at one time during the day. It is well documented that discharge from Homosassa Springs is affected by tides, so instantaneous measurements can vary considerably depending on the tide stage when they were recorded. In contrast, the daily mean records from 1995 through 2010 that are included in the draft minimum flows report for the Homosassa River system are based on up to 96 discharge estimates for each day, and represent much better tidally-averaged values. The differences in how the discharge values in the Water Quality Database and the mean daily values reported in the draft minimum flows report suggest that the "historical" and more recent discharge records may not be directly comparable.

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The United States Geological Survey National Water Information System Water Quality Database also includes discharge records for the Southeast Fork Homosassa Spring at Homosassa Springs, FL gage site. A total of 123 records collected between May 1966 and June 1998 are currently available. All but two of the records are reported as instantaneous measurements, meaning they were recorded at one time during the day. Most of these records are single values recorded on individual dates, but 40 of the records are instantaneous measurements that were taken multiple times during the day on five separate dates in 1998. As noted for the Homosassa Springs gage site, discharge at the Southeast Fork gage site is also affected by tides, so instantaneous measurements may vary depending on tide stage.

In contrast with the "historical" records, the daily mean discharge records for the Southeast Fork site for the period from 2000 through 2010 that are included in the draft minimum flows report for the Homosassa River system are based on up to 96 discharge estimates for each day, and represent much better tidally-averaged values. The differences in how the discharge values in the Water Quality Database and the mean daily values presented in the draft minimum flows report suggest that the "historical" and more recent discharge records for the Southeast Fork gage site, like those for the Homosassa Springs gage site, may not be directly comparable.

The discharge records included in the draft report on recommended minimum flows for the Homosassa River system are classified by the United States Geological Survey as "approved" for publication, following agency processing and review, and "provisional", *i.e.*, subject to revision. Of these records, only approved data were used for data summaries and analyses associated with development of the recommended minimum flows for the Homosassa River system. The records in the Survey's water quality database are coded as "historical" data rather than "reviewed and accepted" data. The differences in how the discharge records were derived, *i.e.*, as instantaneous or daily mean values, and the data quality coding attributed to the records by the United States Geological Survey suggest that a higher level of confidence may be attributed to the daily mean discharge records described in the current draft minimum flows report.

Despite the differences between the "historical" discharge records from the Survey's Water Quality Database and the "daily means" records included in the draft report, it is useful to compare the records with respect to each other and long-term regional rainfall patterns. The figure below shows both the "historical" and "daily means" discharge records for the Homosassa Springs at Homosassa Springs, FL gage site.

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The mean and median for the 115 discharge measurements in the "historical" Homosassa Springs gage site record are 116.5 and 115 cubic feet per second (cfs), respectively. The "daily means" discharge record includes 4,975 entries, with mean and median values of 89 and 88 cfs. As one may presume based on the record sample sizes, a composite discharge record that includes both "historical" and "daily means" discharge records yields mean and median values similar to those of the "daily means" record (mean = 90 cfs, median = 89 cfs). Also, only about eleven percent of the "historical" discharge values are greater than the maximum of 141 cfs included in the "daily means" data set, indicating that the majority of the "historical" discharge measurements are not substantially different than the daily mean discharge values recorded since 1995. The "historical" discharges of 280 and 234 cfs that were recorded on November 1965 and October 1966, respectively, are, however, considerably higher than the more recent daily mean values.

The figures below show both the "historical" and "daily means" discharge records for the Southeast Fork Homosassa Spring at Homosassa Springs, FL site. The first figure includes all reported "historical" records, while the second figure includes daily mean values for the five dates from 1998 in the "historical" record with multiple instantaneous discharge measurements.

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The mean and median for the 123 discharge measurements in the "historical" Southeast Fork Homosassa Springs gage site record are 69.0 and 67.0 cubic feet per second (cfs), respectively. The "daily means" discharge record includes 3,245 entries, with mean and median values of 61.1 and 60.0 cfs. A composite discharge record that includes both "historical" and "daily means" discharge records yields mean and median values similar to those of the "daily means" record (mean = 61.4 cfs,

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median = 60.0 cfs). The "historical" record with averaged values for the five dates in 1998 with multiple instantaneous discharge measurements includes a total of 88 records, with mean and median values of 66.2 and 67.0, respectively. Combination of these records with the "daily means" records yields mean and median values of 61.1 and 60.0 cfs.

Observed variation in discharge measurements for the Homosassa Springs and Southeast Fork gage sites is consistent with long term regional rainfall patterns. The figure below, reproduced from the 2010 technical memorandum by Ron Basso (a Senior Professional Geologist/Engineer with the District) that is included as Appendix B in the draft report on proposed minimum flows for the Homosassa River system, shows annual departure in mean annual rainfall from the average rainfall for the Brooksville, Inverness and Ocala National Weather Service stations for the period from 1930 through 2008. The period of relatively higher "historical" discharge around 1965 evident in the figure for the Homosassa Springs gage site corresponds with above average annual rainfall totals for 1965 and the preceding year. The decreasing trend in "historical" discharge values from the 1965/1966 period through the 1970s evident in the figure showing discharge at the Homosassa Springs gage site corresponds with a relatively large number of years in the late-1960s and 1970s with below average annual rainfall. Discharge patterns for the more recent "daily means" records correspond with a period of generally below average rainfall, except for the period from 2002 through 2004, when rainfall was above average and discharge exhibited an increasing trend at both the Homosassa Springs and Southeast Fork gage sites.



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Collectively, available "historical" and "daily means" discharge records for the Homosassa Springs and Southeast Fork gage sites and long-term rainfall records are not indicative of substantial anthropogenic reductions in historic spring flows that could be expected to impact the availability of warm-water habitat and other system characteristics related to spring discharge. Given this information, staff believes that the water-withdrawal impact assessment completed with the Northern District Model as discussed in the draft recommended minimum flow report on pages 53 through 55 and in more detail in Appendix B of the report is sufficient for characterization of existing withdrawal impacts on the river system. Staff acknowledges that "historical" discharge measurements available from the United States Geological Survey are, however, useful for characterization of the Homosassa River system and anticipates incorporating this information into a revised version of the report on minimum flows for the system.

## Staff Response to Comment No. 1 - Bulleted Point 3

Staff does not agree with the Department's assertion that there has been a 16% decrease in flows in the Homosassa River system. Although one may compare mean or median discharge values for "historical" and more recent "daily means" records, variation in sampling or reporting frequencies for the two records, as well as differences in the completeness of the two records suggest that differences based on contrasting summary statistics for the records should be considered with caution. As noted in the Staff Response to Comment No. 1 – Bulleted Points 1 and 2, differences in flow records included in the "historical" data set and the more recent, daily means data set are consistent with observed rainfall variation. Staff further notes that modeling of withdrawal impacts using the Northern District Model, as described on pages 53 through 55 and in Appendix B of the draft minimum flows report, indicates that withdrawals have contributed to only about a one percent decline in flows in the river system.

## Staff Response to Comment No. 1 - Bulleted Point 4

The proposed minimum flow for the Homosassa River system is 95% of the systems natural flows, with natural flows defined as the flows that would occur in the absence of withdrawals. Based on this definition, an allowable flow reduction of up to five percent, not 21.7% could occur before the minimum flows for the system would be violated. If the intent of the Department's comment is to indicate that by not including "historic" flow values in the baseline flow record, the District's recommended minimum flow would result in a 21.7% decrease in baseline flows, staff note that combination of the 115 "historical" records for the Homosassa Springs gage site with the 4,975 daily mean records yields a median flow of 89 cfs, a 1 cfs difference from the 88 cfs median value for the daily means record. Similarly the combination of "historical" records for the Southeast Fork gage site with available "daily means" records would not influence the median value for the combined data record; the median discharge value of 60.0 cfs did not differ when the "historical" records were include with the "daily means" records. The minor difference noted for the Homosassa Springs gage site based on combination of "historical" and "daily means" records would not be expected to yield an allowable percent-of-flow reduction that differs from the current recommendation. Finally staff believes that differences in how the "historic" flow values and the more recent mean daily values were developed suggest that it is not appropriate to combine the two sets of flow values for development of baseline flows.

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#### Comment No. 2

"Halls River contributes nearly half of the Homosassa River system's flow (Table 2-4, p. 55) and it was not included in the establishment of the minimum flow for the Homosassa River system. There is a USGS gage on the Halls River just upstream of its confluence with the Homosassa River (Figure 2-8, p. 43). Could that gage be used for measurements? We recommend the Halls River be included in the establishment of the minimum flow for the Homosassa River system or have a separate minimum flow established for it."

#### Staff Response to Comment No. 2

Staff notes that the proposed rule language associated with minimum flows for the Homosassa River system will indicate that the river system includes Halls River and all named and unnamed springs and tributaries that discharge to Halls River.

In anticipation of developing minimum flows and levels for the Homosassa River system, the District coordinated with the United States Geological Survey to begin measuring gage height, salinity and water temperature in 2006 at the Halls River gage site located at the County Road 490A bridge, a site that was previously operated by the Survey. 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 staff believed that the time available for development of procedures necessary 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 Halls River and the Homosassa River.

Staff agrees that development of a long-term discharge record for Halls River at the United States Geological Survey 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 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 draft report on recommended minimum flows for the *Relationships of Freshwater Flow with Salinity and Thermal Characteristics of the Homosassa River*, which is included as Appendix A to the draft 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 appropriate procedure for addressing tidal influences, evaluation of the feasibility of measuring discharge at a site upstream from the existing Halls River gage site, and budgetary constraints.

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#### Comment No. 3

"Overall, the draft report appears to accurately describe and depict the springs that are components of the Homosassa River system. Given that the surface hydrology is a reflection of the groundwater conditions in the region, we recommend that Homosassa well #3, at a minimum, be added to Figure 2-8. (We recognize Weeki Wachee well also was used in the model, but it is too far offsite to be represented on this graphic.)"

#### Staff Response to Comment No. 3

Staff plans to include a new figure in the revised version of the minimum flow report that shows the locations of the United States Geological Survey's Homosassa Well 3 near Homosassa, FL and the Weeki Wachee Well near Weeki Wachee, FL.

#### Comment No. 4

"SWFWMD identified most of the important attributes (resources) in the Homosassa River that need to be protected. However, the report also should include evaluation and discussion of how water level changes might impact different ecological communities within the Homosassa River system.

For example, the river is flanked by large stretches of riparian swamp lands. Do these swamp lands provide major spawning or hatching habitats for fish species? If these wetland areas are indeed important fish habitats, how will reduced water levels associated with reduced flow impact the amount of habitat available for fish growth and reproduction? Even if these riparian wetlands do not serve as important fish habitats, are they important source of organic carbon for the river food chain? If they are, how will the water level changes associated with reduced flow change the availability of organic carbon to the river ecosystem? Other than salinity changes associated with reduced river flow, will the change in hydrology associated with reduced flow influence the structure of the riparian vegetation communities?

Additionally, how will the change of riparian vegetation communities influence the population dynamics of birds and other wildlife associated with these vegetation communities? Is the riparian environment a nutrient sink that attenuates the nutrient loading from the Homosassa River watershed? If it is, how will the water level changes associated with reduced flow influence the nutrient retention of riparian wetlands, and the water quality for downstream estuaries?

Unless there are specific reasons why the impact of reduced flow on riparian habitat is not a major issue for this MFL, further studies should be conducted to evaluate such impact, especially whether and how the reduced flow will impact the riparian environments as organic carbon sources for the river ecosystem, influence the vegetation composition of the swamp lands and/or hydric hammock, and change the nutrient retention capacity of the riparian wetlands."

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## Staff Response to Comment No. 4

Staff supports the recommendation that further studies be undertaken to investigate relationships between flow reductions and riparian /river interactions, but does not anticipate immediately devoting District resources to these efforts, given requirements for establishing minimum flows and levels for the large number of water bodies identified on the current *Minimum Flows and Levels Priority List and Schedule*.

#### Comment No. 5

"Page 29 says: "Scott et al. (2004) identify three smaller springs that discharge to an approximate 900foot long run which drains to the Homosassa River a few hundred feet downstream from the Homosassa Main Springs pool. The run originates at Bear Spring, in an approximate 20 by 60 foot pool with a depth of about five feet. Banana Spring discharges to the run from an excavated 40 by 60 foot pool. Downstream, Alligator Spring lies within a larger, 100 by 150 foot pool with an approximate depth between 5 and 8 feet." These pools and the waterway are crucial to the operation of the state park because animal habitats are integrated into the waterway. What is the estimated discharge loss to these small springs, and what changes might occur to the character of the spring run and its water levels, if baseline flows are reduced through permitting?"

#### Staff Response to Comment No. 5

Staff hypothesizes that reductions in discharge associated with regional water use may be similar among the springs and vents within the river system, but does not have any specific information for the small springs identified in the Department's fifth comment.

#### Comment No. 6

"SWFWMD provided effective analyses on the relationships between flows and salinity and temperature habitats of the river. The District used a calibrated and validated EFDC hydrodynamic model to describe these relationships. Although the model was only calibrated against the data for a short period of record, from September of 2006 through June of 2007, because this was a low rainfall and low flow period, the model results should be more conservative and might add a margin of safety to the MFL. Still, it would be helpful if some of the modeling details were clarified in the report. For example, the report (on page 84) states that "... [b]oundary conditions for the [EFDC] model were established west of Shell Island and at the headwaters of Halls River and Homosassa River. Downstream boundary conditions included measured stage, salinity and temperature at the USGS Shell Island gage and modified salinity values developed during the model calibration process. Upstream conditions included discharge, salinity, and temperature at the USGS Homosassa Springs and SE Fork gage sites. Boundary conditions for Halls River included statistically modeled values based on the combined discharge past the USGS Homosassa Springs, SE Fork and Homosassa River gages; salinity conditions measured in Halls River and at the Homosassa Springs gage; and a temperature constant of  $23.2^{\circ}$ C." Based on this statement, it is not entirely clear that, other than the boundary conditions at the headwater and at the outlet of the river, whether the flow through the surface runoff created in the Homosassa River

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watershed was considered as part of the water balance in the EFDC model. In addition, the report did not mention whether, other than the spring inflow from the headwater area of the river, the ground water input along the river was an important portion of the water budget. Also, a description of how rain falling directly onto the river surface was handled in the model was not discussed in the report.

Added details should be provided on how the EFDC model was manipulated to create the reduced flow. Was the percent reduction applied only to headwater boundaries? Was the percent reduction applied uniformly to all the headwater boundaries? Was the percent reduction applied uniformly across all the modeling time steps? Were there any sensitivity analyses done to examine how the same percent flow reduction applied to different seasons will change the salinity and temperature dynamics of the river? It would be useful to add discussions on these aspects in the report."

## Staff Response to Comment No. 6

Staff agrees with the Department's comments regarding the conservative nature of minimum flow recommendations based on calibration and application of the Environmental Fluid Dynamic Code (EFDC) model of the Homosassa River system with input data from a period of relatively low rainfall and flows.

With regard to comments regarding details associated with development and application of the EFDC model, staff notes that in addition to the information presented in the main body of the draft minimum flows report, an original report outlining the modeling process and prepared in 2010 by HSW Engineering, Inc. is included as Appendix A to the report. It may be, however, that the specific comments identified by the Department are not adequately addressed in the report or Appendix A. Staff will try to ensure that these concerns are adequately addressed in the revised minimum flows report. Incidentally, staff notes that the report by HSW Engineering, Inc. included as Appendix A to the draft minimum flows report is currently being revised to address some issues associated with presentation of salinity-modeling results.

The Department is correct in noting that surface water runoff and groundwater contributions downstream from the headwater areas of the river system were not explicitly incorporated as input data for development of the EFDC model for the Homosassa River. Similarly, precipitation falling directly on the river was not included as a boundary condition or input variable. It may, however, be reasonable to expect that hydrologic inputs such as those identified by the Department would be implicitly incorporated into the model through calibration designed to match salinity, temperature and stage characteristics at the United States Geological Survey Homosassa Springs, Halls River and Shell Island gage sites.

Changes in salinity-based habitats associated with flow reductions were evaluated with the EFDC model by reducing flows that were reported for 15-minute intervals by 5, 10, 15, 20, 25 or 30 percent. On page 128 of the draft minimum flows report, staff incorrectly noted that "daily" flows rather than flows

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reported for 15-minute intervals were reduced for the flow-reduction modeled scenarios. This oversight will be corrected in the revised version of the minimum flows report. For each modeled scenario, flow reductions were applied uniformly to the upstream boundary data, including discharge from the headwater springs and Halls River. Sensitivity to seasonal variation in flow reductions was not evaluated with respect to effects on salinities and thermal characteristics of the river. This type of analysis was not considered critical for evaluating salinity-based habitats given the relatively minor variation in seasonal flows in the system. However, effects of flow reductions on salinity-based habitats were evaluated for a wide range of flows as discussed on pages 143-144, 148 and 151 in the draft report (see references to Appendices M, N and O), and this evaluation may be considered analogous to an investigation of the effects of flow reductions during seasonal periods of differing flows. Staff also notes that modeling of flow reduction effects on thermal characteristics of the river system was confined to relatively short, critically-cold periods for the purpose of evaluating potential changes in the availability of thermally-favorable habitat for manatees seeking refuge from cold Gulf waters. This approach may, by design, be considered a seasonal analysis.

# Comment No. 7

"The river and shoreline vegetation/salinity habitats data and mapping appears to represent current conditions correctly, but use of this information in the recommendations section is inconsistent. Although SAV may not be the best indicator at this site due to fairly recent declines, the shoreline, emergent, and marsh/forested zones data do appear to be appropriate indicators to evaluate. Of these, the analyses used only the non-hardened "natural" shoreline data. According to the report (p. 151) even low flow scenarios of the 2007 (dry year) baseline resulted in a low-salinity shoreline further upstream than is currently found. This implies that this indicator is very sensitive to low flow modifications and that perhaps the 2007 year is not the appropriate baseline condition."

# Staff Response to Comment No. 7

Staff note that although relationships between submersed aquatic vegetation and flow were not developed for the minimum flows evaluation, use of the hydrodynamic and regression models was intended to prevent significant change in the extent of salinity-based habitats (bottom area, water-column volume and natural shoreline length) that may be at least partially representative of the requirements needed by the variety of plants that populate this tidally influenced river system. Staff concur that modeling salinity-based habitats, including shoreline exposed to various salinity regimes for a single year such as 2007 is less than optimal. For this reason, regression models were developed to evaluate potential changes in salinity-based habitats for the longer 1995 through 2007 period.

# Comment No. 8

"The discussions on the relationships between salinity habitats and submersed and emergent aquatic plants and benthic macro-invertebrates were relatively weak. Preservation of low salinity habitats appears to be the intention of the MFL. However, based on the biological characteristics of the Homosassa River provided in Chapter 3 of the report, we did not see strong evidence that preserving low salinity habitats of the river will protect any major biological resources. Instead, the chapter devoted

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many pages discussing the taxa that were not feasible to be used to define salinity habitats. For example, the report pointed out (p. 99) that, "...[a]lthough submersed aquatic vegetation has been used to established minimum flow requirements, PBS&J (2009) noted that '... it is not an adequate indicator of increasing salinities in the Homosassa River due to its limited and declining distribution.'" While PBS&J suggested using emergent aquatic vegetation as the indicator to establish the salinity habitat availability, Clewell et al. (2002) reported that apparent transitions in shoreline emergent vegetation may be indicative of general salinity conditions, but are not reliable as predictors of specific salinity regimes because of the disturbance commonly observed to the riverbank habitats."

## Staff Response to Comment No. 8

In presenting information on vegetation, macroinvertebrates and other components of the Homosassa River system, staff sought to provide a general description of the existing and recent biological assemblage. Although specific relationships between inflows, salinity and population or community attributes of vegetation and benthic macroinvertebrates could not be developed with existing information, staff asserts that evaluation of potential changes in salinity-based habitats is a reasonable means for characterizing the potential for significant harm to the organisms and the physical, chemical and biological processes associated with the range of salinities occurring in the tidally-influenced Homosassa River system.

## Comment No. 9

"The relationships between river inflow and absolute/relative abundance of fish and invertebrate nekton and plankton populations used in this study were relatively weak. The report acknowledged that these relationships might be just "artifact of spurious relationships between the inflow values and organism count data used for developing the regression models." The MFL established based on these correlations was not included in the final proposed MFL for the river."

#### Staff Response to Comment No. 9

Staff agrees with the Department's comments regarding the value of the statistical relationships between inflows and abundances of selected planktonic and nektonic fish and invertebrates in the Homosassa River system.

#### Comment No. 10

"The report also mentioned that Sloan (1956) found the number of insect species and total abundances were low in the headwater freshwater segments of the Homosassa River. He considered the low abundance being associated with the low DO discharge from spring vents. Therefore, while high spring inflow in the river may create low salinity habitat for insects, high spring inflow may also mean low DO. Which factor is more dominating probably is river segment specific and salinity is not the sole factor that determines the abundance of taxa. In addition, Grabe and Janicki (2009) also found that the number of macro-invertebrate taxa was highest in the downstream portion of the Homosassa River, where high salinity was commonly observed. Also, a study conducted by Water & Air research, Inc. and funded by the SWFWMD indicated that oyster beds were mostly observed in high salinity areas, and Culter (2009)

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found that salinities less than about two ppt may be inhibitory to barnacle settlement. These research results, while very important to consider when choosing appropriate indicators of salinity habitats, do not establish the quantitative relationship between salinity habitats and the biological resources to be protected."

## Staff Response to Comment No. 10

Staff agrees with the Department's comments regarding the limited utility of the information on benthic macroinvertebrates presented in the draft minimum flows report for the purpose of establishing quantitative relationships between changes in salinity-based habitats and organism or population responses.

# Comment No. 11

"The report provided information regarding the salinity preference of macro-invertebrates in the river, specifically through the studies conducted by Grabe and Janicki (Table 3-1, p. 104). We recommend additional discussion to clarify how the existence or dominance of a given taxon in a given salinity spatial zone can be translated into their responses to 15% reduction of a given salinity habitats. What is the variance of salinity around the center of abundance of interested taxa? Whether the center of abundance of a given taxon may change spatially so that even when a given isohaline moves upstream, the center of abundance of the taxa may also move accordingly so that the total river bottom area, river volume, and shoreline length associated with a favorable salinity of the taxa may not decrease at all with the decrease of inflow. These discussions will help readers to better understand the relationship between salinity habitat and the biological resource to be protected in a dynamic way."

## Staff Response to Comment No. 11

Staff agrees with the Department's assertion that the biota of the Homosassa River likely respond in a dynamic manner to temporal variation in the longitudinal distribution of salinities in the river. In addition, staff acknowledges that salinity at capture information provided for the benthic taxa listed in Table 3-1 of the draft minimum flows report is only of limited value, given known temporal variability in salinity-based habitats within the river system. Staff will attempt to improve the text associated with the Table in the revised version of the minimum flows report to highlight the potential for movement of biota in response to varying flow and salinity regimes.

## Comment No. 12

"The relationship between macro-invertebrates spatial distribution and salinity zones in the Homosassa River is not fully understood based on only the samples collected from May 12 through 14 in 2008. More studies of this type can be conducted to examine whether the center of species dominance will shift in space according to the change of the flow condition in the river, and whether the space shifting will allow the taxa that favor specific salinity zone maintain the total bottom area, river volume, and shoreline length of the favored salinity zone. This will help to understand the relationship between the dynamic of the flow and dynamic of habitat availability."

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## Staff Response to Comment No. 12

Staff agrees that the limited sampling of benthic macroinvertebrates in 2008 is of minimal value for development of quantitative data sets that could be used to develop minimum flow recommendations for the river system. Staff similarly agrees that increased sampling effort might yield information that could be used to relate macroinvertebrate distributions and population dynamics with variation in the distribution and extent of salinity-based habitats. However, staff does not currently anticipate recommending that District resources be devoted to this effort, given budgetary requirements associated with establishing minimum flows and levels for the large number of water bodies identified on the current *Minimum Flows and Levels Priority List and Schedule*.

## Comment No. 13

"There are some places in the report where the District presents information, but does not offer an interpretation or explanation. For example, the last paragraph on page 91 presents information about chlorophyll, but it does not interpret what the median range of  $1-19.9 \mu g/L$  means in terms of water quality or why this is important to know. Similarly, the discussion about withdrawals from studies by Yobbi and Knochenmus (pp. 53-54) does not explain how SWFWMD used this information in developing the minimum flow. The report would be strengthened by further explanation of what the presented information means, and how the District used it in developing the MFL."

## Staff Response to Comment No. 13

Staff acknowledges that some information in the draft minimum flows report is presented solely to serve as descriptive background information to improve the reader's understanding of the river system. With regard to the text dedicated to discussion of chlorophyll concentrations on page 91 of the draft report, staff notes that they will add additional text associated with chlorophyll levels in the Homosassa River system to the revised version of the report. For example, it may be reasonable to note that in their 2006 report on the physical, chemical and vegetative characteristics of the Homosassa, Chassahowitzka and Weeki Wachee rivers, Frazer and his colleagues suggest that chlorophyll maxima in the middle portion of the river may be associated with increased residence time associated with tidal forces in the area of transition between forested wetlands and marsh habitats. Staff also will plan on adding, for comparative purposes, median chlorophyll a values reported by Friedmann and Hand in their 1989 report on typical water quality data for Florida water bodies.

The summary of Knochenmus and Yobbi's work presented on pages 53 and 54 of the draft report was included to provide background information on previous attempts to evaluate withdrawal impacts on flows in the Homosassa River system. This early work was not directly used in developing minimum flow recommendations for the river system. It was presented to serve as supporting information for the more recent modeling effort (described on pages 54 and 55 and in Appendix B to the draft report) that was used to develop the minimum flow recommendations.

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#### Comment No. 14

"The report needs to address how reduced flows would impact manatee access to the refuge areas. Figure 2-19 shows areas with depths of 50-150 cm near river kilometers 3, 7, 8, 10, and 11. Furthermore, when discussing present-day conditions, page 130 says: "Because low tides may be associated with water depths that are insufficient for allowing manatees to access warm-water areas of the river, tide stage was also used to define thermally-favorable manatee habitat. A minimum depth of 1.16 m (3.8 ft) was considered necessary for characterization of areas of the river as thermally-favorable habitat." The report needs to discuss how reduced flow would affect these shallow areas and possibly further impair manatee access to the refuge."

#### Staff Response to Comment No. 14

Staff notes that because the Homosassa River is a short, tidally influenced system, flow reductions from headwater springs are not expected to result in substantial changes in stage. Water lost through reductions in discharge from upstream springs may be expected to be offset by gains associated with the upstream movement of water from the Gulf of Mexico.

#### Comment No. 15

"As noted in the report, the Homosassa River is designated as an Outstanding Florida Water (OFW), and portions of the lower river are contained in the St. Martins Marsh Aquatic Preserve.

DEP has adopted rules about activities that cause changes to these designated areas. For example, s. 62-302.700(1), F.A.C. says: "It shall be the Department policy to afford the highest protection to Outstanding Florida Waters and Outstanding National Resource Waters. No degradation of water quality, other than that allowed in subsections 62-4.242(2) and (3), F.A.C., is to be permitted in Outstanding Florida Waters and Outstanding National Resource Waters, respectively, notwithstanding any other Department rules that allow water quality lowering." Additionally, Chapter 18-20, F.A.C., contains rules on aquatic preserves, under which DEP and the water management districts are charged with protecting water quality.

The report focuses on maintaining low salinity habitats near the headwaters, but does not describe how the proposed MFL might affect water quality in the rest of the river. The report should discuss potential water quality changes in the rest of the river in terms of the OFW and Aquatic Preserve designations."

## Staff Response to Comment No. 15

Designation of a water body as an Outstanding Florida Water is intended to ensure that the ambient water quality at the time of designation becomes a baseline condition for the system, and that water quality is not degraded as a result of increase in pollutants discharged into the water body (see Rules 62-302.200(20) and 62.-302.700, F.A.C.). Implementation of rules associated with designated Outstanding Florida Water Waters is addressed through permitting processes pursuant to Rule 62-4.242, F.A.C. These rules are not intended for regulation of water withdrawals. In the Southwest Florida Water

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Management District, water withdrawal rules, which include consideration of established minimum flows and levels, are addressed in Chapter 40D-2, F.A.C..

Staff notes that potential changes in zones where salinities are less than 2, 3, 5 and 12 were investigated for development of minimum flow recommendation for the Homosassa River system, and suggest that evaluation of these salinity zones and their dynamic nature provides a means to evaluate habitats throughout much of the river system, and not just the headwater areas, as suggested by the Department's commendations. Staff acknowledges that potential changes in salinity zones associated with the minimum flow recommendations would involve longitudinal movement of salinity zones as compared to conditions in the absence of withdrawals, but assert that these changes are not indicative of water quality degradation.

## Comment No. 16

"Is there a reason why a low flow threshold was not developed for this river system?"

## Staff Response to Comment No. 16

Low flow thresholds are typically developed for river systems to protect flows associated with maintaining water depths sufficient to allow for the passage of fish and other biota and to maintain wetted bottom area across the river channel. Because the Homosassa River system is tidally influenced, it may be assumed that even in the event of significant flow reductions, water depths in the system will be maintained as a result of tidal forces. In addition, the relative stability of flows in this groundwater discharge dominated system, as compared to more flashy, rainfall-driven systems, suggests that there is not a need for a low flow threshold.

## Comment No. 17

"The recommended 5% reduction appears to be inconsistent with the data and findings in the document. Tables 5-1 (pp. 134-135) and 5-23 (p. 155) show several species/indicators for which a 15% loss in abundance/habitat is associated with a flow reduction of less than 5%. Even at higher flows, less than a 5% reduction results in greater than 15 percent reduction of the shoreline habitat (pp. 151 and 154). The recommendations section (pp. 160-161) says: "Flow reduction of less than five percent were associated with more than fifteen percent reductions in selected salinity-based habitats determined from isohalines with salinities of 2, 3, 5 and 12" and "[b]ased on the sensitive resource responses demonstrated by the modeling approaches used to evaluate the Homosassa River system, a five percent-of-flow reduction is considered appropriate for the minimum flow recommendation for the system." The report should provide more explanation on why the District considers a 5% reduction appropriate. Some data suggest evaluation of flow reductions below 5% may be warranted."

## Staff Response to Comment No. 17

Staff has initiated development of predicted changes in salinity-based habitats for flow reduction scenarios of less than five percent. As part of this review, evaluation of potential changes in zones where salinities are less than two has been determined to be inappropriate based on limitations of the

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hydrodynamic model that was used for evaluating these low-salinity zones. Exclusion of these modeled results is based on the similarity of mean-weighted salinity for the headwater springs (1.6 psu) as compared to the salinity-zone limit (2 psu) and the frequent proximity of the boundary for this salinity zone at or upstream of the upper extent of the model domain. In summary, staff are continuing to investigate alternate flow reduction scenarios that could lead to modification of minimum flow recommendations for the Homosassa River system, and results from these analyses will be included in a revised version of the minimum flows report.

## Comment No. 18

"The recommendations (pp. 160-161) section clearly expresses the allowable flow reduction; however, it also should specify the baseline flow quantity or period from which the 5% reduction is being allowed."

# Staff Response to Comment No. 18

The proposed minimum flow for the Homosassa River system is 95% of the systems natural flows, with natural flows defined as the flows that would occur in the absence of withdrawals. Natural flows may be calculated based on the combined mean daily flows measured at the United States Geological Survey Homosassa Springs at Homosassa Springs, FL and Southeast Fork Homosassa Spring at Homosassa Springs, FL gages. Based on this definition for the proposed minimum flows, an allowable flow reduction of up to five percent may occur before the minimum flows for the system would be violated.

As noted in the draft minimum flows report, the allowable flow reduction was developed using flows for two baseline periods, calendar year 2007 and the period from January 1995 through December 2007. As additional flow data become available, the calculation of natural flow will also include measured flow from other named and unnamed springs and tributaries that discharge to the Homosassa River System, but not flow data from the United States Geological Survey's Homosassa River at Homosassa, FL gage, as flows past this site include flows reported for the Homosassa Springs and Southeast Fork gage sites.

The primary approach for evaluating compliance with the minimum flows that are ultimately established for the Homosassa River system is expected to involve modeling of the effects of groundwater withdrawals on spring discharge to the system. For example, the Northern District Model could be used as described on pages 53 through 55 in the draft recommended minimum flows report for the Homosassa River system to compare discharge to the system for model scenarios that exclude and include current and projected water use estimates. Differences in discharge, expressed as a percentage change from the no-withdrawal scenario would provide results that could, for example, be directly compared to the current minimum flow recommendation, which allows for up to a five percent reduction in natural flows. In addition to the modeling described in the draft minimum flows report, the District has also evaluated impacts to flows in the Homosassa River system based on water-use demand projections through 2030, and found that the proposed minimum flows are not expected to be violated for this planning period. Evaluation of actual permits associated with requests for water-use that could impact flows in the Homosassa River will likely involve use of the Northern District model or alternative models that relate discharge in the system to hydrologic variables such as rainfall or groundwater levels.

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Results from minimum flows and levels compliance analyses for the Homosassa River system will be included in the annual update on minimum flows and levels compliance that is presented to the District Governing Board. If necessary, strategies to recover or prevent diminution of flows in the system will be developed and implemented. These strategies could include reductions in withdrawals, implementation of conservation efforts, redistribution of withdrawals to minimize effects on discharge, development of alternative water supplies, augmentation of flows, or other yet to be determined approaches. In accordance with state law, any necessary recovery strategies would be included in the District's regional water supply planning process and as necessary, incorporated into the District rules pertaining to minimum flows and levels recovery (Chapter 40D-80, F.A.C.).

## Comment No. 19

"SWFWMD's recommended regulatory minimum flow is a 5% reduction in the mean daily flows in the Homosassa River calculated as the combined flow measured at USGS gages 02310678 Homosassa Springs at Homosassa Springs FL (Homosassa Springs) and 02310688 SE Fork Homosassa Spring at Homosassa Springs FL (SE Fork). Yet, the report states that, due to limited period of record for the two sites, the long-term hydrologic statistics (we assume these are the mean daily flows) could not be calculated. Without such information, it is unclear how the District will determine whether a minimum flow is being met or not."

## Staff Response to Comment No. 19

Minimum flow rule recommendations from the District often include identification of minimum fiveand ten-year mean and median values for reported annual average discharge at selected streamflow gaging stations. These long-term hydrologic statistics can be used for assessments regarding whether flows within a river system or segment remain above the flow rates that are expected to occur with implementation of the recommended minimum flows. Based on the limited availability of measured discharge data for the Homosassa River system, staff does not believe that it is currently appropriate to develop long-term hydrologic statistics for the Homosassa River system. Continued compilation of discharge records for these gage sites may, at some point, permit development of hydrologic statistics that adequately characterize expected flow variation within the system. Staff will continue to support collection of data to support this goal, with the expectation that it will provide ancillary information regarding whether minimum flows are being met in the Homosassa River system.

As noted in the staff response to comment number 18 from the Department, the primary approach for evaluating compliance with the minimum flows that are ultimately established for the Homosassa River system is expected to involve modeling of the effects of water withdrawals on discharge to the system. For example, the Northern District Model could be used as described on pages 53 through 55 in the draft report on recommended minimum flows for the river system to compare discharge to the system for model scenarios that exclude and include current and projected water use estimates. Differences in

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discharge, expressed as a percent change from the no-withdrawal scenario would provide results that could, for example, be directly compared to the current minimum flow recommendation, which allows for up to a five percent reduction in natural flows. An alternative modeling approach used for evaluating minimum flows compliance could involve development and use of statistical models that relate discharge in the system to other hydrologic variables, such as rainfall or groundwater levels.

# Comment No. 20

"The Executive Summary states the "baseline conditions" for the Homosassa River system were established by averaging the combined flow from the Homosassa Springs and SE Fork gages and the flow at these sites averaged 152 cubic feet per second (cfs) for the period of record from 1995-2009. According to Table 2-2 (p. 42), the period of record for daily flows at the SE Fork gage is 10/01/2000 – 03/12/10."

# Staff Response to Comment No. 20

The sentence in the executive summary of the draft minimum flows report, notes that the combined flow for the two USGS gage sites is an "estimated average flow of 152 cfs." The modifier "estimated" was purposefully included in the sentence to indicate that records for some dates during the 1995-2009 benchmark period were estimated. This use of estimated data for evaluation of plankton/nekton and salinity responses to flow variation is noted on pages 126 and 128 of the draft report. The approach for developing estimated discharge data involved using a simple regression between the United States Geological Survey Homosassa Springs and Southeast Fork flow records to extend the Southeast Fork record back to 1995. This effort was undertaken to develop a long-term flow record for evaluating organism and salinity-zone responses to modeled flow reduction scenarios.

## Comment No. 21

"Please note the park's name is Ellie Schiller Homosassa Springs <u>Wildlife State</u> Park. Please correct the name throughout document. On page 30, the text refers to: "...the Ellie Schiller state park..." When a shorter name is desired, please use Homosassa Springs State Park."

## Staff Response to Comment No. 21

Staff will revise references to the State Park in the revised version of the report, as suggested by the Department.

<u>Comment No. 22</u> "The text never references Table 2-4 (p. 55)."

## Staff Response to Comment No. 22

Reference to Table 2-4 will be added to the paragraph preceding the table in the revised version of the minimum flows report.

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#### Comment No. 23

"The captions for Figure 2-21 and 2-23 (pp. 59-60) says the area-volumes are shown for the river kilometers. How are river kilometers represented on these graphs?"

#### Staff Response to Comment No. 23

The caption will be modified in the revised version of the minimum flows report, to indicate stage-areavolume data are for the main channel of the Homosassa River between river kilometers 0 and 12.5. Table of contents entries for these figures will also be revised.

#### Comment No. 24

"The text describing Figure 3-8 (p. 122) says: "Combined counts for both segments averaged 31.2 per survey with a maximum of 156 animals observed (all in the upper segment) during a single survey on January 21, 2009 (Figure 3-8)." The caption for Figure 3-8 (p. 123) and the graph show data from 1985-2010, rather than for a single day."

#### Staff Response to Comment No. 24

Text referring to manatee count data will be modified in the revised version of the minimum flows report to better reflect reference to Figure 3.8.

## Comment No. 25

"The data in the text need to be double-checked against their corresponding tables for accuracy. For example, when discussing Tables 5-2 through 5-7 (pp. 138-140), the text on page 136, paragraph 3, says: "The median lower extent of the oligohaline zone, i.e., waters with salinities less than 5, was located between river kilometers <u>7.6</u> and <u>9.8</u> in 2007. Modeled median locations of the isohalines associates [sic] with a salinity of 12 occurred between river kilometers <u>3.8</u> and <u>6.0</u>." These sentences do not reflect the data shown in the 2007 tables.

Similarly, page 160, paragraph 2 states: "Flow reductions of <u>0.6</u> to 2.7 percent from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa." This sentence refers to Table 5-1 (pp. 134-135), which shows the lowest percent of flow reduction is 0.5%."

## Staff Response to Comment No. 25

Salinity values describe in the referenced text will be corrected in the revised minimum flows report, to reflect information presented in Tables 5-2 through 5-7. Staff note, however, that issues associated with hydrodynamic model output presented in Tables 5-2, 5-3, 5-4 and elsewhere in the draft minimum flows report are currently being addressed and updated information will be used to populate these tables in the revised version of the report. The reference to the "0.6 percent" flow reduction on page 160 in the report will be revised to "0.5 percent" to reflect the information presented in Table 5-1.

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## Comment No. 26

"For Tables 5-11 to 5-22 (pp. 145-153), we noticed these anomalies:

- The caption for Tables 5-11 and 5-17 says: "...Orange shaded cells indicate <u>lowest or highest</u> modeled flow reduction scenarios resulted [sic] in <u>more or less</u> than a fifteen percent reduction in baseline..." These captions suggest the data encompass the entire universe of possibilities; also, the wording in this caption differs from the meaning of the orange highlight in the other tables.
- In Tables 5-15 and 5-16, headings under the 20% Reduction column, and those columns to the right, are mislabeled.
- The caption for Tables 5-21 and 5-22 says: "Orange shaded cell indicates the highest modeled flow reduction scenario resulted in <u>less than</u> a fifteen percent reduction in baseline natural shoreline length." The other tables in this series use orange to represent <u>more than</u> a 15% reduction.
- Furthermore, Tables 5-21 and 5-22 differ by the benchmark periods shown (2007 and 1995-2009), yet the data in these two tables are identical. These identical results also are reflected in Table 5-23 (p. 155)."
- •

#### Staff Response to Comment No. 26

## First Bullet

The captions for Table 5-11 and 5-17 will be modified in the revised version of the report. Table of content entries for these tables will also be corrected.

## Second Bullet

The mislabeled headings in Tables 5-15 and 5-16 will be corrected in the revised version of the report.

## Third Bullet

The captions for Tables 5-21 and 5-22 are correct. Orange shading was used in the salinity modeling results tables to indicate that the lowest modeled flow reduction result in more than a 15% reduction in the salinity zone or that the highest modeled flow reduction resulted in less than a 15% reduction in the salinity zone.

## Fourth Bullet

Data in Table 5-22 were incorrect and will be corrected in the revised report. Note that data in Appendix O summarizing modeled natural shoreline lengths associated with the selected salinities were correct in original report.

#### DAL

Attachments: One page e-mail from Mr. Carolyn Voyles dated November 15, 2010 Seven page document submitted by Mr. Carolyn Voyles with her November 15, 2010 e-mail

## Attachment A

## One Page Attachment to January 3, 2011 Memorandum on Questions and Comments Submitted by Ms. Carolyn Voyles on November 15, 2010

From:	Voyles, Carolyn [mailto:Carolyn.Voyles@dep.state.fl.us]
Sent:	Monday, November 15, 2010 2:35 PM
То:	Marty Kelly
Cc:	Yaun, Shelley; Llewellyn, Janet
Subject:	Homosassa River System Draft MFL
Attachments:	DEP Comments_Homosassa River MFL 07-12-10 draft_to SWFWMD.docx

Hi Marty,

Thank you for giving us the opportunity to comment on the draft MFL report for the Homosassa River System. Reviewers from DEP's TMDL Section, Florida Park Service, Springs Section, Florida Geological Survey, and Office of Water Policy commented on the draft report. We compliment the District on the effort it has invested in the many analyses undertaken to produce this report. The District always works hard to examine the many different and complex components of its river systems, and this comprehensive approach is again evident in this document.

Our comments focus on:

- · selecting the baseline data,
- · evaluating ecological communities in addition to individual taxa,
- · expanding the discussion about salinity,
- · relating the proposed 5% reduction with the 15% harm criterion, and
- $\cdot$  addressing DEP rules about Outstanding Florida Waters and Aquatic Preserves.

I apologize for not getting our comments to you sooner. Nonetheless, we hope that the District finds our comments helpful. If you would like to discuss these comments, either with me or in a teleconference with all of the reviewers, please let me know.

Carolyn Voyles Office of Water Policy FL Dept. of Environmental Protection 2600 Blair Stone Road, MS 46 Tallahassee, FL 32399-2400 (850) 245-8557 (office) (850) 245-8686 (fax)

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## Attachment B

# Seven Page Attachment to January 3, 2011 Memorandum on Questions and Comments Submitted by Ms. Carolyn Voyles on November 15, 2010

This attachment was submitted with the e-mail (Attachment A) sent to the District by Ms. Carolyn Voyles

# DEP Comments Homosassa River System MFL (July 12, 2010 Draft)

# General Comments

- 1. We are concerned about the benchmark periods selected to establish the baseline flows. Data available from 1931-1974 show the spring discharge historically was much higher than the flows used in the models:
  - The draft MFL report states (p. 48): "Mean daily discharge reported by the USGS for the Homosassa Springs at Homosassa FL gage site is derived by averaging 96 daily discharge estimates based on fifteen-minute interval gage heights at the spring and hourly groundwater levels at the Weeki Wachee Well near Weeki Wachee FL site. Discharge at the Homosassa Springs gage site has varied only moderately during the period of record (Figure 2-13), with approved mean daily discharge values ranging from 34 to 141 cfs and average and median values of 89 and 88 cfs, respectively (Table 2-3)."
  - By comparison, FGS Bulletin 31 states: "From 1931 to 1974 the main spring had an average discharge of 106 ft<sup>3</sup>/sec for 90 measurements." The average discharge for these 90 measurements (106 cfs) is 16% higher than the benchmark average discharge used in the MFL proposal (89 cfs). FGS Bulletin 31 also states: "...the Southeast Fork of Homosassa Springs had an average discharge of 69.1 ft<sup>3</sup>/sec for 89 measurements." The average discharge for these 89 measurements (69.1cfs) is 13% higher than the benchmark used in the draft MFL report (61 cfs).
  - The proposed MFL is based on the combined discharge of the main spring and the Southeastern Fork springs. The combined discharge for the historic period (1931-1974) is 175.1 cfs, which is 16.7% higher than the combined benchmark (1995-2007) of 150 cfs used in the model.

The historical flow data are not mentioned in the report, and this omission leads the reader to believe that the only existing data are from the 1995-2009 period. We recommend the District expand the report's data discussion and address these points:

- Discuss the 1931-1974 data.
- Describe why the District selected one data set over the other as the benchmark period.
- Discuss possible reasons why the flow has declined from historical levels. Is there any reason to believe the 16% decrease is due to withdrawals? Have climate patterns remained stable or changed over this time period?

• Address the issue of significant harm. Whether or not the older data set is used as a benchmark, it still seems that a 5% allowable withdrawal would result in a 21.7% discharge loss. Might significant harm already have occurred?

We have read SWFWMD"s response to the FWC on this same issue, and recommend the District incorporate much of that discussion into the final report.

- 2. Halls River contributes nearly half of the Homosassa River system's flow (Table 2-4, p. 55) and it was not included in the establishment of the minimum flow for the Homosassa River system. There is a USGS gage on the Halls River just upstream of its confluence with the Homosassa River (Figure 2-8, p. 43). Could that gage be used for measurements? We recommend the Halls River be included in the establishment of the minimum flow for the Homosassa River system or have a separate minimum flow established for it.
- 3. Overall, the draft report appears to accurately describe and depict the springs that are components of the Homosassa River system. Given that the surface hydrology is a reflection of the groundwater conditions in the region, we recommend that Homosassa well #3, at a minimum, be added to Figure 2-8. (We recognize Weeki Wachee well also was used in the model, but it is too far offsite to be represented on this graphic.)
- 4. SWFWMD identified most of the important attributes (resources) in the Homosassa River that need to be protected. However, the report also should include evaluation and discussion of how water level changes might impact different ecological communities within the Homosassa River system.

For example, the river is flanked by large stretches of riparian swamp lands. Do these swamp lands provide major spawning or hatching habitats for fish species? If these wetland areas are indeed important fish habitats, how will reduced water levels associated with reduced flow impact the amount of habitat available for fish growth and reproduction? Even if these riparian wetlands do not serve as important fish habitats, are they important source of organic carbon for the river food chain? If they are, how will the water level changes associated with reduced flow change the availability of organic carbon to the river ecosystem? Other than salinity changes associated with reduced river flow, will the change in hydrology associated with reduced flow influence the structure of the riparian vegetation communities?

Additionally, how will the change of riparian vegetation communities influence the population dynamics of birds and other wildlife associated with these vegetation communities? Is the riparian environment a nutrient sink that attenuates the nutrient loading from the Homosassa River watershed? If it is, how will the water level changes associated with reduced flow influence the nutrient retention of riparian wetlands, and the water quality for downstream estuaries?

Unless there are specific reasons why the impact of reduced flow on riparian habitat is not a major issue for this MFL, further studies should be conducted to evaluate such impact, especially whether and how the reduced flow will impact the riparian environments as organic carbon sources for the river ecosystem, influence the vegetation composition of the swamp lands and/or hydric hammock, and change the nutrient retention capacity of the riparian wetlands.

5. Page 29 says: "Scott et al. (2004) identify three smaller springs that discharge to an approximate 900-foot long run which drains to the Homosassa River a few hundred feet downstream from the Homosassa Main Springs pool. The run originates at Bear Spring, in an approximate 20 by 60 foot pool with a depth of about five feet. Banana Spring discharges to the run from an excavated 40 by 60 foot pool. Downstream, Alligator Spring lies within a larger, 100 by 150 foot pool with an approximate depth between 5 and 8 feet." These pools and the waterway are crucial to the operation

of the state park because animal habitats are integrated into the waterway. What is the estimated discharge loss to these small springs, and what changes might occur to the character of the spring run and its water levels, if baseline flows are reduced through permitting?

6. SWFWMD provided effective analyses on the relationships between flows and salinity and temperature habitats of the river. The District used a calibrated and validated EFDC hydrodynamic model to describe these relationships. Although the model was only calibrated against the data for a short period of record, from September of 2006 through June of 2007, because this was a low rainfall and low flow period, the model results should be more conservative and might add a margin of safety to the MFL. Still, it would be helpful if some of the modeling details were clarified in the report. For example, the report (on page 84) states that "... [b]oundary conditions for the [EFDC] model were established west of Shell Island and at the headwaters of Halls River and Homosassa River. Downstream boundary conditions included measured stage, salinity and temperature at the USGS Shell Island gage and modified salinity values developed during the model calibration process. Upstream conditions included discharge, salinity, and temperature at the USGS Homosassa Springs and SE Fork gage sites. Boundary conditions for Halls River included statistically modeled values based on the combined discharge past the USGS Homosassa Springs, SE Fork and Homosassa River gages; salinity conditions measured in Halls River and at the Homosassa Springs gage; and a temperature constant of 23.2°C." Based on this statement, it is not entirely clear that, other than the boundary conditions at the headwater and at the outlet of the river, whether the flow through the surface runoff created in the Homosassa River watershed was considered as part of the water balance in the EFDC model. In addition, the report did not mention whether, other than the spring inflow from the headwater area of the river, the ground water input along the river was an important portion of the water budget. Also, a description of how rain falling directly onto the river surface was handled in the model was not discussed in the report.

Added details should be provided on how the EFDC model was manipulated to create the reduced flow. Was the percent reduction applied only to headwater boundaries? Was the percent reduction applied uniformly to all the headwater boundaries? Was the percent reduction applied uniformly across all the modeling time steps? Were there any sensitivity analyses done to examine how the same percent flow reduction applied to different seasons will change the salinity and temperature dynamics of the river? It would be useful to add discussions on these aspects in the report.

- 7. The river and shoreline vegetation/salinity habitats data and mapping appears to represent current conditions correctly, but use of this information in the recommendations section is inconsistent. Although SAV may not be the best indicator at this site due to fairly recent declines, the shoreline, emergent, and marsh/forested zones data do appear to be appropriate indicators to evaluate. Of these, the analyses used only the non-hardened "natural" shoreline data. According to the report (p. 151) even low flow scenarios of the 2007 (dry year) baseline resulted in a low-salinity shoreline further upstream than is currently found. This implies that this indicator is very sensitive to low flow modifications and that perhaps the 2007 year is not the appropriate baseline condition.
- 8. The discussions on the relationships between salinity habitats and submersed and emergent aquatic plants and benthic macro-invertebrates were relatively weak. Preservation of low salinity habitats appears to be the intention of the MFL. However, based on the biological characteristics of the Homosassa River provided in Chapter 3 of the report, we did not see strong evidence that preserving low salinity habitats of the river will protect any major biological resources. Instead, the chapter

devoted many pages discussing the taxa that were not feasible to be used to define salinity habitats. For example, the report pointed out (p. 99) that, "...[a]lthough submersed aquatic vegetation has been used to established minimum flow requirements, PBS&J (2009) noted that ,,... it is not an adequate indicator of increasing salinities in the Homosassa River due to its limited and declining distribution." While PBS&J suggested using emergent aquatic vegetation as the indicator to establish the salinity habitat availability, Clewell et al. (2002) reported that apparent transitions in shoreline emergent vegetation may be indicative of general salinity conditions, but are not reliable as predictors of specific salinity regimes because of the disturbance commonly observed to the riverbank habitats.

- 9. The relationships between river inflow and absolute/relative abundance of fish and invertebrate nekton and plankton populations used in this study were relatively weak. The report acknowledged that these relationships might be just "artifact of spurious relationships between the inflow values and organism count data used for developing the regression models." The MFL established based on these correlations was not included in the final proposed MFL for the river.
- 10. The report also mentioned that Sloan (1956) found the number of insect species and total abundances were low in the headwater freshwater segments of the Homosassa River. He considered the low abundance being associated with the low DO discharge from spring vents. Therefore, while high spring inflow in the river may create low salinity habitat for insects, high spring inflow may also mean low DO. Which factor is more dominating probably is river segment specific and salinity is not the sole factor that determines the abundance of taxa. In addition, Grabe and Janicki (2009) also found that the number of macro-invertebrate taxa was highest in the downstream portion of the Homosassa River, where high salinity was commonly observed. Also, a study conducted by Water & Air research, Inc. and funded by the SWFWMD indicated that oyster beds were mostly observed in high salinity areas, and Culter (2009) found that salinities less than about two ppt may be inhibitory to barnacle settlement. These research results, while very important to consider when choosing appropriate indicators of salinity habitats, do not establish the quantitative relationship between salinity habitats and the biological resources to be protected.
- 11. The report provided information regarding the salinity preference of macro-invertebrates in the river, specifically through the studies conducted by Grabe and Janicki (Table 3-1, p. 104). We recommend additional discussion to clarify how the existence or dominance of a given taxon in a given salinity spatial zone can be translated into their responses to 15% reduction of a given salinity habitats. What is the variance of salinity around the center of abundance of interested taxa? Whether the center of abundance of a given taxon may change spatially so that even when a given isohaline moves upstream, the center of abundance of the taxa may also move accordingly so that the total river bottom area, river volume, and shoreline length associated with a favorable salinity of the taxa may not decrease at all with the decrease of inflow. These discussions will help readers to better understand the relationship between salinity habitat and the biological resource to be protected in a dynamic way.
- 12. The relationship between macro-invertebrates spatial distribution and salinity zones in the Homosassa River is not fully understood based on only the samples collected from May 12 through 14 in 2008. More studies of this type can be conducted to examine whether the center of species dominance will shift in space according to the change of the flow condition in the river, and whether the space shifting will allow the taxa that favor specific salinity zone maintain the total bottom area, river

volume, and shoreline length of the favored salinity zone. This will help to understand the relationship between the dynamic of the flow and dynamic of habitat availability.

- 13. There are some places in the report where the District presents information, but does not offer an interpretation or explanation. For example, the last paragraph on page 91 presents information about chlorophyll, but it does not interpret what the median range of 1-19.9 μg/L means in terms of water quality or why this is important to know. Similarly, the discussion about withdrawals from studies by Yobbi and Knochenmus (pp. 53-54) does not explain how SWFWMD used this information in developing the minimum flow. The report would be strengthened by further explanation of what the presented information means, and how the District used it in developing the MFL.
- 14. The report needs to address how reduced flows would impact manatee access to the refuge areas. Figure 2-19 shows areas with depths of 50-150 cm near river kilometers 3, 7, 8, 10, and 11. Furthermore, when discussing present-day conditions, page 130 says: "Because low tides may be associated with water depths that are insufficient for allowing manatees to access warm-water areas of the river, tide stage was also used to define thermally-favorable manatee habitat. A minimum depth of 1.16 m (3.8 ft) was considered necessary for characterization of areas of the river as thermally-favorable habitat." The report needs to discuss how reduced flow would affect these shallow areas and possibly further impair manatee access to the refuge.
- 15. As noted in the report, the Homosassa River is designated as an Outstanding Florida Water (OFW), and portions of the lower river are contained in the St. Martins Marsh Aquatic Preserve.

DEP has adopted rules about activities that cause changes to these designated areas. For example, s. 62-302.700(1), F.A.C. says: "It shall be the Department policy to afford the highest protection to Outstanding Florida Waters and Outstanding National Resource Waters. No degradation of water quality, other than that allowed in subsections 62-4.242(2) and (3), F.A.C., is to be permitted in Outstanding Florida Waters and Outstanding National Resource Waters, respectively, notwithstanding any other Department rules that allow water quality lowering." Additionally, Chapter 18-20, F.A.C., contains rules on aquatic preserves, under which DEP and the water management districts are charged with protecting water quality.

The report focuses on maintaining low salinity habitats near the headwaters, but does not describe how the proposed MFL might affect water quality in the rest of the river. The report should discuss potential water quality changes in the rest of the river in terms of the OFW and Aquatic Preserve designations.

- 16. Is there a reason why a low flow threshold was not developed for this river system?
- 17. The recommended 5% reduction appears to be inconsistent with the data and findings in the document. Tables 5-1 (pp. 134-135) and 5-23 (p. 155) show several species/indicators for which a 15% loss in abundance/habitat is associated with a flow reduction of less than 5%. Even at higher flows, less than a 5% reduction results in greater than 15 percent reduction of the shoreline habitat (pp. 151 and 154). The recommendations section (pp. 160-161) says: "Flow reduction of less than five percent were associated with more than fifteen percent reductions in selected salinity-based habitats determined from isohalines with salinities of 2, 3, 5 and 12" and "[b]ased on the sensitive resource responses demonstrated by the modeling approaches used to evaluate the Homosassa River system, a five percent-of-flow reduction is considered appropriate for the minimum flow recommendation for the system." The report should provide more explanation on why the District

considers a 5% reduction appropriate. Some data suggest evaluation of flow reductions below 5% may be warranted.

- 18. The recommendations (pp. 160-161) section clearly expresses the allowable flow reduction; however, it also should specify the baseline flow quantity or period from which the 5% reduction is being allowed.
- 19. SWFWMD's recommended regulatory minimum flow is a 5% reduction in the mean daily flows in the Homosassa River calculated as the combined flow measured at USGS gages 02310678 Homosassa Springs at Homosassa Springs FL (Homosassa Springs) and 02310688 SE Fork Homosassa Spring at Homosassa Springs FL (SE Fork). Yet, the report states that, due to limited period of record for the two sites, the long-term hydrologic statistics (we assume these are the mean daily flows) could not be calculated. Without such information, it is unclear how the District will determine whether a minimum flow is being met or not.

# Editorial Comments

- 20. The Executive Summary states the "baseline conditions" for the Homosassa River system were established by averaging the combined flow from the Homosassa Springs and SE Fork gages and the flow at these sites averaged 152 cubic feet per second (cfs) for the period of record from 1995-2009. According to Table 2-2 (p. 42), the period of record for daily flows at the SE Fork gage is 10/01/2000 03/12/10.
- 21. Please note the park's name is Ellie Schiller Homosassa Springs <u>Wildlife State</u> Park. Please correct the name throughout document. On page 30, the text refers to: "...the Ellie Schiller state park..." When a shorter name is desired, please use Homosassa Springs State Park.
- 22. The text never references Table 2-4 (p. 55).
- 23. The captions for Figure 2-21 and 2-23 (pp. 59-60) says the area-volumes are shown for the river kilometers. How are river kilometers represented on these graphs?
- 24. The text describing Figure 3-8 (p. 122) says: "Combined counts for both segments averaged 31.2 per survey with a maximum of 156 animals observed (all in the upper segment) during a single survey on January 21, 2009 (Figure 3-8)." The caption for Figure 3-8 (p. 123) and the graph show data from 1985-2010, rather than for a single day.
- 25. The data in the text need to be double-checked against their corresponding tables for accuracy. For example, when discussing Tables 5-2 through 5-7 (pp. 138-140), the text on page 136, paragraph 3, says: "The median lower extent of the oligohaline zone, i.e., waters with salinities less than 5, was located between river kilometers <u>7.6</u> and <u>9.8</u> in 2007. Modeled median locations of the isohalines associates [sic] with a salinity of 12 occurred between river kilometers <u>3.8</u> and <u>6.0</u>." These sentences do not reflect the data shown in the 2007 tables.

Similarly, page 160, paragraph 2 states: "Flow reductions of  $\underline{0.6}$  to 2.7 percent from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa." This sentence refers to Table 5-1 (pp. 134-135), which shows the lowest percent of flow reduction is 0.5%.

26. For Tables 5-11 to 5-22 (pp. 145-153), we noticed these anomalies:
- The caption for Tables 5-11 and 5-17 says: "...Orange shaded cells indicate <u>lowest or highest</u> modeled flow reduction scenarios resulted [sic] in <u>more or less</u> than a fifteen percent reduction in baseline..." These captions suggest the data encompass the entire universe of possibilities; also, the wording in this caption differs from the meaning of the orange highlight in the other tables.
- In Tables 5-15 and 5-16, headings under the 20% Reduction column, and those columns to the right, are mislabeled.
- The caption for Tables 5-21 and 5-22 says: "Orange shaded cell indicates the highest modeled flow reduction scenario resulted in <u>less than</u> a fifteen percent reduction in baseline natural shoreline length." The other tables in this series use orange to represent <u>more than</u> a 15% reduction.
- Furthermore, Tables 5-21 and 5-22 differ by the benchmark periods shown (2007 and 1995-2009), yet the data in these two tables are identical. These identical results also are reflected in Table 5-23 (p. 155).

#### December 23, 2010

#### MEMORANDUM

TO:	File
FROM:	Douglas A. Leeper, Chief Environmental Scientist, Ecologic Evaluation Section, Southwest Florida Water Management District
SUBJECT:	Response to questions and comments submitted by Dr. Katie Tripp, Director of Science and Conservation, Save the Manatee Club, on November 5, 2010 regarding recommended minimum flows for the Homosassa River system

This memorandum documents a November 5, 2010 e-mail submitted to the Southwest Florida Water Management District by Dr. Katie Tripp, Director of Science and Conservation with the Save the Manatee Club, concerning development of minimum flows for the Homosassa River system. With regard to the currently recommended minimum flows, which allow for up to a five percent reduction in natural flows, Dr. Tripp notes that "[t]he proposed reduction in flows implies that groundwater will be withdrawn. Our organization does not support additional groundwater withdrawals to meet increasing public supply demand. We believe the Homosassa ecosystem would be much better served by maintaining flows at their current levels and using conservation and other select alternative water supplies, along with education and regulation, to lead Florida's citizens to daily practices that reduce our use of water resources." In her e-mail, Dr. Tripp also poses several questions and comments on the District's approach to establishing minimum flows for the Homosassa River system and content of the draft District report titled Recommended Minimum Flows for the Homosassa River System, July 12 2010 Peer-Review Draft.

Excerpted portions of Dr. Tripp's e-mail are reproduced below, along with staff responses to her questions and comments. Dr. Tripp's original e-mail is included in its entirety as a five page attachment (Attachment A) to this memorandum to provide context for the Save the Manatee Club's perspective on the currently recommended minimum flows for the Homosassa River system. A second attachment (Attachment B), which includes a preliminary e-mail response from staff to Dr. Tripp, is also appended to this memorandum.

#### Excerpt No. 1 with Comments

"As the report mentions, a MFL was set for Blue Spring in Volusia County, another important winter manatee aggregation area. That effort has been followed by an ongoing monitoring plan to study and report changes in manatee behavior, health, or usage of the site based on the reduced flows permitted as a result of MFL establishment. The Draft Report for Homosassa made no such mention of monitoring environmental changes that would accompany flow reductions facilitated by establishing the MFL. It seems this would be appropriate, particularly for those species that were found sensitive to even minimal reductions in flow based on model results."

## Staff Response to Excerpt No. 1

The District plans to continue supporting the monitoring of flows and various water quality parameters in the Homosassa River system, but does not plan to monitor manatee responses to flow variation. Evaluation of changes in flows on thermally-favorable manatee habitat indicated that the recommended SUBJECT:Response to questions and comments submitted by Dr. Katie Tripp, Director of Science<br/>and Conservation, Save the Manatee Club, on November 5, 2010 regarding<br/>recommended minimum flows for the Homosassa River system

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minimum flows, which would allow up to a five percent reduction in natural flows, would not be expected to reduce available habitat by more than one percent during chronic cold conditions and by no more than eight percent during acute cold conditions. Staff notes also that thermally-favorable habitat is underestimated based on the modeling approach used by the District to develop minimum flow recommendations for the river system. Upstream areas of the Homosassa Spring run and the Southeast Fork of the Homosassa River, as well as the entire length of Halls River were not included in the modeled evaluation of thermally-favorable manatee habitat. Given that: 1) thermally-favorable habitat in the river system was underestimated; 2) the availability of thermally-favorable habitat sufficient to accommodated over 9,000 and 23,000 animals was predicted for the thirty-percent flow reduction scenario modeled for critically-cold chronic and acute conditions, respectively in 2008; and 3) comparison of the availability of habitat with maximum abundance of manatees in the Homosassa River system and along the west coast of Florida (maxima of 156 and 2,296, respectively) documented by the United States Fish and Wildlife Service and Florida Fish and Wildlife Conservation Commission, staff expect that compliance with the minimum flow recommendations may not be expected to cause significant harm to the area manatee population.

## Excerpt No. 2 with Comment

"Discussions of manatees in northwest Florida should not be referred to as a "subpopulation" (page122), but as a management unit/region."

## Staff Response to Excerpt No. 2

Staff acknowledges that the United States Fish and Wildlife Service currently identifies four regional management units for describing and evaluating regional population trends or environmental threats to the greater Florida manatee population. As suggested by Dr. Tripp, reference to area manatees in the revised version of the Homosassa minimum flows report will indicate that the animals belong to or associated with the Service's Northwest management unit.

## Excerpt No. 3 with Comments

"It would be incredibly beneficial to re-run the models using data from the winter of 2010, which represented a set of extreme conditions for manatees in Florida. The duration of cold surpassed those values used in the model (three day chronic at 68°F, four-hour acute at 59°F). Furthermore, historically, the free-ranging manatee population has not had access to the main spring at Homosassa because a captive environment was created for the manatees at Homosassa Springs Wildlife State Park. Because free-ranging manatees could not access the boil and the first several hundred yards of the spring run, this spring has been sub-optimal for manatees in the northwest management region. This winter (2010-2011), the gates at the park will be opened and the wild herd will regain access to the boil. It would be very beneficial to see if more manatees begin using the site once access improves. If this is the case, it will be appropriate to recalculate the model results. SUBJECT:Response to questions and comments submitted by Dr. Katie Tripp, Director of Science<br/>and Conservation, Save the Manatee Club, on November 5, 2010 regarding<br/>recommended minimum flows for the Homosassa River system

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The report stated that "Flow reductions between five and ten percent were predicted to reduce favorable manatee habitat by fifteen percent for a recent cold period" (page 21). This should be run again using the data from winter 2010 to see if a lower flow reduction is capable of causing a 15% loss in habitat. The report states that, "flow reductions up to thirty percent are not likely to be limiting for manatee use of the Homosassa River system as a thermal refuge" (page 21), but this does not account for any of the changes already discussed: new record cold conditions documented, a growing population, improved access to habitat at the boil. Given that "flow reduction of 7.5 percent would be associated with a fifteen percent reduction in thermally favorable habitat for the acute cold period" (156), it seems appropriate to re-run the model to include the temperature extremes observed last winter."

## Staff Response to Excerpt No. 3

Staff notes that the currently recommended minimum flows were developed based on the best information that was available at the time the thermal-modeling of the Homosassa River system was completed. Staff acknowledges that it may be beneficial to continue to evaluate potential effects of reduced flows on the availability of thermally-favorable manatee habitat in the Homosassa River system, based on future environmental conditions, and expects that efforts directed towards this goal will be implemented when the District completes a re-evaluation of minimum flows for the system at some point in the future. To address this issue, staff plans to include language that calls for periodic re-evaluation of the adopted minimum flows for the Homosassa River system in rule amendments that will be presented to the District Governing Board for approval.

It seems reasonable to assume that future assessments of the availability of thermally-favorable habitat for manatees in the Homosassa River system during critical cold periods will address the increased accessibility of thermal refuge areas associated with the Homosassa Main Springs pool. Staff surmises that allowing free-ranging manatees to access the Main Springs pool and the uppermost segment of the spring run may certainly be expected to increase the extent of thermally-favorable manatee habitat in the Homosassa River system.

With regard to the possibility that more manatees may use the Homosassa River system as a result of allowing animals to access the upper portion of the river and the main springs pool, staff notes that the modeling of thermally-favorable habitat completed for evaluation of minimum flows is independent of the number of manatees that are in the system; the modeling approach simply identifies the extent of thermally-favorable habitat as a function of spring discharge and other physical characteristics of the system. The number of manatees using the system as a warm water refuge only becomes critical for the minimum flows evaluation if the thermally defined carrying capacity is exceeded. As noted in the Staff Response to Excerpt No. 1, modeling of thermally-favorable habitat in the Homosassa River system indicates that the availability of habitat should not be limiting to manatees seeking thermal refuge during critically cold periods.

SUBJECT: Response to questions and comments submitted by Dr. Katie Tripp, Director of Science and Conservation, Save the Manatee Club, on November 5, 2010 regarding recommended minimum flows for the Homosassa River system

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## Excerpt No. 4 with Comments

"The report did not seem to account for future changes in the manatee population in Northwest Florida, but seemed to only use a snapshot of the current population for modeling. As this is a species in recovery, it would be beneficial to consider possible fluctuations in the local population into the future.

Furthermore, Rouhani's work at Blue Spring was extrapolated for a calculation of the volume of space required per manatee (3.1 cubic meters) (page 156). We have never supported this approach to modeling habitat availability for manatees at springs, because manatees are not barrels that can simply be stacked on one another and packed into a habitat. The District would be well served by using a more logical approach to calculating the true carrying capacity of the spring, which accounts for manatee behavior. For example, manatees often move with the sun to increase their solar gain, and may not use all quadrants of a refuge to the same degree at all times. Such modifications should be applied to any future runs of the model."

## Staff Response to Excerpt No. 4

Staff acknowledges that the analyses used to evaluate potential changes in thermally favorable manatee habitat as a function of flow reductions did not include consideration of possible increases in the size of the Florida manatee population. Staff notes however, that the modeling approach used for evaluation of habitat considered thermally-favorable for manatees addresses changes in the availability of habitat from baseline or natural flow conditions and does not specifically address the numbers of animals that may use areas of the river system as a thermal refuge. Staff acknowledges that the use of Rouhani's work for calculating the number of manatees that may us thermal-refuge areas does not specifically account for the repertoire of behaviors exhibited by manatees during critically cold periods. However, staff notes that based on the defined thermally-favorable habitat, many more animals than currently occur in the region could potentially use the Homosassa River system as a thermal refuge, even under the most severe flow reduction scenario that was evaluated (*i.e.*, a thirty percent reduction from natural flow conditions).

Concern regarding potential changes in thermally-favorable habitat with respect to the current or future size of the entire Florida population and the number of animals typically encountered in the Northwest management unit may be of significance only if the availability of thermally-favorable habitat suggests that the habitat is currently limiting or may be limiting at some point in the future. With regard to future limitations in the availability of thermally-favorable habitat in the Homosassa River system, staff suggests that this is an evaluation best left to the point in time when any adopted minimum flows for the system are re-evaluated.

Staff acknowledges the Save the Manatee Club position regarding their lack of support for the District's approach for evaluating potential effects of flow reductions on thermally-favorable manatee habitat, but respectfully notes that this approach has been used repeatedly for establishment of minimum flows in the state and has been subjected to independent, scientific review.

SUBJECT:Response to questions and comments submitted by Dr. Katie Tripp, Director of Science<br/>and Conservation, Save the Manatee Club, on November 5, 2010 regarding<br/>recommended minimum flows for the Homosassa River system

Page 5 December 23, 2010

## Excerpt No. 5 with Comments

"There are several comments made in the report, including on page 84 (maximum salinities observed at the Halls River and Homosassa River gage sites were underestimated by the calibration and validation periods), 127 (use of single year as benchmark for identifying salinity-based habitats and development of significant change criteria), and 136 (modeled isohalines) that results between the regression model and hydrodynamic model were not always in agreement or the data input to the model was problematic, but there is no discussion of whether these differences were significant."

## Staff Response to Excerpt No. 5

Staff acknowledges that differences between absolute salinities and isohaline locations predicted for the Homosassa River based on application of hydrodynamic and regression models were not characterized in terms of their statistical significance. We are not sure how these types of analyses could be undertaken. We note however, that minimum flow recommendations for the river system were not based solely on the hydrodynamic modeling results or the regression modeling results, but on consideration of both sets of results. This approach may be considered conservative with respect to the resources that the minimum flows are intended to protect.

## Excerpt No. 6 with Comment

"Although the report made mention of climate change (page 95), none of the modeling appeared to account for changes in salinity, groundwater flow, etc. that could be associated with future climate change impacts from such factors as rising sea level and changing rainfall patterns."

## Staff Response to Excerpt No. 6

Staff acknowledges that the modeling used to develop proposed minimum flows for the Homosassa River system does not incorporate future sea-level change, but notes that recent sea level variation has been integrated into the analyses through use of available stage and flow records that are dependent, in part on sea level. As noted in response to excerpt number three in this memorandum, the District is committed to the re-evaluation of adopted minimum flows and levels for the Homosassa River system, and expects that relevant information associated with sea-level rise will be included in analyses supporting any necessary review of minimum flows that are established for the system.

## Excerpt No. 7 with Comments

"The report briefly discussed changes to submerged aquatic vegetation in the Homosassa and surrounding rivers, and hypothesized that this could be the result of eutrophication caused by increased nutrient input (page 98). However, the effects of increased nutrients were not accounted for in the modeling efforts."

## Staff Response to Excerpt No. 7

Staff notes that the hypothesis regarding nutrient concentrations being indicative of eutrophication on page 98 of the Homosassa minimum flows report is attributed to Frazer and his colleagues, and is based on results and conclusions presented by these investigators in a report titled *"Final Report, SWFWMD*"

SUBJECT:Response to questions and comments submitted by Dr. Katie Tripp, Director of Science<br/>and Conservation, Save the Manatee Club, on November 5, 2010 regarding<br/>recommended minimum flows for the Homosassa River system

Page 6 December 23, 2010

Contract Number 03CON000038, Changes in the Physical, Chemical and Vegetative Characteristics of the Homosassa, Chassahowitzka and Weeki Wachee Rivers." Staff surmises that Dr. Tripp's comment that "the effects of increased nutrients were not accounted for in the modeling efforts" refers to modeling of thermally-favorable habitat for manatees. Staff acknowledges that effects of increased nutrient concentrations were not modeled for the thermal-habitat or salinity-habitat analyses supporting minimum flow recommendations for the Homosassa River system, and is unsure how this information may be expected to significantly contribute to the evaluation of flow reductions for the river system. With respect to effects on manatees, incorporation of information on nutrient levels and aquatic plants in the modeling effort would require development of defensible, quantitative relationships between river flows, nutrient concentrations and plant distribution, abundance and/or growth. This information would then need to be coupled with manatee feeding behavior and nutritional requirements during critical cold periods and intervening warmer periods.

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. Also, as noted on page 68 of the draft minimum flows report, several reports prepared by the District and others 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. Bulletin 69 of the Florida Geological Survey, which was authored by Copeland and others and published in 2009, and which includes information on trends in various water quality constituents for several springs of the Homosassa River, referenced in the draft minimum flows report. This oversight will be addressed in the revised version of the report.

## Excerpt No. 8 with Comments

"The District used a 15% loss of resource or habitat to constitute "significant harm." As the report states, this standard has not been validated and it is not known if reductions up to this level "are truly protective of the resource" (page 26). Therefore, we are concerned with its use throughout the document, but acknowledge the finding of the peer-review panel that it is a justifiable metric."

## Staff Response to Excerpt No. 8

Staff notes that the Florida legislature did not define "significantly harmful" in the statutory language mandating the establishment of minimum flows and levels. Staff also asserts, as does Dr. Tripp, that numerous peer-review panels have been supportive of the District's use of limiting environmental change to no more than 15% in response to flow reductions. Finally, staff notes that the phrase "are truly protective of the resource" quoted by Dr. Tripp may be attributed not to the District, but to the peer-review panel that reviewed proposed minimum flow for the upper Hillsborough River and Crystal Springs. Incidentally, as noted in the draft Homosassa minimum flows report, that panel found the use of the 15% criterion was reasonable for establishment of minimum flows.

Page 7 December 23, 2010

## Excerpt No. 9 with Comments

"It is not at all clear how the District decided upon a 5% reduction in flow at this site. Impacts to various species were observed with much less of a reduction than this and no real justification appears to have been provided for the selection made. For example, the report states, "Flow reductions of 2.7 percent or less from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa" (page 160). Later, it is stated that, "Flow reductions of less than five percent were associated with more than fifteen percent reductions in selected salinity-based habitats determined from isohalines of 2, 3, 5 and 12" (page 160). Next, it is reported that "The five fish and invertebrate taxa evaluated with regressions based on organisms collected from the Homosassa River using a plankton net exhibited fifteen percent decreases from median baseline abundances with flow reductions ranging from less than one up to 1.4 percent" (page 133). Also, the report states, "Hydrodynamic modeling output indicated that flow reductions of less than five percent, the lowest modeled flow scenario, were predicted to result in more than a fifteen percent decrease in median baseline bottom area exposed to salinities of 2 or less during the 2007 benchmark period."

Finally, "The most sensitive resource responses to modeled flow reductions were exhibited by fish and invertebrate plankton and nekton. Flow reductions of 0.6 to 2.7 percent from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa"(160). These statements suggest that a MFL proposing less than a 5% reduction would be far more protective and appropriate for this system. It is my understanding that no MFLs representing less than a 5% reduction were modeled (i.e. a 2.5% reduction). It seems appropriate to test more conservative MFLs that are more in line with the resource impacts cited above. The report further states in closing that long-term hydrologic statistics based on reductions from baseline conditions associated with percent of flow reductions are typically calculated but were not done here, which is not ideal. A hypothesis is made that the acute sensitivity of evaluated plankton and nekton taxa to flow reductions was an artifact of "spurious relationships" between inflow values and organism count data, but it is equally possible that these changes are significant. As the report admits, the spring-dominated system is fairly stable (page 160), so it is possible that these organisms are sensitive to "mild" changes."

## Staff Response to Excerpt No. 9

Staff has initiated development of predicted changes in salinity-based habitats for flow reduction scenarios of less than five percent, the minimum flow reduction scenario that was evaluated in the draft minimum flows report for the Homosassa River system. As part of this review, evaluation of potential changes in zones where salinities are less than two has been determined to be inappropriate, based on limitations of the hydrodynamic model that was used for evaluation of the low-salinity zones. Exclusion of these modeled results was based on the similarity of mean-weighted salinity for the headwater springs (1.6 psu) as compared to the salinity-zone limit (2 psu) and the frequent proximity of the boundary for this salinity zone at or upstream of the upper extent of the model domain. With regard to predictions for fish and invertebrate plankton and nekton abundances as a function of flow, staff notes that as indicated on page 160 of the draft minimum flows report, these relationships were not considered to be particularly useful for developing quantitative minimum flow recommendations, given the general poor quality of the predictive regression models. In summary, staff is continuing to

SUBJECT: Response to questions and comments submitted by Dr. Katie Tripp, Director of Science and Conservation, Save the Manatee Club, on November 5, 2010 regarding recommended minimum flows for the Homosassa River system

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investigate alternate flow reduction scenarios that could lead to modification of minimum flow recommendations for the Homosassa River system, and results from these analyses will be included in a revised version of the minimum flows report.

## Excerpt No. 10 with Comments and Questions

"There is no discussion of whether the salinity regime from the boil to the river contributes in any way to the manatee refuge. For example, at Port of the Islands in Collier County, the U.S. Geological Survey Sirenia Project has done work showing that stratification in the water layer creates denser (more saline) pockets of warmer water that provide a refuge for manatees. With the moving salinity isohalines that could result from the proposed MFL, is it know whether there will be secondary impacts to the size or other characteristics of the thermal refuge caused by changing salinity? Is it known whether there is a relationship between temperature and salinity at the refuge?"

## Staff Response to Excerpt No. 10

The Homosassa Main Springs pool was not included in the domain for modeling of salinity or thermallyfavorable manatee habitat, so thermal stratification of this area was not evaluated for development of minimum flow recommendations. Thermal and salinity characteristics of water discharged from the Homosassa Main Spring vents and springs that discharge to the Southeast Fork of the Homosassa River were, however, integrated into the hydrodynamic modeling efforts through inclusion of data collected at the United States Geological Survey Homosassa Springs near Homosassa, FL and Southeast Fork Homosassa Springs near Homosassa, FL gage sites. As noted in the draft minimum flows report, development of a hydrodynamic model of the river system was implemented using the Environmental Fluid Dynamic Code, with a three-dimensional curvilinear orthogonal grid that included three proportionally equal vertical layers, depending upon model-cell depth. Although staff do not fully understand what is meant by Dr. Tripp's question concerning "secondary impacts to the size or other characteristics of the thermal refuge caused by changing salinity", we note that application of the hydrodynamic model integrates both thermal and salinity characteristics of the system in response to changes in flows. Staff is similarly unsure what is meant by Dr. Tripp's question regarding "a relationship between temperature and salinity at the refuge", but note that the hydrodynamic model was calibrated to measured salinity and temperature data recorded by the United States Geological Survey at downstream gage sites in the river system.

## Excerpt No. 11 with Comments

"The proposed reduction in flows implies that groundwater will be withdrawn. Our organization does not support additional groundwater withdrawals to meet increasing public supply demand. We believe the Homosassa ecosystem would be much better served by maintaining flows at their current levels and using conservation and other select alternative water supplies, along with education and regulation, to lead Florida's citizens to daily practices that reduce our use of water resources. If there are specific projects slated to receive groundwater from this site, we would be interested in hearing about these plans, and believe concerned local citizens would also benefit from this information." SUBJECT:Response to questions and comments submitted by Dr. Katie Tripp, Director of Science<br/>and Conservation, Save the Manatee Club, on November 5, 2010 regarding<br/>recommended minimum flows for the Homosassa River system

Page 9 December 23, 2010

## Staff Response to Excerpt No. 11

The District acknowledges the Save the Manatee Club's positions concerning development of groundwater sources for water supply and the maintenance of flows in the Homosassa River system at current levels. With regard to water conservation, the District recognizes that conservation measures are the most cost-efficient and environmentally sustainable means of meeting future water demands, and supports water conservation through a variety of programs, outreach efforts, funding of conservation methods and wastewater reclamation, and permit requirements. Per capita water use is generally higher in the northern portion of the District (where the Homosassa River system is located) as compared to the southern region, where conservation efforts have been ongoing for over a decade. Promotion of water-use conservation and recent changes to District permitting rules have focused on reducing this high per capita water use. These efforts may postpone the need to develop additional water supplies in the northern region by several years.

With regard to planned withdrawals in the vicinity of the river system, staff encourages interested parties to review information on existing and potential water supplies that is included in the draft Southwest Florida Water Management District 2010 Regional Water Supply Plan - Northern Planning Region and the Withlacoochee Regional Water Supply Authority Phase II – Detailed Water Supply Feasibility Analyses, which was completed by Water Resource Associates in 2010 for the Withlacoochee Regional Water Supply Authority.

An electronic version of the draft 2010 District water supply plan for the northern planning region is available from the Documents and Publications – Regional Water Supply Plan page of the District web site at the following URL: <u>http://www.swfwmd.state.fl.us/documents/plans/RWSP/drafts/NPR-Public-Draft-4\_20\_10.pdf</u>. An electronic version of the 2010 Withlacoochee Regional Water Supply Authority document may be obtained by contacting Mr. Doug Leeper at the Southwest Florida Water Management District via e-mail at <u>doug.leeper@watermatters.org</u> or by telephone at 800-423-1476, extension 4272.

Although development of the 2010 Withlacoochee Regional Water Supply Authority feasibility report was co-funded by the District, questions pertaining to the report may be best addressed by Mr. Jackson Sullivan, the Withlacoochee Regional Water Supply Director. Mr. Sullivan should be able to provide information on the likelihood of implementation of the water supply options identified in the report during the coming decades. He may be reached by e-mail at <u>jesull@comcast.net</u> or by telephone at 850-591-7422.

Additional information on planned water-supply development projects in the vicinity of the Homosassa River system may be obtained by contacting the Citrus County Utilities Division at 352-527-7646 and the Hernando County Utilities Department at 352-754-4037.

DAL

Attachments: Five page e-mail from Dr. Katie Tripp dated November 5, 2010 One-page e-mail from Doug Leeper to Dr. Katie Tripp, dated November 8, 2010

## Attachment A

## Five Page Attachment to December 23, 2010 Memorandum Addressing Questions and Comments Submitted by Dr. Katie Tripp on November 5, 2010

From:	ktripp@savethemanatee.org
То:	Doug Leeper
Cc:	ktripp@savethemanatee.org
Subject:	Re: Homosassa Minimum Flows Info from SWFWMD
Date:	Friday, November 05, 2010 12:57:08 PM

Hi Doug,

Thanks for the additional info- it was helpful. Pasted below are some comments. I think they pretty much reflect the conversation we had last week, but I wanted to get something to you "for the record." Thanks again for your time. Please let me know if you have any questions.

Take care,

Katie

Katie Tripp, Ph.D. Director of Science and Conservation Save the Manatee Club 500 N. Maitland Ave. Maitland, FL 32751 Phone: 407-539-0990 Fax: 407-539-0871

E-mail: <a href="https://www.ktripp@savethemanatee.org">ktripp@savethemanatee.org</a>

October 29, 2010

Re: Recommended Minimum Flows for the Homosassa River System July 12, 2010 Peer-Review Draft

Dear Mr. Hood,

I have reviewed the Peer-Reviewed Draft released by the SWFWMD for Recommended Minimum Flows for the Homosassa River and would like to offer the following comments:

As the report mentions, a MFL was set for Blue Spring in Volusia County, another important winter manatee aggregation area. That effort has been followed by an ongoing monitoring plan to study and report changes in manatee behavior, health, or usage of the site based on the reduced flows permitted as a result of MFL establishment. The Draft Report for Homosassa made no such mention of monitoring environmental changes that would accompany flow reductions facilitated by establishing the MFL. It

seems this would be appropriate, particularly for those species that were found sensitive to even minimal reductions in flow based on model results.

Discussions of manatees in northwest Florida should not be referred to as a "subpopulation" (page122), but as a management unit/region.

It would be incredibly beneficial to re-run the models using data from the winter of 2010, which represented a set of extreme conditions for manatees in Florida. The duration of cold surpassed those values used in the model (three day chronic at 68°F, four-hour acute at 59°F). Furthermore, historically, the free-ranging manatee population has not had access to the main spring at Homosassa because a captive environment was created for the manatees at Homosassa Springs Wildlife State Park. Because free-ranging manatees could not access the boil and the first several hundred yards of the spring run, this spring has been sub-optimal for manatees in the northwest management region. This winter (2010-2011), the gates at the park will be opened and the wild herd will regain access to the boil. It would be very beneficial to see if more manatees begin using the site once access improves. If this is the case, it will be appropriate to recalculate the model results.

The report stated that "Flow reductions between five and ten percent were predicted to reduce favorable manatee habitat by fifteen percent for a recent cold period" (page 21). This should be run again using the data from winter 2010 to see if a lower flow reduction is capable of causing a 15% loss in habitat. The report states that, "flow reductions up to thirty percent are not likely to be limiting for manatee use of the Homosassa River system as a thermal refuge" (page 21), but this does not account for any of the changes already discussed: new record cold conditions documented, a growing population, improved access to habitat at the boil. Given that "flow reduction of 7.5 percent would be associated with a fifteen percent reduction in thermally favorable habitat for the acute cold period" (156), it seems appropriate to re-run the model to include the temperature extremes observed last winter.

The report did not seem to account for future changes in the manatee population in Northwest Florida, but seemed to only use a snapshot of the current population for modeling. As this is a species in recovery, it would be beneficial to consider possible fluctuations in the local population into the future.

Furthermore, Rouhani's work at Blue Spring was extrapolated for a calculation of the volume of space required per manatee (3.1 cubic meters) (page 156). We have never supported this approach to modeling habitat availability for manatees at springs, because manatees are not barrels that can simply be stacked on one another and packed into a habitat. The District would be well served by using a more logical approach to calculating the true carrying capacity of the spring, which accounts for manatee behavior. For example, manatees often move with the sun to increase their solar gain, and may not use all quadrants of a refuge to the same degree at all times. Such modifications should be applied to any future runs of the model.

There are several comments made in the report, including on page 84 (maximum salinities observed at the Halls River and Homosassa River gage sites were underestimated by the calibration and validation periods), 127 (use of single year as benchmark for identifying salinity-based habitats and development of significant change criteria), and 136 (modeled isohalines) that results between the regression model and hydrodynamic model were not always in agreement or the data input to the model was problematic, but there is no discussion of whether these differences were significant.

Although the report made mention of climate change (page 95), none of the modeling appeared to account for changes in salinity, groundwater flow, etc. that could be associated with future climate change impacts from such factors as rising sea level and changing rainfall patterns.

The report briefly discussed changes to submerged aquatic vegetation in the Homosassa and surrounding rivers, and hypothesized that this could be the result of eutrophication caused by increased nutrient input (page 98). However, the effects of increased nutrients were not accounted for in the modeling efforts.

The District used a 15% loss of resource or habitat to constitute "significant harm." As the report states, this standard has not been validated and it is not known if reductions up to this level "are truly protective of the resource" (page 26). Therefore, we are concerned with its use throughout the document, but acknowledge the finding of the peer-review panel that it is a justifiable metric.

It is not at all clear how the District decided upon a 5% reduction in flow at this site. Impacts to various species were observed with much less of a reduction than this and no real justification appears to have been provided for the selection made. For example, the report states, "Flow reductions of 2.7 percent or less from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa" (page 160). Later, it is stated that, "Flow reductions of less than five percent were associated with more than fifteen percent reductions in selected salinitybased habitats determined from isohalines of 2, 3, 5 and 12" (page 160). Next, it is reported that "The five fish and invertebrate taxa evaluated with regressions based on organisms collected from the Homosassa River using a plankton net exhibited fifteen percent decreases from median baseline abundances with flow reductions ranging from less than one up to 1.4 percent" (page 133). Also, the report states, "Hydrodynamic modeling output indicated that flow reductions of less than five percent, the lowest modeled flow scenario, were predicted to result in more than a fifteen percent decrease in median baseline bottom area exposed to salinities of 2 or less during the 2007 benchmark period." Finally, "The most sensitive resource responses to modeled flow reductions were exhibited by fish and invertebrate plankton and nekton. Flow reductions of 0.6 to 2.7 percent from median baseline conditions were associated with fifteen percent reductions in predicted abundances of individual pseudo-species or taxa" (160). These statements suggest that a MFL proposing less than a 5% reduction would be far more protective and appropriate for this system. It is my understanding that no MFLs representing less than a 5% reduction were modeled (i.e. a 2.5% reduction). It seems appropriate to test more conservative MFLs that are more in line with the resource impacts cited above. The report further states in closing that long-term hydrologic statistics based on reductions from baseline conditions associated with percent of flow reductions are typically calculated but were not done here, which is not ideal. A hypothesis is made that the acute sensitivity of evaluated plankton and nekton taxa to flow reductions was an artifact of "spurious relationships" between inflow values and organism count data, but it is equally possible that these changes are significant. As the report admits, the spring-dominated system is fairly stable (page 160), so it is possible that these organisms are sensitive to "mild" changes.

There is no discussion of whether the salinity regime from the boil to the river contributes in any way to the manatee refuge. For example, at Port of the Islands in Collier County, the U.S. Geological Survey Sirenia Project has done work showing that stratification in the water layer creates denser (more saline) pockets of warmer water that provide a refuge for manatees. With the moving salinity isohalines that could result from the proposed MFL, is it know whether there will be secondary impacts to the size or other characteristics of the thermal refuge caused by changing salinity? Is it known whether there is a relationship between temperature and salinity at the refuge?

Optimized habitat at springs is essential to the recovery of the Florida manatee. Artificial warm water sites are unreliable and in some cases cannot provide the same stability/quality of habitat as springs. If these power plants are lost in the future, springs will become even more important to sustaining Florida's manatee population.

The proposed reduction in flows implies that groundwater will be withdrawn. Our organization does not support additional groundwater withdrawals to meet increasing public supply demand. We believe the Homosassa ecosystem would be much better served by maintaining flows at their current levels and using conservation and other select alternative water supplies, along with education and regulation, to lead Florida's citizens to daily practices that reduce our use of water resources. If there are specific projects slated to receive groundwater from this site, we would be interested in hearing about these plans, and believe concerned local citizens would also benefit from this information.

Thank you for the consideration of these comments.

Sincerely,

Katie Tripp, Ph.D. Director of Science and Conservation

## On Thu 28/10/10 2:42 PM , Doug Leeper Doug.Leeper@swfwmd.state.fl.us sent:

Ms. Tripp – I notices[sic] I previously sent this e-mail without a subject line. In the event that your email program filters out unidentified e-mails, I'm re-sending this...

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

From: Doug Leeper Sent: Thursday, October 28, 2010 2:39 PM To: 'ktripp@savethemanatee.org' Cc: Marty Kelly Subject:

Ms. Tripp:

It was a pleasure to speak with you today regarding the District's report on recommended minimum flows for the Homosassa River system. I look forward to receiving your written comments on our draft report.

As promised, I've attached a copy of the memorandum that was developed in response to comments on the recommended minimum flows that were submitted by the Florida Fish and Wildlife Conservation Commission.

Also, as we discussed, here's a link to the report of the independent peer-review panel that evaluated the District's recommended minimum flows report.

#### http://www.swfwmd.state.fl.us/projects/mfl/reports/homosassa peer review.pdf

Please feel free to contact me if you have additional questions or comments.

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

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.

## Attachment B

## One Page Attachment to December 23, 2010 Memorandum Addressing Questions and Comments Submitted by Dr. Katie Tripp on November 5, 2010

From:	Doug Leeper
То:	"ktripp@savethemanatee.org"
Cc:	Marty Kelly; Sid Flannery; Mike Heyl; Mark Barcelo; Ron Basso; Karen Lloyd; Jay Yingling; Cara S. Martin
Subject:	Homosassa Minimum Flows - 05Nov2010 Comments from KTripp
Date:	Monday, November 08, 2010 10:06:37 AM

Dr. Tripp:

Thank you for your November 5, 2010 e-mail pertaining to the Southwest Florida Water Management District report titled *Recommended Minimum Flows for the Homosassa River System, July 12, 2010 Peer-Review Draft*. Thanks also for expressing the recommendation from the Save the Manatee Club that the District consider allowing no reductions in currently existing flows when establishing minimum flows for the Homosassa River system. Staff appreciates the opportunity to consider comments such as those included in your e-mail as we develop draft rule amendments associated with minimum flows for the river system.

Please note that the comments raised in your e-mail will be included as an appendix to the final, revised version of the report on minimum flows for the Homosassa River system to document the scientific review and public input associated with development of the minimum flows. Note also that in the coming weeks, I expect to be able to provide staff responses to the issues and information requests included in your e-mail. I've sent this e-mail today to acknowledge receipt of your e-mail and provide assurance that we are considering the concerns you have raised.

Douglas A. Leeper, Chief Environmental Scientist Resource Projects Department, Southwest Florida Water Management District 2379 Broad Street, Brooksville, FL 34604-6899 Telephone: 1-800-423-1476, ext. 4272 (FL only) or 352-796-7211, ext. 4272 Fax: 352-754-6885 E-Mail: doug.leeper@watermatters.org Web Site: watermatters.org 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) -- 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
- Page 2 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: <a href="https://www.WaterMatters.org">www.WaterMatters.org</a>

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 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:

Page 3 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 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, 2010B) 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 Web Site: 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.

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

Page 2 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 though 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

Page 3 December 17, 2010

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?

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#### 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."

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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: <u>http://www.swfwmd.state.fl.us/data/wmdbweb/rainfall\_data\_summaries.php</u>. 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

Page 6 December 17, 2010

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

Page 7 December 17, 2010

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 *R[uppia] maritima* and *P[otamogeton] 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
То:	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

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

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 Fl

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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. Question2: 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) (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) (B-2)

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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 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. Weeki Wachee 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) (B-3)

 $\widetilde{V}m = 0.00902154 + 0.9019Vi + 0.12138Vi2 + 0.045375(GH)$  (B-4)

In which

Q = river discharge, in cfs.

A = area of channel cross section at the gauge, in ft2.

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

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 trendedg over an expanded time period. This may also help explain why barnaccle 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/Ouarter 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 HrsMins Flow Hrs Inflow Outflow 11-Nov 2:00 7:45Inflow 5:45 5.75 5.75 7:45 17:30Outflow 9:45 9.75 9.75 17:30 21:45 Inflow 4:15 4.25 4.25 21:45 4:00Outflow 6:15 6.25 6.25 12-Nov 4:00 9:00Inflow 5:00 5.00 5.00 9:00 18:45Outflow 9:45 9.75 9.75 18:45 23:00Inflow 4:15 4.25 4.25 23:00 5:00Outflow 6:00 6.00 6.00 13-Nov 5:00 10:30Inflow 5:30 5.50 5.50 10:30 18:15Outflow 6:45 6.25 6.25 18:15 0:00Inflow 5:45 5.45 5.45 14-Nov 0:00 5:45Outflow 5:45 5.45 5.45 5:45 11:30Inflow 5:45 5.45 5.45 11:30 18:45Outflow 7:15 7.25 7.25 18:45 1:45 Inflow 7:00 7.00 7.00 15-Nov 1:45 8:00Outflow 6:15 6.25 6.25 8:00 13:00 Inflow 5:00 5.00 5.00 13:00 18:45Outflow 5:45 5.75 5.75 18:45 3:00Inflow 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 mathmatical equation.

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

Much appreciate your time. Thanks, Martyn Johnson

## Attachment C <u>E-Mail from Kevin Grimsley to Martyn Johnson</u> 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