Appendix 1A-3: Peer-Review Panel Comments on the Draft *2008 South Florida Environmental Report – Volume I*

In September 2007, these comments were provided to the public on the District's WebBoard (http://www.sfwmd.gov/sfer). With the exception of reformatting some information for better readability, this appendix was not edited or spellchecked by the SFER production staff and appears as posted on the WebBoard.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 1A: Introduction to the *2008 South Florida Environmental Report – Volume I* » Comments by Jordan

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author	Message
jeff jordan	**Subject:** **Comments by Jordan**

Total Messages 23

As has been the case in the past, this chapter provides a good introduction to all of the issues behind the SFER. The unification of over 50 reports into one document is an important and difficult tasks, particularly since this chapter is written for a diverse audience. The section on major geographic features is extremely useful and is aided by figure 1A and numerous helpful pictures.

An important connection is made in this chapter between changes in the hydrology and chemistry of the South Florida ecosystem and widespread development and urbanization. Also this chapter is helpful in noting the 2007 legislation that focuses on the integration of regional projects. In response to past reviews, the new section on public information, media and outreach activities is welcome.

One editing comment: For the general audience that will look at only this chapter, I'm not sure the section on pages 18-25 on the peer review panel is necessary. I would suggest putting all of that with the panel comments that become part of an appendix.

In general, this is a vital and well-done chapter that forms the basis for the SFER.

Posted: 18 Sep 2007 11:25 AM
Originally Posted: 18 Sep 2007 11:22 AM

profile | reply

New Topic | Prev Topic | Next Topic

Go t

Select Conference

Log In Options | Username: | Password: | Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 1A: Introduction to the *2008 South Florida Environmental Report – Volume I* » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic

Author	Message
jeff jordan	**Subject:** **Comments by Meganck**
Total Messages 15	I have only one question on this introductory chapter. I will however include a general comment about the usefulness of this chapter to the readership of the 2008 SFER in the text to be included in the final report of the panel. 1. Might it be possible to include couple of examples to illustrate the very important points made in lines 137-139 and lines 144-145? I feel this concept should be strengthened with examples to facilitate greater understanding/buy-in from the general public? Posted: 17 Sep 2007 04:31 PM Originally Posted: 17 Sep 2007 04:29 PM

profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic

Go t

Select Conference

Author | Message

JoAnn Burkholder

Subject: **Review of Chapter 1B - Burkholder**

Total Messages 18

Chapter 1B Strategies for Re-engineering Water Quality Monitoring in South Florida

This chapter considers, as a cross-cutting theme, redesign of monitoring networks to enable data compatibility and rigorous comparison. It is a thoughtfully conceived, innovative analysis, from its honest characterization of the present morass of monitoring networks in South Florida, to its suggestions of new ideas and its acknowledgment of traditional resistance to change (lines 868-879). It suggests a logical progression to "reengineer" a new water quality network based on analysis of sampling station locations, data redundancy vs. the need for additional stations, sampling frequency, and parameters to be considered.

The problem of focus in this chapter is well described in the introductory writing: A "loose confederation of programs", initiated by various entities for various reasons within various time frames, presently forms the water quality monitoring networks across South Florida. This enormous, albeit "hodgepodge" effort excludes monitoring for TMDLs or NPDES permits, and thus conservatively includes ~1,000 stations and 35,000 sampling events per year, costs ~$18 million per year, and is expected to increase by ~30% during the restoration project. There has been little by way of previous major concerted efforts to infuse coordination or compatibility in sampling frequencies, analytical techniques/detection limits or data management/archiving. Major efforts have been lacking to address overlaps and gaps left by the various programs in water quality data acquisition – in part because no single monitoring approach can satisfy various diverse needs (lines 81-82), and because it would not be feasible for the District to do all of the essential background study needed for a coordinated set of approaches without substantial input from other agencies (lines 199-201).

Nevertheless, water quality is identified as one of four key areas of District responsibility, linked to 10 major programs in its

strategic plan; moreover, more than 160 water bodies within the District are degraded (listed in 303(d) lists). The authors acknowledge that an integrated monitoring strategy is needed for the entire South Florida region; previous review panels have repeatedly recommended that regional water quality monitoring should also be standardized and optimized. As a potential approach, they consider the Basinwide consolidation of water quality networks achieved by the Chesapeake Bay Program, which took advantage of parallel efforts across agencies and used a series of technical workshops to rework programs toward an overarching framework of information needs and questions. This strategy was needed despite the fact that the Bay program had repeatedly been reviewed, and efforts had repeatedly been taken to attempt to optimize regional monitoring networks. The authors suggest that the District work collaboratively with an internal group to develop proposals for reengineering that are reviewed, on a regular basis, by an interagency working group with appropriate expertise.

Integrative Review –

In a strong integrative approach, the authors state that the District needs to "wipe the slate clean" and rethink its monitoring from entirely new approaches, rather than attempting to "tinker" with existing networks. The two broad goals identified (p.1B-8) are to (1) determine water quality and quantify changes through time, and (2) assess the effectiveness of management actions and programs. The authors suggest a new, flow-based sampling regime (BWRF, biweekly if recorded flow" schedule), to improve efficiency while meeting monitoring standards: Stations would only be visited if flow had been recorded since the last scheduled visit; all non-flowing samples would be eliminated. Through its greater efficiency, this system would emphasize the integrative approach conceptualized by NSTC (1997); it would help to strengthen synergism among information sources and approaches in management efforts, rather than competition and isolation of various approaches to data collection and analysis (p.1B-22). All resulting data in the newly engineered, integrated networks would be set up to follow the requirements for the District's DBYDRO database (including QA/QC).

Technical Review

In WY2007, as a test case the District used the above-mentioned workshop approach to "network reengineer" water quality monitoring in the smallest of the WCAs, WCA-2A. Available datasets from WCA-2A (including water quality, vegetation maps, ground elevation maps, soil TP etc.) have been used to form a set of objectives for the marsh and structure

components, need to develop a comprehensive, integrated monitoring plan. Statistical comparisons of stations within five zones of WCA-2A are made from the context of the priority needs to further streamline the network. The generally sound approach (some suggestions/comments to improve, below) also includes an analysis of where stations need to be added. It can accommodate further changes in station recommendations as additional data become available.

Lines 278, 283 – How is a "meaningful frequency" established? This would appear to be a key question for the success of monitoring programs in adequately tracking pollutant inputs and changes over time. This reviewer has major concerns about selection of a monthly frequency for marsh sampling, for example (lines 685-686), because monthly sampling is inadequate to "capture" pollutant loading events. Moving to a bimonthly or seasonal sampling frequency (lines 789-791) is also strongly recommended against – the areas described for this can serve as valuable reference areas (line 819), so the data collected for them is just as important as the data collected for "altered" sites. The authors state that more quantitative study of various sampling frequencies is planned, and this action is strongly recommended, including additional higher-frequency sampling efforts (e.g. weekly, in some important sites – add to lines 806-807).

Lines 704-705 – Why is chlorophyll *a* described as an "esoteric" parameter?

Lines 709 - 711 – The authors state that a reengineering goal should be to have a standard water quality parameter set agreed upon for all stations regardless of project requirements. This seems counterproductive; it would seem much more constructive to have a standard set of parameters, *augmented by* additional parameters depending upon project requirements and information needs. For example, the preliminary standard parameter set should include hydrogen sulfide and ammonia/ ammonium (line 721), an important pollutant; and if mercury contamination is a concern for some projects/sites, mercury should be added.

Lines 730-732 - There is often considerable uncertainty in attempting to use various means to adjust data for diel fluctuations in DO, even when site-specific and based on extensive diel studies. This approach should be abandoned where possible in favor of automated monitoring systems – especially at sites where DO information is critically needed, because this is the only way to obtain scientifically sound data on oxygen sags and other variability. Quarterly deployment of sondes will not provide the information needed to assess DO conditions.

Editorial changes -
Line 199 - …would not be feasible…
Line 261 - …plan considers marsh…
Line 708 - represent problematic…
Line 715 - should be TP, not TPO_4
Line 718 - should be NO_x
Figure 1B-1 – is well-conceived, but the color coding for the various features is difficult to discern; please alter for clarity (the authors noted that the figure was being updated).
Figure 1B-3 – a diagrammatic map should also be included with this figure, which is difficult to decipher. In addition, explanation should be given about the sampling station numbers (from what programs?).

Posted: 18 Sep 2007 01:38 PM
Originally Posted: 18 Sep 2007 01:35 PM

email profile reply

New Topic Prev Topic Next Topic

Go t

Select Conference

Log In Options Username: Password: Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 1B: Strategies for Reengineering Water Quality Monitoring in South Florida » Comments from final report

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author	Message
jeff jordan	**Subject:** Comments from final report

Total Messages 21

The following questions and comments were submitted as part of the draft final report. However, I believe they are best handled independently of the report. For authors, please consider these as you work on the final version of the SFER (some of these might have been asked in the pre-workshop round of comments).

1. While it is apparent that that the reference to “15 federal agencies” in lines 53-55 refers to various water quality programs nationwide, it might not be so clear to the casual reader. A simple clarification should be inserted.
2. Given the reality of the summary comment in lines 88-90, and lines 194-196, is there any precedent (regionally, other state programs) for the District to propose a consolidated, District-wide monitoring program, a single “optimization” model (lines 93-95), to the various regulatory agencies as both a cost-saving and technically feasible manner in which to respond to so many reporting requirements? Would the USEPA, FDEP or the Governor’s office support such an effort? The SFER refers to the need to “wipe the slate clean”, but is there the political will to do so?
3. While the District has “ongoing activities and assigned staff in each element of this framework” (as presented in figure 1B-2), will that initiative provide sufficient technical background for developing an agreed consolidated water quality monitoring program? Are there additional actions contemplated by the District to grease the skids for such an important change in operating procedures? Perhaps the comment in lines 204-213, and in lines 582-588 respond to part of this question.
4. The alternative monitoring strategy for grab sampling, presented on page 1B-14, does not discuss the impact of reduced sample numbers on the current method of computing standard compliance (which needs a minimum of 28 samples per year). The statement in lines 383-384 is not clear – how can less samples make standard compliance more robust if the minimum number needed for the selected data analysis procedure, to compute standard compliance, is not available?
5. Figure 1B-6 is not clear – are the station visits, by sampling week, for all 11 monitoring stations collectively, under the new policy? Is it possible to illustrate a comparison of the old and new policies on the graph?
6. Lines 444-446 discuss how less samples produce an estimated TP mean concentration, but no mention is made of the impact on the confidence interval around this estimate. Have the confidence interval impacts been evaluated with the new policy?
7. Flowing water is the statistical population being sampled for standard compliance at the pumping structures. If the population does not permit acquisition of sufficient samples to support the chosen data analysis procedure (binomial hypothesis test – lines 214-228 in Chapter 3A), there appears to be a disconnect between sample collection policies and data analysis methods. How is this disconnect being addressed?

8. How are the station's identifying letters and numbers determined? Do the identification letters and numbers come from the 'projects' that created the station in the first place? Is there an opportunity to rationalize over larger areas the sampling site identifying scheme to make it easier to locate sites and interpret results presented by station ID?
9. Are there applicable water quality standards that dictate which water quality constituents to measure at each station (per the discussion on page 1B-30)? No mention is made of applicable standards in this discussion of selecting water quality constituents to measure, that I could find.
10. Are there a subset of sampling sites in WCA-2A for which standard compliance is a major reason for sampling? Or is standard compliance evaluated, annually, at all stations? Are stations to be excluded from standard compliance evaluations if there are not enough samples to support the data analysis procedures?
11. In the discussion of 'Other Issues to Resolve' for marsh monitoring, there should be an explanation of the objective of water quality standard compliance in the redesign process. Chapter 3, for some time, has been moving toward identifying a set of sampling sites for routine evaluation of standard compliance. Does the redesign process incorporate the Chapter 3 work?
12. Are the water quality standards not applicable where the water depth is less than 10 cm? This is the implication of the logistical guideline explained in lines 744-751.
13. A very key point is made in lines 762-764 – viewing monitoring as a whole permits focusing its design on management information goals, especially those associated with long-term management decision making (as opposed to project decision-making).
14. I am not quite sure I understand the point being made in lines 785-787. What does "…even for compliance with water quality standards" mean in the context of the sentence? Again, the current methods employed to compute standard compliance requires a minimum number of samples of 28. Alternatives are provided for less than 28 samples, but there is a serious loss of confidence in the information when this happens, as stated in Chapter 3A.
15. Again, I am not sure I understand the statement in lines 834-835. Water quality is routinely compared upstream to downstream, where the upstream condition is often viewed as a 'reference' site (especially when there is an impact between the two sites to be evaluated).
16. A number of times in Chapter 1B, reference is made to the need to review a situation in the future, after more data/information is available. The redesign should consider developing a 'protocol' for updating the design at regular intervals and the procedures to be employed for such a review (e.g. convening a group of management professionals and research scientists to examine the monitoring network's operations, costs, station locations, sampling policies, data storage systems, data analysis methods, reporting options, etc.). This permits changes to the monitoring program to be considered in an orderly and well documented manner, insuring that future uses of the data are well informed about changes that occurred over time.
17. Editorial changes –
- Line 199 - …would not be feasible…
- Line 261 - …plan considers marsh…
- Line 708 - represent problematic…
- Line 715 - should be TP, not TPO4
- Line 718 - should be NOx
- Figure 1B-1 – is well-conceived, but the color coding for the various features is difficult to discern; please alter for clarity (the authors noted that the figure was being updated).
- Figure 1B-3 – a diagrammatic map should also be included with this figure, which is difficult to decipher. In addition, explanation should be given about the sampling station numbers (from what programs?).

In WY2007, as a test case the District used a workshop approach to "network

reengineer" water quality monitoring in the smallest of the WCAs, WCA-2A. Available datasets from WCA-2A (including water quality, vegetation maps, ground elevation maps, soil TP etc.) have been used to form a set of objectives for the marsh and structure components, need to develop a comprehensive, integrated monitoring plan. Statistical comparisons of stations within five zones of WCA-2A are made from the context of the priority needs to further streamline the network. The generally sound approach (some suggestions/comments to improve, below) also includes an analysis of where stations need to be added. It can accommodate further changes in station recommendations as additional data become available.

Lines 278, 283 – How is a "meaningful frequency" established? This would appear to be a key question for the success of monitoring programs in adequately tracking pollutant inputs and changes over time. This reviewer has major concerns about selection of a monthly frequency for marsh sampling, for example (lines 685-686), because monthly sampling is inadequate to "capture" pollutant loading events. Moving to a bimonthly or seasonal sampling frequency (lines 789-791) is also strongly recommended against – the areas described for this can serve as valuable reference areas (line 819), so the data collected for them is just as important as the data collected for "altered" sites. The authors state that more quantitative study of various sampling frequencies is planned, and this action is strongly recommended, including additional higher-frequency sampling efforts (e.g. weekly, in some important sites – add to lines 806-807).

Lines 704-705 – Why is chlorophyll a described as an "esoteric" parameter?

Lines 709 - 711 – The authors state that a reengineering goal should be to have a standard water quality parameter set agreed upon for all stations regardless of project requirements. This seems counterproductive; it would seem much more constructive to have a standard set of parameters, augmented by additional parameters depending upon project requirements and information needs. For example, the preliminary standard parameter set should include hydrogen sulfide and ammonia/ ammonium (line 721), an important pollutant; and if mercury contamination is a concern for some projects/sites, mercury should be added.

Lines 730-732 - There is often considerable uncertainty in attempting to use various means to adjust data for diel fluctuations in DO, even when site-specific and based on extensive diel studies. This approach should be abandoned where possible in favor of automated monitoring systems – especially at sites where DO information is critically needed, because this is the only way to obtain scientifically sound data on oxygen sags and other variability. Quarterly deployment of sondes will not provide the information needed to assess DO conditions.

Posted: 08 Oct 2007 02:14 PM
Originally Posted: 08 Oct 2007 02:12 PM

profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

Go t

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 1B: Strategies for Reengineering Water Quality Monitoring in South Florida » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic

Author	Message
jeff jordan	**Subject:** Comments by Meganck

Total Messages 15

I have limited my questions to the broader implications of a consolidated water quality monitoring program and not focusing on the detailed methods or specifics of WCA-2A test area.

1. While it is apparent that that the reference to “15 federal agencies” in lines 53-55 refers to various water quality programs nationwide, it might not be so clear to the casual reader. A simple clarification should be inserted.

2. Given the reality of the summary comment in lines 88-90, and lines 194-196, is there any precedent (regionally, other state programs) for the District to propose a consolidated, District-wide monitoring program, a single “optimization” model (lines 93-95), to the various regulatory agencies as both a cost-saving and technically feasible manner in which to respond to so many reporting requirements? Would the USEPA, FDEP or the Governor’s office support such an effort? The SFER refers to the need to “wipe the slate clean”, but is there the political will to do so?

3. While the District has “ongoing activities and assigned staff in each element of this framework” (as presented in figure 1B-2), will that initiative provide sufficient technical background for developing an agreed consolidated water quality monitoring program? Are there additional actions contemplated by the District to grease the skids for such an important change in operating procedures? Perhaps the comment in lines 204-213, and in lines 582-588 respond to part of this question.

Posted: 17 Sep 2007 04:31 PM
Originally Posted: 17 Sep 2007 04:29 PM

profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic

Go t

Select Conference

Chapter 1B: Strategies for Reengineering Water Quality Monitoring in South Florida
Technical Review

Prepared by: Robert C. Ward

Chapter 1B describes the initiation of an effort to redesign the monitoring by which information is acquired for the management of water quality in South Florida. Appendix 2-1 presents the current status of the hydrologic monitoring conducted by the South Florida Water Management District (SFWMD). These two portions of the 2008 SFER provide excellent insight into the current water monitoring effort of the District. Such insight has not been provided in the past and is most welcomed by this reviewer.

Chapter 1B and Appendix 2-1 indicate the SFWMD has begun an evaluation of its water monitoring programs. Given the legal and societal changes facing modern water management organizations, this review is very timely. Water resources management in South Florida, originally established in the 20th century for drainage and flood control, is evolving, in the 21st century, into a program to assure human water needs are met while also sustaining the natural aquatic resources of South Florida. The SFWMD, as do many water organizations around the world today, find themselves heavily involved with environmental, recreation, and exotic species management/control associated with the water resources they manage, whether they want to or not. The SFWMD appears to clearly recognize this fact and is embracing the changes required to assume this new function in society. As a result, the SFWMD finds itself operating at the forefront of establishing modern water and water-related information systems in support of meeting human water needs while maintaining a healthy, sustainable, aquatic ecosystem. A private business analogy can be seen the 'supply chain' software developments enhancing the way modern businesses obtain information in support of business decision making. The monitoring framework, presented in Figure 1B-2 portrays water quality monitoring as a series of highly connected activities (i.e. a chain) that, when designed and operated in an integrated manner, produces information for water quality management decision making.

The chapter title refers to 'reengineering' water quality monitoring. Another term, often used in Europe to describe the task discussed in Chapter 1B, is 'rationalizing' monitoring programs. In other words, there is a desire to 'give a rational explanation' of the SFWMD water quality monitoring programs. In the process, monitoring program designs and operations will be carefully examined and revised in a manner that meets legal, scientific, and management needs for an efficient and effective flow of information to decision makers (lines 20-22 on page 1B-2).

The need to rationalize the many individual water quality monitoring programs springs from the wide variety of laws, projects, and initiatives that have been placed on water management organizations during the latter part of the 20th century. Chapter 1B describes this situation with insight and understanding that permits the problem to be well defined. The discussion in Chapter 1B is very well connected to key literature and

thinking on the subject of designing water quality information systems in support of 21st century management. The fact that the lead author is a member of the National Water Quality Monitoring Council further connects the SFWMD monitoring evaluation activities to the latest thinking on the subject. Given that water quality monitoring is conducted by many federal, state, and local agencies, Chapter 1B indicates that the SFWMD monitoring evaluation efforts are well connected to the larger state and federal water quality monitoring infrastructure in South Florida.

The redesign of the SFWMD's water quality monitoring efforts is focused on developing monitoring objectives and designing the monitoring program (lines 125-126), given that there are ongoing efforts to optimize operations of other parts of the monitoring framework, as presented in Figure 1B-2. As the redesign proceeds, there is a need to illustrate and document how all the cogs of the framework, presented in 1B-2, connect in South Florida. The outer ring on the monitoring framework presented in Figure 1B-2 indicates that all the cogs should collaborate and communicate with each other in a coordinated manner – in other words, create an information chain. Chapter 1B is an excellent step to begin the communication and collaboration.

The WCA-2A test case for redesigning the water quality monitoring system is very helpful in understanding the logic and methods employed to date. It is very helpful to explain the reasons why samples are taken, or not taken, for operational purposes (lines 281-293) and present the rationale for change (lines 303-317).

Questions and comments:

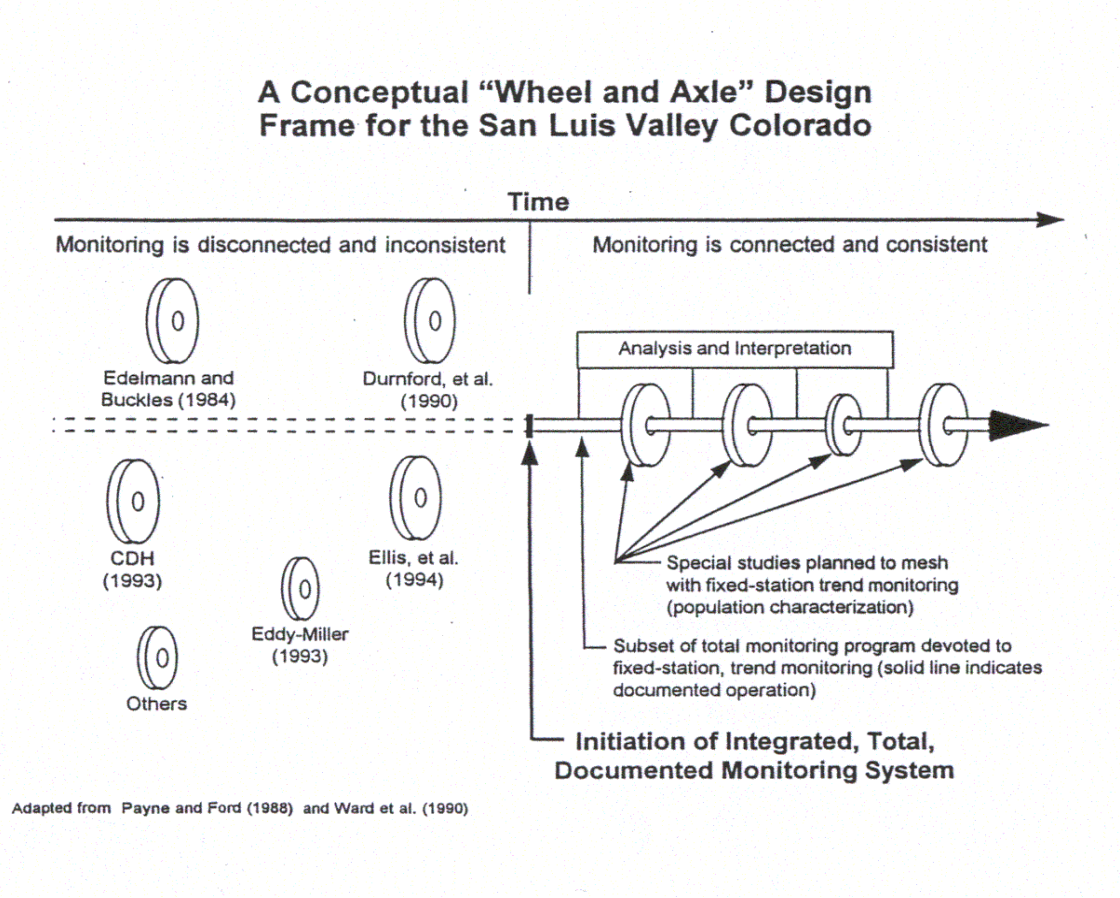
1. The alternative monitoring strategy for grab sampling, presented on page 1B-14, does not discuss the impact of reduced sample numbers on the current method of computing standard compliance (which needs a minimum of 28 samples per year). The statement in lines 383-384 is not clear – how can less samples make standard compliance more robust if the minimum number needed for the selected data analysis procedure, to compute standard compliance, is not available?
2. Figure 1B-6 is not clear – are the station visits, by sampling week, for all 11 monitoring stations collectively, under the new policy? Is it possible to illustrate a comparison of the old and new policies on the graph?
3. Lines 444-446 discuss how less samples produce an estimated TP mean concentration, but no mention is made of the impact on the confidence interval around this estimate. Have the confidence interval impacts been evaluated with the new policy?
4. Flowing water is the statistical population being sampled for standard compliance at the pumping structures. If the population does not permit acquisition of sufficient samples to support the chosen data analysis procedure (binomial hypothesis test – lines 214-228 in Chapter 3A), there appears to be a disconnect between sample collection policies and data analysis methods. How is this disconnect being addressed?

5. How are the station's identifying letters and numbers determined? Do the identification letters and numbers come from the 'projects' that created the station in the first place? Is there an opportunity to rationalize over larger areas the sampling site identifying scheme to make it easier to locate sites and interpret results presented by station ID?
6. Are there applicable water quality standards that dictate which water quality constituents to measure at each station (per the discussion on page 1B-30)? No mention is made of applicable standards in this discussion of selecting water quality constituents to measure, that I could find.
7. Are there a subset of sampling sites in WCA-2A for which standard compliance is a major reason for sampling? Or is standard compliance evaluated, annually, at all stations? Are stations to be excluded from standard compliance evaluations if there are not enough samples to support the data analysis procedures?
8. In the discussion of 'Other Issues to Resolve' for marsh monitoring, there should be an explanation of the objective of water quality standard compliance in the redesign process. Chapter 3, for some time, has been moving toward identifying a set of sampling sites for routine evaluation of standard compliance. Does the redesign process incorporate the Chapter 3 work?
9. Are the water quality standards not applicable where the water depth is less than 10 cm? This is the implication of the logistical guideline explained in lines 744-751.
10. A very key point is made in lines 762-764 – viewing monitoring as a whole permits focusing its design on management information goals, especially those associated with long-term management decision making (as opposed to project decision-making).
11. I am not quite sure I understand the point being made in lines 785-787. What does "…even for compliance with water quality standards" mean in the context of the sentence? Again, the current methods employed to compute standard compliance requires a minimum number of samples of 28. Alternatives are provided for less than 28 samples, but there is a serious loss of confidence in the information when this happens, as stated in Chapter 3A.
12. Again, I am not sure I understand the statement in lines 834-835. Water quality is routinely compared upstream to downstream, where the upstream condition is often viewed as a 'reference' site (especially when there is an impact between the two sites to be evaluated).
13. A number of times in Chapter 1B, reference is made to the need to review a situation in the future, after more data/information is available. The redesign should consider developing a 'protocol' for updating the design at regular intervals and the procedures to be employed for such a review (e.g. convening a group of management professionals and research scientists to examine the monitoring network's operations, costs, station locations, sampling policies, data storage systems, data analysis methods, reporting options, etc.). This permits changes to the monitoring program to be

considered in an orderly and *well documented* manner, insuring that future uses of the data are well informed about changes that occurred over time.

A few additional observations. The Chapter clearly notes the different purposes of monitoring, from producing long-term, area-wide, information for management to highly site specific, short-term, research monitoring. Understanding this distinction and incorporating it into the design is very helpful to both managers and researchers. How to evaluate this diverse array of information in order to rationalize the design of a water quality monitoring system is not an easy question to answer. One author, Lacey Goetz proposed one approach. She studied ways to design a ground water quality monitoring network in the San Luis Valley of Colorado where 39 separate laws/regulations addressed ground water quality in the valley. Her MS thesis on the subject can be reviewed at: http://watercenter.colostate.edu/ce545/theses/LGoetz.pdf. (This same reference is provided to the authors of Appendix 2-1 for the same purpose – searching for common information goals among an array of applicable laws and permits.)

Also, there is a way to connect research, short study-oriented measurements/monitoring to routine management-oriented monitoring via concepts presented in the following figure (from Goetz's work).



The axle monitoring consists of a network of sampling sites that are core to management's accountability information needs. The 'wheels' are special studies, projects, research efforts, etc. which have unique, specialized knowledge/technical, information needs. By insuring that each 'wheel' is connected to the 'axle' by common sampling sites, it becomes possible to draw much larger and more complete pictures of water quality conditions in the jurisdiction being managed. Thus, a strong 'axle' monitoring program that is scientifically consistent and comparable over time and space, is designed to provide management's key information needs. The 'wheels' represent all other types of monitoring which are connected, by joint sampling, to address emerging knowledge needs, special project needs, etc.

Colorado State University offered an academic course on the design of water quality monitoring systems for many years. The handouts for this course are still available at: http://www.engr.colostate.edu/CE545/Handouts/Topic_List.htm. There may be some information here that would be helpful in the District's efforts to rationalize or redesign water quality monitoring programs in South Florida (e.g. Topic 13: Quantifying Information Goals).

Finally, Chapter 1B (in combination with Appendix 2-1) sets the stage for a new reading of the SFERs – the source of the data (in all its facets) is now being revealed in ways that it has not before. The discussion in Chapter 1B opens much new thinking, such as that offered above, that hopefully, will lead to creating a well documented, rationalized, efficient and effective water quality information system for South Florida.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 1B: Strategies for Reengineering Water Quality Monitoring in South Florida » Chapter 1B Review - Ward

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author	Message
Robert Ward	**Subject:** Chapter 1B Review - Ward
Total Messages 13	Chapter 1B Review.doc Chapter 1B Review
	Posted: 19 Sep 2007 02:22 PM Originally Posted: 19 Sep 2007 02:20 PM

email | profile | reply

New Topic | Prev Topic | Next Topic

Go t

Select Conference

Log In Options | Username: | Password: | Log in

Chapter 2: Hydrology of the South Florida Environment
Date of Chapter Draft: 08/08/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: Primary
Technical:
Integrative: X
Reviewers:
A: Stein
AA: Armstrong
B: Burger
B: Jordan

Chapter 2: Hydrology of the South Florida Environment is to receive review primarily at the Accountability level with consideration at the Integrative level. Accordingly, the following questions are addressed in this review of Chapter 2:

1. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
2. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
3. Are findings linked to management goals and objectives?
4. Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
5. Is the chapter cross referenced in a thorough and consistent manner?
6. Is there any constructive criticism and guidance to offer for the District's large-scale programs?

These questions are addressed below.

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

The chapter on hydrology is a mainstay of the SFER reports as it is the management of water that is one of the primary missions of the SFWMD, and it is the presence and movement of that water that influences water quality and ecological resources throughout the District's jurisdiction. The chapter does present for WY2007 the sources of water, the storage of water in the various lakes and impoundments, the movement of water throughout the system, the water management process, and in detail the state of the system hydrology in WY2007. The hydrologic system is clearly an immensely complex one, and the chapter is replete with facts about those factors that influence water sources, storage, flows, etc. However, the chapter assigns little meaning to the facts so the reader is left with a staggering amount of information with little sense of its consequence unless the reader is intimately familiar with the system. The chapter could be strengthened by:

1. Emphasizing more at a "20,000 ft" level the descriptions of the hydrologic system, how it operates, how it responds to spatial and temporal amounts of rainfall, how the system has been operated to accommodate the availability of water, and particularly the consequences of having too much, just the right amount, or too little water in terms of meeting management objectives (see below).

2. Developing on a set of "dashboard" metrics that describes how the hydrologic system has been operated and managed in the past water year and in a historical context so the reader has a quick grasp of the "state of the hydrologic system" in space and time.
3. Linking the discussion of the hydrologic system each year to the emerging topics raised over the past several years, i.e., the hydrologic monitoring system (as is done this year), droughts, hurricanes, long-term climatic change, long-term changes in water demands, and so forth. Some of this is being done, and clearly the impacts of droughts and hurricanes that have impacted water resources are being included, but their impacts on the variability of the hydrologic system and particularly how water uses are being met is sometimes lost in the amount of data being presented.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

Yes, the material is presented in a logical manner, and there is continuity with previous versions of the report. The format/outline of the chapter is about right, and this was a point of discussion during the last SFER review. It is the content that needs to be reconsidered (see above) and whether the large amount of detail provided is appropriate for an accountability report.

Are findings linked to management goals and objectives?

A significant enhancement to this chapter would be to tie hydrology more strongly to water management goals and objectives. It is noted in a number of places that the two major purposes of water management at the District are flood control and water supply and that water supply releases are made for various beneficial uses that includes water supply for municipal and industrial use, agriculture irrigation, environmental restoration (especially the Everglades National Park), salinity control, estuarine management, and navigation depths. How water is managed to provide for these uses is described in great detail in this draft and in the hydrology chapter of the 2007 SFER. But what is not noted is how well the management objectives are achieved. This leads to a number of specific questions which are posed as follows:

1. What are the management objectives, if any, beyond those listed above and how does one know if all of the objectives are achieved? How does the District measure success in managing flood control and water supply objectives – what are the metrics or indicators, what are the targets, and what are the assessment and evaluation methods? For example, salinity is used as an important indicator in estuaries, and water is released to maintain salinity levels in the estuaries at certain times of the year. Further, pulses of water are released to estuaries as well. How does the District determine it has been successful is maintaining desired conditions in estuaries, how does it measure that success? How well is the District able to respond to adaptive management if eventually meeting salinity requirements is supplemented by meeting nutrient loadings and perhaps other requirements?
2. What role has risk management played in developing the decision trees and regulation schedules in terms of managing water to avoid flooding and particularly providing for the various water supply needs under drought conditions? The decision trees focus on water movement but not explicitly on the consequences of that water movement or lack thereof? With the hydrologic system being so sensitive to spatial and temporal variations in rainfall and the ability to store and move water within the system and the economic, environmental, and social consequences of not meeting water needs being so high, it would seem that the risk

of meeting or not meeting a management objective should be examined. A corollary would be the reverse impact of the variation in criteria for meeting objectives on the regulation schedules. For example, if a salinity requirement in an estuary is actually some particular level but the uncertainty in that level such that there is a significant error band about that level, how does that uncertainty translate back to the regulatory schedule and what degrees of freedom does that give managers in managing water?

3. How is growth in water use accommodated? As populations grow on the east and west coasts of Florida and within the system and as water use for municipal and industrial water supply and other beneficial uses increases, how will the District accommodate such growth? The District's pumping volumes depicted in Table 2-1 show a doubling in ten years; does this reflect such water use growth?
4. What has been learned about water management through the current drought? It is noted on page 2-13 that the USACE has recently proposed revisions to Lake Okeechobee operational guidance; does this reflect lessons learned from the drought conditions, a management performance gap, or something else? If so, what were they are what are other lessons learned for other parts of the system?
5. What are priorities for water uses and hence water releases? What are the relative priorities among municipal and industrial water supply, agriculture irrigation, environmental restoration, salinity control, estuarine management, and navigation depths? How were these priorities established, and what is the weight given to these priorities for releases from Lake Okeechobee vs. those from the WCAs?
6. What is the Standard Project Flood? Could its definition be added to the Glossary?

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?

As noted above, the chapter could benefit from closer links to management goals and objectives as expressed in other areas of the SFER. Clearly, the hydrologic system has great impact on water quality, stormwater treatment areas, water conservation areas, restoration and management of Lake Okeechobee, the Kissimmee Basin, the Everglades National Park, and coastal estuaries.

Is the chapter cross referenced in a thorough and consistent manner?

Again, the chapter could benefit from closer links to water quality, stormwater treatment areas, water conservation areas, restoration and management of Lake Okeechobee, the Kissimmee Basin, the Everglades National Park, and coastal estuaries and the role that water management has on these areas and the role that management of these areas has on water management.

Chapter 3A & 3C: Status of Water Quality in the Everglades Protection Area
Accountability Review

Prepared by: Robert C. Ward

General Comments

Chapter 3 of the South Florida Environmental Report (SFER) comes in three parts: (A) provides 'a synoptic view of water quality standards compliance for a portion of South Florida – the Everglades Protection Area; (B) assesses mercury and sulfur monitoring and research in South Florida; and (C) presents an 'overview of the status of phosphorus and nitrogen levels in the surface water within the Everglades Protection Area'. Parts A and C are reviewed together since they both address compliance with water quality standards and an update on trends in water quality in the Everglades Protection Area (EPA). Water quality for other South Florida areas is discussed in 2008 SFER chapters devoted to different parts of the hydrologic system (e.g. Lake Okeechobee and the Kissimmee Basin). Part B of Chapter 3 addresses water quality constituents whose role, and interactions, in the health of the EPA, are currently being investigated. Much of this division of the picture of water quality for South Florida is driven by the various Acts, permits, research and restoration projects, and MOAs put in place over the past half century. The 2008 SFER, in Chapter 1B, initiates an effort to rationalize the array of disjoint water quality monitoring programs conducted across South Florida and to improve the economics of monitoring while also achieving the information goals associated with each monitoring program. This effort, hopefully, will lead to a larger-scale, and more integrated, view of water quality across South Florida (in the manner in which Chapter 2 views the hydrology of South Florida and which was illustrated for water quality in Chapter 1B of the 2007 SFER)

As Chapter 3 is reviewed, the extent of the climatic and hydrologic variability, in a very flat terrain, housing a unique ecosystem, reveals how daunting it is to measure and describe water conditions in the EPA, not to mention all of South Florida. Water quality management, in particular, with its standards, tends to define compliance as holding water concentrations/loads below set values. Nature, as it has over the past three years in South Florida, exhibits wide swings in climatic and hydrologic conditions, causing variation in water quality data and results, not to mention in the ability to take samples in the first place. The authors of the Chapter 3 are adept at developing methods and protocols to handle such variation while insuring that sound science, and transparency, are maintained in the production of management-relevant information. They are also adept in addressing short falls in the number of samples needed to support the excursion analysis protocol. Along this line the authors provide the reader with caution when they encounter situations where their protocols cannot be fully implemented (examples are page 3A-13, lines 221-222; page 3C-7, lines 257-259; and page 3C-12, lines 363-365).

Specific Accountability Review Comments/Questions

Chapter 3, parts A and C, are well written. The conclusions regarding standard compliance and water quality trends are logical and the methods employed are well documented and explained. The data screening and data analysis methods are state-of-the-art. The summaries provided in Chapter 3, parts A and C, are excellent at providing highlights of the findings.

The computed excursions are reported in a manner that permits a good understanding of the context (e.g. units, criteria, number of samples, mean/median, min and max are provided). The excursions are discussed and explained in a rational and logical manner. The comparisons of excursions over time, presented numerically in Table 3A-5 and graphically in the appendices to Chapter 3, with the new time frames for comparing water quality trends since 1978, are especially helpful in evaluating impacts of various initiatives/projects implemented to improve water quality conditions. Improvements in water quality , in general, are seen amid a large amount of annual variability, as noted above. To see the improvements, within the variability, requires the 'long view' that is presented in Chapter 3 (parts A and C).

While the methods employed for extracting data from DBHYDRO and computing standard exceedences (the excursion analysis protocol) are well defined and documented, the same cannot be said for the sampling strategies that generate water quality data that is placed into DBHYDRO. As has been noted in previous SFER reviews, the data entering DBHYDRO – a database maintained by the SFWMD – is of concern. This concern stems from the fact that the water quality data in DBHYDRO, as is explained in Chapter 1B of the 2008 SFER, is collected in support of pump station permit requirements. The data are not collected to support the excursion analysis protocol. If the sampling was designed to support the protocol, there would be a minimum of 28 samples collected at each sampling site used in the excursion analysis. To overcome this data limitation, the authors of Chapter 3 developed a excursion analysis protocol that utilizes several assessment procedures, based on the number of samples available (or 'found' in DBHYDRO). Chapter 1B in this SFER, addresses this past concern and defines a context in which the water quality data limitations, as applied to excursion analysis protocols, can be discussed and addressed.

To further elaborate, a minimum of 28 samples is needed to support the binominal hypothesis test chosen for use in the excursion analysis protocol. If there are not 28 samples available during the year, alternative data analysis methods are employed. The question arises as to why a data analysis method was chosen to conduct excursion analysis if the minimum number of samples required for its use will not be collected at all stations each year, by definition in the sampling protocol? As is pointed out in Chapter 1B, water quality samples are collected using a number of factors (e.g. water must be flowing) to determine sampling frequency. It is not clear if having a minimum of 28 samples at each site, per the scientific requirements of the excursion analysis protocol, is one of the factors guiding development of a new sampling strategy discussed in Chapter 1B.

Collaboration, communication, and coordination, as shown in the monitoring framework in Figure 1B-2, is very much needed between Chapter 1B's assessment of water quality monitoring and the data needs of the excursion analysis protocol employed in Chapter 3A.

As the new Everglades Protection Area Phosphorus Criterion Achievement Assessment comes online, compliance methods are well defined in the criterion itself. There is a separately designed network to supply the data; however it is not clear if the data needs for the assessment influence the sampling strategy at the 58 stations in the network (or if the project requirements, alone, associated with the various stations, guide the sampling strategy). The fact that only 30 stations of the 58 had sufficient data to support the compliance protocol in the TP criterion (page 3C-4, line 124), suggests that the sampling strategies employed at the 58 stations do not account for the data needs of the TP criterion. Or are there reasons, such as dry conditions, that greatly limited sampling in WY 2007?

The definition of compliance contained in the TP criterion (Chapter 3C) is rather specific and, due to critical ecosystem health issues, does not integrate well with the 'excursion analysis protocol' employed for the other water quality constituents assessed in Chapter 3A (thus the need to break the compliance assessments in Chapter 3 into parts A and C). At what point does the monitoring and compliance assessment of TP move from warranting a special section of Chapter 3 into the routine standard assessment compliance descriptions presented in Chapter 3A, even if different excursion analysis methods are employed? This question is asked in the context of providing more integration of water quality assessments across South Florida and across water quality constituents – to better connect with development of a more integrated water quality monitoring design for South Florida, as well as a more integrated view of water quality in South Florida that can be presented in future SFER reports. Chapter 1B in the 2007 SFER hinted at how this might be accomplished.

Additional questions from Chapter 3:

1. Are the water quality standards, whose compliance is being evaluated in Chapter 3, applicable to only flowing water or any water in the water column at any time of sampling, whether flowing or not? Or is the sampling strategy, described in Chapter 1B, relevant to only the permit requirements associated with the pumping?
2. Can the sampling strategy, described in Chapter 1B, be connected to the excursion analysis protocol, described in Chapter 3A, to insure the minimum number of samples are available to support evaluation of standard compliance? If it is not possible to insure the minimum number of samples will be collected each year at each sampling site (e.g. due to economic constraints), is it possible to revisit the excursion analysis protocol to better match available samples with chosen methods to evaluate standard compliance? Currently, there are several excursion data analysis methods

employed in order to handle a range of sample sizes available at the sampling sites.

3. Can there be a reminder in the text of the sampling strategy for pesticides. Use of the term 'pesticide monitoring events' suggests that there is a separate sampling strategy used for pesticides. Are the pesticide data stored in DBHYDRO?
4. In the specific conductance discussion on page 3A-21, lines 403-404, it is noted that all but one of the WY 2007 exceedences occurred during periods of no recorded flow. Will the new sampling strategy, described in Chapter 1B, miss many of these exceedences in the future since only flowing water will be sampled? Consistency of excursion analysis results, across any sampling strategy change, is of concern. Sampling strategy changes have many ramifications, which if understood, often can be accommodated in a scientifically sound manner (e.g. using both sampling strategies for a year to provide correlation among the old and new strategies).
5. On page 3A-33, it is noted that the non-ECP permit was amended on July 13, 2006. This legally driven change to the monitoring program (or more broadly, water quality information system) has implications to the consistency of information provided over both time and space. Can protocols be established to incorporate such modifications into the monitoring program in a well documented and transparent manner? This would help all those who use DBHYDRO data understand the changes taking place in the sampling regime employed.
6. On page 3A-30, lines 546-548, the following quote is noted: "To document the accuracy of the collected data …. the District has compared WY 2007 water quality data from non-ECP structures to state water quality standards." How does comparing data to standards insure its accuracy? The QA/QC procedures, followed in the collection of the data, insure its accuracy for use in standard compliance work.

Further Observations

Referring to Figure 1B-2, data analysis and reporting is well documented and transparent in Chapter 3A and 3B. Data acquisition, however, is not well documented nor transparent, from a water quality excursion analysis protocol standpoint. Chapter 1B goes a long way in explaining the sampling strategy that generates water quality data placed in DBHYDRO which is, in turn, used by the excursion analysis protocol in Chapter 3. As noted above, the Chapter 1B discussion does not mention the data needs of the annual excursion analysis protocol.

South Florida's water/ecosystem management/restoration strategy appears to be managed on a project-by-project basis or by groups of projects (e.g. CERP). These projects come from various federal and State legislative acts, Memorandum of Agreements (MOA), research initiatives, operating permits, and permits, in general. There have been efforts to better integrate laws and permits, but the 2008 SFER, particularly Chapter 3A and 3C, continues to present information project-by-project (as is legally required). The projects

appear, in the past, to establish monitoring requirements on an independent basis (e.g. the Everglades Protection Area Phosphorus Criterion Achievement Assessment has its own network of 58 sampling sites as well as a four-part test to determine compliance – table 3C-4 on page 3C-29).

In many ways the SFWMD has pursued rationalization of monitoring and reporting, particularly water quality standard compliance, to great lengths (about as far as is legally permitted). However, by now approaching water quality monitoring from a strategic point-of-view (in Chapter 1B), the SFWMD continues to drill down into the mechanics of monitoring seeking additional ways to rationalize its acquisition of data and reporting of data analysis findings, within the legal boundaries. This effort is greatly appreciated by this reviewer as it will permit documentation of the entire monitoring system, from sampling strategy, to data storage and retrieval, to data analysis, to interpretation against standards, to, finally, reporting of results.

As the sampling strategy review, described in Chapter 1B, proceeds, there are scientific issues, economic aspects, and operational factors that must be accommodated. These factors can be documented within the larger monitoring strategy documentation. This reviewer also wonders if the rationalization of monitoring will reach a point where there is a need to carefully examine how the laws, MOAs, and permits, in particular, might be rationalized in support of more efficient management and monitoring of water and ecosystem resources in South Florida? To legally demand water quality information, without considering how it will be obtained, places a huge burden on an agency to rationalize a large-scale water quality monitoring program. Once the information from the monitoring redesign described in Chapter 1B (and Appendix 2-1) becomes available, it may become obvious how tweaking of laws, permits, MOAs can greatly improve the economics of monitoring without necessarily diminishing the level of information supporting water quality management decision making.

Chapter 3A & 3C: Status of Water Quality in the Everglades Protection Area
Accountability Review

Prepared by: Robert C. Ward

General Comments

Chapter 3 of the South Florida Environmental Report (SFER) comes in three parts: (A) provides 'a synoptic view of water quality standards compliance for a portion of South Florida – the Everglades Protection Area; (B) assesses mercury and sulfur monitoring and research in South Florida; and (C) presents an 'overview of the status of phosphorus and nitrogen levels in the surface water within the Everglades Protection Area'. Parts A and C are reviewed together since they both address compliance with water quality standards and an update on trends in water quality in the Everglades Protection Area (EPA). Water quality for other South Florida areas is discussed in 2008 SFER chapters devoted to different parts of the hydrologic system (e.g. Lake Okeechobee and the Kissimmee Basin). Part B of Chapter 3 addresses water quality constituents whose role, and interactions, in the health of the EPA, are currently being investigated. Much of this division of the picture of water quality for South Florida is driven by the various Acts, permits, research and restoration projects, and MOAs put in place over the past half century. The 2008 SFER, in Chapter 1B, initiates an effort to rationalize the array of disjoint water quality monitoring programs conducted across South Florida and to improve the economics of monitoring while also achieving the information goals associated with each monitoring program. This effort, hopefully, will lead to a larger-scale, and more integrated, view of water quality across South Florida (in the manner in which Chapter 2 views the hydrology of South Florida and which was illustrated for water quality in Chapter 1B of the 2007 SFER)

As Chapter 3 is reviewed, the extent of the climatic and hydrologic variability, in a very flat terrain, housing a unique ecosystem, reveals how daunting it is to measure and describe water conditions in the EPA, not to mention all of South Florida. Water quality management, in particular, with its standards, tends to define compliance as holding water concentrations/loads below set values. Nature, as it has over the past three years in South Florida, exhibits wide swings in climatic and hydrologic conditions, causing variation in water quality data and results, not to mention in the ability to take samples in the first place. The authors of the Chapter 3 are adept at developing methods and protocols to handle such variation while insuring that sound science, and transparency, are maintained in the production of management-relevant information. They are also adept in addressing short falls in the number of samples needed to support the excursion analysis protocol. Along this line the authors provide the reader with caution when they encounter situations where their protocols cannot be fully implemented (examples are page 3A-13, lines 221-222; page 3C-7, lines 257-259; and page 3C-12, lines 363-365).

Specific Accountability Review Comments/Questions

Chapter 3, parts A and C, are well written. The conclusions regarding standard compliance and water quality trends are logical and the methods employed are well documented and explained. The data screening and data analysis methods are state-of-the-art. The summaries provided in Chapter 3, parts A and C, are excellent at providing highlights of the findings.

The computed excursions are reported in a manner that permits a good understanding of the context (e.g. units, criteria, number of samples, mean/median, min and max are provided). The excursions are discussed and explained in a rational and logical manner. The comparisons of excursions over time, presented numerically in Table 3A-5 and graphically in the appendices to Chapter 3, with the new time frames for comparing water quality trends since 1978, are especially helpful in evaluating impacts of various initiatives/projects implemented to improve water quality conditions. Improvements in water quality , in general, are seen amid a large amount of annual variability, as noted above. To see the improvements, within the variability, requires the 'long view' that is presented in Chapter 3 (parts A and C).

While the methods employed for extracting data from DBHYDRO and computing standard exceedences (the excursion analysis protocol) are well defined and documented, the same cannot be said for the sampling strategies that generate water quality data that is placed into DBHYDRO. As has been noted in previous SFER reviews, the data entering DBHYDRO – a database maintained by the SFWMD – is of concern. This concern stems from the fact that the water quality data in DBHYDRO, as is explained in Chapter 1B of the 2008 SFER, is collected in support of pump station permit requirements. The data are not collected to support the excursion analysis protocol. If the sampling was designed to support the protocol, there would be a minimum of 28 samples collected at each sampling site used in the excursion analysis. To overcome this data limitation, the authors of Chapter 3 developed a excursion analysis protocol that utilizes several assessment procedures, based on the number of samples available (or 'found' in DBHYDRO). Chapter 1B in this SFER, addresses this past concern and defines a context in which the water quality data limitations, as applied to excursion analysis protocols, can be discussed and addressed.

To further elaborate, a minimum of 28 samples is needed to support the binominal hypothesis test chosen for use in the excursion analysis protocol. If there are not 28 samples available during the year, alternative data analysis methods are employed. The question arises as to why a data analysis method was chosen to conduct excursion analysis if the minimum number of samples required for its use will not be collected at all stations each year, by definition in the sampling protocol? As is pointed out in Chapter 1B, water quality samples are collected using a number of factors (e.g. water must be flowing) to determine sampling frequency. It is not clear if having a minimum of 28 samples at each site, per the scientific requirements of the excursion analysis protocol, is one of the factors guiding development of a new sampling strategy discussed in Chapter 1B.

Collaboration, communication, and coordination, as shown in the monitoring framework in Figure 1B-2, is very much needed between Chapter 1B's assessment of water quality monitoring and the data needs of the excursion analysis protocol employed in Chapter 3A.

As the new Everglades Protection Area Phosphorus Criterion Achievement Assessment comes online, compliance methods are well defined in the criterion itself. There is a separately designed network to supply the data; however it is not clear if the data needs for the assessment influence the sampling strategy at the 58 stations in the network (or if the project requirements, alone, associated with the various stations, guide the sampling strategy). The fact that only 30 stations of the 58 had sufficient data to support the compliance protocol in the TP criterion (page 3C-4, line 124), suggests that the sampling strategies employed at the 58 stations do not account for the data needs of the TP criterion. Or are there reasons, such as dry conditions, that greatly limited sampling in WY 2007?

The definition of compliance contained in the TP criterion (Chapter 3C) is rather specific and, due to critical ecosystem health issues, does not integrate well with the 'excursion analysis protocol' employed for the other water quality constituents assessed in Chapter 3A (thus the need to break the compliance assessments in Chapter 3 into parts A and C). At what point does the monitoring and compliance assessment of TP move from warranting a special section of Chapter 3 into the routine standard assessment compliance descriptions presented in Chapter 3A, even if different excursion analysis methods are employed? This question is asked in the context of providing more integration of water quality assessments across South Florida and across water quality constituents – to better connect with development of a more integrated water quality monitoring design for South Florida, as well as a more integrated view of water quality in South Florida that can be presented in future SFER reports. Chapter 1B in the 2007 SFER hinted at how this might be accomplished.

Additional questions from Chapter 3:

1. Are the water quality standards, whose compliance is being evaluated in Chapter 3, applicable to only flowing water or any water in the water column at any time of sampling, whether flowing or not? Or is the sampling strategy, described in Chapter 1B, relevant to only the permit requirements associated with the pumping?
2. Can the sampling strategy, described in Chapter 1B, be connected to the excursion analysis protocol, described in Chapter 3A, to insure the minimum number of samples are available to support evaluation of standard compliance? If it is not possible to insure the minimum number of samples will be collected each year at each sampling site (e.g. due to economic constraints), is it possible to revisit the excursion analysis protocol to better match available samples with chosen methods to evaluate standard compliance? Currently, there are several excursion data analysis methods

employed in order to handle a range of sample sizes available at the sampling sites.

3. Can there be a reminder in the text of the sampling strategy for pesticides. Use of the term 'pesticide monitoring events' suggests that there is a separate sampling strategy used for pesticides. Are the pesticide data stored in DBHYDRO?
4. In the specific conductance discussion on page 3A-21, lines 403-404, it is noted that all but one of the WY 2007 exceedences occurred during periods of no recorded flow. Will the new sampling strategy, described in Chapter 1B, miss many of these exceedences in the future since only flowing water will be sampled? Consistency of excursion analysis results, across any sampling strategy change, is of concern. Sampling strategy changes have many ramifications, which if understood, often can be accommodated in a scientifically sound manner (e.g. using both sampling strategies for a year to provide correlation among the old and new strategies).
5. On page 3A-33, it is noted that the non-ECP permit was amended on July 13, 2006. This legally driven change to the monitoring program (or more broadly, water quality information system) has implications to the consistency of information provided over both time and space. Can protocols be established to incorporate such modifications into the monitoring program in a well documented and transparent manner? This would help all those who use DBHYDRO data understand the changes taking place in the sampling regime employed.
6. On page 3A-30, lines 546-548, the following quote is noted: "To document the accuracy of the collected data …. the District has compared WY 2007 water quality data from non-ECP structures to state water quality standards." How does comparing data to standards insure its accuracy? The QA/QC procedures, followed in the collection of the data, insure its accuracy for use in standard compliance work.

Further Observations

Referring to Figure 1B-2, data analysis and reporting is well documented and transparent in Chapter 3A and 3B. Data acquisition, however, is not well documented nor transparent, from a water quality excursion analysis protocol standpoint. Chapter 1B goes a long way in explaining the sampling strategy that generates water quality data placed in DBHYDRO which is, in turn, used by the excursion analysis protocol in Chapter 3. As noted above, the Chapter 1B discussion does not mention the data needs of the annual excursion analysis protocol.

South Florida's water/ecosystem management/restoration strategy appears to be managed on a project-by-project basis or by groups of projects (e.g. CERP). These projects come from various federal and State legislative acts, Memorandum of Agreements (MOA), research initiatives, operating permits, and permits, in general. There have been efforts to better integrate laws and permits, but the 2008 SFER, particularly Chapter 3A and 3C, continues to present information project-by-project (as is legally required). The projects

appear, in the past, to establish monitoring requirements on an independent basis (e.g. the Everglades Protection Area Phosphorus Criterion Achievement Assessment has its own network of 58 sampling sites as well as a four-part test to determine compliance – table 3C-4 on page 3C-29).

In many ways the SFWMD has pursued rationalization of monitoring and reporting, particularly water quality standard compliance, to great lengths (about as far as is legally permitted). However, by now approaching water quality monitoring from a strategic point-of-view (in Chapter 1B), the SFWMD continues to drill down into the mechanics of monitoring seeking additional ways to rationalize its acquisition of data and reporting of data analysis findings, within the legal boundaries. This effort is greatly appreciated by this reviewer as it will permit documentation of the entire monitoring system, from sampling strategy, to data storage and retrieval, to data analysis, to interpretation against standards, to, finally, reporting of results.

As the sampling strategy review, described in Chapter 1B, proceeds, there are scientific issues, economic aspects, and operational factors that must be accommodated. These factors can be documented within the larger monitoring strategy documentation. This reviewer also wonders if the rationalization of monitoring will reach a point where there is a need to carefully examine how the laws, MOAs, and permits, in particular, might be rationalized in support of more efficient management and monitoring of water and ecosystem resources in South Florida? To legally demand water quality information, without considering how it will be obtained, places a huge burden on an agency to rationalize a large-scale water quality monitoring program. Once the information from the monitoring redesign described in Chapter 1B (and Appendix 2-1) becomes available, it may become obvious how tweaking of laws, permits, MOAs can greatly improve the economics of monitoring without necessarily diminishing the level of information supporting water quality management decision making.

Author

Message

Joanna Burger

Subject: **CHAPTER 3B: OVERALL COMMENTS**

Total Messages 11

CHAPTER 3B: MERCURY AND SULFUR MONITORING

This year's Mercury and Sulfur Monitoring, Research and Environmental Assessment chapter (3B) is an excellent overview of the mercury and sulfur problems in the Everglades, how mercury and sulfur interact with other nutrients (and with each other), how the SFWMD has addressed concerns about environmental problems in the Everglades, on-going research with biota and mercury, the role of sulfur, and the new initiatives to understand mercury cycling. It clearly notes the importance of more data on sulfur cycling.

The major problems both present are noted, along with new research needed to understand how to reduce mercury levels further, particularly in fish. The data, models and conclusions in chapter 3B reflect the complex problem faced by many agencies dealing with mercury and sulfur in freshwater ecosystems. The data generated by the SFWMD are proving useful for other aquatic ecosystems throughout the United States. In many areas, the mercury research program is a leader that is providing testable paradigms for other aquatic systems. The summary is excellent, and hits the high points. It is particularly useful to have a bulleted summary of all the major findings from the overall mercury program. Research with mercury and sulfur in the Everglades ecosystem continues to be a productive collaboration between different agencies in understanding the complex issues.

The authors are to be commended on writing a chapter that is very readable and accessible to a broad range of readers. It is written in a style that can be easily followed, and that make the main points clear. Further, this years report more clearly describes the research findings, with appropriate references to the primary literature. This year's summary will be particularly useful to a wide range of stakeholders, including those new to the Everglades process, although there should be more references to where naive readers can find the full documentation for some of the past conclusions and research. This year's report is readable, concise, and presents clear data. Further, the report makes the data readily accessible to scientists not previously familiar with the Everglades. They have effectively used bass and Great Egrets as bioindicators of mercury exposure, and have one of the longest running such data sets in the country from one region. The chapter accurately and fairly reflects the state of the knowledge about mercury fate and effects in wildlife, and sulfur effects within the system.

Unlike many models to understand the fate and effects of mercury, the Everglades Mercury Cycling Model is dynamic and makes use of additional data

as it becomes available. This is a key point that will increase our general understanding of mercury cycling. The suggestion that further modeling is required to understand how to reduce mercury still further is a move in the right direction. Integration of sulfur into the models is an important step in understanding chemical dynamics within the Everglades, and should be given high priority. The models would profit from an in-depth and transparent peer-review.

Further, the chapter is much improved over last years for several reasons: 1) The current findings are clearly stated with more specific data than previously, 2) The inclusion of previous findings puts the 08 findings in perspective and aids the general reader place the current report within a context of the overall mercury situation in the Everglades, 3). The inclusion of sulfur into the mercury problem makes it possible for the reader to see the interconnections and understand research directions.

FINDINGS:

The new findings are exciting in that they include three important areas: 1) continued biomonitoring to explore temporal and spatial trends in mercury in bioindicators, 2) Results of experiments to determine if the mercury levels are having effects o key bioindicators (wading birds), and 3) The relationship between mercury and sulfur is explored. The inclusion of previous findings is also very important because it provides a context for the current work, and allows the general reader to get up to speed with previous work. The inclusion of sufficient references in the previous findings was extremely helpful, and much improved over previous reports. Separation of the previous findings into sections an improvement and allows the reader to quickly acquire the background information for the current chapter.

MERCURY IN EVERGLADES FISH AND WILDLIFE

This years report is very clear and written in a manner that is accessible to all readers. The problems are clearly laid out, the data and experiments follow from the problem definition, and the conclusions and data needs are clearly explained. The use of the EPA fish criterion throughout the discussions is an important improvement over previous reports.

The long data sets for several sites for mercury in largemouth bass is extremely useful in both showing long-term trends, but also in identifying where mercury levels have not declines, but are indeed rising. A fuller discussion of possible mechanisms would be in order; these anomalies require extensive experimentation in order to determine causes. The lack of statistical significance for temporal trends in FL 11 is interesting and problematic in terms of explaining mercury levels in fish and wildlife. Further, the increase in mercury in feathers of egrets mirrors the problem in fish.

Research funds need to be focused toward understanding firstly why mercury levels remain high in fish from some areas of the Everglades, why these are shifting, and what the slight increase in feather levels is a result of. The clear increases in Holey Land Wildlife Management Area are disturbing in light of other deceases within the system.

ATMOSPHERIC DEPOSITION OF MERCURY TO THE EVERGLADES

This year's section examines the wet deposition in terms of spatial and temporal trends, and then relates these patterns to the patterns in fish and wildlife. The long temporal series is making it possible to relate deposition to wildlife levels in a way that is not possible in other places, and contributes greatly to our understanding of mercury cycling.

The overall VWM mercury concentrations in wet deposition, combined with seasonal dynamics do not see to adequately explain the mercury in FL11. The increases in mercury wet deposition from early 2003 to 2004 seem to be an explanation for the increases in mercury in Everglades fish in some regions, but it is unclear why this explanation works for some areas and not others. That is, why is the wet deposition different in some regions that would lead to this dynamic.

SULFUR LEVELS, SOURCES AND EFFECTS ON THE EVERGLADES

Again, this years report clearly states sulfur dynamics within the Everglades, and puts sulfur within a context of its effect on methylation of mercury. It is clear, concise, and has adequate citations for statements, and the authors are to be commended. Further, managing sulfate inputs into the Everglades is examined as an option for reducing MeHg.

The analysis of the source of the sulfate to the Everglades is an important addition to the chapter because it is well thought out, well documented, convincing, and relies on several lines of evidence. Two questions remain: what is the contribution of current to legacy sulfur, and what are the other sources? Both warrant considerable study.

The summary of the effects of sulfur on the Everglades system was both essential to the rest of the chapter, and a good summary. The complicated interactions of sulfur with both mercury dynamics and other toxic effects, including eutrophication, make the construction of an Everglades sulfur mass balance extremely important. Also mapping the conditions in different parts of the Everglades might become critical to management.

RESEARCH NEEDS

This section is clearly written, and lays out the specific research needs identified in previous reports. The experiments with fish-eating birds are extremely useful, although the initial page needs to have more details of actual effects. Further, these experiments were quite intriguing, but the write-up needs more actual results data presented, and accompanying statistics to allow the reader to judge. Where is the experiment going, and for how long?

Quantifying the global versus local mercury sources for South Florida remains one of the key questions for managing the system. A few more details on the plans, and whether they will be implemented would be helpful. Specific questions being addressed should also be included.

The future activities section brings together the research and studies described in the previous sections, and lists the next steps.

OVERALL

The relative contribution of small urban sources of mercury to the Everglades needs further study to ascertain both its importance and the potential for reducing mercury loads. Thus, an updated emissions inventory might shed some light on whether the initial large reduction in local atmospheric sources is still true. The addition of the research progress section is excellent because it addresses specific global questions about mercury and sulfur cycling and effects within the Everglades.

Posted: 13 Sep 2007 10:57 AM
Originally Posted: 13 Sep 2007 10:55 AM

email profile reply

New Topic Next Topic

Select Conference

Go to Conference: go

Log In Options Username: Password: Log in

Author | Message

Joanna Burger

Subject: **CHAPTER 3B QUESTIONS AND SUGGESTIONS**

Total Messages 11

CHAPTER 3B - Mercury and Sulfur Monitoring

QUESTIONS AND SUGGESTIONS

Overall, this is a clear, concise statement of the problem that is easy to read and understand, and is improved over previous years report.

Summary-

Line 12: I wonder if it should read that it is a threat to the fish themselves, to fish-eating wildlife...

Line 26: should say something here about potential causes of the high mercury levels.

Line 48 and on: The new findings section is extremely useful, and the inclusion of information from both the chapters and appendices is very important.

Line 56: Please include the SE or SD for the mean.

Line 59: Please include the wildlife criterion for clarity.

Lines 51-72. Somewhere here you might need to mention why sunfish and bass are used as bioindicators.

Line 71: give SE and ranges.

Line 73: give SE and ranges.

Line 76: Were these differences significant for both endpoints?

Line 126: Should give the wildlife adverse affects levels.

Line 267: The need for a sulfur mass balance for the Everglades is critical, and should be a high priority.

Mercury in Everglades Fish and Wildlife

Line 302: I thought that inorganic mercury was toxic to some invertebrates?

Line 305: Need to give the reference for Florida's criterion

Line 393-428: These increases in mercury levels are a problem, and some explanation of potential sources might be useful (the north to south explanation needs more work).

Figure 3B-1: It would be useful to put some measure of variance on the table for the current year values.

Figure 3B-2: This is very useful; 2003 seemed to have slightly higher levels in both areas - was there some atmospheric event that caused the increase?

Figure 3B-4: Also very useful, but there seems a clear increase in 2006 and 2007 over 2005. Causes?

Figure 3B-7. Holeyland WMA is clearly experiencing great increases, and the program is correct in following this disturbing trend.

Figure 3b-10. ENP NP had lower levels of mercury in the late 1990s, and I wonder why this was so then, and why the increase now. Holey is difficult to read on this graph because it is too light a color.

Lines 437-457: The increase in mercury in feathers is disquieting, especially since there is no clear cause.

Lines 472: Isn't the average for mercury in feathers in colonies?

Figure 3B-11:Again, some of the graphs are hard to read because of color choices. It is hard to determine which colony has the large increase in mercury in feathers from the graph.

Atmospheric Deposition of Mercury to the Everglades

Line 511: state when the system began.

Figure 3b-15 is very useful

Figure 3B-17 and 18: The inclusion of the residuals is important to evaluating the data.

Lines 531-547: The removal of wet deposition data for so many months makes the model problematic, and some explanation of the possible effect needs to be included.

Lines 559-566: These data clearly indicate the importance of long- term data to examine trends, and the use of statistics to truly examine whether there are trends.

Lines 572-: Are there any regional data to support this?

Lines 581-588: This seems the most logical solution: that there was some regional event which relates to both wet deposition and levels in fish and wildlife in 2003-2004.

Lines 614-616: It is not clear that the models are sufficient to distinguish and

examine wet deposition/VWM concentrations in different parts of the Everglades that can be related to the levels of mercury in fish and birds at some sites.

Sulfur Levels, Sources and Effects on the Everglades

Line 658: Please add some indication of variance

Also what is the degree of backpumping into the lake, how often and what quantities, and what time of the year?

Line 668: what is the source of the dry deposition

Line 672: What is significant mean? Can some measures be given

Lines 679-685: Has the use of agricultural sulfur decreased in the last few years - from what to what? And are the soils tested to make sure this sulfur is actually needed?

Lines 695: Is it possible to add a graph that shows the relationship between rainfall, runoff and sulfate increases to the EAA canals.

Lines 750: Are there data on amounts of fertilizer used - has it increased in the last 50 years, in the last 10 years?

Lines 775: Is there any way to estimate how much of the Everglades is under conditions where increased sulfate would enhance (or decrease sulfate would reduce) MeHg production? Would a map help?

Lines 781: Since no references are given to the potential toxic or stimulatory effects of sulfide on plants, does this mean the experiments have not been done? Some limited experiments are mentioned, and these should be references.

Lines 829: any indication of what these local sources might be, and whether they could be managed or reduced?

Lines 844: Are these research needs identified in all past reports, recently, and by Everglades scientists?

Lines 848: Perhaps a statement should be added here that one of the problems is species-specific effects may well differ greatly (as well as time of exposure effects).

Line 850: The study should be identified (I assume this is Frederick's work).

Line 860: Were they given mercury-laced food throughout their development?

Research Progress

Line 864: What age were the ibis chicks?

Lines 867-872. This effect is unclear: did the dosed birds actually forage more or eat more?

Line 872-873: were all these deficits? (that is, in the predicted direction?)

Line 878: give reference for this effect

Lines 888-889: Are the young birds being followed to ascertain whether the hormonal effect will appear in older birds?

Lines 900-910: I assume this section relates to adult bird fecal samples? (but this needs to be stated).

Line 913: should give data and significance levels so the reader can judge if it is biologically meaningful.

Lines 919-926: What is the sample size for each comparison?

Lines 930-936: Did the females simply not pair, or were there any female-female pairings or attempts?

Lines 955: How long will the experiment continue?

Line 958-980. Should reiterate the main questions these four stations will address, and why each placement is necessary.

Line 989: need references for some of the statements here.

Lines 1000-1039. It is not entirely clear how the model fitting occurred, and what the results were.

Lines 1041-1046: The objectives and plans are not clear, and a further statement should be added here.

Lines 1060-1064: Will the plans for a mass balance be explained in the final version? How far are the discussions?

Future Activities

Lines 1073: what specific areas?

Line 1081: Why not also include those areas with especially high MeHg?

Posted: 13 Sep 2007 10:19 AM
Originally Posted: 13 Sep 2007 10:17 AM

email profile reply

New Topic Prev Topic

Go to Conference: go

Select Conference

Log In Options Username: Password: Log in

Author	Message
Otto Stein	**Subject:** Chapter 3B Stein

Total Messages 7

Review of 2008 SFER Chapter 3B Mercury and Sulfur
by Otto R. Stein

This well-written chapter effectively outlines the problems associated with elevated levels of mercury (Hg) and sulfur (S) to surface waters in the Everglades and the link between the two. It provides a good background for historical levels of these elements, the mostly likely sources and sinks of them in the present and recent past. It also provides a good review of the various and ambitious research projects recently and currently being conducted to further analyze the extent and cause of the problem. Many of my comments that apply to the chapter have been previously posted in my comments on Appendix 3-B Sulfur as a Regional Water Quality Concern and I highlight only some of the mains ones below in addition to a few new ones.

The overall conclusions of this chapter are generally supported by the available data. In fact, it is arguable that the data is so convincing that additional research to further delineate sources of mercury and sulfur to the STAs, WCAs and rest Everglades system is not the best use of available resources. A better use of research funding would be a focus on better delineating threshold concentrations of mercury and sulfur inputs to minimize Hg methylation, subsequent concentration through the food chain, the interactions between sulfate and sulfide and the influence of sulfate and sulfide on nutrient release and plant toxicity. Most importantly, it is best to implement better BMP's and other source reduction efforts for sulfur to the system to try to limit the spatial and temporal spread of the problem. It would appear that effort should focus on sulfur concentrations in the influent because most practical reductions to Hg inputs i.e. local sources, have already been implemented.

In looking through the data set the mechanisms involved I see the possibility that some of the issues regarding sulfur and mercury inputs to the system behaving as a wave through the entire Everglades system, loosely based on the hydrologic distance between a given point and the source of sulfur to the system, since Hg relatively evenly distributed throughout the Everglades. Under this scenario, as increased sulfur loading is first introduced to given point as sulfate, SRB activity creates a spike of MeHg and sulfide, and potentially an increase in nutrient release. However, as more sulfide is produced by SRB activity, inorganic Hg complexes with the available sulfide and MeHg production decreases. Additional sulfate inputs do not increase Hg methlyation but continue to drive SRB activity, potentially maintaining elevated nutrient release from the organic matter and eventually lead to development of plant toxicity issues associated with sulfide. Because WCA2 and WCA3 and perhaps Shark River Slough are hydrologically closer the EAA than others areas the methylation "wave" has passed and these areas are somewhere between methylation and serious plant toxicity issues. The spatial and temporary patterns from sulfur compounds and issues associated with MeHg support this

hypothesis.

Important repercussions regarding sulfur management are possible if the above scenario is true. For example, doing nothing might allow the methylation wave to pass completely though the system over some undefined time period, but will eventually lead to the development of a plant toxicity wave that will also eventually pass through the system, potentially altering the entire ecosystem by altering the plant community structure. However only limited sulfur management might prevent the development of the plant toxicity wave from developing, but would slow the advance of the methylation wave or perhaps stabilize it the in locations that, at present, do not have a methylation problem. These are important issues that additional research should focus on.

Page Specific Review page number (and line where appropriate, suggested text changes in *italics*):

3B-37,797-802 As discussed in my review of Appendix 3-B, the issues associated with alkalinization are more complex that stated here.

3B-41,956-980 A continued strong focus for source delineation of mercury does not seem to be the most important issue. Most of the sources have been identified and the relatively easy ones to minimize (i.e. local) have been reduced or eliminated. Perhaps a better definition of the spatial (and to lesser degree temporal) patterns could help with needed modeling efforts, but a goal of continued significant source reduction does not seem attanable with a reasonable time frame.

3B-44,1040 and 1047 These should be point 4and point 5.

3-B44,1059-1064 The evidence is pretty overwhelming as to the major sources of sulfur, the focus need to be minimization the potential effects of the appropriate level of reduction.

Posted: 25 Sep 2007 01:08 PM
Originally Posted: 25 Sep 2007 01:06 PM

email profile reply

New Topic Prev Topic Next Topic

Go t

Select Conference

Log In Options Username: Password: Log in

Chapter 4: Source Control Programs
Date of Chapter Draft:
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: Primary
Technical:
Integrative: X
Reviewers:
AA: Jordan
A: Armstrong
B: Meganck

Chapter 4: Source Control Programs is to receive review primarily at the Accountability level with consideration at the Integrative level. Accordingly, the following questions are addressed in this review of Chapter 2:

1. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
2. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
3. Are findings linked to management goals and objectives?
4. Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
5. Is the chapter cross referenced in a thorough and consistent manner?
6. Is there any constructive criticism and guidance to offer for the District's large-scale programs?

These questions are addressed below.

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

This chapter is very well written and an excellent example of how an accountability chapter should be constructed. The text is concise, to the point, and communicated effectively. The existing regulatory framework in place and the management objectives developed to meet those regulations are very well addressed as are the regulatory needs. The compliance issues, particularly in the EAA and C-139, are clearly articulated, and the proposed analyses, studies, and contracted research to address those issues are well thought out and appear to be on target to gather the information needed to address those issues.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

Yes, the outline for the chapter has not changed noticeably from the previous SFER, and it does not need to. There is an excellent balance of descriptive information, monitoring results, special studies, proposed work, and accountability for each of the ECP and non-ECP basins.

Are findings linked to management goals and objectives?

This is one of the strong points of the chapter, and the authors have done an excellent job of linking findings to management goals and objectives.

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
Yes, as noted above, the consistency of presentation from basin to basin and the scope of each basin's presentation being appropriate to the issues of each basin are strong points of the chapter.

Is the chapter cross referenced in a thorough and consistent manner?
Yes, this is also a strong point of the chapter.

Is there any constructive criticism and guidance to offer for the District's large-scale programs?
As noted above, the compliance issues are clearly articulated, and the proposed analyses, studies, and contracted research to address those issues are well thought out and appear to be on target to gather the information needed to address those issues.

Chapter 4: Source Control Programs
Date of Chapter Draft:
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: Primary
Technical:
Integrative: X
Reviewers:
AA: Jordan
A: Armstrong
B: Meganck

Chapter 4: Source Control Programs is to receive review primarily at the Accountability level with consideration at the Integrative level. Accordingly, the following questions are addressed in this review of Chapter 2:

1. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
2. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
3. Are findings linked to management goals and objectives?
4. Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
5. Is the chapter cross referenced in a thorough and consistent manner?
6. Is there any constructive criticism and guidance to offer for the District's large-scale programs?

These questions are addressed below.

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

This chapter is very well written and an excellent example of how an accountability chapter should be constructed. The text is concise, to the point, and communicated effectively. The existing regulatory framework in place and the management objectives developed to meet those regulations are very well addressed as are the regulatory needs. The compliance issues, particularly in the EAA and C-139, are clearly articulated, and the proposed analyses, studies, and contracted research to address those issues are well thought out and appear to be on target to gather the information needed to address those issues.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

Yes, the outline for the chapter has not changed noticeably from the previous SFER, and it does not need to. There is an excellent balance of descriptive information, monitoring results, special studies, proposed work, and accountability for each of the ECP and non-ECP basins.

Are findings linked to management goals and objectives?

This is one of the strong points of the chapter, and the authors have done an excellent job of linking findings to management goals and objectives.

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?

Yes, as noted above, the consistency of presentation from basin to basin and the scope of each basin's presentation being appropriate to the issues of each basin are strong points of the chapter.

Is the chapter cross referenced in a thorough and consistent manner?

Yes, this is also a strong point of the chapter.

Is there any constructive criticism and guidance to offer for the District's large-scale programs?

As noted above, the compliance issues are clearly articulated, and the proposed analyses, studies, and contracted research to address those issues are well thought out and appear to be on target to gather the information needed to address those issues.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 4: Phosphorus Source Controls for the Basins Tributary to the Everglades Protection Area » Comments by Jordan

Tree View | Topic | New Topic | Prev Topic

Author	Message
jeff jordan	**Subject:** **Comments by Jordan**

Total Messages 23

line 391-398: Will any preliminary findings be available for this years report? Any speculation or reasons for the 18% reduction, rather than 25%?

It would be helpful to note what is the real difference between 18 and 25% in terms of the impact on the system. What is the impact of the difference between 150mt observed in WY07 TP load and the 137mt predicted 25% reduction? There was still an 32mt reduction that should be discussed.

line 563-564: What is the status and dates for any information?

line 573-580: While referring to Chapters 3C and 5---could you provide a bit more information here on the Lake, particularly in inflows from North of the Lake?

Line 741: 481,415 acres under permit--out of how many acres?

line 795-96: How many attended?

line 958-970: Seems to be describing an intractable situation---is there a solution?

line 1149-50: Is this happening?

line 1152-1162: Notes what is needed---is it being done? If not, why not?

line 867-68: refers to "Source Control Strategy" section on reasons why limits are being exceeded. Line 955-56 again refers to this section for reasons for ineffectiveness. Line 1004-05 again refers to the section for future evaluations.

First it would help to note where that section is (page, line numbers). More importantly, when we actually get to the section (line 1178) there is not much there (only 6 paragraphs). Seems a lot is left to that section with little delivery. Mostly what is noted is a lack of requirements in permits---is that it? Is ti the next section that you are really looking to?

I would also like to see more attention paid to the point system for BMPs---I suspect some of the problem is in a system that I have been unclear about for some time.

line 1289-92: Are these efforts in line with the problem that is noted in lines 1152-62?

line 1355: Timetable?

Posted: 18 Sep 2007 03:46 PM
Originally Posted: 18 Sep 2007 03:43 PM

profile reply

New Topic Prev Topic

Go t

Select Conference

Log In Options Username: Password: Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 4: Phosphorus Source Controls for the Basins Tributary to the Everglades Protection Area » Request by Jordan

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author	Message
jeff jordan	**Subject:** Request by Jordan
Total Messages 23	At the public workshop next month, as part of the presentation on Chapter 4, please give us an explanation, analysis, and evaluation of the effectiveness, of the BMP point system as well as a discussion of the different levels of BMP activity. Posted: 19 Sep 2007 09:20 AM Originally Posted: 19 Sep 2007 09:18 AM
profile	reply
Stuart Van Horn	**Subject:** Request by Jordan
Total Messages 3	Your request is going to be covered in the presentation. -Stuart Van Horn Posted: 28 Sep 2007 07:20 PM Originally Posted: 28 Sep 2007 07:18 PM
email profile	reply

New Topic | Prev Topic | Next Topic

Go t

Select Conference

Log In Options | Username: | Password: | Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | search

Welcome wendy wagman

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 4: Phosphorus Source Controls for the Basins Tributary to the Everglades Protection Area » Request by Jordan

Show New Messages

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author	Message
jeff jordan Total Messages 18	**Subject:** Request by Jordan At the public workshop next month, as part of the presentation on Chapter 4, please give us an explanation, analysis, and evaluation of the effectiveness, of the BMP point system as well as a discussion of the different levels of BMP activity. Posted: 19 Sep 2007 09:20 AM Originally Posted: 19 Sep 2007 09:18 AM
profile	quote reply
Rate this post on a scale of 1-5, 5 being the best Message not rated	
Stuart Van Horn Total Messages 3	**Subject:** Request by Jordan Your request is going to be covered in the presentation. -Stuart Van Horn Posted: 28 Sep 2007 07:20 PM Originally Posted: 28 Sep 2007 07:18 PM
email profile	quote reply
Rate this post on a scale of 1-5, 5 being the best Message not rated	
	Mark this topic read

New Topic | Prev Topic | Next Topic

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 5: STA Performance, Compliance and Optimization » Clarification of comments by reviewers

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author	Message
jeff jordan	**Subject:** Clarification of comments by reviewers

Total Messages 21

These are comments taken from the final report that are best put here:

Clarification on specific review comments by reviewer and comment number:

Marks, comment 4: The reviewer asked specifically about how mass removal rates might increase but not result in lower outflow concentrations. The answer is probably a result of inflow load/concentration being considerably higher so that more P came out even though more was removed. This comment is related to the one below.

Stein, comment 5-6: One question regarded the opposing trends for HLR and PLR in some treatment cells, e.g. STA2 in which hydraulic loading rate was 2.84 (vs. 3.02 for the 31 yr average) but PLR was 1.73 vs. 1.11 for the long tem average. The only way this could happen is if the influent concentration was much higher than the long term average (less water containing more P). However, the question was targeted more toward an explanation of why influent concentrations were much higher to this STA in this drought year, and what that fact might mean for long term performance.

Stein, Comment 23: The TP and flow data might be offset by adjusting the max and min values of the appropriate y-axis (assuming Excel is used). Regardless, this is a relatively minor point.

Stein, Comment 24: The response indicating how the 12 month moving average is calculated is appreciated. However, somerhing must be wrong with the calculations because, by definition, it must be an average of the preceding 12 months and it clearly is not as plotted. Please check these calculations as there is an error in the calculation of the moving average.

Stein, Comment 26: Were some grab samples taken at times of no flow? If so, then the statements in the draft report make sense and all that is required is a better description of the sampling protocols. However if flow was always occurring then all “grab samples” could be used to make a flow weighted average by considering the flow over the time that grab sample is considered representative. Tne result would not be as reliable as an autosampler, but better than ignoring the grab sample data.

Stein, Comment 59: The overall impression is that there was less detail under an individual sub-heading for STA 6 compared to the information provided under identical sub-headings of other STAs. One specific difference is that no information (data) is provided for dissolved oxygen.

Stein, Comment 70: Be sure to include the definitions of the box and whisker plots in the final document.

Stein, comment 80. Perhaps the reviewer's confusion is due mostly to semantics. The k parameter is a mass removal coefficient on a areal basis. It should be called that in both Eq.1 and Eq. 2. As written in the draft document it appears that k has different representations because they are called different things. As an aside why would C* be considered non-zero for overall performance but zero for individual cells?

Posted: 08 Oct 2007 03:47 PM
Originally Posted: 08 Oct 2007 03:45 PM

profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

Go t

Select Conference

Author | Message

Otto Stein

Subject: **Chapter 5 Stein**

Total Messages 7

Review of 2008 SFER Chapter 5
by Otto R. Stein

In general the authors have done a commendable to integrate and report what is clearly an almost overwhelming volume of information in a concise and readable format. The one exception is the section on the RWMA which displays a lack of proof-reading. The overall structure is well laid out and the section-internal format adaquate. That said, as a first-time reviewer I found it very difficult to read through the document; there is too much “boiler-plate” prose and a basic description of results in a very general sense, almost meaningless sense. There is very little synthesis and integration of the results, even in the sections dedicated to “the big picture”. As a firm believer in the adage “a picture is worth a thousand words” I think it would be well worth the effort try to enhance the quality of figures especially the captions to fully explain what is contained within. It should then be possible to reduce the text somewhat as it would not need to contain a description of what is contained in the figures and tables. I have made many suggestions for improvement, cited by page and line number, but many of the comments could be applied to figures, tables and sections other than where first mentioned. For the most important changes I have tried to repeat the comment again where appropriate.

Page Specific Review page number (and line where appropriate, suggested text changes in *italics*):

5-3,63. variable loading of both flow and P? Was the variation greater than in previous years? Is this important to this year’s performance compared to previous years?

5-6 Table 5-2 In looking at Table 2, it is quite obvious that the loading trends within the various STA’s are different when compared to the long term average. For example HLR was up in STA-1E and STA1-W even though this was a drought year (though the others are down) and this would seem counter-intuitive. I can find no explanation for this in the detailed sections of these STA’s. However, more interesting is the inconsistent patterns between the HLR and PLR amongst the STAs. One would expect both to go up or down in a similar ratio, but STA2 and STA6 show HLR down and PLR up. Clearly the influent P concentration this year was greater than the long term mean (data not given) at these two STAs. Three questions are therefore: why?, is this a long term trend?, and is this important to the performance in this and future years?

The HRT is reported as zero, which obviously is not true and probably different for each flow-way. These data should be included.

5-7 Table 5-3 The significance of this table is completely lost to me and not

explained anywhere I can find in the document. I can guess that diversion water was water that was intended to go into the STAs but for some reason was not, but inflows from Lake Okeechobee were somehow put into the STAs directly? How do these relate to the information presented in Table 5-5 (pg 5-15) These look like the data but the numerical values are different.

5-8,181 15,000 ac-ft matches the data in Table 5-5 but not Table 5-3.

5-11m table 5-4 Floc soil biogeochemistry,last column and also of what? Also Scirpus should be *Schoenoplectus*

5-12,316-322 Why are only two factors considered in this mesocosm study? Seems that the jury is still out on which plant communities are best, SAV and PSTA's seem to have the recent favor but why not initiate a much more comprehensive study before huge and costly changes are made to the full-scale STA's such as the conversions to SAV, as is currently occurring?

5-13,332 Grammatical error.

5-13, 343 It would nice to include adjectives such *desired* or *undesired* when mentioning species changes (especially in the summary pages) to help the less initiated reader better understand the meaning.

5-13 348 vegetation sampling *campaigns?*

5-14,369-371 If mass removal is higher but concentration is unchanged when adding Ca, then something else must changing too. Is the Ca enriched water also P enriched? If so then we don't know if it is higher Ca or higher P causing the increased removal rate.

5-16 456-470 The results indicate raising water level after killing undesirable emergent plants might be a way to enhance periphyton growth, at least in the short run. Has this been explored at other locations?

5-17 493-495 In this case periphyton is not desired?? If standing biomass is an issue why not burn, mow or cultivate the site before introducing water?

5-27 782 *preceded* not proceeded

5-27 Fig 5-8 (and all similar figures in each STA section) It is often quite difficult to find in the figure the various important canals, inflow and outflow structures, pumps etc. mentioned in the text (and in some cases at other STA figures I could not find them at all), as there are many gates, canals and structures labeled, but not mentioned. Please be sure all mentioned structures are identified on the figure (in this case they are). Is there a way to highlight the main inflow and outflow structures in the figure? (Note: due to travel, this year I am forced to read the report as a hard copy without color. Perhaps if the PDF were available I could see things better!)

5-29 Table 5-9 (and all similar tables in each STA section) I suggest a second bar across the table immediately below the year bar to indicate water year which is shifted by almost 6 months. Since WY is used for almost all reporting it is arguable that it is more important than calendar year and would help interpret the overall details shown in these tables.

5-29,825 Table 5-9 should be *Table 5-10*.

5-30 Figure 5-9 (and all similar figures in each STA section) It would be helpful if the scales of the y-axis and secondary y-axis were offset so that TP load and flow data were offset sufficiently to not plot on top of each other. It is

good they are plotted together to make a visual comparison but is somewhat hard to read with so much data plotted so close to each other. Also, it would be illustrative if the specific water years could be shaded in the background to highlight differences in water years.

5-30 Figure 5-10 (and all similar figures in each STA section) I cannot follow how the 12 month moving average is being calculated. The line is consistently higher that the individual monthly measurements for a period greater than 12 months. This cannot be as it is an average of 12 months. A moving average is usually calculated from as the previous and following 6 months, but is sometimes the preceding 12 months are used so that calculations up to the current month can be made. In either case, the calculated values would be different than reported. Also, as with figure 5-10, it would be illustrative if the specific water years could be shaded in the background to highlight differences in water years.

5-31 Table 5-10 (and all similar tables in each STA section) The column headings for Load (mt) should be *P Load (mt)* for clarity. What is monthly standard deviation for flow and load? I assume it is based on an "average" monthly value determined by dividing the annual value by 12 and compared to the 12 measured values, but this is not clear. The details should be added as a footnote. Why is the geometric mean used for reporting P concentration values? Are there very large variation in the values? I assume it is calculated as the antilog of the log of the individual values, and can't figure why that is better than the arithmetic mean.

5-32 Table 5-11 (and all similar tables in each STA section) What is the difference between number of samples and number of samples with flow? Since flow is measured continuously, wouldn't (shouldn't?) all samples be "with flow" if that means used in the flow-weighted mean calculations?

5-33 Figure 5-11 (and all similar figures in each STA section) I really don't see the need for the lower panel as it is simply the difference between the bar heights shown above. However, it would be advantageous to add the numerical values to just above the bars and the numerical value of the difference in a text box within the figure.

5-34 to 5-43 Comments on previous Figures 5-8 to 5-11 and Tables 5-9 to 5-11 apply to corresponding figures and tables in this STA1-W section too.

5-35,977 clean out *of the* G-253

5-42,1143-1147 I can't think of an obvious relationship been flow rate and DO levels for velocities as low as they obviously are in these flow-ways. At any rate, all offered reasons for the differences in DO levels between gates in purely speculative. The real reason must be related to differences processes in different regions within this STA that contribute more flow to one or the other outflow structure. No information is given (at least in this chapter) as to the contributing areas to each structure. Is this data available from tracer studies?

5-46,1222 *old* ditches were… *regrading* rather than degrading

5-48 Figure 5-16 I believe the lowest legend should *Cell 5B* not STA1W

5-48 Figure 5-17 is missing.

5-48,1304-1311 High turbidity is often mentioned as a reason for poor SAV colonization and survival throughout this chapter. How does the data from cell 5 compare to the other areas within the entire STA complex as far as the link

between low turbidity and good SAV survival or visa versa?

5-48, 1308-1309 Hard to say if planting rice helped, after about Nov 2006 influent TP is also very low.

5-49 Figure 5-18 An arrow to indicate the beginning/end of restoration efforts would be beneficial.

5-49,1336-1350 These paragraphs seem contradictory. On the one hand, SAV was sparse in areas planted with rice, but on the other hand, rehabilitation efforts (apparently mainly planting rice at least as a final step) enhanced SAV growth. Perhaps the problem is one of which time period is considered and the first paragraph needs some editing. It does seem to be in conflict with the data in Figure 5-21, at least after July 2006.

5-53,1409 not as *much* of.

5-54 to 5-67 Comments on previous Figures 5-8 to 5-11 and Tables 5-9 to 5-11 apply to corresponding figures and tables in these sections on STA2 and STA3/4 too.

5-54,1430 2015-acre expansion *(cell 4)* of the STA

5-54, Figure 5-23 I suggest labeling the L-6 Borrow Canal and adding and arrow and *to the S-7 Pump station as appropriate*

5-55,1460 delete: *were complete*

5-56,1500 irrigation of cell 3?

5-56,1501 I have no clue what is trying to be conveyed by this inflow calculation. This needs a little better explanation and perhaps some checking for typos.

5-61,1623-1624 How are vegetation strips **established** by aerial spraying (and of what)?

5-62 Figure 5-27. The delineation of SAV and emergent cells does not match the text on the following pages. All 3 “B” cells are now planted with SAV?

5-63,1667-1668 Double check these dates.

5-67,1763 change Figure 5-60 to *Figure 5-31*

5-68,1808 Aerial applications of what?

5-68,1810 What is planted in the vegetation strips?

5-69 1838-1840 Operations were not suspended for the entire STA-3-4, just the PSTA Implementation Study, correct?

5-69,1856-1865 This entire paragraph seems out of place, pre and post-ceding paragraphs relate to vegetation, this to water quality.

569,1866-1875 Please identify desired and undesired species.

5-71 Figure5-32 This figure needs to be put into context of Figure5-27 and/or Figure5-31.

5-74 to 5-80 Comments on previous Figures 5-8 to 5-11 and Tables 5-9 to 5-

11 apply to corresponding figures and tables in this section on STA-5 too.

5-75,1983-1986 When did these operations occur?

5-76, 2009 Again, there is confusion as to what is meant by Lake Okeechobee water.

5-76,2016 Why is this STA still considered in the stabilization phase?

5-76,2018 What is the C-139 basin?

5-80 Figure 5-36 It would be nice to identify the flow-ways associated with each gate.

5-81,2133 What is compartment C Build-out and it relation to other STA's?

5-82 to 5-87 Comments on previous Figures 5-8 to 5-11 and Tables 5-9 to 5-11 apply to corresponding figures and tables in these sections on STA-6 too. This section seems to be far less complete than the previous STA sections.

5-82,2150-2151 Section 2 became/will become flow capable in 2006 or 2007?

5-82,2154 How does water get to the G396 gates?

5-82,2155 Delete *is* after section 1

5-82,2156-2165 Many on these structures are not identified on Figure 5-37.

5-83,2183 Change Figure 5-26 to Table 5-26.

5-83,2202 delete one of the *simulated* words

5-84 Figure 5-38 Fix the axis labels to prevent over typing on the x-axis.

5-87,2271. Where is the dissolved oxygen data?

5-88-101 This entire section on the Rotenberger Wildlife Management Area (RWMA) is poorly written. It is hard to follow (has no "flow") and contains numerous typographical mistakes. In fact, it looks like it was cut and pasted from another document and poorly proofed. I will highlight only a few major concerns below.

5-88, 2319-2320. Wow, only 4650 ac-ft discharged but 16195 ac-ft put in?? Something doesn't seem right.

5-89 and 5-90 Comments on figure revisions made previously apply to Figures 5-41 and 5-42 as well.

5-91,92 Figure 5-43 and 5-44. These figures are not presented in a quality format.

5-93 A map of the fire burn intensity in addition to the sample locations would be a better way to show this data.

5-94,2480-2481 Is this a separate section or a subsection of the previous one on the RWMA? I suspect the latter, but there is no map defining gates transects for Figures 5-47 and 5-48 etc.

5-97-98 What do the box, whiskers and points represent on these figures. They are never described.

5-102,2668 TKN is mentioned as a calculation component of TN but is not included as a measured parameter a few lines above. Was it measured, and if not how was TN calculated?

5-105,2671 *available for*

5-102,2681 How often, and in what locations, was groundwater outflow available? (Partially addressed a few paragraphs later)

5-104,2743 One of the key issues is whether or not the gradual conversions of the second cells in a specific flow-way is improving the overall quality of the STA effluent. Considering this, it seems this should be a focus of the ensuing figures 5-53, 5-54 and 5-55 discussed below.

5-106 Figure 5-53 In looking at this figure, I wonder if it might not be more instructive to look at separating the symbols by cell type i.e. emergent vs SAV, PSTA etc. first, then by STA. As presented what jumps out is some STAs are more heavily loaded than others, not which treatment type is working best.

5-107,108 Figure5-54 and 5-55 Again it would instructive to separate individual cell time trends (at least by symbol type) when operation changed from emergent to SAV. Also it not clear why time-series data from only some of the STAs and cells would be presented.

5-109,2791-2792 phosphorous *outflow* loads??

5-109,2796-2802 Is there any reason for the seemingly random pattern of co-dependence between influent hydraulic and P loadings? If a rational meteorological or management issue could be found it might help to better manage the STAs in the future.

5-109,2803-2811 Talking about the change in performance from this WY to last is very misleading, and could easily be due to the drought and/or other random variables. Except for the young STAs which are just coming on line, the overall decreasing performance with time of STA1-W and STA 5 shown in Figure 5-58 is unmistakable. The real question is why STA 2 and STA 6 have not shown this decreasing performance. Identifying this is the key to improving performance of these two longer-record, worse-performing STAs.

5-110,2812-2819 There seems to be confusion between the usage of mass removal of Eq 5.1 (presented on pg 5-102) and “settling rate” Eq. 2. These are the same equations except that Eq.1 assumes C* = 0.0 and is calculated on a monthly basis. Therefore the calculated k value should be virtually identical (assuming both are using TP as stated). The good news is that this appears to be true, but as these data are presented, indicates that the application of these models is not properly understood.

5-111 Figure 5-58 What is the difference between the data in this figure and Figure 5-54 other than the 5-54 separates the data by cell? Is there some difference between “retained” and “removed”? Compressing the y-axis on the earlier graph masks the unmistakable downward trend in performance.

5-112 to 5-113, Figures 5-60 to 5-62 What do the various symbols represent; water years or cells or both? Hard to see any trend in any of this data other than the obvious between inflow and outflow TP. The slope of a regression line of these data would represent an overall average removal rate over the data set, which could be a good simple summary of the effectiveness of these systems.

5-114 to 5-115 This is perhaps the most encouraging part of the report: The system is performing at least as well as designed! However, the devil (if there is one) is in the details. This model does not have a residual concentration C* so “hindcasting” depends on the accuracy of the calculations, especially the difficult-to-quantify k value. Considering some potential confusion as to the calibration of that parameter discussed above, it would behoove the agency to double check these calculations. Also it is clear that, in general, STA 5 is not meeting the design target discharge and efforts should be made find out why. Note there is no Figure 5-64 and a labeling of symbols as for Figures 5-60 to 5-62 is recommended.

Posted: 23 Sep 2007 08:46 PM
Originally Posted: 23 Sep 2007 08:31 PM

email profile reply

New Topic Prev Topic Next Topic

Go t

Select Conference

Log In Options Username: Password: Log in

Chapter 5: STA Performance, Compliance and Optimization
Accountability and Technical Review

Prepared by Robert C. Ward ('A' Review)

Chapter 5 highlights efforts of the SFWMD to understand and manage natural processes for the enhancement of water quality, specifically, and ecosystem health, in general. Stormwater Treatment Areas (STA), at the scale being operated in South Florida, are not well understood. The research updates provide insight into efforts to better manage the STAs for phosphorous removal while enhancing wildlife habitat and public recreation.

The stormwater treatment efforts of the SFWMD have come a long way in a short period of time, especially when the scale of the operation is considered.

Chapter 5 describes a number of efforts to rehabilitate STA cells. What is the longest period of consistent operation of an STA or a cell in a STA? Is the need for rehabilitation caused mainly by natural conditions, poor TP removal rates, or are they part of ongoing research?

STA-1W was operational in 1994, but 10 years of operational data is missing from Figure 5-13. Why is the 10 years of data not included in the figure?

Given the large number of current research projects and new initiatives mentioned in Chapter 5, is there a long-term research strategy for the STAs that indicates what the overall research plan hopes to accomplish? I assume part of the goal is total compliance with permit conditions, but there are so many other aspects to the STAs that I wonder how there total picture is viewed as part of a long-term research plan.

Page 5-23 lines 685-686 - This water year, flow that moves in the opposite way than intended (termed negative flow) is included in the STA TP load estimates. Why was this change made?

Page 5-25 lines 751-754 - For the purpose of this report, DO levels measured at outflow stations from the five STAs (STA-1E, STA-1W, STA-2, STA-3/4 and STA-5) will be assessed using the developed SSAC rather than diel DO evaluation as performed in previous reports. This change in the report was agreed to by the FDEP and the District. Why was this change made? Because the SSAC is being added to the permits?

A streamlined STA Performance Synopsis could be a highlight of Chapter 5, in my opinion. I would suggest streamlining the Synopsis that begins on page 5-109 and moving it to the front of the chapter. The detailed information in the Synopsis, that is not streamlined, could be moved to an appendix with references to it in the shortened Performance Synopsis. Table 5-31, a summary of all STAs, would be a key figure in a streamlined synopsis. Is it possible to prepare a time series plot of the collective performance of all STAs for a streamlined synopsis? In particular, it would be of

interest to observe the collective STA's performance time series relative to the hydrologic and climatic variation routinely experienced in South Florida.

At a number of places in the text of Chapter 5, changes in the way data are analyzed are noted (two are cited above but there are others, e.g. page 5-29 line 828; page 5-56 lines 1501-1502; and page 5-107 lines 2771-2773). Are there plans to standardize data analysis methods in the future so there is consistency in performance results for the STAs from year-to-year? This question is particularly relevant when the performance data is presented over time.

Tables 10, 13, 17 and 20, as examples, present the results of a statistical test. Exactly what hypothesis was tested? What 'n' was used in the computations? Is a statistical difference water quality relevant in this case, if the n changes greatly across inflow and outflow measurements?

Why are the 'other' water quality constituent lists different in Tables 11 and 14? Are not all STAs subject to the same permit conditions regarding 'other' water quality constituents?

Author | Message

Joanna Burger

Subject: **CHAPTER 6 OVERALL COMMENTS**

Total Messages 11

CHAPTER 6

SUMMARY

This years Summary for Chapter 6 is a bit brief, although the inclusion of the Table is excellent, and puts the research in perspective. However, it would be useful to have a few more details in the summary that give the objectives of the chapter, tie together the major projects and findings, and briefly give future directions.

There is a need for an integrative summary that explains how the pieces in the subsections fit together to form an integrate project that examines all levels of biological organization. The framework is there, it is not explained or described. For example, using wading birds as bioindicators transcends all levels of biological organization examined in this chapter, yet it is hard for the reader to see the questions that are asked at each level and how then contribute to understanding the ecology of the system and will lead to restoration.

HYDROLOGY

It would be useful if each major section had an initial paragraph that stated the objectives of this section and how they relate to Everglades work overall. This is especially true with the water levels sections that need some context to understand the importance or relevance of the data.

WILDLIFE ECOLOGY

For the everglades system, wildlife is both a target area of concern, a bioindicator for overall ecosystem health as well as the health of individual species and guilds, and an indicator of potential human exposure. The species (or species groups) chosen for monitoring are excellent and are providing long term data on the overall health of the system. Wading birds have been used worldwide as indicators of ecosystem health, further increasing their usefulness. The description of why wading birds are used, and how they relate to the recovery of the system is excellent.

The overall decline in wading bird nesting is a major problem, especially in light of the fact that water levels did not explain all the nesting patterns or the declined in some areas of the Everglades. Other factors are clearly at plan, and require considerable discussion: this might be an area where a Workshop of scientists from the Everglades system and elsewhere might help shed light on the dynamics. This need is highlighted by the fact that prey densities, and

foraging densities of wading birds did not track nesting behavior.

The study to examine whether food supplementation would increase reproduction in White Ibis chicks is well thought out and will fill an important data gap within the system. Since the timing of the report is such that only preliminary data can be presented, it would be useful to also give the final data from the previous year as well as the current preliminary data. This will allow for a better evaluation of the overall study. The results are particularly intriguing because of the differential effect as a function of hatch order. That the chicks all fledged at the same age corroborates other studies with colonial birds. While the preliminary conclusions are generally warranted, the data are not designed to test whether mercury had an effect; mercury could have depressed reproductive success of both control and experimental groups by the same among, and with this experiment, it would not have been clear. It is extremely helpful to have the statistics presented (Table 6-4).

Another aspect of the foraging problems of wading birds involves whether prey are sufficiently available for wading birds, another aspect of study described in this chapter. The enclosure experiment to determine whether birds forage as a function of prey density, vegetation density, and water depth seemed a little problematic, perhaps because the descriptions were less clear. Did wading birds feed nearby but outside the enclosures, how long did it take to draw them in, did they deplete the prey, and so on are questions that need considering by the researchers. There are other explanations for the results, and these need to be examined as well.

Using a rapid assessment methodology is critical for long-term monitoring of ecosystem health, particularly in a system as large as the Everglades, over the time frames necessary. Some discussion of the use of such indices in other places should be included for a method that may be used generally within the Everglades. Data for more than 2 years is essential to fully develop and test this measurement tool. While it could be extremely useful, more data are required to determine if the wet season/dry season effects remain constant, and the index is a good predictor of conditions.

PLANT ECOLOGY

The overall plant ecology section is aimed at understanding the relationship of flow and hydrological patterns to plant growth and ridge/sough formation, the effects of hydrological extremes on recruitment of tree seedlings, and the effects of hydrology and nutrient gradients on the roots of trees on islands. As such, these questions are broad in nature, and attempt to understand the processes that lead to healthy ecosystem functioning within the Everglades. They form a coherent set of experiments; an additional important aspect deals with algal communities, which seems to be lacking within the current research program.

One problem with the tree seedling stress experiment is that the pots do not provide sufficient soil beneath the roots to imitate the natural conditions. Understanding the effects of nutrient and hydrological gradients on tree roots is an important, and often neglected aspect of tree ecology. The experiment is well designed, but I would feel more comfortable with some citations that the methodology has been used elsewhere with good results. Do the cores adequately reflect root growth? The results with respect to root (and leaf) productivity could be easier to read if there were a table showing how each factor affects root growth (it would help to have leaf productivity on this also).

ECOSYSTEM ECOLOGY

Ecosystem studies in the Everglades are necessarily complex because of the greatly fluctuating hydrology and other environmental conditions. Nonetheless, studies concentrate on understanding different aspects of ecosystem functioning, including in 2008, rapid assessment of periphyton, phosphorus dynamics, and accelerated recovery of impacted areas. As with other areas of ecology, it is critical to develop rapid methods of assessment that can be used both spatially and temporally in the Everglades, and can be done with a minimum effort in time and money. The use of chemotaxonomy has great promise both as an assessment tool and to inform management decisions. However, the objectives need to be clear: are the chemotaxonomy tests being conducted to decide whether the tool can be used as a surrogate to identify the species present, or to identify the environmental conditions? Since this is a relatively new approach for the Everglades program, more explanation is required of the regression trees so that the reader can both interpret them, and understand how they could be used for management.

The Phosphorus reflux studies are extremely important, and are showing that porewater is an important source of phosphorus, which in turn has management implications for restoration. Understanding the movement of phosphorus between porewater and the water is another important and key component.

The accelerated recovery of impacted areas is really a fire project, and should be so called. It is unclear what the time frame for this work is, and how long the plots will be monitored; surely a long monitoring time is required to ascertain the long-term effects. It might be useful in future reports to put the fire regime in a table, with the effects on sawgrass, cattails, pH, phosphate, and other effects so the reader can quickly ascertain what has been learned from each treatment (or series of treatments).

Fire and herbicides can also be used to maintain open areas, and this is another project under the ecosystem ecology section. Again, it would help to have a time frame for the entire study, as well as for the various treatments envisioned, along with appropriate rationale. With all the experiments, especially the cattail habitat improvement one, it would be useful to have concluding statements that discuss whether the changes were positive or negative, and in relation to what; also what are the management implications. The initial data indicates that opening areas has positive benefits for a number of factors, but it is critical to continue monitoring these effects, perhaps for longer than two more years. At some point, the openings may start to fill in with succession, and this should be documented.

LANDSCAPE ECOLOGY

One of the very positive aspects of the ecological work in the Everglades is attention to different structural levels, from individual species and species groups, to the landscape. While this is a daunting task, it is critical to understanding the ecology necessary to restore the Everglades. The landscape ecology section,

The CERP vegetation mapping (from aerial photography) is an important task that will provide a basis for monitoring and recovery of Everglades vegetation. This will be particularly useful in conjunction with the pre-drainage Everglades landscape and hydrology book currently in preparation. With the two, it will be possible to identify the areas with the greatest change and in need of the greatest restoration. The forensic ecology approach is ideal, and a sufficient number of sources are being used to present an excellent picture of the Everglades in the mid 1800s.

While the vegetation mapping, and pre-drainage Everglades landscape mapping will provide a picture of the general habitat within different regions and areas of the Everglades, the smaller habitat variations on the ridge and slough scale will be difficult to plot from the 1800s. The soil profiles of macrofossils work will begin to reconstruct historical vegetation, initially with Shark Slough. This is an important project will allow hypothesis testing retrospectively of sawgrass communities.

The landscape pattern change study seems essential to understanding changes that have occurred in the system, but again, the basic information for the study is lacking, including objectives, hypotheses, start date, length of the study, researchers or agencies involved. Still, the methods seem appropriate and relevant to understanding the patterns, and this will also contribute to understanding the Everglades before drainage.

The Muck Fire Model is another important analysis for understanding drought in the Everglades, one of the key ecological events that affects all levels of ecological organization. Concentrating on fire effects and on those for wading birds was reasonable, but some forethought should be given to science issues before such events occur. Again, this section would profit from a clear statement of objectives, hypotheses, and approaches before the details are presented.

Posted: 13 Sep 2007 11:06 AM
Originally Posted: 13 Sep 2007 11:04 AM

email profile reply

New Topic Next Topic

Go to Conference:
Select Conference go

Log In Options Username: Password: Log in

Author | Message

Joanna Burger

Subject: **CHAPTER 6 QUESTIONS AND SUGGESTIONS**

Total Messages 11

CHAPTER 6

QUESTIONS AND SUGGESTIONS

Lines 9-17: Some statement of overall objective, major findings, and future directions needs to be given.

Table 6-1 is excellent, and the authors are to be commended. Slightly more explanation in the summary itself would put the findings into context. I wonder if the years of the study could be added to the end of the middle section for each study?

Section on Hydrologic patterns: it would be useful to have a beginning statement of objectives and an overview of the effects of the patterns. Is there any need for concern about water levels, and if so, why?

Lines 168-185: This section provides a good introduction to this section, and what is required for the hydrology section.

Lines 208-214: A brief statement of potential reasons for this drastic decline would be in order here.

Lines 230: The loss was not offset, I would think, because the overall nesting effort was so depressed this year.

Lines 254-256: This is an interesting finding, and it might be useful to elaborate on why the authors believe this happened.

Lines 267-268: The disparity between presence of foraging birds and nesting is disturbing, and requires further work.

Line 276: What happened with tricolored heron surveys (this should be added to the footnote.

Lines 292: It would be useful to simply add a brief sentence for the rationale of the study, rather than refer the reader to last years report. Since the primary objectives are then listed (lines 296), it should be clear if these are overall or for the past year.

Lines 296-310: Does this discussion relate to the whole study, to this year?

Line 334: At what age did young depart?

Lines 348-on: Since the timing of the report is such that only preliminary data are presented, perhaps the final results from the previous year can be included.

Line 374: I would be VERY cautious about stating that mercury did not have an effect since the effects of mercury might be small but still significant.

Lines 382-384: This study may have to be done for more than 3 years to adequately characterize the differing hydrological/prey cycles.

Lines 453-end:The results of this experiment require additional data to understand what happened (how many birds came, when, for how long, what species).

Line 470: This sentence seems awkward; it is not a function but rather a task performed by...

Line 491: Some discussion of the relationship between macroinvertebrates and microinvertebrates should be included. How good an index are marcroinvertebrates?

Figures 6-10-12: some indication of whether the differences were significant should be given on the figures.

Line 603: Need to give some indication of how long these experiments will run for, i.e. how many years.

Line 622-: The hypotheses should be given much earlier so the reader can follow the description.

Line 631: should give the dates of planting, not "recently" since the reader will read this in 2008, but it was written in 2007. When exactly was the planting?

Lines 663-667: The Everglades are being affected by many other things, such as invasive species and other runoff besides agriculture.

Lines 711-123: Are the pots sufficiently large to mimic the amount of soil that normally is below the seedling roots. Further, the pots no doubt impede water flow through the soil.

Lines 727-742: Statistical data should also be given.

Lines 779: Is this only a one year study?

Lines 790-800: Are there other studies that validate the use of cores to estimate root features? How can you be sure which tree the roots come from?

Lines 809-810: Maybe roots relate to the strength of the water movement through the tree island, and not just the quantity or periodicity.

Lines 824-826: This sentence is not clear to me.

Lines 834-7: I am unclear whether turnover really relates directly to active

growth. That is, do the fine roots function until they decompose, or is there an in-between period?

What is the effect of differential aeration at the heads and tails of islands?

Figures 6-18-19. Which are significant?

Line 852: Why is this indirect?

Lines 883-888:Need a clear statement of objectives, with hypotheses.

Lines 890-893: Here the researchers are identified, and this is not so in other parts of this (and other) chapters. Perhaps there should be consistency.

Lines 888: Is the objective to identify the algal and other species, or the environmental conditions?

Figure 6-20: It is not clear how to read this, what it means, what is actual data versus the regression, and how they would be used for management.

Figure 6-23 and 24: Do we need to know amounts of water to relate to these TP concentrations?

Figure 6.25: how many data points is this based on? and what is the variance?

Lines 1037: how was the sampling determined? What days and what time of day?

Lines 1047-: Perhaps I missed it, but what is the relationship between inflow and porewater inputs of phosphorus?

Line 1064: I am not sure why you call it an accelerated recovery project when it is really a fire project?

Line 1082: how big were the plots?

Lines 1082: How long will the plots be monitored?

Lines 1112-: Is there a master plan for the burning, and for how to incorporate natural fires?

Line 1194: Were there any data collected on periphyton in the system? If not, are there plans to do so?

Line 1217: It seems to me that soil seedbank and seed germination are very different, and each should be discussed separately.

Lines 1254-1260: Something should be said specifically about the effects of fire on both sawgrass and cattails.

Lines 1272: Any ill effects of glyphosate?

Lines 1265-on: What is the time period for the study, what is the rationale for each treatment (fire, glyphosate), and how will effects be measured over the

long term?

Line 1287: What does periodically mean (daily, monthly, seasonally, yearly?)

Line 1318: Again, some numbers and statistical values would be useful.

Table 6-9: the abbreviations are unclear (what is EC and so on. What are the two reference sites, and where were they located (this should be on the table legend).

Figure 6-36: significance could be indicated by a star above the relevant bars; otherwise the reader does not know which is significant.

Line 1370: I presume you mean in the experimental area? (not in the reference site).

Figure 6-38: on a black and white copy it is hard to read the graphs.

Lines 1402-1414: I assume the secretive bird discussion relates to the experimental area (from the graph, but this is not clear in the text).

Line 1436: Do you expect the open areas to stay open, if so, for how long.

Line 1471: How is the vegetation mapping available to scientists and the public: on the internet?

Line 1531 on: Again, when was the study initiated, how long will it run, what are the main objectives? Who is doing the study?

Lines 1560-62: When are these studies anticipated, or are they part of the current plan?

Lines 1577-on: This section needs a clear statement of objectives, hypotheses, start and end date for the study, researchers or agencies involved. How are the data to be analyzed quantitatively, and how can they be presented to stakeholders?

Lines 1677-1695: What are the objectives, hypotheses, time frames, agencies or scientists involved?

Posted: 13 Sep 2007 10:25 AM
Originally Posted: 13 Sep 2007 10:22 AM

email profile reply

New Topic Prev Topic

Select Conference

Go to Conference: go

Log In Options Username: Password: Log in

Author | Message

JoAnn Burkholder

Subject: Chapter 6 evaluation - Burkholder

Total Messages 18

Chapter 6

Questions

Although foraging conditions should have been about the same as WY 2006 in WCA-2A, reports of large or many flocks were greatly reduced. Provide clarification here as to possible reasons? (lines 102-103)

Can the authors suggest reasons for the disparity between large numbers of foraging birds correlating with a large nesting effort in previous years, but not WY2007? (lines 266-268).

The authors aptly call for further work to allow better characterization of the role of hydrology x food limitation on nesting success (in 2007 and in general), especially how dry conditions and a rain-induced reversal event affect nesting success. Since “wet year” data will be important for overall interpretations, the authors hope for a wet year in WY2008. If that does not happen, can the experimental study be extended until a wet year occurs, since “wet year” data are very important for overall interpretations?

In the ridge-and-slough experiments under Plant Ecology, how will flow be measured (precision often difficult, especially at low flow velocities)? How much destructive harvesting will occur per sampling event (lines 645-646)? How was it determined, prior to the experiments, that the pot size was deep enough to simulate the depth of the soil layer that typically is below the seedling roots?

In the tree island root evaluation study, how was it verified, prior to the experiments, that the soil core size was adequate?

How long a record is there of the historic periphyton communities (line 1059)?

In the Fire Project, cattail biomass (both above- and belowground) significantly increased over pre-fire levels after the February fire (in the moderately enriched site), but not after the July fire (in the highly enriched site) (Figure 6-34). Do the authors attribute this increase mostly to a nutrient affect, and/or to other factors?

In the CHIP, water quality of open and control sites was compared up to ~3.5 weeks post-burn. Have the authors characterized the water quality of open sites post-herbicide application and, if so, how did it compare to that of fire-opened and control sites?

In the Muck Fire Model analysis, can the authors define alternatives 1-3, and provide further explanation as to why there was a preliminary finding of no significant impact (except for elimination of foraging areas near canals) for

alternatives 1-3?

In Figure 6-44, some bird colonies do not seem to have gauges nearby. Where are the additional gauges referenced in line 1729 located? – are their locations designed to address this problem?

Integrative Review

Chapter 6 covers hydrological patterns (1 project) and four main ecological areas: wildlife (4 projects), plants (3 projects), the ecosystem (3 projects), and the landscape (5 projects). The aim was to select projects of focus (17 in total) based on short-term operational needs and long-term restoration goals. The projects generally were presented so that overall goals were clear and well-linked to the descriptions. There was, however, little cross-referencing to other Chapters, and little by way of integrative data summaries and analyses bridging projects. Table 6-1 is excellent - very valuable in providing an overview framework. It would be helpful for the Summary to include 1-2 paragraphs of how the various subsections are being integrated to examine all of the levels of biological organization, and brief indication of future directions.

The hydrological set-up section was excellent in integrating the various project areas. The Plant Ecology section was strongly integrated, as was the Wildlife Ecology section except for the fourth project, development of a qualitative macroinvertebrate index for ecosystem conditions. While the potential for integration of this index is high, some serious technical problems in the design call into question the overall utility of this index. Altered design is encouraged to include replication and rigorous statistics, and to consider more than field-identifiable organisms and more than simply presence/absence. The efficacy of this index cannot be evaluated based upon the data presented.

Within the Ecosystem Ecology section, the Reflux Study is especially well-integrated. The Fire Project mentions that many sub-studies have been initiated to assess ecosystem processes affected by fire (water quality, soil and vegetation nutrient biogeochemistry, plant biomass production and storage, plant species dynamics, ecosystem modeling). It would be helpful to include brief explanation as to how these sub-studies are being integrated into the stated overall goal of identifying ecotypes of special concern and focusing on their biogeochemical linkages. It should be mentioned that such integration, although not mentioned in Chapter 6, is well-explained in its (overall, excellent) Appendix.

In the CHIP, improved integration would be helpful in the “Higher Trophic Level Responses” sub-section; for example, the section focused its description on wading birds and mentioned (as personal communication) that prey densities in WCA-2 were relatively low in WY2007, without cross-referencing to the excellent information presented about prey densities in the Wildlife Ecology section. Another sub-section of the CHIP, “Microbial Change”, presented few replicated data on microbiota and seemed a very preliminary description. The Ecosystem Ecology section also includes a description of a preliminary study to apply chemotaxonomic methodology to assess periphyton composition and then to use this information as a tool to assess ecosystem condition. While the concept is promising as an integrative tool, required calibration of the technique and microscopic groundtruthing appear, thus far, to be lacking. Thus, at present there is insufficient scientific basis for data interpretations.

The Landscape Ecology section aims to provide data on vegetation and vegetation changes in the Everglades at macroscale-to-microscale levels, and includes some

very valuable information on the Everglades. Its introductory paragraph mentions focus in WY2007 on pre-drainage hydrology and vegetation, new paleoecological work to evaluate past vegetation change, spectral analysis of ridge and slough habitats, and application of a landscape muck fire index. Additional writing would be helpful to indicate how these projects are being integrated within this section and with other sections.

Technical Review

Table 6-1 – very helpful as mentioned; however, has some grammatical errors.
Hydrologic Patterns – were defined to have provided "high ecological suitability". This seems misleading, given the fact that wading birds poorly (nesting patterns) fared so poorly.
Periphyton Pigments… – the conclusive statement ("Chemotaxonomy provides…") is in error; the method cannot be evaluated unless required calibration is first conducted (see below).
Phosphorus Reflux – Why was there only one control enclosure?
Change in the Ridge and Slough Pattern – Please clarify "some threshold".

I. Hydrologic Patterns for WY 2007 – This is an excellent section, a pleasure to read; very helpful comparison of WY2006 and WY2007.
Pp.6-4, 6-10 etc. – a map showing these WCAs, the ENP, and gauges mentioned would be helpful.
The authors use both metric and English units.
Line 48 – averages or medians?
Line 146 - …wet season were sufficient…

II. Wildlife Ecology – The focus of four included projects continues to be on interactions between wading birds, aquatic prey species, and hydrology, with the short-term goal of preventing further environmental degradation, and the long-term goal of restoring historical wildlife populations.

1. Wading bird nesting patterns – WY2007 was a poor year for wading bird nesting, with a 36% decline in nests compared to WY2006. Continued focus on wading birds (especially great egret, snowy egret, tricolored heron, white ibis, and wood stork) as indicators of wetland ecosystem health, and the four parameters used to assess recovery of pre-drainage wading bird nesting patterns (lines 196-200), are highly merited. The loss of the major (Alley North) rookery in WCA-3 was clearly described; estuarine rookeries were also minimal in WY2007, and nests in the ENP dramatically declined, attributed to two large reversal events in March – early April.

2. Food limitation on wading bird reproductive success (3-year study, to include comparison of years with different hydrologic conditions) – It seems that the overall hypothesis (lines 369-370) tested in this experiment is that white ibis nesting success is limited by food supply, whereas two sub-hypotheses are given in lines 308-310. Under the section, "Scientific Details", more is needed because little detail is provided. It would be helpful to add justification as to why 10 g fish were fed, why the selected physiological parameters were used (triglycerides, glycerol, corticosterone from blood and fecal samples – lines 329-330), why the sampling frequency (10 and 20 d), the number of replicates within each slough (lines 335-337), etc. Also, please clarify "surrogate nestlings" (line 338). Provisional analyses indicated that extra food significantly increased nestling mass growth and survival of "B" chicks (2nd

chick born), supporting the hypothesis that white ibis nesting success is limited by food supply. Age of mortality and mean age of dispersal were not affected by treatment or hatching order.
Line 300 - …responses are being quantified…
Figure 6-9 legend, 3rd line - …Sample sizes are means ± 1 SE.

3. Prey availability and foraging success of wading birds – Prey availability was identified is the major factor limiting reproductive success in wading birds, yet factors affecting prey availability are poorly known. The objectives of this set of experiments (beginning and end of dry season, January and April; vs. nesting season Feb. - June) were to assess effects of submersed aquatic vegetation (SAV, year 1) and emergent vegetation (year 2) x water depth on prey availability for wading birds. The authors focused on foraging site selection and foraging success, rather than attempting to measure prey availability directly. They hypothesized that prey would be more available in shallow water with lower SAV densities.

The "Methods" section needs further explanation and supporting references – how were the two depths (10 cm, 25 cm) selected, or the 3 SAV densities? Why *Utricularia*? Why 20 mosquitofish m^{-2}? How realistic were the amounts (in liters?) of plants added to impose treatments? Were there important differences between macrocosms 1 and 4?

Line 437 - …ensured constant initial fish density…
Line 454, 455 - …index, suggest that birds preferred shallow water…

4. Macroinvertebrates for rapid assessment of environmental conditions in subtropical wetlands – Although the premise of this study is well-founded – that macroinvertebrates can be valuable indicators of ecosystem conditions – and although it is a description of preliminary findings, this section seems weak. The approach used in developing the qualitative macroinvertebrate index (only field-identifiable fauna, only presence/absence) seems too superficial and limited to be fruitful. The "Methods" section was also seriously lacking: When did sampling occur during the wet and dry seasons? What criteria were used to classify a marsh as "impaired" (how impaired?) versus "reference"? Were only 1 reference and only 1 impaired marsh considered? Did this study include replicates? For example, Figure 6-13 states that [a] "Sample" was collected during 2005. – There is little that can be said about one sample; much more data collection would be needed to evaluate the efficacy of this qualitative index. How were the taxonomic-based metrics developed (basis? selection?). What statistics were used? – Line 553 mentions a "trend", and line 558 mentions "trend analysis"; this statistical term cannot be invoked unless the specific statistical analyses are described, with supporting references. The Results and Discussion sections need editing and clarification as well. In Figure 6-10, the key should be enlarged (partly indiscernible), and the labels should also be enlarged.

Line 474 - …impacts associated with…
Line 498 - …or absence, respectively…

III. Plant Ecology – In three projects of focus in WY 2007, there was continued focus on hydrology, toward understanding the dynamics and dominance of dominant plant species and algal assemblages.

1. Ridge and slough transplant experiments – A new slough competition study

was initiated at the Loxahatchee Impoundment Landscape Assessment (LILA) Facility. The authors provide nice explanation that the central portion of the Everglades historically was a flow-way with a corrugated ridge-and-slough landscape; and that loss of spatial patterning has been attributed to reduced flow, but the experimental basis to predict whether increased flow will restore the natural vegetation is lacking. This study aims to experimentally examine how flow rate and depth interact with plant structure to build ridge and slough habitats. The three keystone wetland species selected (sawgrass, spikerush and water lily) are morphologically distinct. The hypothesis (lines 622-625) and the experimental design are clearly conveyed, including the helpful diagram in Figure 6-14. It will be interesting to follow the progress of this valuable experiment.

2. Tree seedling stress evaluation, based on a complex, ongoing greenhouse experiment – This well-conceived, well-written section targets the slough, ridge and tree island mosaic complex that has been rapidly disappearing in the Everglades. It is directed toward the goal of determining how much of the changes in structural and functional integrity of the Everglades "are due to policy and management practices, and how much of the natural integrity is likely to return" depending on management changes. The authors describe experiments to examine the influence of the frequency and intensity of hydrologic extremes on recruitment of tree seedlings on tree islands, including species responses to (1) constant hydrology (drought, optimal, flooded) – tested in WY2007; (2) fluctuating hydrology (sequential order of drought and flood); and (3) the potential mitigating influence of an interspersed period of average (non-extreme) conditions. The three species selected for study represent a range of flood tolerance (supporting references needed – lines 690-693). In the methods, it would be helpful to clarify how it was known that the 6-inch (change to metric) pots were sufficiently large to prevent root crowding. Were nutrients other than P important, and checked (lines 701-703)? What was the basis (and supporting references) for selection of the treatment regimes? The statistical information should be included (lines 727-738). The legends for Figures 6-16 and 6-17 need to include further explanation, and the heavy black print needs to be altered (very difficult to read). [Note: Line 666 – not only agricultural influence; please modify.]

3. Tree island root evaluation – Extensive hydrological changes in the past 60 years have been related to the disappearance of 60-90% of the tree islands in two WCAs. The authors made a strong case for the premise that the dynamics of fine root production, mortality and decomposition across nutrient and hydrological gradients and hydroperiods may strongly influence restoration success. They assessed fine root dynamics in previously established plots on three tree islands including a tropical hammock with short hydroperiod, a cocoplum-dominated tree island with moderate hydroperiod (< 6 months inundated), and a willow tree island with artificial flooding (< 6 months inundated). Although their experimental design was clear, it would be helpful to include a diagram. The nutrients assessed (and sampling regime, frequency etc.) should also be clarified.

The data from this study indicated that fine root production was highest at the head of tree islands with contrasting short/intermediate hydroperiods and high TP (low TN:TP ratios). In contrast, root biomass was higher near the tail of these tree islands, and highest in the flooded tree island. Turnover of fine roots was higher in the low-water-depth, P-rich soils of the near-tail areas, suggesting that fine roots decompose more slowly in these less-than-optimal conditions.

The authors stated (lines 841-843) that the results suggest that soil formation on tree islands primarily occurs through organic matter deposition as litterfall and slow turnover of fine roots. They presented no data for litterfall or soil formation, however, so this statement requires further clarification (supporting references from other studies).

Line 750 - …the root of the problem is the… [great sentence otherwise!]

IV. Ecosystem Ecology

The overall goal of the three projects included in this section is to identify ecotypes of special concern and focus on biogeochemical linkages therein.

1. Rapid assessment of periphyton chemotaxonomy – The authors describe a preliminary study of application of the CHEMTAX method to assess algal composition, and, from there, development of a classification regression tree analysis of algal groupings (based on the pigment signatures) to estimate six water quality parameters (TP, TKN, DO, pH, temperature, specific conductance, DO). The statement in lines 875-876 is in error: Chemotaxonomy (CHEMTAX) has very rarely been used in freshwaters (see Schlüter et al. 2006, *Freshwater Biology* 51:1474-1485), and has been frequently misapplied in estuaries (see Lewitus et al. 2005, Estuaries 28:160-172). The authors need to define and describe "periphytometers". In addition, fundamental concerns about this study need to be addressed:

Information was not provided about required, fundamental methods development. Effective application of chemotaxonomy requires calibration with cultured isolates of important (abundant) species from the targeted system (Mackey et al. 1996, *Marine Ecology Progress Series* 144: 265-283). CHEMTAX is frequently misused because this important caveat is ignored. Application of CHEMTAX calibrated with oceanic isolates to estuarine or freshwater systems leads to inaccurate predictions of phytoplankton taxonomic composition (Schlüter et al. 2006, Lewitus et al. 2005). Lewitus et al. (2005), for example, demonstrated that application of the CHEMTAX matrix developed for oceanic species (Mackey et al. 1996) to salt marsh estuarine samples resulted in relatively poor predictive capabilities compared to a matrix generated primarily from estuarine isolates.

Before CHEMTAX can be soundly applied to periphyton of the Florida Everglades, the technique should be calibrated with, at a minimum, major species (cultured) from the habitats sampled. Microscopic verification should also be a prerequisite to application of the method (Lewitus et al. 2005). The authors seem to have this "backward" (lines 947-948), given their statement that such traditional taxonomic analyses should be done only after lack of correspondence between measured and predicted conditions is discerned. The lack of such ground-truthing may, in fact, have contributed to the apparent (perhaps false) lack of correspondence. After the two required steps for use of this technique are completed for the Florida Everglades periphyton samples – that is, calibration with major species cultured from the habitats sampled, and microscopic groundtruthing – the data from this preliminary study should be reanalyzed to assess the amount of variation explained within the classification regression trees (lines 927-928). At present, the conclusions presented without these two required steps (lines 950-964) unfortunately lack scientific basis.

Line 945 - …less variable
Line 946 - …predicted conditions
Line 962 - …periphyton biofilm nutrients … [note: tissue is an

inappropriate term for periphyton]

2. Evaluation of phosphorus flux (Reflux Study) – The authors described ongoing work in a 4-year project (through 2008) in the northern, cattail region of WCA-2A. The project is related to the long-term goal of improving wetland regions impacted by excess P. The objectives are to (1) quantify *in situ* sediment P fluxes to the water column; (2) use field enclosures to evaluate management practices (herbicides, burns) to immobilize P in the sediments; and (3) to apply a dynamic model to simulate sediment P flux under different conditions.

A. Phosphorus export (objective 1) - an experiment was conducted to compare P export by 3 control enclosures vs. 3 enclosures to which "SAV-treated" water lower in total phosphorus (TP) was added. Along with the TP concentration, the authors should describe the P species in the SAV-treated water. The data indicated that the SAV-treated units were exporting P. Additional measurements of porewater indicated that porewater was rich in soluble reactive phosphate (SRP), with low but significant P flux from the sediment to the overlying water column. The authors should briefly describe, with supporting reference, the equilibrators used.

Figure 6-22, line 1 - …the experimental enclosures…
Lines 993 - 1003 – change + to ±
Line 1003 – …One possibility (based on data presented below) is…
Figure 6-25 – error bars are needed

B. Management practices vs. sediment P flux (objective 2) – 9 enclosures were used (3 control, 3 with herbicide, and 3 with herbicide + the submersed aquatic macrophyte, coontail) to evaluate effects of these management practices on sediment P flux. Brief rationale is needed for the experimental design, including a brief description of these mesocosms, rationale for the use of coontail (and why this macrophyte species was selected), the amount added (again with supporting rationale), and the water quality of the SAV-treated water. Why was glyphosate selected as the herbicide? How did the authors ensure that the herbicide added did not leach into other plots (there is no information provided on how far apart the treatment and control plots were)? How was DOP measured? The P data should be reported with consideration of the detection limits of the methods used. The authors report an expected spike of TP in outflow water post-herbicide application. Did they follow the TP post-herbicide application long enough to detect when it declined back to pre-application levels?

Line 1034 - …with herbicide were inoculated…
Lines 1036 - 1046 – change + to ±
Figure 6-26 – treatment is cut off in the keys

The "Implications of Results" section was nicely presented; the data indicate that porewater is an important source of P to the water column in cattail-dominated areas, and recovery of these areas will not be likely until both inflow P and porewater P are reduced. The authors logically call for more research to assess the rates and mechanisms controlling P flux from porewater to the overlying water.

3. The Fire Project (Accelerated Recovery of impacted areas) – The rationale

for this important project is to assess whether repeated prescribed fire is effective in accelerating ecosystem recovery of cattail (and willow)-dominated, P-enriched areas by favoring re-establishment of sawgrass and other native species (App. 6-1-20). The project is designed to document (and hopefully distinguish) natural versus accelerated recovery at the landscape level (App. 6-1-20). The stated objectives are to use repeated prescribed fires to encourage a long-term species shift from cattail back to sawgrass, and to accelerate burial of P-enriched peat below the active root zone. The experiment (when was it initiated?) follows a before-after-control-impact-paired series design and includes 6 plots (each 300 m x 300 m) with upstream, within-plot and downstream sampling stations. There are 2 unenriched controls; 2 highly (P) enriched sites dominated by cattail; and 2 moderately enriched sites with a cattail/sawgrass mix. Treated plots are being burned periodically (wildfire affected 1 moderately enriched plot in Feb. 2006, as the first fire in the Fire Project; prescribed fire was applied to 1 highly enriched plot in July 2006). Data analyses are in progress; the authors emphasized short-term ecosystem responses from the latter fire in this preliminary report.

In the burned, highly enriched plot, immediate responses were: ~80% of the detrital biomass burned; ~15% of the live aboveground cattail biomass burned, and all of the aboveground biomass subsequently died; pH increased, SRP increased ~1000% and then declined to pre-burn levels within 2 weeks; porewater P increased less (how much?), but this increase was more lasting (how long?); and periphyton increased within 2 weeks in apparent response to the increased light and nutrients (why were these data not shown? – would be helpful to include). Cattail seed germination decreased, but 1 week post-fire, new ramets were produced and regrowth of burned but still-viable plants began; in fact, within 6 months culm density was at least 50% higher than pre-fire. Cattail leaf height increased rapidly until it was 70% of pre-fire levels, suggesting that this plant allocated sufficient energy to leaf biomass that would sustain growth in the recovery phase. Cattail biomass (both above- and belowground) significantly increased over pre-fire levels after the February fire (in the moderately enriched site), but not after the July fire.

Figure 6-28 – legend should mention that the top left figure is pre-fire.
Figures 6-31, 6-32 – error bars and "n" values should be added.
Figure 6-33 – were these differences statistically significant? Surely seem to be, but the legend should indicate error bars or confidence intervals.
Line 1067 - …enrichment resulted in…
Line 1228 – The writing seems to have been inadvertently cut; the authors should describe what happened to plant biomass, rather than simply referring readers to Figure 6-34.
Line 1257 - as evidenced by the…

4. Cattail Habitat Improvement Project (CHIP) – Overall (as nicely stated in the Conclusions, lines 1429-1437), the results from the first 6 months of data collection support the hypothesis that openings are ecologically better (higher nutrient fluxes, more nutritional plants, more foraging by wading birds).

The goal of the CHIP is to provide a preliminary assessment of the role of active management in accelerating improvement of cattail habitat (App. 6-1-19). The reader is sent to a multi-step web site to find the original hypotheses, experimental design, rationale and methodologies for this 3- to 4-year project. Yet, some of the hypotheses are stated later in the writing (e.g. lines 1333-1335). The website contains several succinct boxes with brief descriptions of the hypotheses, rationale etc., and these should be included here. It would also

be helpful to include Figure 1 from the first page of that website (map of TP at 0-10 cm depth in the Everglades), either here or in Chapter 1 of the 2008 SFER.

The overall goal of the *in situ* large-scale experimental study in the CHIP (replicated 6.25 ha openings, 2x2 factorial, treatments as control vs. open, locations as enriched and transitional) is to assess how well cattail areas can be restored, considering two major objectives: (1) assess whether created openings (via fire and herbicides) will lead to increased wildlife diversity and abundance, and (2) compare the ecosystem functions of these open areas versus natural sloughs (same hypotheses for both, App.6-1-18). The experimental treatments are applied with the aim of maintaining plots at 10% or less cattail cover, and presents preliminary findings from the first comprehensive sampling in Jan.-Feb. 2007. Thus far, herbicide (as glyphosate or glyphosate + imazapyr) was applied in May 2006, August 2006, and March 2007, and a prescribed burn was applied in July 2006. It would be helpful for the authors to also briefly explain why these herbicides were selected, the dose applied, and impacts of the herbicides and primary breakdown products on the ecosystem.

A. Water and floc nutrient chemistry - The surface water quality of open and control sites was compared up to ~3.5 weeks post-burn. In the overlying water, the P species were described as significantly higher in open versus control sites. Floc data were also collected, apparently at 6 months post-burn: floc of open plots had significantly higher TP but lower SRP, lower total carbon (TC) and total organic carbon (TOC) than control plots, with no change in TN or ash pre- vs. post-burn. Brief description should be added of which water quality variables were measured, and numbers of replicates (only P and C species are measured in the text; changes in the other variables shown in Table 6-7 should also be described).

Lines 1321-1322 - …the Ivanoff et al. (1998) fractionation procedure, which…
Table 6-7 – clarify n values, units, and significant integers considering the techniques/detection limits.
Table 6-8 – clarify n values and significant integers considering the techniques/detection limits.
Also, please clarify why SEs are given in Table 6-7, but SDs in Table 6-8.

B. Microbial change – As stated in App. 6-1-29, an understanding of changes in the structure and functions of microbial communities in peat accumulation and nutrient turnover will be essential for successful restoration of the Everglades. However, in the Chapter 6 draft, few replicated data for microbiota are presented; this section presents very limited, preliminary information. In addition, the DO data seem misplaced and might better be included under (A) above, as “Water Quality and Floc Nutrient Chemistry”.

Line 1344 – Does this mean that aerobic respiration values were measured on only one day? Or for 24 hours? Please clarify.
Line 1346 – The immediate appearance of a periphyton community was mentioned, with no supporting information or data. Please add – elsewhere in the Chapter, periphyton are described as an important component of Everglades ecosystems, and would seem to merit further explanation here.
Lines 1348-1350 – How frequently were the diel DO data taken? Where were the data taken – at one site in each plot? Please clarify.

The fact that DO "sags" were more pronounced in the treatment plots relative to the control sites is an important difference that should be emphasized in the writing.

Lines 1350-1357 – A "n" value of 1 means that these measurements all were unreplicated. Unreplicated data cannot be used to support the statements made here; this writing, and Table 6-9, should be omitted. Had replicates been taken, the parameters discussed would have required brief definition/rationale for readers, and brief description of methods (prokaryotes/ eukaryotes, PFLA markers; why the data were interpreted to indicate increased fungi and protozoans, etc.).

Figure 6-36 – The legend should briefly describe how these measurements were taken (method – basis 1 date?; n values). A key should be included.

Figure 6-37 – Needs a key.

B. Higher trophic level responses – Low water levels in Jan. 2007 prevented sampling of invertebrates and fish, so this section focuses entirely on wading birds. Wading bird abundance (11 species) was significantly higher in open plots than in control or unenriched plots. An attempt was also made to assess cryptic or "secretive" birds (5 species), based on visual sitings. Highest numbers were found in enriched and transitional control plots.

Line 1369 - …to be conducted…

Figure 6-38 - legend should clarify n values.

Line 1431 - …Given the intensity of…

V. Landscape Ecology – This section provides generally excellent, essential information about long-term changes in large-scale structure and function.

A. CERP vegetation mapping – The vegetation mapping products, developed from 1,400 aerial photographs (2004-), should provide a valuable baseline for RECOVER.

B. Book on the pre-drainage Everglades – Sounds as though this will be an exciting, excellent contribution. The forensic approach is excellent. It would be helpful to include more explanation (legend) for Figure 6-40.

C. Soil profiles of macrofossils – This important work takes an innovative approach, initially targeted for Shark Slough, in using macrofossils (especially sawgrass and other macrophyte seeds; also fossil pollen, spores, exoskeletons, shells, etc.) with appropriate dating techniques, as well as certain biomarker proxies to reconstruct historical vegetation on a smaller scale (10s of meters) and characterize boundary movements between ridge and slough communities. The data will provide valuable insights about the extent/direction of management changes that are needed to restore more deep-water sloughs and prevent further landscape degradation.

Line 1525 – Briefly describe the biomarker targeted, and their utility.

Line 1537 – Briefly explain how it was determined that a 10-cm core diameter size is sufficient for this evaluation, and mention the number of cores taken per site.

D. Landscape pattern change – Historically (pre-drainage), the Everglades were largely formed of ridge-and-slough patterned peatlands. A pilot

study was conducted to examine the direction, timing, and characteristics of landscape pattern change, considering a library of aerial photographs (roughly decadal, 1940-2004) in three landscape-scale rectangles (4 km x 6 km) in WCA-3 spanning control (least historically degraded landscape pattern, although drier in the 1940s), moderately degraded (west of the Miami Canal) and highly degraded (east of the Miami Canal) landscape patterns. The analyses indicates that surface patterning may not change for several decades, even after severe changes in hydrology, and then rapidly changes after "some threshold" is passed.

Lines 1613-1617 – It would be helpful for the authors to suggest the characteristics of this threshold.
Lines 1598-1601 – The methodology for determination of quadrant values for various parameters is not yet available (reference is a submitted manuscript), and so, should be briefly described.
Figures 6-42, 6-24 – need a key for the color-coding, and needs larger print to make labels readable.

E. Muck Fire Model – This ecological risk assessment aims to improve predictive ability about the effects of drought, here considering the extreme, sustained drought of WY 2007. The South Florida Water Management Model was used to predict water level stages for a baseline (no change) and assess, from three (unspecified) alternatives, the operational scheme that would be most ecologically sound while lowering the minimum allowable stages for the WCAs to increase water supply. The two major ecological concerns that were considered were the potential for peat fire and impacts on wading bird (wood stork, white ibis) nesting success. The analysis included some impressive details, such as consideration of prolonged soil moisture depending soil type and on depth to subsurface flow. The preliminary finding of no significant impact from the alternatives, except for an adverse effect of eliminating forage areas near canals, is surprising (lines 1706-1713); it would be helpful for the authors to provide insights as to why this outcome occurred. The District's effort to expand the muck fire hazard index to include 74 hydrologic monitoring gauges is commendable, but the muck fire hazard index (and its previous basis / number of gauges) was not previously mentioned.

Lines 1674, 1711-1713, 1722 etc. – Describe the three alternatives in the introductory information for this sub-section.
Lines 1728-1730 – Define the fire hazard index up front (1st para. of this sub-section), including the number of gauges upon which it previously was based.
Line 1730 – Briefly describe/define the EdenWeb.
Lines 1730-1732 – Identify the two ecological conditions – I assume that they are the potential for peat fire and wading bird nesting success (?) (lines 1673-1674), but this information needs to be tied together.
Figure 6-46 – should also include a metric scale. Also, the site labels should be altered for clarity

Posted: 15 Sep 2007 12:17 PM
Originally Posted: 14 Sep 2007 03:42 PM

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 7A: Comprehensive Everglades Restoration Plan Annual Report » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic

Author	Message
jeff jordan	**Subject:** Comments by Meganck

Total Messages 15

1. Can an example of “bi-directional” (line 107) project influences be provided during the public comment period? It is not clear from studying the text what is actually implied.

2. Are all “precursor” projects paired with or studied in relation to a CERP project? I did not think that to be the case.

3. How is the effectiveness of a particular Acceler8 project evaluated in terms of its impact on overall water quality when it is downstream from a problem area that may also be slated for a particular action under CERP? This question is posed in light of the renewed commitment by the District to employ a more holistic management scheme yet be able to evaluate the effectiveness of any particular investment to overall water quality.

4. Can any clarification as to the effectiveness of constructing barriers (lines 252-254) to reduce seepage be offered? Are such actions cost effective and on what basis? Will there be impacts to ground water, or possibly salt water intrusion from the reduction of such seepage controls? As I understand this particular project, there is only a pilot project contemplated in L-30 (L-31N) and some action in the C-111 canal to the benefit of the Everglades. Others actions may be planned, but I am not certain as to the priority of such efforts nor the timetable.

5. Is it a correct assumption that the State House and Senate must approve reservation of, through a series of Water Resource Development Acts and based on a request from the District, the water that has been identified for each CERP project? If this is the case, under what circumstances would the District revert to “otherwise legally allocate” (line 286) water resources for a project?

Posted: 17 Sep 2007 04:32 PM
Originally Posted: 17 Sep 2007 04:30 PM

profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic

Chapter 7 (A&B): CERP Annual Report and Implementation and Monitoring Update
Accountability Review

Prepared by Robert C. Ward ('B' Review)

Chapter 7A, lines 511-529, discuss the status of RECOVER, but do not indicate an implementation timeline for formal assessments of CERP's impact on ecological condition. From reading Chapter 7B it appears that RECOVER is in a baseline monitoring phase while projects are constructed. When will RECOVER begin to report the results of project implementation?

Has the agreement, earlier this year between the Department of Interior, Corps of Engineers, and the State of Florida, creating 'interim goals for restoration' impacted RECOVER's implementation and reporting plans?

Chapter 7B is a 2007 report with a 2005-06 reporting period. Most of the 2008 SFER has a 2006-07 reporting period.

Figure 7B-3 utilizes a stoplight map to summarize chlorophyll a. A legend to explain the colors is missing. The stoplight is used only in this one figure, but it seems to have much wider potential application. Are there plans to expand use of this visual way to report quantitative information?

Expanding this line of thinking, is it possible to demonstrate alternative ways of visually presenting baseline conditions in the System Status Reports – as a way of testing the communication effectiveness of various indicator presentation formats? The stoplight method is one presentation format that is widely accepted. Edward Tufte (http://www.edwardtufte.com/tufte/index) has produced a number of books that discuss options for the visual display of quantitative information. Such 'testing' also presents readers with the opportunity to familiarize themselves with options for the visual display of CERP performance measures, thus assisting those designing the final performance measure in choosing visual graphics.

Can the stoplight method report conditions across time in the same ecosystem area – as is done with time series in Figure 7B-6?

RECOVER is a challenging, but very necessary, aspect of managing water resources and related ecosystem health in the 21st century. The issues facing RECOVER are similar to those facing all large ecosystem health management efforts. Thus, RECOVER is on the cutting edge of learning how to report ecosystem health in a sustainable water management context.

Chapter 7 (A&B): CERP Annual Report and Implementation and Monitoring Update
Accountability Review

Prepared by Robert C. Ward ('B' Review)

Chapter 7A, lines 511-529, discuss the status of RECOVER, but do not indicate an implementation timeline for formal assessments of CERP's impact on ecological condition. From reading Chapter 7B it appears that RECOVER is in a baseline monitoring phase while projects are constructed. When will RECOVER begin to report the results of project implementation?

Has the agreement, earlier this year between the Department of Interior, Corps of Engineers, and the State of Florida, creating 'interim goals for restoration' impacted RECOVER's implementation and reporting plans?

Chapter 7B is a 2007 report with a 2005-06 reporting period. Most of the 2008 SFER has a 2006-07 reporting period.

Figure 7B-3 utilizes a stoplight map to summarize chlorophyll a. A legend to explain the colors is missing. The stoplight is used only in this one figure, but it seems to have much wider potential application. Are there plans to expand use of this visual way to report quantitative information?

Expanding this line of thinking, is it possible to demonstrate alternative ways of visually presenting baseline conditions in the System Status Reports – as a way of testing the communication effectiveness of various indicator presentation formats? The stoplight method is one presentation format that is widely accepted. Edward Tufte (http://www.edwardtufte.com/tufte/index) has produced a number of books that discuss options for the visual display of quantitative information. Such 'testing' also presents readers with the opportunity to familiarize themselves with options for the visual display of CERP performance measures, thus assisting those designing the final performance measure in choosing visual graphics.

Can the stoplight method report conditions across time in the same ecosystem area – as is done with time series in Figure 7B-6?

RECOVER is a challenging, but very necessary, aspect of managing water resources and related ecosystem health in the 21st century. The issues facing RECOVER are similar to those facing all large ecosystem health management efforts. Thus, RECOVER is on the cutting edge of learning how to report ecosystem health in a sustainable water management context.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 7B: Update on RECOVER Implementation and Monitoring for the Comprehensive Everglades Restoration Plan » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic

Author	Message
jeff jordan	**Subject:** Comments by Meganck

Total Messages 15

1. Can the experience of the RECOVER team in working with multiple variables and developing project performance measures and monitoring plans (lines 86-87, 95,109-111, 133-139) contribute to the goal of developing an integrated water quality monitoring program as discussed in chapter 1B?

2. The comment beginning with line 280 on the trends and status of the seagrass beds in the Southern Indian River Lagoon and the St. Lucie Estuary are directly related to discharges from Lake Okeechobee and hurricane intensity. Is it a correct assumption that the CERP activities identified in chapter 7A for these areas will reverse these trends or are there other actions contemplated? Perhaps a more fundamental aspect of this question refers to the level of coordination between the RECOVER and CERP work programs.

3. Is the marine phosphorous referred to in line 382 of this chapter naturally occurring? Are the groundwater P loadings noted also naturally occurring or can they be traced to man-influenced activities? Are there historic baseline/trend data concerning the increasing concentrations of periphyton TP in the Southern Everglades or is there some other explanation for this increase? (perhaps a particular type/intensity of hurricane dredging and re-suspension of P?)

4. The comment under lessons learned beginning on line 636 seems to imply a level of application-monitoring that will be extremely difficult to attain. It is one thing to determine “pre” and “post” conditions, but quite another to distinguish between a number of applications occurring after a baseline has been established. Is what proposed realistic and, if possible, how will it contribute to the overall CERP goals in such a way that it can possibly be applied in other areas?

5. The lesson learned beginning online 643 seems to be a self-fulfilling prediction as interim goals can only be reached by successfully reaching an unspecified number of performance measures. The panel has consistently supported the concept of restoration being progress in reaching any number of broad indicators in the general direction of the project/program goals. Are you proposing something more definitive leading to a more precise measure of success? If so, can you please elaborate.

6. In the panel report on the 2007 SFER mention was made to the logic of providing a short explanation of the ecosystem benefit quantification methodology referred to in lines 170-173 (2007 report) as it could be confused with the performance measures. I did not find text to clarify this potential confusion. Can you shed any light on the importance of this matter or any possible solution?

Posted: 17 Sep 2007 04:33 PM
Originally Posted: 17 Sep 2007 04:31 PM

profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic

Go t

Select Conference

Chapter 8: Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area
Date of Chapter Draft: 07/30/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: Primary
Technical:
Integrative: X
Reviewers:
AA: Meganck
A: Jordan
B: Armstrong
B: Stein

Chapter 8: Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area is to receive review primarily at the Accountability level with consideration at the Integrative level. Accordingly, the following questions are addressed in this review of Chapter 8:

1. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
2. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
3. Are findings linked to management goals and objectives?
4. Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
5. Is the chapter cross referenced in a thorough and consistent manner?

These questions are addressed below.

Accountability

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

Yes, the chapter gives an accounting of the status of project-level activities of the Long-Term Plan and the revisions that have been made to the Plan through an adaptive management approach.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the Report?

Yes, this chapter is consistent with previous versions of the SFER, but the reader is consistently left with the impression that they know little about THE PLAN. It would help is a succinct description of the elements of the Plan was included in the Chapter.

Are findings linked to management goals and objectives?

Yes, the Plan is clearly linked to the water quality goals of legislation, the FDEP, and the District.

Integrative

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?

The status of large programs is presented, but the overall goals of the programs are often not included and left to the chapter in which they are discussed in more detail.

Is the chapter cross referenced in a thorough and consistent manner?

There are a considerable number of links of the Long-Term Plan with appropriate chapters across the Report, especially the chapters on source control programs, STA performance, and the CERP.

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 8: Implementation of the Long-Term Plan for Achieving Water Quality Goals in the Everglades Protection Area » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic

Author	Message
jeff jordan	**Subject:** Comments by Meganck

Total Messages 15

1. As this chapter addresses water quality in the EPA, is it logical that it be maintained as a stand-alone chapter or merged with chapter 3A in future SFERs (Status of Water Quality in the EPA)?

2. In the short discussion about Adaptive Management, (beginning with line 162), reference is made to STA optimization activities and BMPs. It is clearly stated that the results of these activities are being used to develop plans for sediment removal in canals upstream of STA inflow structures. Yet in line 169 it is stated that the first sediment removal project is scheduled to “occur in FY 2008.” If the experience of adaptive management is already being employed, was there a pilot phase that produced data to support the earlier statement? If not, on what basis can the statement that these activities are being used to develop future plans be made?

3. The process of the District submitting requests to modify the EFA seems logical as presented, (beginning in line 176). However, I do not recall that the EFA has been altered in previous years. If this supposition is correct, when are results expected from the four projects approved and discussed? How will any results be integrated into the overall water quality chapters of the SFER? It seems that the implications for other water quality projects are potentially very important.

4. I am not clear as to how the outputs from water quality projects in the STAs and on-farm BMPs are being utilized by the FDEP permitting process as related to the EFA and ultimately water quality that enters the EPA. Is the State receiving this information and how are they using it to adjust the application of the EFA (apart from activities initiate by the District and discussed in the Adaptive Management section of this chapter. Any clarification on this issue would be appreciated.

Posted: 17 Sep 2007 04:33 PM
Originally Posted: 17 Sep 2007 04:31 PM

profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic

Go t

Author

Message

Joanna Burger

Subject: **CHAPTER 9: OVERALL COMMENTS**

Total Messages 11

CHAPTER 9: THE STATUS OF NONINDIGENOUS SPECIES IN THE SOUTH FLORIDA ENVIRONMENT

OVERALL

One of the advantages of the CERP and RECOVER programs for the Everglades is the potential to respond to new and emerging problems that the overall ecosystem faces. Examining and understanding nonindigenous species is on of the key components of any Everglades recovery program. The holistic approach of trying to catalogue all nonindigenous plants that seem to be (or could be) a problem in the Everglades is a daunting task, but an essential one, and this chapter is an excellent start. The chapter provides an excellent overview of the species biology of several nonindigenous invasive species.

There remain two main problems with the chapter and approach to these species: 1) It is not clear what is being done with most species, or groups of species, to control them, and 2) It is not clear that the program is pro-active in identifying potential problem species before they become a problem. A third problem has to do with organization of the report: it skips from topic to topic. For example, the agencies involved are mentioned in several places, which is unnecessary, and the areas being covered are also mentioned several places. There should be an introductory section that lists the objectives, agencies, areas to be covered; followed by the monitoring and assessment sections.

SUMMARY

The summary places the problem of nonindigenous species within the context of restoration in the Everglades, and appropriately indicates the overall lack of knowledge for many of these species. For the general public, it would be useful to have some overall observations or conclusions about the impacts of these species (and some indication of the key invasive and problematic ones) in the summary.

THE NONINDIGENOUS SPECIES PROBLEM IN SOUTH FLORIDA

A number of agencies and organizations have recognized the problem of nonindigenous species, particularly nuisance plants and animals whose populations are affecting native species. This problem seems to be one that

has received the administrative attention it deserves, and several groups are working together to develop a database that can be used by all to track invasive species. The chapter rightly identifies one of the main problems: that invasive species work has centered around those with agricultural or other economic effects, rather than those species that cause ecosystem disruption. A table might be useful to identify the agencies and groups that are involved with the nonindigenous species problem, and what their tasks are.

BIOLOGICAL MONITORING FOR NONINDIGENOUS SPECIES IN SOUTH FLORIDA

One of the key management tools is to track the spread and abundance of nonindigenous species so that the spatial and temporal aspects of the problem are known to all managers, public policy makers and the public. Much of the monitoring is still aimed at the large, invasive tree species that can be easily monitored from the air to arrive at good estimates of acreage of each species. While this is useful for these species, it does not address smaller plants and most animals that would not be visible from the air.

AN ASSESSMENT OF NONINDIGENOUS SPECIES IN SOUTH FLORIDA

The authors are to be commended for including animals in this chapter, despite the lower quantity and quality of much of the data. It is a start on a very difficult task, and Table 9-2 is excellent (although some indication of severity could be indicated by a larger letter X).

The exotic plant indicators are excellent, and a similar plan should be instituted for animals. It would also be useful to take the most invasive plants and have one chart that shows them in all the regions (e.g. Table 9-4 and so on).

The descriptions are excellent, and include a short history, effects, and where it occurs, the control measures. In all cases, it would be useful if there were an introductory sentence in each subsection that discussed the plants to be described for that section. It would also help if for each major plant species (or animal for that matter), a statement was made about its legal use (that is, is it sold, illegal to plant it?). The cross-referencing for descriptions of the same species in different modules is excellent (although in the final version it would be helpful if the editors actually put in page numbers so the reader can easily find the sections on the same species).

Florida Keys:

Feral cats, as duly noted, as a problem throughout the world, and very extensive public relations programs are necessary. This effort should be greatly increased throughout South Florida and the US generally. We have not done enough about this particular problem.

I wonder whether the monitoring efforts should include an eradication program as they are occurring. That is, would it be wise at this point to remove all pythons found, especially in view of their eating endangered species.

Florida Bay

This section needs some re-organization to have the same organization as others. Descriptions should include the same order of ideas from a natural history, to extent of the problem, to control measures for each problem species.

Greater Everglades

This section is extremely important, and details the greatest problems faced by the Everglades. The efforts to control the most invasive and problematic plant species are on-going, and simply require more money, time and effort to prevent large-scale ecological changes to the Everglades. The occurrence of two haplotypes of Brazilian pepper is extremely interesting, with major consequences for control, duly noted. This illustrates the complexity of the control issues, and makes the report outstanding.

The python seems to be the species of greatest concern for a wide range of key native animals species in the Everglades, and one that will have myriad cascading effects. Every effort should be made to control them (legal, educational, removal, and reproductive control). Since pythons are egg-layers, a study should be initiated to determine where they nest and to eradicate the eggs. Breeding them in captivity should also be made illegal.

The recent invasion of Sacred Ibises breeding is extremely interesting, and since it is so recent, it can be controlled at this point, and this should be done now, before it becomes another Cattle Egret in North America. No efforts of control are mentioned, and they should be considered.

Big Cypress

This section is clearly written, and clear. The complexities of the feral hog problem typify the problems of invasive species generally. There are often interests that want a given species to remain, and how to deal with different stakeholders is critical (and this topic may deserve a species workshop overall).

Northern Estuaries - West

Given the problems with reptiles in this and other modules within the region, it seems prudent to convene a workshop to address these problems, figure out the best control measures for each species, and talk about overall funding, as well as a public education program. Some of these species promise to create even bigger problems if they expand into some of the other regions.

Northern Estuaries -East

The feral hog removal experiment seems quite critical to understanding the problem in other regions of Florida, and deserves a little more attention (especially for the public readers of this report, and in light of conflicting stakeholder interest in the species). There should be expansion of the types of damage they caused, and to what species.

Lake Okeechobee

It is nice to see plants listed that has been controlled in a region. More such examples would alert the public to the positive benefits of such programs. One of the important aspects of any control program is also to show the positive benefits, and where a species has been effectively controlled, or where managers have developed a regime that will be effective in keeping control or managing the invasive plant.

Kissimmee Basin

Some initial description of the area should be included, along with a list of the most critical species. It was useful to have a statement about which plant species (Limpograss) posed the greatest threat to restoration of the Basin (and other modules would do well to include such statements as backup to the tables). Again, it would be useful to state which plants are and are not being considered for control (and which ones are being controlled).

SUMMARY OF NEEDS AND GAPS

This is an excellent section because it places the chapter in perspective. The emphasis on animal control is good, and very necessary, especially in light of the rapid and alarming expansion of some of the snakes and iguanas. Some of the research gaps are quite large, and the program needs to develop manageable sub-goals that can assigned to particular units, managers, or entities.

Posted: 13 Sep 2007 11:08 AM
Originally Posted: 13 Sep 2007 11:06 AM

email profile reply

New Topic Next Topic

Go to Conference: Select Conference go

Log In Options Username: Password: Log in

Author | Message

Joanna Burger

Subject: **CHAPTER 9: QUESTIONS AND SUGGESTIONS**

Total Messages 11

CHAPTER 9 THE STATUS OF NONINDIGENOUS SPECIES IN THE SOUTH FLORIDA ENVIRONMENT

General:

Make each section more consistent with respect to the information included.

Start each module plant/animal section with the list of species to be individual discussed.

For the cross-references to species discussed in multiple sections, give the page numbers for easy reference.

Include control measures for each species.

The inclusion of a summary of needs and gaps is excellent, and places the elements of the chapter in perspective.

Line 83: Is the MOU available for the our review committee?

Line 87: Is Weedar available for distribution to the public?

Lines 99-116: It is not clear what the role of the SFWMD is in this process, since US Fish & Wildlife Service is the lead agency.

Line 115-116: What studies are being done to determine if these unintended effects are real and important for native fishes?

Lines 1-131: It might be useful to have a table that lists the different agencies with their responsibilities and tasks with respect to the nonindigenous species problem.

Lines 200-206: It might be useful to particularly target landscapers and nurseries that sell nonindigenous species.

General: Some religious groups have as one of their tenets the need to release animals; some people actually purchase animals to release, and these are often released into inappropriate habitats, illegally. Are there efforts to reach these people?

What is the overall objective of the chapter: this needs to be more clearly

spelled out.

Line 286: The use of fixed wing aircraft is surely not very useful for a wide range of small plants and animals. How are these monitored?

Table 9-1: Need to know what the total acreage is that those given relate to; that is, there are 355,200 acres of Melaleuca out of what?

Lines 327-347: It seems to me that the areas covered belongs in the introductory section. The information that starts with 347 seems to be the real beginning of this section.

Lines 360-on: The agencies involved should be pulled out in its own section so that the ideas flow.

Table 9-2: I assume X just means occurrence; this needs to be added. Is there any way to indicate the really large problems (perhaps with a larger X).

This is an excellent table.

Line 461: There has been little mention in the chapter of control, and perhaps this aspect should be added to some of the sections. Table 9-3, which lists expenditures by RECOVER is useful, but hard to evaluate with respect to other problems.

Table 9-3: Are these data available for any of the invasive animals species?

Lines 495-508. This is an extremely important paragraph, and could be expanded to include some information on management of these species. Perhaps these species should have their own section with a little more details.

General for the Modules: It is not clear who has compiled the data for each of the modules. The data, and photographs, in the modules are excellent because it makes the problem real for the reader.

Lines 528-531: What can be done about the problems of invasive species on privata lands (and those sold at nurseries?)

Table 9-4: The inclusion this year of the letters as well as the colors is excellent, since many people will print these in black and white.

Lines 558: Might be useful to have an introductory few lines to this section.

Lines 610-636. What is the effect on other native species of the bait program?

Lines 714-on: It might be wise to encourage removal whenever they are found.

Lines 729: An introductory sentence is required here, and in other sections, that lists the species to be discussed.

Lines 818-821. Here, and elsewhere, it would be useful just to list the species so the reader knows where the section is going.

Line 846: What efforts are being made to discover the impacts?

Line 920: What effects does it have on native species? Are there specific data on its differential effects on other frogs?

Lines 1126: The description of the specific effects of the Australian Pine on the sparrows is excellent, and is the kind of information needed for some other species.

Lines 1277-on: Shouldn't there be legislation to prevent the use of this species in the pet trade? Although there are laws for problem species (up to lines 1291), these don't seem to be strong enough for this species.

Lines 1292-1302: It seems to me that efforts should be made to reduce breeding.

Lines 1428-29: More details on the current position of USFWS relative to control would be useful. This seems a very unusual case that bears more discussion among scientists.

Lines 1448-1465: What is the effect of these eels on native populations?

Lines 1700-on: A little more information on the hog use by other species would be appreciated.

Lines 1746-1758. What efforts are being made for control early so this does not spread throughout the Everglades?

Lines 1772: List the species to be discussed here before launching into a subsection.

Lines 1913-1922: Funding for this control program seems absolutely critical - what can be done to reinstated it?

Lines 1985-1991: Are other areas or counties considering similar programs?

Lines 2040-22: Are there any plans to consider developing a control program before it seriously affects both commercial interest and more ecological ones?

Lines 2196: A clearer description of exactly when and where feral hog removal was accomplished needs to be included (especially in light of the concern for this species in other regions).

Lines 2197-on: A little more detail about the program should be included.

Lines 2244-2256: In light of the problems invasive mussels have caused to other waterways, this seems to deserve considerably more attention. What will be done with this species next year?

Lines 2258-2273: The first paragraph is really an introduction, and does not belong under plants.

Lines 2295-2302: What state efforts are in place to control this species?

Lines 2305-2312: It is nice to see one listed that has been controlled in a region.

Lines 2485: A short description of the basin would aid the reader.

Lines 2533: The evaluation of which species poses the greatest problem for restoration is this area is extremely useful.

Lines 2492-4: How successful have the efforts been? are they continuing?

Lines 2673: Any indication of hunter take? Why not increase also the number limit?

Lines 2800: This is an extremely important program - is it adequately funded? Need more details on the program.

Table 9-12: How was this excellent table arrived at? by whole?

Posted: 13 Sep 2007 11:10 AM
Originally Posted: 13 Sep 2007 10:25 AM

email profile reply

New Topic Prev Topic

Select Conference

Go to Conference: go

Log In Options Username: Password: Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Tree View | Topic | New Topic | Next Topic

Author | Message

JoAnn Burkholder

Subject: Review of Chapter 9 - Burkholder

Total Messages 18

Chapter 9 The Status of Nonindigenous Species in the South Florida Environment

Questions

The potential impacts of invasive species were described as an emerging, high priority for CERP planning (p.9-1). How does the District plan to consider exotic species, across South Florida ecosystems, in evaluating and refining performance measures based on desirable organisms or conditions that are adversely affected by them?

How does the District plan to develop (or collaborate to develop) more proactive approaches toward controlling exotic species in South Florida?

General comments

Chapter 9 again contributes an impressive, fascinating, and disturbing evaluation of the status of progress in understanding terrestrial, wetland and aquatic nonindigenous species in South Florida, and the complexities in attempting to approach their "management". This topic is among the most important considered in the 2008 SFER. Nonindigenous species fundamentally threaten the District's many restoration efforts; they are seriously undermining the efficacy of various performance measures. Yet, there is a critical lack of knowledge about these organisms and the extent of their impacts. Research and monitoring efforts mostly have focused on exotic species that cause economic rather than environmental impacts. The relatively limited environmental monitoring efforts tend to emphasize large, easily detected exotic species, but some of the worst among them (e.g. green mussels) are small and relatively cryptic. Funding limitations relative to the enormity of the task preclude development of an assessment/ monitoring program specifically for nonindigenous species. Thus multiple, often

piecemeal or fragmented monitoring and research programs provide the available information about nonindigenous species throughout South Florida.

The chapter updates what is known about nonindigenous species and their impacts in South Florida terrestrial and aquatic environments within CERP and RECOVER representing eight regional modules including the Florida Keys, Florida Bay and the Southern Estuaries, the Greater Everglades, Big Cypress, Lake Okeechobee, Northern Estuaries – East, Northern Estuaries – West (Caloosahatchee), and the Kissimmee River basin. Table 9-2 provides an excellent compilation of the exotic plant and animal species lists for these modules, while pointing out that the animal species information likely is not comprehensive because of limited availability of distribution data on exotic animals. The approach for developing a suite of ecological indicators on exotic plant species to evaluate CERP restoration progress is nicely explained (p.9-24). These indicators will not be similar to other RECOVER indicators because, as the authors state, nonindigenous species are inherently ill-suited to indicate ecological function, process or structure in a restoration context. The color-coded progress assessment ("stop light") technique remains an innovative, excellent tool for evaluating status and projected conditions, species by species, within each module. The descriptions of selected exotic species, their impacts, and efforts to track/control them are excellent and fascinating, as in previous SFERs. The authors' synthesis of information needs and gaps is clear and compelling, culminating in their identification of the top five priorities that must be addressed to realistically, effectively approach management and control of exotic species in South Florida..

Control efforts (or lack thereof) remain an important gap for many if not most exotic species. In an important advancement described by the 2008 SFER, a process assessment technique is being developed to determine what, if any, management or control measures have been undertaken on a species basis. Various entities are collaborating to develop a clear, integrated method for evaluating progress on controlling invasive plant species, and a parallel evaluation system for exotic animal species is planned within the next 2-3 years. These integrated methodologies will be valuable, if not essential, in assisting District efforts.

Suggestions

The Summary section should mention some of the worst exotic species problems (plant and animal), as well as some (albeit few) "success stories" in their management, control or eradication (e.g. *Caulerpa* in coastal areas) to show that, at least for some species, with concerted effort it *can* be achieved. The

various sections should be checked for parallel organization.

The chapter introductory information would be strengthened by a table (or flow chart?) of the agencies/entities involved in assessment/ management of (which) nonindigenous species within each module, and their directed activities. This may result in a “spaghetti” hodgepodge reflecting the problem that “everyone is in charge, so no one is in charge”, but such a table should be attempted.

Posted: 19 Sep 2007 11:09 PM
Originally Posted: 19 Sep 2007 11:06 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

Go t

Select Conference

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 9: The Status of Nonindigenous Species in the South Florida Environment » chapter 9

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author	Message
ellen van donk	**Subject:** chapter 9

Total Messages 4

Comments and questions by Ellen van Donk on Chapter 9

I miss in this chapter a table with an overview of all the agencies and their responsibilities concerning non-indigenous species.

Page 9-87. The summary of needs and gaps is very useful

Are all nonindigenous species in Florida a problem???

Posted: 17 Sep 2007 02:32 PM
Originally Posted: 17 Sep 2007 02:30 PM

email | profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic | Next Topic

Go t

Select Conference

Chapter 10: Lake Okeechobee Protection Program – State of the Lake and Watershed
Date of Chapter Draft: 08/28/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: X
Technical: Primary
Integrative:
Reviewers:
AA: Meganck
A: Jordan
B: Armstrong
B: Stein

Chapter 10: Lake Okeechobee Protection Program – State of the Lake and Watershed is to receive review primarily at the Technical level with consideration at the Accountability level. Accordingly, the following questions are addressed in this review of Chapter 10:

1. Are the findings and conclusions supported by "best available information," or are there gaps or flaws in the information presented in the document?
2. Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, panel shall identify specific studies that should be addressed or available data to support alternative findings.
3. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
4. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
5. Are findings linked to management goals and objectives?

These questions are addressed below.

Technical

Are the findings and conclusions supported by "best available information," or are there gaps or flaws in the information presented in the document?

There is a substantial, historical database for Lake Okeechobee, its watershed, its water quality and biota, and its outflows. It would be difficult to find gaps in the data. This chapter on Lake Okeechobee focuses on nutrient loading from the watershed, the impacts of very high and very low water levels, and the spread of exotic and nuisance vegetation. The nutrient sources and loads within various areas of the watershed are very useful for prioritizing phosphorus load reduction activities, and this information as well as the reductions in phosphorus loads due to source control programs shows the progress being made to reduce those loads.

The issue of legacy phosphorus is raised in the Lake's watershed (p. 10-31, lines 742-752), and two important questions are raised about the amount of phosphorus currently stored in the watershed (presumably in the sediments) and the time it will take to reach stable levels. While these questions are being addressed by a consultant for the watershed, the legacy phosphorus issue is also relevant within Lake Okeechobee, i.e., in its sediments. That is, the phosphorus retained within the Lake in a given year becomes legacy phosphorus the next year. What happens to this phosphorus? Is it recycled during the year when hypoxic conditions at the water-sediment

surface permit its release from the sediments back to the water column? Is it stored with the sediment and buried deep enough so as not to be recycled? These are important questions not only for Lake Okeechobee, but for the BMPs, the STAs, and the WCAs. Hopefully, the study of legacy phosphorus in the watershed includes phosphorus sorption/desorption and sorption capacity characteristics of the soils under different conditions (e.g., wet, dry, hypoxic, aerobic), and phosphorus partition coefficients for those soils. At some point in time, the phosphorus removal systems will reach capacity to remove phosphorus and will have to have the accumulated phosphorus removed. This necessity is, of course, already recognized by the District in its calculations of phosphorus removed with dredging of exposed sediments in Lake Okeechobee. If phosphorus loading to Lake Okeechobee reaches the 140 mt/yr level (implying the legacy phosphorus in the watershed has reached stable levels), then the time it will take beyond that point for the legacy phosphorus in the Lake to stabilize will be substantial. This point has been raised in past SFER reports, but it is one that should be revisited when studies such as the one on legacy phosphorus is being reported.

Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, panel shall identify specific studies that should be addressed or available data to support alternative findings.
In the chapter Summary, there are a few points worth noting:

1. Page 10-2, lines 43-54, it would be helpful to compare WY2007 flows to the long-term average flow as well as the WY2006 flow. Comparison to the previous year is a relative measure while comparison to long-term lake operation give better perspective;
2. Page 10-2, lines 55-56, is there an explanation for “no substantial reduction in [phosphorus] loading” during the 1990’s? Is this a case of phosphorus load reduction due to controls being matched by increases in pre-treatment phosphorus loads? Some explanation would be helpful.
3. Page 10-3, lines 109-117, the comment that WY2007 TP concentrations are higher than 5-year averages does not appear to have a strong basis when one compares TP concentrations of 173 µg/L and 179 µg/L, i.e., little difference; the difference in SRP of 54 and 78 is kinetics. Further, if sediment resuspension was the mechanism causing a difference, then why would TN and DIN in WY2007 be lower than the 5-yr average while TP is higher. This seems to be contradictory, and it is suggested that this explanation be reconsidered.
4. Page 10-3, lines 118-124, the discussion about the TN:TP ratio of 11 and the DIN:SRP ratio of 5.4 favoring blue-green algae, please comment on the applicability of these ratios when the limiting nutrient concentrations for the blue-green algae are substantially lower than the ambient concentrations. In other words, the concentrations of TN and TP are so high that the algae do not “see” concentrations low enough to be limiting to growth and hence their growth rates and their dominance are not impacted by ratios of nutrients. The ratios may say that the blue-green algae are favored, but neither the blue-green algae nor the diatoms can discern that based on the TN and TP concentrations they “see” in the water column. The fact that diatom to cyanobacteria ratio is greater than one appears to bear that out.

Accountability

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

Yes, the coverage is appropriate.

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?

The chapter this year is emphasizing different aspects of Lake Okeechobee this year, but that is consistent with earlier versions of the report.

Are findings linked to management goals and objectives?

Yes, finds are strongly linked to management goals and objectives.

JoAnn Burkholder

Subject: No Topic

Total Messages 18

Chapter 10 Lake Okeechobee Protection Program – State of the Lake and Watershed

Questions

Chapter 10 mentions three long-term impacts on Lake Okeechobee, one of which is the rapid spread of exotic and nuisance plants in the littoral zone. Yet, District plans for addressing exotic/nuisance plant species seem to focus on herbicide applications. What are District plans for assessing the overall impact of exotic species (plants and animals) on the Lake ecosystem? It would seem that such information would be needed to assess the [changing] effectiveness of some performance measures.

Are studies planned to assess the assimilative capacity of Lakes Istokpoga and Kissimmee? (p.10-30)

It was dismaying to learn that Lake Okeechobee's limits for mercury are among the least restrictive of all advisories in Florida (p.10-47). What are District plans for assessing the bioaccumulation and impacts of mercury on fish populations in the Lake?

Is historic information known about *Nymphaea* abundance in the Lake? Does the District plan to examine whether its increasing abundance is beneficial or detrimental to the Lake ecosystem? (lines 1247-1249)?

General Comments

Chapter 10 contributes a well-written, very nicely illustrated, interesting and frank account of progress and impediments in restoration of Lake Okeechobee, including a compelling description of the havoc wreaked on restoration efforts by major hurricanes followed by a sustained record drought. Long-term impacts on the Lake have been described as excessive P loads, unnaturally high and low water levels, and rapid spread of exotic and nuisance plants in the littoral zone. In WY2007 the Lake

received only one-sixth of the flow that it received in WY2006; to maintain water supply in the EAA, 14 temporary pumps had to be deployed. Discharges from the Lake to the EAA, the St. Lucie basin and the Caloosahatchee basin were less than half the 15-year annual average. The present 5-year average P load is more than four-fold higher than the TMDL target; the TP load for WY2007 was much lower than in previous years because of nonpoint loading reductions imposed by the drought, yet the average inflow-weighted TP concentration increased substantially (e.g. p.10-42) so that the net P loads to the Lake in WYs2006-2007 were similar. An increase in inflow TP concentrations during WY2007 despite much-reduced flow from the Kissimmee River is troubling, and was suggested to have been related to higher contribution of flow and loads from smaller, more agriculturally intensive basins (p.10-43). The net sedimentation coefficient (per year) has declined substantially in the Lake since the 1970s (including consideration of data from WY2007), indicating that the Lake is less able to absorb excess TP loads from the watershed.

Of 11 performance measures (PMs), only 1 (the diatom : cyanobacteria ratio) has been achieved and the underlying reason(s) for that success is uncertain. The goal for water clarity in shoreline areas (100% light visibility to the lake bed from May through September) was only attained ~10% of the time in the past 5 years, and the goal for algal bloom frequency (5% of all samples exceeding 40 ppb of chlorophyll *a*) was exceeded in ~8% of all samples. The serious problem of residual P accumulations in the watershed ("legacy P", an excellent descriptive term) is identified as a major impediment that will delay the TP reductions targeted for completion by 2015 for the TP TMDL. It is exciting, though, to learn that the storage and dynamics of legacy P are beginning to be evaluated by the District, to assess how much P is currently stored in the watershed, and how long it will take for legacy P to reach stable levels (p.10-31).

The major legislation, plans and projects affecting Lake Okeechobee (LOPA, LOPP, LOWP, LOER Action Plan [expanded in 2007 to include the St. Lucie and Caloosahatchee systems], LOWCP, the USACE's Tentatively Selected Plan [TSP], LOIWRP, ERP basin rule) and anticipated effects and accomplishments are nicely described. The Northern Everglades and Estuaries Protection Program seems a welcome addition that will help restoration efforts. The "Watershed Phosphorus Control Programs" section was helpful and interesting; it tracks the progress of District and partners' activities in BMP programs (urban and agricultural) and various projects/incentives – some very innovative - designed to reduce P loading to the Lake. Efforts to assess BMP effectiveness (p.10-32) unfortunately

seem weak in places, but are mostly outside the District's control.

The chapter updates District scientific and restoration activities presented in the 2007 SFER, focusing on water quality, water levels, and aquatic vegetation. It briefly describes the substantial predictive modeling efforts (e.g. the spatially explicit, integrated hydrodynamic, sediment transport, and water quality LOEM – p.10-63). It would be helpful to provide more detailed discussion of the model and its ongoing refinement merit/applications, perhaps in the 2009 SFER.

As in previous SFERs, it updates an excellent analysis of land uses in the Lake watershed, essential information needed to support District planning and management activities. It also provides historic and WY2007 comparisons of TP and TN budgets to the Lake, including a breakdown of contributions by various tributaries, canals and other sources. Research and demonstration projects that were initiated, continued or completed in WY2007 are nicely summarized (Table 10-8; additional information on ecological experiments with SAV, p.10-64). A clear synopsis is included of water quality monitoring in the watershed (p.10-36). In WY2007, comparison of aerial photo-based vegetation maps from 1996 versus 2003 showed that cattail coverage had decreased by ~10%; torpedograss and water lily coverage had each increased by ~25%; and bulrush coverage had decreased by ~20%. An interesting study examined the redistribution of muck sediments and nutrients (P, N) from the central pelagic zone to more nearshore and littoral regions. A major dredging effort removed 1.6 x 10^6 m^3 of muck, with ~273 mt of P from six littoral zone locations to help restore SAV habitat. In addition, the District's efforts to establish more pond apple and cypress habitat by plantings continued in selected locations. Remarkably, the drought created such dry conditions that it exposed the Lake's huge marsh area; in February and May 2007, more than 80% of the emergent vegetation in the western marsh was burned via wildfires or prescribed burns to eliminate much of the exotic torpedograss and invasive cattail. The authors nicely explained the scientifically sound rationale underlying this effort.

Technical review

The caliber of the considerable technical information presented in Chapter 10 is generally excellent, including great supporting figures and tables and very clear, interesting explanations with sound rationale.

The increased diatoms : cyanobacteria ration has been suggested to be linked to higher turbidity. An alternate suggestion that should be considered is the sometimes-very-

high DIN concentrations/ loads (e.g. Table 10-10, p.10-45).

The information on water quality monitoring (p.10-36) would be strengthened by discussion of the compatibility of techniques used over time by the District and others (e.g. some District stations monitored biweekly since 1972 – have techniques been consistent over time, or changes calibrated?; did the District restructure the LOWOD farm-level concentration monitoring network to the LOWA micro-basin level monitoring network so that technique consistency was considered?).

Lines 998-1000 – The chapter describes atrazine and hexazinone as relatively nontoxic to mammals, but conflicting information occurs in the literatures, especially considering insidious, chronic impacts. Additional discussion with supporting references is needed here.

Pesticides in water and sediments are monitored only on a quarterly basis at six sites in the Lake. The District is engaging in concerted herbicide application programs; additional monitoring emphasis (higher frequency) on these and other toxic substances (e.g. mercury) seems warranted.

Figure 10-9 – SEs should be added for the microcystin and chlorophyll *a* data. Was this total microcystins?

Figure 10-10 – Legend or panels should provide the r^2 values.

P.10-49, Figure 10-13 – How many sites had significantly higher water content in the upper sediments? Statistical information (test, p values; error bars in the figure) should be included.

Figures 10-12 – 10-14, 10-25 – Statistical information (test, p values; error bars) should be included.

Figure 10-15 – Legend should indicate when in 2006 the cores were collected, and the core size.

Integrative review

Although this chapter provides an excellent compilation on environmental conditions, District activities, and restoration progress for WY2007, it would be strengthened by additional integration summarizing effects of the lake in WY2007 on the St. Lucie and Caloosahatchee estuaries. Hydrological and P/N loading information from the upper watershed helped integrate the upper watershed with the Lake during this extreme-drought year. The chapter would also benefit from more integration with Everglades effort – for example, lines 1018-1025 describe the relatively little known about sulfate (and mercury) in the Lake, and states that no sulfate research has been conducted on the Lake to date. It would be constructive to mention the planned research described in Appendix 3B of the 2008 SFER.

Editorial changes

Lines 35, 151, 705 – phosphorus
Line 118 – should be four-fold (or more than four-fold)
Lines 139-143 – Percent changes should also be included.
Line 152 – include total cost.
Line 404 - …(Figure 10)….
Line 406 – watershed will soon be under…
Line 707 …and take into…
Lines 1250-1251 – add metric units.
Throughout – Submerged should be changed to submersed (Wetzel 2001, Limnology, 3rd edition, Academic Press).

Posted: 19 Sep 2007 09:53 PM
Originally Posted: 19 Sep 2007 09:51 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

Go t

Select Conference

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 10: Lake Okeechobee – State of the Lake and Watershed » Comments from the final report

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author	Message
jeff jordan	**Subject:** Comments from the final report

Total Messages 21

Here are some specific remarks from the final report that can be addressed here:

1) Chapter 10 mentions three long-term impacts on Lake Okeechobee, one of which is the rapid spread of exotic and nuisance plants in the littoral zone. Yet, District plans for addressing exotic/nuisance plant species seem to focus on herbicide applications. What are District plans for assessing the overall impact of exotic species (plants and animals) on the Lake ecosystem? It would seem that such information would be needed to assess the [changing] effectiveness of some performance measures.
We were not able to find the answer to this question in Chapter 9 as was stated by the authors of Chapter 10 in their response.

2. It was dismaying to learn that Lake Okeechobee's limits for mercury are among the least restrictive of all advisories in Florida (p.10-47). Give in this chapter more information about the levels of mercury in the fish populations in the lake.

3. Include in the chapter more information known about Nymphaea abundance in the lake and whether an increasing abundance is beneficial or detrimental to the lake ecosystem.

4. The increased diatoms : cyanobacteria ratio has been suggested to be linked to higher turbidity. An alternate suggestion that should be considered is the sometimes-very-high DIN concentrations/ loads (e.g. Table 10-10, p.10-45).

5. The information on water quality monitoring (p.10-36) would be strengthened by discussion of the compatibility of techniques used over time by the District and others. Give more details whether techniques have been consistent over time.

6. It is recommendable to expand the experiments described on page 10-64 " Light influence on the growth and germination of submerged aquatic vegetation" with more interacting factors e.g. phosphorus in the sediment.

7. Lines 998-1000 – The chapter describes atrazine and hexazinone as relatively nontoxic to mammals, but conflicting information occurs in the literatures, especially considering insidious, chronic impacts. Additional discussion with supporting references is needed here. Pesticides in water and sediments are monitored only on a quarterly basis at six sites in the lake. The District is engaging in concerted herbicide application programs; additional monitoring emphasis (higher frequency) on these and other toxic substances (e.g. mercury) seems warranted.

Integrative review
Although this chapter provides an excellent compilation on environmental conditions, District activities, and restoration progress for WY2007, it still needs more integration with other chapters. It would be strengthened by additional integration summarizing effects of the lake in WY2007 on the St. Lucie and Caloosahatchee estuaries. Hydrological and P/N loading information from the upper watershed helped integrate the upper watershed with the Lake during this extreme-drought year. The chapter would also benefit from more integration with Everglades effort – for example, lines 1018-1025 describe the relatively little known about sulfate (and mercury) in the Lake, and states that no sulfate research has been conducted on the Lake to date. It would be constructive to mention the planned research described in Appendix 3B of the 2008 SFER.
The chapter should also include a description of plans to account for potential impacts on the lake from urban/suburban development affecting the upper watershed.

Posted: 08 Oct 2007 04:43 PM
Originally Posted: 08 Oct 2007 04:41 PM

profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

Go t

Select Conference

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 10: Lake Okeechobee – State of the Lake and Watershed » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author	Message
jeff jordan	**Subject:** Comments by Meganck

Total Messages 15

1. Are the LOWP-related storage areas referred-to in lines 87-88 all “off site”? If so, why is that the case, or why was it designed in that fashion?

2. I am confused by the reference in line 114 to average TP loads at 179ppb and that in line 118 at “over three times higher than the goal of 40ppb.” Is TP more than three times or four times the goal of 40ppb?

3. Reference table 10-8, Taylor Creek study, is there any indication as to how cost effective this methodology/technology is - based on the experience to date?

4. Reference table 10-8, Technical Assistance Review and Analysis of Existing Data for Evaluation of Legacy P in the Lake Okeechobee watershed. I am curious as to the validity of key research question number 2 given the range of climate / lake watershed conditions during any water year.

5. Reference the same study as in question number 2. What is the start date of the project? Aren’t average data plus average climate data over s number of years needed to ensure the predictive capability of the plan/model?

6. Reference table 10-8, Wetland BMP Research, research question number 1. I there a herd size to wetland size (man-made or natural) ratio that can be applied as a baseline for designing this type of research project?

7. Reference table 10-8, Wetland BMP Research, research question number 4. What has been District experience to date in natural and man-made wetlands in terms of storing P?

8. Reference table 10-8, Dairy lagoon Seepage characterization and Remediation Processes. Do ponds have to be drained before stored P can be effectively removed or are their techniques to remove P from bottom strata in standing water?

9. How does the water quality monitoring work reported in the section beginning on line 788 interface with the work being done to develop a comprehensive water quality model for South Florida (reported in chapter 1B)?

Posted: 17 Sep 2007 04:34 PM
Originally Posted: 17 Sep 2007 04:32 PM

profile | quote | reply

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 10: Lake Okeechobee – State of the Lake and Watershed » chapter 10

Show New Messages

Tree View | Topic | New Topic | Prev Topic

Author | Message

ellen van donk

Subject: chapter 10

Total Messages 4

Chapter 10. Comments and questions: by Ellen van Donk

General comments

The authors of Chapter 10 were responsive to the Panel's recommendations and comments. Chapter 10 has been enhanced from the 2007 report by additional material which addresses several points raised by the Panel last year. This chapter, however, still needs more integration with other chapters. The Kissimmee River is a major source of water and chemical constituents to the Lake, which in turn supplies water and materials to the EPA, the St. Lucie Estuary, and the Caloosahatchee Estuary. The impacts of the upper watershed on the lake, and of the lake on the St. Lucie and Caloosahatchee Estuaries and the EPA, should be described. The chapter should also include a description of plans to account for potential impacts on the lake from urban/suburban development affecting the upper watershed.

Some questions

In Table 10-3 of the 2007 Report the project in Josephine Creek is mentioned. In the 2008 report the same table (Table 10-5 on page 10-22) is given without this creek. Is this project not important anymore??

In the 2007 South Florida Environmental report there is a paragraph on pag. 10-53 concerning "Current velocities inside SAV beds in Lake Okeechobee". I can not find information on this subject in the 2008 report. Has this research been stopped??

On page 10-60 has been written that: "It is expected that the recovery sequence of SAV from the current drought conditions should be similar to that observed after the 2000-2001 drought. Once re-flooding occurs, *Chara* should rapidly expand across the nearshore areas in the southern region and then spread around to the western and northern regions. Assuming that light conditions remain favorable and the sedimentary seed bank is still viable, *Chara* should decline and vascular plants should become dominant. Research to evaluate the nearshore seed

bank status will be conducted as sites become re-inundated". Further is stated that: "one impact of hurricanes has been the redistribution of muck sediments from the central pelagic zone to more nearshore and littoral region. On Pag. 10-82 is further written that low water levels on Lake Okeechobee provided a management opportunity for the District to cost effectively remove muck sediments from nearshore regions of the lake. Once these muck sediments are removed and water levels return to normal, the anticipated environmental benefits include improved water clarity, return of submerged plants and increased critical habitat for fish and wildlife".
I just wondered whether this removal of phosphorus laden muck sediments will also remove many seeds of submerged macrophytes. Return of submerged macrophytes will then be delayed. Is it not better to look at the seed-bank status before the removal?? Further I wondered whether *Chara* can grow in areas where the muck has not been removed? These plants do not like high P concentrations.

Is it not useful to expand the experiments described on Pag. 10-64 "Light Influence on the Growth and Germination of Submerged Aquatic Vegetation" with more interacting factors e.g. phosphorus in the sediment?

Posted: 17 Sep 2007 12:31 PM
Originally Posted: 17 Sep 2007 12:29 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Prev Topic

Go t

Select Conference

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 11: Kissimmee River Restoration and Upper Basin Initiatives » CHAPTER 11: QUESTIONS AND SUGGESTIONS

Tree View | Topic | New Topic

Author	Message
Joanna Burger	**Subject:** CHAPTER 11: QUESTIONS AND SUGGESTIONS

Total Messages 11

CHAPTER 11

OVERALL:

The Background information is excellent because it puts the rest of the chapter in perspective.

The separate discussions of Wilma and Ernest also presented a good overview of the water problems, that spill into Lake Okeechobee.

The discussion on the biological effects of water conditions (and the drought) is largely limited to wading birds. What happened to other species? Foraging areas seem to be key, and potential management options need to be explored.

SPECIFIC QUESTIONS

LIne 91-92: How many years have the low water conditions persisted?

Lines 200-on: What effect did the channelization have on the food web in the terrestrial environment that previously had more water flow?

Line 368: Considered by whom?

Line 387: It would still be useful to have one sentence relating to nutrient loads.

Lines 448-451: What is the relative contribution of agriculture versus the other sources to phophorus problems?

Lines 460-467: Since the Kissimmee is considered separately from some of the other chapters, what are the problems with mercury? While lines 460-467 discuss mercury, no details are given. What fish are impaired, at what levels? are there mercury advisories?

Line 529: What happens when water levels reach high pool stage?

Lines 647-on: What was the food web effect of the fish kill: could some number be put on the fish kill (and relative to others in the region)?

Line 690: How many snail kite nests are usual?

Lines 784-786: How numerous are the fish camps? how important to the local economy?

Lines 796-797: Are these areas only used for foraging, or for nesting also. What happened to wading bird nesting in the region?

Lines 929-940. Have the phosphorus loads changed since 2001? By what amount?

Lines 966-on: What is the current condition of floodplain vegetation, and is it returning to previous levels? The mapping project partly answers this. Are there any pre 1952 data? When did the water regime start to change in this region?

Line 1188: abandoned because of lack of foraging sites because of the drought?

Table 11-3: One might expect with increasing environmental quality, the wading birds would move back. Are there any data on prey availability or density?

Lines 1240-on: it says most foraging areas were dry; there are no other associated foraging areas in the region?

Lines 1312-1318: More details are needed on the outreach component: what does it consist of, how often, what happens to their input?

Fig 11.-17: Since many of the years were dry, the big decrease is unexpected. I assume this is foraging birds. Need to give the region of survey.

Posted: 13 Sep 2007 11:11 AM
Originally Posted: 13 Sep 2007 10:31 AM

Author

JoAnn Burkholder

Total Messages 18

Message

Subject: **Review of Chapter 11 - Burkholder**

Chapter 11 Kissimmee River Restoration and Upper Basin Initiatives

Questions

There was little mention of the encroaching development that is occurring adjacent to the upper watershed (2007 SFER). While this development cannot be controlled by the District, what studies are being conducted that will enable the District to better assess impacts of this urbanization on the Kissimmee River and watershed?

Much of the Kissimmee River restoration depends upon planned replacement of Zone B releases with releases under the Headwaters Revitalization Project proceeding on schedule for completion in 2011 under KRHRP?

What was the source of the spoil material that has been used and is planned for use in backfilling efforts (e.g. lines 298-299)? This question is an example of a broader concern about how the methodology used in restoration impacts the system. How are benthic fauna, an important component of lotic systems, being considered by the District in river restoration?

How is the District tracking mercury bioaccumulation and impacts in the basin, considering that it is not involved in monitoring mercury in the basin? Will the mercury information for the Kissimmee system be included in the overall evaluation of mercury in the Everglades? Is the District involved in, or planning to initiate, studies on impacts of mercury on the Kissimmee ecosystem?

When did the SFWMD begin its long-term water quality sampling program in the Kissimmee basin (line 469)?

What are the District's plans to assess the causative factors for the apparent increase in seed germination and growth of native SAV in the littoral zones of several monitored lakes in the Upper Basin? What actions/future projects are planned to combat

hydrilla, now that it apparently has acquired resistance to the herbicide fluridone? How serious of a problem was hydrilla in WY2007, and what are evolving expectations about its role, and the role of other exotic species in the KRRP?

Relatively few DO stations are included thus far along the Kissimmee River and the Pools (lines 833-838), and only two of 9 stations provide continuous data; the rest have a monthly frequency of data collection. Are there plans for the District to add more stations, including more with continuous data collection?

Is the District planning to examine changes in P storage in the restored reach of the Kissimmee River (lines 1020-1031)?

In efforts to restore the pre-channelization floodplain vegetation, what steps are being taken by the District to encourage broadleaf marsh plants to re-establish in the river floodplain, while discouraging growth of wetland shrub species?

Is it possible to estimate how many nesting colonies, roughly, would have been expected historically within a rich floodplain such as the natural floodplain of the Kissimmee River? Is progress planned to assess whether there are abundant habitats/locations available for nesting sites?

General Comments

As a major source of water, pollutants and other materials to Lake Okeechobee and downstream ecosystems, activities and conditions in the Kissimmee basin can have significant effects throughout South Florida. The major goal of the District under the Kissimmee River Restoration Project (KRRP) is identified as restoring ecological integrity to the Kissimmee River and floodplain ecosystem through a long-term management plan for the Kissimmee Chain of Lakes (KCOL), while retaining the existing level of flood control in the watershed as a whole. This chapter provides an excellent historic account of Kissimmee River/watershed channelization impacts, and an update on environmental conditions and District activities toward restoration goals in WY2007.

The chapter is designed to be reduced in content from previous years, and is intended primarily for accountability review (progress in District programs and projects during WY2007). It focuses on four general areas including (1) a description of environmental conditions in the Kissimmee River watershed, (2) newly available data from the KRREP (Kissimmee River Restoration Evaluation Program), (3) recent planning efforts, and (4) summary updates on the status of selected projects.

It seems in error that Chapter 11 was not designated for integrative review. One of the four main sections of its

organization is “Cross-Watershed Activities”, which is strongly integrative in character. In fact, that section is generally excellent in integrative quality. Integrative review is therefore included below, as well as accountability (primary) and technical (secondary) reviews as requested by the District. It should also be noted that it seems problematic that this chapter was assigned for technical review – since it was shortened from the format of previous years as stated above, technical discussion and details that would previously have been included were omitted by design. This situation would seem to frustrate both the authors and the reviewers. The review below is submitted in the spirit of attempting to be as helpful to the authors as possible, within this situation.

Chapter 11 describes a difficult water year with a sustained, severe drought that wreaked havoc with District plans and progress in restoring the Kissimmee River and upper basin lakes. Restoration efforts in the Kissimmee watershed are already an uphill battle, given the severe channelization and deepening of the Kissimmee River in 1962-1971 by the C&SF Project and other flood control projects that were imposed (lines 128-129). WY2007 provides an unfortunate, all too realistic illustration of the fragility of restoration efforts against major human water supply needs in the region and extreme climatic events (e.g. Hurricane Wilma in WY2006 followed by this severe drought in WY2007). Because of water supply demands during this sustained drought, releases from the upper watershed to the Kissimmee River were stopped for 252 days (8 Nov. 2006 – 18 July 2007), effecting no-flow conditions in the Phase I reach and eliminating much of the floodplain area habitat for wading birds. Thus, WY2007’s dry season was the first since Phase I completion that failed to meet the restoration expectation of ~30 birds/km^2. Discharges from Lake Kissimmee at S-65 were also stopped, so that there was no flow from the Kissimmee River to Lake Okeechobee for 184 days (16 October – 18 July). Moreover, during 16 Oct. 2006 – 21 July 2007, there was only intermittent flow in the river at S-65E. One ecosystem component (perhaps the only one?) that may have profited from the drought was native lake littoral zone SAV in the Upper Basin.

Organization – Whereas the 2007 SFER version of Chapter 11 seemed well organized, the restructuring/ shortening effort this year resulted in writing that does not seem as clearly organized. A recurring problem is that adequate setup information is not provided up front, for example, to help readers understand the KRRP’s Phases I-IV. It is important for the Introduction and Background section, or the Kissimmee River Restoration Project and Associated Initiatives section (i.e. near the beginning of the chapter), to include a table that clearly, briefly describes the KRREP, KRRP (including description/ timelines of Phases I-IV,

KRHRP, KBMOS, KCOL LTMP, and LOPP, and their inter-relationships.

The addition of such clarifying information is much needed. As presently written, for example, readers are left to wonder, through much of the document, what the four phases are and what they are supposed to accomplish (readers are later informed that they all involve backfilling), and why Phase I (completed in 2001) is followed by Phase IVA (which has not been explained, except "for logical reasons"). Readers first logically but wrongfully believe that "a second phase of backfilling, initiated in June 2006 (lines 48-49) is Phase II – they later are informed that this "second phase" is really Phase IVA (lines 290-305).

Accountability review

In WY2007, the District completed preliminary planning for KRRP Phases II and III (these should be defined as noted above, with supporting rationale – e.g. why was the Caracar Run or Lanier Floodplain area of Pool D targeted for the ecological studies?), and continued efforts to assess restoration progress. New available data from the Phase I area included two water quality studies (DO, P), floodplain vegetation responses (from aerial photos in 2003), and an analysis of wading bird nests and foraging use of the Kissimmee River floodplain. The District logically continued to follow the Zone B1 line in 2007, based on the fact that multiple years of data are needed to evaluate the efficacy of this management alternative (lines 539-543).

An important feature of the District's approach to managing the Kissimmee waters is the use of an emergency modeling team that is used to guide operations during flood events in an attempt to minimize adverse effects on the ecosystem. The District also has infused adaptive management in its periodic re-evaluations and revisions of the stage regulation schedules used for the C&SF Project structures in the Kissimmee watershed so as to minimize the potential for adverse impact to downstream ecosystems. The authors indicate that the KBMOS provides an example of a regulation schedule review. Missing from the writing, though, is explanation as to how the accountability of KRRP will actually be evaluated as restoration efforts continue.

The KBMOS is an exciting, valuable effort in the restoration process. Its final deliverable (June 2008) will be modified interim and long-term operating criteria for the Kissimmee basin water control structures that optimize ecosystem recovery within mandated hydrologic requirements. Development of the LMP, another excellent effort, appears to be progressing well. Among the smaller projects described in this chapter, the Three Lakes Wildlife Management Area and Rolling Meadows/Catfish Creek

restoration projects are progressing, but very unfortunately, the promising Packingham and Buttermilk Sloughs project had to be abandoned because the wildlife (birds) accompanying restoration would have conflicted with operations at a nearby airport (FAA Advisory Circular – hazardous wildlife attractants).

Technical review

It would be helpful to clarify (lines 469-478) more about the District's water quality sampling program – length of time, station locations, duration of data collection and parameters sampled at each station, frequency/consistency of sampling at each station, and consistency of analytical techniques.

The inclusion of additional data past the end of WY2007 is a sound approach, and enables the authors to discuss the full duration of the sustained drought (lines 491-492). Figures 11-4 and 11-5 are well conceived and very helpful in conveying how conditions changed in East Lake Toho and Lake Toho over time.

Maps – Figures 11-1 and 11-2, repeated from the previous SFER, are generally excellent, but there is need to show additional features (likely on an additional map or two) that are discussed in the text without providing readers with information on where the features are located. These features include Weir #1 (p.11-19); the Phase I floodplain (is shown in Figure 11-15 but out of context with the rest of the basin; would be very helpful to show in Figure 11-1); PC62 (p.11-21); C-37 canal (p.11-23); the SFWMD water quality monitoring sites (p.11-13) in lakes (Lakes Kissimmee, Cypress, Hatchineha, Tohopekaliga, East Tohopekeliga) and three main tributaries (Boggy Creek, Shingle Creek, Reedy Creek); Caracara Run and the Lanier Floodplain area of Pool D (p.11-40); and the Three Lakes Wildlife Management Area (p.11-44).

Major water quality issues in the Kissimmee basin were identified as bioaccumulation of mercury, nutrient transport, lake eutrophication, and low dissolved oxygen. It is therefore unfortunate that the District is not involved in any monitoring of mercury in the basin. Is the District involved in, or planning to initiate, studies on impacts of mercury on the Kissimmee ecosystem? It would seem that such action would be needed to assess the influence of mercury bioaccumulation on restoration success.

Dissolved oxygen (lines 56-57, 641-666, 718-725) – Standard errors or standard deviations and "n" values should be included where mean DO concentrations are reported. Mean DO prior to tropical storm Ernesto was at a level that adversely affects fish health (3.35 mg/L). Post-storm levels were at < 1 mg/L (1 Sept. 2006) , 0.1 mg/L on 7 Sept., ≤ 1 mg/L for the next two weeks, and only 2 mg/L by early October. Predictably, the

already-severely stressed fish (all species, even low-oxygen-tolerant catfish) under hypoxic conditions pre-storm (depth ~0-1m: 3 mg/L on 11 July [lines 723-725], 3.35 mg/L pre-Ernesto) died when the "restored" (more accurately, so far, backfilled) reach of the Kissimmee River and Pool C went anoxic (< 1 mg DO/L). The writing describes this as a "small" fish kill, yet very likely all of the fish present died. Various authorities in fish kill evaluation (e.g. the American Fisheries Society) define a major fish kill as ≥ 1,000 fish affected, and ~2,000 dead fish were reported. The fact that DO was already depressed, prior to the tropical storm, to a level that can severely stress fish health, and that DO then sank even lower to anoxia (down to 0.1 mg/L, technically below the technique/instrument level of detection – line 846), seems at odds with the statement in lines 662-666. These fish clearly were stressed at 3.5 mg/L; moreover, few fish species can physiologically adapt to anoxia. Lines 641-666 should be rewritten accordingly.

The authors should clarify lines 718-719 (31 October 2006 was the end of the critical period for low DO?). Here readers first learn that data are available for bottom-water DO. Writing needs to be added to explain how the benthic fauna are being considered in restoration. DO figures for minima (depth 0-1 m, and depth ~2 m) should be added. For Figure 11-7 – Bankfill stage should be defined in the legend or where it first appears in the text.

Pp. 11-24 to 11-27 – As in comments on the 2006 SFER's coverage of the Kissimmee watershed, a major concern remains about the use of mean DO as a restoration performance measure (PM). It is well established that in aquatic ecosystems, the worst DO "sags" occur before dawn, yet mean daily DO was selected as the PMs (lines 853-860). Two of the eight streams from which "reference conditions" were derived are also suspect. The PMs also seem questionable: It is doubtful that the pre-channelization Kissimmee River typically had < 2 mg/L, or 2-4 mg DO/L at depths ≤ 1 m (PMs 1-3). The PM for DO concentrations at depths from 1-2 m (bottom) considers severe hypoxia bordering on anoxia (~1 mg/L) as acceptable, although it is well known that many benthic organisms in lotic ecosystems require 4 mg/L or more for healthy growth and low physiological stress. It is encouraging that restoration expectations for DO concentrations in the restored river channel are to be re-evaluated after implementation of the KRHRP regulation schedule (p.11-26).

SAV in lake littoral zones (Toho, Kissimmee, Hatchineha, Cypress; lines 699-709) – Native SAV (*Valisneria, Potamogeton illinoiensis*) apparently increased seed

germination and growth in the littoral zones of several monitored lakes in the Upper Basin – perhaps in response to prolonged low water levels (and increased light?), or to discontinued herbicide treatments for hydrilla. Explanation should be added about the District's plans to assess the causative factors for the apparent increase in seed germination and growth of native SAV in the littoral zones of several monitored lakes in the Upper Basin. The District's planned actions/future projects to combat hydrilla, now that it apparently has acquired resistance to the herbicide fluridone, should also be described.

Phosphorus - Increased phosphorus levels at the southern end of Lake Kissimmee are, as in the 2007 SFER, unexplained and could confound management goals. The panel had requested clarification of the steps being taken in the 2008 SFER to identify the sources of this elevated phosphorus, and also had requested assessment in the 2008 SFER of progress in resolving the source(s) of the elevated P. Unfortunately, the drought prevented planned data collection of runoff, and made sampling access more difficult (private property issues etc.), so no water quality samples were collected from this site in WY2007. Line 943 - Additional explanation (number, frequency) about the composite samples is needed (line 943). Figures 11-11 and 11-12 are very helpful. Lines 985-989 – another factor that should be considered here is increased regeneration from bottom sediments because of the hypoxic/ anoxic conditions. Are data being taken to resolve the role of low DO in higher P release?

Project updates – other information

River metabolism – This study was completed some time ago (1998-2003), and the information became available this year in the peer-reviewed literature. For the chapter text, at least brief technical detail is needed (number of stations sampled, number of replicates, description of the variability in GPP). Figure 11-13 should include error bars and "n" values. The data were interpreted to *suggest* that the connection between the river and its floodplain has been partially restored. Additional data will be needed to assess whether this is the case.

Floodplain vegetation responses – Aerial photographs (1952 pre-channelization, 1974 (3 yr after completion of channelization), and 2003 (2 yr after completion of Phase I restoration construction) were the basis of this valuable study. Tables 11-1 and 11-2 are very helpful. While reestablishment of wetland plant communities did occur rapidly in the Phase I area, the pre-channelization community has not been achieved: broadleaf marsh plants historically dominated but remain low in abundance, while wetland shrubs and other

wetland types are disproportionately higher than historically. In Figure 11-14, it would be helpful to add a wetland shrubs panel. The PMs for wetland vegetation in the restored floodplain seem well conceived (p.11-36). Additional aerial photos will be taken in spring 2008.

Wading birds – Use of wading birds is a sound approach because they integrate ecological conditions. Unfortunately, only 1 nesting colony was found in severe drought WY2007, and it was unsuccessful (abandoned in mid-season); moreover, nearly all wading birds cattle egrets (exotic species). Even in 2006, however, there were only 5 nesting colonies within the Kissimmee River floodplain. This seems very low for such an historically rich area. The legend for Figure 11-17 should include more information (e.g. "n" values and what they mean).

Integrative review

A major priority of the Kissimmee Watershed Program is to integrate watershed and river restoration management strategies. The District's recognition of the critical need for this integration was also reflected in its action to expand the Kissimmee Program to include more of the Kissimmee watershed, especially some of the Kissimmee Chain of Lakes (KCOL, 19 water bodies). In addition, the stated goal of Phase II/III evaluation is to better understand relationships among individual components of ecosystem response to restoration through increased integration of a subset of studies (p.11-40).

Coordinated initiatives include the KRRP, KRHRP, and the interagency KCOL LTMP. The latter Plan is designing collaborative strategies for identifying when management intervention is needed, or when management actions should be modified to achieve targeted goals. Integration is also being strengthened by the KBMOS major modeling effort, which assesses basin-wide effects of alternative operations schedules for flow control structures in the watershed while also considering impacts of the resulting discharges on Lake Okeechobee. Flows in the Kissimmee River are formally considered in decisions for managing outflows at Lake Okeechobee.

The chapter helpfully, if briefly on some issues, explains how management of the Kissimmee relates to/coordinates with management of the rest of the Everglades system. One area that is missing in integration is how the Kissimmee restoration plans will be integrated with management of exotic species.

Regional water-related issues, beyond the watershed, that will affect the Kissimmee basin – for example, urbanization – were

identified as a primary District concern. The District is continuing to strengthen relationships with agencies and other entities that control these areas which are outside of the District's purview. It was very encouraging to learn that, because of recent changes to LOPA (the Lake Okeechobee Protection Act), the Lake Okeechobee Works of the District Rule is being revised to include the Upper Kissimmee basin, so implementation of BMPs will be required of landowners, rather than on a volunteer basis. It would be helpful to include more information about these mandatory BMPs in future SFERs once this revision to the rule is in place.

Editorial changes

Figure 11-2 legend, 4th line – Revitalization…
Throughout document (e.g. p.11-9, lines 282-284) – consistency is needed in presentation of units; metric (English) format is recommended. Should check throughout (e.g. Figure 11-3, p.11-45).
Line 557 – change to: …150 cfs (Figure 11-5C).
Line 562-563 – should be omitted (already stated).
Figure 11-6 - would benefit by previous information to inform readers as to the location of Weir 1 (see "Maps" comments above). The legend for this figure should also explain to readers why the stage recorder was deactivated (explanation presently occurs later, on p.11-22 – because of backfilling).
Figure 11-7 – should be moved up to p.11-20. The bankfill line (Figure 11-7B) should be clarified (difficult to see). The legend for Figure 7C should be: (C) mean dissolved oxygen…
Line 791 - …the mean daily concentration…
Line 815 – monthly data are insufficient to show effects of extreme climatic events; this writing should be altered accordingly.
Line 837 - …on eight free-…
Figure 11-9 – change the colors to match those in Figure 11-8 (reduces confusion).
Figures 11-7C and Figure 11-10 – aren't these figures supposed to show the same data? (they differ slightly – and if they are showing the same data, then Figure 11-10 could be omitted.
Figure 11-15 – add 2003 to map at far right.
Line 1159 - …dominated by wetland shrub vegetation…
Line 1284 - …four headwater
Figure 11-17 – should be moved to p.11-41.

Posted: 19 Sep 2007 09:00 PM
Originally Posted: 15 Sep 2007 06:07 PM

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 11: Kissimmee Basin » chapter 11

Show New Messages

Tree View | Topic | New Topic | Next Topic

Author | Message

ellen van donk

Subject: chapter 11

Total Messages 4

Comments and questions by Ellen van Donk on Chapter 11

I miss in the Introduction a table that describes all abbreviations used in this chapter, like: KRREP, KRRP, KRHRP, KBMOS, KCOL LTMP, LOPP etc.

On page 11-19 is written that on Sept. 6 approximately two thousand dead fish were found in both the restored reach of the Kissimmee River and in the downstream reach of the C-38 canal remaining in Pool C. My question is: what were the consequences of this for the rest of the food web. Did you see an increase in transparency??

More clarification is still needed how management activities in the Kissimmee are integrated with management for the rest of the Everglades system. Clarification should include explanation of how the phosphorus and mercury information will be included as part of the overall Everglades evaluation of mercury contamination.

Is the increased seed germination and growth of SAV in the littoral zones of several monitored lakes in the Upper Basin a response to prolonged low water levels (and increased light) as in Lake Okeechobee, or to discontinued herbicide treatments?

Posted: 17 Sep 2007 01:21 PM
Originally Posted: 17 Sep 2007 01:19 PM

email | profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic | Next Topic

Go t

Chapter 11: Kissimmee River Restoration and Upper Basin Initiatives
Accountability Review

Prepared by: Robert C. Ward ('B' Review)

In lines 957 – 964 (page 11-29), an explanation is provided for the TP concentrations being higher today than during the restoration construction activities, being higher than pre-channelization conditions – from former pastures and flood plain transitions from terrestrial to wetland vegetation. Would you not expect spikes in TP concentration from restoration construction activities also? At times it would seem the construction activities would be a major source of TP.

Lines 1321-1338, page 11-40, discuss development of the Kissimmee Chain of Lakes Long-Term Management Plan. The plan will include measures of ecosystem health along with tools to assist in management decision making. Is this effort being coordinated with RECOVER, discussed in Chapter 7, and the water quality monitoring re-engineering discussed in Chapter 1B? If so, describing the coordination would be helpful. If not, there are opportunities to coordinate the production of management oriented water quality and ecosystem information, *across South Florida*, that could greatly facilitate decision making at all levels of water management, including communication with the public.

Is the water quality monitoring conducted in the Kissimmee River region coordinated, in any way, with the water quality monitoring conducted in the Everglades Protection Area and reported on in Chapter 3?

Chapter 12: Management and Restoration of Coastal Ecosystems
Accountability Review

Prepared by: Robert C. Ward ('B' Review)

Chapter 12 is an overview of the research activities of the Coastal Ecosystems Division (the term 'Program' was used in parts of the text). The Division seeks to provide insight and understanding of the connection between water for human needs (e.g. water supply and flood control) and the water needs for a healthy coastal ecosystem. This tension must be addressed if society is to move from the water resources 'development' orientation of the 20th century into a water 'sustainability' orientation for the 21st century. Chapter 12, along with Chapters 10 and 11, indicate that the SFWMD is on the forefront of connecting human needs with ecosystem needs and evolving a sustainability-oriented management infrastructure.

The overview of management and research activities associated with restoring coastal ecosystems in South Florida, presented in Chapter 12, is readable and informative. The reader is left with a good understanding of the critical issues facing each coastal area as well as efforts of scientists and managers in addressing the issues.

In trying to understand connections among the staff producing Chapters 10, 11 and 12 (and Appendix 6-1), I searched the SFWMD webpage for an organizational chart. I was unable to download it. Given the stated need to connect research products with operational policy, there needs to be some indication in Chapter 12 of how the staff of each are organizationally related.

Chapter 12 and its research plan in Appendix 12-1, focuses on research and ecosystem understanding – their mission. At some point in the future, there is a need to integrate new ecosystem health and human water connections into management decision making, in an ongoing, routine, fashion. While the current coastal ecosystem knowledge base may not support strong integration, of a routine nature, it is time to begin to examine how the emerging coastal ecosystem health knowledge will become a part of the standard operating procedures in the Water Resources and Operations and Maintenance portions of the SFWMD. There are hints of such connections in Chapter 12, but they are not well developed. For example, on page 12-88, the 'stoplight' method for presenting SAV findings to managers and the public is discussed.

The Chapter could use more explanation of how its mission and research efforts are connected to the larger mandates of society and needs of a water management organization. To illustrate the vagueness of this connection, as presented at the beginning of Chapter 12, lines 42-47 contain the following terms:

1. science activities
2. technical activities
3. freshwater flows
4. science strategies

5. restoration efforts
6. management efforts
7. Comprehensive Everglades Restoration Plan
8. operations and maintenance
9. water supply

The exact meaning and connections of science and management, attempted to be explained in these lines, is not clear. Lines 47-49 clearly state:

> "The Coastal Ecosystem Program's primary role is to provide the required information necessary to design effective restoration and protection measures for the estuaries, and inform decision makers.

I am willing to go even further with the above line of thinking and suggest, if it has not been done already, that there needs to be an operations person directly connected to, and/or serving on, each research project's staff. It is not advisable to produce new ecosystem knowledge without having management actively involved in each step of the research itself. Why? As scientists seek new knowledge, their questions are framed around the needs of science. As new knowledge is presented to managers, they, generally, have a different set of questions that should also be incorporated into the research as it is being conducted. In this manner, when the final scientific findings are produced, most, if not all, of the water manager issues about the new knowledge will have been addressed. This greatly facilitates movement of research findings into practical application. [The above observations come from experience in directing a water and water-related research program that was designed to better inform the scientific basis for water management decisions in Colorado.]

The research plan presented in Appendix 12-1, acknowledges the need to connect legal mandates to management goals, to management objectives, and to mission element (in Figure 1). To incorporate a stronger bridge to future applications of the research findings, the plan should expand its discussion of Figure 1 to quote, directly, statements from the mandates to insure the details of the purpose of the coastal ecosystem research efforts are clear to everyone. In addition, each research project description/update should indicate how the research is being connected, as it is being conducted, to its ultimate users – water management decision makers. Future research updates could then explain what issues are arising, among both scientists and water decision makers, regarding accommodating ecosystem health into water management decisions. In this way, implementation issues can, hopefully, be resolved as the new knowledge emerges and not after it is produced.

Specific Questions:

1. Line 36 – Average monthly flows are sought for management goals. These are helpful in managing water under average conditions. Are there guidelines under consideration to help decision making under natural hydrologic extremes, such as floods and droughts?

2. Figure 12-4 presents the current year's data while Figure 12-3 presents data back to the year 2000. Could Figure 4's timeline be extended back in time?
3. Line 141 refers to Figure 12-4 as showing maximum inflows have not been exceeded, but it contains salinity data.
4. Line 322 indicates minimum flow target of 35 cfs. Figure 12-13, if I understand the data, shows minimum not maintained for long periods of time. As I read the text, the non-compliance is tolerated until future projects will solve the problem.
5. Not all coastal area research is being addressed/led by the SFWMD Coastal Ecosystems Division, e.g. the Lake Worth Lagoon. Is this the only coastal water body with another organization leading the effort?
6. From a strategic research planning point-of-view, why have minimum flows been developed for some coastal ecosystems, but not all (e.g. Lake Worth Lagoon and Biscayne Bay)?
7. Figure 12-20 has its axis labeling blocked out on my computer. Is this a problem with my computer or the text?

Chapter 12: Management and Restoration of Coastal Ecosystems
Date of Chapter Draft: 08/27/2007
Authors of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability: Primary
Technical:
Integrative: X
Reviewers:
AA: Armstrong
A: Burkholder
B: Jordan
B: Ward

Chapter 12: Management and Restoration of Coastal Ecosystems is to receive review primarily at the Accountability level with consideration at the Integrative level. Accordingly, the following questions are addressed in this review of Chapter 12:

1. Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?
2. Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
3. Are findings linked to management goals and objectives?
4. Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
5. Is the chapter cross referenced in a thorough and consistent manner?
6. Is there any constructive criticism and guidance to offer for the District's large-scale programs?

Before addressing these questions specifically, it must be noted that the presentations in this chapter are closely tied to the Coastal Ecosystems Division Science Plan presented in Appendix 12-1 and which is to receive special review by the Panel. So closely tied is this Plan to Chapter 12 that some review of the Plan is needed here to set in context the responses given below to questions (1) through (6) listed above.

In developing the Coastal Ecosystems Division Science Plan, the Coastal Ecosystems Program (CEP) has constructed an approach for coastal ecosystem management that is basically sound as a solid starting point for managing the coastal ecosystems, the waters that flow to them, and their watersheds, but it is incomplete. While the Plan is not necessarily unique - for it embodies approaches taken by water regulatory agencies in other states since at least the 1950s in which water resources are often scarce and in which the coastal ecosystems support commercially important finfish and shellfish and their associated support structure - the Plan is a integration of science, engineering, and management within the District and perhaps most importantly it begins to elevate the value of freshwater inflows (and their needed spatial and temporal variability) to Florida's southern estuaries to a level commiserate with municipal, industrial, and agricultural water supply.

One can quibble with Alber's (2002) overly simplistic conceptual model for freshwater inflow impacts on estuaries derived from her literature review (see Figure 2 of Appendix 12-1) or the classification of watershed, hydrologic, water quality, and ecological models presented in Table 1 of the same appendix. For example, Alber (2002) discusses in her article the transport and mass loading of organics and nutrients along with flows to estuaries, impacts of flow reduction such as salinity intrusion and alterations in circulation within and flushing from estuaries, alterations in geomorphology, impacts on species composition, abundance, and distribution due to tolerance limits, primary and secondary productivity supported by the flux of organics and nutrients to the estuaries, yet these important processes are not incorporated into her framework. The District mentions many of these factors in its Plan and seems to recognize the importance of nutrient recycling of nutrients by adding "Processing of Material" to Alber's conceptual model diagram, but the implementation of the Plan in the coastal systems under its jurisdiction does not really deal with anything more than tolerance limits to salinity and the resulting effect on species distribution.

With regard to Table 1, water quality modelers would include statistical models and simplified mass balance models in the simple models category. The steady state "box" model or continuously stirred reactor (CSTR) model as it is more commonly called, for example, would fit there, and Thomann's (1972) use of such a model for Hillsborough Bay in Tampa, FL illustrates their practical use. Plug flow and dispersive flow models would be appropriate for the linear estuaries. Finite segment, mass-balance, steady-state models would be classified as Intermediate models – they are not included in Table 1 but would be simple, spreadsheet-based, powerful tools useful in each one of the coastal systems the District manages. Thomann and Mueller (1987) describe their application to the Wicomico Estuary in Maryland (one dimensional), Boston Harbor (two dimensional), and Lake Erie (three dimensional).

Likewise, the resource-based Valued Ecosystem Component approach is in fact the approach taken by state water regulatory agencies since the 1950's when commercially important finfish and shellfish were the focus of freshwater inflow management as "key species," expanded in the 1960s and 1970s to incorporate the food chains and habitats of these organisms and eventually nutrient cycling. The USEPA formalized it as the Valued Ecosystem Component approach in 1995 as part of the National Estuaries Program but adapted it from others who have originally proposed a similar name in the mid-1980s (from Alber 2002). Regardless of what name is applied to the concept, it is one that has been in play for half a century. But the point is that the District and its CEP has adopted the concept as part of its Integrated Modeling and Assessment Framework, and that is highly significant.

As comprehensive as this Integrated Modeling and Assessment Framework is, the one concern with it is its strong focus on salinity as the primary indicator for management purposes of freshwater inflows on the estuaries within the District's boundaries. Yes, salinity is a strong indicator of the impact of freshwater inflows on estuaries and it is a major influence on the distribution of biota in estuaries due to their tolerance limits as noted above, but the flux of organic materials and nutrients to estuaries and their cycling within the estuaries governs system productivity. For commercially important species, it is productivity or commercial yield from coastal systems that is most important. What is largely missing from the Framework is the consideration of organics and nutrients. Armstrong (1982) developed relationships between the

average fraction of freshwater in estuaries caused by freshwater inflows, nutrient areal loading rates, and secondary (key species of finfish and shellfish) productivity in Texas estuaries (see attached figure); these are relationships that could be and should be explored in the lower Florida estuaries.

The heavy focus on salinity as the primary indicator of freshwater inflow and their influence on the distribution of VECs may have its roots in the outcome of the Estuarine Research Federation conference entitled "Freshwater Inflow: Science, policy, and management" held in St. Pete Beach, FL in November 2001. The Alber (2002) article was an outcome of that conference as was another article (Montagna, et al. 2002, which included a District co-author) which summarized the conference and spoke to the issues of estuarine management. They summarized the issue by saying that:

> An improved understanding of the functioning of estuarine systems has allowed for increased sophistication of freshwater inflow management techniques. … These sophisticated biological and modeling approaches are very data intensive and a few simple principles may be sufficient for making water allocation decisions with competing demands are not extensive.
>
> The nature of these decisions makes them amenable to using adaptive management, i.e., using the results of ongoing monitoring and assessment to modify and optimize the operating decisions. Because we are still learning about the properties of these systems, we must develop ways to improve out understanding on how the systems we manage function and about the process of adaptive management so that future capabilities can be improved.

The District's management objectives of (1) improving timing, volume, and delivery of fresh water, (2) improving operation of District infrastructure, (3) improving and protecting water quality, and (4) rehabilitating estuarine habitats as articulated in this Appendix are very good objectives, and it is presumed that over time the District will practice adaptive management and over time move beyond salinity as it primary indicator of the impacts of freshwater inflows to other indicators that are also water quality as well as biologically based such as food chains (phytoplankton and detrital), nutrient cycling, and primary and productivity.

Following are responses to the six questions listed above to be addressed for chapters being reviewed primarily as Accountability and secondarily as Integrative.

Does the draft document present a defensible account of data and findings for the areas being addressed that is complete and appropriate?

On page 12-2 the primary role of the Coastal Ecosystems Program (CEP) is given, and that is "to provide the required information necessary to design effective restoration and protection measures for the estuaries, and inform decision makers." Continuing on page 12-4, "a primary objective of the District is to ensure that an appropriate pattern of fresh water is supplied to the estuaries," and to do this requires knowledge about:

- Current conditions and ecology of each one of the water bodies and watersheds;
- Appropriate ecological endpoints;

- Means to predict changes to the freshwater inflow patterns.

This is a substantial task which the District has embraced, and it is a task that is complex, difficult, and long-term based on the experience of other water management agencies in Gulf coast and Atlantic states in which water resource needs of coastal systems have been studied.

The District began reporting in its 2005 SFER on coastal systems, and that report and subsequent ones has shown that the District is approaching coastal ecosystem management in a reasonable way and building on the experience of others as well as its own. It has developed a Coastal Ecosystems Science Plan to guide its work from this point forward, and comments about that Plan are provided above and elsewhere. There are issues with this chapter that need to be addressed, and they are given below.

1. As has been pointed out by the Panel in the past two SFER report reviews, there still appears to be little review, analysis, and incorporation into the District's coastal work, especially for the determination of and impacts of freshwater inflows, of research performed outside of Florida. An analysis (using the search engine in the Adobe Acrobat program) for example of the number of times that a Gulf coast or lower- or mid-Atlantic state's names appear in Chapter 12 (including the literature citations) is zero for Texas, Louisiana, Mississippi, Alabama, Georgia, South Carolina, North Carolina, and Virginia but 366 times for Florida. This is not surprising since Chapter 12 is all about the lower Florida estuaries within the District's boundaries. The same analysis for the Coastal Ecosystems Science Plan (Appendix 12-1) shows the numbers of times states are mentioned are: Florida – 122, North Carolina – 2, Texas – 1, and the rest zero. While the District has developed a strong approach to estuarine management, it could be stronger if experience gained in other states with freshwater inflow management was incorporated.
2. For each estuarine system, additional information should be provided routinely on an annual basis to get a sense of the "state of the bay", namely:
    a. Physical characteristics such as volume at mean tide, surface area at mean tide, average depth at mean tide, measures of tidal exchange such tidal prism, major currents, major geomorphic features;
    b. Hydrologic characteristics such as annual average inflows by year for previous 20 years at least, annual average hydraulic residence times by year, average annual constituent residence times, fraction of freshwater;
    c. Water quality characteristics such as annual average concentrations and temporal variations of key constituents (e.g., salinity, DO, organics, and nutrients) bay wide and spatially that conveys general information about water quality conditions throughout the estuary;
    d. Biological data such as general concentrations (volumetric, areal, etc. as appropriate) of primary producers (e.g., phytoplankton, submerged aquatic vegetation) and secondary producers (e.g., zooplankton, benthic organisms, key species/VECs), and associated organisms.
3. Table 12-1 gives the status of Coastal Ecosystems Science Plan modeling products for each estuary, but the chapter could benefit from adding a short section (i.e., no more than half a page each) for each estuary describing the mathematical models that have been prepared and

their status. This additional information would balance the descriptions provided of sampling programs for water quality and biota and other material provided. Any efforts to develop and apply simplified models (e.g., CSTR, plug flow, dispersive flow) and intermediate models (e.g., finite segment models in one-, two-, or three dimensions) should be described as well.

4. For each estuarine system, accountability needs to be addressed via a statement as to how the hydrologic and water quality modeling, water quality data, and biological data are being used to manage this estuary at the present time, how water management in the watershed upstream relates to that management, and how well water quality goals have been met during the year.

5. Specific comments on each estuarine system are below:

   a. Southern Indian River Lagoon and St. Lucie River and Estuary - Water quality monitoring should include a measure of organic materials such as Volatile Suspended Solids or Total Organic Carbon

   b. Loxahatchee River Estuary - Flow and salinity are used as primary indicators now; what about using nutrients and nutrient cycling?

   c. Lake Worth Lagoon – concern about sedimentation and turbidity was raised but not explained in this section; was shallowing of the Lagoon due to sediment deposition measured and was it considered as a cause for water volume decrease and hence salinity decrease?

   d. Biscayne Bay – Formatting is needed to make this section equivalent to the others; there are a number of questions remaining about salinity distribution in the Bay.

   e. Florida Bay – A considerable part of this chapter (54 pages) is devoted to Florida Bay as was planned, but there appears to be too much data presentation and too little analysis and synthesis of the meaning and relevance to management; there are a number of federal and state agencies involved in Florida Bay but little specific mention is given of their work and contribution to the understanding of the structure and function of the Bay; change the units of TP in Figures 12-28, 12-29, and 12-30 from µM to µg/L so that units are comparable to presentations in other parts of the chapter and SFER report; the update on the algal bloom in eastern Florida Bay and southern Biscayne Bay leads to the conclusion that this explanation for the bloom is still not resolved; in the section on key resources (p. 12-86) the use of “Fish and Crustaceans” is a very broad group compared to “Pink Shrimp”, “Seagrass (SAV)”, “Wading Birds”, and the others which are much more specific – how will this group be defined and will Mollusks be added so that oysters will be considered a key resource?

   f. Naples Bay – the management plan for this estuary is at the beginning stage – what is the time frame for developing more components of the plan?

   g. Estero Bay - the management plan for this estuary is at the beginning stage although tributary flow regimens have been specified for maintaining eastern oyster adults– what is the timeframe for developing more components of the plan?

   h. Caloosahatchee River Estuary and Charlotte Harbor - what is the timeframe for developing more components of the management plan of this estuary?

Is the synthesis of this information presented in a logical manner, consistent with earlier versions of the report?
Yes, the chapter has much the same format as previous versions of the report, but the content needs to be more focused on accountability with the basic information listed above provided each year so the reader has a better sense of the "state of the bay" so to speak of each estuarine system. The format/outline is reasonable, and the content could be changed in the ways described above. The Biscayne Bay heading (line 417) needs to be elevated so it comparable to the other estuarine system headings.

Are findings linked to management goals and objectives?
As noted above, for each estuarine system, accountability needs to be addressed via a statement for each estuarine system as to how the hydrologic and water quality modeling, water quality data, and biological data are being used to manage this estuary at the present time, how water management in the watershed upstream relates to that management, and how water quality goals are being met. There is some reference to management objectives and management plan implementation, but the information does not lend itself to a determination of whether management objectives are being met.

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
The Coastal Ecosystems Science Plan is the main large scale program linked clearly to the chapter. Other programs like CERP, Acceler8, and RECOVER are mentioned but the linkage could be made stronger.

Is the chapter cross referenced in a thorough and consistent manner?
The linkage of the Coastal Ecosystems Science Plan to each estuary could be stronger. While the Plan's products relative to modeling are contained in Table 12-1, there is no similar linkage for flows, water quality, and biota to a level of detail that indicates how well the Plan is being achieved. Also, linking to the water management system (Chapter 2) would be highly desirable so one can determine if estuarine management goals are being met while hydrology goals are being met as well.

References:

Alber, Merryl. 2002. A conceptual model of estuarine freshwater inflow management. Estuaries 25:1246-1261.

Armstrong, Neal E. 1982. Responses of Texas Estuaries to Freshwater Inflows. In Estuarine Comparisons, Victor Kennedy (Ed.), 1982, Academic Press.

Montagna, Paul A., Merryl Alber, Peter Doering, and Michael S. Connor. 2002. Freshwater Inflow: Science, Policy, Management. Estuaries 25:1243-1245.

Thomann, Robert V. 1972. Systems Analysis and Water Quality Management. McGraw-Hill, New York.

Thomann, Robert V. and John A. Mueller. 1987. Principles of Surface Water Quality Modeling and Control. Harper & Row, Publishers, Inc.

Ward, George H. and Neal E. Armstrong. 1982. Matagorda Bay: A Management Plan. Submitted to National Coastal Ecosystem Team, Division of Biological Services, Fish and Wildlife Service, Slidell, LA, Contract No. 14-16-0009-78-066.

Figures

Influence of annual areal nutrient loading rates and average estuarine freshwater content (as influenced by freshwater inflow and tidal exchange) on average annual areal commercial catch yields of finfish and shellfish in Texas estuaries. The three figures are for carbon, nitrogen, and phosphorus, and within each figure lines connecting equal yield rates of finfish (solid lines) and shellfish (dashed lines) are drawn forming response surfaces. Each point in each figure represents one of the six major estuaries of Texas which lie in a freshwater inflow spectrum from very high inflow and small volume (Sabine estuary) to small inflow and large volume (Guadalupe estuary) and variations in between. With these figures one may estimate the change in yield (or secondary production) caused by changes in freshwater inflow and nutrient loading. Because freshwater inflow and nutrient loading are interrelated, one can examine combinations of flow change and nutrient concentration change on yield that occur to due changes in the watershed and/or changes in the estuarine system itself. In Ward and Armstrong (1982) several perturbations in Matagorda Bay, Texas were evaluated for their impacts on secondary productivity.

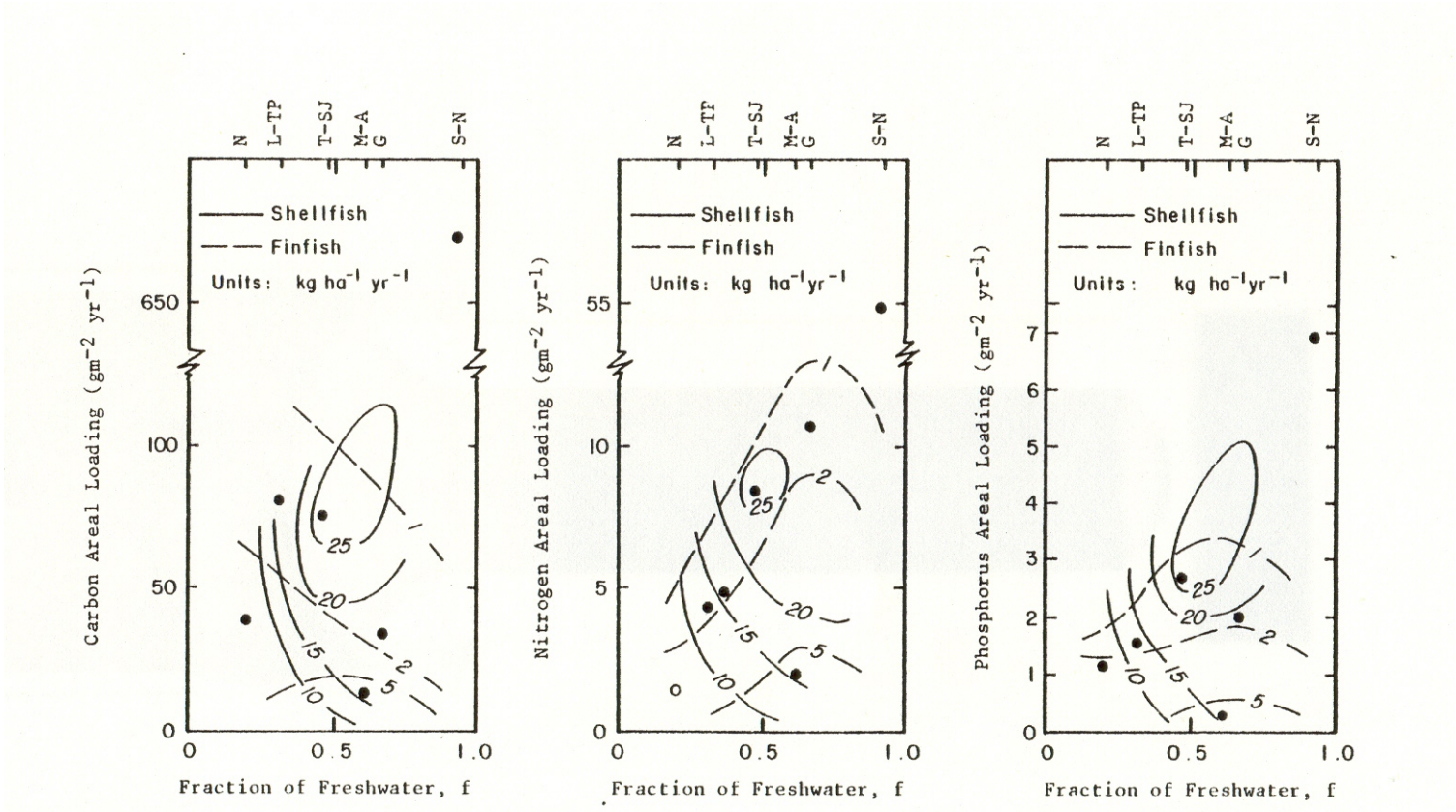


Figure 28. Influence of annual areal loading rates of nutrients and estuarine freshwater content on average annual areal yields of finfish and shellfish (Armstrong 1982). N-Nueces, L-TP-Lavaca-Tres Palacios, T-SJ-San Jacinto, M-A-Mission-Aransas, G-Guadalupe, S-N-Sabine Neches estuaries.

Author	Message
JoAnn Burkholder	**Subject:** Review of Chapter 12 - Burkholder

Total Messages 15

Chapter 12 Management and Restoration of Coastal Ecosystems

Chapter 12 seems inappropriately categorized for evaluation primarily in accountability, and secondarily for integrative quality. Chapters that are categorized for primary evaluation in accountability are supposed to be of *"a more routine nature, reporting in a similar format and content from year to year"* (SFER2008 Panel SOW from the SFWMD). In contrast to that description, the format for Chapter 12 has evolved and has changed considerably over the past three SFERs. Therefore, it seems more constructive to provide review of this chapter at technical and integrative levels.

The stated primary role of the Coastal Ecosystem Program is to provide the information needed to design effective restoration and protection measures for the District's eight priority Coastal Ecosystems. This year's Chapter 12 is outstanding in structure and content, and a pleasure to read. In WY2007, the District's Coastal Ecosystems division, which oversees science programs for all of the coastal areas except Florida Bay, also developed a *Coastal Ecosystems Science Plan* (Appendix 12-1) to better guide restoration efforts in the coastal estuaries. Chapter 12 presents general summary information and WY2007 progress for each of the eight priority coastal ecosystems, with special emphasis this year on Florida Bay. The chapter sections generally include an excellent history of major anthropogenic impacts on the coastal ecosystems, and identified major research needs for each coastal ecosystem.

Questions

The authors describe vegetation monitoring of 10 transects. A continued concern from critique of the Restoration Plan for the Northwest Fork of the Loxahatchee is that, of the 10 transects and 138 plots included in the study, about half of the plots are in the Riverine reach, 37% in the Upper Tidal, and 14% in the

lower tidal; moreover, only 1 transect is lower tidal (2007 SFER, Appendix 12-2). What is being done to address the paucity of information in the tidal areas?

Detailed quantitative information on specific urban impacts is described as essential for sound management decisions. What specific urban impacts are of concern, and what studies are planned to target quantitative assessment of those impacts?

The research needs for Biscayne Bay (p.12-32) include an effective technique or modeling tool to hindcast and more accurately describe aquatic communities in the bay prior to major human disturbance (pre-1900). Such an assessment would be of value for all of the coastal ecosystems. What efforts are being undertaken to address this need?

How does the District plan to fill spatial critical gaps in salinity data for Biscayne Bay? What is being done to address the uncertainty in precision of canal flow data (based on stage)? Are seagrass mapping efforts planned for expansion to address the lack of data in critical areas and, if so, when will these efforts be undertaken?

What is the historic information underlying the statement (line 1763) that seagrasses and oysters in Naples Bay have been reduced by 80-90%, considering the authors' description of extremely sparse data available for environmental conditions in that ecosystem?

Information on the aerial extent of oyster reefs in Estero Bay apparently was last obtained in WY2003 (summarized in the 2004 SFER). Are there plans to update this information (p.12-94)?

Monitoring stations seem limited to one in the southernmost area of Florida Bay (Figure 12-21). Are there plans to add any stations in that area?

Are there data on the role of nutrient regeneration in supporting phytoplankton blooms in central and eastern Florida Bay? Are studies planned to resolve the magnitude/composition of the nutrient source for this bloom from construction and soil/sediment disturbance along US 1?

The FHAP's efforts for SAV sampling were expanded by the District in 2004, from 10 basins to 22 basins (30 sites per basin; p.12-63). Does the District plan to increase the sampling frequency from once per year a seasonal basis?

Are there plans to conduct additional mesocosm experiments to examine influences of nutrient enrichment on these seagrasses, salinity x nutrient interactions, and salinity x sulfide concentrations (p.12-81, lines 1648-1649)?

Accountability Review

Chapter 12 targeted progress in District programs and projects in the District's priority coastal ecosystems. The chapter is structured similarly as in the 2006 SFER, but with greatly improved content and clarity of presentation. A few comments toward further strengthening the generally excellent writing/content are as follows:

The Summary unfortunately is weak – the 2007 SFER's chapter 12 is excellent in caliber; please alter it to do this chapter, and the considerable, generally excellent work represented within it, justice.

The Introduction is clear and very helpful. It includes an excellent table (Table 12-1) on the status of Coastal Ecosystems Science Plan products for each estuary that provides a strong foundation for readers' understanding about where progress has been made versus where information is critically needed. This table can be updated for each future SFER, and is a great addition (note – suggest that Table 12-1 also include the status of MFLs in the coastal ecosystems). An area of additional improvement for this table is under VECs (p.12-6) – "some data available" should be further clarified with brief further details.

It would also be helpful to add, as the first table in this chapter, the pertinent information from Chapter 1's Table 1A-1, which includes a nice general comparison of the eight coastal ecosystems.

For each of the coastal ecosystems, a table of ongoing projects in WSY2007 should be included. Each ecosystem section should also include (e.g. as for the Lake Worth Lagoon and Biscayne Bay ecosystems) summary information about planned efforts, referring to Appendix 12-1 for further information.

Throughout Chapter 12 – salinity should not have units. If units continue to be included, the chapter should be consistent (present draft includes both psu and ppt). In addition, consistency is needed on presentation of metric versus English units (including figures); please use the metric (English) format.

Integrative Review

The District's overarching strategy within each of the coastal ecosystems is to apply an integrated modeling and assessment framework to help structure and organize priority needs, and to provide the framework for constructing detailed science plans. Understandably in this huge effort, much more progress has been made thus far toward achieving this goal in some coastal ecosystems than others. The information on the coastal ecosystems is/will be integrated through this series of models. It was exciting to learn that progress has been made to

implement the Restoration Plan for the Northwest Fork of the Loxahatchee River: the Preferred Restoration Flow Scenario has been incorporated into the District water supply and CERP modeling efforts, and a draft Northwest Fork Science Plan has been developed to assist in further implementation.

Technical Review

The Chapter was appropriately designed to only briefly summarize technical information except for the expanded section on Florida Bay. The technical information in that section was clearly presented and scientifically sound.

Florida Bay –

Much was accomplished by the District in Florida Bay during WY2007. A MFL rule was approved (salinity 30 as a 30-day running average) at an indicator site, Argyle Hendry Pond between Taylor Slough and the Bay, based on SAV protection. Operational attempts to restore more natural water distribution patterns by increasing water flow through Taylor Slough apparently were successful. The major cyanobacterial bloom that began in WY2005 continued in the central and eastern waters of the Bay. In the eastern boundary waters, the cause of the bloom was linked to discharge of freshwater and nutrients from the C-111 canal (fall 2005) and road widening construction activities (which also added nutrients - fall 2005 – present; C-111 canal discharge was minimal in WY2007). The cyanobacterial bloom was linked, in turn, with dieoffs of seagrasses and calcareous green macroalgae as a destructive feedback loop. Total organic carbon (TOC) and total phosphorus budgets (TP) were estimated, including presentation of scientifically sound rationale (Table 12-2 is a nice addition), to assist in evaluating nutrient sources that are supporting this bloom. Experiments were also conducted in a District-supported project to evaluate the nutritional ecology of the bloom-forming species, and to gain information about the relative importance of nitrogen and phosphorus in supporting the bloom. SAV monitoring efforts indicated that *Thalassia testudinum* has expanded in coverage and density in the central and western Bay since the mid-1990s. Experimental research suggested that *T. testudinum* is more sensitive to low salinities than *Halodule wrightii* or *Ruppia maritima*. A hydrodynamic model was completed; experiments on dissolved organic matter (DOM) decomposition rates were conducted to provide key parameters for the bay water quality model; and the District's Florida Bay Seagrass Community Model was fully documented and peer-reviewed. Efforts are underway to expand the latter model to include *R. maritima* along with *T. testudinum* and *H. wrightii*.

Evaluation of the adequacy of restoration efforts is the mandate

of CERP's Florida Bay and Florida Keys Feasibility Study (FBFKFS). The Florida Bay section should mention the excellent Strategic Research Plan for Florida Bay that is included in Appendix 6-1; that plan is very helpful in explaining how the integrated modeling effort builds upon and integrates various datasets.

Figure 12-21 – Blackwater Sound (mentioned in the writing) should be added.

Figures 12-26 – The legend should add brief description of what these data represent (averages from n? samples per date; quadrat size?, add standard errors to the lower figure? etc.).

Figure 12-27 – These are data, not trends; trends is a statistical term that is misapplied here. Legend should include n values and indication of statistical significance.

P.12-48 – Does not seem to match the figures in some of the writing; please recheck.

Figures 12-28 - 12-30, 12-35 - Legend should add brief description of the data (averages from n? samples per date; add standard errors, indicate statistical significance).

P.12-52 – It would be constructive to clarify that inter-annual variability of chlorophyll *a* concentrations vs. total freshwater discharge may not be a sufficiently sensitive approach to detect relationships; more in-depth analyses of periods (weeks or months) prior to bloom development, for example, would be instructive. For balance, it should also be mentioned that increased nutrient pollution does appear to be linked to supporting the (smaller) bloom in the eastern Bay.

Figure 12-33 – The legend should clarify whether these are means; n values and standard errors should also be added.

Lines 983-985 vs. Figure 12-35 – There seems to be no coherence between TOC and TN.

Lines 1015-1016 – Supporting literature should be cited.

Lines 1085-1086 – The modified Braun-Blanquet index categories need to be listed here.

Line 1086 – Clarify why this large difference in n values (4-12).

P.12-65 – Description of the calcareous green macroalgae should be provided here (species, known nutritional ecology) – would help support the rationale presented in lines 1148-1150.

P.12-72 - 12-73 – The authors' suggestions should be included as to why the benthic community in Lake Surprise continued to thrive during this major cyanobacteria bloom.

Lines 1331-1332 – Meaning should be clarified (DOM is the dominant form of this nutrient import (?)).

P.12-77 – Brief description of the mesocosm experimental design should be added.

Line 1710 – Do "periphyton" include macroalgae here?

Editorial changes
Throughout – change submerged to submersed (Wetzel, *Limnology*, 3rd edition, 2001).
Throughout – Taylor River and Taylor Creek are interchanged; should be consistent.
Line 552 – include the name of the pond (Argyle Hendrey Pond).
Line 923 - …during the summer/fall, and…
Line 1037 - …dry season (Figure 12-30). It…
Line 1117 - …No significant change is…
Line 1153 - …but rather suggest either decreasing

Southern Indian River Lagoon and St. Lucie River and Estuary – The status of understanding freshwater inflows and salinity is described, and research needs are briefly identified (focus on cause/effect relationships of inflows on VECs such as oysters and early life stages of fishes). Information should be added to inform readers that this estuary (along with the Caloosahatchee) has been targeted for major emphasis because of the recently passed Northern Everglades Protection Plan; and that modeling efforts for this estuary are relatively advanced.

Line 123 – change to channelizing (instead of straightening [straitening])
Line 127 and throughout – change submerged to submersed
P.12-10 – the MFL rule does not seem very protective, probably because very little rationale is presented; brief explanation would help, considering both the North Fork of the St. Lucie and Lake Okeechobee.
Editorial changes
Line 141 - …inflows were not exceeded…
Figure 12-3 – shouldn't the title be North Fork?
Lines 159-160 – why the change from biweekly to monthly sampling?
Lines 167-168 – what is the Ten Mile Creek facility?

Loxahatchee River Estuary – In progress on data collection and analysis during WY2007, data were collected on shrub and groundcover for comparison with 2003 data (report in progress). A monitoring network on the Loxahatchee River was strengthened at selected sites to include more frequent (monthly) sampling. The District developed a plan to complete a baseline survey of freshwater fish, including exotic species. The District also plans to use side sonar to develop a new map of oyster resources, and to introduce oyster substratum at RM 4.5 for assessment of colonization and oyster health. Monthly monitoring of seagrass (LRD) documented recovery this year from the 2004/2005 hurricanes. Additional seagrass mapping/groundtruthing (LRD) was planned for summer 2007. The MFL rule for the Northwest Fork was exceeded for 83 days in

spring 2007, reflecting a major drought in the region.

Figure 12-6 – study area boundaries should be added.
Figure 12-7 - should add information (river miles) to legend to indicate freshwater, upper tidal, and lower tidal areas.
Line 253 - please clarify parameters being monitored.
Figure 12-8 - should also indicate the selected sites where the water quality monitoring network was strengthened (are these stations in green? If so, it would be helpful to add 1-2 stations for monthly monitoring in the upper watershed).
Figure 12-9 – legend should clarify that this information is based on 2003 LRD data. Where are the live oyster locations within the squares? Why are there no live oysters indicated in the main embayment?
Figure 12-10 – Are additional sites for oyster monitoring planned farther down-estuary? It seems that such sites would be important to add in helping to track restoration success.
P.12-21 - Please provide more rationale for use of the Hobe Sound site as a reference area.
Editorial changes
Line 254 - …at selected sites…
Line 256 - …long-term trends in…
Line 317 – Loxahatchee River Central Embayment…

Lake Worth Lagoon – This coastal ecosystem has been extremely impacted by hydrologic changes and urbanization; sedimentation/turbidity (muck sediments) is a major concern, and daily flow (avg. ~500 cfs) can be more than 7,000 cfs, suggesting characteristics more on the order of a river in flood than a lagoon. Muck sediment accumulation prohibits oyster and seagrass colonization in some areas. MFL criteria have not yet been established. In WY2007 a new salinity monitoring program designed to evaluate a new CERP target (that should be briefly described) was established. Apparently for two reasons – the fact that PBC-ERM and FDEP are the lead agencies for this ecosystem, and the anticipation that many existing information gaps will be addressed by PBC-ERM, CERP RECOVER, and the CERP North Palm Beach County Project – Part 1 study – the District anticipates no increase in its present level of effort.

Lines 374-375 – why have these important long-term sites for salinity
monitoring been discontinued?
Figure 12-17 – legend should briefly explain the gap in data collection (1999-2001), and the paucity in data prior from 1994-1998 compared to 2002-2006.
Figure 12-18 – legend should explain the trend line (statistical basis, p value for apparent increase).

Biscayne Bay – Present projects include development of a linked hydrologic and hydrodynamic model; habitat suitability indices

(salinity / abundance of shoreline fish); and a literature search to assess salinity dose responses for important species. No MFL criteria have yet been adopted, and no specific quantities of water reserved. The District hopes to have a detailed science plan for Biscayne Bay by 2008.

Figure 12-19 – should include the key stations for long-term salinity monitoring (data in Figure 12-20).

Figure 12-20 - legend should explain the trend lines (statistical basis, trend directions, p values).

Editorial changes

Line 431 - …Today, about half of…

Line 449 - …listed in the…

Naples Bay – This heavily urbanized, highly impacted system continues to be underemphasized in comparison to most other coastal ecosystems. There is a serious lack of data for this system, even for salinity, and therefore (p.12-89) “there is no way to quantify the relationships between freshwater inflow, salinity, and ecology”. A Surface Water Improvement and Management Plan for Naples Bay was approved in 2007, focusing on water quantity, water quality, and habitat loss.

Line 1763 – Briefly clarify the historical information underlying these losses of seagrasses and oysters.

Lines 1790-1791 – Explain why monitoring ceased at the Golden Gate Canal after 2002.

Estero Bay – This system has also been underemphasized in comparison to other coastal ecosystems. Available data are very sparse; there are some historical records for freshwater inflow, but little information relating freshwater inflows to salinity, and no available data quantifying responses of biota to changes in salinity or freshwater flow. In WY2007 updated seagrass maps were created from aerial surveys (Jan. 2006). Potential VECs being evaluated are seagrasses, oysters, fish, and benthic macroinvertebrates. No MFL criteria have been established, but salinity tolerances of eastern oysters were used to define flow envelopes (appropriate ranges in salinity). Freshwater inflows to three of the five major tributaries to Estero Bay in WY2007 were compared to historic inflows (1988-2006). The data indicated that inflows contributed by the three tributaries would have resulted in lethal salinities for juvenile oysters for 39-82 days in WY2007.

Lines 1849-1850 – clarify how this seagrass coverage compares to the total area of Estero Bay.

Caloosahatchee Estuary and Charlotte Harbor – The severe drought of WY2007 caused daily inflows to fall below the preferred range and MFL rule in October-November 2006.

District efforts to alleviate the elevated salinity conditions for *Vallisneria americana* were stopped in mid-February, and from mid-February through the rest of WY2007 no fresh water was discharged through the S-79 dam. *Vallisneria* beds are extremely sparse, and have been since a previous drought in WY2001-2002. In contrast, the higher-salinity conditions in WY2007 apparently were beneficial to oyster spat recruitment (clarify who Volety is – line 1963), and apparently helped *Halodule wrightii* regrowth. There are, as yet, no available diel DO data for this estuary; installation of DO sensors is planned. Additional nutrient limitation studies are being considered to support the new Northern Everglades and TMDL initiatives.

Line 1951 – Figure 12-5 shows only 5 continuous salinity sensors? (the Sanibel Causeway sensor was destroyed by a hurricane). Should another sensor's location be added to Figure 12-5?

Line 1957 – Clarify how long salinity at Shell Point was near 0.

Lines 1980-1981 – The writing should be altered: The sparse regrowth of *Vallisneria*, compared to its abundance prior to the WY2001-2002 drought, cannot be called recovery; it likely will take much longer than 2-3 years for the populations in the upper estuary to recover.

Figure 12-53 – Y axis 2 should be labeled Salinity.

Editorial - Line 1931 - …that were discharged…

Posted: 18 Sep 2007 11:51 PM
Originally Posted: 18 Sep 2007 11:49 PM

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » Chapter 12: Management and Restoration of Coastal Ecosystems » Review of Chapter 12 - Burkholder

Show New Messages

Tree View | Topic | New Topic | Prev Topic

Author | Message

JoAnn Burkholder

Subject: Review of Chapter 12 - Burkholder

Total Messages 18

Chapter 12 Management and Restoration of Coastal Ecosystems

The stated primary role of the Coastal Ecosystem Program is to provide the information needed to design effective restoration and protection measures for the District's eight priority Coastal Ecosystems. This year's Chapter 12 is, overall, outstanding in structure and content, and a pleasure to read. In WY2007, the District's Coastal Ecosystems division, which oversees science programs for all of the coastal areas except Florida Bay, also developed a *Coastal Ecosystems Science Plan* (Appendix 12-1; Florida Bay's strategic science plan is included in Appendix 6-1) to better guide restoration efforts in the coastal estuaries. Chapter 12 presents general summary information and WY2007 progress for each of the eight priority coastal ecosystems, with special emphasis this year on Florida Bay. The chapter sections generally include an excellent history of major anthropogenic impacts on the coastal ecosystems, and identified major research needs for each coastal ecosystem.

The format for Chapter 12 has evolved and has changed considerably over the past three years. The past two years have followed a similar format, except that the authors were responsive to comments from the panel last year and included much more detail about the system of focus, Florida Bay. Therefore, it seems constructive to provide review of this chapter at technical as well as administrative and integrative levels.

Questions

The authors describe vegetation monitoring of 10 transects. A continued concern from critique of the Restoration Plan for the Northwest Fork of the Loxahatchee is that, of the 10 transects and 138 plots included in the study, about half of the plots are in the Riverine reach, 37% in the Upper Tidal, and 14% in the lower tidal; moreover, only 1 transect is lower tidal (2007 SFER,

Appendix 12-2). What is being done or planned to address the paucity of information in the tidal areas?

Detailed quantitative information on specific urban impacts is described as essential for sound management decisions. What specific urban impacts are of concern, and what studies are planned to target quantitative assessment of those impacts?

The research needs for Biscayne Bay (p.12-32) include an effective technique or modeling tool to hindcast and more accurately describe aquatic communities in the bay prior to major human disturbance (pre-1900). Such an assessment would be of value for all of the coastal ecosystems. What efforts are being undertaken to address this need?

How does the District plan to fill spatial critical gaps in salinity data for Biscayne Bay? What is being done or planned to address the uncertainty in precision of canal flow data (based on stage)? Are seagrass mapping efforts planned for expansion to address the lack of data in critical areas and, if so, when will these efforts be undertaken?

What is the historic basis for the statement (line 1763) that seagrasses and oysters in Naples Bay have been reduced by 80-90%, considering the authors' description of extremely sparse data available for environmental conditions in that ecosystem?

Information on the aerial extent of oyster reefs in Estero Bay apparently was last obtained in WY2003 (summarized in the 2004 SFER). Are there plans to update this information (p.12-94)?

Monitoring stations seem limited to one in the southernmost area of Florida Bay (Figure 12-21). Are there plans to add any stations in that area?

Are there data on the role of nutrient regeneration in supporting phytoplankton blooms in central and eastern Florida Bay? Are studies planned to resolve the magnitude/composition of the nutrient source for this bloom from construction and soil/sediment disturbance along US 1?

The Florida Bay and Florida Keys Feasibility Study (FBFKFS) is mentioned in both chapter 12 and Appendix 6-1, yet the Florida Keys are not considered in either appendix. What are the District's plans (and how do they mesh with activities of other agencies) regarding the Florida Keys?

The FHAP's efforts for SAV sampling were expanded by the District in 2004, from 10 basins to 22 basins (30 sites per basin; p.12-63). Does the District plan to increase the sampling frequency from once per year a seasonal basis?

Are there plans to conduct additional mesocosm experiments to examine influences of nutrient enrichment on these seagrasses,

salinity x nutrient interactions, and salinity x sulfide concentrations (p.12-81, lines 1648-1649)?

Accountability Review

Chapter 12 targeted progress in District programs and projects in the District's priority coastal ecosystems. The chapter is structured similarly as in the 2006 SFER, but with greatly improved content and clarity of presentation. A few comments toward further strengthening the generally excellent writing/content are as follows:

The Summary should be strengthened – the 2007 SFER's chapter 12 is excellent in caliber; please alter it to do this chapter, and the considerable, generally excellent work represented within it, justice.

The Introduction is clear and very helpful. It includes an excellent table (Table 12-1) on the status of Coastal Ecosystems Science Plan products for each estuary that provides a strong foundation for readers' understanding about where progress has been made versus where information is critically needed. This table can be updated for each future SFER, and is a great addition (note – suggest that Table 12-1 also include the status of MFLs in the coastal ecosystems). An area of additional improvement for this table is under VECs (p.12-6) – "some data available" should be further clarified with brief further details.

It would also be helpful to add, as the first table in this chapter, the pertinent information from chapter 1's Table 1A-1, which has a nice general comparison of the eight coastal ecosystems including size (surface area), which has been given in chapter 12 for some systems but not others.

For each of the coastal ecosystems, a table of ongoing projects in WSY2007 should be included. Each ecosystem section should also include (e.g. as for the Lake Worth Lagoon and Biscayne Bay ecosystems) summary information about planned efforts, referring to Appendix 12-1 for further information.

Throughout chapter 12 – salinity should not have units. If units continue to be included, the chapter should be consistent (present draft includes both psu and ppt). In addition, consistency is needed on presentation of metric versus English units (including figures); please use the metric (English) format.

Integrative Review

The District's overarching strategy within each coastal ecosystem is to apply an integrated modeling and assessment framework to help structure and organize priority needs, and to provide the framework for constructing detailed science plans. Considering the enormous task of managing these coastal

ecosystems and their watersheds, logically much more progress has been made toward achieving this goal in some coastal ecosystems relative to others. The information on the coastal ecosystems is being integrated through this series of models.

Clarification should be added in chapter 12 that strategic science plans have been developed for the coastal estuaries and can be found in Appendix 6-1 (Florida Bay) and Appendix 12-1. Clarification is also needed as to the status of plans and work regarding the Florida Keys.

It was exciting to learn that progress has been made to implement the Restoration Plan for the Northwest Fork of the Loxahatchee River: the Preferred Restoration Flow Scenario has been incorporated into the District water supply and CERP modeling efforts, and a draft Northwest Fork Science Plan has been developed to assist in further implementation.

Technical Review

The chapter was appropriately designed to only briefly summarize technical information/progress except for the expanded section on Florida Bay. The technical information in that section was clearly presented and scientifically strong.

Florida Bay

Much was accomplished by the District in Florida Bay during WY2007. A MFL rule was approved (salinity 30 as a 30-day running average) at an indicator site, Argyle Hendry Pond between Taylor Slough and the Bay, based on SAV protection. Operational attempts to restore more natural water distribution patterns by increasing water flow through Taylor Slough apparently were successful. The major cyanobacterial bloom that began in WY2005 continued in the central and eastern waters of the Bay. In the eastern boundary waters, the cause of the bloom was linked to discharge of freshwater and nutrients from the C-111 canal (fall 2005) and road widening construction activities (which also added nutrients - fall 2005 – present; C-111 canal discharge was minimal in WY2007). The cyanobacterial bloom was linked, in turn, with dieoffs of seagrasses and calcareous green macroalgae as a destructive feedback loop. Total organic carbon (TOC) and total phosphorus budgets (TP) were estimated, including presentation of scientifically sound rationale (Table 12-2 is a nice addition), to assist in evaluating nutrient sources that are supporting this bloom. Experiments were also conducted in a District-supported project to evaluate the nutritional ecology of the bloom-forming species, and to gain information about the relative importance of nitrogen and phosphorus in supporting the bloom. SAV monitoring efforts indicated that *Thalassia testudinum* has

expanded in coverage and density in the central and western Bay since the mid-1990s. Experimental research suggested that *T. testudinum* is more sensitive to low salinities than *Halodule wrightii* or *Ruppia maritima*. A hydrodynamic model was completed (not described in the chapter); experiments on dissolved organic matter (DOM) decomposition rates were conducted to provide key parameters for the bay water quality model; and the District's Florida Bay Seagrass Community Model was fully documented and peer-reviewed. Efforts are underway to expand the latter model to include *R. maritima* along with *T. testudinum* and *H. wrightii*.

Evaluation of the adequacy of restoration efforts is the mandate of CERP's Florida Bay and Florida Keys Feasibility Study (FBFKFS). The Florida Bay section should mention the excellent Strategic Research Plan for Florida Bay that is included in Appendix 6-1; that plan is very helpful in explaining how the integrated modeling effort builds upon and integrates various datasets.

Figure 12-21 – Blackwater Sound (mentioned in the writing) should be added.
Figures 12-26 – The legend should add brief description of what these data represent (averages from n? samples per date; quadrat size?, add standard errors to the lower figure? etc.).
Figure 12-27 – These are data, not trends; trends is a statistical term that seems misapplied here. Legend should include n values and indication of statistical significance.
P.12-48 – Does not seem to match the figures in some of the writing; please recheck.
Figures 12-28 - 12-30, 12-35 - Legend should add brief description of the data (averages from n? samples per date; add standard errors, indicate statistical significance).
P.12-52 – It should be clarified that inter-annual variability of chlorophyll *a* concentrations vs. total freshwater discharge may not be a sufficiently sensitive approach to detect relationships; more in-depth analyses of periods (weeks or months) prior to bloom development, for example, would be instructive. It should also be mentioned that increased nutrient pollution does appear to be linked to supporting the (smaller) bloom in the eastern Bay.
Figure 12-33 – The legend should clarify whether these are means; n values and standard errors should also be added.
Lines 983-985 vs. Figure 12-35 – There seems to be no coherence between TOC and TN (?).
Lines 1015-1016 – Supporting literature should be cited.
Lines 1085-1086 – The modified Braun-Blanquet index categories need to be listed here.
Line 1086 – Clarify why this large difference in n values (4-12).
P.12-65 – Description of the calcareous green macroalgae should

be provided here (species, known nutritional ecology) – would help support the rationale presented in lines 1148-1150.
P.12-72 - 12-73 – The authors' suggestions should be included as to why the benthic community in Lake Surprise continued to thrive during this major cyanobacteria bloom.
Lines 1331-1332 – Meaning should be clarified (DOM is the dominant form of this nutrient import (?)).
P.12-77 – Brief description of the mesocosm experimental design should be added.
Line 1710 – Do "periphyton" include macroalgae here?

Editorial changes
Throughout – change submerged to submersed (Wetzel, *Limnology*, 3rd edition, 2001).
Throughout – Taylor River and Taylor Creek are interchanged; should be consistent.
Line 552 – include the name of the pond (Argyle Hendrey Pond).
Line 923 - …during the summer/fall, and…
Line 1037 - …dry season (Figure 12-30). It…
Line 1117 - …No significant change is…
Line 1153 - …but rather suggest either decreasing

Southern Indian River Lagoon and St. Lucie River and Estuary – The status of understanding freshwater inflows and salinity is described, and research needs are briefly identified (focus, cause/effect relationships of inflows on VECs such as oysters and early life stages of fishes). Information should be added to inform readers that this estuary (along with the Caloosahatchee) has been targeted for major emphasis because of the recently passed Northern Everglades Protection Plan; and that modeling efforts for this estuary are relatively advanced (refer to Appendix 12-1).

Line 123 – change to channelizing (instead of straightening [straitening])
Line 127 and throughout – change submerged to submersed
P.12-10 – the MFL rule does not seem very protective, probably because very little rationale is presented; brief explanation would help, considering both the North Fork of the St. Lucie and Lake Okeechobee.
Line 141 - …inflows were not exceeded…
Figure 12-3 – shouldn't the title be North Fork?
Lines 159-160 – why the change from biweekly to monthly sampling?
Lines 167-168 – briefly state what the Ten Mile Creek facility is.

Loxahatchee River Estuary – In progress on data collection and analysis during WY2007, data were collected on shrub and groundcover for comparison with 2003 data (report in progress).

A monitoring network on the Loxahatchee River was strengthened at selected sites to include more frequent (monthly) sampling. The District developed a plan to complete a baseline survey of freshwater fish, including exotic species. The District also plans to use side sonar to develop a new map of oyster resources, and to introduce oyster substratum at RM 4.5 for assessment of colonization and oyster health. Monthly monitoring of seagrass (LRD) documented recovery this year from the 2004/2005 hurricanes. Additional seagrass mapping/ groundtruthing (LRD) was planned for summer 2007. The MFL rule for the Northwest Fork was exceeded for 83 days in spring 2007, reflecting a major drought in the region.

Figure 12-6 – study area boundaries should be added.
Figure 12-7 - should add information (river miles) to legend to indicate freshwater, upper tidal, and lower tidal areas.
Line 253 - please clarify parameters being monitored.
Figure 12-8 - should also indicate the selected sites where the water quality monitoring network was strengthened (are these stations in green? If so, it would be helpful to add 1-2 stations for monthly monitoring in the upper watershed).
Figure 12-9 – legend should clarify that this information is based on 2003 LRD data. Where are the live oyster locations within the squares? Why are there no live oysters indicated in the main embayment?
Figure 12-10 – Are additional sites for oyster monitoring planned farther down-estuary? It seems that such sites would be important to add in helping to track restoration success.
P.12-21 - Please provide more rationale for use of the Hobe Sound site as a reference area.
Editorial changes - Line 254 - …at selected sites…
Line 256 - …long-term trends in…
Line 317 – Loxahatchee River Central Embayment…

Lake Worth Lagoon – This coastal ecosystem has been extremely impacted by hydrologic changes and urbanization; sedimentation/ turbidity (muck sediments) is a major concern, and daily flow (avg. ~500 cfs) can be more than 7,000 cfs, suggesting characteristics more on the order of a river in flood than a lagoon. Muck sediment accumulation prohibits oyster and seagrass colonization in some areas. MFL criteria have not yet been established. In WY2007 a new salinity monitoring program designed to evaluate a new CERP target (that should be briefly described) was established. Apparently for two reasons – the fact that PBC-ERM and FDEP are the lead agencies for this ecosystem, and the anticipation that many existing information gaps will be addressed by PBC-ERM, CERP RECOVER, and the CERP North Palm Beach County Project – Part 1 study – the District anticipates no increase in its present level of effort.

Lines 374-375 – why have these important long-term sites for

salinity monitoring been discontinued?
Figure 12-17 – legend should briefly explain the gap in data collection (1999-2001), and the paucity in data prior from 1994-1998 compared to 2002-2006.
Figure 12-18 – legend should explain the trend line (statistical basis, p value for apparent increase).

Biscayne Bay – Present projects include development of a linked hydrologic and hydrodynamic model; habitat suitability indices (salinity/abundance of shoreline fish); and a literature search to assess salinity dose responses for important species. MFL criteria have not yet been adopted. The District hopes to have a detailed science plan for Biscayne Bay by 2008.

Figure 12-19 – should include the key stations for long-term salinity monitoring (data in Figure 12-20).
Figure 12-20 - legend should explain the trend lines (statistical basis, trend directions, p values).
Editorial changes: Line 431 - …Today, about half of… ; Line 449 - …listed in the…

Naples Bay – This heavily urbanized, highly impacted system continues to be underemphasized in comparison to most other coastal ecosystems. There is a serious lack of data Naples Bay, even for salinity, and therefore (p.12-89) “there is no way to quantify the relationships between freshwater inflow, salinity, and ecology”. A Surface Water Improvement and Management Plan for Naples Bay was approved in 2007, focusing on water quantity, water quality, and habitat loss.

Line 1763 – Briefly clarify the historical information underlying these losses of seagrasses and oysters.
Lines 1790-1791 – Explain why monitoring ceased at the Golden Gate Canal after 2002.

Estero Bay – This system has also been underemphasized in comparison to other coastal ecosystems. Available data are sparse; there are some historical records for freshwater inflow, but little information relating freshwater inflows to salinity, and no available data quantifying responses of biota to changes in salinity or freshwater flow. In WY2007 updated seagrass maps were created from aerial surveys (Jan. 2006). Potential VECs being evaluated are seagrasses, oysters, fish, and benthic macroinvertebrates. No MFL criteria have been established, but salinity tolerances of eastern oysters were used to define flow envelopes (appropriate ranges in salinity). Freshwater inflows to three of the five major tributaries to Estero Bay in WY2007 were compared to historic inflows (1988-2006). The data indicated that inflows contributed by the three tributaries would have resulted in lethal salinities for juvenile oysters for 39-82 days in

WY2007.

Lines 1849-1850 – clarify how this seagrass coverage compares to the total area of Estero Bay.

Caloosahatchee Estuary and Southern Charlotte Harbor – The severe drought of WY2007 caused daily inflows to fall below the preferred range and MFL rule in October-November 2006. District efforts to alleviate the elevated salinity conditions for *Vallisneria americana* were stopped in mid-February, and from mid-February through the rest of WY2007 no fresh water was discharged through the S-79 dam. *Vallisneria* beds are extremely sparse, and have been since a previous drought in WY2001-2002. In contrast, the higher-salinity conditions in WY2007 apparently were beneficial to oyster spat recruitment (clarify who Volety is – line 1963), and apparently helped *Halodule wrightii* regrowth. Surprisingly, there are as yet no available diel DO data for this estuary; installation of DO sensors is planned. Additional nutrient limitation studies are being considered to support the new Northern Everglades and TMDL initiatives; it should be clarified that major District emphasis is planned for this estuary (refer to Appendix 12-1).

Line 1951 – Figure 12-5 shows only 5 continuous salinity sensors? (the Sanibel Causeway sensor was destroyed by a hurricane).
Line 1957 – How long salinity at Shell Point was near 0?
Lines 1980-1981 – The writing should be altered: The sparse regrowth of *Vallisneria*, compared to its abundance prior to the WY2001-2002 drought, cannot be called recovery; it likely will take much longer than 2-3 years for the populations in the upper estuary to recover.
Figure 12-53 – Y axis 2 should be labeled Salinity.
Editorial changes
Line 1905 – and Southern Charlotte Harbor
Line 1931 - …that were discharged…

Posted: 19 Sep 2007 12:07 PM
Originally Posted: 19 Sep 2007 12:05 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Prev Topic

Go t

Select Conference

Chapter 12: Management and Restoration of Coastal Ecosystems
Accountability Review

Prepared by: Robert C. Ward ('B' Review)

Chapter 12 is an overview of the research activities of the Coastal Ecosystems Division (the term 'Program' was used in parts of the text). The Division seeks to provide insight and understanding of the connection between water for human needs (e.g. water supply and flood control) and the water needs for a healthy coastal ecosystem. This tension must be addressed if society is to move from the water resources 'development' orientation of the 20th century into a water 'sustainability' orientation for the 21st century. Chapter 12, along with Chapters 10 and 11, indicate that the SFWMD is on the forefront of connecting human needs with ecosystem needs and evolving a sustainability-oriented management infrastructure.

The overview of management and research activities associated with restoring coastal ecosystems in South Florida, presented in Chapter 12, is readable and informative. The reader is left with a good understanding of the critical issues facing each coastal area as well as efforts of scientists and managers in addressing the issues.

In trying to understand connections among the staff producing Chapters 10, 11 and 12 (and Appendix 6-1), I searched the SFWMD webpage for an organizational chart. I was unable to download it. Given the stated need to connect research products with operational policy, there needs to be some indication in Chapter 12 of how the staff of each are organizationally related.

Chapter 12 and its research plan in Appendix 12-1, focuses on research and ecosystem understanding – their mission. At some point in the future, there is a need to integrate new ecosystem health and human water connections into management decision making, in an ongoing, routine, fashion. While the current coastal ecosystem knowledge base may not support strong integration, of a routine nature, it is time to begin to examine how the emerging coastal ecosystem health knowledge will become a part of the standard operating procedures in the Water Resources and Operations and Maintenance portions of the SFWMD. There are hints of such connections in Chapter 12, but they are not well developed. For example, on page 12-88, the 'stoplight' method for presenting SAV findings to managers and the public is discussed.

The Chapter could use more explanation of how its mission and research efforts are connected to the larger mandates of society and needs of a water management organization. To illustrate the vagueness of this connection, as presented at the beginning of Chapter 12, lines 42-47 contain the following terms:

1. science activities
2. technical activities
3. freshwater flows
4. science strategies

5. restoration efforts
6. management efforts
7. Comprehensive Everglades Restoration Plan
8. operations and maintenance
9. water supply

The exact meaning and connections of science and management, attempted to be explained in these lines, is not clear. Lines 47-49 clearly state:

> "The Coastal Ecosystem Program's primary role is to provide the required information necessary to design effective restoration and protection measures for the estuaries, and inform decision makers.

I am willing to go even further with the above line of thinking and suggest, if it has not been done already, that there needs to be an operations person directly connected to, and/or serving on, each research project's staff. It is not advisable to produce new ecosystem knowledge without having management actively involved in each step of the research itself. Why? As scientists seek new knowledge, their questions are framed around the needs of science. As new knowledge is presented to managers, they, generally, have a different set of questions that should also be incorporated into the research as it is being conducted. In this manner, when the final scientific findings are produced, most, if not all, of the water manager issues about the new knowledge will have been addressed. This greatly facilitates movement of research findings into practical application. [The above observations come from experience in directing a water and water-related research program that was designed to better inform the scientific basis for water management decisions in Colorado.]

The research plan presented in Appendix 12-1, acknowledges the need to connect legal mandates to management goals, to management objectives, and to mission element (in Figure 1). To incorporate a stronger bridge to future applications of the research findings, the plan should expand its discussion of Figure 1 to quote, directly, statements from the mandates to insure the details of the purpose of the coastal ecosystem research efforts are clear to everyone. In addition, each research project description/update should indicate how the research is being connected, as it is being conducted, to its ultimate users – water management decision makers. Future research updates could then explain what issues are arising, among both scientists and water decision makers, regarding accommodating ecosystem health into water management decisions. In this way, implementation issues can, hopefully, be resolved as the new knowledge emerges and not after it is produced.

Specific Questions:

1. Line 36 – Average monthly flows are sought for management goals. These are helpful in managing water under average conditions. Are there guidelines under consideration to help decision making under natural hydrologic extremes, such as floods and droughts?

2. Figure 12-4 presents the current year's data while Figure 12-3 presents data back to the year 2000. Could Figure 4's timeline be extended back in time?
3. Line 141 refers to Figure 12-4 as showing maximum inflows have not been exceeded, but it contains salinity data.
4. Line 322 indicates minimum flow target of 35 cfs. Figure 12-13, if I understand the data, shows minimum not maintained for long periods of time. As I read the text, the non-compliance is tolerated until future projects will solve the problem.
5. Not all coastal area research is being addressed/led by the SFWMD Coastal Ecosystems Division, e.g. the Lake Worth Lagoon. Is this the only coastal water body with another organization leading the effort?
6. From a strategic research planning point-of-view, why have minimum flows been developed for some coastal ecosystems, but not all (e.g. Lake Worth Lagoon and Biscayne Bay)?
7. Figure 12-20 has its axis labeling blocked out on my computer. Is this a problem with my computer or the text?

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 »
VOLUME I: THE SOUTH FLORIDA ENVIRONMENT » OVERALL COMMENTS FOR FINAL REPORT

Tree View | Topic | New Topic | Next Topic

Author	Message
Joanna Burger	**Subject:** OVERALL COMMENTS FOR FINAL REPORT

Total Messages 11

OVERALL COMMENTS FOR FINAL REPORT

1. The potential for unusual environmental events (such as the extreme 2007 drought) suggests that there should be an organization or mechanism for Rapid Response that has several different levels. That is, the biologists should be organized in such a way that they can meet early on during any crisis to decide on key questions that will further understanding of Everglades ecology and restoration potential. Some forethought should be given now to what key ecological questions should be addressed should another such drastic drought (or any other ecological stressor) occurs. While the Emergency Operations Center was activated and functioned appropriately, a small group should be forward thinking about potential issues and do emergency planning before such ecological events.

2. Again, there is less consistence both across and within chapters with respect to the initial paragraphs of any project. Such initial paragraph (s) should include objectives, hypotheses, project period, project initiation date and so on. This would make the report far more readable.

3. The cross-cutting appendices, such as 3B-2, is a very useful stakeholder tool, and provides an easy and quick look at a particular problem. This type of chapter would be even more useful if there was a table at the end that directed the reader to the appropriate chapter in the entire document that discussed further the aspects highlighted in this chapter. The authors are to be commended on an excellent document.

4. There is still a need for an examination of the issues and problems ajacent to the Everglades system.

Posted: 13 Sep 2007 10:48 AM
Originally Posted: 13 Sep 2007 10:46 AM

email | profile | reply

New Topic | Next Topic

Select Conference

Go to Conference: go

Log In Options | Username: | Password: | Log in

Appendix 2-1: Hydrological Monitoring Network of the South Florida Water Management District
Date of Chapter Draft: 08/16/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability:
Technical: Primary
Integrative: X
Reviewers:
AA: Ward
A: Armstrong
B: Stein

Technical

Are the findings and conclusions supported by "best available information," or are there gaps or flaws in the information presented in the document?

The findings in this Appendix appear to be supported by best available information. There are a few specific areas to be amplified, and they are as follows:

1. In lines 325-327 and elsewhere there is mention of graphical techniques used to spot data that may need further QA/QC attention. Some additional detail about how this is done would be helpful, i.e., does the software itself help identify questionable data or is the user that does that and the software simply permits easy tagging of such data? Is there in characterization in the database of the quality of each data point as reflected in the QA/QC analysis of the raw data?
2. In lines 980-985, it is noted that an "evapotranspiration network design is now planned"; with that plan incorporate optimization as has been done in other hydrologic networks by the District?
3. The section contained in lines 2054-2067 describes the improvement of flow equations and elsewhere there is description of re-analysis of structures and their characteristics related to flow measurements. To the extent that these improvements change the values of flows estimated, how are these flow estimate changes reflected in the historical record? Are these changes in flow estimates significant enough to affect design criteria for STAs and WCAs for instance?
4. How is the groundwater monitoring network used to detect saltwater intrusion (see lines 2511-2537)?

Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, panel shall identify specific studies that should be addressed or available data to support alternative findings.

Because the Appendix is primarily a description of the hydrologic monitoring system and associated data collection, processing, storage, and retrieval and because the District appears to be using up to date methods for all phases of the Network, no suggestions are made here for other interpretations or other available information.

Integrative

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
The hydrologic network is indeed a large program, and the goals of the program and subprograms were made clear. Further, the hydrologic system is linked across the Report because of the important of the system to not only water flow but transport of water quality constituents through the system, operation of the STAs and WCAs, as well as desirable salinity conditions in the estuaries.

Is the chapter cross referenced in a thorough and consistent manner?
Appears to be.

Special
Does the hydrologic monitoring network report provide necessary information on hydrologic monitoring networks of the District?
This Appendix is an exhaustive review of the hydrologic network and provides extensive information on the District's overall network. It is left to the chapters on source control, STAs, WCAs, and estuaries to describe in more detail how the hydrologic monitoring system is used to monitor flows, constituent loads, salinities, etc. This appendix is pivotal in describing the hydrologic underpinnings of these chapters as it describes how rainfall, surface water stage, surface water flow, and groundwater stage measurements are made and the confidence one can have in those measurements.

How can the existing hydrologic monitoring network be made more efficient and cost effective?
The optimization studies carried out to date and those planned will be the basis for such decisions most likely. As long as the network is functioning efficiently and effectively to support the mission of the District, then continued efforts to keep instrumentation current, to process and store data carefully, and to make the data available as needed are what must continue. It is important that the network be able to adapt to changes in the mission of the District as they occur or to respond to adaptive management as it occurs.

Because no costs were provided in this Appendix, it would be instructive to have some idea of the costs associated with various aspects of the network from instrumentation purchase and maintenance to data collection, processing, storage to data retrieval support, and user support. Perhaps some process improvement techniques could be applied to the processes embedded in the hydrologic network (e.g., instrumentation maintenance, data gathering, processing, storage, and retrieval) as ways to where the problem areas continue to exist and where solutions (both "low hanging fruit" and longer term efforts) may become evident.

What additional information should be included in the hydrologic monitoring network report to improve the utility of work product? Should information be added about the equipment used in past measurements?
As noted above, the QA/QC procedures for raw data processing and detection and tagging of questionable data could be described in more detail.

The report indicates that the longest consistent measurement record [for rainfall] is from 1995 to 2005. How can past data be used with current data for longer-term trend analyses? What techniques are used to 'correct' past data to be compatible with values being generated currently?

Tagging each data point with QA/QC information (i.e., instrumentation used and information about its accuracy and precision, measured vs. interpolated data, data processing and analysis techniques and their efficiency in converting raw data to finished data, etc.) and incorporating such information into data analysis is about the only way to compare data from different time periods. Users of such data must have enough information readily at hand to make valid comparisons.

Author | Message

JoAnn Burkholder

Subject: **Burkholder - Review of Appendix 2-1**

Total Messages 18

Appendix 2-1: Hydrological Monitoring Network of the SFWMD

Response to four questions

1. Does this report provide necessary information on hydrologic monitoring networks of the District?

Yes, except that surface water stage monitoring stations appear to be needed in the most northwestern and southern regions; and the District's surface water flow monitoring network only appears to be in the eastern half of the SFWMD.

2. How can the existing hydrologic monitoring network be made more efficient and cost-effective?

It seems that the District has been working closely with partner agencies toward this goal; such efforts should continue to build in order to minimize overlap and redundancy. I realize that the District plans to integrate these datasets as modeling efforts continue to strengthen, and this will also help to identify areas where the monitoring network can be made more efficient/cost-effective.

3. What additional information should be included in the report to improve the utility of the work product?

It would be helpful to include information about the accuracy of the various datasets and sub-datasets (where instruments and sampling techniques differed over time).

4. The report indicates that the longest consistent measurement record is from 1995-2005. How can past data be used with current data for longer-term trend analyses? What techniques are used to "correct" past data to be compatible with values being generated currently? Should information be added

about the equipment used in past measurements? Information is not included about the accuracy of the datasets (and sub-sections of the datasets), so it is difficult to assess consistency. An excellent trend analyst (e.g. Dr. David Dickey, NCSU Dept. of Statistics) should be consulted about whether/how to best correct past data for compatibility with present data. For some datasets corrective techniques can be successfully applied, i.e. with statistical viability. In my opinion it would be helpful to include a table that describes this information, as well as the equipment/accuracy used throughout.

General Comments

The District network for the acquisition of hydrologic and hydraulic data is impressive in its number of stations, the amount and type of data that are acquired, and the ability of the District to rapidly assimilate data and make management decisions. The District maintains 287 rain gauges and is currently acquiring radar rainfall using NEXRAD. Thus, 287 separate points can be used to calibrate the NEXRAD radar rainfall data over south Florida, providing excellent accuracy in real-time rainfall estimates. A broad suite of other meteorological data are acquired from 45 active weather stations, and daily potential evapotranspiration (PET) data are available from 19 weather stations, giving managers excellent coverage in the event of dry conditions conducive to fires. The data acquired by this network provide excellent calibration/validation opportunities for modelers.

The District also has a network of 1,265 active surface water gauges to provide surface water stage data allowing excellent accuracy in assessing flow and surface water depth in the District area. There are also 446 active flow-monitoring sites to provide instantaneous flow data. The groundwater-monitoring network contains 907 active wells providing excellent coverage. It should be noted that there is a collaborative effort between SFWMD and the USGS to fund and maintain these wells.

All data acquired are rapidly assimilated into two database programs. DCVP (Data collection/validation and pre-processing) is the site where instantaneous data is stored. DBHYDRO is the site where summary data is stored. Users can access data from either site.

Overall, the monitoring SFWMD monitoring network is comprehensive and well conceived. The amount of data acquired provides excellent input for modeling efforts, and the high temporal and spatial coverage provides managers the necessary information for reaction to hydrological events. The continuous time series, in data mined, will provide insights about

seasonal and inter-annual trends. Despite this excellent effort, there are still some geographical gaps in data sites and acquisition (below).

Specific comments

Introduction – It would be very helpful to include a figure with flow vectors (e.g. as in Figure 3 of Richards et al., "A multidimensional modeling system for simulating coupled canal, overland and groundwater flow in South Florida" – US Army Engineer Research and Development Center, Waterways Experiment Station, Vicksburg, MS). Inclusion of such a figure would provide a nice setup for the many figures with sensor and monitoring sites, and would clarify for readers why there are clusters of sites in specific areas. It would also be helpful if surface flow could be visualized during the "dry" and "wet" seasons to allow readers to examine station sites in reference to water flow.

Section II, Hydrologic Data Management – is will written and clear; it effectively communicates data flow and processing.

Section III, Meteorological Monitoring Network is comprehensive and complete. The specifics on equipment, data acquisition and sensor formulae are valuable inclusions.

One concern involves the pan evaporation sites in Figure 15. The northwestern and southern regions of the District are not covered adequately with this data. It would be helpful to have stations in these areas. Also, in Fig. 17, the PET sites are lacking in the SW. The addition of stations at Rookery Bay could be helpful in modeling and monitoring.

Section IV, Rainfall Monitoring Network – This is an excellent section. With acquisition of NEXRAD data in concert with rain gage data, the assessment of rainfall rates likely are very accurate. It would be helpful to include such a calibration comparison in subsequent reports. Figure 27, Proposed rain gauge network is a valuable inclusion. This figure effectively addresses any questions concerning rain data coverage.

Section V, Surface Water Stage Monitoring Network – Figure 33, the composite surface water stage monitoring network in the District, shows a lack of gauges in the most northwestern and southern regions. Are none there because of surface flow characteristics, such as the border of a watershed? The surface flow diagram with streamlines would be valuable here to address this question and apparent gap. The fact that the borders of the SFWMD are straight and not irregular (as at the edge of a

watershed) leads the reader to think that flow might be significant in those areas.

Section VI, Surface Water Flow Monitoring Network – Figure 50, the District's flow monitoring network, illustrates that the majority of the monitoring sites are located in the eastern half of the SFWMD. The authors should explain why this is the case. Is it because other entities are monitoring the western half? Or because the eastern half is where the majority of the water is now going, to populated areas? If water is to be diverted to the Everglades, shouldn't there be more sites in the western part of the region?

Section VII. Groundwater Monitoring Network – Figure 53 is a nice addition that provides an overview of the extent of aquifers in the southeastern area. The groundwater-monitoring network is comprehensive because of coverage by both SFWMD and USGS. There appears to be excellent coverage for groundwater data.

Posted: 15 Sep 2007 12:58 PM
Originally Posted: 15 Sep 2007 12:57 PM

email profile reply

New Topic Prev Topic Next Topic

Go t

Select Conference

Log In Options Username: Password: Log in

Appendix 2-1: Hydrological Monitoring Network of the South Florida Water Management District
Date of Chapter Draft: 08/16/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability:
Technical: Primary
Integrative: X
Reviewers:
AA: Ward
A: Armstrong
B: Stein

Technical

Are the findings and conclusions supported by "best available information," or are there gaps or flaws in the information presented in the document?

The findings in this Appendix appear to be supported by best available information. There are a few specific areas to be amplified, and they are as follows:

1. In lines 325-327 and elsewhere there is mention of graphical techniques used to spot data that may need further QA/QC attention. Some additional detail about how this is done would be helpful, i.e., does the software itself help identify questionable data or is the user that does that and the software simply permits easy tagging of such data? Is there in characterization in the database of the quality of each data point as reflected in the QA/QC analysis of the raw data?
2. In lines 980-985, it is noted that an "evapotranspiration network design is now planned"; with that plan incorporate optimization as has been done in other hydrologic networks by the District?
3. The section contained in lines 2054-2067 describes the improvement of flow equations and elsewhere there is description of re-analysis of structures and their characteristics related to flow measurements. To the extent that these improvements change the values of flows estimated, how are these flow estimate changes reflected in the historical record? Are these changes in flow estimates significant enough to affect design criteria for STAs and WCAs for instance?
4. How is the groundwater monitoring network used to detect saltwater intrusion (see lines 2511-2537)?

Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, panel shall identify specific studies that should be addressed or available data to support alternative findings.

Because the Appendix is primarily a description of the hydrologic monitoring system and associated data collection, processing, storage, and retrieval and because the District appears to be using up to date methods for all phases of the Network, no suggestions are made here for other interpretations or other available information.

Integrative

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
The hydrologic network is indeed a large program, and the goals of the program and subprograms were made clear. Further, the hydrologic system is linked across the Report because of the important of the system to not only water flow but transport of water quality constituents through the system, operation of the STAs and WCAs, as well as desirable salinity conditions in the estuaries.

Is the chapter cross referenced in a thorough and consistent manner?
Appears to be.

Special
Does the hydrologic monitoring network report provide necessary information on hydrologic monitoring networks of the District?
This Appendix is an exhaustive review of the hydrologic network and provides extensive information on the District's overall network. It is left to the chapters on source control, STAs, WCAs, and estuaries to describe in more detail how the hydrologic monitoring system is used to monitor flows, constituent loads, salinities, etc. This appendix is pivotal in describing the hydrologic underpinnings of these chapters as it describes how rainfall, surface water stage, surface water flow, and groundwater stage measurements are made and the confidence one can have in those measurements.

How can the existing hydrologic monitoring network be made more efficient and cost effective?
The optimization studies carried out to date and those planned will be the basis for such decisions most likely. As long as the network is functioning efficiently and effectively to support the mission of the District, then continued efforts to keep instrumentation current, to process and store data carefully, and to make the data available as needed are what must continue. It is important that the network be able to adapt to changes in the mission of the District as they occur or to respond to adaptive management as it occurs.

Because no costs were provided in this Appendix, it would be instructive to have some idea of the costs associated with various aspects of the network from instrumentation purchase and maintenance to data collection, processing, storage to data retrieval support, and user support. Perhaps some process improvement techniques could be applied to the processes embedded in the hydrologic network (e.g., instrumentation maintenance, data gathering, processing, storage, and retrieval) as ways to where the problem areas continue to exist and where solutions (both "low hanging fruit" and longer term efforts) may become evident.

What additional information should be included in the hydrologic monitoring network report to improve the utility of work product? Should information be added about the equipment used in past measurements?
As noted above, the QA/QC procedures for raw data processing and detection and tagging of questionable data could be described in more detail.

The report indicates that the longest consistent measurement record [for rainfall] is from 1995 to 2005. How can past data be used with current data for longer-term trend analyses? What techniques are used to 'correct' past data to be compatible with values being generated currently?

Tagging each data point with QA/QC information (i.e., instrumentation used and information about its accuracy and precision, measured vs. interpolated data, data processing and analysis techniques and their efficiency in converting raw data to finished data, etc.) and incorporating such information into data analysis is about the only way to compare data from different time periods. Users of such data must have enough information readily at hand to make valid comparisons.

Appendix 2-1: Hydrological Monitoring Network of the SFWMD
Special Review
(Panel is to consider comments of outside reviewers)

Prepared by: Robert C. Ward

While Appendix 2-1 clearly states that 'the objective of the report is to describe the hydrologic monitoring network of the District', there are qualifications. Clarification of the report's purpose includes noting that the …'report provides a status of the hydrologic monitoring network.' – in other words, the network is constantly under review thus the report captures the status at a specific point in time – April 30, 2007. The report, in many places, notes that the SFWMD's hydrological monitoring efforts evolved project-by-project until the early years of this decade, with out any effort to design for any single purpose (lines 114-118). In 2002 initiatives were undertaken to explore ways to optimize and design hydrological monitoring programs. A number of specific optimization/design efforts have been completed while others are currently underway or planned for the future.

In spite of the above, the report's information is viewed as '…a prerequisite to expanding and refining the District's hydrologic network to meet the needs of CERP and non-CERP projects.' Thus, the needs of 'projects' continue to influence how the optimization/design initiatives will be conducted.

Reviewers were provided four questions to guide evaluation of the report. The questions are used to organize this review.

Does the hydrologic monitoring network report provide necessary information on hydrologic monitoring networks of the District?

If the question refers to the physical infrastructure of the current network, the answer to this question is 'yes'. The report provides extensive information on the sensors employed in measuring South Florida's rainfall, meteorological conditions, surface water stage, surface water flow, and groundwater levels. The documentation regarding sampling equipment and data transmission/storage (with references), in particular, is thorough. Ongoing efforts to identify new measurement technology and incorporate reliable new equipment into the network are described.

It should be noted, however, that the detail provided in report in Appendix 2-1 is not sufficient for someone to duplicate the described sampling and data processing, using only the information provided in the Appendix. The report references many additional documents that provide much greater detail. Thus, the report is an overview of the hydrological monitoring network's status, in its physical dimensions, with much of the actual design detail presented in cited literature. Given the immense amount of detail associated with a well designed and operated network, this arrangement for presenting the design of a network is necessary. Where sub-network designs are planned,

underway, or recently completed, the report notes this fact (e.g. on page App. 2-1-36 where it is noted that an evapotranspiration network design is being planned; and on page App. 3-1-61 where a completed rain gauge network optimization study is summarized).

The 2008 SFER glossary does not define the term 'network'. The report defines a network as a 'collection of sensors that are spatially distributed'. If the word 'information' in the question includes the entire hydrological information system, the report does not provide insight into how the data and information, generated by the network, are used for decision making. The discussion of the 'purpose for hydrologic monitoring' is too brief to fully understand why the SFWMD connects its hydrologic monitoring to management decision making. Without knowing more about why and how data and information are used in the management of water resources in South Florida, it is difficult, if not impossible, to determine how the network can be made more efficient and cost effective or to identify what additional information should be collected.

It is obvious that the studies recently completed or underway do examine information needs to justify additional monitoring features. For example, new groundwater monitoring wells are called for, on page 2-1-115, apparently before a study is undertaken to evaluate the need for new wells. Another example is the rainfall network optimization where the study concludes that 154 new rainfall gauges are needed '…to achieve an accuracy of standard error of 0.3 inch, which was determined to be reasonable and acceptable to the District'. Is there a reference for the methods used to determine this level of accuracy and how the new information will improve SFWMD decision making? Such insight would be very helpful in evaluating the rainfall network expansion being proposed. It is very difficult to evaluate the justification for additional monitoring if the logic behind management's need for additional information is not detailed.

Under the brief 'Purposes of Hydrologic Monitoring' on page 2-1-4, five bullets provide why hydrologic monitoring is needed. To continue to examine the information behind justifying monitoring, several questions are posed to illustrate the need for more insight into data/information connections. How does the SFWMD use hydrological monitoring data and information:

1. In the operation of water control structures?
2. To support hydrological and hydraulic analyses and modeling and why are the analyses and models needed?
3. To identify needs for, and design of, new infrastructure;
4. In regulatory and/or permit compliance; and,
5. In the evaluation and assessment of infrastructure structures.

Given the description of sampling strategy for water quality monitoring contained in Chapter 1-B in the 2008 SFER, such descriptions probably exist, but they are not referenced in Appendix 2-1. A similar type of explanation is needed for each of the information questions above to help the reader of Appendix 2-1 determine if the monitoring network is meeting its information goals.

The considerations currently being used in Appendix 2-1 to guide design/optimization of monitoring (provided on page 2-1-4) include:

- Purpose or objective of monitoring
- Total optimal number of monitoring stations (or points) needed
- Locations of the monitoring stations (spatial distribution)
- Sensor(s) needed for the monitoring station
- Frequency of the data sampling needed at the monitoring station (temporal distribution)

These considerations relate well to a network where sampling location, frequency of sampling, and equipment are used to define a network. The fact that 'purpose or objective of monitoring' is also listed (and is discussed in a few places in the report), indicates that this issue will be addressed as the District continues its efforts to optimize and/or design its monitoring programs.

It should be noted again, however, that the authors of Appendix 2-1 may define 'network' in a limited fashion, focusing on the sampling hardware. If this is the case, why is the purpose of monitoring listed?

To answer the questions asked, as well as to describe the totality of the SFWMD hydrological monitoring efforts (as a total hydrological information system), the authors of Appendix 2-1 should consider following the thinking in Chapter 1-B, described for water quality monitoring, and summarized in the Figure 1B-2. It is very difficult to design/optimize a monitoring network without connecting the design to well defined reasons of why the data are being collected, how they are being analyzed, how the resulting information is being reported, and, ultimately, how the information us used to make decisions – the reason for the hydrological network in the first place.

How can the existing hydrologic monitoring network be made more efficient and cost effective?

The discussion of monitoring network design/optimization efforts, presented in the report, refers to justifications for new monitoring resources. As with zero-based budgeting, it would be helpful to review the information justifications for existing monitoring resources along with proposed new monitoring resources. This fits with the above recommendation to review the approach to water quality monitoring presented in Chapter 1B.

However, given the complexity of the water and ecosystem being managed, and the project-by-project approach to meeting legal mandates, permit conditions, and MOA requirements, it is difficult to envision a single manner in which the monitoring programs could be designed/optimized, other than dividing up the hydrologic cycle into parts and addressing each part separately. One thought that comes to mind, for addressing the array of legal mandates and permit conditions, is a process employed by Lacey Goetz in

examining ways to design a ground water quality monitoring network in the San Luis Valley of Colorado where 39 separate laws/regulations addressed ground water quality in the valley. Her MS thesis on the subject can be reviewed at: http://watercenter.colostate.edu/ce545/theses/LGoetz.pdf.

Is it possible to indicate in this report how hydrological monitoring interfaces with water quality monitoring? Are hydrological monitoring staff field activities coordinated with water quality monitoring staff field activities? Are the staff the same people? It is not clear if there is an opportunity to gain efficiency by better coordinating monitoring staff.

What additional information should be included in the hydrologic monitoring network report to improve the utility of work product?

The report's utility could be improved by adding to each section a justification for the existing monitoring. Why are stations located where they are? Why is the sampling frequency at the current levels? How is the data analyzed (e.g. models, statistical methods, data summaries, or just the raw data itself) to produce the data/information utilized by management? This would help connect the physical attributes of the network, which are well described and documented in the report, with well described and documented reasons for the network to exist. This effort would, in effect, document the current monitoring network designs, from sample collection to utilization of the resulting information for decision making. In the process, sampling strategies would be documented; data transmission, storage, and retrieval processes would be documented; data analysis methods would be described and documented; data analysis results interpretation and reporting described and documented; and, ultimately, use of the information in decision making would be documented. Much of this information is mentioned and referenced in the report, but it is not organized following the flow of information through the monitoring system, from the water body being managed to the mind of the manager.

A table of all the recently completed, currently underway, and planned monitoring system design/optimization efforts would be helpful in understanding the strategic nature of the hydrologic monitoring system improvements. It is obvious that a lot of effort is going into designing/optimizing hydrological monitoring, but the information about the effort is scattered throughout the report.

It would also be helpful to discuss how the various design/optimization activities could possibly be integrated across the sections of the report (i.e. across the parts of the hydrologic cycle). Is it possible to view hydrological monitoring being conducted for a 'single purpose' (lines 115-116)? Can the monitoring optimization be around District needs, overall, or must the optimization remain on a project-by-project basis?

The report indicates that the longest consistent measurement record is from 1995-2005. How can past data be used with current data for longer-term trend analyses?

What techniques are used to 'correct' past data to be compatible with values being generated currently?

At the beginning of this review, it was noted that the descriptions of the current sampling equipment are excellent, but the manner in which equipment changes, over time, are handled is not well developed. This aspect of a hydrological monitoring system relates to being able to analyze long-term trends in a consistent and comparable manner – i.e. a scientifically sound manner. If dates of equipment changes have not, historically, been noted in the data record, and if data were not collected with the old and new methods simultaneously for a set time after the change, then it is difficult to correlate the old data with the new date in analyses of long-term trends.

Thus, is it possible to 'research' past equipment changes; learn about the specifications of the equipment over time; obtain any old-new comparison data from other agencies, such as the USGS or equipment companies; compute the bias that may be attributed to equipment change, and then develop a new long-term data record that accounts for the equipment changes? This is a time consuming process but it is the best way to create consistent and comparable hydrological data records from records that do not account for equipment changes.

This situation, hopefully, points up the need for the SFWMD to, in the future, operate old and new sensors together for a set time in order to correlate the data that comes from both pieces of equipment. This way, future efforts to remove the bias of equipment can be accomplished without the need for research described above.

If the above research effort does not produce the information needed to sufficiently understand equipment bias in the data, it is possible to perform the long-term trend analysis with the existing data and note on all information products (time series plots, tables, figures, etc) when the equipment changes took place. In this way, each person can judge the impact of the equipment change bias on the data analysis results.

Author

JoAnn Burkholder

Total Messages 12

Message

Subject: Comments on Appendix 3B-2 - Burkholder

Appendix 3B-2 Sulfur as a Regional Water Quality Concern

The purpose of this document is to improve stakeholder understanding of sulfur as a regional water quality concern in South Florida, and its triad importance in nutrient (especially phosphorus) mobilization, toxic influences on plants, and exacerbation of mercury bioaccumulation. The authors provide a clear, concise, and very helpful explanation about the present status of knowledge about sulfur including sources, impacts, gaps in understanding, and an action plan to support decision-making about sulfur in restoration efforts. The complexities influencing the relationship between sulfate, sulfide and methylmercury are nicely conveyed, and the action plan elements seem scientifically sound and excellent overall.

Response to two questions

1. Are the findings and conclusions supported by “best available information,” or are there gaps or flaws in the information presented in the document?

Generally, yes, the findings and conclusions are supported by “best available information”. It would be helpful, though, to add information should be added about historic limitations in sampling frequency (e.g. trend analyses based on quarterly values – this information would help to underscore for stakeholders the need for more sampling), and problems in measuring sulfur that have contributed to the present gaps in understanding (e.g. application of isotopic ratios - large fractionation can occur during sulfate reduction; and other sampling problems, e.g. sample contamination mentioned on line 327).

It would also be helpful to explain, within the Sulfide section, that acid-volatile sulfide is potentially important in addition to porewater sulfide, and that few data are available for this parameter.

2. Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, the panel shall identify specific studies that should be addressed or available data to support alternative findings.

Within the action plan, it would be helpful to add clarification: Within the sulfur budget studies, acid-volatile sulfide should be measured as well as porewater sulfide, and chloride/sulfate ratios should be considered (as in panel recommendations for the 2007 SFER).

An excellent point was made in lines 362-365, that the available data do not indicate whether the sulfate entering canals in the EAA is from recently applied agricultural sulfur or from historically applied sulfur that is slowly being released by soil oxidation. How will that important question be addressed?

Specific comments

Lines 51, 100 – Sulfur is an essential plant nutrient. Why is it described as a "secondary" nutrient? (please clarify in the writing)

Figure 1 - Acid-volatile sulfide should be added.

Line 311 – Explanation should be added as to why atmospheric sulfate deposition is low in Florida whereas mercury deposition is substantial.

A section should be added about the District's present monitoring and research efforts on sulfur (prior to the Action Plan section).

Current Interagency Research – This section seems to need a better title (e.g. the first topic is research by a university, not an agency). Here, as well, it would be helpful to add information about the partner agencies working with the District on sulfur monitoring, research, and/or modeling efforts.

Posted: 17 Sep 2007 06:33 PM
Originally Posted: 17 Sep 2007 06:31 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Next Topic

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » VOLUME I: Ch. 3B Appendix - Sulfur as a Regional Water Quality Concern in South Florida » Appendix 3-B Stein

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author | Message

Otto Stein

Subject: **Appendix 3-B Stein**

Total Messages 7

Review of 2008 SFER Appendix 3B-2
by Otto R. Stein

This is a well written, succinct overview of the background, issues, science, problems and research needs surrounding sulfur in the greater Everglade ecosystem and the STAs in particular. I believe it very effectively meets the stated goal, specifically to "provide the stakeholder understanding of sulfur as a water quality concern in South Florida". I provide a list of specific questions that authors should address and suggestions for improvement in the document below.

First, I want to emphasize that this reviewer's opinion is that there is little additional benefit to be gained by further refinement of the sources of sulfur to the Everglades: the data collected to date is quite convincing that the predominate source is from EAA runoff. Perhaps the only unanswered question is whether more of the sulfur load is from current or historical anthropomorphic (e.g. agricultural) sources. That however, is a largely an academic question: the need now is to explore ways to limit additional sulfur loading to the extent possible and to discover ways to minimize activity of SRB and/or the link between SRB and mercury methylation and the potential for sulfate to inhibit nutrient removal objectives. The best use of available resources is to focus current and future research on these issues. The SFWMD should therefore focus its research into action plan items 2-4 and deemphasize action plan 1 as outlined on pages 16-17.

Page Specific Review by page and line number (suggested text changes in *italics*):

Pg2 36 replace can be far-reaching to *are limited*

Pg 2-71 add *which can be released to the atmosphere.*

Pg.3 Figure 1 the arrows linking the Methylmercury Production and Mercury Sulfide Complex boxes to the bacterial sulfate reduction lines are confusing and need some editing. The line connecting sulfate surface water and sulfate porewater should be double-arrowed. Add an arrow for sulfide to the atmosphere.

Pg4,111-112 why does 500/acre translate to 70 lbs/acre? Because only a portion of the EAA has elemental sulfur applied or because the maximum is seldom applied, or some combination? Also change to 78 (*kg/Ha-yr*)

Pg55, 122-130 The term "internal eutrophication" needs a little better explanation. As I understand the process, nutrients can be released to porewater and eventually surface water by SRB activity because they will

release N and P bound to and/or internal to the organic matter they are consuming. In that process they also increase alkalinity by producing CO_2. Of course aerobic and methanogenic bacteria perform the same two processes, but perhaps the increased concentrations of SO_4 will increase the rate the organic matter utilization by stimulation of SRB. In this case more nutrients will be released, but I don't see how the production of sulfide and alkalinity increase nutrient loading in and of themselves. If other factors are at work this should be made clearer. These points are further (and better) outlined in the number items (esp 1, 2 and 4) on the next page but the paragraph could be a little clearer.

Pg6,136-140 Alkalinity generation is more complicated than this. **If** the pH is low, SRB activity does tend to increase pH, but if pH is high the produced alkalinity tends to decrease pH. SRB can survive and grow over a wide range of pH, but do seem to prefer moderately acidic conditions. So, if the porewater is acidic, the opening statement is generally true. That said, the assumption that increased pH will stimulate more microbial activity (of some consortium other than SRB?) categorically is rather suspect.

Pg6,145-146 This statement does not make sense to me and seems to be in conflict with the argument about SRB raising pH discussed above.

Pg8,205-206 Reword to: …generally highest *when Everglades surface water is between 2-20 mg/L sulfate* and porewater sulfide…

Pg8, 210 change: *beyond* to *higher than*

Pg8,213 by using the word "pristine" is there an implication that this means areas with sulfate concentrations within and/or below the optimal sulfate range for mercury methylation?

Pg 12,297 wording change to: can remove *some* sulfate, but *typically much* less compared

Pg12,320 move the sentence …In some cases… to line 314 after *(Gilmour et al., 2007a)*

Pg12, 323-324 replace: *stable isotope values typically much lower* to: *an isotope profile that is different*

Pg14,367-384 While groundwater samples may be mixed as to sulfate concentrations it is clear that A) historical everglades water quality data shows very low sulfate concentrations (Orem et al., 1997), B) only one sampling location of deep groundwater within WCA-2 (which demonstrates the highest levels of surface-water concentrations outside the EAA boundary) shows concentrations higher than in the EAA canals, C) highest deep groundwater sulfate levels are under WCA-1 (which has low surface-water concentrations) and D) all surface water balance data from the STAs suggests minimal interaction or downward movement of surface water to groundwater. Based on these points, it is far more likely that EAA or other surface water is a **source** to elevated groundwater sulfate concentrations, not the other way around.

Pg 15,386-393 Perhaps the best way to say this is that Lake Okeechobee is a buffer for sulfate concentrations. If it is the only source of water to the rest of the downstream system, then surface water will be similar to its concentration. That surface water is in the EAA and many of the STAs is higher offers evidence that lake water actually reduces the concentration of sulfate in the STAs and WCAs under normal conditions.

Pg 16,406-420 The data collected to date provided rather compelling evidence

that the predominate source of sulfate to the STAs and WCAs is surface water originating somewhere within the EAA. To continue monitoring and refining techniques for monitoring other sources, such dry atmospheric deposition, in great detail is not putting future research to the greatest good. Developing ways to minimize future sulfur applications with the EAA and other source water contributing areas is an important goal and should implemented as quickly as possible. Therefore one possible emphasis is to conduct studies for optimal minimum sulfur applications in agricultural production as suggested in the Item 4 action plan.

Posted: 23 Sep 2007 08:41 PM
Originally Posted: 23 Sep 2007 08:32 PM

email profile reply

New Topic Prev Topic Next Topic

Go t

Select Conference

Log In Options Username: Password: Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log in | Not Logg

Home Page » Boards » The South Florida Environmental Report - 2008 » VOLUME I: Ch. 3B Appendix - Sulfur as a Regional Water Quality Concern in South Florida » APPENDIX 3B-2

Tree View | Topic | New Topic

Author	Message
Joanna Burger	**Subject:** APPENDIX 3B-2

Total Messages 11

APPENDIX 3B-2

The objectives for this appendix are met, and it is a good statement of the current state of knowledge for the sulfur problem in the Everglades. The problem and the data needs are clearly stated. The mercury link is well discussed in its own section, but could be mention earlier under effects.

This chapter is an excellent introduction to some of the major Everglades problems; and it is a good tool for stakeholder initiation into the problems of the Everglades.

Some mention should be made of the agencies and groups working on the sulfur problem

Lines 57-66: Might also mention the negative effects briefly here (such as its relationship to mercury.

Lines 310-on: it is interesting that Florida is low with respect to atmospheric deposition of sulfur, given the high rate for mercury. Some comment could be made about this here.

Lines 462-on: Some mention should also be made here of the SFWMD research projects and overall monitoring plan.

Posted: 13 Sep 2007 10:41 AM
Originally Posted: 13 Sep 2007 10:38 AM

email | profile | reply

New Topic

Select Conference

Go to Conference: go

Log In Options | Username: | Password: | Log in

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options | Help | News | Log off | Welcome

Home Page » My Home Page » Boards » The South Florida Environmental Report - 2008 » VOLUME I: Ch. 3B Appendix - Sulfur as a Regional Water Quality Concern in South Florida » Comments by Meganck

Show New Messages

Tree View | Topic | New Topic | Prev Topic | Next Topic

Author | Message

jeff jordan

Subject: Comments by Meganck

Total Messages 15

1. Given the complexity of the “sulfur” issue, the research questions posed and the commensurate research program that will logically follow, does the District have the political support to undertake what may turn out to be an even more fundamental and more costly research track than the effort undertaken to understand the phosphorus issue? This effort may require an incremental education effort on the part of the District towards the decision-makers and the general public, but it is certainly a valid issue considering the complex nature of the sulfur cycle.

2. This chapter presents a general justification for undertaking a sulfur research program. What has been the reaction from the agricultural community to date as it is apparent from the preliminary data that there is a link, the nature of which has yet to be clarified, to the levels of sulfur and historic and present agriculture practices. I refer to the general discussion of the sulfur concentration transect in the region and to the section on atmospheric deposition (line 309) and particularly to the last sentence (lines 334-336).

3. It is clearly stated that there is a relation between sulfur levels and phosphate release (the section beginning with line 131 and line 147) and one of the research questions posed at the end of the chapter will apparently address this issue specifically. The discussion in this chapter would seem to indicate that this is a particularly critical problem in the EAAs and nearby STAs and WCAs. Is this the case and are the farming communities aware of this potential relationship?

4. Can sulfur be recovered in the STAs in the same physical way that phosphorus can or as is noted in the section of the chapter beginning with line 292 the primary ways in which sulfur is “removed” from a water system is through microbial reduction/storage in soils and sediments or through uptake by plant communities?

5. Given that sulfate may actually contribute to the release phosphorus and promote the production of toxic methylmercury (line 174) shouldn’t its control be the focus of water quality activities for the region as is alluded to in line 223 of the chapter?

6. Will the District recommend that the State adopt a sulfur standard for water quality?

7. The figures provided on groundwater sulfur levels (section beginning with line 366) also support the general contention that the majority of the sulfur in the system is related to its long-term on-farm use. Am I correct in putting these two data points together?

Posted: 17 Sep 2007 04:34 PM
Originally Posted: 17 Sep 2007 04:32 PM

profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Prev Topic Next Topic

Go t

Select Conference

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Author

Message

Joanna Burger

Subject: **APPENDIX 6-1 OVERALL COMMENTS**

Total Messages 11

APPENDIX 6-1

ENVIRONMENTAL RESPONSES TO WATER MANAGEMENT

This chapter is an excellent overview of water management strategies, and provides an excellent overview of organization, problems, and possible solutions. The inclusion of a table of contents makes it easier for the reader to find subjects. The introduction and background clearly lays out the objectives, priorities, and implementation plans. As such, it is a clear statement with finite and do-able objectives. The organizational chart listed on the first page, however, is confusing; it is unclear how this relates to anything else in the document. It would also help the organization if a paragraph were added to the end of the introduction that briefly summarizes the organization of the rest of the chapter.

Table 6A-1 is extremely important as a basis for understanding the overall Everglades research plan in relation to clear goals and objectives. The authors are to be congratulated on making the research objectives clear.

This is an opportunity for the program to add areas that clearly need addressing, and should be placed within the water management area. Invasive species is one such area that seems to be missing from this chapter, and in the invasive species chapter, several of the species seemed to be partly dependent on water level regimes. For example, are there any plans to determine whether invasive fish are having an effect on fish communities such that prey are less available to wading birds? In this same line, it would be useful to make sure that tribal interests are included in the synthesis area.

There should be a clear connection between the hypotheses and the individual studies being described (I'm sure there is, but it isn't clear). That is, it should be easy to see which hypothesis an individual study is addressing. While these are explained in Table 6a-1, it should also be under each study. Perhaps these could be placed under management and restoration objectives, making the chapter more reader friendly.

The overall organization of each section, and the consistency between sections, makes this an extremely useful document, and one deserving considerable discussion. This chapter would be improved with the addition of literature citations to work mentioned.

It might also help to have references in Table 6A-1 that tell the reader where to go for details about the specific studies. This could also go into the individual studies mentioned. In other words, there has to be a place for the reader to find more details on each of the study components that make up the overall research plan.

The hypotheses as written are not really hypotheses, but are statements. Usually a hypothesis is worded in such a way that it could be tested (e.g. for hypothesis 1 it would be - Wading bird nesting colony location, size and timing are related to changes in water levels [or whatever]). A hypothesis usually gives the reader some indication of a causal relationship, and these are mainly declarative statements.

Finally, at the end of the hypotheses for each section, and before the description of the studies it would be useful to have a paragraph that lays out how each of the studies in the section relate to one another. In other words, lay out the rationale for how they were selected.

Most of the comments above relate to all the sections, and below I give only comments specific to each section.

EXAMINING THE FOOD WEB

The problem of mercury and its effects on the food web, and the methylation of mercury in the periphyton should be included. Similarly, the effects of invasive species should be integrated in some way, as these species will have a drastic effect on foods webs.

MANAGING FOR ACCELERATED RECOVERY

What attention has been given to other methods for accelerated recovery except herbicides and burning for this project. It would be useful to have a sentence or two about alternatives that are, or have been considered. LTP 1 is very useful because it can be tested.

Have models been used to predict recovery times, both for natural recovery and for accelerated recovery. Do the models predict differences as a function of herbicides vs fire? What about fire intervals as a factor? Although modeling will be conducted for scaling up, it is not clear that modeling has been used to predict behavior of the system itself under different conditions.

It would be useful to have a little more information about natural and accelerated recovery: time frames, differences among microhabitats, effects on wildlife and plant communities, effects on invasive plant spread.

UNDERSTANDING ECOSYSTEM PROCESSES

While the two main questions addressed under this section are indeed quite important, I wonder whether other similar questions should be addressed, such as the relationship of Okeechobee to the Everglades proper and the relationship of the more northern modules with the Everglades proper? These same functional linkages need to be explored at some time. Similarly, are there other overview questions besides microbial and soil processes that are needed to understand ecosystem processes. While they may not be addressed at this time, they should be mentioned. One such question that comes to mind is the relationship between reptile invasives, native reptiles, and food web interactions. Many of the hypotheses listed for the relationship between the

Everglades and Florida Bay would be of interest for the linkages between other components of the system.

The conceptual models for ecosystem functions is very useful, and the study of the effect of sea levels rise is critical to the system. Many of the models being developed will be useful throughout the Everglades. I wonder, however, about the definitions of stability in the system, given the externals of potential changes in sea level? Further, do the models also examine interactions with the bay with respect to compartments (e.g. open water, mangroves and so on).

The Florida Bay Everglades Linkage study is extremely important, and it good the SFWMD had turned to understand these interactions. This is the first place that stewardship has appeared as a long term goal, and this is an important aspect of the overall research and restoration plan. Are there any historical data on inputs into Florida Bay that might indicate what restoration goals might look like (do the data indicate anything about temporal and spatial patterns?). This would extend not only to direct measures of nutrient input, but the effect in terms of algal blooms (which might be surrogate problem for which there are data). Presentation of the models (Fig. 6A-4) is useful because it shows the complexities of the interactions, and makes the text more understandable.

ANALYZING LANDSCAPE STRUCTURE AND FUNCTION

The examination and study of the Everglades system on a landscape scale is a necessary part of restoration, although perhaps the most difficult. In this section was the mention of a 100 year time frame, and perhaps this concept needs to be expanded so that it is clear when specific goals are to be met throughout the report. The holistic approach taken in this section is optimal for an overview of the Everglades restoration. The use of 100 years makes it clear that a series of interim goals and assessment measures need to be developed.

The mapping being proposed is also important for the overall Everglades work, both for managers and scientists, but for the greater public, including public policy makers. The issue of ground-truthing needs to be considered, as well as adding some details about the scale of the data. It is not clear from the description how the historical information (as well as the peat cores) are going to be integrated into the current vegetation mapping. Who is responsible for comparing historical vegetation mapping with the current products? This comparison should prove particularly useful in the restoration process, and for the public to understand the nature and extent of ecosystem disruption.

The experiments to understand flow effects on plant community interactions are very important to overall restoration goals, and more details need to be provided on how the experiment will contribute to understanding in the greater Everglades area. It is a matter of scaling up the effects observed. The meta-scale transport processes study should go a ways toward understanding the scaling up. The ridge and slough pattern is critical to Everglades restoration, and any studies aimed at understanding how to maintain existing ones should be vigorously pursued. The management and restoration objectives for the ridge and slough pattern analysis and modeling project are well-stated and important.

Tree island formation and maintenance are clearly integral to the restoration efforts in the Everglades, and play a key role in ecosystem dynamics. To what degree have the effects of potential sea level rise been factored into the thinking, models and research plans. For this project, it might be useful to relate the management and restoration objectives to the larger picture. That is, how will understanding litterfall help with restoration of tree islands. Are there

any plans to actually build new tree islands to experimentally determine if this is feasible or even possible?

Since the water regime is expected to change in the future as a function of water management, what thought has been given to selecting tree island sites that most mimic the future water level regimes to predict future effects? If not, then some preliminary water regimes should be tested to examine these effects. At the very least, the flooding tolerances data to be collected are extremely important to answering some of these questions.

The role of exotics in tree island formation is another critical question. This is one of the few places in this chapter where invasives are seriously considered, yet they should be integrated into as many of the research projects as possible as they will become even more important in the future of the Everglades. Monitoring is extremely important, and every effort should be made to encourage monitoring of the program at Loxahatchee with respect to exotic invasive plants.

Finally, Mangrove structure and function has been an area that has received little attention, but which has great potential for affecting the Florida Bay system. Since this system serves as a buffer for the Everglades from storms, as well as to coastal communities, it deserves some careful studies. Are there historical data that would allow for an understanding of the spatial and temporal changes in the location and extent of the mangrove system? Are any data available from the 1940s, 50s or later?

SYNTHESIS

Ecological evaluation is a critical part of ecosystem management, and is usually done with a goods and services approach. Both ecological economics and ecological services approaches usually examine the value of ecosystems from an extractive and services viewpoint. Yet, many subsistence and American tribal peoples view ecosystem values in a more holistic and larger context. Every attempt should be made to go beyond the goods and services approach when evaluating ecosystems.

Posted: 13 Sep 2007 11:09 AM
Originally Posted: 13 Sep 2007 11:07 AM

email profile reply

New Topic Next Topic

Go to Conference:
Select Conference go

Log In Options Username: Password: Log in

Author | Message

Joanna Burger

Subject: **APPENDIX 6-1: QUESTIONS AND SUGGESTIONS**

Total Messages 11

APPENDIX 6-1

ENVIRONMENTAL RESPONSES TO WATER MANAGEMENT

The organizational chart listed on the first page, however, is confusing; it is unclear how this relates to anything else in the document.

Line 72: might mention restoration goals here (not just the ecological trajectory).

Line 77: Do you want to also add that support fish consumption?

Line 116: How many workshops - might be useful to have a table of workshops with their objectives.

Line 151: Under food webs, I wonder if there should be an invasive animal component, particularly where the invasive is disrupting the whole system (such as the pythons or feral hogs).

Line 164: Are wading birds higher in numbers than alligators (which are also top predators)?

Lines 191-205: How do these individual hypotheses relate to the projects listed thereafter? This information is in table 6a- 1, but it requires going back and forth, and it should be in each section.

Lines 247-258: Give citations for the specific studies mentioned.

Line 281-309: Are there any plans to determine the effect invasive fish have on prey availability?

Line 328: Should the problem on methylation of mercury be included.

Line 411: What datasets?

Lines 459-462: The management and restoration objectives do not seem as tied to restoration as the others are.

Line 503: Need to state removal of what.

Line 505: Need to include the options (These should stand alone).

Line 542: Might say what kind of community structure.

Line 562-578: Are cattails the only vegetation that is so dense?

Line 586: Are there any predictions for time to natural recovery.

Line 663: I found this line a little condescending - it should be softened.

Line 667: Might add a sentence about the historical fire interval in the Everglades.

Line 672: When initiated?

Line 688: Do you have a criterion for how to determine success? In order to have natural recovery you need to know the time frames of that recovery.

Lines 800+: The two questions are very different in approaches and scope. One deals with the whole system, and the other deals with how parts of the system interact or are linked. This needs to be addressed.

Line 841: Again this is a statement rather than a hypothesis.

Lines 847-895: I would like to see all of these framed as testable hypotheses (I think this would make it easier for the reader also).

Line 960 on: To what degree will sea level rise affect these models and peat accretion?

Table 6A-3 is extremely useful.

Line 1031: I agree it will be useful, but it would be helpful to have some examples of potential applications.

Line 1099: Any field evidence for this?

Line 1113: In the laboratory or the field?

Line 1124 on: The use of stewardship is important, but should be defined.

Line 1210-on: Are there any data for historical inputs to Florida Bay from the Everglades?

Line 1247: I don't normally think of bioavailability as being decomposition rate (surely there is some percentage thereof?). This needs more explanation.

Line 1264: Are there any data showing the extent of increases in algal blooms as a function of 30 years, 20 years or 10 year time-frames. What are the data?

Line 1270-1272: Are there data on relative public concerns. Not just a few comments, but has there been any research to actually assess perceptions and attitudes about the Bay?

Line 1307: Up to this point, there has been little mention of the mangrove system (is this covered elsewhere?).

Line 1354: Does it also look at percent salinity?

Fig 6A-4: The abbreviations along the left-hand side are not always obvious, and should be in the legend. The same with other abbreviations in the model.

Line 1408. This sentence seems incomplete - and stable what?

Line 1429: What was the time period of the canal digging?

Lines 1458-1464: Again, change to testable hypotheses.

Line 1495: Who is developing the interim goals, and is anyone developing assessment measures?

Line 1515: Need to define LiDar

Lines 1526-1530: What is the timing of the mapping? When will the initial draft be done?

Line 1535: I think that the Tribal interests should be mentioned here.

Line 1539-40: What ground-truthing will there be for the mapping.

Line 1572: Did the aerial photography in the 1940s cover the whole Everglades?

Fig 6A-5: This is difficult to read because it is not clear.

Line 1602: How will these sample areas be selected; will only one of each type be used?

Fig 6A-6. The date of construction should be in the figure legend.

Line 1723: How will pre-drainage flow be determined?

Line 1774-1781: Are there good data on all the drainage and water flow changes that mirror the aerial photography?

Line 1789: Can intermediate times also be determined? What did the pattern look like in 1950, for example?

Line 1793: It is not clear what "these pattern changes" refer to. Some of these need to be more clearly stated.

Fig. 6A-8: Need to give the location of this quadrant pattern.

Line 1852: Need to list the predictions that can be rapidly tested, and in what timeframe?

Lines 1864-on: It might be useful to give some basic statistics on the relative degree of tree island loss (these are presented elsewhere,but would be useful

here.

Line 1903:Is the 61% decline typical of the Everglades overall?

Line 1924: What is the pattern of formation of new tree islands? Are there many? Have they been studied well? Are they being followed? How stable are tree islands, and do they have a lifespan?

Line 1960 and on: It might be useful to state how each of the objectives will help understand tree islands and their restoration.

Line 1775: What paleontological data will be used? peat cores?

Line 2005-2009: Are the water tolerant species invasives, nonindiginous, or just native species that are outcompeting more preferred species?

Line 1036-2045: The objectives are not parallel; some are statements, others are effects of...

Line 2114: Is there any chance of getting this program to include a monitoring component and appropriate controls?

Line 2176: It would be useful to add more details of the predicted changes as a result of sea level rise.

Posted: 13 Sep 2007 11:12 AM
Originally Posted: 13 Sep 2007 10:30 AM

email profile reply

New Topic Prev Topic

Select Conference

Go to Conference: go

Log In Options Username: Password: Log in

Author

Message

JoAnn Burkholder

Subject: Burkholder - Review of Appendix 6-1

Total Messages 18

Appendix 6-1 Strategic Research Plan for the Everglades Division

I was asked to review this document in addition to my other responsibilities, partly in response to a request from the District to ensure that a member of the panel who reviews Chapter 12 (Coastal Ecosystems, including the most detail to date within a SFER on Florida Bay) also assesses the Science Plan for future Florida Bay work, contained in this appendix.

The 5-year Plan is written as an outline and general approach to Everglades restoration, conservation biology, and resource management needs of the District. It focuses on understanding four general sets of Everglades components or functions affected by water management activities, including (1) Food webs, (2) Areas impacted by phosphorus enrichment, and management to accelerate recovery; (3) Ecosystem processes related to soil dynamics and functional linkages between the Everglades and Florida Bay; and (4) The structure and function of major landscape features.

The Plan also projects ahead over the next decade by identifying three priority needs and directives for District programs, as (1) Implementation of the Long-Term Plan with options for accelerated recovery; (2) Restoration of more natural flows and levels in the Everglades, and concomitantly, restoration of natural ecological functions; and (3) Development of technical criteria for minimum flow levels in the coastal watersheds.

The planned projects logically focus on key components and uncertainties identified by conceptual ecological models. Within each section, four elements of each project are clearly presented, including overview and background – with generally excellent, very helpful explanations; management and restoration objectives; methodological approaches; and importance/application of the findings. The Plan acknowledges that, while present Everglades restoration efforts strongly

emphasize hydrologic restoration (water quantity, timing and distribution), it is important to continuously consider potential trade-offs with water quality (lines 1109-1111).

Response to four questions

1. Does the research plan represent a good strategy for addressing key scientific and management-relevant questions related to hydrology, water quality, habitat, wildlife, and ecosystem management?

Yes: Overall, this appendix presents an excellent strategic research plan. I found the writing extremely helpful in understanding some of the underlying logic for various SFER chapters.

2. Given that the Everglades Division does research across a very broad landscape, at multiple scales, what is the best way to integrate the spatial and temporal dynamics of these projects?

The basic strength of this plan lies in the increasingly well-developed modeling approaches that continue to be built and refined based upon empirical datasets that are strengthening over time. Modeling specialists in ecological endeavors typically are frustrated because they are often consulted after research and monitoring studies are designed – often, after such projects are finished. Here, in contrast and as an ongoing effort, the District is focusing on conceptual, hydrologic, and mechanistic models to identify the most important information that should be obtained in order to evaluate progress in restoration efforts. The District should continue to emphasize and to increase emphasis on the use of these carefully constructed, constantly improved-upon models to integrate the spatial and temporal dynamics of its Everglades projects.

3. Is the research strategy a logical progression from previous studies and will it provide projects that are relevant to management decisions?

Yes: This Plan clearly builds from previous work, and clearly conveys why the planned projects are highly relevant to its management decisions in efforts to restore the Everglades.

4. What important ecological and management issues are not addressed in this Strategic Research Plan?

In the Florida Bay algal blooms component, sampling, research and modeling efforts should go beyond chlorophyll *a* to consider the responses of dominant bloom species and functional groups of phytoplankton, and the responses of known noxious macroalgal species.

There is also a critical need to include consideration of exotic species in the Food Web and Florida Bay-Everglades Linkages Sections.

It is astonishing that ecosystem valuation techniques have never been applied to the Everglades (lines 2304-2305). The Ecological Valuation section of the Plan is not mandated or listed as a restoration need, but the District deserves major credit for including it – this is an exciting section, and the work that it describes is critical, very much needed as part of the process to guide restoration efforts and to help the general citizenry understand them.

Integration

The Plan explains that research project linkages with each other are not shown in a conceptual diagram because it would "look like spaghetti"…Nevertheless, it acknowledges that such a diagram would be useful in revealing strong linkages, dependencies, and critical paths (line 139). A nice example of an integrative diagram is shown in Figure 6A-3; it would be helpful to include such diagrams for the other sections.

The Florida Bay effort also provides a strong illustration of project integration, planned through several levels of numerical analysis including calculations of improved nutrient budgets, statistical analyses/models of monitoring/Dataflow data, mass balance modeling, and dynamic water quality modeling. In the seagrass component, the approach to understand interactions of freshwater flow, salinity, water quality, and seagrass dynamics is planned to integrate modeling, fieldwork and laboratory research including a strong set of mesocosm studies to measure nutrient uptake and kinetic parameters of seagrasses under different inter-specific competition treatments, strengthened by field verification studies to "ground-truth" the data.

Impediments to progress in managing the South Florida water supply network in a holistic, integrative manner are very nicely explained, as are strategies for surmounting these impediments (lines 1436-1455). The Plan recognizes the need for projects that examine not only direct effects of management actions, but indirect effects, feedback loops, and habitat stability (lines 2269-2270).

The value of Table 6A-1 cannot be overstated – this table provides an excellent overview of the Plan, including linkages of each project with scientific needs of CERP and with State and Federal regulations and policies. The Plan is organized, in part, around a set of clearly defined hypotheses that guides the research of each major section. The Application of Results sections are also well conceived and clearly presented.

Technical Review

This document was, in general, a pleasure to read – it clearly explained the logic underlying the various projects presented in Chapter 6, the hypotheses, and even provided clear definitions (e.g. “secretive” marsh birds, lines 231-233).

The methodological approaches generally were also clearly presented and combined both traditional/ foundational and innovative new techniques (e.g. for wading birds, compiled nesting data, systematic reconnaissance flights, and development of a bioacoustics library and network – lines 247-258).

Florida Bay and Bay-Everglades Linkages – overall, this component of the Strategic Plan is excellent and well-conceived. Planned monitoring, research and modeling efforts should also include consideration of dominant bloom-forming algal species (microalgal and macroalgal), as well as exotic species.

Rationale and application – Performance measures (CERP RECOVER) have targeted the spatial expansion of the valued ecosystem component (VEC), “transition zone” SAV (e.g. *Ruppia maritima, Halodule wrightii*, with concomitant reduction in *Thalassia testudinum*), in the northern third Florida Bay. Yet, little is actually known about the forage and refuge functions of transition zone plants as a habitat mosaic for fish and other fauna. Planned projects are designed to fill this knowledge gap, and to assess whether the transition zone SAV habitat has unique benefits for fish that cannot be provided by mangrove prop roots – an important question since SAV has declined while mangrove cover has increased.

Methodological approach – An appropriate multi-phase approach involving analysis of long-term field data (10-15 yr thus far) and targeted experiments is planned to examine underlying mechanisms for forage fish distribution and habitat structure in dominant vegetation types of the transition zone.

The Ecosystem Processes section describes integration of monitoring, research, and modeling to improve understanding about functional linkages between the Everglades watershed and Florida Bay. Two sets of hypotheses, #11 (Florida Bay water quality hypotheses) and #12 (Florida Bay submersed aquatic vegetation). Of these, hypothesis #12c would be helped by further explanation.

Numerical modeling, largely through CERP’s Florida Bay and Florida Keys Feasibility Study (FBFKFS), is being used as a tool for information synthesis and forecasting responses of Florida Bay to water management activities, especially focusing on (1) salinity magnitude, spatial and temporal variability; (2) estuarine hydrodynamics, especially water residence time; (3)

nutrient loadings and other pollutants; (4) structure and productivity of SAV habitat and associated fauna, especially fish. The modeling efforts are impressive continue to strengthen. This effort includes development of a suite of large-scale dynamic numerical models to guide restoration of more natural and historical flows to the bay. An identified key constraint is that the changes in hydrology imposed by restoration must not further degrade water quality in the bay or the Keys coral reef areas. The suite of models being integrated includes:

- *Watershed models* – USGS' TIME, Tides and Inflows in the Mangrove Ecotone; a wetland hydrologic model to estimate freshwater flows; and mangrove zone models to estimate nutrient inputs to the bay);
- *Ocean boundary hydrodynamic model* (HYCOM – Hybrid Coordinate Ocean Model, to provide ocean boundary conditions);
- *Bay integrated hydrodynamic and water quality models* (the EFDC – Environmental Fluid Dynamics Code, central to the entire modeling effort; includes consideration of biogeochemical processes such as nutrient uptake and transformation, nutrient sequestration, and primary production); and
- *Bay biological models* – for example, the evolving Florida Bay seagrass community module developed by the District is to be incorporated into an EFDC model. Also planned for integration into the EFDC model are a phytoplankton simulation module and higher trophic level models for critical species (e.g. pink shrimp).

This ongoing and planned effort aims to synthesize the knowledge base and datasets on the Florida Bay ecosystem to enable assessment of the effects of hydrologic changes from management practices.

Florida Bay Algal Blooms

The Plan frankly acknowledges widespread public concerns about water management effects on Florida Bay water quality that need to be clearly addressed through project modification to improve water quality and prevent degradation, and/or through providing quantitative analyses that provide strong scientific basis to refute the concerns. One major concern and critical uncertainty identified in the Plan is that increased freshwater flows to the bay will concomitantly increase nutrient loadings (especially N and P species), stimulating undesirable algal blooms. The overall objective of planned projects is to quantify the status and trends of nutrient inputs to the bay, and general water quality conditions in the bay, targeting performance measures as nutrient loading and chlorophyll *a* concentrations (indicator of phytoplankton biomass). Projects to address this

objective will involve a combination of long-term monitoring (in place planned for strengthening?), research, and quantitative synthesis through modeling. The monitoring and research is planned to include (1) nutrient loading to the southern wetlands from canals, (2) N and P transformation, retention and transport through the southern marshes to the bay, as influenced by hydrologic changes, and (3) nutrient cycling within the bay. An important targeted area for emphasis is nutrient retention/transport studies in Whitewater Bay, which is expected to receive much more freshwater flow through hydrologic management. Research on phytoplankton dynamics and light extinction will also include landscape-scale analysis of water quality monitoring network data, and experiments about research processes that influence both phytoplankton and benthic algal production/ productivity (e.g. the role of various forms of dissolved organic matter).

Seagrass and Ecosystem Studies

The Florida Bay seagrass community is the central, keystone component of the ecosystem, and the central performance measure under CERP. Innovative fine-scale mapping and geostatistical analyses of seagrass meadows are planned including use of Dataflow, with emphasis on mapping gradients from the mangrove transition zone. Hydroacoustic or side-scan sonar methods for continuous seagrass mapping will also be examined. Mesocosm studies will be conducted to assess seagrass nutritional ecology and competitive species interactions. An evolving mechanistic, process-based simulation model (calibrated for a baseline period of 1996-2001) is being developed to predict seagrass dynamics (*Thalassia testudinum, Halodule wrightii; Ruppia maritima* to be added within 10 yr) in response to management-imposed hydrologic and salinity changes in the northern and central bay.

Editorial comments

Lines 286-288 – omit; stated below.
Line 364 - …how specific…
Line 462 - …were known to…
Line 479 - …of *Typha domingensis*…
Line 493 - …The Fire Project focuses…
Line 543 - …rapid way to…
Lines 579-580 - …in Newman et al. (2006).
Line 584 - …intensive restoration
Line 601 - …Approach: CHIP will…
Lines 616-626 – The same hypothesis is addressed for Objectives 1-2; these should be combined.
Line 660 - …The Fire Project
Line 883 - …(e.g., denitrification…
Line 890 - …will be influenced by…

Line 895 – correctly states “submersed” for SAV – should be changed from submerged to submersed throughout the document.
Line 1077 – Is there an improved method since White et al. (1979)?
Lines 1084-1085 – Additional explanation would help here; as is, seems somewhat “far-fetched”.
Line 1144 - …is leading this ambitious
Line 1172-1173 - …effects from other…
Line 1233 - …transects include…
Line 1241 - …Bay is also…
Line 1245 - …where groundwater nutrient
Line 1319 - Implications of…
Line 1342 - …capability so that we
Line 1353 - *T. testudinum* and…
Line 2112 - …but little progress…
Line 2137 - …species have often…

Posted: 14 Sep 2007 09:01 PM
Originally Posted: 14 Sep 2007 09:00 PM

SOUTH FLORIDA WATER MANAGEMENT DISTRICT

sfwmd.gov Web Conference Board

Sign Up | Search | Calendar | Options
Help | News | Log off | Welcome

Author | Message

ellen van donk

Subject: appendix 6-1

Total Messages 4

Comments and questions on Appendix 6-1

This appendix explains clearly the various projects presented in Chapter 6. It is good readable and also the methodological approaches are clearly presented and include innovative new techniques.

Line 1262- Are there data available how long algal blooms are already present in Florida Bay.

Line 1316- The planned mesocosm studies are not very clear described.

Line 2009: Are the water tolerant woody species in the tree islands nonindiginous species?

Posted: 17 Sep 2007 03:23 PM
Originally Posted: 17 Sep 2007 03:21 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

Appendix 6-1: Environmental Responses to Water Management: A Strategic Research Plan for the Everglades Division.
Special Review

Prepared by: Robert C. Ward ('B' Review)

1. Given that the District is a water management agency, does the research plan represent a good strategy for addressing key scientific and management-relevant questions related to hydrology, water quality, habitat, wildlife, and ecosystem management?

The research plan provides a good roadmap for research. However, given management needs for new knowledge, the plan should provide more insight into how it will integrate research products with future management decision making. The organization chart for the Everglades Division is appreciated as it is difficult to grasp exactly who, from where, are producing the SFER documents. Having also reviewed Chapter 12 and scanned Appendix 12-1, I would also like to see the organization chart above the Everglades Division. I do not understand how the research divisions are connected to the larger SFWMD. Given the nature of this special review question, I need to have a better feel for how research is, organizationally, placed among the key water management decision making groups.

Thus, I would like to see more detail in the science plan on how the researchers will connect research, in all its phases, with management decision making. As I noted in my review of Chapter 12, based on 14 years of directing a highly applied water research institute, I recommend that those who make water management decisions be engaged in all facets of the research, from planning, through conduct, to reporting, and, ultimately, to using the new knowledge to modify, if necessary, decision making procedures. Preparation of the science plan in Appendix 6-1 is an excellent first step in this process. Are the appropriate decision makers providing written reviews of the plan? Will decision makers serve on the research project staff in an active advisory manner? Will emerging science/research questions be examined by decision makers? Will decision makers be able to provide their own questions as the research unfolds? Positive answers to all the above questions sets the stage for decision makers to have comfort with the research findings and comfort with using the new knowledge in their work.

However, I want to also throw in caution and think the best way to do this is to relate an experience I had several years ago at a meeting of the National Institutes for Water Resources in Washington, D.C. The Department of Interior's Assistant Secretary for Water and Science was addressing the group and noted that he accesses four categories of information, in equal amounts, as he prepares to make a management decision: (1) Science; (2), History behind the issue; (3) Applicable laws; and (4) The politics surrounding the issue. I would suggest that most high level decision makers work with some similar model in assembling information for making policy level decisions. As decision making moves down an organizational chart, I would agree more with the quote in lines 50-52 in Appendix 6-1: "Environmental science provides much of the basis for

defining and deciding the nature of this balance and effectively improving management for each of these often competing missions."

Thus, as an organization, such as the SFWMD, strives 'to get the water right' (line 69) many factors must be considered, one of which is 'what does the research say?' In order for science to be effective in its role in informing decision making at all levels of a water management district, the science plan must include much more insight into how science and management will be integrated to achieve the SFWMD mission, stated in lines 48-50. It would be helpful for the science plan to indicate it understands management decision making with more elaboration on guiding mandates, rules, and permits. These are mentioned, but they are not examined for detailed guidance.

After some mention of mandates (Table 6A-1), the science plan is rather silent on how research will interface with decision makers. [To be honest, the plan is brief on all details which helps with my review!] The subtitle selection under each project description is heavily science oriented. The subtitle 'Application of Results' is too general to fully explain the connection between decision makers and researchers. Given the importance of this connection, the connection needs to be better understood. For example, lines 266-268 state that the results 'will be used by' CERP to shape hydrologic targets. How will the results be used? Is there a reference that could be cited here? Will the researchers be involved in the shaping? Or will only their science be considered by the decision makers? What is the connection, at the point of use, between the researcher and decision maker?

One recommendation I would suggest that a new subtitle be added to each project description in the plan: "Decision Maker Involvement'. A first task in the section would be to identify relevant decision makers. Also, in this section connections/dialogue between researchers and decision makers, over the entire course of the research, will be defined - from the initial formulation of the research, through proposal writing and peer review, through the actual conduct of the research (where updates and emerging questions are addressed in, for example, monthly meetings), through presentation and use of the results.

A context for research/decision maker dialogue is provided in lines 68-72:

> "Virtually all District projects regarding Everglades management strive to "get the water right" in terms of quantity, timing, distribution, and quality and this Plan describes how we intend to relate these hydrologic and water quality drivers (including their variability and their interactions) to the ecological condition and trajectory of the Everglades ecosystem."

The process of doing what the sentence says is not well defined in the plan.

I should point out that not all decision makers and ecosystem researchers are able to work closely together, in a collaborative and constructive manner, to speedily bring the results of research to application. In my work, generally, one third of researchers were equipped

to work well with water managers. The others simply were too focused on the details of their research to be concerned about its application. I did not view this as a negative - these researchers often made the best discoveries. It does, however, put more pressure on the research and operations directors to pay close attention to who is asked to take on the critically important role of strongly connecting research and water operations.

2. Given that the Everglades Division does research across a very broad landscape, at multiple scales, what is the best way to integrate the spatial and temporal dynamics of these projects?

The issue raised by this question is addressed on lines 183-188 in the plan:

> "The complexities of understanding wildlife ecology in an Everglades restoration context—multiple temporal and spatial scales, non-linear ecosystem attributes, numerous components—necessitates a transdisciplinary approach that encompasses studies at multiple levels of the food web over various spatial and temporal scales. The studies will variously utilize observational, experimental, and modeling approaches. A synthesis of this information will help guide restoration and operational decisions.

However, it is not clear how the synthesis will occur; nor, how it will interface with restoration and operational decisions taken by management.

The answer to the next special review question suggests that the previous-research review contained in each project description is too short to judge the progression of planned research from previous studies. Rather than add a research review to each project's description, an integrated review of past research at the beginning of the plan could assist readers in integrating past and planned research across the landscape and over time, as well as across disciplines. Such an integrated overview of research status could also include connections with decisions mandated by the laws, permits, and rules. I believe similar types of Everglades research reviews have appeared in previous SFERs, thus an update for the plan should not be too difficult. The difficult part will be summarizing the research so it will be read (i.e. short and to the point) and adding meaningful and specific management connections.

Table 6A-1 lists an array of projects by title under major research themes. Mandates are associated with each project as are hypotheses. The project descriptions provide insight to scales, but the project-by-project comments make it difficult to see how the entire science plan integrates across the broad South Florida landscape.

3. Is the research strategy a logical progression from previous studies and will it provide projects that are relevant to management decisions?

Without a literature review of previous research, it is hard to answer this question. The project summaries are very brief and literature citations few. It is hard to context the

research plan based on the plan itself. The reader would need to know, personally, more about past research than I do to provide an answer.

4. What important ecological and management issues are not addressed in this Strategic Plan?

As noted in the answer to special review question number one, lack of strong connections to decision makers is a key issue that needs addressing in the science plan.

The science plan talks about identifying flows that protect ecosystem health. How will the flows be expressed. If in the form of something like monthly averages, how do decision makers handle extreme hydrologic events, when flows to protect the ecosystem are presented as averages? Is there guidance regarding flows during extreme events that could be provided? This is an example of where dialogue among researchers and decision makers could work through the decisions to be made and develop a research plan to benefits operations in a direct manner.

Additional Comments and Questions:

1. Lines 229-230 note that experts agree that causes for declines in avian population are related to hydrologic changes, but no references are cited. Is it just hydrologic changes that cause the decline? What about loss of land (habitat size) to human occupation? Has the loss of avian population caused by habitat loss been quantified?
2. What is the relationship of this science plan to the science plans associated with CERP and RECOVER. I note the use of CERP/RECOVER hypotheses in this plan, thus there is a strong connection. Lines 102-115 and lines 125-127 discuss CERP/RECOVER, but the exact nature of the connection is not explained. There is a concern of duplication that should be addressed somewhere in the plan.
3. Lines 121-124 asked that the plan be reviewed as an outline. No reference is provided as to where one could go for more detail. Some research project descriptions provide references, but not all.
4. With the Coastal Ecosystems Division and the Everglades Division both developing science plans, is there a larger initiative in the SFWMD to develop a District-wide science plan? How do the individual science plans relate to one another?
5. The ecological valuation project described at the end of the science plan may offer an opportunity to address many of the issues raised in this review. What type of water flow and level decisions have to be made under what conditions? Can these decisions be related to ecological value? A prorated scaling of decision options could be developed and used to formulate policy regarding the trade offs between human and ecosystem needs. This is an exciting new avenue of research, as is stated in the report.

Appendix 12-1: Coastal Ecosystems Division Science Plan
Date of Chapter Draft: 08/27/2007
Author of Comments: Neal E. Armstrong
Level of Panel Review:
Accountability:
Technical: X
Integrative: Primary
Reviewers:
AA: Burkholder
A: Van Donk
B: Armstrong
B: Jordan
B: Meganck

The Panel was asked to address the questions posed for primarily Integrative, secondarily Technical, and three specific questions in its review of this Appendix.

Are large programs presented so that the overall goals are clear and linked systematically to descriptions across the Report?
As noted in the reviews of Chapters 2 and 12, hydrology and coastal systems are indeed linked, but there is little mention of the consequences of managerial decisions about releases of water to coastal systems in either chapter. This is a significant gap as the interrelationships between water management in the watershed and management of the coastal systems are strongly related.

Is the chapter cross referenced in a thorough and consistent manner?
This appendix is cross referenced thoroughly in Chapter 12.

Are the findings and conclusions supported by "best available information," or are there gaps or flaws in the information presented in the document?
The coastal system approach adopted by the District is limited in its scope and represents only partially estuarine management approaches that have been developed for estuaries elsewhere. This point is addressed in the text below.

Are there other interpretations of the data and other available information that should be considered by the authors and presented to decision makers? If so, panel shall identify specific studies that should be addressed or available data to support alternative findings.
The District's coastal system management approach is based primarily on freshwater inflow to the estuaries and salinity limits in those systems which are based on VECs (or key species). This approach does not include consideration of nutrients (organics, N, and P) carried with those inflows which are vital to the productivity of the systems. Specific estuarine management approaches that include nutrient loading and secondary productivity are presented in the text below.

Is the research strategy proposed by the Coastal Ecosystems Division scientifically sound and consistent with the state of the art in coastal science?
The Districts approach to estuarine management is partially consistent with the state of the art in coastal science for reasons noted above. It is anticipated that through adaptive management, the District will adopt more robust management approaches and utilize more fully the data being gathered through the studies being conducted in the estuaries. Again, see the text below for more detail.

Given that the District is a water management agency, is this a good strategy for addressing water quality, water quantity, and habitat problems that may be related to water management or are there better alternatives?
The basis approach is sound; it could just be improved with consideration of more aspects of the structure and function of estuarine systems.

If this is a reasonable strategy, how could the strategy or its application be improved?
As noted above, the District's coastal system management approach is based primarily on freshwater inflow to the estuaries and salinity limits in those systems which are based on VECs (or key species). This approach does not include consideration of nutrients (organics, N, and P) carried with those inflows which are vital to the productivity of the systems. Specific estuarine management approaches that include nutrient loading and secondary productivity are presented in the text below.

Note: Because of the strong relevance of this Appendix to Chapter 12: Management and Restoration of Coastal Ecosystems, the material presented below is also contained in the comments offered for Chapter 12.

In developing the Coastal Ecosystems Division Science Plan, the Coastal Ecosystems Program (CEP) has constructed an approach for coastal ecosystem management that is basically sound as a solid starting point for managing the coastal ecosystems, the waters that flow to them, and their watersheds, but it is incomplete. While the Plan is not necessarily unique, for it embodies approaches taken by water regulatory agencies in other states since at least the 1950s in which water resources are often scarce and in which the coastal ecosystems support commercially important finfish and shellfish and their associated support structure, the Plan is a integration of science, engineering, and management within the District and perhaps most importantly it begins to elevate the value of freshwater inflows (and their needed spatial and temporal variability) to Florida's southern estuaries to a level commiserate with municipal, industrial, and agricultural water supply.

One can quibble with Alber's (2002) overly simplistic conceptual model for freshwater inflow impacts on estuaries derived from her literature review (see Figure 2 of Appendix 12-1) or the classification of watershed, hydrologic, water quality, and ecological models presented in Table 1 of the same appendix. For example, Alber (2002) discusses in her article the transport and mass loading of organics and nutrients along with flows to estuaries, impacts of flow reduction such as salinity intrusion and alterations in circulation within and flushing from estuaries, alterations in geomorphology, impacts on species composition, abundance, and distribution due to tolerance

limits, primary and secondary productivity supported by the flux of organics and nutrients to the estuaries, yet these important processes are not incorporated into her framework. The District mentions many of these factors in its Plan and seems to recognize the importance of nutrient recycling of nutrients by adding "Processing of Material" to Alber's conceptual model diagram, but the implementation of the Plan in the coastal systems under its jurisdiction does not really deal with anything more than tolerance limits to salinity and the resulting effect on species distribution.

With regard to Table 1, water quality modelers would include statistical models and simplified mass balance models in the simple models category. The steady state "box" model or continuously stirred reactor model as it is more commonly called, for example, would fit there, and Thomann's (1972) use of such a model for Hillsborough Bay in Tampa, FL illustrates their practical use. Finite segment, mass-balance, steady-state models would be classified as Intermediate models – they are not included in Table 1 but would be powerful tools useful in each one of the coastal systems the District manages. Thomann and Mueller (1987) describe their application to the Wicomico Estuary in Maryland (one dimensional), Boston Harbor (two dimensional), and Lake Erie (three dimensional).

Likewise, the resource-based Valued Ecosystem Component approach is in fact the approach taken by state water regulatory agencies since the 1950's when commercially important finfish and shellfish were the focus of freshwater inflow management as "key species," expanded in the 1960s and 1970s to incorporate the food chains and habitats of these organisms and eventually nutrient cycling. The USEPA formalized it as the Valued Ecosystem Component approach in 1995 as part of the National Estuaries Program but adapted it from others who have originally proposed a similar name in the mid-1980s (from Alber 2002). Regardless of what name is applied to the concept, it is one that has been in play for half a century. But the point is that the District and its CEP has adopted the concept as part of its Integrated Modeling and Assessment Framework, and that is highly significant.

As comprehensive as this Integrated Modeling and Assessment Framework is, the one concern with it is its strong focus on salinity as the primary indicator for management purposes of freshwater inflows on the estuaries within the District's boundaries. Yes, salinity is a strong indicator of the impact of freshwater inflows on estuaries and it is a major influence on the distribution of biota in estuaries due to their tolerance limits as noted above, but the flux of organic materials and nutrients to estuaries and their cycling within the estuaries governs system productivity. For commercially important species, it is productivity or commercial yield from coastal systems that is most important. What is largely missing from the Framework is the consideration of organics and nutrients. Armstrong (1982) developed relationships between the average fraction of freshwater in estuaries caused by freshwater inflows, nutrient areal loading rates, and secondary (key species of finfish and shellfish) productivity in Texas estuaries (see attached figure); these are relationships that could be and should be explored in the lower Florida estuaries.

The heavy focus on salinity as the primary indicator of freshwater inflow and their influence on the distribution of VECs may have its roots in the outcome of the Estuarine Research Federation conference entitled "Freshwater Inflow: Science, policy, and management" held in St. Pete

Beach, FL in November 2001. The Alber (2002) article was an outcome of that conference as was another article (Montagna, et al. 2002, which included a District co-author) which summarized the conference and spoke to the issues of estuarine management. They summarized the issue by saying that:

> An improved understanding of the functioning of estuarine systems has allowed for increased sophistication of freshwater inflow management techniques. … These sophisticated biological and modeling approaches are very data intensive and a few simple principles may be sufficient for making water allocation decisions with competing demands are not extensive.
>
> The nature of these decisions makes them amenable to using adaptive management, i.e., using the results of ongoing monitoring and assessment to modify and optimize the operating decisions. Because we are still learning about the properties of these systems, we must develop ways to improve out understanding on how the systems we manage function and about the process of adaptive management so that future capabilities can be improved.

The District's management objectives of (1) improving timing, volume, and delivery of fresh water, (2) improving operation of District infrastructure, (3) improving and protecting water quality, and (4) rehabilitating estuarine habitats as articulated in this Appendix are very good objectives, and it is presumed that over time the District will practice adaptive management and over time move beyond salinity as it primary indicator of the impacts of freshwater inflows to other indicators that are also water quality as well as biologically based such as food chains (phytoplankton and detrital), nutrient cycling, and primary and productivity.

References

Alber, Merryl. 2002. A conceptual model of estuarine freshwater inflow management. Estuaries 25:1246-1261.

Armstrong, Neal E. 1982. Responses of Texas Estuaries to Freshwater Inflows. In Estuarine Comparisons, Victor Kennedy (Ed.), 1982, Academic Press.

Montagna, Paul A., Merryl Alber, Peter Doering, and Michael S. Connor. 2002. Freshwater Inflow: Science, Policy, Management. Estuaries 25:1243-1245.

Thomann, Robert V. 1972. Systems Analysis and Water Quality Management. McGraw-Hill, New York.

Thomann, Robert V. and John A. Mueller. 1987. Principles of Surface Water Quality Modeling and Control. Harper & Row, Publishers, Inc.

Ward, George H. and Neal E. Armstrong. 1982. Matagorda Bay: A Management Plan. Submitted to National Coastal Ecosystem Team, Division of Biological Services, Fish and Wildlife Service, Slidell, LA, Contract No. 14-16-0009-78-066.

Figures

Influence of annual areal nutrient loading rates and average estuarine freshwater content (as influenced by freshwater inflow and tidal exchange) on average annual areal commercial catch yields of finfish and shellfish in Texas estuaries. The three figures are for carbon, nitrogen, and phosphorus, and within each figure lines connecting equal yield rates of finfish (solid lines) and shellfish (dashed lines) are drawn forming response surfaces. Each point in each figure represents one of the six major estuaries of Texas which lie in a freshwater inflow spectrum from very high inflow and small volume (Sabine estuary) to small inflow and large volume (Guadalupe estuary) and variations in between. With these figures one may estimate the change in yield (or secondary production) caused by changes in freshwater inflow and nutrient loading. Because freshwater inflow and nutrient loading are interrelated, one can examine combinations of flow change and nutrient concentration change on yield that occur to due changes in the watershed and/or changes in the estuarine system itself. In Ward and Armstrong (1982) several perturbations in Matagorda Bay, Texas were evaluated for their impacts on secondary productivity.

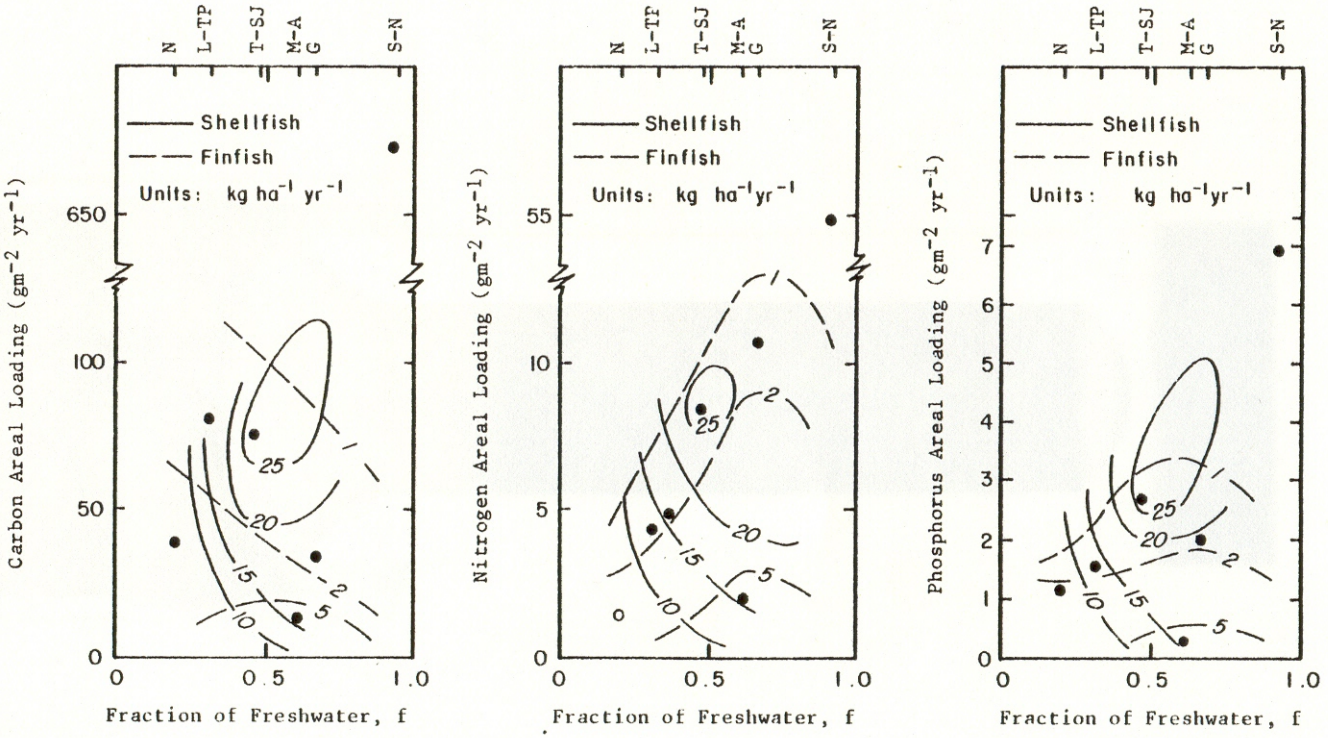


Figure 28. Influence of annual areal loading rates of nutrients and estuarine freshwater content on average annual areal yields of finfish and shellfish (Armstrong 1982). N-Nueces, L-TP-Lavaca-Tres Palacios, T-SJ-San Jacinto, M-A-Mission-Aransas, G-Guadalupe, S-N-Sabine Neches estuaries.

JoAnn Burkholder

Subject: Review of Appendix 12-1 - Burkholder

Total Messages 18

Appendix 12-1 Coastal Ecosystems Division Science Plan

Questions

What are District plans regarding the Florida Keys? (not found in Appendix 6-1 or Appendix 12-1)

In the generalized conceptual model (p.4), does sediment refer to bottom sediments? (sediment is particulate matter)

How much area has the District rehabilitated (p.10), by estuarine ecosystem, with mangrove plantings, construction of artificial oyster reef habitat, and trial SAV plantings?

Contaminated sediments (heavy metals, other toxic substances) are identified as a major problem in the St. Lucie Estuary (pp.7-8). Yet, the St. Lucie plan mentions nothing about toxics in research, monitoring or modeling efforts. How will the Strategic Science Plan for the Coastal Estuaries address toxic substances in the St. Lucie and other affected coastal estuaries?

Response to three questions

1. Is the research strategy proposed by the Coastal Ecosystems Division (CED) scientifically sound and consistent with the state of the art in coastal science?

Appendix 12-1 did not clearly describe strategic scientific plans (research strategies) to address the four major objectives that were the stated focus. The writing does demonstrate in-depth understanding of the “state of the art in coastal science”, but conceptualization of clear plans for each coastal ecosystem need to be strengthened in the descriptions provided in Appendix 12-1.

2. Given that the District is a water management agency, is this a good strategy for addressing water quality, water

quantity, and habitat problems that may be related to water management, or are there better alternatives?

As indicated in the above response, a clear strategy for addressing the water quality, water quantity, and habitat problems for each coastal ecosystem seemed lacking. It was also difficult to determine timescales of the plans (e.g. Table 6, Timeline column).

3. If this is a reasonable strategy, how could the strategy or its application be improved?

See above answers. The projects described are reasonable and valuable, but strategic planning is not clear. The Florida Bay plan (Appendix 6-1) provides a strong template that could be followed to clarify, strengthen, and/or develop strategic science plans for each coastal ecosystem in Appendix 12-1.

General Comments

Chapter 12 discusses eight prioritized estuaries, combining the Caloosahatchee and Southern Charlotte Harbor. Appendix 12-1 considers the nine estuaries and their watersheds separately. The overall identified stresses to the coastal estuaries are disruption of the natural magnitude and timing of freshwater input, increasing pollution (nutrients, bacteria, toxic substances, suspended sediment); and loss of critical estuarine habitat and biological communities.

The stated major goal of this plan contributed by the District's Coastal Ecosystems Division (CED) is to manage, protect and rehabilitate coastal ecosystems. This plan describes a generalized applied research strategy to address four major management objectives (below). The plan's foundation is a [very] general conceptual model developed by Alber (2002), and use of a resource-based Valued Ecosystem Component approach (nicely explained on p.12) in combination with an Integrated Modeling and Resource Assessment Framework (including watershed models; estuarine hydrodynamic, sediment transport, and water quality models; and ecological models – p.11). The intent logically is to consider each coastal ecosystem and its watershed, i.e. watershed-scale management. The benefit of using models that range from simple to complex are clearly conveyed (p.13), but it would be helpful to add, following Table 1, a new table providing examples of different levels of complexity of linked models to address estuarine water quality issues. The CED's intent is logically to apply models as an iterative, evolutionary process as available data increase, understanding is strengthened, and models are improved. Three clear examples are included which provide excellent illustrations of the application of this process (Caloosahatchee River and Estuarine MFL, Southern Indian River Lagoon Feasibility Study,

Restoration Plan for the Northwest Fork of the Loxahatchee River). The second major part of this Appendix is divided into four (I suggest three) components:

Background

The background section demonstrates the CED's knowledge of "state-of-the-art" estuarine/coastal science. This section also provides the very general conceptual model used as an overall framework for the CED Science Plan. The authors clarify the important point out that while the conceptual model integrates science, it does not address temporal and spatial variability. The next section of this Appendix, "Summary of Coastal Ecosystem Models", has a helpful table of estuary and watershed models that the CED has applied in each coastal ecosystem that shows where (by coastal ecosystem) and how the CED has applied various models to date. This section might better be included as the last subsection of the "Background" section.

Major Environmental Problems and Management Objectives

This section might be more appropriately retitled because it also summarizes approaches that have been taken or are planned to address the major objectives, as follows:

Objective 1 - Improve freshwater quantity/timing – the plan relies upon CERP, Acceler8, and the Northern Everglades Protection Plan to construct new infrastructure that will partly restore more natural freshwater deliveries (p.7).

Objective 2 - Improve operation of District Infrastructure – Two identified components are provision of weekly input based on the status of the Caloosahatchee and St. Lucie estuaries (based mostly on best professional judgment), and application of science (evaluation of different discharge scenarios, development of improved predictive tools) to the operational rules and protocols of District infrastructure. The Caloosahatchee and St. Lucie evidently were selected as the "marker" coastal ecosystems to address this objective because "larger projects" (line 388) are being built there.

Objective 3 - Improve and protect water quality – Appendix 12-1 describes little that has been done as of yet to address this important objective. Scientific studies have mostly focused on water quality status, trends, and pollutant loadings from the watersheds. More recently, nutrient inputs/cycling has begun to be emphasized, including development of acceptable levels (targets) and indicators. Additional Water quality models have also begun to be developed. These activities are building toward the ability to address this objective.

Objective 4 - Rehabilitate estuarine habitats – Appendix 12-1

describes District efforts thus far to address this important objective as including funding of “on-the-ground” restoration efforts (mangrove plantings, construction of artificial oyster reef habitat, trial SAV plantings); assessing seagrass ability to repopulate habitats, and use of the Valued Ecosystem Component approach (from the US EPA) to establish water quantity and water quality targets. The “on-the-ground” activities clearly are rehabilitation efforts; the latter two are needed to build toward the ability to rehabilitate. It is difficult to evaluate, from the writing, the extent to which the District has been successful thus far in rehabilitating estuarine habitats.

Water Body Science Plans

This section unfortunately would more accurately be entitled, “Program Inventories and Some Planned Activities”.

The short introduction should clarify that Florida Bay is omitted here, providing brief rationale for its inclusion in Appendix 6-1). Much of the introductory writing for each coastal ecosystem is taken directly from Chapter 12, and should be omitted since the intent of this document is to provide a clear strategic science plan for each ecosystem. A brief history of District efforts and approaches is provided for each coastal ecosystem, providing helpful context. Each section generally also contains a description of historic and present water quality monitoring and modeling efforts, and past/present biological investigations and VEC evaluations. Each section ends with a list of planned activities for FY2008 or FY2008-9; for some ecosystems, [immediate] future information needs; and for some ecosystems, an inventory of present-into-near-future science *programs*. *Missing, though, is clear explanation of project and modeling integration.*

For example, in the St. Lucie sub-section, readers are directed to Table 6 for the science plan, only to find that Table 6 inventories current science *programs*; it does not present a *strategic science plan* to address the four major objectives identified for major focus. The sub-section for the Southern Indian River Lagoon presents no plan, even by title – rather, Table 7 is appropriately entitled, “recent investigations”. Examination of this table indicates (last column) that the milestones addressed thus far help to address only Objective 1. No strategic plan is developed to chart a course for how the four objectives will be concretely addressed within a 5-year or 10-year timeframe. The plan for the Loxahatchee system is succinctly presented on p.45: it is designed to *“establish and support monitoring programs which gather information on a structured, focused basis that provide information on water quantity, water quality, timing, and distribution of increased dry season flows and improved wet*

season flows. The writing indicates that the information gained (addressing only Objective 1 above) will be used to form the basis for addressing objective 2. Readers are referred to Table 8 for a summary of the science plan; again, they find only an inventory of projects. The project objectives are listed, but there is no indication of how the projects will be integrated into a science plan to address the four major objectives identified in this Appendix for each of the coastal ecosystems. Nor is there indication of what the priorities mean (effort planned? timeline?), except that 1 is the highest rating (footnote).

The "science plan" offered for the Lake Worth Lagoon is contained in several lines (lines 1524-1533), summarized by the first sentence therein – *"The CED Science Plan for Lake Worth Lagoon currently anticipates a continuation of the existing level of effort".* This is not a plan. It does not provide a roadmap of how/what efforts will be integrated to tangibly address the four objectives in order to improve this highly impacted, highly urbanized system. Table 9 in the Biscayne Bay subsection tellingly has blank space under every project for "District Strategic Milestones" that are targeted or achieved. The other coastal ecosystems, similarly, suffer from lack of presentation of a clear, strategic science plan that addresses and integrates the four overarching major objectives identified by Appendix 12-1 for all of the coastal ecosystems.

Overall Evaluation (integrative, technical)

While the abbreviated technical information presented seems scientifically sound, this Appendix falls short of presenting clear, strategic, integrated science plans for each of the coastal ecosystems considered.

In Appendix 6-1, the Florida Bay strategic science plan (which should be mentioned in Appendix 12-1, although a small amount of overlap is included in the [incomplete?] coverage of Florida Bay in Table 2) is framed around several key hypotheses that guide the research. It includes an Application of Results section that is well conceived and clearly presented. It provides a strong illustration of project integration, planned through several levels of numerical analysis including calculations of improved nutrient budgets, statistical analyses/models of monitoring/Dataflow data, mass balance modeling, and dynamic water quality modeling. In the seagrass component, the approach to understand interactions of freshwater flow, salinity, water quality, and seagrass dynamics is planned to integrate modeling, fieldwork and laboratory research including a strong set of mesocosm studies to measure nutrient uptake and kinetic parameters of seagrasses under different inter-specific competition treatments, strengthened by field verification

studies to “ground-truth” the data.

It is recommended that the Florida Bay plan be considered as a model for developing plans for the other coastal ecosystems in Appendix 12-1.

Posted: 19 Sep 2007 02:40 PM
Originally Posted: 19 Sep 2007 02:38 PM

email profile quote reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

New Topic Prev Topic

Go t

Select Conference

Author	Message
ellen van donk	**Subject:** comments on Appendix 12-1

Total Messages 5

Appendix 12-1 Coastal Ecosystems Division Science Plan Comments by Ellen van Donk

Specific Questions

I just wondered why have minimum flows not been developed for all the coastal estuaries?

What are the plans for research regarding monitoring of nutrients, toxins and the development of models?

Response to the three questions:

Is the research strategy proposed by the Coastal Ecosystems Division scientifically sound and consistent with the state of the art in coastal science?
I have the opinion that the research strategy proposed by the Coastal Ecosystems Division is only partially consistent with the state of the art in coastal science. The strategic scientific plans are not very clear described in this Appendix.

Given that the District is a water management agency, is this a good strategy for addressing water quality, water quantity, and habitat problems that may be related to water management or are there better alternatives?
The approach could be improved by including a clear strategy for addressing the water quality, water quantity, and habitat problems for the separate coastal ecosystems

If this is a reasonable strategy, how could the strategy or its application be improved?
The District's coastal system management approach is based primarily on freshwater inflow to the estuaries and salinity limits in those systems. Also strategies for addressing nutrient loading and other water quality problems are necessary.

Posted: 25 Sep 2007 02:13 PM
Originally Posted: 25 Sep 2007 02:12 PM

email | profile | quote | reply

Rate this post on a scale of 1-5, 5 being the best Message not rated

Mark this topic read

Go to Conference:

Select Conference

go

Author | Message

ellen van donk

Subject: comments on Appendix 12-1

Total Messages 5

Appendix 12-1 Coastal Ecosystems Division Science Plan
Comments by Ellen van Donk

Specific Questions

I just wondered why have minimum flows not been developed for all the coastal estuaries?

What are the plans for research regarding monitoring of nutrients, toxins and the development of models?

Response to the three questions:

Is the research strategy proposed by the Coastal Ecosystems Division scientifically sound and consistent with the state of the art in coastal science?
I have the opinion that the research strategy proposed by the Coastal Ecosystems Division is only partially consistent with the state of the art in coastal science. The strategic scientific plans are not very clear described in this Appendix.

Given that the District is a water management agency, is this a good strategy for addressing water quality, water quantity, and habitat problems that may be related to water management or are there better alternatives?
The approach could be improved by including a clear strategy for addressing the water quality, water quantity, and habitat problems for the separate coastal ecosystems

If this is a reasonable strategy, how could the strategy or its application be improved?
The District's coastal system management approach is based primarily on freshwater inflow to the estuaries and salinity limits in those systems. Also strategies for addressing nutrient loading and other water quality problems are necessary.

Posted: 25 Sep 2007 02:13 PM
Originally Posted: 25 Sep 2007 02:12 PM