

*Science Excerpt from the Draft Minutes of the  
South Florida Ecosystem Restoration Task Force  
Meeting held in Coral Gables, Florida  
on October 28, 2010*

*National Research Council (NRC) Report*

Mr. Tom Strickland noted that one of the key underpinnings of restoration is to base decisions on sound science. As part of that commitment and consistent with the requirements of WRDA 2000, the Secretary of the Army, the Secretary of Interior and the Governor of Florida established an independent review panel through NRC. The Committee on Independent Scientific Review of Everglades Restoration Progress (CISRERP) was asked to prepare a report every two years, an independent assessment of the progress on the Comprehensive Everglades Restoration Plan (CERP) and this is the Committee's third assessment. Mr. Strickland noted that a group of concerned scientists sent a letter to the Task Force members regarding water quality and water quantity trade-offs. The Committee's report generally addresses the themes in that letter and many others, for this meeting the Task Force will focus on the report's findings.

Dr. Frank Davis noted the Committee is a multi-disciplinary group and he reviewed their charge which included an assessment of progress in restoring the natural system, discussion of significant accomplishments of the restoration, discussion and evaluation of specific scientific and engineering issues that may impact progress in achieving the natural system restoration goals of the plan and independent review of monitoring and assessment protocols to be used for evaluation of CERP progress. The Committee reaffirms the conclusions of its predecessor that continued declines of some aspects of the ecosystem (tree islands, peat loss and snail kite as examples) make accelerated progress of Everglades restoration more important now than ever. Two years ago the NRC Committee reported that the CERP team was bogged down in procedure, planning and administration and very little tangible restoration was taking place. This Committee found that there has been tangible progress over these last two years to include the beginning of construction on four CERP projects; making progress on important foundation projects; and moving forward with pilot studies. He also noted that after 10 years no projects have been completed and the cost of CERP has gone from \$8 billion to \$13 billion in 2009 dollars. Maintaining political momentum and public support for this is critically important and they need to be able to demonstrate tangible public benefits and tangible ecological restoration results as soon as possible.

He explained that the scientific foundation for decision making is found in Chapter 6 of the report. The Everglades is one of the most intensively studied wetlands systems on the planet and in the last two years there has been additional progress and advances in scientific understanding about climate change and water management implications of climate change, better understanding of the pre-drainage Everglades as well as better understanding of the formation and maintenance of the ridge and slough landscape. This Committee is reiterating what previous Committees have found that the science is strong. RECOVER is a good program and the most recent Monitoring and Assessment Plan (MAP) 2009 report is a significant improvement over its predecessor. There has been a loss of momentum in developing and refining integrated hydrologic, ecological and biogeochemical models to examine different planning approaches and inform restoration decision making and provide input for adaptive management. One of the three

things of particular concern is whether or not the institutional structure is there to link the science findings back to decision making and that needs to be addressed right away. The Committee is asking CERP to evaluate the effectiveness of the current stakeholder processes and how they can be improved. It is very hard to get the water right everywhere all the time and this has always been recognized in CERP. Right now there is not a good capacity to examine in a multi-objective way the consequences of multiple trade-offs being made across the system in terms of the overall benefits of one design versus another and the Committee is calling for better planning support tools to do the analysis. The report also discusses some of the complex trade-offs between species and water in different parts of the system.

Dr. Davis said the Everglades Restoration Transition Plan (ERTP) process is an example where they have used multi-objective reasoning in the way water management decisions are made and the Committee commends that effort. There is a detailed chapter on water quality but essentially it will be a lot more expensive, involve a lot more STA acreage and a lot of creative solutions to try and meet the water quality objectives of CERP. They are calling for all options to be on the table and a scientific, rigorous analysis of cost effectiveness of different water quality approaches as well as a combined strategic approach that includes all the tools. The Committee is also calling for more research to better understand how to improve the sustainability and performance of STAs; better source control effectiveness and a better understanding of Phosphorus, particularly in the Everglades Agricultural Area (EAA). Dr Davis noted that even if they get a lot of the water quality control systems in place it will be many decades before the system processes the legacy phosphorus. There is a long time period that they start to worry about the consequences of withholding water until it is clean enough. They are not suggesting any particular trade-off at this time but suggesting it is the scientifically responsible thing for the scientists in south Florida to formally and rigorously analyze the consequences in this transition period of Everglades restoration. In particular, take a serious look at the environmental reversibility or irreversibility of the decisions they are making now.

Overall, the Committee finds that there have been tangible improvements over the past two years. Progress is still slow and the need for restoration to accelerate and build on that momentum is more important than ever. The science program is strong and can benefit from better, more transparent mechanisms for integrating the science into decision making. There are challenges related to both water quality and distribution that have become increasingly clear over time, as well as the difficulty of achieving restoration goals simultaneously. CERP was envisioned as a 30-year effort and this Committee thinks 40 – 60 years is more realistic. The long time frames of transition require a more strategic look at how to manage the transition, more careful analysis of the trade-offs among Everglades features, water quality and water quantity, and understanding and communicating those trade-offs to the stakeholders because it is important to maintain public trust and credibility as this effort moves forward.

Mr. Gene Duncan noted the Task Force deals mostly with policy and while his comments are obvious to the scientists, some on the policy side may not have thought about what the term ‘trade-off’ means. First, he noted that there are impacted areas of the Everglades near the discharges and those areas are expanding. Both DEP and EPA have determined that there is no assimilative capacity for any more Phosphorus in the Everglades. Also, they are not currently meeting the water quality criteria. It is not just about water quality it is also about the hydrology. They have barriers in the Everglades such as Alligator Alley and Tamiami Trail so as the water flows, it ponds across those barriers and it is too deep in some areas and too shallow in other areas. It is those too shallow areas that have led to over drainage

and caused soil oxidation and peat loss. Putting clean water in shallow areas in the right quantity and quality will cause the water to be too deep and drown out the tree islands. Putting dirty water on top of loaded soils causes destruction of the Everglades. Mr. Duncan believes that any concept that they are going to put dirty water and trade-off water quality for water quantity means they intend to sacrifice the Everglades to get more water down south. They say that they have brought the Phosphorus levels down from 200 ppb to 50 ppb and the Miccosukee Tribe's response is that the result is exactly the same, the Everglades will still die. Water quality is much more important than water quantity although they are interrelated.

Mr. Duncan added that state law passed this concept of net improvement and hydro-pattern restoration as moderating provisions and now they have rulings in federal court that say that both of those concepts violate the Clean Water Act. The concept of net improvement and hydro-pattern restoration goes back to the idea of putting partially clean water in the Everglades. When people say trade-offs they are talking about destroying the Central Everglades so they can have more water in the Park and Florida Bay. The East Coast and the West Coast Estuaries are tired of being blown out and they don't want the dirty water. The folks at Lake Okeechobee don't want the dike to break so they have lower lake levels. The Park wants more water and Florida Bay needs water since they are dying of hyper salinity. They are talking about sacrificing the Central Everglades. The Tribe's position is that water quality has to come first and as they increase the treatment then they can increase the quantity. Mr. Duncan closed by saying that to do it in the wrong order means they will restore the Everglades with dirty water the Tribe will fight them at every turn. Mr. Strickland thanked Mr. Duncan for his candor and directness and noted he would not ask Dr. Davis to reply because they are asking the scientists to help them understand how to frame the policy calls with the best science information and he noted the next agenda item is on water quality.

Ms. Estenoz, on the nexus between science and decision making, asked whether the Committee received specific suggestions on how to make it better. Dr. Davis said some expressed concern that the scientists were being vertically cut-off from the decision making process and they were worried that the science voice was lost. The Committee said this is an important part of Adaptive Management and they need to make sure that link is strong and well articulated. Ms. Estenoz said she supports this Task Force looking at those processes and to conduct some sort of audit or survey. She said she does not want the scientists to feel like they are voices in the wilderness. Ms. Estenoz, on the issue of trade-offs, asked whether the Committee was recommending that the analysis be performed or whether they were taking a position on what the trade-offs are. Dr. Davis explained that water quality and water quantity work in concert to produce ecological outcomes. The analysis is to better understand that coupling and the differences of how the water quality and quantity interact across that landscape. That science has not actually been done to the level that can support policy and management decisions. The science could be stronger in pulling the bio-geochemistry and hydrology together and the Committee is not recommending any particular trade-off at this time because of a lack of analysis. It is not about the final conclusion but about what happens during this transition. For example, peat loss takes centuries to replace. They have to think about it in terms of timing and spatial trade-offs.

Dr. Robinson noted that there are certain elements of ecosystem services that are on the decline and the Committee noted the limited capacity through modeling to help predict how they may look over time. From a policy perspective, it is an important capability to know the implications, for example loss of peat, on other ecosystem services. He asked whether it was due to unavailability of resources or the way they

were approaching it as agencies. Dr. Davis replied the Committee sense was that it was both. CERP invested quite a lot up front in state-of-the-science modeling, both ecological and hydrological systems. The water management models are still state-of-the-science and they are moving forward. The Committee is reiterating what previous Committees have said and what they see as an important concern.

Mr. Buermann said it was important to recognize that they get competing scientific opinions and it is not because the scientists are wrong. He knows that it is hard to reconcile the science and it is something they have been struggling with for a long time. Dr. Davis reminded everyone that the whole restoration is based on Adaptive Management. They do not have good enough understanding to predict outcomes across a system this big and this complicated with as many competing concerns as they have. The very best science needs to be brought to the process to ensure the science is delivering as much as it can to that adaptive learning process. Ms. Wehle complimented the Committee and said they do pay attention to the Committee's reports adding that they have effectuated change. On finding more and better mechanisms, to make sure that science is a part of the policy and decision making, they are already looking at the existing processes and advisory committees. On the trade-offs issue, the recommendation is to work on developing a mechanism to take the best science and deliberate on it as a policy. They have not developed a systems model but systems modeling is something a lot of the major universities in the country are beginning to develop as disciplines. They will continue to have this argument until they embrace that type of systems model development and will bring forward a recommendation on that as well. The SFWMD welcomes this outside view and will move forward on those recommendations.

Ms. Patty Power said she remembered the meeting in West Virginia several years ago with Interior's Science Advisor (Jim Tate) to the Secretary at the time on how to better integrate science. The take away message was that they were all speaking English but they were not speaking the same language. They need to develop methods or processes that will allow the conversation to happen in an effective way. There is a tremendous amount of information out there and they need to ask what the next steps are to make it have an impact.

Ms. Wehle added there is no guarantee that they will ever achieve that number, no one else in the world has ever built infrastructure to treat the volume of water they are talking about and have successfully achieved that number. She asked what if the best they can do is to get is 14 and they just haven't developed the technology to get to 11. Do they forego rehydrating the Everglades with water at 14? Does 14 ppb cause irrevocable damage to the Everglades, if not what is the extent of the damage? That is a policy consideration that needs to be grounded in science. Litigation aside, she cannot promise that if they build A, B, C and D they will achieve the number people want them to, there is no guarantee. Knowing there is uncertainty, they will embrace putting these processes together to discuss what happens if they can't get there.

Mr. Strickland thanked Dr. Davis and the Committee. The Task Force is better informed with this ongoing input. This is a civics lesson on how they ought to be operating. There are complicated questions and they are doing their best with the best information they can get from the scientific community. He recommended that the WG and the SCG consider this report and these comments and come up with some recommendations to the Task Force on next steps. He also suggested the Task Force have a retreat/work session devoted to science.