

# DRAFT

**NC Coastal Resources Commission Science Panel  
July 21, 2014  
Craven County Cooperative Extension  
New Bern, NC  
Meeting Summary**

## Attendance

Margery Overton (Chair)	Charles Peterson
Steve Benton	Stan Riggs
Bill Birkemeier	Spencer Rogers
Bill Cleary	Greg Rudolph
Tom Jarrett	Beth Sciaudone

Absent: Rob Young

10 of 11 duly-appointed members present.

Other attendees: Frank Gorham (CRC); Braxton Davis (DCM); Mike Lopazanski (DCM); Ken Richardson (DCM); Michele Walker (DCM); Tancred Miller (DCM); Frank Jennings (DCM); Stan Young; Jim Early; Dave Burton; Frank Tursi (NCCF); Ana Zivanovic-Nenadovic (NCCF); Renee McCullen.

## Call to Order

Margery Overton called the meeting to order at 10:00 a.m. and welcomed the members.

## Elections

Overton said that she and staff could not find that the panel had conducted elections within the past two years so they were probably due. Nominations are invited for chair and vice chair and should be emailed to Tancred Miller by July 31<sup>st</sup> after first verifying the nominee's willingness to serve. The list of nominees will be sent out on August 1<sup>st</sup> and members should vote by August 8<sup>th</sup>. Overton said that the vote could not be held today since the intent is to give all members the opportunity to vote, and neither Steve Benton were present. Winners will be determined by simple majority. Panel members approved the process. Greg Rudolph asked Overton whether she was willing to continue to serve as chair; Overton said yes.

## Sea-Level Rise

Overton invited Frank Gorham to make remarks regarding the SLR report update. Gorham said that the study needs to be formatted so that it reflects predictions/forecasts out to 30 years, and not beyond; limiting the projections to 30 years will help with the credibility of the report. Gorham said that he has been taking a lot of heat for his decisions, but no additional members will be added to the panel until after the SLR report is complete, and then in consultation with the panel chair. The panel reviewed the study charge from the CRC, including the timeline and technical peer review process by Drs. Robert Dean and James Houston. The panel expressed agreement with the process and timeline. Tom Jarrett asked whether the panel could invite experts to come in and talk to us, for example, to offer expertise on the modeling section from H819. Gorham said that the CRC will respect whatever the panel wants, except that no new voting members may be added. The panel may bring in outside experts on an as-needed basis as long as

the panel thinks this individual(s) could bring valuable knowledge/experience to a topic specific discussion. Gorham also stated that he does not want the panel to form a subcommittee to draft the report.

Overton asked if there was anything from H819 that the panel needs to have front and center in addition to the CRC's study charge. Bill Birkemeier asked whether the SLR projections in the report have to end at 30 years. Gorham said that he cannot tell the panel what to do, but he would prefer the report look no further than 30 years; he thinks that credibility goes down after 30 years. Stan Riggs asked whether the panel could ask for a third-party review of the update, whether it be an additional group of scientists that the CRC or the panel selects. Riggs said that for the 2010 report the panel had other expert input, including from three world-class researchers, but that they were no longer involved. Gorham responded that as long as deadlines are met, the panel can do what's required to provide the final report. Riggs said that this needs to be not just an update of the science, but the panel also needs to do more from a public education point of view. Gorham asked that the panel commit to updating the report every five years. Riggs said that the panel had already made that commitment and included it as a recommendation in the 2010 report. Steve Benton arrived and joined the meeting.

Gorham asked the panel to identify the data points that we need for future studies, and we can go the General Assembly and ask for funding. Overton said that the panel is happy to do that. Riggs said that NC had a Climate Commission that produced a report with about seven pieces of proposed legislation, including recommending additional research and data collection. Riggs recommended taking a look at that. Gorham agreed. Charles Peterson said that data points are important, but should not be limited to water level stations; we can also reach valid conclusions from other methods, e.g. satellites, aerial photos, and sediment analysis. Can NC afford it all is a question. Gorham said that we should ask for funding anyway.

Spencer Rogers recommended inviting Rick Leuttich of UNC-IMS to talk about dredging impacts, and Gary Thompson of the NC Geodetic Survey to talk about subsidence, to the SLR discussion as he believes their knowledge and experience could be beneficial. Their work might support the ability to look at sub-regions. Rogers said that he has already talked to both Leuttich and Thompson and each has expressed an interest in assisting. Overton suggested the panel could have a single meeting to bring in outside expertise, or could invite them to multiple meetings. Overton said that she would like to lock in a meeting schedule for the rest of the year, and reminded members to complete a doodle poll that had been sent out for that purpose.

Greg Rudolph said that H819 directs the panel to give projections for no fewer than the four BIMP regions, but this will be difficult. Overton asked staff to provide a map of the regions. Beth Sciaudone noted that H819 allows for the use of proxies if data does not support projections for all four regions.

Gorham said that he expects to be asked often how the study is going, and he intends to say that the CRC is just waiting for the panel's report. Peterson said that he might also suggest that they thank the panel members for volunteering their time in service to the state because it is a substantial effort.

Tom Jarrett said that there has already been a lot of work done in looking at historic water level data, most notably by Chris Zervas at NOAA. Jarrett asked whether the panel wanted to invite Zervas to discuss the data and analysis of the dredging impacts in the Cape Fear River. Rogers questioned the accuracy of the analysis and whether the panel needed Zervas. Overton said that the panel needs any reports from NOAA and Zervas that can provide any information that the panel can use, and asked for staff's help in finding those. Overton also pointed members to NOAA's Sea Level Trends website and asked members to get familiar with it. Jarrett asked if the panel can get the actual data as well; the acceleration issue is still floating around and we need to examine it. Overton suggested that the new IPCC

report might help in that regard. Sciaudone said that the new IPCC report has a maximum eustatic projection that is a little lower than in the previous IPCC report.

Riggs said that the historical database is very important and goes back thousands of years. The panel should invite Dave Mallinson and Reide Corbett to talk about the data and modeling. Peterson concurred. Gorham said that we should not fall into the trap of waiting for expert input if it does not meet our timeline. Overton agreed; if we cannot have them in person we can use any peer-reviewed papers that they have published.

Birkemeier said that we can simplify this for ourselves by considering it an update. Riggs said that is true but we still have to report projections for at least four regions. There is a big difference in the amount of quaternary sediments in the north versus the south; plus we want to bolster the education value. Overton asked members to go back and review the 2010 report and 2012 addendum, and look at what we can improve. Peterson said he remembered that the panel wanted to report regional differences in the 2010 report but there was not sufficiently compelling data to do so; if that has changed we need to have people speak to why. Rogers said it has changed, and this is why we need Leuttich and Thompson. Sciaudone said that there is Continually Operating Reference Station (CORS) data for 1997-2004 available online; that and other data might also be available from Thompson. Peterson recommended we contact Thompson immediately to see if we can get him to our next meeting.

Overton said there are two things to do differently from the 2010 report: there will not be a single planning number, and we are free to use a range and discuss uncertainty. Birkemeier said that curves such as in the 2010 report are all about risk and uncertainty—below the curve is 100% certainty of impact, and above the curve suggests risk-free. We need to discuss it more thoroughly in the report because we don't know the exact risk. Gorham confirmed that the CRC is not looking for a single number. Peterson noted that the panel did not consult with the insurance industry for the 2010 report, and while we ought to talk to them their data and analysis might be proprietary. Sciaudone said that her husband does some of that kind of work for the insurance industry, and agreed that it would be tough for them to give us that kind of information, especially by geography. Riggs also agreed, and added that the industry usually looks at much shorter timeframes, maybe about one year. Gorham recommended that the panel speak with CRC commissioner John Snipes, who is in the insurance industry and would be a good source.

Jarrett said that we should not be worried about focusing on one industry, we can do the report and they can use it however they want. Sciaudone agreed, and said that we need to be clear and transparent as to where we are getting our numbers. Rudolph asked whether insurance numbers would improve the SLR report; he doesn't see how they would. Peterson said that risk was a key component that was missing from the 2010 report. Braxton Davis said that Paul Gayes has done a comparison in South Carolina of some different statistical packages and might have some useful insights for the panel. Overton said we should table this discussion for a later meeting and focus today on process.

Overton said that the Army Corps has their own SLR guidance document that they are using currently, and we should take a look at it. Jarrett noted that the Corps' guidance is for infrastructure and other long-lived structures and will differ from houses.

Riggs asked whether the CRC is interested in a planning benchmark like the panel recommended in 2010. Gorham said no; he would prefer no discussion about planning numbers until after the report is complete. Rudolph added that the report does not need to include a planning number since the bill does not ask for one. Overton asked whether the CRC wants the report in the same format as in 2010, with curves, or with tables instead. Gorham said he would prefer a set of curves. Peterson asked whether the report should look at 30 years from today or from 2010. Gorham said 30 years from today. Peterson said that the 30-year window may be too fine, and the results could be indistinguishable for such a short period of time.

Birkemeier suggested 30-year curves by region showing high, medium and low projections, along with tables, in meters and feet. Sciaudone said that people like mm/yr. Overton said that most of the literature is in metric, and she would not want to have to convert all of the numbers to inches. Gorham said we should use both to avoid conversion errors.

Peterson asked whether subsidence rates change over time. Riggs said there is no question that they do. We can report general patterns, but specific numbers will be difficult.

Overton and Peterson suggested looking at what other states have done/found, especially adjacent states. It can add perspective and will overlap with planning; this might be useful to the CRC. Gorham asked the panel to keep a running tally of what documents are circulated and reviewed by the panel; only documents that are reviewed by the entire panel should be included, not documents that are only reviewed by individual members. Davis said that staff will keep a running list of documents that the panel reviews, whether or not they are cited in the report. Staff will look into using Dropbox or another distribution method. Overton said that we can link to most online, but some will be pdf. There might be some paywalls to navigate.

Davis said that the CRC revised the general charge to the panel two years ago and recommended a standard format for panel reports, including a minority opinion when there is one. Rogers said that it is important to note that in the 2010 report there was minority opinion because one did not exist; it was a consensus report. Gorham responded that the public perception is that there was a minority opinion that got squashed.

Birkemeier said that recent large studies include the IPCC's Fifth Assessment Report, the National Climate Assessment, and the USGS Hotspot paper (Sallenger et al); need to add the appropriate NC factors to the eustatic numbers. Sciaudone said that there is a 2013 paper from Jim Houston, and possibly an addendum to his 2011 paper. Gorham said that report should focus on NC work as much as possible, and not primarily on international work; this was a criticism of the 2010 report and will add to the new report's credibility.

Overton suggested that for the next meeting we need to have a map of the BIMP regions, NOAA gauge data and any related reports, and maybe invite Gary Thompson to talk about the CORS data. Rudolph said that there are discrepancies between the altimetry and tide gauge data, we need to be aware. Peterson asked whether we can help the public understand the differences. Overton stated that the satellite data are 'global,' and tide gauges are 'relative' to local conditions. The panel should focus on local data as much as possible, but they still need to put into a global context.

Sciaudone said that 30 years does not pose any obstacles when looking at gauge data, but the literature usually goes out much further; it is important to point out that the IPCC and others go further. Can we talk about these longer-term studies and reference their timeframes? Gorham said yes. Overton said we should talk about the implications of downscaling timeframes and geography; how do we bring those together? Birkemeier said that we're not going to come up with the curves and the data, we will use the National Climate Assessment and other data that are already out there, and highlight in the report the significant studies that have come out since the 2010 report.

Peterson said that there are things at the event scale that would manifest as a significant jump in the rate, not as a smooth curve; our 2010 curves are approximations that smooth out episodic events. Overton agreed that that was one of the inherent assumptions, and should be made clearer in the next report. Riggs said that the historic record over the last 2000 years is episodic, not linear, and episodic events can occur at the decadal scale. Overton said the group should consider the likelihood of episodic events that could accelerate SLR within the 30-year window.

Overton advocated August 27<sup>th</sup> for the panel's next meeting on SLR. Peterson, Benton and Cleary were unsure, Riggs was not available. The 28<sup>th</sup> is possible.

Sciaudone showed a map of the BIMP regions. Riggs said that the regions are not feasible for the SLR report, and should be dictated instead by the geology. The line at Cape Hatteras does not make a lot of sense, and we can easily divide the Albemarle Embayment into two regions. The biggest changes are in the Albemarle. Riggs agreed to draw a map showing how he would define the regions.

Sciaudone showed the NOAA Sea Level Trends website and explained some of the features and data that are available. Overton asked members to get familiar with the data. Jarrett asked whether the panel should pick a period of time that is consistent among all of the gauges. Peterson said that there are two gauges in the state that DCM was not aware of—Lolo and Pine Knoll Shores. The gauges are not yet certified by NOAA, but are referenced to NAVD88 and have been in place for about 10 years. John Fear has the links and data. The group decided to create a list of all known active tide gauges that might benefit the study. Gauges 10 years old or newer should be considered on the premise that they are local and will serve as additional reference points for what's going on in NC. Jarrett said he's pretty sure that NOAA has a protocol for water level stations, including installation, maintenance, re-surveying, etc. Birkemeier said that the location of the CORS stations is equally important. Sciaudone displayed the SONEL mapping website: <http://www.sonel.org/-GLOSS.81-.html>. Overton said the panel should look at Bob Dean's subsidence presentation on the website.

The panel looked at the Springmaid Pier (SC) gauge, and noted a decadal-scale SLR rate jump followed by a decline. Not sure of the cause. Sciaudone noted that NOAA SL graphs do not always cover the same data period as the published trend, so the panel needs to be careful which data it cites. Rudolph said that all of the gauges will include subsidence data for north and south; we can superimpose the eustatic data and be done. Rudolph said that we can see where this is going—he knows this is not the scientific method but we can see where it's going. Overton asked to save that discussion for the next meeting.

Overton said the panel needs to start with the data. Rudolph asked whether there would be an appendix that discusses data quality. Peterson said there would, and it can be updated as appropriate.

Overton said that there was a request on the table for inviting speakers, be thinking about setting aside time at future meetings. There could also be listening sessions in addition to the regular public comment periods. Riggs said that he is opposed to letting just anyone come address the panel, unless they are “sponsored” by a panel member; he is old enough to protect every minute and is not going to sit for long periods and listen to a bunch of garbage. Birkemeier said that the panel has already identified certain knowledge gaps and appropriate speakers. The panel can decide as a group who to invite; he is not too keen on setting aside long periods of time in addition to the normal public comment period for everyone who just wants to tell us stuff. Peterson said that information that the panel hears ought to be relevant, rigorous, and scientific, not policy oriented. Sciaudone said she is a little more open; if someone wishes to address the panel and has not been sponsored maybe they can submit a written request and the panel can decide. Overton agreed. Rudolph said that it is standard in government meetings that there is a public comment period and there is an agenda, speakers need to be in one or the other. Overton said that she is hearing that the panel's time is precious and limited, but that anything that is submitted will be shared among the group.

#### IHAs

Mike Lopazanski told the panel that H819 tasked the CRC with exploring the feasibility of eliminating the Cape Fear Inlet AEC. The CRC decided to convert that task into a larger study of all Inlet Hazard AECs. Some of you were at the CRC's meeting in Nags Head in February and heard the discussion on

inlet management issues from an invited panel. DCM then held four regional meetings and accepted comments from local governments and interested stakeholders. You were all given a copy of the preliminary inlet management study priorities that arose from those meetings. At the CRC's direction staff has categorized the priorities into short term and long term. We heard that the public wants to see the IHA delineation study completed; this task will be incorporated into the inlet management study. Chairman Gorham will be looking for the panel's help in developing two new AECs: deep-draft and shallow-draft inlet AECs, drawing upon individual inlet studies. We also need to make sure the report is responsive to the H819 requirements. Past panel work will also be incorporated into the report. Cleary asked what constitutes deep draft versus shallow draft. Lopazanski said that Cape Fear and Beaufort are deep, all others are shallow.

Cleary said that the inlet study was more of a priority than the SLR report since H819 requires it to be completed before the SLR report. Staff explained that under H819 the Cape Fear report was due by December 31<sup>st</sup>, 2013, and the IHA study is due by January 31<sup>st</sup>, 2015. The CRC, however, has combined the two reports into a single study and has promised to have them both completed by December 31<sup>st</sup>, 2014.

Sciaudone said that the problem the panel had with computing erosion rates for the inlets was that they were migratory versus oscillating, not deep versus shallow. Davis said that deep versus shallow is more of a management issue.

Overton asked what specifically the panel is being tasked with; is the February 14<sup>th</sup>, 2013 charge from the CRC still valid? Lopazanski said yes, the questions are still valid even though the date by which the panel was asked to deliver their report had already passed. Davis said that the short answer to the question of whether it's feasible to eliminate the IHA AEC is probably no; the next question is what is the risk and how do you manage for it. Cleary said the panel had been arguing about lines, and there are still serious roadblocks ahead.

Rogers said that the CRC has never seen the 30-year risk line; they were never submitted to the CRC for review and discussion. Cleary said that the panel had a problem with the 30-year risk line; there is still room for argument and discussion so how could they have been presented to the CRC? Cleary said he did not see how the inlets, e.g. Tubbs, could ever produce a result similar to the 30-year risk line.

Sciaudone said the panel agrees on the boxes. Rogers said that the boxes are "dead in the water." Lopazanski disagreed. Rudolph said he thinks the panel is comfortable with the boxes being regarded as "areas of inlet influence," not necessarily management areas. Rogers repeated that "reading between the lines, the boxes are dead in the water." Rogers added that the locals have been up in arms over the boxes. Davis asked Rogers what he did not like about the boxes. Rogers said that there is better technology available now than when the panel drew those boxes; the 30-year risk line is one example. Jarret said he does not know what new technology is available, the panel is still forced to use historical aerial photos for analysis; new technology does not create old photography. Birkemeier said that technology for looking at elevation could be considered new. Overton said that the panel used elevation in the latest IHA work.

Benton said that the panel has made good progress, but there are other things out there that the panel needs to provide information about, such as catastrophic events. Jarrett said that like Rogers he does not like the boxes from the perspective of a prospective homeowner; but he also does not buy the 30-year risk line because inlets do not behave like that. Sciaudone said that calling it a risk line implies that a risk analysis was performed and the panel did not do that. Rogers said we can call it something else.

Lopazanski said that the CRC never reached the point of discussing what the use standards might be inside of the new boxes, and instead tabled that discussion until after the oceanfront erosion rate update

was complete. Lopazanski said that people associated the existing use standards with the new and expanded boxes, which the CRC had not necessarily planned to do. Davis added that the CRC has the authority to designate the AEC as they choose; they can define a management area that is different from the area of influence area. Benton said there are a lot of factors that go into drawing the boxes that the CRC does not fully understand; the panel should identify those things for the CRC and include descriptions with each of the boxes. Davis suggested clarifying for the CRC that the boxes are areas of inlet influence, and do not need to be adopted as inlet management areas. Jarrett said the panel can present the CRC with the setback methodology, the 30-year risk line, etc., and the CRC can use them as they please. Rogers said he has a strong feeling that the CRC wants to use the vegetation line for measuring setbacks in IHAs, and the panel concluded that they should not.

The panel reviewed the questions in the CRC's IHA charge and concluded that they had been substantially answered. Birkemeier said that on the second question in the charge the panel used variability to define the starting point of inlet influence; that answers part of the second question and the group is comfortable with this approach. How do we define the greatest risk within these areas? Sciaudone said that the panel went painstakingly, inlet by inlet, to try to come up with a uniform methodology, but one of the main problems seemed to be coming up with a standard reference point to use. The CRC seems to be open to a non-uniform methodology. Davis said there is an interest with that, and the starting point is going to be deep versus shallow draft.

Davis said that in order to get the report done by the end of the year we need to capture what's been done, and note that some methods work well in some areas but not others. The recommendation can be to go inlet by inlet and apply whatever technology and methodology works best. Riggs said that the panel has not dealt with ephemeral inlets, and in some places they are more important.

Ken Richardson went through a presentation showing the analysis that staff had performed on calculating inlet erosion rates and setbacks using AMBUR. Overton noted that AMBUR does not include variability/standard deviation, which is the primary tool for identifying the areas of inlet influence.

Davis said that staff's position is that we have learned enough from the panel to draft the year-end report to the General Assembly. Staff can draft the report and give it to the panel to review and comment. Overton said in framing the questions start with what exists today. i.e., based on the 1979 report the CRC developed use standards, etc., and we now have to respond to H819 and the study charge from the CRC.

Davis said we will also state that the panel has also been calling for an update of the IHA boxes. Overton agreed and said that the CRC never tasked the panel with looking at the nuances of what should be allowed within the boxes. Rogers said that DCM had proposed to the CRC that they use the existing line of development as the setback line in IHAs. Rogers said this caused the CRC to go back to the panel and that is what led to the development of the 30-year risk line. Davis said that staff's focus right now is on preparing the H819 reports on schedule, and there will be plenty of opportunity to have more discussion on specifics.

Overton closed off the IHA discussion and opened the public comment period.

### **Public comments**

Dave Burton said he drafted a lengthy critique of the 2010 report and 2012 addendum, and they are available on his website. The website contains lots of resources, such as tide gauges, subsidence, etc. Burton is concerned that the panel is dealing with a highly politicized issue, and contains seven Democrats and no Republicans. Sciaudone asked if Burton knew her affiliation; Burton said she is unaffiliated. Overton reminded the panel that this is a public comment period, and asked the panel to listen, not engage in conversation.

Burton said that he would like to make a 30 to 40-minute presentation to the panel but was only given five so he will do the best can. Burton said that he recently attended two climate change presentations in Raleigh. One was by Nicola Scafetta at a John Locke Foundation event, and there were about 250 people in the room. The other was by Rob Young to a similar-sized audience. Burton said he was the only person who attended both presentations, and this is the problem of everyone living within their own echo chamber; why wouldn't people want to hear both sides of the issue? This was one of the fundamental problems with the 2010 report. The panel said in 2010 that the SLR rate increased due to global warming; this is simply not true but it was one of the panel's assumptions. The panel's 2012 addendum abandoned that claim but stuck with the 39" by 2100 projection; how can that be possible?

Burton said that he would like to present his detailed analysis of the issues with the 2010 report as a way to help strengthen the new report. It should include a rebuttal. Burton said that the panel relied very heavily on one paper from Stefan Rahmstorf, calling it "robust," apparently without knowing that Rahmstorf in 2009 had admitted that it was not robust because the averaging period was incorrect. This comes from a lack of diverse viewpoints and he was hoping for a broader range this time. Burton said he would like to assist the panel and present what went wrong in 2010 and 2012, and how to make the next report better. Burton encouraged panel members to visit his website at [sealevel.info](http://sealevel.info) and submit suggestions. Burton said that is a computer scientist and does not work in climatology, geology or other natural science fields, but he is a citizen scientist. Burton said he has had one paper published and has others in the works.

No other members of the public wanted to make comments.

### **Adjourn**

Overton reminded members to submit nominations for chair and vice chair, and to vote at the beginning of August. Look out for an email for the next meeting date.

The panel adjourned at 2:55 pm.