



**STORMWATER COMMITTEE MEETING**  
**Surfside Beach Town Council Chambers**

**Attachment 1: 7-21-2020 Agenda 6. PRESENTATION. Title: “How’s the Beach and Other Related Efforts for Improved Decision Making in Support of Public Health and Economic Vitality.” by Dr. Dwayne Porter & Ms. Katya Altman, University of South Carolina, Columbia.**

The discussion is with Ms. Altman, a Ph.D. student, working with Dr. Porter in the USC’s School of Public Health, Dept of Environmental Health Sciences. Their work is support by the National Oceanic and Atmospheric Administration (NOAA), Southeast Coastal Ocean Observing Regional Association (SECOORA), and in part with USC’s Center for Oceans and Human Health and Climate Change Interactions within USC and its funding is derived from the National Institute of Health’s (NIH’s), National Institute of Environmental Health Sciences (NIEH).

Dr. Porter’s spoke on the efforts undertaken with USC and the University of Maryland to discussion the evolution of efforts USC began with DHEC in 2007. The initial engagement with DHEC resulted in a beach monitoring program and Ms. Erika Johnson (a former graduate student in USC’s School of Public Health). The beach swimming advisory program entailed taking water quality samples, getting lab results the next day, and make a determination if the results necessitated the need to issue a beach swimming advisory.

It wasn’t until after Ms. Johnson had a child, that she felt there must be better way to prevent beachgoers from potential exposures to bacterial latent waters. This was the start of “How’s the Beach.” Several model iterations later, today’s program includes forecasting and nowcasting methodologies. Historically, the target audience were resources managers at the state level. There weren’t opportunities to work with communities and to tailor products that were complimentary to other efforts and helping to identify the needs and resources of the communities.

When USC was funded to establish the Center for Excellence for Ocean and Human Health, a community engagement core was started to work beyond academia. The science-based tools primarily developed for the state government/resource management venue and tailor them to the needs and wishes of individual communities. Ms. Altman will speak about how we have evolved to the point of forecasting water quality conditions along the entire southeast coast, not just as a South Carolina project. Dr. Porter also noted that this work is complimentary with Dr. Libes and Brian Rabon (DHEC) water quality efforts and hopes to work developing ways to contribute. This may be of interest to SWC, residents and leadership of Surfside Beach.

Ms. Altman provided an overview on “Check My Beach” vs. “How’s the Beach?” as very different monitoring “products.” The common goal is to educate people about the beach safety and to make a more informed decisions about the beach. Both rely on the CCU volunteer WQ monitoring and Waccamaw Academy monitoring data. (*See Attachment 2, the presentation handout.*)

Key points about “How’s the Beach?” - The program is not looking for funding and is not in competition with “Check My Beach.” Their goals are community-based research and learning, engaging with communities and coastal management tourism officials about public health. The primary goal is to provide daily ‘nowcasts’ of bacterial levels for the swimming beaches, recreational waters and shellfish harvesting waters from NC to FL.

56 How's the Beach? is developing a new website, Howsthebeach.org., will cover  
57 swimming, recreational waters and shellfish harvesting waters.  
58

59 **USC is seeking recommendations from Surfside Beach for the following**  
60 **questions:**

- 61 1. **Do we see value in the work being done with “How’s the Beach?”**
- 62 2. **Does SWC have any recommendations as to what would be useful to**  
63 **beachgoers, SWC as representatives of Surfside Beach and the Surfside**  
64 **Beach residents?**
- 65 3. **Would Surfside Beach be interested in working with USC and the “How’s the**  
66 **the Beach?” program to give feedback and share suggestions?**
- 67 4. **Would Surfside Beach be interested in working with developing an**  
68 **operational situation notification system in Surfside Beach? For example,**  
69 **at the Surfside Beach pier which will be under construction.**  
70

71 Currently, “Check My Beach” provides today’s advisory based on yesterday’s water  
72 quality. Technically, the information is always going to be 24 or more hours behind the  
73 time of sampling before it’s reported. A potential improvement with “How’s the Beach”  
74 are daily “nowcasts” of bacterial (Enterococci) levels. Differences can include daily  
75 forecasts of bacterial levels with accuracy that are up to 72 hours ahead. This results  
76 from a predictive modeling approach. Data is assimilated and integrated from multiple  
77 monitoring sources from field programs, observational systems and remote sensing /  
78 models.  
79

80 **Is Surfside Beach interested in developing an operational situation notification**  
81 **system?** Especially now that the Pier is soon-to-be under construction. The title of the  
82 project will be “Development of Integrated Observing, Nowcasting and Situation  
83 Notification Systems to Address Issues of Public Health, Ecosystem Services and  
84 Economic Vitality.” The results expected is a decision-support tool at the user’s  
85 fingertips for public health, economic and personal decision-making. Public health  
86 decisions can be made in a more informed manner. Everyone (residents and visitors)  
87 can use the information to decide how best to spend their time when visiting the  
88 beaches with the use of sound science.  
89

90 Pilot project occurred with Foley Beach, SC to develop a site-specific “situation  
91 notification system” for integrating nowcast with webCAT cameras to assess before,  
92 during and after events of interest, such as how many people are on the beach,  
93 swimming advisories, rip current advisories, special events, etc. The “How’s the Beach”  
94 program work can lead to an integrated effort of observing, nowcasting and situation  
95 notification systems to address public health, ecosystem, services and economic vitality  
96 (such as tourism) issues.  
97

98 As a recent example, Dr. Porter came upon a nearby swash and realized that after a  
99 rainfall from the night before, the water quality resulted in a smelly bacteria odor. He  
100 observed several kids playing in the waters of the swash. He took pictures and had a  
101 conversation with the moms asking if they were the waters may have potentially high  
102 levels of bacteria. The moms had no idea. The front desk clerk at the hotel they were  
103 staying told them that these swashes were “natural, lazy rivers” and considered the best  
104 places for kids to go swimming. We have a challenge ahead to use sound science  
105 collaboratively to help improve the education process and on many angles. They are  
106 developing tools that will hopefully be seen as collaborative to go along with “Check My  
107 Beach,” and Dr. Libes’ and Victoria’s (Green) work with the water quality monitoring in  
108 the Grand Strand area.  
109

110 Is this program being used in Foley Beach, SC? Yes, the mayor an interest. The mayor  
111 is interested in pushing forward the good picture of water quality and the riptide data.  
112 Have also used an application for beach closure usage. We need local experts to id  
113 what are usable products.

114  
115 Questions and answers:

116 1. Chairman Mask – We test weekly or biweekly (depending on whether you’re  
117 talking beach or lake) and we get data and use it to advise people what we think  
118 the surf is by putting up signs that are temporary or semi-permanent depending  
119 upon the levels it’s reaching. The problem with that system is you never on any  
120 given day what the bacteria level is. We’re in a situation, we’re trying to advise  
121 people of what the beach quality or lake quality, but mostly beach quality and we  
122 end up with a system that probably isn’t doing a completely accurate job. You’ve  
123 been working with predictive models that appear to have some level of accuracy  
124 that’s far superior to our ability to currently look at what the level is. There’s a lot  
125 of jokes around about the flock of birds that hit the water in one spot and how  
126 bad the water quality is right there immediately thereafter. When you predict this,  
127 have you been able to look at the real data 72 hours in advance or 24 hours in  
128 advance, even better, and see how well are you are doing? And explain how 72  
129 hours in advance will be helpful if you’re only getting sampling data weekly or  
130 biweekly? In other words, how good is your predictive capability with the current  
131 sampling and analysis of currents and other things?  
132

133 Ms. Altman – The models are developed for each location and validated with  
134 data so we can see how well we are doing based on what are the predictions and  
135 results from sampling to see how well it correlates. A lot of this is more or close  
136 to 85% accuracy.  
137

138 Dr. Porter –when we talk about accuracy it’s in similarity to a national weather  
139 service weather forecast. It’s not absolute value of the coliform-forming units  
140 (CFUs) but whether or not we are in excess of the regulatory numbers. So about  
141 85% of the time and it’s getting better because of the longer we’ve been doing  
142 this and advancements in our modeling processes. About 85% of the time, we  
143 are confident that if we predict that there’s going to be an elevated level, then the  
144 factor will be an elevated level.  
145

146 We don’t have bacteria measurements every day to elevate that, so we  
147 developed our models based on historical data and real-time data. There is not  
148 one model that is applicable everywhere. We use an ensemble modeling  
149 approach as recommended by the weather services and for each DHEC  
150 monitoring site, we develop a suite of models around that site. So, if you look at  
151 the Surfside Beach area and 7-8 monitoring sites, we develop a suite of models  
152 for each of those sites and take into consideration the local geography and the  
153 modeling process.  
154

155 Don’t want to oversell modeling, it’s a tool, that can be used in conjunction with  
156 other sound science and techniques. We feel comfortable we have developed a  
157 nowcasting process that is a sound decision support tool.  
158

159 The work about being able to forecast 72 hours out, that’s a work in progress.  
160 Working closing with N. Carolina State Univ. and their Shellcast program. We  
161 started focusing on the longer-range forecast is from a discussion with Myrtle  
162 Beach Chamber of Commerce a couple of years ago. In addition to the  
163 nowcasts, they wanted estimates of what it’s going to be 24, 48 and 72 hours

164 out, so that in the event the conditions merit a beach swimming advisory, the  
165 advertising folks can kick in with a promotion of activities that pulled people off  
166 the beach rather than to the beach.

167  
168 Comment – Chairman Mask – From an area that sells itself as a beach that’s  
169 always fun, any system that’s likely to be advising them more often, and  
170 irregularly so that it’s harder to plan, scares the heck out of them even though it  
171 may be the absence of that system may be exposing them a little more to some  
172 bacteria situations. That’s a difficult thing to negotiate before until you feel the  
173 certainty of the accuracy.

174  
175 2. Chairman Mask – Are you working with anyone where you’re actually providing a  
176 daily forecast for their beach people, say the lifeguards to tell them what the surf  
177 conditions are in terms of water quality?

178  
179 Dr. Porter –We provide daily reports to Shawn Torrance(sp?) DHEC/MB, Brian  
180 Rabon’s group, and a number of the shellfish harvesting areas in SC. We send  
181 reports and are working in the Outer Banks, NC, in the Grand Strand area,  
182 Charleston area, and Manatee and Sarasota counties of FL. We send daily  
183 reports on predicted levels to the local public health officials.

184  
185 3. Chairman Mask –Do you know how they are used in terms of communication to  
186 the public?

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188 Dr. Porter – It is used as an additional information tool and an additional arrow in  
189 their quiver. No one to best of my knowledge is making a decision based solely  
190 on this information. They are using it as additional information in support of their  
191 decision-making process.

192  
193 4. Chairman Mask – They are using it for their decisions, they are not posting it as  
194 here’s the daily surf water quality projection?

195  
196 Dr. Porter – That’s correct and part of the reason we moved towards the  
197 development of a mobile phone app a couple of years ago was following  
198 discussion with DHEC, and Sarasota and Manatee. They wanted people to have  
199 the information as a source along with other sources of information and not to  
200 use as a single source for the issuance of a beach advisory.

201  
202 Mr. Adair – I can see it integrated with the DHEC information as another data  
203 feed. I’ve spoken with Brian Rabon and they see value in it, and the two  
204 programs can work synergistically. My concerns are how are we going to  
205 implement it, what is going to be the proofing at 85% possible accuracy rating.  
206 Would like to see in Surfside Beach, like a trial? Let’s compare it to the actual  
207 testing results for a while before we hang our hat on it.

208  
209 I’m concern as is Chairman Mask about tourism. We’ve derived probably three-  
210 quarters of our annual budget on tourism which has taken a hit with Covid19.  
211 Advertising a marketing campaign that would chase people away from the beach  
212 would be problematic. When grant funding runs out, are the municipalities going  
213 to be expected to contribute to support this?

214  
215 My initial concern, with all the work that’s been done in DHEC’s “Check My  
216 Beach,” is this is going to conflict or confuse the public. Brian Rabon and you say  
217 it’s just another data source. It will depend on whether this is going to confuse the

218 public, so it depends on how we tell the public. We put up 35 new signs to que  
219 code for "Check My Beach" with website information for the phone app. They can  
220 look at the data on their phone. How are we going to overload people with  
221 information? These are some of the concerns I have. A predictive model is great  
222 going into the future, but I'm concern with how it's going to be presented. How  
223 will the tourism base of the town could possibly be affected by it?  
224

225 Comment – Chairman Mask- I'll add to Mr. Adair's comment that if you start  
226 telling people you're giving them a bacteria report on a daily basis, without even  
227 seeing any data, their first thought is "My God is it that bad?" So, we have to be  
228 careful.  
229

230 Comment – Ms. Hellyer – Some of the comments I've gotten, I've asked people  
231 who do a lot of surfing because there's an organization along Grand Strand  
232 called Surfrider Association and there's also adaptive surfing and they really like  
233 the idea if they can go a phone app and find out what are the bacteria levels  
234 before deciding whether or not to either a) setup an annual event at around the  
235 same time if there's enough data to indicate annually when's a better time to go  
236 versus not so good time because of seasonal, geographical or whatever the  
237 historical history is with the data, climate change, that being another factor.  
238

239 There are also schools on the beach like in Garden City that teaches surfing to  
240 young children and that particular educator thought well if I know the bacterial  
241 levels are really high, I may not want to take them onto the beach that day. I may  
242 want to do an indoor class time with them or something else on the beach.  
243

244 It's still kind of fuzzy as to how much data would it be, or what are the categories  
245 that would keep you out of the water versus allow you to go into the water with  
246 some knowledge of understanding that you could get sick. That kind of gaging is  
247 a little hard to picture right now.  
248

249 It looks like it could be applicable to more than just the tourists. I don't even know  
250 that tourists, unless they are here to surf, or go fishing, to collect shellfish and  
251 they are probably the first folks that would want to check into this. Swimmers  
252 might be the third level of interest. Then there's also the people who live here  
253 consistently throughout the year or for particularly long seasonal times, like the  
254 people who are hired to be the lifeguards on the beach and along the beach  
255 would probably want to have access to this kind of information more readily.  
256  
257

258 5. Ms. Hellyer – Is the program being used in Foley Beach, SC now?  
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260 Dr. Porter – We have received funding from a couple of sources to help develop  
261 this beta-operational notification system for Foley. With the mayor of Foley, and  
262 getting to one of Chairman Ron's points, what was of interest was the fact that  
263 water quality is really good along our swimming beaches, but that's not what ever  
264 makes the news. The quality of the water being good does show up in the app  
265 we provide to people. We've come up with this terminology called "boutique  
266 applications." The mayor is interested in putting forth a good picture of what  
267 Foley has to offer in terms of water quality and providing guidance as to whether  
268 there's potential for riptide. This is a work in progress, unfortunately it's slowed  
269 down by the pandemic. We currently have north and south facing camaras on  
270 Foley Pier. That has been focus of developing the automated feature extraction  
271 algorithm so we can start to look at the clustering of people. One of the things we

272 did recently in both SC and FL with our webcast system was to monitor beach  
273 usage-during times when the beaches were opened and closed. There's a  
274 number of applications that are potentially developable using the funds available  
275 through our efforts, but we need the experts. We need residents there that are  
276 responsible for the health and safety of your communities to help us identify and  
277 define what those useable products are.  
278

- 279 6. Ms. Gray, CCU – It sounds like for example when you were describing the  
280 modeling process, you mention that it was tailored locally, but it sounds like  
281 you're using point source or spot data in order to create your model. Are there  
282 any dispersion aspects to it, for example you mentioned the picture with the kids  
283 and they were at a point? Does your model also include dispersion of the  
284 potential pollutants?  
285

286 Dr. Porter – It currently does not. We do some bio aerosolization studies<sup>1</sup> looking  
287 at what happens with sea breezes come across wastewater treatment facilities  
288 then what is dispersed. We are not doing the same thing for the waterborne  
289 issues yet.  
290

- 291 7. Mr. Hoke – How many of these things are automated so they're real time?  
292

293 Dr. Porter – In terms of the modeling or the data we are ingesting?  
294

295 Mr. Hoke – Data.  
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297 Dr. Porter – We assimilate real time data from a number of assets that are  
298 supported by SECOORA, we take advantage of the work Dr. Libes and her folks do,  
299 use their data, when we have access to it. We rely a lot on the national weather  
300 services and their NexRad<sup>2</sup> information that are available. So anywhere that there is  
301 a near-shore buoy, a pier-based system, an estuarine system, a weather station,  
302 etc., that's capable of delivering real-time data, we assimilated it and evaluate its  
303 utility to improving the output of our forecasting efforts.  
304

- 305 8. Mr. Adair – The target again, if I remember the presentation, was bacteria, we're  
306 predicting bacteria?  
307

308 Dr. Porter - Correct.  
309

- 310 9 Mr. Adair – And that's largely water and wind driven, correct?  
311

312 Dr. Porter – Yes.  
313

- 314 10 Mr. Adair – It would kind of hard to plan events ahead, like what Ms. Hellyer said  
315 earlier, around something if you only have a couple of days' notices of what the  
316 weather might be, based on the weather service and NOAA information, and all  
317 that. How long of a project is this? Would this effort be taken over by someone

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<sup>1</sup> Bio aerosolization or bioaerosols (short for biological aerosols) are a subcategory of particles released from terrestrial and marine ecosystems into the atmosphere. They consist of both living and non-living components including organisms, dispersal methods of organisms, and excretions. (source: Wikipedia)

<sup>2</sup> NEXRAD is a part of the National Weather Service under the NOAA. It is a system of NWS weather surveillance radars (including Doppler) under a joint effort of the US Departments of Commerce, Defense, and Transportation.

318 else later at some point and you move on to something else? Is it a pilot  
319 program?

320  
321 Dr. Porter- We have been working in this arena since about 2005 and we  
322 currently have in the bank another 5 years of funding to continue our efforts. We  
323 have a couple of proposal in that would extend it for at least another 7 years. So,  
324 between NOAA and NIH, we have a fairly stable funding base. We feel pretty  
325 secured in the funding for a number of years.

326  
327 11 Chairman Mask – Are we restricted because our pier isn't going to be done for a  
328 few years that we won't be able to put in any videos and monitors that would  
329 help?

330  
331 Dr. Porter – Not necessarily. To us, we just identify the to-be rebuilt pier as a  
332 potential placement area. What we need from you all and Dr. Libes and her folks,  
333 where are the best locations for us to put in anything. If we have additional  
334 funding for additional water quality stations and for cameras, what would be the  
335 best locations to do so. We're not territorial here whatsoever, if we have funding  
336 and we identify the best use of that funding is to work with Dr. Libes to manage  
337 the stations, or someone else. For our webcams, we had initially partnered with  
338 Surfline<sup>3</sup> and they were responsible for maintaining all the cameras that we put in  
339 place. We are looking for local partners for all of our efforts.

340  
341 9 Chairman Mask – What would be a partnership with Surfside Beach look like to  
342 you? What would be required of a city that wanted to work with you and see what  
343 we could develop that would be predictive and help us?

344  
345 Dr. Porter – What Katya said, we are not asking for money. We are looking for  
346 communities that are willing to work with us to better understand what we are  
347 capable of doing. Assessing how it may or can be a useful tool to meet the  
348 responsibility of your community and provide an assessment and evaluation.

349  
350 10 Ms. Hellyer - Are you working with MB or NMB or Garden City too?

351  
352 Dr. Porter- We are not working with Mayor Bethune at the moment. We had  
353 some initial discussions with them and literally we're just starting out small. We  
354 like working with small communities.

355  
356 Comment – Ms. Hellyer – We're small, we're only less-than 2 miles.

357  
358 Dr. Porter – I like to bite off small chunks at a time.

359  
360 11 Chairman Mask – What would be a proposal? Well if you say you want to work  
361 with us, here's what we'd like to do for the next 24 months. What would you be  
362 doing?

363  
364 Dr. Porter – Depending upon the total funding we have available, ideally, I would like  
365 for us to be able to find a location that you all deem as the best place for us to  
366 enhance what we are already with the Nowcast in the area. Be able to install

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<sup>3</sup> Surfline is a company and website based in Huntington Beach, CA that specializes in surf forecasting and surf reports, like webcasting, etc. Ar surfing organization since 2003, it has taken on buoyweather.com and fishtrack.com. It offers streaming cameras at 150 surf breaks. (Source: Wikipedia)

367 cameras and walk-through the development the applications that you all think are  
368 valuable variety of methods.  
369

370 12 Chairman Mask – Would we focus on sites that have a little bit of bio-problem?  
371

372 Dr. Porter – I would really leave the site identification up to you all. So, when we  
373 were working up at the Outer Banks and other parts of NC, they identified a number  
374 of locations that they felt were of highest interest. And we went out and began to  
375 determine whether or not there was a rich history of monitoring data and real-time  
376 data available that would allow us to move forward with our efforts. It was a multi-  
377 step process but we start with those who are most intimate with their geographies  
378 and ask you all where do you want us to focus on.  
379

380 13 Chairman Mask – If we gave you a stretch of beach or some specific sites,  
381 particularly where there was an outfall of stormwater, or something like that or if  
382 we had an interest of what happens there and how it varies, right?  
383

384 Dr. Porter – We would start both, which ever you are able to provide.  
385

386 14 Chairman Mask – Okay, we are a pretty small. We're almost a site here but we  
387 have several sites in it. I don't know where we're going to go with this but it  
388 certainly seems interesting as a concept long term. It certainly has some value to  
389 be able to give people a projection of what water quality is and not just from the  
390 "oh, we'll tell you when it's bad," but literally telling them when it's good. So, it  
391 would be of interest to us, I think, in general but specifically, I'll ask John Adair,  
392 our city works manager. John, do you think we need to sit down and talk about  
393 this a little bit? What are your feelings now?  
394

395 15 Mr. Adair – I think the initial proposal that Katya sent to us was looking in some  
396 sort of the letter of support. What was the purpose of that?  
397

398 Dr. Porter – We recently had to recompetete for the SECOORA. As part of the  
399 recompetete package, we were soliciting letters of support from those we were  
400 already working with and in NC, SC, and FL, as well as, potential new partners.  
401 That recompetete is already in and we should hear in the next couple of months as  
402 to what level of funding it'll come back at.  
403

404 16 Mr. Adair –At this point, for Surfside Beach what you are looking is a commitment  
405 to provide a spot to put monitoring equipment?  
406

407 Dr. Porter- A commitment may be too strong a word, but an interest in better  
408 understanding what we're able to work with you to provide and a willingness to  
409 assess, provide commentary, criticism, *etc.*, of what we are proposing to do.  
410

411 17 Chairman Mask- Would you like a letter expressing that, is that what you are  
412 looking for?  
413

414 Dr. Porter – No, at this point we don't need anything along those lines. We are  
415 perfectly fine with a gentleman's agreement that this may be of interest to you all.  
416

417 Mr. Adair – The Stormwater Committee would make a recommendation to our town  
418 Council. I would come back to you with the blessing of our Town Council to proceed.  
419 If the Stormwater Committee is amendable to that then Chairman Mask would have  
420 to get a recommendation to Mr. Adair.



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Chairman Mask – Okay, then let's take that up with the group shortly. I think that would be good.

18 Chairman Mask – Asking if anyone has any questions that haven't been answered at this point?

Dr. Porter – Offers that if the SWC has questions, concerns, don't hesitate to be honest with us. Let us know what you are thinking, good, bad or ugly.

19 Chairman Mask – I have a question that irritates me because quite often we've had problems in our swashes where the level has been high for a day or two and it goes away for a long time. I'm curious. Is there a way that we can monitor that more accurately? We're testing the water that's flowing down into these swashes on a biweekly basis, but we don't really have a good way, John correct me if you think I'm wrong, we don't really have a good way of telling what days are going to be really bad in the swash because it depends on the water flow among other things.

20 Dr. Porter – Just a question out of curiosity, over the years for the past three decades we've done a lot of work over in Murrells Inlet looking at bacterial source tracking to determine what is the contributor of the bacteria in receiving waters. Have you done any similar bacteria source tracking in your ponds and impoundments?

Mr. Adair – Not with genetics, but I do know Eric Johns did a Big Pond Study, pretty well-known, up and down the ponds of this area. He had equipment in our Dogwood Lake for a couple of years, I believe that was the intention of that program, to see what was coming into and out of the ponds. Largely what we found was that it was environmental. We paid for a couple of individual incidents of PCR testing with Susan Libes and the bacteria came back as non-human, mammalian bacteria in a couple of samples we tested a few years ago. I'm pretty confident that most of our bacteria that washes out to the ocean is based off of terrestrial sources, like birds and wildlife.

Dr. Porter – And pets, a big contributor.

Mr. Adair – And pets with waste stations all over the place with doggy bags. There's been plenty of times where the testing we've done at our lake outpolls, the two locations from the volunteer monitors, they take a clean reading, then DHEC will take a hot reading the same day 400 yards in knee-deep in the ocean, which means there's something that's flowing by, It isn't something that didn't necessarily come off the land. It might have been something that got discharged in Murrells Inlet and came up the coast, depends on how the winds are blowing. There was also a sign of the oxygen problems they were having in the near shore waters. Some of that hypoxia<sup>4</sup> was a result of inbound winds.

Comment-Dr. Libes – I've got one more offender on my list of sources and that's urbanized wildlife. That includes the raccoons among other things that really have exploited food sources. What we are doing in managing this, like the way we keep the lids down on the garage pails, is very important. So, I think rather than pets, I

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<sup>4</sup> Hypoxia is a condition in which the body or a region of the body is deprived of adequate oxygen supply... (Source: Wikipedia)

472 stay focused urbanized wildlife. The other point that I wanted to make here is that,  
473 and we'll see that in the Surfside volunteer monitoring report, when it rains, we can  
474 be fairly confident that there's going to be increased bacterial levels. From that  
475 standpoint, we understand the importance of Stormwater runoff in running this show.  
476

477 21 Dr. Libes - Do all the high values come with stormwater runoffs? No. As Mr. Adair  
478 is pointing out, birds look like they can be point discharge there, but a lot of the  
479 story comes from the rainfall. There is a bigger issue down there at Myrtle Lake.  
480 Mr. Adair can talk about spending a large amount of time trying to manage the  
481 source down there. That site has chronic elevations of bacteria. Do you want to  
482 address that one Mr. Adair?  
483

484 Mr. Adair – The 300-some acres that Myrtle basin comprises, the lake isn't really  
485 large enough to drop that out like the Dogwood system is. There are a lot of  
486 canals and ditches, various feeds from the north, south and west that go into  
487 Myrtle Lake.  
488

489 Dr. Libes – Oh, I thought you were going to talk about the waterfowl.  
490

491 Mr. Adair – Well the waterfowl certainly plays a big part of it. You've got 25 geese  
492 in a one-acre pond.  
493

494 Mr. Petree – Plus ducks.  
495

496 Mr. Adair - And people love geese.  
497

498 Chairman Mask – We have a couple of waterfowl feeder problems at that lake.  
499

500 Mr. Petree – Yes, we do.  
501

502 Dr. Libes – There's signage posted there and Mr. Adair, I just wanted to give you  
503 credit for trying to manage that wildlife and the domesticated waterfowl too. It's  
504 just been a long-term challenge. I think we understand what's going on there, it's  
505 just a challenge.  
506

507 Chairman Mask – It is. I just made a 4-year old cry by telling him he couldn't feed  
508 the geese anymore. It's a tough thing. It's a great tourist thing to feed bread to  
509 the geese. There's so many of them that live here permanently because of that  
510 that we really have to keep working on that.  
511

512 22 Ms. Hellyer – I think also a big contributor just in the geese population situation is  
513 that we've had an incredibly mild winter now for several years. To me, I have  
514 personally observed, because I live off of Lake Elizabeth, the geese population  
515 has probably grown three and four-fold because each pair has started with two or  
516 three goslings around them now can have six and seven. That are part of their  
517 pack. So, we're seeing higher and higher numbers of these geese propagating  
518 and living here, and they are not type to fly back to Canada or go down to FL,  
519 they stay here.  
520

521 And then, to compound that there are a lot of our residents who feel they have an  
522 obligation to feed the geese and that they should be protecting them and that  
523 they are wonderful creatures that should be allowed to roam wherever they want  
524 to roam and be as large or as many as they want to be. Coming from a  
525 conservation background in biology, you don't want an overload of geese like you

526 don't want deer and racoon or any other wildlife species. The signs are not as  
527 effective. People literally walk around thinking there is nothing to it. When our  
528 officers do enforce it, the offender gets slapped a hefty fine. The officers are  
529 looked as the culprit and not the protector of the water quality and the quality of  
530 life in general. On the same token that we have people protecting geese, we  
531 have property owners who are disgusted with it them and all the damage that  
532 they do and concerned the water quality is going down and they can visibly see  
533 it. That's a whole other area besides, to look at, and consider outside of  
534 stormwater not just water quality, in general.  
535

23 Chairman Mask – It is a big problem for us, and it's certainly an impact on the  
536 bacteria in the lakes, but in this point, it isn't impacting the decision we want to  
537 make with the folks from USC regarding participation in the nowcasts and the  
538 beach programs. Why don't we wrap this up? It's been a great presentation.  
539 You've really cleared the air on what it is your offering and we'll have to have a  
540 little discussion very shortly and get back to you with our intent with what we can  
541 do with you, but I think you've made a very favorable impression. It would still be  
542 worthwhile for us to discuss it as a separate topic and get back to you. Is that  
543 okay with you?  
544

545  
546 Dr. Porter – That is absolutely fine with me. Is that okay with you Katya, you're  
547 the one doing all the work.  
548

549 Ms. Altman – Absolutely, Yes. Thank you for your time.  
550

551 Dr. Porter – Yes. Thank you very much for your time. Susan, it was great seeing  
552 you again. I will get off here so you all can move on with your meeting. Let me  
553 know if you have any further questions.  
554

555 Chairman Mask – Thank you for putting up with a virtual meeting, it's been very  
556 convenient for everyone. We were all a little worried about it.  
557

558 Mr. Petree – Everyone, stay well.  
559

560 Ms. Hellyer – We've had more people on this meeting than we've had in person.