

## **Albemarle-Pamlico National Estuary Partnership SAV Team**

**WebEx Meeting  
10:00 AM – 12:00 PM  
March 23, 2018**

Meeting Notes by Tim Ellis

### **Participants:**

Rob Emens (NCDWR)  
Drew Gay (NCDWR)  
Matthew Duvall (NRCS)  
Patrick Gillam (NCDMF)  
Jessie Jarvis (UNC-W)  
Joe Luczkovich (ECU)  
Shane Staples (NCDWM)  
Anne Deaton (NCDMF)  
Dean Carpenter (APNEP)  
Tim Ellis (APNEP)  
Jimmy Johnson (APNEP)  
Bill Crowell (APNEP)

### **Agenda/Notes:**

The purpose of this meeting was to discuss upcoming control measures for invasive SAV species in Kitty Hawk Bay by the NC Aquatic Weed Control Program. Agenda items included the review of available survey data from the area collected by ECU and NCDWR, a discussion of the 2018 plans for herbicide treatment of Eurasian watermilfoil in KHB, and a discussion on the need for additional SAV monitoring in KHB. Prior to the meeting, a brief summary document on this issue was sent to the team, along with the 2018 workplan recently approved by the NC Aquatic Weed Control Council. These documents and other supporting materials from this meeting are available through the team's Google Drive.

10:03 AM - Meeting started.

Team members were asked to introduce themselves since Rob Emens and Drew Gay were new to the group.

- Rob is the manager of the NC Aquatic Weed Control Program and has agreed to officially join this team.
- Drew works with Rob.

- Matt Duvall works with the Soil Science Division of the Natural Resource Conservation Service (NRCS), an agency of the USDA.
- Affiliations for other participants are listed above.

Dean provided a brief overview of the issue and why we are having this meeting. There is a high abundance of aquatic vegetation in Kitty Hawk Bay that has become problematic for residents in that area. The town of Kill Devil Hills has reached out to Rob for guidance and support in removing invasive Eurasian watermilfoil that is preventing boaters from accessing a public ramp and private docks. Through initial discussions with Anne Deaton and NCDMF, it was recommended that the SAV Team have an opportunity to meet with Rob to discuss his treatment plans for the area and potential impacts to the sentinel site in KHB. Note: Prior discussions on this issue from 2017 and 2018 are included in the summary document distributed to the team prior to today's meeting.

Rob stated that Eurasian watermilfoil has been in the sound since at least the 1970s. For the most part, it hasn't greatly impacted recreational uses of the water but it does flare up occasionally and cause some localized problems. Prior to last year (2017), the last time Rob recalls such high density of Eurasian watermilfoil was about a decade ago (2008) in KHB. They did some limited (< 10 acres) herbicide treatment in KHB during that time and have since been annually treating about 1 acre around the WRC (Avalon) boat ramp. The intent was to remove it in the immediate vicinity of the ramp to help stop boat trailers from transporting the plant elsewhere.

In August of 2017, Rob was contacted by the town of Kill Devil Hills to come assess the situation. Rob found lots of Eurasian watermilfoil in the area that was topped out (i.e., canopy at the water surface) and in bloom. He had not seen the plant in bloom previously. Boating and other recreational use was clearly impacted in this area, as most home owners along the shoreline south of the boat ramp have docks and couldn't navigate out to the channel for access to the rest of the sound.

Drew reviewed his proposed map for two separate herbicide treatments (see Appendix Fig. A1). This was done in coordination with the vendor to help determine the amount of the herbicide that would need to be purchased. The green polygon is the area around the boat ramp (4.8 acres) and the red polygon is the area in the immediate vicinity of private docks along the shoreline south of the boat ramp (20.2 acres). Rob clarified that the town didn't specify where to treat but was looking for help from the state on how best to deal with the situation. Rob and Drew came up with this map as a couple of possible treatment scenarios to help start the conversation.

Anne asked if Rob has determined what the species composition of SAV is for this area. Rob replied that last year it was mostly Eurasian watermilfoil but *Ruppia* was also common. Rob stated that he is not an expert in estuarine macrophyte composition and can recognize a handful but not all of the SAV species that may have been out there.

Joe began discussing his monitoring efforts in KHB and noted that there is certainly dense SAV in this region (see Appendix Fig. A2-4). For the sentinel site located in the northern corner of KHB, Eurasian watermilfoil is not the only species present; at least 50% of the SAV present was *Ruppia*. Joe noted that *Ruppia* is an important habitat and food source for aquatic fauna and waterfowl. Joe stated that the question of how to manage this important habitat around conflicts with recreational uses (e.g., boating and swimming) is not just a problem for KHB but also for freshwater lakes everywhere. He mentioned that there are mechanical techniques (mowers) for removing or thinning dense areas of SAV. He asked Rob if there has been any consideration for using mechanical harvest of SAV in KHB as opposed to herbicide treatment (e.g., cost comparisons).

Rob has not looked at mechanical harvest as an option here and he doesn't know of any mechanical harvesting that is used in NC to managed aquatic vegetation. The main reason is that most of our large bodies of freshwater are reservoirs and inherently have a lot of stumps (i.e., hitting stumps with a harvester damages the equipment); companies that do mechanical harvesting don't want to do any business in NC because of this. Rob acknowledged though that there aren't stumps in KHB, so the situation is different from his reservoir example.

Joe also noted the lack of stumps in KHB, but pointed out that there are stumps elsewhere in Albemarle Sound but those areas tend to lack SAV. He thinks that given the size of KHB, it wouldn't be hard to entice a company to come in and mechanically harvest the SAV. This would also present an opportunity to acquire seeds from desirable SAV species like *Ruppia* for use in restoration efforts. Joe noted that outside of KHB, it is uncommon to find large dense areas of native SAV in Albemarle Sound. Joe also noted that if most of these houses in the area are on septic then the rapid growth of SAV in the area is likely facilitated by high nutrient input. If so, then using herbicide is comparable to treating the symptom but doesn't address the root cause (i.e., you will have to keep treating repeatedly). As such, Joe proposed that perhaps mechanical harvest is cheaper once you invest in the equipment. He suggested that the town buy a mower and that dock owners buy something similar.

Anne clarified that the public is not allowed to remove a public trust resource like that. It must be a state agency that does the eradication effort. She noted that there was an instance (Southern Shores) where a "licensed applicator" could spray herbicide, but the public can just mow the SAV.

Jessie noted that she has been on those mechanical harvesters before and found that they collect a lot of material. If someone was to try to acquire seeds from this material then there would need to be facilities for storing it, as the seed separation process would take some time. She noted that several studies have considered this for the Chesapeake Bay restoration efforts.

Joe agreed and noted that he sees this as a long-term problem, so considering other options besides just herbicide is important. There was some review of Joe's change-detection analysis at the KHB sentinel site with the point made that SAV is expanding at that site (at least between the two years compared).

The team reviewed sonar data collected by Rob and Drew from KHB (see Appendix Fig. A5-7). Areas in red were where Eurasian watermilfoil was topped out (i.e., flowering 2-3 inches about the water). Rob noted that due to the size of the area, they didn't focus much on species composition but instead tried to get a good estimate of biovolume (i.e., took considerable time to run all the sonar transects). Rob noted that like Joe pointed out, there was more open water north of the ramp and heading up to the sentinel site.

Joe asked what the long-term plan was for treating Eurasian watermilfoil in this area and elsewhere. He stated that Eurasian watermilfoil is present at the sentinel site as well and will only spread back to the southern areas of the bay that Rob is treating.

Rob agreed that it is not recommended to try to completely eradicate Eurasian watermilfoil from the bay, which would take a tremendous amount of resources, because it will just be reintroduced to KHB at some point from other parts of the sound. He reiterated that his history with Eurasian watermilfoil in KHB is that it flares up about every 10 years. He acknowledged that he can't predict what the future may hold but his hope is that they wouldn't have to treat this area every year.

Joe asked Rob if he plans to survey again this summer with the BioBase system before spraying.

Rob replied that the treatment prescription would be based on what they saw last summer. He noted that in the past, there has been a shift back to other species after they treated for Eurasian watermilfoil, but that the timing of the treatment is critical to achieving your efficacy goals and maximizing your investment in the herbicide. Earlier in the growing season, there is less biovolume and the herbicide is more effective; later in season requires too much herbicide to combat the high biovolume.

Joe agreed that treating earlier in the growing season was best, but also recommended surveying again with the BioBase system prior to treatment to get the best information on before/after effects of the treatment. Joe asked what specific herbicide will be used in KHB.

Rob stated that in the past they have used 2,4-D (aquatic granular herbicide) under the product name of "Navigate", but are considering a similar product, "Sculpin G", for this treatment.

Joe asked if other state agency folks on the call would comment on the policies regarding the use of herbicides.

Anne stated that NCDMF has no policy because they are interested in protecting and increasing SAV, so they would prefer to limit herbicide application. She noted that NCDMF works with Rob and traditionally he has limited his activities to where it is a problem, such as around a boat ramp. Anne stated that she sees a couple of opportunities here: 1) Have a group of volunteers do some outreach with the KHB community and talk to the town and residents in the area about the value of SAV, and 2) Just do the minimum treatment required for boats to get in and

out of the ramp. She noted that given that Eurasian watermilfoil is mixed in with native SAV species and that juvenile fishes are using all the SAV, the state hasn't historically approached Eurasian watermilfoil like it was an invasive monoculture. Anne expressed concern that spraying around the private docks here would set a policy precedent where everyone would start wanting the state to come in and remove SAV from around their property. She also agreed with Joe's earlier point regarding the potential for nutrient enrichment in this area from failing septic systems. **Anne will contact J.D. Potts with the NC Shellfish Sanitation and Recreational Water Quality Monitoring Program to see what data from stations in that area may tell us.** She thinks that dense SAV has been in KHB for a long time and asked Rob to confirm.

Rob stated that from his observations, which are annual over the last decade, the density seems to vary from year to year. In his conversations with locals, there do seem to be years of very high growth that impact recreational use of KHB, and this has been occurring at least back to the 1960s and 1970s. Rob noted though that the extent of Eurasian watermilfoil that he saw last year was greater (by 4-5x) than anything he has seen in the last 10 years, including the last time there was very high growth of Eurasian watermilfoil (~2008-2010).

Joe mentioned that he was just now looking at documentation on Sculpin G and seeing that Eurasian watermilfoil is more susceptible to it than other SAV species. He asked if we know how *Ruppia* responds to this specific herbicide.

Drew responded that he has been working with the manufacturer to determine the right amounts they will need but he has not asked them about the impact of the product on other native species of SAV such as *Ruppia*. **Drew will contact the company on this to find out more.**

Joe asked what the plans are for the amount of herbicide that will be used.

Drew responded that they plan to use the maximum amount per acre recommended by the manufacturer because of the dilution effect with open water outside of the treatment area. The depth around the boat ramp is about three feet. Drew and Joe were referring to Table 4 of the Sculpin G documentation available online.

Rob noted that this is a challenging place to do an herbicide treatment.

Joe asked about the impact to drinking water and noted that the herbicide label recommends a setback distance. He asked if there should be concern here for groundwater and well-water supply.

Rob clarified that what Joe was reading on the label only applies if there was a surface water intake nearby; groundwater is not applicable here.

Joe asked Rob what the opinion of residents in the area, excluding the dock owners, were to the use herbicide and has that been considered here.

Rob replied that he works with the local governments as the cooperator on these types of projects, so he relies on them to deal with issues with the public like the one Joe was asking about. Since it is their community, they are better able to gauge the opinions and wishes of the residents. Rob noted though that the town is required to do all of the postings prior to an herbicide treatment. These posting requirements are stated on the herbicide label and pertain to any restrictions on use of the waters that were treated (e.g., closed to swimming, fishing, and uses).

Joe noted that the label also states that the water should be tested for 2,4-D at 21 days after treatment, and he wondered if the state was requiring the town to do that testing.

Drew replied that this only pertains to treated areas that also serve as a drinking-water supply, which is not the case here in KHB.

Joe noted that this area is a popular area for duck hunting. Ducks feed on *Ruppia* and Joe asked if there was concern here with 2,4-D getting into the food web.

Rob replied that this is not a concern at this level of treatment, as it is a small area that they are proposing to treat.

Joe noted that he is only a consultant in this project but is interested in what will happen. He encouraged the state agencies involved to educate the town on all the concerns expressed in this meeting, since it is the state that is recommending an herbicide treatment to the town.

Jessie followed up on Anne's earlier comment about the policy precedent being set here, and asked Rob if other municipalities have reached out to the Aquatic Weed Control Program for assistance with control of SAV.

Rob elaborated more on the history of the project in KHB. He noted that the town of Kill Devil Hills wanted the town of Kitty Hawk to the north to join in on this project, recognizing that Eurasian watermilfoil was along the shore throughout KHB and could easily spread back to any areas that were treated. Previous treatments by Rob in the area around the ramp were right near the jurisdictional line, but Kitty Hawk wasn't interested in treatment during those efforts. Rob doesn't know the current status of communication between the two municipalities regarding the planned treatment for 2018, but he has only been working with the town of Kill Devil Hills. Rob recognized that having a policy precedent established by this project is a valid concern.

Joe noted that he and his students regularly interact with the public when they are out monitoring SAV. The general opinion of the public they encounter in KHB is that SAV is a nuisance and needs to be reduced, so Joe understands why the town is seeking the state's help on this. Joe further stated, however, that there are other uses of the bay (e.g., commercial fishing and duck hunting) that rely on the SAV as wildlife and fish habitat. Joe stressed that all

uses needed to be considered here. He noted that by setting a precedence here for herbicide treatment around private docks, other municipalities in the area will likely follow suit and this practice could eventually spread to other areas along the coast. Since the APNEP Comprehensive Conservation and Management Plan has actions to protect and restore SAV, such a precedent would go against APNEP's mission.

Dean agreed and asked to revisit Anne's earlier comment about outreach. He wanted to know if there was an interest in having a workshop in that area to engage the public on this issue.

Shane noted that when this issue of KHB was brought up at the recent meeting of the Aquatic Weed Control Council, it was presented as being just a treatment around the boat ramp. He thinks that is easier to justify than for extending treatment to around private docks as well. Shane noted that in the permitting process for building docks, they recommend smaller platform sizes, specifically with the purpose of reducing shading and associated negative impacts to SAV. Spraying herbicide on SAV around docks goes against this conservation principle taken with the building docks. Shane also mentioned another potential conflict of this with existing rules that prohibit dredging through Eurasian watermilfoil because that is recognized as destruction of habitat. He noted that if herbicide treatment is allowed for purposes of opening navigation, then it will be hard to justify why dredging for the same purpose isn't allowed.

Rob stated that there is a distinction between removing SAV and treating an invasive plant. In this case, treatment also serves to reduce the impact of the invasive on the native SAV community.

Anne replied that we don't have good information on species composition at this site, and this is something that needs to be established before treating the proposed areas with herbicide outside of the boat ramp.

Rob asked Anne if there were existing surveys conducted by the NCDMF to determine SAV species composition.

Anne clarified that the agency doesn't have such a survey but that they are part of this APNEP SAV Team that is developing monitoring protocols for SAV, how best to gather information on species composition. She stated that she and her staff would be willing to visit the site and run transects to determine what species are there.

Drew and Rob clarified that they do make in-field decisions as an applicator when they visit the site. Based on what they see at the time, they will decide if to treat all the area as planned or just part of the area. In some cases, they may even delay treatment for a couple of weeks to be at more of an optimal time during the growing season for treatment efficacy. Rob emphasized though that there is a great deal of planning involved in developing a treatment prescription, so they must use the 2017 survey information to propose areas to treat and to determine the type and amount of herbicide to order. The purchasing process alone takes a month, so if they

waited to order the product until after they visit the site then they will miss their optimal treatment window. Rob noted that in past treatments of the boat ramp area, they ended up having more herbicide than they needed because they thought they would be treating areas away from the boat ramp as well. However, given that Eurasian watermilfoil wasn't a persistent problem in these other areas each year, they limited their annual treatments to the immediate area around the boat ramp and stored the excess herbicide on site, using it up over about a 5-year period (2010-2015). Rob reiterated that they are interested in treating the invasive species and not removing SAV; if Eurasian watermilfoil doesn't have a dominant presence in the SAV profile, then they are not going to put out herbicide. He elaborated that on the day of the treatment, they do rake tosses to determine the amount of Eurasian watermilfoil in the area and the condition of the plants, and base the herbicide application on that.

Joe asked for more details on the rake-tossing procedure (e.g., number and distribution of tosses).

Rob replied that they do take samples across the whole target area, but there is a balance between time spent on analysis and time left for treating the area, all in the same day.

Dean recommends establishing a second sentinel site in this area that Rob and Drew have surveyed to get before/after information on treatment effects. This would need to be done in the spring prior to the optimal treatment window of May/June.

Joe agreed and clarified that his sentinel site further north would serve as the control and this new sentinel site would provide information on treatment effects. He suggests just replicating his sampling protocol for the site in the north at this new site, but the logistical concern is having the resources (people and equipment) to do it. Joe is willing to help coordinate that.

Dean asked if this could be done before the time when Rob needs to purchase the product.

Joe stated that he couldn't do it until into May when classes are over, but that his impression is that Rob and Drew will be making their order based on their 2017 survey of the area. If so, they can go ahead and place their order now and then begin their treatment as soon as this new sentinel site has been established (sometime in late May).

Shane asked if this herbicide was species-specific or if it was going to affect all SAV species in the area.

Rob stated that 2,4-D is an auxin mimic that is typically used as a selective herbicide because it specifically targets dicots. Any broadleaf plants are susceptible to 2,4-D, whereas the grasses (monocots) aren't nearly as susceptible.

Shane asked for further clarification if native SAV species like *Ruppia* would be impacted.



Rob thinks it would be a valuable exercise to do a literature search to see what sensitivity *Ruppia* has to 2,4-D.

Anne asked for clarification that Eurasian watermilfoil is a dicot and *Ruppia* is a monocot.

Jessie and Rob confirmed this to be the case.

Joe just searched Google and found a 1999 honors thesis from UNC-W by Daron Crew (under Michael Durako) looking at the impact of 2,4-D on *Ruppia*. He asked Jessie to get in touch with Michael Durako and find out more, since there is no abstract shown. Jessie will look into it.

Rob stated that based on his past observations, *Ruppia* seemed to recover quickly after the treatment.

Joe mentioned that he just found another bulletin online from NCSU by S.H. Kay in the Crop Science Department.

Anne stated that she will have to leave the meeting shortly but wanted to clarify that even though the definition of SAV that NCDMF has in its rulebook (NC Coastal Habitat Protection Plan) states they are not to conflict with the Aquatic Weed Control Act, she only supports doing this around the public boat ramp and maybe a small part of the other areas for the purposes of the study. She would like to talk with Lee Paramore and/or other fisheries biologists in that area before providing a more definitive response to this proposed project. She noted that many of the low-salinity SAV species in that area are likely dicots, so we really need to know what species are present before moving forward with an herbicide treatment.

Rob agreed with her assessment and thinks it's a good idea to talk with biologists from the region for their input. He noted that this map of proposed treatment areas was just their first stab at responding to a request from the town of Kill Devil Hills for assistance, but they needed to bring others into the conversation because folks like the members of this APNEP SAV Team are the experts on this particular habitat.

Joe asked Anne if the rules allow for the town to be permitted to do mechanical harvesting, as opposed to a private homeowner.

Anne will have to check, as they have never had that type of a situation. Other activities like dredging and clamming aren't allowed in SAV, so she is unsure how this situation fits into all of that.

Joe stated that there seems to be a difference between high-salinity SAV and areas like KHB where these invasive species can take over.

Anne noted that the NCDMF has never considered Eurasian watermilfoil as highly invasive because it does support fish and mixes in with native SAV species while not overly impacting the health of those native species.

Shane elaborated on Anne's point that when NCDMF does permitting, they recognize that Eurasian watermilfoil is mixed in with native SAV species and generally equate that the habitat function is the same. One exception would be *Hydrilla*, but in those cases, it was a monoculture and there were no native SAV species for miles along the shoreline in either direction. He noted that there have been several requests for dredging operations to facilitate the building of boat ramps in KHB and other areas of the Outer Banks, where there is a limited number of boat ramps. In those requests, they've given SAV protection regardless of species since Eurasian watermilfoil is almost always mixed with native SAV species.

Anne asked for Dean's thoughts and he stated he is supportive of treating the area around the boat ramp. Shane agreed and reiterated that his understanding from the Aquatic Weed Control Council Meeting in February was that the scale of the treatment would be limited to the boat ramp and areas just outside of that required to access the ramp. Dean also thought it was fine to treat a portion of the proposed area south of the ramp as a test case as long as a new sentinel site could be established there to monitor before/after effects.

Rob stated that he is supportive of creating a sentinel site in this area but that he can't commit the resources of the Aquatic Weed Control Program towards leading that effort; however, they could cooperate in those efforts. He asked how much of the area would be encompassed by a sentinel site.

There was some back and forth debate on this but about half of the area that Rob and Drew surveyed in the 2017 would be covered by a sentinel site (i.e., 1000 m X 500 m).

Drew directed us to a different BioBase image that overlaid his proposed treatment polygon with the biovolume transect data (see Appendix Fig. A5-7). This revealed that the proposed treatment area was only a small portion of the area that was surveyed. Drew explained that the costs to treat the proposed area is about \$9K but it would be in the \$100K+ to treat all of the heavily-infested areas (red on the map). Their intent is to just provide some relief to those waterfront home owners.

Dean asked if they anticipate their treatment impacting the SAV outside of the proposed area.

Drew does not since they will be concentrating their application to around the docks, with the anticipation that the herbicide will drift to the outward edge of the proposed target area.

Matt clarified that the length of the proposed area around the docks is about 1000 m and the distance from shore to the outer edge of the area surveyed is about 500 m.

Joe noted that the granular nature of this herbicide may just result in effects localized to the treated area and that there may not be any impacts detected elsewhere in a theoretical sentinel site for the area. But he is still supportive of creating a sentinel site here and monitoring it and the more northern site both before and after the treatment. Joe reiterated that most of what he saw at his sentinel site, including at the surface, was mostly *Ruppia*. The team looked at various photos Joe had taken from the site (see Appendix Fig. A8-9).

Dean noted that he likes the idea of exploring mechanical harvesting options (e.g., cost and effectiveness). Joe agreed to look into it. Dean asked if mechanical harvesting is done in Chesapeake Bay. Jessie suggested talking with Brooke Landry, Maryland DNR biologist and chair of the Chesapeake Bay Program SAV Workgroup, because sometimes they control for Eurasian watermilfoil up there by mechanical harvesting.

Shane stated that he would have to leave the meeting shortly but wanted to summarize his final thoughts on the issue. He thinks the treatment should be limited to just around the boat ramp and with monitoring to determine impacts. He noted that if it turns out that applying herbicide knocks back Eurasian watermilfoil and allows the native species to thrive, then maybe there is more of a positive outcome to this than he sees right now. However, if treatment reduces all SAV and diminishes fish habitat in the area, then that is a major concern.

Dean asked to hear from others in the group as well, particularly those that haven't spoken much during the meeting.

Matt stated that he wasn't sure that it was his place to provide an opinion on this issue. The NRCS mission is to provide technical assistance with voluntary conservation measures. From his standpoint, he is probably most concerned with ecosystem function, but he does appreciate the value of the human perspective and the recreational objective as well. Matt is happy to be part of the solution regarding pre/post monitoring. He doesn't have a boat but can offer his time and labor in the field. He prefers to leave any decision on this issue with others whose agencies have more explicit objectives.

Tim noted that we have run out of our allotted time for the meeting. He reviewed a list of action items (see below) that the team can address further through email. Tim expressed concerns with the short turnaround needed to establish and survey a new sentinel site, given that Rob and Drew need to order their herbicide in April in preparation for treatment as early as May.

Joe thinks there is chance to get out there in early May. Dean asked Joe to send him dates in early May when he may be able to complete this work, so that APNEP can help assemble a team to assist him. Joe said he will do that but expressed concern that he already has a busy schedule in May and isn't sure if he can work in this extra sentinel site. Joe noted that he has a contract with APNEP to do sentinel sites in Albemarle Sound, so this will have to somehow count towards fulfilling that contract. Dean acknowledged that he would work with Joe on that.

Rob asked for clarification on what areas of this new sentinel we would like to have treated (i.e., just the target area that he and Drew had originally proposed or other portions of the sentinel site as well, such as the red areas with heavy infestation of Eurasian watermilfoil).

Tim noted that the confusion here for Rob likely is due to how we have been referring to sentinel sites, which theoretically were established to monitor natural change in SAV (i.e., no direct human intervention on SAV species abundance/distribution). Originally, Anne and others had expressed concern to Rob about the potential impacts of applying herbicide in KHB on the established sentinel site that was north of the proposed treatment area. Now we are suggesting creating a new sentinel site to be directly impacted by the treatment prescription, so that we can assess before/after effects of the herbicide on species composition and biovolume. The team clarified that only the proposed target area is to be treated and no other portions of the new sentinel site.

Anne suggested that this supplemental sentinel site doesn't have to be as large as the other sentinel sites, since time and resources are limited.

Joe replied that the portion they are proposing to treat is the shallow areas along the shoreline, so monitoring the length of that portion, which is about 1000 m, is important.

There was some back and forth discussion on why areas were selected for treatment that have little to no survey information (i.e., too shallow for sonar to work accurately). Rob explained that from an application efficacy standpoint, the areas closest to shore will have the best results because that is where exposure time is the longest. As you move further from shore, the herbicide is less effective due to dilution and less exposure time.

Joe asked what the intention of this project was in terms of service to the public. It appears to him that the proposed treatment prescription only opens up some areas immediately around a few homeowner's docks, but once they leave the proposed treatment area, they are right back in dense SAV.

Rob replied that the intent is to create an alley connecting these dock owners to the public boat ramp where there is less SAV and more open access to the rest of KHB. Joe understood and acknowledged that it does appear that motorboat use at the ramp has contributed to removal of SAV around the ramp (i.e., prop removal...green and blue areas of the map). He suggested again that the state and the town consider mechanical harvest for keeping navigation channels open, since that is the real intent of this effort and not the eradication of Eurasian watermilfoil from the area, which isn't feasible anyway without a lot of expense and herbicide. Joe cautioned again about the precedence this is setting for estuarine SAV policy up and down the coast (i.e., homeowners in other areas will likely come to the state asking for the same services to clear SAV from around their docks).

Anne noted that the one exception here is that they are treating Eurasian watermilfoil, which is an invasive. She thinks the only justification for treatment outside of the public boat ramp is that it allows for the study of the effectiveness of herbicide in reducing the invasive while minimally impacting the native SAV. If there is a positive benefit to be gained here for the native SAV, then we need to find out.

Tim reminded the group that Rob explained earlier that his program exists to control invasive aquatic plants; they are not interested in removing native SAV. They are responding to a request from the town of Kill Devil Hills to provide some assistance with dealing with Eurasian watermilfoil and the problems it is creating for boating in the area.

Jimmy asked who was paying for this herbicide treatment.

Rob replied that it is a 50:50 cost share with the town.

Shane noted that it will be interesting if this treatment knocks back Eurasian watermilfoil and then *Ruppia* becomes dense like it did in the sentinel site further north. He suspects that the town and residents still won't be happy with the results of the money they spent.

Jimmy asked Rob how much political pressure there was to do this treatment.

Rob said zero. He told the town that his program would help, so he imagines there may be political pressure if they tell them they aren't going to help.

Rob asked that since we are planning to establish a new sentinel site here, would it be better to only treat half the proposed area, which allows one half to be a control.

Joe disagreed because by looking at the survey that was done in 2017, it was too shallow for them to do sonar in the upper half of the proposed area versus the deeper lower half where they did get sonar data. That is a flawed experimental design in terms of pre/post monitoring of control versus treatment. Since we have run out of time, **Joe recommends that we debate this experimental design offline.**

Tim thanked everyone for their participation and stated that he and Dean would be following up shortly with minutes and action items from today's meeting.

11:58 AM - Meeting adjourned.

**Action Items (based on text highlighted in red above):**

- Anne Deaton will contact J.D. Potts with the NC Shellfish Sanitation and Recreational Water Quality Monitoring Program to see what data from stations in that area may tell us about possible nutrient enrichment.
- Anne Deaton will contact Lee Paramore (NCDMF) to determine the importance of this SAV habitat in KHB for fisheries species based on biological sampling data collected in the area.

- Rob Emens and Drew Gay will contact the manufacturer of Sculpin G to see if any testing has been done on the impacts of this product on *Ruppia*.
- Jessie Jarvis will contact Michael Durako (UNC-W) regarding a 1999 honors thesis from by Daron Crew (under Michael Durako) looking at the impact of 2,4-D on *Ruppia*. **COMPLETED: This report has been added to the team's Google Drive.**
- Joe Luczkovich will explore mechanical harvesting options (e.g., cost and effectiveness). Jessie Jarvis suggested talking with Brooke Landry, Maryland DNR biologist and chair of the Chesapeake Bay Program SAV Workgroup. **PARTIALLY COMPLETED - Joe has provided the following links:**
  - <https://weedersdigest.com/lake-groomer-lake-weed-roller/>
  - <http://www.berky.de/485-Weed-Harvester.html>
- Joe Luczkovich will provide Dean Carpenter with dates in early May when he may be able to survey a new supplemental sentinel site in KHB, so that APNEP can help assemble a team to assist him.
- Interested members of the team will work offline to confirm an experimental design for the supplemental sentinel site to be established in KHB.

**Appendix: Key images discussed during the meeting (also located in the team's Google Drive)**

- **Fig. A1:** Proposed areas for herbicide treatment in Kitty Hawk Bay.
- **Fig. A2:** Caption from Joe Luczkovich - The Kitty Hawk Bay study area. Rapid Assessment RA transects shown at 1 m water depth along shore (ciBiobase biovolume estimates of SAV, variable sized green dots SAV present in SONAR, white = no SAV on SONAR) and video drop camera SAV present (large green dots) or SAV absent (large white dots). Sentinel Site AS-SS-01 is shown in upper corner of Kitty Hawk Bay.
- **Fig. A3:** Caption from Joe Luczkovich - SAV biovolume in AS-SS-01 on 29 Sep 2017 (38.23 ha surveyed, 10.28 ha with SAV).
- **Fig. A4:** Caption from Joe Luczkovich - Change analysis of SAV between 20 Jun 2016 and 29 Sep 2017. Red shows areas of SAV loss from 2016 to 2017; green shows areas of SAV gain. Green area shows SAV expansion of 6.6 ha.
- **Fig. A5:** August 2017 BioBase data and proposed treatment areas for Kitty Hawk Bay.
- **Fig. A6:** August 2017 BioBase data and proposed treatment area polygon for the Avalon boat ramp in Kitty Hawk Bay.
- **Fig. A7:** August 2017 BioBase data and proposed treatment area polygon for private docks in Kitty Hawk Bay, just south of the Avalon boat ramp.
- **Fig. A8:** Photo taken by Joe Luczkovich of *Ruppia* at the sentinel site in Kitty Hawk Bay.
- **Fig. A9:** Photo taken by Joe Luczkovich of *Ruppia* at the sentinel site in Kitty Hawk Bay.



# Proposed Treatment Areas for 2018

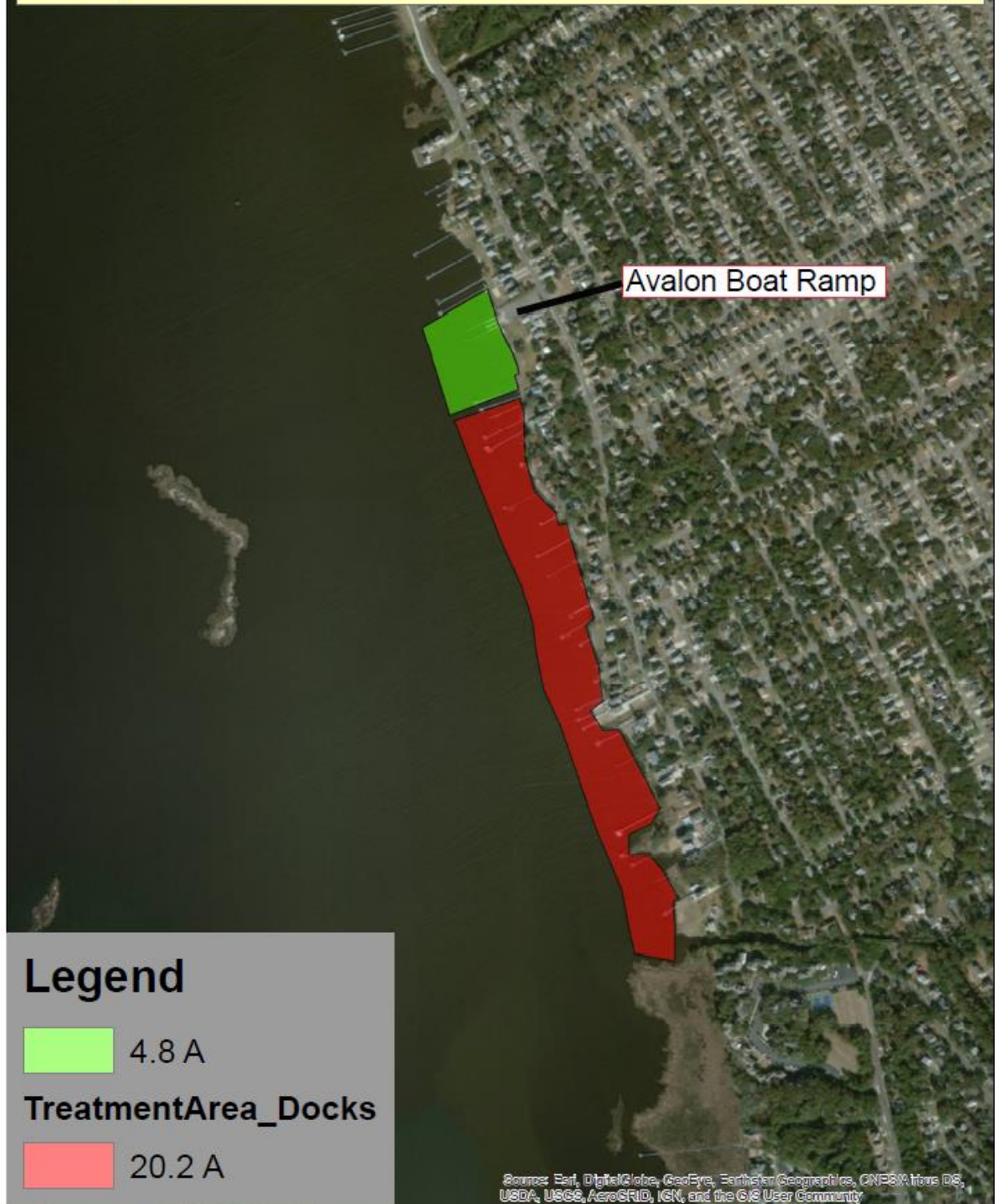


FIGURE A1

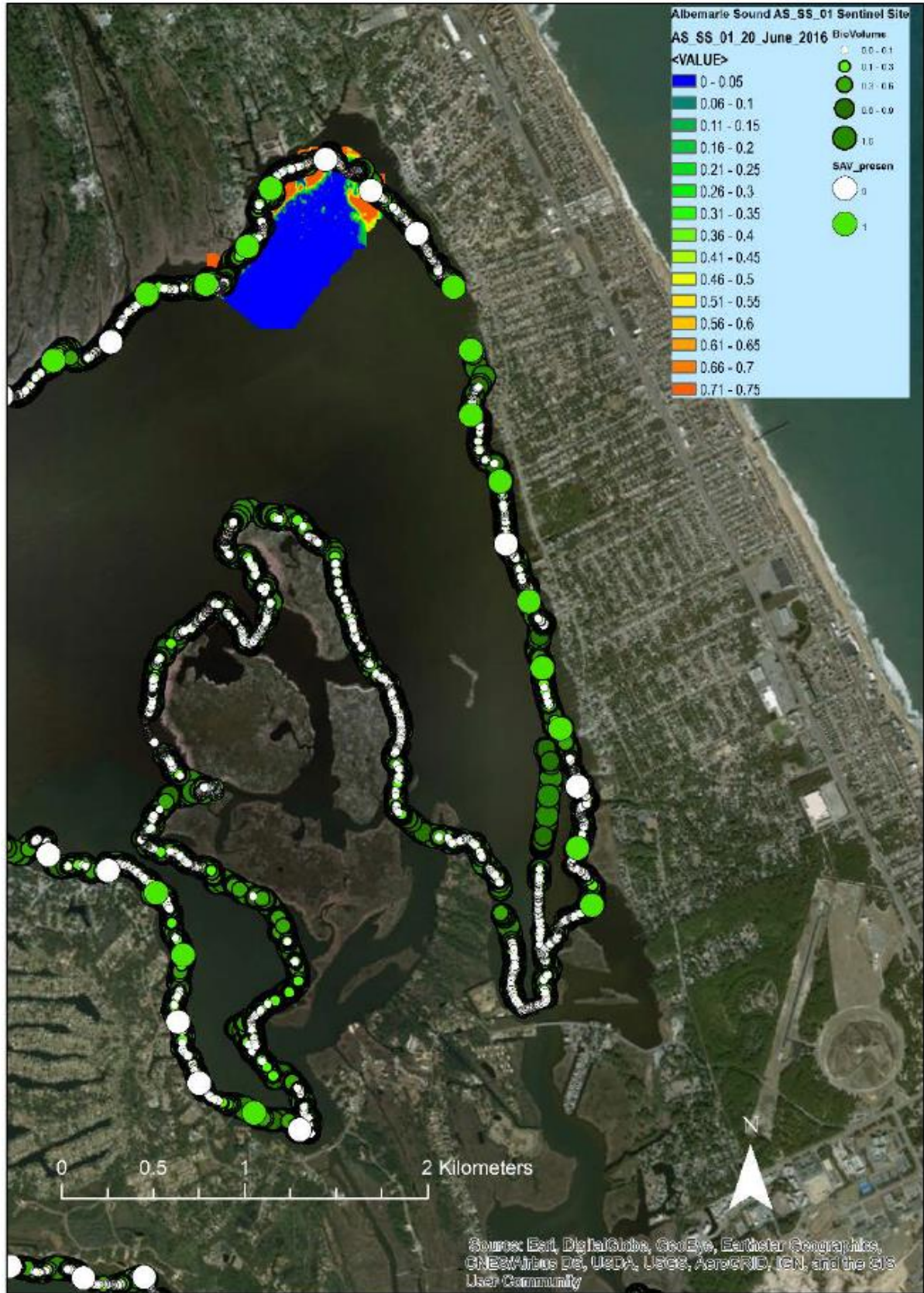


FIGURE A2



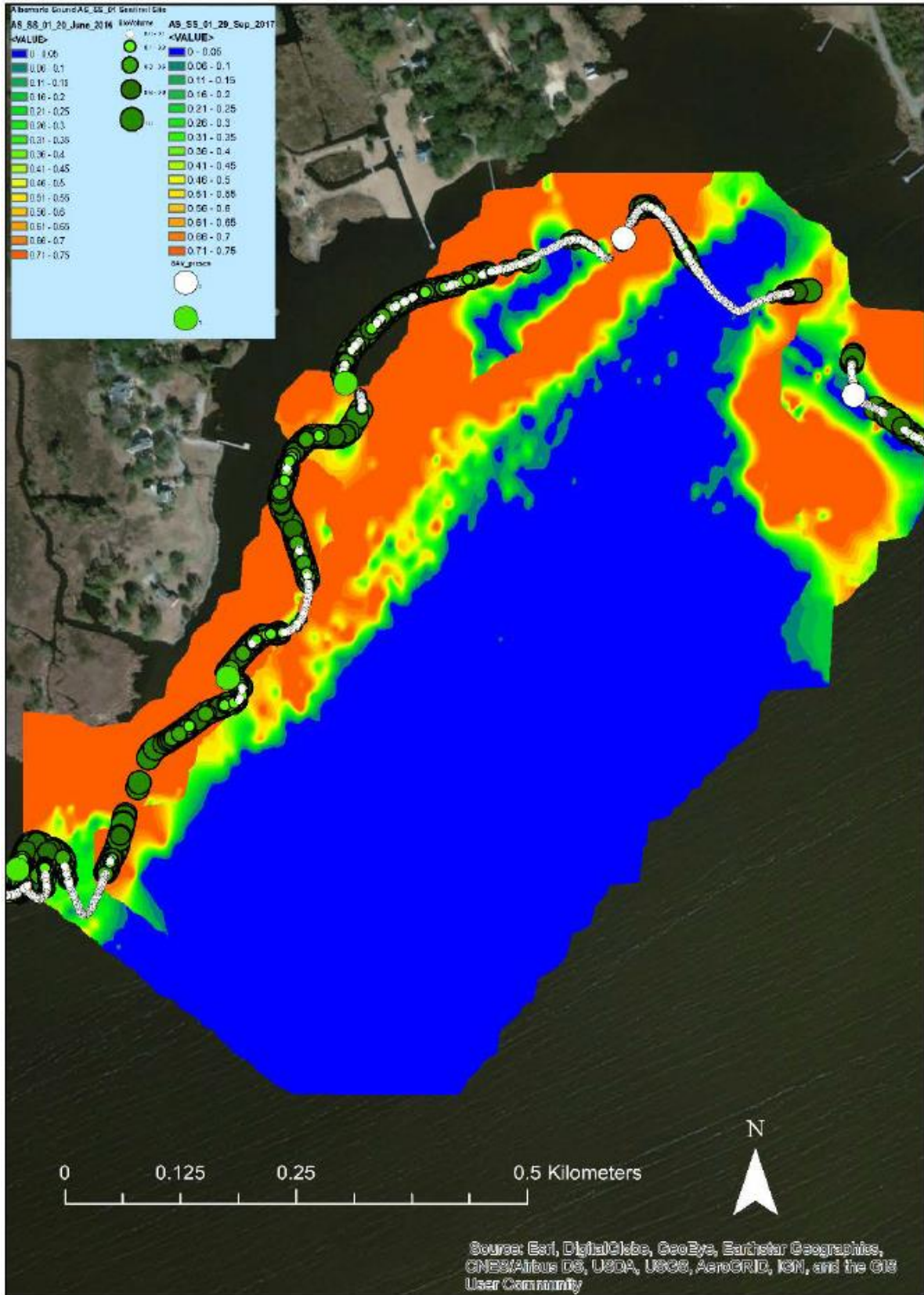


FIGURE A3

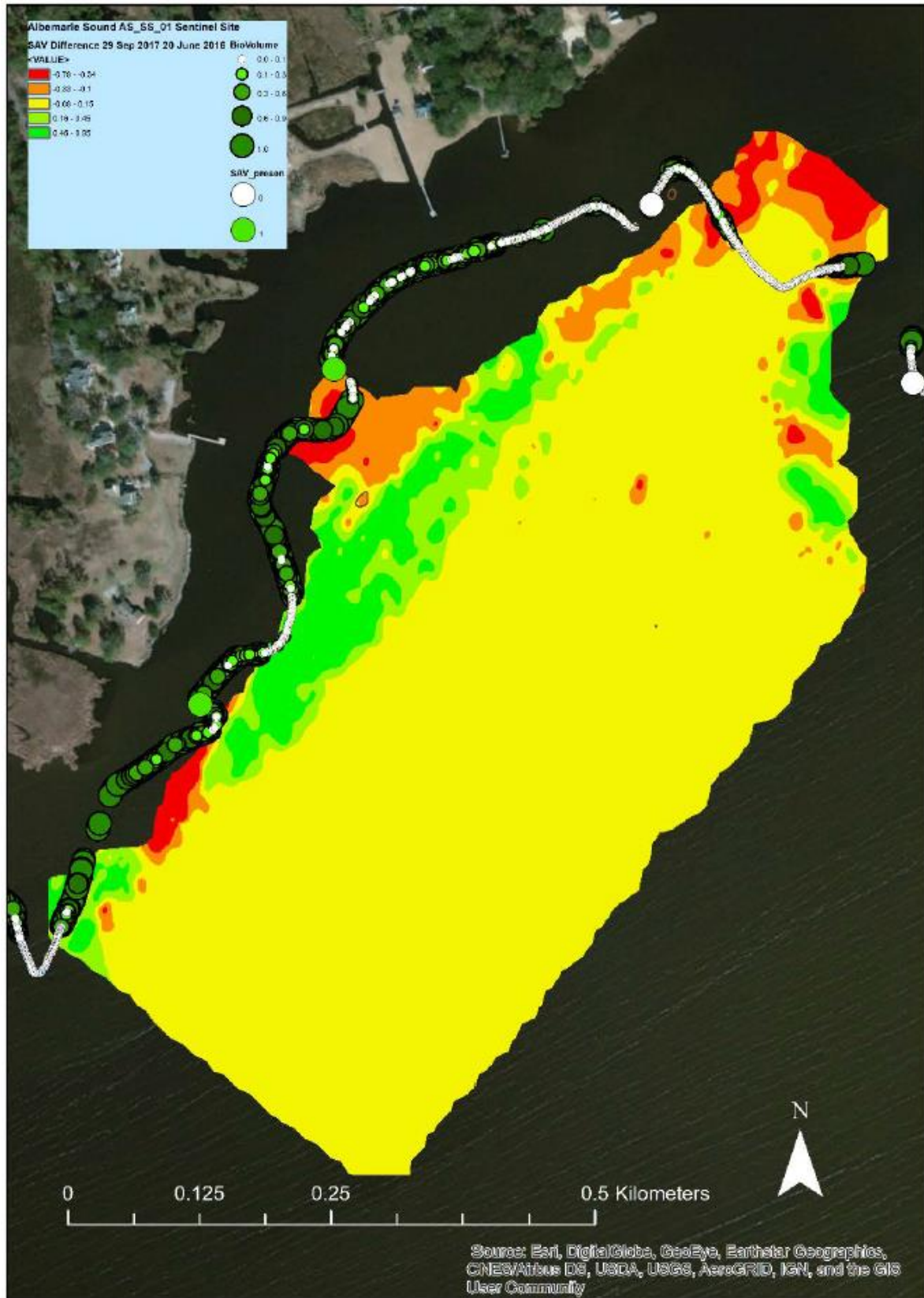


FIGURE A4



Track | Layers | Polygons | Clear

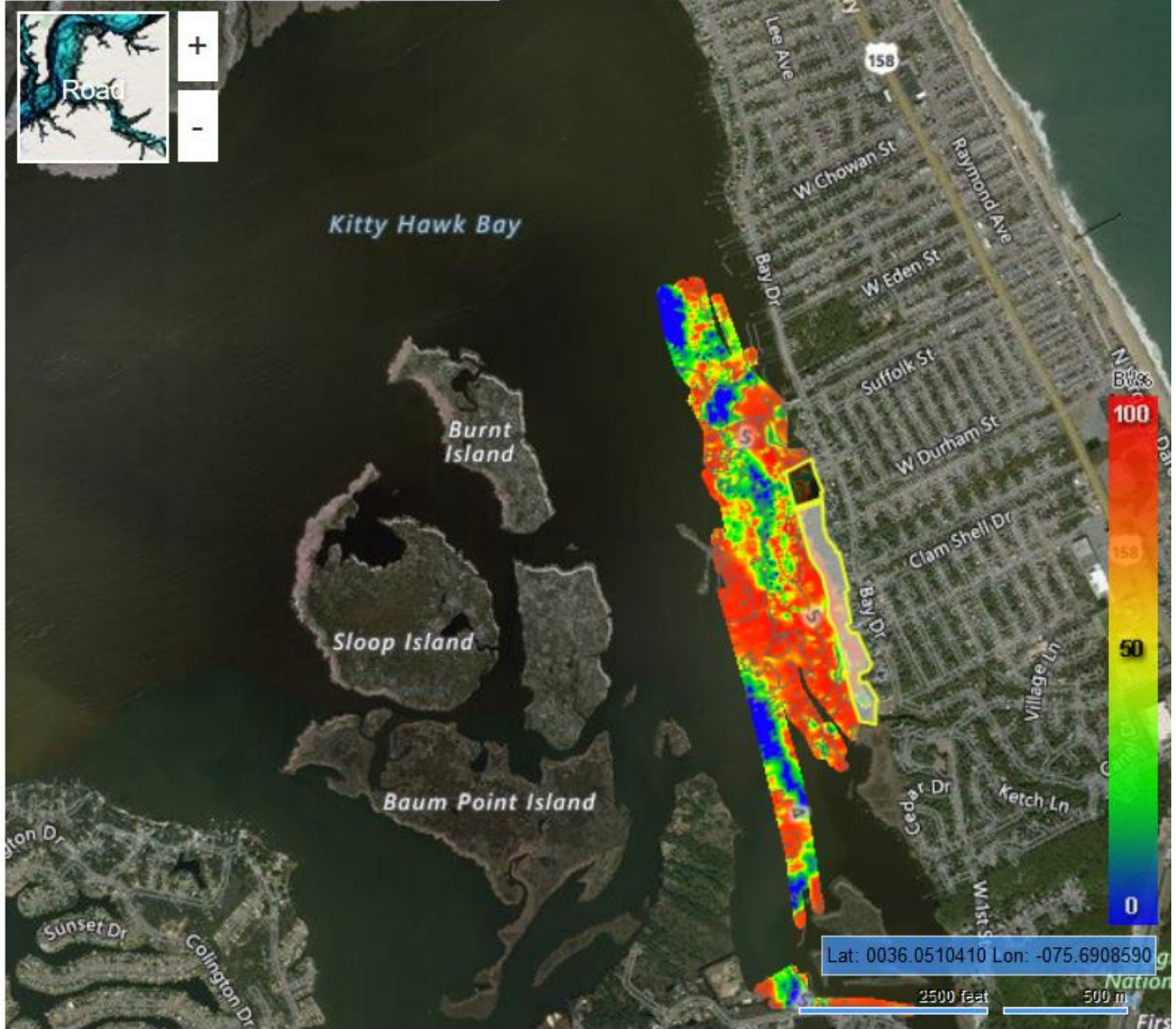


FIGURE A5

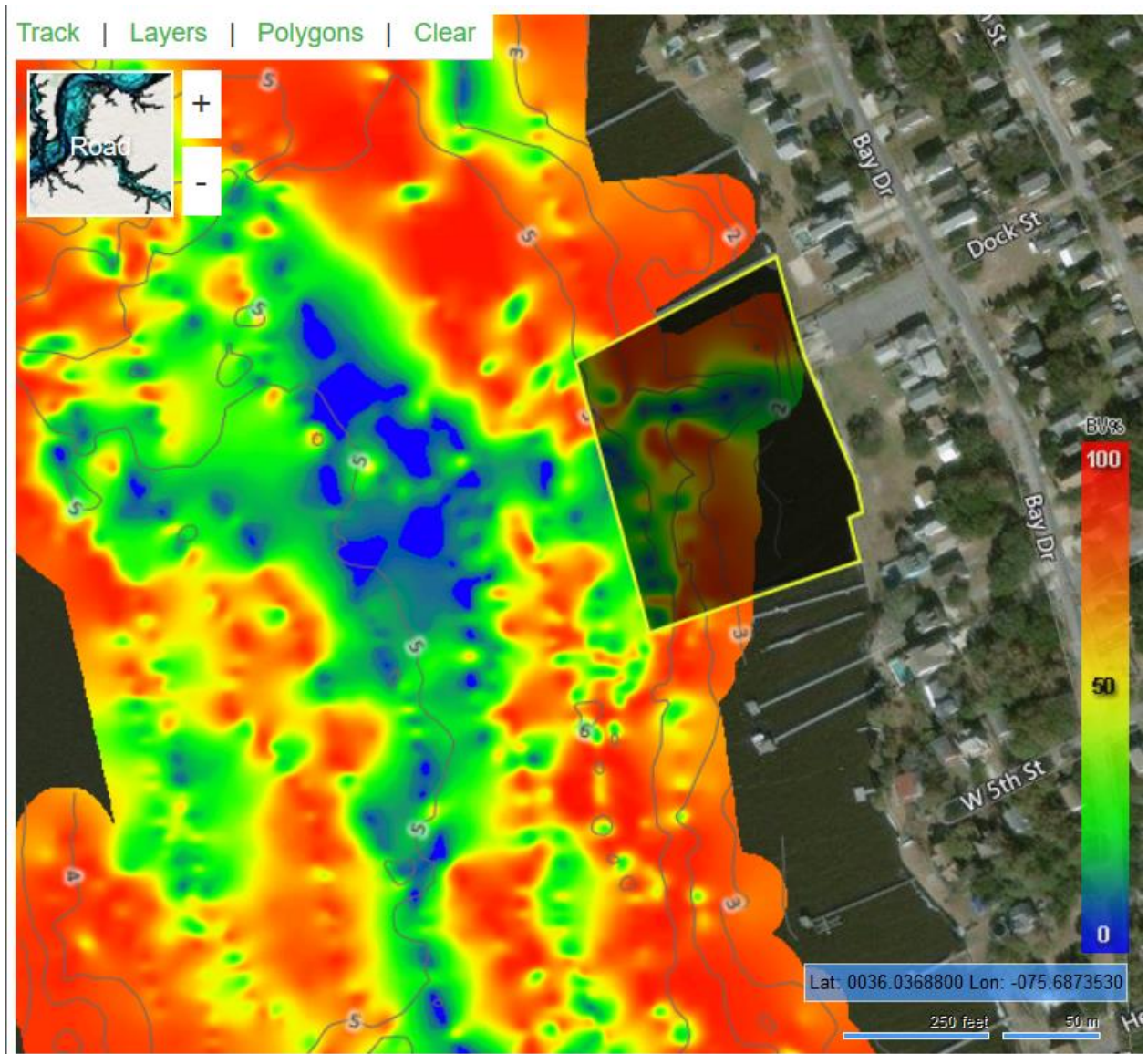


FIGURE A6



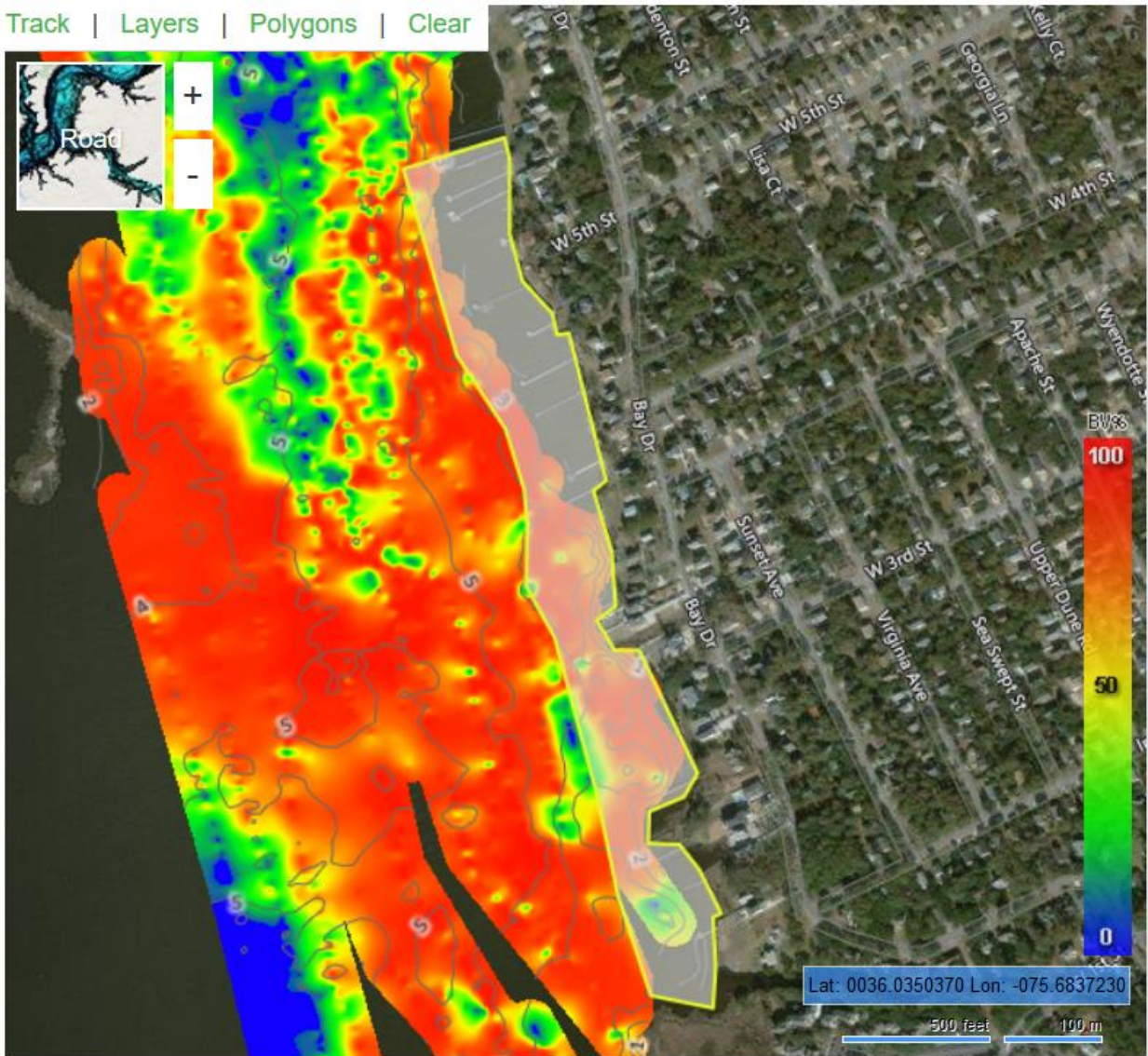


FIGURE A7





**FIGURE A8**





**FIGURE A9**