

Awareness of Erosion, Flooding, and Building Development on Sullivan's Island

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Abstract

The following study is an in depth analysis to examine the awareness that high schoolers had on an important local environmental issue. Students of a local suburban high school were rated on their knowledge of erosion, flooding, and building development issues on Sullivan's Island, a nearby barrier island. A mixed-method approach was taken. Students were asked to rate their awareness of specific topics relevant to the environment and the island on a scale of 1 through 10. Certain students were then chosen to elaborate on these results via interviews. This study found that students were somewhat aware of erosion, flooding, and development on Sullivan's Island, an important part of their community. Students could name the definitions of erosion, flooding, and development and were able to recognize that these problems are interconnected and important. However, students were not able to go into detail regarding these environmental processes and could not give specifics as to why the current frequency of these processes are bad for the environment on Sullivan's Island. This study in the social science discipline shows that there is lots of room for improvement in the realm of environmental education and awareness.

Keywords: Erosion, flooding, development, Sullivan's Island, awareness

Introduction

For a variety of reasons, individuals are not spending nearly as much time outside as they have in the past. Many people are not aware of the environmental processes that surround them, and how their community's actions are impacting these processes. I have witnessed this within my own community on a barrier island known as Sullivan's island. This island is extremely ecologically important and hosts a variety of ecosystems. Due to its beauty, it has become a prime real estate destination for large beach houses over the past 20 years. Rapid urbanization is occurring, which can be extremely problematic for the environment. This urbanization is leading to increased erosion and flooding on the island, negatively impacting wildlife and humans. While there is plenty of research in existence regarding how building development increases the rate of erosion and frequency of flooding, I discovered that there was a lack of research regarding awareness of this issue. The protection of this island is extremely important, but there is an insufficiency of recognition regarding this extremely important topic. This led me to investigate the extent in which students of coastal suburban high school are aware of how building developments on Sullivan's Island impacts the environmental issues of erosion and flooding. High school students in this high school were chosen because many of them often interact with the island, using its beaches for recreational activities. With this demographic in mind, I conducted an in depth mixed method study.

Literature Review

Building development along the coast has caused a rapid increase in beach erosion and flooding. The following literature review is information regarding beach development, flooding,

and erosion, providing details about this problem to establish context for this study. It centers around barrier islands, small islands between the ocean and the mainland.

Beach Erosion and Flooding

Erosion is the “removal of soil and sand by the forces of wind and water” and is a natural process. However human activity on beaches has increased rates of erosion (Hoyle, 2005, para. 1). Flooding is heavily linked to erosion as a high frequency of floods increases the flow of water, which carries high amounts of sediment washing it away, increasing the rate of erosion (Konrad, 2016). Building development is the main cause of the increase in both of these environmental factors. These natural processes are interrupted by building development (Lerner & Lerner 2008). More buildings in coastal communities, areas where humans reside along the shore, are hurting the environment in these areas by increasing the frequency and severity of environmental processes.

Building Development

There are many elements that go into developing a community which can increase the frequency and intensity of erosion and flooding issues. Coastal areas are more “densely populated than the hinterland and exhibit higher rates of population growth and urbanization” (Neumann et al., 2015, para. 1). This means that coastal areas have a larger and faster growing population than inland, making coastal development and protection an important global issue, as it houses a majority of the world’s population. Since there is a higher population and growth on these shorelines, these areas have to continue to be developed to sustain this population (Helvarg, 2003; Factoids, 2002). As of the early 2000s, roughly 54% of the US population lived within 50 miles of a coastline and about a million more were moving there everyday (Helvarg, 2003). This number has only increased since that time. This growing population requires homes and

structures, meaning more buildings are needed to sustain these people. In order to put these buildings up, vegetation must be removed. An example of this is Sullivan's Island. This is a coastal community on a barrier island off the coast of Charleston, South Carolina. Officials have voted to cut down vegetation in its maritime forest so that buildings in that area can have better beach views (Johnson, 2021). The vegetation in this forest acts as a barrier between the direct wind and the island, and the removal of this vegetation means that wind will be hitting these islands directly. With no barrier to slow or diminish incoming coastal winds, there will be an increase in the rate of erosion. These high erosion rates cause a loss of beach and can even be harmful to the buildings themselves. When sand is washed away, it leaves the ground that a building is on unstable. The support for a house is washed away, thus causing the house itself to wash away (Hoyle, 2005). As established earlier, flooding is also an issue. The creation of roads and buildings takes away the amount of ground that can absorb rainfall. As a result, water from storms is not being absorbed into the ground, and instead, being displaced causing flooding and erosion. Furthermore, the coastal buildings themselves can be heavily damaged by these floods. Buildings with water damage have recurring problems with rot and mold. Despite preventive measures, these issues can still occur and potentially cause the entire building to collapse (Craig, 2021; Shadid & Colwell, 2018). The development of coastal communities increases the frequency for both flooding and erosion, while causing issues for the buildings that contribute to this problem.

The Failure of Fixes

There are some preventive measures to protect beaches from these issues, but they are often not restrictive enough or do more harm than good. One of these many preventive measures are sea walls. Sea walls are a beach hardening measure in which walls of stone are put against

coastlines. These walls act as a barrier between waves hitting the shore, preventing the waves from washing sand away. When these guards are put up, it is “hindering the process of sand deposition along the shorelines,” meaning the sand is not being brought to neighboring shores, which is destroying nearby coastal areas (Guardian, 2014, para. 7). In addition, the seawalls and beach hardening measures are also taking away habitat for certain birds and are considered “dangerous to swimmers” (Johnson, 2000, para. 6). This means that seawalls and other beach hardening measures are harmful in many ways and therefore are not a solution to this issue. Beach nourishment is also a common fix. This is when sand is brought in to replenish areas of the shore that have been eroded. However, this is only a short term fix as it is extremely expensive and will eventually deplete itself. For example, in Ocean City, Maryland, \$5 million dollars was spent on a nourishment project. The sand that was brought in had completely eroded within three months (Kahrl, 2014). This solution of beach nourishment is not viable. There is also some legislation that has helped with the issues of erosion and flooding, like South Carolina’s Beach Management Act (BMA), which created limitations with property lines and regulatory restrictions to help with these issues. However, there are many exceptions to this legislation, such as the areas of Folly Beach and Fripp Island (Shahdid & Colwell, 2018). While the measures passed to alleviate this issue are a positive thing, they are not nearly restrictive enough and coastal developments are not always subject to these measures.

Sullivan's Island

The area of concentration for this study, as mentioned earlier, is Sullivan’s Island. This area is heavily affected by erosion, flooding, and building development. This year alone, there has been \$45.3 million in flood damage and this number is expected to increase with time (Factor, 2021). The most vulnerable parts of this island experienced “13.5 feet” of erosion

between 2018 and 2019 (Huechtker, 2021, para. 3). Sullivan's Island is “now almost completely developed” and faces overdevelopment like many other barrier islands. This means that most of the island is covered in buildings. Part of this community’s development includes erosion and flooding preventive measures including jetties, groins, and seawalls (Levine & Kaufman, 2012, para. 4). However these preventive measures can be problematic. There is plenty of information on what is happening on this island, but there is a gap in the research regarding awareness of this issue. If there is a lack of people aware of what is going on, the solutions to these issues cannot be found and will continue to occur, hurting these vital ecologically diverse barrier islands. Investigation into awareness is crucial as it can measure how this issue is being treated in regard to environmental importance. I hypothesize that the majority of students of a coastal suburban high school are not very aware of how building development on Sullivan’s Island impacts the environmental issues of erosion and flooding.

Method

Design

The purpose of my study was to determine the awareness that high school students in a coastal suburban high school had about a local environmental issue. The first step in this process was to determine the demographic in which I wanted to study. The participants of my study started out as randomly selected, with the only requirement being enrolled at my current high school. Once I had this demographic decided on, I then started working on my IRB proposal. I determined a mixed methods study was best. Through this method I could determine general awareness with quantitative data, and I could elaborate on these results with qualitative data. I collected the quantitative data via a number scale with participants rating their awareness on a

1-10 scale and the qualitative data via interviews. Studying awareness was risky as it relies on participants to be completely honest about their amount of knowledge. Using both quantitative and qualitative data allowed me to witness the correlation between how much participants could truly describe and what they rated themselves, allowing me to see if they rated themselves accurately and eliminating bias. Once I committed to this kind of data sampling, I started to create consent and assent forms detailing the purpose of my study and participants' roles in it (Appendix C and D). In order to properly inform participants, I included an overview of the study detailing the purpose, who I am, and what results would be displayed. Promises of anonymity were disclosed and the participants were informed that they could opt-in to an optional interview process. A written signature on this consent form was required. In addition to signature by the participant themselves, a parent signature was also needed if the student was under 18. The next step in my process before IRB approval was determining a sample size. Using a sample size calculator, it was suggested that I use 160 students for my study. However, I knew that the response rate would be very low in accordance with my demographic. At the end of my data collection period despite contacting over 200 people, I only had 44 survey responses. However, this was still a valid study as the 44 students are representative of the population as my population of interest is relatively homogenous. Once I established the sample size, I decided how I would sample to get participants. In order to increase participant response I decided to offer volunteer hours for participation in my study. I did this because I figured that the benefit of more participants would allow a greater response rate and therefore a better sample. Lastly, I wrote out my survey and interview questions (see Appendix C and E). The process of this will be detailed in the instruments section of this paper. All of these determinations were written down in

a clear manner on an inquiry proposal form and this form was submitted to the IRB. The board approved my study with no suggestions of change.

Procedure

My original plan was to use a stratified random sample to randomly gather data. The high school in which I was collecting data has four main entrances. I decided that I would stand outside each of these entrances, asking people if they were interested in participating in my study. I then decided that it would be best to do this Wednesday mornings as people will be more likely to participate coming into school rather than out as most are eager to get home as soon as possible. At my school, there are no extracurriculars on Wednesdays before school, as that is the time that teachers have meetings, therefore most students would be coming into school at the regular entrance times of 8am to 8:30am. For that reason, I would get a more representative sample of the student body using this time slot. I used an online generator that produces random results to determine the order that I would go to the entrances (OmanderConsulting LLC). Between 12/1/21 and 1/5/22 on Wednesday mornings, I asked every person at one of the four main entrances if they were interested in participating in my study. I had them write down their name, school and email, and whether or not they were over 18 so I would know whether or not to send them the assent form (not attached for confidentiality reasons). Once I had their school email, I sent the consent and assent forms to them. After I received these back I emailed the survey to the participants. If they chose to participate in an interview then I would email them once again to schedule a time. See all email templates in Appendix D. On January 4th, I determined that I had too few responses to draw conclusions. It was at this point that I decided to change to a voluntary sample in order to increase the number of responses. My study, along with many others, was emailed to every student in the school offering service hours in exchange for

participating. This helped increase response rate so that I could truly see results as before numbers were simply too close with too few participants.

Instruments and Materials

Two main materials were used in this study. The first was a survey sent out via google form, something in which my demographic is very familiar with as this school often uses them for surveys, and the second being interview questions that I kept on a google document only available to me and my research mentor. Prior to either of these instruments being used, a consent form was signed and turned back in. Once these forms were received, the survey was sent to participants' school email. The survey contained 15 questions.

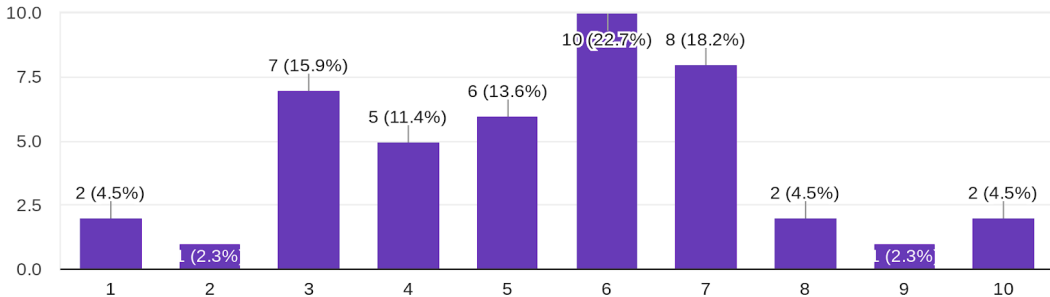
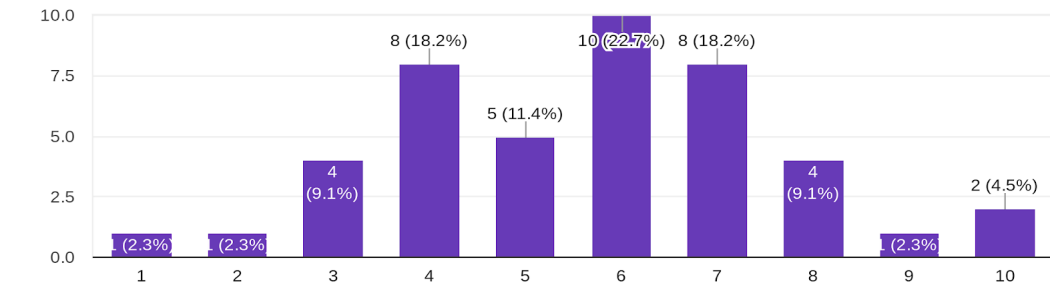
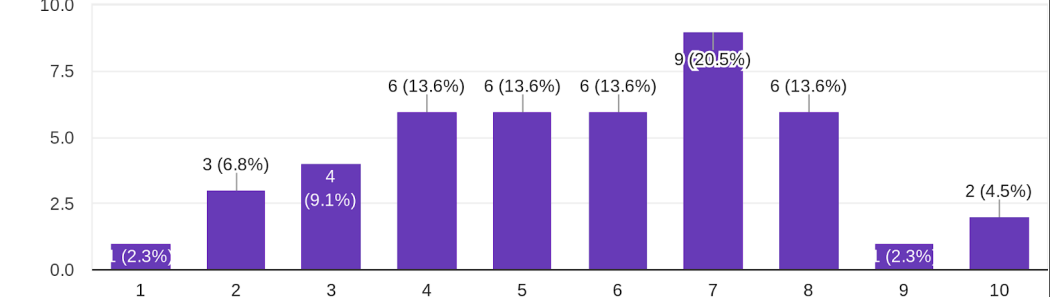
Data Points

Three of these questions were demographic based asking for things like grade level and gender. Eight of these questions asked participants how familiar they were with items such as the impact of erosion and to rate their familiarity on a scale of one to ten. Three questions inquired as to whether or not participants' knowledge of the data was taught at school and if applicable, in which classes. The last question of this survey was an option to choose whether or not participants were interested in an interview or not (Appendix C). There could be some bias in these survey results, since asking participants to rate themselves means that each participant could be interpreting their knowledge and the scale slightly differently. However, I still thought that this was the best way to conduct this study because it allowed for quantitative data and was user-friendly for participants. If participants selected the option that they were interested in an interview, I emailed them asking for a time that would work for them. Afterwards, I met with participants either in person or on zoom. Eleven questions were asked, most of which asked about the extent of their knowledge of erosion and flooding and three questions regarding

interaction with Sullivan’s Island and whether or not these issues are something that everyone should be aware of (Appendix C). The interview results could possibly be biased, as there may be some knowledge that participants did know about these topics and forgot about at the moment. However I felt like this was the best way to conduct this study as these data points allowed me to gather qualitative data to support quantitative results and allowed me to gauge general knowledge and the extent of it on these topics. There was no manipulation involved to gain these results. All data points were collected through observation and evaluation.

Results

<p>Questions and Responses with participants rating themselves 1-10 (1 being weak and 10 being strong) (Bar Chart)</p>	<p>Mean</p>	<p>Graph Number</p>																																	
<p>On a scale of 1 to 10, with 10 being the strongest, how much do you know about beach environments? 44 responses</p> <table border="1"> <caption>Knowledge about beach environments data</caption> <thead> <tr> <th>Rating</th> <th>Number of Responses</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>1</td><td>0</td><td>0%</td></tr> <tr><td>2</td><td>4</td><td>9.1%</td></tr> <tr><td>3</td><td>3</td><td>6.8%</td></tr> <tr><td>4</td><td>8</td><td>18.2%</td></tr> <tr><td>5</td><td>9</td><td>20.5%</td></tr> <tr><td>6</td><td>8</td><td>18.2%</td></tr> <tr><td>7</td><td>5</td><td>11.4%</td></tr> <tr><td>8</td><td>4</td><td>9.1%</td></tr> <tr><td>9</td><td>0</td><td>0%</td></tr> <tr><td>10</td><td>3</td><td>6.8%</td></tr> </tbody> </table>	Rating	Number of Responses	Percentage	1	0	0%	2	4	9.1%	3	3	6.8%	4	8	18.2%	5	9	20.5%	6	8	18.2%	7	5	11.4%	8	4	9.1%	9	0	0%	10	3	6.8%	<p>6.007</p>	<p>1</p>
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<p>On a scale of 1 to 10, with 10 being the strongest, how familiar are you with the impacts of building development? 44 responses</p>  <table border="1"> <thead> <tr> <th>Scale</th> <th>Count</th> <th>Percentage</th> </tr> </thead> <tbody> <tr><td>1</td><td>8</td><td>18.2%</td></tr> <tr><td>2</td><td>0</td><td>0%</td></tr> <tr><td>3</td><td>7</td><td>15.9%</td></tr> <tr><td>4</td><td>6</td><td>13.6%</td></tr> <tr><td>5</td><td>6</td><td>13.6%</td></tr> <tr><td>6</td><td>3</td><td>6.8%</td></tr> <tr><td>7</td><td>9</td><td>20.5%</td></tr> <tr><td>8</td><td>4</td><td>9.1%</td></tr> <tr><td>9</td><td>1</td><td>2.3%</td></tr> <tr><td>10</td><td>0</td><td>0%</td></tr> </tbody> </table>	Scale	Count	Percentage	1	8	18.2%	2	0	0%	3	7	15.9%	4	6	13.6%	5	6	13.6%	6	3	6.8%	7	9	20.5%	8	4	9.1%	9	1	2.3%	10	0	0%	<p>4.868</p>	<p>8</p>
Scale	Count	Percentage																																	
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7	9	20.5%																																	
8	4	9.1%																																	
9	1	2.3%																																	
10	0	0%																																	

Discussion

In total, I was able to collect 44 responses, with 12 of those participants signing up for an interview. Results from the interview are not shown in the visual graphs because it was qualitative data. These results will be used to support data found via the survey method. Exact responses will not be stated for anonymity purposes. All 12 interviewees stated that when they visit Sullivan’s Island they interact with the beach in some way. As seen in graph 6, high school students of a local suburban high school visit Sullivan’s Island relatively often, with students rating themselves visiting 4.745 on a scale of 1 through 10. In the interviews, it was shown that

all students visit the island for some sort of recreation activity, such as going swimming, having a picnic on the beach, or walking along the coastline. This shows that this demographic interacts with this environment relatively often. When looking at the awareness of issues such as erosion and flooding, most students could state some general information but could not apply it, meaning that they could not identify processes happening in the environment around them.

When asked about awareness regarding erosion (graph 2), the majority of students rated themselves with a knowledge basis of 4 through six out of ten, with the mean of this graph being 5.357. This shows that about half of the students consider themselves to be somewhat aware of erosion, but cannot name specifics. This is supported by the qualitative data in the interview. The majority of students could state the definition of erosion and understood that it is “the washing away of sediment”. However, students were unable to apply this knowledge to Sullivan’s Island. When inquiring about awareness of the impacts of erosion (graph 3), most students rated themselves relatively aware with the mean being 5.661 on a scale of 1 to 10. However, this rating could be a bit biased as it is not supported by the data gathered in the interview. When asked about erosion’s impacts and affects, 11 students said that they knew some general facts, that it was bad for Sullivan’s Island’s ecosystems, and that there is some damage to buildings. While these students were able to name these general facts, they were unable to name specifics.

When investigating student's awareness of flooding (graph 4), most students rated themselves in the 4 through 7 category, with the mean of this graph being 4.572. This indicates that participants in this study consider themselves to be somewhat aware of flooding issues. This data is supported by responses from the interview. Roughly 5 students stated that they knew no information about flooding, 4 students knew some information about flooding and its impacts, and 3 students were pretty knowledgeable about flooding and could link flooding and erosion as

being heavily associated with each other. When questions about participants' awareness of the impacts of flooding (graph 5), the majority of students rated themselves a 7 out of 1 through 10 with the mean being 6.103. This is a much higher number than my other, meaning that students consider themselves more aware regarding this topic. This is supported by replies in the interview as all 10 participants knew something about flooding. This number makes sense as in this community there are some infrastructure problems that are connected to flooding such as roads closing and houses needing flood insurance, meaning that students would have more exposure to this topic. These results show that students are somewhat aware of impacts of the environmental issue of flooding, but lack knowledge of flooding itself such as its definition and long term effects.

In regard to beach environments and Sullivan's island itself (graph 1), awareness was lacking. Despite students interacting with Sullivan's Island relatively often, awareness of building development on it was extremely low with an average of 3.125. This data also contained 2 points which could be considered outliers, meaning that the true center of this data is even lower. This number is supported by interview responses as all interviewees either knew nothing about it or only knew vague information. While investigating the awareness of the impacts of building development on Sullivan's Island (graph 8), students rated themselves pretty evenly with the mean being 4.868 on a scale of 1 through 10. Once again the interview responses supported this data. 5 interviewees used the words "some urbanization" and six participants talked about habitat loss due to urban development.

On a scale of 1 through 10, students rated their awareness of beach environments largely in the 4, 5, and 6 categories with the results of this question having a mean of 6.007 (graph 1). This is in accordance with the context of my area as this study is taking place in a coastal

community and while many students do interact with the beach, there seems to be a lack of formal education in place regarding the beach environment. In conclusion, a mean of 6.007 shows that students in this community consider themselves to be pretty aware of beach environments and ecosystems.

It appears that students have a general knowledge base of these issues. However, they are not able to apply it. This means that most students know the definitions and basics of these environmental processes, however they are not able to recognize it happening in the world surrounding them. While most participants in this study did know the basis of these issues, they could not identify them happening in an environment in which they often interact with. This begs the question of to what extent are people aware and how knowledgeable are they about the environments they are interacting with. The results from this study show that students in a coastal suburban highschool are somewhat aware of erosion, flooding, and building development on Sullivan's Island.

Conclusion

Building development on barrier islands such as Sullivan's Island is increasing erosion and flooding rates which is problematic both environmentally and for the people who inhabit these islands. I originally hypothesized that students would not be aware of these issues. I was incorrect, though, and the average student of a coastal suburban high school is somewhat aware of these issues. However, there is lots of room for improvement. There were a number of limitations that I experienced in my study that should be taken into account should someone choose to replicate this study. Due to the fact that I used a survey which involved participants to rate their own awareness, there is most likely some self-reporting bias in the results with participants interpreting the 1 through 10 scale differently. I decided to still use this method

though as I felt like awareness was best rated by the participants themselves and not through a test or another method as typically these test memorization, not awareness. During my data collection process I also decided to change my sampling into a convenience sample in order to have a larger sample size. This limited my findings because it means that my responses are not completely random as students who wanted volunteer hours were more likely to respond, making the responses slightly biased. However, in this case I felt like doing a convenience sample in order to get more responses was the right decision. The population of interest, students in a coastal suburban high school, is relatively homogenous. I determined that the bias that would come from using a convenience sample would be less than the bias that would have come from a small sample size. Overall I am relatively confident in my results. In addition to these limitations, there was also one delimitation that I included in this investigation, using high school students of a coastal suburban high school. This population was feasible for my study and interacted with the environment in which I was researching. Using a different population would no doubtly impact the results. Replicating this study but with a different population such as students that live in a mountainous region would be extremely interesting. In order to further validate the results of this study, the research question would need to be investigated in a study that has more resources than this one was allowed and would require a greater time frame to collect data. Future research on this topic would be benefitted by examining different populations and demographics and possibly different local environmental issues relevant to them. In closing, through this research process I have achieved the new understanding that while students of a coastal suburban high school have some awareness of erosion, flooding, and building development on Sullivan's Island, there is lots of room for improvement in regard to their knowledge of environmental impacts on their local community. A lack of full understanding of

these issues could potentially contribute to the current climate crisis and a decrease in the quality of life in certain areas. This is because an absence of information regarding these issues could lead to the continuation of environmental degradation. In closing, more education regarding the impact on nature and the natural process of one's community is needed in order to increase awareness.

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APPENDIX - ATTACHMENT A**Researcher**

AP Research Student

(843) 801-2210

Consent Form

The Awareness of Development, Erosion, and Flooding on Sullivan's Island**OVERVIEW**

My name is Hannah Kern and I am conducting a study for the AP Research class. I am inviting you to participate in a study regarding the awareness of certain environmental issues occurring on the nearby island of Sullivan's Island. This study consists of a survey sent to your school email via a google form and an interview if you choose. Your responses will remain confidential but the results will be displayed in an academic paper and presentation for the AP Research College board exam and they do have a possibility of being published.

Purpose

The purpose of this study is to measure awareness about an issue. There are no expectations for you to answer a certain way and you are not required to have any background knowledge about any of the information mentioned in the survey.

Description of Procedure

A google form will be sent to you the day that you are invited to participate. There are no time constraints and you can answer the questions at your own pace. Your name will be asked but this is only so that I can contact you if you choose to participate in an interview. Service hours for a variety of clubs will be offered if you choose to participate in the interview. You have the right to withdraw at any time.

Promises

Your information will be kept confidential and you have the right to withdraw at any time. There is no foreseeable risk that can come from participation.

Consent

By signing the following you are agreeing to be a participant in this study and confirming that you understand all the information provided above. You can contact the researcher with any questions at any time.

Participant Information:

Participant Name: _____ Participant Age: _____

Participant Student Email: _____

Participant Signature _____ Date: _____

Researcher Information:

Researcher Name: Hannah Kern

Researcher Title: AP Research Student

Researcher Age: 18

Researcher Email: Kerhan5131@ccsdschools.com

APPENDIX - ATTACHMENT B

Researcher

AP Research Student

(843) 801-2210

Parent Consent Form

The Awareness of Development, Erosion, and Flooding on Sullivan's Island**OVERVIEW**

My name is Hannah Kern and I am conducting a study for the AP Research class. I am inviting your child to participate in a study regarding the awareness of certain environmental issues occurring on the nearby island of Sullivan's Island. This study consists of a survey sent to your child's school email via a google form and an interview if they are willing. Their responses and information will remain confidential but the results will be displayed in an academic paper and presentation for the AP Research College board exam, and they do have a possibility of being published.

Purpose

The purpose of this study is to measure awareness about an issue. There are no expectations for your child to answer a certain way and they are not required to have any background knowledge about any of the information mentioned in the survey.

Description of Procedure

A google form will be sent to your child's school email the day that they are invited to participate. There are no time constraints and they can answer the questions at their own pace. Their name will be asked but this is only so that I can contact them if you choose to participate in an interview. Service hours for a variety of clubs will be offered if they choose to participate in the interview. They have the right to withdraw at any time.

Promises

Your child's information will be kept confidential and you have the right to withdraw them at any time. There is no foreseeable risk that can come from participation.

Consent

By signing the following you are agreeing that your child can be a participant in this study and confirming that you understand all the information provided above. You can contact the researcher with any questions at any time.

Participant Information:

Parent/Guardian Name: _____

Participant Signature _____ Date: _____

Researcher Information:

Researcher Name: Hannah Kern

Researcher Title: AP Research Student

Researcher Age: 18

Researcher's Student Email: Kerhan5131@gmail.ccsdschools.com

Researcher's Phone Number: 843-801-2210

APPENDIX - ATTACHMENT C

Awareness of Development, Erosion, and Flooding on Sullivan's Island Survey

1. Name: *

Answer

2. Grade level: *

Freshman

Sophomore

Junior

Senior

3. How old are you? *

Answer

4. What is your gender? *

Male

Female

Non-binary

Prefer not to say

Other:

5. On a scale of 1 to 10, with 10 being the strongest, how much do you know about beach environments? *

1

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6. On a scale of 1 to 10, with 10 being the strongest, what would you rate the importance of beaches?

1

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7. On a scale of 1 to 10, with 10 being the strongest, how much do you know about erosion (the washing away of sand)? *

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8. On a scale of 1 to 10, with 10 being the strongest, how much do you know about the impact/effects of erosion? *

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9. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with flooding issues? *

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10. On a scale of 1 to 10, with 10 being the strongest, how much do you know about the impact of flooding issues? *

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11. On a scale of 1 to 10, with 10 being the strongest, how often do you visit Sullivan's Island? *

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12. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with building development on Sullivan's Island? *

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13. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with the impacts of building development? *

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14. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with erosion and flooding prevention measures, such as sea walls (walls lining shore lines to protect the shore)? *

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15. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with the impacts and effects of erosion and flooding prevention measures? *

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16. On a scale of 1 to 10, with 10 being the strongest, how familiar are you with laws and rules about the environment in our area? *

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17. Have you ever taken an environmental science class at Wando? *

Yes

No

18. If so, which one?

Your answer

19. Have environmental issues been taught to you in a class taken outside of Wando or in a non-environmental course? *

Yes

No

Maybe

Other:

20. Would you be interested in participating in an interview to elaborate on this information.

Please note that service hours will be offered if you participate but there is no obligation.

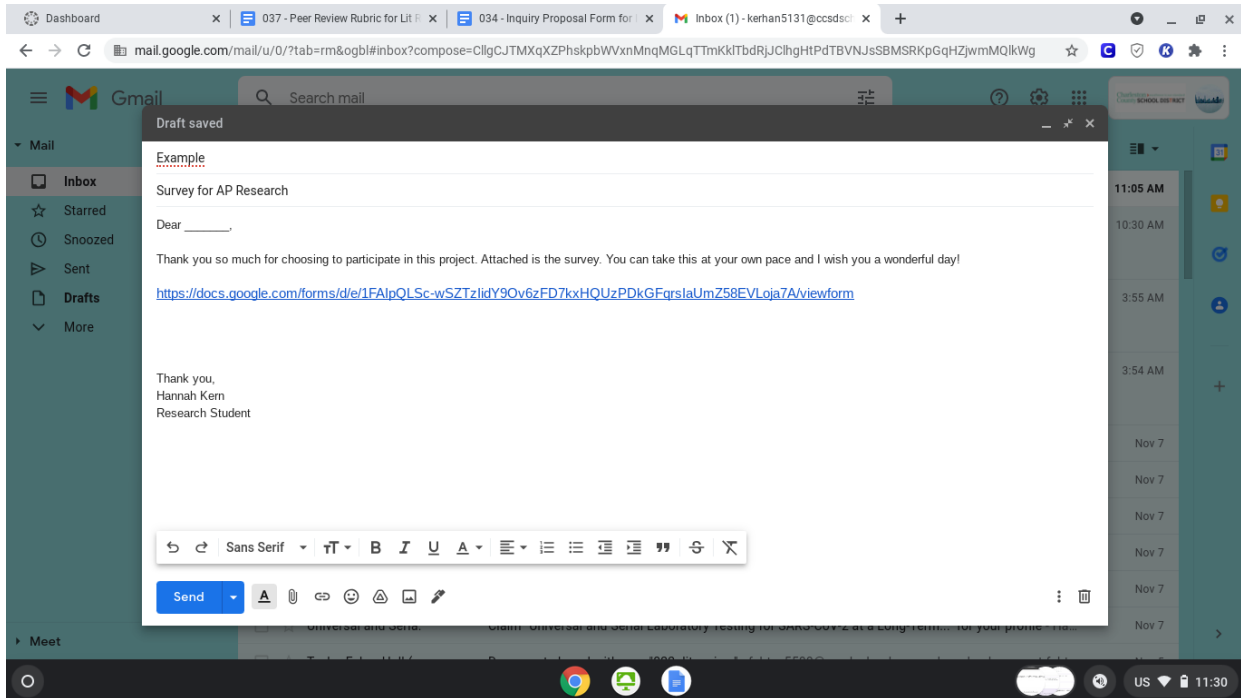
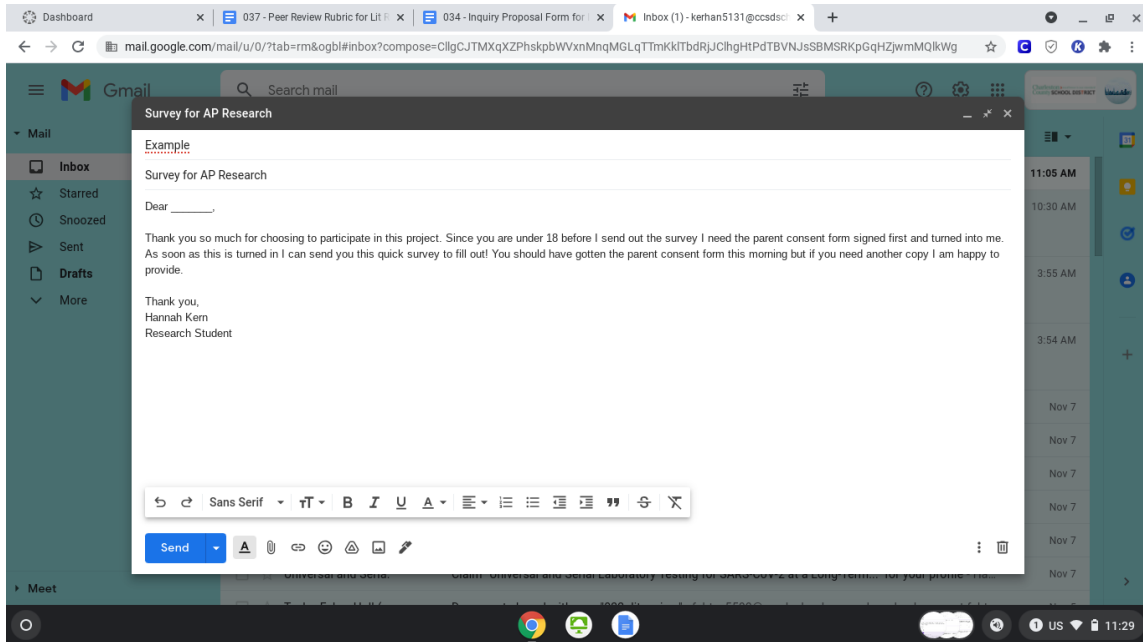
*

Yes

No

Maybe

APPENDIX - ATTACHMENT D



APPENDIX - ATTACHMENT E

Interview Questions:

1. When/if you visit Sullivan's island, describe what you typically do?
2. What are your thoughts on the importance of this island?
3. Have you ever been taught about flooding and/or erosion?
4. Was this teaching in a school environment? Knowing nothing is perfectly fine.
5. What is some of the information you know about erosion? Knowing nothing is perfectly fine.
6. Can you describe what you know about the impacts or erosion?
7. What is some of the information you know about flooding? Knowing nothing is perfectly fine.
8. Can you describe what you know about the impacts of flooding?
9. What is some of the information you know about seawalls and beach replenishment?
Knowing nothing is perfectly fine.
10. Do you think that these issues affect you personally?
11. What are your thoughts on building development?
12. Can you describe building development on Sullivan's Island?
13. Do you think everybody needs to know about these issues?
14. Do you think awareness of an issue can bring change?