**Slide 1:**

* My project this semester was to create a citizen scientist dashboard to show case data from AWRI Muskegon Lake buoy.

**Slide 2:**

* AWRI or Robert B Annis Water Resource Institution is a local organization that does research in multiple fields relating to our great lakes, inland lakes, rivers, local ecosystems and much more.
* This semester as part of my graduate assistantship I took on a project in partnership with Dr. Bopi Biddanda (Bid-don-da) and his lab at AWRI.
* Since I have never been to Muskegon lake, I opted to include this image to help show off where the buoy is on Muskegon lake.
* The buoy collects two types of data:
  + Meteorological Data
    - Rain, wind (speed and direction), air temperature, humidity, and barometric pressure,
  + Water Data:
    - Water temperature at varying depths, dissolved oxygen concentration at certain depths, pH of the water, turbidity, phycocyanin and chlorophyll-a levels and various others.

**Slide 3:**

* Here is their current conditions page which shows of the current conditions of the buoy…when the buoy is in the water that is.
* This page was mentioned by one of the Lab Members in Bopis lab to be one of the most viewed pages.
  + They show this page to the children while they are on a boat to see the buoy for field trips.
  + Fishermen and boaters use this page during and off season (they get emails about it from fishermen when the page isn’t working, or the buoy is out of the water for the season)

**Slide 4:**

* This page is a place where people can graph the buoy data and it goes as far back at 2011.
* In my experience in using that page you have to know what you are looking for and what you want to graph in order to use it.
* It is hard to explore around since there are what feels like an overwhelming number of options with no context.

**Slide 5:**

* So, after some thinking about this I decided to write down some notes on what do we want to show off for this dashboard:
  + What is currently available and already exist to the public?
    - The data grapher and current conditions
  + What is something they don’t have already?
    - Any place to have pre curated data analysis.
    - Place to highlight only certain data/concepts.
  + Lastly: who is our audience for this dashboard:
    - We know that the general public or citizen scientist use this as discussed earlier but there is to be expected some level of interaction with field experts to come and view this proposed dashboard.

**Slide 6:**

* So, the task at hand was to:
  + Create a dashboard that is easily readable and that highlights key data show on the current conditions page.
    - Since we know that children and fishermen are using this page my thinking was why not make something a bit easier to look at and understand.

**Slide 7:**

* Here is my final mockup for this dashboard. I had created about four or five dashboards previous and had a meeting with the Bopi Lab about what each different dashboard concept was showing off.
* After some feedback from them this is one of the dashboards concepts we landed on.
  + So, the left side of this page is showing off data that is being read in the buoy.
  + While the right side is graphing the data that is coming in from the buoy.
  + Ideally this would be real time, so as the buoy updates the data file points are added on the right side of the graph and older ones are removed on the left side of the graph.
    - When talking with Bopi’s lab they said that they would like to see something more daily focus than weekly focused so for the axis on this it would be something around past 12 hours.
  + This graph section would also include multiple graphs for a user to view.
  + I also included the concept of a slider where a user can look back in time or potentially forward in time depending on the graph they are looking at: this idea came from how you would look at weather radar information.
  + The water column and the DO column were something that was introduced by a student before me to this group and they really enjoyed the idea of having something in the column format. They provided me values and colors to associate with those values.
  + The chlorophyll and phycocyanin gauges are also something I had found on another GVSU AWRI website where it shows off the levels of those organisms and what is considered to be an algal bloom and a harmful algal bloom (this comes from the phyco levels).
  + The wind speed container has the wind speed and direction as both text and a visual widget.
    - For this it was mentioned that maybe with something like this to have the background of the wind direction indicator have a color that indicated the intensity of the wind speed. (Similar to like you would see flags at the beach for warnings.).
    - They also asked to include compass for the direction of the wind arrow.
  + The last container to talk about is the Air Temperature container, something to indicate rain in the past hour, the current humidity, and the current barometric pressure.

**Slide 8:**

* So, I turned the previous into this page. Currently we are looking at my local host version but there is also a GVSU cis version of this available.
* I will note however there are some visual bugs that I have yet to completely iron out, but it is the same code I have on my local machine.
* I will take us to the live site right now to interact with this a bit:
  + The links on the nav bar will take the user to the other pages that I showed off earlier.
  + The graphs I made in other programs but ideally in the future these would be live graphs and generated using something like D3.
  + Similar concept with the widgets:
    - The compass as you can see is not showing a direction. But it is here for a proof of concept and a place holder for when I find a better widget to use in this spot.
    - The gauges are something that I ended up making in bas JS/CSS, but there are ones available on JQuery that I also would like to implement.
* For the graphs:
  + Graph 1: Made in Tableau
    - The blue line is the top water temp while the orange is the bottom water temp and then the gray is the air temperature.
    - Here you can see there are some missing data points for the water temperature.
  + Graph 2: Made in Tableau
    - Is showing off dissolved oxygen concentration at top and bottom of the water and the wind speed.
      * The arrows I have included are meant to act a fake wind speed direction.
      * This is something I would like to also eventually make is the arrows on the point are pointing in the direction of the wind.
  + Graph 3: Made in RStudio
    - Thermocline depth is a thin layer where temperature changes more drastically in this depth than in the layer above or below it.
    - I was able to find a package in R that calculates the thermocline depth.
    - With the data I provided it calculated the thermocline depth to be at about 9 meters down.
    - I would take this with a grain of salt as typically from what I found reading is the thermocline is a range of depths and not just one specific depth.
* This main page is a great starting point to show off to Bopi’s Lab at AWRI since this can show off what they want in a real site that is still static but will eventually become dynamic.
* There is still plenty more to improve on for this site but overall, for not having done web dev before this semester I am quite happy with how it came out.

**Slide 9:**

* So, I mentioned some of them earlier but here are the tools I used for this project:
  + Adobe Xd: The site mockup
  + VS Code: For the webdev (JS, CSS, Html)
  + Tableau: Making the first two graphs
  + R Studio: Making the thermocline depth graph.

**Slide 10:**

* I am also providing a link to my GitHub page where I am currently storing all the files for this project.
* And the GVSU hosted site I made for this.
* Thank you for listing and watching and good luck on everyone’s finals!