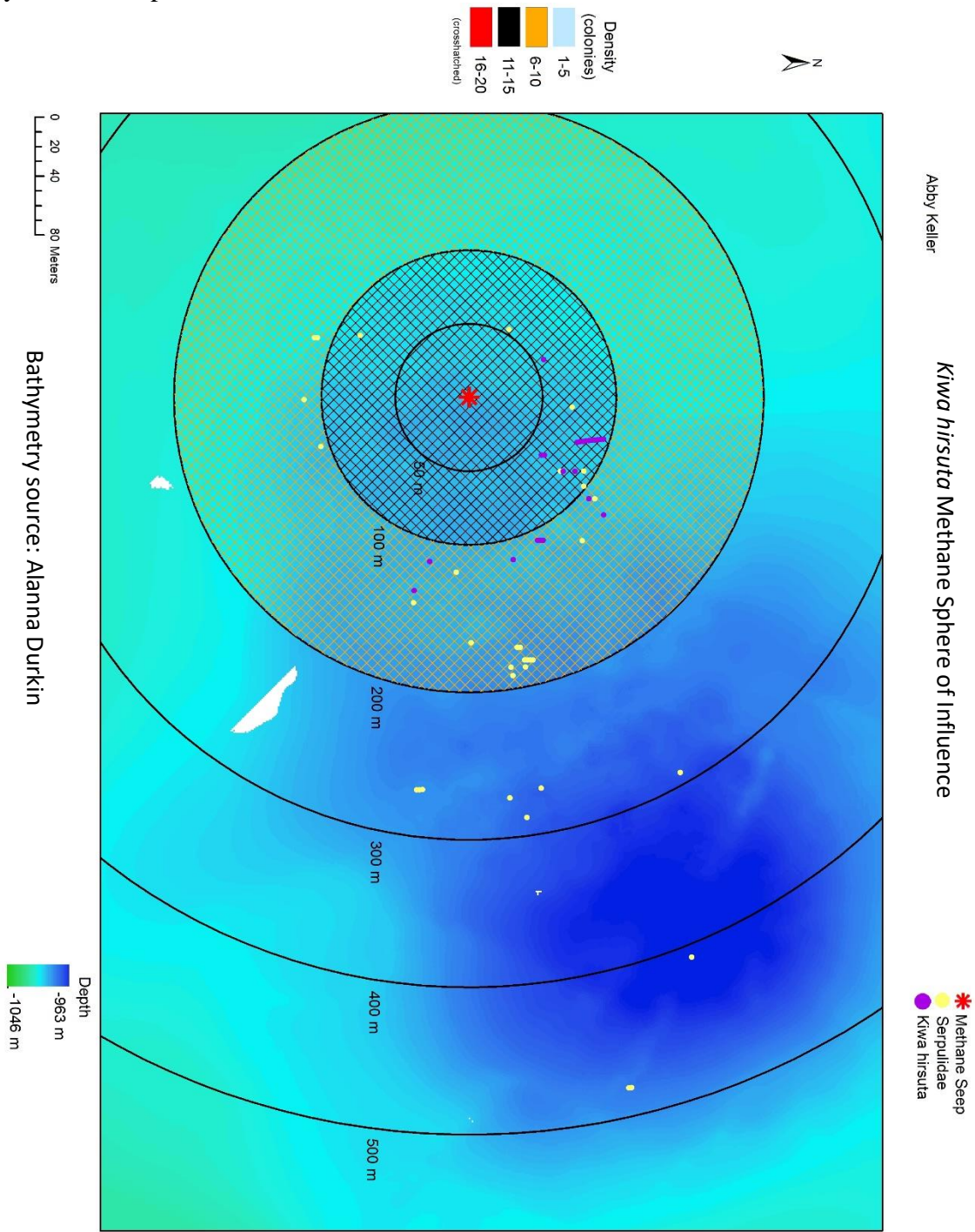


Research Question: What is the sphere of influence of a methane seep on organisms supported by methanotrophic bacteria?



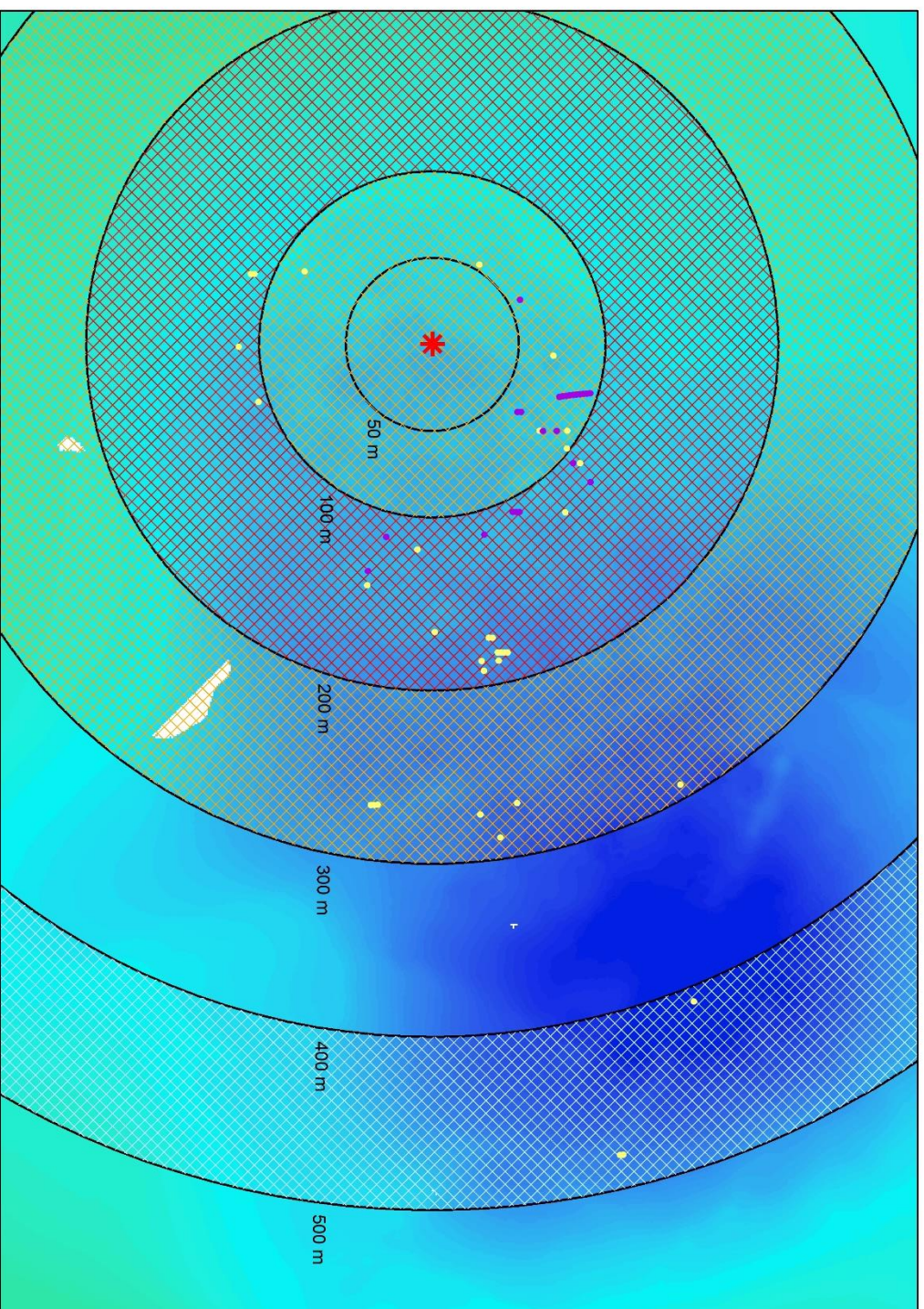
Abby Keller

Serpulidae Methane Sphere of Influence

- * Methane Seep
- Serpulidae
- Kiwa hirsuta



- Density
(colonies)
- 1-5
 - 6-10
 - 11-15
 - 16-20
- (crosshatched)

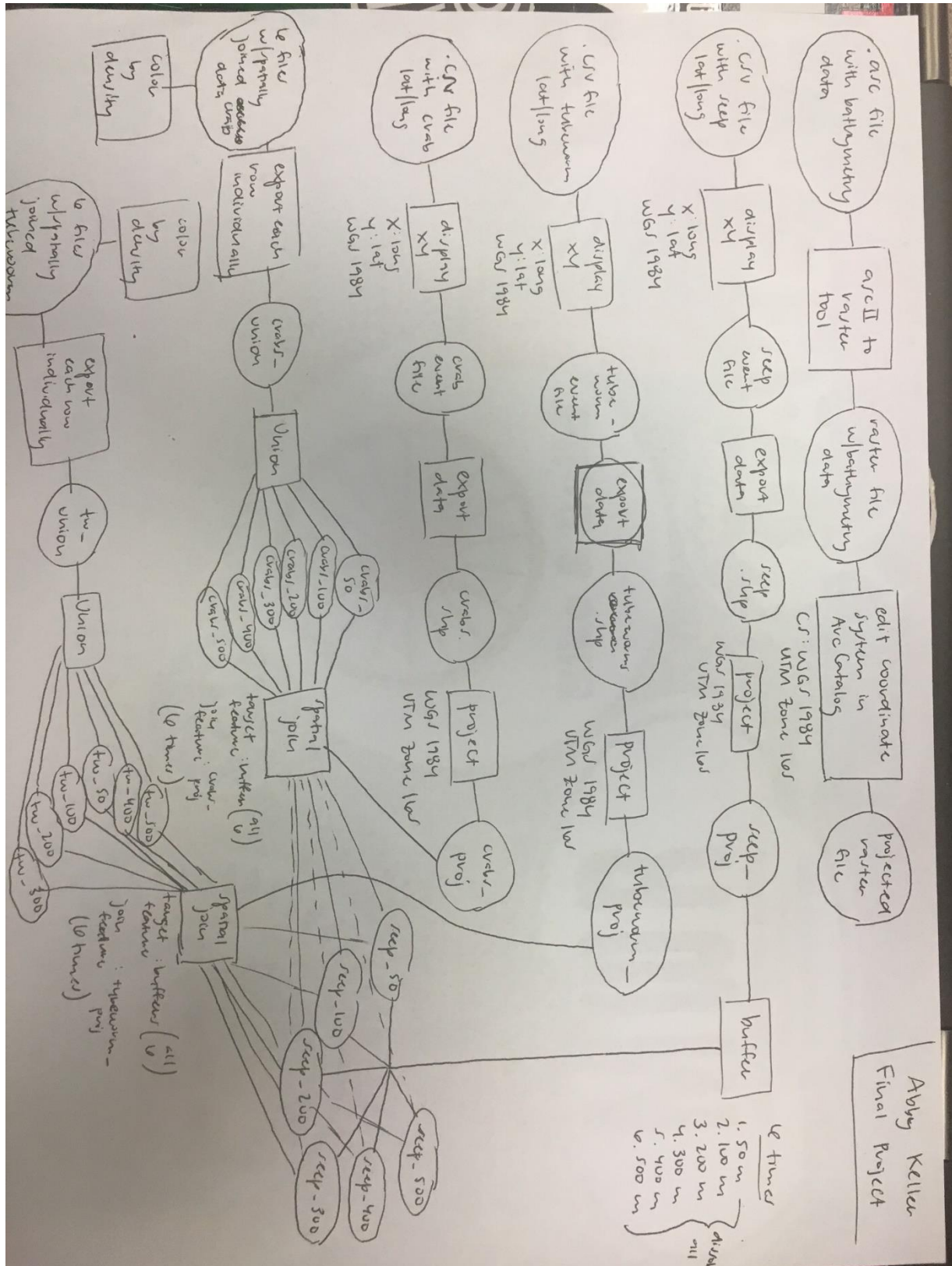


0 20 40 80 Meters

Bathymetry source: Alanna Durkin

Depth
-963 m
-1046 m

Plan: Visual Representation



Plan: Step by Step Instructions

Files to start:

1. .asc file with bathymetry data
2. .csv file with seep lat/long
3. .csv file with tubeworm lat/long
4. .csv file with crab lat/long

1. Convert .asc file to raster (asci to raster tool)
2. Edit raster coordinate system in ArcCatalog to WGS 1984 UTM Zone 16S
3. Display XY for the three .csv files (WGS 1984)
4. Export data
5. Project the pointfiles into WGS 1984 UTM Zone 16S
6. Add 6 buffers around the seep point: 50 m, 100 m, 200 m, 300 m, 400 m, and 500 m
7. Spatially join the tubeworm pointfile to all six buffers
8. Create a union with the six spatially joined tubeworm files
9. Export each section (row in the attribute table) of the union individually
10. Color by join count
11. Spatially join the crab pointfile to all six buffers
12. Create a union with the six spatially joined crab files
13. Export each section (row in the attribute table) of the union individually
14. Color by join count

Visual hierarchy is how different elements are arranged in a map or other visual representation to denote relative importance. This is especially important in my maps because there are many layers of information. The least relevant component of the map is the bathymetry data, or the depth of the ocean. In terms of understanding the influence of the seep, the depth is not as important, so it sinks into the background. What I wanted to highlight was the idea of “sphere,” so I added concentric circles/buffers coming out of the seep, and they are most prominent in the map. Also, the colors of the points showing organism presence are highly contrasted to bathymetry colors. You can somewhat get a sense of organism density just by seeing the clusters of the points, but I wanted to supplement this density by adding an element of quantification. Therefore for the density, I did crosshatching with different colors, so it corroborates what is shown by the points but is not overpowering.

I think the biggest challenge I faced this semester was not getting frustrated. I would come to class at 5:30 after working 8 or 9 hours, and usually the last thing I would want to do is have a tough time with GIS. It is easy to get frustrated or annoyed if you make one error that affects or inhibits your downstream success as the problems progresses. However, this frustration was most often mitigated by my peers and also just telling myself to relax. This class was a very collaborative and supportive environment to learn something that was new to all of us. Typically if one of us was having an issue, somebody else in the class had the same experience and could offer some advice. I definitely learned to not get panicked and either start over and retrace my steps, and often it is much easier to just ask questions rather than try and agonize over something yourself. I also found that I learned the most by just messing around with the program. I found that if you understand it only in a formulaic way, you are unable to problem solve. Especially when I was working on my final project, I would try different ways of getting to the same

outcome and would learn a lot. Sometimes ArcGIS can be glitchy or frustrating, but if you can find multiple ways of achieving the same outcome then you can find solutions to the problems.

I probably struggled most in the course when we had to synthesize and combine tools that we had learned at different points in the semester. It is easy to apply a concept that you just learned, but once you have to combine concepts and tools that you practiced and learned separately, it gets much harder. This is where I found the plans very helpful because it forces you to slow down and work through a problem step by step rather than trying to get to the solution too quickly.

I am actually signed up to take environmental GIS in this fall semester! I really enjoyed this class because although it was a bit intimidating at the beginning, it is basically like doing puzzles (and I love puzzles!). I am hoping to go to graduate school for Environmental Science and/or Environmental Management, and GIS is used a lot in that type of work. I am interested in the management of natural resources, and GIS is a great way of understanding large amounts of spatial data that helps with this management. It is typically difficult to understand large amounts of different kind of data at an ecosystem level, but GIS provides the tools to understand it visually and geographically. I took this class to see if it is something that I would want to integrate into a career, and after this semester I am hopeful about a future using it.