Commercial fishing has long been a cultural mainstay in New England, and the economic gains that are derived from the fishery are undeniable. While fisheries are a renewable resource, they do require close regulation to ensure that the catch does not exceed the ability of the fishery to replenish itself. The goal of this project was to gain a better understanding of the complexity of regulation that exists off of the Northeastern coast. Specifically, the project delves into the closure of the Cod & Haddock (Northeast Multispecies) fisheries, looking at biomass and fishing density in the regulated area, as well as the bathymetry of the region. Using these datasets I was able to get a more complete picture of some of the driving factors behind fishery regulation in the Gulf of Maine (GOM).

### Methods

In order to get a better idea of the regulatory methods used by the New England Fishery Management Council, it was first necessary to map regulated areas. Unfortunately, the NOAA has yet to publically release GIS data for the new multispecies fishery closures. I was able to create polygons of the regulated areas based on the latitudes and longitudes that accompanied the official rule. I used Vessel Monitoring System (VMS) data to look at multispecies fishing intensity in the Gulf of Maine. I then overlaid the fishery closures onto the intensity raster. As expected there is a sharp decline in fishing intensity in the closure areas. However there is multispecies fishing activity in the closure areas. This is because the intensity data was collected over years, during some of which the closures where lifted.

### Limitations & Conclusion

The primary limitation to the scope and depth of this study was the availability of Data. Though there is consistent and regular data for the yearly commercial catches of Cod and Haddock, the data is not spatially linked. Catches are reported by weight at the docks and are only categorized into vague locations that relate to very large areas like the entire Gulf of Maine. It would certainly help regulators to better understand catch data if it was recorded along with information on where each haul was brought onboard.

That being said, regulation in the Gulf of Maine is certainly having an effect. Looking at the fishing density data it is clear that vessels do avoid the closed areas. The regulation is also clearly well aimed. The "Closures at Juvenile Depths Map" overlays bathymetry data that corresponds to the tendencies of juvenile fish. It reveals that 77.8% of the closure area covers areas with depths that correspond to habitat for juvenile individuals. The biomass and species richness maps indicate that there is little correlation between these two factors and the regulated areas. However, both factors are deeply important to the health of the fishery and are worth noting as such.

Finally, through regulation has helped limit commercial Haddock catch to a sustainable rate, Cod stocks are in critical condition. The federal government has implement rolling closures for 2015 as a temporary measure. In the coming years, GIS analysis and strong data collection will prove vital to the proper management of the Gulf of Maine; a natural resource of extreme intrinsic and extrinsic value.