



Offshore Oil and Gas Industry Risks to the Environment

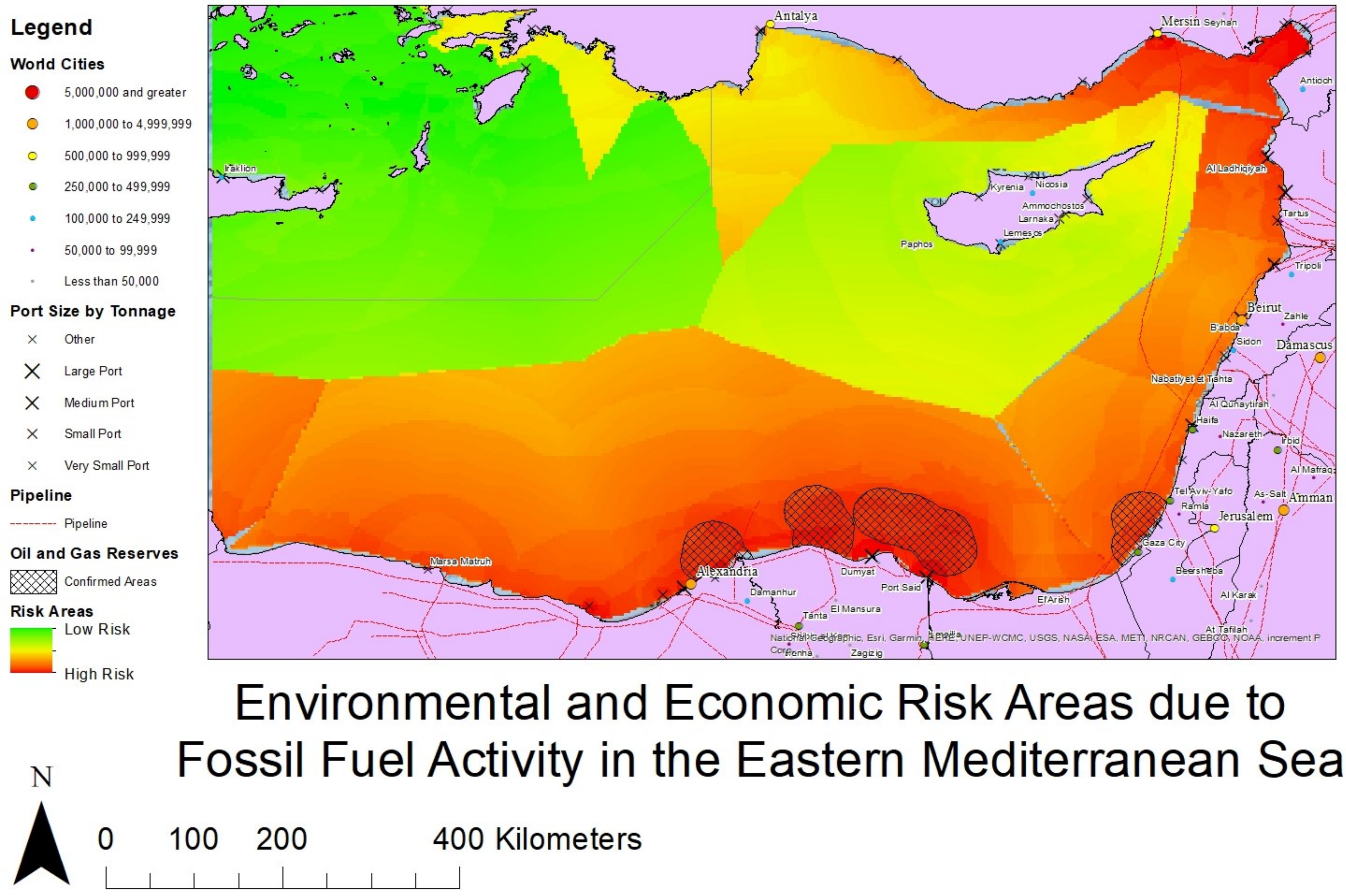


Introduction

In the 2010s, oil and gas deposits were discovered in the Eastern Mediterranean Sea, in part because of drilling technology that allows companies to drill much deeper. However, with a warming earth, its becoming obvious that the oil and gas industry has effects on other industries that need to be considered. I wanted to map out the fossil fuel fields and ongoing extraction projects in the Eastern Mediterranean Sea. I wanted to know where these projects are in relation to the other industries, and how that calculates into the risk factor. The industries I chose was fishing and tourism, since they both rely on a healthy environment and are significant sectors in the region.

These had the most obvious connection, since an oil spill can ruin a beach or a fishery. Additionally, since tourism tends to be in urban areas, it also factors in many other effects that could stem from a natural gas-related accident or oil spill (I included urban areas as a factor in tourism activity levels).

For my project I decided to go with a raster suitability map to show what areas of the Eastern Mediterranean are most at risk of having issues due to the proliferation of offshore oil and gas drilling. This shows where the industries intersect the most.



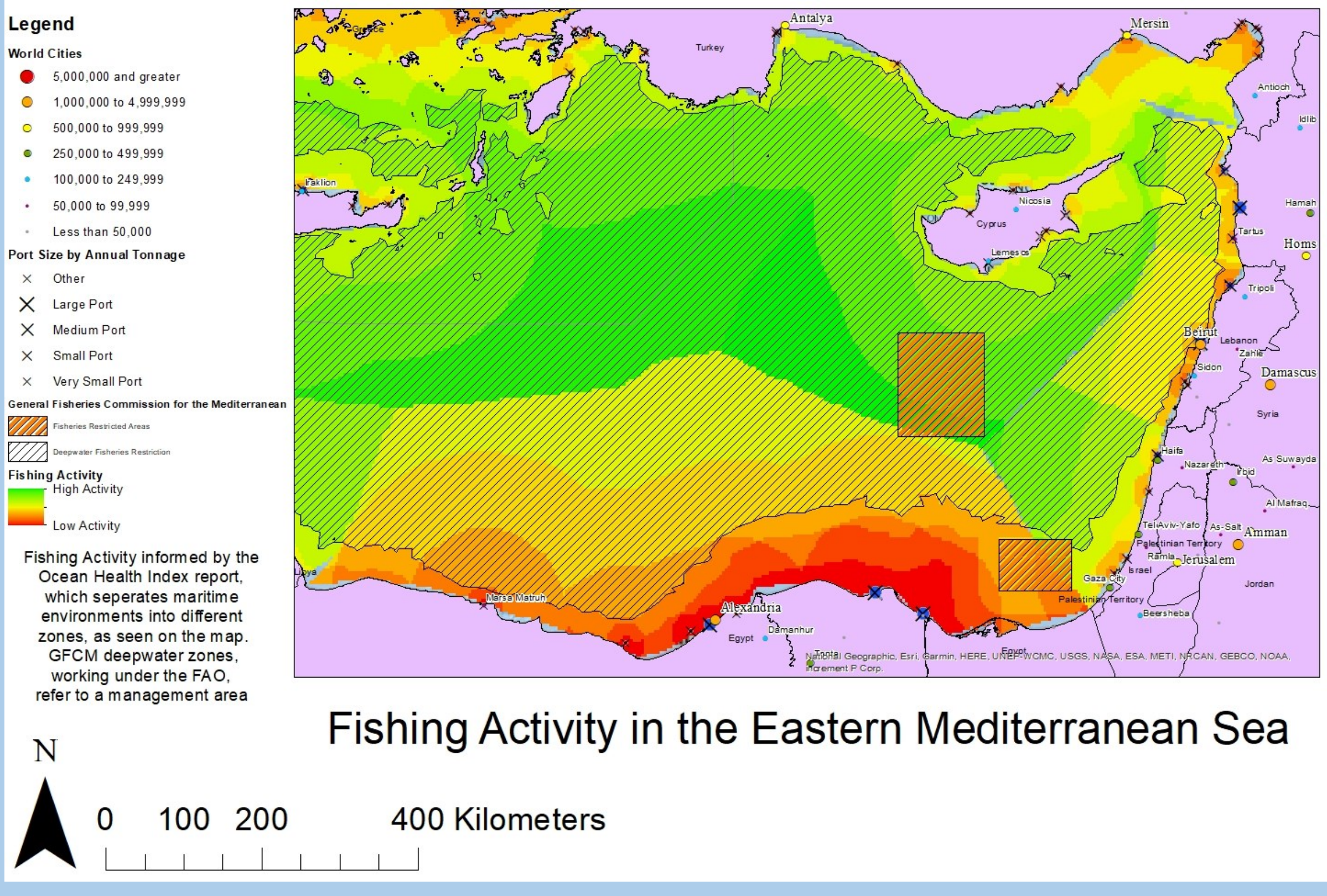
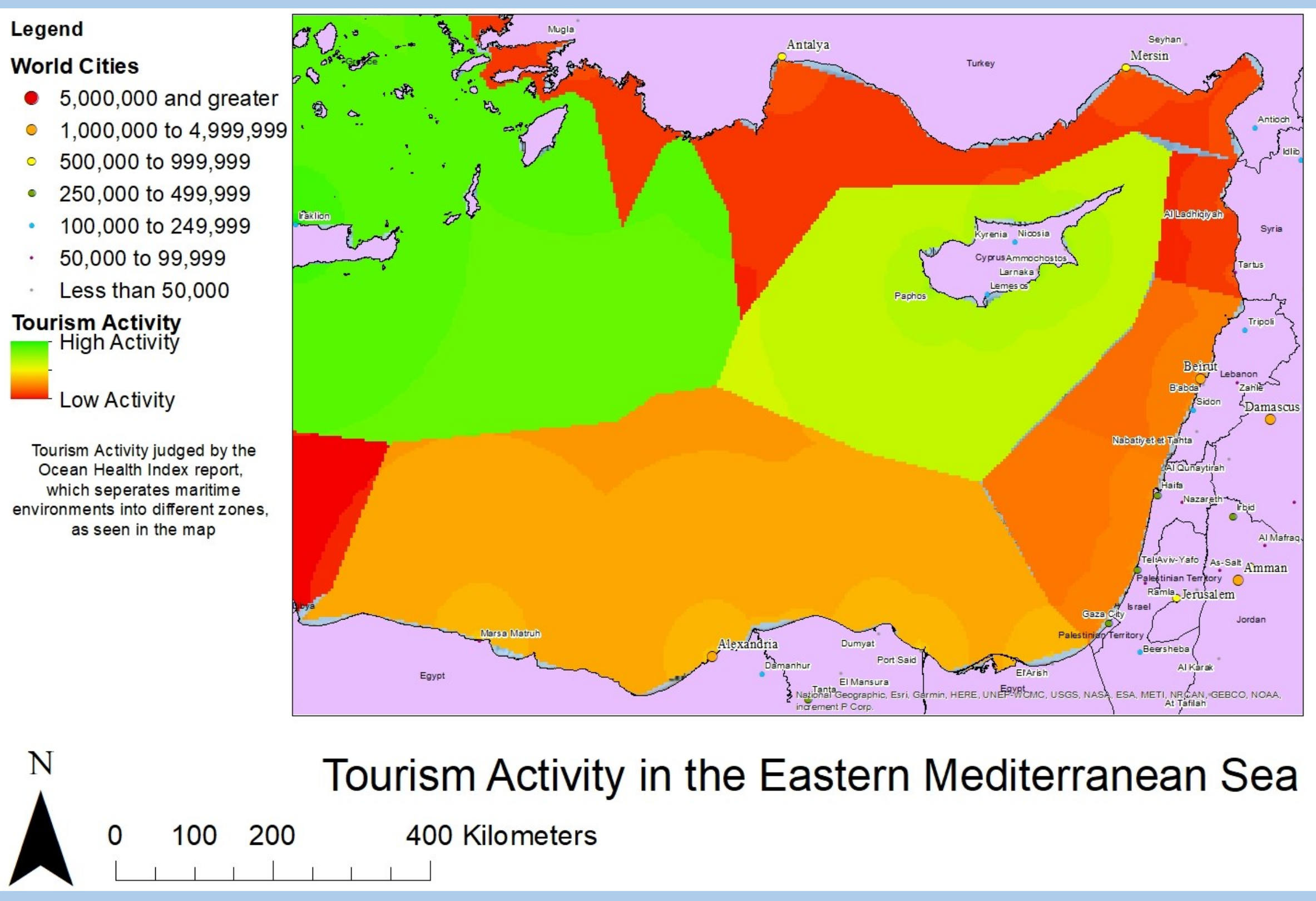
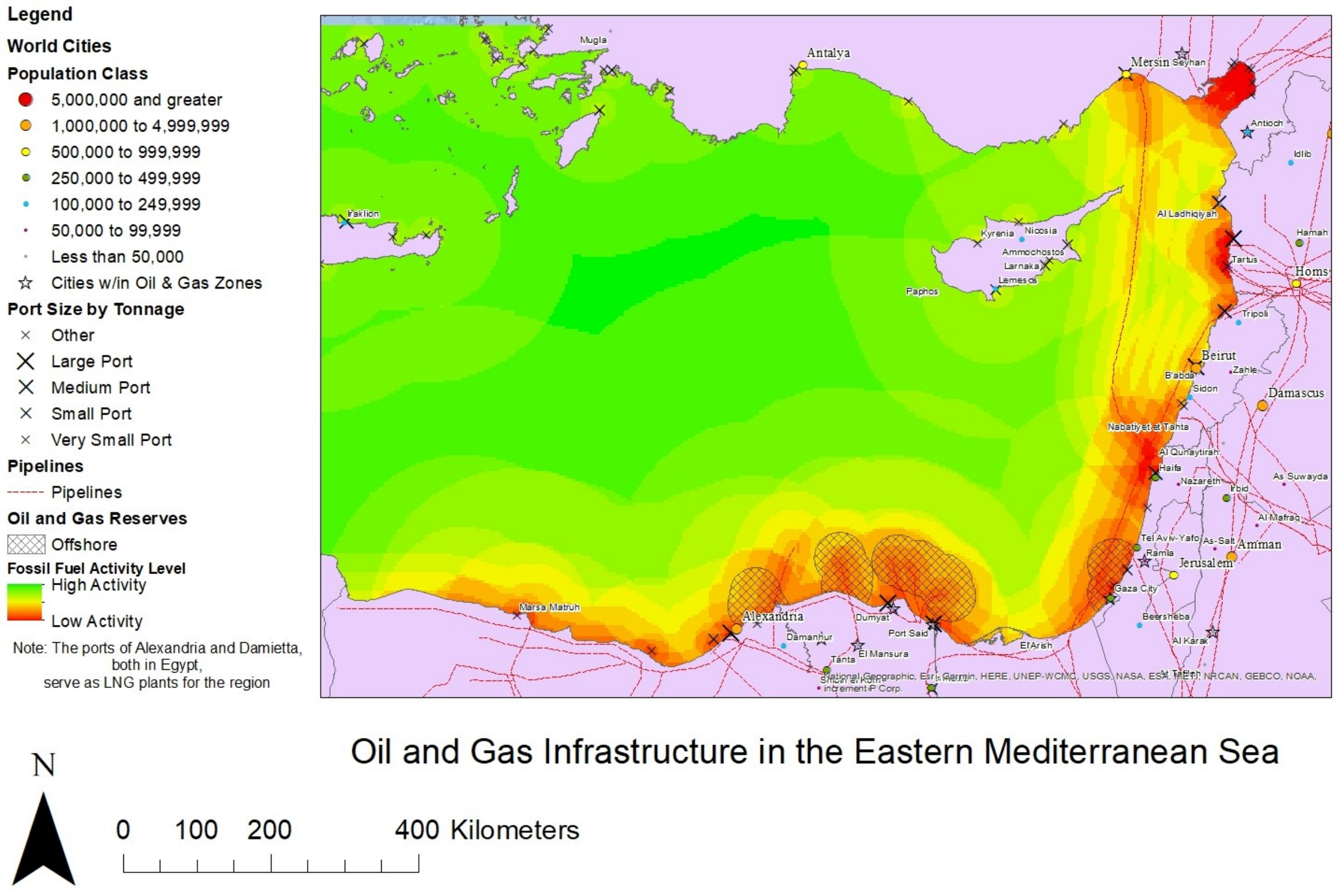
Methodology

Data compiling
Sourcing it from both my research, primarily from the Ocean Health Index and the ESRI database, I put all the data onto one map to make it easily comparable for me. This helped me to understand what direction I wanted to go in. The OHI is an initiative to look at the environmental and economic health of the oceans, using various zones (six of which are visible on my maps). These zones are scored 0-100 in various categories, including fisheries and tourism, as shown here.

Create fossil fuel, fishing, and tourism maps
Using the data, I created three separate maps to show the basic factors for each of the industries I wanted to analyze. This included laying out infrastructure such as pipelines and ports, looking at the cities of the region, and where current fossil fuel activities are taking place.

Raster analysis
From each of these maps, I made each of the factors into a raster and then divided it into five categories, based on things such as Euclidean distance or the OHI index score. Since the OHI index is 0-100, I had to scale it down so that it wouldn't overpower the other factors, which I split into five point scales.

Total raster analysis
After this, I brought the three raster layers into the main map and performed a raster calculation for all of them, thus showing where these three industries intersect, and so where the greatest risk is. This can give a very rough estimate of where the greatest threats from the oil and gas industry can occur, since the geospatial relation between the points show areas most likely to have an incident or ongoing damage from increased activity occur.



Results and Conclusion

What these results show is that there is significant risk to expanding oil and gas drilling in the Eastern Mediterranean sea, even before you begin to consider the additional damage that climate change could due to the region. The final map shows us that the highest risk areas are along the Nile Delta, off the coast of Israel and Lebanon, and near the border of Syria and Turkey. Syria and Turkey have outsized risk due to a large conglomeration of ports and pipelines coming from Syria, Iraq, and the Arabian Peninsula meeting in that area, providing energy to Turkey and the rest of Europe beyond that. Egypt and the Levant region have a large risk due to a heavy extraction industry in addition to large amounts of fishing, especially in Egypt, and that coastline being a tourism hotspot. Importantly, some of the largest cities in the region, such as Alexandria, Tel Aviv, and Beirut all sit on that coast. Clearly, without considering this in any development plan for the expansion of Eastern Mediterranean offshore oil and gas extraction, the potential loss from the drop off in fishing and tourism could ruin any economic benefits from the oil and gas industry.

References

Mark Benedetti
Intro to GIS
8 May 2020
Source: ESRI; Tufts M Drive, Ocean Health Index
Projection: Mercator
Coordinate System: WGS 1984
(clockwise from top right) Photography Credit: Fiske, Gavriel, and JTA. 2013. "No Oil Found in Promising Mediterranean Coastal Well." The Times of Israel, October 14.
Photography, JM Travel. 2016. "Marsaxlokk Harbour And Traditional Mediterranean Fishing Boats I." Fine Art America.
Royal Caribbean Cruise Lines. 2020. Mediterranean Cruises. <https://www.royalcaribbean.com/sgp/en/mediterranean-cruises>.