MAP DESIGN FOR SHORELINE OIL CLEANUP SUPPORT

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BACKGROUND AND OBJECTIVES

When oil is released into the shoreline by oil spill accident, it can be affect coastal ecosystems and human environment. Oil spill response strategy is necessary to prevent oil diffusion and reduce the polluted area. The strategy should be built through considering shoreline environment, oil feature and response resources which are related to the geographical characteristic.

Geographic information about the vicinity of the shoreline is the foundation of response strategy. So map is very important tool in order to make response strategy. Specific map for shoreline oil cleanup support is necessary because a general map of the shoreline is very complex and includes unnecessary elements.

In this study, map is designed in order to support shoreline oil cleanup decision making.

APPROACH AND METHOD

First, the process of making shoreline response strategy is analyzed and then key spatial elements are derived. They should be the map elements and they should categorized by shoreline segment which has homogeneous spatial features and becomes the response work unit. The criteria for segmentation are defined and reflect shoreline features. Along with segmentation criteria, segmentation identifier rules are defined. Segmentation ID is implicit in the segmentation features which are related to oil spill. Segmentation ID is composed of the acronyms.

Second, spatial data and their attributes are collected through the field survey, paper study and so on. Segment attributes include cleanup method, biological constraints, response caution and so on which are considered the response features of the each segment. These datasets are built into GIS database and then segment layers are extracted by segmentation criteria. ESRI ArcGIS Desktop is used to build GIS datasets and Segmentation.

After GIS datasets for supporting shoreline oil clean is built, map symbols are defined and map layouts are designed. They can be utilized in ArcGIS and Google.
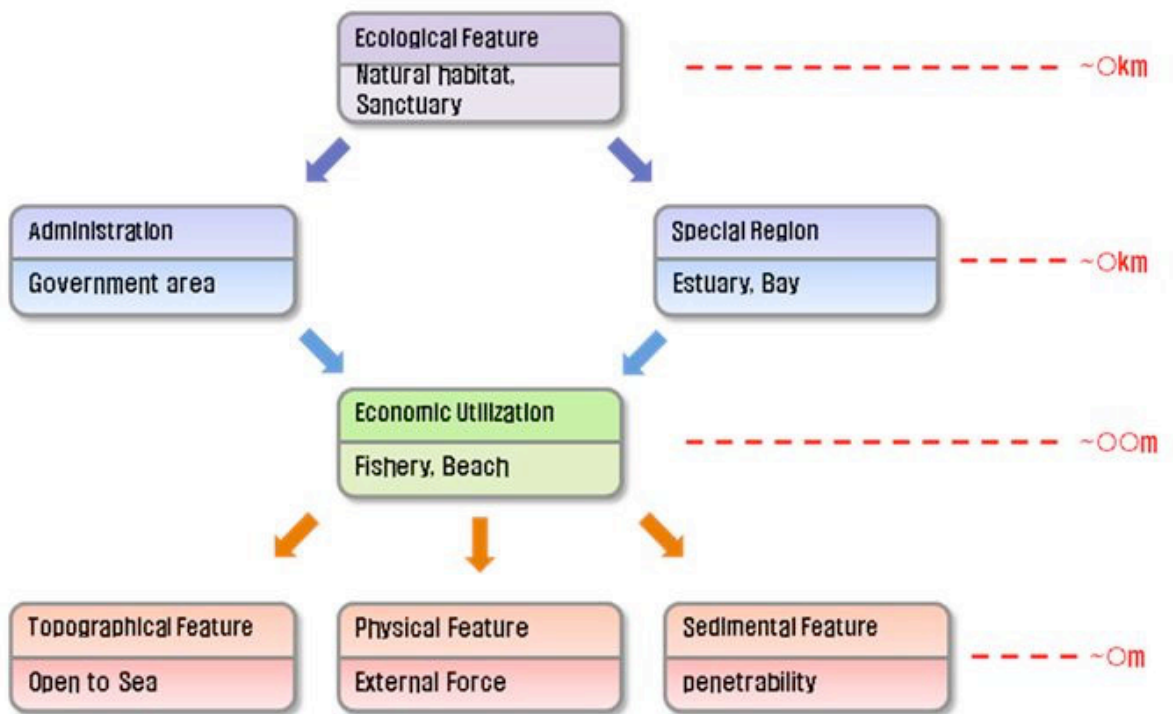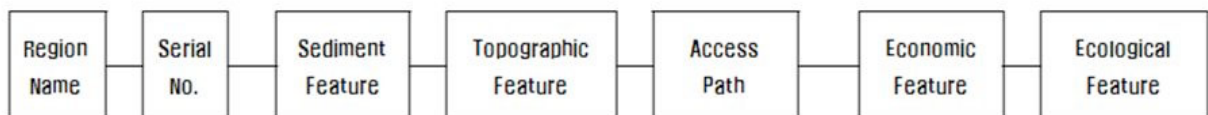
Figure 1 Segmentation Criteria

Figure 2 Segmentation ID Rules

Table 1 Layer Symbol and Display

Layer Name	Display Priority	Display Scale Range	Symbol
Biotic Resources	3	1:25,000~	
Fishing Village Cooperatives	5	1:25,000~	
Fisheries Cooperatives	6	1:10,000~	
Fishery, farm	3	1:50,000~	□ 가두리 양식 □ 마을 어업 ■ 양식 □ 패류 양식
Fishing Port	3	1:50,000~	
Accommodation	4	1:50,000~	
Camp Site	4	1:50,000~	
Seaside Park	3	1:50,000~	
Beach	3	1:50,000~	
Bistro, Retail	3	1:50,000~	S 상가 소도매상 ⊓ 식당 회관
Oil/HNS facility	7	1:10,000~	
Response Organization	2	1:100,000~	
Segmentation	1	1:100,000~	

RESULTS

In this study, map is built for Taean area of South Korea through our approach. This area has experienced Hebei oil spill accident in 2007. This whole area is defined by National Marine Park and there are various fishery activities and tourist attractions. This shoreline is rias coast. This area is divided into 12 segments as following figure.
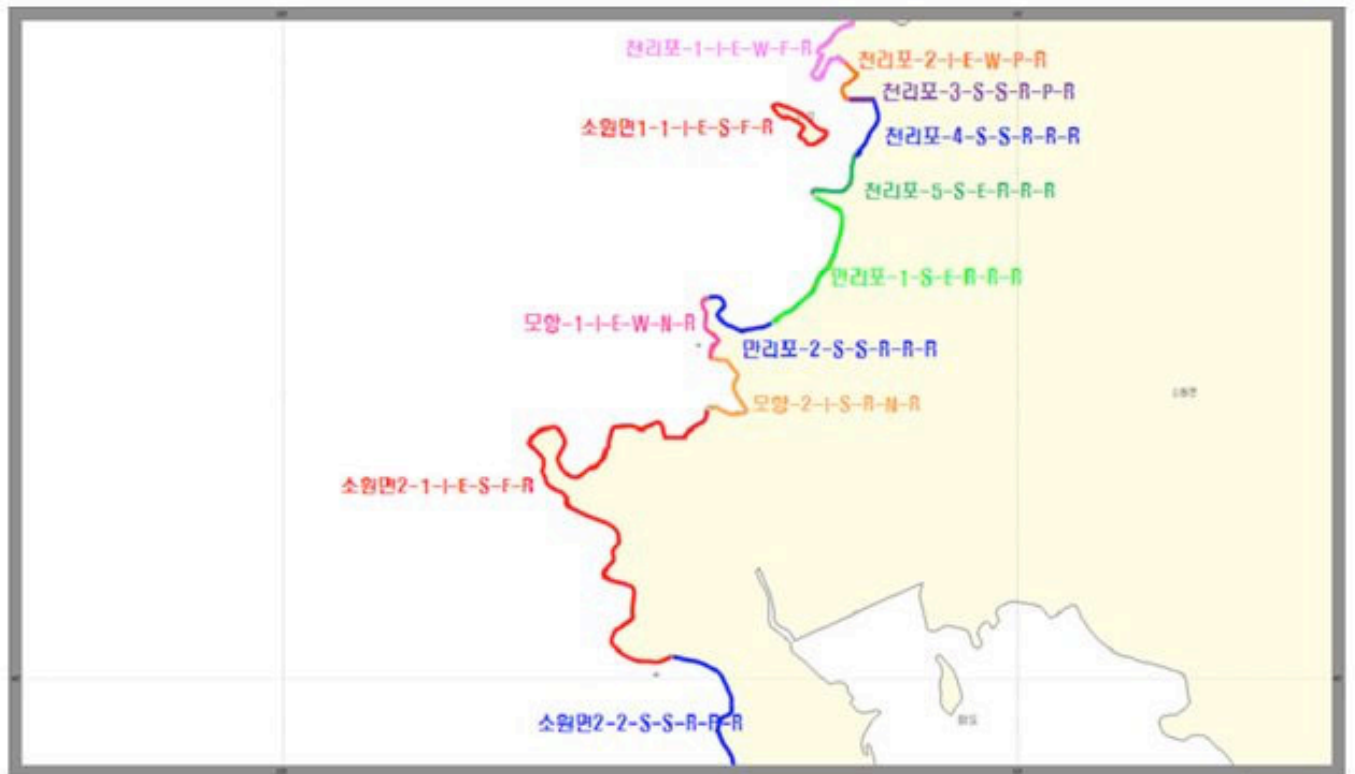
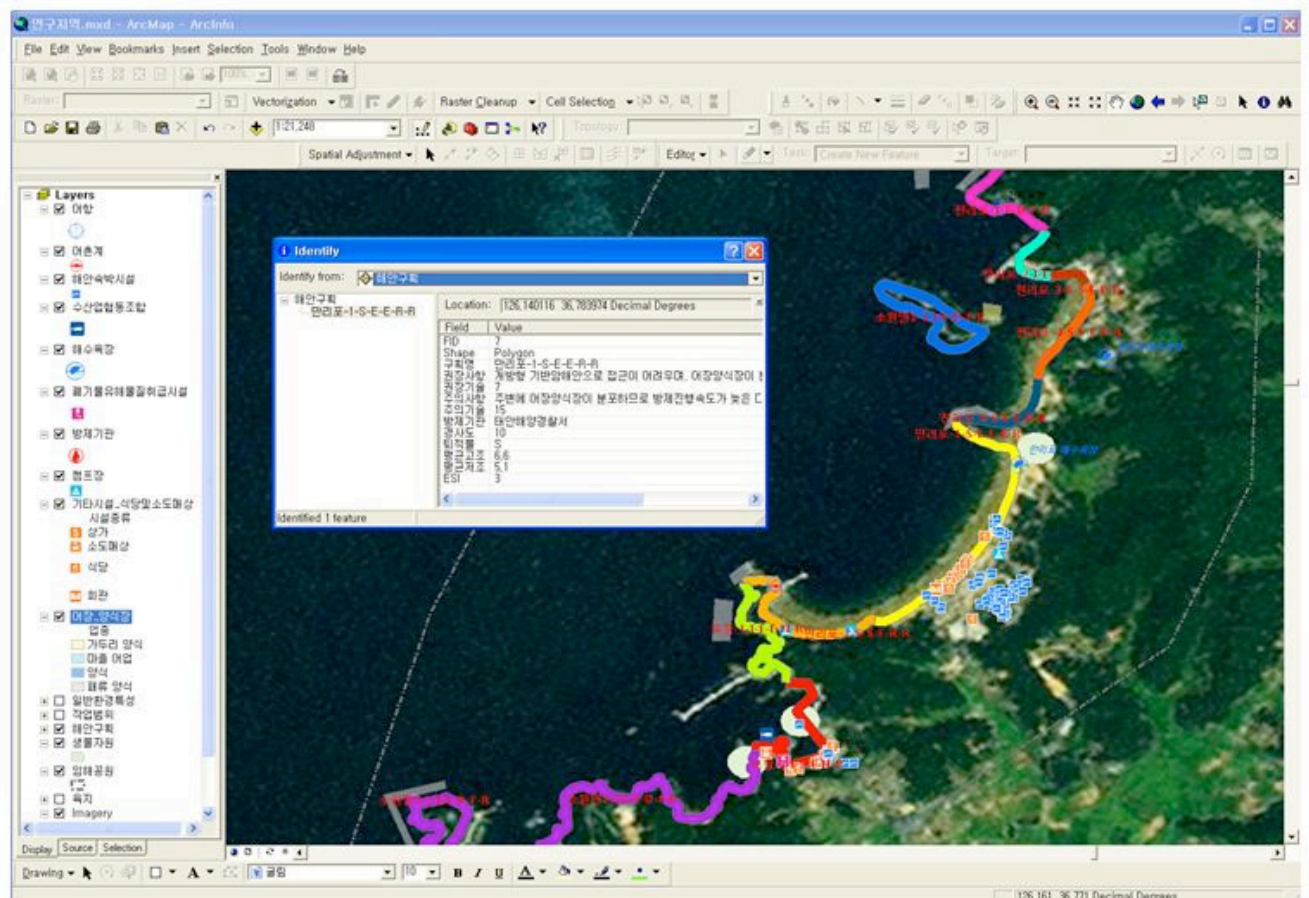Figure 3 Segmentation of the Study Area (Taean, South Korea)

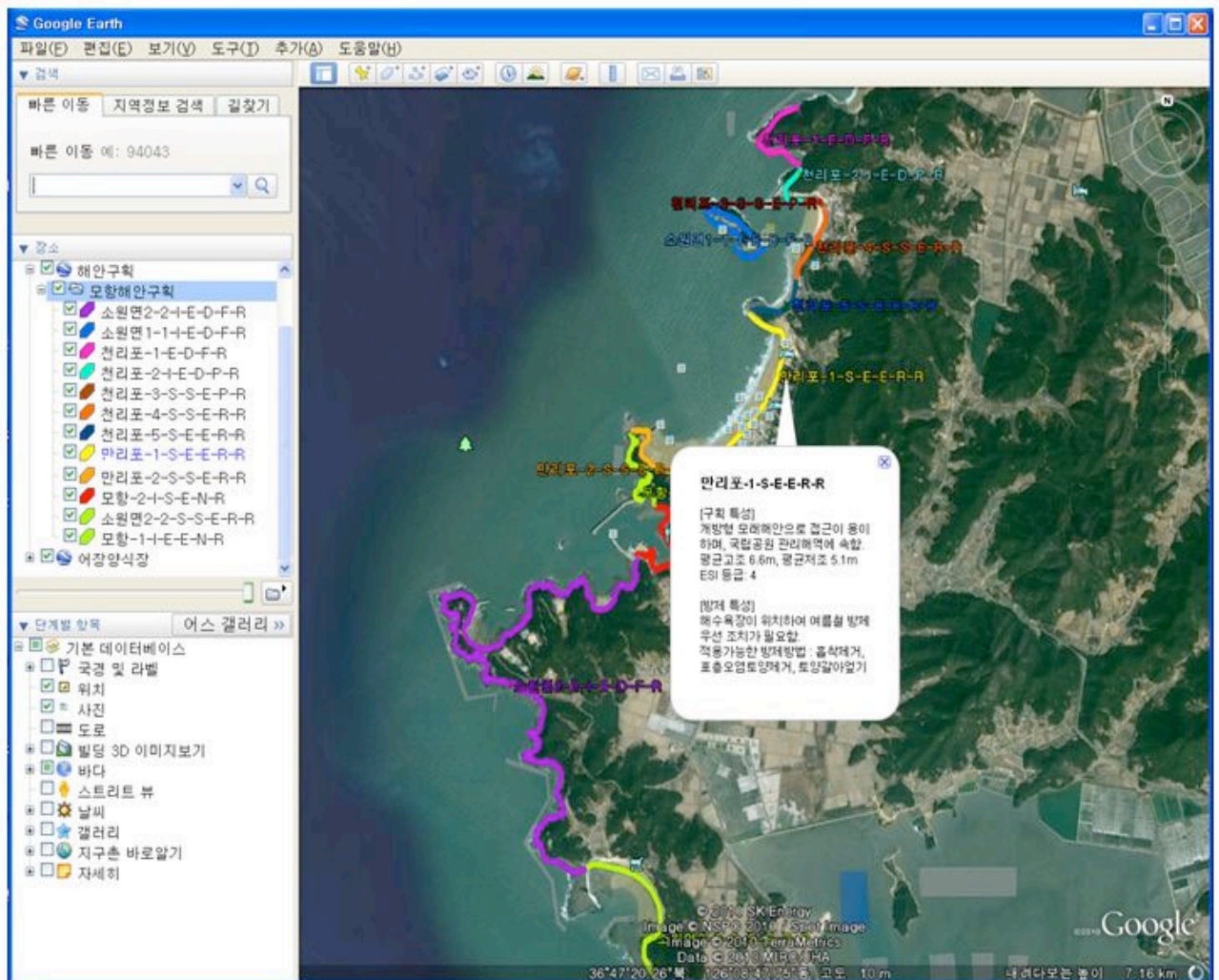Figure 4 Shoreline Map Utilization on the ArcGIS

Figure 5 Shoreline Map Utilization on the Google Earth

CONCLUSION AND FUTURE PLANS

Shoreline oiling accident is very complex issue to various stakeholders and organizations and so that oiling assessment works and response works are carried by predefined process and objective method. Shoreline map for oil cleanup support is a good tool for objective and scientific works. GIS based shoreline map is very efficient to utilize various information of coastal area. Through this study, GIS map for shoreline cleanup is built and these spatial dataset are provided by ArcGIS and Google Earth.

In next study, shoreline map design will be separated into two user group; workers for response and general users such as residents, the press, NGO and so on. Professional map for workers should include more professional functions such as map editing, map producing and internal information identifying. On the other hand, the map for general users should be light and easy to use.

ACKNOWLEDGMENT

REFERENCES

ESRI, http://www.esri.com

Google Developer's page, http://code.google.com