

ECOLOGICAL PROTECTION WHEN DEVELOPING OIL ON A SHELF BY MEANS OF GIS TECHNOLOGIES

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ABSTRACT:

Coastal areas are among the most developed places. The most prominent issues are oil pollution. We developed GIS system for accidents prevention and taking response measures in oil spill risk areas. Such system considers the environment sensitivity to oil pollution, which allows managing the situation and making efficient decisions. The informational-analytic system core is the coastal sensitivity maps to oil pollution. The sensitivity indices make it possible to choose the technology for response measures in risk areas. For choosing the most appropriate technology we suggest to use the matrix as it allows selecting combination of optimal response measures based on local conditions. This is how the process of operational modeling works. It is not possible to predict precisely the place, time, scale of oil spills. We could use different scenarios that we put into the system. Usually we consider the typical and worst conditions in main seasons. To sum up our GIS mapping system based on the coastal areas sensitivity to oil pollution is used for planning, obtaining reference data, making predictions and recommendations. The available algorithms allow setting priorities and form complex environmental safety system.

Major oil spills risk near Russian Far East costs increasing, organizations on prevention of oil spills should be well-informed not only of conditions and parameters of oil recovery system resources and potential pollution sources but of the objects that can be damaged by pollution or by the preventive measures as well. Comprehensive information support characterizes completeness of the Oil Spills Contingency Plans and the system work effectiveness in the whole. Information reliability and timeliness play a crucial role in the matter of minimization of damage from oil spills. In this case coastal zones maps of sensitivity to oil contamination are the most suitable for surveying and analyzing the present-day state of natural resources, other resources, and their sensitivity to oil contamination.

Maps of sensitivity represent a system that enables to store various information with geographical relation as separate components that a user can download when necessary. The components of these maps are the following:

- basic maps (abris of coastlines and adjacent seashore and shorelands, that are related to geographical coordinates and mapped at the scale that enables to carry out necessary detailing);
- geomorphologic characteristics of coastlines (define period of natural recovery, complexity of mechanical removal and presence of biological components);
- climatic and hydrological conditions (define an oil patch behaviour, probability of shoreline oiling, choice of a response action);
- biological variety of coastal areas (define coastline sensitivity degree);
- nature management objects (organizations working in the coastal zone, that can be damaged from oil spill or can provoke it).

Maps of sensitivity enable to rank coastal zone areas by degree of its sensitivity to oil pollution, and to quickly assess the damage from oil spill while using special-purpose software products. And it is possible to assess the damage not only for individual components but for the whole natural and/or social complex as well.

Maps of sensitivity perform one more very important function, which serve as the starting point when assessing the damage for the contaminated area, that is the possibility to assess the environmental conditions background. This function can also serve as a basis for making up a cadastre of coastal zones.

So, coastlines maps of sensitivity to oil pollution represent an information system that enables establishing a priority at combating oil spills, modeling and forecasting the process that has to do with oil spills, and also assessing an estimate damage from oil spill.

KEY WORDS: Geoinformation technology, oil pollution, oil accident prevention, sensitivity map