USE OF DIGITAL GEOPHYSICAL MAPPING DATA IN THE APPLICATION

OF THE RISK MANAGEMENT METHODOLOGY (RMM)

TO UNDERWATER RANGES

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The Risk Management Methodology (RMM) was developed to support risk management decision-making, help define remedial action objectives (RAOs), and provide a basis for assessing achievement of RAOs at Military Munitions Response Program sites. The RMM is applied to assess the potential explosive hazards at a site qualitatively by considering a series of risk factors that include: the likelihood of encountering munitions (which considers the quantity and depth of the discovered munitions), the potential severity of an explosive incident (which considers the amount and type of explosives in the munitions), and the sensitivity of the munitions to detonate if contacted by site users. Other risk factors relating to site and munitions accessibility, the frequency of area use, and the energy imparting intensity of the intrusive activities associated with the current or future site uses also are considered in the RMM. Underwater digital geophysical mapping (DGM) provides the site characterization data associated with the presence of munitions in an area and their horizontal distribution. Subsequent intrusive investigation of the anomalies detected by the DGM provides the needed information on the vertical depth distribution and type/condition of the munitions present. A summary of the application of the RMM to an underwater Munitions Response Site (MRS) defined as an assessment area is presented. The assumptions and alternate interpretations of some of the RMM risk factors needed to apply the RMM that was principally designed and tested for use at upland or terrestrial sites to underwater sites are discussed. The establishment of distinct assessment area boundaries within an MRS in consideration of the site history and the conceptual site model is discussed, along with how to account for possible sediment and munitions item migration in high energy marine environments. Suggestions are provided relative to organizing and formatting the DGM data and associated observational information to more easily support RMM analyses and re-analyses, especially in circumstances where the assessment area boundaries may be subject to change. The calculation of anomaly densities and spatial distribution patterns from the collected data and the development of a vertical conceptual site model relative to defining protective remedial alternatives are described. The effect of the degree of area coverage by the DGM, the type of surveys performed (e.g., grid versus transects), the survey system detection limits with depth for the munitions of interest, and the impact of obstacles or areas off-limits areas for the survey on the use of the DGM data in RMM analyses are discussed as uncertainties to the RMM application.