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Ecological Risk Assessment and Problem Formulation for Lake Uluabat, a Ramsar State in Turkey

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ABSTRACT / Unlike the United States and the European Union, developing countries do not have sufficiently structured legal and institutional systems to apply certain environmental management tools such as ecological risk assessment. However, it is important for countries with valuable environmental and ecological resources to have appropriate tools and to strengthen their environmental management capabilities and capacities for the sake of those resources. The case study described in this paper attempts to be a case study towards developing environmental management plans, especially in developing countries. The problem formulation step of Ecological Risk Assessment applied in this study contributed to the basic elements of an environmental management plan including the following: the partnership-building process, prioritization of the problems and issues of the ecosystem, and development of the action plan. Based on the information provided by participants from a series of workshops held to develop an environmental management plan for Uluabat Lake, ecosystem risks were ranked and an action plan was formed. The results obtained with the aid of fuzzy set theory provided a base for identification of the action steps by allowing scientific information to be included in the process. The degree to which Uluabat Lake's problem formulation fits into the existing legal framework of Turkey is also analyzed in this paper.

Environmental managers need tools and information that can be applied to a decision-making process in a timely manner. These tools deal with the management of information by collecting, evaluating, storing, and supplying the data and information to citizens, policy makers, government, and businesses (Storsdieck and Zimmermann 1994, Erdmenger 1998). Ecological risk assessment (ERA) is now recognized as one of the most important of these tools that can be applied to several ecosystems (Wenger and others]2000, Lemly 1997, Serveiss 2002), although it is not the final solution for environmental problem solving (Bartell 1997). Despite the ongoing debate about the validity of estimates obtained from risk assessment results (Power and Adams 1997; Power and McCarty 1997), most members of the scientific community of risk assessment agree that ERA is a useful process (Adams and Power 1997) to collect, organize, and present scientific information and to prioritize complicated environmental issues to improve decision making (Serveiss 2002, Van Leeuwen 1997).

In the United States and the European Union (EU), ERA is a well-developed tool with the necessary legal and institutional background (USEPA 1994, Van Leeuwen 1997, USEPA 1998) that facilitates the ERA to be used as a primary input into the environmental decision-making process.

Having industrialized rapidly and witnessed increasing levels of pollution, developed countries have learned that pollution prevention is less expensive than cleanup and base their environmental management efforts on that principle. ERA was born in this era, when the effects of pollution could not remain unnoticed (Van Leeuwen 1997), and was adopted by the United States and EU countries as a tool that served pollution prevention efforts and allowed scientific information to be included in the decision-making process.

The range of implications in these countries of the whole or certain steps of the ERA process are illustrated in studies addressing rivers (Wenger and others 2000, USEPA 2000), freshwater wetlands (Lemly 1997), watersheds (Serveiss 2002, USEPA 1996a), forests (Hogsett and others 1997), bays (Harris and others 1994), floodplains (Kooistra and others 2001), and valleys (USEPA 1996b). Current research seeks to improve

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