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Speech Title: Investigating Environmental Disputes Using the Graph Model for Conflict Resolution

Abstract: A groundwater contamination dispute arising in the town of Elmira, Ontario, Canada, is utilized to explain a rich range of capabilities of the Graph Model for Conflict Resolution (GMCR) and the associated decision support system (DSS) GMCR II. The Elmira case study is used to demonstrate the process of modeling and analysis within the GMCR paradigm in order to obtain strategic insights for supporting informed decision making. The modeling phase includes the identification of decision makers (DMs), options or courses of actions available to the DMs, and feasible scenarios or states which can occur, as well as the elicitation of each DM's relative preferences over the feasible states. The analysis phase involves the determination of stability of each state for each DM and the equilibria, which are possible resolutions, for the conflict according to a variety of solution concepts, which reflect the ways humans may behave under conflict, and coalition analysis, which checks if a DM can fare even better by cooperating with others. Ongoing research to expand GMCR in the areas of modeling uncertain preferences, considering psychological factors, handling hierarchical structures, and representing composite DMs is discussed. Three perspectives of further development in GMCR, forward investigation, inverse engineering, and behavioral analysis, are presented.