There is growing concern that water resource systems are vulnerable to climate variability and climate change. The projected impacts of climate change, in particular, have extraordinary implications for most water resource systems. As a result, water resource managers and policy makers seek the best possible sources of climate change projections and information to assist their decision making needs. However, there is lack of an accepted framework for incorporating climate information, with its inherent uncertainties and limitations, into the decision making and policy processes of most institutions. As a result, the typical analysis follows the climate modelers’ pathway of physical processes producing information that is often costly to produce and of limited value to decision makers. In this demonstration we propose and demonstrate a risk-based framework for the analysis of climate impacts on water resources systems. Risk-based approaches are gaining traction in the field of integrated assessment of climate change impacts as a result of a growing recognition of the irreducible uncertainties associated with climate change. The process proposed here builds from this work to develop a framework that is designed specifically for water resource systems and related infrastructure. It consists of three steps. The first step is a climate sensitivity analysis that is conducted based on past climate impacts and identification of the system vulnerabilities. The second step uses modeling to develop a “climate response function” that characterizes the response of the system to a given climate perturbation. The third step uses decision-scaling to tailor climate information to the climate response function to produce probabilistic estimates of climate risks. The framework will be illustrated with examples from actual water resource systems. Next, a strategy for managing climate risks will be discussed. The strategy focuses on dynamic management of the changing nature of climate to address risks that we can only partially anticipate. The resultant climate risk assessment and management approach is advocated for addressing future uncertainties in water resources planning and design.