Understanding and anticipating the effects of climate change on fisheries social-ecological systems is central to proactive fisheries management in a changing global climate. With fisheries management increasingly striving to consider interactions and feedbacks among people, targeted fish stocks, and the broader ecological and human communities, fisheries managers need tools to help them assess these complex systems. We developed a comprehensive framework for assessing the impacts on a fishery system from a climate-induced trend or event. This framework consists of a conceptual model and systematic approach to account for indirect as well as direct effects, links between subsystems, and multiple climate change-induced stressors. We demonstrate the framework's utility in both retrospective and prospective case studies. Unlike other Climate Vulnerability Assessment frameworks and applications, ours is designed to fully consider all significant aspects of both the ecological and human communities. This extent and breadth of this framework's considerations provides a valuable approach for examining and assessing potential impacts to a fishery system.