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Adaptive Management using Remote Sensing and Ecosystem Modeling in Response to Climate Variability and Invasive Aquatic Plants for the California Sacramento-San Joaquin Delta Water Resource

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The California Sacramento-San Joaquin River Delta is the hub for California's water supply and supports important ecosystem services, agriculture, and communities in Northern to Southern California. Expansion of invasive aquatic plants in the Delta coupled with impacts of changing climate and long-term drought is detrimental to the San Francisco Bay/California Delta complex. NASA Ames Research Center and the USDA-ARS partnered with the State of California to develop science-based, adaptive-management strategies for invasive aquatic plant in the Sacramento-San Joaquin Delta. Specific mapping tools developed utilizing satellite and airborne platforms provide regular assessments of population dynamics on a landscape scale and support both strategic planning and operational decision making for resource managers. San Joaquin and Sacramento River watersheds water quality input to the Delta is modeled using the Soil-Water Assessment Tool (SWAT) and a modified SWAT tool has been customized to account for unique landscape and management of agricultural water supply and drainage within the Delta. Environmental response models for growth of invasive aquatic weeds are being parameterized and coupled with spatial distribution/biomass density mapping and water quality to study ecosystem response to climate and aquatic plant management practices. On the water validation and operational utilization of these tools by management agencies and how they are improving decision making, management effectiveness and efficiency will be discussed. The project combines science, operations, and economics related to integrated management scenarios for aquatic weeds to help land and water resource managers make science-informed decisions regarding management and outcomes.