NCERA-101 station report (2022) – NASA Ames Research Center, Moffett Field, CA 94035

1. Representatives:
   Dr. David Bubenheim, Biosphere Science Branch, Earth Science Division, NASA Ames Research Center, Moffett Field, CA (David.L.Bubenheim@NASA.GOV)

   Greg Schlick, Bay Area Environmental Research Institute, NASA Ames Research Center, Moffett Field, CA

   Vanessa Genovese, California State University – Monterey, NASA Ames Research Center, Moffett Field, CA

   David Wilson, Bay Area Environmental Research Institute, NASA Ames Research Center, Moffett Field, CA (retired)

2. Accomplishments:

   NCERA-101 project areas addressed: Covid and NASA Ames Research Center closure severely restricted Controlled Environment Laboratory access. As a result, accomplishments focused on utilization of initial Controlled Environment results enabling completion of phase one decision support and related vegetation assessment objectives.

   • Completed Phase One Objectives for NASA Ames Research Center / State of California Space Act Agreement - Utilizing Adaptive Management Methods for Invasive Aquatic Plant Management: Phase one objectives include 1) remote sensing method development for mapping and vegetation assessment, 2) testing of Unmanned Aircraft Systems (UAS), 3) decision support methods, and 4) daily environmental input sources for vegetation model. Field study area is the California Delta – an intricate network of waterways, canals, and sloughs connecting Sierra Nevada watersheds (San Joaquin and Sacramento with San Francisco Bay) carrying more than 90% of the state's precipitation and supplying California agriculture and communities.

   • Satellite-based, Remote Sensing Tool for Vegetation Mapping and Canopy Characterization: Completed development of a remote sensing method, utilizing European Space Agency (ESA) Sentinel satellite series, for mapping and characterizing vegetation community structure for Floating Aquatic Vegetation (FAV). Remote sensing tool is in beta testing by the State of California, Division of Boating and Waterways for directing allocation of FAV management resources (personnel and treatment methods) and assessment of management effectiveness.

   • Unmanned Aircraft System (UAS) Evaluation Test Completed: Completed first field test using UAS (drone and autonomous control) for treatment and assessment of vegetation communities in difficult to access landscapes. Addressed both operational demands and treatment effectiveness.

- Decision Support - Linking Landscape-Scale Remote Sensing Assessment and Natural Resources Management: Initial decision support tool combines weekly satellite-based vegetation mapping and canopy assessments with weekly field management practices to assess effectiveness of management practices locally and landscape scales.

- Return to the Lab - FAV Evapotranspiration and Water Use : The measured return to the Controlled Environment Lab is focused on resumption of remote identification of FAV and Submerged Aquatic Vegetation (SAV) and plans to use CE chambers gas exchange and on-water (field) validation measurements to add ET monitoring and modeling to the landscape-scale assessment.

3. Description of Activities and Outputs: Laboratory access and associated activities were limited due to Covid and Federal Facilities closures. Emphasis was placed on remote sensing analysis and tool development, field sampling to validate remote sensing, and data analysis for model parametrization. Only limited controlled environment studies related to shifting Floating Aquatic Vegetation (FAV) and Submerged Aquatic Vegetation (SAV) and differential response to environmental shifts could be conducted.

4. Awards: NASA Spotlight Award – Recognizing significant achievement in Technology Transfer and Interagency Collaboration.