**NASA ROSES-2024 A.60 Earth Action: Ecological Conservation - Notice of intent**

In California, quaking aspen (*Populus tremuloides*) is an important tree species with numerous ecological and cultural values (e.g. supporting wildlife biodiversity, providing fire breaks, ceremonial uses). It is also an indicator species for other valuable habitats (e.g., meadows, riparian areas) and cultural resources (e.g., springs). Numerous federal, state, tribal, and nonprofit end-users would like to implement carry out restoration projects, protect culturally sensitive areas, prioritize forest management and fire management efforts, etc. focusing on this species. However, there is currently no extensive spatially extensive information available on the distribution of this species across the state, nor information on temporal trends in abundance. This knowledge gap prevents effective spatially-informed decision-making or monitoring by end-users.

This proposal from the California Aspen Working Group (representing researchers at the University of California Berkeley and 10+ federal, state, tribal, and nonprofit co-investigators and end-users) will address this knowledge gap, by:

1. Assembling and harmonizing a large set of spatial data resources for this species that are currently siloed in various organization’s archives;
2. Developing a remotely-sensed product mapping quaking aspen fractional cover across the state of California, using the above datasets and Landsat 8 multispectral imagery;
3. Deploying the above product across California for the duration of the Landsat record (x-2027) and validating predictions through additional fieldwork; and
4. Producing a publicly available data resource / dashboard hosted on Google Earth Engine and/or US Forest Service data portals, enabling end users to readily access and analyze data.

The project will additionally opportunistically use field validation time to collect leaf tissue for whole genome sequencing, enabling assessment of genetic diversity in this species across the state, supporting this additional end-user goal, and opening the possibility of remotely sensing genetic diversity with NASA assets using future funding.

The project is ready for decisional activities. A version of the core machine learning algorithms has already been developed, trained, and validated on quaking aspen forests in the Rocky Mountains, using ESA Sentinel-2 multispectral imagery. Our confidence is high in being able to transfer the algorithms and training procedure to California and to NASA satellite data products.  Conversations with US Forest Service personnel in the Rocky Mountains also identified the value of the product and the value and challenge of obtaining high-quality training datasets. The scope of work for California follows this experience and the stated needs of our end users.

Additionally, the project will be guided by collaborations with several California tribal partners, in order to ensure that concerns around mapping culturally sensitive areas are addressed, and to ensure that valuable data products are appropriately shared with users who can substantially benefit from accessing them.