**NASA DEVELOP National Program**

**Fall 2016 Project Proposal**

**Wise County and City of Norton Clerk of Court’s Office**

**Grand Canyon Water**

Utilizing NASA Earth Observations to Assist the National Park Service in Monitoring Shoreline and Sediment in the Lower Grand Canyon

**Project Overview**

***Objective:*** To quantify dropping lake levels in Lake Mead and Lower Grand Canyon and assess the changes in land cover and sediment loading brought about by this drop.

***Community Concern:*** Over the last 20 years the water level in Lake Mead in Arizona and Nevada has dropped over 50 feet below peak pool level, a historically low level for the lake. This drop in water has exposed thousands of acres of lake bed sediments to the atmosphere. This fine-grained sediment presents a health hazard when it becomes airborne, increases turbidity in the lake, and easily forms sand bars that can be hazardous to mariners. Additionally, the sediment presents a threat to the quality of the drinking water for Las Vegas, NV and the surrounding area.

***National Application Area(s) Addressed:*** Water Resources, Climate

***Study Location:*** Lower Grand Canyon and Lake Mead, NV and AZ (exact study area TBD)

***Study Period:*** January 1998 to April 2016

***Advisor(s):*** Kenton Ross (NASA DEVELOP National Program), Bob VanGundy (University of Virginia’s College at Wise), DeWayne Cecil (NOAA NCEI)

***Source of Project Idea:*** This project originated from Ed Schenk, a National Parks Service physical scientist at Grand Canyon National Park.

**Partner Overview**

***Partner Organization(s):***

|  |  |  |  |
| --- | --- | --- | --- |
| **Organization** | **POC (Name, Position/Title)** | **Partner Type** | **Boundary Org?** |
| U.S. National Park Service, Grand Canyon National Park | Ed Schenk, Physical Scientist | End-User | No |

***End-User Overview***

***End-User’s Current Decision Making Process:***The National Park Service currently monitors exposed riparian sediment and vegetation through marine and aerial surveys. This process is costly, time-consuming, and lacks an effective means of quantifying the change in shoreline and near-shore vegetation.

***End-User’s Capacity to Use NASA Earth Observations:*** The National Park Service is familiar with NASA Earth observations and use them regularly. This project would introduce them to new method of using NASA Earth observations to conduct up-to-date land use-land cover and land cover change assessments to augment aerial surveys.

***Project Communication & Transition Overview***

***In-Term Communication Plan:*** The team will communicate with the National Park Service (POC: Ed Schenk) via bi-weekly teleconferences.

***Transition Approach:*** Project hand off will be conducted at the end of the term via telecon with a shared screen. Software release is not anticipated.

**Letters of Support:** Ed Schenk, National Park Service

**Earth Observations Overview**

***Earth Observations:***

|  |  |  |
| --- | --- | --- |
| **Platform & Sensor** | **Parameter(s)** | **Use** |
| **Landsat 5 Thematic Mapper (TM)** | Land Cover | Landsat 5 TM will be used to derive a land use-land cover classification that depicts shoreline conditions and exposed riparian sediments and compares them to historical land use-land cover classifications. |
| **Landsat 8 Operational Land Imager (OLI)**  | Land Cover | Landsat 8 OLI will be used for current land use-land cover classification to be used in modeling efforts. |
| **Shuttle Radar Topography Mission (SRTM)** | Digital Elevation Model | SRTM will be used to accurately assess the basin topography. |

***Ancillary Datasets:***

U.S.G.S. – National Land Cover Database (2011) – Land Cover

***Modeling:***

TerrSet Land Change Modeler (Clark Labs)

***Software & Scripting:***

TerrSet - Land cover modeling

ERDAS or ArcGIS - Land cover classification

**Decision Support Tool & End-Product Overview**

***End Products:***

|  |  |  |  |
| --- | --- | --- | --- |
| **End Product(s)** | **Partner Use** | **Datasets & Analyses** | **Software Release Category** |
| Land Cover Map | This will complement existing land use-land cover maps and provide up to date land cover for the areas exposed by the lower water levels in Lake Mead | Landsat imagery will be analyzed using ArcMap and ERDAS IMAGINE to create a classified image. | N/A |
| Etc… | Etc… | Etc… |  |

***End-User Benefit:***

This in-depth study of the Lake Mead and Lower Grand Canyon area will be the first of its kind since long-term drought affected the region. This map will be a cornerstone in future analysis of the health of Lake Mead as a sustainable lake and water resource.

**Project Timeline & Previous Related Work**

***Project Timeline:*** 1 Term: Fall 2016

***Related DEVELOP Work:***

Summer 2013 (LaRC) - New England Water Resources: Multispectral Monitoring of New England Freshwater Resources to Assess Turbidity, Algal Blooms, and Water Quality for Enhanced Natural Resource Management

Summer 2010 (LaRC) – Outer Banks Climate: Shoreline Delineation using NASA Satellite Imagery and Instrument Data for Assessing North Carolina Estuary and Coastal Erosion

**Notes & References:**

***Notes:*** Anything else you deem relevant and that supports the proposal.

***References:***

List out any relevant content or websites, however please note that citations should not be included in the text in the body of the proposal.