

**Project Summary**  
**Rocky Mountains Cooperative Ecosystem Studies Unit**

**Project Title: Taxonomic Consistency and Autecology of Algae in Water Quality Assessments**

**Discipline: Natural**

**Type of Project: Research, Technical Assistance**

**Funding Agency: USGS**

**Other Partners/Cooperators: University of Colorado**

**Students Involvement: Yes, Graduate and Undergraduate**

**Effective Dates: 4/15/2015 - 4/14/2020**

**Funding Amount: \$430,581**

**Investigators and Agency Representative:**

USGS Contact: Sarah Spaulding, National Water Quality Assessment Program, US Geological Survey, 1560 30<sup>th</sup> St, Boulder, CO 80309, phone: 303-492-5361, email: sspaulding@usgs.gov

Investigator: Diane McKnight, Director, CWest Campus Box 450, University of Colorado, Boulder, Co 80309, phone: 303-735-6567, email: diane.mcknight@colorado.edu

**Project Abstract:** In order to effectively use diatoms as environmental tools and understand human impacts that alter aquatic ecosystems, research is needed to document diversity, geographic distribution and environment-species relationships. National Water Quality Assessment (NAWQA) Program in conjunction with CWest scientists and Colorado University (CU) graduate and undergraduate students have the technical expertise to accomplish fundamental work. The results of the collaboration promises to increase the accuracy of biotic metrics and indices in aquatic surveys. Specifically, the collaborators aims to produce and expand upon (1) taxonomic consistency, (2) species habitat modeling, (3) species and ecosystem properties, (4) diatom seasonality and life histories and (5) novel information interfaces.

**Specific Objectives Include:**

- 1) Taxonomic consistency - The primary objective of this work is to further taxonomic consistency by integrating sample analysis, autecological research, expert content and an improved interface of the Diatoms of the United States. Will use modern technological tools and evaluation of user experience to bring taxonomic consistency and autecological information to a broad community of users across North America.
- 2) Species habitat modeling - The second objective of this research is to use the approach above to develop habitat models for several key diatom species in NAWQA surveys, such has been accomplished for *D. geminata*. The taxa that have been targeted as indicator species (Potapova and Carlisle 2011) are a priority.
- 3) Species and ecosystem properties - The third objective of this research is to investigate the relation of species composition to ecosystem properties in the local Boulder Creek Watershed to determine the "keystone" taxa within clusters of species.
- 4) Diatom seasonal dynamics and watershed events - The fourth objective of this research is to investigate diatom seasonality, time lags and life histories in the local Boulder Creek Watershed, in relation to threshold events.
- 5) Novel information interfaces - The fifth objective is to advance the website from version 1.0 to 2.0, by better meeting the needs of its users. More specifically, the primary goal is to create a visual key that enables quick and accurate identification of taxa within morphological groups, genera and species. The secondary goal is to improve the two-way sharing of taxon information and research with a broader scientific community.

**Keywords:** Taxonomy, species habitat modeling, ecosystems properties, undergraduate research, graduate research, USGS, University of Colorado Boulder