

Project Summary

Rocky Mountains Cooperative Ecosystem Studies Unit

Project Title: Excavation of Fossils from the Florissant Formation to Investigate the Response of Insects to Climate Change during the Eocene-Oligocene Transition

Discipline: Natural
Type of Project: Research
Funding Agency: National Park Service
Other Partners/Cooperators: University of Colorado at Boulder
Effective Dates: 8/30/2008 - 9/30/2010
Funding Amount: \$20,000

Investigators and Agency Representative:

NPS Contact: Herbert W. Meyer, Paleontologist, Florissant Fossil Beds National Monument, P.O. Box 185, 15807 Teller County Road 1 (for FedEx or UPS), Florissant, CO 80816 USA, phone: 719-748-3253 / fax: 719-748-3164, Herb_Meyer@nps.gov

Investigator: Dena M. Smith, Department of Geological Sciences, UCB 265
CU Museum, University of Colorado-Boulder, Boulder, CO 80309, Phone: 303-735-2011
FAX: 303-735-2347, dena@colorado.edu

Project Abstract: This project will examine the effects of a known, dramatic climatic cooling event on insect communities in the fossil record, with applications for better understanding biotic responses to the Eocene-Oligocene transition and their implications for understanding how modern climate change could affect terrestrial communities. To achieve this, new major excavations at Florissant are needed to provide standardized sampling techniques that are not possible using existing museum collections of Florissant fossils. By carefully documenting unbiased new samples for species diversity, it will be possible to quantitatively document through rarefaction analysis the actual taxonomic diversity at Florissant.

Scope of Work

Fossil plants and insects from the Florissant Formation will be excavated in compliance with NPS regulations. A collecting permit will be acquired, and the excavation will be limited by any stipulations specified in the permit. Final determination of the location and magnitude of the excavation sites will be made by the monument's staff. Field notes will be made to document the locality and stratigraphic context of the collection and these notes will be made available for the monument's archive.

All specimens will reside permanently at FLFO, but University of Colorado will provide assistance for assuring the timely cataloging of the collection. Fossil specimens will be prepared, stabilized in specimen boxes, identified (where possible), numbered, and labeled for entry into NPS' ANCS database. University of Colorado will use project funds to acquire appropriate conservation-quality specimen boxes and other materials for stabilization of the specimens. These specimen boxes will become the property of NPS.

Data will be analyzed to provide a statistical model for determining the actual taxonomic diversity at Florissant, ultimately to be compared to other fossil sites. This will utilize rarefaction models based upon the unbiased samples made during the excavations. This will help in testing hypotheses about the timing and magnitude of biotic responses to climatic cooling during the Eocene-Oligocene transition, including the rate at which climate change influenced the extinction and origination of insect taxa. The results of this project will better enable the comparison of the Florissant fossils to other fossil plant and insect assemblages from Colorado, both older and younger in age than Florissant.

Outcomes with Completion Dates:

- Fossil excavations - June 1, 2009 to August 20, 2009
- Fossil specimens prepared, stabilized, identified, and labeled with NPS catalog numbers. Catalog information is incrementally provided to the Monument at regular intervals for entry into ANCS database - September 1, 2009 through December 1, 2009
- Manuscript of scientific results and summary submitted for park and peer-review - August 15, 2010

Keywords: Fossil plants and insects, climatic cooling event, Florissant Formation, Eocene-Oligocene, Florissant Fossil Beds National Monument, **University of Colorado at Boulder**