

**Interim Report**  
***Carex constanceana* Survey for the Fremont National Forest**  
**18 October 2008**  
***Carex* Working Group**

*Carex constanceana* is an extremely rare sedge. Before 1990 it was known from only one site on Mt. Adams, Washington, where it has not been relocated and is presumed to be extirpated. In the 1990's, Andrew Hipp collected it at the Sagehen Experimental Forest in the central Sierra Nevada, California. Subsequently, a specimen collected by Jimmy Kagan in the Deep Creek drainage of the north Warner Mountains, on Fremont National Forest property, was identified as *C. constanceana*. Concerned about the status of this globally rare sedge, the Fremont National Forest initiated a survey for the plant.

### **Results**

In July and August 2008, the *Carex* Working Group searched for *C. constanceana* in the Fremont National Forest and some surrounding Bureau of Land Management property. The species was located at three sites. These finds answered some questions about *C. constanceana* but created others.

*Carex constanceana* was found in the north Warners at Deep Creek and near Willow Creek. It was also found in the Dairy Creek drainage near Gearhart Mountain.

Deep Creek: The largest population of *C. constanceana* at this site was near the junction of road 4015 and its spur 019, on a flat, sunny, upland area on the uphill side of the road. *Carex constanceana* at Deep Creek had pale inflorescences and resembled *C. multicosata*, which was moderately common at this site.

Willow Creek: One plant of *C. constanceana* was located with *C. multicosata* on a toeslope at the margin of the floodplain of a small, unnamed drainage on the south side of Forest Service road 4011 not far from its junction with road 3915. The site was not searched extensively; it should be searched further.

North Warners in general: We searched many, many sites that seemed similar to the Deep Creek site (open mixed conifer forest on north-facing slopes). We found *C. multicosata* at nearly every site but we did not find *C. constanceana*. Either this is not actually *C. constanceana* habitat and/or *C. constanceana* is a truly rare sedge at the local as well as the global scale.

Dairy Creek drainage: We found five plants of *C. constanceana* in one area of shallow, seasonal, gently sloping, partly to mostly sunny, headwater drainages on private land. These plants had darker, narrower inflorescences than the plants at Deep Creek, and were easier to distinguish from *C. multicosata* (which was not present at this site). We were unable to locate the plant or what we think would be suitable habitat on Forest Service land nearby.

Developments in the Sagehen Experimental Forest, California: Peter Zika visited this site and found a few hundred plants of what appears to be *C. constanceana* in shallow, gently sloping, open, seasonal snow-melt channels at a little over 6000 feet. Joy Mastrogioseppe has examined the Zika specimens. She agrees that (1) they appear to be *C. constanceana* and (2) they are very similar to (but slightly different from) the rare California endemic *C. davyi*.

### **Some questions**

What is *C. constanceana* habitat? We know it's not simply openings in upland forest, as we first thought. Perhaps it is gently sloping, seasonal snow-melt channels and headwater streams. We don't know.

Is *C. constanceana* the same plant as *C. davyi*? Both are very rare, coarse, upland sedges of *Carex* section *Ovales*, growing in mountains of the Cascade – Sierra axis and producing very large achenes and perigynia. There are small differences.

Did *C. constanceana* originate as a hybrid of *C. multicosata* and *C. petasata*? If so, was the hybridization a recent or ongoing event, or a relatively ancient occurrence? Is there gene flow among those taxa? *Carex constanceana* does seem to have features of both other species, and all three grow in a small area at Deep Creek. However, all three may have different (though somewhat overlapping) habitats. Also, the other two species were not present at the Dairy Creek site or at the Sagehen Experimental forest. Therefore, it doesn't seem that current hybridization could explain the *C. constanceana* populations at either of those sites.

Can the small Dairy Creek population on private land be preserved by growing plants in cultivation and planting them out somewhere? Is that desirable? If so, how and where would the plants be grown?

### **Issues in progress and plans**

Amy Bartow of the USDA NRCS Plant Materials Center in Corvallis, Oregon, is attempting to germinate seeds of both *C. multicosata* and *C. constanceana*. She reports unexpectedly quick germination of seeds from one *C. multicosata* maternal plant. Vernalization is in progress; we should get results in three or four months.

Live adult plants of *C. multicosata*, *C. petasata*, and *C. constanceana* have been sent to Andrew Hipp of the Morton Arboretum in Illinois. He will do chromosome counts on the plants and will incorporate their DNA sequences into his large database of *Carex* section *Ovales* DNA sequences (including *C. davyi*) to try to determine relationships among these species. Hopefully this study will be sufficient for answering our questions, but fine-scale analysis of the three species at Deep Creek goes beyond his current funding. We will hear about the chromosome counts in the spring and the DNA results when they are generated.

Live plants will be sent to Paul Rothrock in Indiana for chromosome counts. We will presumably hear about the results in the spring.

Pressed specimens have been sent to Brianna Chouinard at the Canadian National Museum for her “DNA barcoding” project. We may or may not hear about the results. Brianna reports that the matK gene is failing to distinguish many of the taxa she is studying, so results may or may not be useful to us.

We would like to do a careful morphometric analysis of *C. constanceana*, *C. multcostata*, and *C. petasata* to determine if our difficulty trying to distinguish *C. constanceana* from *C. multcostata* at that site is due to the presence of intermediate individuals or to superficial similarities. Because of other commitments, we will have to put that study off until after the first of the year.

We have requested an additional herbarium loan of *Carex davyi* to compare with *C. constanceana*.