Table 2 Carp Lake vegetation and climate history

Pollen Zone Age & Depth	Oxygen Isotope Stage & Age (ref. 18)	Vegetation	Inferred Climate
CL-1a 0-3.9 ka (1.30-2.35m)	1 0-14.1 ka	Development of the modern forest in the late Holocene. *Pinus ponderosa* and *Pseudotsuga menziesii* became the dominant trees, with *Alnus*, *Corylus*, and other shrubs. Mesic locations supported *Abies grandis*, *Pinus monticola*, and *Tsuga heterophylla*. *Quercus* woodland was established at lower treeline. Poaceae pollen indicates the establishment of grassland at lower elevations and in forest openings.	Modern
CL-1b 3.9-9.1 ka (2.35-3.70 m)		Middle Holocene forest of *Pinus ponderosa* and *Quercus* woodland.	Warmer drier than present
CL-2 9.1-13.2 ka (3.70-4.65 m)		Early Holocene steppe vegetation with Poaceae and Chenopodiineae. *Alnus* was present in riparian settings.	Warmer drier than present
CL-3 13.2-30.9 ka (4.65-8.25 m)	2 14.1-27.6 ka	Cold steppe with *Artemisia*, Poaceae, and herbs during the full-glacial period. Temperate aquatic taxa (e.g., *Nuphar*, *Sparganium*-type, *Myriophyllum*, *Polygonum amphibium*-type, and *Typha*) are absent. *Polygonum bistortoides*-type pollen (not shown) indicates subalpine or alpine conditions. Populations of *Picea engelmannii* near the site, especially in late-glacial period.	Coldest driest period
CL-4 30.9-43.1 ka (8.25-10.4 m)	3 27.6-58.9 ka	Open forest with mixture of low- and high-elevation species. *Picea* and *Abies* present in mesic settings, and lower or drier forests supported *Pinus contorta* or *P. ponderosa*, *Pseudotsuga* or *Larix occidentalis*, and *Abies grandis*. *Picea* and *Artemisia* pollen are more abundant at the bottom of the zone.	Cooler drier than present
CL-5 43.1-58.0 ka (10.4-12.85 m)		Open forest or forest-steppe vegetation, dominated by *Pinus ponderosa* and/or *P. contorta* with lesser amounts of *Picea* and *Abies*. Pollen of Poaceae, *Artemisia* and other herbs suggests forest openings or nearby steppe.	Cooler than present, relatively humid
CL-6 58.0-72.7 ka (12.85-15.15 m)	4 58.9-73.9 ka	Closed *Pinus* forest with some *Picea* and *Abies*. *Artemisia* percentages indicate some dry forest openings.	Cooler drier than present
CL-7 72.7-82.8 ka (15.15-16.70 m)	5a 73.9-85.1 ka	Open forest of *Pseudotsuga*/*Larix*, *Tsuga heterophylla*, *Abies*, *Quercus*, and Cupressaceae; the first four taxa are typical of low elevations in the western Cascade Range. Cupressaceae pollen may have come from *Thuja plicata* or *Chamaecyparis nootkatensis*, both mesophytes, or *Juniperus occidentalis*, a xerophyte. Chenopodiineae, Poaceae, *Pteridium*, Umbelliferae and *Eriogonum* were present.	Warmer wetter summers than present
CL-8 82.8-96.8 ka (16.70-18.83 m)	5b 85.1-93.6 ka	Open forest of *Picea engelmannii*, *Pinus contorta*, and possibly *P. ponderosa*. *Alnus sitchensis* grew in areas of seepage. *Artemisia* percentages imply nearby steppe or forest openings.	Cooler than present, dry
CL-9 96.8-109.5 ka (18.83-20.75 m)	5c 93.6-107 ka	Closed forest with *Pinus*, *Pseudotsuga/Larix*, *Abies*, and *Picea*, similar to montane forests in eastern Cascades and northeastern Oregon. *Pinus* pollen was probably from *P. contorta*, *P. ponderosa*, and *P. monticola* or *P. albicaulis*.	Warmer summers than present, cool humid winters
CL-10 109.5-117.3 ka (20.75-21.95 m)	5d 107-116.7 ka	Open *Pinus* forest with *Picea*, *Abies*, and *Artemisia* and Poaceae.	Cooler than present, humid
CL-11 117.3-124.6 ka (21.95-23.15 m)	5e 116.7-133 ka	Open forest during previous interglaciation. *Pinus* is from *P. ponderosa* or *P. contorta*. *Quercus* suggests dry woodland at lower elevations. Cupressaceae is ascribed to *Juniperus*. Chenopodiineae, *Eriogonum*, *Artemisia*, and Poaceae values imply steppe element. *Brasenia schreberi* (not shown) occurs in this zone and the Holocene only.	Warmer drier than Holocene

Whitlock, C. & P.J. Bartlein, 1997, Vegetation and climate change in northwest America during the past 125 kyr. *Nature* 388:56-61