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Seasonal occurrences of ostracodes in lakes and streams of the San Francisco Peninsula, California

by

Claire Carter[1]

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[1]345 Middlefield Road, Menlo Park, CA 94025

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ABSTRACT

Fresh-water ostracodes from eight different sites on the San Francisco Peninsula were sampled periodically between May, 1989 and May, 1990. Seasonal variations in the relative abundances of ostracode species were observed. Those changes are believed to have been due, at least in part, to seasonal changes in water and sediment temperatures.

INTRODUCTION

Ostracodes are bivalved crustaceans with calcite carapaces that live in most aquatic environments, from the oceans to ditches and seeps (Forester, 1983). Each environment (lake, pond, spring, etc.) has its own set of physical and chemical parameters (temperature, salinity, etc.) and hosts its own characteristic species of ostracodes because ostracodes are sensitive to these parameters (Forester, 1983). Therefore, fossilized ostracodes can also be used as environmental indicators for the sediments in which they were deposited (Delorme, 1969). Fresh-water ostracodes are good indicators of water chemistry and thus of the local climate (Forester, 1987).

Although ostracode biology is poorly known, it is known that ostracode life cycles are temperature dependent (Forester, 1987) and that therefore ostracode populations exhibit seasonal fluctuations. This study is an effort to document and quantify the seasonal fluctuations in a few California ostracode populations in terms of the relative abundances of the individual species comprising the total population.

ACKNOWLEDGEMENTS

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METHODS

This study focuses on fresh-water ostracodes found in the vicinity of Menlo Park, California. Several sites (Fig. 1) were periodically sampled over the course of more than a year. These sites include Searsville Lake, Arastradero Lake, Boronda Lake, Los Gatos Creek, Coast Casey Forebay, and, when they contained

water, Lake Lagunita and a place here informally designated as "duckpond seep".

Water surface, sediment, and water/sediment interface temperatures were measured with a digital thermometer at each site on almost every visit. Ostracodes usually were collected with a solid-bottomed "bola", a small aluminum box on a 35-foot-long cord that is thrown out into the water and retrieved. At some sites (Coast Casey Forebay, Searsville subloc. 1), the shoreline sediments were sampled with an ordinary turkey baster. The samples were returned to the laboratory for processing and identification.

The ostracodes were processed using the following techniques: each sample was frozen and thawed in a steel beaker. Hot water and baking soda were added and the sample was allowed to sit for 24 hours. Calgon was then added and after another 12 to 24 hours, the sample was washed over sieves and air dried. All adult ostracodes were picked onto micropaleontological slides. For samples in which one species was overwhelmingly abundant (more than 100 individuals), an estimate of its numbers relative to the rest of the fauna was made and only the less numerous species were actually picked and physically counted. These counts were converted to percentages of the total population and are listed in the appendix.

COLLECTING SITES

Searsville Lake: This is a small lake, about 7 meters (22 feet) deep at the center, about 730 meters (2400 feet) long and a maximum of 240 meters (800 feet) wide at its widest point. It is located in the Jasper Ridge Biological Preserve, an area owned by Stanford University and maintained in its natural state as an outdoor laboratory. The general public is not allowed to enter unescorted. The lake is an impoundment behind a concrete dam across upper San Francisquito Creek and is fed by several intermittent streams from the foothills of the Coast Range. The stored water is now used only for irrigation on the campus and, as a result, water levels in the fall season are usually several feet below the top of the dam. The lake is surrounded by low, grassy to brush-covered hills with scattered live oak trees.

Cattails (Typha sp.) grow sparsely in a small stretch of shoreline. The dominant vegetation in the lake is two species of Myriophyllum (Nona Chiariello, oral commun., 1989), one of them introduced. It grows in shallow water where its fronds can reach the surface. Charophytes also are present. Because the lake is closed to the public, the resident bass are numerous and sizable. Searsville attracts passing waterfowl, including coots, cormorants, grebes, and many species of ducks.

For this study, ostracodes were collected regularly from two separate sites on Searsville Lake. Sublocality 1 is on the shore below the biology laboratory building (Fig. 2). The substrate there is composed of black, organic-rich mud. Cattails grow rather sparsely along the shoreline. Sublocality 2 is at the southern

end of the main part of the lake, near a footbridge and a boat-launching ramp (Fig. 2). The substrate there is sandy and lighter-colored than at sublocality 1.

ARASTRADERO LAKE

This very small lake is located in the Arastradero Preserve (Fig. 3), an area of undeveloped open space owned by the City of Palo Alto and maintained in its natural state. The lake is about 120 meters (400 feet) in diameter and about 5 meters (16 feet) deep. It appears to be formed, at least in part, by a low earthen dam across Arastradero Creek, which is dry most of the year. The lake is spring fed and therefore the water level is largely maintained during the year. Lake level does rise during the rainy season, commonly overtopping the dam and supporting local stream flow.

Most of the shoreline is heavily vegetated by cattails. The surrounding area consists of rounded, grassy hills with scattered oak trees and brushy patches. Floating mats of filamentous algae appear for a few weeks during summer and charophytes have been found. Because Arastradero Lake is so small, it supports only a few resident coots and grebes, and the occasional passing duck or heron.

Ostracodes were collected from various sites around the perimeter of the lake, but largely from one locality on the southern shore. All collection sites yielded black, sulphur-smelling, organic-rich mud except in the late spring and summer of 1990, when excessive growth of bottom vegetation generally prevented the bola from sinking into the offshore mud.

BORONDA LAKE

The City of Palo Alto's Foothill Park is the location of Boronda Lake (Fig. 4), a shallow, artificial body of water used by Palo Alto residents mainly for fishing (stocked). It is roughly the same size as Searsville Lake and is contained by a large earthen dam. In 1987-88, the lake was drained and the dam was repaired. It was refilled in the spring of 1988. The water level is artificially maintained by automatic valves and drains.

The lake is only about 3 meters (10 feet) deep and the bottom is covered with submerged macrophytes and algae. Charophytes are also present. The surrounding area is mixed grassland and live-oak woodland on hilly terrain. Waterfowl visit Boronda Lake, but not in the numbers that frequent Searsville Lake.

The principal collecting site is off the floating dock on the west side of the lake. The bottom here is sandy to gravelly and light gray in color. The bottom weeds make sampling difficult.

LOS GATOS CREEK

Los Gatos Creek flows northward through Los Gatos Creek County Park

(Fig. 5) and is roughly paralleled on the east by Highway 17 and on the west by a series of percolation ponds that recharge the groundwater supply of the Santa Clara Valley. The creek does not flow naturally all of the year, but is augmented at certain times by input from a huge "fountain" located upstream from the percolation ponds. This imported water, as well as the creek water, is diverted into the percolation ponds. Several small dams or weirs cross the creek bed in the park.

Streamside vegetation is controlled (cut back) periodically by County crews and the general area is occupied by suburban homes and businesses. In the summer months, thick, floating mats of algae cover the slower-moving stretches of the creek, and sometimes "duckweed" covers large areas. The ponds attract large numbers of gulls and migrating waterfowl, as well as herons and egrets.

Various sites along the creek and in the percolation ponds have been sampled for ostracodes, but four main sites have received the most attention (Fig. 5). Sublocality 1, on Los Gatos Creek near the first percolation pond, yields black, organic-rich mud. Summertime algal mats preclude good bottom samples during that time, but collecting at other times is productive. Sublocality 2 is upstream of the percolation ponds and behind a wooden weir. Bottom-hugging filamentous algae are a drawback at this site and it was not sampled regularly in the second half of the study period. Sublocality 3 is upstream of the "fountain," and the bottom there is rocky, with a thin veneer of sediment and abundant submerged macrophytes. Sublocality 4 is along the northern shore of the southwestern-most percolation pond. The bottom of the percolation pond is gravelly and light colored. Tall reeds grow in scattered places around the perimeter.

COAST CASEY FOREBAY

This locality (Fig. 6) is a diked-off section of salt marsh near the edge of San Francisco Bay. It is part of Shoreline Park, which is owned by the city of Mountain View. A small, fresh-water stream flows in at one corner and out at the opposite corner through a flood-control gate. The stream meanders across the bottom of the basin in a shallow, and in places braided, channel.

The bounding dikes support pickleweed, indicative of salty soil. A clump of cattails grows near one edge of the basin, with the stream flowing through it. The water level varies very little, never exceeding a depth of 10-20 cm near the cattails. Large numbers of gulls and ducks regularly rest in the basin and shore-birds work the stream for food.

Ostracodes have been collected from the submerged bases of the cattails and just slightly downstream of them. The substrate here is light-gray mud.

DUCKPOND SEEP

This site is an intermittent fresh-water seep, thick with cattails, near the

duck pond in the Palo Alto Baylands (Fig. 1). The source of the water is unknown, and the seep has been dry more often than it has been wet during the time of this study. It is adjacent to salty-brackish marshes of San Francisco Bay. When it is wet, the water is only a few centimeters deep, and it is frequented by ducks from the nearby pond. The sediment is dark brown mud.

LAKE LAGUNITA

Lake Lagunita (Fig. 1) is an intermittent, man-made sailing and swimming facility on the Stanford University campus. It regularly dries up in late summer or early autumn and is filled during the winter rainy season. The University supplements natural inflow with water from San Francisquito Creek (except in years of drought, for political reasons). Lagunita has been completely dry for over two years (July, 1988 to the present) because of a prolonged drought.

Lagunita supports varying amounts of submerged and emergent vegetation, depending on water level and time of year. The substrate is sandy mud. Ostracodes were collected along the shoreline only a few times because the lake was dry from July, 1988 through May, 1990.

SEASONAL TEMPERATURES

At each collecting site on every visit, the air temperature, the temperature of the water surface, and the temperature of the sediment/water interface or the sediment itself were measured and recorded. This data is listed in the appendix.

Because most ostracodes are bottom dwellers, the temperature of the sediment and the sediment/water interface are most critical to their life cycles. In Figures 7 through 14 these temperatures are plotted for each site together with the monthly mean, mean maximum, and mean minimum air temperatures recorded at the nearest weather station. The monthly mean air temperatures shown in Figures 7 through 10 were recorded at Woodside, California, those in Figure 11 at Palo Alto, California, and those in Figures 12 through 14 at Los Gatos. In every case, a definite seasonal cooling and warming is shown and the temperature of the sediment or sediment/water interface generally is very close to the mean monthly air temperature. At the sites visited during the summer (Searsville, Arastradero, Boronda, Coast Casey; Figs. 7-11), the warmest temperatures of sediment or sediment/water interface occurred in June and July. The three warmest dates for each of the sites fell between May 8 and September 12 (Fig. 15). The coldest temperatures for all sites occurred in December, January, and February and the three coldest dates for each site fell between November 7 and February 20.

The difference between the highest and lowest recorded sediment or sediment/water-interface temperature averaged 17.1°C (Fig. 16).

OSTRACODE POPULATIONS

Graphs of the ostracode populations of each site (Figs. 17-24) reveal the fluctuations in the constituent species as a percentage of the total population over time. Several caveats should be kept in mind when interpreting this data. Only the adult or nearly adult specimens were counted; in most cases, juveniles of all or most of the resident species are present in every collection. Ostracodes can be quite active and their movements and habits may have an effect on sampling. Some variations in sample size and exact location of collection sites were unavoidable. Finally, other factors such as variations in pH and conductivity may affect the ostracodes.

At Searsville Lake sublocality 1 (Fig. 17), the population was largely dominated by Physocypria pustulosa except in late January, when it was supplanted by Cypria opthalmica, which rapidly decreased through February and March. P. pustulosa was usually so overwhelmingly abundant that it was not counted. The remaining species were counted but showed no discernable population trends.

Searsville Lake sublocality 2 (Fig. 18) shows a bloom of P. pustulosa in the spring months and a bloom of C. opthalmica in the winter and again in May. Correspondingly, pustulosa seems to have died out in December and January while opthalmica died out in the fall and spring (March, April). Of course, these "die-offs" may not be real but only apparent, relative to a population explosion in a different species.

The Arastradero Lake population (Fig. 19) was dominated by P. pustulosa during the entire year, comprising 70% to 100% of the adult fauna. The remainder of the population consists of small numbers of individuals, and any observable trends could not be distinguished from patterns resulting from random walks.

In Boronda Lake (Fig. 20), P. pustulosa experienced a population explosion at the end of the cold season and dominated through the spring (February to May). Cypridopsis vidua was the most abundant species in the summer and fall population.

The data on Coast Casey Forebay (Fig. 21) does not show an obvious seasonal trend or correlation.

The ostracode population at Los Gatos Creek sublocality 1 (Fig. 22) was very sparse, even in the best of times, which seemed to be only in March through May, when there was a minor "bloom" of Candona sp. Most of the year there were no adult specimens at all.

At Los Gatos Creek sublocality 3 (Fig. 23), Limnocythere itasca was most numerous in late summer through fall, when the entire population of adults was not very large. A bloom of Herpetocypris brevicaudata occurred in March and April and Isocypris sp. became relatively numerous at odd times (December, January, May).

The final locality with enough data to plot is the Los Gatos percolation pond, sublocality 4 (Fig. 24). However, the population trends here are not clear and may require a whole year's worth of collections.

CONCLUSIONS

The temperature of the sediment and sediment/water interface at the collection sites varies over an average range of 17.1°C between the warmest and coldest recorded temperatures. The highest temperatures occurred in June, July, and August, and the lowest in December, January, and February. Some of the sites (Searsville 1 and 2, Boronda, Los Gatos 1 and 3) yielded clear evidence of seasonality in ostracode populations, while others (Arastradero, Coast Casey, Los Gatos percolation pond) show no clear correlation between ostracodes and temperature. Seasonality was detected in the following species: C. opthalmica increased in the winter (January) and decreased over the spring months; P. pustulosa increased markedly in the spring at three sites (Searsville 1 and 2, Boronda); H. brevicaudata attained maximum numbers in March and April at Los Gatos 3.

The next step in the study of ostracode seasonality at these California localities is to record changes, if any, in some other parameters, including pH and conductivity of the water.

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APPENDIX

SEARSVILLE LAKE, JASPER RIDGE BIOLOGICAL PRESERVE
Elevation 360 feet
Sublocality 1

89CCt14: May 23, 1989 — air temp(9:30a) 17.5° C; water surface 20°C; sed/water temp 20° C
fauna: about 80-90% P. pustulosa
remainder: 50% C. vidua
25% H. brevicaudata
25% Candona sp. A
also present: C. opthalmica, Candona sp.B
total: 4

89CCt20: June 6, 1989 — air temp (1:30p) 25° C; water surface 31°C; sed temp 25°C
fauna: about 90% P. pustulosa
remainder: 71% H. brevicaudata
29% Candona sp. B
also present: C. vidua, C. opthalmica
total: 7

89CCt23: July 12, 1989 — air temp(9:00a) 17°C; water surface 21°C; sed temp 20°C
fauna: about 90% P. pustulosa
remainder: 100% H. brevicaudata
also present: C. opthalmica, C. vidua, Candona sp. B, I. gibba
total: 6

89CCt26: July 25, 1989 — air temp (8:15a) 16°C; water surface 22°C; sed temp 18.5°C
fauna: about 90% P. pustulosa
remainder: 67% H. brevicaudata
33% C. vidua
also present: Candona sp. B, C. opthalmica, I. gibba
total: 3

89CCt34: Aug. 15, 1989 air temp (8:30a) 22°C
water surface 17.3°C
sed temp 16.7°C

fauna: 97% P. pustulosa
3% C. opthalmica
also present: I. gibba, H. brevicaudata, C. vidua, Candona sp. B
total: 33

89CCt43: Aug. 29, 1989 air temp (8:30a) 17°C
water surface 17.7°C
sed temp 17.6°

fauna: 80-90% P. pustulosa
remainder: 55% C. opthalmica
18% H. brevicaudata
9% Candona sp. B
9% I. gibba
9% C. vidua
also present: Isocypris sp.
total: 11

89CCt50: Sept. 12, 1989 air temp (8:30a) 14°C
water surface 17.2°C
sed temp 17.7°C

fauna: 90% P. pustulosa
remainder: 67% C. opthalmica
33% Candona sp. B
also present: H. brevicaudata, L. itasca, C. vidua, I. gibba
total: 6

CC-89-CA-60: Oct. 9, 1989 air temp (9:00a) 15°C
water surface 15°C, sed/water 15°C
sed temp 13.1°C

fauna: 80-90% P. pustulosa
remainder: 29% C. vidua
19% C. opthalmica
19% Candona sp. B
19% H. brevicaudata
14% I. gibba
total: 21

CC-89-CA-70: Nov. 7, 1989 air temp (9:30a) 16.7°C
water surface 13.4°C, sed/water,
13.4°C, sed temp 12.1°C

fauna: about 90% P. pustulosa
remainder: 100% Candona sp. B
also present: C. vidua, C. opthalmica, I. gibba, H. brevicaudata, Candona sp. B, Isocypris sp.

total: 2

CC-89-CA-85: Nov. 21, 1989 air temp (8:35a) 9.5°C
water surface 8.3°C, sed temp 7.8°C

fauna: 70-80% P. pustulosa
remainder: 67% Candona sp. B
25% C. opthalmica
8% H. brevicaudata
also present: I. gibba, C. vidua
total: 12

CC-89-CA-96: Dec. 5, 1989 air temp (8:30a) 8.0°C
water surface 7.4°C, sed temp 7.5

fauna: 70-80% P. pustulosa
remainder: 83% C. opthalmica
17% Candona sp. B
also present: C. vidua, I. gibba, H. brevicaudata
total: 6

CC-90-CA-1: Jan. 8, 1990 air temp (8:30a) 11.6°C
water surface 9.2°C, sed temp 9.6

fauna: 77% P. pustulosa
18% C. opthalmica
2% C. vidua
2% I. gibba
2% H. brevicaudata
also present: Candona sp. B
total: 57

CC-90-CA-11: Jan. 31, 1990 air temp (8:30a) 3.5°C
water surface 7.7°C, sed/water 7.5°C

fauna: 69% C. opthalmica
20% P. pustulosa

6% C. vidua
2% H. brevicaudata
2% H. gibba
also present: Candona sp. B
total: 49

CC-90-CA-21: Feb. 13, 1990 air temp (8:45a) 8.3°C
water surface 8.6°, sed/water 8.6°C
fauna: 49% P. pustulosa
49% C. opthalmica
2% C. vidua
also present: I. gibba, H. brevicaudata, Candona sp. B
total: 43

CC-90-CA-33: Feb. 27, 1990 air temp (8:45a) 10.0°C
water surface 10.9°C
sed/water 11.0°C
fauna: approx. 65% P. pustulosa
approx. 35% C. opthalmica
also present: H. brevicaudata, Candona sp. B, I. gibba, C. vidua

CC-90-CA-42: Mar. 13, 1990 air temp (8:15a) 10.2°C
water surface 10.7°C
sed/water 10.3°C
fauna: 83% P. pustulosa
13% C. opthalmica
2% C. vidua
2% Candona sp. A
also present: Candona sp. B, H. brevicaudata, I. gibba
total: 86

CC-90-CA-51: Mar. 27, 1990 air temp (8:30a) 16.3°C
water surface 15.5°C
sed/water 14.0°C
fauna: 89% P. pustulosa
8% C. opthalmica
3% Candona sp. A
also present: H. brevicaudata, I. gibba, Candona sp. B, C. vidua
total: 107

CC-90-CA-59: Apr. 10, 1990 air temp (8:30a) 14.4°C
water surface 15.8°C
sed temp 15.1°C

fauna: 80-90% P. pustulosa
remainder: 80% C. vidua
20% C. opthalmica
also present: H. brevicaudata, Candona sp. B
total: 6

CC-90-CA-68: Apr. 24, 1990 air temp (8:35a) 15.5°C
water surface 17.2°C
sed temp 16.4°C

fauna: 80-90% P. pustulosa
remainder: 40% C. vidua
20% Candona sp. B
20% H. brevicaudata
20% C. opthalmica
also present: I. gibba
total: 5

CC-90-CA-77: May 8,1990 air temp (8:35a) 19.5°C
water surface 20.1°C
sed temp 18.4°C

fauna: 80-90% P. pustulosa
remainder: 60% H. brevicaudata
40% C. vidua
also present: C. opthalmica, Candona sp. B
total: 5

SEARSVILLE LAKE
Sublocality 2

89CCt15: May 23, 1989 air temp (9:30a) 17.5°C
water temp 18°C

fauna: 65% C. opthalmica
31% P. pustulosa
4% Candona sp. B
also present: C. vidua, H. brevicaudata, I. gibba
total: 95

89CCt21: June 6, 1989 air temp (1:30p) 25°C
water surface 25°C

water/sed 23°C; sed temp 23°C

fauna: 100% P. pustulosa
also present: I. gibba, C. vidua, H. brevicaudata, C. opthalmica, Candona sp.B
total: not counted

89CCt22: July 12, 1989 air temp (8:15a) 17°C
water surface 21°C
water/sed 20°C

fauna: about 50% C. opthalmica
about 40% P. pustulosa
remainder: 100% C. vidua
also present: I. gibba, Candona sp. B, H. brevicaudata
total: 5

89CCt27: July 25, 1989 air temp (8:55a) 16°C
water surface 23°C
water/sed 23°C; sed temp 23°C

fauna: 81% P. pustulosa
19% C. opthalmica
also present: H. brevicaudata, Candona sp. B., C. vidua
total: 21

89CCt35: Aug. 15, 1989 air temp (8:30a) 22°C
water surface 21.5°C
water/sed 20.2°C

fauna: 55% C. opthalmica
45% P. pustulosa
also present: H. brevicaudata, I. gibba, C. vidua, Candona sp. B
total: 87

89CCt44: Aug. 29, 1989 air temp (8:30a) 17°C
water surface 19.7°C, sed temp 19.4°C

fauna: about 90% P. pustulosa
remainder: 100% C. opthalmica
also present: I. gibba, C. vidua, Candona sp. B
total: 3

89CCt51: Sept. 12, 1989 air temp (8:30a) 14°C

water surface 17.5°C
sed temp 18.2°C

fauna: 89% P. pustulosa
8% C. opthalmica
3% Candona sp. B
also present: C. vidua
total: 36

CC-89-CA-61: Oct. 9, 1989 air temp (9:00a) 15°C
water surface 14.1°C, sed/water 13.8°C, sed temp 14.2°C

fauna: 75% P. pustulosa
25% C. opthalmica
also present: Candona sp. B, C. vidua, H. brevicaudata
total: 16

CC-89-CA-71: Nov. 7, 1989 air temp (9:30a) 16.7°C
water surface 10.2°C. sed/water 7.8°C, sed temp 8.4°C

fauna: 70-80% P. pustulosa
remainder: 94% C. opthalmica
6% Candona sp. B
also present: I. gibba, C. vidua
total: 53

CC-89-CA-86: Nov. 21, 1989 air temp (8:35a) 9.5°C
water surface 6.5°C
sed/water 5.8°C

fauna: 70-80% P. pustulosa
remainder: 95% C. opthalmica
2% C. vidua
2% Candona sp. B
also present: H. brevicaudata
total: 44

CC-89-CA-97: Dec. 5, 1989 air temp (8:30a) 8.0°C
water surface 4.9°C
sed temp 5.4°C

fauna: 72% C. opthalmica
26% P. pustulosa
2% Candona sp. B
also present: H. brevicaudata, C. vidua

total: 125

CC-90-CA-2: Jan. 8, 1990 air temp (8:30a) 11.1°C
water surface 10.0°C, sed/water 9.5°C,
sed temp 9.3°C

fauna: 90% C. opthalmica
10% P. pustulosa
also present: Candona sp. B, C. vidua
total: 20

CC-90-CA-12: Jan. 31, 1990 air temp (8:30a) 3.5°C
water surface 8.2°C
sed/water 8.4°C

fauna: 87% C. opthalmica
6% Candona sp. B
4% P. pustulosa
2% H. brevicaudata
total: 47

CC-90-CA-22: Feb. 13, 1990 air temp (8:45a) 8.3°C
water surface 8.9°C
sed/water 9.1°C

fauna: 65% C. opthalmica
34% P. pustulosa
1% Candona sp. B
also present: C. vidua
total: 65

CC-90-CA-34: Feb. 27, 1990 air temp (8:45a) 10.0°C
water surface 11.4°C
sed/water 11.5°C

fauna: 57% C. opthalmica
42% P. pustulosa
2% Candona sp. B
also present: C. vidua
total: 53

CC-90-CA-43: Mar. 13, 1990 air temp (8:15a) 10.2°C
water surface 11.3°C
sed/water 10.7°C

fauna: 79% P. pustulosa
21% C. opthalmica

also present: C. vidua, I. gibba, Candona sp. B
total: 19

CC-90-CA-52: Mar. 27, 1990 air temp (8:30a) 16.3°C
water surface 16.6°C, sed/water 15.5°C, sed temp 15.4°C
fauna: 79% P. pustulosa
21% C. opthalmica
also present: Candona sp. B, C. vidua
total: 29

CC-90-CA-60: Apr. 10, 1990 air temp (8:30a) 14.4°C
water surface 16.7°C
sed/water 16.7°C
fauna: 94% P. pustulosa
6% C. opthalmica
also present: Candona sp. B
total: 18

CC-90-CA-69: Apr. 24, 1990 air temp (8:35a) 15.5°C
water surface 17.3°C
sed temp (in bolo) 16.9°C
fauna: 83% P. pustulosa
14% C. opthalmica
3% Candona sp. B
also present: H. brevicaudata, C. vidua, I. gibba
total: 70

CC-90-CA-78: May 8, 1990 air temp (8:35a) 19.5°C
water surface 20.3°C
sed/water 20.3°C
fauna: 67% C. opthalmica
33% P. pustulosa
also present: Candona sp. B, I. gibba, C. vidua
total: 49

ARASTRADERO LAKE, ARASTRADERO PRESERVE, PALO ALTO
Elevation: 330 feet

Subloc. 1

88CCt56: Nov. 28, 1988 air temp (2:00p) 15°C
water surface 12°C
sed/water 12°C; sed temp 12.5°C

fauna: 50% P. pustulosa
42% Potamocypris sp.
8% Candona sp. B
also present: H. brevicaudata, C. vidua, P. unicaudata, L. itasca, I. gibba
total: 12

89CCt4: April 11, 1989 air temp (9:00a) 22°C
water surface 19°C
sed temp 19°C

fauna: about 90% P. pustulosa
remainder: 50% Candona sp. B
50% C. vidua
also present: I. gibba
total: 2

89CCt13: May 23, 1989 air temp (8:30a) 14°C
water surface 18°C
sed temp 18°C

fauna: 100% P. pustulosa
also present: C. vidua, L. itasca, H. brevicaudata, I. gibba, Candona sp. B
total: 14

89CCt24: July 12, 1989 air temp (9:45a) 20°C
water surface 25°C
water/sed 24°C; sed temp 23.3°C

fauna: about 85% P. pustulosa
remainder: 36% Candona sp. B
27% Potamocypris sp.
18% C. vidua
9% H. brevicaudata
9% P. unicaudata
also present: I. gibba, L. itasca
total: 11

89CCt28: July 25, 1989 air temp (10:00a) 22°C
water surface 25°C
water/sed 25°C

fauna: 82% P. pustulosa
9% C. vidua
9% Candona sp. B
also present: P. unicaudata, Potamocypris sp., I. gibba, H. brevicaudata, L. itasca
total: 32

89CCt38: Aug. 15, 1989 air temp (10:30a) 29°C
water surface 24.9°C
water/sed 24.4°C; sed temp 23.8°C
fauna: about 80-90% P. pustulosa
remainder: 26% L. itasca
26% Potamocypris sp.
17% P. unicaudata
13% Candona sp. B
13% C. vidua
4% H. brevicaudata
also present: I. gibba, Candona sp. A
total: 23

89CCt45: Aug. 29, 1989 air temp (10:15a) 15°C
water surface 23°C, sed temp 21.6°C
fauna: about 80% P. pustulosa
remainder: 72% C. vidua
14% P. unicaudata
14% Potamocypris sp.
also present: Candona sp. B, L. itasca, I. gibba, H. brevicaudata
total: 7

89CCt52: Sept. 12, 1989 air temp (9:50a) 18°C
water surface 21.8°C, sed. 21.7°C
fauna: 80-90% P. pustulosa
remainder: 32% Potamocypris sp.
21% L. itasca
16% C. vidua
16% P. unicaudata
16% Candona sp. B
also present: I. gibba
total: 19

CC-89-CA-62: Oct. 9,1989 air temp (11:00a) 18.4°C

water surface 18.4°C; sed/water 18.5°C; sed temp 18.6°C(bola)

fauna: 80-90% P. pustulosa
remainder: 46% L. itasca
37% C. vidua
11% P. unicaudata
3% Candona sp. B
3% Potamocypris sp.
also present: H. brevicaudata, I. gibba
total: 35

CC-89-CA-74: Nov. 7, 1989 air temp (1:00p) 17.3°C
water surface 14.8°C; sed/water 14.4°C; sed temp 13.7°C

fauna: 69% P. pustulosa
16% L. itasca
12% C. vidua
2% I. gibba
2% Potamocypris sp.
also present: H. brevicaudata, Candona sp. B, P. unicaudata
total: 51

CC-89-CA-87: Nov. 21, 1989 air temp (10:10a) 11.0°C
water surface 11.9°C
sed/water 11.8°C

fauna: 80% P. pustulosa
8% Potamocypris sp.
5% C. vidua
5% L. itasca
3% P. unicaudata
also present: Candona sp. B, I. gibba, H. brevicaudata
total: 132

CC-89-CA-99: Dec. 5, 1989 air temp (2:45p) 19.4°C
water surface 12.9°C
sed/water 10.6°C

fauna: 78% P. pustulosa
16% C. vidua
3% L. itasca
3% Potamocypris sp.
also present: H. brevicaudata, Candona sp. B, I. gibba, P. unicaudata
total: 79

CC-90-CA-3: Jan. 8, 1990 air temp (9:40a) 19.9°C
water surface 8.9°C
sed/water 8.3°C

fauna: 88% P. pustulosa
12% C. vidua
also present: P. unicaudata, L. itasca, Candona sp. B
total: 25

Subloc. 2

CC-90-CA-13: Jan. 31, 1990 air temp (10:30a) 14.5°C
water surface 9.2°C
sed/water 8.8°C

fauna: 86% P. pustulosa
9% C. vidua
2% L. itasca
1% H. brevicaudata
1% I. gibba
1% P. unicaudata
also present: Candona sp. A, Candona sp. B
total: 99

CC-90-CA-23: Feb. 13,1990 air temp (10:30a) 10.9°C
water surface 9.3°C
sed/water 9.5°C

fauna: 70-80% P. pustulosa
remainder: 50% C. vidua
33% Candona sp. B
17% P. unicaudata
also present: Candona sp. A, H. brevicaudata
total: 6

CC-90-CA-35: Feb. 27,1990 air temp (10:45a) 10.4°C
water surface 10.8°C
sed/water 11.0°C

fauna: 72% P. pustulosa
22% C. vidua
6% Candona sp. B
also present: H. brevicaudata
total: 36

CC-90-CA-44: Mar. 13, 1990 air temp (9:45a) 13.6°C

water surface 11.7°C; sed/water 11.2°C; sed temp 11.5°C

fauna: 70-80% P. pustulosa
remainder: 88% C. vidua
8% Candona sp. B
4% P. unicaudata
also present: Candona sp. A, I. gibba
total: 26

Subloc. 3

CC-90-CA-53: Mar. 27, 1990 air temp (9:45a) 20°C
water surface 17.6°C
sed/water 15.2°C

fauna: 75% P. pustulosa
19% C. vidua
6% Potamocypris sp.
also present: H. brevicaudata, P. unicaudata, I. gibba, L. itasca, Candona sp. A, Candona sp. B
total: 36

Subloc. 2

CC-90-CA-62: Apr. 10,1990 air temp (1:50p) 23.5°C
water surface 18.9°C
sed temp 19.5°C

fauna: 80-90% P. pustulosa
remainder: 25% C. vidua
25% L. itasca
25% Potamocypris sp.
25% H. brevicaudata
also present: Candona sp. B
total: 4

CC-90-CA-70: Apr. 24, 1990 air temp (10:00a) 15°C
water surface 17.9°C
sed/water 17.6°C

fauna: 93% P. pustulosa
5% Candona sp. B
2% L. itasca
also present: C. vidua, Candona sp. A
total: 41

CC-90-CA-79: May 8,1990 air temp (9:55a) 20°C

water surface 21.4°C; sed/water 20.8°C; sed temp 21.0°C

fauna: 96% P. pustulosa
2% C. vidua
2% L. itasca
also present: H. brevicaudata, Candona sp. A, Candona sp. B
total: 42

BORONDA LAKE, FOOTHILLS PARK, PALO ALTO
Elevation: 750 feet
Shoreline samples--

89CCt5: April 11, 1989 — air temp (10:00a) approx. 22°C
water surface 22°C
water/sed 21°C

fauna: 96% C. vidua
4% L. itasca
also present: P. pustulosa, Potamocypris sp.
total: 27

89CCt30: July 25, 1989 — air temp (10:40a) 22°C
water surface 25°C
water/sed 25°C

fauna: 100% C. vidua
also present: Isocypris sp.

89CCt37: Aug. 15, 1989 — air temp (9:30a) 23.5°C
water surface 24.6°C
water/sed 24.2°C

fauna: 100% C. vidua

BORONDA LAKE
Offshore mud samples--

88CCt57: Nov. 28, 1988 — air temp (3:30p) 14.5°C
water surface 12°C
water/sed 12°C; sed temp 12°C

fauna: 67% C. vidua
33% Potamocypris sp.
also present: L. itasca, H. brevicaudata, P. pustulosa, P. unicaudata, Candona sp., C. beaconensis
total: 6

89CCt6: April 11, 1989 — air temp (10:00a) approx. 22°C
water surface 22°C
water/sed 21°C; sed temp 21°c

fauna: 78% C. vidua
13% L. itasca
8% Potamocypris sp.
1% Isocypris sp.
also present: H. brevicaudata, Heterocypris sp.
total: 87

89CCt16: May 23, 1989 — air temp (11:00a) 17.5°C
water surface 18°C

fauna: 89% C. vidua
11% Potamocypris sp.
also present: P. pustulosa, L. itasca
total: 18

89CCt25: July 12, 1989 — air temp (10:45a) 20°C
water surface 24°C
water/sed 24°C

fauna: 96% C. vidua
3% L. itasca
1% Potamocypris sp.
also present: Heterocypris sp., Isocypris sp., H. brevicaudata
total: 239

89CCt29: July 25, 1989 — air temp (10:40a) 22°C
water surface 25°C
water/sed 25°C

fauna: 99% C. vidua
1% L. itasca
less than 1% Potamocypris sp.
also present: H. brevicaudata, Isocypris sp., P. pustulosa
total: 225

89CCt36: Aug. 15, 1989 — air temp (9:30a) 23.5°C
water surface 24.6°C
water/sed 24.2°C

fauna: 90% C. vidua
10% P. pustulosa
also present: L. itasca
total: 21

89CCt46: Aug. 29, 1989 air temp (11:00a) 15°C
water surface 23.1°C, sed/water 22.9°C

fauna: 69% C. vidua
31% P. pustulosa
also present: I. gibba, L. itasca
total: 16

89CCt53: Sept. 12, 1989 air temp (10:30a) 21°C
water surface 22°C
sed/water 21.5°C

fauna: 72% C. vidua
28% P. pustulosa
also present: L. itasca, Candona sp.
total: 32

CC-89-CA-63: Oct. 9,1989 air temp (11:45a) 22.9°C
water surface 20.4°C
sed/water 19.4°C

fauna: 60% C. vidua
40% P. pustulosa
also present: Candona sp., L. itasca
total: 10

CC-89-CA-72: Nov. 7,1989 air temp (11:00a) 16.7°C
water surface 14.7°C
sed/water 14.2°C

fauna: 88% C. vidua
22% P. pustulosa
also present: L. itasca
total: 17

CC-89-CA-88: Nov. 21, 1989 air temp (11:10a) 12.5°C
water surface 13.6°C
sed/water 13.0°C

fauna: 50% C. vidua
50% P. pustulosa
also present: L. itasca
total: 6

CC-89-CA-98: Dec. 5, 1989 air temp (1:40p) 19.1°C
water surface 11.5°C

sed/water 10.9°C

fauna: 100% C. vidua
also present: H. brevicaudata, L. itasca, P. pustulosa
total: 1

CC-90-CA-4: Jan. 8,1990 air temp (10:40a) 17.8°C
water surface 10.0°C
sed/water 9.7°C

fauna: 100% C. vidua
total: 5

CC-90-CA-14: Jan. 31, 1990 air temp (11:30a) 11.0°C
water surface 9.5°C
sed/water 8.9°C

fauna: 100% C. vidua
also present: P. pustulosa, L. itasca, Potamocypris sp.
total: 1

CC-90-CA-24: Feb. 13, 1990 air temp (11:30a) 9.3°C
water surface 9.9°C
sed/water 9.8°C

fauna: 75% P. pustulosa
25% C. vidua
also present: L. itasca
total: 16

Subloc. 2

CC-90-CA-25: same as above (CC-90-CA-24)

fauna: 93% P. pustulosa
7% C. vidua
total: 14

Subloc. 1

CC-90-CA-36: Feb. 27, 1990 air temp (11:50a) 12.8°C
water surface 11.9°C
sed/water 11.9°C

fauna: 67% P. pustulosa
33% C. vidua
total: 3

CC-90-CA-45: Mar. 13, 1990 air temp (10:30a) 13.6°C
water surface 11.7°C

sed/water 11.8°C

fauna: 92% P. pustulosa
8% L. itasca
also present: C. vidua
total: 13

CC-90-CA-54: Mar. 27,1990 air temp (11:00a) 22°C
water surface 17.5°C
sed/water 16.7°C

fauna: 100% P. pustulosa
also present: C. vidua, L. itasca, I. gibba

CC-90-CA-61: Apr. 10, 1990 air temp (9:20a) 19.3°C
water surface 17.0°C
sed/water 16.9°C

fauna: 100% P. pustulosa
also present: C. vidua, L. itasca

CC-90-CA-72: Apr. 24,1990 air temp (11:00a) 21°C
water surface 16.9°C
sed/water 16.2°C

fauna: 100% P. pustulosa
also present: C. vidua, L. itasca
total: 10

CC-90-CA-80: May 8, 1990 air temp (10:50a) 21°C
water surface 22.6°C
sed/water 22.3°C

fauna: 85% P. pustulosa
11% C. vidua
4% Potamocypris sp.
also present: H. brevicaudata, L. itasca, Candona sp. A
total: 27

COAST CASEY FOREBAY, SHORELINE PARK, MOUNTAIN VIEW, CA

Elevation: approximately sea level

88CCt54: Nov. 28, 1988 air temp (11:30a) 18°C
water surface 16°C
water/sed 16°C; sed temp 16°C

fauna: 100% H. salina
also present: H. carolinensis, Candona sp.

total: 1

88CCt55: Nov. 28. 1988 air temp (11:30a) 18°C
water surface 16°C
water/sed and sed temp 16°C

fauna: 63% H. salina
37% C. beaconensis
also present: H. carolinensis, Candona sp.
total: 8

89CCt2: March 17, 1989 air temp (9:00a) 15°C
sed temp 13°C

fauna: 75% H. salina
25% C. beaconensis
also present: H. carolinensis
total: 4

89CCt17: June 6, 1989 air temp (8:15a) 18°C
sed temp 18°C

fauna: 100% H. salina
also present: H. carolinensis
total: 6

89CCt33: July 25, 1989 air temp (2:35p) 23.5°C
sed temp 27°C

fauna: 99% H. salina
1% H. carolinensis
total: 359

89CCt42: Aug. 15, 1989 air temp (2:10p) 27°C
water surface 27.7°C
sed temp 24.6°C

fauna: 94% H. salina
6% H. carolinensis
total: 32

89CCt49: Aug. 29,1989 air temp (2:30p) 21°C
water surface 22.2°C
sed temp 20.4°C

fauna: 94% H. salina
6% H. carolinensis
also present: C. beaconensis
total: 108

89CCt57: Sept. 12,1989 air temp (2:30p) 25°C
water surface 26°C
sed temp 23.6°C

fauna: 98% H. salina
2% H. carolinensis
total: 48

CC-89-CA-67: Oct. 9, 1989 air temp (8:50a) 16.6°C
water surface 17.2°C
sed temp 17.5°C

fauna: 78% H. salina
17% H. carolinensis
4% C. beaconensis
total: 23

CC-89-CA-80: Nov. 14, 1989 air temp (8:35a) 13.3°C
water surface 14.0°C
sed/water 14.4°C; sed temp 14.0°C

fauna: 92% H. salina
8% H. carolinensis
also present: C. beaconensis
total: 13

CC-89-CA-90: Nov. 28, 1989 air temp (8:45a) 6.9°C
water surface 10.4°C
sed temp 10.5°C

fauna: 86% H. salina
14% H. carolinensis
also present: C. beaconensis
total: 7

CC-89-CA-101: Dec. 12, 1989 air temp (10:00a) 10.4°C
water surface 11.0°C
sed temp 10.0°C

fauna: 100% H. salina
also present: C. beaconensis
total: 5

CC-90-CA-6: Jan. 23, 1990 air temp (9:20a) 8.3°C
water surface 9.8°C
sed temp 9.4°C

fauna: 100% H. salina
also present: H. carolinensis, C. beaconensis
total: 3

CC-90-CA-17: Feb. 7, 1990 air temp (9:40a) 8.2°C
water surface 9.6°C
sed/water 9.2°C

fauna: 58% H. salina
33% H. carolinensis
8% C. beaconensis
total: 12

CC-90-CA-28: Feb. 20,1990 air temp (10:00a) 9.6°C
water surface 10.5°C
sed temp 9.8°C

fauna: 87% H. salina
9% C. beaconensis
4% H. carolinensis
total: 23

CC-90-CA-38: Mar. 6, 1990 air temp (9:10a) 17.4°C
water surface 12.7°C
sed temp 12.1°C

fauna: 71% H. salina
29% H. carolinensis
total: 14

CC-90-CA-47: Mar. 20, 1990 air temp (9:00a) 20.8°C
water surface 15.3°C
sed temp 14.0°C

fauna: 100% H. salina
also present: H. carolinensis
total: 9

CC-90-CA-55: Apr. 3, 1990 air temp (9:00a) 18.4°C
water surface 14.3°C
sed temp 13.8°C

fauna: 100% H. salina
also present: H. carolinensis, C. beaconensis
total: 4

CC-90-CA-64: Apr. 17, 1990 air temp (8:30a) 14.7°C
water surface 15.8°C

sed/water 15.7°C

fauna: 100% H. salina
also present: H. carolinensis, C. beaconensis
total: 5

CC-90-CA-73: May 1, 1990 air temp (8:45a) 20°C
water surface 15.9°C
sed temp 15.1°C

fauna: 100% H. salina
also present: H. carolinensis, C. beaconensis
total: 10

CC-90-CA-81: May 15, 1990 air temp (8:40a) 15°C
water surface 15.3°C
sed temp 15.1°C

fauna: 86% H. salina
14% H. carolinensis
also present: C. beaconensis
total: 7

LOS GATOS CREEK, LOS GATOS CREEK COUNTY PARK, LOS GATOS, CA

Elevation: 240 feet

Sublocality 1

89CCt10: April 11, 1989 air temp (11.15a) unknown
water surface 20°C
sed/water 18.5°C; sed temp 17.5°C

fauna: 100% Candona sp. C
also present: L. itasca, C. vidua, Isocypris sp., Potamocypris sp., I. gibba
total: 3

89CCt48: Aug. 29,1989 air temp (12:30p) 17°C
water surface 22°C
sed/water 22.4°C

fauna: no adults

89CCt56: Sept. 12, 1989 air temp (1:45p) 24.5°C
water surface 21.4°C
sed temp (bolo) 21.8°C

fauna: no adults

also present: Candona sp., C. vidua

CC-89-CA-64: Oct. 9, 1989 air temp (2:10p) 25.1°C
water surface 21.5°C
sed/water 20.8°C

fauna: no adults
also present: Candona sp. C, I. gibba, L. itasca

CC-89-CA-81: Nov. 14, 1989 air temp (10:00a) 16.6°C
water surface 14.7°C
sed/water 14.6°C

fauna: no adults
also present: I. gibba, Candona sp., L. itasca, C. vidua

CC-89-CA-92: Nov. 28, 1989 air temp (10:40a) 9.6°C
water surface 11.4°C
sed/water 11.3°C

fauna: 100 % L. itasca
also present: H. brevicaudata, Isocypris sp., Candona sp. C, I. gibba, C. vidua
total: 1

CC-89-CA-102: Dec. 12, 1989 air temp (11:15a) 11.4°C
water surface 10.8°C
sed/water 10.3°C

fauna: no adults
also present: H. brevicaudata, Candona sp. C, I. gibba, C. vidua

CC-90-CA-7: Jan. 23, 1990 air temp (10:30a) 14.0°C
water surface 9.7°C
sed/water 9.2°C

fauna: no adults

CC-90-CA-20: Feb. 7, 1990 air temp (12:50p) 12.3°C
water surface 11.7°C
sed/water 11.1°C

fauna: no adults

CC-90-CA-32: Feb. 20, 1990 air temp (11:30a) 12.4°C
water surface 10.6°C
sed/water 10.1°C

fauna: no adults

CC-90-CA-41: Mar. 6, 1990 air temp (10:35a) 21.8°C
water surface 14.7°C
sed/water 14.0°C

fauna: no adults
also present: H. brevicaudata, I. gibba, Isocypris sp., L. itasca, C. vidua

CC-90-CA-50: Mar. 20, 1990 air temp (10:30a) 25.0°C
water surface 17.6°C
sed/water 16.9°C

fauna: 40% Candona sp. C
40% L. itasca
20% I. gibba
total: 5

CC-90-CA-58: Apr. 3, 1990 air temp (10:30a) 23.5°C
water surface 19.8°C
sed/water 18.9°C

fauna: 67% Candona sp. C
22% L. itasca
11% C. vidua
total: 9

CC-90-CA-67: Apr. 17, 1990 air temp (10:00a) 19°C
water surface 17.5°C
sed/water 17.2°C

fauna: 71% Candona sp. C
29% L. itasca
also present: I. gibba, Isocypris sp.
total: 7

CC-90-CA-76: May 1, 1990 air temp (10:15a) 24.5°C
water surface 19.8°C
sed/water 19.8°C

fauna: 75% Candona sp. C
25% Isocypris sp.
also present: C. vidua, L. itasca, I. gibba
total: 4

CC-90-CA-84: May 15, 1990 air temp (11:35a) 18°C
water surface 21.7°C
sed/water 20.9°C

fauna: 57% Candona sp. C
29% L. itasca
14% Isocypris sp.
also present: I. gibba, C. vidua
total: 7

Sublocality 2

89CCt31: July 25, 1989
air temp (11:45a) 23°C
water surface 22°C
water/sed 22°C

fauna: no adults
also present: C. vidua, H. brevicaudata, I. gibba

89CCt39: Aug. 15, 1989
air temp (12:10p) 28°C
water surface 23.2°C
water/sed 22.7°C; sed temp 22.7°C

fauna: no adults
also present: C. vidua, H. brevicaudata

89CCt55: Sept. 12, 1989
air temp (1:45p) 24.5°C
water surface 22.1°C

fauna: 100% C. vidua
also present: H. brevicaudata
total: 1

CC-89-CA-65: Oct. 9, 1989
air temp (2:10p) 25.1°C
water surface 21.5°C
sed/water 20.8°C

fauna: 100% C. vidua
also present: H. brevicaudata
total: 1

Subloc. 3

89CCt41: Aug. 15, 1989
air temp (12:10p) 28°C
water surface 23.2°C
water/sed and sed temp 22.7°C

fauna: 100% L. itasca
also present: H. brevicaudata, C. vidua, Potamocypris sp., Candona sp., I. gibba, Isocypris sp.
total: 2

89CCt54: Sept. 12, 1989 air temp (1:45p) 24.5°C
water surface 22.6°C

fauna: 100% L. itasca
also present: C. vidua, H. brevicaudata, Isocypris sp., Potamocypris sp., I. gibba
total: 1

CC-89-CA-66: Oct. 9, 1989 air temp (2:10p) 25.1°C
water surface 19.6°C
sed/water 19.6°C

fauna: 100% L. itasca
also present: H. brevicaudata, Isocypris sp., I. gibba, C. vidua, Potamocypris sp.
total: 2

CC-89-CA-83: Nov. 14, 1989 air temp (10:00a) 16.6°C
water surface 13.5°C
sed/water 13.8°C

fauna: 100% L. itasca
also present: H. brevicaudata, I. gibba, Isocypris sp., Potamocypris sp., C. vidua
total: 2

CC-89-CA-93: Nov. 28, 1989 air temp (10:40a) 9.6°C
water surface 12.0°C
sed/water 12.0°C

fauna: no adults
also present: H. brevicaudata, I. gibba, Isocypris sp., Potamocypris sp., C. vidua, L. itasca

CC-89-CA-104: Dec. 12, 1989 air temp (11:15a) 11.4°C
water surface 9.0°C
sed/water 8.9°C

fauna: 60% L. itasca
40% Isocypris sp.
also present: H. brevicaudata, I. gibba, C. vidua, Potamocypris sp., Candona sp. A
total: 5

CC-90-CA-10: Jan. 23, 1990 air temp (12:00p) 20.8°C
water surface 9.0°C
sed/water 8.8°C

fauna: 57% Isocypris sp.
14% H. brevicaudata
14% I. gibba
14% L. itasca
also present: C. vidua
total: 7

CC-90-CA-18: Feb. 7, 1990 air temp (12:50p) 12.3°C
water surface 9.4°C
sed/water 9.2°C

fauna: 100% I. gibba
also present: P. pustulosa, C. vidua, H. brevicaudata
total: 5

CC-90-CA-29: Feb. 20,1990 air temp (11:30a) 12.4°C
water surface 8.1°C
sed/water 8.0°C

fauna: 67% L. itasca
17% Isocypris sp.
17% C. vidua
also present: H. brevicaudata, I. gibba, Potamocypris sp., Candona sp. A
total: 6

CC-90-CA-39: Mar. 6, 1990 air temp (10:35a) 21.8°C
water surface 11.7°C
sed/water 11.2°C

fauna: 56% L. itasca
33% C. vidua
11% Potamocypris sp.
also present: Isocypris sp., I. gibba, H. brevicaudata
total: 9

CC-90-CA-48: Mar. 20, 1990 air temp (10:30a) 25.0°C
water surface 14.7°C
sed/water 14.5°C

fauna: 76% H. brevicaudata
19% I. gibba
5% Isocypris sp.
also present: L. itasca, C. vidua
total: 21

CC-90-CA-56: Apr. 3, 1990 air temp (10:30a) 23.5°C
water surface 16.3°C
sed/water 16.2°C

fauna: 56% H. brevicaudata
39% Isocypris sp.
5% L. itasca
also present: I. gibba, C. vidua
total: 18

CC-90-CA-65: Apr. 17, 1990 air temp (10:00a) 19°C
water surface 16.7°C
sed/water 16.6°C

fauna: 58% H. brevicaudata
23% Isocypris sp.
13% L. itasca
6% I. gibba
also present: C. vidua
total: 64

CC-90-CA-74: May 1, 1990 air temp (10:15a) 24.5°C
water surface 18.0°C
sed/water 17.3°C

fauna: 57% L. itasca
29% H. brevicaudata
14% I. gibba
also present: Isocypris sp., C. vidua
total: 7

CC-90-CA-82: May 15, 1990 air temp (10:05a) 17°C
water surface 17.5°C
sed/water 17.3°C

fauna: 69% Isocypris sp.
19% H. brevicaudata
6% I. gibba
6% L. itasca
also present: Potamocypris sp., C. vidua
total: 11

Subloc. 4 (percolation pond)

CC-89-CA-84: Nov. 14, 1989 air temp (10:00a) 16.6°C
water surface 16.0°C
sed/water 15.0°C

fauna: 75% L. inopinata

25% Potamocypris sp.
also present: Pelocypris sp., I. gibba, L. itasca, C. vidua
total: 4

CC-89-CA-105: Dec. 12, 1989 air temp (11:15a) 11.4°C
water surface 10.8°C
sed/water 9.9°C

fauna: 75% L. itasca
25% Pelocypris sp.,
also present: L. inopinata, C. vidua, Potamocypris sp., Isocypris sp., H. brevicaudata
total: 8

CC-90-CA-8: Jan. 23, 1990 air temp (10:30a) 14.0°C
water surface 9.4°C
sed/water 9.1°C

fauna: 81% L. itasca
7% C. vidua
7% Potamocypris sp.
4% I. gibba
also present: L. inopinata, P. pustulosa
total: 27

CC-90-CA-19: Feb. 7, 1990 air temp (12:50p) 12.3°C
water surface 11.8°C
sed/water 11.0°C

fauna: 55% L. inopinata
42% L. itasca
3% I. gibba
also present: Pelocypris sp.
total: 31

CC-90-CA-30: Feb. 20, 1990 air temp (11:30a) 12.4°C
water surface 9.8°C
sed/water 9.2°C

fauna: 50% L. inopinata
35% L. itasca
12% Potamocypris sp.
4% I. gibba
also present: Pelocypris sp., Candona spp.
total: 26

CC-90-CA-40: Mar. 6, 1990 air temp (10:35a) 21.8°C
water surface 16.1°C
sed/water 13.1°C

fauna: 78% L. itasca
11% L. inopinata
11% Pelocypris sp.
total: 9

CC-90-CA-49: Mar. 20, 1990 air temp (10:30a) 25°C
water surface 18.1°C
sed/water 17.1°C

fauna: 69% L. itasca
23% L. inopinata
8% I. gibba
also present: Isocypris sp., C. vidua, Pelocypris sp.
total: 13

CC-90-CA-57: Apr. 3, 1990 air temp (10:30a) 23.5°C
water surface 19.8°C
sed/water 18.5°C

fauna: no adults
also present: Pelocypris sp., L. inopinata, I. gibba,
L. itasca, Candona sp.

CC-90-CA-66: Apr. 17, 1990 air temp (10:00a) 19°C
water surface 18.3°C
sed/water 17.9°C

fauna: 100% L. inopinata
also present: Candona sp. C, I. gibba
total: 1

CC-90-CA-75: May 1,1990 air temp (10:15a) 24.5°C
water surface 20.2°C
sed/water 19.5°C

fauna: 67% Potamocypris sp.
17% L. itasca
17% L. inopinata
also present: Pelocypris sp., I. gibba, C. vidua, Isocypris sp.?,
Candona sp. C
total: 6

CC-90-CA-83: May 15, 1990 air temp (10:05a) 17°C

water surface 20.6°C
sed/water 19.7°C

fauna: 64% Potamocypris sp.
18% L. itasca
9% L. inopinata
9% Isocypris sp.
also present: Pelocypris sp., I. gibba, H. brevicaudata, C. vidua
total: 11

LAKE LAGUNITA, STANFORD, CA (dried out before Aug. 4, 1988)

88CCt12: March 11, 1988 no temperature data
fauna: 41% C. vidua
33% H. brevicaudata
19% Limnocythere paraornata
7% Potamocypris sp.
also present: I. gibba, Cypris pubera
total: 27

88CCt23: April 26, 1988 no temperature data
fauna: 54% Eucypris sp. A
15% Potamocypris sp.
8% Isocypris sp.
7% L. paraornata
7% I. gibba
5% C. vidua
3% H. brevicaudata
also present: C. pubera, Candona sp.
total: 59

88CCt24: April 26, 1988 no temperature data
fauna: 30% Eucypris sp. A
30% L. paraornata
20% Isocypris sp.
10% I. gibba
10% C. vidua
also present: C. pubera, H. brevicaudata
total: 10

88CCt36-39: June 9, 1988 no temperature data

fauna: 100% H. brevicaudata

DUCKPOND SEEP, PALO ALTO BAYLANDS, PALO ALTO, CA (dried up in April, 1989) Elevation: approximately 5 feet

88CCt1-5: Feb. 18, 1988 no temperature data
fauna: 100% H. brevicaudata

88CCt53: Nov. 28, 1988 air temp (11:00a) 18°C
water surface 14°C
water/sed 13°C; sed temp 11°C
fauna: 91% Candonocypris novaezelandiae
7% C. vidua
2% H brevicaudata
total: 85

89CCt1: March 17, 1989 air temp (8:30a) 15°C
sed temp 11°C
fauna: no ostracodes found

89CCt12: April 11, 1989 no temperature data; seep mostly dried up
fauna: 83% C. vidua
13% H brevicaudata
2% H. carolinensis
2% C. novaezelandiae
also present: Eucypris sp. B
total: 54

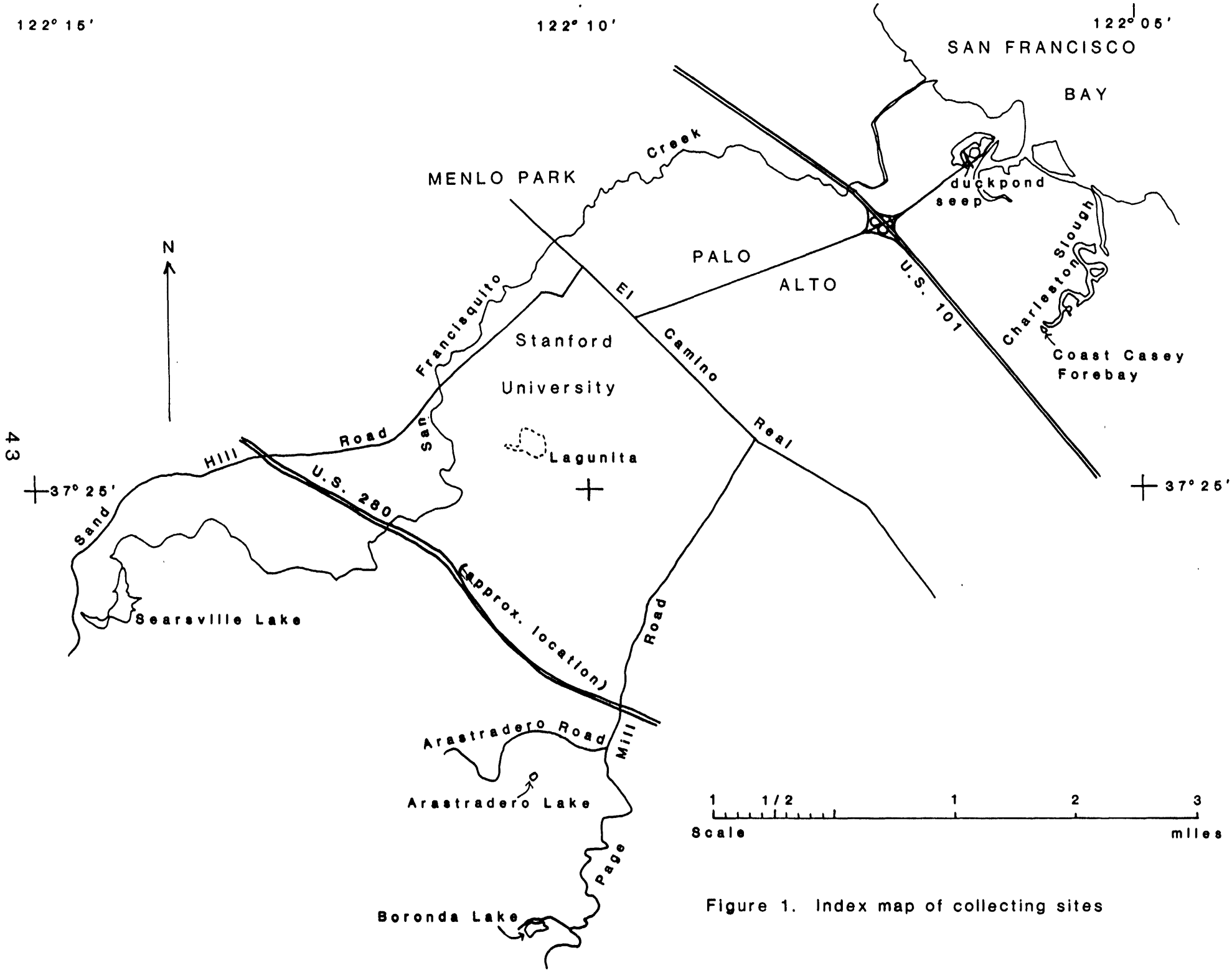


Figure 1. Index map of collecting sites

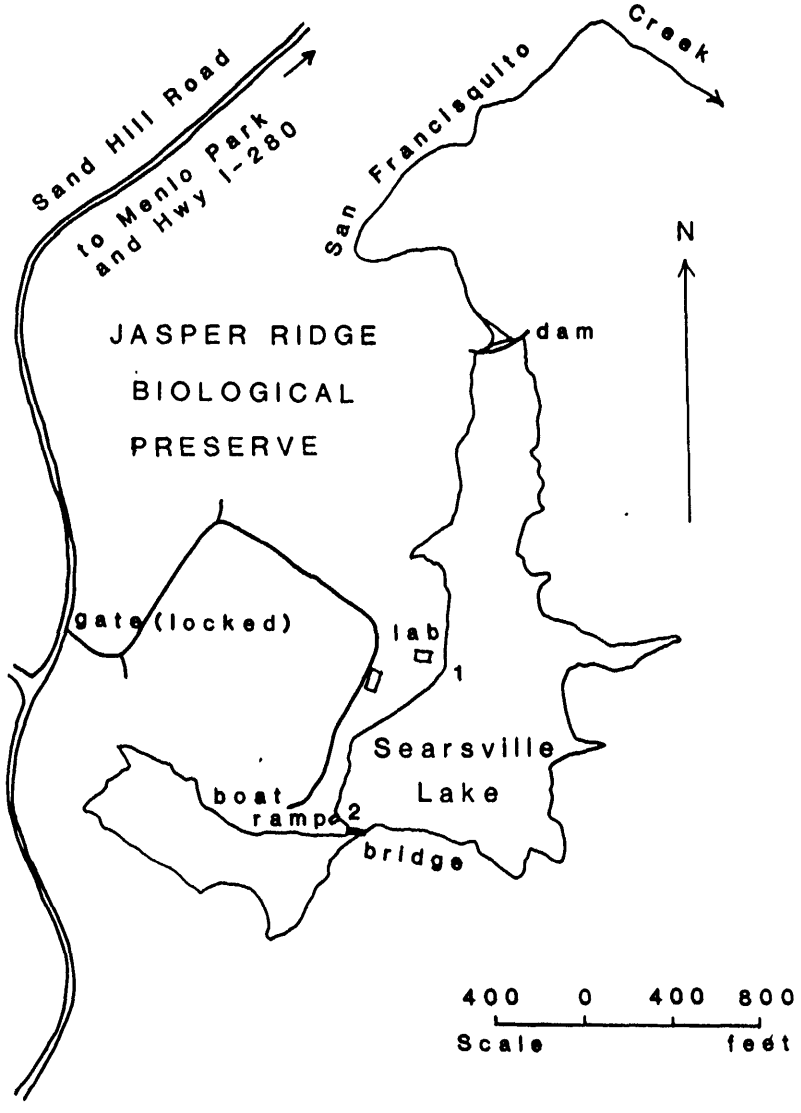


Figure 2. Sketch map of Searsville Lake

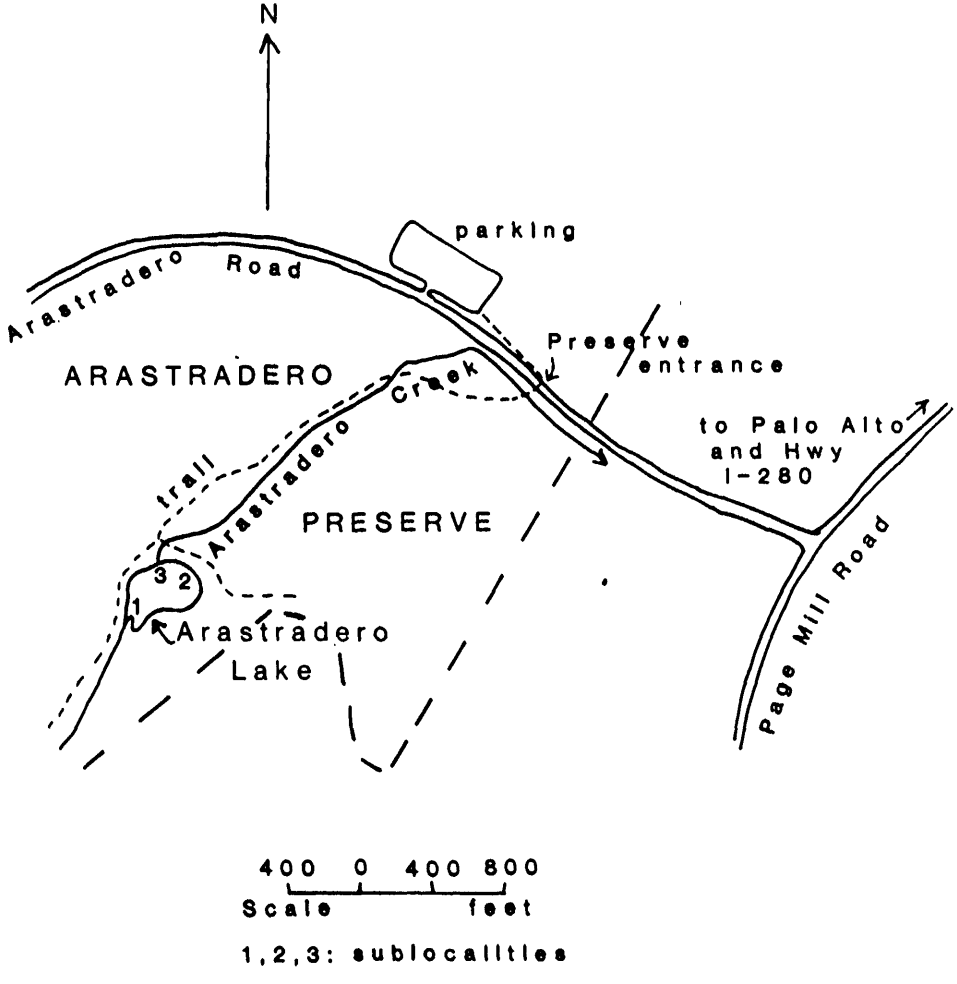


Figure 3. Sketch map of Arastradero Lake

Figure 4. Sketch map of Boronda Lake

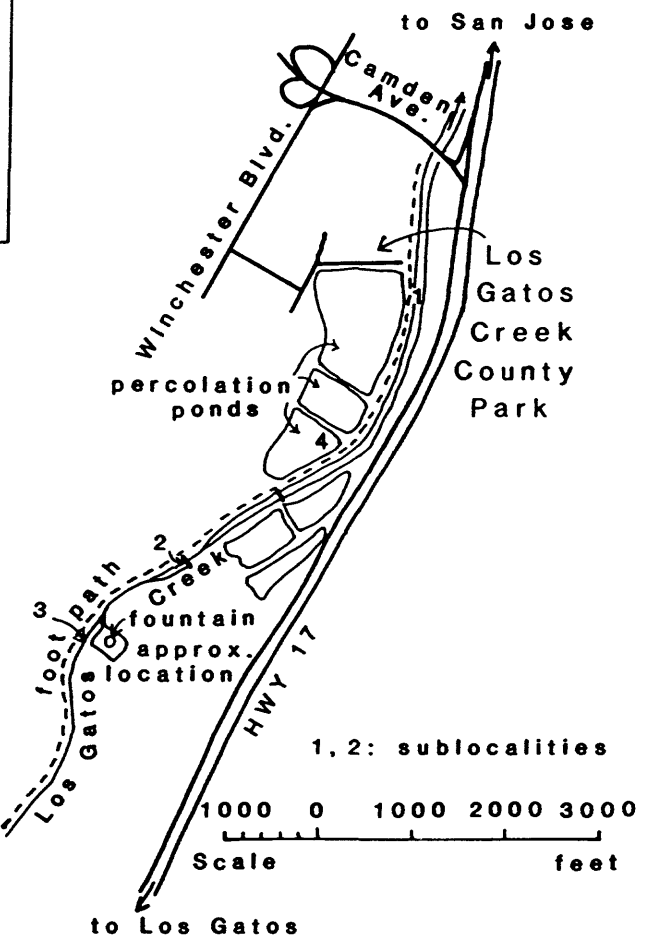


Figure 5. Sketch map of Los Gatos Creek

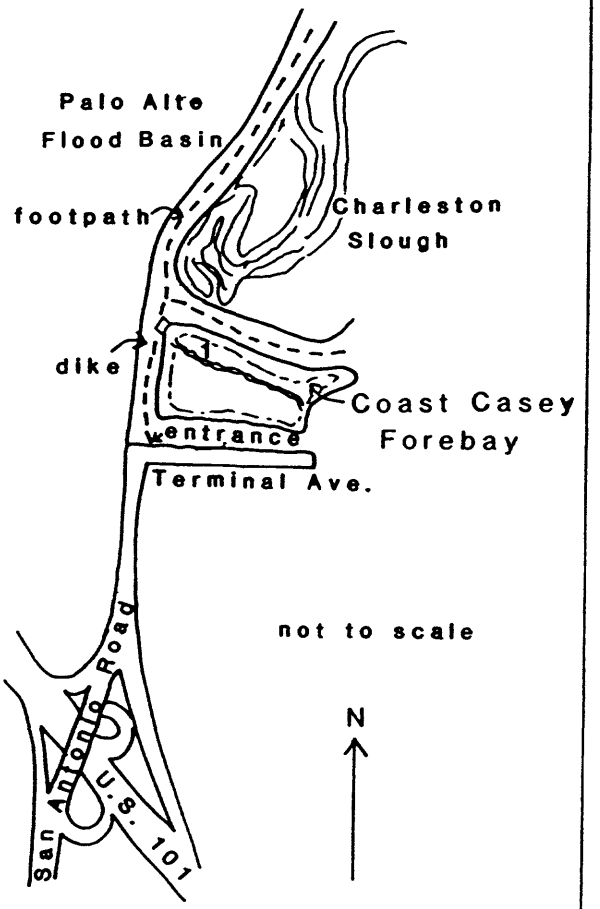


Figure 6. Sketch map of Coast Casey Forebay

Figure 7. Temperature plot for Searsville Lake, sublocality 1, from May 23, 1989 through May 8, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 6, through vol. 94, no. 5, NOAA

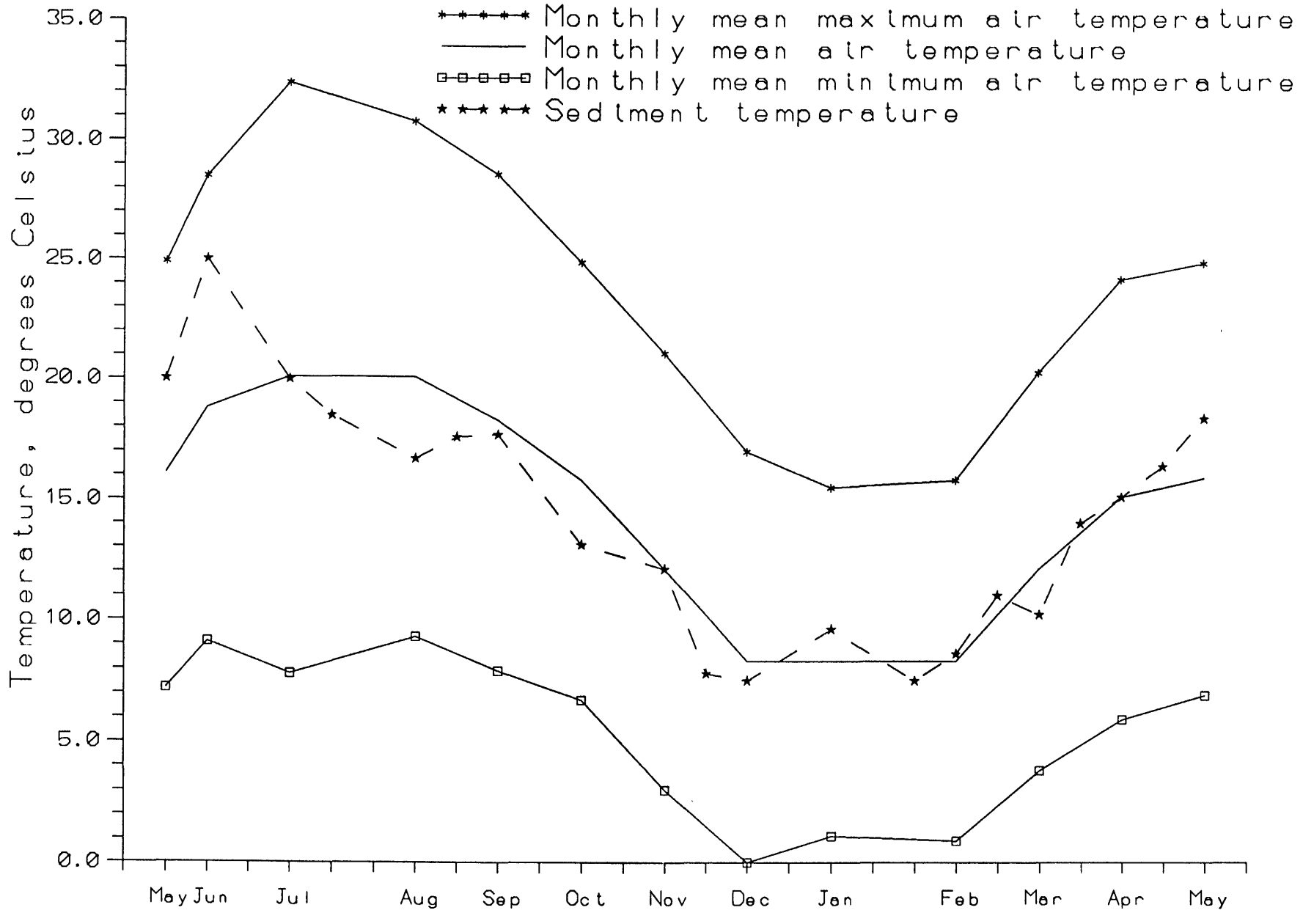


Figure 8. Temperature plot for Searsville Lake, sublocality 2, from May 23, 1989 through May 8, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 6, through vol. 94, no. 5, NOAA

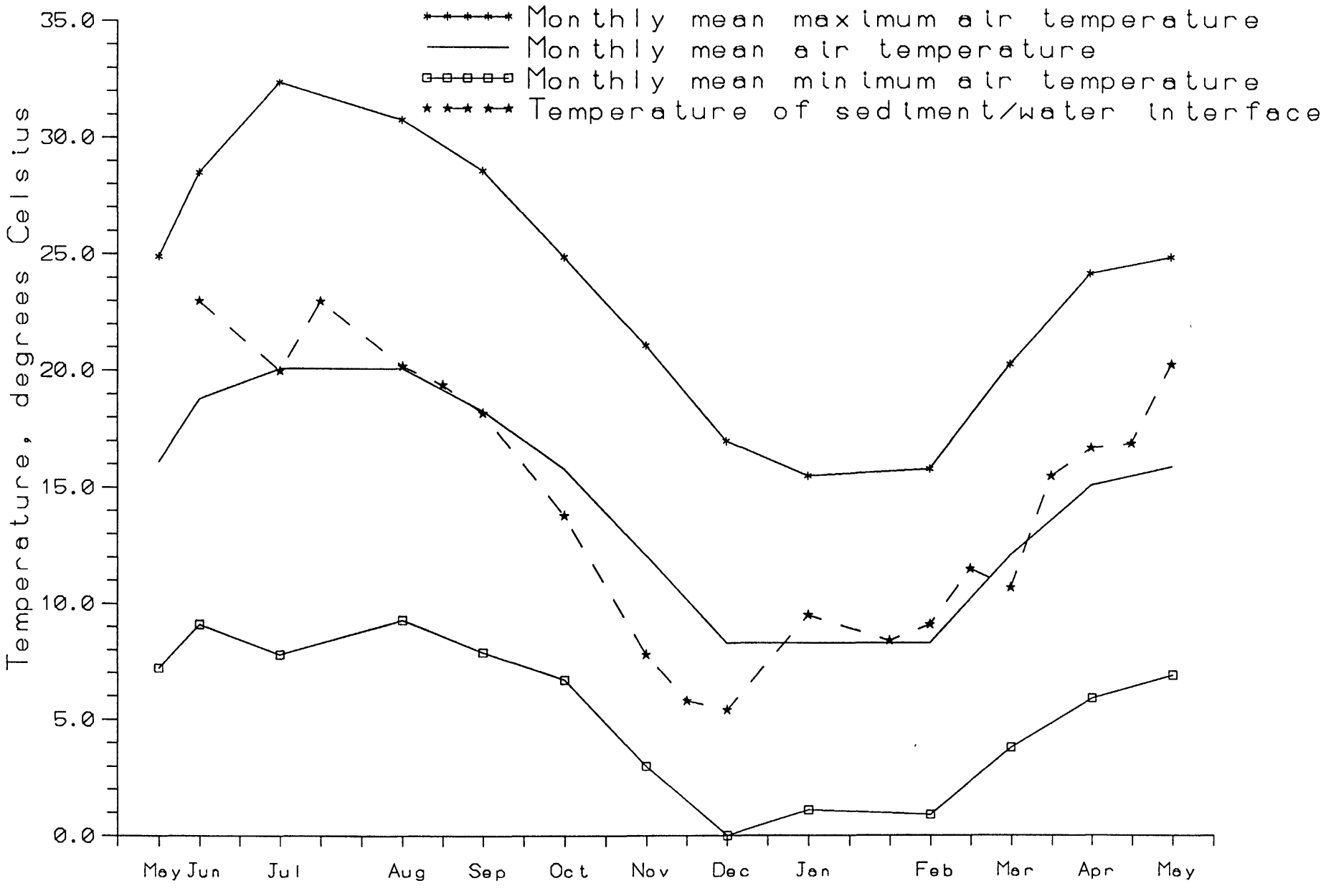


Figure 9. Temperature plot for Arastradero Lake from May 23, 1989 through May 8, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 6, through vol. 94, no. 5, NOAA

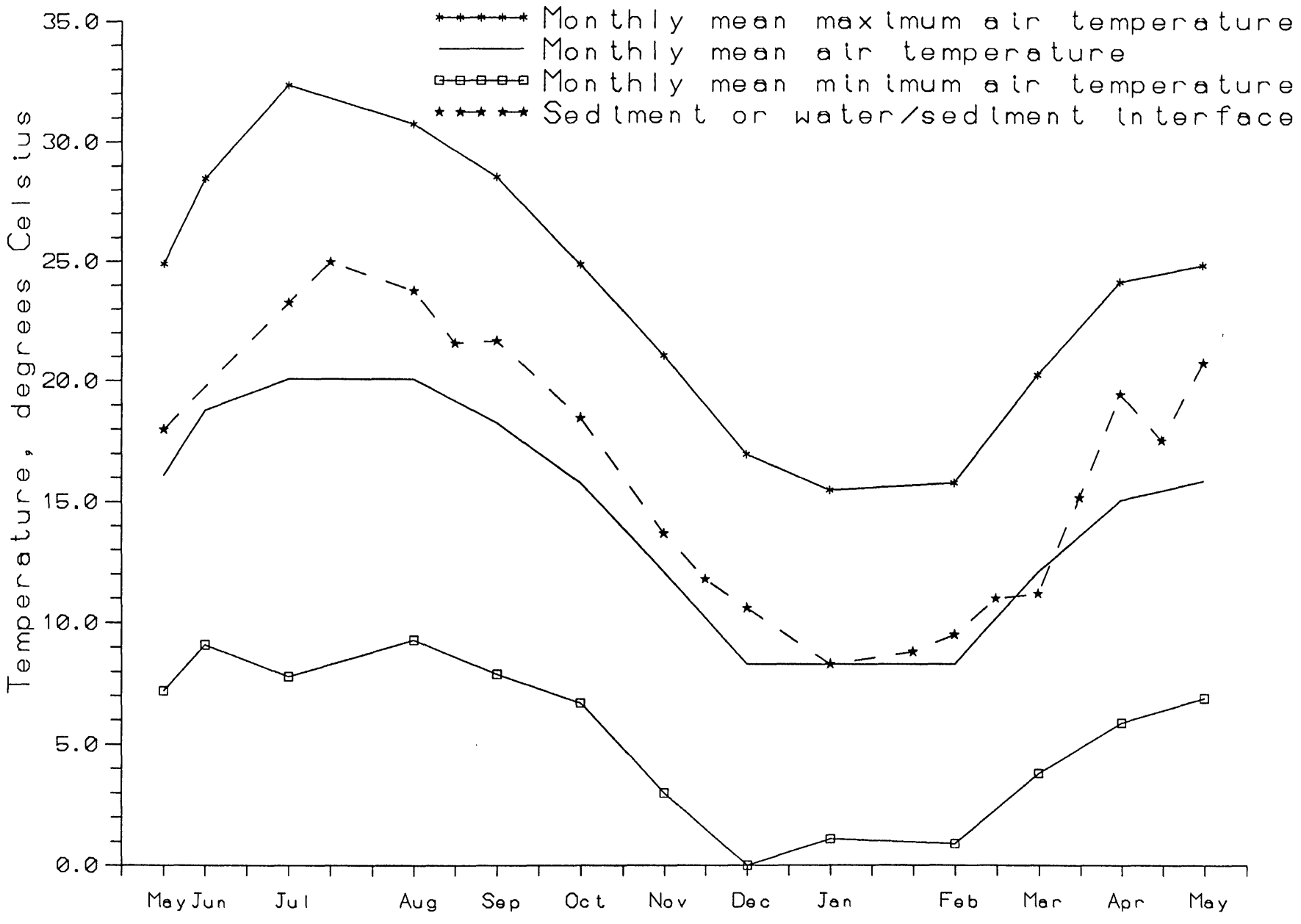


Figure 10. Temperature plot for Boronda Lake from May 23, 1989 through May 8, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 6, through vol. 94, no. 5, NOAA

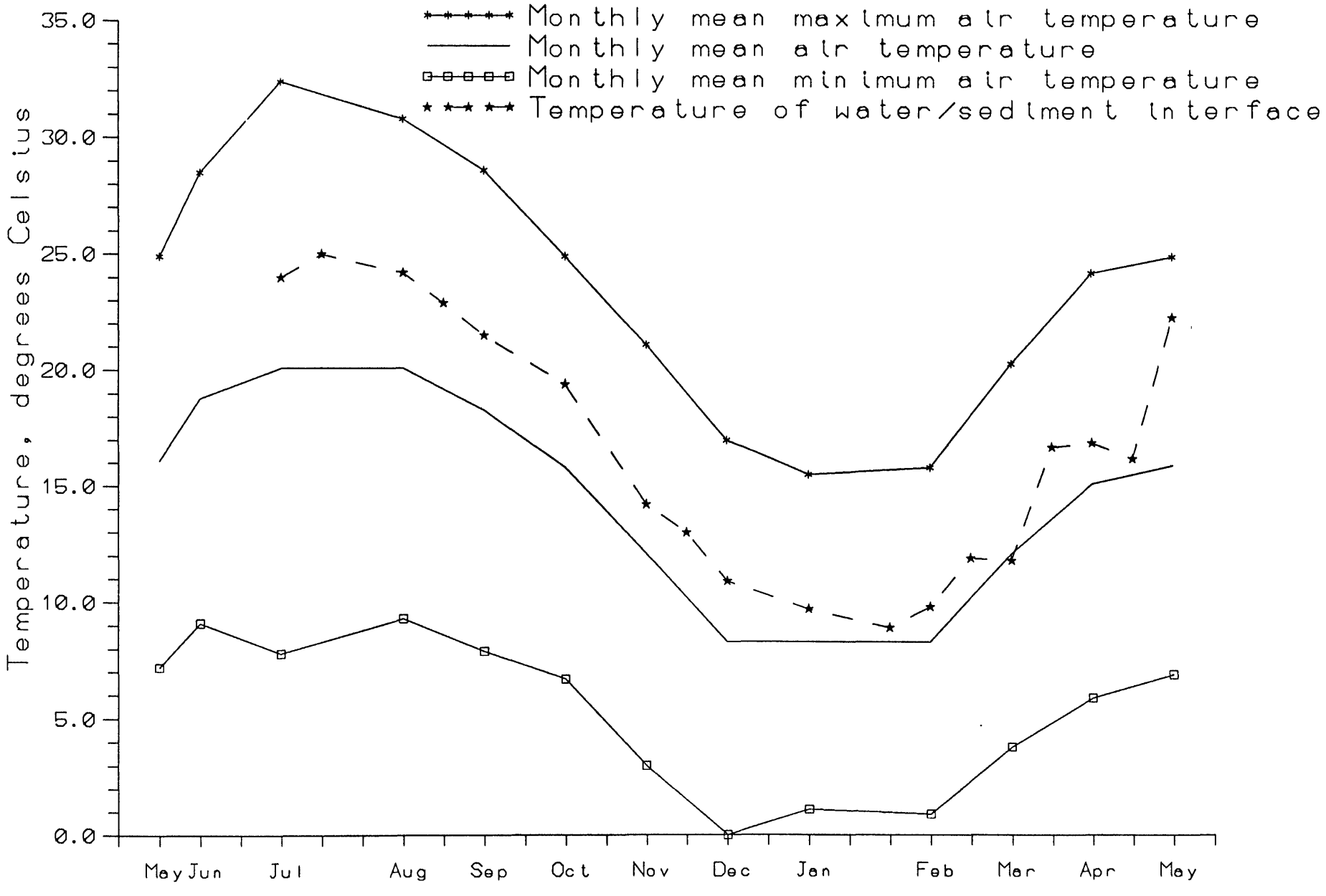


Figure 11. Temperature plot for Coast Casey Forebay, from June 6, 1989 through May 15, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 6, through vol. 94, no. 5, NOAA.

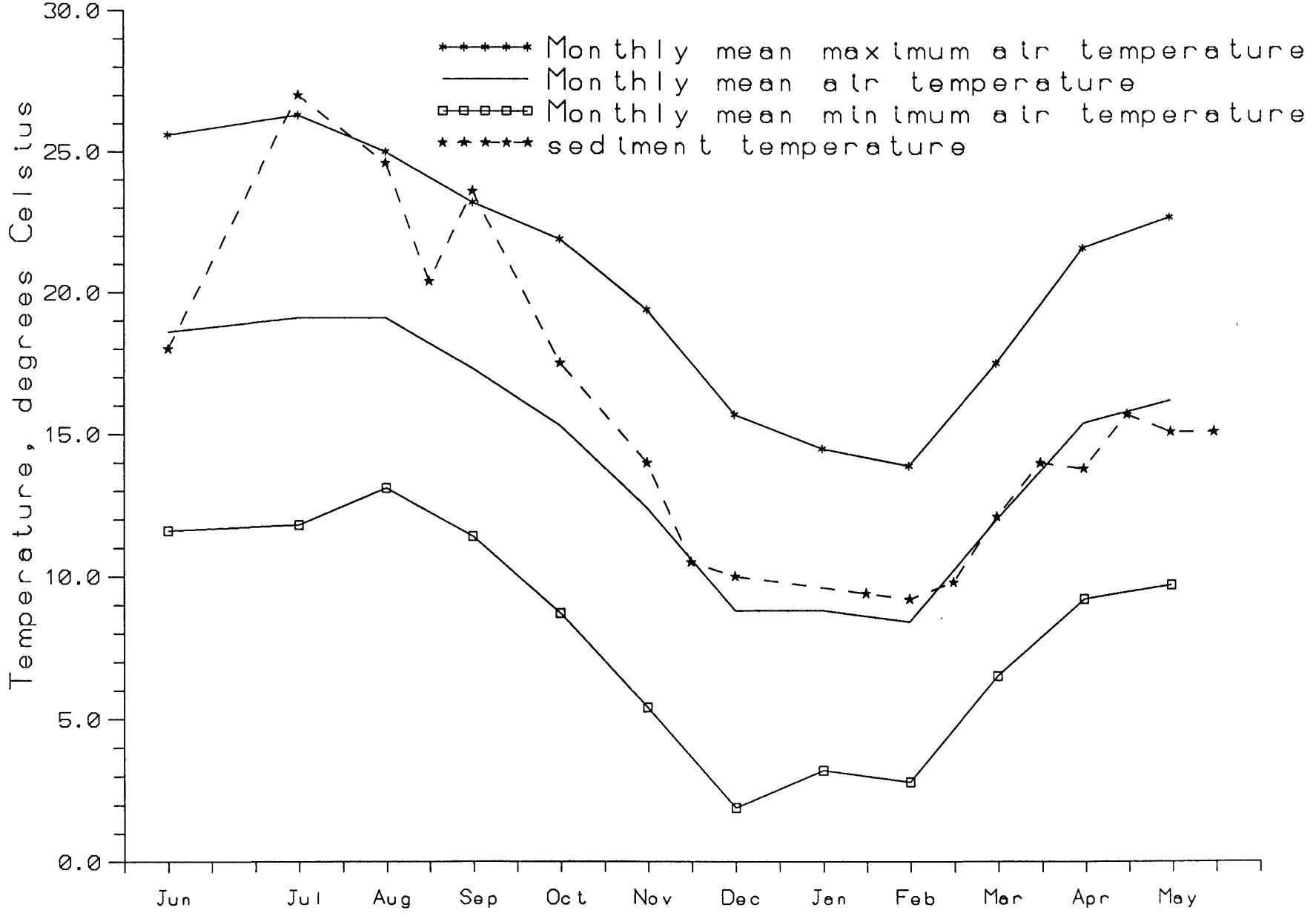


Figure 12. Temperature plot for Los Gatos Creek, sublocality 1, from August 29, 1989 through May 15, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 8, through vol. 94, no. 5, NOAA

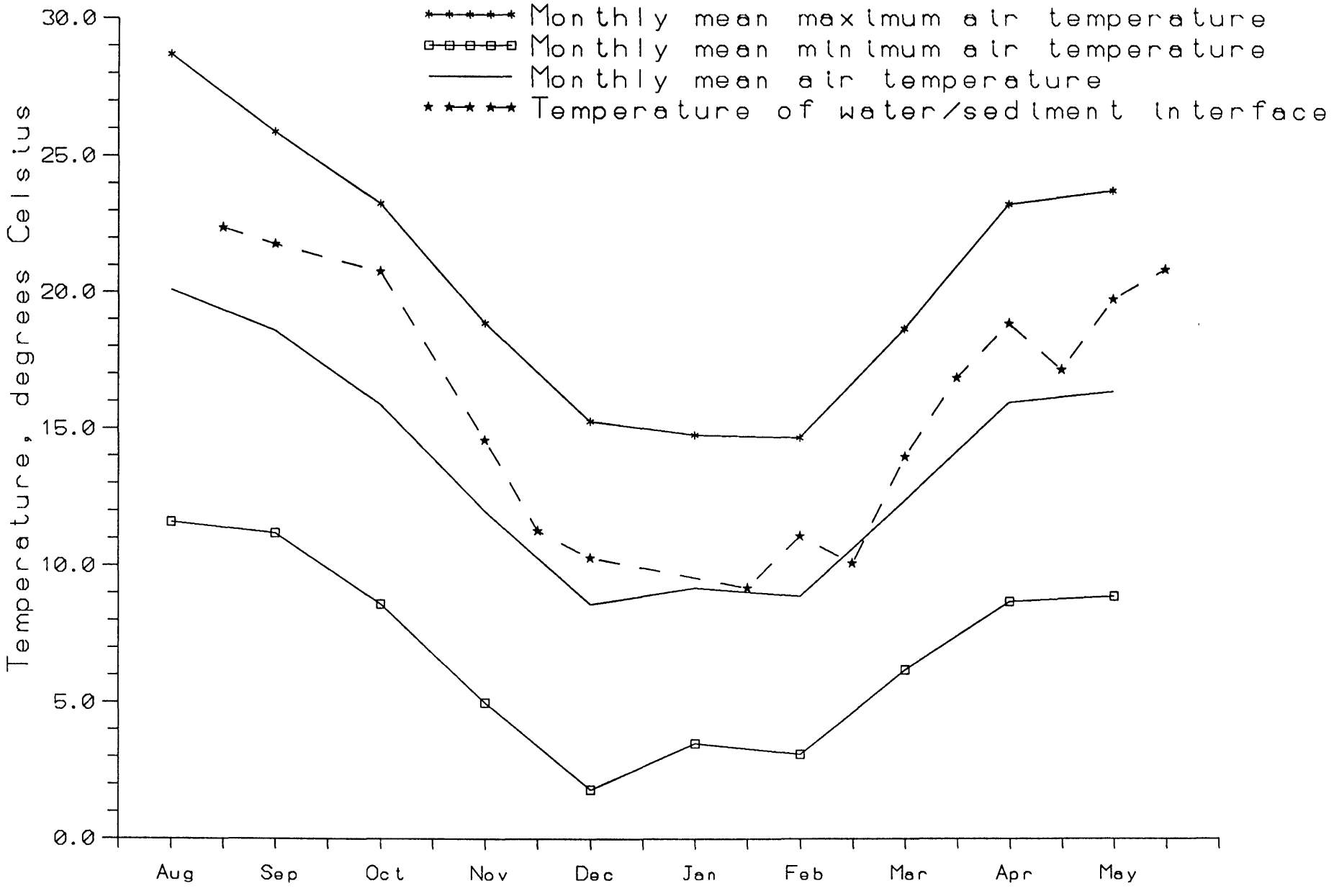


Figure 13. Temperature plot for Los Gatos Creek, sublocality 3, from August 15, 1989 through May 15, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 8, through vol. 94, no. 5, NOAA

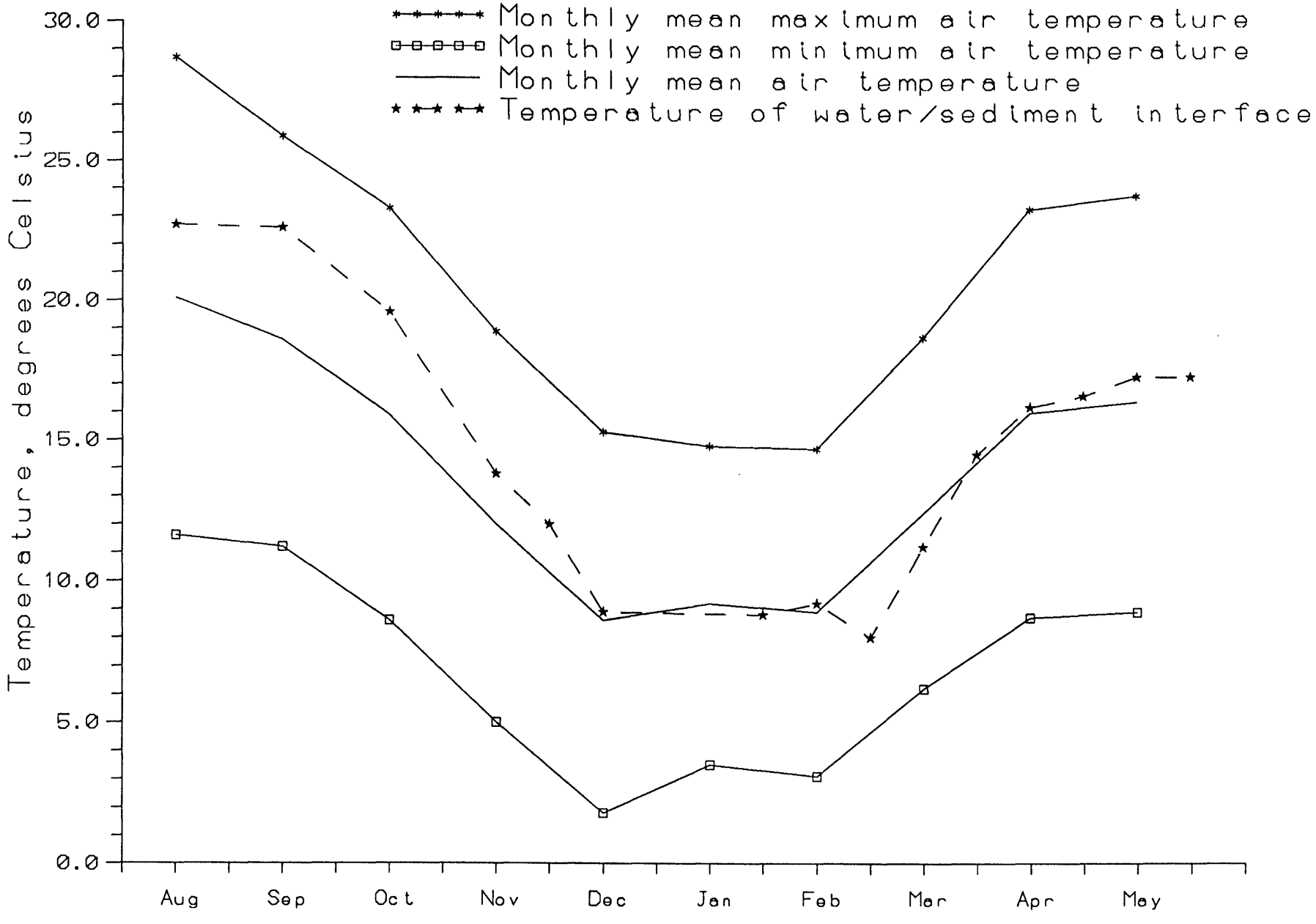
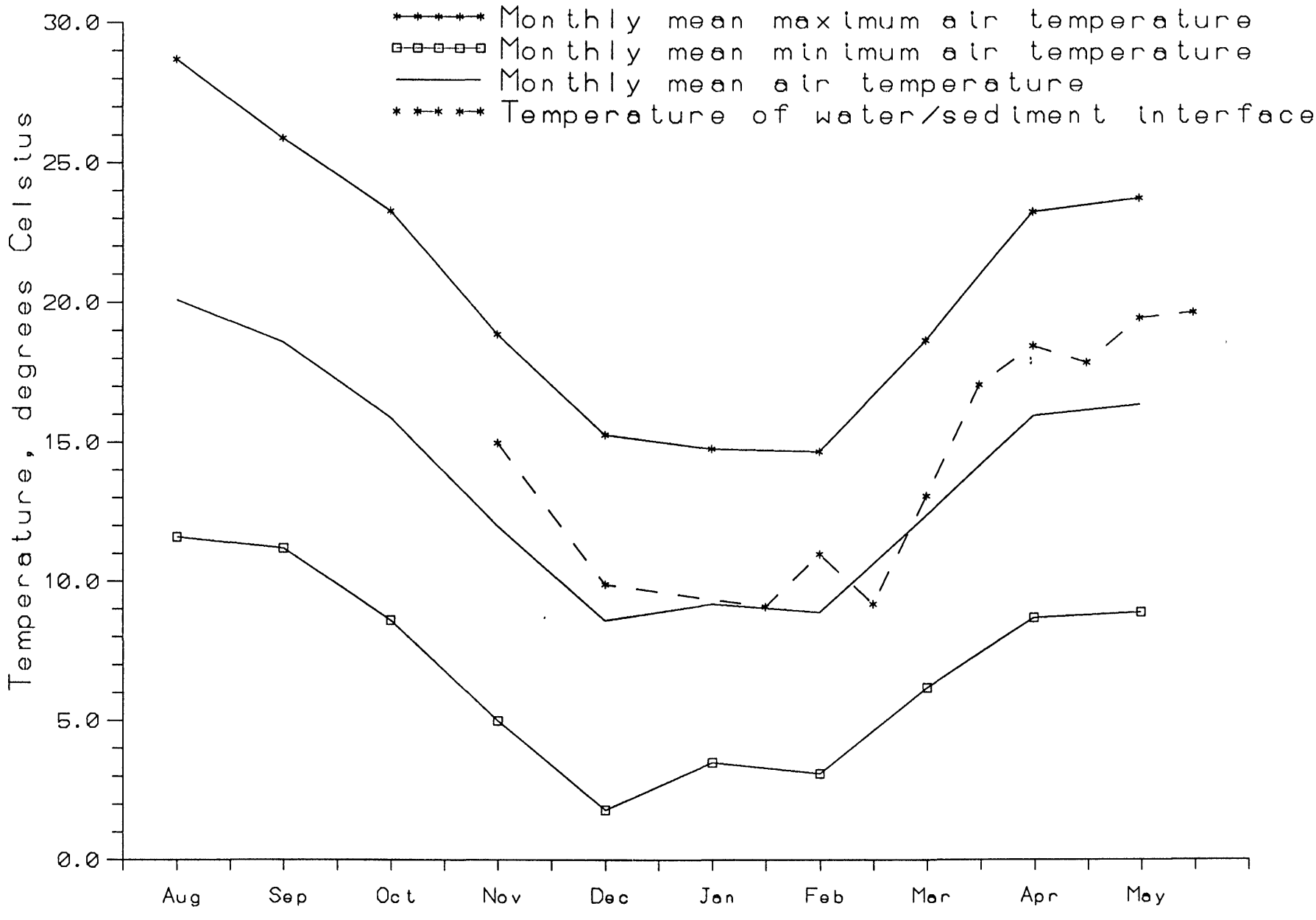


Figure 14. Temperature plot for Los Gatos percolation pond, sublocality 4, from November 14, 1989 through May 15, 1990. Air temperature data from: Climatological Data, California, vol. 93, no. 8, through vol. 94, no. 5, NOAA



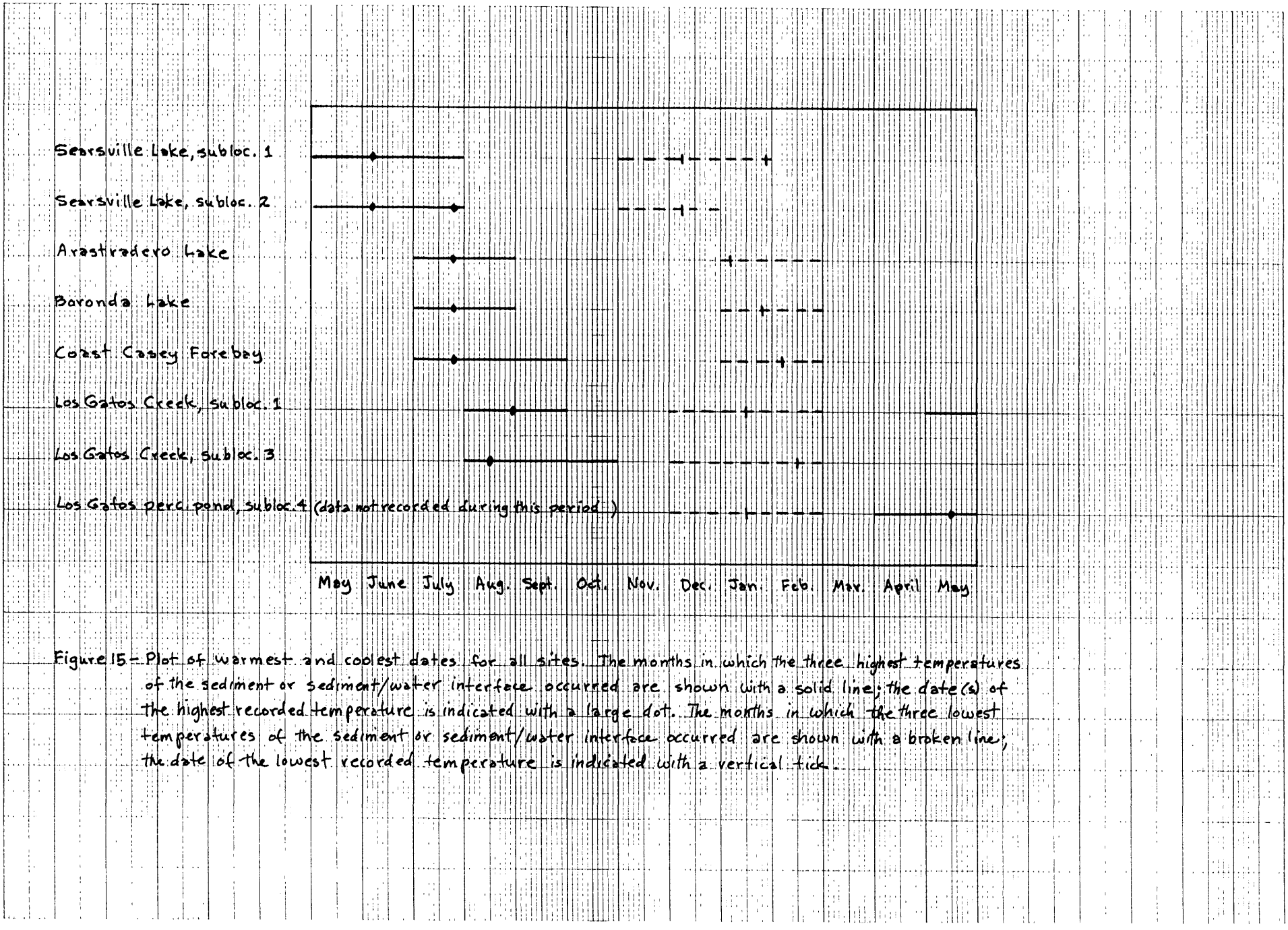


Figure 15 – Plot of warmest and coolest dates for all sites. The months in which the three highest temperatures of the sediment or sediment/water interface occurred are shown with a solid line; the date(s) of the highest recorded temperature is indicated with a large dot. The months in which the three lowest temperatures of the sediment or sediment/water interface occurred are shown with a broken line; the date of the lowest recorded temperature is indicated with a vertical tick.

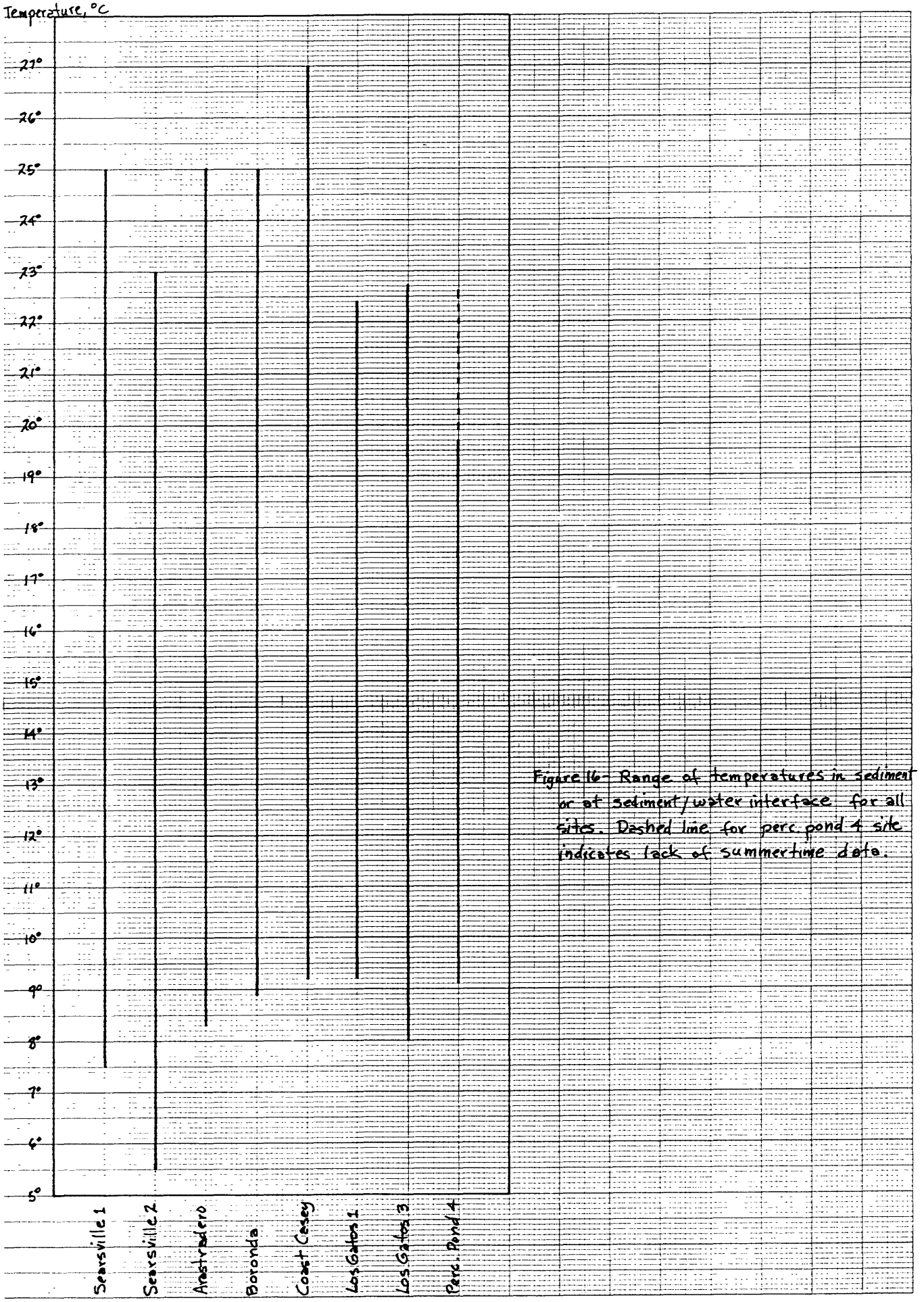


Figure 16- Range of temperatures in sediment or at sediment/water interface for all sites. Dashed line for perc. pond 4 site indicates lack of summertime data.

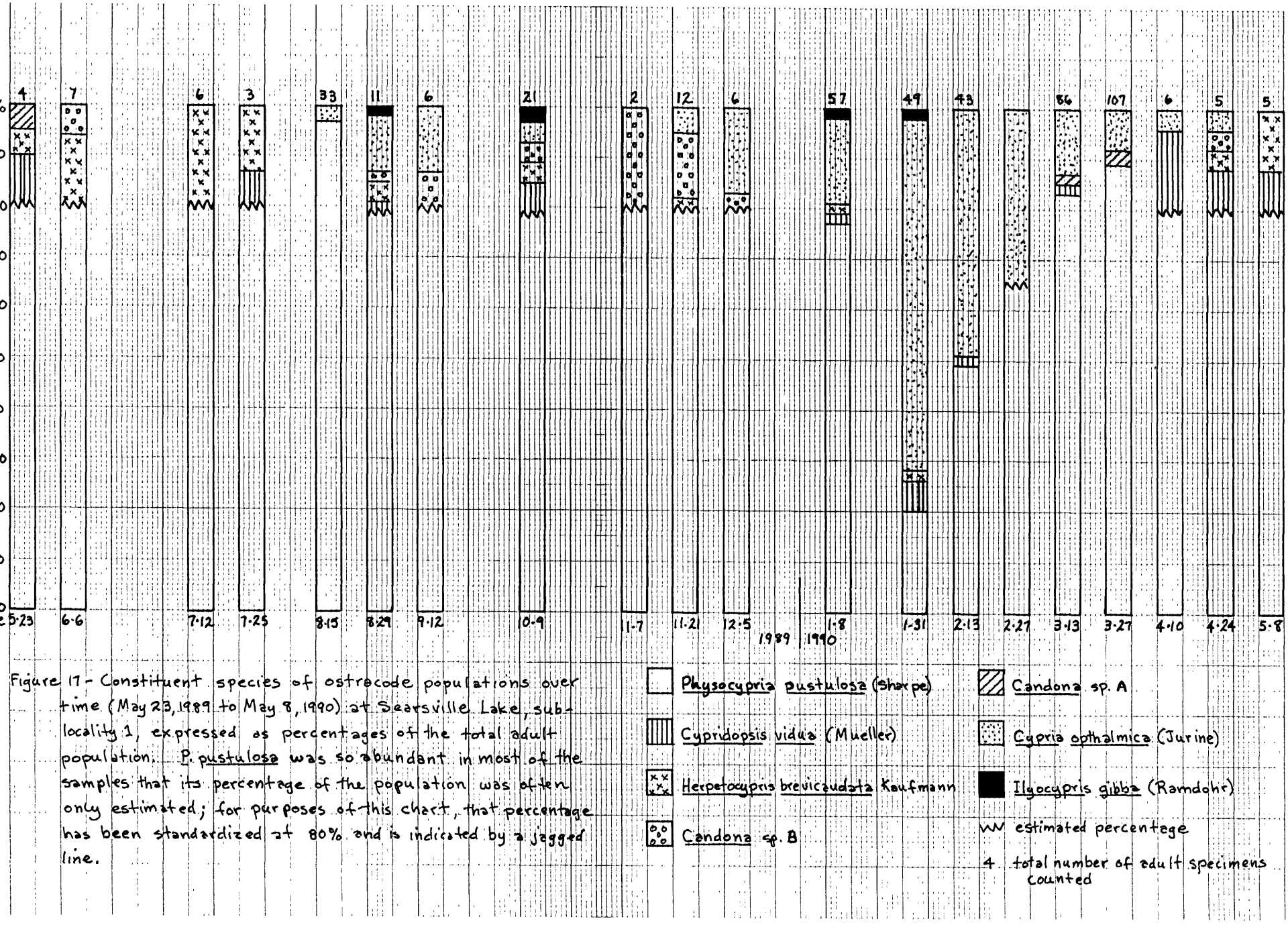


Figure 17 - Constituent species of ostracode populations over time (May 23, 1989 to May 8, 1990) at Searsville Lake, sub-locality 1, expressed as percentages of the total adult population. P. pustulosa was so abundant in most of the samples that its percentage of the population was often only estimated; for purposes of this chart, that percentage has been standardized at 80% and is indicated by a jagged line.

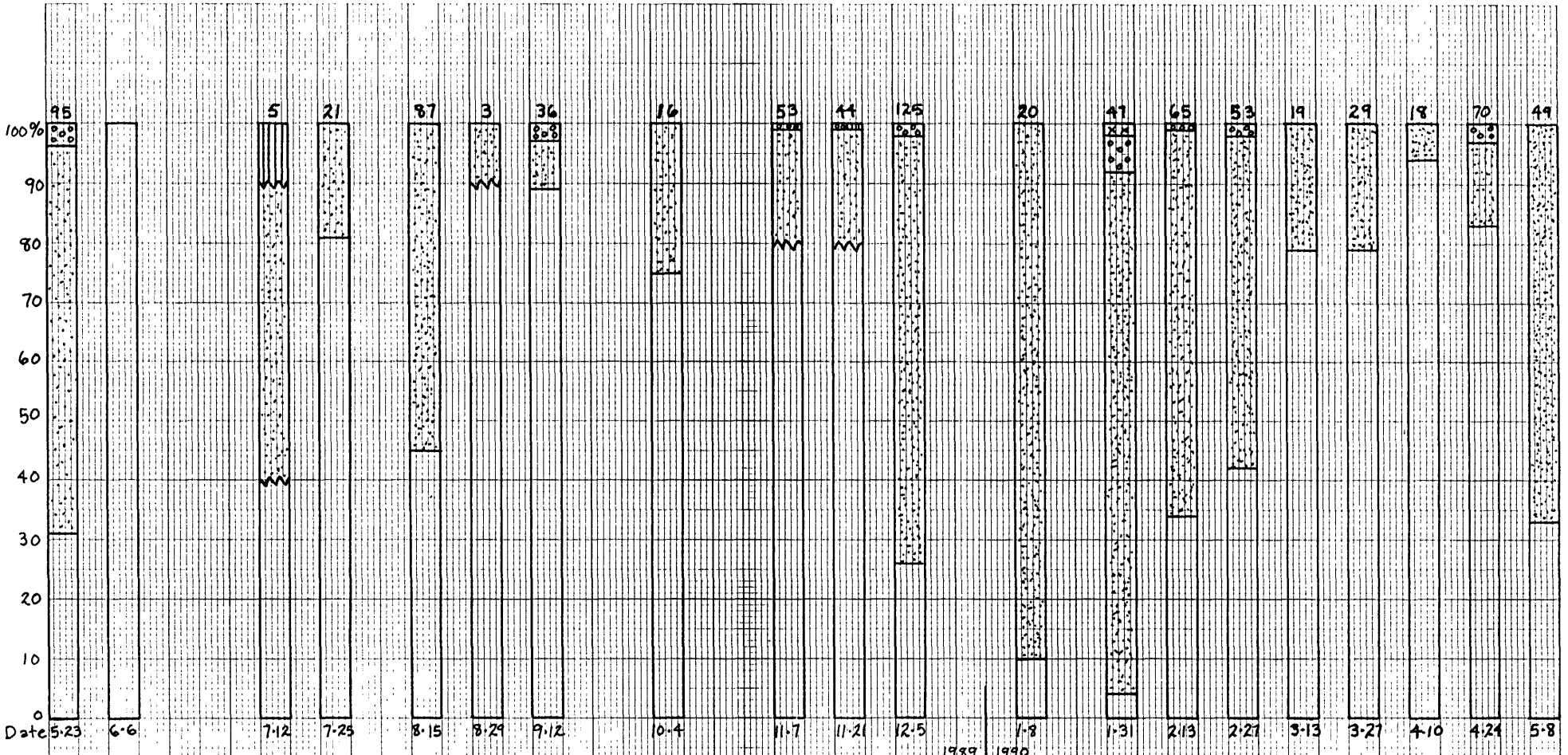


Figure 18 - Constituent species of ostracode populations over time (May 23, 1989 to May 8, 1990) at Searsville Lake, sub-locality 2, expressed as percentages of the total adult population.

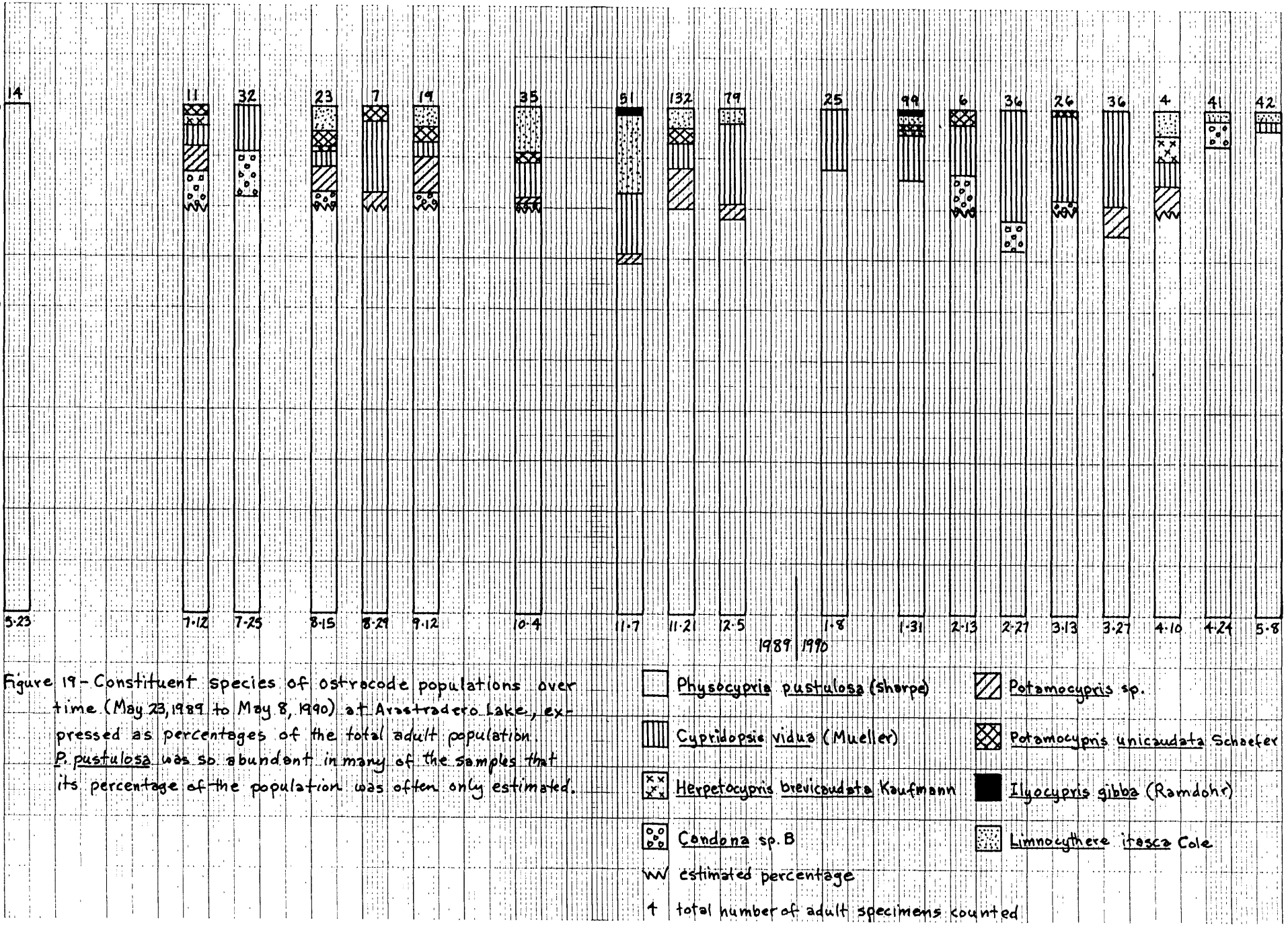


Figure 19 - Constituent species of ostracode populations over time (May 23, 1989 to May 8, 1990) at Arastradero Lake, expressed as percentages of the total adult population. *P. pustulosa* was so abundant in many of the samples that its percentage of the population was often only estimated.

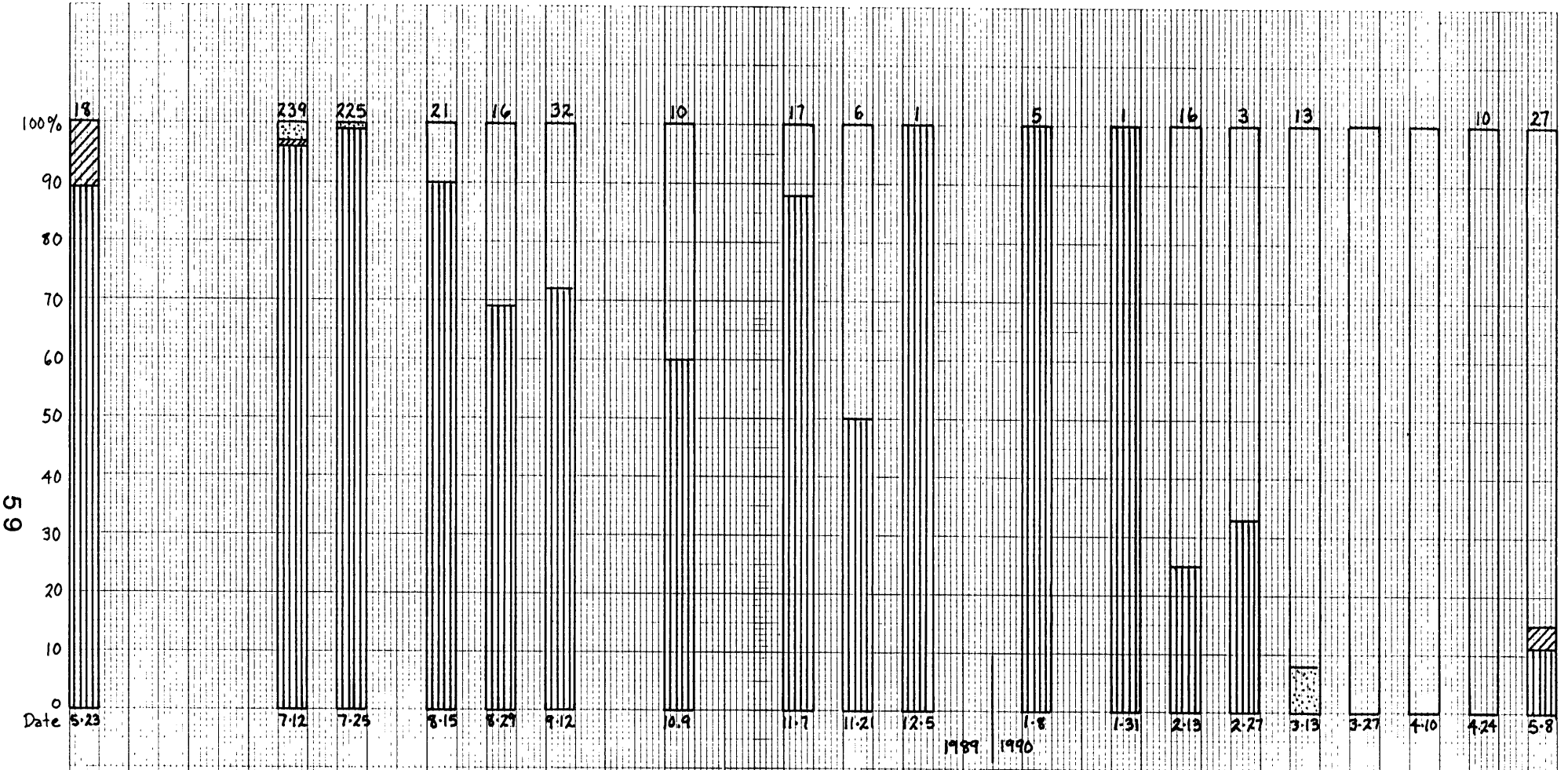


Figure 20 - Constituent species of ostracode populations over time (May 23, 1989 to May 8, 1990) at Boronda Lake, expressed as percentages of the total adult population.

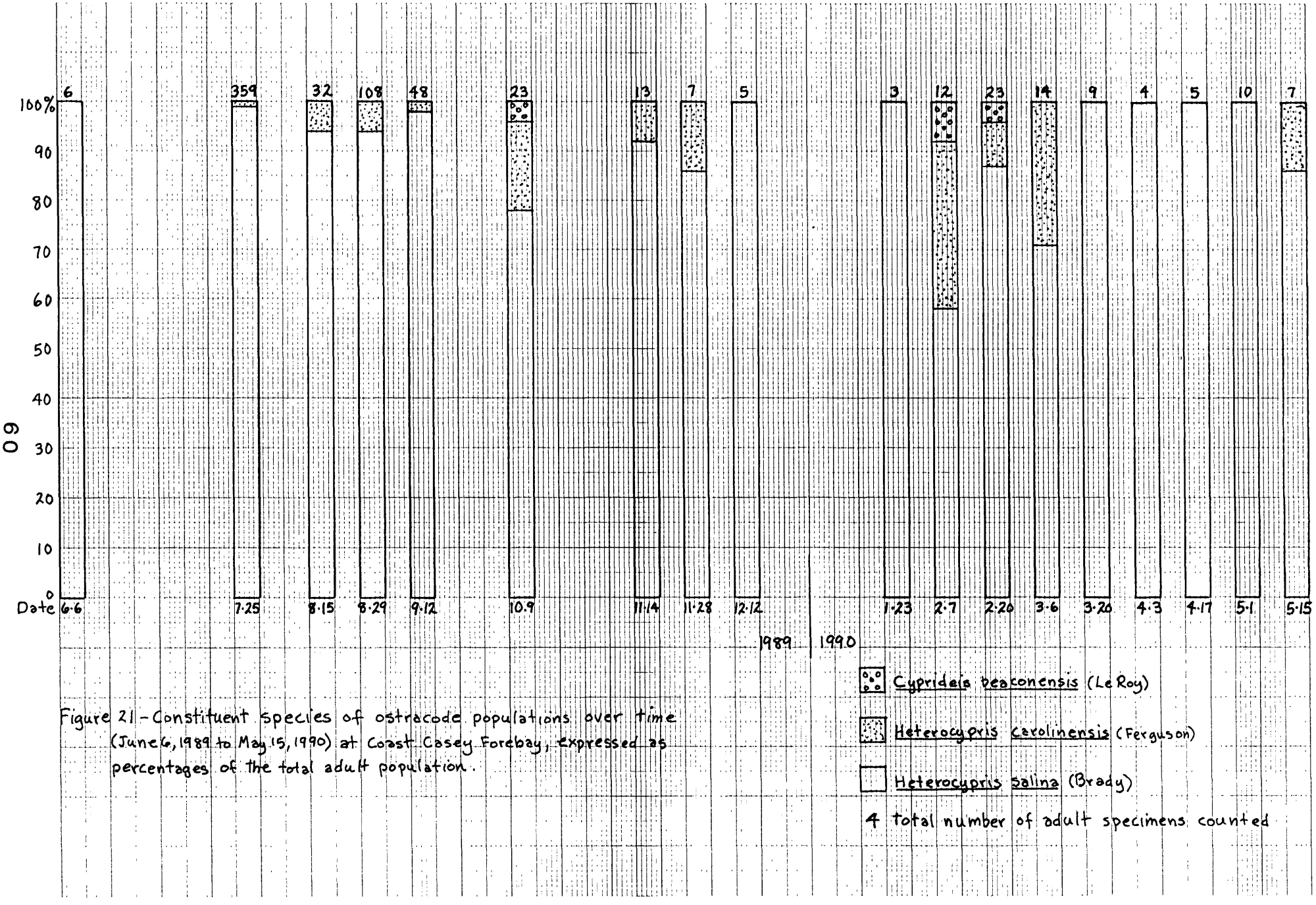


Figure 21 – Constituent species of ostracode populations over time (June 6, 1989 to May 15, 1990) at Coast Casey Forebay, expressed as percentages of the total adult population.

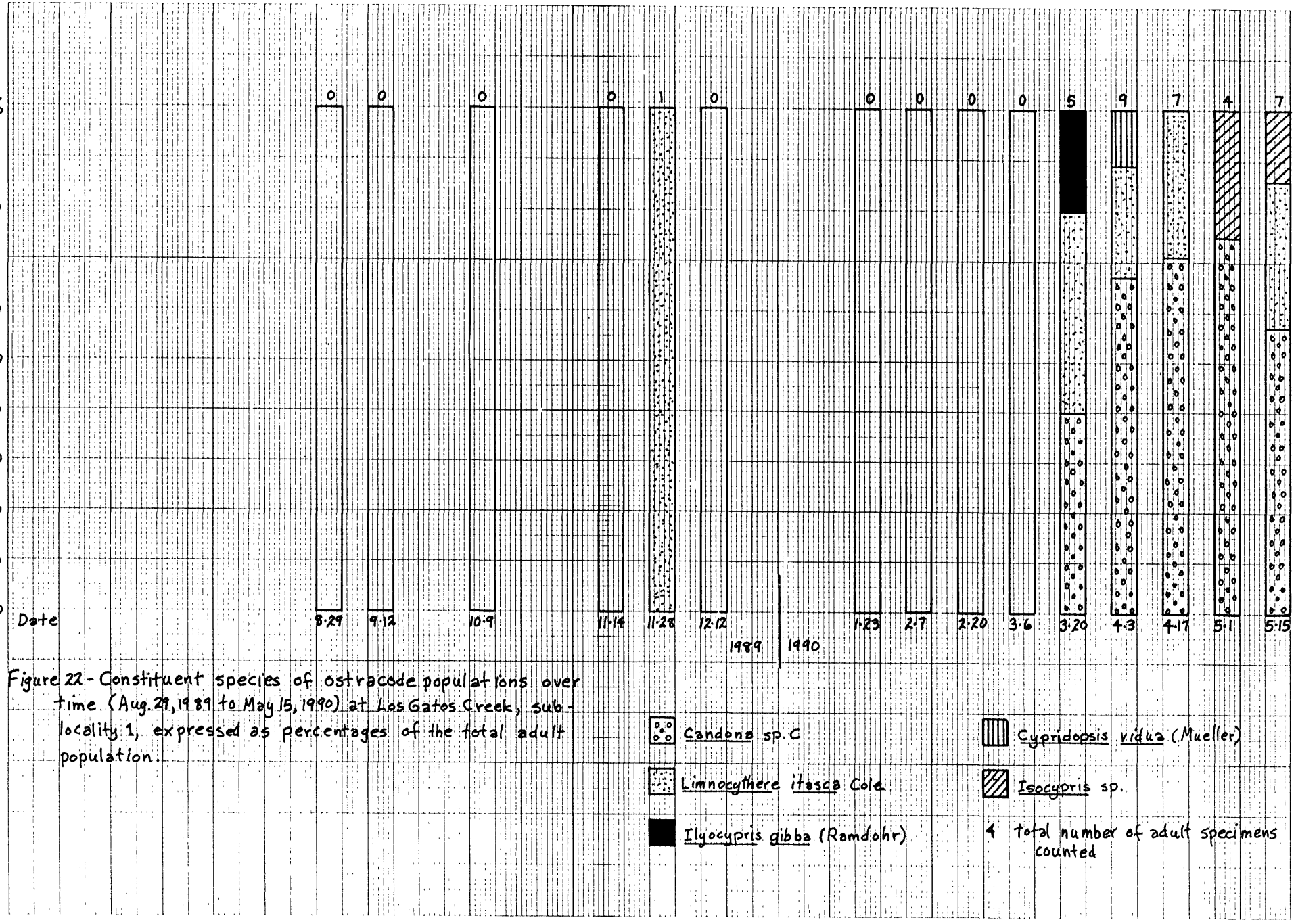


Figure 22 - Constituent species of ostracode populations over time (Aug. 29, 1989 to May 15, 1990) at Los Gatos Creek, sub-locality 1, expressed as percentages of the total adult population.

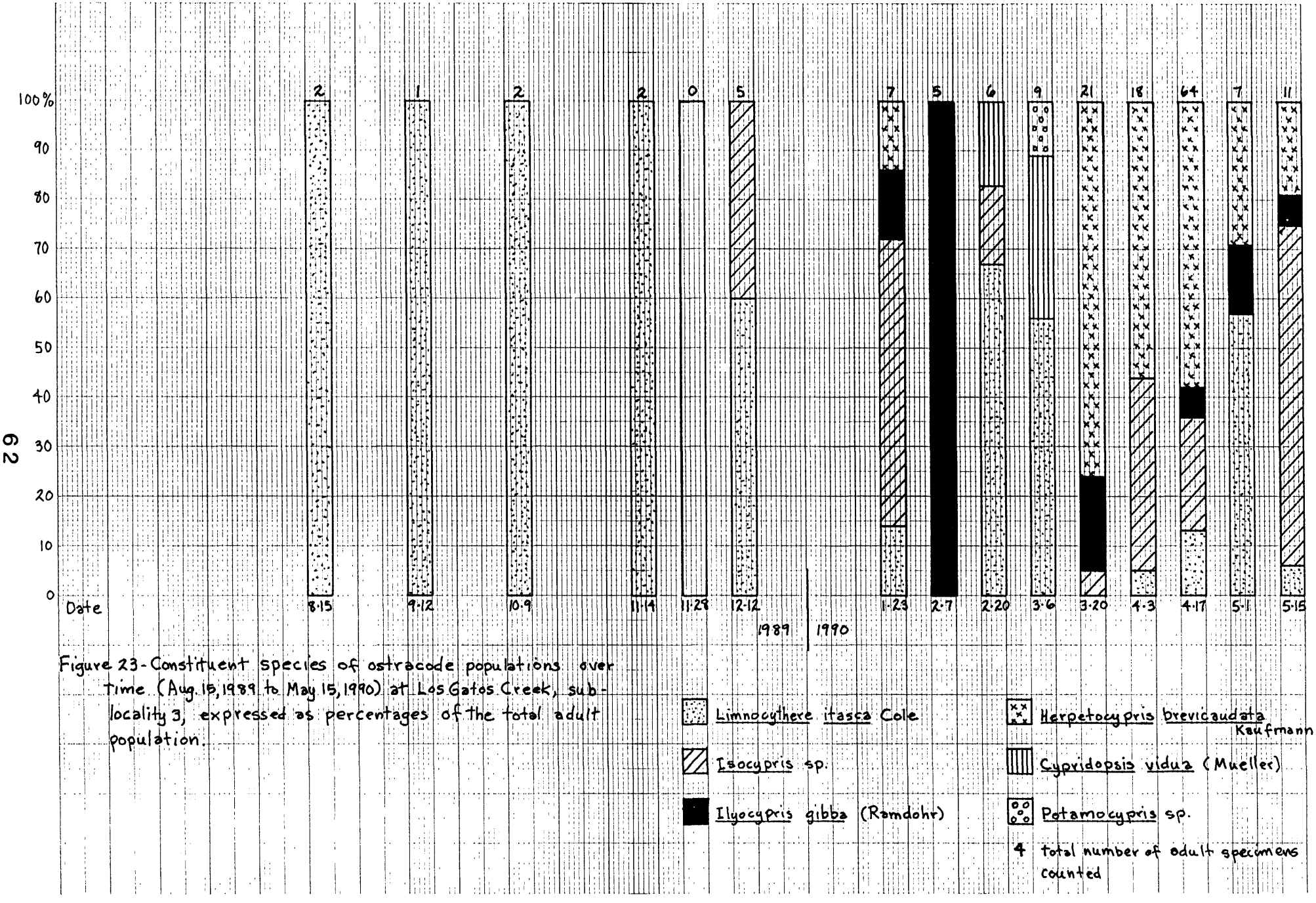


Figure 23 - Constituent species of ostracode populations over time (Aug. 15, 1989 to May 15, 1990) at Los Gatos Creek, sub-locality 3, expressed as percentages of the total adult population.

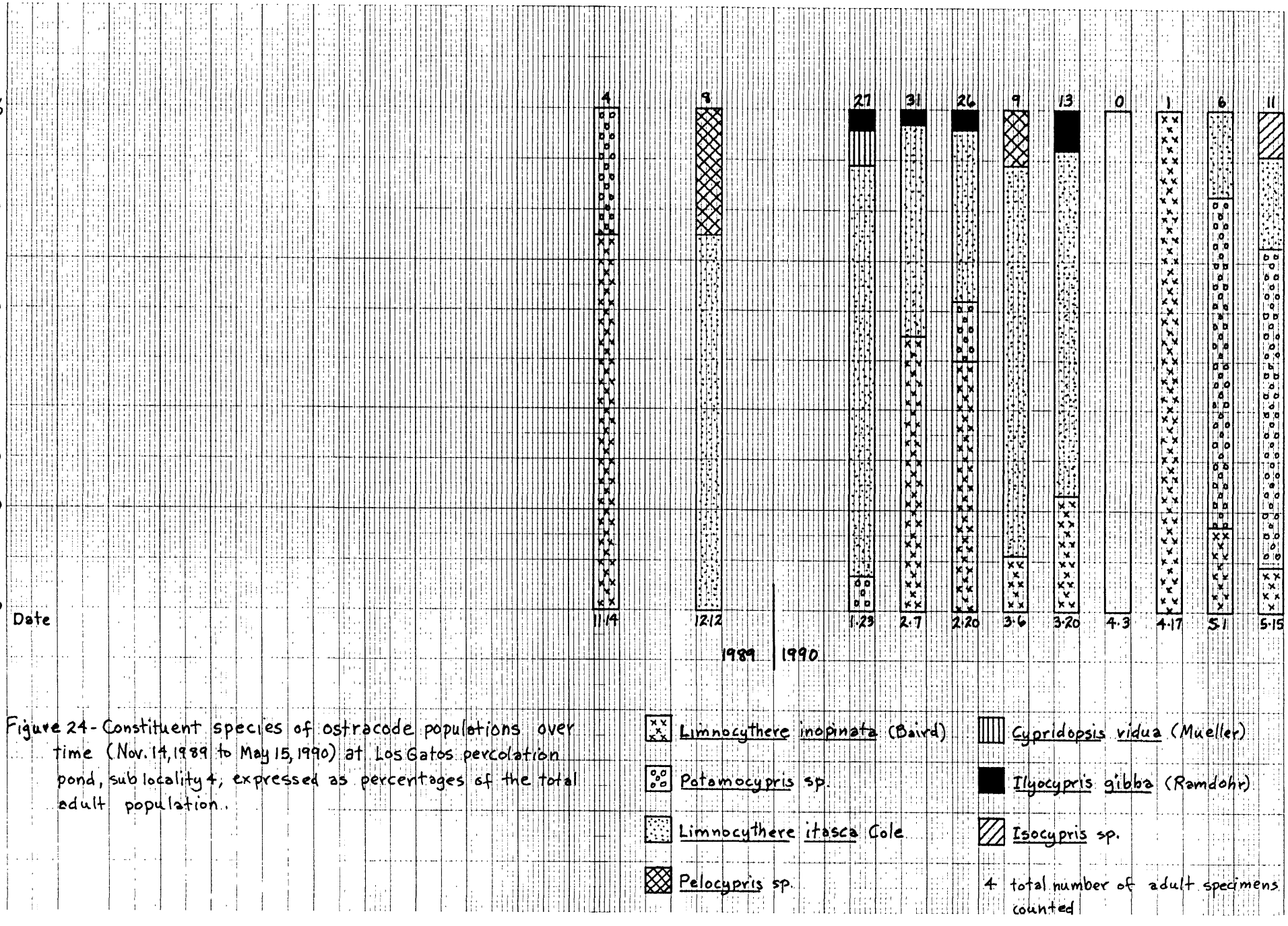


Figure 24- Constituent species of ostracode populations over time (Nov. 14, 1989 to May 15, 1990) at Los Gatos percolation pond, sub locality 4, expressed as percentages of the total adult population.