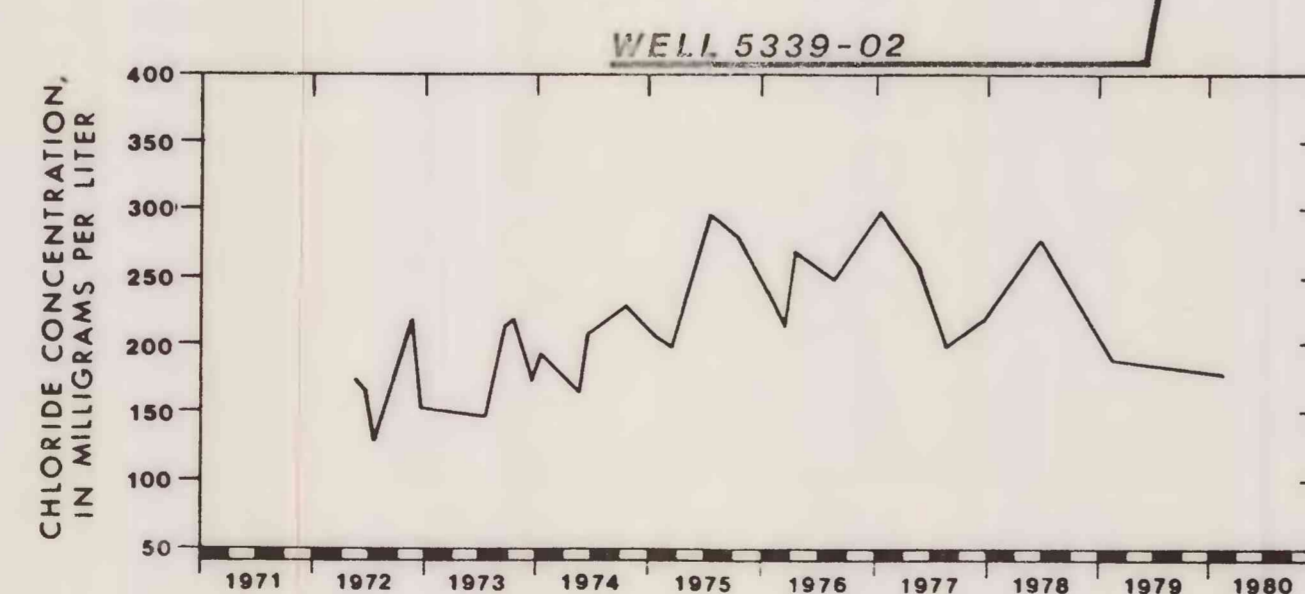
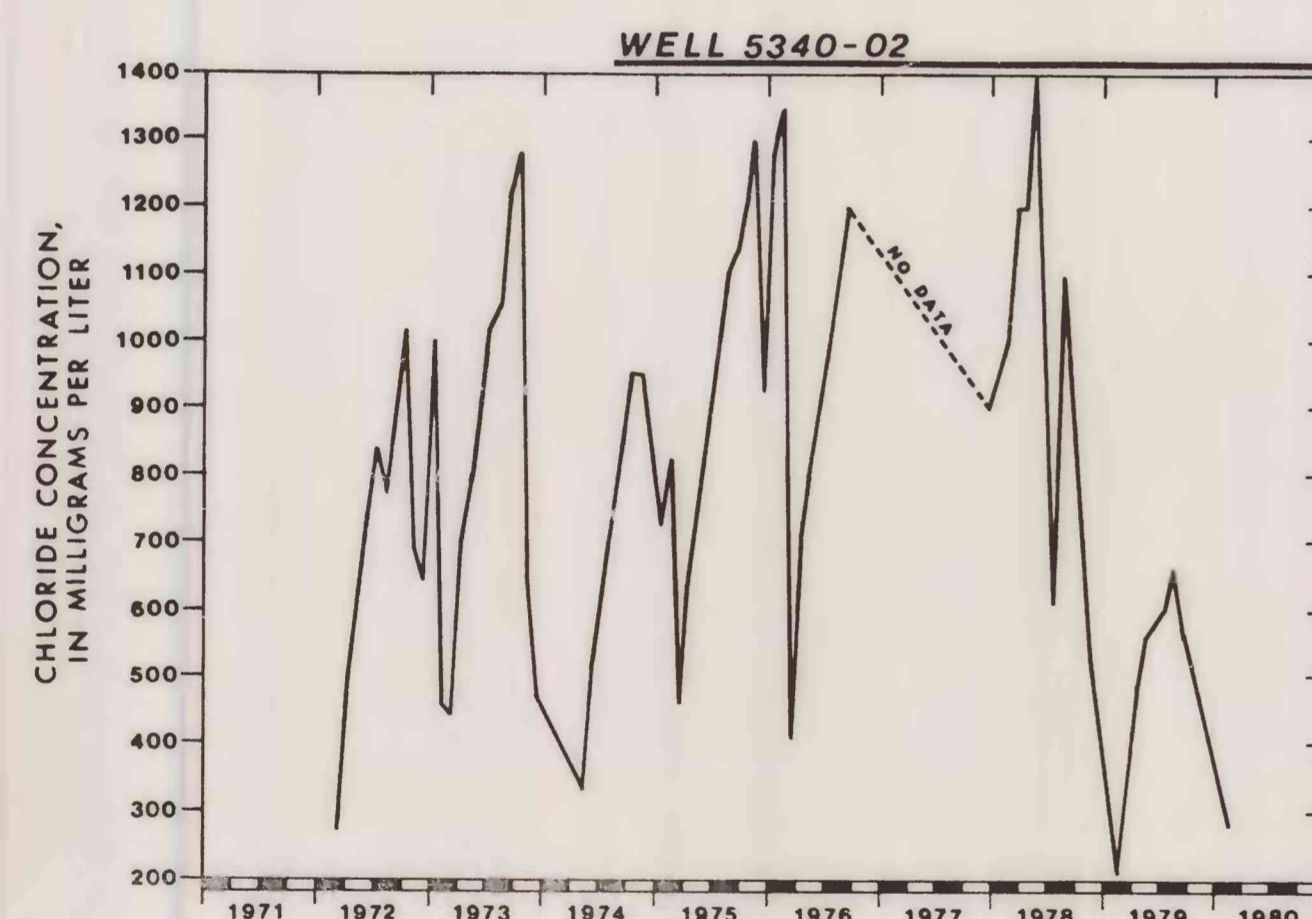
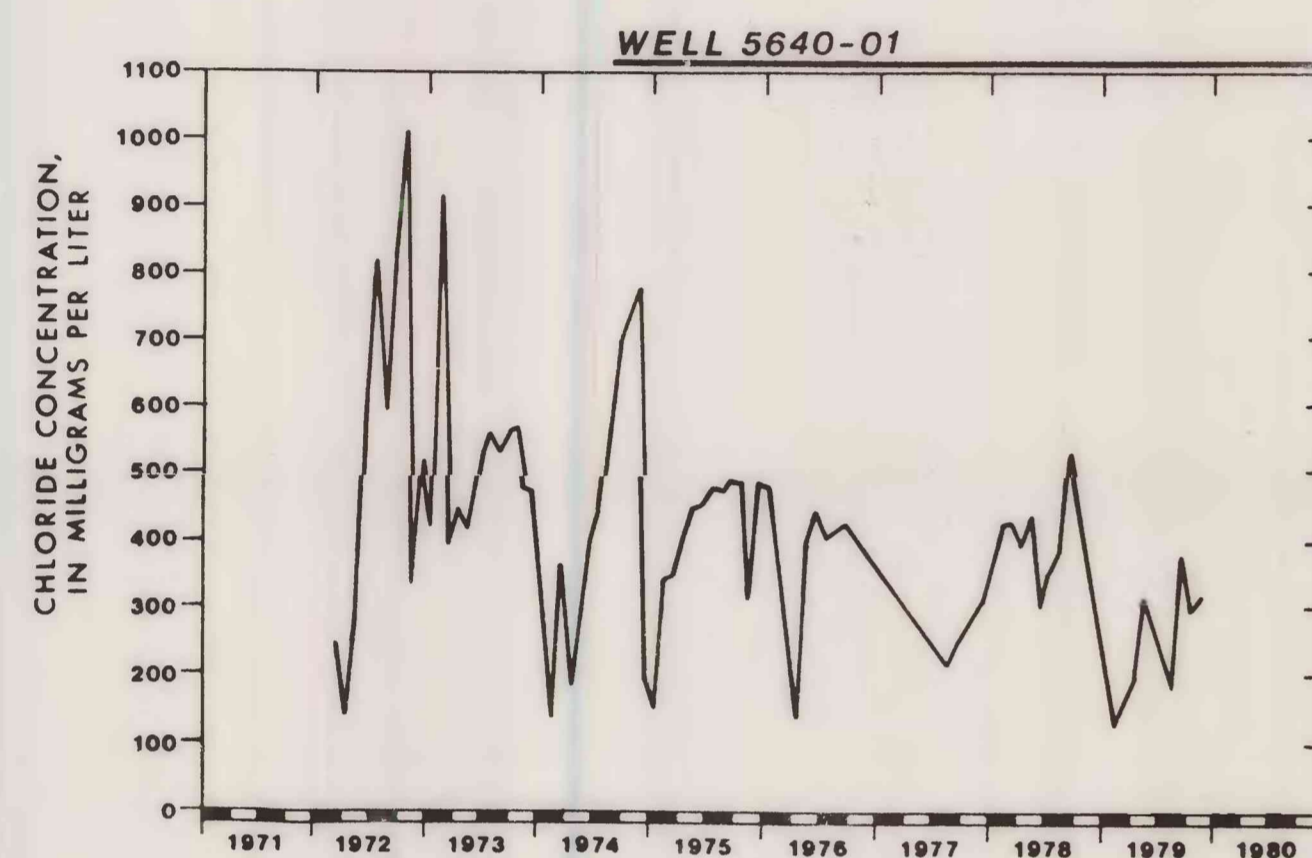
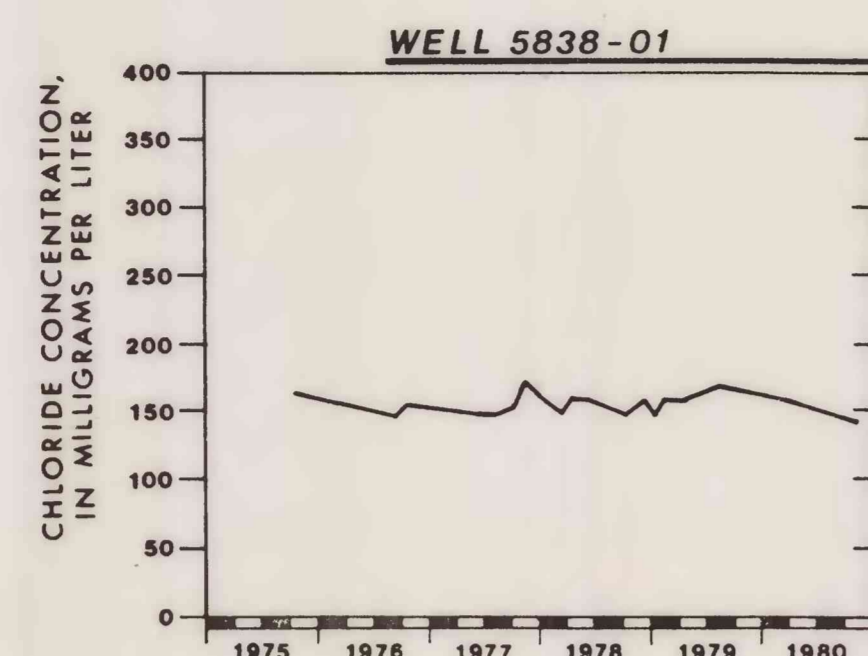


# Water Quality

Long-term pumping for sugarcane irrigation has affected the quality of ground water over most of the Lahaina District. Major sources of pollution are from irrigation-water return and the intrusion of saline water. Historically, the chloride content of the basal-water irrigation wells is dependent upon the amounts of water pumped and is the single most reliable indicator to define the limits of usable water. The relation between pumping stress and chloride concentrations is shown for well 5340-02. During the period 1970-1978, the effect of higher pumpage and of drought conditions caused large increases in the chloride concentrations. However, normal rainfall during 1979 apparently reversed the trend. No long-term trends in chloride concentration are evident in basal-water irrigation wells, although large, but temporary increases occur during extended irrigation seasons. Chloride records for domestic wells are limited to recent years, so that long-term trends are not known.

Chloride data showing seasonal trends have been plotted for selected wells. During the dry summer, the chloride concentration of the basal-water irrigation wells (wells 5340-02 and 5640-01) increases dramatically as a result of pumping an increasing admixture of seawater. Well 5339-02, a municipal well located near a pumping and irrigation center, shows a small yearly cycle, but no progressive change. Well 5838-01, outside the major pumping centers, shows little yearly fluctuation.

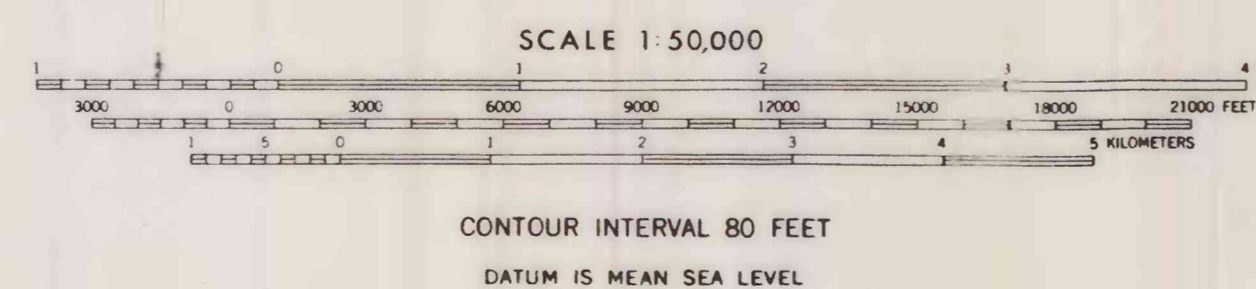
During February 1979 and February 1980, mass samples for water-quality analyses were taken at selected wells. The chloride concentrations are shown at the location of the sampling site along with isochlors from Swain (1973). The mass samples were taken during periods when there was no irrigation pumping and reflect, in general, minimum concentrations for each site.



## References

- Belt, Collins, and Associates, 1969, A water source development plan for the Lahaina District, Island of Maui: Hawaii Division of Water and Land Development Report R33.
- Broadbent, E. W., 1969, An estimate of present and future sources of water in the Lahaina-Kahana sector of West Maui: Manuscript report, Amfac Properties, 29 p.
- Ekern, P. C., 1977, Drip irrigation of sugarcane measured by hydraulic lysimeters, Kunia, Oahu: Water Resources Research Center, University of Hawaii, Honolulu, Technical Report No. 109, 99 p.
- Hawaii Water Authority, 1959, Water resources in Hawaii: Honolulu, Hawaii, 148 p.
- Stearns, H. T., 1964, Groundwater supplies for Pioneer Mill Company, Maui: Consultant report.
- Stearns, H. T., and Macdonald, G. A., 1942, Geology and ground-water resources of the island of Maui, Hawaii: Hawaii Division of Hydrography Bulletin 7, 344 p.
- Swain, L. A., 1973, Chemical quality of ground water in Hawaii: Hawaii Division of Water and Land Development Report R48, 54 p.
- Wilson, Okamoto and Associates, Inc., 1977, Kahakuloa water study: Hawaii Division of Water and Land Development Report R54, 84 p., App. A-G.
- Yamanaga, George, and Huxel, C. J., 1969, Preliminary report on the water resources of the Lahaina District, Maui: Hawaii Division of Water and Land Development Circular C51, 47 p.

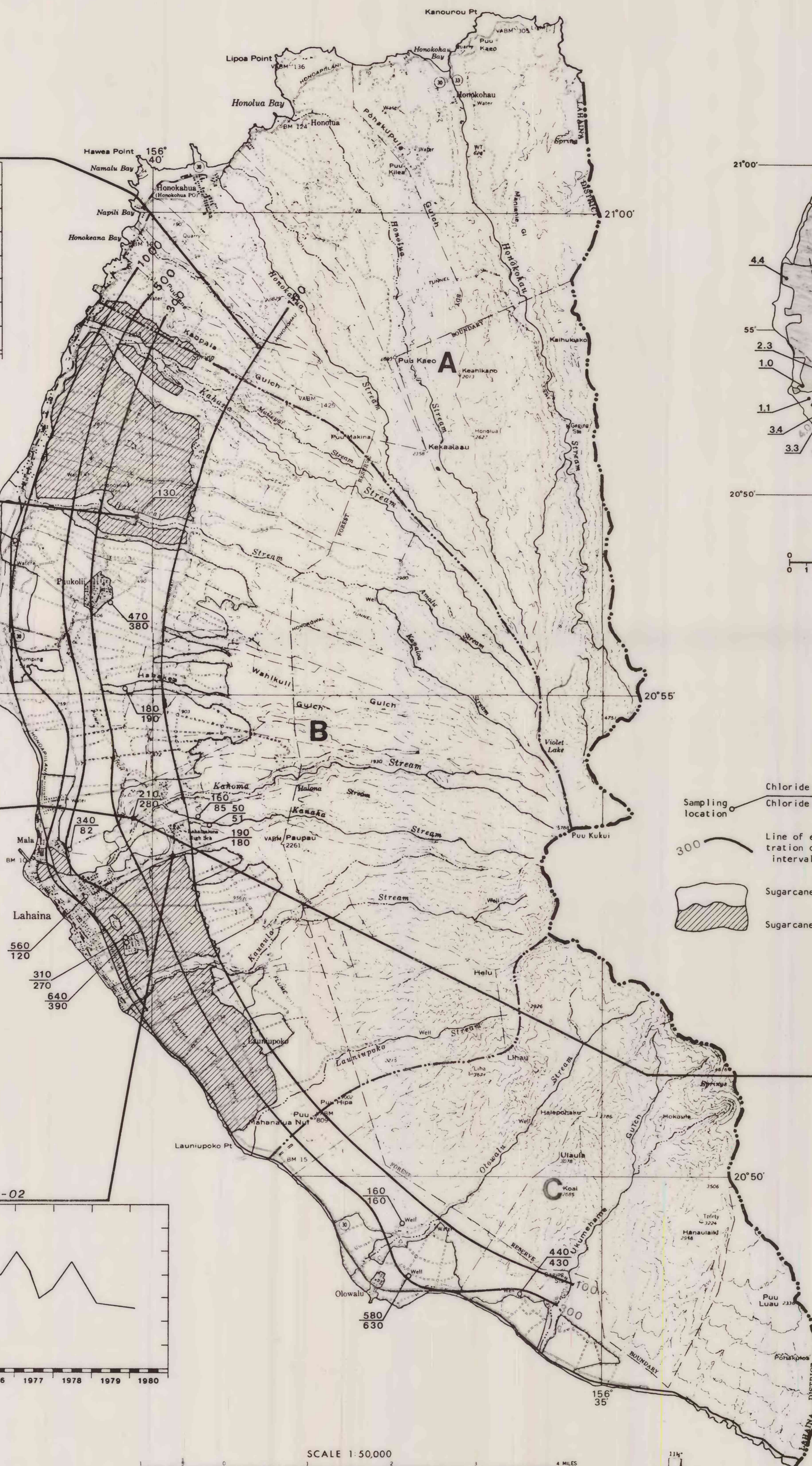
Base from U.S. Geological Survey  
Island of Maui 1:62,500, 1957



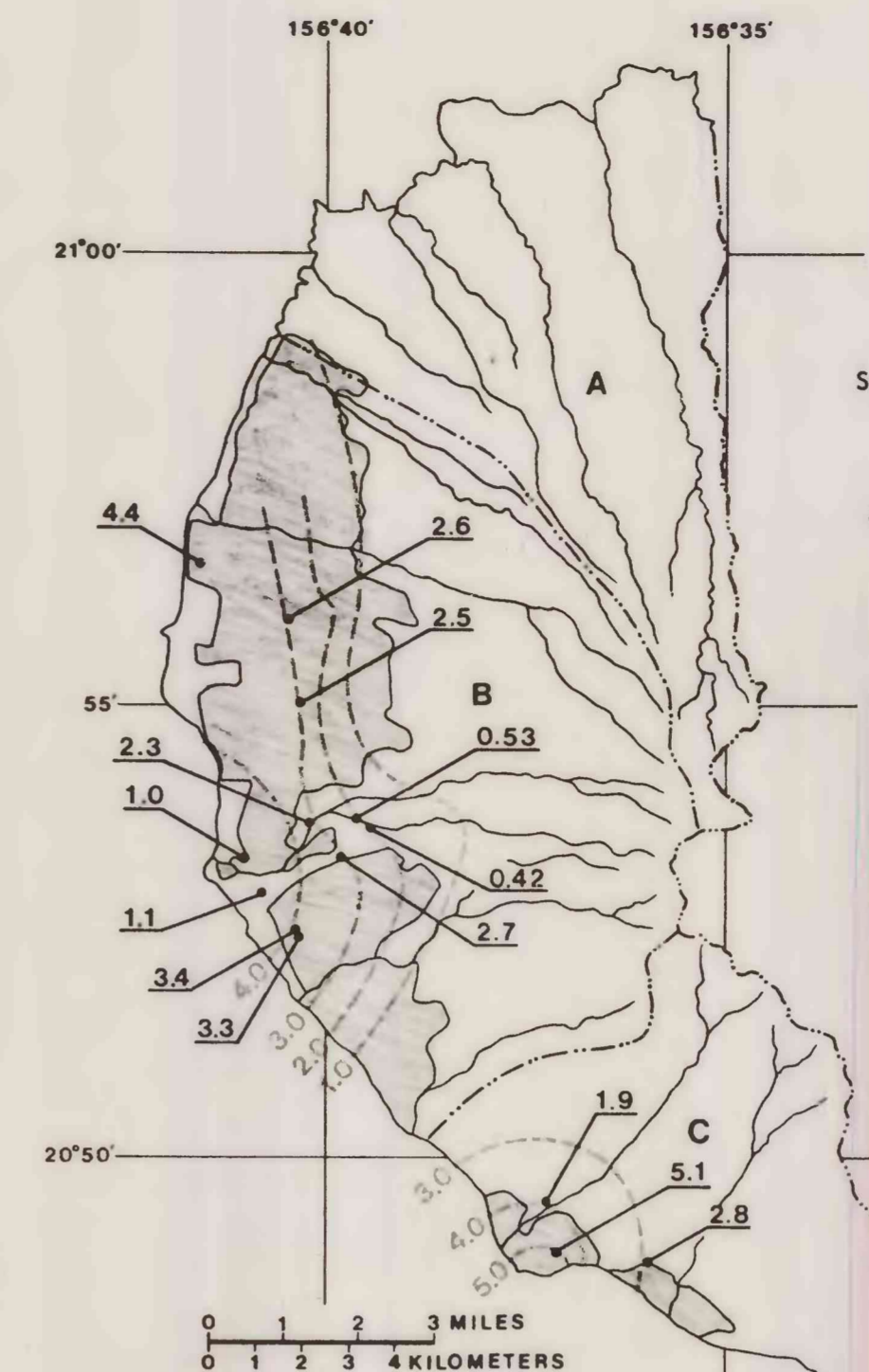
## GROUND-WATER QUALITY, LAHAINA DISTRICT

## GROUND-WATER STATUS REPORT, LAHAINA DISTRICT, MAUI, HAWAII, 1980

By  
William R. Souza  
1981



- EXPLANATION**
- Sampling location
  - Chloride concentration, in milligrams per liter, February 1979
  - Chloride concentration, in milligrams per liter, February 1980
  - Line of equal chloride concentration, showing minimum concentration of pumped ground water (1956-66), milligram per liter interval is variable (from Yamanaga and Huxel, 1969)
  - Sugarcane irrigated by drip method
  - Sugarcane irrigated by furrow method



- EXPLANATION**
- Nitrate concentrations in ground water greater than 0.25 mg/L (milligrams per liter) may be considered a reliable indicator of return irrigation water (Swain, 1973). Nitrate concentrations obtained at selected locations during February 1980 are shown on the map. These values are within the range shown by the lines of equal nitrate concentration from Swain (1973).
  - Although none of the sources exceeded the drinking-water limit of 10 mg/L (as N), the map clearly shows the results of the application of large quantities of irrigation water. Approximately half the total 98 Mg/d of applied irrigation water is assumed to infiltrate back to the freshwater body from the use of furrow irrigation. However, during the past few years, approximately half the sugarcane acreage has been converted to a drip-irrigation system. The long-term effects of the conversion to drip irrigation are not known. However, it is known that with drip irrigation, infiltration is reduced (see Sheet 1, Ground-water Availability and Use). The lower nitrate concentrations at wells 5340-01 and 5240-01 may result from this use of drip irrigation. This significant loss of recharge may be the single most important change affecting the water supply in the Lahaina District. Careful monitoring of water quality throughout the Lahaina District is recommended.
  - Lines of equal nitrate concentration mg/L (as N) (Modified from Swain, 1973)
  - Approximate area of irrigated sugarcane land

WELL 5340-02, KAHOMA, PUMP M

