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Report 8  
**LAKE ELSINORE**  
**USER SURVEY RESULTS**

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March 2004

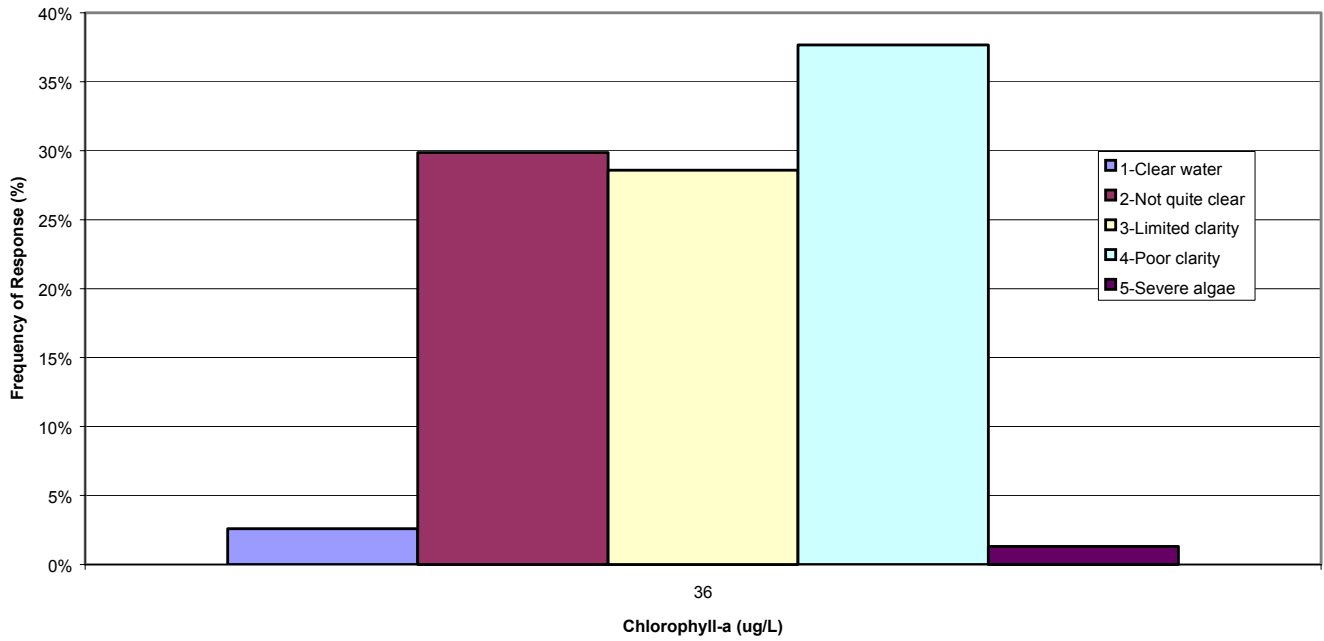
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## **Lake Elsinore User Survey Results For April 21, 2002**

On April 21, 2002, the first Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users. Cindy Li, Pat Kilroy and Grace Ng conducted water quality testing. Secchi depths were read on three sites that are regularly monitored by Regional Water Quality Control Board. Samples were collected for *chlorophyll a* testing at three sites. The survey results were analyzed by Pat Kilroy and Cindy Li. The graphs show the results from the first survey. Most lake users survey (67%) considered that Lake Elsinore has limited and poor clarity. Likewise, majority of the lake users (70%) responded that lake use is either slightly impaired or enjoyment substantially reduced. Further analysis between survey results and water quality data will be conducted as more data are collected.

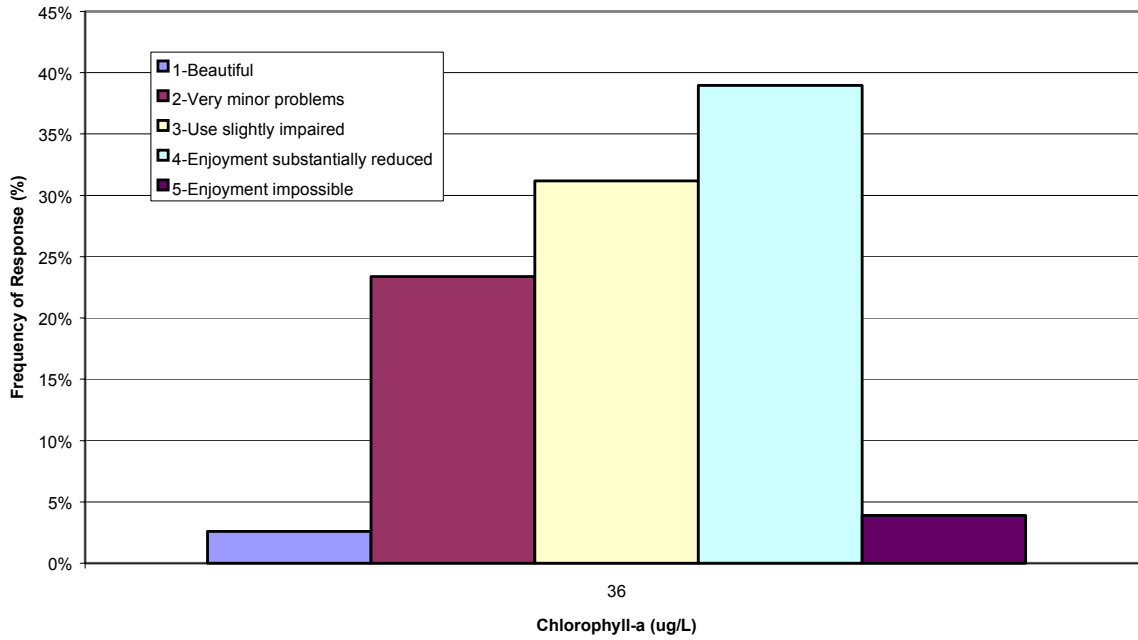
### Algal Biomass vs. Response

QUESTION-A (Physical condition of the lake water today.) n=77

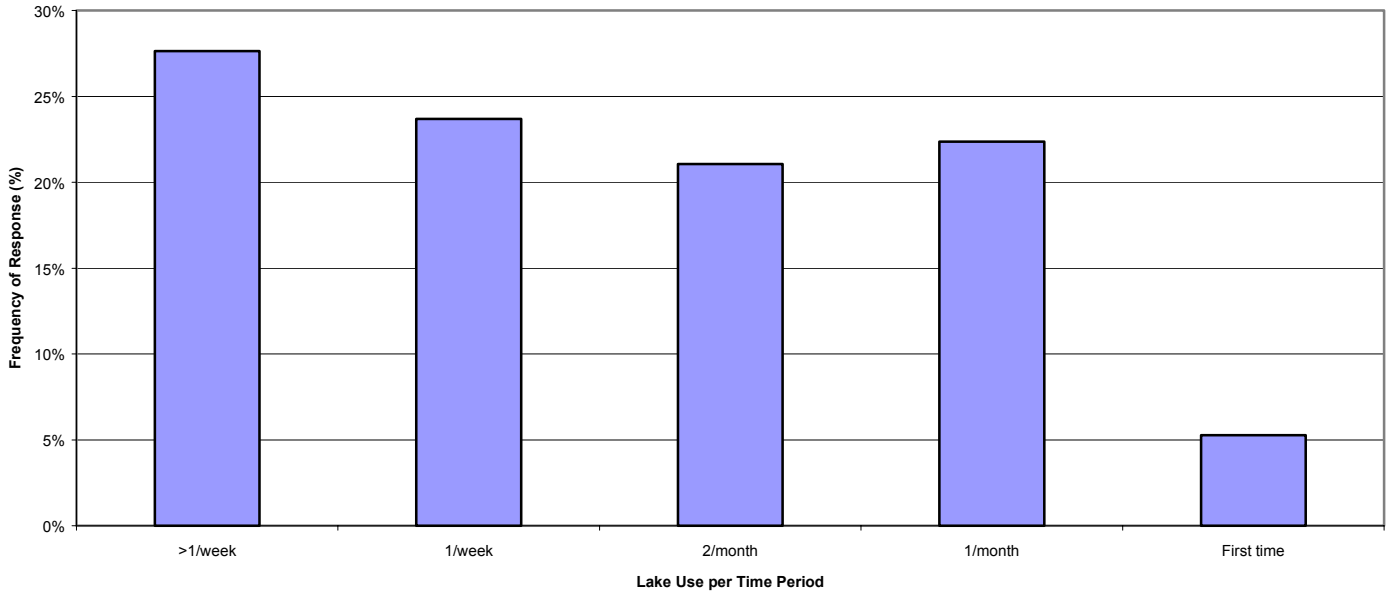


### Algal Biomass vs. Response

QUESTION-B (how suitable...enjoyment , today.) n=77

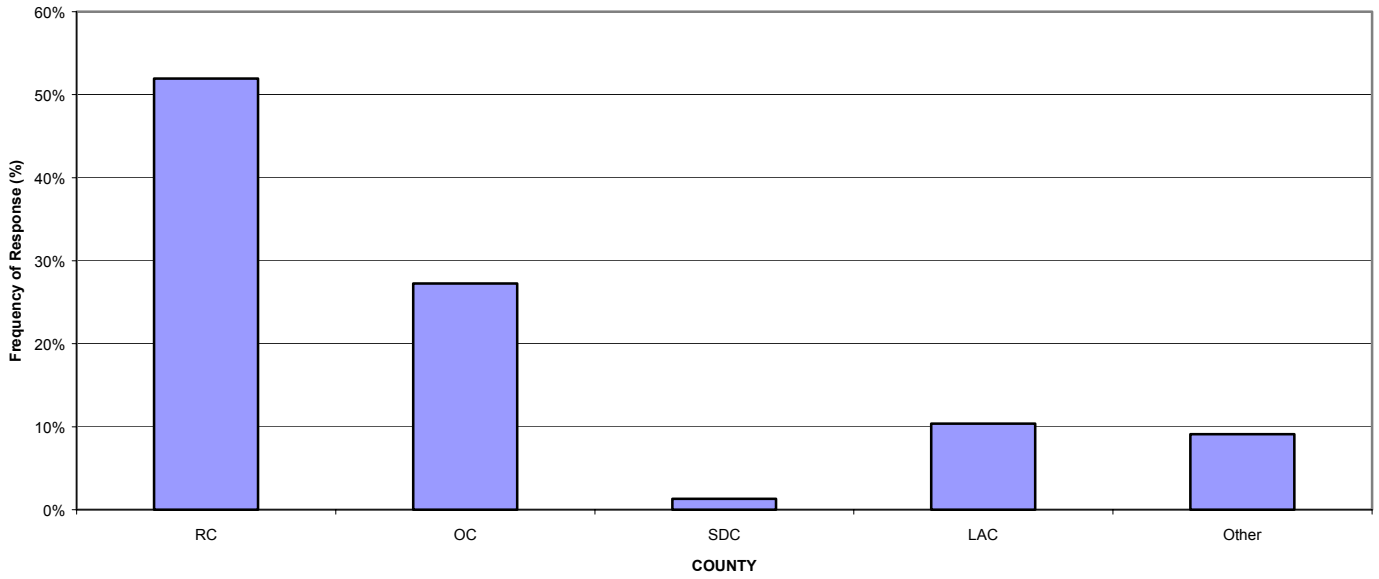


### Frequency of Lake Use



### COUNTY OF RESIDENCE

QUESTION-D

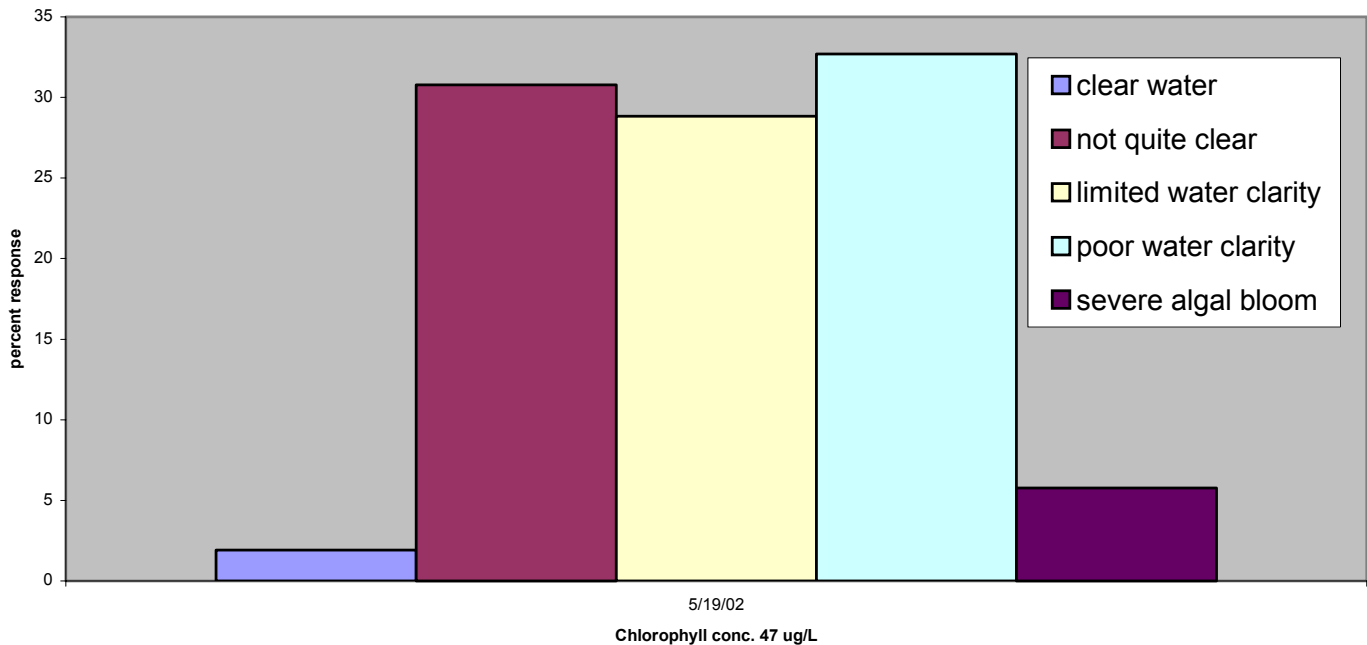


## Lake Elsinore User Survey Results For May 19, 2002

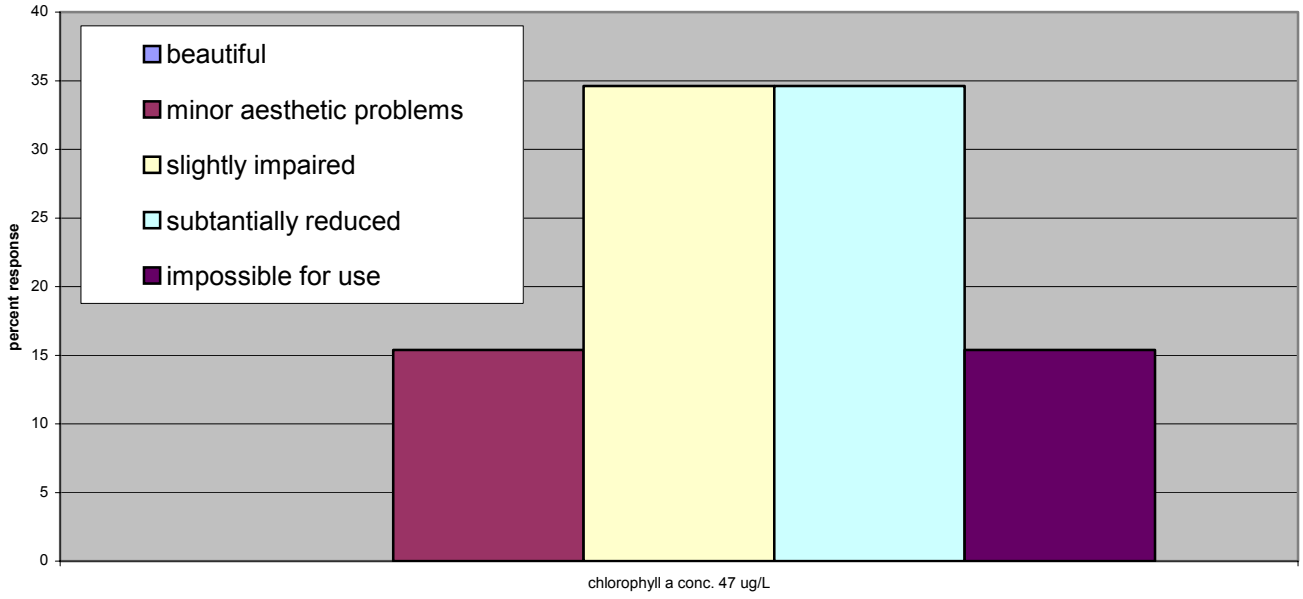
On April 19, 2002, the second Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users. Cindy Li, Pat Kilroy and Grace Ng conducted water quality testing. Secchi depths were read on three sites that are regularly monitored by Regional Water Quality Control Board. Samples were collected for *chlorophyll a* testing at three sites. The survey results were analyzed by Cindy Li.

Compared to the first survey, fewer people participated the survey (52 vs. 77). The water quality has deteriorated (chlorophyll a = 47 ug/L vs. 36; Secchi Depth =12 inches vs. 18). It appears that lake users' perception of the lake clarity and lake enjoyment corresponds well with the water quality deterioration. Most lake users survey (68%) considered that Lake Elsinore has limited and poor clarity. Likewise, majority of the lake users (85%) responded that lake use is either impaired or enjoyment substantially reduced. The graphs show the results from the second survey.

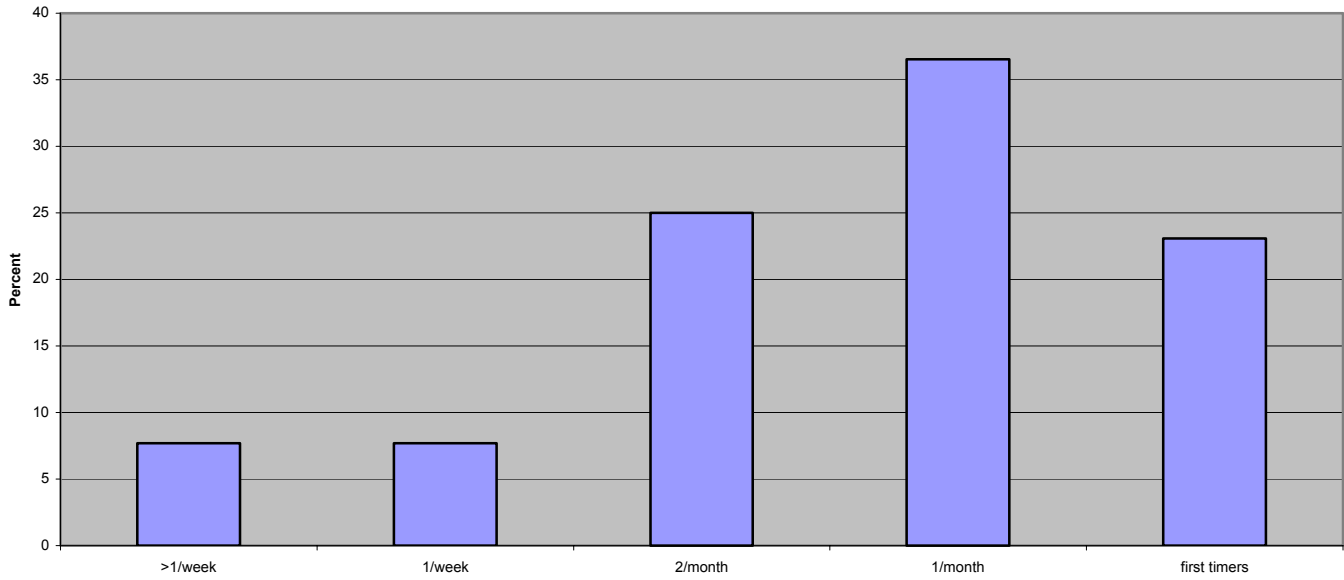
Lake Elsinore Users Survey Results - Answer A (Water Clarity)  
5/19/02, n=52



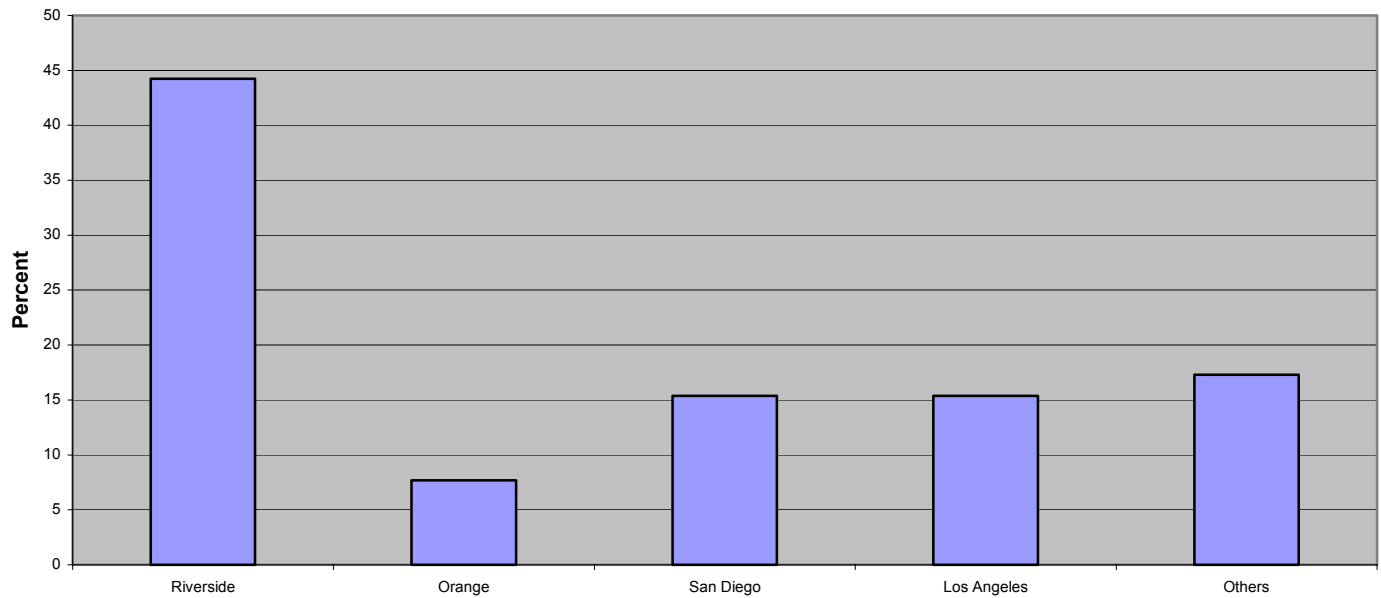
Lake Elsinore Users Survey Results - Answer B (Beneficial Uses)  
5/19/02, n=52



**Question C - Frequency of Uses, n=52**



**Question D - Users Residency, n=52**



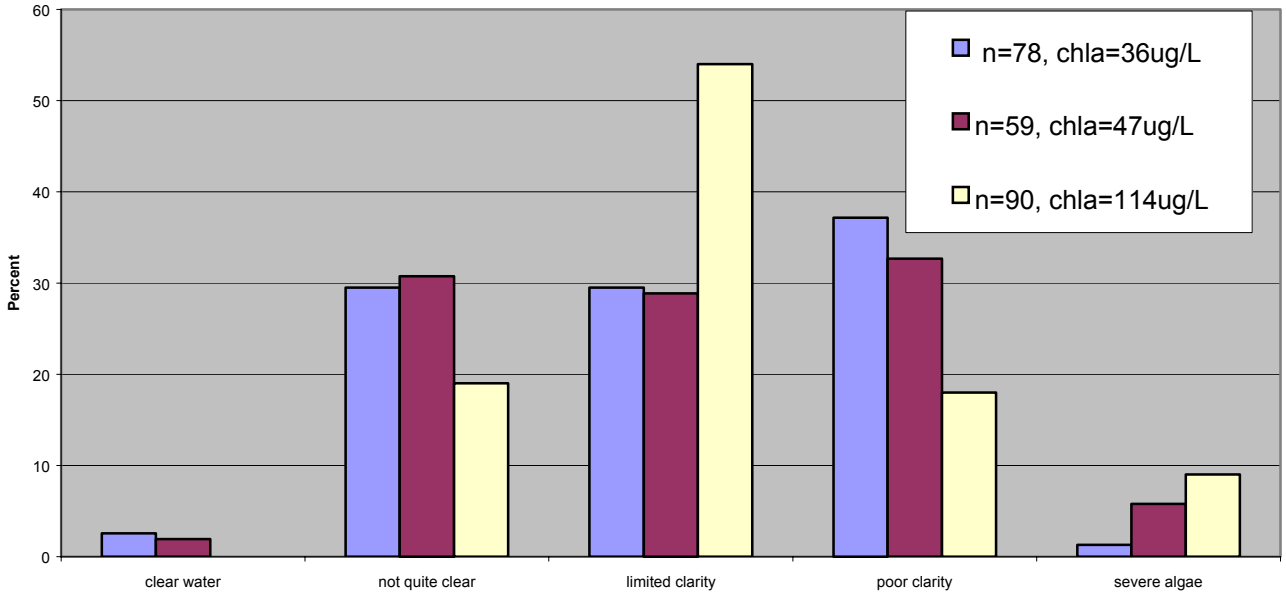


## **Lake Elsinore User Survey Results For June 9, 2002**

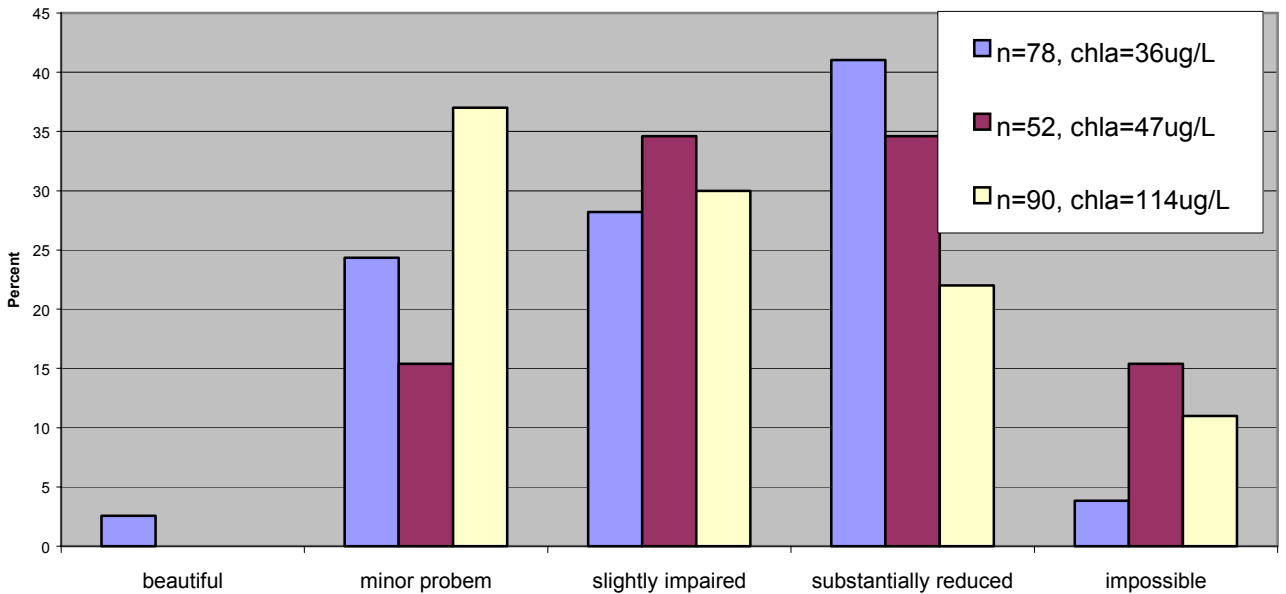
On June 9, 2002, the third Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users. David Woelfel, and Pat Kilroy conducted water quality testing. Secchi depths were read on three sites that are regularly monitored by Regional Water Quality Control Board. Samples were collected for *chlorophyll a* testing at three sites. The survey results were analyzed by Pat Kilroy and Cindy Li.

Algal blooms were observed on Lake Elsinore in June. The result of *chlorophyll a* of 114 ug/L reflects such high algal biomass. The Secchi depth reading stayed at 1 foot. Consequently, there is zero positive response for “beautiful lake” and “clear lake”. The number of people checked “severe algae” and “limited clarity” has increased as well. However, there is no clear correlation between water quality testing results and responses to question A4 “Poor water clarity, high algal greenness, significant surface algae bloom visible”. No clear correlation exists between water quality testing and response to question B4 “Desire to swim and level of enjoyment of the lake substantially reduced because of algae levels” either. Possibly it is difficult to perceive the difference between question A4 and A5 for average users. The results of three lake users surveys are shown in the next two pages.

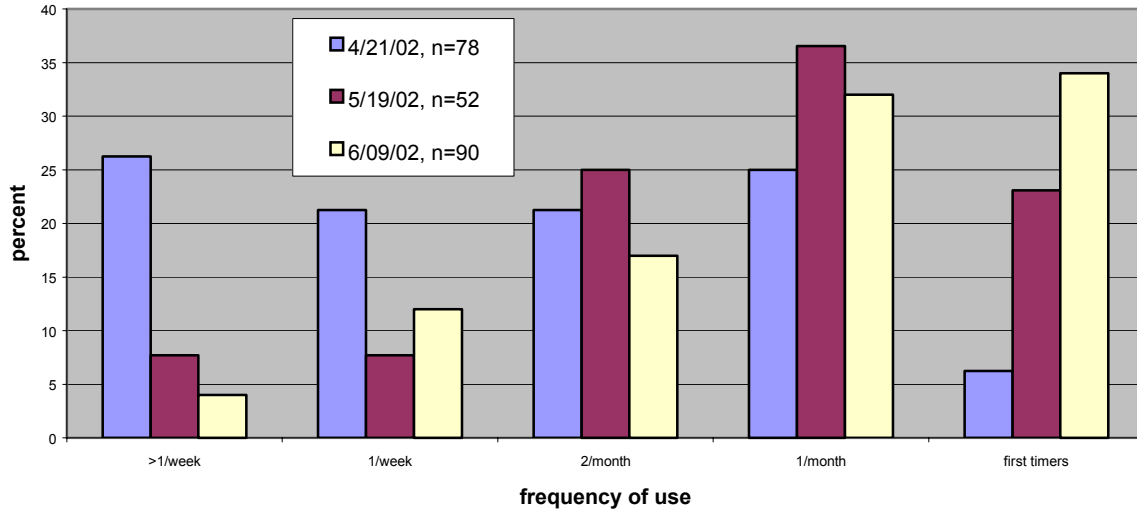
Lake Elsinore Users Survey Results  
Question A- Water Clarity



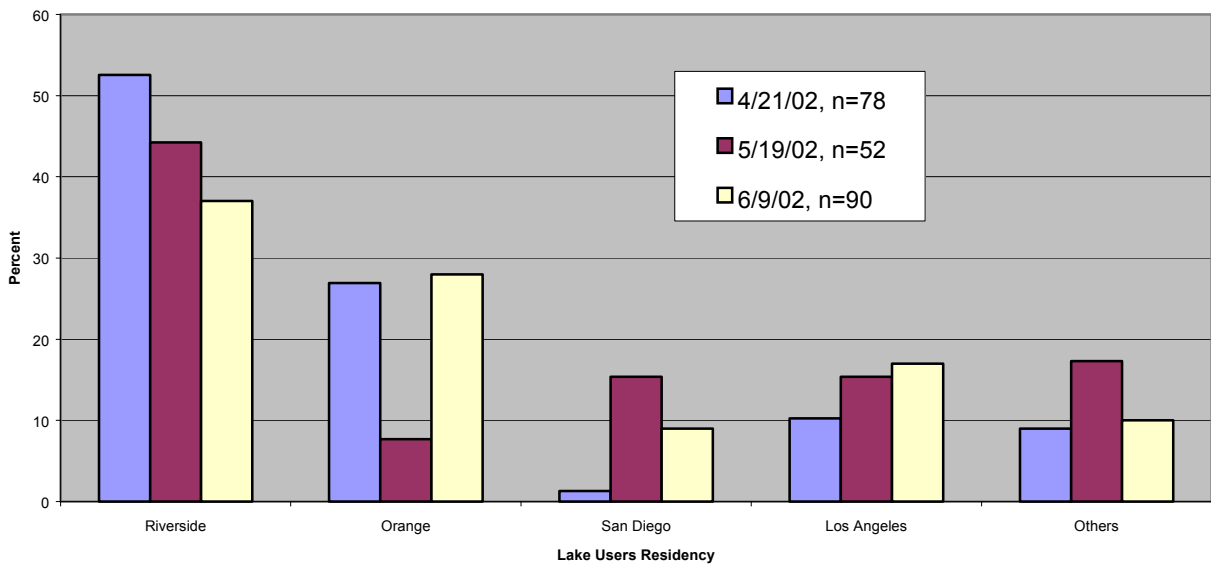
Lake Elsinore Users Survey Results  
Question B - Beneficial Uses



**Lake Elsinore Users Survey  
Question C - Use Frequency**



**Lake Elsinore Users Survey  
Question D - Lake Users Residency**



**Lake Elsinore User Survey Results  
For July 14, 2002**

Submitted by:

*Cindy Li*

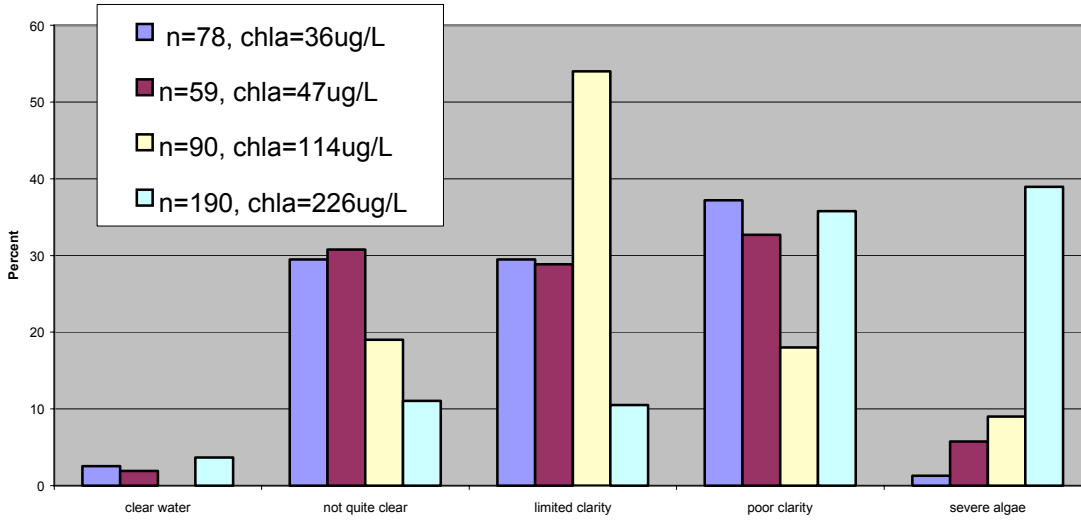
*California Regional Water Quality Control Board*

On July 14, 2002, the fourth Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users. Hope Smythe and Dennis Wait conducted water quality testing. Secchi depths were read on three sites that are regularly monitored by Regional Water Quality Control Board. Samples were collected for *chlorophyll a* testing at three sites. The Van Doren water sampler was broken at the field; only surface samples were taken this time. During the previous monitorings, composite samples at depths one and two feet were taken.

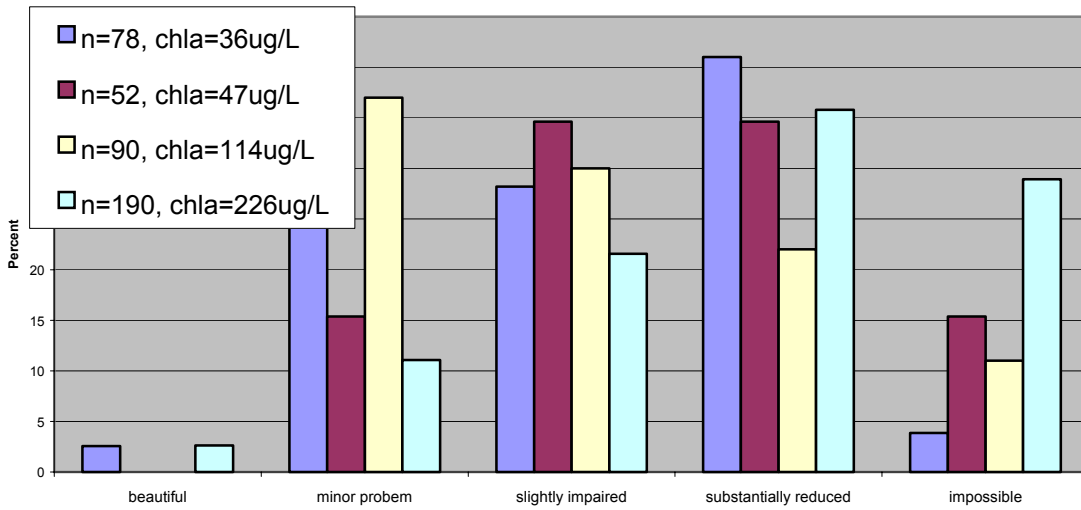
Severe algal blooms were observed on Lake Elsinore in July. The *chlorophyll a* concentration increased to 226 ug/L from 114 ug/L in the June. Secchi depth reading stayed has also decrease from 1 foot to 6 inches. The number of responses to “poor clarity” and “severe algae” increased to 75%. ” Similarly, the number of responses to lake use “substantially limited” and “impossible” increased to 65%. Interestingly, the lake users residency has kept constant during the survey, mostly from Riverside and Orange county. But the number of first time users has increased since the beginning of the lake users survey till June and kept the same in July.

The results of three lake users surveys are shown in the next two pages.

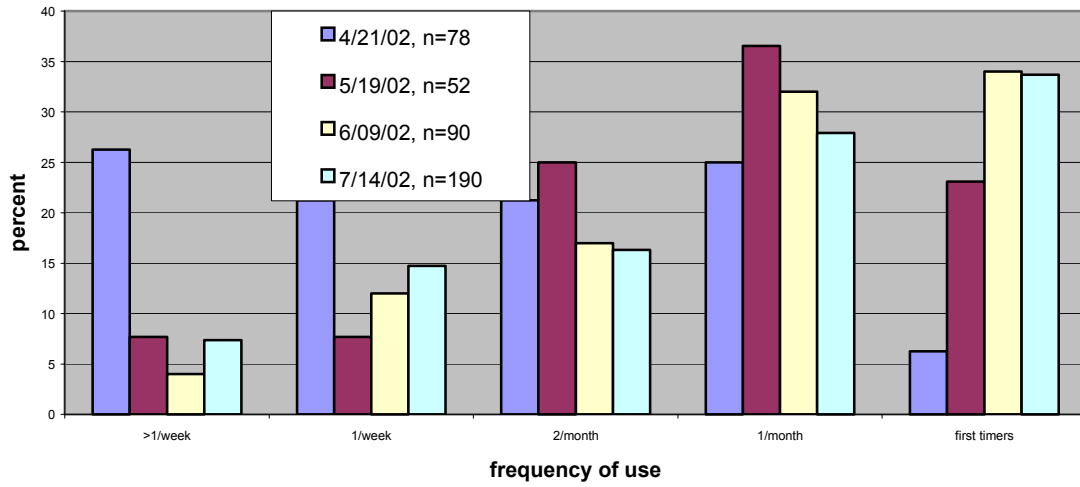
Lake Elsinore Users Survey Results  
Question A - Water Clarity



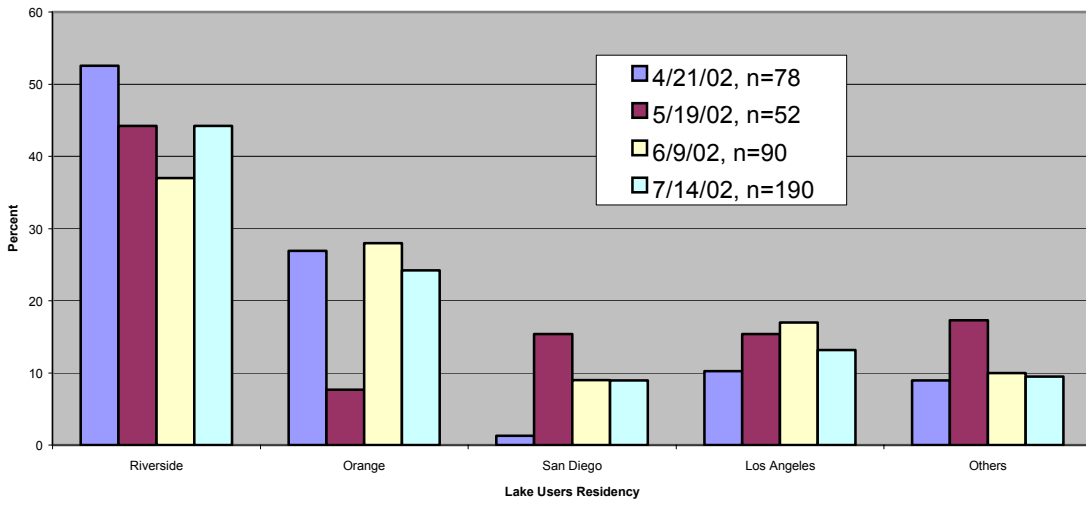
Lake Elsinore Users Survey Results  
Question B - Beneficial Uses



**Lake Elsinore Users Survey  
Question C - Use Frequency**



**Lake Elsinore Users Survey  
Question D - Lake Users Residency**



**Lake Elsinore User Survey Results  
For August 11, 2002**

Submitted by:

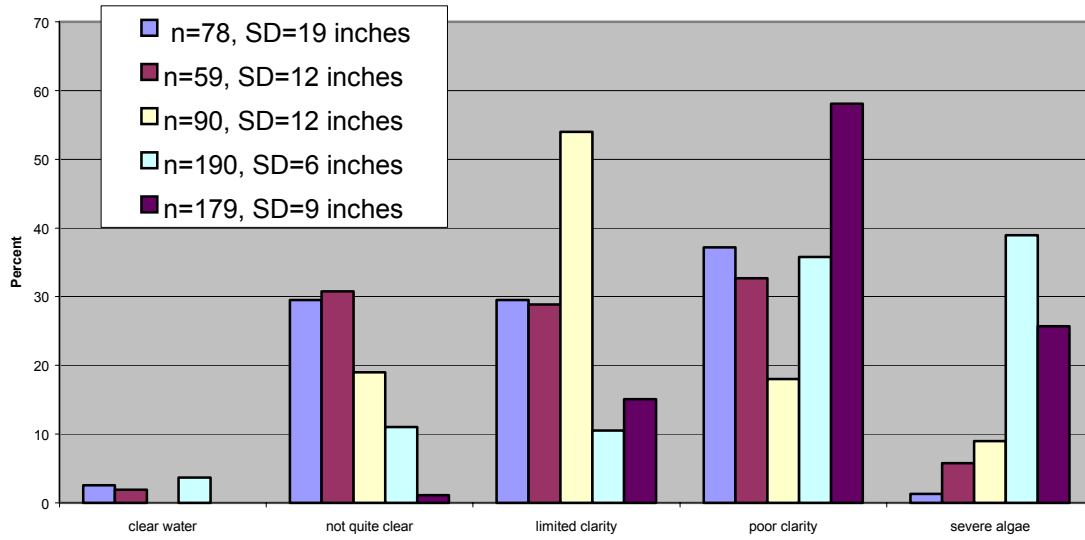
*Cindy Li*

*California Regional Water Quality Control Board*

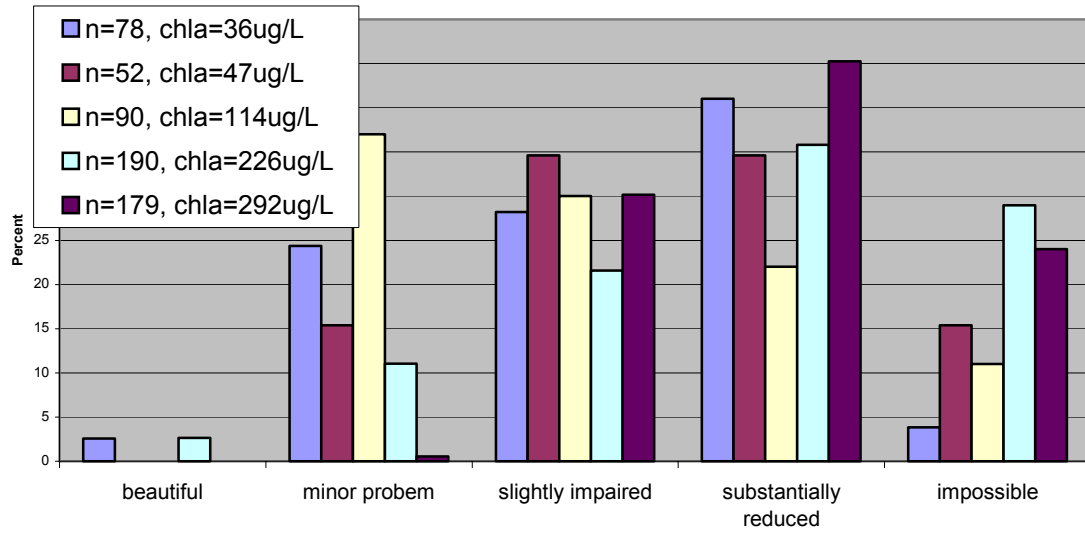
On August 11, 2002, the fifth Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users by staff from the O'Reilly PR firm. Pat Kilroy and David Woelfel conducted water quality testing. Secchi depths were measured at three sites that are regularly monitored by Regional Water Quality Control Board. Samples were also collected for *chlorophyll a* testing at three sites.

Severe algal blooms were observed on Lake Elsinore in August, as in July. The *chlorophyll a* concentration increased from 226 ug/L in July to 292 ug/L in August. Secchi depth reading has increased from 6 to 9 inches. The number of responses to "poor clarity" and "severe algae" increased to 84% in August compared to 75% in July. Similarly, the number of responses to lake use "substantially limited" and "impossible" increased to 69% from 65% in July. The results of five lake users surveys are shown in the next two pages.

**Lake Elsinore Users Survey Results  
Question A- Water Clarity**

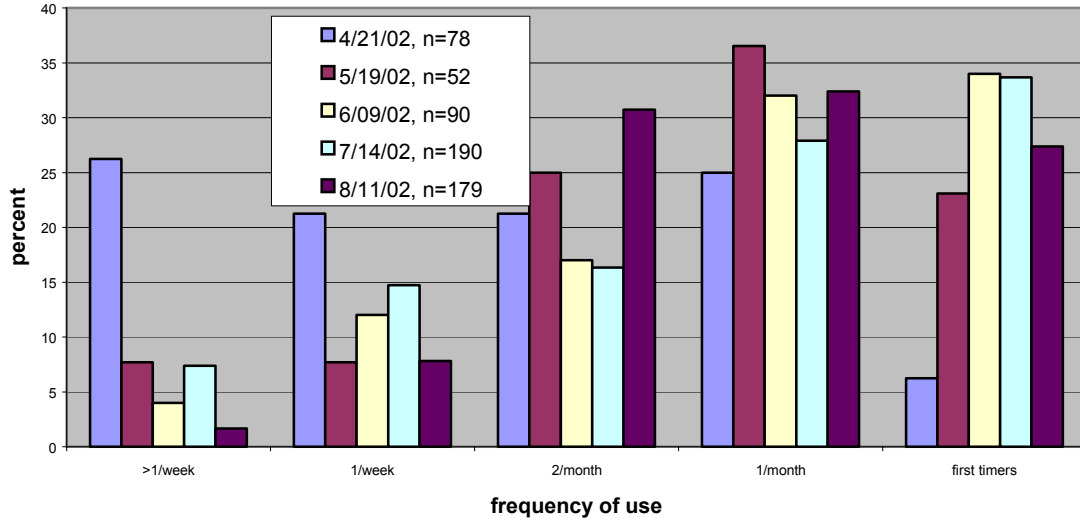


**Lake Elsinore Users Survey Results  
Question B - Beneficial Uses**

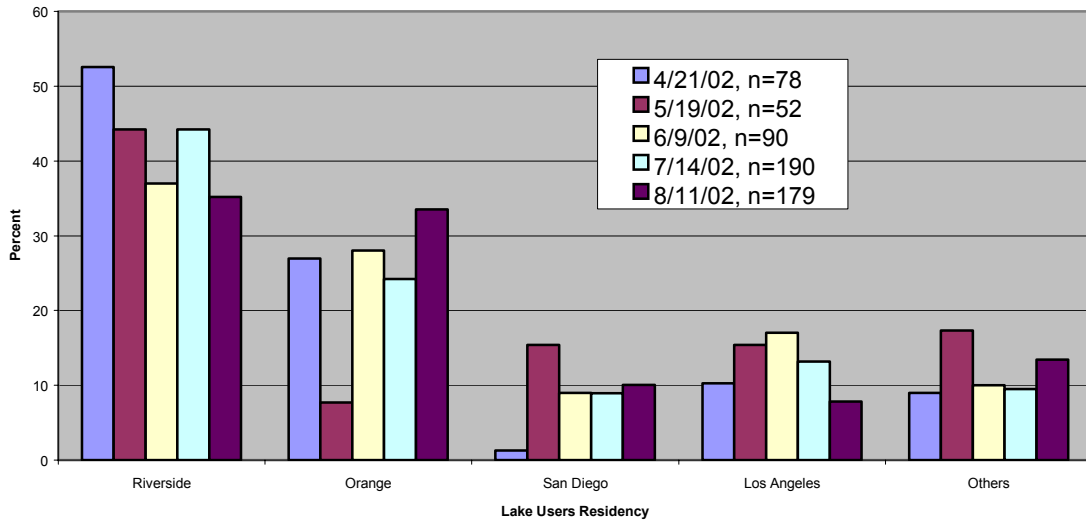




**Lake Elsinore Users Survey  
Question C - Use Frequency**



**Lake Elsinore Users Survey  
Question D - Lake Users Residency**



## Lake Elsinore User Survey Results For September 8, 2002

Submitted by:

*Cindy Li*

*California Regional Water Quality Control Board*

On September 8, 2002, the last Lake User Survey was conducted on Lake Elsinore. Survey forms developed by Pat Kilroy were distributed to lake users by staff from the O'Reilly PR firm. Pat Kilroy and Cindy Li conducted water quality testing. Secchi depths were measured at three sites that are regularly monitored by Regional Water Quality Control Board. Samples were also collected for *chlorophyll a* testing at three sites.

Water quality of Lake Elsinore was still poor during the survey. The *chlorophyll a* concentration was still very high on September 8, 2002 with 298 ug/L. Secchi depth reading was 5 inches. The number of responses to "poor clarity" and "severe algae" was 78% of all responses. The number of responses to lake use as "substantially limited" and "impossible" was 66% of all responses. The results of six lake users surveys are shown in Table 1 and Figure 1.

Water quality of Lake Elsinore has deteriorated during the survey period (from April through September 2002) as indicated by chlorophyll a concentration and Secchi depth readings, the users survey results reflect that the public perception of the lake use quality has also worsened. To further illustrate the relationship between the water quality data and lake users perception, the responses to A2 were plotted against chlorophyll a concentration (A1= clear water, but the A1 values are mostly zero, so the second category, A2 was chosen.). Responses to A4 and A5 were lumped and plotted against chlorophyll a (Figure 2). A strong linear relationship is observed between chlorophyll a concentration and percent response to A1 and A2 questions:

$$\text{Response to A2} = -0.1123 * \text{chlorophyll a conc.} + 34.199$$
$$R^2 = 0.9834$$

$$\text{Response to A4 and A5} = 0.1896 * \text{chlorophyll a conc.} + 24.751$$
$$R^2 = 0.8299$$

If the chlorophyll a concentration of Lake Elsinore is set to be 40 ug/L, near thirty percent of the users will consider the lake as "not quite clear, a little algae visible, green color of water barely perceptible", the best condition during the survey period. At the same time, at chlorophyll a of 40 ug/L, close to one-third of the users will consider the lake having "poor water clarity, high algal greenness, significant surface algae bloom visible", and "severe surface algae bloom with one or more of the following: massive floating scums on lake or washed up on shore, strong foul odor, or fish kill"

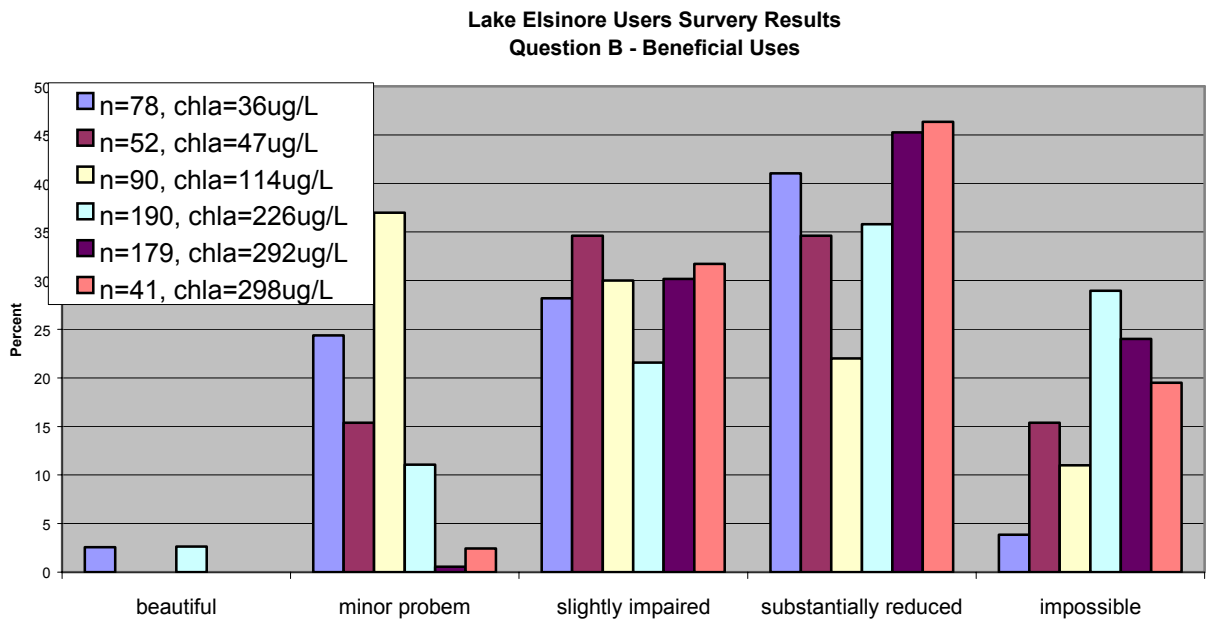
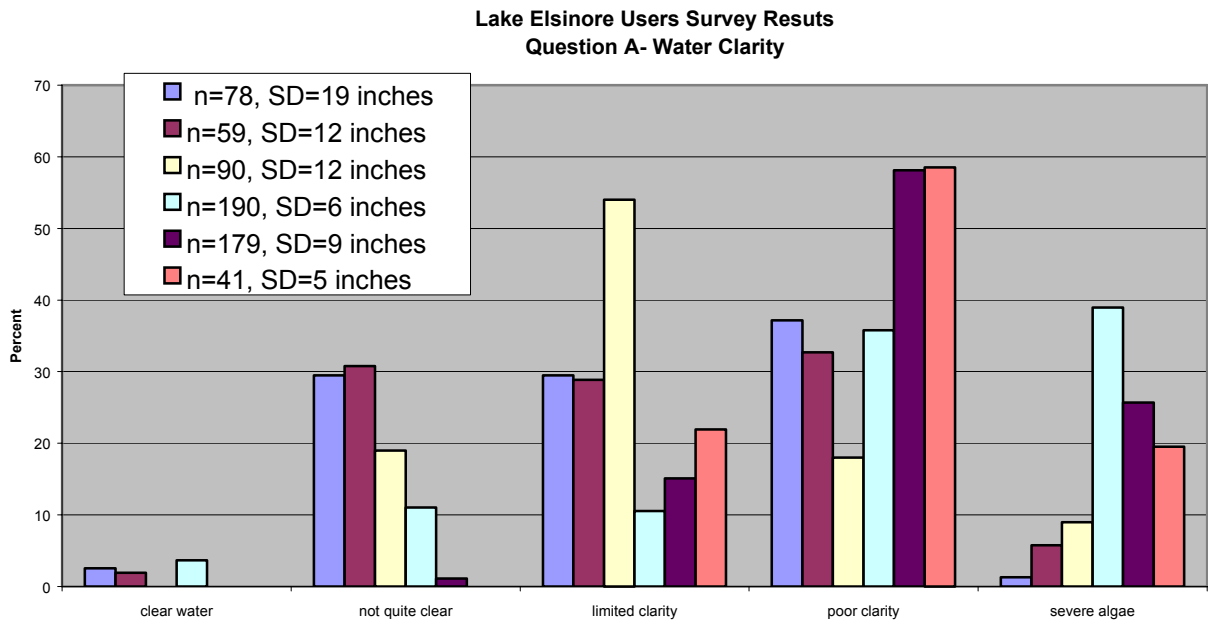
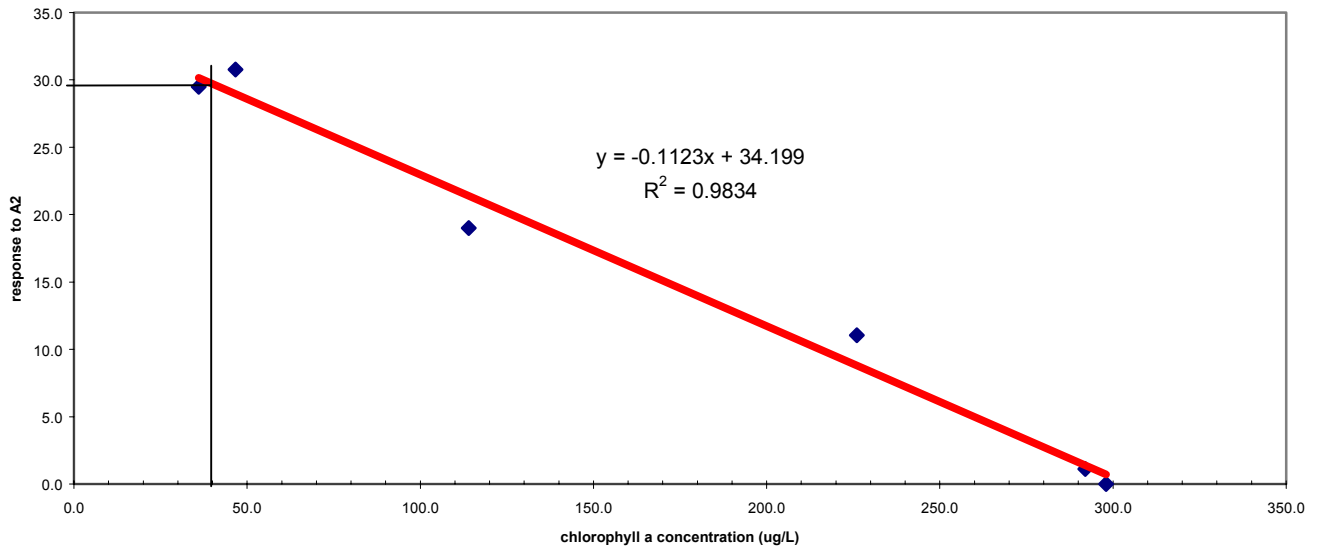


Figure 1. Lake Elsinore users survey results.

### Lake Elsinore Users Survey Results



### Lake Elsinore Users Survey- chla vs. response to A4 and A5

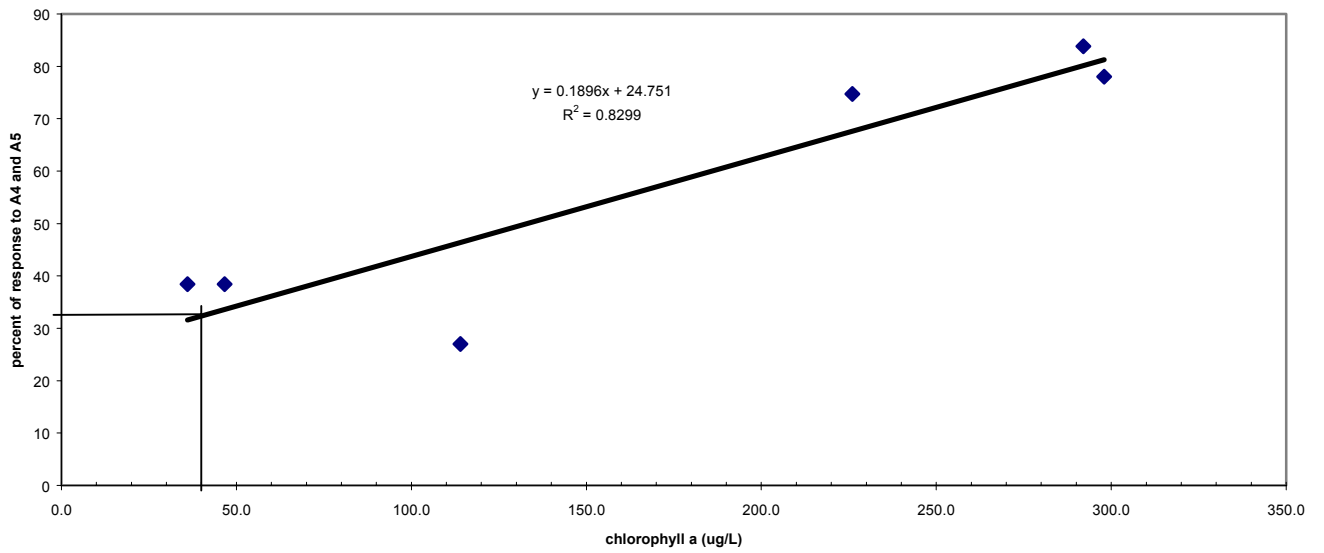


Figure 2. Lake Elsinore users survey results – chlorophyll a vs. responses to question A1 and A2.

The correlation between lake users responses and Secchi depth readings has a similar trend, but the regression is not as strong (Figure 3).

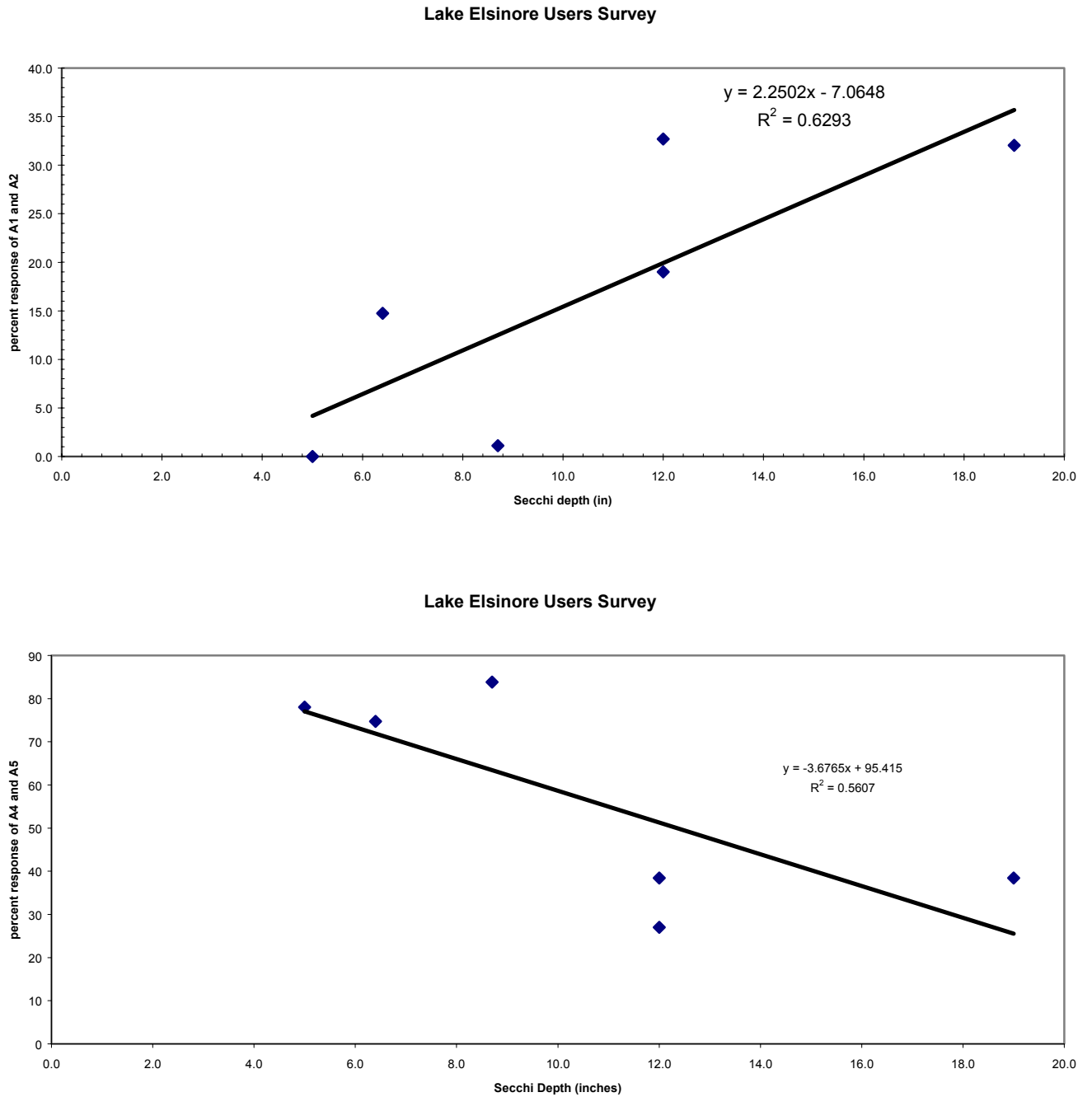


Figure 3. Lake Elsinore users survey and Secchi depth readings.

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