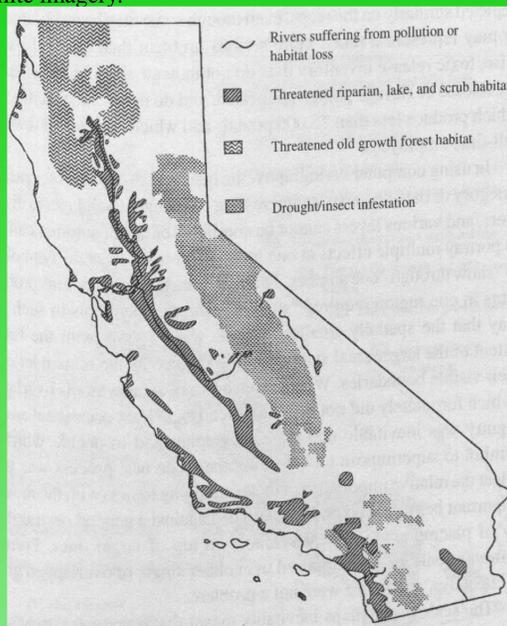


## Introduction

A pair of critical environmental area maps for the state of California has been prepared. These maps show regions of the state where the natural environment has been adversely affected by the consequences of economic activities, in some cases exacerbated by natural conditions. Environmental topics mapped include pollution on inland waters, and lakes, oil and gas fields, air pollution, major mineral extraction locations, and hazardous waste sites. Cartographic decisions were updated to use color and satellite imagery.



Original map by Cheryl Rogers and Derrick Mar, 1995

## Method

The methodology included researching new data published by different agencies, i.e. government and non-government organizations, and updating the maps from the original research done in 1995. In doing this, we seek to have a better understanding of how the rivers, habitats and air quality have improved or declined.

The data obtained from this project will be provided on two maps using Google Earth Pro.



## Acknowledgements

Professor Lisa Chaddock, Mentor  
Rafael Alvarez, MESA Director



## Results

### River water pollution

More data and monitoring available now than during first project.

Comparisons are not able to be compared due to increased monitoring.

Increased population levels coupled with increased use of plastics are still putting pressure on the environment.

### Nitrogen dioxide concentrations

As a result of factories being built, there was an initial spike in 2006 and has gradually increased since.

### Carbon monoxide

Due to changes in automobile technology the carbon monoxide has not increased significantly.

### Oil and mineral extraction locations

Oil locations have increased slightly.

Abandoned mines continue to be a hazard, especially in relation to earthquake faults and waterways.

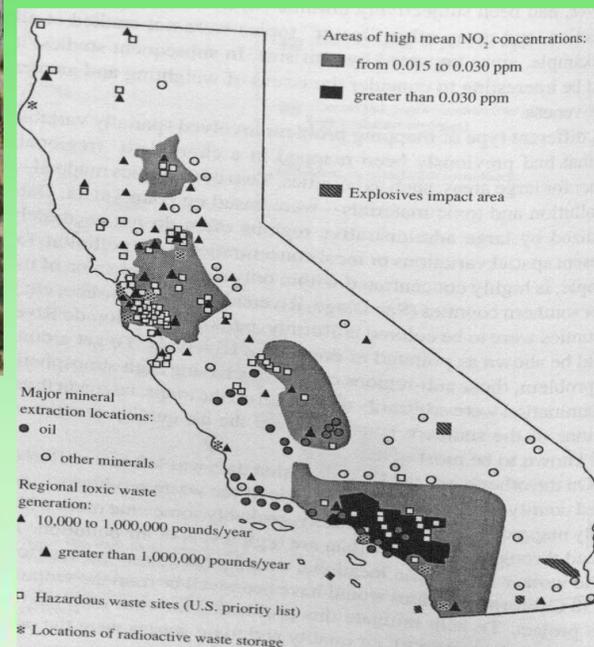
### Hazardous waste sites

Superfund has dramatically decreased the number of sites.

### Locations of radioactive waste storage

Equal amount of locations as original map

San Onofre in particular poses a hazard due to its location in relation to fault lines.



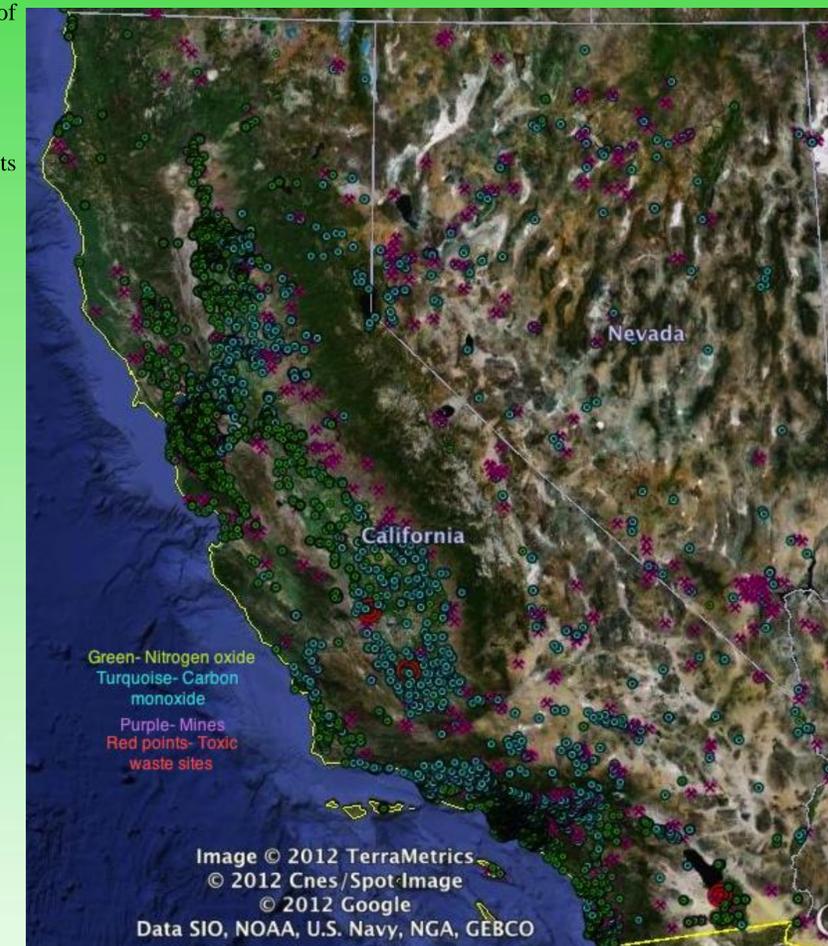
Original map by Cheryl Rogers and Derrick Mar, 1995

## Conclusion

Decisions included using Google Earth Pro instead of ArcView, obtaining shapefiles from government sources determining color schemes to overlay onto Google Earth satellite view, and sizing point data to depict placement relationships.

Overall the water pollution continues to increase even in the face of additional monitoring. Nitrogen dioxide increased dramatically through 2006 and since 2008 it has gradually increased. Oil extraction sites have slightly increased overall, with new sites in northern California. Toxic waste has highly increased since 2009 due to additional facilities. Projects such as Superfund and Brownfield have helped to decrease hazardous waste. Radioactive sites have stayed the same, with 9 sites in California. Although industry has contributed to the decrease of radioactive waste, improper disposal by the general population has negated the efforts.

The use of color has made the maps more dramatic in impact, however a graphics program would enable a cartographer to add a component of difference of severity. The use of color schemes would also allow for color to be expressed in gradations of saturation or grey scale.



## Constraints

Some data was not available in shapefile format, therefore the data was not re-incorporated into the study. California budget cuts have made ArcView or ArcGIS software license renewal unavailable.

## Advantages

Using Google Earth Pro incorporated the ability to use color, topography and satellite imagery. Direct internet download of shapefiles from government agencies allowed for up-to-date data acquisition.