



May 20, 1998

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To: Michael Picker

From: Ray Tretheway 

Subject: Sacramento Cool Community Project,  
Memorandum of Agreement with U.S. Environmental  
Protection Agency

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Michael:

Let's attempt a Thursday, June 4th Council agenda or Tuesday, June 9th which is not as preferred since it is our first alternate flight day.

EPA now calls this program their Urban Heat Island Initiative, however, we are the Sacramento Cool Community Project under that initiative. Department of Energy and NASA are key collaborators in this project.

All our Project Group members have committed to signing the MOA. Yesterday, Roger Dickinson and I presented it before the County Board of Supervisors and it will be on their consent calendar next Tuesday, May 26th.

Signatures to date include: California Energy Commission, Cleaner Air Partnership, Sacramento Municipal Utility District, U.S. Forest Service Pacific Southwest Station, California Department of Health Services, Nexus Distributors and Sacramento Tree Foundation. All the other members have commitments and calendar meeting dates to finalize their approvals.

Attachments: Sacramento Cool Community Project: Mission and Goals  
MOA with US EPA  
NASA Press Release  
London Times News Article

SACRAMENTO COOL COMMUNITIES PROJECT  
Memorandum of Agreement between the  
U.S. Environmental Protection Agency and  
the Sacramento Cool Communities Project Group

*I. Background*

The U.S. Environmental Protection Agency develops and supports collaborative partnerships designed to prevent air pollution and save energy.

EPA is exploring the energy and air quality benefits of "cool communities" measures such as solar-reflective roofs and pavements, and shade trees. Research has shown that wide-scale adoption of these measures can help cool urban areas, thereby reducing air-conditioning demands, and reducing ozone levels.

*II. Goals of the Project*

This Memorandum of Agreement ("MOA") outlines a partnership between EPA and the Sacramento Cool Communities Project Group ("SCCPG"). Under the framework of this MOA, the parties will develop and implement a broad-scale cool community initiative in the greater Sacramento area. The goals of this project are to achieve significant implementation of cool community measures that reduce emissions of greenhouse gases, ozone levels, and savings in summer energy demand; and to quantify the projected ozone reductions so that they may eventually be included in the State Implementation Plan (SIP).

*III. Environmental Protection Agency Responsibilities*

EPA agrees to designate a single liaison for the Sacramento Cool Communities Project and to notify the SCCPG within one month of any change in liaison responsibilities.

EPA agrees to assist the SCCPG with development of a Cool Communities Action Plan designed to achieve maximum overall benefits to the community. During this planning phase, EPA agrees to provide the SCCPG with a technical analysis of the local energy and air quality benefits of various cool communities actions and to the development of the SCCPG Action Plan by undertaking the following activities:

- A. Assist the SCCPG in collecting and analyzing necessary baseline information about the greater Sacramento area including current reflectivity, tree cover, and meteorological conditions, as appropriate.
- B. Assist the SCCPG in exploring methods for quantifying the resulting ozone benefits for incorporation in future State Implementation Plans.
- C. Assist the SCCPG in contacting appropriate state and local agencies that may be of potential assistance in ensuring the success of the Cool Communities Program.

- D. Assist the SCCPG in designing and implementing specific cool community programs and policies in the greater Sacramento area. This support may include the following: providing program suggestions, reviewing proposed ideas, developing educational materials, and other activities as appropriate.

#### *IV. Sacramento Cool Communities Group Responsibilities*

The Sacramento Cool Communities Project Group agrees to designate a single liaison for the Cool Communities Project and to notify the EPA liaison within one month of any change in liaison responsibilities.

The Sacramento Cool Communities Project Group agrees to recruit a cross-functional team of people from within the local community who will help design and implement necessary actions. This Cool Communities Group may include, but not be limited to, local governments, planning departments, utilities, regional agencies, nonprofit organizations; state air quality and energy departments, and private industry. The designated Group will work closely with EPA in a collaborative manner to gather appropriate data, analyze opportunities, and implement the recommended cool community actions.

The Sacramento Cool Communities Project Group agrees to work with EPA and their Cool Communities partners to develop a Cool Communities Action Plan that outlines program and policy actions, resources, and timelines. Within (4) four months of signing this MOA the first draft of the Action Plan will be completed, with the final draft completed within (6) six months.

The Sacramento Cool Communities Project Group agrees to implement cool community programs and policies according to the Sacramento Cool Communities Action Plan.

#### *V. General Provisions*

Both parties agree that this project is undertaken in good faith and that this MOA does not commit EPA to any future financial obligations to the Sacramento Cool Communities Project Group, nor does it imply that EPA forgoes any regulatory authorities.

Both parties agree to notify each other if any problems arise and to work together to foster maximum public confidence in the Cool Communities Pilot Project. Either party can terminate this agreement, without penalty, via 30 days' written notice to the other.

Both parties agree that EPA's involvement in the Cool Communities Pilot City Project does not imply EPA endorsement of any specific commercial products.

#### *VI. Entry into Force and Duration*

This MOA enters into force when signed by both EPA and the Sacramento Cool Communities Project Group. The Agreement is intended to remain in effect for an initial two-year period, during which time the analysis, planning, and initial implementation activities will be undertaken. The agreement may be extended for a designated period of time by mutual consent prior to the termination of this MOA to continue the implementation of Cool Communities programs and activities.

The undersigned hereby execute the MOA on behalf of their parties. This MOA takes effect when signed by all parties to the EPA and the Sacramento Cool Communities Project Group.

For U.S. Environmental Protection Agency

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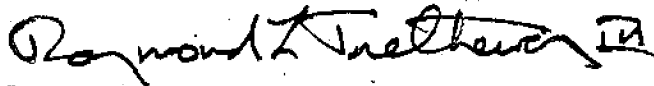
Paul M. Stolpman  
Director Office of  
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For Sacramento Cool Communities Project Group



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Raymond L. Trethewey III  
Executive Director  
Sacramento Tree Foundation

For SCCPG participants:

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Clean Air Partnership  
contact: Jude Lamare

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California Department of Health Services  
contact: Andrew Manthew

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Sacramento Municipal Utility District  
contact: Ginger Salmon

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Nexus Distributors  
contact: Michele Didier

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Sacramento Area Council of Governments  
contact: Bob Fasel

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California Energy Commission  
contact: Nancy Hanson

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Sacramento Air Quality Management District  
contact: Karen Wilson

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USFS Western Ctr Urban Forest Research  
contact: Greg McPherson

**SAMPLE**  
**SACRAMENTO COOL COMMUNITY PROJECT GROUP**  
**MEMORANDUM OF AGREEMENT**  
**ENDORSEMENT LETTER**

Date

Your Address

Dear Mr. Tretheway:

The enclosed Memorandum of Agreement between the United States Environmental Protection Agency and the Sacramento Cool Community Project Group has been reviewed and received the endorsement of \_\_\_\_\_ (your group or agency). It is our intent to fully participate and support the development of the Sacramento Work Plan and its implementation to the extent of our resources and abilities.

Sincerely,

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**SAMPLE**



## **Sacramento's Cool Community Project**

*A collaborative project involving the City and County of Sacramento • The Cleaner Air Partnership • Sacramento Municipal Utility District • Sacramento Metropolitan Air Quality Management District • Sacramento Area Council of Governments • Nexus Distributors • California Energy Commission • California Air Resources Board • California Department of Health Services • U.S.D.A. Forest Service Western Center for Urban Forest Research and Education • U.S. E.P.A. Region IX •*

*This is an Urban Heat Island Initiative sponsored by the U.S. Environmental Protection Agency, the National Aeronautics and Space Administration, and the U.S. Department of Energy  
Coordinated by the Sacramento Tree Foundation*

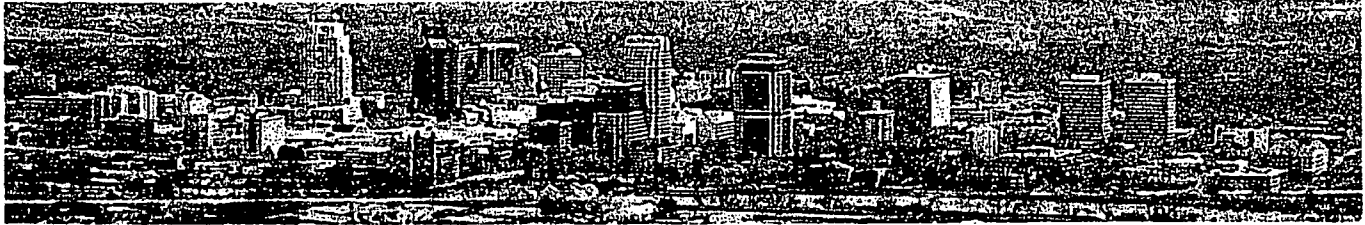
*201 Lathrop Way, Suite F, Sacramento, CA 95815 • (916) 924-TREE • [sactree@mother.com](mailto:sactree@mother.com) • Tom Whitney, Coordinator*

### **Mission**

**Sacramento's Cool Community Project will improve the liveability of the greater Sacramento area by increasing shade trees and reflective surfaces that save energy and reduce greenhouse gas emissions, urban ozone, exposure to ultraviolet radiation and storm water runoff.**

### **Goals**

- Improve comfort, health benefits and aesthetics across a variety of residential and commercial areas with a special focus on low-income neighborhoods.*
- Build broad community support and understanding of cool community measures.*
- Develop and implement strategies and programs that will provide the greatest benefits.*
- Involve young people in the research, educational and implementation efforts of the program.*
- Demonstrate and document successful projects so they may be copied in other communities.*



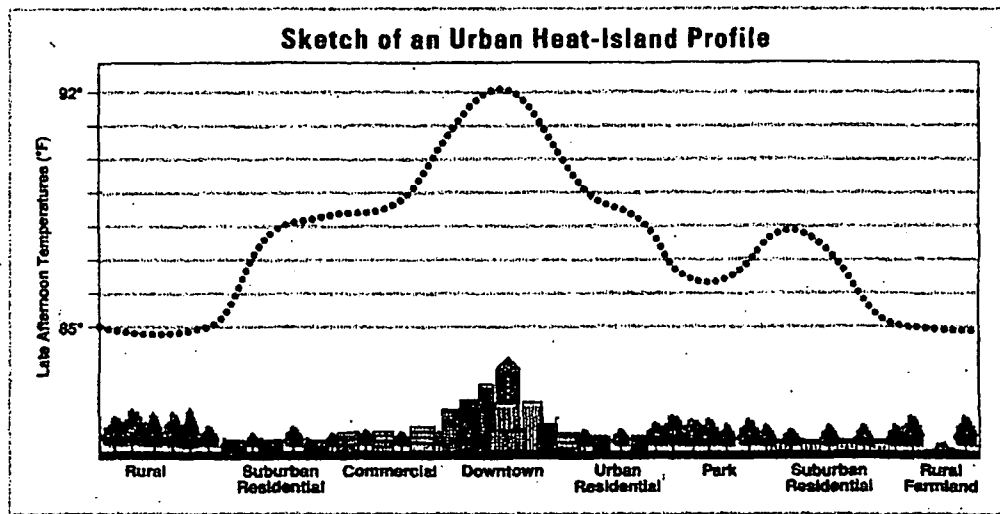
# Sacramento's Cool Community Project

## Sacramento to Team Up With NASA, EPA and DOE for Study to Reduce Heat, Smog and Energy Costs

By Kelly McFall, *National Aeronautics and Space Administration*

Sacramento will partner with NASA, the Environmental Protection Agency and the U.S. Department of Energy to study how strategically placed "urban forests" and the use of reflective surfaces may help cool cities, reduce air pollution, lower energy bills, modify growth plans and help mitigate further deterioration of air quality.

Researchers from NASA's Marshall Space Flight Center in Huntsville, Alabama, will travel to Sacramento, June 8 - 19, to gather information on bubble-like accumulations of hot air, called urban heat islands. Heat islands develop over cities as naturally vegetated surfaces are replaced with asphalt, concrete, rooftops and other man-made materials.



Source: Andrasko and Huang, 1990

Sketch of a typical urban heat island profile: It shows temperature changes in degrees Fahrenheit correlated to the density of development and trees.

"The artificial materials store much of the sun's energy and remain hot long after sunset," said the experiment's lead investigator, Dr. Jeff Luvall of the Global Hydrology and Climate Center at Marshall. "This produces a dome of elevated temperatures over a city, 5-10 degrees higher than air temperatures over adjacent rural areas," he explained.

"The more a city grows - replacing trees and grass with buildings and roads - the warmer it becomes, increasing peak electricity demands. To meet those demands, power plants must utilize fossil fuels to a greater extent, which ultimately has a negative impact on air quality," said Luvall.

To better understand which surfaces contribute to or drive the development of heat islands, a jet aircraft equipped with thermal imaging equipment will fly over Sacramento taking high resolution

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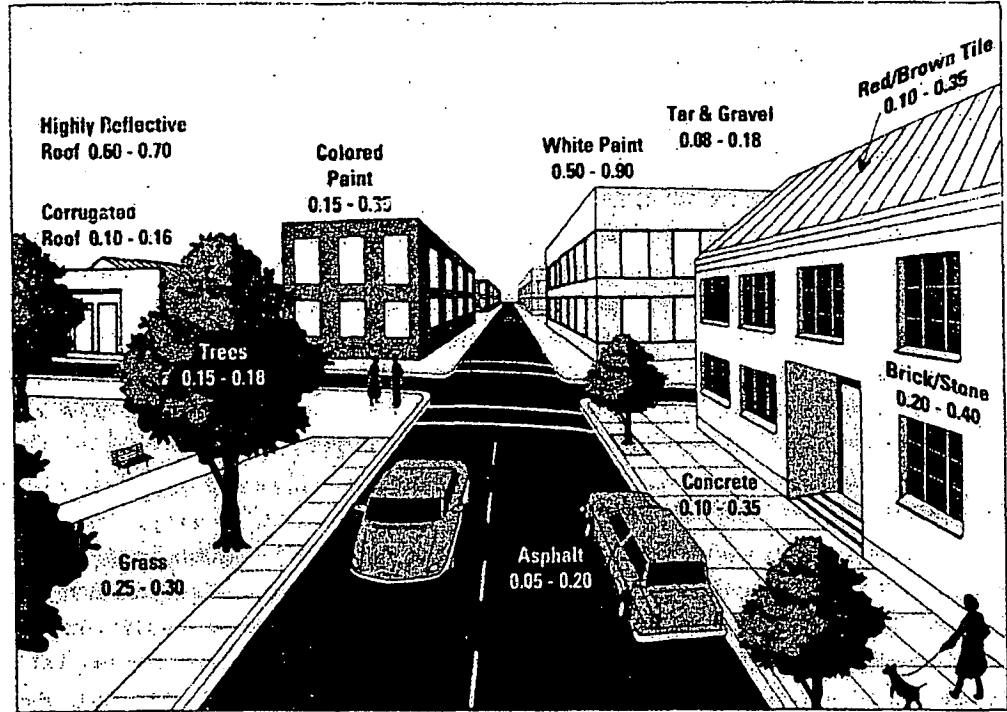
*Coordinated by the Sacramento Tree Foundation*

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thermal measurements.

## Opportunity to Use Space Science and Involve Students

"It is a great opportunity for Sacramento to use space science technology the federal agencies have developed to help us better understand our vexing air pollution problems," says Tom Whitney, the Sacramento Tree Foundation's coordinator of the project. Currently the Sacramento region ranks eighth worst in the nation in air pollution, according the Sacramento Metropolitan Air Quality Management District.

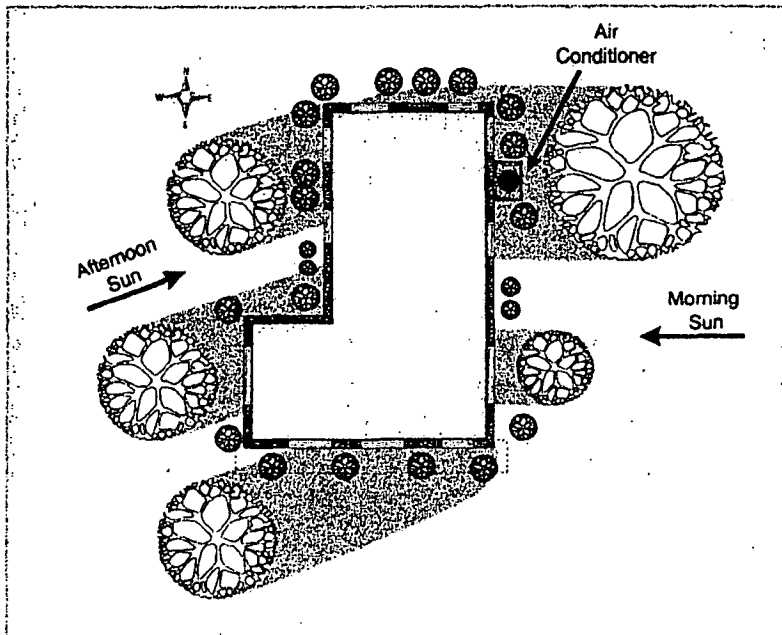


Source: Huang and Taha, 1990

Surface albedo values: The more solar radiation a surface absorbs, the hotter it gets. The more radiation it reflects, the cooler it stays. Today's urban communities contain many different albedo values. Surfaces with high albedo values reflect more solar radiation and are generally cooler.

Students at schools around the County will use scientific procedures to take ground-level temperature readings over paved and unpaved surfaces during the time of the overflight to validate the thermal infrared images taken by the NASA jet.

Researchers will also use thermal satellite imagery to map and measure "hot spots" and heat energy rising up into the lower atmosphere of the city. Science team members will use the thermal imagery in



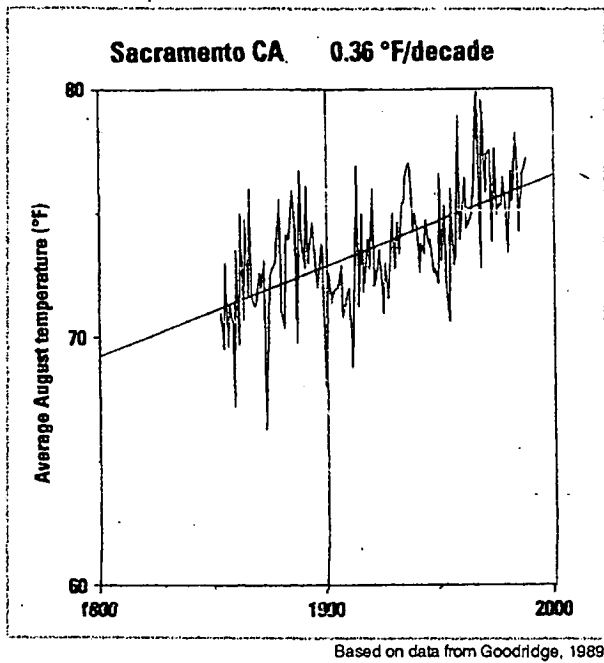
Source: Parker, 1987

Sample residential landscape: Large trees planted on the westward and south sides to cast the maximum shadows and on the east side to shade the air conditioner. Shrubs planted on all sides of the house help to reduce wall and soil temperatures.

meteorological and air quality models, allowing researchers to better understand how cities in different locations and with different land uses characteristics affect local and regional climate.

Additionally the EPA will use the satellite imagery to determine how urban heat islands contribute to the ground-level generation of ozone. Not to be confused with the ozone layer protecting the Earth from ultraviolet rays, ground-level ozone is a powerful and dangerous respiratory irritant found in cities during the summer's hottest months. Ground level ozone is an air pollutant that cannot be seen but contributes to lung problems such as asthma, emphysema and lung cancer in a number of U.S. cities including





Sacramento. Ozone formation occurs primarily during the months from May through October.

NASA, the EPA and the Department of Energy will work with the cooperating agencies in Sacramento, including the Sacramento Tree Foundation and the Sacramento Municipal Utility District (SMUD) to quantify potential reductions in smog and find cost-effective means of implementing measures to cool Sacramento. SMUD has for many years funded a program of strategically planting trees around homes to reduce its summer heating load. The U.S.D.A. Forest Service Western Center for Urban Forest Research and Education will also help provide research direction in addition to the other regional and state agencies involved. The Center, located in Davis, California, has done extensive work in quantifying the benefits urban forests provide.

### **Green Areas, Trees, Reflective Surfaces Help**

In findings from similar studies in Huntsville and Atlanta, Georgia, researchers have learned that parks and other urban areas with trees and grass are cooler than parking lots and areas with a high concentration of buildings.

“These green areas are cooler because they dissipate solar energy by using it to evaporate water from leaves, thereby cooling the air,” said the experiment’s co-investigator, Dr. Dale Quattrochi of the Global Hydrology and Climate Center. Researchers believe that cities could be cooled by reintroducing vegetated areas, such as “urban forests,” into the cities. Trees can shade buildings, preventing solar heating, and are able to naturally cool a city as they release moisture into the air and provide shade over urban surfaces.

Another way to cool cities, the science team believes, is by using reflective surfaces, such as light-colored roofs, roads, and parking lots. Light-colored surfaces reflect rather than absorb heat. The researchers want to demonstrate that by cooling a city, it is possible to directly reduce energy use by buildings, which in turn reduces greenhouse gas emissions and ultimately improves air quality.

Additionally, individuals, businesses and governments can save money by reducing the amount of energy consumed.

“Essentially, we want to help city and county planners develop tools that allow them to better plan for long-term sustainable urban development,” said Luvall.

### **Background**

Based on the results of the project, the science team plans to disseminate its findings nationally so other cities also can incorporate what the team has learned into their long-range growth plans.

Also slated to participate in the study are Baton Rouge, Louisiana, and Salt Lake City, Utah.

The science team is composed of researchers from the Marshall Space Flight Center, the EPA and the Department of Energy’s Lawrence Berkeley National Laboratory in Berkeley, California. Locally, the U.S.D.A. Forest Service Western Center for Urban Forest Research and Education will help provide research direction. The Center, located in Davis, California, has done important work in scientifically quantifying the important benefits urban forests provide.

The study contributes to NASA’s Earth Science enterprise. This is a long-term coordinated research effort to study the total Earth system and the effects of natural and human-induced changes in the global

environment. The project is aimed at making the more near-term economic and societal benefits of Earth science research and data products available to the broader community of public and private users.

**Credits:**

Illustrations in this article are used with permission from "Cooling Our Communities, A Guidebook on Tree Planting and Light-Colored Surfacing," edited by Hashem Akbari, Lawrence Berkeley National Laboratory; Susan Davis, Lawrence Berkeley National Laboratory; Sofia Dorsano, The Bruce Company; Joe Huang, Lawrence Berkeley National Laboratory and Steven Winnett, U.S. Environmental Protection Agency; published by the U.S. Environmental Protection Agency, January, 1992.

The urban heat island profile and the surface albedo illustration is from "Residential Cooling Loads and the Urban Heat Island Effects of Albedo," by H.G. Taha, A.H. Rosenfeld, and Y.J. Huang, *Building and Environment*, 23(4): 271-283, 1988

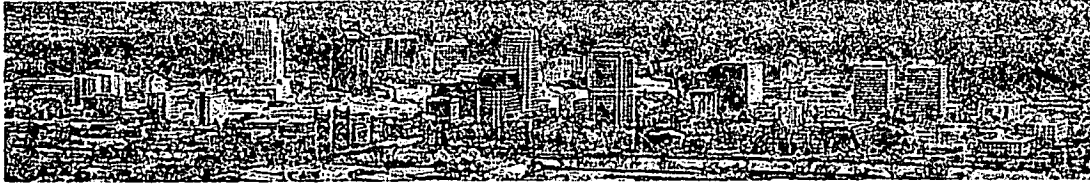
The graph of Sacramento's rising temperature trend is based on data in "Air Temperature Trends in California, 1916 to 1987" by J. Goodridge, personal manuscript, 1989

The residential landscape shading diagram can be found in "The Implementation of Energy Conservation Landscaping Through Local Ordinances," by J.H. Parker, Florida International University, Department of Physical Sciences, 1982.

The surface albedo illustration and the urban heat island profile is from "Residential Cooling Loads and the Urban Heat Island Effects of Albedo," by H.G. Taha, A.H. Rosenfeld, and Y.J. Huang, *Building and Environment*, 23(4): 271-283, 1988.

Additional material about ozone was adapted from fact sheets provided by the American Lung Association-Emigrant Trails, Sacramento, California.

The article was assembled by Tom Whitney, Sacramento Cool Community Coordinator, Sacramento Tree Foundation, 201 Lathrop Way, Suite F, Sacramento, California 95815, (916) 924-TREE, [sactree@mother.com](mailto:sactree@mother.com)



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