Urban forests and climate change:
Greenhouse Gas Reporting Protocols

Carbon dioxide levels in the atmosphere are higher than at any time in the last 400,000 years according to the most recent report of the International Panel on Climate Change, and the rate at which they are being added is increasing. Humans add carbon dioxide and other greenhouse gases (GHG) to the atmosphere through a number of activities, in particular the burning of coal, gasoline, and other fuels for energy.

The problem of GHG is twofold. First, how do we reduce the amount of GHG being produced? Second, how do we lower the excessive amounts already in the atmosphere? **Urban forests are one solution** to both. Trees in cities affect GHG in three main ways:

- As they grow, they remove carbon dioxide and other GHG from the atmosphere and sequester them in their leaves, branches, trunks and roots; when the trees die, however, the carbon is released back into the air through decomposition.

- By shading buildings in summer and blocking cold winter winds, trees reduce electricity and natural gas use, which reduces the production of GHG at the power plant or home furnace.

- Wood from dead trees can be used to produce energy, create biofuel, and for thermal heat and cooling, replacing fuels that produce more GHG.

The Center for Urban Forest Research has been working for years to quantify the contribution of trees to reducing global warming. We have extensive data on tree growth and GHG sequestration for trees throughout California, and we have developed models to estimate the effects of shade trees on energy use. For these reasons, we have been invited to lead a team in drafting Urban Forest Reporting Protocols for the California Climate Action Registry.

The Registry

We can't begin reducing GHG emissions without understanding the current situation. The Registry is the first in the nation to provide a forum for entities—corporations, municipalities, even individuals—to voluntarily report greenhouse gas (GHG) emissions. In this way, the nonprofit partnership hopes to **encourage early actions to reduce emissions.**

A series of protocols, including one for general reporting and other industry-specific protocols, provide guidance on how to report your organization's emissions or emission reductions in a way that is complete, transparent, and accurate. It's important to note that the Registry is *only* an accounting forum, a place to document and monitor emissions levels. It is not involved in a cap-and-trade market, in offering carbon offsets, or in setting a carbon tax. These policy-related decisions will be made later at the legislative level.

Urban forest protocols

For the next year, the Center for Urban Forest Research will lead a team in drafting Urban Forest Reporting Protocols under the direction of a steering committee, including representatives from Cal Fire, Pacific Forest Trust, the Registry, California Energy Commission, California Air Resources Board and utility, nonprofit and urban forestry professionals. Our work will be guided by a technical advisory committee made up of researchers, policy makers, and public officials, and by a stakeholder committee representing groups most likely to make use of the protocols. The drafting process will end in the spring of 2008 with a public workshop and a chance for public comment.

Registering your urban forest

Although every tree helps to fight climate change, the efforts necessary to document the urban forest will be most economically feasible at larger scales. For this reason, registering urban trees will most likely be undertaken by large entities, including municipalities, colleges and universities, utilities, and other owners of large urban properties.

There are two levels of reporting: sector and project. Using the **Urban Forest Sector Protocol,** the reporting entity accounts for all of its carbon stocks and forecasts the changes in the urban forest that will occur if management practices, planting, and mortality continue as usual.

The **Urban Forest Project Protocol** allows a reporting entity to plan a GHG reduction activity that goes beyond business as usual. Project types include (1) planting trees or changing tree care and wood utilization practices to increase carbon stocks, (2) planting trees strategically around buildings to reduce energy use, and (3) using woody waste as a bioenergy source to replace more GHG-intense fuel sources. An activity, such as a large-scale tree planting, may combine two or three of these project types. The main steps in the protocols are described in the center box.

Reporting an urban forest project

Sector level

1. Conduct an inventory of your urban forest.

2. Calculate the carbon stored in the trees.

3. Forecast the expected changes in the urban forest under a business-as-usual scenario.

4. Forecast the change in carbon storage into the future. This is your baseline.

Project level

The first year...

1. Describe the activity, for instance, a large-scale tree planting. Will it be a carbon storage project, a shade effect project, a bioenergy project or a combination of these?

2. For each kind of project, determine a baseline.

3. Forecast the changes in the project trees into the future.

4. Describe the extent to which your project activity will exceed the predicted baseline.

5. Describe measures taken to insure the permanence of reductions.

6. Have the project certified.

In future years...

1. Monitor the changes in the urban forest by verifying the existence, size, and condition of the trees.

2. Report the carbon storage, shade effects, and bioenergy value of your urban forest and any changes from your initial predictions each year to the Registry.

3. Have the project certified.

After a project has been registered, it must be certified using the **Certification Protocol** to insure that the highest standards of accuracy, completeness, and transparency are met. Certifiers will be looking for evidence of "additionality," that is, making sure that any changes to the urban forest for the purpose of reducing GHG go beyond business as usual.

Certifiers will also guard against "leakage," or the shifting of money or effort from one part of an organization to another without adding value. For example, certifiers will insure that an urban forester doesn't stop pruning trees to make more time and money available for tree planting, as this would have a negative effect on the overall health of the urban forest and potentially negate any positive GHG benefits.

Finally, the certifier will work to insure that the project has been carried out as registered: that the trees have been planted as described, and that over the years they achieve the expected growth and remain in good condition.

The Urban Forest Reporting Protocols will use state-of-the-art science from the Center for Urban Forest Research to provide cities, utilities, and other organizations with an opportunity to predict, measure, and verify the role of urban trees in fighting global climate change.

For more information on urban forest reporting protocols and GHG, visit: http://www.fs.fed.us/psw/programs/cufr/