

# Satellite Pinpoints State's Sprawl

## New Computer Maps Show Loss of Land In Every Town To Development Over Decades

By MIKE SWIFT, The Hartford Courant

In recent decades, the view from the ground in Connecticut has left many people with a sense that the landscape is changing rapidly, but with no good way to measure exactly how.

Jim and Honora Futtner, who farm in South Windsor and East Hartford, worry that development won't leave enough land to sink a plow into.

Donald J. Poland, East Windsor's planning director, suspects Connecticut is using more land than it did two decades ago to build the same number of houses.

Don Strait, an environmentalist, fears the forests that cloak Connecticut's drinking water reservoirs are an irresistible target for developers.

Now, using images collected by NASA satellites orbiting 438 miles above the Earth, scientists at the University of Connecticut have spent two painstaking years building a unique series of computer maps that may change the way people look at the state. The maps developed by UConn's Center for Land use Education And Research (CLEAR) provide the first measurement of the persistent, acre-by-acre change within Connecticut's 169 cities and towns over the past 17 years.

The Land of Steady Habits, it turns out, is really The Landscape of Relentless Change.

High-density development - including buildings, parking lots and roads - covered an average of 12 acres of Connecticut each day since 1985, CLEAR's data show. During that time, the state lost on average 18 acres of forest a day.

The pace of change has been anything but uniform across the state; development has been minimal in some parts of the state, dramatic in others. Overall, CLEAR's data show significant change between 1985 and 2002.

The amount of high-density urban cover expanded by 119 square miles - an area 6½ times the size of the city of Hartford.

### Contact:

University of  
Connecticut, CES  
1066 Saybrook Road  
Box 70  
Haddam, CT 06438

**Phone:** (860) 345-4511

**Fax:** (860) 345-3357

**Email:** [nemo@uconn.edu](mailto:nemo@uconn.edu)

**Web Address:**

[nemo.uconn.edu](http://nemo.uconn.edu)

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The state lost about 170 square miles of forest, an area roughly equivalent to two-thirds of the state forest system.

The amount of land covered by roads and buildings grew by more than 30 percent in 10 towns, including several Hartford suburbs.

The “urban footprint” of developed land cover grew by 15 percent, roughly double the state's rate of population increase.

The pace of development was fastest during the late 1980s, and slowed during the recession of the early 1990s.

Since 1995, however, the pace at which buildings and asphalt are covering the land has accelerated. And with a host of interests - environmentalists and even faith-based groups, including the Catholic Archdiocese of Hartford - saying Connecticut is sprawling too much, CLEAR's data are likely to become important in the evolving political debate over how Connecticut uses land.

“These are significant changes,” said Strait, executive director of Connecticut Fund for the Environment. “The data reflect what people in communities all across Connecticut knew but couldn't prove, and that is we are fast losing our forests and natural resources, and we owe it to our children and all future generations to save what is left.”

CLEAR's scientists don't go that far.

“We think we've provided a very critical piece of information to inform that debate,” said Chet Arnold, the associate director of CLEAR. “I'm still not prepared to look at this and say this is damning evidence that we're the sprawl capital of the world here in Connecticut.”

A top federal official in New England's sprawl debate said CLEAR's maps will provide a “revolutionary” viewpoint on what the U.S. Environmental Protection Agency has called New England's top environmental challenge.

“One of New England's dirty little secrets is we are sprawling more, using more land for development per capita, than many other places in the country, including places like Atlanta and L.A.,” said Rosemary Monahan, the New England “Smart Growth” coordinator for the EPA.

Connecticut still has much more land in forest, about 56 percent of the state, than under parking lots and buildings, about 19 percent. But the satellite-based maps, accessible on the center's Internet site at <http://clear.uconn.edu>, provide striking evidence of a landscape in flux.

The maps and the land database suggest that the state has four significant development hot spots: the suburbs north and east of Hartford, the area along I-395 in southeastern

Connecticut, the northern fringes of New Haven and Fairfield counties, and lower Middlesex County shoreline towns such as Clinton and Westbrook.

Along I-84 in Manchester, on what was a golf course in 1985, acres of asphalt parking lots and concrete buildings appear on the 1990 map with the construction of the Buckland Hills mall. That development spreads steadily around the mall in images from ensuing years.

Manchester added more than 1,400 acres of developed land between 1985 and 2002 - more new developed acres than any other city or town in Connecticut, CLEAR's data show.

### **Pixel Patience**

If they aren't quite the Sistine Chapel, building the maps from satellite images required an effort of nearly superhuman patience for James Hurd, a remote sensing specialist with CLEAR.

Each of the computer maps contains roughly 25 million pixels, each covering 100 square feet on the ground.

The images captured in visible and infrared light by Landsat satellites between April 1985 and September 2002 were just the foundation of the land-cover maps. CLEAR then added a digital database of the state's road system, and used existing topographic maps, aerial photographs and other data to make sure that what the satellite was seeing was actually what was on the ground.

That required Hurd to manually edit tens of thousands of individual pixels to be sure the data were correct - he has no idea how many. Hurd began the project in July 2002, spending four to five hours a day. He finished last month.

"I'm not a real patient person, but I said, 'I know if I don't fix this, it's going to come back to haunt me,'" Hurd said.

Hurd and others at CLEAR say they are now confident in the accuracy of their database. As far as they know, no one has ever used satellite images to develop a database of land-use change for an entire state over a two-decade period, based on four distinct points in time.

CLEAR's new website allows anyone to access not only statewide data on the change in developed land, forest and wetlands between 1985 and 2002, but also to use an interactive map that can zoom in on an individual town.

In fast-growing suburbs like Burlington, Tolland and Glastonbury, animated maps show subdivisions as creeping capillaries of asphalt through land that had been forest in 1985.

CLEAR hopes town and state officials will be able to use the new database not just to decide how much development is too much, but to find the best way to develop. The issue, they say, isn't just how much development, but whether new development, for example, is fragmenting untouched forest.

"Development is going to happen, and it has to happen for our economy, but what's the best way for it to happen with the least impact on the environment?" said Emily Wilson, a geospatial technology specialist with CLEAR.

### **Too Much Asphalt?**

Concern over sprawl prompted a legislative commission this fall to propose an overhaul of the system that has made Connecticut one of the nation's most dependent on real estate taxes for school and local government revenue.

"If you have a tax system that says most of our taxes come from the development of property, well, duh, you're going to get more consumption of property," said New Haven Mayor John DeStefano, chairman of the commission and a gubernatorial candidate who plans to run on land-use issues in 2006.

Donald Smith, the state forester, said the state needs to take a close look at CLEAR data showing that the state has had a 6 percent decline in its deciduous forest, and a 3 percent decline in its coniferous forest, since 1985.

Covering more land with asphalt creates potential environmental problems as pollutants from cars run into groundwater. When forests are fragmented by housing or commercial development, it can hurt animal species that depend on large, contiguous blocks of woods.

But there are aesthetic and social issues, as well.

Even forests "close to human habitation ... are what form the backdrop of daily life for our residents," Smith said. "When that vanishes, it affects the psyche. That affects the quality of life for those people."

Not everyone agrees that the new CLEAR data are evidence that Connecticut has done a poor job of managing growth.

One UConn land-use expert, Jim Gibbons, said the CLEAR maps show that the concentration of development roughly matches the state's population concentration from back in the 1770s - along major watercourses and roads.

"I think the maps are showing that development has occurred pretty much where it should," he said.

East Windsor is in the path of one of Connecticut's biggest development expansions.

The town ranks third among 169 towns in terms of percentage increase in land covered by buildings and roads. CLEAR's maps show development blooming like hothouse flowers around major roads such as I-91 and Route 5, including a wedge of asphalt that includes a Wal-Mart and a theater and supermarket complex.

The construction of nearby I-291 a decade ago is one likely cause of East Windsor's growth in land coverage, Town Planner Poland said, but with suburbs to the west, south and north of Hartford developing in earlier decades, "it's possible that our time has come."

Outside Poland's office, a chart showing the progress of 14 active residential subdivisions nearly covers a wall. What worries Poland is land consumption - that with minimum-lot sizes growing, Connecticut is chewing up more land per building permit than it did 20 years ago.

"If you believe in sprawl, we probably have the worst-case scenario, because we don't have the population growth but we do have the land consumption," Poland said.

In South Windsor, Jim and Honora Futtner spread a map across their dining-room table to show a visitor the prime agricultural soils in the Connecticut River valley.

The Futtners advocate allocating a share of real estate conveyance taxes for farmland preservation, something they say will help safeguard a local supply of fresh, high-quality produce.

Jim Futtner said half the land he farms is at immediate risk of development. The Futtners are in a tough place for farmers - they don't own the land they farm; they rent. They say they just can't compete with developers who can pay millions of dollars for a piece of land.

"Some of the best soil in the world is in the Connecticut valley," Jim Futtner said, "and what do they do with it? They pave it over."

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