

# From rock to forest: Southeast's carbon sink

ADVERTISEMENT

By MARY CATHARINE MARTIN

Friday, February 19, 2016 1:04am | NEIGHBORS

ALASKA OUTDOORS



*We're glad that journalism matters to you!*

Get unlimited digital access for just 99¢.



Already have an account? [Click here](#) to log in.



Fens and bogs in the rainforest have deep accumulations of carbon.

To talk with local scientists about the Tongass National Forest is to become aware of how much

lies literally beneath its surface.

It's a lot, and it could have big repercussions for its future. Researchers call carbon storage "carbon sequestration," and the Tongass is pretty good at it — temperate rainforests have the densest concentrations of carbon in the world.

A 2006 estimate found the Tongass has the carbon equivalent of 8 percent of the Lower 48's national forests' carbon reserves put together. Now, that appears to be an underestimate.

The Tongass, said U.S. Forest Service research soil scientist David D'Amore, has "definitely some of the highest (carbon stores) in the world" per unit area. "I hesitate to say 'the highest,' because there are some forests in Indonesia that are pretty high, but we are in the top five," he said.

Mitigation of carbon emissions is "a key concept," internationally, D'Amore

said, “and of course this region plays a role in that, just because of the stock we have.”

Where is it,

and why is it here?

When people think of carbon, they think of trees. But that’s not even close to the whole picture.



We're glad that journalism matters to you!

Get unlimited digital access for just 99¢.

REGISTER

Already have an account? [Click here to log in.](#)

“There’s a whole lot more carbon out there,” D’Amore said.

Estimates of carbon in soil, for example, have doubled since the 8 percent figure came out, he said.

“We’re probably increasing 2 to 4 percent total,” he said.

That would mean the Tongass would represent 10 to 12 percent of America’s stored carbon in national forests.

Soil carbon, though it represents two-thirds to three-fourths of the total stored carbon in the landscape, is hard to measure, D’Amore said. Imaging, for example, is blocked by rocks and roots. And then there’s the soil’s very depth.

“There are places where the peat is tens of meters thick. It’s basically building up since the last ice age,” said University of Alaska Southeast Assistant Professor of Forest Ecosystem Ecology Brian Buma. “You can dig down a couple meters and you’re back a thousand years.”

“Soils is where most of the carbon is stored, and it’s probably the least understood and least quantified tool,” D’Amore said.

The Tongass also contains quite a few different kinds of landscapes, which means there’s a lot of variance to figure out over quite a large area. Muskegs, forested wetlands, well-drained upland forest — the list goes on.

The water in the landscape also contains carbon, D’Amore pointed out — and up to 30 percent of the carbon cycling in a watershed can be dissolved. D’Amore compares the land to a giant sponge continuously being squeezed, releasing water and minerals into streams, rivers and the ocean. That

process happens slowly in some areas, and very quickly in others — all of which affects the way things move through the system.

But why is the Tongass so good at storing carbon?

Basically, it's the weather.

"We're cold, and we're wet, and we don't decompose things as well,"

D'Amore said.

That also means the Tongass isn't nearly as susceptible to fire as most other national forests, another factor increasing its total carbon capacity.

**The overall picture**

As the Alaska Region Director of Wildlife and Fisheries for the Forest Service, and climate change advisor to the regional forester, Wayne Owen has been thinking about a different aspect of the equation.

Yes, he said, the Tongass has some big carbon stores (though, he added, it depends on where you're looking, as some areas are higher than others).

"But that sort of belies the bigger question — how do our activities impact that carbon balance?" Owen said.

How much, say, does making 40 million board feet of timber available affect the Tongass' carbon balance? How does it return? How can they help that process?

"It's a complicated thing that we think about a lot, often in the context of other objectives," Owen said.


The Forest Service also has what it calls FIA, or Forest Inventory and Analysis, which aims to get better estimates of carbon in its forests through annual estimates. (Of Alaska's forests, as of 2013, the Tongass had the highest carbon density and the Chugach had the lowest.)

Overall, the Tongass appears to be growing, Buma said. It's obvious that will happen in logged areas regrowing trees, but there's also growth in unmanaged areas, because retreating glaciers and isostatic rebound (land rising after being depressed by glaciers) make land available. (Isostatic



We're glad that journalism matters to you!

Get unlimited digital access for just 99¢.

REGISTER 

Already have an account? [Click here to log in.](#)



rebound is much more pronounced in northern Southeast Alaska.)

Outside management areas, in logged areas like Prince of Wales Island, the growth and decline due to avalanches, blowdown, and other events, for example, appear to be evenly matched, Buma said.

"In general," Buma said, "the forest is growing quite a bit."

⊗ We're glad that journalism matters to you!  
Get unlimited digital access for just 99¢.

He estimates that measurement, which takes into account only tree

REGISTER 

soil, at "not quite a teragram a year." A teragram is around 1.1 million tons. [Click here to log in.](#)

To put that in perspective, an adult humpback whale weighs between 25 and 40 tons.

"That's a pretty significant carbon sink for the country. It's an appreciable component of our automotive emissions," Buma said. "It could be a pretty significant part of a national carbon strategy if we want it to be."

### The business of carbon

Where that strategy comes into play is where things get economically interesting.

"Carbon markets in other parts of the world are coming to Alaska and looking at the great carbon stores we have here, and finding ways to protect those carbon stores as mitigation for carbon expenditures," Owen said.

Federal lands can't participate directly in carbon markets, but can contribute in other ways, he said.

At least one company in California, for example, is currently talking with the Forest Service about using lands in the Chugach to mitigate its carbon emissions. Some possibilities are buying it and giving it to the state, or keeping things like coal in the ground, or setting lands aside with an easement, or bringing non-federal lands into federal ownership. Other companies might sponsor renewable energy projects in rural communities as an offset. (Owen declined to elaborate on an ongoing talk in the Chugach but said it's "a multi-million dollar deal" that "would be great for everybody.")

He doesn't know of anyone currently talking about setting aside land in the

Tongass, but added that “there’s no reason why a company that wanted to do that couldn’t purchase private land, or make a deal with a Native corporation like Sealaska to preserve some of their forest in perpetuity as carbon mitigation.”

Sealaska Corporation forester and manager of the corporation’s department of natural resources Brian Kleinhenz confirmed in an email that Sealaska is “looking at the forest carbon market,” but said he didn’t currently have anything more to share.



We're glad that journalism matters to you!

Get unlimited digital access for just 99¢.

REGISTER 

Already have an account? [Click here to log in.](#)

## Future research

Logging leads to a lower amount of stored carbon; the trees contain them. The key question, said D’Amore, is “how long does it take them to get back to the stock that was there?”

It’s the same question for a slightly more complicated version of that equation. As all but one of the glaciers on the Juneau Icefield retreat, soil gradually accumulates on exposed rock, and plants and trees begin to grow.

“A key question is not as much if you’ll lose or if you’ll gain,” D’Amore said. “It’s how much.”

Another question: how will climate change affect the world’s forests, and their subsequent ability to absorb and store carbon?

“That’s where science plays a really important role — avoiding major pitfalls in terms of what we take for granted,” D’Amore said. “It’s important to get good numbers, especially in this region.”

D’Amore calls soil “the great unifier;” it’s also the least understood piece of the puzzle at the moment. Unity is what the study of carbon in the ecosystem needs, “from the bedrock right up through the trees,” with input from many different scientists, he said. He thinks they’re close to that.

“It’s fascinating and it’s infinitely complex,” Owen said. “You and I go out in the forest, and it’s lush and it’s full of life, and it’s huge — and that means something to us on a personal and maybe even a spiritual level — and you can quantify that (landscape) in terms of the carbon that’s stored there. The value of this resource on a global scale, not just personally and



locally.”

More information about the Forest Service’s annual Forest Inventory and Analysis, essentially a “forest census” that also estimates total carbon in the forests (14.1 percent of the U.S.’ CO<sub>2</sub> emissions in 2012 were sequestered in forests and wood products, according to the site) is here! *We're glad that journalism matters to you!*  
<http://www.fia.fs.fed.us/forestcarbon/default.asp>. Get unlimited digital access for just 99¢.

REGISTER 

Read a Forest Service report about carbon storage in Alaska here:  
<http://www.fs.fed.us/climatechange/documents/AlaskaRegionCarbonAssessment.pdf>.

Already have an account? [Click here](#) to log in.



Dave D'Amore stands with exposed limestone rock, which shows signs of weathering, or erosion. Weathering rock consumes atmospheric carbon dioxide and stores the byproducts of the weathering reaction as organic carbon in the soil.





⊗ We're glad that journalism matters to you!  
Get unlimited digital access for just 99¢.

**REGISTER** 

Already have an account? [Click here](#) to log in.

Mark Nay with a soil respirometer, which measures the carbon dioxide flowing out of the soil into the atmosphere. The "breathing" of the earth is the combined respiratory loss from plants and micro-organisms.

- News
- Sports
- Neighbors
- Capital City Weekly
- Alaska Outdoors
- Opinion
- Letters to the Editor
- Obituaries
- Death Notices

- Search
- E-Edition
- Classifieds
- Weather
- Newsletters
- Subscribe
- Contact Us

**JUNEAU EMPIRE**  
The Voice of Alaska's Capital  
Since 1912

Subscribe Now

Subscribe Now

©2019 Juneau Empire and Sound Publishing, Inc.  
[Terms of Use](#), [Privacy Policy](#), and [Comments Policy](#)