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Tribes Step Up To Lead On Carbon Removal

By Mark Fogarty

American Indians are well suited to play a major part in carbon removal, and many tribes are eager to engage with the biggest problem facing humanity.

That was the major takeaway I got from listening to Global Ocean Health's recent symposium on Building Tribal Leadership in Carbon Removal.

I was reminded of a visit I made to one of the Paiute bands in Nevada. Somehow the topic of Crater Lake came up, and Marlon Thompson, the Paiute official I was visiting, said, "We remember that. It's in our history."

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Now, the volcano that blew up to create Crater Lake erupted 7,700 years ago. Yet it had happened within the tenure and the memory of the Paiute in the Pacific Northwest. And they remembered it, the way I might remember the eruption of Mount St. Helens in Washington state in 1980.

The point, underlined at the symposium, is that tribes have an intimate knowledge of the lands they have been residing on for thousands of years, and a history of environmental stewardship rooted in deep time. Who would have a better feeling for how to protect and restore their ancestral lands and waters than tribes? Who would work harder to do it?

"You can't get carbon removal to work without tribes in the wheelhouse. Don't even try," said Brad Warren, president Global Ocean Health, which started working with tribes on ocean acidification in 2010, helped Tulalip and other Washington tribes learn to shape carbon pricing policies (leading to Washington's and mark Climate Commitment Act in 2021) and recently launched a new initiative called Building Tribal Leadership in Carbon Removal."

The problem? "In any sane world, if people were more on top of things, we would have gotten on top of this emissions curve and we wouldn't have kept on making more and more mess every year," he said.

The result? "We're at record levels of 414 parts per million now and rising. You don't want to address it by cleaning it up. You want to address it by preventing it. But we now have to do both. There's no option. We've got to do it."

By using both methods, "We can get the earth's carbon balance back in order," Warren said.

But the task is daunting, he said. "People are still learning the ropes, and we're talking about going from removing about 50,000 tons a year to 10 billion tons a year by 2050."

Who is going to run this effort? Who is going to be in charge? "Those are good questions," Warren said. "We think that tribes should be in that who's-in-charge group."

Some of the removal methods coming into use include the use of kelp, trees, biochar work, and rock weathering, plus many engineering methods.

The money to achieve carbon balance is starting to come online, said Warren. "There's billions of dollars now already flowing in to do this work," he said. And by 2050, by one estimate, carbon removal will be generating $8.5 trillion in revenues.

There are both benefits and risks for tribes in this effort, he said, including preservation of homelands and economic development, and even the pursuit of tribal food sovereignty objectives.

Warren quoted the late Terry Williams, the Tulalip Elder who led the Tribe's cutting-edge climate, habitat, and fisheries work for decades, and also served on the board of the National Fisheries Conservation Center, home of the Global Ocean Health: "Tribes have been here for thousands of years. We know things that are going to be needed to fix this landscape."

Traditional kelp culture has been going on for a long time, he said, and there are Native areas (such as the Columbia Basin's basalt plateau) that naturally act to sequester carbon already, absorbing carbon dioxide into rock.

"Our goal is to build tribal capacity to lead in this field," he said. That would include research and development, actual projects, and modes of governance.

"Tribes are who should write some of the rules," he said.

To build a shared understanding among tribes and other influential actors, Global Ocean Health is using a method known as transformative scenario planning, Warren explained. "You build a story together as to what the future might look like," he told the meeting.

There's Money Available

Federal and private funding to advance carbon removal has grown rapidly. From zero in 2018, federal funds have increased to $1 billion plus in 2022 and soon, over $3 billion. Tribes could compete well for the federal dollars available, he said.

The Bipartisan Infrastructure Law (BIL) appropriated $3.5 billion for Direct Air Capture (DAC), Warren said. He described DAC as machines "that hoover up air and strip the CO2 out of it." The DAC money is set to go to four different Hubs.

However, there are match requirements for the money, which may be discouraging for some tribes.

Mike Robinson, entrepreneur in residence at the University of Washington, outlined private-sector funding opportunities, which are fueling starting up companies to participate in this gargantuan effort.

The big driver in the private sector is revenue from companies and people purchasing carbon removal credits. The whole carbon effort could add up to $8.5 trillion in revenue by 2050, he said, citing a July report from the carbon credit rating agency BeZero.

That assumes a compulsory market," Robinson noted. "That assumes that nations catch up and force people to start cleaning up their mess."

Already, there is a large voluntary market of companies, individuals and government entities who are choosing to purchase carbon removal credits to help balance their own footprint—and to help grow this new class of climate solutions. Some of the enterprise companies include Frontier (a consortium of several Silicon Valley firms), Microsoft, and Shopify. Frontier, a subsidiary of the online payment firm Stripe, has committed $925 million to buy carbon removal credits over the next few years.

Another big money source is marketplaces, Robinson said. These are companies that buy carbon removal credits and then turn around and sell the credits to small businesses. Collectively, it adds up to a considerable volume, he said. Governments are getting into the act too, with initiatives like New York's proposed Carbon Dioxide Removal Leadership Act (CDRLA). Washington state and California may follow suit, he said.

Then there are local and county governments that want to buy CDR in order to offset their own output. 4CORE, a Four Corners initiative by Boulder and Flagstaff counties is an example of such an initiative.

The problem is, this industry employs about 5,000 people today, when millions are needed.

"This thing needs to grow faster than the Internet," Robinson said.

Equity investment is the second big driver in carbon removal, Robinson said. "Impact" investors will fund CDR projects or startup companies that will target CDR.

"They are looking to make a profit, but they're looking to make that profit by investing in things that have a positive impact on the climate," he said. Some of these firms include Breakthrough Energy, Lower Carbon Capital, and Closed Loop Partners.

The third pot of money comes from grant and philanthropic dollars, ranging from $100,000 up to $2 million.

"This is typically smaller money to get things started," he said. "It's money for R&D, or for pilot tests, for studies about whether a project makes sense."

In some cases, governments or private firms will prepay for a commitment to extract a certain volume over a period of time.

Ocean Impact

Brad Ack, a veteran marine environmental leader who started an NGO called Ocean Visions a few years ago, briefed the meeting on the concept of using the power of the ocean to repair the climate.

"The climate crisis is an ocean crisis," he said, "and the ocean crisis is a climate

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crisis. They are inseparable. You can't solve one without solving the other." Ack said there are two critical threats to the ocean being driven by too much greenhouse gas in the atmosphere trapping too much heat.

The first is thermal stress," he said, a category which has several subcategories: "Accelerated warming is causing deoxygenation that's now measurable across the global ocean. Intensifying heat waves interrupting the mixing between the upper and the mid layers of the ocean where nutrient transfers happen. Increasing storm intensity. Increasing the melting of sea ice."

In consideration of this, Ack put forth a question to the audience: "Is it prudent to put all of our chips on a single number on the roulette wheel? I would argue it is completely imprudent. We need a new agenda. We have to remove massive amounts of carbon and methane pollution."

Ack said people have spent millions and hundreds of millions cleaning out metals from Puget Sound, so why wouldn't we think of the same kind of effort for carbon removal?

"Carbon removal is the only thing that can take us backwards," he said. "We're at 1.2 degrees of change now and we see this is dangerously unsafe for hundreds of millions of people. Most of them people at the lower end of the economic spectrum."

Even stabilizing at 1.5 degrees wouldn't be enough. That would be an average, Ack pointed out, and the amount of warming would still be much greater in the Arctic. "We need to do better than 1.5 and the only way to do that is by carbon removal coupled with decarbonization.

"Net zero won't cool the planet," he said. There are only two options to do that: to reduce concentrations of greenhouse gas, or solar radiation modification.

The ocean, Ack pointed out, holds fifty times more carbon at its bottom than the atmosphere right, and twenty times more than soils and vegetation.

The deep ocean is the ocean's largest enormous storehouse of carbon, he said, though carbon added at the surface is causing acidification. But the deep ocean has huge potential to store carbon once it is removed from the atmosphere.

Ack listed four major ways: photosynthesis through cultivation of algae, (for example kelp farms), enhancing alkalinity via mineral or liquid sources, direct ocean capture (using electricity to separate carbon from sea water), and protecting and restoring coastal "blue" carbon (salt marshes, mangroves, sea kelp etc.). But, "none of these technologies is ready for deployment at scale," he said. "They all need a massive acceleration in research and development."

This kind of research must include field trials, Ack told the audience. "It can't just be done in the laboratory. It can't just be done in models. We have to test this stuff in the ocean."

Ocean Visions has created a series of road maps for this, such as electrochemistry, macroalgae and ocean alkalinity enhancement.

"All of these things need significant expansion of human resources, institutional resources, and financial resources, and tribes can play an enormous role in the development and testing of this field."

Land-Based Approaches

Wil Burns, professor of environmental policy at Northwestern University, briefed the symposium on land-based approaches for carbon removal.

Large-scale reforestation is a popular

idea for carbon capture to take up billions of tons of carbon dioxide. “Estimates vary widely about how much more we could do. Some say less than one billion tons even at a large sustainable scale. Other studies say it could be as much as a third of all the carbon dioxide we need to take up,” he said.

A lot of corporations purchase forest carbon credits, Burns said, “so it’s definitely an opportunity you want to look to moving forward.” But there are lots of questions about this approach," he said.

First of all, is it going to be ephemeral? Is it going to be permanent?” he said. Burns pointed out that diseases and forest fires have resulted in massive losses of trees.

Another question he posed is whether planting trees in the Northern hemisphere results in an actual decrease in temperatures. “We often plant in ice-covered areas or deserts that have high albedo, meaning they reflect a lot of sunlight away, which exerts a cooling impact.”

Putting trees in those places absorbs incoming radiation, meaning it offsets some of those albedo benefits.

Managing these new forests can be a challenge, too. In Chile, he said, where they planted millions of trees, within two years two thirds of the new trees were dead.

A second idea is soil carbon enrichment. Burns said, using low-till agriculture or no-till agriculture, or planting cover crops during times the land is fallow.

"Some studies have indicated we might be able to increase storage of carbon dioxide by one half to three or four billion tons a year,” he told the meeting. “This is definitely worth looking at,” he said, especially for tribes in agricultural regions.

Challenges here include high capital requirements. “Another challenge is measuring the amount of carbon dioxide that actually gets stored.”

Bio-energy with carbon capture and storage is a third approach, he said. Here, feedstocks like trees, switchgrasses or forest residues can be used for fuels such as ethanol, or for electricity production or heating.

“Then we capture the carbon as it is combusted, we separate it out from the rest of the constituent elements, and then we pressurize it into a liquid form, and then we ship it, using pipelines or rail cars.”

This could sequester three or four billion tons of CO2 a year, he said.

Challenges include diverting a large amount of crop areas, raising the possibility of food price increases for some of the poorest people in the world. Tremendous amounts of water would also have to be used in this effort.

Biochar production and burial is another possibility. Biochar is a process that can produce charcoal and hold CO2 for a thousand years. It can also be spread on soil and increase yields of crops.

Challenges include questions about how much CO2 could be sequestered with this approach. Estimates, he said, range from .9 gigatons a year to five or six gigatons a year.

Another idea is enhanced weathering. Enhanced weathering happens when CO2 gets taken up into rocks and converts the CO2 into carbonates and bicarbonates, which could be stored for hundreds of years, “or get washed into ocean areas and used by species that form their shells using these, and that can result in sequestration,” Burns said.

This process happens naturally and takes up about a quarter billion tons annually. Enhancing ocean alkalinity in most cases requires mining rocks such as limestone, basalt or olivine.

“The idea here would be to mine them, pulverize them into powders, and spread them on land.” Some studies have suggested this could produce a takeup of four to five billion tons a year, he said. And economies of scale might bring down the current high cost of doing this.

Direct air capture might be able to sequester as much as five to seven billion tons of carbon a year, Burns said. But the cost is quite high.

Tribal Leaders Step Up

Meeting facilitator Bob Whitener, a Squaxin Island Tribal member who is also noted leader in tribal economic development and a former key aide to Billy Frank Jr in the creation of the Northwest Indian Fisheries Commission, summarized the central question of the workshop: it comes down to whether tribes are going to take a leadership role in carbon removal.

“I think the answer is probably yes,” Whitener said.

Kris Peters, chairman of the Squaxin Island Tribe, who offered the welcome at the beginning of the meeting, stood to affirm Whitener’s view. “I’m in,” he said after the workshop. “Carbon removal, this is something that anyone from forest companies to local governments, anyone can jump on board with.”