wolves—a reliable indicator of levels in the bloodstream. In the June issue of *Conservation Biology*, Creel's group reveals that elk in Yellowstone National Park show higher levels of stress hormones during the snowmobile season and that levels rise and fall with the amount of daily snowmobile traffic. Wolves in Voyageurs National Park in Minnesota, where snowmobile use is heavy, show higher hormone levels than those of wolves in nearby Isle Royale National Park in Michigan, which is closed to snowmobiles. During the 2-year study, wolf glucocorticoid levels at Voyageurs dropped 37%, paralleling a 37% drop in snowmobile activity.

Creel says the findings provide an "early warning" that the populations, which have been stable so far, could suffer in the future. Chronically elevated stress hormone levels in vertebrates suppress the immune system, inhibit reproduction, and cause other maladies. But in the absence of population declines, Creel says his team is not out to push recreation from the parks. "We're being careful not to recommend policy to managers; that's their job," he says.

Wildlife ecologist Joshua Millspaugh of the University of Missouri, Columbia, says that it's not clear whether the glucocorticoid levels measured are detrimental to the animals, but that the researchers' noninvasive techniques are informative and might indeed suggest incipient population effects. Samuel Wasser, a conservation biologist at the University of Washington, Seattle, adds that policy-makers should err on the side of caution: "If we wait to show a fitness effect, it may already be too late to turn things around." **–JAY WITHGOTT**

Jay Withgott is a science writer based in San Francisco.

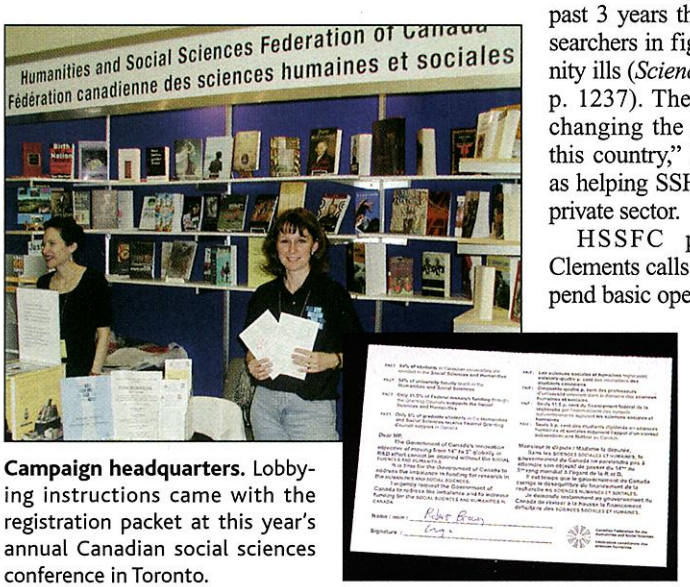
CREDITS: MICHAEL ANDRECHUK/UNIVERSITY OF TORONTO

CANADA

Social Scientists Go For a Political Dip

TORONTO—For more than 3 decades, sociologist Ralph Matthews of the University of British Columbia in Vancouver had quietly gone about his academic business, producing five books and over 80 journal articles on such issues as how energy megaprojects affect communities. Negotiating a new contract was as close as he ever came to political activism. But last week, within hours of arriving here for the 71st Congress of the Social Sciences and Humanities, Matthews experienced two "unprecedented" events that have turned him—and thousands of his colleagues—into lobbyists for their profession.

Canada's social scientists have complained for years about getting the short end of the funding stick. They are particularly fond of noting that only 11% of the government's allocation to the country's three funding councils goes to the social sciences, although they represent 54% of all academic researchers. Last week the head of the social sciences council, Marc Renaud, sharpened the rhetoric. He announced that he would be forced to end the council's bread-and-butter awards to individual investigators unless the government came through with substantial funding increases. The threat was designed to get legislators to notice his proposal for more than tripling the council's $92-million-a-year budget. It certainly got Matthews's attention. "It would be close to a tragedy if Standard Research Grants were cut," he says. "They are the intellectual base for curiosity-driven fundamental research."



Campaign headquarters. Lobbying instructions came with the registration packet at this year's annual Canadian social sciences conference in Toronto.

Renaud's threat helped convince Matthews to participate in a novel exercise. His registration packet, assembled by the Humanities and Social Sciences Federation of Canada (HSSFC), which organizes the congress and serves as the national lobbying arm for 90 organizations and their 24,000 members, contained a postcard to be filled in and mailed to Industry Minister Allan Rock and other members of Parliament. Such a campaign might not seem like a big deal in the United States, but it represents a major step for most Canadian scientists. "One of the sad facts about the Canadian scholarly community is that we have tended to let our national representatives do the job for us," says philosopher Andrew Brook of Carleton University in Ottawa. "But this has served as a real wake-up call. I haven't heard of anybody who hesitated a second about signing the postcards."

The $21-million-a-year individual grants program is the largest component of the base budget for the Social Sciences and Humanities Research Council (SSHRC). It provides researchers $15,000 in seed money for studies that ultimately gestate into books or larger research initiatives. Renaud says an inadequate budget is now forcing him to choose between eliminating those grants or dismantling programs aimed at helping society, such as the 37 science shops established over the past 3 years that enlist university researchers in fighting various community ills (*Science*, 13 November 1998, p. 1237). The latter programs "are changing the nature of research in this country," Renaud notes, as well as helping SSHRC make allies in the private sector.

HSSFC president Patricia Clements calls Renaud's threat to suspend basic operating grants "the most serious and chilling thing that I have ever heard in my lengthy career." And although Renaud says he's invigorated by the community's initial response to his call for political action, he's also aware of the government's propensity to respond to critics by tightening the purse strings. It's a risk he's willing to take. "I'm not directing this against the government," he says. "But if they don't like it, they can fire me." **–WAYNE KONDRO**

Wayne Kondro writes from Ottawa.

RICE SEQUENCE DATA

Syngenta Agrees to Wider Release

TOKYO—In a step anticipated by rice genome researchers, the company that published a draft sequence of the rice genome earlier this year has agreed to a fuller release of its data. On 23 May Syngenta, a Swiss-based agricultural biotechnology giant, announced that it would transfer the assembled sequence together with the underlying data to the publicly funded International Rice Genome Sequencing Project (IRGSP), which is working on its own draft of the rice genome sequence. The Syngenta data will be incorporated into the IRGSP sequence, which will be deposited in public databases.

On 5 April *Science* published a draft of the genome sequence of the *japonica* subspecies of rice that was produced by Syngenta's Torrey Mesa Research Institute in San Diego, California (p. 92). Instead of following the traditional practice of depositing the data in a public database, such as GenBank, the Syngenta group made the sequence available on its own Web site and on a CD-ROM. Researchers could use the raw sequence data in

their labs but were limited in how much of the Syngenta data they could publish at one time. Scientists doing commercial work were required to negotiate access to the data. Syngenta says that more than 700 researchers have accessed the data since it became available.

The most important potential user, however, is the international consortium of publicly funded labs led by Japan's National Institute of Agrobiological Sciences in Tsukuba. The consortium wanted wholesale access to the data, which the new agreement provides. Although IRGSP member laboratories initially must keep the Syngenta data confidential, they can use the information in their sequencing efforts. The consortium has a similar agreement with Monsanto, which has also completed a draft sequence of *japonica*.

Rich yield. Rice sequencing data will be more accessible under new agreement.

Consortium members say that it's too early to know how the new agreement will affect their work. Takuji Sasaki, who heads Japan's rice genome sequencing efforts, says researchers need to start working with the information before they can judge its value but that some of the consortium's mapping and sequencing gaps "might be filled by the [Syngenta] data." Ben Burr, a plant geneticist at Brookhaven National Laboratory in Upton, New York, who advises IRGSP, says that "this [agreement] is not going to have an impact on the overall schedule." But sequencer Dick McCombie of Cold Spring Harbor Laboratory in New York, a participant, predicts that the additional data will have "a positive impact" on either the speed or the accuracy of the final product.

Meanwhile, the debate continues over the propriety of allowing private companies to publish sequence data without depositing them in a public database. A committee of the U.S. National Academy of Sciences is preparing a report on these issues. This week in *Nature*, Ari Patrinos and Dan Drell of the U.S. Department of Energy's Office of Biological and Environmental Research in Germantown, Maryland, propose an approach that might encourage companies to publish more of their data. They suggest that the data remain sequestered—entrusted to a reliable gatekeeper such as the journal—for a specified time period after publication. That delay would protect a company's intellectual property rights, they argue, without excluding the public sector.

–DENNIS NORMILE

CREDITS: (LEFT TO RIGHT) SUSAN MCCOUCH AND LOIS SWALES/CORNELL UNIVERSITY; GSFC/NASA

GLOBAL WARMING

Rain Might Be Leading Carbon Sink Factor

"Where's all the carbon going?" Atmospheric scientists have been wondering about that for years. The United States spews out more than 5 billion tons of carbon dioxide emissions each year, but mainland U.S. ecosystems are absorbing an unexpectedly large amount of the gas—somewhere between 10% and 30% of the total—and the amount is steadily increasing. Scientists aren't complaining, mind you, because this absorption or sequestration offsets global warming. But they've been at a loss to explain it.

Most of the carbon is being sucked up by plants, which use it to manufacture roots, stems, leaves, and wood. Indeed, over the past several decades, researchers have recorded increased vegetation growth across the country. But why all this vegetation is growing so quickly has remained unclear. Theories abound, but the principal ones involve regrowth of forests on previously logged lands and accelerated forest growth spurred by global warming.

Now, a team is proposing another explanation: rain. A study published online by *Geophysical Research Letters* on 28 May suggests that the increased rainfall and humidity documented in the continental United States might be the single most important factor spurring increased plant growth; this, in turn, is slowing the accumulation of carbon dioxide in the atmosphere.

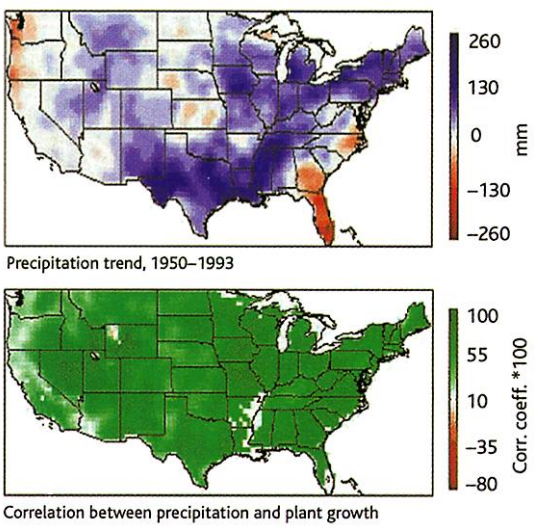
The answer might seem obvious, but carbon sink modelers had overlooked it. They have focused instead on the regrowth of forests, temperature changes, and the encroachment of woodlands on abandoned farmlands. Some have extended these studies to calculations of how many trees must be planted to offset new emissions.

Then researchers at the University of Montana's School of Forestry in Missoula began pondering the role of rainfall changes in the growth of the North American carbon sink. Working under a grant from NASA, Ramakrishna Nemani and co-workers used a computer model to simulate, region by region, the impact of this previously overlooked factor, focusing primarily on climate data from 1950 to 1993. Even after adjusting for other determinants of plant growth, including temperature changes, Nemani's team found that rainfall increases account for two-thirds of the additional growth.

Increased moisture helps plants in a number of ways, says the University of Montana's Steven Running, one of the study's co-authors. Not only does it provide more water to the plants' roots, but extra humidity also allows plants to open wider the pores that allow carbon dioxide into their leaves, allowing photosynthesis to proceed more rapidly.

All told, the researchers calculated that increased moisture in the United States during the study interval produced a 14% spurt in plant growth, with the greatest change occurring in the parts of the country that received the biggest increase in rainfall. And the increased plant growth affects not only replanted forests but vegetation of all types, including shrubs, grasses, and long-standing woodlands.

Even proponents of other theories admit, in retrospect, that the Montana researchers have a point. Boston University botanist Ranga B. Myneni, for one, recently co-authored a paper that linked increased forest growth to a different factor, temperature change (*Science*, 31 May, p. 1687). Yet he readily accepts rainfall as an important new variable that must be considered. After all, he says, whatever effect increasing temperatures per se might have on the growing season, plants can benefit only if there's water to support their growth.



Remodeled. Scientists had overlooked the link between precipitation and carbon sequestration.

In addition to encouraging other researchers to restructure their carbon sink models, the new findings might mean that proposals to counteract global warming by planting forests are overly naïve. Planting trees is well and good, Running says, but the trees' effectiveness as carbon sinks will depend on rainfall—which could suddenly reverse its trend and decrease. Perhaps rainfall will continue increasing with global warming, but if that doesn't happen, Running cautions, "we could lose a lot of carbon sink strength very quickly." –RICHARD A. LOVETT

Richard A. Lovett is a science writer based in Portland, Oregon.