

WEDNESDAY ♦ JUNE 27, 2001

SCIENCE EDITOR: JAMES HOLMAN ♦ 503-294-7699

RESEARCH
NOTEBOOK**Sleep deficit a risk factor for diabetes, researchers report**

Sleep researchers at the University of Chicago have found evidence that inadequate sleep might prompt development of insulin resistance, a risk factor for diabetes.

"We have shown that failure to get the slightly more than eight hours sleep per night that clinical experts recommend may contribute to the rising incidence of diabetes," researcher Bryce A. Mander said, noting that sleep debt disrupts body functions.

The researchers studied 27 healthy, nonobese adults. Fourteen were "normal" eight-hour-a-day sleepers and 13 were "short" sleepers who slept an average of 6½ hours. They found that insulin sensitivity in the short sleepers was almost 40 percent lower than in the normal sleepers.

Mander reported the findings Monday at the American Diabetes Association's 61st Annual Scientific Sessions.

Altering mice feeding behavior offers insights into Parkinson's

Researchers have used gene therapy to rejuvenate feeding behavior in starving mice. The genetically engineered mice had avoided eating because their brains contained a low level of dopamine.

The study, reported in the June issue of the journal *Neuron*, provides new information about a brain region that helps integrate internal hunger signals and external sensory information about food to trigger feeding behavior.

A research team led by Richard D. Palmiter, a Howard Hughes Medical Institute investigator at the University of Washington, demonstrated that gene therapy restored dopamine production in specific areas of the brains of the mutant mice. These mice lack the motivation to feed, and they die of starvation a few weeks after birth unless they are given the drug L-dopa.

The research may offer insight into nutritional problems in Parkinson's disease patients, Palmiter said. "It's known that people with Parkinson's have eating difficulties, which have been ascribed to difficulties in manipulating utensils, chewing and swallowing, as well as depression. Our mouse studies suggest that there is an underlying motivational deficit in Parkinson's disease as well."

'On,' 'off' switch in molecule hints at an advance for computers

Your future computer may have components that function based on the action of single molecules. Scientists have shown that single molecules can switch between "on" and "off" states, then hold in a state for hours at a time.

Researchers at Pennsylvania State and Rice universities reported in the current issue of the journal *Science* that specially designed single molecules can switch in that manner. Because switching provides the basis of logic and memory in computer systems, the discovery of what causes such switching in single molecules may help researchers move closer to making molecular computers a reality.

"We essentially tightened the noose around the molecule and showed that once its motion was reduced, switching went way down," said Paul Weiss, associate professor of chemistry at Penn State. "Our next step is figuring out how to control the molecules' movement between 'on' and 'off.'"

Study of genes in fruit fly finds counterparts to human diseases

Carbon dioxide isn't all up in smoke

A new study details how carbon emissions aren't just added to the atmosphere as gases; they also are stored in unlikely places

By VIRGINIA GEWIN
THE OREGONIAN

Walking through the forest, you might never realize you are ambling through, stepping on and crawling over a vast carbon warehouse.

You might also have no clue that to researchers who track such things, all that carbon had been missing, at least technically.

In the current issue of the journal *Science*, 22 scientists say, in effect, "Eureka!" ending a long-standing debate by detailing where about 320 million to

620 million tons of carbon are "stored" in the United States. It turns out that the carbon is locked up in forests, other woody growth, decaying wood, cropland soils, wood products and, surprisingly, the sediment that builds up behind dams.

Deforestation and the burning of fossil fuels increase the emissions of carbon dioxide, a critical greenhouse gas, into the atmosphere. That is clear. Scientists have sleuthed out where carbon could remain stored while in living things and while slowly decaying.

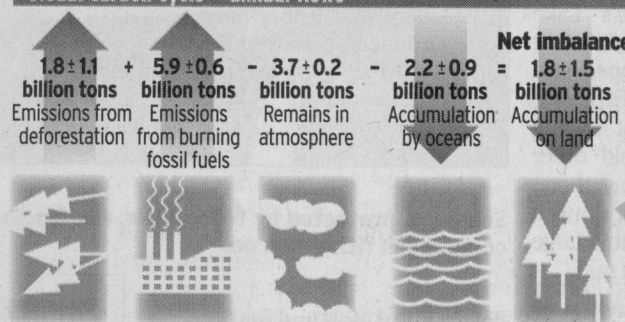
Plants breathe in carbon dioxide and fix it into their structure. The carbon remains in the plant until it is eaten or until the plant dies and fully decays, which could take hundreds of years.

But scientists have long been trying

Please see **STUDY**, Page D11

CARBON STORAGE

The global carbon cycle is made up of sources of carbon dioxide (a greenhouse gas) and stores, or "sinks", of carbon. The net imbalance is an accumulation of carbon into a variety of sinks on land each year that partially offset the atmospheric concentrations.

Global carbon cycle - annual flows*

Sources: Science magazine, Intergovernmental Panel on Climate Change

The U.S. contribution

Scientists have identified an estimated 20 to 60 percent of the global carbon sink in the continental United States.

0.0-0.4: Cropland soils

.01-0.4: Organic matter in sediments behind dams and reservoirs

.03-0.7: Wood products that do not decay

.03-1.6: Dead or decaying forest organic matter

.12-1.6: Living forest trees

.13-1.5: Woody growth in fire-suppressed lands

Total: .32-.62 billion tons

DERRIK QUENZER/THE OREGONIAN



Photos by STEVEN NEHL/THE OREGONIAN

A California sea lion bites off a chunk of salmon and flings the fish through the air. Sea lions typically eat this way when feeding on large prey.

Competing *with* pinnipeds

Oregon fishermen are losing salmon and steelhead catches to protected seals and sea lions

By BILL MONROE
THE OREGONIAN

ASTORIA -

Brian and Vince Tarabochia race against their fiercest foe, although both know it's a contest they won't win.

A hydraulic reel relentlessly draws a 900-foot, small-mesh gill net into the boat — a so-far successful experiment to see whether commercial fishermen can catch and release wild salmon without hurting them.

But the reel, bringing the net aboard faster than a foot per second, isn't turning nearly as fast as a swimming California sea lion bull following them up the lower Columbia River and relentlessly cruising the net slightly ahead of the boat.

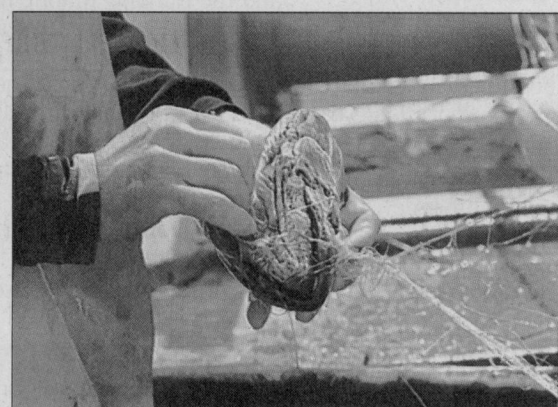
Sea lions don't care whether the

erupts from the water near the bow, arcs quickly and tears into the net, plowing through the thin nylon and tearing a large hole as it plucks a struggling spring chinook from the tangle.

"This net won't last more than a couple, maybe three trips," Vince Tarabochia says with resignation as he and his brother inspect the gaping hole that once held either a \$30 salmon or an endangered species.

All too familiar

The scene is familiar to Oregon anglers and commercial fishermen, who lose hundreds, perhaps thousands, of salmon and steelhead a year to crafty marine mammals called pinnipeds. Their frustration is shared by federal and state biologists, who are documenting increasing losses caused by



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Study of genes in fruit fly finds counterparts to human diseases

Biologists at the University of California at San Diego have identified genes in the common fruit fly, *Drosophila melanogaster*, that appear to be counterparts of genes responsible for more than 700 genetic diseases in humans.

Their discovery, detailed in the June issue of the journal *Genome Research*, provides medical geneticists a powerful new tool to identify and study the many genes that may be responsible for a particular human genetic disease.

"Scientists have long known that humans share many similar genes with fruit flies," said Ethan Bier, a biology professor who headed the research. "The surprise is how deep these similarities really are. Basically, every category of human genetic disease is well-represented with a counterpart in the fly."

The UCSD scientists screened the genes involved in 929 human genetic diseases in their database against the fruit fly genes in the complete *Drosophila* genome, published in March in *Science*. Their comparison of the amino acid sequences identified 548 fruit fly genes that are similar to genes involved in 714 human genetic disorders.

—Compiled by Richard L. Hill



Photos by STEVEN NEHL/THE OREGONIAN

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But the reel, bringing the net aboard faster than a foot per second, isn't turning nearly as fast as a swimming California sea lion bull following them up the lower Columbia River and relentlessly cruising the net slightly ahead of the boat.

Sea lions don't care whether the salmon is wild or hatchery — or that the brothers and the federal government have invested several hundred dollars in the mesh.

"C'mon, c'mon," Brian shouts, having seen the precise place where the salmon hit the net but knowing it won't make any difference.

Sure enough, a huge brown body

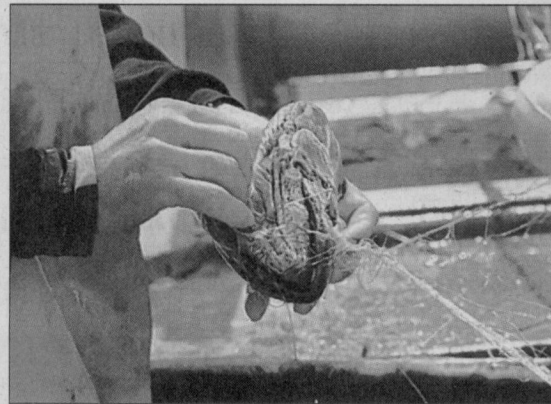
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The scene is familiar to Oregon anglers and commercial fishermen, who lose hundreds, perhaps thousands, of salmon and steelhead a year to crafty marine mammals called pinnipeds. Their frustration is shared by federal and state biologists, who are documenting increasing losses caused by specific animals but are getting little help from Congress in relaxing strict federal protections for marine mammals.

The clashes intensify as a booming population of seals and sea lions protected by the Marine Mammal Protection Act of 1972 feeds on declining runs of salmon and steelhead. It's a bitter



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paradox that some of their victims are also protected by a different federal law.

Biologists caution that it isn't so much increased numbers of pinnipeds, but rather that a few individual animals learn to target salmon and steelhead in congested areas, such as fishing zones, dams, fishway entrances and weirs.

They can quickly wreak havoc.

Please see **PINNIPEDS**, Page D11

Study aims to create consensus on iron overload test

Five centers will split \$30 million to assess who needs to be screened for the defect

By OZ HOPKINS KOGLIN
THE OREGONIAN

Every body needs iron, but many people unknowingly have an inherited condition that causes too much iron to build up in the body.

The disorder, hemochromatosis, can lead to potentially fatal illnesses, such as cirrhosis or cancer of the liver.

Unlike many other genetic conditions, iron overload is easily treated if diagnosed in time. But though it is one of the most common genetic disorders in the United States, there is no public health consensus about who should be tested for the disease, other

than relatives of hemochromatosis patients.

To help resolve this question, the National Heart, Lung and Blood Institute has awarded \$30 million to five centers in the United States and Canada to answer questions about iron overload. The Kaiser Permanente Center for Health Research, with sites in Portland and Honolulu, will get \$4.07 million to study 20,000 Kaiser members.

John Legry, 58, is a Kaiser Permanente patient whose iron overload was discov-

ered in time for effective treatment.

Legry normally enjoys an active running, swimming, bicycling and ing weights. But a little more than years ago, he was stricken with chr fatigue. Even when sitting down he breathing too hard, feeling as tho he had just finished a strenuous ru

His doctor ordered a simple b test, which revealed that Legry was fering iron overload.

Please see **IRON**, Page D11

MEDICAL RESEARCH

June 2001

Pinnipeds: A few animals wreak havoc

Continued from Page D12

studies show that individual animals can become major problems," said Robin Brown, the only marine mammal biologist for the Oregon Department of Fish and Wildlife and one of the lead researchers on Pacific harbor seals and California and Steller sea lions. "Since fishermen are in those areas at the same time, they naturally see more activity."

The quantity of salmon and steelhead that seals and sea lions eat hasn't been definitively documented.

A California sea lion nicknamed "Herschel" and a few buddies nearly destroyed Seattle's Lake Washington steelhead run, but they were ultimately trapped and moved out of town. Explosive sound devices and other hazing activities have so far held other California sea lions at bay there, but most biologists think it's only a matter of time before another large pull moves back in, Brown said.

The Marine Mammal Act is so strong, it took years to get permission to move Herschel and company.

"There basically isn't anything fishermen can do about it," Brown said. "When people tell us there are a lot of seals and sea lions out there, it's true. They're everywhere."

Under the act's protection, reauthorized in 1994, the offshore population of seals and sea lions from Washington to California is ballooning, in part also because of the past several years of improved ocean productivity.

Pressure points

And bit by bit, scientists are learning more about what they're doing — and where.

The emphasis now, supported by increasing research, is aimed at individual pressure points rather than seals and sea lions as a whole.

Pinnipeds for the most part eat larger quantities of other fish and sea species than salmon. Brown and his researchers cite, among other things, aerial surveys and "scatology," the study of bones and pieces of prey found in droppings at haulout areas.

Seals and sea lions eat the equivalent of 3 percent to 5 percent of their body weight a day, which adds up quickly for the handfuls of animals feeding in salmon and steelhead areas.

The latest estimate of the harbor seal take of salmon in Oregon is 10 metric tons a year. In 1993, however, exhaustive studies in the Georgia Strait in British Columbia found that only 400 metric tons were taken by three times as many animals as found in Oregon.

It's hard to explain the inconsistency, which is perhaps a function of different habitats and prey species.

"The answers we get are all over the board," Brown said.

In one river on Hood Canal in Washington, a study showed that seals and sea lions ate nearly 81 percent of the chum run one year. The pinnipeds rarely showed up in other river estuaries.

And there is another developing story in research, Brown said. Unusually, Oregon researchers studying scat did so largely in the



STEVEN NEHL/THE OREGONIAN

Sea lions, protected by federal law, find docks like this one in Astoria just as convenient as commercial fishermen do.

daytime. But seals and sea lions are tide-dependent.

"They sleep until the water comes up and forces them off their haulouts," Brown said. "Then they go eat, night and day."

Increasingly, studies show they're just as good at finding food at night as they are during the day, so researchers are beginning to work at night, too.

They're also ranging farther upriver in many estuaries. In fact, California sea lions often visit Bonneville Dam and Willamette Falls in search of spring chinook. That's where Brown and the research will focus on specific animals.

In the lower Columbia, with the help of gill-net fishermen and volunteers, Brown's crews are marking individual California sea lions with permanent hot brands, like cattle, and brightly colored tags that allow quick identification. One sea lion carrying a hot brand on its back showed up this spring at Willamette Falls precisely when wild winter steelhead, a federally protected species, were passing upriver.

"We've seen up to 10 or 12 sea lions there in the past few years," Brown said. "They're perfectly aligned with the presence of winter steelhead, but in order to remove problem animals we have to document all the individuals."

Although the annual loss to pinnipeds at the falls — 79 to 240 steelhead and 136 to 176 spring chinook — might not seem like much from runs of thousands, many could be endangered fish. That causes wrinkled brows.

Brown said there is continuing support for new and different research, and he's hopeful that scientific efforts will prevail.

A request before Congress

Still, Congress has yet to react to an official request from the states and the National Marine Fisheries Service in February 1999 to allow management control over individual seals and sea lions. The report cited evidence that some sea lions and harbor seals are a threat to endangered salmon and steelhead stocks.

No action has been taken, but Penny Dodge, an aide to U.S. Rep. Peter DeFazio, D-Ore., said her of-

PINNIPEDS

STELLER SEA LION

Scientific name: *Eumetopias jubatus*.

Description: Largest North Pacific sea lion, lighter tan and reddish brown than California. Males may weigh up to 1 ton, females up to 770 pounds. Blunt face and boxy, bearlike head.

Number in Oregon: Highly seasonal and variable, 1,000 to 4,000 per year.

Annual increase: About 4 percent a year off Oregon.

Biology: Steller sea lions are threatened off Oregon but are endangered in their northern range off the Aleutian Islands. Pups are born on offshore Oregon islands from mid-May until mid-July. Sea lions eat a variety of fishes, invertebrates and even other pinnipeds. Known predators of all pinnipeds are killer whales and white sharks. **Behavior:** Rarely move inland, even in Puget Sound, and prefer the open sea.

CALIFORNIA SEA LION

Scientific name: *Zalophus californianus*.

Description: Intelligent, playful and bark more noisily than other pinnipeds. Chocolate brown, although females — rarely seen in Oregon waters — are often golden brown. Males weigh up to 1,000

pounds, females to 400 pounds. Faces resemble dogs'.

Number in Oregon: About 2,000 during the winter, but 8,000 to 10,000 in the fall and spring, ranging into coastal bays and up rivers.

Annual increase: 8 percent.

Biology: Reproduce farther south than Steller's, as far as the Galapagos Islands. Similar to Steller's in rearing and diet.

Behavior: California sea lions are the smartest, and aggressive males often range far inland to forage for fish.

PACIFIC HARBOR SEAL

Scientific name: *Phoca vitulina*.

Description: Spotted coats in a variety of shades from silver gray to black to dark brown. Males weigh up to 300 pounds, only slightly larger than females.

Number in Oregon: About 10,000.

Annual increase: Stable.

Biology: Often born on beaches accessible to people, which puts them in danger of being "rescued." Largely local and nonmigratory. Eat sole, flounder, sculpin, hake, cod, herring, octopus and squid.

Behavior: Deep divers capable of staying down more than half an hour, but usually only five to seven minutes.

Source: Oregon Department of Fish and Wildlife

fice was told by Dave Jansen, a legislative staff member for the House Resources Committee, that the issue could come up in 2002.

In Oregon, the Legislature is considering asking Congress for some relief from the damage caused by individual animals, but such requests are typically ignored. Meanwhile, Senate Bill 31 is languishing in the Legislature's Joint Ways and Means Committee. The bill would allocate \$300,000 to the state Department of Fish and Wildlife for studies justifying to Congress the transfer of managing California sea lions and harbor seals from the federal government to the state.

And Brown thinks some natural controls may be occurring, based on the recent stabilization of harbor seal numbers.

On June 5, a small pod of half a

dozen killer whales moved into the lower Nehalem Bay for nearly three hours, chewing their way through the bay's 70 to 100 harbor seals, long a fixture at low tide, hauled out on the sand spit opposite U.S. 101 near the bay's entrance.

At high tide, the whales chased and killed seals up to the state park boat ramp and then back to the mouth, said Kelly Laviolette, owner of Jetty Fishery. "The day after, there were only 13 seals out, and I don't think we've seen more than 50 since. It looks like they got all but one pup."

You can reach Bill Monroe at 503-221-8231, by mail at 1320 S.W. Broadway, Portland, OR 97201, or by e-mail at billmonroe@news.oregonian.com.

Study: Climatologists need to know where carbon goes

Continued from Page D12

to resolve a pesky little accounting problem: The global carbon budget wouldn't balance. The rates of carbon dioxide emitted into the atmosphere are consistently higher than the amounts actually measured there. Tons of carbon dioxide put into the atmosphere don't remain there.

Even when scientists included the sizable amount of carbon stored in the ocean, a substantial amount still couldn't be accounted for by photosynthesis alone. The results of the new study show how part of that atmospheric carbon dioxide is funneled into fixed systems on Earth.

Knowing where carbon goes is crucial to understanding global climate change.

"If we want to predict the future climate, one of the things we have to be able to predict is the future of atmospheric carbon dioxide concentration," said George Hurtt, co-author of the study and a researcher at the Institute of Earth, Oceans and Space in New Hampshire. "We can't do that unless we can explain why the build-up in the atmosphere isn't as rapid as the emissions."

Finding the 'missing sink'

Scientists knew there had to be an unknown storehouse of carbon, a "missing sink," as they called it.

The amounts of carbon in atmosphere and oceans were relatively easy to document, but they failed to account for all the missing carbon. The global sink, 1.8 billion tons of carbon, must be on the land. But where?

North America was identified early as having great potential to be a significant carbon sink. But scientists were coming up with contrary numbers, and the debate grew contentious. None of the estimates of the size of the North American sink agreed. Atmospheric models seemed to overestimate the stores of carbon in the United States, while land-based inventories appeared to underestimate them.

"The answer, as is often the case, was somewhere in the middle," said Steven Pacala, lead author on the Science paper. Pacala initiated the collaboration among the scientists by circulating an initial draft, and it became "a 19th-century sort of interaction conducted in writing," he said.

The current study updates both atmospheric and land-based analyses, and researchers now agree about the size of the sink in the continental United States. In the same issue of Science, researchers detail the impact of reforestation policies on the increased carbon sink in China.

"Right now, the rate of increase of carbon dioxide in the atmosphere is pretty rapid, but it's less rapid than it would be if we didn't have any sinks," Hurtt said.

Earth's living components have been acting as a sponge, soaking carbon dioxide from the atmosphere and storing it. In the study, the scientists identify the six pri-

mary contributors to the accumulation of carbon in the United States.

Human-caused changes in land use seem, inadvertently, to have made greater storage of carbon possible. "Some of the sinks were not set up deliberately," said Oregon State University forest scientist Mark Harmon, study co-author. "They were kind of a happenstance of the history of an area."

Forests now recovering from past land-clearing and the wood growth that has emerged in grasslands where fire has been suppressed are storing vast amounts of carbon. In the past 50 years, forest regrowth has exceeded harvest in the Eastern United States.

Suppressing fire and increasing grazing on some lands have allowed woody plants to invade large areas of the United States. In recent years, fire has been suppressed on more than 95 percent of the land that once burned each year. The frequent wildfires common until the 19th century never allowed significant stores of carbon to build. In the past 150 years, however, woody growth has increased substantially.

Researchers also found significant stores of carbon in decaying wood in forests, in cropland soils managed to increase organic matter, and in wood products used to build homes and furniture. Many of those products end up in landfills.

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A surprise was the amount of carbon stored in the sediment behind the 68,000 dams and reservoirs in the United States. "The problem with reservoirs is that they completely fill up with gunk ... and carbon becomes entombed there," Pacala said.

Carbon sink may now be full

The natural systems ease the effect of the increases in carbon dioxide by storing it in reserves that have been accumulating steadily but decaying slowly. But scientists remain cautious about how long the world can rely on these land sinks to transport carbon dioxide out of the atmosphere. The warehouses may be filling to capacity.

Because the sink is in large part caused by recovery from past land use, Pacala said, "The land-use sink is going to go away as ecosystems recover."

The information about the carbon sinks is of great importance to climate modelers seeking to understand how the global climate could be altered by increasing carbon dioxide levels.

"Their predictions of future carbon dioxide concentrations are based on the assumption that whatever the sink is on land, it will continue or even increase as the concentrations go up," said co-author Richard Houghton, an ecologist at Woods Hole Research Center in Massachusetts, "and it might be that that's just dead wrong."

You can reach Virginia Gewin at virginiagewin@news.oregonian.com or 503-294-4153.

Iron: Blood-letting process an effective treatment for the disorder

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COMING UP

Look for these stories to run

Men are about five times more likely to be diagnosed with the

TO LEARN MORE

Early diagnosis and treatment may prevent excess iron from be-

IRON OVERLOAD

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Description: Spotted coats in a variety of shades from silver gray to black to dark brown. Males weigh up to 300 pounds, only slightly larger than females.

Number in Oregon: About 10,000. **Annual increase:** Stable.

Biology: Often born on beaches accessible to people, which puts them in danger of being "rescued." Largely local and nonmigratory. Eat sole, flounder, sculpin, hake, cod, herring, octopus and squid.

Behavior: Deep divers capable of staying down more than half an hour, but usually only five to seven minutes.

Source: Oregon Department of Fish and Wildlife

dozen killer whales moved into the lower Nehalem Bay for nearly three hours, chewing their way through the bay's 70 to 100 harbor seals, long a fixture at low tide, hauled out on the sand spit opposite U.S. 101 near the bay's entrance.

At high tide, the whales chased and killed seals up to the state park boat ramp and then back to the mouth, said Kelly Laviolette, owner of Jetty Fishery. "The day after, there were only 13 seals out, and I don't think we've seen more than 50 since. It looks like they got all but one pup."

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as the emissions.

Finding the 'missing sink'

Scientists knew there had to be an unknown storehouse of carbon, a "missing sink," as they called it.

The amounts of carbon in atmosphere and oceans were relatively easy to document, but they failed to account for all the missing carbon. The global sink, 1.8 billion tons of carbon, must be on the land. But where?

North America was identified early as having great potential to be a significant carbon sink. But scientists were coming up with contrary numbers, and the debate grew contentious. None of the estimates of the size of the North American sink agreed. Atmospheric models seemed to overestimate the stores of carbon in the United States, while land-based inventories appeared to underestimate them.

"The answer, as is often the case, was somewhere in the middle," said Steven Pacala, lead author on the Science paper. Pacala initiated the collaboration among the scientists by circulating an initial draft, and it became "a 19th-century sort of interaction conducted in writing," he said.

The current study updates both atmospheric and land-based analyses, and researchers now agree about the size of the sink in the continental United States. In the same issue of Science, researchers detail the impact of reforestation policies on the increased carbon sink in China.

"Right now, the rate of increase of carbon dioxide in the atmosphere is pretty rapid, but it's less rapid than it would be if we didn't have any sinks," Hurtt said.

Earth's living components have been acting as a sponge, soaking carbon dioxide from the atmosphere and storing it. In the study, the scientists identify the six pri-

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GEORGE HURTT,

RESEARCHER AT THE INSTITUTE OF EARTH, OCEANS AND SPACE IN NEW HAMPSHIRE

researchers also found significant stores of carbon in decaying wood in forests, in cropland soils managed to increase organic matter, and in wood products used to build homes and furniture. Many of those products end up in landfills.

A surprise was the amount of carbon stored in the sediment behind the 68,000 dams and reservoirs in the United States. "The problem with reservoirs is that they completely fill up with gunk ...

and carbon becomes entombed there," Pacala said.

Carbon sink may now be full

The natural systems ease the effect of the increases in carbon dioxide by storing it in reserves that have been accumulating steadily but decaying slowly. But scientists remain cautious about how long the world can rely on these land sinks to transport carbon dioxide out of the atmosphere. The warehouses may be filling to capacity.

Because the sink is in large part caused by recovery from past land use, Pacala said, "The land-use sink is going to go away as ecosystems recover."

The information about the carbon sinks is of great importance to climate modelers seeking to understand how the global climate could be altered by increasing carbon dioxide levels.

"Their predictions of future carbon dioxide concentrations are based on the assumption that whatever the sink is on land, it will continue or even increase as the concentrations go up," said co-author Richard Houghton, an ecologist at Woods Hole Research Center in Massachusetts, "and it might be that that's just dead wrong."

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Iron: Blood-letting process an effective treatment for the disorder

Continued from Page D12

his body of the excess iron, underwent a blood-letting called phlebotomy. For six weeks he went to Kaiser Sunnyside Hospital every two weeks to have a pint of blood removed.

After the first blood draw he began feeling "peppy" again.

Legry continues to have periodic hemochromatosis checkups but doesn't need more blood removed. He watches his diet and his doctors' orders to cut out iron-rich foods such as red meats and spinach.

"I would be horrified," Legry said. "Spinach bad for you?"

After his diagnosis, members of his immediate family have been tested for the condition. His brother was found to be a carrier.

Iron (iron) accumulates in the body, Legry said. "It's a kind of illness, and they probably should add it to the blood-serum tests run regularly for all kinds of things."

Screening effectiveness

Harris, senior investigator at the Portland arm of the study, says researchers hope to find out

COMING UP

Look for these stories to run monthly in the Science section:
1st Wednesday: Sky and Space Watch
2nd Wednesday: Weather Watch
3rd Wednesday: Critter Watch
4th Wednesday: Medical Research
5th Wednesday: Geo Watch

whether screening large populations for iron overload would be efficient and cost-effective. And although simple blood tests, including DNA tests, can detect iron overload, no one knows at what age people should be tested.

Researchers in the Hemochromatosis and Iron Overload Screening Study hope to learn who should be screened for iron overload and when. They also hope to learn what role genes play in iron overload among different ethnic populations, how too much iron in the blood affects health, and how people feel about having iron and genetic screening, Harris said.

Hemochromatosis most often affects white people of Northern European descent, although other ethnic groups also are affected.

Men are about five times more likely to be diagnosed with the condition than women, and they tend to develop problems earlier. Symptoms seem to occur in men 30 to 50 and in women older than 50.

About five people in 1,000 (0.5 percent) of the U.S. white population are susceptible to developing the disease, and one person in eight to 12 is a carrier, according to the National Institutes of Health.

Yet the disease often goes undiagnosed and untreated because most doctors consider it rare and don't think to test for it.

Defective gene

The 1996 discovery of the defect in a gene called HFE, and more recently the availability of rapid tests, has brought the disorder to the attention of many more people and prompted some groups to call for universal screening, Harris said.

The HFE gene regulates the amount of iron absorbed from food, and two variants of the gene, C282Y and H63D, can cause hemochromatosis.

Symptoms of the condition rarely show up before adulthood.

A person who inherits the defec-

TO LEARN MORE

◆ For more information about hemochromatosis, contact the American Hemochromatosis Society, 407-829-4488.

◆ For more information about the screening study, call 503-499-5500 in Oregon or 360-418-6002 in Washington. Candidates for the Kaiser part of the study must be Kaiser Permanente members in the Northwest or Hawaii region and at least 25 years old.

The other centers participating in the study are the University of California at Irvine; University of Alabama at Birmingham; the London Health Sciences Center in London, Ontario; and Howard University in Washington, D.C.

tive gene from both parents develops iron overload, but a person who inherits the defective gene from only one parent is a carrier and usually does not develop the disease.

As with Legry, the condition is relatively easy to treat by removing excess iron with repeated blood draws.

Early diagnosis and treatment may prevent excess iron from being stored in the body and may prevent the illnesses caused by storing too much iron.

Along with fatigue, symptoms can include joint pain, abdominal pain, loss of sex drive, heart problems and abnormal skin pigmentation (making skin look gray or bronze).

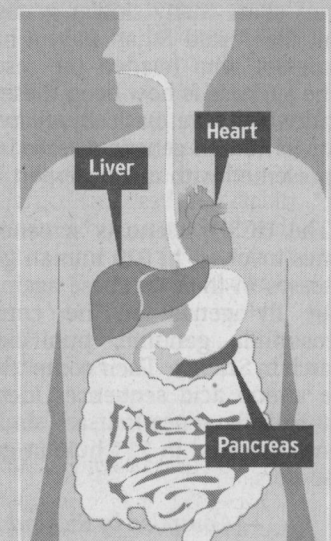
In addition to liver damage, iron overload can lead to arthritis, diabetes, irregular heart rhythms and congestive heart failure.

"This study is long overdue," said Sandra Thomas, president and founder of the American Hemochromatosis Society in Lake Mary, Fla. "I think it is going to be tremendously valuable because it will define accurately the statistics on how many people in the country have the mutations for hemochromatosis, so that the government can effectively do population screening — which we are advocating — as soon as possible."

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IRON OVERLOAD

Hemochromatosis is an inherited disorder that is the most common cause of iron overload in the body. Because the body has no natural way to rid itself of excess iron, it gets stored in body tissues, especially the liver, heart and pancreas. If iron overload is not identified and treated before it causes serious organ damage, it can result in potentially fatal conditions such as cirrhosis or cancer of the liver.



Source: National Institutes of Health

PAT MCLELLAND/THE OREGONIAN