

Human Impact on the Environment

Name:

Per:

Directions

1. In your small group, read the article and take notes on the worksheet labeled "Marking a Text."
2. In your mixed group, share the summary of your article. Decide with your group which learning goal fits the article.

Learning Goals:

1. Explain the effect that a non-native species can have on an ecosystem.
2. Describe the effects of habitat disruption/destruction can have on an ecosystem
3. Explain the relationship between pollution and climate change
4. Explain the consequences (good & bad) of human influence on biodiversity

Article Title	Summary	Learning goal #	Bonus: Other Real Life Example
1. Bad air for growing brains and minds	Who: What: When: Where: Why: How:		

<p>2. Air pollution can be so cooling</p>	<p>Who: What: When: Where: Why: How:</p>		
<p>3. Cultivation changed monsoon in Asia</p>	<p>Who: What: When: Where: Why: How:</p>		

4. Pollution keeps rain up in the air	Who: What: When: Where: Why: How:		
5. Green'ish pesticides bee-devil honey makers	Who: What: When: Where: Why: How:		

<p>6. Predatory pythons shift Everglades ecology</p>	<p>Who: What: When: Where: Why: How:</p>		
<p>7. Forests on the wane</p>	<p>Who: What: When: Where: Why: How:</p>		

8. US bird populations
in decline

Who:

What:

When:

Where:

Why:

How:



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Bad air for growing brains and minds

Mexico City's air pollution may be undermining neural and mental functioning in some children

By Bruce Bower

Web edition: October 10, 2008

Print edition: November 8, 2008; Vol.174 #10 (p. 18)

Mexico City wears a thick coat of air pollution that clogs lungs and takes a toll on hearts and blood vessels. But that's just the beginning — the metropolis's dirty air may have contributed to brain inflammation and intellectual deficits in at least some school-age children, a new study suggests.

Among healthy children aged 7 to 18, lifelong Mexico City residents scored lower than their peers from Polotitlán — a Mexican city with low levels of air pollution — on tests of memory, flexible thinking, novel problem-solving skill and the ability to monitor and change one's behavior during challenging tasks, scientists report in an upcoming *Brain and Cognition*. These tests make up part of standard IQ measures for school children.

What's more, brain scans of many Mexico City youngsters revealed alterations that can impair the prefrontal cortex, a neural region heavily involved in memory and thinking skills, say environmental pathologist Lilian Calderón-Garcidueñas of the University of Montana in Missoula and her colleagues.

Similar brain alterations, as well as evidence of neural inflammation, appeared in 1- to 2-year-old dogs that had grown up in Mexico City, the investigation finds.

Widespread declines in intelligence of the type and magnitude observed in the new report would have a huge impact on a country's economic productivity, says psychologist and study coauthor Randall Engle of the Georgia Institute of Technology in Atlanta. "Saving money by failing to curb pollution truly is a matter of 'pay me now or pay me later,'" Engle says.

Although their findings are preliminary, the researchers hope to conduct a five-year study tracking large groups of children living in areas with low and high air pollution. The most common air pollutants in Mexico City are particulate matter, which contains a complex mixture of various substances, and ozone. Polotitlán's air contains low concentrations of all major pollutants.

"The growing brain may be vulnerable to the inflammatory effects of air pollution's fine particulate matter as well as to specific chemicals that are toxic to brain growth," comments neuropsychologist Sidney Segalowitz of Brock University in St. Catharines, Canada.

Children in Mexico City and Polotitlán showed large neural and cognitive differences that need to be

confirmed in further work, remarks epidemiologist David Bellinger of Children's Hospital Boston. The new study didn't measure the composition of Mexico City air pollution, so chemical culprits possibly responsible for the results remain unknown, Bellinger notes. Children's increased lead exposure in Mexico City could also have contributed to lower scores on mental tasks, he adds.

Blood testing before admission to the study found no differences in average lead concentrations of Mexico City and Polotitlán children, Calderón-Garcidueñas says.

She and her coworkers recruited 55 children from Mexico City and 18 children from Polotitlán. All children came from middle class families and had no serious health problems.

Mexico City kids generally scored lower on specific memory and reasoning tests than their counterparts did. Using magnetic resonance imaging, or MRI, on a subset of the children, the researchers observed tissue alterations typical of inflammation in the brains of 13 of 23 Mexico City youngsters and 1 of 13 Polotitlán children.

Neural alterations were located near the front of the brain in tissue that could obstruct nerve transmissions sent to and from the prefrontal cortex.

In three Mexico City children who received another round of MRI scans 11 months after initial testing, frontal-brain tissue alterations remained the same.

Calderón-Garcidueñas' team then conducted brain studies of seven healthy Mexico City dogs and 14 healthy dogs from Tlaxcala, another Mexican city with low levels of air pollution. All dogs were mixed breeds and had been reared at animal research facilities.

Comparable inflammation-related tissue alterations in the frontal brain appeared in four of seven Mexico City dogs and none of the others. In tissue analyses, brains of Mexico City dogs also displayed particularly high levels of substances produced by two genes that have inflammatory effects on the brain.

In studies conducted since 2002, the researchers have reported signs of brain inflammation and brain disease in dogs exposed to Mexico City's air. Earlier this year, the researchers found that chronic exposure to air pollution was associated with markers of brain inflammation and increased brain immune responses in children and young adults who had died suddenly and were studied at autopsy. These individuals also possessed high levels of brain proteins thought to contribute to Alzheimer's and Parkinson's diseases.

Citations

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Air Sickness

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Air Pollution Can Be So Cool — ing

By Janet Raloff

Web edition: May 5, 2008

Earth has been warming in recent years. That means it takes in more energy than it emits. The net difference amounts to some 1.6 watts per square meter, averaged over the planet's surface, according to Michael B. McElroy of Harvard University. But that value would be roughly 30 percent greater if it weren't for some combustion pollution — chiefly the sulfur dioxide emitted by fossil-fuel burning, he told journalists and other attending a mini climate-change conference last week.

Pollution's ability to offset climate cooling should not be viewed as an excuse to delay programs aimed at reducing emissions of potentially toxic smog contributors, such as sulfates, he argued: "Without any question, the first problem that we should address is pollution."

His reasoning: Although global warming is a serious issue, its actions play out over a much longer term than do the direct effects of pollution. Because sulfate's life span in the atmosphere is measured on the scale of just days, pollution can be tackled and make an almost immediate improvement on health and the environment.

McElroy spoke April 30 at an event in Cambridge, Mass., that was sponsored by Harvard Medical School's Center for Health and the Global Environment together with the Society of Environmental Journalists.

In the air, sulfur dioxide turns into sulfate, microscopic particles that serve as park benches on which water-vapor molecules can rest and then turn to liquid. When enough molecules condense, clouds form.

"The more cloud particles you have, the whiter will be the cloud and the more reflective," McElroy explains. Any sunlight bounced back into space does not contribute to Earth's warming.

Although the United States has done a reasonable job of scrubbing sulfur dioxide from fossil-fuel exhaust — especially from the stack gases of industrial plants that burn coal — the same can't be said for more populous nations, the physicist said. "The major source of sulfur dioxide in the atmosphere, for the moment," McElroy says, "is China. And India is not very far behind."

The sulfate-cooling phenomenon has prompted ruminations within the research community about whether clever engineers might not be able to fling sulfur into the upper atmosphere, or stratosphere, to deliberately seed it with cooling aerosols. There's no question that if this could be accomplished, it would help cool the planet, McElroy says, since major volcanic eruptions naturally propel such aerosols into the stratosphere. Shortly afterward, scientists invariably record "a detectable drop in global average surface temperature."

Of course, it would take a lot of energy to emulate the volcanic thrust of sulfates into the upper atmosphere, something that in itself would likely release tons more pollution — literally. And that would sort of defeat the

purpose, I'm guessing. It would also be a pricey tactic.

But McElroy has another reason for dismissing such a proposed global air-conditioning strategy: "It's not clear at all to me that you won't generate a totally different type of climate." One that can't be predicted beforehand.

So that would argue that we should be moving toward energy sources that are less carbon-centric. Think wind power instead of coal, geothermal instead of diesel. Because as we clean the air of sulfates and other fossil-fuel pollution — thereby losing their thermal buffering — global warming stands to become much, much worse than it is today.

But "there may be a silver lining" in controlling some especially sooty air pollution, argued another panelist at last week's meeting, Paul Epstein. Associate director of the Center for Health and the Global Environment, he observed that an April *Nature Geoscience* paper reported that soot, also known as black carbon, aggravates global warming much more than previously realized, largely by making air plumes less reflective, which means better at absorbing heat.

Indeed, owing to soot's high energy-absorption capacity and regional distribution, it's global-warming potency ranks second only to carbon dioxide, according to the new *Nature Geoscience* paper. And in high altitudes and latitudes, where migrating soot can fall out and darken snow or ice, this pollutant may actually be "as important as carbon dioxide" in contributing to the melting of snowpacks and glaciers, its authors conclude.

As such, Epstein argues, curbing sooty fossil-fuel emissions would appear to promise a double benefit: less carbon dioxide and better protection of important freshwater reservoirs — glaciers, polar ice and mountain snowcaps.

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Cultivation changed monsoon in Asia

Loss of forests in India, China during the 1700s led to a decline in monsoon precipitation

By Sid Perkins

Web edition: June 1, 2009

The dramatic expansion of agriculture in India and southeastern China during the 18th century — a sprawl that took place at the expense of forests — triggered a substantial drop in precipitation in those regions, a new study suggests.

Winds that blow northeast from the Indian Ocean into southern Asia each summer bring abundant rain to an area that's home to more than half the world's population. But those seasonal winds, known as monsoons, brought about 20 percent less rainfall each year to India and southeastern China in the 1850s than they did in the early 1700s, says Kazuyuki Saito, a climate scientist at the University of Alaska Fairbanks. That decline, he and his colleagues contend online June 1 in the *Proceedings of the National Academy of Sciences*, is the result of deforestation in the region.

In 1700, forests covered between 40 and 50 percent of India and China. But by 1850 that proportion had shrunk to between 5 and 10 percent, Saito says. The substantial decline in forests dramatically reduced the amount of moisture pulled from deep in the soil and sent skyward by trees — moisture that typically would have joined that present in the monsoon winds flowing from the ocean. The overall reduction in moisture, in turn, triggered a substantial slump in soil-dampening precipitation, the researchers note.

Western India, for example, received 20 centimeters (7.9 inches) less monsoon rainfall in 1850 than it did in 1700. The resulting drop in atmospheric humidity also led to a decline in cloud cover, which boosted heat at ground level and dried surface soil even further.

In their study, Saito and his colleagues used a global climate model to confirm the effect of deforestation in the region. One scenario depicted the forest coverage present in 1700, and the other included the reduced coverage present in 1850. Both simulations used month-to-month variations in sea-surface temperatures and sea ice coverage that reflect modern-day conditions. The decline in monsoon precipitation seen in the computer simulations mimicked the extent and pattern of those seen in the real world, the researchers report.

"What's really exciting about this study is that you can rule out things such as greenhouse gases," says Roger A. Pielke Sr., an atmospheric scientist at the University of Colorado at Boulder. The new findings "show that the climate system is more complex and less predictable than scientists had recognized."

Many of the suspected causes of climate change probably had little to do with this drop in Asia's monsoon precipitation, Saito and his colleagues contend.

Noteworthy changes in the atmospheric concentrations of greenhouse gases such as carbon dioxide didn't begin to occur until after the 1850s. Solar activity varied on its normal 11-year cycle between 1713 and 1850, but there were no apparent long-term trends in activity over that period, they note. Several major volcanic eruptions occurred during the interval, but the cooling effects triggered by any individual volcano would have lasted only a few months or years. Sea-surface temperatures didn't exhibit any unusually large variations, the researchers add.

Together, these observations tend to pin the blame on deforestation, the researchers say.

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http://www.sciencenews.org/view/generic/id/260/description/Pollution_Keeps_Rain_up_in_the_Air

Pollution Keeps Rain up in the Air

By Tina Hesman Saey

Web edition: September 13, 2002

Print edition: March 11, 2000; Vol.157 #11 (p. 164)

Neither rain, nor sleet, nor snow falls heavily in extremely polluted areas, suggests a new study. Scientists modeling cloud systems have debated whether air pollution tends to increase or decrease precipitation. New evidence from satellites now indicates that aerosols—pollution made up of fine, airborne particles—have a dampening effect on rainfall.

Previous satellite pictures showed that the particle-laden exhaust that oceangoing ships pump out makes visible trails in low clouds. The particles change the structure of clouds by breaking large water drops into droplets that reflect more light into space, creating a shiny trail. The polluted clouds in a ship's track produce less rain than pristine clouds, but scientists didn't know how massive pollution would affect precipitation, says Yoram J. Kaufman of NASA's Goddard Space Flight Center in Greenbelt, Md.

To tackle the bigger problem, cloud physicist Daniel Rosenfeld of the Hebrew University of Jerusalem traced pollution plumes from cities in Australia, Canada, and Turkey. For his study, published in the March 10 *Science*, Rosenfeld peered into the clouds with two different types of satellites. Using the Advanced Very High Resolution Radiometer on satellites operated by the National Oceanic and Atmospheric Administration, Rosenfeld saw shiny pollution trails in clouds that had floated over the cities.

Rosenfeld picked up pollution tracks extending out of Adelaide, Australia, from a power plant, a lead smelter, oil refineries, and the port. He traced one strong plume—arching across Canadian clouds—to the Hudson Bay Mining and Smelting Co. in Flin-Flon, Manitoba.

He then used sensors onboard NASA's Tropical Rainfall Measuring Mission satellite to determine how much rain the clouds in the pollution plume produced. No rain fell from these clouds, while similar clouds in nearby unpolluted areas produced normal amounts of precipitation.

Although he suspected that aerosol pollution would suppress some rainfall, "I was actually stunned to see that it was shut off all together," says Rosenfeld.

The black-and-white nature of his evidence is particularly striking because conflicting models have clouded

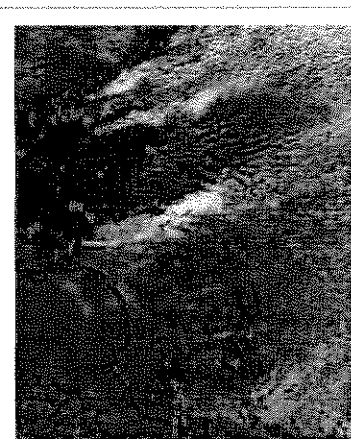


Image from NOAA weather satellite shows light-green-blue pollution tracks from sources near Adelaide, Australia, in unpolluted (pink) clouds moving to the right.

Credit: Rosenfeld/*Science*

the connection between pollution and rain, Rosenfeld says. Some studies have indicated that both pollution and the heat associated with cities might increase rainfall (SN: 3/27/99, p. 198). Rosenfeld's data suggest that any heat effect could be canceled out by aerosol pollution, says Owen B. Toon, an atmospheric scientist at the University of Colorado at Boulder.

Aerosol pollution in the tropics may reach far beyond suppressing local rainfall, says Hans F. Graf of the Max Planck Institute for Meteorology in Hamburg, Germany. Tropical rain provides much of the energy needed for worldwide movement of air in the atmosphere. "Any change in precipitation in the tropics will affect global climate," says Graf.

Air pollution more easily stifles rain from short-lived tropical clouds than from the longerlasting clouds common in northern latitudes, says Rosenfeld. This may explain why rainfall in the tropics has decreased despite predictions that global warming would make the area wetter, he says.

The shininess that aerosol pollution generates on clouds may counteract some of the green house effect by reflecting sunlight away from Earth, says Toon. However, aerosol pollution carries health hazards. "You can't beat the greenhouse effect by polluting more and more," he says.

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Green-ish pesticides bee-devil honey makers

They appear to pose egg-ceptional risks

By Janet Raloff

Web edition: March 7, 2010

Pesticides are agents designed to rid targeted portions of the human environment of undesirable critters – such as boll weevils, roaches or carpenter ants. They're not supposed to harm beneficials. Like bees. Yet a new study from China finds that two widely used pyrethroid pesticides – chemicals that are rather "green" as bug killers go – can significantly impair the pollinators' reproduction.

Both chemicals are widely used in North America and elsewhere, including China. And, the researchers point out, the concentration of each pesticide that produced adverse effects in the experiments was at or below those that bees could encounter while pollinating treated crop fields.

In recent years, there's been a big move by U.S. farmers to turn away from broad-spectrum potent bug killers to the more targeted and environmentally friendly pyrethroids. These synthetic chemicals have been fashioned after the natural pyrethrin bug deterrent in chrysanthemums.

The authors of the new study don't argue that pyrethroids are a cause of colony collapse disorder, the mysterious die-offs affecting honeybees throughout North America. But they do argue that their findings suggest further investigation is warranted to confirm whether these immensely popular crop-protection chemicals might prove a previously unrecognized threat to pollinators. The source of a double-whammy, if you will, for already hammered bees.

Ping-Li Dai of the Chinese Academy of Agricultural Science and the Ministry of Agriculture led a team of researchers at those Beijing institutions together with a physiologist from the Second Military Medical University in Shanghai. The team investigated sublethal effects of bifenthrin and deltamethrin. Bifenthrin is used to kill everything from termites around homes to fire ants, corn pests and the mites that attack fruit trees. Deltamethrin is targeted at aphids, mealy bugs, whitefly, fruit moths, caterpillars on field crops, roaches, horseflies, mosquitoes and fleas.

After first establishing the dose that would kill no more than five percent of exposed bees, the researchers laced sugar water near bee hives with either of the pyrethroids at that tolerable dose. Worker bees had access for 20 days to the pseudo-nectar in each of three successive years. Queens in each colony were dosed every five days over each treatment period. Studied bees had no access to outside nectar during the trial periods.

Compared to queens receiving clean sugar water, those in the pyrethroid groups were substantially less

fecund. For instance, clean queens in 2006 laid a little more than 1,200 eggs each day, compared to not quite 900 a day in the bifenthrin group and roughly 600 per day in the deltamethrin group. In general, the weight of eggs laid was higher in the pyrethroid-treated hives, but the hatch rate of pyrethroid-exposed eggs was significantly depressed. It varied by year, but in 2008, for instance, 88 percent of eggs in the control hives hatched versus 71.4 percent of those in the bifenthrin-treated hives and 80.5 percent of the deltamethrin-treated bees.

The success rate of hatchlings, that is the share that reached adulthood, varied from 75 to 95 percent in the control hive – making it between 20 and 40 percentage points higher than in hives where bees had been exposed to a pyrethroid. Dai and colleagues report their findings in the March *Environmental Toxicology & Chemistry*.

The bottom line, Dai's team concludes: "The impact of pesticides on the colony may be severe."

And the researchers concede that they can only guess at how severe because their paper focused on easily quantifiable, gross effects. Both pyrethroids are neurotoxic, typically causing paralysis and worse in target pests. The Chinese scientists didn't investigate whether in-egg or juvenile exposures to the pesticides might have resulted in behavioral impacts during adulthood. Perhaps diminishing the bees' ability to learn tasks or remember where good nectar sources were.

As I pointed out in a story four years back, pyrethroids may be relatively green – but they're not totally benign to non-target organisms. That story was about little aquatic midges and other sediment dwellers. Essentially the food for fish and other critters people really care about.

Now we see threats to bees. And that should give all of us pause – because these unsung heroes of the farm make much of today's bountiful harvests possible.

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Predatory pythons shift Everglades ecology

As invasive snakes expand territory, some mammal populations drop by more than 90 percent

By Janet Raloff

Web edition: January 30, 2012

Print edition: February 25, 2012; Vol.181 #4 (p. 5)

Giant snakes are eating their way through the Everglades, leaving a drastically changed ecosystem in their wake, a new study shows.

The snakes, many of which measure 10 to 16 feet, are called Burmese pythons. But make no mistake: Virtually all of the roughly 30,000 living in southern Florida were born in the Everglades. Ecologists now report that populations of mammals have begun plummeting throughout the pythons' expanding range. And the timing of these mammal losses matches the geographic spread of the snakes, which federal officials believe were initially released into the wild by snake fanciers, probably 15 to 30 years ago.

Raccoons, opossums, deer and other mammals, along with birds and gators, have all turned up in the stomachs of captured pythons, testifying to the snakes' varied appetite, notes ecologist Michael Dorcas of Davidson College in North Carolina. "But until now, there hadn't been any indication that the snakes were altering the ecosystem," says Dorcas, who led the study.

The new data "make a persuasive case for cause and effect," says herpetologist J. Whitfield Gibbons of the Savannah River Ecology Lab in Aiken, S.C., who was not affiliated with the new analysis. "The investigators take a convincing position that introduced predatory pythons are responsible for the decline in numbers of large- and medium-size mammals in the Everglades."

With much of the roughly 6,000-square-kilometer Everglades National Park virtually inaccessible, the team of 11 university and federal scientists took an indirect approach to surveying the region's mammal populations. Between 2003 and 2011, researchers cruised roads on 313 nights and compared the number of individuals in each species they saw per 100 kilometers traveled to rates witnessed along the same roadways over 51 nights in the 1990s — before pythons had established local breeding populations.

As in the earlier survey, raccoons and Virginia opossums were the most commonly observed mammals, although sightings of each were down by more than 98 percent in the most recent survey. Counts were 94 percent lower for white-tail deer and bobcat sightings were down 87 percent. And in contrast to the earlier



Predatory pythons

University of Florida scientists show off a 15-foot Burmese python, weighing more than 160 pounds, that was captured in the Everglades. Its stomach contained a 6-foot gator.

Credit: Michael R. Rochford, University of Florida

survey, scientists saw no rabbits or foxes. Rabbits had been among the most common mammals witnessed in the 90s.

Roadside sightings of mammal species remained unchanged between the two periods in areas outside the python range. In spots of recent python migration, mammal sightings were also down somewhat from a decade earlier, drops ranging from 20 to 80 percent, Dorcas' team reports online January 30 in the *Proceedings of the National Academy of Sciences*.

The new diminished mammal counts in python territory "are pretty similar to what we found," says Joshua Holbrook of Florida Atlantic University in Davie. A more circumscribed road-sampling survey he coauthored in 2010 in *Florida Scientist* turned up nine mammals over four nights: seven deer, a possum and an unidentified small mammal. On five nights, he and his colleagues saw none. Meanwhile, beyond the python's range in the nearby Corbett Wildlife Management Area, he and Thomas Chesnes of Palm Beach Atlantic University sighted 40 mammals over nine nights.

"This study paints a stark picture of the real damage that Burmese pythons are causing to native wildlife and the Florida economy," says U.S. Interior Secretary Ken Salazar. His agency announced new rules on January 17 that will ban the importation and interstate transport of Burmese pythons, yellow anacondas and two other invasive constrictors sold in the pet trade. All have been found in Everglades National Park.

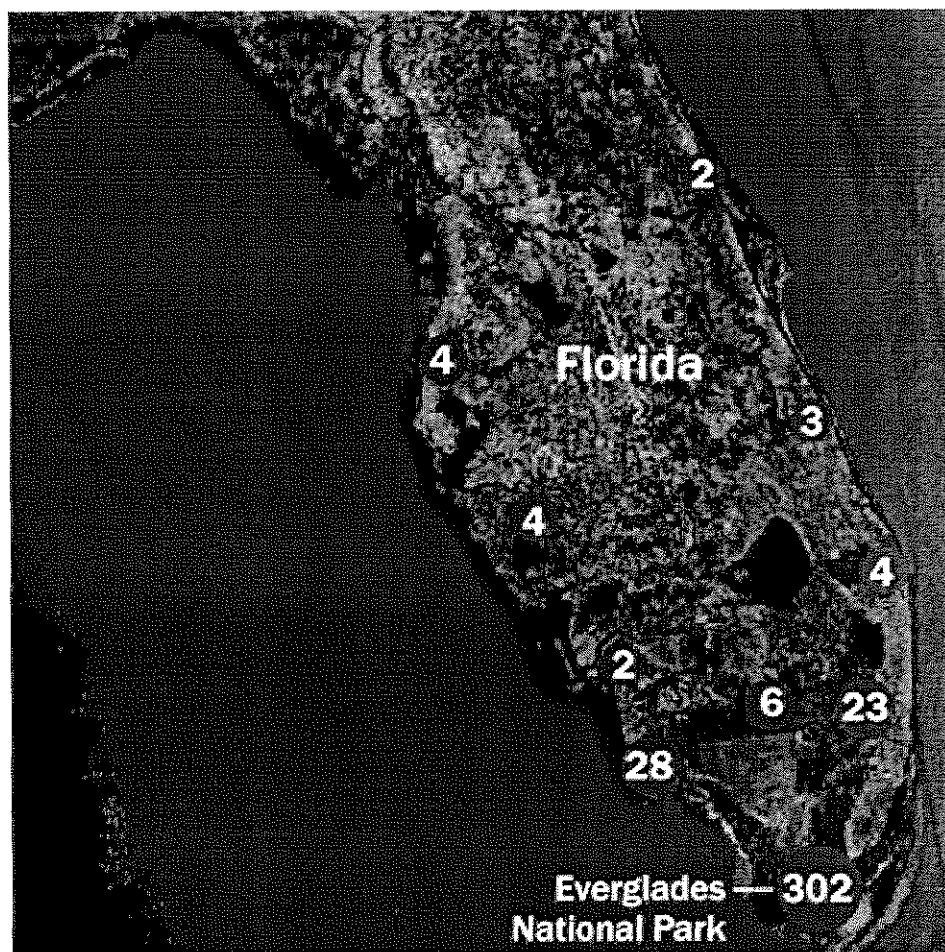
With so many invasive constrictors already breeding in South Florida, research is now focusing on ways to limit their spread and better understand the prey they threaten. Although Burmese pythons need freshwater to survive, a team of biologists with the U.S. Geological Survey led by Kristen Hart in its Davie, Fla., lab showed that the snakes can apparently derive much of their needed moisture from the tissue of prey animals.

The team's experiments suggest that python hatchlings can't survive more than two months with access to only saltwater. But a pair of hatchlings was still alive after 200 days with access to only brackish water. And a yearling snake with access to only saltwater survived 7 months — holding open the prospect that these adept swimmers could, if motivated, enter the marine realm and migrate long distances through seawater, the team reports in the Feb. 10 *Journal of Experimental Marine Biology and Ecology*. In fact, Burmese pythons have already been found eating endangered wood rats on Key Largo, off the mainland coast.

Back Story – SNAKES IN THE GRASS

Source: Center for Invasive Species and Ecosystem Health/Univ. Of Georgia;
 Credit: © 2012 Google, © 2012 Terrametrics, SIO, NOAA, U.S. Navy, NGA, GEBCO

In most of North America, a constrictor found slithering around in the wild is bound to be a lost or intentionally released pet. But in Florida, Burmese pythons have started expanding from the southernmost reaches of the Everglades (red dots indicate numbers of sightings). Researchers believe a breeder or dealer may have deliberately released a number of snakes in the remote location.



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Forests on the wane

Early last decade, the world's tree coverage dropped by more than 3 percent

By Sid Perkins

Web edition: April 27, 2010

Print edition: May 22, 2010; Vol.177 #11 (p. 10)

Some people can't see the forest for the trees, but many can't see them because they're truly disappearing: About 3 percent of forests standing in 2000 were gone by 2005, a new analysis of satellite images reveals.

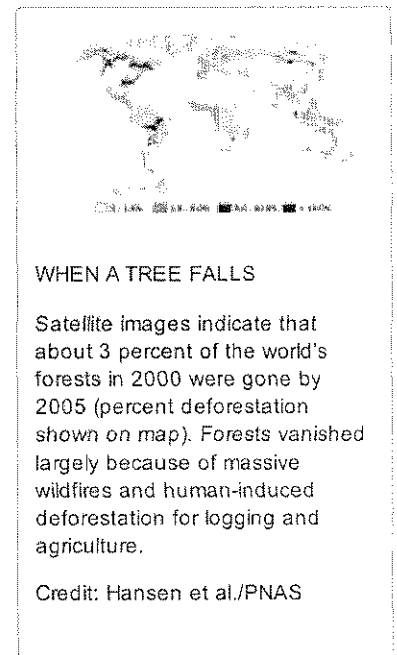
Forests vanish for a variety of reasons, from agriculture and logging to natural phenomena such as wildfires, storms and insect infestations, says study coauthor Matthew Hansen, a geographer at South Dakota State University in Brookings.

For purposes of forest accounting, researchers classify an area as forest if trees cover more than 25 percent of the landscape. In 2000, forests blanketed almost 33 million square kilometers of land worldwide. But by 2005 more than 1 million square kilometers of those forests had disappeared, Hansen and his colleagues report online April 26 and in an upcoming *Proceedings of the National Academy of Sciences*.

On a percentage basis, forests are vanishing most quickly in the boreal region encircling the Arctic. More than 350,000 square kilometers — about 4 percent of the forests in that ecosystem — fell victim. Fires caused about 60 percent of those losses, says Hansen. Logging accounted for a substantial fraction of the remaining deforestation, which also included losses due to storms and beetle infestations (*SN*: 5/10/08, p. 9).

More than 58 percent of forest loss worldwide occurred in just four nations — Brazil, Canada, the Russian Federation and the United States. Together, these sprawling nations account for about 45 percent of the world's forests, Hansen notes.

The new study didn't measure the spread of forests between 2000 and 2005, so recovery from previous natural disasters such as wildfires or storms wasn't included. Also, Hansen notes, future analyses by the group will use techniques better able to distinguish natural deforestation from that caused by humans.



Citations

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U.S. bird populations in decline, report says

U.S. bird populations in decline, report says

Secretary of the Interior calls government agencies and the public to action

By Solmaz Barazesh

Web edition: March 19, 2009

A review of bird populations in the United States was released March 19 by Secretary of the Interior Ken Salazar. Nearly a third of the United States' 800 bird species are endangered, threatened or in significant decline, the new report shows.

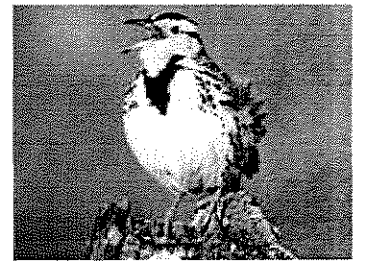
Bird populations are critical indicators of the health of our environment — “like the canary in the coal mine,” Salazar said at a press conference.

The report, called *The U.S. State of the Birds*, combines 40 years of studies from government agencies and data gathered by citizen scientists participating in bird censuses like the National Audubon Society's Christmas Bird Count.

The majority of native Hawaiian bird species are in danger of extinction because of habitat destruction, invasive species and disease, the report notes. Populations of bird species native to grassland regions and coastal areas of the mainland United States have also declined.

But conservation projects have been successful in reversing declines in some bird populations. Populations of 39 different species of waterfowl have increased by more than 100 percent during the past 40 years, thanks to efforts to restore more than 30 million acres of wetlands, the report says.

“This report is a call to action — but the action is within our reach,” Salazar said. “We can move forward to restore the bird populations of this country and the world.”



The Western meadowlark is a grassland bird native to the western two-thirds of the United States. Populations of the bird have declined over the last 40 years.

Credit: Donald Metzner, courtesy of the Cornell Lab of Ornithology

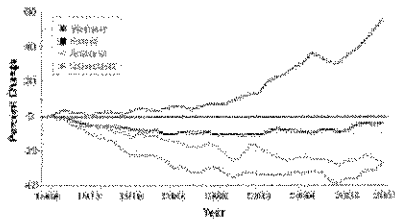
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This chart shows population changes in birds in different habitats. Grassland, aridland and forest bird populations decreased, but wetland bird populations increased because of conservation work

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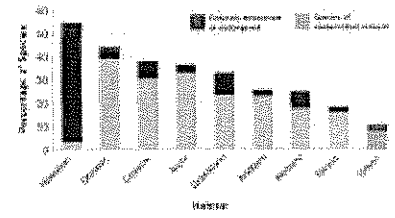
This chart shows the percentage of bird species that are endangered, threatened or of conservation concern in each type of habitat. The percentage of bird species that are federally listed as threatened or endangered is shown in red, and the percentage of species of conservation

to restore wetland



concern is shown in tan.

Credit: Courtesy The State of the Birds



habitats.

Credit: Courtesy The State of the Birds