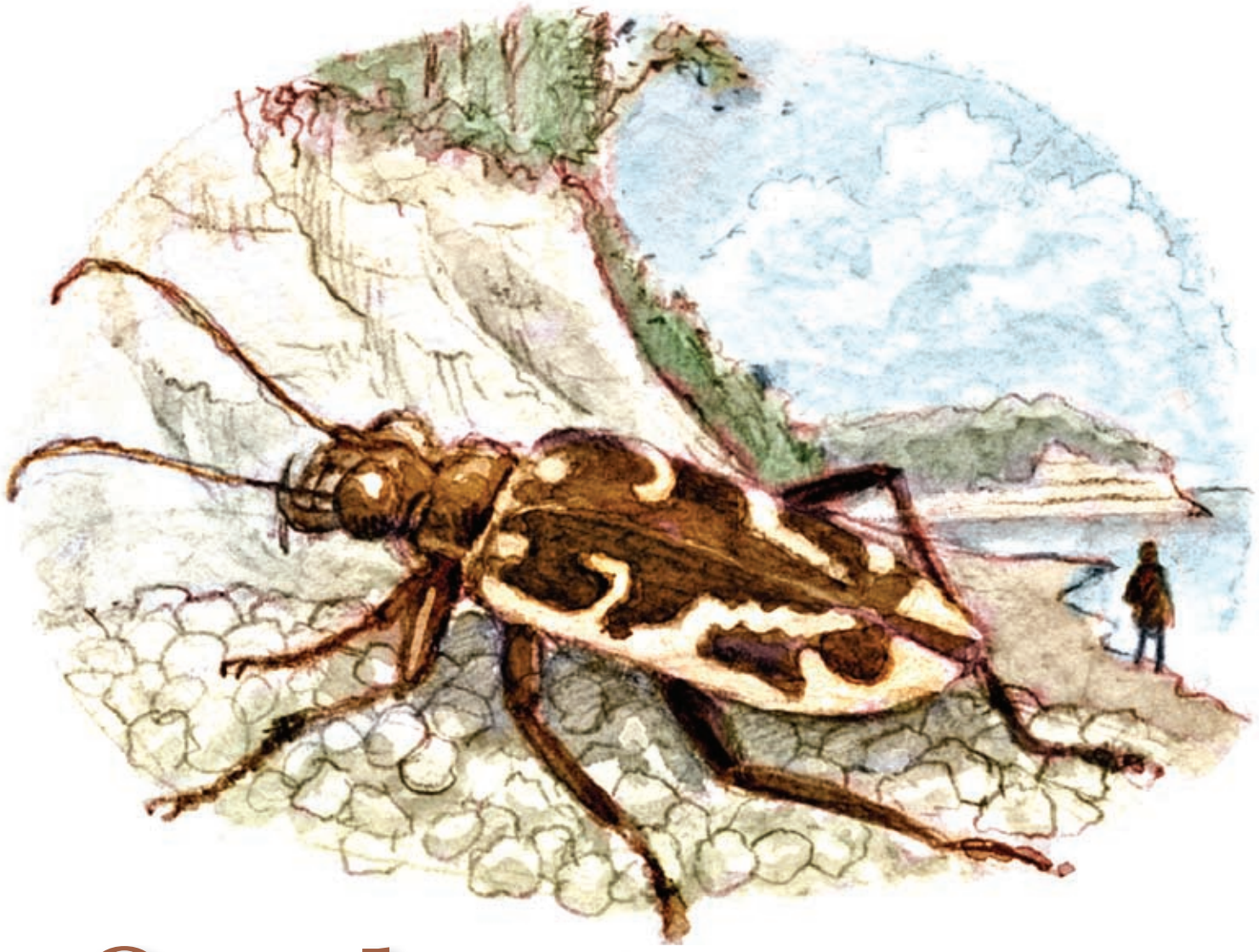
[The Washington Post]

VOLUME 8, ISSUE 7



On the Brink

Threatened and Endangered Species

BT PATTERSON CLARK — THE WASHINGTON POST

INSIDE

March 10, 2009

About On the Brink

More than 2,000 species are listed as either endangered or threatened in the United States under the Endangered Species Act (ESA). As illustrated in On the Brink found in this guide, the Washington region has its share of endangered and threatened species.

In January *The Post* reported that beached right whales were euthanized, and in March 54 whales and five dolphins stranded on a beach were rescued. Similar rescue attempts elicit questions of the ethics, policy, money spent and intervention in the natural course of life. The response is stronger when endangered and threatened species are involved.

This guide presents current Post coverage, activities and resources for further examination of species on the brink. Suggested activities include personal, state and government involvement. Case studies ask students to focus on the different points of view involved in a Montana housing project, plague on the prairie and a Bahamas reserve. Bush and Obama administration policies are contrasted and NOAA's marine mammal stranding network actions are examined.

Acknowledging the 200th birthday of Darwin, we include a George Will commentary and David Brown's science article on today's scientists' decoding of "humanity's autobiography" through DNA.

e- Replica

A reminder to *Post* INSIDE program teachers: If you plan to use articles in this guide in the e-Replica format more than three months after their publication date, remember to bookmark them to use this school year. "Follow the News" in this guide provides an activity for using the Monitor feature of the e-Replica *Post*.

Cover image: A puritan tiger beetle, one of 17 endangered and threatened species illustrated by Patterson Clark for the Post's On the Brink series. More than 90 percent of the world's remaining populations are along Maryland's Chesapeake Bay shoreline.

Lesson: Survival of plant, fish and wildlife species depends on efforts by individuals, communities and state and federal governments. Conservation includes application and interpretation of provisions of the Endangered Species Act.

Level: Low to High
Subjects: Biology, Government
Related Activity: Journalism, Economics

NIE Online Guide
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On the Brink Threatened and Endangered Species

Maryland, Virginia and the federal government identify species to classify as threatened and endangered. Supporters of the Endangered Species Act of 1973 present evidence of more than 1,300 species that have been protected in the U.S. and its territories. Others question the monies that have been spent and success in recovering biodiversity. This guide presents current media coverage, activities and resources for further examination of species on the brink.

Complete a Puzzle

Similar in shape to the original "word-cross" puzzle that was first published in 1913, "A Threat" includes words related to the fate of plants and animals. After students complete the puzzle, teachers may wish to discuss some of the terms (eagle, imperil, hive, bill, ovum and Hawaii) as related to endangered and threatened species.

Define the Terms

Ask students to define "endangered" and "threatened." After discussion, provide the definitions as found in the Endangered Species Act of 1973 (See In the Know sidebar.) It will be helpful for students to understand the definitions as they read material that refers to government actions.

Note the provision for Class Insecta under "Endangered species." What balance is attempted by this provision? [Between the safety of humans and preservation of a species].

Review the other terms found in the sidebar. Note the Dept. of Interior's Fish and Wildlife Service. What areas are under that agency's supervision?

Follow the News

This activity is provided for teachers who use *The Post*'s e-Replica program.

In addition to instructions on setting up a monitor alert, students are provided five news briefs to read. They are asked to select one to set up a monitor e-mail alert.

Discuss the phrasing of the search term. How may a term be too broad or too narrow to get the information that is sought?

As a follow-up two or more weeks after setting up the monitor, group students by the news brief selected. Have them share the search term they used and the alerts they received. Did the results vary widely by phrasing of the search term?

Teachers who do not use the e-Replica program could have students do a search within *www.washingtonpost.com* to locate follow-up articles.

Track a Tiger

The *www.washingtonpost.com* posting, relates an unusual approach to monitoring animals in a preserve.

Before reading "Dung is Key to Tracking Elusive Cambodian Tiger," teachers may wish to define the following: "conservationist," "nature reserve," "unorthodox," "poaching," and "scat."

Locate Cambodia and Phnom Penh on a map. What do students know about this country? Its habitat?

Discussion might include:

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Who's in Charge?

http://epw.senate.gov/esa73.pdf
Endangered Species Act of 1973
The Endangered Species Act protects the U.S.'s rarest plants and animals. Ranging from green sea turtles to Santa Cruz cypress trees, these species are not only national treasures, but also biological resources and often integral parts of their ecosystems.

www.fws.gov/endangered/
Endangered Species Program
U.S. Fish and Wildlife Service, part of the Dept. of Interior, latest information and archived features; Kids' Corner includes Teacher and Students sections, and Species in the Spotlight.

www.epa.gov/espp
Pesticides: Endangered Species Protection Program
EPA's ESPP promotes recovery of listed species; determines whether pesticide use may affect any listed species. Site includes For Kids (information, poster, coloring book.)

www.fs.fed.us/biology/tes/index.html
Watershed, Fish, Wildlife, Air & Rare Plants
USDA National Forest Service National Threatened, Endangered and Sensitive Species (TES) Program includes recovery of threatened and endangered species and their habitats. Site links to news, initiatives, reports and projects. See also National Botanical Ecology Unit, National Wildlife Ecology Unit, and National Fish & Aquatic Ecology Unit.

www.nmfs.noaa.gov/
National Marine Fisheries Service
Dedicated to stewardship of living marine resources and promotion of healthy ecosystems. National and international news, features and hot topics; map for Fish Facts

www.nmfs.noaa.gov/pr/species/
Office of Protected Resources
National Oceanic and Atmospheric Administration site provides species numbers, types and status; "For Kids & Teachers" and "Protecting Wildlife: How You Can Help" sections.

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- What conventional devices to track animals in the wild failed to locate the tigers? [cameras, field surveys, paw prints]
- What is the purpose of hiring dogs from Russia?
- In what other parts of the world has this approach been employed? For what animals?
- What is the goal of the "Tigers Forever" initiative?
- Locate China, India, Indonesia, Laos, Myanmar, Thailand and the Russian Far East on a map. What tigers are indigenous to these countries? What are some of the causes of reduction in numbers of tigers in this part of the world?
- Why is scat or dung used in this study? Where has it been a proven method?

Research What Has Worked — or Not

The "Tigers Forever" campaign was lauched in 2006. It is just one of many preservation programs around the world. Have students become investigative reporters to locate conservation initiatives and to determine their success.

Use the sidebar "Who Cares?" as a launching point. Have students explore these sites for programs. You may wish to narrow the study to a particular species, all animals or only fauna.

While searching these sites, students may locate the names of other organizations that are involved. For example, in "Dung is Key to Tracking Elusive Cambodian Tiger," students learn about the Wildlife Conservation Society and Panthera. Compile a list of organizations to research.

In teams or pairs, students will conduct their investigation to

- Locate projects,
- Find funding amount and sources,
- Read reports of the organization and independent agencies to determine the success of the initiative,
- Itemize reasons for success and factors influencing failure or less than expected results.

If time allows, students might expand this Web-based study to conduct interviews.

Class discussion might conclude with compiling a list of best practices, approaches that have resulted in success, negative influences and pitfalls to avoid.

When all research has been conducted, discussion or debate might include the worthiness of the project itself. Did it meet the goals of preserving and protecting endangered and threatened species? Of achieving biodiversity? Was there a narrower goal that did/did not justify the expenses? Students may attempt to rate the organizations' projects.

Students will write articles reporting their findings.

Find What's on the Brink

August 17-21, 2008, *The Washington Post* Metro section ran On the Brink, a series illustrated by Patterson Clark. Each day plants and animals in the Washington region that the federal government considers threatened or endangered were profiled.

If you have not done so already, explain the procedure for classifying plants, fish and wildlife as endangered and threatened. The Fish and Wildlife Service (FWS), in the Department of the Interior, and NOAA's National Marine Fisheries Service (NOAA Fisheries Service), in the Department of Commerce, share responsibility for administration of the ESA. These

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Who Cares?

www.defenders.org
Defenders of Wildlife
Site includes news, Creature Feature, Featured Report, Wildlife Conservation Agenda

www.esa.org/
Ecological Society of America
Online resources include peer-reviewed web-based ecological education materials, blog and podcast.

www.iucnredlist.org
International Union for Conservation of Nature and Natural Resources
News and projects around the world assessing the conservation status. Red List classifications include vulnerable, critically endangered and extinct. Download pdf: IUCN Red List Categories and Criteria.

www.nature.org
The Nature Conservancy
Search site for many reports; slideshows, podcasts and photo contests.

www.nsf.org
National Science Foundation
Search Web site for reports

www.nwf.org
National Wildlife Federation
Pull-down Wildlife menu includes gray wolf, polar bear, whooping crane, and Adopt an Animal. Check Outside in Nature menu for Ranger Rick activities.

www.sierraclub.org
Sierra Club
Search Web site for many reports on threatened and endangered species

http://hbs.bishopmuseum.org/endangered/endangered.html
Hawaii's Endangered and Threatened Species
The state with the highest number of threatened and endangered species; lists, images of rare and fragile species and "extinct-o-meter"

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responsibilities include listing and delisting species, designating critical habitat, and formulating recovery plans.

Within this guide a sampling of what's vanishing from the Washington region is provided.

Teachers should provide students with a set of the On the Brink "cards." Discuss the visual details and short descriptions. Remind students of the Endangered Species Act definitions of "threatened" and "endangered."

Questions would include:

- Do students recognize any of the featured plants and animals?
- Where is the species found in the Washington area?
- What conditions and habitat does it require to thrive?
- What is threatening its existence?
- What might be done to preserve it?

Prepare a Profile

After viewing and discussing the On the Brink series, students may be given a complete list of species that have been determined to be threatened or endangered by the federal government, Maryland and Virginia. Each is to select a plant or animal to research.

Ask students to prepare profiles similar to the On the Brink series. They are to draw or photograph (if they are lucky enough to have one of the species living in their area) their plant or animal and to write a description that includes the previous bulleted discussion items.

Get the Picture

Bring out the artist in your students. Get them to be more aware of the plants that surround them. Have them draw or photograph plants growing in their neighborhood. These may be ornamental, domesticated or wild plants. Students should ask knowledgeable people or look in plant books to locate the common and Latin names.

Create a gallery of Flora. Have students prepare the identifying labels that will be displayed with the artwork. Each label should have the student's name, the artwork's name, medium, day of creation and a short description of the plant.

Download *Museum Musings* (found at *www.washpost.com/nie*. Select Lesson Plans and scroll to September 11, 2007) for more information on setting up an exhibit.

Use a Case Study

Give students "U.S. Forest Policy Is Set to Change, Aiding Developer." After students have read the article, ask them to complete the activity found in the sidebar, "Who Is Involved in This Issue?"

They now have a summary of each stakeholder's point of view. Assign them different roles to play. Pair students or, to give the entire class a different role, you might add various county and local entities that will be affected by more residents (part-time or permanent), different environmental groups and lobbyists for specific interests.

Students are to put aside their personal points of view in order to represent the position of those they are assigned. Students should prepare a one-page statement of their role's point of view. Hold a town meeting in which each student is given the opportunity to speak.

Another potential case study is included in this guide. On January 23, 2009, Juliet Eilperin reported in "New Bahamas Reserve Protects Marine Life From

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In the Know

Conserve, conservation: Methods and procedures which are necessary to bring any endangered or threatened species to the point at which the measures provided in the Endangered Species Act are no longer necessary

Critical habitat: The specific areas within and outside the geographical area occupied by the listed species on which are found those physical or biological features 1) essential to the conservation of the species and 2) which may require special management considerations or protection

Endangered species: Any species which is in danger of extinction throughout all or a significant portion of its range other than a species of the Class Insecta determined by the Secretary [of Interior, Commerce, Agriculture] to constitute a pest whose protection would present an overwhelming and overriding risk to man

Fish and wildlife: Any member of the animal kingdom, including without limitation any mammal, fish, bird (including any migratory, nonmigratory, or endangered bird for which protection is also afforded by treaty or other international agreement), amphibian, reptile, mollusk, crustacean, arthropod or other invertebrate, and includes any part, product, egg or offspring thereof, or the dead body or parts thereof

Plants: Any member of the plant kingdom, including seeds, roots and other parts thereof

Threatened species: Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range

Source: Endangered Species Act of 1973

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Development" the disagreement between resort owners and the Bahamas Environment, Science and Technology Commission over a threatened ecosystem. The situation also has a change in national leadership influencing the outcome.

"Plague Threatens Prairie Fauna" is also included in this guide. It provides a different scenario with conflicting points of view with a direct impact on endangered species, the role of animals in the balance of nature, preservation and the interests of humans who live in the same region.

Investigate Changes in Policy

Another variation would be to use the U.S. Forest Policy case ("U.S. Forest Policy Is Set to Change, Aiding Developer") to study the impact a change of administration makes. Discussion should include the last five paragraphs of the article.

After reviewing the details of the situation, research needs to be done to confirm what action the Bush administration took, if any, on this case before January 20, 2009. Students should search *www.washingtonpost.com* or the e-Replica edition to locate follow-up articles and U.S. Forest Service documents available online.

Give students "Obama Reverses Bush on Species Protection Measure" (March 4, 2009) to read. How is the president's memorandum likely to affect the U.S. Forest Policy and the particular case involving Plum Creek Timber?

Consider the Obama Administration's Policy

Review the Bush administration positions on the Endangered Species Act, funding for preservation projects and actions taken. For example, during the Bush administration regulations made optional the consultations federal scientists have performed for 35 years on endangered species decisions. This will serve as a base to compare and contrast the policies of the two administrations.

Read "Obama Reverses Bush on Species Protection Measure." Students should summarize the presidential memorandum as reported by Juliet Eilperin.

Eilperin reports that "environmentalists and scientists welcomed the move." Outline the sources who are quoted who support this statement.

Eilperin also reports that business officials have concerns. What are their apprehensions? Who does she quote to present this point of view?

What other actions has the Obama administration taken that indicates the direction of its environmental policies?

Have students read *The Post* for a week to locate articles that relate to the administration's environmental policy. Look in particular in the News, Metro and Business sections.

Locate Stimulus Impact

The proposed stimulus package to resuscitate the American economy and the Obama administration's environmental policy *(visit www.whitehouse.gov* for policy statement) may impact a local research and endangered species management facilities. Read "Interior Secretary Pitches Stimulus in Pr. George's."

Discuss the transformation of the decaying facility into a viable lab and other facilities.

- Which agencies are involved in proposed projects?
- What are the projects?

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Read About It

Charman, Andrew
I Wonder Why the Dodo Is Dead
Kingfisher (ages 4-8)
Conversational tone answers questions about endangered animals, their habitats and conservation efforts

Collard III, Snead B.
Creepy Creatures
Charlesbridge Publishing (ages 4-8)
In living color are 22 creatures that are outfitted for survival. Pairs well with National Geographic's DVD of the same name.

Jenkins, Steve
Almost Gone: The World's Rarest Animals
HarperCollins (ages 4-8)
Caldecott Honor Book beautifully presents 21 endangered species, four extinct animals and three that were saved

Louv, Richard
Last Child in the Woods: Saving Our Children from Nature-Deficit Disorder
Algonquin Books
Louv believes children should experience the enjoyment to be found in nature near where they live as well as receive the physical and mental health benefits of spending time outside.

Schanzer, Rosalyn
What Darwin Saw
National Geographic (ages 10-14)
A tribute to Darwin's five-year voyage around the world; includes excerpts from Darwin's journals.

Wright, Alexander
Will We Miss Them?
Charlesbridge Publishing (ages 4-8)
Wright was 11 when she wrote this introduction to the challenges facing endangered species.

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- In what ways do these meet short- and long-term goals?
- What ties do FDR and Rachel Carson have to the facility?

What would students propose to use the $15 million to stimulate the local economy, involve endangered and threatened species, and provide future employment?

Propose Criteria for Rescue

On Friday, January 30, 2009, *The Post* reported that "a rare 30-foot right whale had to be euthanized after it stranded itself on a remote North Carolina beach" according to officials. The marine mammal stranding coordinator for NOAA's Southeast region stated that the "best course of action" had been taken. A veterinarian and others went by helicopter in inclement weather to examine the whale and assess its condition.

In December a newborn right whale was euthanized after it was stranded on an Outer Banks beach in Dare County.

Both whales were assessed to be in "poor condition." Both are also endangered species. Officials believe there are 350-400 North Atlantic right whales left. Should/could something have been done to rescue the whales?

Read "Officials and Scientists Debate the Criteria for Rescuing Animals." Discuss the situation in New Jersey's Navesink and Shrewsbury rivers. Use the map to locate these rivers.

Include in discussion:

- What situation in New Jersey illustrates the differences in handling stranded, injured and beached animals?
- What does the NOAA veterinarian say is a goal of the Fisheries Service? [maintaining a wild, healthy population]
- Why is NOAA involved in this situation?
- What position does Rep. Frank Pallone Jr. (D-NJ) take?
- Eilperin informs the reader that NOAA "has an elaborate marine mammal stranding network." Explain how the network works and what it has done.
- List the factors that NOAA officials consider in making a decision on rescuing an animal, especially an endangered species.
- In what ways do the animals themselves influence the success of a rescue effort?

Ask the class to write guidelines for rescuing or euthanizing endangered animals.

Read George Will

George Will's commentary, "How Congress Trumps Darwin," can be used with AP Government and English Language and Composition students for practice in analyzing rhetoric and positions on the role of government.

- What is the news peg for this column?
- Why does Will begin with a reference from the past?
- What is the contrast being made between the words of a poet and Darwin?
- What rhetorical purpose do references to Copernicus, Marx and Freud serve?
- Will adds another layer to his premise by relating Darwin's position to political philosophy. In what ways are they analogous?
- What views did Burke and Hayek hold?
- What is Will's position on the Endangered Species Act and

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Flora and Fauna

Read the Washington Post Weekend tab, especially the Museum and For Families sections for these and current activities.

Department of the Interior
Conservation in Action: The Legacy of Rachel Carson
Interior Department Museum exhibit open indefinitely
Open M-F 8:30 a.m. to 4:30 p.m.; free
18th and C streets

Department of Commerce
National Aquarium in Washington exhibit of more than 1,000 specimens of aquatic life including alligators
Open daily 9 to 5 (last admission 4:30 p.m.); $7, $6 seniors, $3 ages 2 to 10, younger free
14th Street and Constitution Avenue

http://www.nationalzoo.si.edu
National Zoo
Houses about 2,000 animals representing 400 species, a quarter of which are endangered.
Grounds open daily 6 to 6, buildings open 10 a.m. to 4:30 p.m.; free
3001 Connecticut Avenue, N.W.

Check out Washington Post online photo galleries.

http://www.washingtonpost.com/wp-dyn/content/gallery/2009/02/09/GA2009020902394.html
Animal Views
Weekly photo gallery of animals from across the globe

www.washingtonpost.com/wp-dyn/content/artsandliving/pets/
Art & Living Pets
Articles and photographs, Tip of the Week, Animal News & Views

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government intervention in preserving species?

Note Darwin's Legacy

In the January 2009 guide, the legacy of Abraham Lincoln was featured. Both Lincoln and Charles Darwin were born on February 12, 1809. "Going Where Darwin Feared to Thread" appeared in *The Post* on the 200th anniversary of Darwin's birth.

This lengthy article by *Post* science and health reporter David Brown, who is a physician, is a contemporary look at Darwin's concepts. In spite of many discoveries since the *Beagle* sailed, Brown states that "[t]he search for signs of natural selection in human beings has just begun."

What examples does Brown include to support his question: "How, if at all, are we still evolving?"

Use the informational graphic as a companion to the article.

Write About Science

Give students "Making Sense of Science Reporting" to read. Deborah Howell is the *Post's* former ombudsman, the individual who acts as a liaison between *The Post* and the public. In this December 2008 column, she addresses the job of science reporters to "take complicated subjects and translate them for readers who are not scientifically sophisticated."

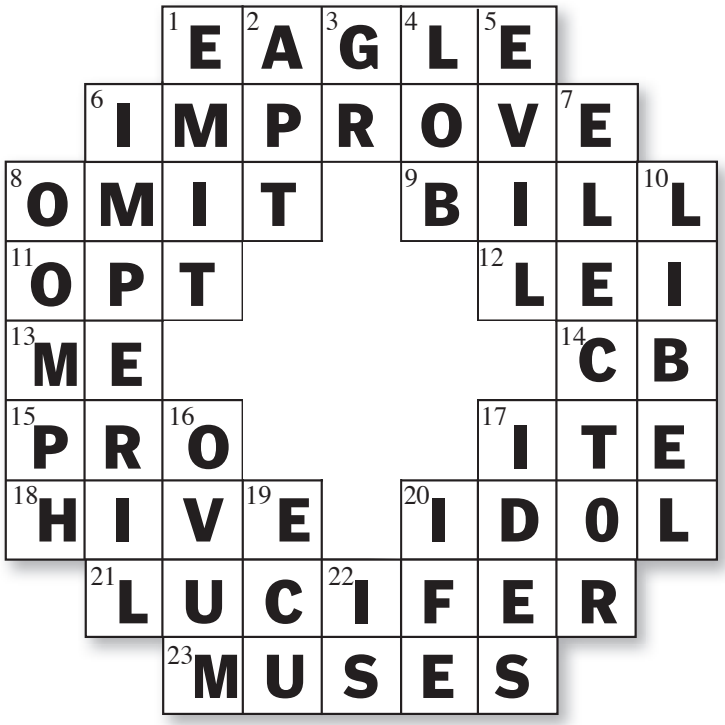
- In her column, she quotes *Post* health and science reporter David Brown. What are his perspectives on writing about science? What guidelines does he give readers? ["If there isn't enough information to give you, the reader, a fighting chance to decide for yourself whether something is important, then somebody isn't doing his job, or hers."]
- Howell also includes the criticism of an article written by science reporter Rob Stein. What problems do critics have of his coverage? What is Stein's response?

Many of your students have expertise in an area of science. Students may chose to write about a science fair or independent research project, an area of personal interest or a science project completed for class. They are to write an article, not a laboratory report.

They should apply the advice given by David Brown.

Newspaper classes and broadcast programs could consider the possibility of creating a science column or health beat. There are contests focusing on health available to students. Visit *www.jea.org* for the Ryan White Excellence in Health contest and *www.neahin.org* for Take a Shot at Disease, a vaccination awareness contest. Both require that entries be broadcast or published. ■

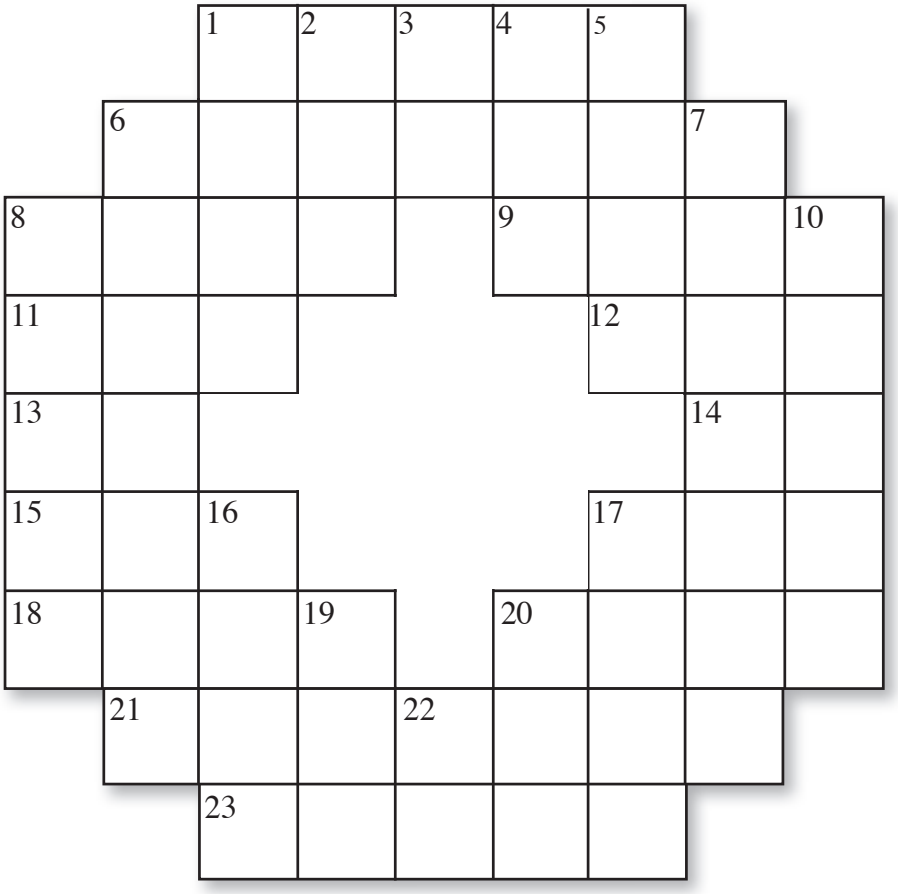
ANSWERS: A Threat?



Name _____ Date _____

A Threat?

Similar in shape to the original "word-cross" puzzle that was first published in 1913, this variation includes words related to the fate of plants and animals.



Across

1. Large bird of prey that is a national symbol of many countries
6. Become better
8. To fail to include
9. Beak
11. To make a choice
12. A garland of flowers from the state with the most endangered species
13. Objective first person who can make a difference
14. Children's Bureau (abbr.)
15. Expert
17. Suffix, native of
18. Home for bees
20. Object of worship
21. Devil
23. Guiding spirits of art and science

Down

1. Give out energy or sound
2. Exactly suitable
3. Greece (abbr.)
4. Hit in a high arc
5. Opposite of good
6. Endanger
7. Voter
8. Spirited (slang)
10. Damage a person's reputation in print
16. Egg
17. The ____ of March.
19. Environmental Crimes Unit (abbr.)
20. Injury Free Environment (abbr.)
22. Exists

Follow the News

e-Replica

You find a news brief or article of interest. Is there any means of learning the final decision, the next step or outcome? Using the Monitor feature of the e-Replica edition you can arrange to have an alert sent to you by e-mail. ▸After opening the current issue, select the My Services tab. ▸Select "My Monitors" to add a monitor. ▸In the space provided, type in your Search Term. Make this a specific request. ▸For frequency of e-mail notification, you have three choices: once a day, every other day and as-it-happens. Select the one you want. ▸If there is a particular time of day that is best for you to receive the notice, select that time. ▸After reviewing the information that you have provided, hit the Save Monitor button.

Read the following news briefs. Select one of the topics. Prepare a monitor alert.

❶ A Rare and Blessed Event; Zoo's Newborn Gorilla Could Bring Attention to Threatened Species
January 12, 2009; Metro

Zoo officials said the birth is significant because the animals, western lowland gorillas, are listed as critically endangered on the International Union for Conservation of Nature and Natural Resources Red List of Threatened Species.

❷ Wolves to Lose U.S. Protection
Associated Press
January 15, 2009; Nation

BILLINGS, Mont., Jan. 14 — The Bush administration on Wednesday announced plans to remove gray wolves in the western Great Lakes and northern Rocky Mountains regions from the federal endangered species list.

But wolves in Wyoming will remain under federal jurisdiction because that state has not done enough to ensure their survival, Deputy Interior Secretary Lynn Scarlett said.

Previous attempts by the federal government to remove wolves in both regions from the endangered list and return management authority to the states have been overruled by courts.

In the northern Rockies, the Fish and Wildlife Service tried to address the courts' concerns by excluding Wyoming, where officials had sought a "predator zone" covering almost 90 percent of the state where the animals could be shot on sight. In the western Great Lakes region, the federal government made no policy changes.

◂ Initial screen

Data screen ▸

❸ Activists, Circus Square off over Elephants
By Nedra Pickler
The Associated Press
February 4, 2009; 5:12 p.m.

WASHINGTON — The treatment of circus elephants went on trial in federal court Wednesday with animal rights groups accusing Ringling Bros. of violating the Endangered Species Act when it uses bullhooks and chains to control its performing pachyderms.

During opening statements, the two sides showed dueling videos that painted vastly different portraits of the animals' lives under the big top.

The American Society for the Prevention of Cruelty to Animals, the Animal Welfare Institute and other activist groups say they will prove that Asian elephants are injured physically and emotionally by their treatment in the circus. ...

Ringling Bros. and Barnum & Bailey Circus and its parent company, Feld Entertainment, say the activists are just philosophically opposed to animals living in captivity and want to destroy a beloved American family tradition.

Defense lawyer John Simpson said the circus is nothing without its elephants, and the tools are needed for safety and are not harmful to the animals.

❹ Feds to Consider Protection for American pika
The Associated Press
February 12, 2009; 4:56 p.m

SAN FRANCISCO — The U.S. Fish and Wildlife Service will consider whether to protect a rabbit-like, alpine creature known as the American pika because of habitat loss.

The decision comes in an agreement announced Thursday with the Center for Biological Diversity and Earthjustice. The groups sued in August to protect the so-called "boulder bunny" under the federal Endangered Species Act.

The government has until May to decide if protection is warranted.

Environmentalists say the pika is losing its cold, high-altitude habitat because of global warming. The American pika cannot survive in warm climate and has been moving to higher elevations as temperatures at lower elevations rise.

❺ Eagles' Big Moment, Diverted by a Definition
David A Fahrenthold, Washington Post Staff Writer
Feb 26, 2007; Metro

If the regal bird is ever "delisted," as officials have promised, an eagle-protection statute from 1940 will be left to guide new development along the Potomac River and other places where eagles now thrive. That law makes it illegal to "disturb" an eagle.

Now, environmentalists fear the government will settle on a narrow definition of "disturb" — like one that prohibits only killing birds, injuring them or driving them from their nests. That, they say, would be difficult to enforce and would allow developers to encroach ever more closely on eagle havens such as Mason Neck National Wildlife Refuge in Fairfax County.

The word is found in the Bald and Golden Eagle Protection Act, which will become the primary law about eagles if the birds lose threatened-species protection. It lists all the things one cannot do to the national bird: pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest, disturb.

ON THE BRINK

The Washington region has species the federal government considers threatened or endangered. More are listed by Maryland and Virginia. August 17 - 21, 2008, The Post's Metro profiled a sample of what's vanishing.

SWAMP PINK

This flowering plant, with pink blossoms that appear in spring, lives along springs, ponds or meandering streams. Its habitats have been destroyed, as wetlands were filled in for agriculture or development. Virginia and Maryland are among several Eastern states where the plant survives: 21 populations were found living on the western slopes of the Blue Ridge Mountains. Fewer than 10 populations live in Maryland, and these face threats from habitat loss and disturbance.

Federal status: **Threatened**

PURITAN TIGER BEETLE

These small insects live on and in the naturally eroding faces of sandy cliffs. More than 90 percent of the world's remaining populations are along Maryland's Chesapeake Bay shoreline, with scattered sites in Calvert County and near the mount of the Sassafras River in the upper bay. Human efforts to halt the retreat of cliffs, including breakwaters and jetties that hold back waves, throw off the delicate balance of natural erosion processes that maintain the habitat they need.

Federal status: **Threatened**

SEABEACH AMARANTH

This short plant, with red stems and green leaves, lives in a seaside niche that was unstable even before people arrived. It prefers a particular band of barren sand on the beaches of Atlantic barrier islands. Today, human activity makes it hard for the plants to take root, and efforts to address beach erosion often stop the natural shifting of sand that creates habitat. Seabeach amaranth is found on Assateague Island, but it is sometimes crushed by vehicles or eaten by wild horses and deer. National Park Service officials at Assateague are considering plans to reduce the horse and deer populations.

Federal status: **Threatened**

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MANATEE

These slow-moving "sea cows" are most often found in Florida and along the Gulf Coast, but they do turn up in summertime around the Chesapeake Bay. The most famous recent case was "Chessie," spotted in the mid-1990s, then in 2001. The creatures can eat 30 pounds of underwater grasses daily, often feasting on nonnative grasses. They have no natural predators but are slashed by motorboat propellers.

Federal status: **Endangered.**

SMOOTH CONEFLOWER

This plant, which can top four feet high, was adapted to an earlier version of the eastern United States where large animals such as elk and bison kept grazing areas close-cropped. It thrived in areas where other plants were routinely cut back, removed or burned out by fire. Now the plant survives mainly in areas that humans mow regularly, such as power-line rights-of-way and highway edges, but development has eliminated it from even some of these places. Some of the last remaining pockets are in western and central Virginia.

Federal status: **Endangered.**

HAAYS SPRING AMPHIPOD

This tiny, blind crustacean, no more than half an inch long, is found only in the District of Columbia. It lives in small freshwater springs called seeps at Rock Creek Park, where it eats bacteria and fungi on decaying leaves. Scientists say the amphipod could be at risk if pollutants are spilled into one of the springs or if development prevents rainwater from soaking into the ground and flowing out at the seeps.

Federal status: **Endangered**

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SHORT-NOSED STURGEON

This primitive-looking species has been found in the Chesapeake Bay for 70 million years. It has a long life "— some females can be older than 60" — and grows to four feet. The sturgeon's population dropped in the 19th century, when it was frequently caught by accident as fishermen sought Atlantic sturgeon, a separate species known for its caviar. Now, industrial pollution is a major threat because the sturgeon accumulates toxins as it feeds off the bottom.

Federal status: **Endangered.**

AMERICAN CHAFFSEED

This relative of the snapdragon requires grassland habitat that is periodically swept clean of competing plants by fire. In this area, it adapted to Native American practices of setting fires to drive deer herds, but it has suffered since those practices ended and fire-created grasslands nearly vanished. When the plant was listed as endangered in 1988, it was found in nine locations nationwide, including one in Baltimore County.

Federal status: **Endangered.**

DELMARVA PENINSULA FOX SQUIRREL

This large squirrel, about twice the size of common suburban squirrels, lives on nuts and seeds from hickory, walnut and loblolly pine trees. It is slower and less agile than other squirrels, living mainly on the ground and usually running away from predators instead of scurrying up a tree. The squirrel once roamed all of the Eastern Shore and nearby parts of Pennsylvania and New Jersey, but its numbers shrank about 90 percent as forests were cleared. Dangers from development persist as the Eastern Shore suburbanizes. But officials say the squirrel's numbers seem to be increasing, thanks in part to a network of protected refuges and programs to reintroduce the squirrels to suitable land.

Federal status: **Endangered.**

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NORTHEASTERN BULRUSH

This tall drooping grass-like plant with chocolate-brown flowers grows at the edges of small ponds around the Appalachians. Scientists think the plant's numbers could be shrinking further as small wetlands are filled in for development or farming. The one known location in Maryland, in Washington County, had just 100 stems when the species was listed in 1991.

Federal status: **Endangered.**

VIRGINIA BIG-EARED BAT

This odd-looking bat, whose ears can account for one-fourth of its body length, lives in scattered populations across several states, including in a handful of caves in western Virginia. It lives mainly on moths. The bat has suffered because it is extremely sensitive to disturbance: If a spelunker disturbs bats during their hibernation, the animals must raise their body temperature to flee, burning valuable fat reserves. The animals may also be threatened now by the mysterious "white nose" syndrome, in which thousands of other bats have been wiped out by an affliction that leaves their muzzles coated in white fungus. Officials fear cavers might spread the disease on their clothes.

Federal status: **Endangered.**

SHENANDOAH SALALNDER

This amphibian lives only on rocky slopes, only above 2,900 feet and only on three mountains in Virginia's Shenandoah National Park. The salamander has no lungs and breathes through its skin, so it must always stay moist. It spends its days in rock crevices and emerges at night to eat small insects. The species is threatened by acid rain, which alters the chemistry of the soil it lives in, as well as by disturbances from hikers.

Federal status: **Endangered.**

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SANDPLAIN GERARDIA

This foot-tall plant, technically an herb, lives in wooded areas mainly devoid of "understory" "— bushes or plants below the tree canopy" — and depends on forest fires to burn the understory away. So its habitat has shrunk as humans have prevented or extinguished forest fires and shrinks further when developed. The plant apparently has disappeared from Virginia and Maryland. It survives in other Eastern states.

Federal status: **Endangered.**

PEREGRINE FALCON

This fierce, fast bird eats mostly other birds "— songbirds, ducks, pigeons" — which it attacks in midair, swooping down to strike at speeds up to 200 mph. Its numbers were devastated by DDT use in the mid-20th century. The population climbed after the pesticide was banned, and the falcons have been found nesting on several large bridges and on buildings in Baltimore, Richmond and Washington.

Federal status: **No longer threatened or endangered** (still listed as threatened by the state of Virginia, and one subspecies is listed as "in need of conservation" in Maryland).

HARPERELLA

This quill-like plant, a member of the carrot family, often lives in rocks along riverbanks. The plant is adapted to the annual rise and fall of river waters, but its habitats can be silted over by dirt washing down off farm fields, construction sites and suburban lawns. At last count, the remaining Maryland populations lived along two creeks in the western hills. The last holdouts in Virginia live in Prince William County, in a site heavily threatened by nearby development.

Federal status: **Endangered.**

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DWARF WEDGE MUSSEL

The 1.5-inch mollusk once lived in 70 rivers and streams on the East Coast. But, because this mussel needs very clean water to survive, its populations have been decimated by industrial chemicals, pesticides and silt washed off farm fields. In Maryland, small populations remain on the Eastern Shore and in Charles and St. Mary's counties. In Virginia, it is found in Potomac River tributaries, as well as in the Nottoway and Po rivers.

Federal status: **Endangered.**

CANBY'S DROPWORT

A yard-tall plant with small white flowers, Canby's dropwort grows in swampy meadows and at the edges of ponds. Its habitats look like wasted land to people, so many of these marshy areas have been drained and converted to pastures or farmland. When the species was listed in 1986, there were only 10 populations left, including one with about 36 stems in Queen Anne's County on Maryland's Eastern Shore.

Federal status: **Endangered.**

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U.S. Forest Policy Is Set to Change, Aiding Developer

Shift Would Let Firm Pave Logging Roads

By Karl Vick
Washington Post Staff Writer

• *Originally Published January 4, 2009*

LOS ANGELES — The Bush administration appears poised to push through a change in U.S. Forest Service agreements that would make it far easier for mountain forests to be converted to housing subdivisions.

Mark E. Rey, the former timber lobbyist who heads the Forest Service, last week signaled his intent to formalize the controversial change before the Jan. 20 inauguration of President-elect Barack Obama. As a candidate, Obama campaigned against the measure in Montana, where local governments have complained of being blindsided by Rey's negotiating the policy shift behind closed doors with the nation's largest private landowner.

The shift is technical but has large implications. It would allow Plum Creek Timber to pave roads through Forest Service land. For decades, such roads were little more than trails used by logging trucks to reach timber stands.

But as Plum Creek has moved into the real estate business, paving those roads became a necessary prelude to opening vast tracts of the company's 8 million acres to the vacation homes that are transforming landscapes across the West.

Scenic western Montana, where Plum Creek owns 1.2 million acres, would be most affected, placing fresh burdens on county governments to provide services and undoing efforts to cluster housing near towns.

"Just within the last couple weeks, they finalized a big subdivision west of Kalispell," said D. James McCubbin, deputy county attorney of Missoula County, which complained that the closed-door negotiations violated federal laws requiring public comment because the changes would affect endangered species and sensitive ecosystems. Kalispell is in Flathead County, where officials also protested.

The uproar last summer forced Rey to postpone finalizing the change, which came after "considerable internal disagreement" within the Forest Service, according to a U.S. Government Accountability Office report requested by Sen. Jon Tester (D-Mont.). The report said that 900 miles of logging roads could

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BY MICHAEL GALLACHER — THE MISSOULIAN

Paving roads on Forest Service land would allow for the development of subdivisions. The head of the service says he will finalize the change before Jan. 20.

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be paved in Montana and that amending the long-held easements "could have a nationwide impact."

Tester and Sen. Jeff Bingaman (D-N.M.), who chairs the Energy and Natural Resources Committee, then asked for an inquiry by the inspector general of the Agriculture Department, which includes the Forest Service.

"I think we need another set of eyes on it," Tester said Friday. "I don't think that's running out the clock. If this is a good agreement, then what's the rush? Why do it in the eleventh hour of this administration?"

Probably because the proposal would die after Jan. 20. Obama sharply criticized Rey's efforts during the presidential campaign, seizing on concerns that a landscape dotted with luxury homes would be less hospitable to Montanans accustomed to easy access to timberlands.

"At a time when Montana's sportsmen are finding it increasingly hard to access lands, it is outrageous that the Bush administration would exacerbate the problem by encouraging prime hunting and fishing lands to be carved up and closed off," Obama said.

Rey vows to act soon. In a Dec. 12 letter to Tester and Bingaman, he repeated his logic for granting Plum Creek the changes it requested, then closed with a promise to schedule briefings "to describe how we plan to proceed."

In a phone interview Wednesday, Rey said he will act immediately after the courtesy meetings with the lawmakers. "That will probably be in the next week or so, before this goes forward," he said. Tester said he has not yet heard from Rey's office to arrange a meeting.

On environmental questions, the Bush administration has a checkered record of following through on promised eleventh-hour changes, said Robert Dreher, a lawyer with Defenders of Wildlife.

"I suppose it's a legacy issue," Dreher said. "They've already backed off on a couple of things they said they were going to do," including proposed changes on marine fisheries and industrial emissions.

On the other hand, the Bush White House went ahead with controversial changes to the Endangered Species Act, despite opposition from environmentalists.

The Plum Creek deal could be accomplished with the stroke of a pen. Because it amends existing easements, the change involves no 30-day waiting period. But the step carries a political cost that the administration evidently has been assessing since June, when Rey said he expected to formalize within a month the change, which half a year later is still hanging fire.

"It's conceivable they don't want to leave office looking like bad guys," Dreher said. "There's been a lot of concern about the nature of the process and the lack of inclusiveness. You've got the county government in Montana angry over it. If they do this walking out the door, they're kind of ramming it down their throats." ■

Who Is Involved in This Issue?

After reading the article, write a short statement of the position being taken by the following stakeholders in changing U.S. Forest Service agreements.

- ❑ Agriculture Department (inspector general)
- ❑ Bush administration
- ❑ County governments
- ❑ Environmentalists
- ❑ Homeowners
- ❑ Lobbyist
- ❑ Plum Creek Timber
- ❑ Sportsmen
- ❑ U.S. Forest Service leadership
- ❑ U.S. Forest Service employees involved in this case
- ❑ U.S. Government Accountability Office
- ❑ U.S. senators

What position would you encourage the Obama administration to take?

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Plague Threatens Prairie Fauna

By Chet Brokaw
Associated Press

• *Originally Published September 7, 2008*

BY BLAINE HARDEN — THE WASHINGTO POST

A prairie dog in the Buffalo Gap National Grasslands in South Dakota.

INTERIOR, S.D. — On the grasslands a few miles from the pinnacles and spires of Badlands National Park, federal wildlife officials are waging a war to save one of the nation's largest colonies of endangered black-footed ferrets.

Deadly sylvatic plague was discovered in May in a huge prairie dog town in the Conata Basin. The black-tailed prairie dog is the main prey of ferrets, and the disease quickly killed as much as a third of the area's 290 ferrets along with prairie dogs.

The disease stopped spreading with the arrival of summer's hot, dry weather, but it poses a serious threat to efforts to establish stable populations of one of the nation's rarest mammals, said Scott Larson of the U.S. Fish and Wildlife Service in Pierre.

The plague, which is carried by fleas, is the biggest danger to ferrets' survival in the Conata Basin and other sites that still support ferrets, said Larson, who is coordinating ferret conservation efforts among five federal agencies.

"It has the capacity to take out more ferret habitat than anything we've run up against, and do it in such a short order," Larson said. "For ferrets, it's the most challenging issue we face."

The ferrets were once considered extinct. But one colony was discovered in Wyoming in 1981, and a captive breeding program succeeded in increasing their numbers. Since then, ferrets have been reintroduced at 17 sites in South Dakota, Wyoming, Montana, Colorado, Utah, Kansas and Mexico, said Nancy Warren, endangered species program leader in the Rocky Mountain Region of the U.S. Forest Service.

Reintroduction efforts failed in some locations, and plague has hit most of the ferret colonies to some degree, Larson said.

Establishing many reintroduction sites helps protect the overall ferret population from being wiped out by plague, Larson said. "I guess it's the old risk management of having your eggs spread out among many baskets."

Representatives of federal agencies and some conservation groups have taken a double-barreled approach to try to stop the spread of plague and save prairie dogs and ferrets in the 20-mile-long Conata Basin, a portion of the Buffalo Gap National Grasslands that lies just south of the Badlands in southwestern South Dakota.

This summer, a crew of four has buzzed across the prairie on all-terrain vehicles, pausing frequently to spray white insecticide dust into prairie dog burrows to kill fleas.

After dark, another crew moved into

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another crew moved into the area during part of the summer to shine spotlights across the grasslands, trap ferrets and vaccinate them against the plague.

Officials want to dust about 11,000 acres with insecticide by this fall and have covered about two-thirds of that area so far. More than 60 ferrets have been vaccinated, with 15 of them already getting the desired two doses.

Of the 25,000 acres of prairie dog habitat managed for ferrets in the basin, the plague had spread to about 9,700 acres before its growth halted in August. Officials expect the plague might start spreading again this fall or next spring. The disease has not been found inside Badlands National Park itself.

Warren said the insecticide appears to be effective, but it is too early to tell if it will save the ferrets.

"We're learning as we go. We really don't know the answer to that yet," Warren said. "We're hopeful with the dusting, which is something new we're doing now, we'll be able to at least contain the extent of this plague."

The basin also has been the focus of controversy as the Forest Service tries to balance the protection of prairie dogs and ferrets with the needs of ranchers who graze cattle on leased sections of the national grasslands.

Prairie dogs once were routinely poisoned as pests. However, the rodents expanded rapidly in the region, moving from federal land to private ranches, during an extended drought and a halt to poisoning on federal land while government officials considered whether they should be protected under the Endangered Species Act. The Fish and Wildlife Service decided in 2004 not to protect prairie dogs, but the agency is now reconsidering the issue.

Jonathan Proctor, Great Plains representative for Defenders of Wildlife, a conservation group, said the Conata Basin is the last remaining large complex of black-tailed prairie dogs on the Great Plains since the plague destroyed two in Montana and Wyoming. Prairie dogs must be protected because they are important not only to ferrets, but also to hawks, burrowing owls and many other species, he said.

"Even with the loss of almost 10,000 acres of prairie dogs, Conata Basin still remains the largest and most important prairie dog complex on federal lands in the Great Plains. It's worth all these efforts to save it," Proctor said.

But Shirley Kudma, who ranches in the basin with her husband, Donald, said the prevalence of plague confirms the predictions of ranchers overrun by prairie dogs in the past decade. They argued more should have been done to limit the spread of prairie dogs because the hungry rodents strip the ground of grass and leave little for cattle.

"Nature took care of it, didn't it?" Shirley Kudma said. "There's the plague and the prairie dogs, and that's nature taking care of the expansion."

Ranchers don't want to wipe out prairie dogs, she said.

"I think we want to get along. We want to be able to survive just the same as the prairie dogs want to survive. We don't want to annihilate them. We don't. Just get them under control so they're not sick. Give the ferrets something healthy to eat."

About five to 15 people are infected by plague in the United States each year, but it can be cured with antibiotics if treatment is prompt. ■

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Dung is Key to Tracking Elusive Cambodian Tiger

By Sopheng Cheang
The Associated Press

• Originally Posted February 13, 2009; 4:53 a.m.

PHNOM PENH, Cambodia — A dog trained to sniff for tiger droppings will help conservationists determine if the big cats still roam one of Cambodia's largest nature reserves.

Starting next week, Maggie, a German wirehaired pointer, will begin scouring the undergrowth and sniffing for tiger scent on trees at the 1,158 square mile (3,000 square kilometer) Seima Biodiversity Conservation Area in northeastern Cambodia.

The unorthodox move to employ a dog trained in Russia to search for signs of tigers comes after camera traps and field surveys failed to find the big cats last year. The last sign of a tiger was in 2007, when a paw print was spotted in the park.

"We think this is the best method when we have a large area and not that many tigers," said Hannah O'Kelly, a wildlife monitoring adviser for the New York-based Wildlife Conservation Society, which along with the wild cat conservation group Panthera is spending about $30,000 to bring Maggie and a second dog from Russia to Seima later this year.

Hiring the two dogs is part of a $10 million, 10-year initiative by WCS and Panthera, also based in New York, called "Tigers Forever." It aims to increase the numbers of tigers by 50 percent in Cambodia, China, India, Indonesia, Laos, Myanmar, the Russian Far East and Thailand through a range of measures that include better monitoring, assessments of threats and efforts to minimize the dangers facing the big cats.

The campaign was launched in 2006 to combat a dwindling tiger population in Asia. Across the continent, the number of tigers has plummeted to as few as 5,000 tigers from a high of 100,000 a century ago due to poaching, habitat loss and other threats. It is unclear how many tigers remain in Cambodia.

Men Soriyun, a project manager for Seima Biodiversity Conservation Area, said he felt that dogs offered the best hope of finding the tigers and that the method could be used by other national reserves.

"The best way to find tigers in the jungle is to use dogs because they can find tigers by their smell," Men Soriyun said.

Cambodia is the first country in Asia to employ the dogs to search for tigers, a method pioneered in Russia's Far East region which has hundreds of tigers spread across several thousand miles (kilometers).

Since then, dogs have been used to search for jaguars in South America and leopards in Africa.

All six dogs taught to search for tigers were trained by wildlife biologist and WCS consultant Linda Kerley in Russia's Lazovsky Nature Reserve. The best dogs for the task, she said, are hunting or sheep herding dogs that can easily detect the musky smell of the tiger's scat, excrement left by a wild animal.

"We don't want a dog that will hunt tigers," said Kerley, who accompanied Maggie to Cambodia. "We want a dog that wants to hunt for the scent of the scat."

The effort is part of a larger campaign by conservationists worldwide to mine animal droppings for genetic information that can save endangered species.

Elephant dung, for example, was used two years ago to calculate the population of pachyderms in Malaysia's Taman Negara National Park. ■

WILDLIFE CONSERVATION SOCIETY

Tigers Forever aims to increase the numbers of tigers by 50 percent in Cambodia, China, India, Indonesia, Laos, Myanmar, Thailand and the Russian Far East.

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Obama Reverses Bush on Species Protection Measure

By Juliet Eilperin
Washington Post Staff Writer

• *Originally Published March 4, 2009*

In a move that will subject a number of government projects to enhanced environmental and scientific scrutiny, President Obama is restoring a requirement that U.S. agencies consult with independent federal experts to determine whether their actions might harm threatened and endangered species.

The presidential memorandum issued yesterday, which marks yet another reversal of former president George W. Bush's environmental legacy, will revive a decades-old practice under the Endangered Species Act that calls for agencies to consult with either the Fish and Wildlife Service or the National Oceanic and Atmospheric Administration on whether their projects could affect imperiled species. On Dec. 16, the Bush administration allowed agencies to waive such reviews if they decided, on their own, that the actions would not harm vulnerable plants and animals.

Obama, who visited the Interior Department to commemorate its 160th anniversary, said he had instructed Interior and Commerce Department officials to review the Bush rules. In the meantime, according to the memorandum, officials should "follow the prior longstanding consultation and concurrence practices" that call for independent reviews. "The work of scientists and experts in my administration, including here at the Interior Department, will be respected," Obama said. "With smart, sustainable policies, we can grow our economy today and preserve the environment."

Environmentalists and scientists welcomed the move, but business officials said it could delay federally funded projects that could help revive the nation's economy: All of them agreed it would prompt a second look at several initiatives adopted by the Bush administration in its final months in office.

Earthjustice lawyer Janette Brimmer, whose group had challenged the Bush rule in federal district court in California, said she expected that the new administration would reexamine two pending projects: a Bureau of Land Management plan for overseeing Oregon's forests, which was finalized on Dec. 30 and could affect protected species such as the northern spotted owl; and construction of the White Pine coal-fired power plant in Nevada.

"I think the Obama administration now is going to take a step back on these projects. It needs to bring science back into the equation," Brimmer said, adding that her group will not drop its lawsuit until it can assess how the new policy is working.

Francesca Grifo of the Union of Concerned Scientists, an activist group, said the switch would help guard against the potential conflicts of interest and lack of expertise that could color decision-making by any agency hoping to press ahead with a particular project. "After years of scientific scandal, the Interior Department and its partner agencies need desperately to regain credibility by making decisions with honesty, clarity and transparency," Grifo said.

But William L. Kovacs, the U.S. Chamber of Commerce's vice president of environment, technology and regulatory affairs, said that reviving another layer of review "will result in even greater delays to projects — including stimulus-backed, job-creating projects — as agencies now grapple with the prospect of lengthy interagency consultations to determine, for instance, if a bridge project in Florida contributes to the melting of Arctic ice. This is such a departure from the spirit and the letter of the Endangered Species Act that we wonder if the law's drafters would even recognize it today."

The latest policy shift follows several other administration actions revamping environmental policies, including a reexamination of fuel economy standards and offshore oil drilling; a new review of whether to grant California and other states the right to regulate greenhouse-gas emissions from vehicles; and the endorsement of a new international treaty negotiation on global mercury emissions.

House Natural Resources Committee Chairman Nick J. Rahall II (D-W.Va.), who had been seeking to overturn Bush's endangered species rule through legislation, called the announcement "one more indication that the new administration truly represents change for the better and is committed to the protection of our natural resources and our environment."

Officials said the move is unlikely to trigger broad use of the Endangered Species Act to regulate greenhouse-gas emissions. While the Bush rule specifically prohibited endangered species consultations on the basis of "global processes" such as climate change, an Interior official speaking on the condition of anonymity said that under the new policy, such a review would be triggered only if scientific evidence suggested "a causal connection" between emissions from a federal project and its effect on an imperiled species or an identifiable part of its habitat. ■

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Interior Secretary Pitches Stimulus in Pr. George's

By Ashley Halsey III
Washington Post Staff Writer

• *Originally Published February 10, 2009*

The Obama administration reached for the symbolism of the Depression-era public works projects yesterday, sending Interior Secretary Ken Salazar to tour a decaying 1939 federal research facility in Prince George's County that would receive $15 million under the current stimulus proposal.

Standing by a laboratory shut down four years ago because of structural deterioration, Salazar touted the plan to replace it as evidence that the stimulus proposal would have the same enduring effect of President Franklin D. Roosevelt's effort to revive the economy in the 1930s.

Salazar said construction of a new lab and other facilities and restoration of various buildings would create about 100 jobs within 18 months at the Patuxent Research Refuge and Wildlife Research Center near Laurel.

"These are real projects that are going to make a real difference in the lives of people," Salazar said of both the local proposal and the $827 billion stimulus legislation being debated in Congress.

Salazar's visit to suburban Maryland, for which he was flanked by a group of local Democratic members of Congress, came as President Obama took his campaign for passage of the stimulus package to Elkhart, Ind., where unemployment has climbed to 15.3 percent in the past year. Obama says the plan would save or create 3 million to 4 million jobs over the next two years, but many Republicans have questioned just how much of the spending actually would create jobs.

The mission to Patuxent by Salazar, Majority Leader Steny H. Hoyer (D-Md.), Sen. Benjamin L. Cardin (D-Md.) and Rep. John Sarbanes (D-Md.) appeared intended to answer that criticism with an example of a place where the money would go and the number of jobs it would create.

"We will be investing in short term gain, but also for long term gain," Hoyer said, "and that's what President Roosevelt did in leading us out of the Depression."

The stimulus spending at Patuxent would inaugurate a 10-year, $76 million project to rejuvenate facilities shared

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BY SARAH L. VOISIN — THE WASHINGTON POST

The Stickel Laboratory at the Patuxent Research Refuge and Wildlife Research Center near Laurel is part of a $15 million stimulus proposal.

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by the U.S. Fish and Wildlife Service and the U.S. Geological Survey. The project has been planned for some time and meets the stimulus package requirements that it be ready to begin almost immediately.

The initial $15 million would pay for demolition and replacement of the abandoned laboratory; new pens for endangered owls, whooping cranes and other endangered birds; a new building for the Office of Migratory Bird Management; construction of housing for resident federal employees and modernization of several other buildings.

A similar gaggle of congressmen and an assistant Interior secretary gathered for the opening of Patuxent in 1939, three years after Roosevelt signed an executive order creating the refuge. The 2,200-acre property was part of a land-grant plantation owned by the Snowden family, and the Colonial Snowden Hall still stands amid a collection of weathered brick buildings, some with air conditioning units hanging in the windows.

The facility opened to considerable fanfare 70 years ago on land that had been restored after repeated harvesting of timber and quarrying for gravel.

The restoration, construction and creation of ponds was carried out by two of the major make-work organizations created during the Depression, the Civilian Conservation Corps and the Works Progress Administration. The CCC was created under the Emergency Conservation Work Act in 1933, and the WPA came about under the Emergency Relief Appropriation Act of 1935. Together, they put millions of Americans back to work.

BY SARAH L. VOISIN — THE WASHINGTON POST

Sen. Benjamin L. Cardin (D-Md.), left, Interior Secretary Ken Salazar and Majority Leader Steny H. Hoyer (D-Md.) outline a proposal to replace and update research facilities.

Over the past 70 years, research that at first was billed as studying the "relationship of wild life to forests and agriculture" found a name for itself: the environment. Now Patuxent's mission includes advancement of endangered species, such as the screech owl and whooping crane, the study of migratory birds, research on environmental contaminants and a host of other projects.

The Patuxent lab is credited with a major breakthrough in determining that the synthetic pesticide DDT was making its way into birds' food, thinning the shells of eggs they produced.

In 1962, biologist Rachel Carson turned that research into a best-selling book, *Silent Spring*, which said DDT had endangered entire species of birds and threatened the environment. Federal hearings followed, and ultimately DDT was banned for most uses.

The twin legacies of Carson and Roosevelt were invoked several times yesterday as officials underscored their political message: Jobs could be created to rebuild a facility that would stand for generations and house researchers whose work might make an indelible difference.

"The men and women who work here are doing incredibly important work," Cardin said. "They have been working in very difficult conditions. Look at these labs, many of which were built 50 years ago." ■

Staff researcher Meg Smith contributed to this article.

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New Bahamas Reserve Protects Marine Life From Development

By Juliet Eilperin
Washington Post Staff Writer

• *Originally Published January 23, 2009*

The Bahamas government has created a marine reserve off the island of North Bimini, preserving critical mangrove habitat and a shark nursery that had come under threat from a resort there.

The reserve, which will be protected from most fishing and other "extractive activities," is home to endangered species such as the Nassau grouper and the Bimini boa, as well as a vibrant nursery for lemon sharks.

The decision — approved by the Bahamas cabinet Dec. 29 but announced last week — is a setback for the Bimini Bay Resort and Marina, which has been clearing some of the island's mangroves to build a hotel, a golf course, a casino and two marinas, some of which have already been constructed.

Prime Minister Hubert Ingraham had initially considered establishing the reserve in the late 1990s, but his party lost power in 2002, and the development proceeded. Ingraham's party won back control in 2007.

Philip Weech, director of the Bahamas Environment, Science and Technology Commission, said the government concluded that the mangroves on North Bimini's North Sound contribute to the nation's fisheries as well as tourism.

"It is vital for the fisheries in the area to retain the ecosystem in that area," Weech said, adding that the reserve "helps us also to deal with the issue of climate change, flooding, storm surge and the biodiversity that's there."

Under the plan, the government will allow traditional land crabbing in the protected area, along with limited catch-and-release bonefish fishing.

Samuel Gruber, a University of Miami professor who has studied lemon sharks for nearly 20 years as head of the Bimini Biological Field Station, called the creation of the reserve "miraculous."

Gruber and four colleagues published a scientific paper last year showing that dredging in the North Sound for the resort construction in March 2001 had cut the first-year survival rates of juvenile lemon sharks there by more than 23 percent.

Ellen Pikitch, executive director of the Institute for Ocean Conservation Science at Stony Brook University, who has collaborated with Gruber on his shark research, said the Bahamas' decision is significant because mangroves represent "essential fish habitat, and they're dwindling all over the globe."

The Bimini Bay Resort and Marina did not return calls seeking comment yesterday. Weech said any further development, including the planned construction of a golf course, would be allowed only if it did not jeopardize the reserve.

Demian Chapman, a Stony Brook professor who has also conducted research in Bimini, said the golf course "would be a disaster" because it would damage the reserve's water quality.

"It's just like having a sewage plant next door," he said. ■

NOAA.GOV

Nassau grouper.

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Officials and Scientists Debate the Criteria for Rescuing Animals

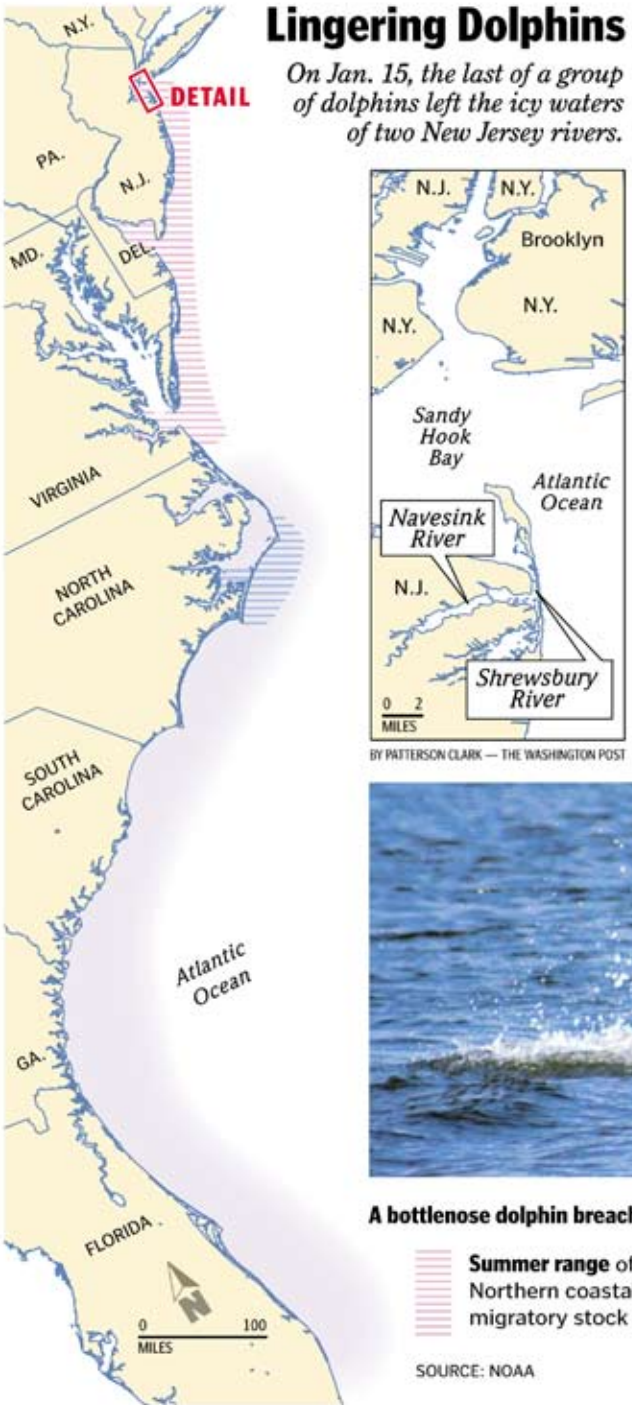

PHOTO COURTESY NOAA

A bottlenose dolphin breaches the surface of the Navesink-Shrewsbury estuary.

By Juliet Eilperin
Washington Post Staff Writer

• *Originally Published January 26, 2009*

Early last summer, a group of 16 migratory dolphins that usually spend their time cruising off the East Coast ventured up New Jersey's Navesink and Shrewsbury rivers. As the weather turned colder, local residents and federal scientists waited to see if the animals would leave — but they didn't.

Their presence triggered months of debate over whether the dolphins were trapped and should be rescued, as politicians, researchers and local residents argued over what to do when marine mammals find themselves in unfamiliar places. While the New Jersey dolphins have finally vanished — at least three have died, and the remaining members of the group have either returned to the ocean or are now trapped under a frozen river — the incident highlights the scientific and ethical questions that officials at the National Oceanic and Atmospheric Administration regularly confront.

"There's a push-pull between scientists, resource managers and the public," said Teri Rowles, the NOAA Fisheries Service's lead marine mammal veterinarian. "What's best to maintain a wild,

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healthy population — that often may be in conflict with what the public wants in terms of removing animals within a particular situation."

Rep. Frank Pallone Jr. (D-N.J.), whose district includes the region where the dolphins found themselves, said NOAA should establish consistent criteria by which to judge such situations.

"The problem is, they don't have any standards," Pallone said in an interview, adding that he had expected the agency to intervene once weather conditions worsened. "What's the policy going to be, and what's it based on? And we can't have it change from one day to the next."

In fact, NOAA has an elaborate marine mammal stranding network that involves more than 100 partner organizations to help monitor and aid animals in distress. Each year, the groups deal with more than 5,000 marine mammals in trouble, including large whales, small cetaceans such as dolphins and porpoises, and pinnipeds such as seals and sea lions. In Hawaii alone, the large whale network has tried to disentangle 28 humpback whales since 2002; 53 percent of its attempts succeeded.

NOAA, which ultimately determines whether to attempt a rescue, takes several factors into account when deciding whether to intervene, Rowles said. If the animals are trapped as a result of human activity or if they are in danger of going extinct, federal authorities usually make an effort to extricate them. If the creatures are far outside of their usual habitat — such as the 100 offshore bottlenose dolphins that got stranded in a lagoon in Long Key, Fla., in 2000, or the humpback whale cow and calf that swam into the Sacramento River in 2007 — officials often seek to relocate them. On a few occasions, rescuers have helped young cetaceans that were incapable of moving on their own.

Some animals, of course, are easier to herd than others. Larger groups of marine mammals are often more willing to move than smaller ones, and certain species that find themselves out of their usual range, such as pilot whales or Atlantic white-sided dolphins, are more comfortable following a leader out of a tight bind.

The coastal bottlenose dolphins that swam upriver in New Jersey did not fit any of these categories, said NOAA officials and independent experts. Belonging to a population that numbers about 7,500, the group of 16 dolphins would normally not be that far inland, but they were not as far out of their usual habitat as ones that travel exclusively in the open ocean.

Dolphins have been stranded at least twice before in the Shrewsbury River, in 1993 and 2000, and rescue attempts in those instances largely failed. In 1993, the animals scattered and were not seen again; in 2000, the mother dolphin died while her calf survived, only to die later in a rehabilitation center.

Randall Wells, a senior conservation scientist at the Chicago Zoological Society who advised NOAA in both this year's New Jersey case and the one in 1993, said wildlife managers must respect the fact that animals sometimes seek to expand their range. Since 2005, the New Jersey shore has been home to a growing profusion of menhaden, a small fish that bottlenose dolphins eat — a factor that may have lured the animals into the two rivers.

"The animals got to where they are under their own power. It wasn't human intervention that got them to where they are," said Wells, who manages the Mote Marine Laboratory's dolphin research program in Sarasota, Fla. He added that for humans to resist the idea that wild populations can shift over time "is insanely shortsighted on our part and doesn't give the animals credit for being adaptable."

Others challenge that reasoning. David DeGrazia, who chairs George Washington University's philosophy department and has written about dolphins' cognitive abilities, questioned whether federal officials would have responded the same way to humans in a similar predicament. "We should regard them to having the same moral entitlements as we have," DeGrazia said. "Even if they're not human, we're talking about individuals who matter a great deal, who are in distress."

Robert Schoelkopf, who directs the Marine Mammal Stranding Center in Brigantine, N.J., observed the dolphins getting thinner over time and accused NOAA of practicing "poor science" by letting the animals fend for themselves.

"We do strandings. That's what we do," he said, adding that he watched the river, which is now frozen, as the weather got colder. "That is not natural habitat for bottlenose dolphins."

NOAA scientists, who have performed eight vessel surveys of the area in the past seven months, said five dolphins remained in the river as of Jan. 13. Two days later, local residents saw multiple dolphins leaving the Shrewsbury River and heading into Sandy Hook Bay, and no dolphins have been seen in the area since then.

"We're optimistic that the dolphins have left the area," said Trevor Spradlin, a NOAA marine mammal biologist. "We'll know more in coming days. We plan to do a thorough survey of the area as soon as weather and ice conditions improve." ■

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Lightning in a Beetle

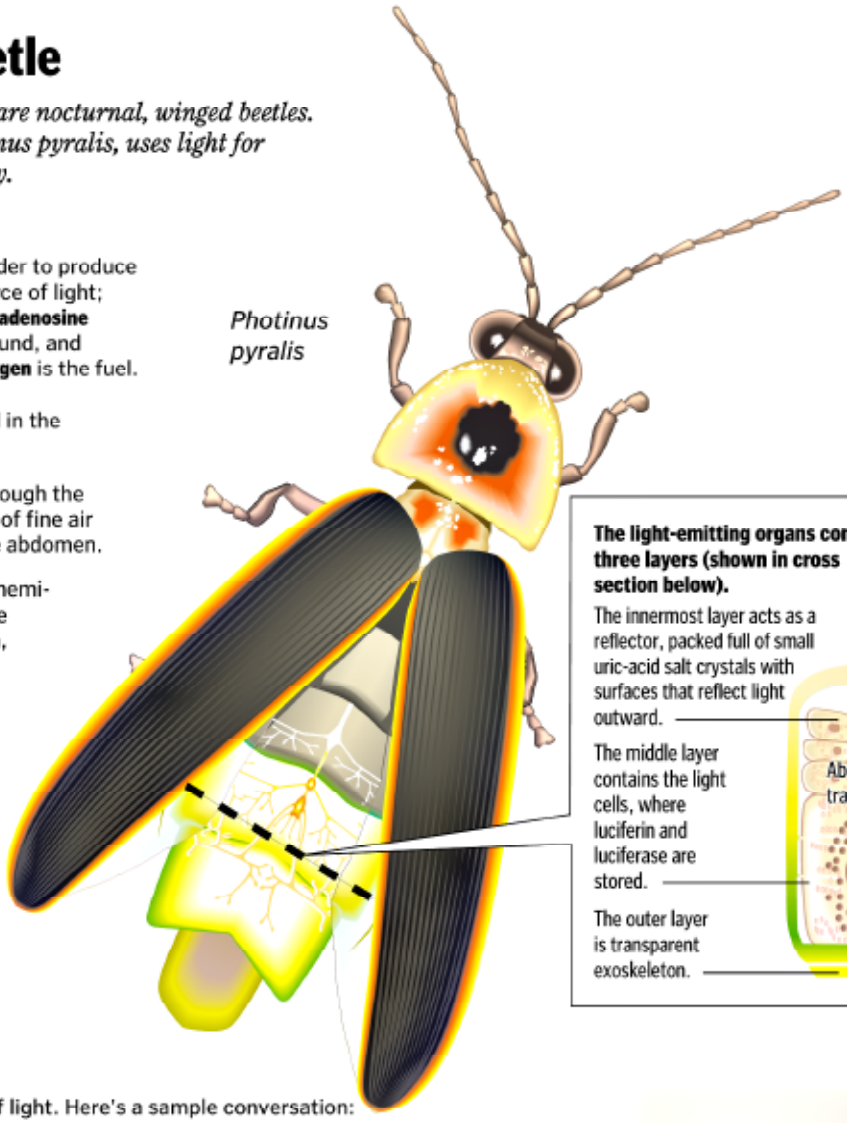
Fireflies are not flies at all; they are nocturnal, winged beetles. The most common species, Photinus pyralis, uses light for finding mates and for luring prey.

Creating light

Five components must interact in order to produce the firefly's light: **Luciferin** is the source of light; **luciferase**, an enzyme, is the trigger; **adenosine triphosphate (ATP)**, a chemical compound, and **magnesium** transport energy; and **oxygen** is the fuel.

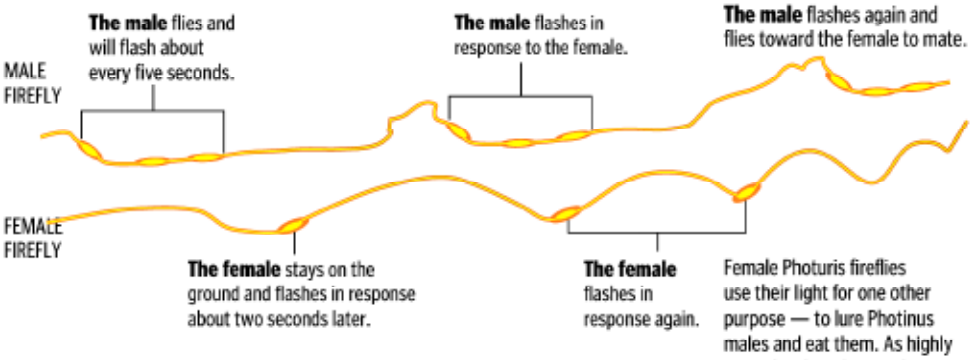
1. **Luciferin** and **luciferase** are stored in the firefly's light-emitting organ.
2. The firefly breathes in **oxygen** through the abdominal tracheae — a system of fine air tubes controlled by nerves in the abdomen.
3. Aided by **magnesium** and **ATP**, a chemical reaction takes place when the luciferase acts upon the luciferin, resulting in a flash of light.
4. The flashing continues until the luciferin is used up, when the firefly must generate more.

Nearly 100 percent of the energy of a firefly's flash is light; in a standard light bulb, only 10 percent of the energy is light and the other 90 percent is given off as heat. The brightness of a single firefly is 1/40 that of a candle.



Communicating with light

Fireflies communicate with flashes of light. Here's a sample conversation:



Female Photuris fireflies use their light for one other purpose — to lure Photinus males and eat them. As highly specialized predators, they can imitate the flash signal given by other species' females.

HOW OTHERS USE THEIR LIGHT

■ Fireflies are used in medical research. As all living cells contain ATP, the injection of the firefly's chemicals quickly detect energy problems in human cells (for example, between normal and cancerous cells). The firefly technique is used in research on cancer, multiple sclerosis, cystic fibrosis and heart disease.

SOURCES: Eric R. Day, manager, Insect Identification Laboratory, Department of Entomology, Virginia Tech; "Fireflies at One Hundred Plus: A New Look at Flash Control," Helen Ghiradella and John Schmidt, Department of Biological Sciences, State University of New York at Albany

BY BRENNA MALONEY AND JAMES SMALLWOOD — THE WASHINGTON POST

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GEORGE F. WILL

How Congress Trumps Darwin

"Descended from the apes!" exclaimed the wife of the bishop of Worcester. "Let us hope that it is not true, but if it is, let us pray that it will not become generally known."

An American majority resists such an annoying notion, endorsing the proposition that "God created human beings pretty much in their present form at one time within the last 10,000 years." Still, evolution is a fact, and its mechanism is natural selection: Creatures with variations especially suited to their environmental situation have more descendants than do less well-adapted creatures.

This Thursday, the 200th anniversary of the births of Charles Darwin and Abraham Lincoln, remember that Lincoln mattered more. Without Darwin, other scientists would have discerned natural selection. Indeed, Darwin's friend Alfred Wallace already had. Without Lincoln, the United States probably would have been sundered into at least two nations. Probably into more: Southerners, a fractious tribe, would not have played nicely together in the Confederacy for very long.

Unlike Lincoln, Darwin still disturbs humanity's peace of mind. Some people flinch from the idea of natural selection, a.k.a. "survival of the fittest," because it suggests Lord Tennyson's "nature, red in tooth and claw." But Darwin, in the last paragraph of *The Origin of Species,* saw beauty:

"Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved."

Walt Whitman, seared by Lincoln's war to guarantee the nation's survival, adopted a materialist's mysticism about the slaughter: Human immortality is in earth's transformation of bodies into an "unseen essence and odor of surface and grass, centuries hence."

After Copernicus dislodged humanity from the center of the universe, Marx asserted that false consciousness — we do not really "make up our minds" — blinds us to the fact that we are in the grip of an implacable dialectic of impersonal forces. Darwin placed humanity in a continuum of all protoplasm. Then Freud declared that the individual's "self" or personhood is actually a sort of unruly committee. All this dented humanity's self-esteem.

Still, many people of faith find Darwinism compatible with theism: God, they say, initiated and directs the dynamic that Darwin described.

In the end, Darwin, in spite of perfunctory rhetorical references to "the Creator," disagreed. As a scientist dealing with probabilities, and with a profoundly materialist theory, he had no intellectual room for a directing deity that wills a special destination for our species.

Darwin's rejection of premeditated design helped to validate an analogous political philosophy. The fact of order in nature does not require us to postulate a divine Orderer, and the social order does not presuppose an order-giving state. As a practical matter, we cannot expel government from our understanding of society as Darwin expelled God from the understanding of nature. But Darwinism opens the mind to the fecundity of undirected, spontaneous, organic social arrangements — to Edmund Burke and Friedrich Hayek.

Speaking of government, in 1973, Congress passed the Endangered Species Act. It said that when identifying an "endangered" or "threatened" species, the government should assess not only disease, predation and threats to its habitat but also "other natural ... factors affecting its continued existence." Natural factors?

Four years later, the act held up construction of a Tennessee dam deemed menacing to the snail-darter minnow. Ed Yoder, a learned and sometimes whimsical columnist, noted that it was under Tennessee's "monkey law" that John Scopes was tried in 1925 for teaching biology in a way considered incompatible with Genesis. While not equating Tennessee's law with "a measure so enlightened" as the 1973 act, Yoder noted:

"Both measures involve legislative interposition in the realm of biological change; and which will have involved the greater hubris is yet to be seen. Tennessee's ambitions were comparatively modest. It sought only to conceal the disturbing evidence of natural selection from impressionable school children. The Congress of the United States, one is intrigued to learn, intends to stop the nasty business in its tracks."

With that accomplished, it should be child's play for Congress to make the climate behave. Pick your own meaning of "child's play." ■

— Sunday, February 8, 2009

George Will may be contacted at georgewill@washpost.com.

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Going Where Darwin Feared to Tread

Scientists Begin to Decode the History of Human Evolution

By David Brown
Washington Post Staff Writer

• *Originally Published, February 12, 2009*

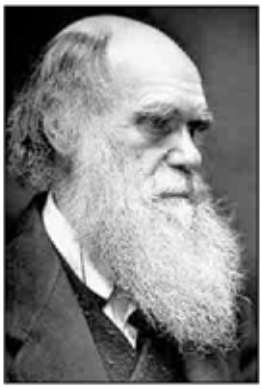
In biology's most famous book, *On the Origin of Species,* Charles Darwin steered clear of applying his revolutionary theory of evolution to the species of greatest interest to his readers — their own.

He couldn't avoid it forever, of course. He eventually wrote another tome nearly as famous, *The Descent of Man*. But he knew in 1859, when "Species" was published, that to jump right into a description of how human beings had tussled with the environment and one another over eons, changing their appearance, capabilities and behavior in the process, would be hard for people to accept. Better to stick with birds and barnacles.

Darwin was born 200 years ago today. *On the Origin of Species* will be 150 years old in a few months. There's no such reluctance now.

The search for signs of natural selection in human beings has just begun. It will ultimately be as revelatory as Newton's description of the mathematics of motion 322 years ago, or the unlocking of the atom's secrets that began in the late 1800s.

The inundation of data since the completion of the Human Genome Project in 2003, and the capacity to analyze it at the finest level of detail — the individual DNA nucleotides that make up the molecule of heredity — are giving us a look at humanity's autobiography in a way that was once unimaginable.



Charles Darwin, who formulated the theory of evolution, was born 200 years ago today.

In small, discrete changes in our genes that have accumulated over time, we are seeing evolution's tracery, as durable as it is delicate. It is slowly revealing how climate, geography, disease, culture and chance sculpted *Homo sapiens* into the unique and diverse species it is today.

Biologists are discovering that the size of our limbs and brains, the enzymes in our spit and stomachs, the color of our skin, the contour of our hair, and the armament of our immune systems are each to some degree the products of evolutionary adaptation. They are the hard-earned, but unintended, bequests of our ancestors' struggle to survive.

This, of course, is no surprise. Darwin knew it was so — and he'd never heard of a gene.

The surprise is our capacity to see the mechanical changes — for genes are nothing more than little machines operating in water — that are evolution's working material. Natural selection has moved beyond metaphor. We can see the thing itself.

"Why are we the way we are? That has always been a sort of fundamental question, hasn't it? But it is only now that we can really begin to address it," said Carlos D. Bustamante, a professor of computational biology at Cornell University. "Over the ages we catalogued the anatomical differences between people and eventually biochemical differences, too. Now we can get down to the molecular differences. We really mean it this time."

Understanding which of our 25,000 genes have changed since we climbed out of the trees may have practical results as well. Many of mankind's most common health problems — hypertension, diabetes and obesity are examples — may partly be consequences of natural selection that occurred long ago, in a world far different from today's. Identifying which genes have undergone the most rapid evolution, and then figuring out what they do, may shed important light on these ailments.

Out of this research may come one other tantalizing insight: How, if at all, are we still evolving?

Promising Leads, Few Complete Answers

At the moment, though, there are a lot more promising leads than mysteries solved.

More than 300 human genes show strong evidence of recent mutations that favored survival in the face of new threats or novel environments, and consequently spread quickly through populations. For only a few, however, have researchers nailed down the full story of what the mutations did and how they helped our ancestors.

"We are really just beginning to see the landscape of human evolution. We're working toward a coherent picture of how

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we evolved over time," said Pardis Christine Sabeti, an evolutionary biologist at Harvard University.

Some of that landscape is visible on a map of the world. Many of the differences in appearance and physiology between ethnic groups are products of natural selection that occurred eons ago in the geographic regions those groups still inhabit. Natural selection, of course, didn't begin just when human ancestors and chimpanzees diverged 6 million years ago and we became our own, distinct lineage. Much of what makes us special (at least in our own eyes) was already underway.

Take our brains.

The marvelous things they can do — and the use of language is right at the top of the list — didn't leap fully formed from a profoundly inferior predecessor. Instead, our brains are the result of small structural changes, some more important than others, accumulating since deep in evolutionary time. That appears to be the case of a gene called FOXP2.

When a mutation occurs in that gene in people (a rare event), they lose the ability to make sense of language and to produce coherent speech. When the gene is knocked out in birds, their songs are incomplete and inaccurate. In bats, it seems to be involved in echolocation.

Across many species, the gene appears to play a role in processing sound and using the information to perform an action — making an intelligible grunt, singing the right song or avoiding a collision with a cave wall. And it turns out that human beings have two mutations in the FOXP2 gene that chimpanzees don't. What do they mean for the functioning of our brain cells? Nobody knows, but the betting is: something that may be key to humans' unique capacity for language.

Curiously, sometimes evolution lurches forward when a gene stops working. Making room in our skulls for our outsize brains may have been helped by such an occurrence.

Humans have completely lost the function of a gene called MYH16. It's still there, but scientists can tell from the DNA

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Over the eons, genetic mutations played a role in the skin color of different ethnic groups, including, from left, those in Kenya, Romania, Bangladesh and Bolivia. As early humans migrated around the globe, their pigments evolved in response to different levels of sunlight. Now, scientists have the ability to trace such genetic changes over generations, as well as discover how climate, geography, disease, culture and chance shaped Homo sapiens.

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sequence that it underwent a "frameshift mutation" and no longer works.

MYH16 codes for a protein that is a component of some muscles. In chimpanzees and other primates, it is active only in muscles of the head, especially ones used for chewing. Some scientists speculate that the mutation that disabled the gene freed our skulls of the physical constraints required to anchor large, powerful jaw muscles. That, in turn, may have helped make room for the brain's rapid enlargement.

Brain size itself appears to be controlled by at least four other genes; mutations in them cause microcephaly, a birth defect characterized by a small head and mental retardation. These genes have been changing more rapidly in primates than in rodents, and the pace of that evolution has been especially fast in humans and chimps. That's no surprise; they're smart and we're smarter.

Beneficial Traits Spread

It takes time for a mutation that produces an advantageous genetic trait to sweep through a population. How quickly that occurs depends, in part, on how big an advantage the change provides.

With many traits — big brains, upright posture, scant body hair, color vision — the advantage is so great that the DNA sequence for them reaches what geneticists call fixation. Everyone has it.

But fixation isn't always the endpoint. A gene-altering

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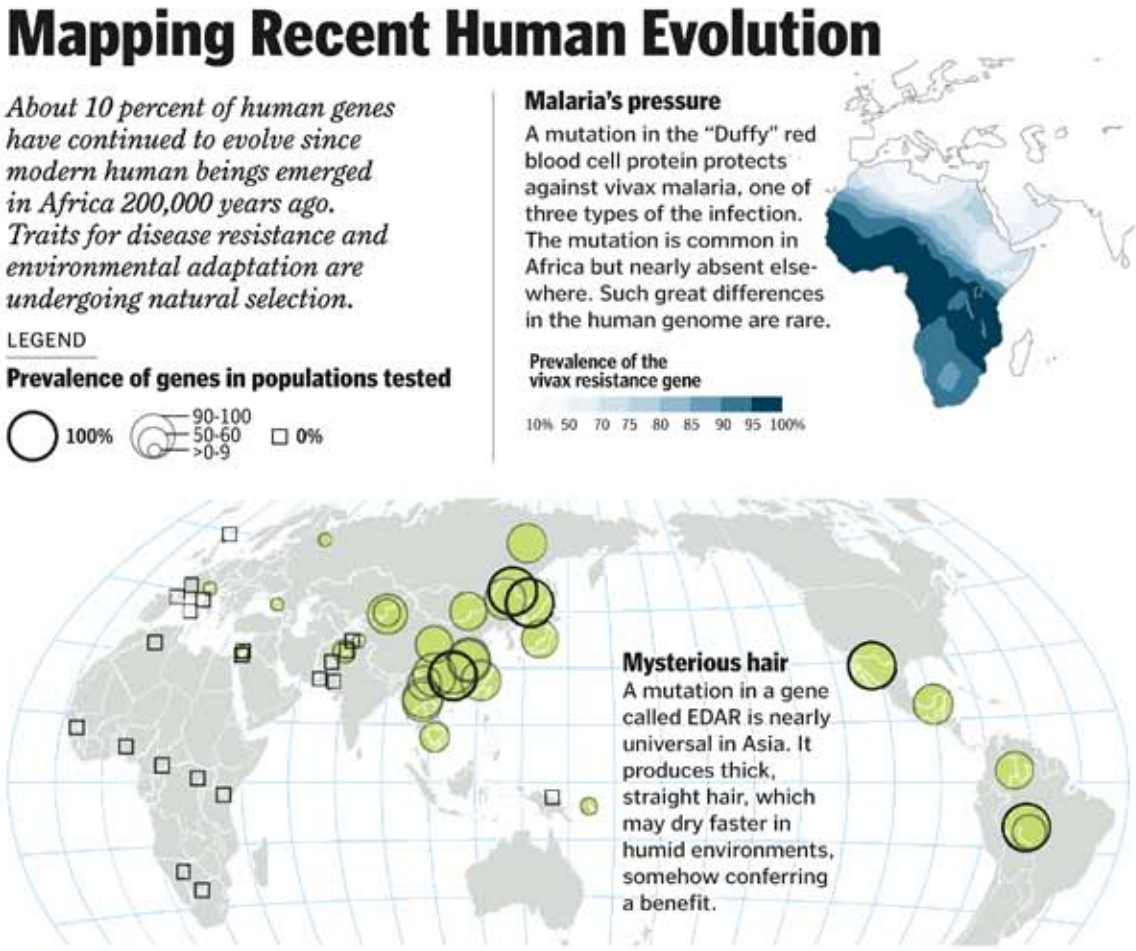
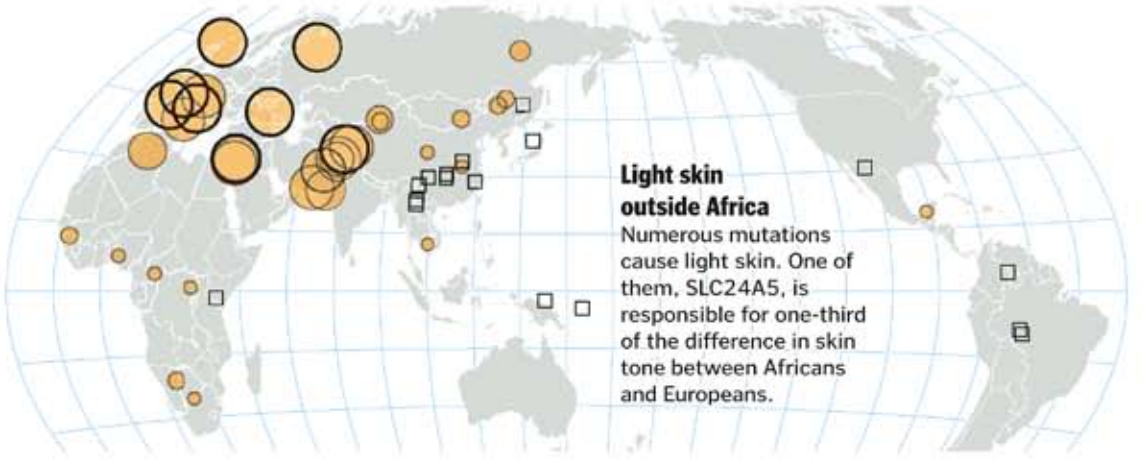
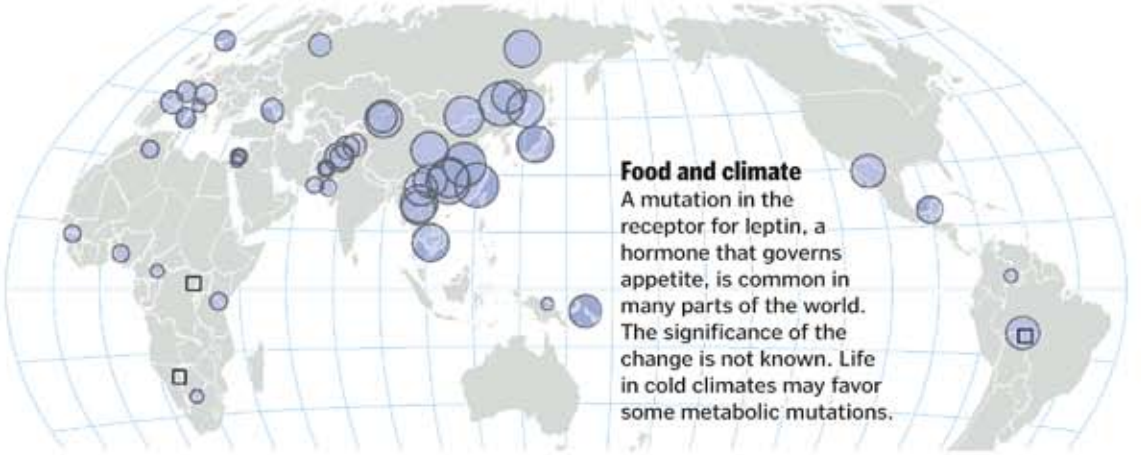


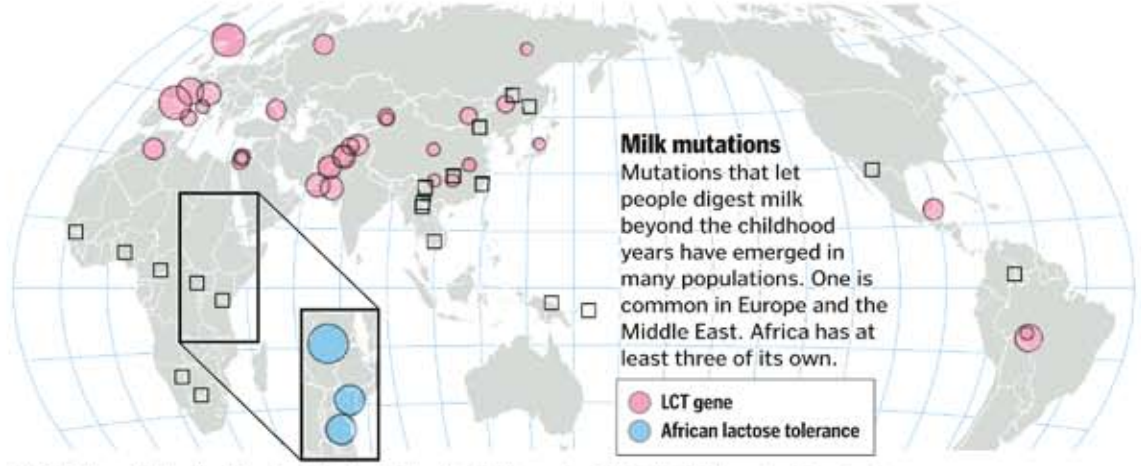
Mapping Recent Human Evolution | *continued*



Light skin outside Africa
Numerous mutations cause light skin. One of them, SLC24A5, is responsible for one-third of the difference in skin tone between Africans and Europeans.



Food and climate
A mutation in the receptor for leptin, a hormone that governs appetite, is common in many parts of the world. The significance of the change is not known. Life in cold climates may favor some metabolic mutations.



Milk mutations
Mutations that let people digest milk beyond the childhood years have emerged in many populations. One is common in Europe and the Middle East. Africa has at least three of its own.

LCT gene
African lactose tolerance

SOURCES: Joseph Pickrell and Jonathan Pritchard, University of Chicago; Sarah A. Tishkoff, University of Pennsylvania; Pardis C. Sabeti, Harvard University; Science Magazine

BY DAVID BROWN, MARY KATE CANNISTRA AND PATTERSON CLARK — THE WASHINGTON POST

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mutation can sweep through one population but remain virtually absent in another. That's because all that's required for a mutation to spread is for it to improve its carriers' chance of surviving and reproducing under their current circumstances. And circumstances are not the same for all people and can change over time.

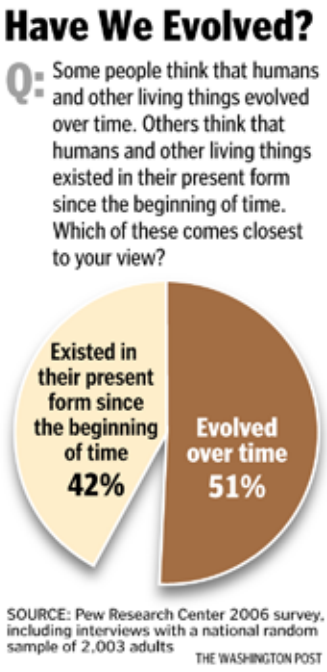
That was certainly the case 2,000 generations ago, when groups of modern humans began to leave Africa and settle nearly every corner of a geographically, climatically and botanically diverse planet. Their genes changed as a result of their journeys, and the genes of people who stayed in Africa continued to evolve, too, as life there changed.

All of this occurred by chance, and the result is the world of human diversity we see today.

"Evolution in a pure Darwinian world has no goal or purpose," biologist Edward O. Wilson wrote in the introduction to a collection of Darwin's writings a few years ago.

In other words, evolution is not like an arrow shot at a target, but like a blind dog stumbling across an obstacle-strewn landscape. This is what caused Darwin to shy away from talking about evolution and mankind in the same breath, at least at the beginning. It is still the heresy that quickens the creationist's pulse.

The current conservative estimate is that 10 percent of our genome has undergone "positive selection" since modern humans emerged about 200,000 years ago. Not surprisingly, the changes that tell the clearest stories involve basic needs — food, protection from the elements, resistance to disease.



The adaptation to malaria is the best and oldest example.

Children and pregnant women are at highest risk of dying from malaria (and about 900,000 still do each year). Any mutation that protects victims from early deaths and lets them reproduce will spread widely, because the survivors are more likely to carry it — and therefore pass it on to their descendants.

Over the past 10,000 years, such protective mutations have arisen and been "naturally selected" not once, but several times. They emerged in places where malaria was endemic — West Africa, Southern Africa, the Middle East — and took hold independently of one another.

So great was their value that they became widespread, even though they can cause problems of their own — sickle cell anemia, thalassemia and G6PD deficiency, diseases most prevalent in places where malaria was a scourge.

Matching Skin Tone to Sunlight

Non-living threats have also exerted heavy pressure on our genes over the eons. Sunlight is the most obvious one.

Several mutations that lighten skin swept through the out-of-Africa migrants, though different populations have different "suites" of altered pigment genes. That probably explains why fairness in Europeans often extends to hair color, while in Asians it almost never does.

Curiously, the reason sunlight is such a driving force isn't entirely clear.

Too much sun can burn the skin and damage folate, a vitamin essential to fertility and embryo growth. Too little blocks formation of Vitamin D, which is crucial for absorbing the calcium necessary for bones and muscle. Whatever the reason, having the right skin color for one's home latitude has clearly been a huge evolutionary task.

Of course, it's possible it could have happened by chance.

The random death of individuals carrying some genes and the chance survival of people bearing others — called genetic drift — has also shaped our genomes, most biologists believe. But the fact that so many mutations affecting skin color occurred in non-African populations and went to fixation (or close) makes chance an unlikely explanation.

"A big thing that makes you think this is natural selection is when you see 'convergent evolution' — different mutations with the exact same biological function," said Sabeti, the Harvard geneticist. "Lightning strikes once, but it doesn't often strike twice."

Researchers are now showing that culture — what humans have created — also can drive natural selection with as much force as disease and the environment.

The ability to digest milk in adulthood, called lactase persistence, exists in more than 90 percent of Scandinavians but only 1 percent of Chinese. It is much more common in places where cattle, goat and camel herding are common —

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and milk is a big part of the diet — than in populations (such as hunter-gatherers) where herding is more rare.

Most Europeans have a mutation in the lactase gene that allows them to digest milk as adults. But it is virtually absent in Africans, many of whom can also drink milk.

In 2006, scientists found three previously unknown lactase mutations that swept through East African herding cultures in the past 5,000 years, long after the European one emerged.

"The reason for the advantage is not entirely clear," said Sarah Tishkoff, a geneticist at the University of Pennsylvania who made the discovery. "It could be the protein in the milk; it could be the fat; it could be that it's a source of water in an arid region — or none of the above."

Are Humans Still Evolving?

Which brings us to the question: In a world of intensive-care units, vitamin pills, sunscreen, down jackets and (for many) too much food, has evolution ground to a halt? Or will global warming, urban crowding, HIV infection, the obesity and diabetes epidemics, and the galloping changes in technology crank it up again?

The answer seems to be: Nobody knows. But something is probably still happening.

"I definitely think people will come under new pressures," said Eugene E. Harris, a biological anthropologist at Queensborough Community College in New York. "There are going to be micro-evolutionary adjustments that occur over time. Culture is imperfect and is not going to buffer all of us."

But Bustamante, the computational biologist from Cornell, cautions that it takes 200 generations for natural selection to show its hand — and that's when it's working full tilt.

"What is going to happen in 200 generations? I don't think we have any mathematical models to answer that," he said.

Darwin, like evolution, took his time. He is the patron saint of dawdlers.

He got off the *HMS Beagle*, the ship that took him on the trip that taught him almost everything, on Oct. 2, 1836. He then spent 22 years in study, experiment and cogitation — capped with the equivalent of an all-nighter — to come up with his theory. He crashed it into print in a dead heat with Alfred Russel Wallace, a young man in a hurry, presenting it on the night of July 1, 1858, before the Linnean Society of London.

The truth is that even 200 years from today, on Darwin's 400th birthday, when we're all dead, our descendants still won't have a clue as to what the traits just now starting to evolve may be. Evolution moves slowly, and it grinds exceeding small. Darwin knew this, and wouldn't be surprised. ■

An Integrated Curriculum For The Washington Post Newspaper In Education Program

Deborah Howell

Making Sense of Science Reporting

The job of science reporters is to take complicated subjects and translate them for readers who are not scientifically sophisticated. Critics say that the news media oversimplify and aren't skeptical enough of financing by special interests.

That led me to review papers that are to be published soon as part of a project sponsored by the American Academy of Arts and Sciences on how the media cover science and technology, and to interview a half-dozen experts, from scientists to teachers of science writing. Here's my take:

■ Look for the evidence. News organizations should give weight to scientific evidence, whether it is about global warming or what the medical establishment says about Lyme disease.

Post science reporter David Brown, who is also a physician, talked about this in a recent speech at the University of Iowa. It will be published next year. "In science, there is a natural tension between evidence and opinion, and evidence always wins. What authority figures have to say about anything in science is ultimately irrelevant. Unfortunately, in a lot of science reporting, as in a lot of reporting in general, that isn't the case."

Science reporters should give readers enough information to judge "the strength of a claim" and report "how the news fits into what's already known about the subject," Brown said. "It isn't always easy to boil down research findings to a few numbers that capture the essence" of a study. "Sometimes it can't be done or can't be done on deadline," he said. So follow-ups are important.

Brown recommends noticing how much space in an article is devoted to describing the evidence of the newsworthiness of the story and how much is devoted to someone telling you what to think about it. "If there isn't enough information to give you, the reader, a fighting chance to decide for yourself whether something is important, then somebody isn't doing his job, or hers."

■ Look for context. Are the results preliminary? Does the research conflict with or confirm earlier work? Has it been published in a reputable science journal or been presented at a science meeting?

■ Look beyond the lead paragraph and headline. Remember that antioxidants were touted to prevent all sorts of disease; research proved that not to be true. One recent Page 1 story, by veteran Post science reporter Rob Stein, attracted

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comment and criticism. Stein wrote that a study produced "powerful evidence" that a blood test designed to monitor inflammation could identify "seemingly healthy people who are at increased risk for a heart attack or stroke" and that a widely used statin drug offered "potent protection against the nation's leading killers." The story quoted the study's author and other prominent experts as calling the findings a "breakthrough," a "blockbuster" and "absolutely paradigm-shifting."

The Foundation for Integrative AIDS Research (FIAR) — which has a stake in the issue because AIDS drugs can raise "bad" cholesterol levels — said stories about the study reflected "shoddy boosterism for the pharmaceutical industry rather than a careful and balanced analysis."

FIAR Director George M. Carter's chief complaint was that stories emphasized a change in "relative risk" — a 44 percent fall in the number of heart attacks, strokes and surgical procedures among people taking the statin, compared with those in the placebo group. He said the fact that everyone in the study had an extremely low "absolute risk" for heart problems should have been emphasized more. About 1.36 percent of people taking the placebo suffered a heart attack or stroke; that fell to 0.8 percent among those taking the statin. That means that nearly 97 percent of the people using the drug would not see any benefit, he said.

Stein quoted a skeptic in the ninth paragraph and noted near the story's end that "the actual risk reduction for an individual would be very small, given the relatively low risk for most middle-age people, so that the benefits easily could be outweighed by the costs of thousands more people taking tests, drugs and being monitored by doctors."

Stein said, "While I would have liked to have explored many of the nuances of this study more fully, I feel confident we struck a responsible balance. I think it's crucial to provide readers with both the evidence supporting new claims and enough context and interpretation to help them gauge its significance." Independent experts, he said, concluded the study was "a very well done, very convincing piece of research."

One of the issues in science reporting is that most readers aren't schooled in statistics. Harold Varmus, former director of the National Institutes of Health, recommends looking more deeply into the numbers. "The percentages may be high, but what is the risk of an event in the first place? If the risk is low, there's a much smaller benefit." Varmus, a Nobel laureate, is chief executive of Memorial Sloan-Kettering Cancer Center.

Marcia Angell, a physician and former editor of the *New England Journal*

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of Medicine who is now a senior lecturer at Harvard Medical School, said journalists can write "overly dramatic" stories for "gullible" readers. "Everyone has an interest in hyping news of medical research — the researcher, the institution, reporters. Readers should be very skeptical of new findings. Newspapers are in the business of telling you the news, which needs to be startling or counterintuitive or flies in the face of what we knew. By definition these stories are less likely to be accurate."

Don J. Melnick, professor of conservation biology at Columbia University, said that if a story "doesn't sound newsworthy or front page-worthy, it will be buried or not printed at all. That tends to promote people hyping the research. They have to convince their editors to put it in the paper."

Nils Bruzelius, *The Post*'s science editor, said, "I thought the story and Page 1 play were justified because the potential impact was significant, even as I understand the criticisms. There's an inevitable tension between the desire of reporters and editors to get good play for their stories and the need to avoid hype or overstatement, and we feel this very acutely in dealing with scientific or medical stories, because the advances, even those that prove to be part of something very big, usually come in incremental steps. I've long believed that science and medical stories enter this competition at some disadvantage. I certainly don't have data on this but I suspect that most of the top editors who make the front-page decisions tend to be less drawn to these topics than the average reader because, with a few exceptions, they are a naturally self-selected group who got to where they are by dint of their interest and ability in covering such topics as politics, international relations, war and national security — not science."

■ Who sponsored the research and who makes money from its findings? Angell, a critic of drug companies' influence on medical research, said, "The caveats are at the end [of the story]. The pharmaceutical industry is spreading money everywhere and the researchers have their hands out."

That was true of the statin story. In the last six paragraphs, readers learned that the study was financed by AstraZeneca, which makes the statin Crestor, and that the study's author and his hospital will receive royalties on the blood test that was studied. Drugmakers fund many large medical studies. The story said that the company had no influence over the analysis.

Varmus said there is no mechanism for support or motivation to conduct clinical trials without drug industry money. "Obviously, companies have a vested interest in a good outcome and being truthful and getting answers that won't cause them grief later on," he said. Such trials also must follow Food and Drug Administration regulations.

"It's not new that the industry is the primary source of funding clinical research," Angell said. "What is new is the strings attached and the willingness of medical schools and faculty to accept these strings. They have influence over every detail of clinical trials."

Jonathan Weiner, who teaches science writing at the Columbia University Graduate School of Journalism, said, "It's a very messy, complicated problem. With government funding tight, many doctors rely on industry for funding. People in research medicine can't stay current without going to industry-funded conferences that have the quality of junkets." Weiner wrote *The Beak of the Finch*, a book about evolutionary biology that won the Pulitzer Prize for general nonfiction in 1995.

For readers, Brown's best advice is this: "In the end, all that counts is evidence." ■

— December 7, 2008

Howell was The Washington Post's ombudsman, 2005-2008.

Academic Content Standards

This lesson addresses academic content standards of Maryland, Virginia and the District of Columbia.

Maryland

Science, Ecology: The student will investigate the interdependence of diverse living organisms and their interactions with components of the biosphere (Expectation 3.5)

Science, Biology: Recognize and explain how human activities can accelerate or magnify many naturally occurring changes.
a. Based on data from research identify and describe how natural processes change the environment.
- Cyclic climate change
- Population cycles
- Extinction (Environmental Issues, Grade 8)

Reading: Apply and refine comprehension skills by selecting, reading, and analyzing a variety of print and non-print informational texts, including electronic media. (Standard 2, Indicator 1)
a. Read, use, and identify the characteristics of primary and secondary sources of academic information such as textbooks, trade books, reference and research materials, periodicals, editorials, speeches, interviews, articles, non-print materials, and online materials, other appropriate content-specific texts.

The Maryland Voluntary State Curriculum Content Standards can be found online at http://mdk12.org/assessments/vsc/index.html.

Virginia

Science, Biology: The student will investigate and understand dynamic equilibria within populations, communities, and ecosystems. (BIO.9)

Science, Life Science: The student will investigate and understand the relationship between ecosystem dynamics and human activity. Key concepts include
a. food production and harvest;
b. change in habitat size, quality, or structure;
c. change in species competition;
d. population disturbances and factors that threaten or enhance species survival; and
e. environmental issues (water supply, air quality, energy production, and waste management. (LS.12)

Government: The student will demonstrate knowledge of the role of government in the Virginia and United States economies by
c. examining environmental issues, property rights, contracts, consumer rights, labor-management relations, and competition in the marketplace. (GOVT. 16)

Standards of Learning currently in effect for Virginia Public Schools can be found online at www.pen.k12.va.us/VDOE/Superintendent/Sols/home.shtml.

Washington, D.C.

Biology: Evolution and biodiversity are the result of genetic changes that occur in constantly changing environments. As a basis for understanding this concept, (7) Research and explain that Darwin argued that only biologically inherited characteristics could be passed on to offspring, and that some of these characteristics would be different from the average and advantageous in surviving and reproducing; (B.5)

Biology: Explain how a large diversity of species increases the chance that at least some living things will survive in the face of large or even catastrophic changes in the environment (2). (B.5)

Biology: Stability in an ecosystem is a balance between competing effects. (B.8. Broad Concept)

English: Write interpretations of literary or expository reading that
- Demonstrate a grasp of the theme or purpose of the work;
- Analyze the language and unique aspects of text;
- Support key ideas through accurate and detailed references to the text or to other works;
- Demonstrate awareness of the effects of the author's stylistic and rhetorical devices; and
- Include information on the validity and reliability of all relevant perspectives. (Expository Writing, 11.W-E.2)

Learning Standards for DCPS are found online at www.k12.dc.us/dcps/Standards/standardsHome.htm.