

Frequent, abrupt changes in the climate of Earth have been the rule over the past 250,000 years, according to climate specialists' analysis of ice extracted from the full depth of the Greenland ice sheet.

Walter Sullivan of the **New York Times** wrote in mid-July that the "astonishing" findings suggest that the period of stable climate in which human civilization has flourished may be unusual and that the present climate may get either warmer or colder much more quickly than had been believed—"in spans of decades or even less."

J.W.C. White of the Institute of Arctic and Alpine Research at U/CO noted that whereas adaptation—the peaceful shifting of food-growing areas, coastal populations, etc.—seemed possible if change meant a few degrees in a century, the new studies indicate change of as much as 18 degrees in a couple of decades. The new results, reported in **Nature**, unexpectedly showed abrupt climate changes in inter-glacial as well as in glacial periods. The *Nature* article authors had no explanation for the rapid shifts, nor for the "mystery" of why the climate of the last 8,000 to 10,000 years has been "strangely stable."

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Merck, Sharp and Dohme, the pharmaceutical company, has agreed to pay Costa Rica \$1 million plus royalties from products developed as part of the on-going hunt for new chemicals in nature that may prove useful to human beings. The \$1 million is being applied by Costa Rica toward its conservation effort, and represents industry's acknowledgement that helping to preserve biodiversity is a wise investment.

Thomas Eisner, Shurman Professor of Biology at Cornell Institute for Research in Chemical Ecology and a member of the National Academy of Sciences, was quoted in the July 6, 1993 issue of the **Oregonian** as having proposed creation of a Biotic Exploration Fund of about \$250 million (the approximate cost of bringing a single pharmaceutical drug to market) to receive contributions from industrial and governmental sources. The fund would then help finance biodiversity institutes in developing nations and help create partnerships between those nations and industry. The donors would recover their investments from the new products developed; the developing nations would acquire the resources needed for conservation.

Only a tiny fraction of the millions of species of animals, plants and microorganisms on Earth have been tested for useful chemicals, Eisner said, "but the shelf of

natural molecules is fast disappearing...being cut down, eroded away, lost to urbanization..."

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Norman Myers, an environmental consultant in Headington, Oxford, UK, and a senior fellow of the World Wildlife Fund, US, is the author of an article titled *The Question of Linkages in Environment and Development* in **BioScience**, 43:5,302-310.

The article, based on an extended policy background for the secretariat of the UN Conference on Environment and Development, analyzes the character and prevalence of linkages, illustrates linkages through instances from several spheres of human activity, and concludes by considering the sorts of policy initiatives that would enable us to deal with linkages in a manner and on a scale to reflect the challenge they represent.

He describes our world view as "traditionally grounded in a practice of splitting it up into manageable components" that consider linkages as "an incidental factor too complex to be reflected (operationalized) through institutional responses," and concludes:

"We will respond to linkages either by reactions of sufficient scope and character, or by salvage measures in a world impoverished by our disregard for linkages. Linkages will eventually be addressed, whether by design or by default."

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Revelstoke, a community in the Columbia Mountains of interior British Columbia (and near Glacier NP), has developed a "vision statement," described by Jenny Feick and Dr. Albert Einsiedel, Jr. in **Research Links** (Spring 1993), Vol. 1, No. 1 of the Canadian Park Service, Western Region's Forum for Cultural and Social Studies. The authors question *Revelstoke's Vision: Will It Help Achieve Sustainable Development?* and describe the evidence supporting the notion that goals have a motivating effect on behavior.

Revelstoke has experienced a boom and bust economy based on resource exploitation of the Columbia River, its neighboring forests, and major transportation corridor. Community residents decided they wanted to shape their destiny rather than be subjected to the whims of transient developers and government. In 1992 an interdisciplinary team prepared a vision statement and in February 1993 the Revelstoke citizens voted to purchase the tree farm license north of Revelstoke "to gain local control of forest management, thus taking a first step toward making their vision a reality." Their stated goal is "achieving sustainable growth by

balancing environmental, social, and economic values within a local, regional and global context."

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From Cliff Martinka, NPS Senior Research Scientist at Glacier NP, comes word of a new book, **Parks, Peaks, and People**, compiled and edited by Lawrence S. Hamilton, Daniel P. Bauer, and Helen F. Takeuchi and produced by the East-West Center with assistance from the Woodlands Mountain Institute, the U.S. NPS, and IUCN's Commission on NPs and Protected Areas.

The book is an outstanding collection of papers arising from an international consultation on protected areas in mountain environments, held in Hawaii Volcanoes NP Oct. 26-Nov. 2, 1991. The book is available from East-West Center, Program on Environment, 1777 East-West Road, Honolulu, HI 96848. The cost is \$5, and Martinka notes: "A good value nowadays."

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The Pacific Northwest Region's Resource Management newsletter recently highlighted, from the 11/30/92 issue of **U.S. News and World Report**, a paragraph that deserves repetition. It appeared as part of a review of **The Diversity of Life**, by E.O. Wilson.

"A vital reason to protect biodiversity is to preserve the ecosystems that we depend on to enrich the soil, modify the climate, even create the air we breathe. Turning over a stump, Wilson pointed out the profusion of small and obscure life forms—a metallic blue beetle, a centipede, mites, a crane fly, slugs galore, and a riot of orange, white, and yellow fungi, topped by green and eggplant hued colonies of algae. These, he said, are the organisms that 'hold the world steady.'"

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Henri Grassino-Mayer, a researcher from U/AZ, is working on his PhD studying trees at El Malpais National Monument in New Mexico and developing a tree ring chronology and climatic history of the area. A recent presentation at El Malpais by Grassino-Mayer for an audience of people from NPS, BLM, USFS, and Los Amigos del Malpais (an organization of volunteers who assist on park projects) was written up by J.D. Meisner and appeared in the **Cibola County Beacon** (Aug. 4, 1993) of Grants, New Mexico. Grassino-Mayer told his listeners that grazing, fire suppression, and logging showed up in his studies as having a solid impact on the natural record of fire and climate. His studies have provided what he called "the deepest fire

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history ever obtained in the southwest" and showed that many trees had survived 20 to 30 fires in their lifetimes.

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For an arresting evocation of landscape in the form of words, see Gary Dwyer's description of the three landscapes that have been "most influential/important" to him in his work. The piece appears on page 169 of **Landscape Journal** (Fall 1993), and Dwyer's No. 1 choice is a National Park System site—which shall be nameless here, so as not to spoil the punch line at the end of Dwyer's astounding word picture.

For contrast, read Carol Franklin/Andropogon's essay (following Dwyer's) on the Russel Wright Garden of Woodland Paths, Garrison, NY... "an expression of the American landscape as opposed to imposing a European vision on it." She calls it "an ecological garden" because, as she says, Wright asked the question "What is this place?" and then brought the skills and the sensitivity of a designer to the task of discovering and dramatizing the patterns and processes of this landscape.

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"They came, they multiplied, they conquered" is the opening of a **Science News** report (Vol. 144, p.20) on zebra mussels. These hitchhikers entered the Great Lakes in the ballast tanks of a transoceanic cargo ship and triggered one of the most disastrous ecological invasions in recent U.S. history. But they were only the first of many such invaders reaching saltwater ports, inland waterways, and marine estuaries "on a vast and largely unnoticed scale," says marine ecologist James T. Carlton of Williams College in Williamstown, MA.

Carlton (whose complete article appeared in the July 2, 1993 **Science**) studied the ballast water of 159 ships in Coos Bay, OR—ships that hailed from 25 Japanese ports—and found 367 different marine species, including shrimps, sea anemones, jellyfish, snails, clams, fish, flatworms, and a variety of microscopic life forms. These "invaders" are rarely noticed until, like the zebra mussel, they become a major nuisance. John Chapman, marine biologist at Oregon State University's Hatfield Marine Science Center in Newport, OR, calls it a lottery. "We can speculate," says Chapman, "but there are no data."

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Biological Diversity: Conserving the Earth's Wild Wealth is the title of a poster-sized brochure produced by the NPS's Wildlife and Vegetation Division in Washington,

DC, and the Harpers Ferry Center in West Virginia. The attractive, colorful design focuses on the history and diversity of the planet's life forms, as found and studied in World Heritage sites and Biosphere Reserves. Interspersed with maps and photos, the text describes the evolution of our present finely woven fabric of life and suggests that its current unraveling can "harm human civilization too, by foreclosing opportunities for spiritual, intellectual, social, and economic development."

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"Some basic ideas about ecology are changing. A change in theory may end up profoundly changing the physical world." With that provocative subtitle, Steve Packard's *Restoring Oak Ecosystems* in the Summer 1993 issue of **Restoration & Management Notes**, tackles the emerging debate about the nature of ecosystems and of Nature itself.

"Conservation biology, natural areas management, and restoration ecology are emerging disciplines that have been generating new definitions, information, understandings, goals and values," he says in opening. He then summarizes the elements of earlier conventional wisdom and proceeds to try to "untangle some of the interrelated ideas" they involve. The 11-page article covers Natural vs. Artificial Succession, the Power of Definitions, and the Setting of Management Priorities, all within the context of Midwestern tallgrass savanna restoration.

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Worth sharing (in the context of restoration) is this quotation from **The New Republic**, Dec. 28, 1992, carried inside the cover of the Summer 1993 **Restoration & Management Notes**:

"Break a vase, and the love that reassembles the fragments is stronger than that love that took its symmetry for granted when it was whole."

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For readers interested in Old-growth forests of Eastern North America, the April 1993 **Natural Areas Journal** carries an article by Gregory J. Nowacki (U.S.F.S., P.O. Box 21628, Juneau, AK 99802-1628) and Paul A. Trianosky (Duke University School of the Environment, Durham, NC 27708) that gives 749 literature citations, listed alphabetically by author. Numbered citations are cross-referenced with broadly defined forest types and selected old-growth sites.

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The New York State Parks Agency's **Fostering Environmental Stewardship Plan**, undertaken in response to Governor Cuomo's 1990 State of the State directive, presents a 10-year stewardship action plan that would strengthen preservation and maintenance efforts on behalf of the State Park System, and also would dovetail with recommendations in the 1984 **NPCA Adjacent Land Survey: No Park Is an Island**. The National Park and Conservation Association report stated that "Unless all levels of government mount a concerted effort to deal with adjacent land problems in a coordinated manner, the NPS mandate will be completely undermined."

New York State Parks Agency Commissioner Orin Lehman noted that "other state park agencies and the National Park Service are looking introspectively and recommitting to their stewardship responsibilities."

Copies of the 81-page report and its 37 pages of appendices, plus a 16-page executive summary, may be requested from Thomas L. Cobb, NYS Office of Parks, Recreation and Historic Preservation, Bldg. 1, Nelson A. Rockefeller Empire State Plaza, Albany, NY 12238. The summary was presented by Dr. Dobb at the 5th Annual Northeastern Recreation Research Symposium at Saratoga Spa State Park, Saratoga Springs, NY, April 18-20, 1993.

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Pilobolus Ecology: Fungal forests, fecal ecosystems, and the wild ride of lungworm larvae. This is the intriguing title of an article by K. Michael Foos in the Spring 1993 issue of **Yellowstone Science** (Vol. 1, No. 3), complete with photos, charts, and maps. Also carried in the Spring 1993 issue is an interview with Pete Feigley, project coordinator/zoologist and a staff botanist, on the new Greater Yellowstone Conservation Data Center—a Natural Heritage Program funded by The Nature Conservancy with logistical support from the NPS. The project's aim is to inventory and monitor a wide variety of species in greater Yellowstone in order to improve understanding of the status and trends in ecosystem health.

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Resource Management Notes, the Florida Dept. of Natural Resources quarterly newsletter, noted in its July 1993 issue a new program to help address the conservation and management needs of neotropical migrants that occur in Florida. The state's Game and Fresh Water Fish Commission's research, survey, and educational activities

will focus on breeding species suffering widespread declines, key habitats that support rare breeding species, and migration counts in many coastal areas.

These activities will be undertaken in cooperation with the Partners in Flight program, a nationwide effort being promoted by several federal agencies, including the National Park Service.

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From Giovanni Puggioni, Natural Resource Officer for the B.C. Ministry of Environment, Lands, and Parks, comes a copy of **A Protected Areas Strategy for British Columbia** and a 1-square-yard poster/foldout of maps/artwork/text. The Strategy describes the policies and process necessary to protect 12 percent of the Province on a representative basis.

Copies of the 40-page Strategy publication and the associated poster/brochure may be had by contacting Puggioni at the Ministry, 2nd flr, 800 Johnson St., Victoria, BC, Canada; V8V 1X4; (604)387-5002.

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Environmental Concern Inc.'s **Wetland Journal**, (Vol. 5, No. 2) introduces a new feature into the journal: The DOs and DON'Ts of Wetland Planning. The correct procedures associated with planned wetlands that will assist and often assure the success of such work will be listed under DOs. The errors associated with planned wetlands that will jeopardize the success of, and often cause the failure of, such work will be listed under DON'Ts. Contributors to this Restoration Techniques feature will be acknowledged, according to Dr. Edgar W. Garbisch, president of the publication's environmental concern staff.

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PEER: A Publication of Public Employees for Environmental Responsibility, began publication (Vol. 1, No. 1) in Summer 1993. Billing itself editorially as "a new voice for environmental ethics," the publication received national press coverage. Its first issue carried news of a new organization formed by employees of the Bureau of Reclamation in Denver—REOEI (Reclamation Employee Organization for Ethics and Integrity), and a white paper written by employees of the BLM's Bureau of Land Management (BLM). The white paper is entitled *Grazing report: Gross BLM Mismanagement Cited*, and is available from PEER, 810 First St., N.E., Suite 680, Washington, DC 20002; (202)408-0041.

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An article entitled *NPWS - licenced to kill!* in the **Australian Ranger** (Spring 1993) by Lorraine Donne, describes a new and successful line of attack by environmentalists against logging activities in New South Wales. Under the National Parks and Wildlife Act there, it is illegal to "take or kill" fauna without permission (licence) from the National Parks and Wildlife Service (NPWS). The court found that the forestry activities in northern NSW's Chaelundi State Forest fell within this definition and were both a direct and indirect threat to endangered fauna in the forest.

As a result, the Endangered Fauna/Interim Protection (EFIP) Act of 1991 and the Environmental Planning and Assessment Act of 1979 (EPA Act) were amended. A significant change is expansion of the definition of "take or kill" to include "hunt, shoot, poison, net, snare, spear, pursue, capture, disturb, lure, or injure..." and also includes "...significant modification of the habitat of the fauna likely to affect its essential behavioural patterns." (All spellings reflect British style).

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Nature Conservancy, TNC's bi-monthly publication, devotes its Ecology Forum in the November/December 1993 issue to "Florida's Plumbing Problems," and contains a beautifully illustrated look by Greg Breining at America's once-vast savanna: "The Case of the Missing Ecosystem," where did it go and can we bring it back?

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More than 5,000 miles of beach were scoured in 1992 by some 160,000 volunteers as part of an international litter removal program coordinated by the Center for Marine Conservation (CMC) in Washington, DC. Trash brigades in the U.S. and 32 other countries retrieved 5,328,000 pieces of debris, 58.8 percent of which was plastic (including styrofoam).

This depressing item is carried in the October 9, 1993 issue of **Science News**, page 235. The CMC survey points out that fishing paraphernalia (monofilament line, floats, and lures), while it accounts for only 1 percent of the retrieved litter, kills more marine wildlife than any other category of beach debris.

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The upcoming "Pacific Salmon & Their Ecosystems" conference in Seattle, WA, Jan. 10-12, 1994 will look at the status of Pacific Northwest salmonids, regional trends, salmon policies and politics, technological solutions (cost effective restoration), and institutional solutions (effective long-term

planning and management). One of the sessions is titled "Managing Resources with Incomplete Information: Making the Best of a Bad Situation"—surely an excessive redundancy!

The Portland **Oregonian**, editorializing on the salmon situation in the Nov. 21, 1993 paper, describes the "scientific consensus" for salmon recovery, beyond fishing restrictions: aggressive state and federal crackdown on salmon habitat destroyers—the logging, grazing, and mining practices that strip streambanks of vegetation and destroy spawning beds.

"Even more than freedom from fishermen's hooks or nets," the **Oregonian** editors wrote, "wild salmon need homes to return to."

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Jack Ward Thomas, newly appointed Chief of the U.S. Forest Service, delivered his inaugural speech as chief to an overflow crowd at Oregon State University on Nov. 18, 1993... a speech that at least one reporter, covering it for the **Oregonian**, found to be "in an academic way, profound."

What Thomas talked about was the role of science in decision-making. "The public," he said, "should not expect too much from scientists because science is a *method*." He took aim at "professional gladiators" on both sides of the old-growth forest conflict—people who aren't interested in collaboration but are only in the fight to win. He understands that such people are a part of the political system, but they're not part of the approach Thomas sees evolving in the management of public lands. He characterizes this new approach as "an attempt to preserve biodiversity through ecosystem management at the landscape scale," with people an integral part of that landscape.

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Wire service reports and work by the **Oregonian** staff describe how researchers at U/WA have cloned the insect juvenile hormone receptor—the cellular gateway that controls metamorphosis in caterpillars and butterflies. The receptor is the docking point in each insect cell for juvenile hormone, a protein substance that prevents the caterpillar from entering the pupal stage until its body has grown sufficiently. The insect matures only when the hormone is absent.

Hormone-based pesticides offer a way to control targeted bugs without hurting other creatures. Lynn Riddiford, a U/WA zoology professor who led the research, said the description of the receptor's biology will give the pesticide industry a road map for

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designing dummy proteins that plug into cells of caterpillars, blocking the insect's natural hormone from the binding site and allowing premature metamorphosis.

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The status and prospects for success of the Endangered Species Act (ESA) is the subject of an article in the Policy Forum section of *Science*, Nov. 12, 1993, pp 976-7. Four authors, two from U/ID, one from the USFWS unit there, and a research biologist for USFWS in Alaska, attempted to assess the validity of recent criticisms regarding the level of protection provided by the ESA and the recovery process.

They found that recovery plans all too often "manage for extinction" rather than for survival. "We need to be more realistic in setting biologically defensible recovery goals," they stated. If suitable habitat is severely limited, then habitat restoration should be included as a necessary component of recovery efforts.

They also pointed out that the ESA requirement that species should be recovered within their ecosystems "often may not be done." They propose "initiating an aggressive, proactive effort to save species while they are still common, viable parts of their self-sustaining natural ecosystems." An important step in that direction, they conclude, would be to ensure that a minimum of three viable representatives of each vegetation cover type are preserved in each ecoregion in which they occur.

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A discussion of "sustainable use of renewable resources" in the Policy Forum section of *Science*, Nov. 5, 1993, pp 828-9, starts with the definition of sustainable use (as published in *Our Common Future*, Oxford Univ. Press, by the World Commission on Environment and Development): It is defined as use that "meets the needs of the present without compromising the ability of future generations to meet their own needs."

From there, five distinguished authors, (whose scientific expertise is mainly in fisheries), found that the challenges to sustainable use in the area of fisheries management are not insurmountable. "To meet these challenges," they write, "we must address fundamental economic biases against sustainability, particularly in open-access management regimes; continue the development and application of methods that directly integrate sources of uncertainty into scientific advice; and learn from past management failures and successes."

Their conclusion is that "Sustainable development is achievable if scientific advice based on biological, social, and economic considerations is an integral part of the development of policies for renewable resource use."

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The Cowbird Peril: A Resource Management Problem and an Interpretive Story is the title of a 33-page paper, written and distributed to selected NP sites and personnel by Richard L. Cunningham, NPS Western Region's Chief of Interpretation.

Cunningham notes that the National Park Service is a signatory agency to the Migratory Bird Conservation Program (also known as Partners in Flight). In spite of the fact that migratory birds are an important part of the biological diversity of the National Park System and a resource the NPS is committed to conserve, too little is understood about one of the major threats—brood parasitism by cowbirds.

Three species of the cowbird now reside in the United States, and Cunningham has addressed his paper to NPS interpreters and resource management specialists to inform and educate park staffs and the public about the cowbird menace and methods for combatting it.

The paper while still in draft form prompted the Western Regional Office to prepare and submit an NRPP Proposal (WR-N-02, Neotropical Migratory Bird Population Management: Parasitic Cowbird Removal).

For copies of the paper or further information, contact Cunningham at (415) 744-3910.

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The Oct. 15, 1993 issue of *Science* describes (on p 410-412) a 5000 year record of extreme floods and climate change in southwestern U.S. The regional paleoflood chronology, based on flood deposits from 19 rivers in Arizona and Utah, shows the largest floods in the region cluster into distinct time intervals that coincide with periods of cool, moist climate and frequent El Nino events.

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Fire History and Climate Change in Giant Sequoia Groves, by Thomas W. Swetnam of the U/AZ Laboratory of Tree-Ring Research, describes how fire scars in giant sequoia (*Sequoiadendron giganteum*) were used to reconstruct the spatial and temporal pattern of surface fires that burned episodically through five groves in the past 2,000 years. Regionally synchronous fire histories demonstrate the importance of climate in maintaining nonequilibrium conditions. The article appears in pp 885-9 of *Science*, Nov. 5, 1993.