very thinnest ice thickness proposed," says Turtle, at least at the places and times Europa's several central-peak craters formed.

Another, stereoscopic analysis of surface forms is yielding even larger estimates of ice thickness. Planetary scientists Paul Schenk of the Lunar and Planetary Institute in Houston and William McKinnon of Washington University in St. Louis have calculated that ice more than 6 kilometers thick must underlie plateaus they have found to rise 0.5 to 1 kilometer in height and pits 0.5 kilometer deep. That "rules out the ultrathin case," says McKinnon, echoing Turtle.

Although the thicker ice thesis seems to be gaining ground, planetary geologist Robert Sullivan of Cornell University acknowledges that the real world is often not as simple as one extreme or the other. Planetary scientist Christopher Chyba of the SETI Institute in Mountain View, California, says he's also leaning in the direction of thick ice, but "we're not going to feel confident until we get there again."

That won't happen anytime soon, however. Budget-strapped NASA has yet to commit itself to a mission to send an orbiter to Europa, which could confirm an ocean from orbit by measuring the tidal squeeze on the satellite. But getting an ice thickness "won't be easy," says one possible participant.

–RICHARD A. KERR

U.S. DEPARTMENT OF ENERGY

## Science Office Grows, Nonproliferation Stalls

It could have been worse. The new science budget for the U.S. Department of Energy (DOE) isn't flat, as the Bush Administration had requested. But Congress has spent much of the 2.5% increase it awarded the department on pet projects, and it squeezed programs in Russia that protect nuclear stockpiles and employ former weapons scientists.

The $25 billion spending bill—approved on 1 November and expected to be signed shortly by the president—includes $3.2 billion for DOE's Office of Science, which is the largest funder of basic physical science programs at U.S. universities and government laboratories. Although it follows the White House budget blueprint closely in most respects, lawmakers restored $10 million for fusion studies and tacked on nearly 10% for DOE's Biological and Environmental Research (BER) program (see table). Legislators, however, earmarked nearly all of BER's $84 million in new money for equipment and construction at specific universities—typically in the home states of senior members of the House and Senate spending panels. There is $11 million, for instance, for the new Mental Illness and Neuroscience Discovery Institute at the University of New Mexico in Albuquerque; the state is the home of Senator Pete Domenici, a top Republican on the appropriations committee.

Given earlier fears of budget cuts, "the bite turned out to be nowhere [near as] bad as the bark," says Scott Sudduth, the Washington, D.C.–based director of government relations for the University of California. Still, researchers "got rather slim pickings if you consider the important role that science plays in national security," adds Michael Lubell, a lobbyist for the American Physical Society in Washington, D.C.

Arms control advocates, meanwhile, failed to increase funding for DOE's nuclear nonproliferation programs. The 2002 budget contains $803 million for arms control programs, $29 million more than the president's request but $69 million less than this year. It also lumps into a single $42 million pot the budgets for two programs—the Initiatives for Proliferation Prevention (IPP) and the Nuclear Cities Initiative (NCI)—aimed at keeping weapons scientists from freelancing for U.S. enemies.


The decision disappointed IPP officials, who had been expecting a substantial increase from last year's budget of $24.5 million, but buoyed NCI backers, who feared Congress would follow the Administration's wishes and practically kill the $27 million

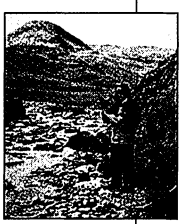
**HOW DOE SCIENCE FARED ($ MILLIONS)**

| | 2002 Request | 2002 Final | Change from 2001 |
|---|---|---|---|
| Office of Science | 3159 | 3233 | 2.5% |
| High-Energy Physics | 721 | 716 | 0.6% |
| Nuclear Physics | 361 | 361 | – |
| Basic Energy Sciences | 1005 | 1004 | 1.2% |
| Fusion Energy Sciences | 239 | 249 | – |
| Biol. & Envir. Research | 443 | 527 | 9.3% |
| Advanced Scientific Computing Research | 164 | 158 | –4.6% |
| Other | 226 | 218 | –25% |

CREDITS: (LEFT TO RIGHT) SOURCE: U.S. CONGRESS; U.S. DEPARTMENT OF THE INTERIOR/U.S. GEOLOGICAL SURVEY; TOXIC SUBSTANCES HYDROLOGY PROGRAM

## ScienceScope

**Geologic Rebound** Things looked grim earlier this year for scientists in the water resources division of the U.S. Geological Survey (USGS). The Department of the Interior had requested a budget that would have cut funding for the National Water Quality Assessment (NAWQA) by 30%, slashed 71% from the Toxic Substances Hydrology Program, and completely eliminated a nationwide network of cooperative research institutes (*Science*, 11 May, p. 1040). Alarmed, groups that use USGS water data—from environmentalists to civil engineers—raised a ruckus.



Now they, and the USGS, can breathe a sigh of relief. When President George W. Bush signed the 2002 Interior appropriations bill into law this week, many of the proposed cuts had evaporated. The toxics and NAWQA programs got 2.3% and 1.6% raises, respectively, while the State Water Resources Research Institutes won a 10% boost. "Compared to the bleak scenario in the spring, things are much better," says David Blockstein, a senior scientist with the National Council for Science and the Environment in Washington, D.C. But he's not optimistic that the water programs will be spared next year, when the federal budget is expected to be even tighter.

**Squeaky Wheels** The newly signed Interior appropriations bill (see above) also contained mixed news for researchers upset with plans to ax two science centers at the Smithsonian Institution. Last spring, Smithsonian director Lawrence Small announced plans to eliminate the Conservation and Research Center in Front Royal, Virginia, and the Center for Materials Research and Education in Suitland, Maryland (*Science*, 13 April, p. 183). The proposed closures were part of a plan to reorganize Smithsonian science and free up funds for other projects.

After protests from researchers and local lawmakers, Small backpedaled, but warned that Congress would have to come up with more money to keep the units open. It did, giving the Smithsonian $497 million in 2002, $3 million more than the president's request. That's barely enough to cover all the costs of those units, says the Smithsonian's Paula DePriest. And the other science units will take a $1.9 million hit. "It's actually very grim," she adds.

**Contributors: Jeffrey Mervis, Jocelyn Kaiser, Erik Stokstad, Elizabeth Pennisi**

program. "Now it's up to us to figure out how to split up this money," says DOE's Steven Black, who oversees both programs.

Congress rejected the Administration's plan to prune DOE's $173 million Material Protection Control and Accounting (MPCA) program, which helps Russia safeguard its nuclear materials. But House and Senate negotiators rejected an effort by Representative Chet Edwards (D–TX) to add $131 million to it. Calling the decision "irresponsible and dangerous," Edwards and others hope to snare some money for MPCA from the $40 billion antiterrorism package that Congress approved last month but has not yet decided how to spend.

–DAVID MALAKOFF AND ROBERT KOENIG

RUSSIAN SCIENCE

## Government Spurns Human Genome Effort

**MOSCOW**—As most nations rush to mine the riches of the human genome, Russia is moving to eviscerate its 12-year-old National Human Genome Program (NHGP). *Science* has learned that the science ministry plans to strip the NHGP of its special funding status and fold the money into a general pot for basic research. Beyond imposing a 50% cut in direct spending on genome research, the move will affect millions of dollars in other research activities that the genome program helped to manage.

The NHGP was the brainchild of Alexander Bayev, a molecular biologist at the Engelhardt Institute of Molecular Biology in Moscow who persuaded Mikhail Gorbachev to establish a national genome program in 1988. The fledgling effort received about $20 million a year over the next 2 years, on par with the U.S. program. Funding ebbed, however, after the Soviet Union's dissolution, a decline that accelerated with Bayev's death in 1994. Still, NHGP researchers pioneered hybridization sequencing. And dozens of Russians are involved in genome-related U.S. bioinformatics projects, says an official at the National Institutes of Health in Bethesda, Maryland. "Despite a shortage of resources, they have made use of their financing very effectively," says Valery Soyfer, a molecular biologist at George Mason University in Fairfax, Virginia, and an expert on the history of Russian genetics.

The new cuts, which end a block grant to the NHGP, threaten to derail projects involving approximately 400 researchers. The NHGP's funds will now be part of a "special purpose" program at the science ministry covering 120 basic research areas. However, only a handful of topics—including tumor genomics and genome software development—cover core areas within the genome program. Each topic will be supported by a single project, with total spending on genome-related research not to exceed $180,000 in 2002. The ministry will appoint its own panel to choose meritorious projects.

"No one formally closed the NHGP or dismissed the council," says the Engelhardt's Lev Kisselev, NHGP council head. "But we will no longer choose grantees, and we cannot decide whether the funding will go to a worthwhile project or not." Ministry officials did not respond to requests for comment.

Scientists rue what they see as the imminent demise of a program that maintained a sense of community for Russian genome researchers, sponsored workshops, and supported projects in key areas such as bioinformatics and population genetics. If the program were to die, says Evgeny Sverdlov of the Institute of Molecular Genetics in Moscow, "the infrastructure will die, and that will be very bad."

–VLADIMIR POKROVSKY AND ANDREY ALLAKHVERDOV

Vladimir Pokrovsky and Andrey Allakhverdov are writers in Moscow. With reporting by Richard Stone.

**GENOMICS RESEARCH FUNDING**
**(SELECTED PROGRAMS; $ MILLIONS)**

| Program | 1998 | 1999 | 2000 |
|---|---|---|---|
| National Human Genome Research Institute (U.S.) | 210.9 | 270.7 | 326.4 |
| Wellcome Trust (U.K.) | 61.3 | 103.5 | 121.4 |
| Science and Technology Agency (Japan) | 38.9 | 77.9 | 115.4 |
| European Commission | 23.5 | 104.6 | 108.5 |
| U.S. Department of Energy | 85.0 | 89.8 | 88.9 |
| German Human Genome Project | 19.0 | 20.2 | 79.0 |
| Knut and Alice Wallenberg Foundation (Sweden) | 5.0 | 11.0 | 35.0 |
| Centre National de Séquençage, Genoscope (France) | 4.5 | 7.4 | 9.0 |
| Russian National Human Genome Program | 2.8 | 5.4 | 8.3 |
| Ministry of Science and Technology (China) | 3.6 | 8.5 | 6.6 |

GENOME SEQUENCING

## Insects Rank Low Among Genome Priorities

**ARLINGTON, VIRGINIA**—Insects get no respect, at least from the U.S. agencies that support genome sequencing. That was the grim news here last week at the Comparative Insect Genomics Workshop, sponsored by the U.S. Department of Agriculture (USDA), where entomologists interested in genomics argued for deciphering the genomes of several insect groups. Not only are insects the most diverse creatures on Earth, but they also cause more than $26 billion in damage annually to crops and livestock.

**Funding buzz.** Currently, there's little support for sequencing insect genomes.

The USDA, however, can't afford to do anything about this. "Animal genomes are on the radar screen, but insect genomes are not," says entomologist Mary Purcell-Miramontes of the USDA Cooperative State Research, Education and Extension Service. And that seems to be the case throughout the federal government.

Only two insects, both biomedically important, have gotten the nod. The genome of the fruit fly *Drosophila melanogaster*, long studied by geneticists, was deciphered in March 2000 (*Science*, 24 March 2000, p. 2181). This year, work began on the malaria mosquito *Anopheles gambiae*. But proposals to study the genetic makeup of other insect species have yet to get funding, even though entomologists say such research could lead to new ways to fight pests and protect pollinators.

For instance, Gene Robinson of the University of Illinois, Urbana-Champaign, has marshaled support among insect researchers to sequence the honeybee genome. Honeybees are critical for the pollination of many crops, he explains, and some of its relatives are useful in biocontrol. The entomologists think the project warrants the estimated $6 million price tag. But no one is biting, yet.

The same is true for the 530-million-base

CREDITS: (LEFT TO RIGHT) SOURCE: STANFORD UNIVERSITY; SCOTT T. SMITH/CORBIS