

FROM THE HILL

In working to pass federal appropriations for fiscal year 2019, set to begin October 1, 2018, congressional appropriators made faster progress this spring and summer than they have in recent years, with eight bills already approved by the full House and nine by the Senate. Most of these bills have rejected the Trump administration's recommendations. However, none has yet been finalized via the conference committee that resolves any differences between the House and Senate.

President Trump has said he would not sign another 2,000-page omnibus such as the one he signed in spring 2018, but he may not have to. Congress is moving forward on talks over the energy, veterans, and legislative branch spending bills, representing the first package of spending legislation to be considered. The House has also named conferees to meet with the Senate on its defense and labor, health and human services, and education bills.

Also in the mix are the agriculture and interior/environment bills. Altogether, as many as nine out of 12 spending bills, accounting for most of the federal discretionary budget, might be completed before October 1. Any agencies that don't receive a final appropriation before then are likely facing a short-term continuing resolution to keep the lights on, perhaps extending beyond the November midterm elections. The agencies likely to face such a situation include the National Aeronautics and Space Administration (NASA), the National Science Foundation, and the Departments of Commerce, State, and Homeland Security, which have yet to receive floor votes in either chamber.

With that background, here's a rundown of funding for those science agencies that might see final negotiations before October 1.

Department of Energy (DOE). Following a big increase in last spring's omnibus bill, both chambers have approved increases of at least 5.4% for the

Office of Science. The biggest winner here is again advanced computing, which was boosted by at least 12.9% in both chambers. Increases were approved for advanced facilities at the Oak Ridge, Argonne, and Lawrence Berkeley national laboratories, and for the Exascale Computing Project. High Energy Physics was also increased by at least 10.6% in both chambers, with most of the increase going to construction of projects such as the Deep Underground Neutrino Experiment and the Fermi National Accelerator Laboratory's PIP II. Most other programs were protected from administration-proposed cuts.

Elsewhere, both chambers emphatically protected the Advanced Research Projects Agency-Energy, a favorite White House target for elimination, and would add substantial additional funding to DOE's new grid cybersecurity office. Both chambers would protect DOE's manufacturing institutes and innovation hubs on advanced materials and nuclear modeling, all of which had been slated for elimination. Research and development (R&D) for advanced reactor technology would ramp up substantially, especially in the House, which provided \$100 million for public-private partnerships on small modular reactor R&D and design. Finally, both chambers have rejected the proposed ramp down of the Omega laser at the University of Rochester.

Although both chambers agree on increasing basic research at the Office of Science, in several areas they disagree on how much. The House would increase domestic R&D and US contributions to the international fusion project ITER, whereas the Senate would flat-fund ITER and cut funding for the domestic research program by 26%. This savings allows Senate appropriators to be a bit more generous in several areas. For instance, House funding for DOE's light sources, neutron sources, and nanoscale centers is flat or slightly increased, whereas the Senate provided marginally more funding for each.

Renewable energy and efficiency R&D was cut by 10.3% in the House, including a 21.8% reduction for solar energy and an 18.5% reduction for building efficiency R&D. The House also adopted a 45% increase for advanced coal technology R&D while trimming carbon-capture-and-storage activities. The Senate generally adopted much more limited changes to these programs.

Department of Defense (DOD).

Both chambers would grant the Defense Advanced Research Projects Agency (DARPA) a sizable increase of at least 10.3% and cut back applied research funding. The House is toughest on the Army, whereas the Senate cuts the Navy the most. Both chambers would also cut back DOD's manufacturing science and technology program, by 38% in the House and 14% in the Senate.

The House would trim back DOD's basic research by 1.7%, while the Senate would provide a 19.4% boost, including a modest increase for DOD-university partnerships and a larger increase for the military's Defense Research Sciences programs. The House wants to reduce funding for the National Defense Education Program by 16.8% (as the administration requested), whereas the Senate would nearly double spending on the program.

National Institutes of Health (NIH).

Appropriators are mostly in agreement over NIH matters, including the proposal that the NIH should receive at least a billion-dollar increase for the fourth year in a row. The House seeks \$1.25 billion, and the Senate \$2 billion. Legislators also continued to highlight Alzheimer's research as their major priority. Both chambers approved an increase of at least \$400 million, which would raise the National Institute on Aging's Alzheimer's effort to about \$2.3 billion.

These funding increases generally include boosts for several high-profile initiatives such as the BRAIN Initiative, precision medicine, and antibiotic resis-

tance research. The Cancer Moonshot's budget would rise to \$400 million, as scheduled in the 21st Century Cures Act. Legislators are also united in their support for recent NIH efforts on Down syndrome and in the search for a universal flu vaccine. Legislators in both chambers are also willing to increase support for NIH facilities to \$200 million, a 55% increase, as requested by the White House.

Also notable is what they agree on not doing. Both chambers have rejected the administration's proposals to consolidate the Agency for Healthcare Research and Quality; the National Institute on Disability, Independent Living, and Rehabilitation Research; and the National Institute for Occupational Safety and Health. Both chambers have also rejected the administration's proposal to limit and reduce the salary cap for grant recipients.

Although the House bill would provide broad increases, most individual institutes would see their budgets rise by less than the rate of inflation. Representative Tom Cole (R-OK), chair of the House subcommittee responsible for NIH funding, has reiterated his now-annual comment that the typically lower House number is a "floor, not a ceiling," which suggests the NIH could again end up closer to the higher Senate figure if there's room in the final bill. That extra Senate money would mean additional funding for major priorities such as opioids-related research, including \$500 million split across the National Institute on Drug Abuse and the National Institute of Neurological Disorders and Stroke.

Environmental Protection Agency (EPA). Both chambers preserved funding for the endocrine disruptor and computational toxicology programs. As in prior years, House and Senate appropriators included a provision that prohibits the EPA from using funds to implement a mandatory greenhouse gas reporting system for livestock producers.

The House recommended a total 8.9% reduction in funding for EPA science and technology activities, whereas the Senate recommended a flat budget. Both chambers also clashed over the administration's "workforce reshaping" proposal to reduce the number of EPA scientists through

organizational restructuring. The House included the requested funding for the workforce effort, but the Senate prohibited any proposed reorganizations, workforce adjustments, or downsizing of laboratories.

US Geological Survey (USGS).

Both chambers preserved funding for the agency's eight Climate Adaptation Science Centers. USGS cooperative research units, as well as the contaminant biology and toxic substances hydrology programs, were all shielded from proposed elimination. The agency's earthquake and volcano monitoring systems were also protected, and funded at higher levels in the House. Landsat-9 was fully funded in both chambers.

Energy and mineral resources activities fared better under the Senate bill, with additional funding for the administration's new critical minerals initiative. Meanwhile, the House favored water-related research funding, particularly for the National Groundwater and Streamflow Information Program.

Department of Agriculture (USDA).

Intramural research funded by USDA's Agricultural Research Service (ARS) would see increases of at least 4.8% in both chambers, and legislators have rejected the proposed closure of nearly two dozen laboratories and research sites. Appropriators have also generally accepted the White House-proposed transfer of the National Bio and Agro-defense Facility (NBAF) from the Department of Homeland Security (DHS) to the USDA, albeit with some concerns, reservations, and requests for information. The NBAF has been under construction by DHS on the Kansas State University campus and will serve as a biosafety level 4 research center when completed in the next five years. The USDA had planned to be the lead research partner of the DHS-owned facility, but the administration wants to shift eventual ownership to the USDA outright.

Legislators have also provided very modest increases for extramural research and extension, including moderate increases for the Agriculture and Food Research Initiative, USDA's premier competitive grants program, and flat or moderate increases for select capacity grants. They also preserved several small

research programs within the National Institute of Food and Agriculture from elimination. In addition, appropriators rejected cuts to the Economic Research Service and to core programs within the National Agricultural Statistics Service, as part of their general rejection of the Trump administration's research budget.

Beyond some modest differences over funding for certain accounts and programs, the largest difference between the two chambers is funding for ARS laboratory facilities. House appropriators would provide \$136 million—near FY 2018 levels—for continued modernization, construction, and upgrades of ARS labs in accord with their Capital Investment Strategy. The Senate would provide no such funding.

Other agencies. Appropriators will negotiate the Department of Veterans Affairs research budget between the House's 1.4% increase and the Senate's 7.9% increase. Most programs at the Centers for Disease Control and Prevention would see fairly modest (if any) changes in both the House and the Senate, though the House would also establish a \$300 million Infectious Disease Rapid Response Reserve Fund.

FY 2020 R&D budget priorities

The White House Office of Management and Budget and the Office of Science and Technology Policy issued a memorandum to the heads of federal departments and agencies that highlights the administration's R&D priority areas for FY 2020. The administration again prioritizes defense R&D, but also spotlights artificial intelligence, quantum science, and computing as "critically important to our national security and economic competitiveness." Increased R&D investment is recommended in the areas of wireless networks, autonomous vehicles and aircraft, manufacturing technologies, and space exploration. Health and agricultural R&D also received attention in the memo. Meanwhile, the administration continues to call for an increased reliance on the private sector to fund later-stage research—particularly in the energy domain—alongside a push for lab-to-market initiatives and public-private collaborations.

Administration discovers science, nominates officials

After taking twice as long as any previous president to nominate a director of the Office of Science and Technology Policy, on July 31 President Trump announced his intention to nominate Kelvin K. Droegemeier, the vice president for research at the University of Oklahoma. Droegemeier, a meteorologist who has studied extreme weather events, is considered to be well qualified for the position. In addition to having excellent research experience, he has served as a member of the National Science Board during the George W. Bush and Obama administrations.

Droegemeier was among a flurry of nominees proposed for science-related positions during July and August, a year and a half into the president's term. Scott Hutchins was nominated to be the undersecretary of agriculture for research, education, and economics. Hutchins, an entomologist, currently serves as the global leader of integrated field sciences for Corteva Agriscience and is a past president of the Entomological Society of America.

Lane Genatowski was nominated to be the director of the Advanced Research Projects Agency-Energy at the DOE. Genatowski currently serves as a managing partner in investments at Dividend Income Advisors. Also at the DOE, William Bookless was nominated to be the principal deputy administrator of the National Nuclear Security Administration. Bookless, a physicist, previously served as the assistant laboratory director for policy and planning at the Brookhaven National Laboratory and in senior positions at the Lawrence Livermore National Laboratory.

The president also nominated James Morhard to be the deputy administrator of NASA. Morhard currently serves as the US Senate deputy sergeant-at-arms and previously served as the staff director of the Senate Appropriations Subcommittee on Commerce, Justice, Science, and Related Agencies.

Alexandra Dunn was nominated to be the EPA's assistant administrator for toxic substances. Dunn currently serves as the

regional administrator for EPA's Region 1 in Boston. She previously served as executive director and general counsel for the Environmental Council of the States. The president also nominated Raymond Vela to be the director of the National Park Service at the Department of the Interior. Vela has served 28 years at the park service and currently is the superintendent of Grand Teton National Park and the John D. Rockefeller Jr. Memorial Parkway. The president announced the nomination of Jay Angle to be the director of the National Institute of Food and Agriculture at the USDA. Angle worked for 24 years as a professor of soil science and administrator for the Maryland Agricultural Experiment Station and the Maryland Cooperative Extension at the University of Maryland. He is a fellow of the American Society of Agronomy and the Soil Science Society of America.

NIH, FDA propose changes to gene therapy monitoring

On August 17, the NIH and the Food and Drug Administration (FDA) placed a notice in the *Federal Register* requesting comments on proposed changes to the manner in which gene therapies are reviewed and monitored. NIH Director Francis Collins and FDA Commissioner Scott Gottlieb wrote in an article in the *New England Journal of Medicine* that since 1990—when the FDA oversaw the first human gene therapy trial in the United States—enough experience has accumulated through research in government agencies, academic institutions, and commercial enterprises that there is no longer a scientific reason to think gene therapy is “entirely unique and unpredictable.” The authors stated that as gene therapy has matured, so must the framework for overseeing its safety. Until now, the Recombinant DNA Advisory Committee (RAC) advised the NIH director on research that used then-emerging technologies involving manipulation of nucleic acids and was slated to review protocols for human gene therapy. Collins and Gottlieb suggested that gene therapy can be assessed using the tools now used to address other areas of science and proposed therapies. The RAC will

be asked to advise on current emerging technologies, such as gene editing, synthetic biology, and neurotechnology.

Murray, DeLauro address NIH on harassment concerns

In early August, Senator Patty Murray (D-WA) and Representative Rosa DeLauro (D-CT) sent a letter to NIH Director Francis Collins expressing their “deep concern” about harassment in the workplace and inquiring what the NIH was doing to provide a harassment-free workplace for women working within the agency and in external NIH-funded research facilities. The letter cited the National Academies of Sciences, Engineering, and Medicine's recent report on sexual harassment, which found that nearly 60% of women in academic sciences have experienced sexual harassment on the job. The letter acknowledged that the NIH has taken steps to address the problem in its intramural programs, but the lawmakers stated that NIH's current policies do “not go far enough” and that the “agency has failed to take steps to hold its awardee institutions accountable” for guaranteeing safe workplaces free of harassment.

EPA to reconsider 2011 curbs on mercury emissions

The Trump administration is reviewing a major Obama-era clean air regulation on the emission of mercury—a pollutant linked with damage to the brain, the nervous system, and fetal development—with the intent of proposing a replacement rule, according to a spokesperson for the EPA. The mercury regulation under review chiefly affects pollution from coal-fired power plants. Though owners of coal plants fought the rule in the courts, most have since complied with the regulation and have already invested in the technology required to lower mercury pollution; hence, some analysts say it makes little sense to change it. On the same issue, Senators Susan Collins (R-ME) and Tom Carper (D-DE) introduced legislation to track mercury pollution, the Comprehensive National Mercury Monitoring Act. The bipartisan bill would establish a national mercury monitoring

network to protect human health, safeguard fisheries, and track the environmental effects of emissions reductions.

NIH worries about foreign government influence

As reported in *Science*, the NIH is concerned that scientists at US universities are not properly disclosing funding sources from foreign governments. NIH Director Francis Collins sent a letter to over 10,000 institutions outlining three areas of concern: 1) diversion of intellectual property in grant applications or produced by NIH-supported biomedical research to other entities, including other countries; 2) sharing of confidential information on grant applications by NIH peer reviewers with others, including foreign entities, or otherwise attempting to influence funding decisions; and 3) failure by some researchers working at NIH-funded institutions in the United States to disclose substantial resources from other organizations, including foreign governments, which threatens to distort decisions about the appropriate use of NIH funds. The letter further states that the NIH is working with other federal agencies and higher-education organizations “to identify steps that can help mitigate these unacceptable breaches of trust and confidentiality that undermine the integrity of US biomedical research.”

Bipartisan push to retire animals from research labs

A bipartisan group of lawmakers wrote a letter to several government agencies asking about the agencies’ policies on the retirement and adoption of dogs, cats, and primates no longer needed for research. The letter asked for statistics on the number of these animals used for research in 2016 and 2017, as well as the location of the animals adopted out. “Our constituents are increasingly concerned about the welfare of animals used in federally-funded research and strongly support research animal adoption and retirement,” the lawmakers wrote. “We agree that cats, dogs, and primates that survive taxpayer-funded government research should be provided with an opportunity to find suitable non-laboratory homes at

the completion of studies.” The letter reflects a campaign promoted by an animal rights group, the White Coat Waste Project, that encouraged its members to contact Congress and encourage retirement of animals from federal labs.

Court orders EPA to ban controversial pesticide

A federal appeals court ordered the EPA to ban the pesticide chlorpyrifos, which the agency’s former administrator, Scott Pruitt, did not respond to last year. EPA’s own research, as recently as 2016, linked chlorpyrifos to developmental and neurological disorders, especially in children and infants. The Court of Appeals for the 9th Circuit said the Federal Food, Drug and Cosmetic Act, the federal law governing pesticides, requires the EPA to ban the allowance of a pesticide on food if it finds any harm from exposure to it.

INTERNATIONAL NEWS

EU court ruling on gene editing

The Court of Justice of the European Union (EU) ruled in July that plants created with new gene-editing techniques—such as CRISPR—that do not involve gene transfer between organisms must nevertheless be subjected to the same approval process as transgenic plants. The court determined that gene-editing techniques “alter the genetic material of an organism in a way that does not occur naturally.” Thus, the organisms are subject to existing EU directives concerning genetically modified organisms. Many in the scientific community, arguing that the new techniques are not substantively different from various other widely used and approved techniques, expressed concern that these substantial and costly regulatory hurdles will cripple plant biotech in Europe.

Bioethics council wants debate on gene editing of embryos

In July, the Nuffield Council on Bioethics, an independent organization in the

United Kingdom (UK) that provides recommendations on medical and biological questions, released a report, “Genome editing and human reproduction: social and ethical issues,” that suggested that gene editing of human embryos should be permissible in some circumstances. *The Scientist* reported that “UK law currently prohibits making alterations to people that could be passed down to future generations, and the report stops short of recommending an immediate change to that policy, but instead encourages public debate around what regulations should be in place.” The chair of the working group behind the report stated, “It is our view that genome editing is not morally unacceptable in itself,” and the report goes on to recommend that it should be permitted “if, and only if, two principles are satisfied: first, that such interventions are intended to secure, and are consistent with, the welfare of a person who may be born as a consequence, and second, that any such interventions would uphold principles of social justice and solidarity—by this we mean that such interventions should not produce or exacerbate social division, or marginalize or disadvantage groups in society.” A critic of the report from the UK group Human Genetics Alert was quoted in Reuters as saying, “We must have an international ban on creating genetically engineered babies.”

Europeans propose open-access initiative

In early September, 11 national research funding organizations, which together spend 7.6 billion euros in research grants annually, launched an initiative, “Plan S,” to make full and immediate open access to research publications a reality. In the initiative, which has the support of the European Commission, the funding agencies commit to the principle that by 2020, scientific publications resulting from research they fund must be published in compliant open-access journals or on compliant open-access platforms.

“From the Hill” is derived from the weekly Policy Alerts and the reports of the R&D Budget and Policy Program of the American Association for the Advancement of Science.