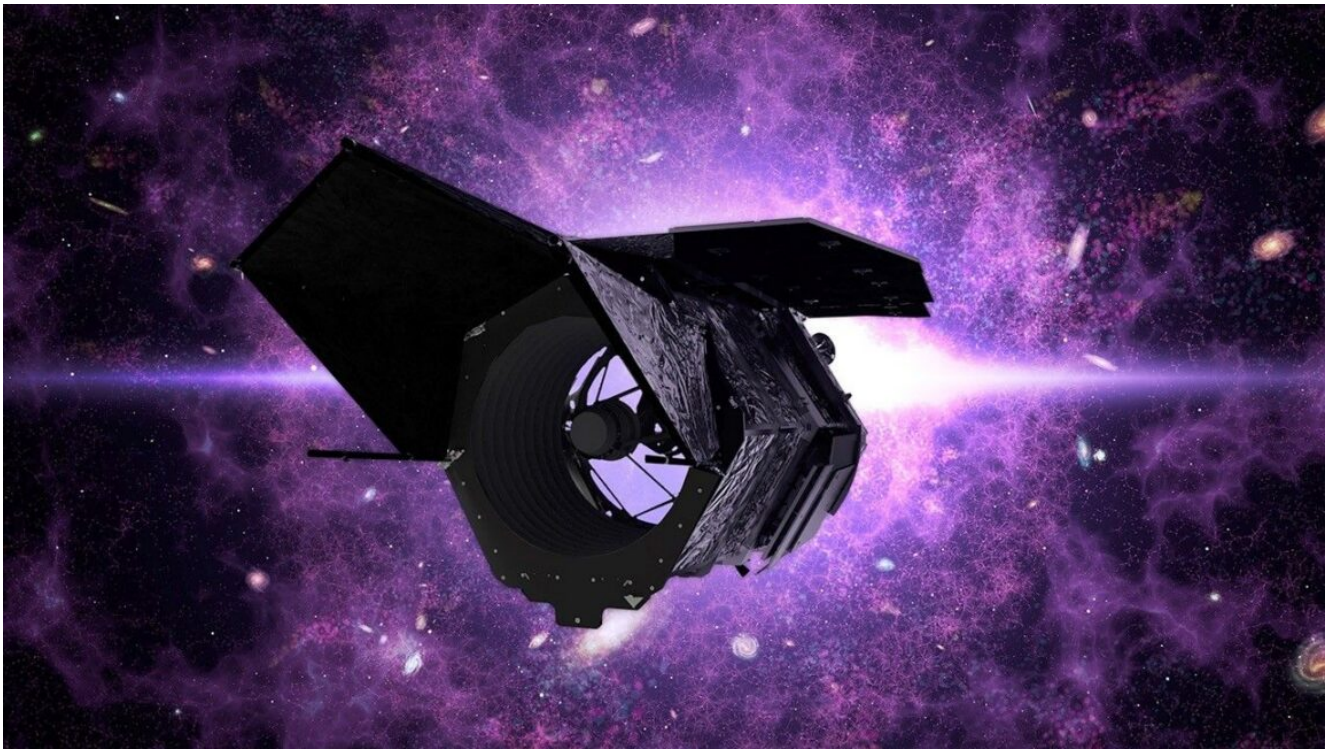
The $4.3 billion space telescope Trump tried to cancel is now complete



“We don’t have moments of terror for the deployment,” Townsend said. “Obviously, launch is always a risk, the tip-off rates that you have when you separate from the launch vehicle… Then, obviously, getting the aperture door open so that it’s deployed is another one. But these feel like normal aerospace risks, not unusual, harrowing moments for Roman.”

It also helps that Roman will use a primary mirror gifted to NASA by the National Reconnaissance Office, the US government’s spy satellite agency. The NRO originally ordered the mirror for a telescope that would peer down on the Earth, but the spy agency no longer needed it. Before NASA got its hands on the surplus mirror in 2012, scientists working on the preliminary design for what became Roman were thinking of a smaller telescope.

The larger telescope will make Roman a more powerful tool for

science, and the NRO’s donation eliminated the risk of a problem or delay manufacturing a new mirror. But the upside meant NASA had to build a more massive spacecraft and use a bigger rocket to accommodate it, adding to the observatory’s cost.

Tests of Roman’s components have gone well this year. Work on Roman continued at Goddard through the government shutdown in the fall. On Webb, engineers uncovered one problem after another as they tried to verify the observatory would perform as intended in space. There were leaky valves, tears in the Webb’s sunshield, a damaged transducer, and loose screws. With Roman, engineers so far have found no “significant surprises” during ground testing, Townsend said.

“What we always hope when you’re doing this final round of environmental tests is that you’ve wrung out the hardware at lower levels of assembly, and it looks like, in Roman’s case, we did a spectacular job at the lower level,” she said.

With Roman now fully assembled, attention at Goddard will turn to an end-to-end functional test of the observatory early next year, followed by electromagnetic interference testing, and another round of acoustic and vibration tests. Then, perhaps around June of next year, NASA will ship the observatory to Kennedy Space Center, Florida, to prepare for launch on a SpaceX Falcon Heavy rocket.

“We’re really down to the last stretch of environmental testing for the system,” Townsend said. “It’s definitely already seen the worst environment until we get to launch.”

https://arstechnica.com/space/2025/12/the-4-3-billion-space-telescope-trump-tried-to-cancel-is-now-complete/

Utah leaders hinder efforts to develop solar energy supply



Other ranchers told ProPublica they've been able to stay on their land and preserve their way of life by leasing to solar. Landon Kesler's family, which raises cattle for team roping competitions, has leased land to solar for more than a decade. The revenue has allowed the family to almost double its land holdings, providing more room to ranch, Kesler said.

"I'm going to be quite honest, it's absurd," Kesler said of efforts to limit solar on agricultural land. "Solar very directly helped us tie up other property to be used for cattle and ranching. It didn't run us out; it actually helped our agricultural business thrive."

Solar lobbyists and executives have been working to bolster the industry's image with lawmakers ahead of the next legislative session. They're arguing solar is a good neighbor.

“We don’t use water, we don’t need sidewalks, we don’t create noise, and we don’t create light,” said Amanda Smith, vice president of external affairs for AES, which has one solar project operating in Utah and a second in development. “So we just sort of sit out there and produce energy.”

Solar pays private landowners in Utah $17 million a year to lease their land. And, more important, solar developers argue, it’s critical to powering data centers the state is working to attract.

“We are eager to be part of a diversified electricity portfolio, and we think we bring a lot of values that will benefit communities, keep rates low and stable, and help keep the lights on,” Rikki Seguin, executive director of Interwest Energy Alliance, a western trade organization that advocates for utility-scale renewable energy projects, told an interim committee of lawmakers this summer.

The message didn’t get a positive reception from some lawmakers on the committee. Rep. Carl Albrecht, R-Richfield, who represents three rural Utah counties and was among solar’s critics last session, said the biggest complaint he hears from constituents is about “that ugly solar facility” in his district.

“Why, Rep. Albrecht, did you allow that solar field to be built? It’s black. It looks like the Dead Sea when you drive by it,” Albrecht said.

This story was originally published by ProPublica.

https://arstechnica.com/science/2025/12/utah-leaders-hinder-efforts-to-develop-solar-energy-supply/

Ars Live Today: 3 former CDC leaders detail impacts of RFK Jr.’s anti-science agenda



The Centers for Disease Control and Prevention is in critical condition. This year, the premier public health agency had its funding brutally cut and staff gutted, its mission sabotaged, and its headquarters riddled with literal bullets. The over 500 rounds fired were meant for its scientists and public health experts, who endured only to be sidelined, ignored, and overruled by Health Secretary Robert F. Kennedy Jr., an anti-vaccine activist hellbent on warping the agency to fit his anti-science agenda.

Then, on August 27, Kennedy fired CDC Director Susan Monarez just weeks after she was confirmed by the Senate. She had refused to blindly approve vaccine recommendations from a panel of vaccine skeptics and contrarians that he had hand-selected. The agency descended into chaos, and Monarez wasn’t the only one to leave the agency that day.

Three top leaders had reached their breaking point and coordinated their resignations upon the dramatic ouster: Drs. Demetre Daskalakis, Debra Houry, and Daniel Jernigan walked out of the agency as their colleagues rallied around them.

Dr. Daskalakis was the director of the CDC National Center for Immunization and Respiratory Diseases. He managed national responses to mpox, measles, seasonal flu, bird flu, COVID-19, and RSV.

https://arstechnica.com/health/2025/12/ars-live-3-former-cdc-leaders-detail-impacts-of-rfk-jr-s-anti-science-agenda/

Sharks and rays gain landmark protections as nations move to curb international trade



But until last week, there were no international controls in place to regulate trade in these species despite growing demand for their livers.

That has now changed through the latest decisions adopted at CITES, which Warwick said mark a turning point in marine conservation.

For much of its 50-year history, the convention focused on protecting iconic land species like elephants, rhinos, primates, and parrots, or charismatic marine species like sea turtles, Warwick said. By 1981, CITES had imposed an international ban on all international trade of sea turtles, which Warwick credited for helping some species make remarkable comebacks in the last few decades. Only in the last 10 years, Warwick said, has the convention slowly begun recognizing sharks and rays with similar urgency.

This year at COP20, all proposed protections for sharks and rays were adopted, largely with unanimous support from CITES' 185 member countries and the European Union, which Warwick said had never happened before.

The European Union is one of the top suppliers of shark meat to Southeast and East Asian markets, with its imports and exports adding up to more than 20 percent of global shark meat trade, according to the World Wildlife Fund.

Gulper sharks, targeted for their livers, as well as smoothhound and tope sharks, which are primarily fished for their meat, were listed under CITES' Appendix II. Each listing covers multiple species—20 species of gulper sharks and 30 species of smoothhounds—grouped together because their products cannot be reliably distinguished in trade.

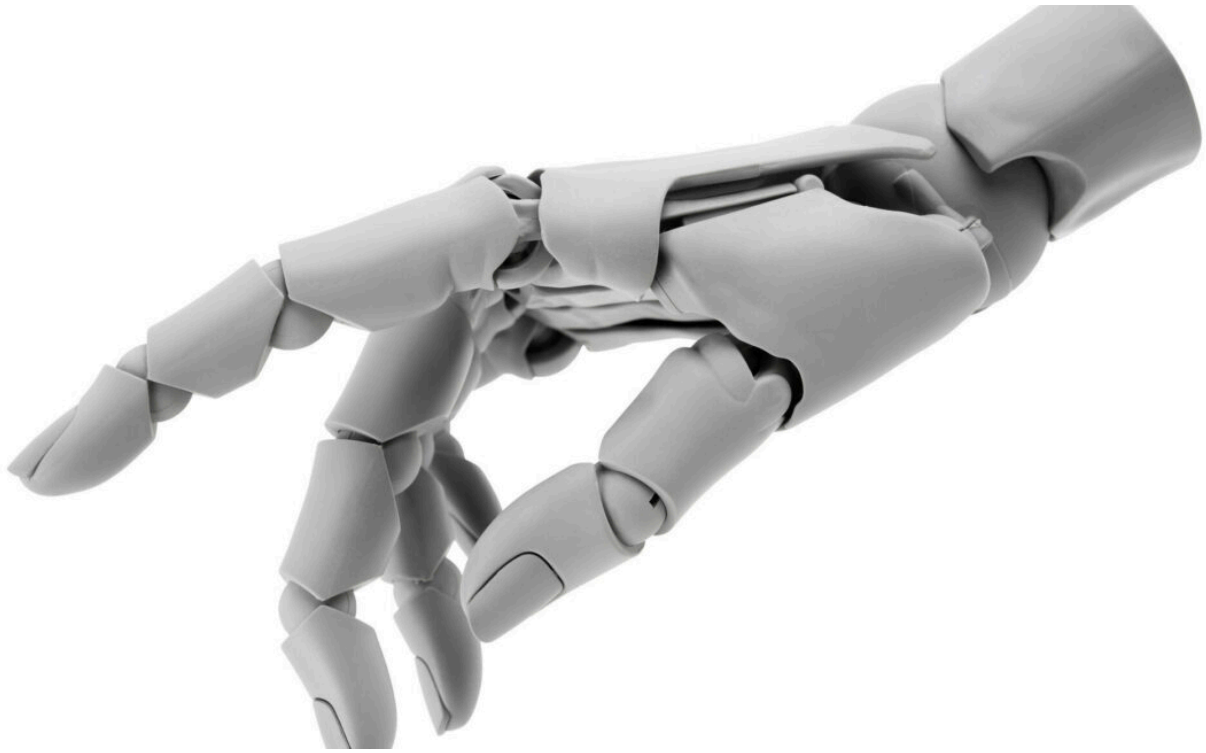
The listing requires all CITES parties to strictly regulate international trade of the species and demonstrate if it is traceable and biologically sustainable. Some species, including wedgefish and giant guitarfish—large shark-like rays

targeted for their highly valuable fins—are now protected by a temporary suspension of trade.

Others, such as oceanic whitetips, whale sharks, manta, and devil rays, can no longer be traded internationally at all. Under the new protections, CITES now lists them as Appendix I species, meaning they face a real extinction risk due to trade and are afforded the treaty's highest level of protection.

https://arstechnica.com/science/2025/12/sharks-and-rays-gain-landmark-protections-as-nations-move-to-curb-international-trade/

Scientists built an AI co-pilot for prosthetic bionic hands



To test their AI-powered hand, the team asked intact and amputee participants to manipulate fragile objects: pick up a paper cup and drink from it, or take an egg from a plate and put it down somewhere else. Without the AI, they could succeed roughly one or two times in 10 attempts. With the AI assistant turned on, their success rate jumped to 80 or 90 percent. The AI also decreased the participants' cognitive burden, meaning they had to focus less on making the hand work.

But we're still a long way away from seamlessly integrating machines with the human body.

Into the wild

"The next step is to really take this system into the real world and have someone use it in their home setting," Trout says. So far, the performance of the AI bionic hand was assessed under controlled laboratory conditions, working with settings and objects the team specifically chose or designed.

"I want to make a caveat here that this hand is not as dexterous or easy to control as a natural, intact limb," George cautions. He thinks that every little increment that we make in prosthetics is allowing amputees to do more tasks in their daily life. Still, to get to the Star Wars or Cyberpunk technology level where bionic prostheses are just as good or better than natural limbs, we're going to need more than just incremental changes.

Trout says we're almost there as far as robotics go. "These prostheses are really dexterous, with high degrees of freedom," Trout says, "but there's no good way to control them." This in part comes down to the challenge of getting the information in and out of users themselves. "Skin surface electromyography is very noisy, so improving this interface with things like internal electromyography or using neural implants can really improve the algorithms we already have," Trout argued. This is why the team is currently working on

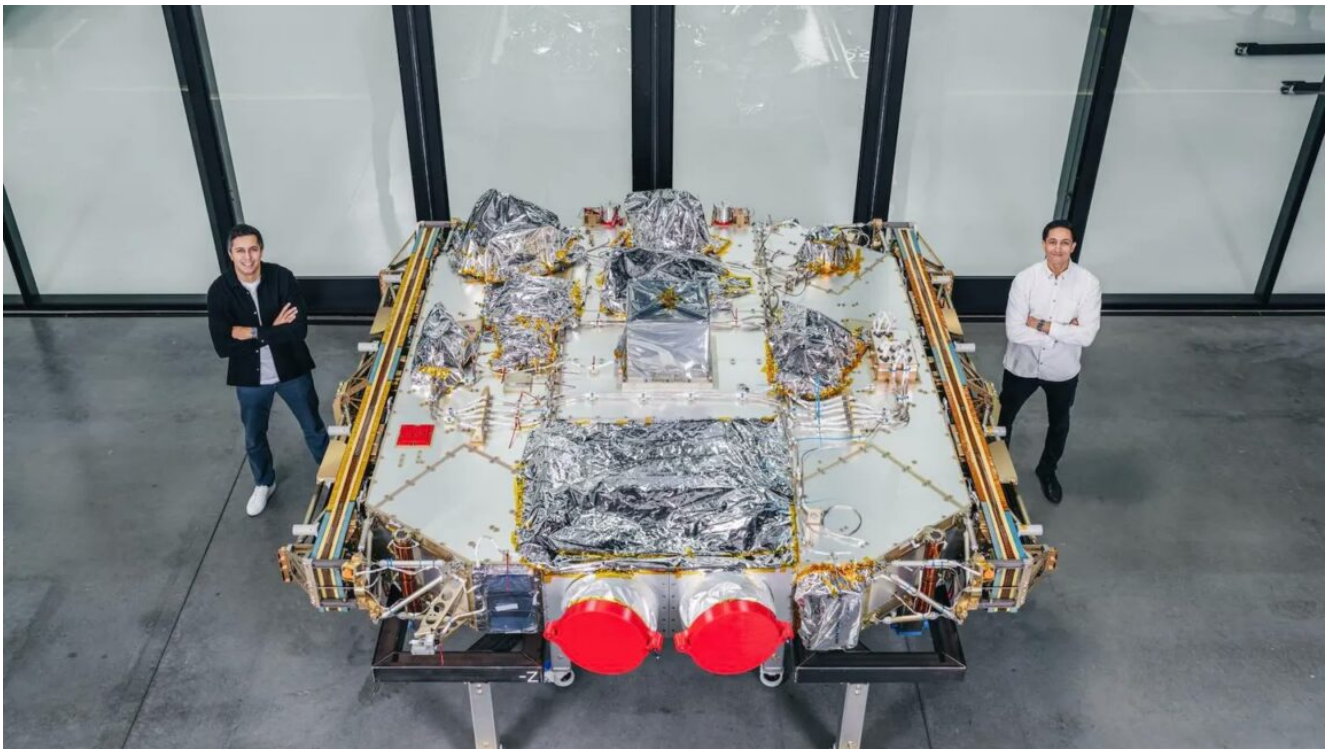
neural interface technologies and looking for industry partners.

“The goal is to combine all these approaches in one device,” George says. “We want to build an AI-powered robotic hand with a neural interface working with a company that would take it to the market in larger clinical trials.”

Nature Communications, 2025. DOI: 10.1038/s41467-025-65965-9

https://arstechnica.com/ai/2025/12/scientists-built-an-ai-co-pilot-for-prosthetic-bionic-hands/

Investors commit quarter-billion dollars to startup designing “Giga” satellites



A startup established three years ago to churn out a new class

of high-power satellites has raised $250 million to ramp up production at its Southern California factory.

The company, named K2, announced the cash infusion on Thursday. K2's Series C fundraising round was led by Redpoint Ventures, with additional funding from investment firms in the United States, the United Kingdom, and Germany. K2 has now raised more than $400 million since its founding in 2022 and is on track to launch its first major demonstration mission next year, officials said.

K2 aims to take advantage of a coming abundance of heavy- and super-heavy-lift launch capacity, with SpaceX's Starship expected to begin deploying satellites as soon as next year. Blue Origin's New Glenn rocket launched twice this year and will fly more in 2026 while engineers develop an even larger New Glenn with additional engines and more lift capability.

Underscoring this trend toward big rockets are other launchers like SpaceX's Falcon 9 and Falcon Heavy, United Launch Alliance's Vulcan, and new vehicles from companies like Rocket Lab, Relativity Space, and Firefly Aerospace. K2's founders believe satellites will follow a similar progression, reversing a trend toward smaller spacecraft in recent years, to address emerging markets like in-space computing and data processing.

Mega, then Giga

K2 is designing two classes of satellites—Mega and Giga—that it will build at an 180,000-square-foot factory in Torrance, California. The company's first "Mega Class" satellite is named Gravitas. It is scheduled to launch in March 2026 on a Falcon 9 rocket. Once in orbit, Gravitas will test several systems that are fundamental to K2's growth strategy. One is a 2o-kilowatt Hall-effect thruster that K2 says will be four times more powerful than any such thruster flown to date. Gravitas will also deploy twin solar arrays capable of

generating 20 kilowatts of power.

“Gravitas brings our full stack together for the first time,” said Karan Kunjur, K2’s co-founder and CEO, in a company press release. “We are validating the architecture in space, from high-voltage power and large solar arrays to our guidance and control algorithms, and a 20 kW Hall thruster, and we will scale based on measured performance.”

https://arstechnica.com/science/2025/12/investors-commit-quarter-billion-dollars-to-startup-designing-giga-satellites/

Court: “Because Trump said to” may not be a legally valid defense



In one of those cases, a judge lifted the hold on construction, ruling that a lack of a sound justification for the hold made it “the height of arbitrary and capricious,” a legal standard that determines whether federal decision-making is acceptable under the Administrative Procedures Act. If this were a fictional story, that would be considered foreshadowing.

With no indication of how long the comprehensive assessment would take, 17 states sued to lift the hold on permitting. They were joined by the Alliance for Clean Energy New York, which represents companies that build wind projects or feed their supply chain. Both the plaintiffs and the agencies that were sued asked for summary judgment in the case.

The first issue Judge Saris addressed is standing: Are the states suffering appreciable harm from the suspension of wind projects? She noted that they would receive tax revenue from the projects, that their citizens should see reduced energy costs following their completion, and that the projects were intended to contribute to their climate goals, thus limiting harm to their citizens. At one point, Saris even referred to the government’s attempts to claim the parties lacked standing as “tilting at windmills.”

The government also argued that the suspension wasn’t a final decision—that would come after the review—and thus didn’t fall under the Administrative Procedures Act. But Saris ruled that the decision to suspend all activity pending the rule was the end of a decision-making process and was not being reconsidered by the government, so it qualified.

Because Trump told us to

With those basics out of the way, Saris turned to the meat of the case, which included a consideration of whether the agencies had been involved with any decision-making at all. “The Agency Defendants contend that because they ‘merely

followed’ the Wind Memo ‘as the [Wind Memo] itself commands,’ the Wind Order did not constitute a ‘decision’ and therefore no reasoned explanation was required,” her ruling says. She concludes that precedent at the circuit court level blocks this defense, as it would mean that agencies would be exempt from the Administrative Procedures Act whenever the president told them to do anything.

https://arstechnica.com/tech-policy/2025/12/trumps-order-blocking-wind-development-thrown-out-by-court/

Brazil weakens Amazon protections days after COP30



Under the law, deforested properties or land cleared without a license can be retroactively legalized without restoring the land or ecological conditions, which rewards illegal deforestation. Larger projects, like irrigation, dams, and

sanitation works, as well as roads and energy infrastructure, can proceed with minimal environmental scrutiny, risking more forest fragmentation and habitat destruction. And the licensing changes narrow who must be recognized and consulted during reviews, which could exclude communities without formal land titles.

A human rights issue

It’s alarming that the legislature overrode the vetoes, said Astrid Puentes Riaño, the United Nations special rapporteur on the human right to a healthy environment. As it stands now, the law may violate Brazil’s international environmental commitments, she added.

“What is at stake is [whether] Brazil, as a country, is able to effectively protect the environment, including all their fundamental resources,” she said.

She noted that Brazil is not facing this problem alone.

“I think that we, unfortunately, are seeing a wave of regressions globally toward weakened environmental impact assessments, because they’re seen as obstacles for development and investment,” she said.

But cutting reviews when science clearly shows that the planet is facing a “triple crisis of climate change, biodiversity loss, and toxic contamination” is a huge step in the wrong direction.

“Environmental impact assessments are not a checklist in a supermarket,” she said. “They are an essential element for states to prevent environmental, climate, human rights, and social impacts.”

She emphasized that weakening environmental review isn’t a technocratic tweak or political win for one side. It undermines the foundations of public health, Indigenous

rights, and climate safety.

“This is not about politics, it’s about survival,” she said. “Some of these impacts on water, on air, on biodiversity, on people’s health, are irreversible. These are not things you can fix later.”

Climate backlash is scientifically unfounded

The fight over Brazil’s environmental licensing law can be seen as a microcosm of global climate policy tensions, with governments performatively signaling climate ambition at international meetings, such as COP30, while doubling down on economic nationalism by claiming there is no money for climate action at home and instead financing measures to boost development and growth.

https://arstechnica.com/science/2025/12/days-after-cop30-brazil-weakened-amazon-safeguards/

Pompeii construction site confirms recipe for Roman concrete



Back in 2023, we reported on MIT scientists' conclusion that the ancient Romans employed "hot mixing" with quicklime, among other strategies, to make their famous concrete, giving the material self-healing functionality. The only snag was that this didn't match the recipe as described in historical texts. Now the same team is back with a fresh analysis of samples collected from a recently discovered site that confirms the Romans did indeed use hot mixing, according to a new paper published in the journal Nature Communications.

As we've reported previously, like today's Portland cement (a basic ingredient of modern concrete), ancient Roman concrete was basically a mix of a semi-liquid mortar and aggregate. Portland cement is typically made by heating limestone and clay (as well as sandstone, ash, chalk, and iron) in a kiln. The resulting clinker is then ground into a fine powder with just a touch of added gypsum to achieve a smooth, flat surface. But the aggregate used to make Roman concrete was made up of fist-sized pieces of stone or bricks.

In his treatise *De architectura* (circa 30 CE), the Roman architect and engineer Vitruvius wrote about how to build concrete walls for funerary structures that could endure for a

long time without falling into ruin. He recommended the walls be at least two feet thick, made of either “squared red stone or of brick or lava laid in courses.” The brick or volcanic rock aggregate should be bound with mortar composed of hydrated lime and porous fragments of glass and crystals from volcanic eruptions (known as volcanic tephra).

Admir Masic, an environmental engineer at MIT, has studied ancient Roman concrete for several years. For instance, in 2019, Masic helped pioneer a new set of tools for analyzing Roman concrete samples from Privernum at multiple length scales—notably, Raman spectroscopy for chemical profiling and multi-detector energy dispersive spectroscopy (EDS) for phase mapping the material. Masic was also a co-author of a 2021 study analyzing samples of the ancient concrete used to build a 2,000-year-old mausoleum along the Appian Way in Rome known as the Tomb of Caecilia Metella, a noblewoman who lived in the first century CE.

And in 2023, Masic’s group analyzed samples taken from the concrete walls of the Privernum, focusing on strange white mineral chunks known as “lime clasts,” which others had largely dismissed as resulting from subpar raw materials or poor mixing. Masic et al. concluded that was not the case. Rather, the Romans deliberately employed “hot mixing” with quicklime that gave the material self-healing functionality. When cracks begin to form in the concrete, they are more likely to move through the lime clasts. The clasts can then react with water, producing a solution saturated with calcium. That solution can either recrystallize as calcium carbonate to fill the cracks or react with the pozzolanic components to strengthen the composite material.

https://arstechnica.com/science/2025/12/study-confirms-romans-used-hot-mixing-to-make-concrete/

Reintroduced carnivores' impacts on ecosystems are still coming into focus



He said he was surprised by how few studies show evidence of wolves, bears, and cougars having an effect on elk, moose, and deer populations. Instead, the biggest driver of changing elk population numbers across the West is humanity.

"In most mainland systems, it's only when you combine wolves with grizzly bears and you take away human hunting as a substantial component that you see them suppressing prey numbers," Wilmers said. "Outside of that, they're mostly background noise against how humans are managing their prey populations."

In some studies, ungulate populations actually increased slightly in the presence of wolves and grizzlies, Wilmers

said, likely because human wildlife managers overestimated the effects of predators as they reduced hunting quotas.

“This is a much-needed review, as it is well executed, and highlights areas where more research is needed,” said Rae Wynn-Grant, a wildlife ecologist and cohost of the television show *Mutual of Omaha’s Wild Kingdom Protecting the Wild*, in an email to Inside Climate News. Wynn-Grant was not involved in the paper, and her work was not part of its survey.

In her view, the paper showed that an increase in predators on the landscape doesn’t automatically balance plant communities. “Our world would be much simpler if it did,” she said, “but the evidence suggests that so many variables factor into if and how ecosystems respond to increases in carnivore population in North America.”

Yellowstone, with its expansive valleys, relatively easy access, and status as an iconic, protected landscape, has become a hotspot for scientists trying to answer an existential question: Is it possible for an ecosystem that’s lost keystone large carnivores to be restored to a pre-extinction state upon their reintroduction?

Wilmers doesn’t think scientists have answered that question yet, except to show that it can take decades to untangle the web of factors driving ecological shifts in a place like Yellowstone. Any changes that do occur when a predator is driven to extinction may be impossible to reverse quickly, he said.

Yellowstone’s alternative stable state was a point echoed by researchers in both camps of the trophic cascade debate, and it is one Wilmers believes is vital to understand when evaluating the tradeoffs of large-carnivore reintroduction.

“You’d be better off avoiding the loss of beavers and wolves in the first place than you would be accepting that loss and trying to restore them later,” he said.

This story originally appeared on Inside Climate News.

https://arstechnica.com/science/2025/11/reintroduced-carnivores-impacts-on-ecosystems-are-still-coming-into-focus/