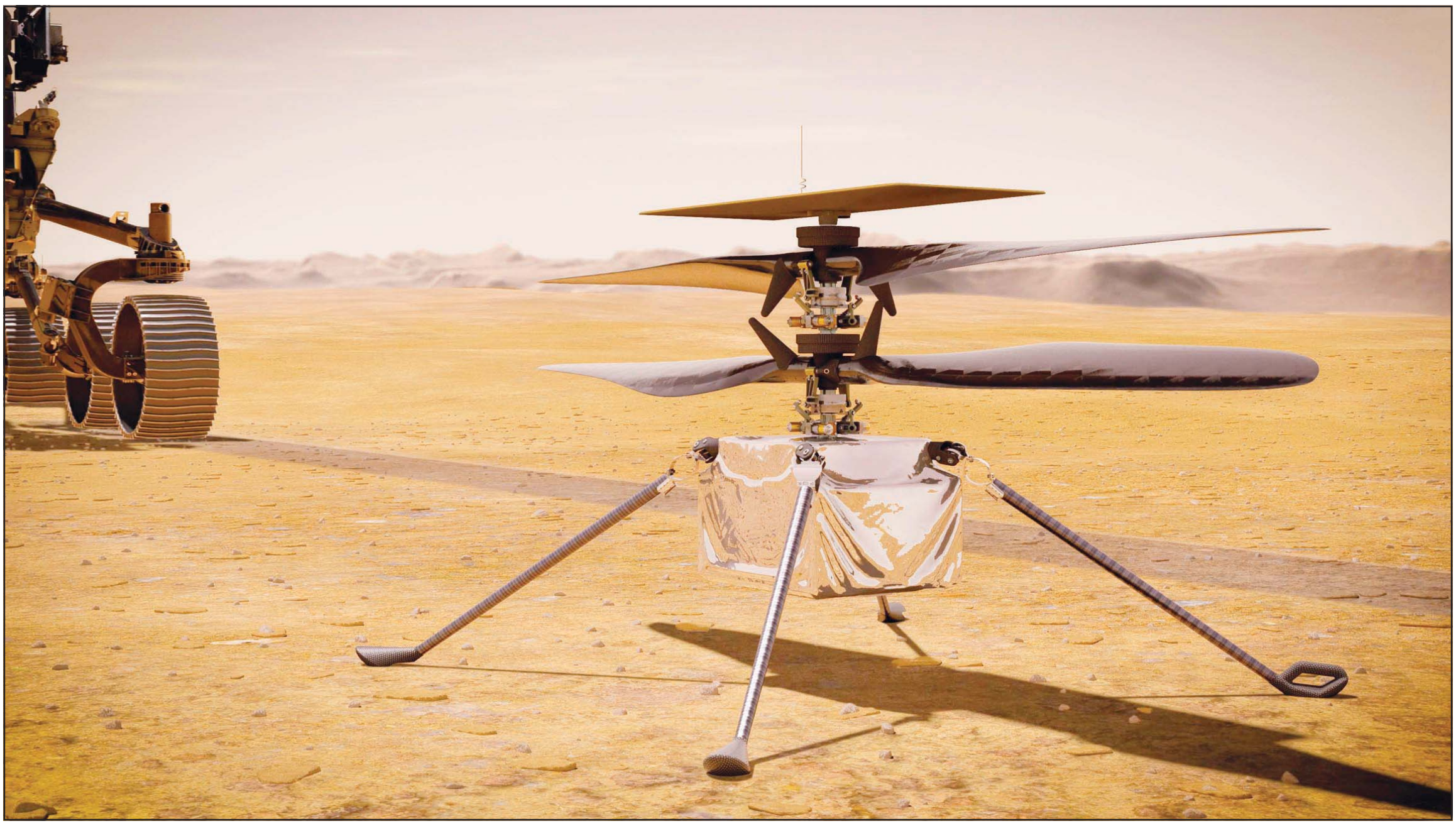

This illustration made available by NASA depicts the Ingenuity Mars Helicopter on the Red Planet's surface near the Perseverance rover (left). (AP)

Ecology

Grayling at risk

US wildlife group rejects protection for 'rare fish'

BILLINGS, Montana, July 28, (AP): US wildlife officials on Wednesday rejected special protections for a rare, freshwater fish related to salmon that's been at the center of a long-running legal dispute, citing conservation efforts that officials say have increased Arctic grayling numbers in a Montana river.

The Associated Press obtained details of the decision not to protect the fish under the Endangered Species Act in advance of a public announcement.

The move comes almost two years after a federal appeals court faulted the US Fish and Wildlife Service for arbitrarily dismissing threats to grayling from climate change and other pressures.

Munday

While some of those threats will persist, government officials said conservation measures have improved the fish's habitat and will lessen future temperature increases in the cold waters where they reside.

Known for their iridescent appearance and sail-shaped dorsal fins, Arctic grayling are members of the salmon family that can reach 30 inches (76 centimeters) in length and are prized by many anglers.

Officials credited a conservation agreement involving landowners and government agencies for recent improvements to the grayling's river habitat in southwestern Montana's Big Hole Valley.

The Big Hole River and its tributaries – home to one of the few native populations of the fish in the Lower 48 states – saw grayling numbers roughly double during the last decade to about 1,500 adult fish, said Fish and Wildlife Service biologist Jim Boyd. The population figure was derived from an estimate of the number of breeding fish.

"If you can increase the number of breeding individuals, you can start to feel really good about the conservation efforts and know they are truly working," he said.

Wildlife advocates criticized Wednesday's decision and said the worsening climate crisis leaves the grayling's survival in doubt. Even with a commitment from ranchers along the Big Hole to reduce the amount of water withdrawn to grow hay, flows drop sharply during dry periods and imperil grayling, they said.

Despite recent habitat improvements, Arctic grayling occupy only a fraction of the streams across the upper Missouri River basin where they were historically widespread. The species declined over the past century because of competition from non-native fish and after their habitat was significantly altered by dams and high summer water temperatures.

Survival

"The commitment of landowners along the Big Hole River is commendable and absolutely essential for the survival of grayling. We question whether it's enough," said attorney Jenny Harbine with Earthjustice, the environmental law firm that represented wildlife advocates in a lawsuit over the fish.

Montana Tech professor **Pat Munday**, a plaintiff in the lawsuit who fishes the Big Hole regularly, said grayling have become increasingly scarce over the past three decades. Munday alleged government biologists were "cooking the books" by inflating population estimates to justify their decision.

"The biologists and technicians get better and better at knowing where to anticipate grayling and they get better at finding them, but that doesn't mean the numbers are increasing," said Munday, a professor of science and technology studies and author of "Montana's Last Best River: The Big Hole and Its People".

Efforts to protect Arctic grayling date to at least 1991, when wildlife advocates petitioned the government to add the fish to its list of threatened and endangered species. Officials determined in 1994 and again in 2010 that protections were needed. But they were never imposed because other species were given a higher priority.

The Fish and Wildlife Service in 2014 determined that protections were no longer needed because the landowner conservation agreement had helped the fish rebound. Wildlife advocates then sued in federal court and prevailed before the 9th US Circuit Court of Appeals in 2018.

The appeals court faulted the government for not taking into account data that showed the fish's population in the Big Hole River was then declining and for dismissing the potential for climate change to cause lower water flows and warmer temperatures.

Federal wildlife officials said steps already taken, such as more shade trees on stream banks and the reduced water withdrawals, have decreased the duration of warmer water temperatures that can hurt the fish. Those measures also will help protect them going forward, they said.

A fisherman passes by the SpaceX Falcon 9 rocket first stage on the dock at Port Canaveral, Fla on July 27, as SpaceX readies for its next launch, scheduled for Saturday at nearby Kennedy Space Center. The Falcon 9 will be flying the tenth batch of 60 satellites to be added to SpaceX's Starlink broadband network. On Thursday, NASA's Mars 2020 rover will be launched by the United Launch Alliance Atlas 5 rocket from Cape Canaveral Air Force Station. (AP)

Wasser

Donnelly

Discovery

Orca Tahlequah pregnant: An orca known as Tahlequah, who raised worldwide concern when she carried her dead calf for 17 days and more than 1,000 miles almost two years ago, is pregnant, scientists said.

Scientists John Durban, senior scientist of Southall Environmental Associates and Holly Fearnbach, marine mammal research director for the nonprofit SR3, recently finished recording drone images of the endangered southern resident whales and discovered pregnancies amid the J, K and L pods, The Seattle Times reported.

The pregnancies are not unusual but Tahlequah's pregnancy carries special meaning for a region that grieved the death of her calf with her.

The southern residents frequent Puget Sound, are struggling to survive, and most pregnancies are not successful.

Tahlequah's baby was the first for the whales in three years. The southern residents have since had two more calves, in J pod and L pod. Both are still alive.

The current population of the southern resident orcas is 72.

About two-thirds of all southern resident pregnancies are typically lost, researcher **Sam Wasser** of the Center for Conservation Biology at the University of Washington has found. Stress from hunger because of a lack of salmon is linked to the whales' poor reproductive success, according to his research.

"There are stressed whales out there, critically stressed," she said.

Boaters should respect the whales' space and give them the quiet they need, Fearnbach and Durban said. Whales use sound to hunt, and boat disturbance and underwater vessel noise is one of the three main threats to their survival, in addition to lack of adequate, available salmon and pollution. (AP)

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Rare plants could go extinct: The US Fish and Wildlife Service says there's enough scientific evidence that two rare plants in Nevada's desert could go extinct to warrant a year-long review of whether to list them as endangered species, including one at the center of a fight over a proposed lithium mine.

Tiehm's buckwheat, which is found on just 10 acres (4 hectares) of federal land in west-central Nevada and believed to exist nowhere else in the world, could be wiped out by the lithium mine proposed 200 miles (320 kilometers) southeast of Reno, according to conservationists who petitioned for both listings last year.

The Las Vegas bearpoppy is facing threats from dramatic habitat loss in southern Nevada due to urban sprawl and mining, as well as killer bees, they said.

The service said in a formal 90-day finding published in the Federal Register on Wednesday the petitioners presented "substantial scientific or commercial information" that listings of both plants may be warranted and, consequently, the agency will initiate full-status reviews of the species.

It agreed the buckwheat is potentially threatened by destruction of habitat from mining, as well as invasive species, off-road vehicles, wildfires, livestock grazing and climate change.

The bearpoppy is threatened by urbanization, mining, recreation, climate change and the invasive bees, the agency said.

Existing regulatory mechanisms may be inadequate to address impacts of the threats, the agency concluded in the ruling cheered by environmentalists.

"Nevada has some of the world's most remarkable botanical diversity and we're thrilled these beautiful flowers are moving toward Endangered Species Act protection," said **Patrick Donnelly** of the Center for Biological Diversity.

"Wildflower aren't just pretty to look at. They're building blocks of the desert ecosystem and we can't let them go extinct," said Donnelly, Nevada state director of the group that filed the petitions and sued the Bureau of Land Management last year to block the mine.

Ioneer Ltd, the Australian-based company that wants to build the mine, has spent millions exploring the site it says is one of the world's biggest undeveloped lithium-boron deposits critical to making batteries for electric cars.

It also recently agreed to a five-year extension of a research project it's financing at the University of Nevada, Reno, where scientists started growing hundreds of Tiehm's buckwheat seedlings this year in a campus greenhouse to determine whether it's feasible to transplant them in the wild to bolster its limited population.

"Ioneer looks forward to the USFWS full status review of Tiehm's buckwheat and stands ready to assist the Service in any way possible," the company said in a statement emailed to The Associated Press.

The company acknowledges Tiehm's buckwheat hasn't been documented anywhere else on earth, but denies the mine would lead to its extinction.

Nearly 100 environmental scientists and university professors, mostly from Nevada and California, disagreed in a letter earlier this week to state officials considering whether to add the buckwheat to a list of protected species in Nevada. (AP)

Space

NASA's Perseverance – set for liftoff this week

New Mars rover brawniest, brainiest

CAPE CANAVERAL, Fla, July 28, (AP): With eight successful Mars landings, NASA is upping the ante with its newest rover.

The spacecraft Perseverance – set for liftoff this week – is NASA's brawniest and brainiest Martian rover yet.

It sports the latest landing tech, plus the most cameras and microphones ever assembled to capture the sights and sounds of Mars. Its super-sanitized sample return tubes – for rocks that could hold evidence of past Martian life – are the cleanest items ever bound for space. A helicopter is even tagging along for an otherworldly test flight.

This summer's third and final mission to Mars – after the United Arab Emirates' Hope orbiter and China's Quest for Heavenly Truth orbiter-rover combo – begins with a launch scheduled for Thursday morning from Cape Canaveral. Like the other spacecraft, Perseverance should reach the red planet next February following a journey spanning seven months and more than 300 million miles (480 million kms).

NASA Administrator Jim Bridenstine doesn't see it as a competition. "But certainly we welcome more explorers to deliver more science than ever before," he said following a launch review Monday, "and we look forward to seeing what it is that they're able to discover."

Here's a peek at Perseverance:

Perseverance vs Curiosity:

The six-wheeled, car-sized Perseverance is a copycat of NASA's Curiosity rover, prowling Mars since 2012, but with more upgrades and bulk. Its 7-foot (2-meter) robotic arm has a stronger grip and bigger drill for collecting rock samples, and it's packed with 23 cameras, most of them in color, plus two more on Ingenuity, the hitchhiking helicopter. The cameras will provide the first glimpse of a parachute billowing open at Mars, with two microphones letting Earthlings eavesdrop for the first time. Once home to a river delta and lake, Jezero Crater is NASA's riskiest Martian landing site yet because of boulders and cliffs, hopefully avoided by the spacecraft's self-navigating systems. Perseverance has more self-driving capability, too, so it can cover more ground than Curiosity. The enhancements make for a higher mission price tag: nearly $3 billion.

Sample Collection:

Perseverance will drill into rocks most likely to hold signs of ancient life and stash the collection on the ground to await a future rover. Forty-three sample tubes are on board this rover, each one meticulously scrubbed and baked to remove Earthly microbes. NASA wants to avoid introducing organic molecules from Earth to the returning Martian samples. Each tube can hold one-half ounce (15 grams) of core samples, and the goal is to gather about a pound (0.5 kilogram) altogether for return to Earth. NASA hopes to launch the pickup mission in 2026 and get the samples back on Earth by 2031 – at the soonest.

Helicopter Demo:

The 4-pound (1.8-kilogram) helicopter, Ingenuity, will travel to Mars clutching the rover's belly and, a few months after touchdown, attempt to fly solo. Once dropping onto the Martian surface, Ingenuity will start out like a baby bird, rising 10 feet (3 meters) into the planet's extremely thin atmosphere and flying forward up to 6 feet (2 meters). With each attempt, it will try to go a little higher and farther. "It really is like the Wright brothers' moment," said project manager MiMi Aung. She has one month to squeeze in as many helicopter hops as possible before the rover moves on to more pressing geologic work. The future could see next-generation helicopters scouting out distant Martian territory for astronauts or even robots.

Human Benefits:

Besides the helicopter, Perseverance carries other experiments that could directly benefit astronauts at Mars. An instrument the size of a car battery will covert atmospheric carbon dioxide into oxygen, an essential ingredient for rocket propellant and breathing systems. Another instrument, zapping rocks with lasers to identify organic molecules and minerals, carries samples of spacesuit material. NASA wants to see how the fabrics withstand the harsh Martian environment. It will be the 2030s at best, according to NASA, before astronauts venture to Mars.

Cool Stowaways:

A couple Martian meteorites are finally headed home, or at least slivers of them to be used as calibration targets by laser-shooting instruments aboard Perseverance. Other cool stowaways: silicon chips bearing the names of nearly 11 million people who signed up, as well as a small plate showing Earth and Mars on opposite sides of the sun with the message "explore as one" in Morse code tucked into the solar rays. There's also a plaque paying tribute to medical workers on the pandemic's front lines. The coronavirus is preventing hundreds of scientists and other team members from traveling to Cape Canaveral for the launch.

In this May 20, 2020 photo, made available by NASA/JPL-Caltech, engineers and technicians insert sample tubes into the belly of the Perseverance Mars rover at the Kennedy Space Center in Florida. (AP)