

Grim Future for a Festive Bird?

FWP biologists and others track harlequin ducks to learn why populations appear to be declining. **By Laura Lundquist**

ON MAY 1, 2018, AT HIS OFFICE in Kalispell, Chris Hammond opened his computer to check the location of 15 radio-tagged waterfowl he'd been following for months. He'd yet to see a GPS signal flicker on his Montana map. But that morning, there it was. In the foothills of the Cabinet Mountains near the Idaho border, about 35 miles south of Libby, a point flashed. Harlequin ducks were returning.

Over the winter, the Montana Fish, Wildlife & Parks nongame wildlife biologist had watched the drake harlequin points pulse along the Pacific Coast between Alaska and Seattle. Harlequins are sea ducks, spending most of the year surfing saltwater among seagulls and cormorants. But in the spring, they nest inland on fast-moving mountain streams, where they feed on aquatic insects by swimming underwater and probing bottom cobble. Hammond was relieved to see that his research birds had made it back to Montana. "There's a lot of mortality during migration, so you never know," he says.

Harlequin ducks are among Montana's most obscure



COURTSHIP ENTREATY A drake harlequin duck courts a hen along a mountain stream in Glacier National Park. After spending winter along the Pacific Coast, these ducks return to Montana each spring to nest and raise their young.

CINDY GOEDEL



LUNCH BREAK A trio of male harlequins rests on a mid-stream boulder. During the summer, the mountain ducks swim underwater in swift current feeding on aquatic insects.

waterfowl. Small ducks about the size of blue-winged teal, they are rarely seen here by anyone except backcountry hikers, outfitters, and anglers. And even then the birds might go unnoticed if not for the males' striking plumage. Named for the colorfully costumed servant characters in classical European theater, the male harlequin is distinctively marked with a slate-blue body, white facial crescent and head spot, rust-red crown and flanks, and bold white and black body stripes. While hen harlequins are a modest brown with white markings, drakes rival male wood ducks as the state's most colorful waterfowl species.

Harlequin ducks are well known to people along the Pacific seashore, where bird biologists and citizen scientists report steady population declines. In Canada's Strait of Georgia, an arm of the Pacific between Vancouver Island and Vancouver, British Columbia, scientists estimate the population is decreasing 2.6 percent per year. Another coastal population has declined by nearly 50 percent during the past four decades. Breeding numbers are dropping, too. In Banff National Park in Alberta, harlequin pair numbers have dropped from 90 to 25 since 1995.

Threats include water pollution, climate change, road building, mining, and distur-

bances by backpackers and other mountain visitors during nesting season. The long-lived birds, surviving up to 18 years, are slow to reach reproductive age and breed sporadically, producing no young some years and large broods of up to 10 ducklings in others.

All northwestern states in the United States have listed the harlequin as a Species of Greatest Conservation Need.

While biologists are trying to learn exactly why harlequin numbers are dropping, bird conservationists worry that an *Exxon Valdez*-

type accident could wipe out the Strait of Georgia population if Canada moves forward with plans to ship Alberta tar-sands oil out of Vancouver ports. Harlequins didn't return to Alaska's Prince William Sound for 25 years after the *Exxon Valdez* spill.

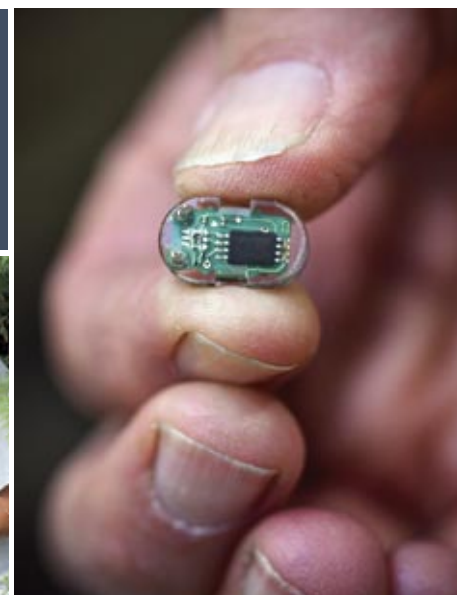
An oil spill could mean far fewer harlequin ducks in Montana during the spring and summer. That's when the birds journey hundreds of miles from the coast to breed along the icy streams of the Rocky Mountains. Males linger only about six weeks, leaving females to raise the chicks until they and the young head to the Pacific Coast in September.

Until recently, scientists had scant data on harlequin ducks in Montana, so they were unsure if numbers here were declining. But during the past decade, they have tracked several dozen birds and discovered new migration movements and activities. "The more I did this, the more I realized just how little we knew about this species," says Lisa Bate, a wildlife biologist at Glacier National Park who has been banding and tracking harlequins since 2011.

TINY TRANSMITTERS

In 2015, biologists from across the Pacific Northwest joined forces to tease apart the harlequin life cycle and learn where to focus conservation activities. Since life for most harlequins begins in the Rockies, FWP biologists, along with those in British Columbia, Alberta, Washington, and Wyoming, have tagged ducks in early summer for the past

DATA RECOVERY Below: Glacier National Park wildlife biologist Lisa Bate and FWP nongame wildlife biologist Chris Hammond with harlequins located by tracking a GPS device surgically implanted in the drake's abdomen. A geolocator (right) on the hen's leg band records information used to determine nesting success.



CLOCKWISE FROM TOP: LEFT, DAWN Y. WILSON; JOHN ASHLEY, DICK WALKER

four years. Thanks to recent technological advances, wildlife agencies can now afford miniature GPS devices that allow them to learn more about the harlequin's reproductive success and annual migrations.

Veterinarians carefully implant platform terminal transmitters (PTTs) in the males' abdomens. The thumb-sized devices, which cost \$1,800 and weigh just 26 grams (less than 3 percent of the duck's weight), broadcast an instantaneous signal that biologists track to locate the males, and females by association, for up to three years. Because females can't produce eggs with transmitters in their bellies, biologists attach tiny \$200 geolocators to the hens' leg bands. The geolocators measure daily light levels, which can be used to determine if a hen has nested successfully. When a hen is nesting, light measurements drop because the sensor is hidden beneath her body. Successful females remain on their nests about 28 days, so biologists look for a four-week span of lower light levels. The females must be recaptured each year to retrieve the data.

It's no small feat to catch a harlequin duck. Not only are they small, they're shy and elusive. They also breed in remote high-

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mountain streams. Capture has grown easier in recent years thanks to the PTTs, which allow scientists to pinpoint a drake's location to within 150 meters. When biologists find males during the breeding season, the banded hens are there, too.

Harlequin ducks mate for life. For the past three years, most of Hammond's research males have returned with their mates to Montana. In May 2018, after the first GPS blip appeared, Hammond rallied as many biologists, wardens, and volunteers as possible to recapture ducks on streams around Noxon Reservoir, an impoundment of the Clark Fork River near the Idaho border, where the signal originated.

A few days later, Hammond had a 10-person team stalking the upper stretches of

Elk Creek, located south of the reservoir. For the first several hours at the site, no one could locate a harlequin. By 5 p.m., Hammond and several other team members gathered to discuss options, including erecting a fine-mesh “mist” net at the mouth of the stream to catch any ducks that flew down to spend the night on the reservoir.

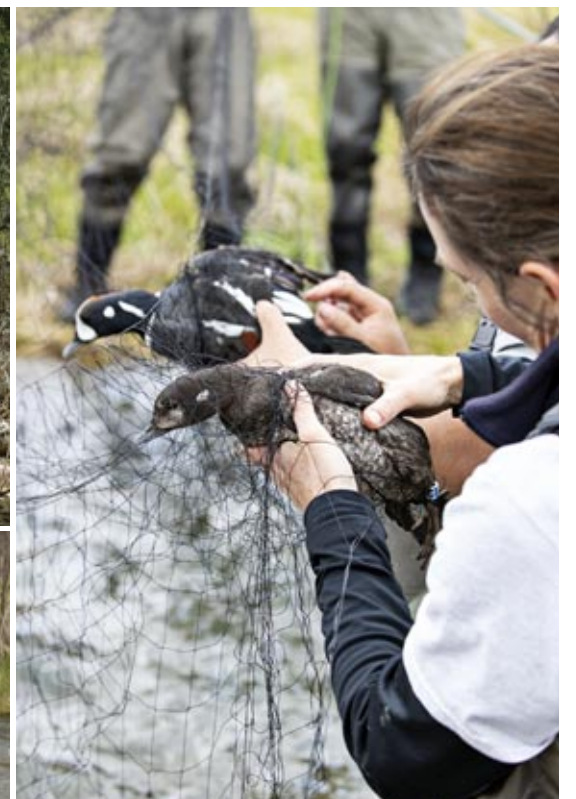
Then Hammond's handheld radio beeped. Another team member had spotted a harlequin, one of the banded females, upstream.

Team members quickly but quietly converged on the site. As some watched the hen, others circled below to set a net across the stream. Reports of the duck's location flew back and forth on the radios. At one point the hen flew off, but then she returned to the stream—with a male.

With the net in place, team members began to usher the pair downstream. Herding harlequins requires a light touch. Pushing too hard causes them to flush prematurely and fly over the net. Waiting too long allows the birds to spot the net and dive under it. “There's definitely a learning curve to doing this,” says Hammond. “You need to be a serious ‘harlequin duck whisperer’ to move them at just the right pace.”



CAPTURE SITE Above: At Elk Creek near Noxon Reservoir, biologists spread a mist net across the stream to capture flying harlequins (far right). FWP wildlife biologist Bruce Sterling hands a captured duck to John Ashley, a retired Glacier National Park biologist who pioneered harlequin research in the park.





IN GOOD HANDS Top: University of Montana graduate student Warren Hansen uses a radio receiver to track harlequin ducks fitted with “backpack” VHF transmitters. Above: FWP wildlife biologist Kristina Smucker (right) and former FWP wildlife technician Kaitlyn Farrar release a drake harlequin in Glacier National Park. Right: Chris Hammond holds a healthy drake harlequin duck. “We get asked a lot by members of the public about the welfare of these research harlequins,” he says. “As is the case with all the wildlife that FWP biologists and technicians handle, our protocols are reviewed by the International Animal Care and Use Committee, made up of veterinarians and wildlife officials.”

The team timed this capture perfectly, and soon two ducks were caught in the net. Hammond and FWP wildlife biologist Kristina Smucker quickly moved in to gently slip the birds free from the mesh and into soft bags. The birds were weighed and examined, and then Hammond removed the female’s precious geolocator before releasing the pair to, he hoped, produce another generation of harlequins.

Not every day is so successful. Of the ten pairs tagged in 2018 in northwestern Montana, along the Rocky Mountain Front, and on the Boulder River south of Big Timber, teams recovered only five males and four hens in 2019.

MULTIPLE RUNOFF PEAKS

After graphing the geolocator data taken from the four hens this past spring, Hammond saw that three had failed to hatch

chicks the previous summer. The fourth hen nested for the required 28 days.

Other areas also are reporting poor reproductive success. “Last year, Lisa Bate saw 20 single hens at McDonald Creek [in Glacier National Park], and only one had a brood. That indicates a lot of nest failures,” Hammond says.

What accounts for the lack of success? No one knows for sure, but Bate and Hammond suspect that major changes in spring runoff caused by climate change could be the reason.

Because female harlequins usually choose nest sites just a few feet from a stream, they must wait to nest until after peak runoff, when floodwaters recede. Historically, streams experience a single runoff peak. But in recent years, multiple peaks have occurred from sudden spring warm-ups or rain falling on snow-covered ground. A harlequin hen nesting after the

first peak could lose her eggs in the second, when rising waters wash the eggs away. “And harlequins don’t re-nest after a failure like many other duck species do,” Hammond says. “Once she starts incubating the eggs, the male heads back to the Pacific and isn’t around for re-breeding.”

Over the next several years, Hammond will verify whether runoff changes are a factor by comparing the location and timing of hen nesting with river stream gauge measurements. “Harlequins have evolved to sense a stream’s peak flow and then nest right at that time,” Hammond says. “But multiple peak flows caused by climate change are completely messing up that adaptation.” 🐼

For more information on Montana’s harlequin ducks, visit the Montana Outdoors website at fwp.mt.gov/mtoutdoors and search for “harlequin.”

CLOCKWISE FROM TOP: LEFT: JEREMY ROBERTS; DONALD M. JONES; DICK WALKER