SUNDAY
Territory

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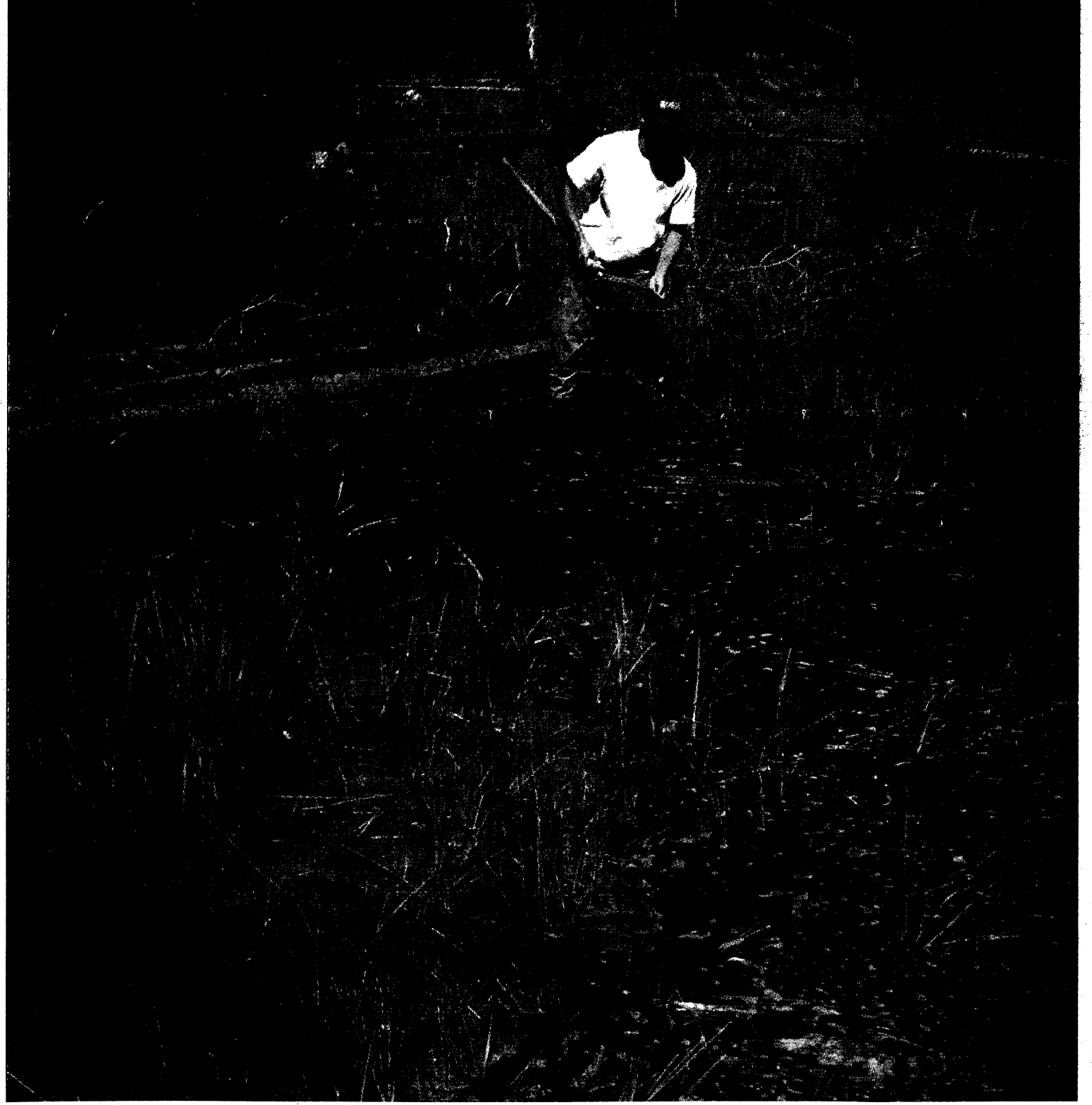
U.S. Geological Survey

Boreal toads, also known as mountain toads, have seen sharp population declines in recent decades. New research in Glacier National Park suggests one reason for their decline could be a century of fire suppression. The sun-seeking toads, which have been found above treeline as high as 11,000 feet, do not fare well in shady forests choked with 100 years of growth.

'They like open areas with lots of light. A dense lodgepole forest is just not very good toad habitat.'

– Steve Corn, zoologist

Sun worshippers



Toad's numbers linked to fire

By MICHAEL JAMISON
of the Missoulian

WEST GLACIER – Could it be that, after the raging and red-hot inferno, rising like a phoenix from the ashes is ... a toad?

"It's certainly something we need to think about," said Steve Corn. "These toads might actually be a fire-adapted species. When we suppress fire, we might be suppressing the toads."

Corn is a zoologist working for the U.S. Geological Survey at the Missoula-based Aldo Leopold Wilderness Research Institute. His emerging theory that the beleaguered boreal toad might be adapted to thrive alongside wildfire is getting the attention of forest scientists for a couple of reasons.

First, it offers an unlikely addition to the cast of characters known to need fire in order to thrive. That toads, generally thought to like cool, damp hollows under logs, actually need scorching fire to survive is a strange and novel idea.

Second, and more importantly, Corn's theory is significant because it adds to the list of possible suspects in the mystery of why boreal toads have been croaking at an alarming rate throughout their Rocky Mountain range.

MICHAEL JAMISON/Missoulia

Joshua Kinser, a volunteer field technician, dips nets for a U.S. Geological Survey study that is tracking amphibians across Glacier National Park. By the end of this summer, crews will have sampled more than 10,000 wetlands throughout the park. Boreal toads have been found breeding at about 5 percent of the sites, especially in areas recently burned by wildfire.

In Colorado, the boreal toad is almost gone in some places, and in Montana its numbers are thought to be dropping precipitously. Some scientists have blamed an exotic fungus known to attack the toads; others, an increase in ultraviolet light reaching the Earth and damaging the toad's gelatinous egg bundles. Still others point to pesticides, pollutants and habitat destruction.

Now, a century of fire suppression can be added to the list of probable causes for the toads' decline.

By choking forests with unnaturally thick growth, fire-suppression cut off sunlight from prime toad breeding ponds. By scouring clear the underbrush and forest canopy, wildfire is opening the forest for the boreal toad, allowing patches of sunlight to warm the toads as they bask in the sun.

"It makes pretty good sense," Corn said. "They like to soak up the sun, like to bask in it. They like open areas with lots of light. A dense lodgepole forest is just not very good toad habitat."

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Toad

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But a dense lodgepole forest is
actly what covers much of the West
ese days, thanks in no small part to a
ntury of fire suppression. For the past
veral years, Corn and a team of
ientists have been working that
dgepole forest, finding the small seeps
nd wetlands where amphibians hang
ut; searching to see who's out there.

And until fire came through, the
oreal toad just wasn't out there.

Since the late 1990s, Corn's teams
d been surveying a corner of Glacier
ational Park, just inside the park's
estern entrance. Year after year, they
pped their nets into the ponds along
e Camas Road, and year after year
ere was no sign of boreal toads.

Then, in the summer of 2001, the
oose Fire burned out of control
ross Corn's study area. A year later,
real toads are breeding in a half
zen ponds.

The same toad explosion happened a
uple years before in the area of the
naconda Fire, located just to the
rtheast of the Moose Fire.

"Having the old data to compare to
s critical," Corn said of his theory.
nless you just happen to be studying
area before it burned, you'd have no
y of knowing whether the toads had
en there all along or whether they
d just moved in. We were lucky that
already had pretty good data on
se sites."

Joshua Kinser picked his way
ugh a charred forest, decked out
n all the high-tech scientific gear
needed to collect data on amphibians. He had his rubber boots, a net that looked suspiciously like a child's butterfly net, a notebook and a USGS ballcap to block the sun.

Behind the volunteer field technician walked Blake Hossack, a USGS zoologist and project leader in the search for Glacier Park's amphibians.

As they made their way through the burn, Hossack explained the bizarre metamorphosis that is a toad's life. The eggs, planted in black bundles under shallow ponds, pull in oxygen from the water around them. When the tadpoles emerge, they breath through external gills for a few days before developing internal gills.

Lungs slowly develop, and the long-tailed tadpoles begin to surface, gulping at the air above. Then come rear legs, bulging eyes, a changing mouth for a changing diet. The "beak" used for nibbling algae gives way to a toady mouth for eating insects.

Within a couple months, they are ready to leave the water, although the process still is not entirely complete – "they're still dragging a little bit of tail," Hossack said.

Before emerging, the bundles of black eggs soak up the sun in shallow water. Afterward, family groups of black tadpoles stick together, presumably to better bask. And as adults, the boreal toads like to perch on a hot rock in the heat of the day, letting the sun warm their bumpy backs.

By the end of this summer, Hossack and his helpers will have sampled more than 10,000 wetlands hoping to watch this cycle in action.

"And after all this time," he said, "we still can't predict where they'll be, except that it will be open."

Open, just like in this year-old burn, where even the weedy wetlands were cooked clean of shadowy plants.

At about half the sites, they find long-toed salamanders. At about a quarter, they find the Columbia spotted frog. But the boreal toad turns up at just 5 percent of sites, "which concerns us," Corn said, "because that seems lower than it should be. Anecdotally, the toads have always been described as historically common and abundant."

What is abundant in this burn are all the well-known fire-adapted plants and animals that usually crop up after a fire.

Tiny lodgepole pine carpet the forest floor, the seeds cut loose from waxy, serotinous cones by the heat of the fire. Scattered among the pines are other "fire plants;" spirea and fireweed and arnica and dragontail mint and pine grass, which only flowers after a fire. Other plants, like the red-stemmed ceanothus and Bicknell's geranium, only appear in burns, either because they need the unfiltered sun to survive or because their hard seeds can only be opened by scorching heat.

Beetles move into trees killed or weakened by the blaze, and little-seen birds like the black-backed woodpecker move in to eat the beetles.

Scientists have long understood that these species need fire to thrive. Now, perhaps, they will add the warty boreal toad to the list.

The toads already are distinguished for their surprising choice of habitat, living as high as 11,000 feet, far above treeline among the alpine rocks.

The Colorado Division of Wildlife has listed them as endangered, and the southern population of mountain toads is a candidate for federal protection under the Endangered Species Act.

Scientists believe the thousands of breeding populations that existed just a few decades back have shrunk to a few hundred.

The supposed reasons for the decline — including climate change and ultraviolet light and mining and logging and development and introduced fish and disease — have long been studied. But until now, no one made the connection between toads and fire.

"This is brand-new," Corn said. "No one has ever really studied this angle."

It was sheer luck that his team was working in an area that happened to burn, he said, "and one of the interesting things that showed up right away was the arrival of the toads. We were surprised by the magnitude of the invasion."

Corn's old data will be compared with current data being collected this summer, he said, and then will be analyzed in the context of a bigger project exploring toads' relationship to fire in the Bitterroot Valley and Idaho.

"We want to know the effects of fire suppression over the last century," he said. "It's something we need to start thinking about in terms of future forest management."

Very little is known about how fire impacts most species, he said, and there may be other animals, like the toad, that have more in common with the mythical and majestic phoenix than would at first be imagined.

What is known, however, is that in Glacier Park, the toads seem to be holding on, Corn said, "and as long as they have a fairly open forest and open ponds, areas opened by fire, then I think they'll do OK."

Reporter Michael Jamison can be reached at 1-800-366-7186 or at mjamison@missoulian.com.

Toad migration closes Glacier road

WEST GLACIER – A rock-pocked road that winds its way along the western edge of Glacier National Park was closed this week to make room for thousands of tiny toads hopping in a mass migration from pond to forest.

The Inside North Fork Road had been open for the season only a couple days when a heavy-equipment operator working on a park road crew noticed the young boreal toads crossing the road. In a move biologists applauded, the equipment operator shut off his rig and called rangers, who later closed the road to traffic.

Boreal toad populations have been in steep decline in recent decades, and park officials said closing the little-used road for a few days was a small price to pay for bolstering boreal survival.

The current migration was expected to last a few days at least, officials said, with the road opening once the amphibians have crossed to the other side.

Closed road gives Glacier toads a hopping chance

Migration route sealed off as babies attempt to get to the other side

By **MICHAEL JAMISON**
of the Missoulian

WEST GLACIER – Steve Corn doesn't know why the toads cross the road, doesn't know where they're going or when they'll be back.

What he does know, however, is that thanks to Glacier National Park officials, the tiny toadlets suddenly have much better odds of making it to the other side.

"I'm really pleased with the park's response on this situation," said Corn, a U.S. Geological Survey zoologist working at the Missoula-based Aldo Leopold Wilderness Research Institute.

"This situation," as Corn calls it, is a massive migration of boreal toads not far from Glacier's west entrance. The migration route cuts straight across the park's Inside North Fork Road, and Thursday park officials temporarily closed the road to allow safe passage for the amphibians.

According to Corn, populations of the sun-loving boreal toad have been in decline for decades. The mountain toads are listed as endangered by the state of Colorado, and are being considered for protection under

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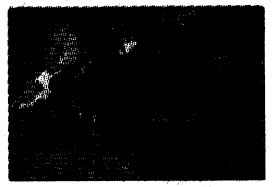
Coming Sunday



The boreal toad has led a precarious life that has it on the brink of the Endangered Species List. But oddly enough, the Moose fire of 2001 seems to have been the perfect antidote. Is fire suppression hastening the demise of these toads?

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Continued

the federal Endangered Species Act.

That precarious status, he said, makes it even more important to protect large local populations during their migration from ponds to forests.

According to Corn, "waves of metamorphs" – the tiny tadpoles-turned-toadlets still dragging some tail – are crossing the road in the Sullivan Meadow area of last summer's Moose Fire. They are headed from marshy breeding ponds to upland forests.

"That site had a lot of toads breeding in it," Corn said, "so it doesn't surprise me that there are a lot of toadlets coming out of there."

The toadlets, which are about as big as a fingernail, likely will not fare well on the road, he said, even with traffic stopped.

"Roads," he said, "are not typically really hospitable to toadlets."

The young boreal toads like moisture, he said, and can dry out and die during the long hop across the road.

On a hot, dry day, he said, "the dumb ones may start out, but they won't make it across."

And the few that make it across, he said, will quickly disappear from the view of science.

"We know they're looking for a place to eat," he said, "a place to spend the winter. But from our point of view, they just become invisible for a while."

Scientists are uncertain how long it takes a toad to reach adulthood and hop back to the pond to breed, in large part because the amphibians are "small and inconspicuous," he said.

The current migration, which was reported by a park road crew working in the area, likely will last a few days at least, he said. If the weather turns wet, more toads will try to follow across the road, hurrying the exodus along. If it remains dry, however, the migration will be prolonged as toadlets wait by the pond for favorable conditions before crossing the road.

A similar toad road was reported nearly a decade ago in the park's southern reaches, when a mass migration of boreal toads was reported in the Nyack Flats area of the Middle Fork Flathead River.

Park officials have said the rock-pocked Inside North Fork Road will remain closed to vehicles until the current migration is complete.

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