

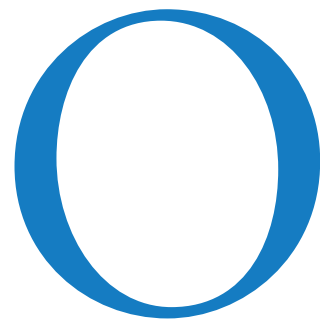
TURF WAR TWIST

Why mountain bluebirds have disappeared from western Montana's valleys—and might never return.

By Renée A. Duckworth
and Alexander V. Badyaev

IN FOR THE DURATION Secure in man-made nesting structures, western bluebirds no longer face the historical loss of nesting trees toppled by age and wind. The authors maintain that the boxes are good for this species in western Montana valleys but don't benefit, in the long run, mountain bluebirds, which require a cycle of fire and new cavities to colonize low-elevation areas.





One morning in March 1999, just like every year for the previous 50 years or so, the late Joe Waldbillig—a cattle rancher and self-taught naturalist—was driving his pickup down the snowy road bisecting his western Montana ranch.

Ranging in elevation from 4,000 to 5,000 feet, the ranch was a haven for mountain bluebirds, and every day through early spring Waldbillig drove around the valley looking for signs of the birds' return as indication that the worst of winter was over.

But that morning, much to his surprise, he came across a bluebird species he had never before seen on his ranch: an industrious male western bluebird, inspecting nest boxes along the fence.

It was a preview of momentous changes. In just five years, Waldbillig would witness on his ranch the near complete takeover of mountain bluebirds by the newly arriving western bluebirds. Over the next decade,

such stories of rapid replacement of one bluebird species by the other would repeat itself over and over on our 15 western Montana study areas, which included the Waldbillig ranch, where we monitored these remarkable relationships. Since 1995 we have been investigating competitive interactions between mountain bluebirds and western bluebirds to understand the mechanisms underlying these dramatic changes in distri-

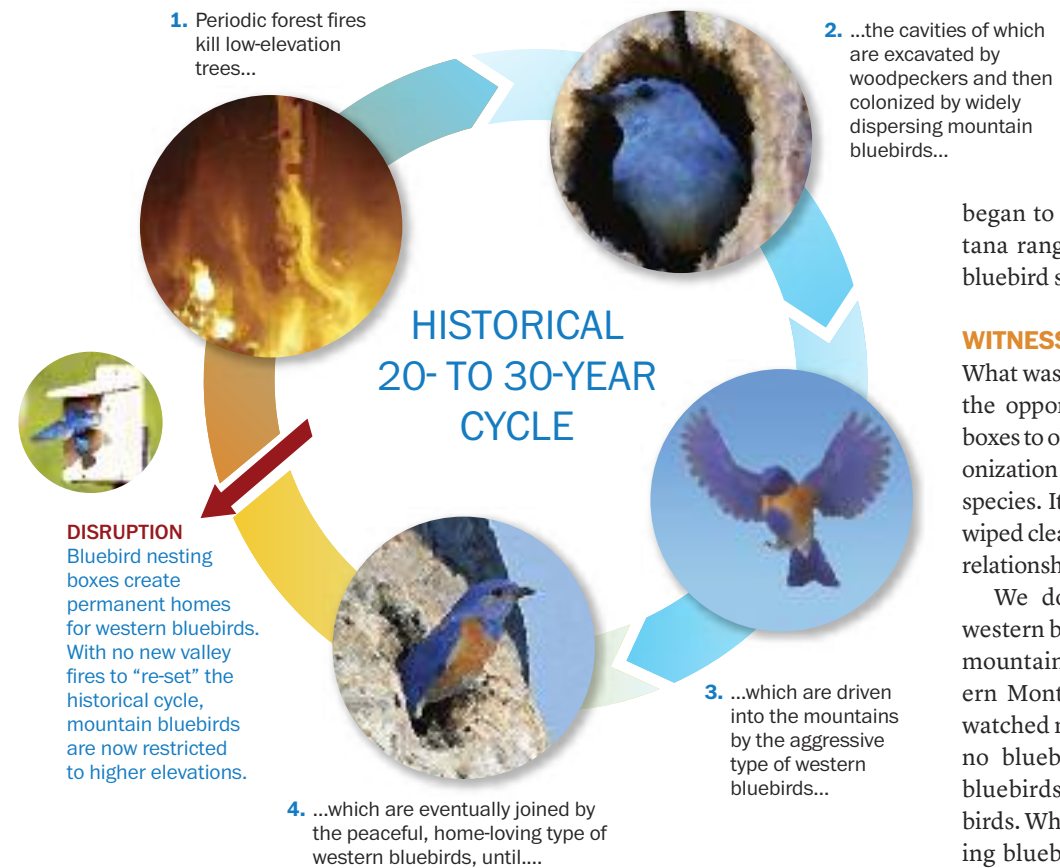
bution. We learned that the historical cycle in which the two bluebird species displace one another every 20 or so generations has been disrupted. And the cause, ironically, has been the creation and maintenance of new nesting habitats.

FIRE-INDUCED CYCLE

Historically in Montana, western bluebirds and mountain bluebirds more or less coexisted in the forested river valleys west of the Continental Divide (another species, the eastern bluebird, lives east of Great Falls).

The relationship worked like this: Bluebirds nest in tree cavities but, unlike woodpeckers, cannot make their own. After a wildfire, woodpeckers colonize burned areas, and, in less than a year, numerous cavities in dead and decaying trees provide prime nesting real estate for bluebirds.

The first to arrive are mountain bluebirds, more wide-ranging than westerns and able to find new habitat quickly. Then the more aggressive, but less mobile, western bluebirds arrive and outcompete the mountain bluebirds for nest sites. The mountain bluebirds retreat to the mountains, where they can survive but western bluebirds can-



began to re-colonize their historical Montana range. Just as in times past, the two bluebird species were back.

WITNESSING HISTORICAL PATTERNS

What was so exciting for us as scientists was the opportunity provided by the bluebird nest boxes to observe the patterns of historical colonization and competition between the two species. It was as though the slate had been wiped clean and the birds had to reform their relationships before our very eyes.

We documented how newly arriving western bluebirds started to rapidly replace mountain bluebirds in the valleys of western Montana. In only 15 to 20 years, we watched many of our research sites go from no bluebirds, to 100 percent mountain bluebirds, to 100 percent western bluebirds. When we conducted a census of nesting bluebirds in a popular recreation area near Missoula in the early 1990s, all but one breeding pair were mountain bluebirds. By the early 2000s, the mountain bluebirds were gone, completely replaced with a much higher density of western bluebirds. Five years ago, the western bluebird was a rare visitor in the Blackfoot-Clearwater Wildlife Management Area near Ovando. Today the bird is common throughout the entire Blackfoot Valley.

not, waiting for the next cycle of valley wildfire to re-set the process and start over. This went on for thousands of years.

But starting around the late 1930s, the western Montana river valley landscape changed more drastically than at any time since the last ice age. Many bottomland forests were logged and replaced with lush fields of wheat, alfalfa, and other crops. Forest fires were suppressed. Populations of western bluebirds, a species generally confined to lower-elevation valleys, were devastated by the loss of nesting cavities. By the mid-1940s they had nearly disappeared from Montana. Although mountain bluebirds also lost nesting sites, they had evolved to also use habitats at higher elevations, where forests remained largely intact.

In the early 1970s, conservation-minded Montanans began an ambitious effort to restore low-elevation bluebirds by nailing wooden nest boxes to fence posts. Over the next several decades, volunteers with the nonprofit group Mountain Bluebird Trails placed more than 8,000 nesting structures along what are known as bluebird "trails"—

five or more boxes placed roughly 100 to 300 yards apart, often along highways and country roads.

As hoped, bluebird populations began to recover. First mountain bluebirds reclaimed their historical lower-elevation areas. Then western bluebirds, which had retreated to bottomland refuges farther west and south,



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With trees no longer dominating the valley floors as in the past and no periodic "re-setting" of the cycle by natural wildfires, the dynamics of coexistence between these two species have fundamentally changed.



PERIODIC VALLEY VISITOR Historically mountain bluebirds lived in low-elevation areas for several years until driven into high country by aggressive western bluebirds. The situation would remain static until old snags toppled, driving out the western bluebirds, and forest fires created new dead trees that attracted the more widely dispersing mountain bluebirds.

OPPOSITE PAGE AND BLUEBIRD BOX PHOTOS: ALEXANDER V. BARDNEV; HISTORICAL CYCLE GRAPHICS SOURCE: SHUTTERSTOCK.COM

For the time being, it seems that western bluebirds will dominate low elevations

and mountain bluebirds will be restricted to the high country.



We set out to find out why western bluebirds are so successful at displacing mountain bluebirds and found an important behavioral difference. Western bluebirds are more aggressive and also breed at higher densities. Once they arrive in an area and start to breed, they crowd out mountain bluebirds. This, we discovered, is because the westerns have two distinct behavioral strategies that allow them to successfully colonize habitats newly created by fire and, at the same time, maintain previously established populations.

The species is what's known to biologists as a "facultative cooperative breeder"—meaning that some adult offspring postpone breeding for a year or two to help their parents and relatives raise nestlings. In any pop-



ulation, a young male western bluebird has two choices—either assist his parents in raising their young and then inherit a part of their territory (and thereafter nest near his birthplace), or disperse and compete for a territory in a new area. We found that the strategy a male pursues depends closely on his aggressiveness. Belligerent males are more likely to leave their home ground and disperse to new areas to breed, while peace-loving males remain in their natal population and eventually acquire a territory near relatives.

Dispersing to new areas with a low density of other western bluebirds means that aggressive males acquire larger territories than they would have obtained in a crowded natal area. And nonaggressive males, despite being poor competitors, can still obtain a territory from their parents and start a family of their own if they stay near their birthplace.

What's more, the gentle males are superb providers, something essential during late-spring snowstorms that are common in Montana and the chief cause of bluebird egg and nestling mortality. Because the female

must stay on the nest to keep eggs or nestlings warm during the cold, she can't forage on her own. Nonaggressive males bring her nearly all her food during these times, and consequently the family's broods tend to survive the nesting season storms.

Aggressive males, on the other hand, hardly ever feed their mates, so their nests rarely survive late-spring cold snaps. This greatly limits the western bluebird's ability to establish in a new area until enough mellow males establish themselves in the population to ensure a secure base from which the bold males can continue dispersing.

Historically, the combination of aggressive explorers and nurturing settlers enabled the western bluebird to colonize new areas and displace the more widely dispersing mountain bluebirds that had arrived in newly burned areas before them. But eventually, old trees with cavities would topple while new live trees without cavities would grow. Lacking nesting habitat, bluebirds of both species would be forced to search for new patches of habitat elsewhere, and the

Renée Duckworth (left), an ornithologist and ecologist at the University of Arizona, has been studying Montana bluebird coexistence dynamics for two decades. Alex Badyaev, an evolutionary biologist at the University of Arizona, divides his time between long-term field research projects in northern Montana and southern Arizona.

Is there a way to “re-set” the historical cycle so that mountain bluebirds might make their way back to the valleys of western Montana?

..... cycle would play out all over again. Mountain bluebirds would find new fire-created nesting sites first, and then the aggressive type of westerns would start to displace them. Over time, once mountain bluebirds were completely gone, the peaceful type of westerns would join the bolder birds—until the next fire re-set the cycle once again.

These fire-induced dynamics began to change as farms and ranches reshaped Montana and natural nesting cavities, created by wildfire, were replaced with thousands of more or less permanent nest boxes. Unlike natural cavities, nest boxes are a “constant habitat.” With trees no longer dominating the valley floors as in centuries past and no periodic “re-setting” of the cycle by natural wildfires, the

dynamics of coexistence between these two species have fundamentally changed.

BOXED OUT

Without question, nesting boxes have been a boon to bluebirds. Without them, we'd see very few western bluebirds in Montana. But they have had unintended consequences. The constant nature of the man-made structures, replaced by bluebird fans as soon as they break down, has disrupted the natural cycle of repeated colonization. Many lower-elevation valleys in western Montana are now home to stable populations of western bluebirds that have permanently replaced mountain bluebirds. For the time being, it seems that western bluebirds will dominate low elevations and most mountain bluebirds will be restricted to high country.

Why can't western bluebirds take over the higher elevations, too? Like the peaceful type of western bluebird male, the male mountain bluebird is a great provider, allowing his and his mate's nest to survive late-spring snowstorms, more common at 6,000-foot elevations and higher. The peace-loving western bluebird type could likely survive in the mountains, thanks to the male's food-delivery service to his nesting mate. But it would need the aggressive type to drive out moun-

tain bluebirds beforehand, as occurs in low-lying areas. Unfortunately for the species, the eggs or nestlings of the pushy western male and his mate quickly perish in the harsh mountainous conditions. The western bluebirds' Achilles' heel—the inability of aggressive males to feed their incubating and brooding females during late-spring snowstorms—creates a safe haven for mountain bluebirds at higher elevations.

Is there a way to “re-set” the historical cycle so that mountain bluebirds might make their way back to the valleys of western Montana? Probably not—at least not in a way that mimics natural forest succession.

But there is a way for these delightful bird species to coexist. Some nest boxes could be installed 300 yards or farther apart. Mountain bluebirds don't stick around when western bluebirds are too close. If mountain bluebirds can stay far enough away from western bluebird boxes, they won't leave. An ideal bluebird trail in western Montana, in areas where both species still occur, would have boxes placed at varying distances. Because bottomland forests and accompanying wildfires are a thing of the past, this might be the only way for people to enjoy seeing both species of these cheery, charismatic birds in the same general area. 🐦

CLOCKWISE FROM BOTTOM: LEFT, ALEXANDER V. BODINEY; ALEXANDER V. BODINEY; WESLEY M. SARMENTO