ENDANGERED SPECIES: As climate warms, scientists consider a new Noah’s ark

Lauren Morello, ClimateWire reporter

Like many Southern California natives, the Quino checkerspot butterfly is being squeezed out of the real estate market.

The insect once ranged from Ventura County, Calif., down to Baja California, Mexico. But in recent years, its habitat has declined by nearly 80 percent, thanks to increasing development in San Diego and Los Angeles and rising temperatures along the Mexican border.

Now, threatened by climate change and hemmed in by development, the endangered butterfly’s best hope may lie with a once-unthinkable solution: allowing humans to move the species to a new habitat in a cooler climate.

The idea, called “assisted migration” or “assisted colonization,” gives many conservation biologists pause. Such a move could fail, further reducing a dwindling species’ numbers. Or it could turn an endangered plant or animal into an invasive one, wreaking havoc on the new ecosystem’s native plants, animals and insects.

Yet, in the face of rising temperatures and changing weather patterns, many scientists say it’s an idea they can no longer afford to reject.

“I would talk to people about it at conservation meetings 10 years ago, and it was totally, completely dismissed,” said Camille Parmesan, a global change biologist at the University of Texas-Austin. “Five years ago, people were mumbling about it. Two years ago, papers started coming out.”

Now Parmesan and colleagues in Australia and England have authored the first framework to help biologists and policymakers decide when such a radical move may be appropriate. Their paper was published yesterday in the journal Science.

“I think it’s a great paper,” said Jessica Hellmann, a biology professor at the University of Notre Dame who is organizing a new scientific working group to examine the concept. “I think it’s important for people to talk about [assisted migration]. This is an issue that is not going to sit around and wait very long for us to figure it all out.”

‘A difficult pill to swallow’

To Parmesan, the seemingly radical response to climate change is a natural outgrowth of her large-scale studies of global warming’s effects on hundreds of plant and animal species and more detailed research of butterflies.

“When you start doing that work, you realize that climate change is having a huge impact on where species live,” she said. “A lot of biologists still think it’s into the future. They don’t realize we’ve already got enormous numbers of observed changes.”

Still, supporters of assisted migration couch their comments in caveats, viewing it as an unpalatable, but increasingly likely, option.
“When I first heard it come up, it was discussed almost with revulsion that we would really tamper so heavily with ecosystems,” said John Kostyack, director of wildlife conservation and global warming programs at the National Wildlife Federation. “It’s a very difficult pill to swallow to think we would be involved with that level of intensive management. It’s a major paradigm shift.”

Now, he said, “people are thinking of it as a realistic option that has to be considered -- recognizing again that it’s a last resort.”

May be the only survival route for some species

Bob Davison, a senior scientist with Defenders of Wildlife, agreed. “I think it is something that probably -- in very limited circumstances -- we should be considering,” he said. “It might be the only way for corals or some other species.”

But it would require moving forward with extreme caution, experts said.

To avoid the possibility of creating a new invasive species, scientists should only consider moving species whose habits are well-documented, Parmesan said. “For a lot of species, we just don’t know enough, and we wouldn’t consider them good candidates. Really, it’s a tradeoff between how much you know about the species you want to move and how degraded the area is where you want to move them.”

Keeping the distance between the old and new habitats short is also key, she said. Since many invasive species problems can be tied to continent-to-continent hops by plants and animals, scientists should limit their targets to within 100 to 500 miles of a species’ original home.

In the case of the Quino checkerspot butterfly, the risk of creating a new invasive species is low, she said. “It doesn’t compete with other species,” Parmesan said. “It’s not aggressive and it doesn’t defend nectar sources. It eats a very common plant and never does much harm to plant populations. And when you put it somewhere, it tends to stay there.”

The butterfly’s poor mobility is one reason human intervention may be necessary, she added.

Other species that may be good candidates for assisted migration include those that are highly mobile but find their paths blocked by cities or agricultural fields. “Even the best disperser is not able to go 300 miles past large urban areas,” Parmesan said. “The Midwest is a real barrier for a lot of southern species that are trying to move north.”

‘Devil’s in the details’

But even after clearing the scientific hurdles, political difficulties may remain.

“My biggest fear is that people will misunderstand and think about this as a solution for climate change biodiversity problems -- but it’s not,” said Hellmann, the Notre Dame biologist. “It could never be a solution for a lot of species. So greenhouse-gas reduction should still be the No. 1 priority.”

Kassie Siegel, director of the climate program at the Center for Biological Diversity, said she also is wary of how policymakers may interpret the idea. “I think the big danger here is that we allow really reasonable, farsighted thinking about assisted migration to be allowed as an excuse by decision-makers to avoid mitigation measures,” she said. “The devil’s in the details.”

There is also the risk that assisted migration of a species could simply fail.

“The trouble is that the climate hasn’t stabilized at its new level yet,” Parmesan said. “It’s a continually moving target. Until we get our atmospheric levels of greenhouse gases stabilized, which we’re way far away from, we don’t know what the new climate is going to be.”

Without a worldwide plan in place to drastically cut emissions, it’s impossible to pinpoint where climate change might stop, Hellmann added.

“We often talk about 2050 or 2100 like we’ll be done [with climate change] or have a new climate by then,” she said. “But we don’t know when climate change will be ending.”

In the end, though, climate change may force scientists’ hands, said Kostyack.

“If you are reduced to functional extinction, to captive breeding program with no hope of returning a species to its original range, [migrating a species] seems to be a better option than having it go extinct.”

Moving a 160-year-old species north

Despite those concerns, at least one group outside mainstream science is already moving forward with plans to revive a species by moving
it to a new home beyond its natural habitat.

The Torreya Guardians, a loosely defined group of “citizen-scientists,” horticulturists and ecologists, are planning to plant 31 seedlings of an endangered evergreen -- Torreya taxifolia, also known as the “stinking cedar” -- in North Carolina later this month.

It’s part of a last-ditch effort to save the Torreya. Ravaged by warming temperatures and fungal diseases in recent decades, the 160 million-year-old species is now found in pockets of land along Florida’s Apalachicola River and in southern Georgia. Of the thousand or so wild Torreya taxifolia trees in the United States, just one is healthy enough to produce seeds, scientists believe.

With that in mind, the Torreya Guardians are busily harvesting seeds from Torreya trees living in nurseries and private gardens, such as those at the Biltmore estate in Asheville, N.C. They’re convinced that moving the species to a cooler climate offers the best hope for its continued survival.

“We realized when it comes to plants, if you have access to a private seed stock and someone’s property or horticultural nursery, you can take those seeds and plant them on your property, wherever you live,” said Torreya Guardians member Connie Barlow, explaining the group’s strategy, which allows it to operate outside the bounds of the federal Endangered Species Act.

“This tree has been around since the Jurassic Period, since before the Tyrannosaurus rex, since the time of long-necked dinosaurs,” she said. “We have to save it.”