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IT'S ALL CONNECTED

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A 60 MPH Moving Fence

“We do so much on this planet to make animals' lives harder.” A tough truth spoken by Ben Goldfarb author of Crossings: How Road Ecology is Shaping the Future of Our Planet. The early impetus for his book was an opportunity to tour a wildlife crossing along Highway 93 in Montana. As Ben stood atop the crossing, he realized *“it was just this incredibly beautiful, inspiring moment to be on this remarkable piece of infrastructure that humans had built explicitly for wildlife.”*

One key question popped into his mind: how do you build structures that appeal to an entire ecosystem? Every species has its own sort of habitat requirements and ecological niche, so how can you build infrastructure that checks all of those boxes for different species? Ben says he “*loved the imaginative challenge there*."

On a personal note, I wholeheartedly agree with Ben, because Michael Hawk and I had the privilege of a personal tour of the Wallis Annenberg Wildlife Crossing over the 101 Freeway in greater Los Angeles. Last October, the lead architect of the crossing, Robert Rock, walked us around the budding construction site of the crossing and shared the extensive challenges the team explored to make this structure fit the needs of any and all critters who might desire to use it. Those details are fascinating, but this article is not about only one wildlife crossing, it is about **road ecology** everywhere.

Road ecology is best defined as the sum total of the ways in which roads interact with and shape nature. A carcass that you see lying on the side of the road is the most conspicuous and visible way that a road shaped nature. Consider also the noise of traffic, road salt that's applied as a de-icer, lights from the vehicles as well as street lamps, entire roads cutting off wildlife migrations, and the continual moving fence of traffic. These examples represent a vast spectrum of **road ecological impacts which are enough to deter animals from reaching critical habitats**. A dead animal is an obvious impact, but that

ubiquitous car noise that we are accustomed to, is actually highly detrimental to animals (and to people as well).

Road infrastructure has created islands of habitat that are fragmented and less able to sustain many animal, plant, and insect populations. Looking at the migratory herds of mule deer, elk, and pronghorn, we know they need to move between habitats, especially in the fall where they need to access low elevation winter ranges. Highways are preventing many of these migrations and there have been cases of mass starvation in herds that couldn't get across a highway…which is basically a moving fence at 60-70 mph.

Road noise is a huge pollutant and numerous studies show that animals avoid noisy areas. Amphibians and songbirds, for example, cannot compete with the constant din of human activity. So, they avoid noisy areas. Such avoidance itself is a **form of habitat loss**, since these animals cannot access particular places or cross over/through them to more suitable habitat elsewhere.

When it comes to light pollution, many nocturnal species rely on darkness to hunt, to avoid predators, and to feed. Yet, headlights and streetlights deprive them of that darkness and this also becomes another form of extensive habitat loss.

Road salt, as a de-icer, is applied in exorbitant amounts in the colder climates. It impacts animals, water systems, and people on many levels that may not be truly obvious. Road salt can make frogs more susceptible to disease, it can stunt the growth of water loving creatures from plankton to trout, and the runoff of road salt into many lakes and streams causes these bodies of water to become brackish.

Not all news is bad when it comes to roads, tune in to the Nature's Archive podcast where Ben and Michael discuss road ecology and the amazing story of rapid Cliff Swallow evolution that was driven by cars, trucks, and road infrastructure (the swallow segment begins about the 23 minute mark).

Animal responses to crossing or not crossing roads run a gradient from animals that cross no matter what and the animals that almost never cross roads: these are termed non-responders and avoiders. Considering the options, one realizes that **animals in each category are both imprisoned by roads**. Non-responders will cross and likely get flattened, while the avoiders don't even try, but then are limited to the resources available in whatever space is afforded them on the one side of the road barrier. Both options show a heavy negative impact on those animals' life history.

Research over the last two to three decades points to the importance that animals be able to access the entirety of their habitat. **Habitat connectivity** means large intact landscapes over which animals can move to meet their biological and ecological needs. However, roads are often the structures that prevent animals from moving. The science of road ecology is helpful in showing how animals use or avoid road systems which allows for people to design various options to mitigate these detrimental effects.

> *"It's also important that that development doesn't occur in ecologically destructive ways. And that's what road ecology does. It points us towards ways to hopefully help that development lay lighter on the land."* - Ben Goldfarb discussing wildlife crossings on our Nature's Archive podcast

Perhaps we are, in fact, entering an age of wildlife crossings. California has passed a Safe Roads and Wildlife Protection Act in 2022 requiring crossings to be included in all road improvement or new development. Additionally, the Department of Transportation allocated $350 million for a Wildlife Crossing program designed to reduce animal vehicle collisions and improve habitat connectivity.

Not all wildlife species need large bridge overcrossings, many are happy with ravines and even culverts. According to Ben, there are a lot of places where you can just add fences to both sides of an existing culvert or ravine and direct animals that direction rather than having them cross the surface of the road. There are solutions, we simply need to advocate for the actions. **Let your voice be heard** - vote, write to your local legislator, and drive carefully!

That's a Fly?!

If I polled 1000 random people and asked if this photo is of a fly or a wasp, I suspect at least 900 would say wasp. And many of those who said fly likely would have done so because they are contrarian or just flat out skeptical, thinking it was a trick question.

But for the Jumpstart Nature and Nature's Archive audience, I suspect we'd do much better because I'm always talking about mimics, and especially hover flies.

So you got it, this is a hover fly (aka flower fly or syrphid fly). In particular, it is a Four-speckled Hover Fly, *Dioprosopa clavata.* It's quite small, perhaps 1 cm. Then again, there are many insects even smaller - we just tend to not pay attention to them unless they are biting us or in our pantry or window sills.

Like so many hoverflies, the larva are predatory, feeding on aphids. And the adults feed on nectar and pollen (and as a result, act as pollinators).

One thing I hope to do with Jumpstart Nature going forward is to really "lean in" to the **importance of biodiversity**. Looking at hover flies as one example - there are perhaps 6,000 species in the world. Each one has unique adaptations and traits that they've evolved to make their way in the world.

This means some are particularly suited for specific plants. Some may act as predators to specific aphid species. Some may fly earlier in the year or later in the year. They each carve out a place that allows them to maximize their lives and minimize the risks they face.

And hover flies are not alone. The same happens with bees, birds, cicadas, moths, butterflies, and pretty much all life. Given 10's of thousands of years, interesting things result.

I like to use the fabric analogy. Each of these relationships between plants, birds, mammals, insects, fungi, etc are like threads. **Our ecosystem is like a shirt**. We can pull out a few threads and the shirt still functions. Pull out a few more and perhaps we begin to notice that it isn't doing its job very well. Some critical species are like buttons and seams. Loose those, and the shirt begins to fall apart. And those threads are all connected. Loose enough threads and the seams fail, too.

So this is why we're such huge advocates of **native plants** - those plants support the insects, birds, fungi, and other organisms that co-evolved with them. They form the foundation of the "food web" that connects everything.

It's why we advocate for sustainable practices like minimal or no pesticide use, leaving leaves, protecting soil development, preventing introduction of new invasive species, and of course, getting climate change under control.

So **do what you can**, and *normalize* it by telling your friends, family, and coworkers why you do it and why you care. - *Michael Hawk*

This article from Michael Hawk was recently posted on Jumpstart Nature's Patreon page. If you enjoy this content, please consider supporting us for as little as $4 a month.

Quick Connections

Books, websites, documentaries, podcasts, events, quotes, and more

After listening to the road ecology podcast, delve a little deeper into the new field of fence ecology with this short article.

Quote we're pondering

"Nature is not a place to visit. It is home."
— **Gary Snyder**

Tune In

Find 10 minutes to watch this informative TedX talk about coexisting with carnivores.

October Big Day comes up this Saturday, the 12th. Grab your binocs and get outside to see some birds. New to birding? Join a group walk, or check out more ideas from eBird.

Your feedback is important. Tell us how we are doing and what you would like to see covered in future newsletters.

Every connection counts! Please help grow our community of everyday heroes by sharing this newsletter with a friend or colleague.

Thank you,

Laura Schare, Editor

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