

**“When Eels Attack!” Transcript**

<p><b>KENNETH CATANIA</b></p>	<p>Most of the things that I have found of studying these eels have been things that have just sort of fallen out of watching the behavior. And the most recent one certainly falls in that category.</p> <p>As I approach the electric eels, the bigger ones would periodically turn around, make a very rapid approach to the net, and then sort of leap up the handle towards my hand, while giving off high voltage volleys. I was recording the high voltage output through electrodes that went into a speaker. It was quite shocking to experience.</p> <p>In the midst of sort of thinking about what all this meant, I came across a really amazing figure showing an experience by Alexander von Humboldt in 1800.</p>
<p><b>ERIC KUHL</b></p>	<p>We were conducted by the Indians to a stream rich in the time of drought from the basin of muddy water. To catch the eel with nets is very difficult. The Indians therefore taught us that they would fish with horses. The extraordinary noise caused by the horse's hooves makes the fish issue from the mud and excites them to the attack. A contest between the animals of so different an organization presents a very striking spectacle. The Indians prevent the horses from running away. The eel, being 5 foot long and pressing itself against the belly of the horses, makes a discharge along the whole extent of its electric organ. The horses are probably not killed, but only stunned. They are drowned from the impossibility of rising amidst the prolonged struggle."</p>
<p><b>CATANIA</b></p>	<p>This was a total spectacle. And when I first heard about that story, I was very skeptical. Why would eels go on the offensive, and could they possibly attack horses? I have a broad interest in brain evolution and different animal sensory systems, and often really intrigued by the outliers, sort of mysterious animals. So the electric eels are really interesting in that they are not related to other freshwater eels. They're really an electric fish. And I kind of like to say the electric eel went down the weapons of mass destruction pathway from that origin.</p>
<p><b>LUKE GROSKIN</b></p>	<p>Most of the eel's body contains electric organs with the head giving off a positive charge and the tail negative when zapping a fish.</p>
<p><b>CATANIA</b></p>	<p>They're essentially a series of batteries lined up one after another, in series, the way you might put a whole bunch of batteries in a long, powerful flashlight. And those add together to give 600 volts, ultimately, for a large electric eel.</p>
<p><b>GROSKIN</b></p>	<p>In the few years that Catania's been studying eels, he's looked at how they stun their prey.</p>

<p><b>CATANIA</b></p>	<p>The eel can remotely activate the prey's muscles through the nerves to temporarily paralyze it. And that is the same as a Taser.</p>
<p><b>GROSKIN</b></p>	<p>And eels can control the intensity of their shocks. So what would make an eel emerge from the water, as recounted by Humboldt and now seen by Catania? To find out, Catania used some unconventional props.</p>
<p><b>CATANIA</b></p>	<p>So what I did was to take what I thought was a good stand in predator, a crocodile head, and I drilled holes in it and put LEDs that could be lit up by the electric eel as it ascended out of the water.</p> <p>And I wanted to take it a step further and get people to imagine what it might be like if this actually happened to them. So I took some sort of Halloween zombie arms and put LEDs into these as well. Normally, the eel is in the water and a lot of this electric current spreads. And what was interesting is the voltage increased as the eel rose up out of the water. By placing its positive end against the potential threat and rising up out of the water, that makes a new current path to complete the circuit through the threat.</p>
<p><b>GROSKIN</b></p>	<p>This isn't a hunting behavior though. The eels were not looking at the horses or Catania's zombie arms as prey.</p>
<p><b>CATANIA</b></p>	<p>In the Amazon, there's a rainy season. And then there's a dry season where a lot of fish, including electric eels, get caught in these residual pools. And actually that's exactly what was the case when Humboldt went to collect the electric eels. Those eels were trapped in a drying pool from a stream.</p> <p>They can't retreat. And so they need another option to defend themselves. It's a situation, I think, where the best defense is a good offense.</p>