



## The Natural Laboratory Podcast Transcript: Burning Ancient Life: The Geology of an Oil Reserve

### Introduction

This is the Natural Laboratory, a podcast exploring science for Bay Area National Parks. I'm Cassandra Brooks.

[intro music]

Phytoplankton form the base of the ocean's food chains transferring energy from the sun to sustain the global ocean. These tiny floating plants account for half of the photosynthetic activity on Earth. They also generate the majority of our fossil fuels.

### Interview with Ivano Aiello

*Ivano Aiello:* Ninety-five percent of oil is marine algae, marine plankton.

*Cassandra Brooks:* Ninety-five percent?

*IA:* Yeah. I mean the vast majority of oil comes from marine plankton.

*CB:* That's Ivano Aiello, a geological oceanographer at Moss Landing Marine Laboratories in Monterey Bay, California.

According to Ivano, plankton populations bloom, then die and drift to the seafloor. Slowly, they accumulate, getting compressed and buried under sediments. And, so long as they are in low oxygen conditions, the plankton will be preserved.

And how long of a time period are we talking about here for all of this to happen?

*IA:* Millions...millions to hundreds of millions of years. It takes millions of years for oil to form. Yeah. Yeah.

*CB:* So, even though, probably, right now, there's oil...new oil being formed all the time, it's...

*IA:* We'll have to wait for millions to hundreds of millions of years. Yeah. No. It's, um...it's the scale of things we are talking about is insane. So, yeah, our rate of consumption is orders of magnitude faster than anything that has to do with the actual formation of oil. We are exploiting something that moves so slowly that there is no way that it can be regenerated anytime soon.

So, but that's what we use in our cars —something that formed a hundred million years ago. So, it would be really nice to have this in gas station so people will say, "Wait a second. You know, I'm burning this thing in the next two hours and it took 200 million years to form?!"

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**Interview with  
Ivano Aiello  
(continued)**

*CB:* And it isn't even just gas for our cars—our entire western lives depend on petroleum products. Our roads are covered in tar. Petroleum based plastics are all around us—in our phones, computers, cameras, toys, clothes, toothbrushes, and cosmetic bottles. And almost everything we buy at the grocery store is covered in plastic.

And while we once found reserves of oil so rich and abundant they came bubbling out of the ground, we now have to probe ever deeper and farther. At this point, we have to use a great deal of oil to drill for more oil.

*IA:* So, that's the problem. And that is that when we were working on land, mostly, and you could poke just the ground and the oil was coming out, that was it. Costed, I don't know, one gallon of oil to drill 100 gallons of oil. But now, we are talking about one gallon of oil to drill, I don't know, 10 gallons of oil or 20. So, it's becoming more and more expensive. So, that's the problem.

And when you push the technology offshore, not only do you increase the risks, but also, it's very expensive, you know. An offshore oil rig is a really expensive thing to run. But our thirst for oil is so much that we are...we are really like drug addicts right now. We are looking for a little drop somewhere.

So, I gave a lecture after the oil spill...

*CB:* You did?

*IA:* Yeah, on the Deepwater Horizon. So, that's why it's actually neat that you asked me to talk to you, because I, actually, I was, uh, reading more about, uh, offshore drilling and, uh.... So, this is one...this is a map from 2006. There are 3,858 oil and gas platform only in Gulf of Mexico. It's like covered.

*CB:* No way!

*IA:* Yes, way. I mean look at that. They are just next to each other. So, just think about when you have a hurricane going through this thing. It's insane.

I...I don't know. Our society is a fossil fuel-based society. Our civilization in the last several hundreds years has been—I mean, since the beginning of the Industrial Revolution—has been completely dependent on fossil fuels. But that's why we had this amazing, uh, increase in technology, I mean, in the last few hundred years. The technology has been...and also life quality, in a way. I mean, unfortunately, you know, it allows us to travel, it allows us to make clothing and...and containers and...

*CB:* Everything.

*IA:* everything, everything. But it's a limited resource.

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**Conclusion**

Here in 2011, we are at a crossroads. Those tiny plankton sinking and compressing over millions of years can't support our appetite for energy. As humans, we have incredible ingenuity, which is why we've been so efficient at using up our reserves of oil. As we look to the future, perhaps it's time to apply that same ingenuity to

cutting energy consumption and employing alternative energies, ones that don't depend on ancient ocean plants.

With the Pacific Coast Science and Learning Center, I'm Cassandra Brooks.