

# All the Pieces Matter

A.P. Raj



Jason stared at the whiteboard at the front of the classroom, trying to make sense of what he saw there. Mr. Freamon had drawn a complicated diagram of all the creatures living in the nearby Ho Tep Wildlife Reserve. Every type of living thing, from trees and insects to mammals and birds, was written down and circled on the board. Arrows snaked around the board, connecting the circles, showing which creatures depended on which other creatures to survive.

Though he had been hiking out in Ho Tep plenty of times, Jason had never given much thought to the animals and other wildlife he had seen out there. He'd never thought about how the amount of rainfall affected the amount of moisture in the soil, which affected how well plants could grow, which affected the ability of the animals that ate those plants to survive. It was enough to make his head swim a little.

Jason wasn't the only one who was confused. Mr. Freamon could tell that his students were all struggling to make sense of the mess of connections drawn out on the board. He smiled and stopped drawing for a moment to speak to the class.

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“Take a deep breath,” Mr. Freamon said. “You don’t need to memorize what’s on the board. If you’re going to take away one thing from this lesson, let it be this: All the pieces matter. Every ecosystem on earth depends on a delicate balance among all of the different forms of life within it.”

Adriana raised her hand and asked why that was.

“Well,” Mr. Freamon said, “in any ecosystem, all of the creatures within it are competing for the same resources: food, water and shelter—the basic needs of every living thing. There’s only so much to go around, so creatures have to compete with other creatures to get what they need. And since they all go about it in a unique way, all of the creatures in an ecosystem end up depending on one another. Let me give you an example.

“Remember that video we watched last week? With the wolves killing the elk at Yellowstone National Park?”

Everyone nodded.

“And how many of you thought that the wolves were mean for killing those elk?”

About half the students raised their hands, but Jason kept his hand down. Wild animals will do what they do, he thought. The idea of meanness never enters into it. They act on instinct.

“Consider this, then,” Mr. Freamon continued. “Without the wolves in the park to keep the elk population in check, the elk would have eaten all of the aspen and willow in the park. Not only would those plants be gone, but the other animals that depend on them to survive, would have been out of luck too. All the pieces matter.”

After class that day, Jason went home and looked up “ecosystem resilience” on the Internet. He found a lot of interesting links about different ecosystems that had changed rapidly because one of the pieces had been taken out of the puzzle, as Mr. Freamon would have put it.

In Africa, people hunted lions and leopards and reduced their population, leading to higher populations of a certain type of baboon. That had led, somehow, to higher rates of parasites in baboons and people. And along some coasts, human activity had reduced the sea otter population. The sea otters ate sea urchins that ate kelp from massive kelp forests. Without the sea otters to keep them in check, the kelp started to disappear.

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