

CALIFORNIA

Daniel Feeny, 15

Woodside, California



Are Waves the Dominant Force Driving Diversity in the Intertidal Zone?

Project Background: During a recent trip observing tidepools at the beach, Daniel noticed that some sections of the intertidal zone were rich in species, while other sections of the beach were bare. The difference intrigued him, and he wanted to learn why there was so much variability in sections of the beach just a few feet apart. He wondered if the force of waves striking the shore affects the diversity and number of organisms living there. To find out, he designed an experiment to quantify wave forces in different sections of the intertidal zone and correlate this data with the diversity of organisms in each location.

Tactics and Results: Daniel designed and built a force meter by attaching a lightweight ball to a spring. He encased the device inside a plastic tube and a PVC housing to protect it from the force of waves striking the intertidal zone. He anchored several of these meters within a sampling unit called a quadrat, following a line running from the low tide line to the high tide line at a beach in Pescadero Beach, CA. He also recorded the number and types of marine organisms inside the quadrats. He calculated biodiversity using an ecological measure called the Shannon Diversity Index, and recorded wave forces over a 24-hour period. Then, he plotted both sets of data against distance from the low tide mark. He found that wave forces varied randomly with distance from low tide. He also found no correlation between diversity and either distance from the high tide line or wave force. Daniel concluded that wave force is not the most significant factor in determining patterns of diversity in the intertidal zone, but that other factors, such as physical terrain and dessication at low tide, also play a role.

Other Interests: Daniel loves to be outdoors — he recently joined a sailing club, has played soccer for the past 9 years, and spends his summers hiking and backpacking in the Montana wilderness. He also plays the drums, and participates in a climate change research project on a lake in Montana.

Career of Interest: Scientist. Daniel is not yet sure of which field of science he will pursue as a career, but he loves the natural world and learning about cause and effect.