

# Why do leopard sharks flash their white bellies in Southern California? Student researchers are on the case

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It's no secret to most San Diegans that leopard sharks come each summer to warm their pregnant bellies on the sand at La Jolla Shores.

But much still remains unknown about these animals. Andrew Nosal, an associate professor of biology at Point Loma Nazarene University, has spent the past several years trying to unlock their secrets each season while they are here.

Such as why so many gather here in the first place. And why they flip on their backs to rub against the sand, an action first noticed last summer.

Nosal has always mentored undergraduates who have helped with [field work](#). But this year he began teaching a summer program in which students help direct the research.

During the 10-week program, which wrapped up in August, he encouraged students to form research questions as well as collect and analyze data that will be used for a published paper, Nosal said.

His research methods have improved over the past 15 years.

Back then, it was still relatively unknown just how many leopard sharks typically gather off La Jolla.

One day Nosal saw footage from a news helicopter flying over a shiver of sharks, prompting the scientist to order a 6-foot-wide helium balloon for the same birds-eye view. Turns out, there were dozens of sharks.

Now, rather than attaching a first-generation GoPro to his balloon and trying to guess—often unsuccessfully—where the sharks were, he uses drones.

A few years ago he started pairing the drone footage with a computer program that tracks each shark in the group by looking at contrasts, such as a dark object swimming in a lighter area.

"We didn't have to guess where the sharks were. We could just look on our phones or on the controller and see where the sharks were and we could search for them if we didn't see them in the first place," Nosal said.

On a weekday in mid-August, Nosal met with three of his students behind the La Jolla Shores Hotel before launching a drone to spot the location of the sharks.

Then the group put on their snorkel gear and swam out in search of the animals.

"Some days we like to just have a little bit of fun and just be in the water to really connect with the animals that we study," he said. "But it's not just for fun. We are making observations, and that's what we were doing today."

They were looking for a few behaviors and trying to better grasp the sharks' relationship with one another.

One behavior in particular is a rolling motion in which the animal flips on its back to rub against the sand, which has been seen numerous times from an aerial view since it was first noticed last summer but witnessed few times in the water.

Nosal observed the movement that day.

"When you have 200 sharks in the same field of view, it's amazing because you start to see these white flashes all over the place," he said.

The scientists think the strange flipping could possibly be a tactic to rub off parasites. The footage has been helpful with counting how many times this behavior occurs and how many sharks actually participate in

the action.

The data is also used to try to answer why so many leopard sharks gather here at the same time. Are they all attracted to the same features? Or is there a social reason for the congregation?

The location is a popular site for mostly pregnant females from late June to early December. The warm water is thought to be used for incubation. The spot is at the head of the La Jolla Submarine Canyon which creates a "divergent zone," creating smaller waves by diverting them left and right over the top of the canyon, ultimately creating a warm water patch. Each year, the sharks give live birth to about 20 pups each. The bigger the female, the more offspring she has.

"We're starting to look into how they interact with each other and how they stay together as a group because they are like a [schooling fish](#) where they'll all stay together ... " said Josh Gailey, a senior at Point Loma Nazarene with a double major in biology and philosophy. "Or are they all independent (and) they just happen to be in the same area because they all like it?"

Gailey has an interest in bioethics and has been thinking a lot about the popularity of snorkeling and swimming with the sharks, which are harmless to people. The sharks are known to hang out in the Matlahuayl State Marine Reserve, one of four of La Jolla's marine protected areas, where fishing isn't allowed but recreating is.

Gailey wonders if the commotion of people may frighten the sharks, causing them to leave.

"But then it means that maybe (the sharks are) spending less time in the optimal temperature area so they may incubate more slowly," he said. "How do people affect them?"

During the [students'](#) hour dive, there were more [leopard sharks](#) seen than normal that day. The group left satisfied after seeing a rare underwater flip of a white belly and capturing other behaviors that will be taken back to the lab to study.

"(Students) get to learn these important field techniques. They get to learn how to safely handle sharks and how to respectfully handle [sharks](#)," Nosal said. "And there's nothing quite like seeing your study species in real life."

Gailey agreed that this wasn't the typical lab class.

As a student, most of the time labs are already planned out and with steps to follow. "But there's very few times that you come across a thing where it's like you're the one coming up with the steps," he said.

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