



**NOAA Teacher at Sea
Brenton Burnett
Onboard NOAA Ship DAVID STARR JORDAN
June 26 – July 6, 2006**

NOAA Teacher at Sea: Brenton Burnett
NOAA Ship DAVID STARR JORDAN
Mission: Shark Abundance Survey
Day 3: Wednesday, June 28, 2006

Weather Data from Bridge

Visibility: 10 nautical miles (nm)
Wind direction: 300 degrees
Wind speed: 17 kts
Sea wave height: 2-3'
Swell wave height: 3'
Seawater temperature: 19.6 degrees C
Sea level pressure: 1015 mb
Cloud cover: Scattered clouds

Science and Technology Log

Dr. Kohin, our chief scientist, tapped me to assist on the shark platform this morning! This means I helped remove the hook from sharks' mouths and helped with the tagging. Note: I didn't get bit once nor was I lost overboard. And the sharks did well, too.

There are many tasks that lead up to shark tagging and hook removal. As the long line is drawn in by electric winch, one member of the science team unclips the gangion (or the buoy) and passes it on to others for stowing. If no catch was made on that hook (which is the case most of the time), the bait has to be removed before stowing. If there is a shark, however, it is walked "on its leash" to the stern (back) of the ship to the shark platform where Russ Vetter and Rand Rasmussen (and often Suzy Kohin though she is also busy coordinating the efforts of everyone) work to collect data and release the animal. Others record data and provide the materials necessary for tagging. As is often the case when conducting scientific research, much of this work can be repetitive. But when something comes in on the line, or when something unexpected happens like when a gangion is twisted on a line, there is lots of activity and excitement.

To be sure, the most excitement is on the shark platform. This 4 foot by 8 foot (approximate) platform is connected along its long side to the shark trough. The shark platform is accessed from the deck by a large chute that is as wide as the platform is long.

The shark trough is lowered just under the water until the shark (still on the line) can be maneuvered into the shark trough by Russ. Once there, Russ and Rand are quick to hold down the shark so that they can safely work on it. Rand uses a small thick blanket to cover the shark's mouth and sharp teeth. Before releasing the animal, however, he needs

to remove the hook. While the two of them hold the shark, another person (which was me this morning) cuts the hook or wire lead.

By this time the sex of the shark has been determined. This is easily accomplished by observing the rear underside of the shark—two finger like “claspers” near the pelvic fins are present if the shark is a male. The last step before releasing the shark is to measure its length. A meter stick along the edge of the trough makes this an easy task.



A National Marine Fisheries Service (NMFS) tag and insertion tool.

If the shark is a mako or a thresher, however, a number of other tasks are undertaken before hook removal and release of the shark.

First, a National Marine Fisheries Service (NMFS) “spaghetti tag” is attached just forward and to the side of the dorsal fin. These are “conventional tags” which give the animal a number and provide an address to send the tag to if the animal were recaptured. The spaghetti tag is barely more than a plastic wire attached to a pointed piece of metal. To insert it, a small incision is first made in the shark’s back. Then, using an awl shaped tool, the metallic portion of the tag is wedged through the incision just under the skin.

Because these tags may not stay in for life, a backup tag is also used. These are called ROTO tags and they are attached directly to the dorsal fin. Sharks returned with ROTO tags also indicate to researchers that oxytetracycline has been injected into the shark. These tags, like others, contain reward information for the return of specimens or information about them.



A ROTO tag clamp.

For larger and healthier sharks, satellite tags, of which there are two, may be attached to the shark. The SPOT tag (smart position and temperature tag) is a bit thinner and smaller than a computer mouse. Attached to the dorsal fin (in lieu of the ROTO tag), the SPOT tag has two metal washers on its exterior. If the shark rises to

the surface, with its dorsal fin out of the water, these washers dry long enough to disrupt the electrical current that normally passes between them through the water. This cues the tag to transmit the shark’s position to a satellite. Using these tags costs more than \$2,000

each, so it is important to use them with animals that are large enough to receive them and ones who are in good health.

If a shark receives a SPOT tag, a PAT tag (popoff and archival tag) will also be attached. The PAT tag records water temperature, depth and light levels at one minute intervals. After a few months or some other specified time, the tag is designed to pop off and float to the surface. At that time the tag transmits a summary of its data collection to researchers via satellite. If the PAT tag can actually be recovered, the full set of data at its full resolution can be retrieved.



SPOT tags being programmed for use.

It is interesting to note that light levels act as a proxy for time of day given that noon and midnight can easily be determined from them. And, in turn, this information can be translated into a longitudinal position as one notes the shift of day time from the location of tagging. Light level can also be used to determine latitude as on all days except those nearest the equinoxes, the length of day is dependent upon how far one is north or south.



PAT tags ready for use.

Between the SPOT and PAT tags, the horizontal as well as vertical movement of the animal can be tracked over a period of time. Using only conventional tags, only one additional location can be mapped, and that only with a recatching of the animal.

With these methods, it is hoped that the travels of these young makos and threshers, will be better understood as they feed and

breed.

Personal Log

Every day has been exciting, but today helping on the shark platform has topped it all. I was lucky, too, as that set was the most productive, so far. We caught 57 sharks on 202 hooks—a pretty good batting average. And five of these were makos. We also caught a larger thresher shark, rare out this far. I was thrilled to think I'd get to see this guy up close, but alas it was not to be. The thresher threw the hook and escaped—the big one got away! Fortunately, later in the trip we'll likely be more in thresher waters!

Brenton