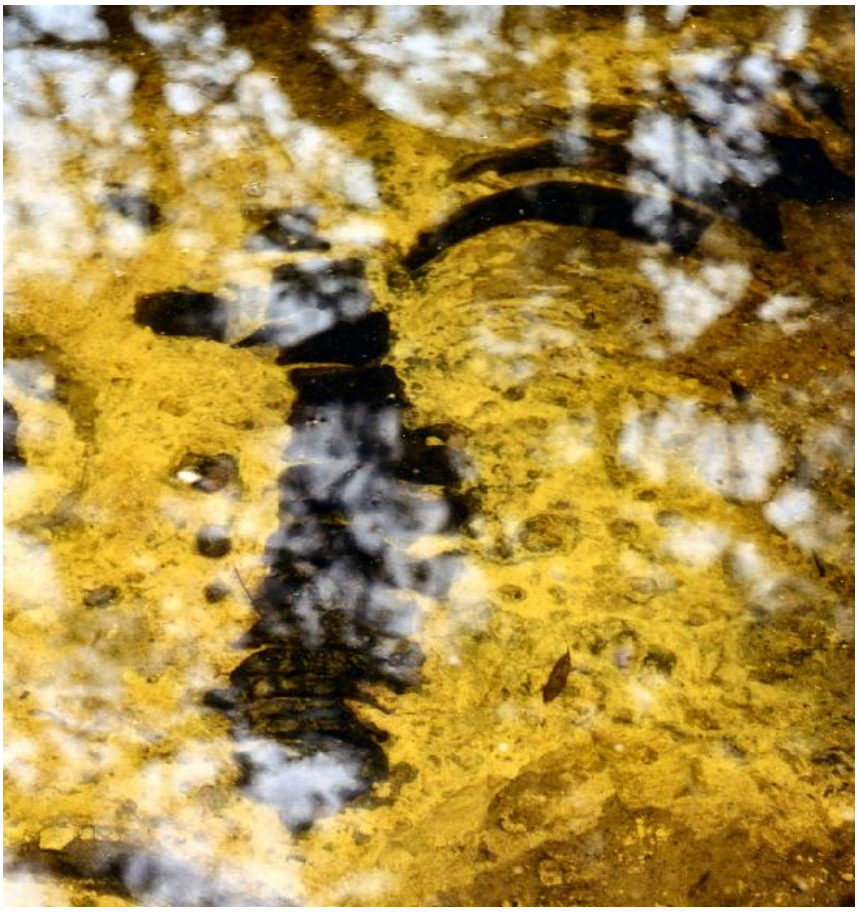


Partial dugong embedded in Peace River limestone (length: 5 feet)

Chapter 1: Doggone Dugongs

The large burlap bag that was weighted down under water with rocks made me a little nervous. What if I had stumbled onto a recent crime scene? But in the same way most of us rubber-neck as we pass a car accident, I couldn't resist lifting the Peace River-soaked cloth and peering underneath.

If it really was a crime scene, then the victim had been killed long before humans had evolved into ornery up-righters. Encased in white limestone was what appeared to be a partial M*etaxytherium*

floridianum, or Florida dugong, at least two-three million years in age, perhaps much older. The dugong is a cousin to today's manatee. Unlike the manatee, which exists in fresh and saltwater, the dugong is strictly a saltwater mammal. The burial material was a white colored marine limestone, which made it more likely to be a dugong than a manatee.

I recognized its thick banana-like ribs immediately and the heart-shaped vertebrae, which were typical of dugongs. The diver who covered the bones had already excavated half of the animal. My temptation was to take over where the other person left off and continue removing ribs and vertebrae. But since I wasn't the first to discover the skeleton, they weren't mine for the taking. I settled for sticking my camera into a clear zip-lock bag for a quick field photo and placed the burlap and stones back over the bones.

This wasn't my fist encounter with a dugong. After my grass-pulling expedition in a farmer's flooded field, I put away my snorkel until the dry season began in October. A few months had passed and water levels had dropped considerably. Visibility was good enough where the river flowed through Arcadia that I could see the rib fragments partially buried in sand.

Dugong rib buried in sand (length: 5 inches)

Date me

At first I suspected the ribs were thin, broken mammoth tusks. After all, they were dense with no porous marrow showing at the breaks. Some of the ribs had what appeared to be growth rings on the ends where breaks occurred.

Although their findings were inconclusive, researchers Daryl P. Domning and Albert C. Myrick Jr., attempted in 1980 to determine the age of an Amazon manatee by safely injecting tetracycline into the rib of a live animal and measuring the bone layering rate at natural death. In later studies by other researchers, portions of manatee earbones were sectioned and read to provide useful estimates of an individual's age at time of death.

Because dugongs have tusk-like incisors, they can be dated without this method. But manatees have no tusks. Their teeth are continually replaced with no accumulative growth layers so age is normally estimated by approximated body length.

Fresh break in dugong rib shows rings on lower right. (width: 2-1/2 inches)

Dugong earbone (length: 3 inches)

Dugong skull cap (length: 4-1/2 inches)

Collecting methods

My preferred method for any type of collecting in the Peace is by snorkel initially if the water is clear and shallow (1-2 feet) – diving later if the water is too deep. I face the top of my head into

the current, fully sprawled out like a skydiver. Then I gently fan the bottom, pushing the sand left, right or behind me, allowing it to clear up before the next swipe at the bottom. I am looking for shapes and textures – or stories.

Screen-washing with a shovel is also an option, but it's easy to scratch or break specimens. You also don't have to worry about accidentally swallowing water that might be swarming with bacteria or other micro yuck from citrus grove spraying, cow manure, phosphate processing or dead animal carcasses from hunters or natural causes.

Dugong rib fragments (length largest rib: 6 inches)

In some places, dugong ribs are so common that one fossil hunter calls them Peace River oranges. However, they should not be taken for granted. There is a story in every fragment of bone -- if you look closely. A rib with circular drilling might indicate marine invertebrates that bored into the ribs after the animal died. Slices might mean a shark killed the dugong or fed on its carcass. Or those same circles in the right pattern might indicate that a Native American fashioned the bone into a handy tool or weapon.

Dugong rib with marine invertebrate boring (length: 5 inches)

Mako shark tooth with invertebrate boring (length across base: 1 ½ inches)

Dugong rib with possible shark bite marks. Did the shark kill the animal or feed on its carcass after death? (length: 5 inches)

Dugong rib may have been fashioned into a tool or weapon by a Native American. In this case, the holes, as well as the polishing, may have been man-made. (length: 3 inches)

Dugong vertebra (length: 4 inches)

Dugong Connection

Earlier, I mentioned how fossil collecting allows us to connect the past with the present, to see moments preserved from ancient events. One of those events happened 10 million years ago and caught up to me in 1984.

That year, while walking along the edge of an abandoned Cargill phosphate mine searching for sharks teeth, I instead stumbled onto a nearly complete skeleton of *M. floridanum*. The site was only about a mile from today's Peace River near the town of Bowling Green. The dugong lived in a shallow salt water sea in its day.

Florida Museum of Natural History paleontologist Gary Morgan suspected the animal – as well as other partial dugongs nearby, may have been killed by a winter cold snap. Morgan estimated the skeleton was about 10 million years old.

Think about it, I was seeing and touching an animal in its last position after dying. It was like I had a window that could gaze 10 million years backward in time to a night so cold the dugong suffered from hypothermia and died. That exact dugong and others nearby, passed in one brief 24-hour period, and the record of the exact night and paleo tragedy remained preserved all this time. It was even better than a photograph. This record was three-dimensional.

"The dugongs may have died in a coastal lagoon or estuary, perhaps between barrier islands and the coast," said Morgan. "The water was probably about 20 feet deep at the time. We're standing 125 feet above sea level right now, so that means the ocean would have been 145 feet higher than it is today."

Miocene dugongs resembled manatees, but their tails were V-shaped like a whale's, rather than the round paddle-style seen on the manatee. A species of dugong still exists in the shallow tropical waters off east Africa; west, south and southeast of Asia;

Austrailia and the Pacific Islands. Most of the populations are around northern Australia. The Florida species, *M. floridanum* became extinct about 2 1/2 million years ago, the same time manatees were beginning to show up in the fossil record.

Why the changing of the guards? No one is certain. But, two to three million years ago is when the Isthmus of Panama finally connected North and South America together through changing water levels and plate tectonic mountain-building. This major geological change also brought about a change in the sea grass beds.

M. floridanum may have been a specialized feeder and couldn't adjust to the changing plant life quick enough. Additionally, the angle of the dugong's mouth is more pronounced. Its short, broad trunk-like snout ends facing downward, forcing it to feed on the bottom while manatees can also feed on plants growing at or near the surface. Such a minor difference in positioning could have led to major differences in manatees gaining access to vegetation beyond the bottom (such as tree leaves over-hanging a river bank).

Another disadvantage is that the Florida dugong's teeth were not as robust as manatee teeth and the manatee benefited from continuous tooth replacement.

Cargill dugong teeth – Maxilla (length: approx. 1 inch each tooth)

Cargill dugong maxilla and mandible. Mandible was missing all its teeth. Maxilla tusks were missing too. (length skull: Approx. 18 inches; lower jaw approx. 10 inches)

Manatee (*Trichechus manatus)* teeth for comparison (length: approx. 9 inches)

Worn fossil manatee teeth (length: ½ inch each)

Worn fossils manatee tooth (length: ½ inch)

Unworn fossil manatee tooth (length: 2/3 inch)

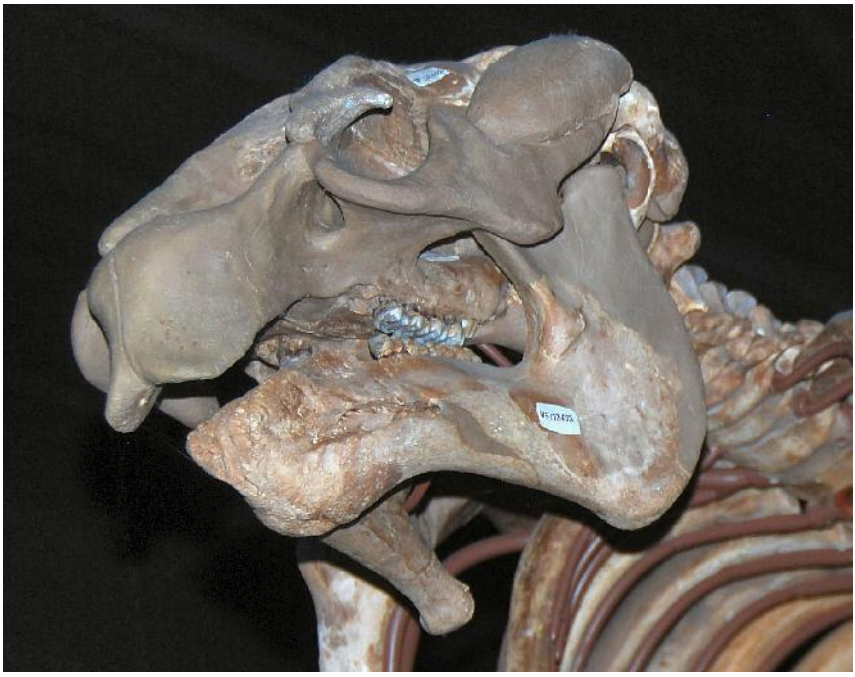
Cargill dugong ribs. Notice multiple fractures where ribs would break apart if in the Peace River. (length: approx. 30 inches longest rib)

Cargill dugong vertebrae – thoracic
(height from base to center process approx. 6-7 inches)

Cargill dugong vertebrae – lumbar
(height from base to center process approx. 7-8 inches)

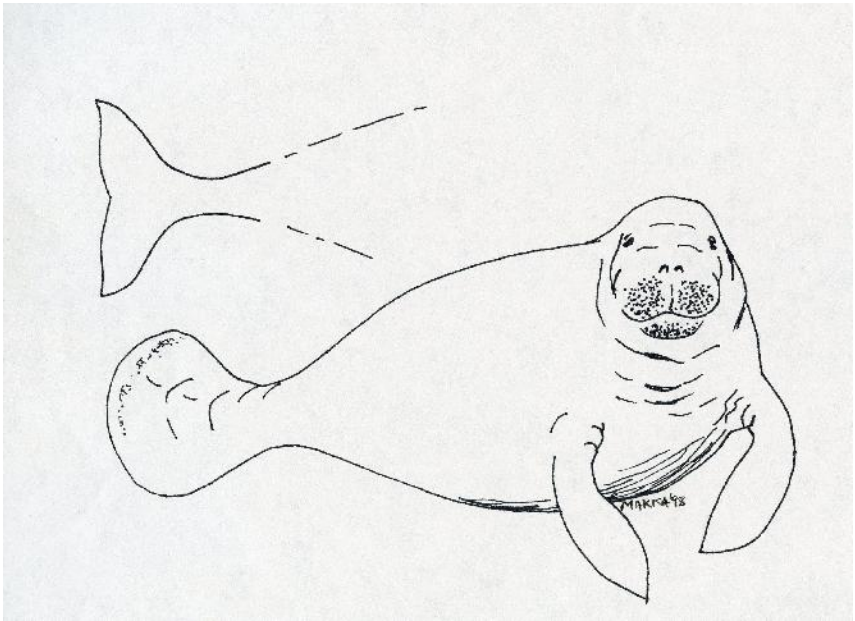
Cargill dugong I found. Excavated by Barbara and Jim Toomey and turned over to Florida Museum of Natural History, now on permanent loan to Clewiston Mueum. (length including skull: approximately 9-10 feet if tail verts had been been present)

Dugong mother and calf on exhibit at Florida Museum of Natural History in Gainesville, FL. Not the Cargill dugong I found. (adult length: approx. 9 feet)



Skull of FLMNH dugong mother

Forelimb bones of FLMNH dugong mother and skull of calf



Dugong tail at top – resembles dolphin. Manatee tail at bottom
Marisa Renz illustration

The darkened part of map is Florida as it likely looked 10 million years ago when the Cargill dugong lived. The small circle is Lake Okechobee. Between the lake and the southern part of the darkened in area (NW of Lake Okeechobee), is where I found the dugong. The widest line is Florida's land mass as it may have been at other times – twice as wide as today.
Marisa Renz illustration.

My Peace River Yacht.