PHOTO PROVIDED/RICHARD WHITMAN

Paintless, sand-blasted skeg is evidence that I'm no stranger to sandbars and shallows of Charlotte Harbor.

Why is Charlotte Harbor so shallow?

RICHARD WHITMAN, PH.D.
Columnist

There's a saying among boaters: "If there is still paint on your engine's skeg — a rudder-like fin below the propeller — then you really haven't fished Charlotte Harbor."

Others might accuse me of sloppy navigation, ADD or cite me for failure to trim. Perhaps their immaculate skegs are like my friends, he repaints his twice a year.

Well, I must admit that my skeg has met a few sandbars — maybe more. And yes, I've been unproudly aground a time or two.

Blame it on low tide, shifting sandbars, oyster reefs, flats, weather, skinny water, or simply reading the water wrong. But it is more. Charlotte Harbor is shallow. Sandblasting your skeg seems like an unavoidable consequence of boating our waters.

Charlotte Harbor averages only about 7–8 feet deep, with a typical tidal range of roughly 1.5–2 feet.

Lower Charlotte Harbor is generally deeper, while the tidal rivers and broad flats are shallower. Residential canals and navigation channels may be dredged and maintained, but sediment can shift and shoals can quickly develop.

Why is Charlotte Harbor so shallow? Ultimately, it's about geology.

To get the best geological perspective, we need to dig a hole. Better yet, extract a vertical sediment core. Each layer provides another page in the geological history of Charlotte Harbor.

Our story begins millions of years ago — before Charlotte Harbor, before its present rivers and barrier islands, and long before humans lived here.

Much of what is now Florida lay beneath shallow tropical seas. Marine organisms accumulated on the bottom, and their shells and skeletal remains eventually contributed to the fossil-rich limestone and other carbonate formations underlying Southwest Florida today.

As sea level, climate and currents changed, different sediments accumulated. High-energy water transported and deposited coarser material such as gravel, shell and sand. Quieter water allowed finer silts and clays to settle. Geologists can read these deposits much as we read a history book. They help reconstruct where shorelines once stood, how energetic the water was and what kinds of organisms lived there.

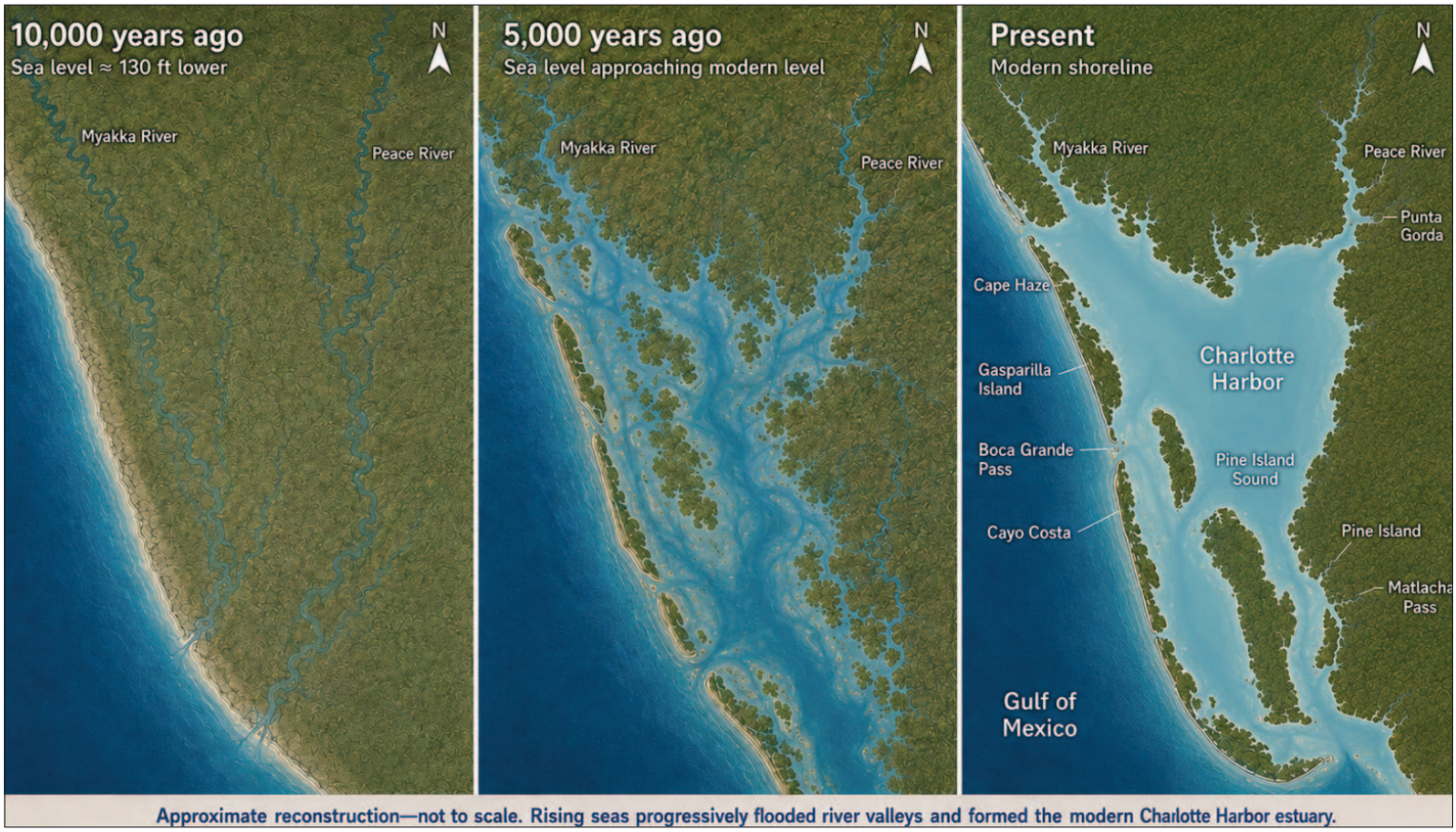
About 20,000 years ago, near the end of the last Ice Age, global sea level was approximately 400 feet lower than it is today.

Florida was far wider, twice its

More **SHALLOW** | **A9**

ADAPTED FROM NOAA/USGS PUBLIC-DOMAIN DATA

Darker blues within the Charlotte Harbor generally correspond to deeper water and natural or dredged channels. Some deeper natural channels may have followed valleys established by earlier river drainage. Image has been contrast enhanced to emphasize relative depths. Do not use for navigational purposes.



CREDIT: CONCEPT AND DIRECTION BY RICHARD WHITMAN; ILLUSTRATION CREATED WITH OPENAI.

Sea levels progressively rose after the Ice Age inundating Myakka and Peace river valleys. Today these ancient broad coastal plains are flooded creating Charlotte Harbor estuary we see today. Prehistoric landscapes are rough approximation derived from the geologic record. Not to scale.

Shallow/from A8

present size, and the Gulf shoreline lay many miles west of its present location. Charlotte Harbor, as we know it, did not exist. The Peace and Myakka rivers instead flowed across an exposed coastal plain toward the distant Gulf.

As the great continental ice sheets melted, sea level rose and progressively flooded the lower portions of those river valleys.

Florida is remarkably flat, so even a modest vertical rise in the sea can move the shoreline a considerable distance inland. Lowlands became wetlands, wetlands became salt marshes, and marshes eventually gave way to more open estuarine waters.

Evidence from sediment cores indicates that the modern Charlotte Harbor estuary began developing roughly 9,000 years ago as rising seas advanced into the Peace and Myakka river valleys.

Nine thousand years seems ancient to us, but it is extremely recent in geological terms — only about 0.0002% of the history of life on Earth.

Over the following millennia, currents, waves and storms reworked sediment along the coast. Sand accumulated into spits and barrier islands, partly enclosing the harbor and restricting its exchange with the Gulf.

By roughly the last few thousand years, Charlotte Harbor had begun taking on a form we would recognize today. More recently, dredging, canal construction, shoreline development and other human activities accelerated changes to its contours, circulation and drainages.

Charlotte Harbor, therefore, is not merely a depression that filled with water. It is a broad, drowned river-valley estuary modified by sediment, tides, rivers, storms and enclosed barrier islands. Deeper undredged channels and holes are old river beds, scoured sediment or ancient bedrock contours.

Within its approximately 270 square miles of open water, freshwater and marine forces remain in constant tension.

That geology helps control the Charlotte Harbor we know today. Its flooded valleys and gentle relief created a large, shallow estuary that is remarkably productive. Sunlight can reach much of the shallow bottom where water clarity permits, supporting seagrasses and benthic algae.

Freshwater from the watershed delivers organic matter and nutrients, while tides bring salt water, marine organisms and additional materials from the Gulf.

The result is a patchwork of habitats and variable salinity. Seagrass beds, tidal flats, mangrove shorelines, wetlands and oyster reefs provide feeding grounds, shelter and nursery habitat for tiny invertebrates, juvenile fish and baitfish.

Those organisms, in turn, support shrimp, crabs, mullet, redfish, seatrout, snook, wading and diving birds too numerous to list. Barrier islands and the harbor's relatively limited connections with the Gulf further influence water movement, salinity and where these organisms live, feed, reproduce and young develop.

Charlotte Harbor is the theater constructed by geological, physical and biological processes. Living things are the players—and the richness of that production helped bring many of us here as well.

But shallowness also has a downside. Because Charlotte Harbor contains so much "skinny water," it responds more rapidly than a deeper, larger-volume waterbody.

Wind can push water toward one shore and away from another, producing water-level changes that sometimes exceed the normal tide. Strong winds can also resuspend fine bottom sediments, reducing water clarity. Heavy rainfall can rapidly lower salinity, while dry weather and Gulf water entering through the passes can raise it. Shallow water also heats and cools more quickly.

Large storms can rearrange shoals, erode shorelines, damage seagrass and oyster habitat, and alter channels and passes. Water levels and circulation may recover quickly after a storm, while ecological recovery can take much longer.

Because contact between land, bottom sediments and water is so extensive, whatever enters the harbor from its watershed can have an outsized influence. Nutrients sustain biological production, but excessive nutrient loading can promote some harmful algal blooms, reduce water clarity and contribute to ecological damage.

I swear my outboard seeks sandbars it wants to kiss. But Charlotte Harbor's shallow depth is more than a navigational nuisance. It is fundamental to the harbor's character and ecology.

The next time you look across Charlotte Harbor, think of it not simply as a hole filled with water, but as a wide, ancient river valley reclaimed by the sea — and still being reshaped today.

Richard Whitman has spent over 50 years studying natural and disturbed aquatic ecosystems from the Gulf Coast states to the Great Lakes. His studies are widely cited in the scientific literature. Currently his research is focused on beach and canal recreational water quality of upper Charlotte Harbor.