You already know about the climate crisis, fisheries collapse, ocean acidification, and the biodiversity crisis. Now you can add a fifth one: the global sand crisis. The demand for sand is exploding due to burgeoning construction in China and other developing countries. The result: water bodies are being devastated by massive dredging operations.

Lake Poyang is up the Yangtze River from Shanghai. Shanghai is booming, having constructed as many high-rises in just the last decade as New York City has built in a century. The construction industry started by taking sand from the bottom of the Yangtze, but that was banned because bridges were being damaged, the riverbank was collapsing, and shipping was harmed. So production moved to Lake Poyang. Here's what's happening on the lake (from the Guardian):

> "Hundreds of dredgers may be on the lake on any given day, some the size of tipped-over apartment buildings. The biggest can haul in as much as 10,000 tonnes of sand an hour. A recent study estimates that 236m cubic metres of sand are taken out of the lake annually. That makes Poyang the biggest sand mine on the planet, far bigger than the three largest sand mines in the US combined."

The result is that the water level is rapidly dropping, damaging wetlands nearby. That's an important change because Poyang Lake is said to be Asia's largest winter destination for migratory birds, providing habitat for millions of cranes, geese and storks, while the lake is also one of the few remaining habitats for the endangered freshwater porpoise.

It's not just China. Dubai has built so much that, even though it's in the middle of the desert, it imports sand from Australia. India's use of sand has tripled. According to the Guardian, "India's supreme court recently warned that 'the alarming rate of unrestricted sand mining' is disrupting riparian ecosystems all over the country, with fatal consequences for fish and other aquatic organisms and 'disaster' for many bird species." In Indonesia, sand miners have destroyed at least two dozen islands since 2005.

Construction is a big part of the problem, but not all of it. According to a scientific new site, Science X,

> “Sand and gravel are now the most-extracted materials in the world, exceeding fossil fuels and biomass (measured by weight). Sand is a key ingredient for concrete, roads, glass and electronics. Massive amounts of sand are mined for land reclamation projects, shale gas extraction and beach renourishment programs.”

What’s to be done? I’ve seen less discussion of how to respond to the crisis, but there are some obvious possibilities. The first and most pressing is to protect the most environmentally sensitive areas — places like Lake Poyang — from sand mining. An article in the journal *Sustainability* on the economics of sand use also points out that there are some alternatives for construction purposes:

> “Substitutes for sand or optimizing the use of existing buildings and infrastructure represent only a few steps that can be made to reduce sand consumption. Different substitutes are available, depending on the type of sand that is required. For example, waste products, crushed granite, barite powder, quarry dust, etc. are sand substitutes in concrete, while waste glass is used as sand replacement in cement mortar. Replacing sand partially by quarry dust determines a better performance of blocks and also the costs for these replacements are not very high. In addition, partial replacements of sand with crushed rock in concrete production preserves its properties and determines a decrease of the concrete price.”

Hopefully, engineering research can help find ways to make these substitutes for sand cheaper and more appealing. Maybe there is room to find new materials (other than concrete) for construction projects. We may need to give further thought to the desirability of beach renourishment. And increasing the recycling of glass would reduce the need for new glass.

I’m not sure what the answers will turn out to be. But, they say the first step in addressing a problem is admitting that you’ve got a problem.