Ocean Gazing: Episode 31
A river runs through it all
Center for Coastal Margin Observation & Prediction (CMOP)

<begin music>

Ari: This is Ocean Gazing, the podcast where we tune our ears to the stories bubbling up out of the sea. I'm Ari Daniel Shapiro. We're in northwest Oregon this time at the mouth of the Columbia River. It's one example of what's called a coastal margin.

Baptista: One way of thinking about coastal margins is the region where land and sea meet, going from freshwater all the way into the salinity in the ocean.

Ari: António Baptista is the director of the Center for Coastal Margin Observation and Prediction, or CMOP. It's a collection of Oregon-based research institutions, universities, local colleges, and community groups working together to both predict and influence the coastal margin of the Columbia. And it's just the latest installment in a river awash with history. Stay tuned.

<fade up music and sustain until ends>

Ari: Go find the Columbia River on a map. It's a force of nature. As the Center for Columbia River History puts it: "[This] river is arguably the most significant environmental force in the Pacific Northwest region of the United States." The river forms much of the border between Washington and Oregon before spilling into the Pacific Ocean.

Now, humans have shaped and lived along this river for at least 10,000 years. A variety of Native American and First Nation tribes have occupied different sections over time. European explorers arrived in the late 1700s.

The Columbia River did become quite important for fur trading as trappers fanned out along the river's winding course. Later, salmon canneries dominated: by 1883 there were 40 of them packing and exporting over 30 million pounds of fish each year. Then, the 1900s witnessed the construction of dam after dam. Today, more than 400 dams interrupt the flow of the Columbia and its tributaries.

In late February, António Baptista and I drove along Route 30, which follows the Columbia River from outside Portland, Oregon to its mouth. There were several places along the way where the most recent installment of human impact on this river was obvious. We climbed one hill on the highway with a view of the Columbia River off to our right. We pulled over and looked onto the scene before us.

Baptista: This particular spot is very illustrative of how we have used the Columbia River for a variety of purposes. We see factories that produce paper products, use timber resources. We see ships that travel upstream to Portland and take products from the Midwest of the United States: grain, for instance, into the Pacific and the rest of the world. So we see a river that is being used for the development of society.

Ari: What this sort of shows to me is both commercial and natural interests are at play before us. Across the way, there must be two dozen smokestacks that are releasing some sort of pollution into the air. And yet there are trees and there's some farmland and grasses. So it seems that these two systems are in somewhat of a coexistence.

Baptista: Absolutely, they are completely in coexistence. We have climate changing. We have anthropogenic uses of the coastal margin of the Columbia River. We have the natural system. And in the end, they all interact and the future of these interactive systems is what we are talking about.

Ari: It's by buying cars, using houses, using electricity: this is what's created this particular landscape.

Baptista: Sure. Absolutely.

Ari: Baptista told me that he frequently makes stops just like this one to remind himself of why he does his science. To remember just how real the data are. You see, CMOP – the Center for Coastal Margin Observation and Prediction – operates a dozen data collection sites scattered throughout the Columbia River basin. These sites track the health, biology, chemistry and physics of the river. Baptista and I continued our drive until we ended up at one of these field stations in Hammond, Oregon. It's about as far northwest as you can go in the state. We hopped out of the vehicle <sound of door closing>, and made our way out to a large shed at the end of a pier.

We were accompanied by Michael Welkin, a senior engineer with CMOP. He wore a pair of bright red weatherproof overalls with a plaid top. Welkin spends half his time 20 minutes down the road working with students from Clatsop Community College. These students build and weld the buoys and equipment used for studying the river. The rest of the time Welkin's traveling to the various field sites, like this one.

Welkin: This is Point Adams fish packing plant. Essentially what we're in is the back of a big refrigerator. The room behind you is a very large ice room. And the ice room is used for keeping fish when it comes straight off the fishing boats. But also for generating the ice to put on the fishing boats before they go to sea.

Ari: And so then you're keeping track of the very small life and the chemistry of the estuary.

Baptista: Yes, trying to understand microbial communities in the context of the physics and the chemistry of the estuary, yes.

Ari: Of course, all the data that're collected are beamed to the web for anyone to use and study, including the CMOP scientists and researchers. Now, the various field stations have one of two basic setups. Here in Hammond and at a couple of other sites, the sensors are suspended on ropes tied off to the edge of a pier, say.

Welkin: We like this because we can walk out to it. It's got utility power. I mean, this is luxury when it comes to ocean observation!

Ari: Various tubes snake down into the river as deep as 50 feet. <pump noise> Here's our last sonic stumper. It's the pump that draws the water through a small filter, through those tubes and into the shed. That's where all the measurements are made. Every few days, the filter has to be cleaned manually. Welkin demonstrated the process by hauling in a rope cast over the side of the pier <hauling sounds> and scrubbing the filter at the other end. Katie Rathmell, a CMOP research associate, looked on.

Rathmell: The one on the seabed needs to be cleaned fairly regularly: each time the tide changes, it seems to get clogged up with sediment. <cleaning/brushing sounds> You can hear it starting to flow again. It's covered in sediment and slime.

Ari: Once the pump's cleaned, the water's free to flow. Now, the second type of setup isn't quite this convenient. The sensors at these other field sites are tethered to an anchor or a buoy. Welkin and Rathmell have to dive into the river with a dry suit in order to clean and service the instruments and the pumps. And that kind of scuba diving isn't quite like basking in turquoise tropical waters.

Rathmell: Diving in the Columbia River is, it's like going into a closet and closing the door. Really dark. No lights on.

Ari: And don't forget the tides that cause that river to ebb and flow. That means you gotta time your dive just right.

Welkin: So for myself, what I prefer to try and do is to time it so that the water is moving a little bit at the seabed. And when I get to the surface, the water is more or less stopped, so that I have an easier time getting out of the boat when I'm already exhausted.

Ari: Sometimes the equipment can really take a beating too. But all this effort of people and instruments alike, it's painting a picture of the Columbia River.

Baptista: We are trying to understand change in a system that varies by nature. Over time, as we accumulate data, we can separate what is natural variability from what is a trend of change.

Ari: And it's these trends that'll reveal something about both the natural state of the Columbia and the human impact on the river. This work requires a real team. Baptista compares the science he does at CMOP to soccer. Since he was a boy growing up first in Angola and then in Portugal, he's played soccer, coached soccer and watched soccer.

Baptista: Soccer is a prototype team sport. And it's a game where you can have an outstanding player, but if that outstanding player doesn't have 10 other players working with him or her, then you can't outcompete the other teams. In many ways, as we look at the grand challenges of coastal margins, we need to have a full team to provide the answers that society needs from scientists. And that has many different angles to it. We need to have all the disciplines that we need to study coastal margins. But we also need to have a representation of the entire segments of society.

Ari: Segments like the Native Americans who've been sustained by the Columbia River for centuries, and like the growing Hispanic community of Portland who's being sustained by that river today. The Columbia River continues to unite all these people with the natural world too. And in the middle of it all are 24 sets of sensors pumping water, taking down measurements, and speaking for the river.

<fade up transition music>

Ari: Here's our next sonic stumper. Now we've gotten some feedback saying that sometimes these stumpers are a little obscure.

<sonic stumper>

Ari: So I'll give you two hints. First of all, it's a state anthem or state song. And the second hint, that state is the birthplace of one of our presidents from the second half of the twentieth century. <cross-fade sonic stumper and outro music>

Our website, oceangazing.org, has gotten a facelift. We've got all sorts of social networking features now. Now you can also engage in online conversations with friends and colleagues Facebook-style. In fact, I've posted a question there about this episode, and I'd love to hear what you think. You can also listen to Michael Welkin describe the harrowing adventure of one of his buoys, and see a couple of photos and videos that I took. Just bob on over to oceangazing.org.

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