

Scientists figuring out how to measure Bay Program oyster goal

By Karl Blankenship

The Bay Program's first goal in its new Chesapeake 2000 Agreement calls for achieving a tenfold increase in the number of oysters by 2010.

Now, they have to figure out how to count them.

"We don't know how many oysters are in the Bay, except that there are billions," said Steve Jordan, director of the state-federal Cooperative Oxford Laboratory in Maryland.

Although disease, overfishing and poor water quality have taken a toll on the Bay's oysters, large numbers remain — but they are widely scattered, making it hard to come up with any reliable Baywide estimate.

So scientists in Virginia and Maryland are working on ways to measure oyster populations so they can monitor progress toward the new goal. Each state is developing its own technique, but scientists say they should be able to piece together a Baywide picture from the different methods.

The job is easier in Virginia, where the hard-hit oyster population is now restricted to relatively few reefs in various rivers.

For years, biologists from the Virginia Institute of Marine Science conducted surveys by dragging a heavy dredge across the Bay bottom, then examining its contents. But the margin of error in such a survey was large. The dredge bounces up and down, potentially missing oysters. And, once filled, the dredge won't gather anything at all.

"What you cannot do from that process is estimate the absolute number of oysters that are down there," said Roger Mann, a VIMS scientist.

To get a better estimate, Mann and his colleagues at VIMS, with support from the Virginia Marine Resources Commission, have been developing a new patent tong survey for Virginia oyster reefs. The tong allows scientists to grab everything in one square meter of bottom. "You know how many oysters there are per square meter," Mann said. "There are no ifs, ands or buts about it."

With enough tong "grabs," scientists can determine the number of oysters per meter, and extrapolate that over an oyster bar to get — within a known margin of error — the number of oysters present.

By 2010, the survey could accurately tell scientists whether the tenfold number has been reached in Virginia, Mann said. The drawback, he said, is the survey is labor intensive, requiring a large crew to spend many days sampling the bottom.

In Maryland, though, oyster grounds cover a much larger area. Getting enough tong samples to make a statistically valid estimate of oyster numbers would be — at the very least — daunting.

Instead of an exact number, Jordan and his colleagues are working to develop a "biomass index" — derived from the state's ongoing oyster dredge survey — that could be used to measure oyster restoration progress.

To develop the index, biologists took oysters of different sizes, shucked them, then dried the meat and weighed it. From that, they were able to determine the relationship between the length and dried weight — or biomass — of the oyster.

Using that, the scientists were able to convert the last 10 years of Maryland's oyster survey data —

which record the sizes of oysters taken from the same monitoring sites each year — into a biomass index.

Using the index, 1994 was the lowest year on record, with an index of 85 grams dry weight per bushel of bottom material surveyed. In 1991, the highest of the 10 years analyzed, the index was 148. This year, it bounced back to 147.5. The tenfold goal would be an index of 850.

Unlike the VIMS survey, which provides an absolute number of oysters, the index is only a relative gauge of how the stock is trending — not a population estimate. “We can’t say this sample represents so many oysters per square meter which we can extrapolate out over an area and come up with a number,” Jordan said.

But, looking at the past 10 years of data, Jordan said the index seems to be a good predictor of harvest, and is therefore a good indicator of overall population.

Jordan said measuring the tenfold increase based on biomass has some advantages. For example, a small number of oysters can produce huge numbers of small spat which could greatly distort a count. If there was a large “spat set” in 2009, the 2010 index could show a huge increase in the number of oysters. But many could soon die of disease.

A tenfold increase in biomass, though, should indicate that more, large oysters are in the population. And biomass is more indicative of the ecological role of the oyster as well. “A larger oyster,” Jordan said, “is going to filter more water than a smaller oyster.”

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