

## Bay Pollution Progress Overstated

Government Program's Computer Model Proved Too Optimistic

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At news conferences, on its Web site and in its regular publications, the government agency leading the cleanup of the Chesapeake Bay has documented more than a decade of steady progress.

The Chesapeake Bay Program has reported that the flow of major pollutants from rivers into North America's largest estuary has declined nearly 40 percent since 1985, bolstering the claims of politicians in Virginia, Maryland, Pennsylvania and the District that they were "saving the bay" and helping the states fend off criticism and lawsuits from environmentalists.

Those reports, however, significantly overstated the environmental achievements.

The estimates of pollution reduction were based on a computer model -- not water samples -- that program officials now say was distorted by overly generous assumptions.

Bay Program officials said there was no deception involved. The magnitude of the gap between the computer estimates and actual water quality is a matter of scientific debate.

But U.S. Geological Survey water monitoring data from the mid-1980s through 2003, requested by The Washington Post, indicate that observed concentrations of the two targeted pollutants, nitrogen and phosphorus, showed no decline in most of the major rivers spilling into the bay.

Several scientists affiliated with the Chesapeake Bay Program said the water monitoring reports offer a more reliable measure of pollution reduction than the computer estimates that the program has used.

"Basically, what we're seeing is that the government has had its thumb on the scale for years," said J. Charles Fox, former secretary of the Maryland Department of Natural Resources. "There's no question now that the government was inflating progress in the Chesapeake Bay."

He attributed the overstatements to "an institutional bias to show progress."

While conceding that the computer model had overestimated progress in reducing pollution, Chesapeake Bay Program officials defended its use to report to the public

about the bay cleanup. They have revised the model's assumptions to reflect new scientific findings.

"There was no intention to mislead," said Richard Batiuk, the associate director for science at the Environmental Protection Agency's Chesapeake Bay Program office. "Our models continue to be refined over time."

The Chesapeake Bay Program, an alliance of the federal government and Maryland, Virginia, Pennsylvania and the District, has been under pressure to show progress since 1987, when members signed a landmark agreement to reduce the flow of phosphorus and nitrogen into the bay.

Since then, as the Chesapeake Bay Program reported steady reductions in pollution, the bay suffered precipitous drops in its prized blue crab and oyster harvests, and at times its desolate "dead zone" grew.

The disclosure by the Bay Program this spring that the model had overstated the cleanup underscores the folly of relying on it to measure progress, environmentalists said.

They blamed the more optimistic model figures for shrinking political support for more rigorous anti-pollution measures.

"It's sucked the public outrage out of the system," said Howard Ernst, author of "Chesapeake Bay Blues" and senior scholar at the Center for Politics at the University of Virginia. "If you are told year after year that things are getting better, what's the incentive to make the necessary changes?"

Theresa Pierno, vice president of the Chesapeake Bay Foundation, a watchdog group, said the computer model and the Bay Program have something in common. "The model is extremely over-optimistic -- and the rhetoric continues to be very optimistic," she said. "But the improvements that we have seen in the bay have been very, very small."

Most of the nitrogen and phosphorus entering the bay from the 64,000 square miles that drain into it come from farm fertilizer, animal waste, sewage treatment plants and air pollution caused by cars, which eventually drops into waters and heads to the bay.

Once there, the chemicals serve as nutrients that set off algae blooms, which block sunlight from the sea grass and creatures on the bay bottom, while also starving them of oxygen.

As part of the cleanup, the states have pushed for the retrofitting of sewage treatment plants, encouraged farmers to minimize excess fertilizer and animal waste flowing into streams and groundwater and cautioned against long-distance automobile commuting.

One of the program's most significant achievements was the phosphate detergent ban that went into effect in the bay states and the District between 1985 and 1990, a measure

believed to have yielded significant phosphorus reductions. This spring, too, Maryland legislators passed a \$2.50 monthly surcharge on every homeowner in the state -- the "flush tax" initially proposed by Gov. Robert L. Ehrlich Jr. -- to pay for upgrades to wastewater treatment plants.

Those efforts, however, are offset by pollution created by the rising population in the bay's vast watershed.

"As we speak, Virginians are working diligently to meet the commitments of the Chesapeake Bay agreement," Virginia Gov. Mark R. Warner (D) said at a meeting of bay state leaders in December.

But exactly what the cleanup goals are, and how to measure their achievement, has proven a problem from the start.

In the widely publicized 1987 agreement, the District, Maryland, Virginia and Pennsylvania promised to reduce the amount of nutrients flowing into the bay by 40 percent by the year 2000.

To the consternation of several involved scientists, the members of the Chesapeake Bay Program soon after interpreted the promised reductions to exclude pollution from cars and other sources. The agreed-upon 40 percent reduction was cut to 20 percent for nitrogen and 31 percent for phosphorus.

The Chesapeake Bay Program has reported its progress against those goals primarily by citing the results of its computer model, though officials also review water monitoring reports as another means of examining the bay.

The model estimates the amount of pollution flowing into the bay based on the various land uses in the vast watershed. Forested land is judged to contribute relatively little to the problem; agricultural and urban lands contribute the most, officials said.

"It is the Cadillac of watershed models across the world," said Christopher S. Conner, director of communications for the Chesapeake Bay Program.

The model is useful, bay officials said, because it can take variations of rainfall and other factors into account. Even scientists who question its use for measuring progress credit the model with being well-constructed and useful for prediction.

But some scientists and other experts on the bay said the model is the wrong tool for reporting bay pollution because it relies on so many assumptions and because it continues to suggest more progress than water monitoring reports.

The Chesapeake Bay Program's revised computer model currently reports that phosphorus pollution has dropped about 28 percent since 1985 and that nitrogen pollution has dropped about 18 percent.

But according to the U.S. Geological Survey data, the observed concentrations of those chemicals flowing into the bay from the major rivers has changed little.

Eight of the nine major rivers entering the bay have shown no trend or have increased concentrations of phosphorus since the late '80s. Only one of the smaller rivers has shown a small decrease in phosphorus pollution.

Seven of the nine major rivers have shown no trend or increased concentrations of nitrogen, the other key bay pollutant. Two have shown slightly decreased concentrations.

"There's clearly mixed messages," said Mike Burke, the program's acting associate director. "The modeled data show a declining line [for pollution]. The other shows you a flat line."

Even aside from the varying numbers, however, several scientists said they were uneasy using a model to measure progress.

"Think of the weather," said Donald F. Boesch, president of the University of Maryland's Center for Environmental Science and one of several scientists who have advised the program. "You can use computer models to forecast the weather. But if we want to know what the weather is, we go out and see if it is raining and snowing.

"In other words, monitoring -- not modeling -- should be used to assess present conditions."

Scott Phillips, the Chesapeake Bay coordinator of the U.S. Geological Survey, agreed. "From our perspective, the first indicator [of the pollution reductions] should be the trends in observed concentration -- because that's what we actually measure in a river and what actually enters the bay," he said. "The model provides a prediction of what water quality will be, without the effects of annual changes in rainfall."

A critical weakness in the pollution estimates was revealed this spring when, at the urging of scientists, the Bay Program revised the assumptions in its computer model. Assumptions about the amount of pollution coming from certain agricultural lands were off, program leaders conceded, overestimating the overall pollution progress by about 10 to 15 percent, officials said.

"Scientists have to change what they're saying all the time. It's the nature of science," said Tom Simpson, a University of Maryland professor who led the group of scientists advocating a revision to the model. But "in the public arena, it's difficult to say, 'What we have actually achieved is less than we had previously reported.' "

It was not the first time a revision to the model assumptions significantly changed the results.

According to an October 1999 "State of the Chesapeake Bay" report, the model showed that the states were on course to achieve the phosphorus goal by 2000 and would come very close to the required reduction for nitrogen.

"To many, the steady restoration of the Chesapeake system is a budding success story," the report said.

Months later, however, the model assumptions changed, and the goals were further away than the program had reported. The earlier results, critics said, were used because the Bay Program felt pressure to show progress.

"The Chesapeake Bay Program's 'State of the Bay' reports have been inexcusable," Ernst said. "It's one thing to make a mistake once, but to consistently make mistakes in your own favor is suspicious."

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