Testimony

"Load Estimates of Nitrogen, Sediment and Phosphorus Delivered to the Chesapeake Bay; a Comparison of Estimates from the Draft Chesapeake Bay TMDL to those from the Chesapeake Bay CEAP Analysis by USDA-NRCS"

Presented by

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Chairman Thompson, Ranking Member Holden, and members of this Committee, my name is Tom Hebert and I am here today as Senior Advisor to the Agricultural Nutrient Policy Council – the ANPC. The ANPC has worked on multiple issues in the six short months that it has been in existence and among these are the topics of this hearing – the Chesapeake Bay and the U.S. Environmental Protection Agency's (EPA) Total Maximum Daily Load (TMDL)for the Bay and its tidal tributaries. Thank you for this opportunity to share some of the ANPC's work on this topic. We hope you find this testimony helpful to your deliberations concerning policies involving agriculture, nutrient and sediment loss and the health of the Chesapeake Bay.

The ANPC is a new organization, started this past September by five agricultural organizations. It has grown to include more than 30 participants from the agricultural and forestry sectors that share the goal of sound federal policy involving nutrients and environmental quality. The purpose of the ANPC is to support participants' efforts to achieve that goal by drawing on and applying their expertise in the relevant areas of science, technology, law and policy, and coordinating those efforts with outside experts on these matters. These are tough, highly complicated issues, particularly when considered through the lens of the Clean Water Act. The ANPC works to help its participants make sense of all that is happening by charting a path forward that is informed, thoughtful, and reasoned.

While the ANPC will speak to the meaning, substance and implications of technical, legal or policy matters, the council does not serve as the policy voice for its participants. That remains the participants' role as individual organizations or in their collective efforts as expressed through ad-hoc coalitions that they might form around specific issues. But in the case of agriculture, forestry, nutrients, and water quality, it is fair to say that ANPC participants are absolutely supportive of protecting and improving water quality. The ANPC members share this view with respect to waters across the country, and relative to today's hearing, the Chesapeake Bay and the waters of the basin.

The fact that these organizations and all of agriculture embrace this objective can be too often lost in the rancor of debate. Perhaps that is because these groups are also unabashed supporters of farmers and ranchers as business people, and there are often no easy answers able to address the multiple challenges facing agriculture. America's farmers and ranchers are committed to doing their part to reduce the loss of nutrient and sediment from their land to help improve the health of the bay, though they cannot pursue this to the exclusion of the other integral objectives for their operations. The ANPC is proud to be part of and contributing their efforts.

The ANPC's Examination of Agriculture's Loadings to the Chesapeake Bay

The ANPC has spent considerable time examining agriculture's contributions of nutrients and sediments to the Chesapeake Bay, its tributaries and to the waters of the entire watershed. This is of course a critical issue for water quality in the Bay and in the context of the Chesapeake Bay TMDL (Bay TMDL) rulemaking and the associated state watershed implementation plans (WIPs). Many in the agricultural community have been deeply concerned that the process and speed with which EPA was moving to conclude the TMDL rulemaking was going to encumber sound and accurate supporting analysis.

These were not just hypothetical concerns. They stemmed directly from things we learned in public meetings with EPA staff about how agriculture was being addressed in the Chesapeake Bay Model (Bay Model) and its associated "Scenario Builder." Scenario Builder is the model EPA developed for sectors like agriculture for use in the Bay Model. Critically important data about the historical levels of conservation practices were, from agriculture's perspective, seriously incomplete. Assumptions regarding crop yields, nutrient and manure use levels, and how loads not assigned to point sources were to be distributed led to enormous concerns.

EPA was attempting to bring considerable sophistication and expertise to the challenge of modeling the hydrology and all of the relevant activities in the entire Bay region. The Bay Model represents the product of many years of work by qualified people. However, the model is unprecedented in its scope and complexity; it is not a single TMDL, rather a combination of 92 distinct TMDLs for different segments of the Bay. Still, the task given to the model was and remains enormously complex and largely untested in the scope of the landscape and the level of detail it purported to represent. Agriculture expressed our serious concerns with the speed of the process and the possible inaccuracy of its estimates regarding agriculture's contributions to the Bay.

Concerns about the accuracy of EPA's estimates for agriculture's baseline contributions of nutrients and sediments to the Bay translate directly into concerns about the accuracy of the reductions in loads EPA would expect of farmers and ranchers under the Bay TMDL. While they have and will be committed to reducing nutrient and sediments losses, in the case of this particular TMDL it becomes nearly impossible for farmers and ranchers to embrace the assigned reductions if they are not considered accurate. It is bad enough to be worried that you are being relegated to failure before the process even begins. Adding to these worries is the knowledge that the load reductions and practices required to achieve them are expensive, and perhaps in many instances prohibitively so. And yet the Bay

TMDL development process lacks economic analysis of the costs of what these practices will entail for agriculture or any other sector.

As if those concerns are not enough, EPA has sought to ensure that states would adopt "enforceable or otherwise binding" measures on row crop agriculture to achieve the assigned load reductions, a considerable break from the past and the Clean Water Act provisions that provide exemptions for discharges associated with agricultural stormwater – so-called agricultural non-point source discharges. Mandating practices of unknown cost and efficacy could spell disaster for many farmers and ranchers in the Chesapeake Bay, yet the very prospect confronts them in this case.

The USDA-NRCS Conservation Effects Assessment Program Report for the Bay

The ANPC welcomed the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service's (NRCS) release this past October of its draft analysis of agriculture in the Bay.[1] We hoped and still hope that it might be able to better quantify agriculture's contributions and additional efforts needed and ultimately used in conjunction with the Bay Model in the development of load reduction expectations for agriculture. This draft report is one of 12 assessments that USDA-NRCS is conducting of basins nationwide under the Conservation Effects Assessment Program (CEAP). The Bay CEAP was the second of these assessments and was issued for public comment this fall while the proposed Bay TMDL rulemaking was out for public comment.

Because it is an estimate, the Bay CEAP will not be perfect. The estimates are based on data and observations collected from 2003 to 2006 and the conditions it represents are already dated. We have reason to expect that it underestimates farmers' use of improved and advanced nitrogen management techniques and practices, and therefore overestimates the baseline loss of nitrogen from agriculture. As is the case with the Bay Model and the Bay TMDL, it lacks estimates of the practice costs that it suggests producers could adopt to lower their loadings, and it lacks estimates of the economic effects of practice adoption. As such, we also have questions about whether the additional conservation measures proposed for use on Bay cropland are practical and achievable.

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[1] Draft Assessment of the Effects of Conservation Practices on Cultivated Cropland in the Chesapeake Bay Region, USDA-NRCS, October 2010.

Despite these shortcomings, the Bay CEAP (as well as the other 11 CEAP analyses that USDA-NRCS is conducting) has many strengths. It is based on a thoroughly peer reviewed statistical and modeling process of the National Resources Inventory (NRI), one that has been in use for several decades and with which agriculture has considerable familiarity. It combines the NRI findings in the Bay with detailed survey results of farmers and farm operations in the region, allowing CEAP to be based on a statistically valid sample of farmland and farming practices in use in the Bay. The CEAP is therefore grounded in the actual conservation practices, crops and crop rotations, soil types, and other land features that directly shape how many nutrients and how much sediment leaves farm fields and makes its way into waterways that ultimately reach the Bay. For these reasons we welcomed the draft Bay CEAP results as a solid contribution to the federal effort to set goals and objectives for load reductions in the Chesapeake Bay.

Before I review the findings of the analysis the ANPC commissioned to compare some of the key results of the Bay CEAP to those in the Bay TMDL derived from the Bay Model, I would like to share a few of the findings from the Bay CEAP itself. The picture it conveys as to what farmers have achieved in the Chesapeake Bay is quite remarkable. It is a testament to the work farmers in the Bay are doing to reduce nutrient and sediment loads, and the success of the partnership of federal, state and local officials that constitutes today's conservation delivery system.

I would like to draw to your attention the following draft CEAP findings relative to agriculture's baseline (2003-2006) conservation conditions for cropland in the Bay region:

- About 88 percent of the crop acres in the Bay region are using conservation tillage, in the form of no-till or mulch till.
- 63 percent of the highly erodible cropland has structural measures for controlling water erosion, constituting 46 percent of all crop acres.
- 96 percent of the crop acres have some residue, tillage management, and/or structural practices in use.

Most crop acres have some nitrogen or phosphorus management, with significant percentages having the appropriate rate, timing or method of application in use – but most of these acres lack the consistent use of all these tools simultaneously.[2]

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[2] See pages 8 and 9 of the draft CEAP report,

The CEAP model shows that as a result of these and other conservation practices for cropped acres in the region, the amount of nutrient and sediment loss from these acres has been reduced significantly from what would be the case if farmers were not using these practices. For example, these practices have resulted in:

- Reduction in sediment loss from fields by 62 percent;
- Reduction in total nitrogen loss from fields by 30 percent and reduced nitrogen lost with surface runoff by 42 percent; and
- Reduction in total phosphorus loss from fields by 43 percent.[3]

Clearly, more can be accomplished by farmers and ranchers in the Bay region. More practices can be adopted, or those in use today can be consistently applied simultaneously. The Bay CEAP estimates what could be possible were such practices adopted on all the acres that could benefit from their use. While these estimates are not accompanied by any cost and economic analysis to indicate how truly feasible they are, they are indicative of the further contributions that agriculture could be making to water quality in the Bay. Through the adoption of further sediment controls and nutrient management practices on some two-thirds of the acres in the region, USDA estimates that the total sediment and nutrient loads actually delivered to the Chesapeake Bay from all sources could be reduced (relative to baseline conditions) as follows:

- Sediment by 7 percent;
- Nitrogen by 16 percent; and
- Phosphorus by 17 percent.

Of course, these are the draft estimates from the October version of the report. We understand that NRCS will be issuing in the near future their final Bay CEAP report. As such, the numbers above are subject to change.

A Comparison of the Draft Bay CEAP Results to those from the Draft Bay TMDL

Agriculture generally has a significant degree of comfort with the NRCS' NRI, as it has been used to report on the conservation efforts of farmers for decades. Its coupling with farmer

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[3] See page 11 of the draft CEAP report.

survey results and models to make the CEAP analysis possible is a newer effort and agriculture is just now becoming familiar with its use. Nonetheless, agriculture is given a high degree of confidence in the CEAP analysis by the fact that its foundation is the NRI's statistically valid field level observations of the actual conservation and nutrient management practices, soils and conditions in place. Its statistical validity yields confidence because it is representing what is in fact happening on the ground.

It is this physical grounding in actual, observed practices that lead the ANPC to want to compare the CEAP loading estimates to those from the Bay TMDL. The hope was that the CEAP results would allow agriculture to assess the accuracy of the Bay TMDL baseline conditions and the load allocations. The CEAP is not the only other sound source of data and information that could help federal policy makers assemble an accurate understanding of what is happening on the ground in the Bay region. State and local agencies also have good data that could be used in the effort. The CEAP information, though, is critical to reaching this goal.

In an effort to highlight the importance of using the CEAP data to inform federal decision making, the ANPC commissioned a study from LimnoTech, one of the nation's leading environmental science, engineering and modeling firms. The report, Comparison of Draft Load Estimates for Cultivated Cropland in the Chesapeake Bay Watershed, was completed on December 8, 2010, and a copy of the report was provided with this testimony.[4]

LimnoTech analyzed the available documentation (both of which were draft) and compared the two efforts, looking in particular at:

- Land use and total acreage of the Bay watershed;
- Hydrology;
- Assumptions about conservation practices;
- Model frameworks; and
- Model results.

These models were constructed, designed and used for very specific yet different purposes. Different modeling techniques are used and the data sources vary. That said, it is

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[4] The comparison of the USDA and EPA draft estimates can also be found on the ANPC website at http://www.nutrientpolicy.org/ANPC_News.html.

reasonable to expect that two models prepared by two federal agencies, estimating loads from agriculture delivered to the Bay over roughly the same period, could very well come up with comparable results – or at least the differences in their results could be explained in a straightforward way.

LimnoTech did not find comparable estimates of the loads delivered to the Bay, nor were they able to discern how to reconcile these differences. This finding, and several others, led LimnoTech to conclude that EPA should not finalize the Bay TMDL until it had reconciled these differences in the estimates. I will not detail here the differences that LimnoTech found and the questions and concerns that were raised. A comparison of the actual estimates of baseline loads to the Bay from agriculture should be sufficient to demonstrate why these concerns arose.[5]

Figure 1 below, which is drawn directly from the LimnoTech report, graphically compares the EPA (Bay TMDL) and USDA (Bay CEAP) estimates of the baseline delivered loads to the Chesapeake Bay from agriculture as well as all other sources. Looking at the largest difference (on a percentage basis) in estimated loadings from agriculture, those for sediments, EPA's estimate is almost three times the size of the USDA estimate. The Bay TMDL baseline assigns about 65 percent of all sediments reaching the Bay to agricultural sources, while USDA assigns only 14 percent of the total. These are enormous differences and give many in agriculture cause for serious concerns.

[5] These are the results of the analysis of two draft documents – the proposed TMDL rulemaking, and the draft Bay CEAP report. These numbers will certainly change once the final Bay CEAP findings are compared to the final Bay TMDL.

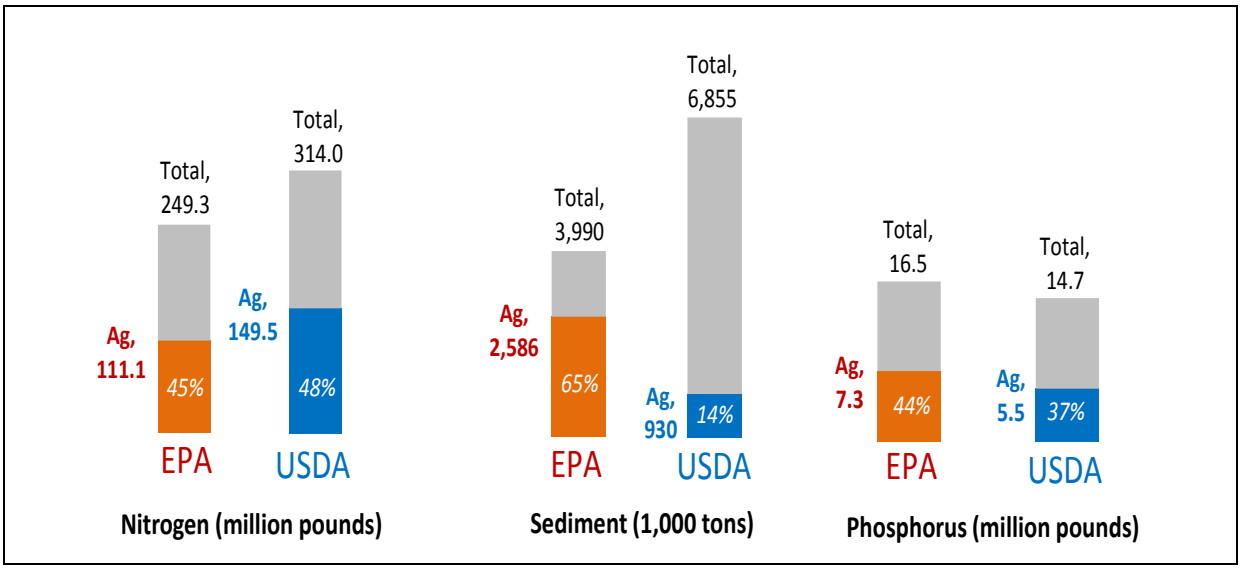

Figure 1—Differences in estimates of baseline delivered loads to the Chesapeake Bay from agriculture and all sources.

Turning to the estimates for nitrogen with the next lower differences, USDA's agricultural load estimates are about 25 percent higher than EPA's estimates. Although the differences between EPA's and USDA's estimates of phosphorus loads are smaller, it is still very large. USDA's loads are 25 percent lower than EPA's estimates, amounting to some 1.8 million pounds per year. This is a sizable amount, given that EPA is holding states accountable for every single estimated pound that must be reduced.[6]

Absent full access to EPA and CEAP model inputs, LimnoTech was unable to fully explain these differences in baseline estimates, although there are some good, educated guesses that could be made. First, there are significant differences in the amount of land designated as agricultural. USDA's estimate for the amount of crop and pasture land in the Bay region is more than 3 million acres greater than EPA.

Second, the draft Bay TMDL assumed only 50 percent of the crop acres in the Bay region were farmed under conservation tillage, while the draft Bay CEAP used the NRI estimate of 88 percent, with another 8 percent or so that had structural erosion control measures. Having more acres under conventional tillage would certainly translate into estimates of

[6] For example, 14 hours before the WIPs were due, EPA reported to Virginia that they needed to find an additional one million pounds of nitrogen.

greater sediment loss under the Bay TMDL baseline than you would from the Bay CEAP. Yet important as this is, it seems unlikely it would explain almost a threefold difference in sediment loads.

The ANPC has no explanation at this point for the 25 percent difference in the nitrogen baseline load estimates for agriculture. We understand that this difference was far smaller for EPA's 2005 estimate of nitrogen loads compared to Bay CEAP's – not an explanation. It just raises further questions. In the case of phosphorus, sizable differences in sediment load estimates would certainly lead to differences in phosphorus load estimates. This is because most phosphorus is lost due to erosion, where the phosphorus bonds tightly with a soil particle and goes wherever that particle goes. What to make of the varying magnitude in percent differences between the sediment estimates and those for phosphorus is still unclear.

Figure 2 below is a graphical representation of LimnoTech's assessment of the comparability of the two baseline agricultural load estimates and the possible load reductions estimated by the Bay CEAP. Four estimates are depicted for loads of nitrogen, sediment and phosphorus. The first of the estimates is EPA's baseline number. The next is the USDA baseline number. These are the same values depicted for agriculture in Figure 1. The next two bars depict the USDA (Bay CEAP) estimates of the loads that would result if additional acres were to receive more intensive conservation treatments (an additional 2 million acres and an additional 3.5 million). The horizontal redline that accompanies the estimates for nitrogen, sediment and phosphorus depicts the allowable level of loads for each pollutant EPA assigned to agriculture in the draft TMDL.

Figure 2 indicates that as more acres receive intensive treatment, the estimated loadings of sediments and phosphorus are below the TMDL allocation. Interestingly, USDA's baseline loads of sediment and phosphorus start out below the TMDL allocation. The pattern is different in the case of nitrogen, where USDA's baseline load is greater than that for EPA's, and the intensively treated acre scenarios do not yield loads below the TMDL allocation. Perhaps this is due to the fact that EPA's TMDL scenarios assume that approximately 600,000 acres leave crop production, about 20 percent of the crop acres in the region. USDA has no comparable acres change. We simply do not know the reason for these differences.

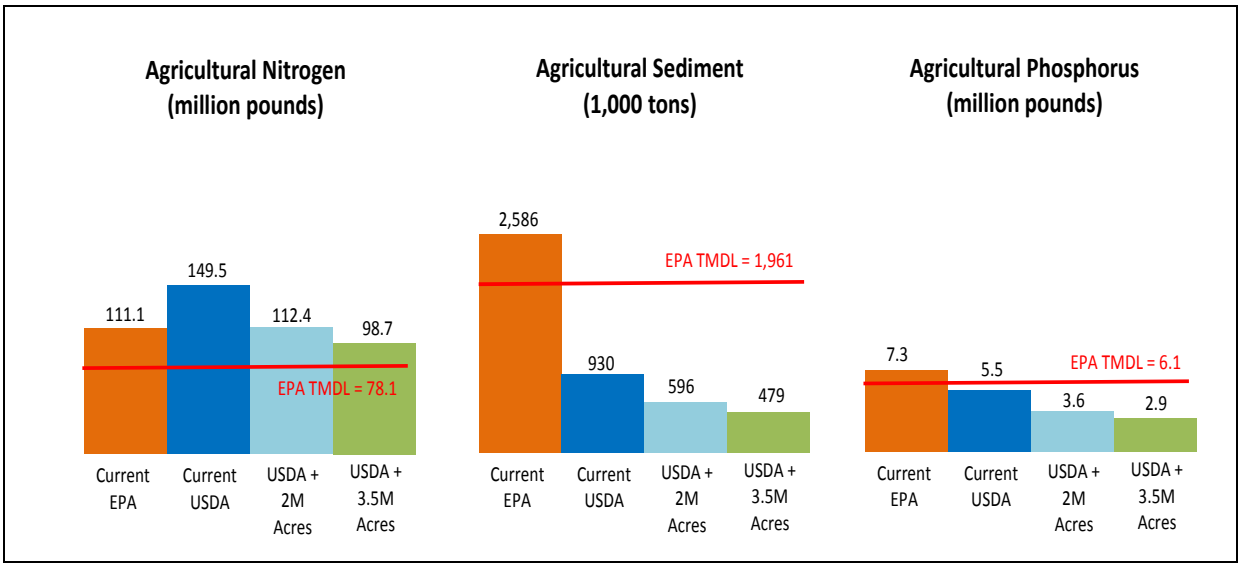

Figure 2—USDA estimates of delivered loads under baseline and 2 treatment scenarios, compared to EPA's Draft TMDL baseline loads and TMDL load allocations.

Conclusion

Taken at face value, it appears that in terms of sediment and phosphorus, agriculture has already met its TMDL obligations. And in the case of nitrogen it might appear that somehow EPA's nitrogen load under the TMDL is unachievable for agriculture. Such conclusions, while feasible, are probably premature to draw at this point.

The most reasonable conclusions to draw from the differences depicted in Figures 1 and 2, along with the several others LimnoTech investigated, is that something important and seriously confounding is creating these differences. USDA and EPA should work together to find out what this is and reconcile their work. If possible, they should include agriculture and other stakeholders fully in that process, and as appropriate find ways to incorporate other useful datasets and sources of information that can improve the outcomes. The goal would be two-fold. First, to understand how the two models operate, reconcile their differences in a way that makes sense, and arrive at sound TMDL load reductions. The second would be for these reductions to be accepted by agriculture and the general public as accurate, fair, trustworthy and capable of making a lasting contribution to improving the health of the Chesapeake Bay.

Thank you.

Committee on Agriculture
U.S. House of Representatives
Information Required From Nongovernmental Witnesses

House rules require nongovernmental witnesses to provide their resume or biographical sketch prior to testifying. If you do not have a resume or biographical sketch available, please complete this form.

1. Name: Tom Hebert

2. Organization you represent:
   The Agricultural Nutrients Policy Council

3. Please list any occupational, employment, or work-related experience you have which add to your qualification to provide testimony before the Committee:
   I have worked in the private sector on agricultural and environment issues since 1998. I served as USDA Deputy Under Secretary for Natural Resources from 1993 to 1998. I was the Senior Economist for the Senate Committee on Agriculture from 1989 to 1993. I served as Staff Economist at USDA in 1988 and as an Agricultural Budget Examiner at the Office of Management and Budget in 1987. I hold an undergraduate degree in horticulture and a Master's of Science degree in agricultural economics, both from Michigan State University.

4. Please list any special training, education, or professional experience you have which add to your qualifications to provide testimony before the Committee:
   My training in graduate school included a primary emphasis on public policy. My area of emphasis during my 24 year career in Washington DC has been on agriculture and the environment, with particular emphasis on the intersection between economics, science and public policy.

5. If you are appearing on behalf of an organization, please list the capacity in which you are representing that organization, including any offices or elected positions you hold:
   I am Senior Advisor to the Agricultural Nutrients Policy Council.

PLEASE ATTACH THIS FORM OR YOUR BIOGRAPHY TO EACH COPY OF TESTIMONY.

Committee on Agriculture
U.S. House of Representatives
Required Witness Disclosure Form

House Rules* require nongovernmental witnesses to disclose the amount and source of Federal grants received since October 1, 2008.

Name: **Tom Hebert**

Organization you represent (if any): The Agricultural Nutrients Policy Council.

1. Please list any federal grants or contracts (including subgrants and subcontracts) you have received since October 1, 2008, as well as the source and the amount of each grant or contract. House Rules do NOT require disclosure of federal payments to individuals, such as Social Security or Medicare benefits, farm program payments, or assistance to agricultural producers:

Source: None **Amount: NA**

2. If you are appearing on behalf of an organization, please list any federal grants or contracts (including subgrants and subcontracts) the organization has received since October 1, 2008, as well as the source and the amount of each grant or contract:

Source: None **Amount: NA**

Please check here if this form is NOT applicable to you: _____

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