Atmospheric Deposition to Farmington Bay – FAQ

What is atmospheric deposition?

Atmospheric deposition (AD) is the process where nutrients—such as nitrogen (N) and phosphorus (P)—are transported from the atmosphere to water bodies. In lakes and bays, this occurs through precipitation (rain or snow) but also includes dust and airborne particles settling out of the air onto the water surface.

Why does it matter?

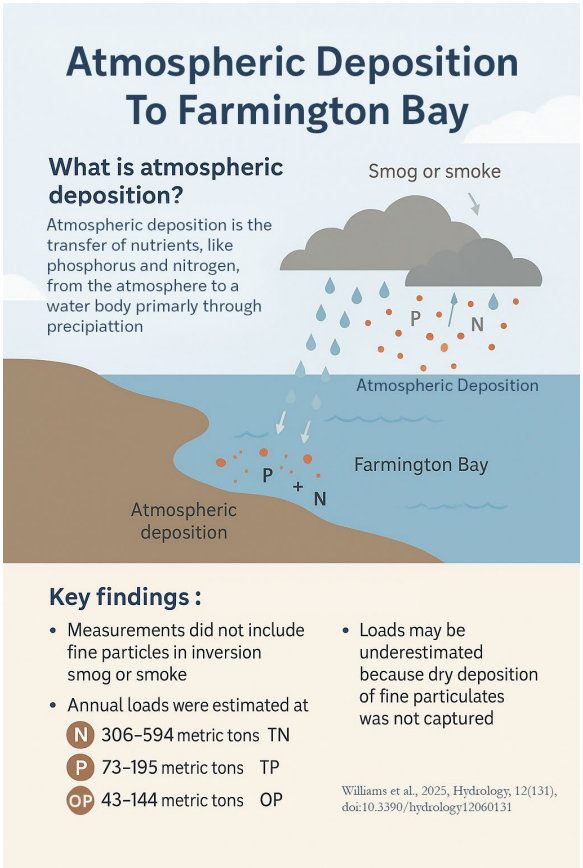
Atmospheric deposition can supply nutrients that fuel eutrophication, leading to harmful algal blooms (HABs), oxygen depletion, and declines in water quality. Understanding and quantifying AD is vital for managing nutrient loads and protecting the ecosystem.

How was AD measured in Farmington Bay?

Researchers measured precipitation-related AD between 2021 and 2024:

- Collected rain/snow samples after storms at seven monitoring sites
- Analyzed concentrations of total nitrogen (TN), total phosphorus (TP), and orthophosphate (OP)
- Used local precipitation data to compute total deposition loads.

⚠️ Note: The method excluded fine airborne particles (e.g., inversion smog, smoke) deposited without precipitation, meaning some loads were not included.



What were the estimated nutrient loads?

Average annual loads from precipitation-related AD (2021–2024):

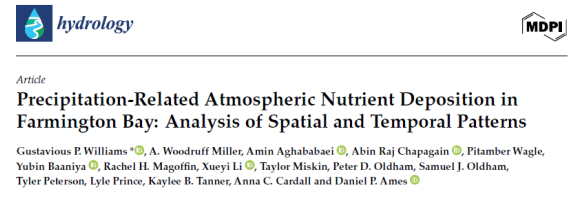
- 🟦 Total Nitrogen (TN): 306–594 metric tons/year
- 🟧 Total Phosphorus (TP): 73–195 metric tons/year
- 🟪 Orthophosphate (OP): 43–144 metric tons/year

These numbers may be underestimates—other methods suggest actual loads could be 2–3 times higher due to dry and fine particulate deposition not being included.

Why is this important for management?

Including atmospheric deposition in nutrient budgets:

- Helps quantify all nutrient sources
- Improves accuracy of watershed models
- Helps prioritize nutrient mitigation efforts
- Informs policies for controlling HABs and eutrophication
- Recognizes airborne pollution as a relevant nutrient source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Precipitation-Related Atmospheric Nutrient Deposition in Farmington Bay: Analysis of Spatial and Temporal Patterns

Gustavious P. Williams *, A. Woodruff Miller, Amin Aghababaei, Abin Raj Chapagain, Pitamber Wagle, Yubin Baaniya, Rachel H. Magoffin, Xueyi Li, Taylor Miskin, Peter D. Oldham, Samuel J. Oldham, Tyler Peterson, Lyle Prince, Kaylee B. Tanner, Anna C. Cardall and Daniel P. Ames

📘 For more details, see: Williams et al., 2025, *Hydrology*, 12(131), doi:10.3390/hydrology12060131