



Wastewater
Treatment



TRANSFORMING
WASTEWATER
TO RESOURCES



Recycled
Water



Energy
Production



Biosolids
Reuse

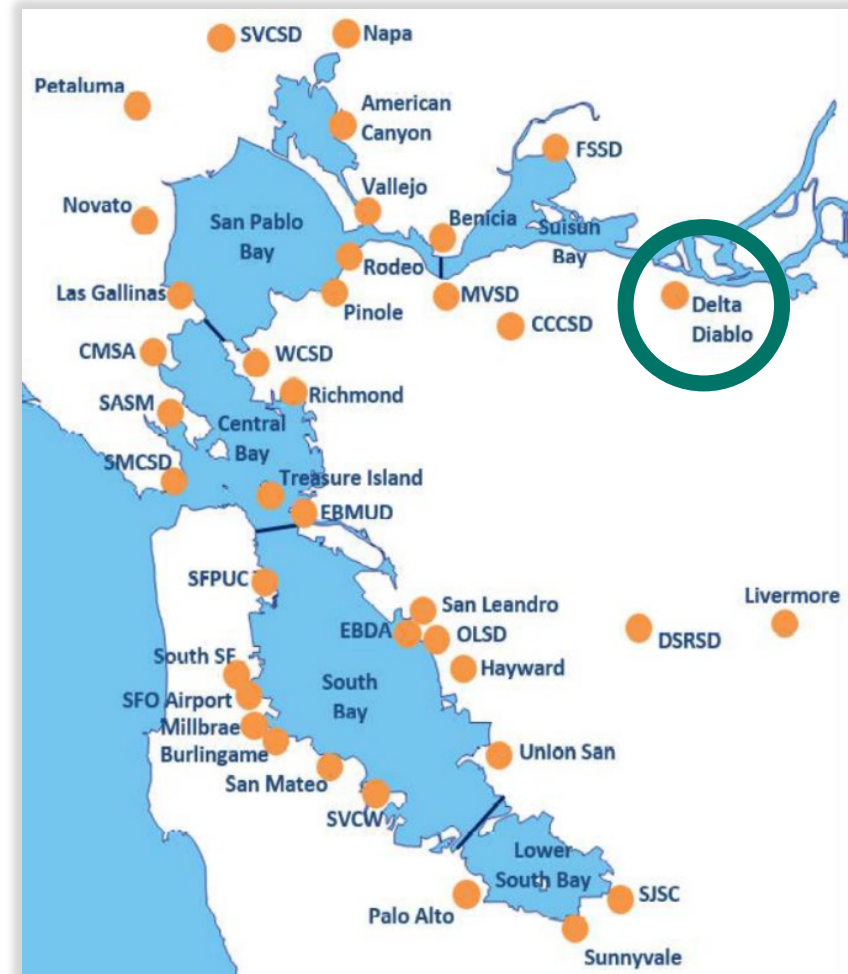
Nutrient Management in SF Bay and Emerging Regulations

Board of Directors Meeting
July 12, 2023

Background

Nutrient Loading to SF Bay

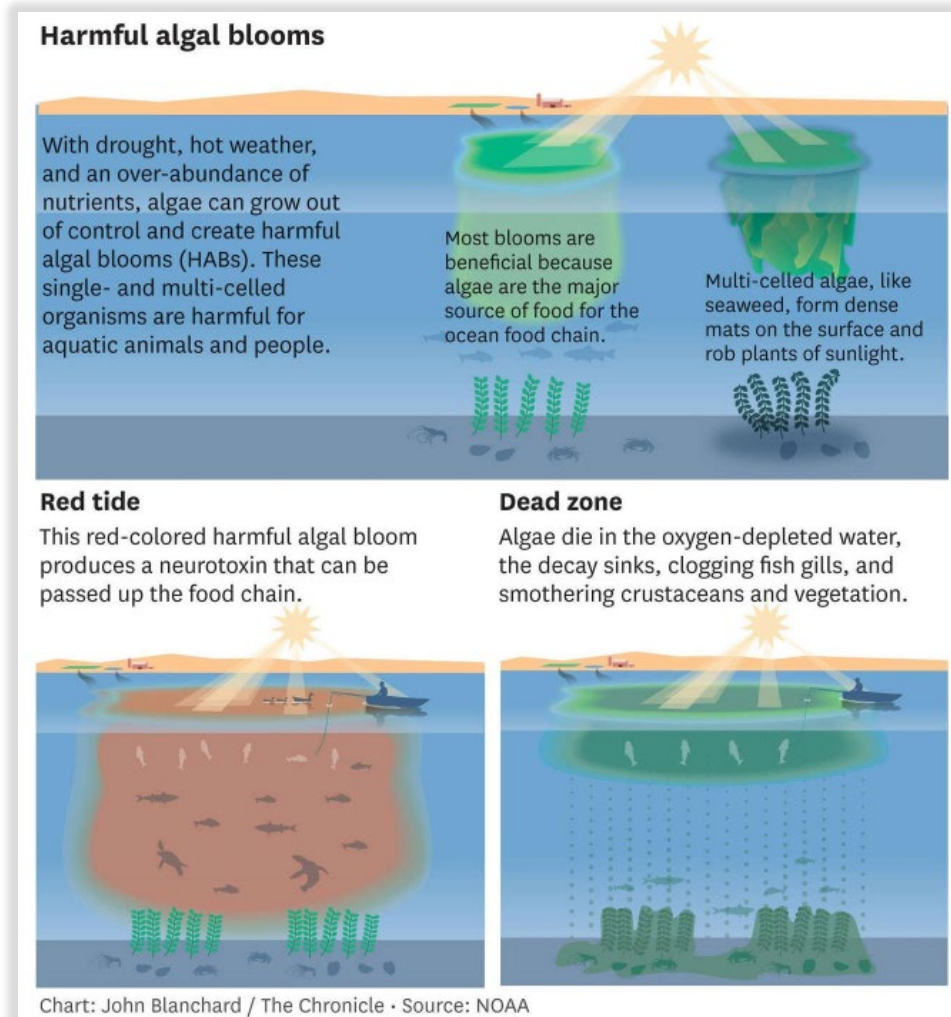
- Most NPDES permits for **37 WWTPs** in SF Bay Area are **not required to remove “nutrients”—nitrogen (e.g., ammonia)** and phosphorus
- WWTPs discharge ~65% of nutrient loading to SF Bay (**District = 1.3% of total**)
- In many areas across the world, nutrients cause negative water quality impacts
- **Resiliency** of SF Bay to nutrients **is changing**



Background

Potential Impacts to Water Quality

- High nutrient levels may cause **excessive algae** (phytoplankton) growth
- Sustained events may cause **low dissolved oxygen** “eutrophication” and **harmful algal blooms** from neurotoxins produced by certain species
 - Fish mortality; impacts to aquatic life, humans, pets



Background

Historical Resiliency of SF Bay

- **High turbidity** blocks sunlight and limits algae growth
- **Strong tidal mixing** dilutes nutrient levels
- Presence of **filter-feeding clams** on bottom of SF Bay reduces algae concentrations
- SF Bay is a dynamic, complex water body with multiple factors influencing water quality conditions



Declining turbidity and **smaller clam populations** are reducing ability to assimilate nutrient loading without water quality impacts

Regional Approach to Future Nutrient Removal Requirements

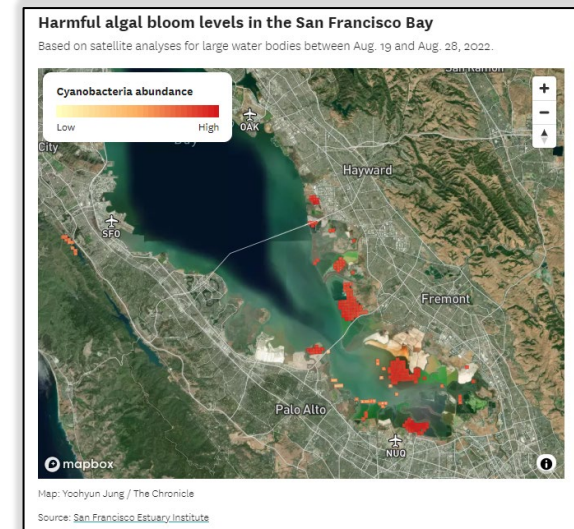
- As BACWA member, District has been working with regulators, scientific community, and NGOs to ensure **collaborative, sound science-based** approach
- **BACWA has funded >\$16M** in scientific monitoring, modeling, and special studies under multiple 5-year term “Watershed Permits”
- **Key Issue:** Upgrading 37 WWTPs could cost **\$10B-15B (\$150M-200M+ at District)** to achieve **60-80%** removal



To date, collaborative approach has worked well without nutrient removal requirements—**until a game-changing event**

Game-Changing Event (Jul-Sep 2022) Major Algal Blooms in SF Bay

- Fish mortality, toxicity, and low dissolved oxygen conditions occurred from late July to early-September 2022
- **Intensified regulatory, public focus** on reducing WWTP nutrient discharges
- BACWA is currently negotiating key 2024-2029 Watershed Permit requirements with Regional Board
 - **Significant shift in regulatory pressure** compared to pre-algal bloom period
 - Coalescing a package of current, upcoming, and future nutrient removal projects at WWTPs to **demonstrate voluntary actions** (~35-45% reduction over 10 years)



The Regulatory Challenge Adapting to This New Environment



- Aggressive Regional Board Position
 - ① Implement **interim SF Bay-wide and individual WWTP effluent limits** to be met immediately
 - Both interim limits are anticipated to be **achievable** based on current data
 - WWTPs would be in **violation only if both limits are exceeded**
 - ② Implement **aggressive long-term SF Bay-wide limits** based on current scientific information with **10-year compliance schedule**
 - ③ Consider opportunities to **update all limits and compliance schedule during future negotiations** for watershed permits based on updated scientific information and water quality conditions in SF Bay

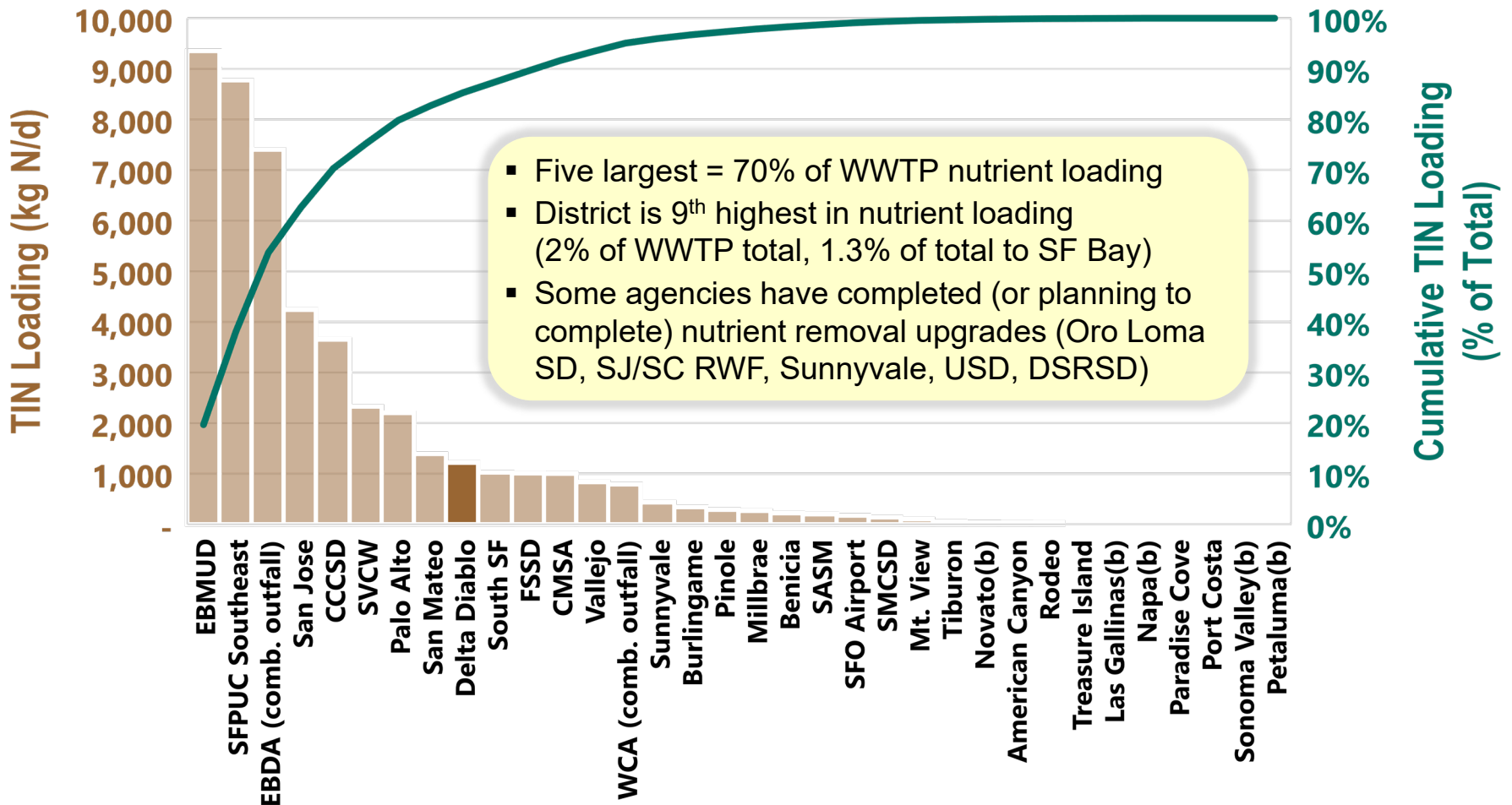
This is key as it could result in Regional Board **resetting 10-year compliance schedule** every five years—not the case if algal blooms persist



Our vision is to reduce nutrients substantially on a regional basis while implementing projects that maximize benefits and balance competing priorities

Benefit of Early Actions Nutrient Loading by WWTP

Cumulative Contribution of TIN Loading (Based on 2013-2022 Averages)



Meeting the Challenge

District Nutrient Management Plans



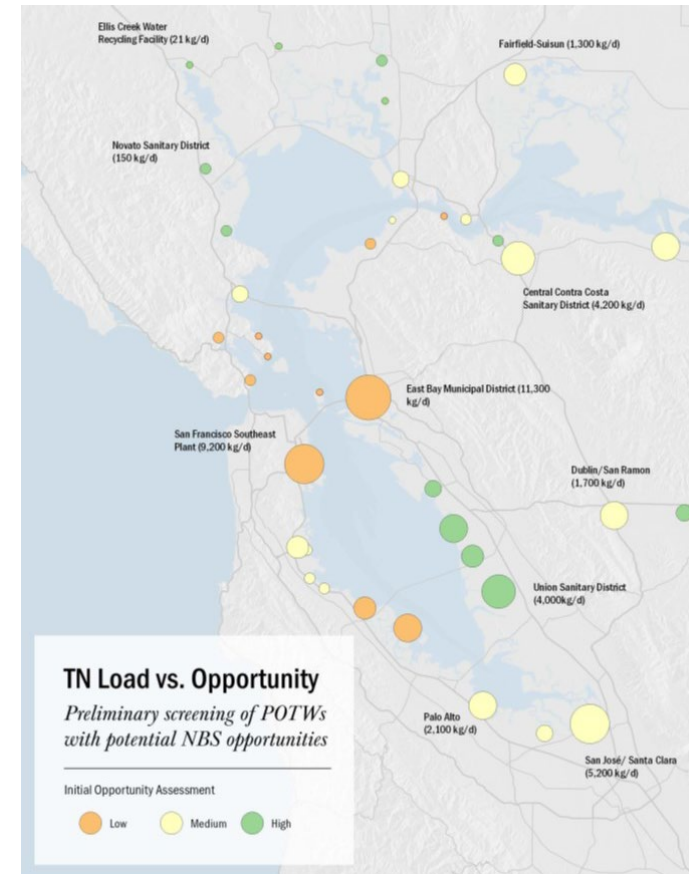
- District informed BACWA of plans to **achieve 10-15% removal** in near term (may be significantly higher at 30-35%)
- Recently completed a master plan that highlights long-term **Nutrient Removal Roadmap** for District's WWTP
- Currently in planning phase for **\$60M+ Secondary Process Improvements Project**
 - Originally conceived to replace aging tower trickling filters with new aeration basins, address growth—**no nutrient removal**
 - Key Change: Evaluate options for **partial nutrient removal** via mainstream biological (and/or sidestream) treatment
 - Well positioned with ~\$20M in Advanced Treatment Fund for incremental nutrient removal WWTP upgrade costs



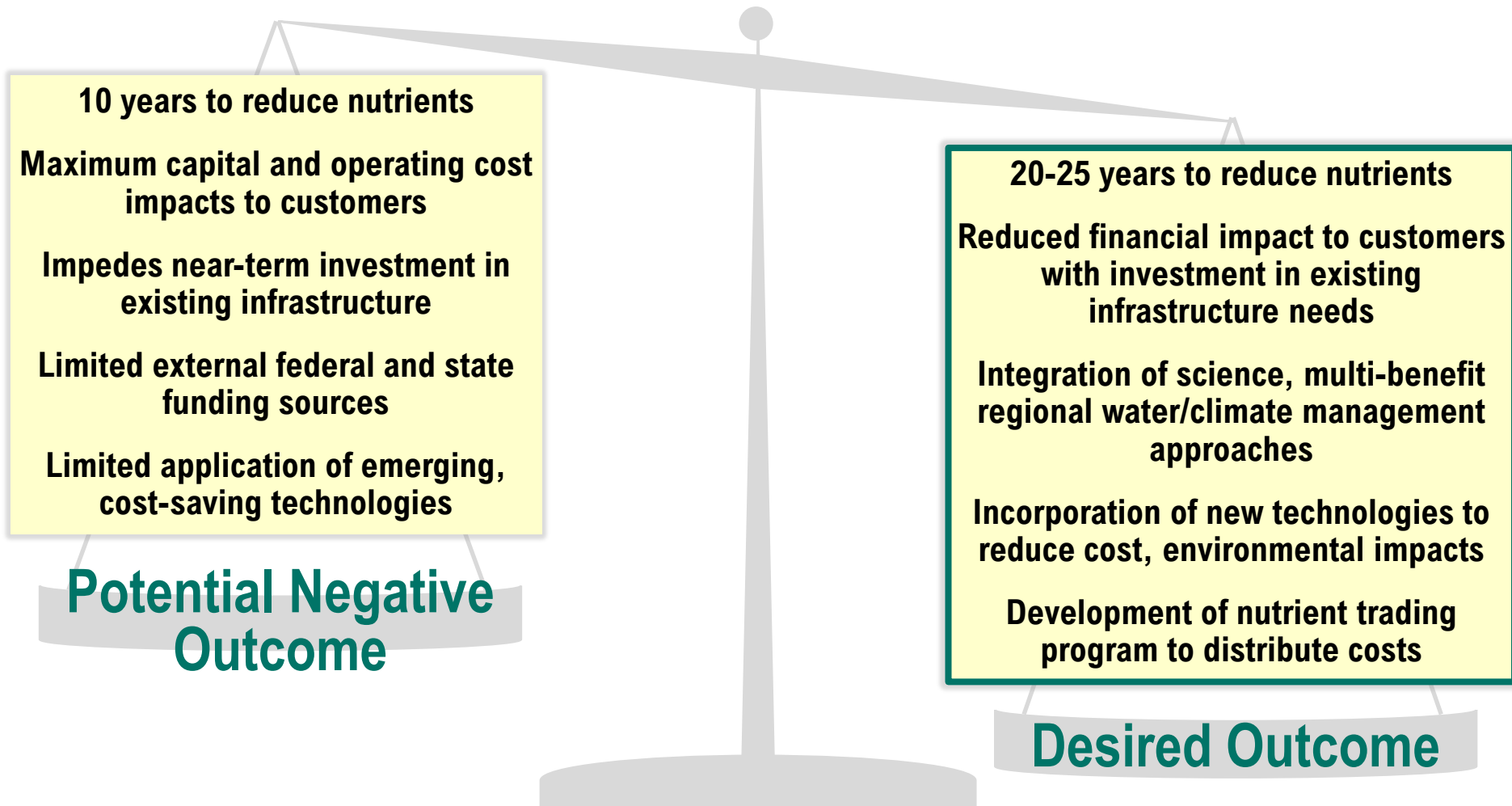
Meeting the Challenge (cont'd)

District Nutrient Management Plans

- Participating in study evaluating WWTP sites that may support “**nature-based solutions**” to achieve partial nutrient removal (e.g., **use of wetlands areas**)
 - District is “medium” potential site
- Reducing nutrient via **recycled water production** for irrigation purposes (only 5-7% of total use)
- Supporting development of complex **Nutrient Trading Program**
 - Purchase nutrient credits from other WWTPs instead of directly removing nutrients at District



Ensuring a Strategic Regional Approach to Nutrient Reduction





Wastewater Treatment



TRANSFORMING
WASTEWATER
TO RESOURCES



Recycled Water



Energy Production



Biosolids Reuse



MISSION

Delta Diablo protects **public health and the environment** for our communities by **safely providing exceptional wastewater conveyance, treatment, and resource recovery services** in a **sustainable and fiscally-responsible** manner

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