

Nutrient Loadings from NEORSD WWTPs and CSOs

Loading from Landscapes and Coastal
Margin Effects Workshop

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NEORS D Treatment Plants

- EASTERLY WWTP
 - Average 100 MGD Flow
 - Discharges to Lake Erie
- WESTERLY WWTP
 - Average 28 MGD Flow
 - Discharges to Lake Erie
- SOUTHERLY WWTC
 - Average 123 MGD Flow
 - Discharges to Cuyahoga River





Typical POTW Processes

PRELIMINARY

- BAR SCREENS & GRIT CHANNELS

PRIMARY

- SEDIMENTATION *w/ & w/o chemical addition*

SECONDARY – AEROBIC PROCESSES

- BOD and TSS Removal
 - ACTIVATED SLUDGE, TRICKLING FILTERS
- SEDIMENTATION *w/ & w/o chemical addition*

DISINFECTION

- CHLORINATION / DECHLORINATION



Nutrients at WWTPs

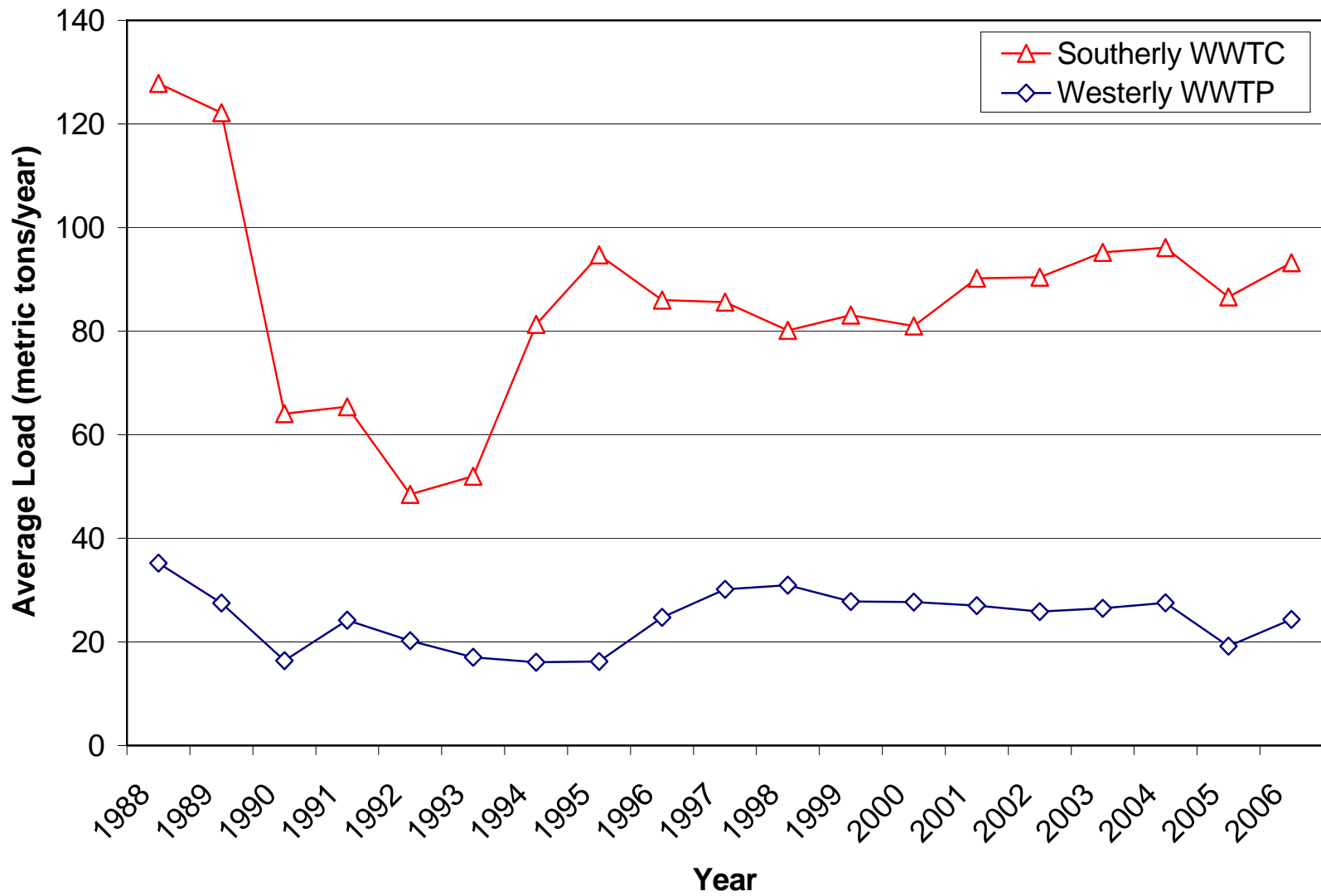
- EASTERLY WWTP
 - Addition of ferric chloride prior to primary sedimentation
- WESTERLY WWTP
 - Addition of ferric chloride prior to secondary sedimentation
- SOUTHERLY WWTC
 - Addition of ferric chloride prior to primary sedimentation
 - Second stage aeration for nitrification of ammonia



Sources of Phosphorus in Wastewater

- Fecal and waste materials
- Industrial and commercial uses
- Drinking water- orthophosphates
- Detergents
- Runoff

NEORSD Average Effluent Total Phosphorus Loading





Phosphorus Loading from NEORSD WWTPs

NEORSD WWTPs TP Load	175 metric tons/yr
Ohio Lake Erie WWTPs TP Load	641 metric tons/yr
Lake Erie External TP Load	8968 metric tons/yr
NEORSD WWTPs DRP Load	140 metric tons/yr
Ohio Lake Erie WWTPs DRP Load	513 metric tons/yr
Lake Erie PS and NPS DRP Load	2396 metric tons/yr



Estimated Dissolved Reactive Phosphorus Loading to Southerly WWTC from Drinking Water

Average DRP concentration in tap water	0.34 mg/L
Total influent DRP load	129 metric tons/yr
Influent DRP load from tap water	37 metric tons/yr
% influent DRP load from tap water	29%
Total effluent DRP load	73 metric tons/yr



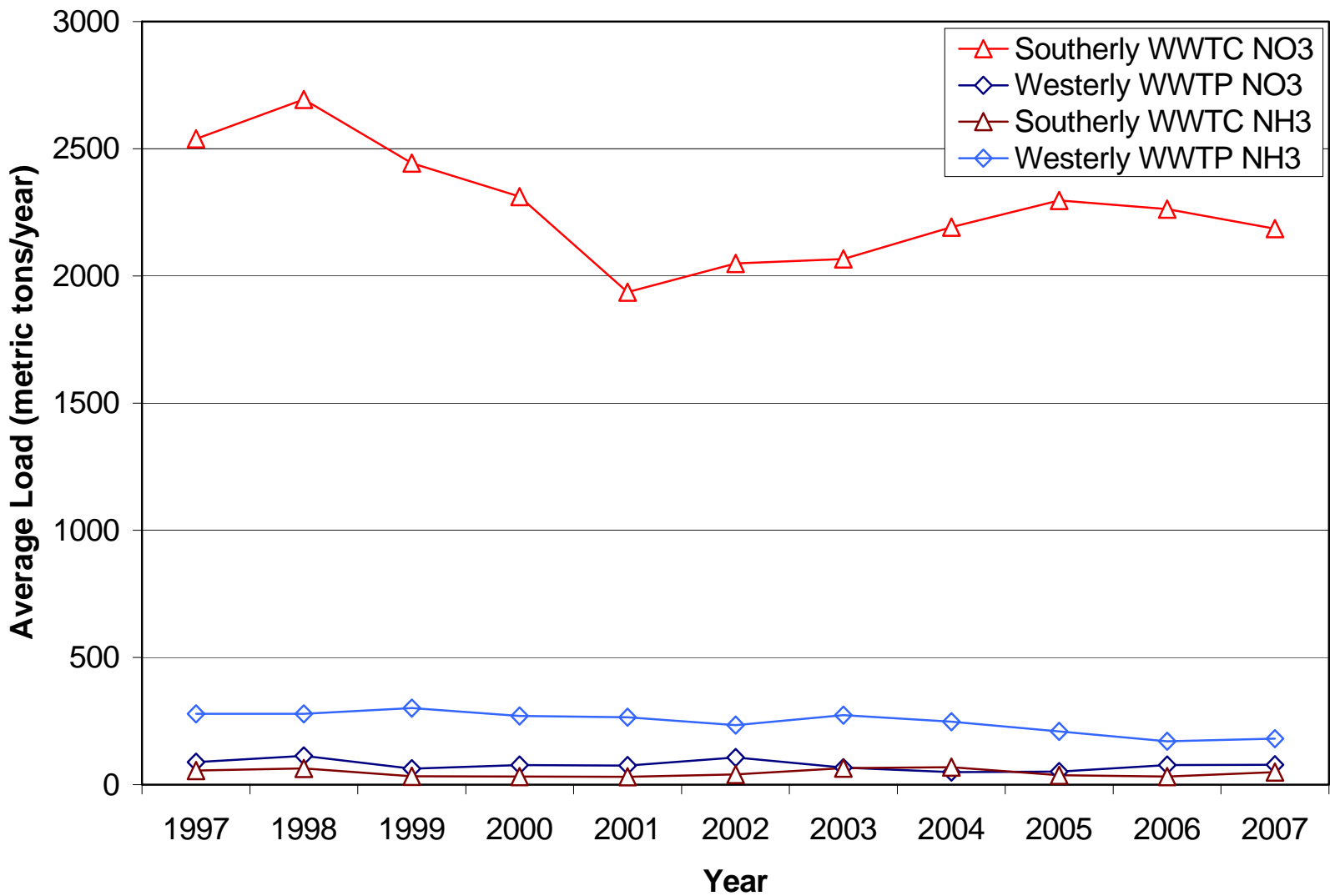
Estimated Phosphorus Loading to Southerly WWTC from Dishwasher Detergent

Estimated % households w/dishwashers	50%
Estimated P load from dishwashers	61 metric tons/yr
Influent TP Load	465 metric tons/yr
% influent TP load from dishwashers	13%

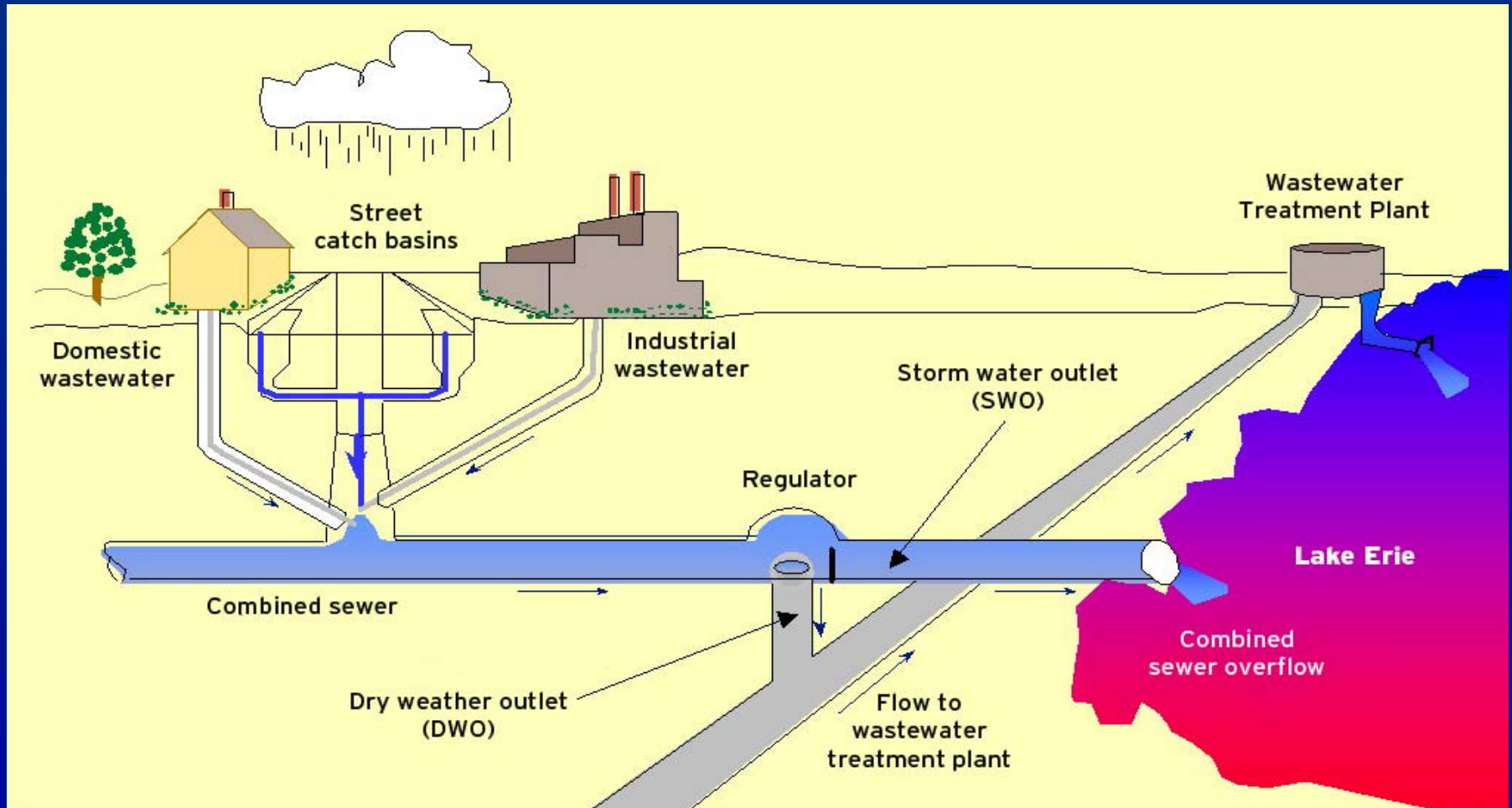
Sources of Nitrogen in Wastewater

- Fecal and waste materials
- Industrial Uses
- Runoff

NEORSD Average Effluent Nitrate and Ammonia Loading



What is a CSO?





NEORSD CSOs

	2007	After LTCP
Number of Overflows/Yr	2957	194
Volume (million gallons/yr)	4949	775
Total P Load (metric tons/yr)	41.0	6.4
% of external TP load to Lake Erie	0.5	0.1
Ortho-P Load (metric tons/yr)	8.0	1.3
% of total DRP load to Lake Erie	0.3	0.1
NH ₃ Load (metric tons/yr)	92.1	14.4

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