

# Improvement of Water Quality in Tokyo Bay

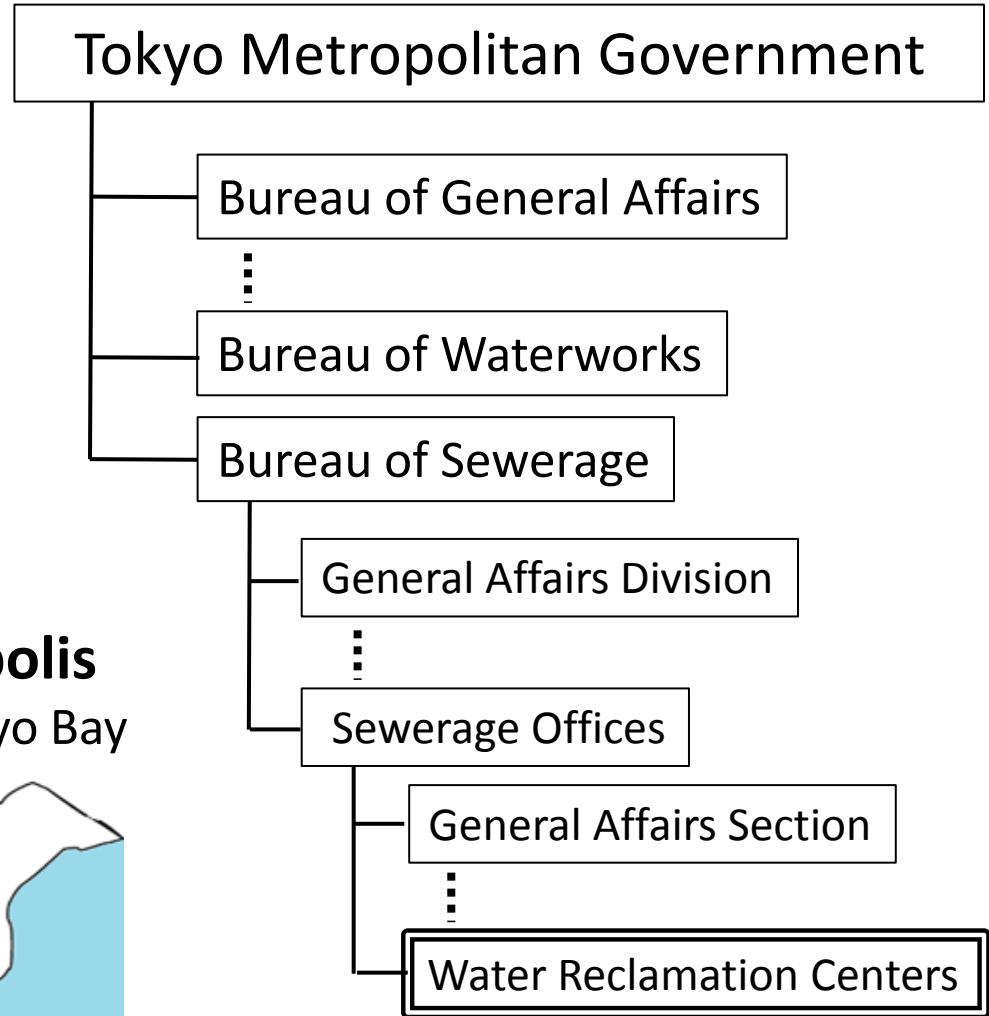
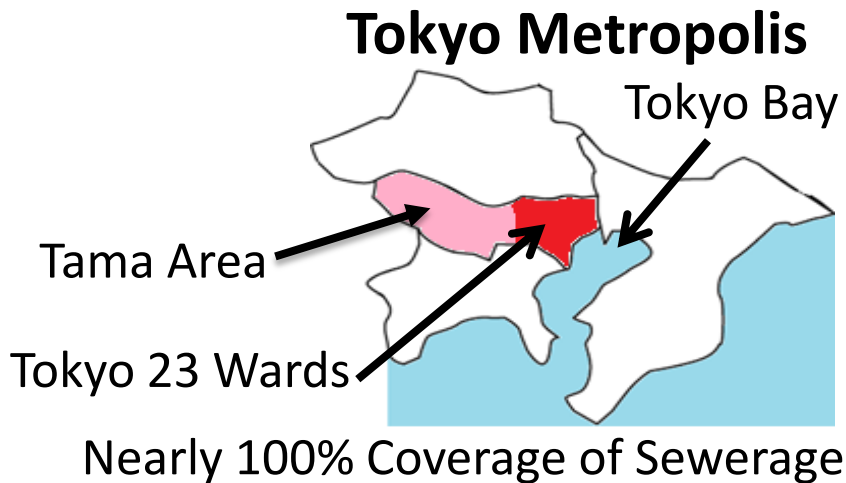
Kiyoaki Kitamura

2<sup>nd</sup> East Sewerage Office

Bureau of Sewerage

Tokyo Metropolitan Government

# Organization of Tokyo Metropolitan Government



# Removal of Nitrogen and Phosphorus for Comfortable Water Environment of Tokyo Bay

## Water Pollution of Tokyo Bay



Red Tide



Blue Tide

<http://www1.kaiho.mlit.go.jp/>

Discharge of Nitrogen and Phosphorus (NP) into Closed Water Body



Eutrophication



Explosive Growth of Plankton in Summer



Red Tide



Lack of Dissolved Oxygen



Production of Elemental Sulfur

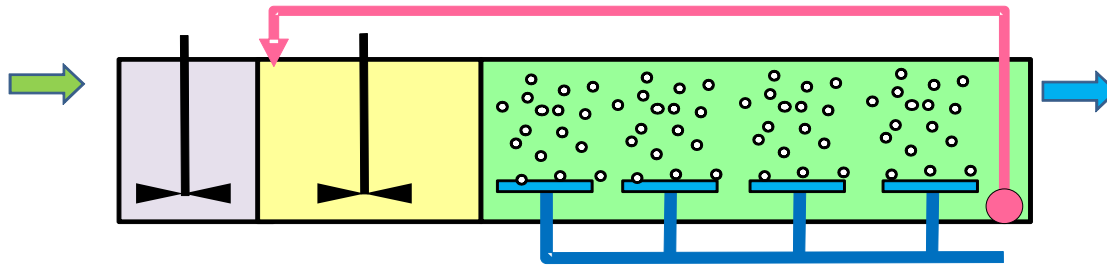


Blue Tide

# Obstacles in Reducing NP in Treated Wastewater

Low Ratio of Implementation of Advanced Treatment Method

(approx. 15% since 1996)



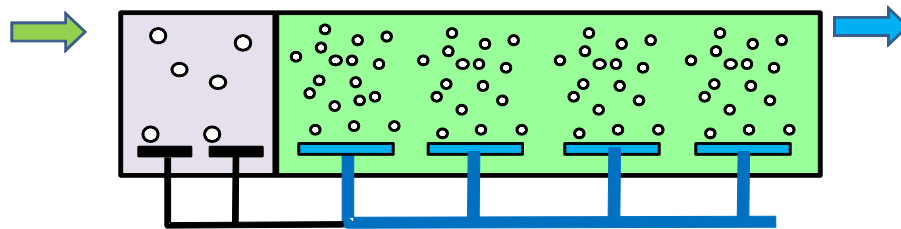
Example of Advanced Treatment Method (A2O Method)

	CAS	A2O	
Nitrogen in Treated Wastewater	100	65	✓ Excellent Water Quality
Hydraulic Retention Time (HRT)	100	159	× Wider Space
Energy Consumption	100	130	× More Energy Consumption

# Key Strategies to Reduce NP

## Management both of Water Quality and Energy Consumption

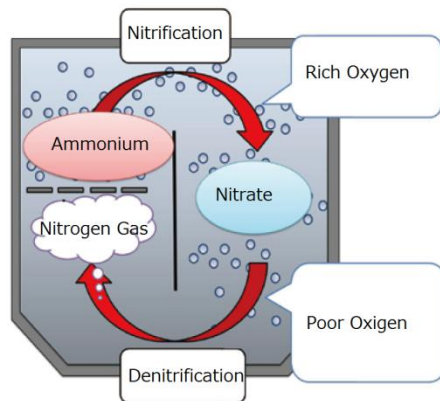
Semi-Advanced Treatment Method



- ✓ Good Water Quality
- ✓ Same Space
- ✓ Same Energy Consumption

## Development of Novel Technology

Simultaneous Nitrification Denitrification



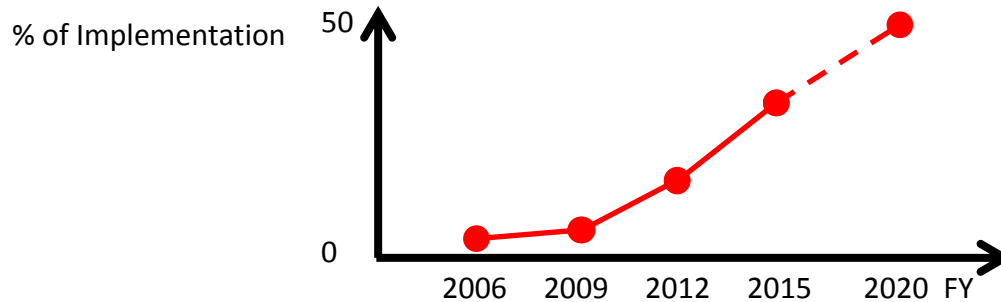
- ✓ Excellent Water Quality
- ✓ Same Space
- ✓ Same Energy Consumption

## Partnership with other Local Governments

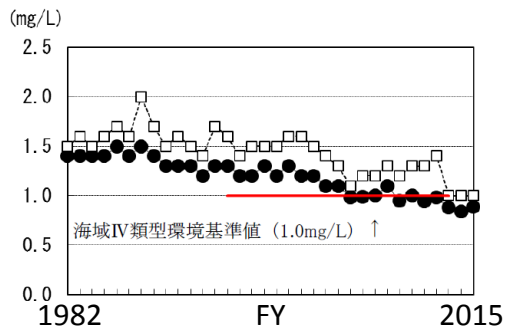
Meeting for NP Removal by Sharing Knowledge

# Current Situation

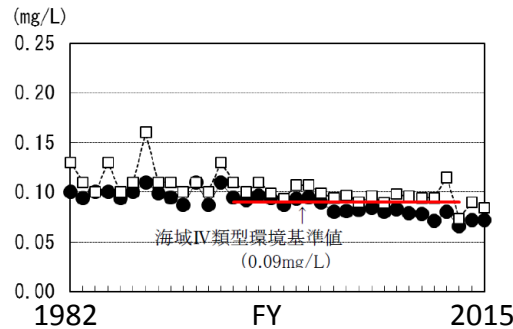
## Steady Growth of Implementing Advanced Treatment Method



## Gradual Improvement of NP in Tokyo Bay

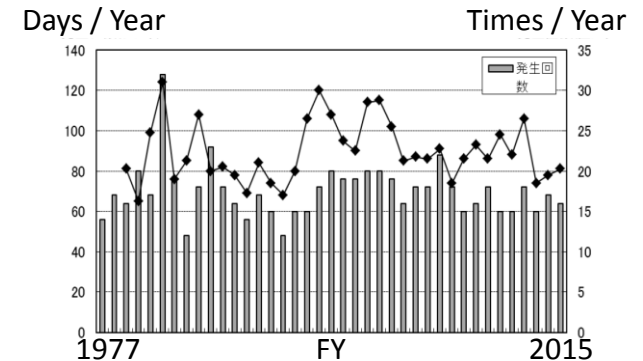


N Concentration



P Concentration

## No Improvement of Red Tide



<http://www.kankyo.metro.tokyo.jp/water/>

Simulation shows the effect of advanced treatment method will appear 20 years after.

# Lessons and Implications

## Importance of Ingenuity and Novel Technology

- Breakthrough to Overcome the Obstacles
- Flexibility of Introducing Better Tools

## Necessity of Continuous Effort

- Effect after Long Term Effort
- Understanding of Citizen by Enhancing PR



Thank you!

