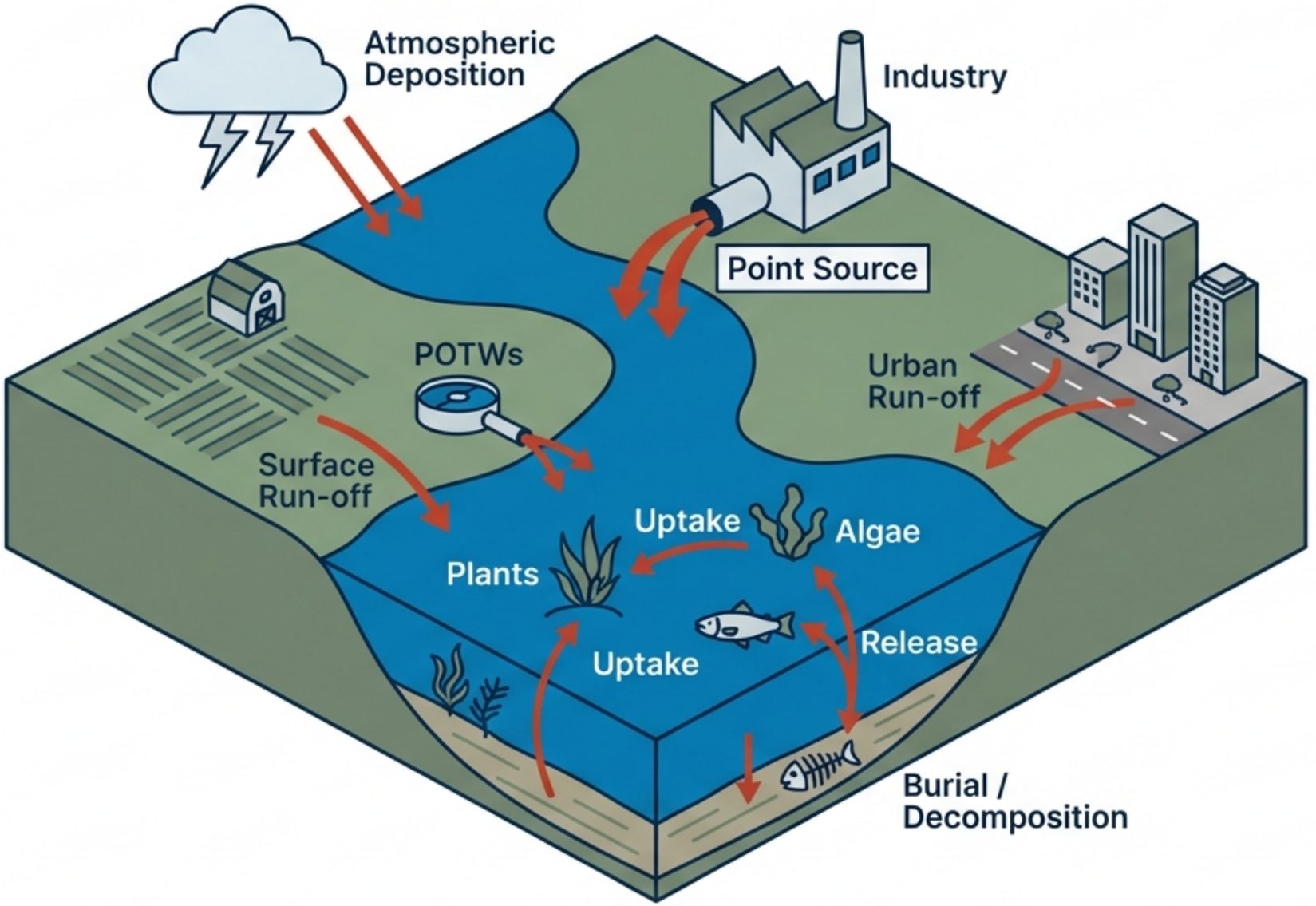
Water Quality in New Jersey: Standards, Classifications, and Challenges

An Overview of N.J.A.C. 7:9B and Pollutant Dynamics

New Jersey Surface Water Quality Standards (SWQS) Analysis

The Water Environment and Sources of Pollution



The New Jersey Context: Density Meets Hydrography

Natural Wealth: Extensive river systems, lakes, reservoirs, and estuaries.

Human Pressure: The most densely populated state in the US, situated between NYC and Philadelphia.

The Result: High concentration of population and industry creates unique pollution risks.

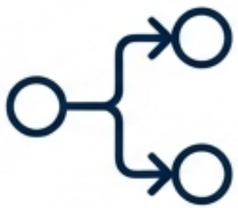
The Regulatory Framework: N.J.A.C. 7:9B

Mission: Protecting, Maintaining, and Restoring New Jersey Surface Waters

Surface Water Quality Standards (SWQS)

Policies

General technical and anti-degradation policies, including nutrient handling and mixing zones



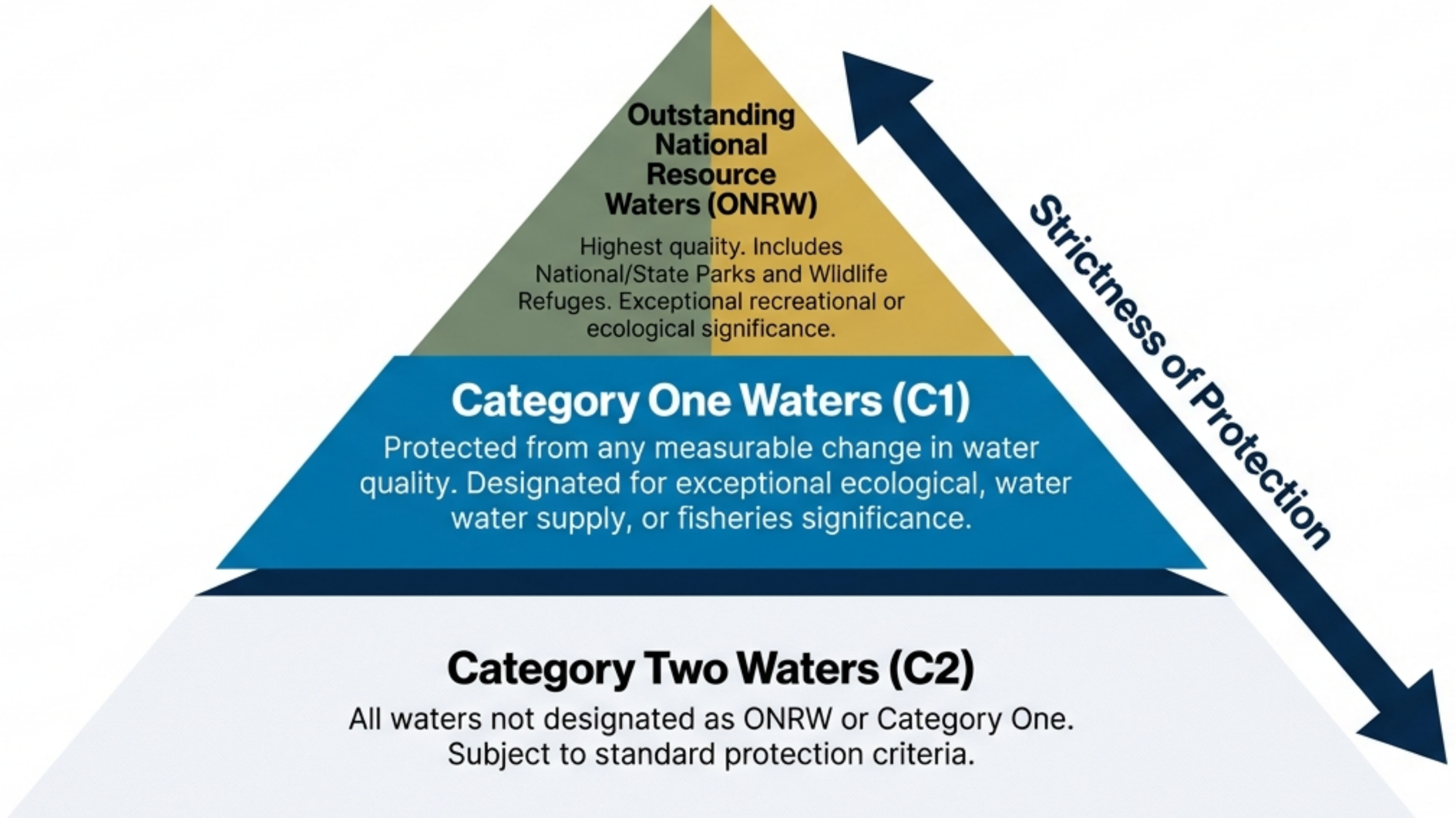
Classifications

Categorizing waters based on their designated uses (e.g., FW1 vs. FW2)

Criteria

Setting specific scientific metrics (bacteria, pH, dissolved oxygen) required to support those uses

A Tiered Approach to Water Protection



Designated Uses of Surface Waters

Classifications identify the potential uses a waterbody is legally required to support.

Public Potable Water Supply

Treatable for drinking.

Recreation

Swimming and boating.

Ecological

Maintenance, migration, and propagation of fish.

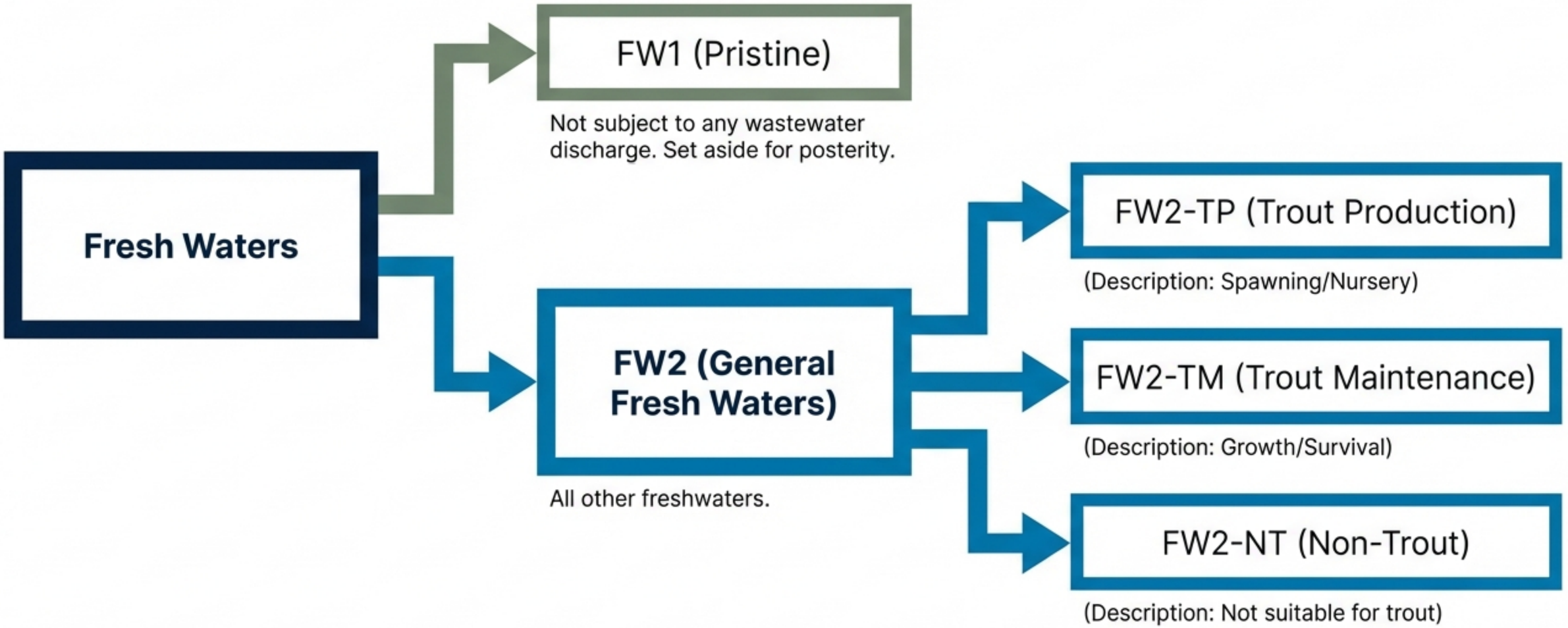
Consumption

Fish consumption and Shellfish harvesting.

Economic

Agricultural and Industrial water supplies.

Classification Logic: Fresh Waters (FW)



Classification Logic: Saline, Coastal, and Special Zones

Saline Estuarine (SE)

- SE1: Shellfish harvesting & Recreation
- SE2: Maintenance of fish
- SE3: Secondary contact recreation

Saline Coastal (SC)

Ocean waters.

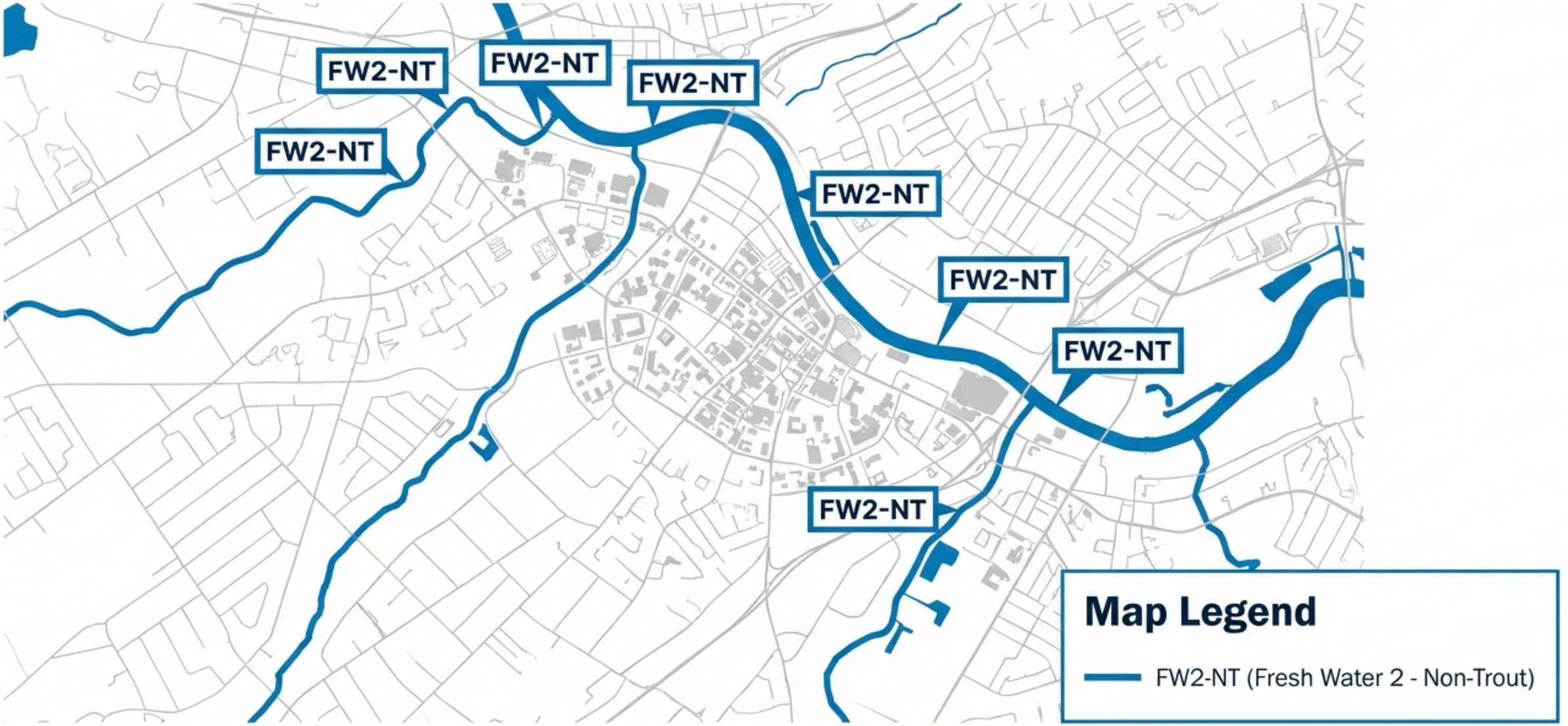
Pinelands (PL)

Special protection area (Fresh or Saline).

Dual Classifications

Fresh — Example: FW2-NT/SE1 (Transition from fresh stream to estuary). — Saline

Applied Classification: The Rutgers Vicinity



Water Quality Metrics: Bacteria and Dissolved Oxygen

Bacterial Quality (Health Safety)

Primary Contact Recreation Limits

E. coli (Freshwater/FW2):

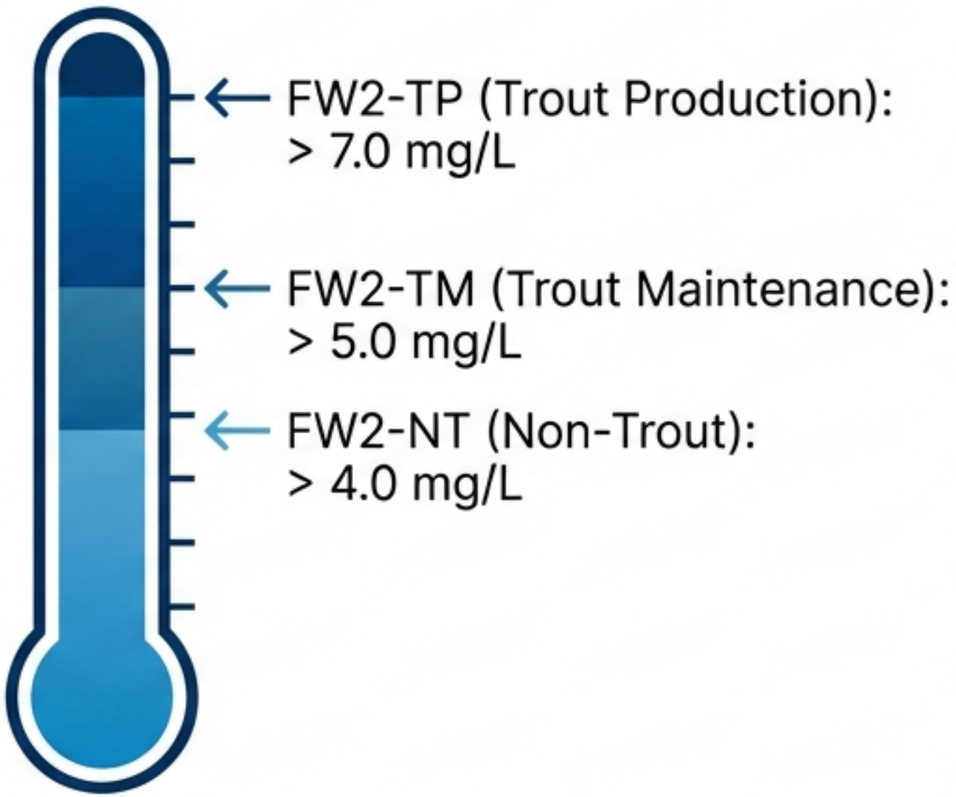
Max 100/100ml

Enterococci (Saline/SE1):

Max 30/100ml

Shellfish Waters must meet National Shellfish Sanitation Program standards.

Dissolved Oxygen (Aquatic Life Support)



Nutrient Criteria: Managing Phosphorus

Non-Tidal Streams

Max 0.1 mg/L Total P

Lakes have stricter limits (0.05 vs 0.1) because standing water traps nutrients, increasing susceptibility to eutrophication.

Lakes & Reservoirs

Max 0.05 mg/L Total P

Physical and Chemical Standards Dashboard

pH Levels

Standard (FW2/SE): 6.5 – 8.5

Ocean (SC): Natural conditions prevail.

Temperature

- Trout Production Max: **22°C**
- Trout Maintenance Max: **25°C**
- Non-Trout Max: **31°C**

Solids (TSS)

- Trout Waters: **Max 25 mg/L**
- Non-Trout: **Max 40 mg/L**

Toxics

No acute or chronic toxicity allowed.

- Persistent toxic substances limited to 0.01 of the LC50 value.

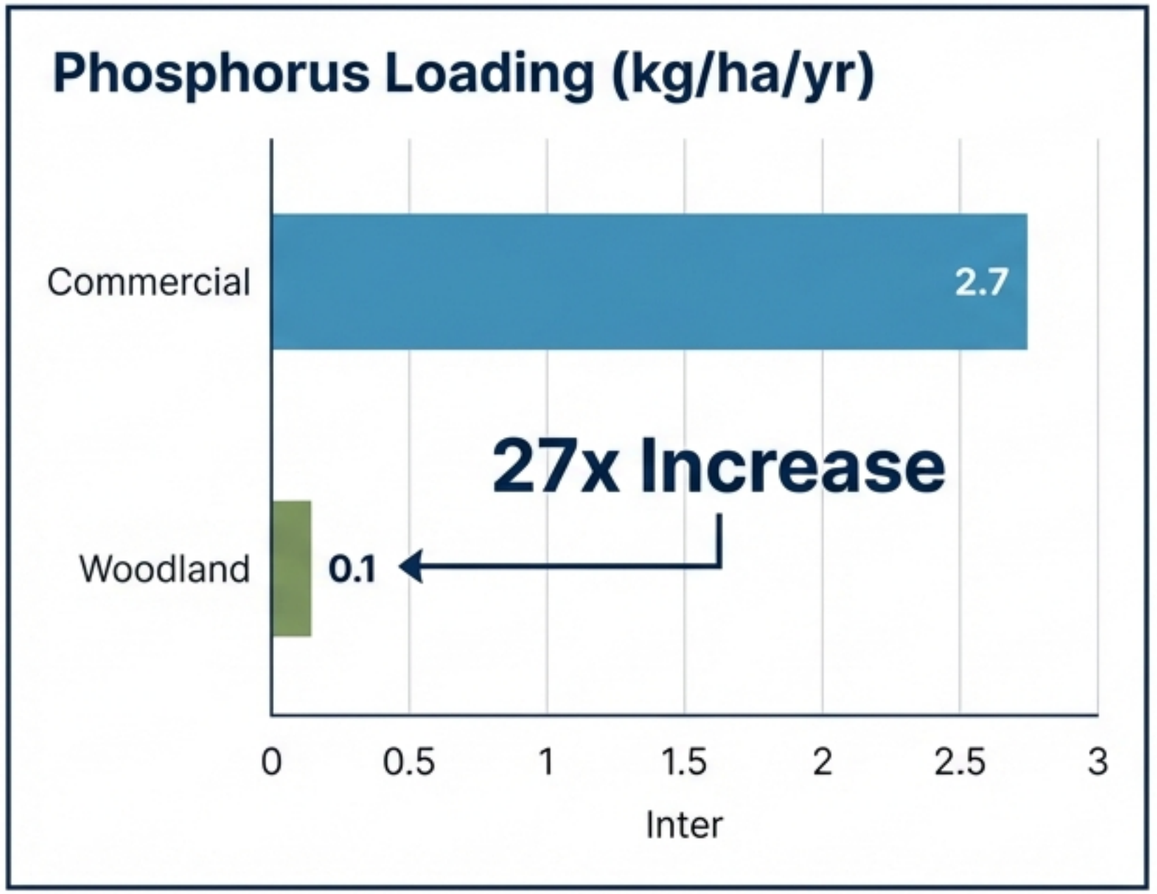
The Root Cause: Stormwater Runoff Dynamics

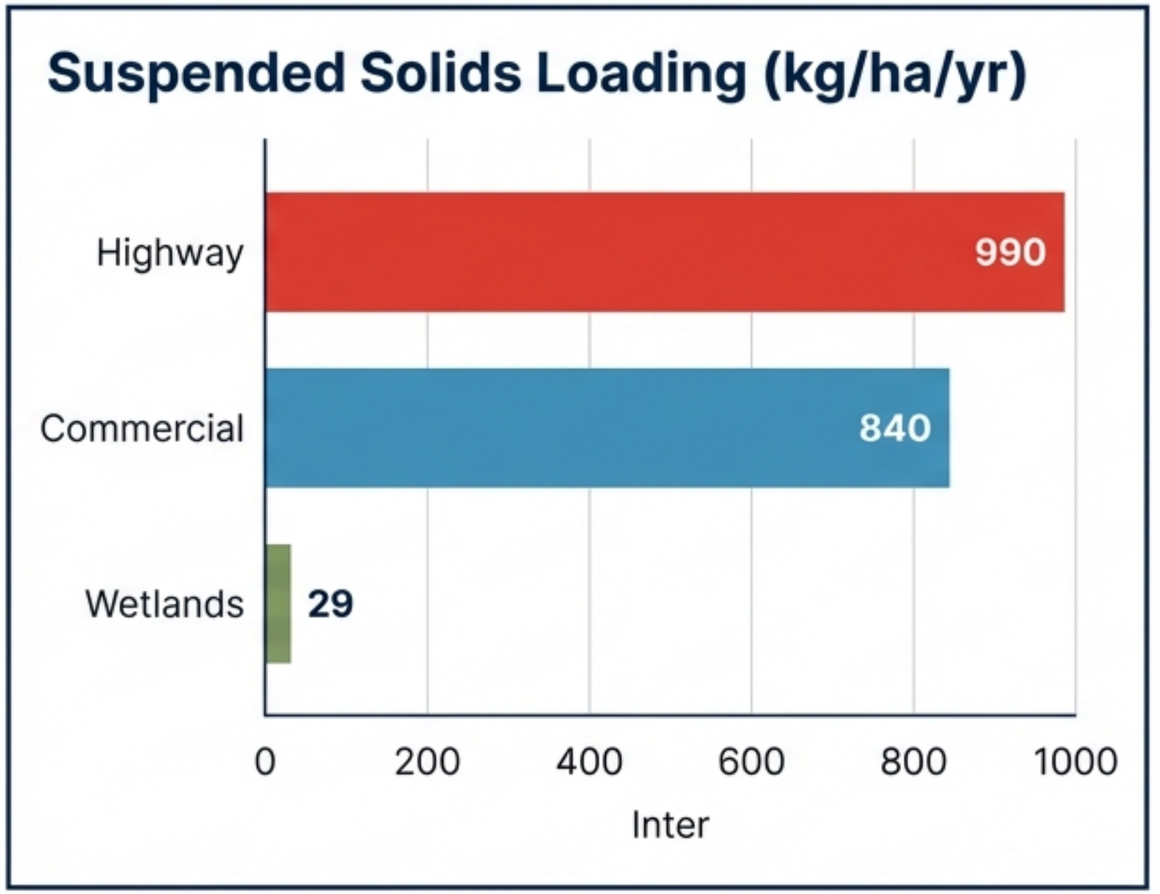
Median Event Mean Concentrations (EMC) by Land Use

	Residential	Mixed	Commercial	Open/Nonurban
Total Kjeldahl Nitrogen (µg/L)	1900	1288	1179	965
Total Zinc (µg/L)	135	154	226	195
TSS (Solids) (mg/L)	101	67	69	70

Residential areas drive Nitrogen load; Commercial areas drive Metals (Zinc).

Quantifying the Impact of Land Use on Water Quality





Summary: The Interplay of Regulation and Reality

Context
High density requires rigorous management

Classification
Use-Based System (FW, SE, SC)

Goal: Sustainable Designated Uses.
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Challenge
Urbanization increases Pollutant Loads.

Criteria
Science-Based Limits (DO, Bacteria, Nutrients)