Lake Stevens Lake Management Program Overview

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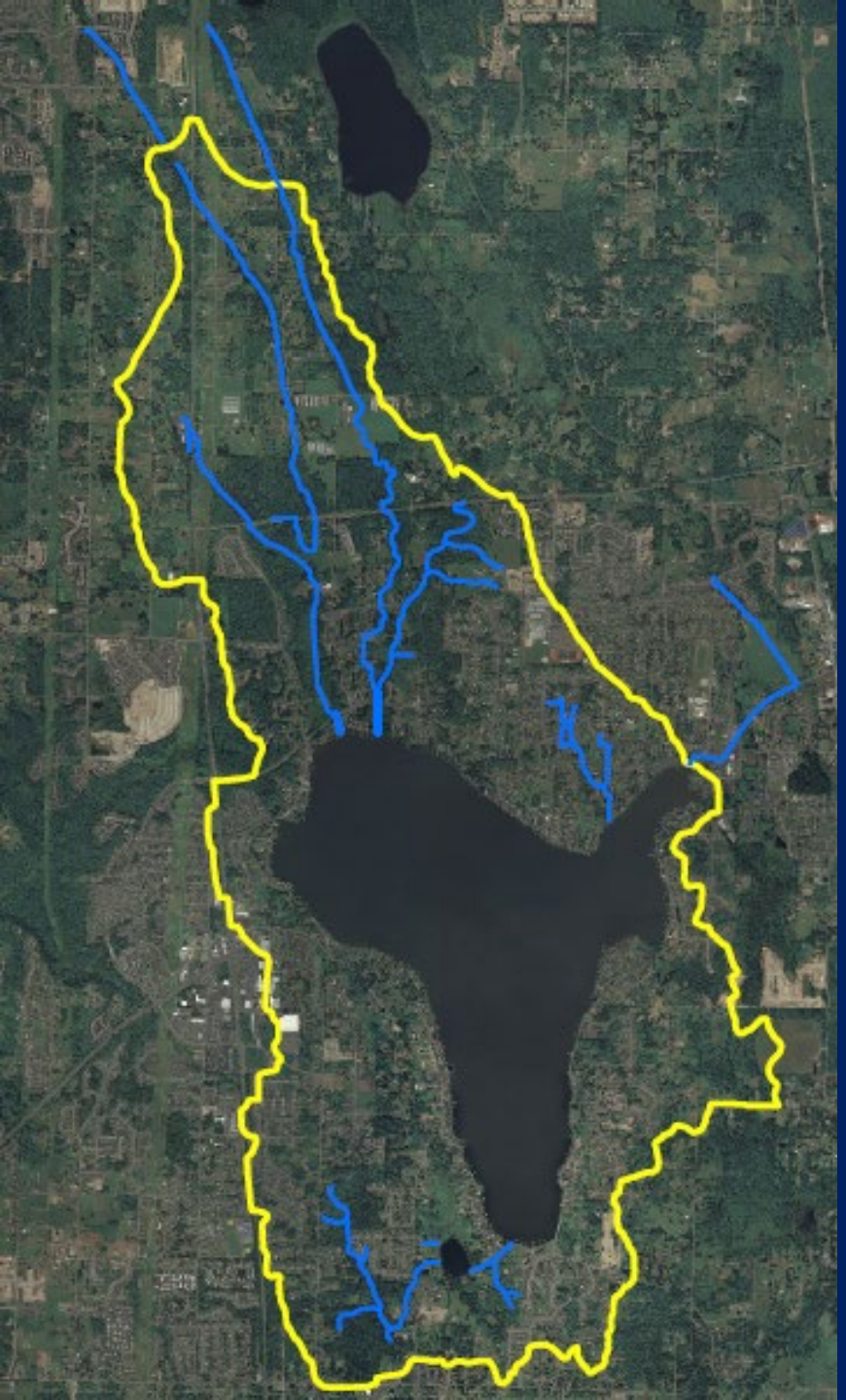
FEBRUARY 24, 2026

Overview

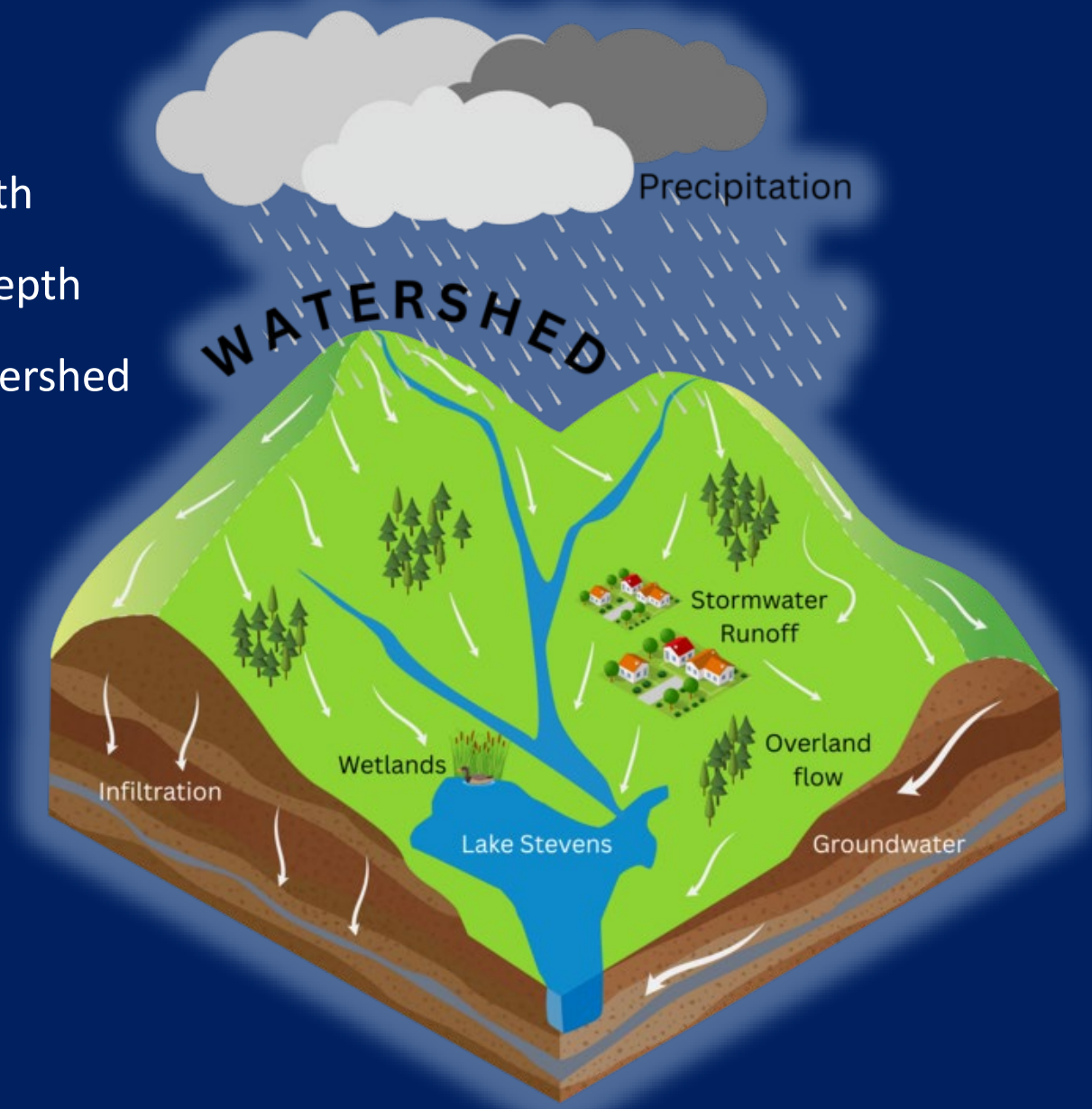
- Lake Stevens History
- Water Quality Overview
- Lake Management Strategies
- Current Lake Management Program
- 2025 Water Quality Results
- 2026 Lake Management Strategy
- 2024 and 2025 Perchlorate Results
- Other Lake Management Programs
- Community Engagement

"A lake is a mirror of its watershed — what happens on the land is reflected in its waters."



Lake Stevens

- 1,013 acres
- 150 ft Max Depth
- 63 ft Average Depth
- 3,500 acres watershed



History of Lake Stevens

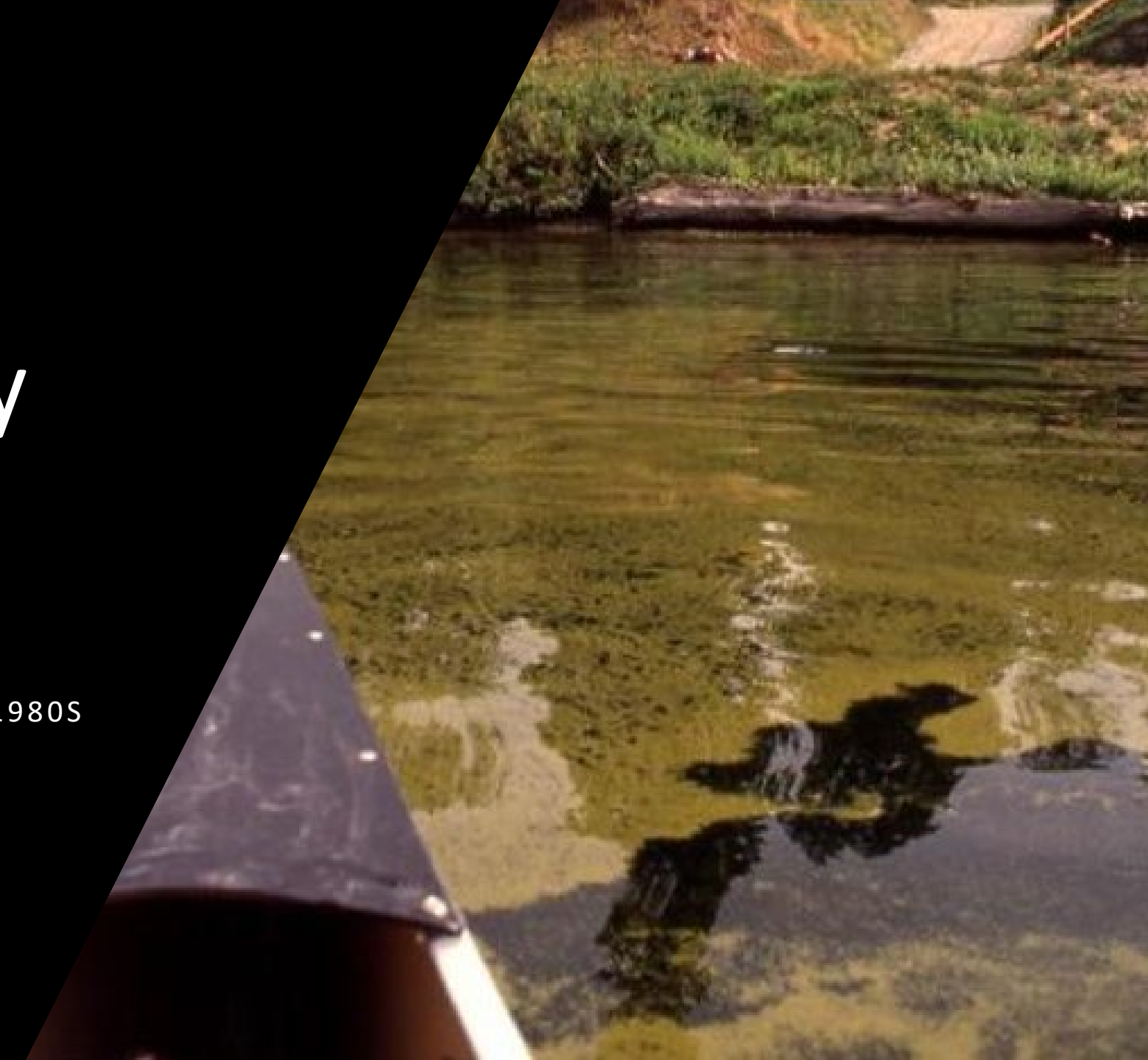
Rucker Mill before 1916

Rucker Mill 1917

Lake Stevens 1940

Water Quality 1970s and 1980s

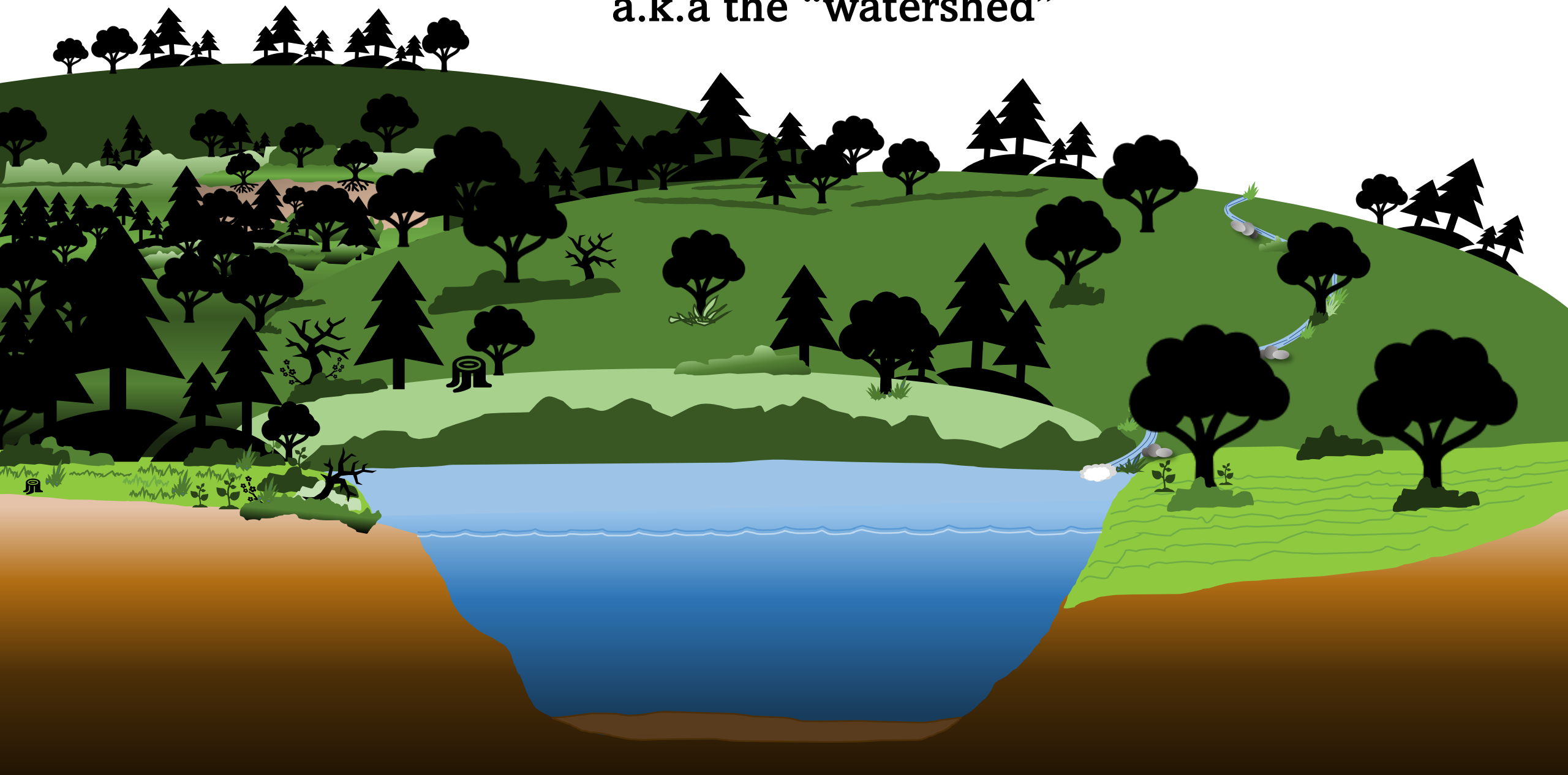
RESTORATION STUDIES BEGAN IN 1980S

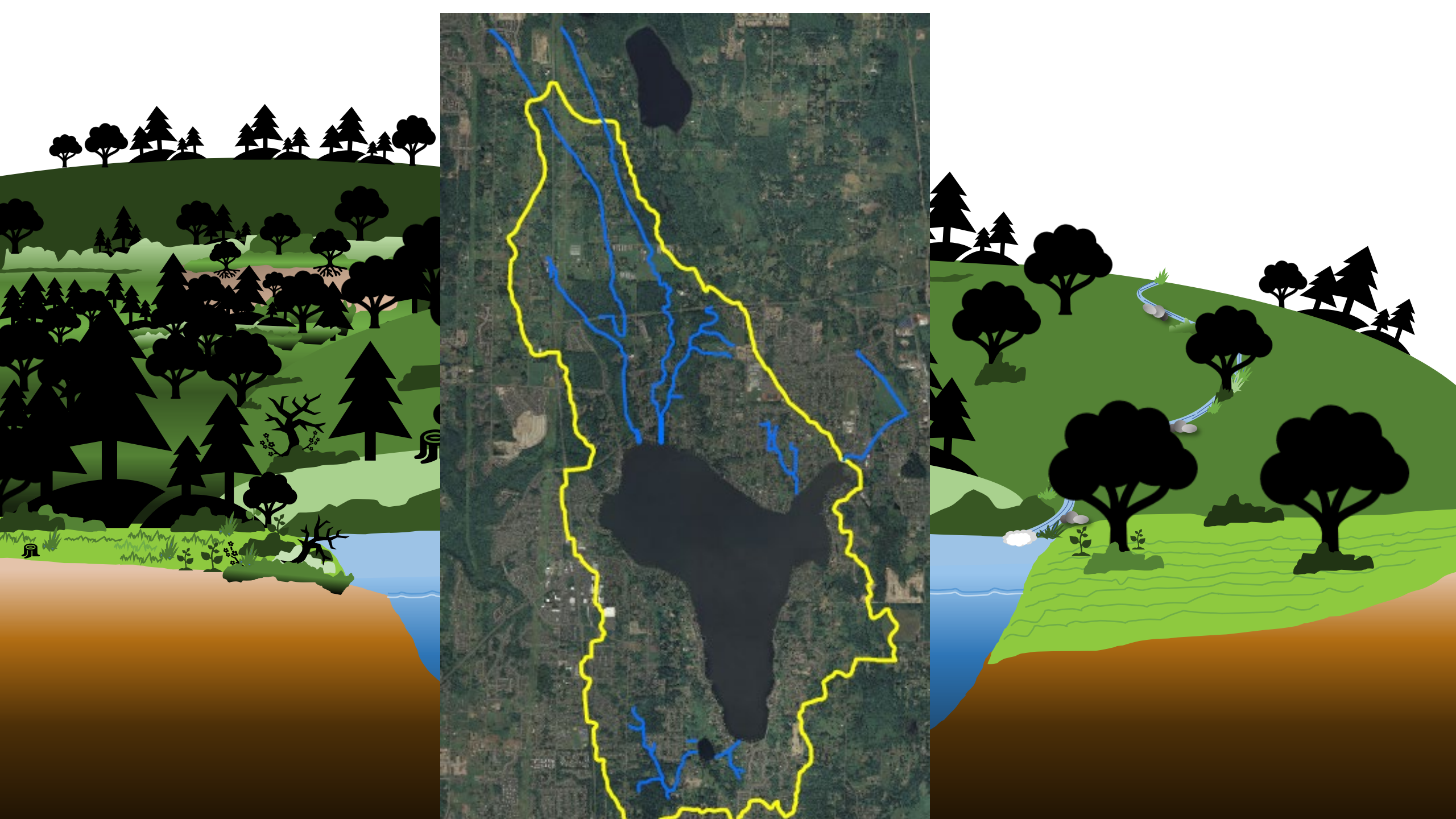


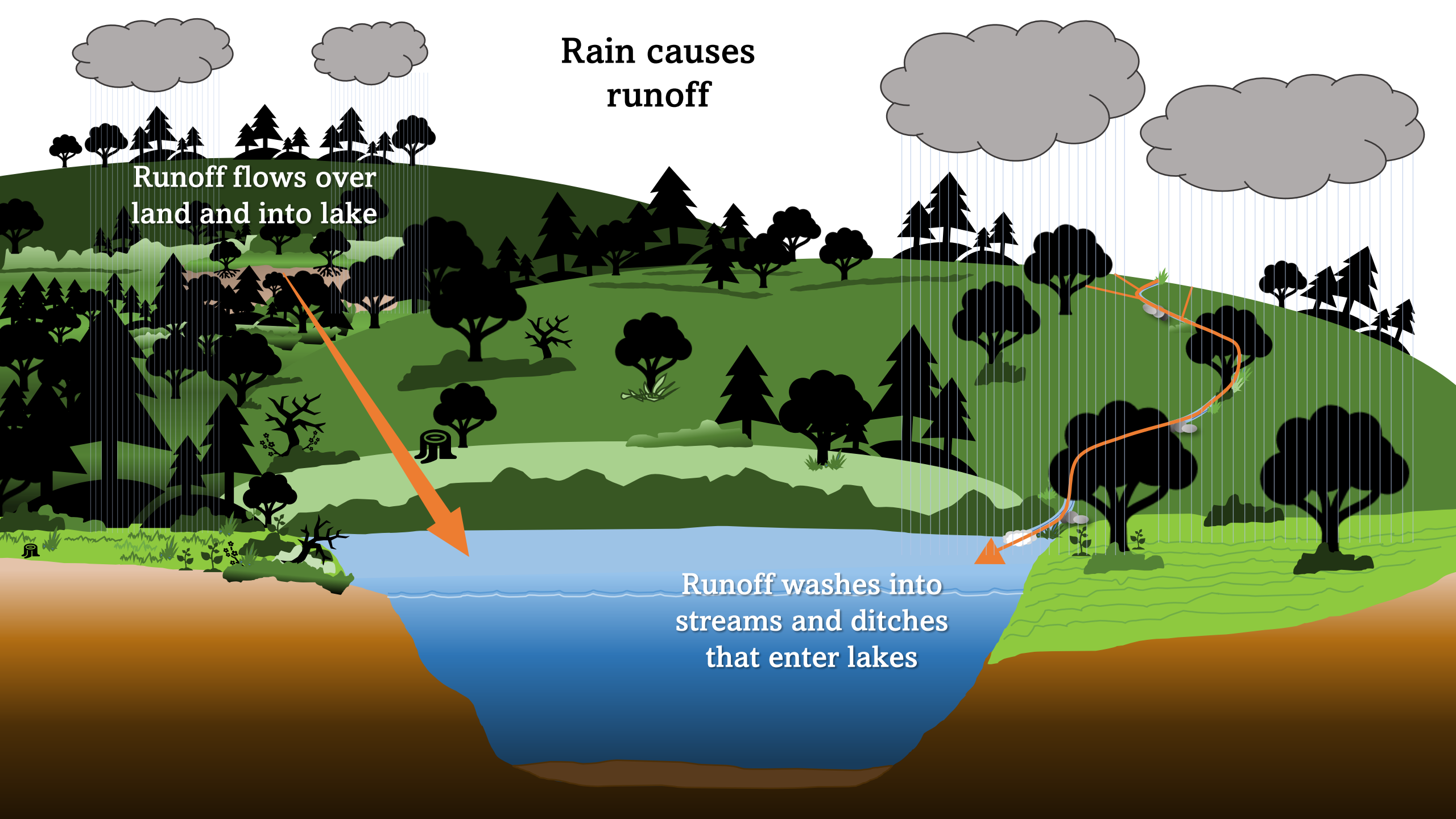
What Causes Algae Blooms?

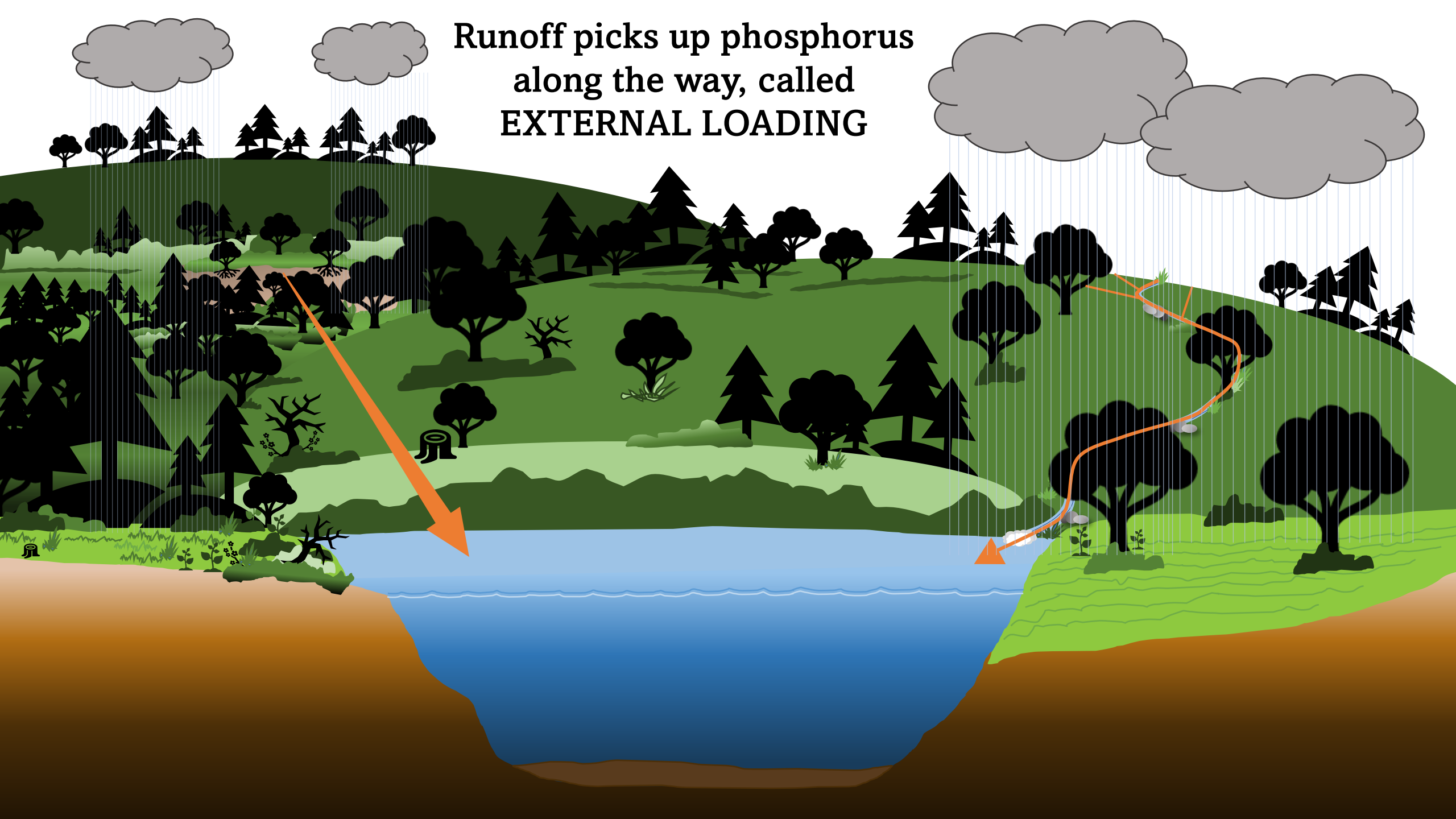
- **Phosphorus** is key nutrient
- A little goes a long way
- 1 tsp = 30 lbs of algae
- BUT where does it come from??

Phosphorus comes from around the lake – a.k.a the “watershed”





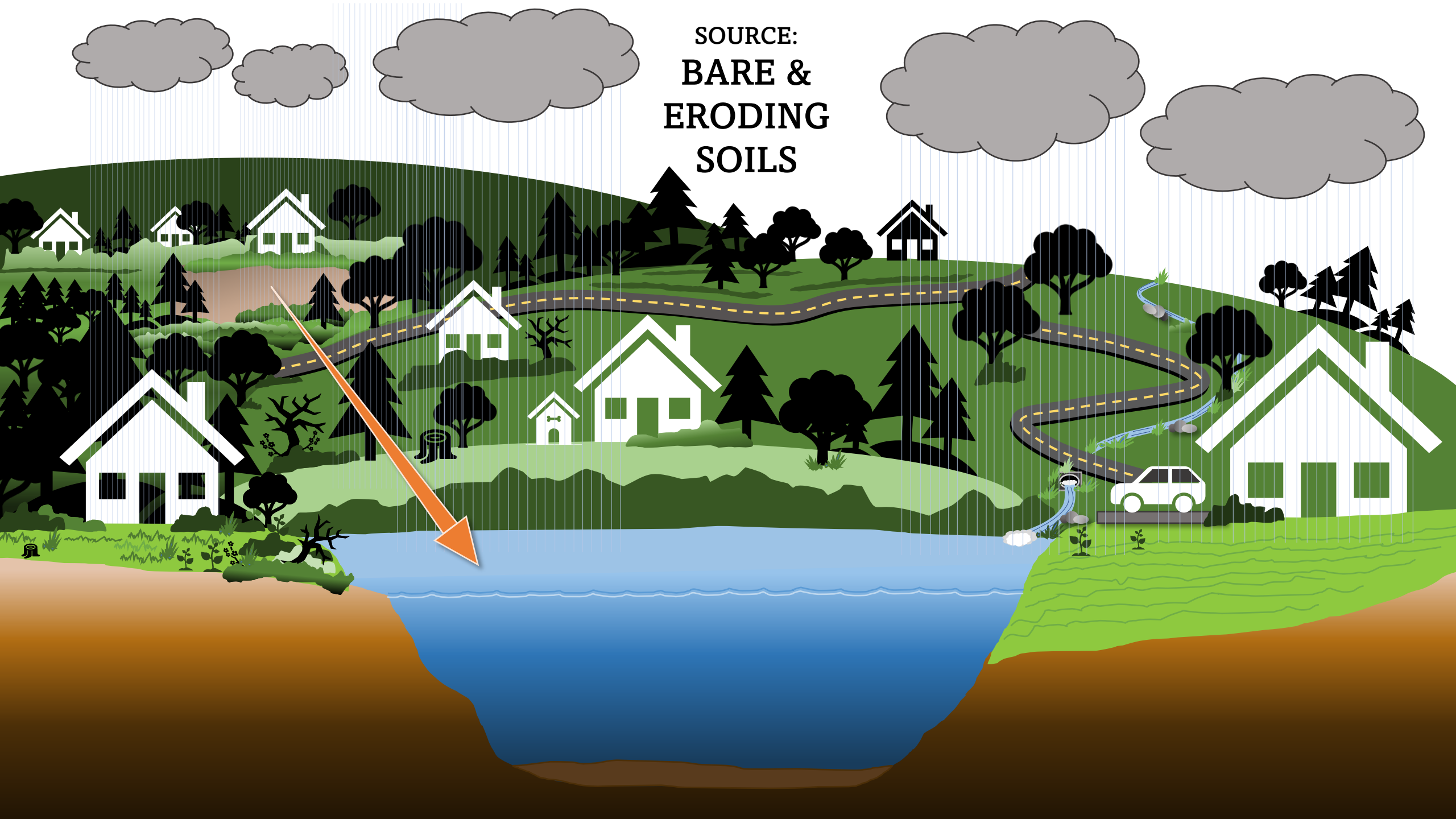

Rain causes runoff
Runoff flows over land and into lake
Runoff washes into streams and ditches that enter lakes

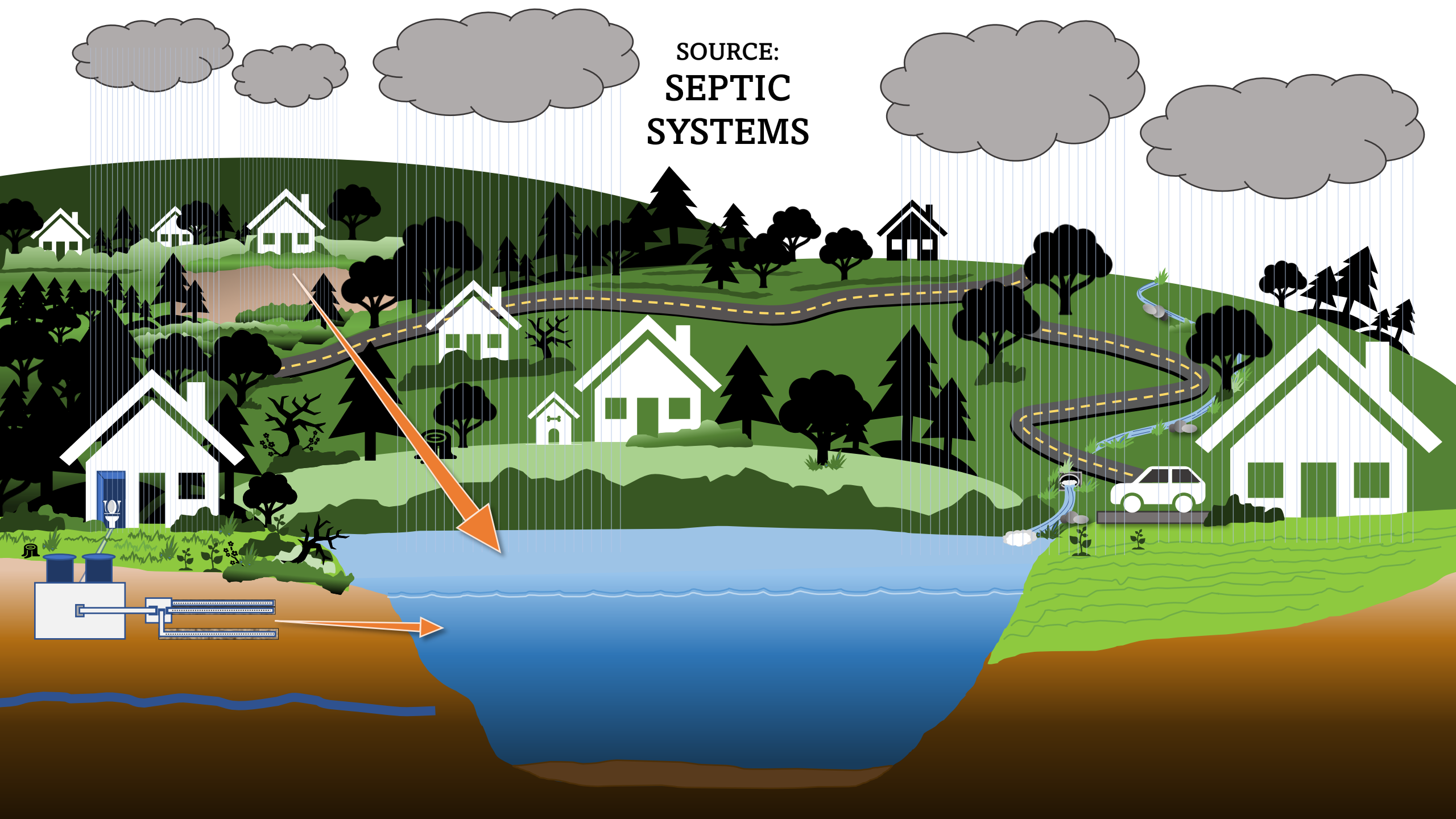

Runoff picks up phosphorus
along the way, called
EXTERNAL LOADING

People bring additional phosphorus sources

SOURCE:

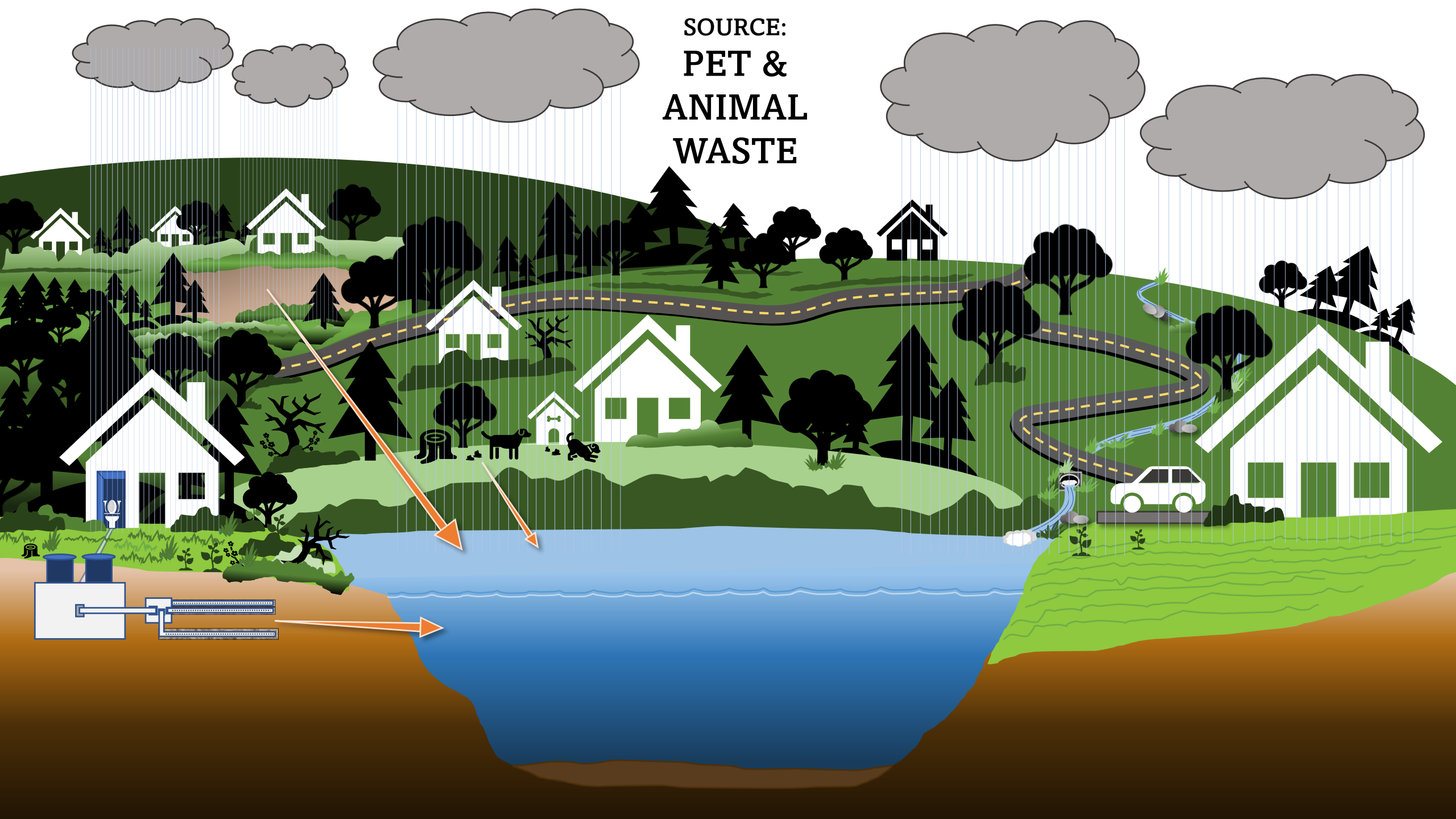
BARE & ERODING SOILS

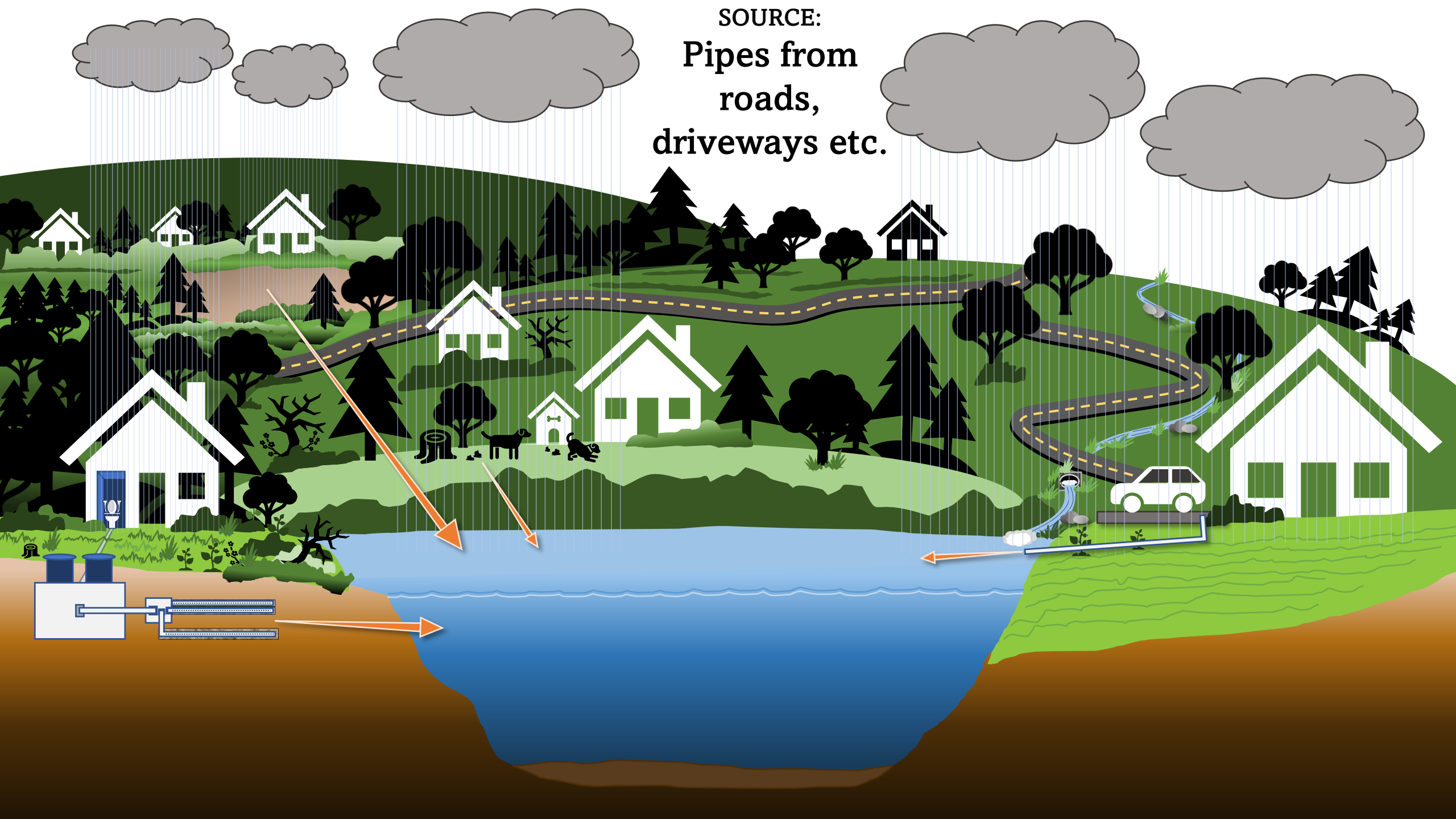



SOURCE:
SEPTIC
SYSTEMS

SOURCE:

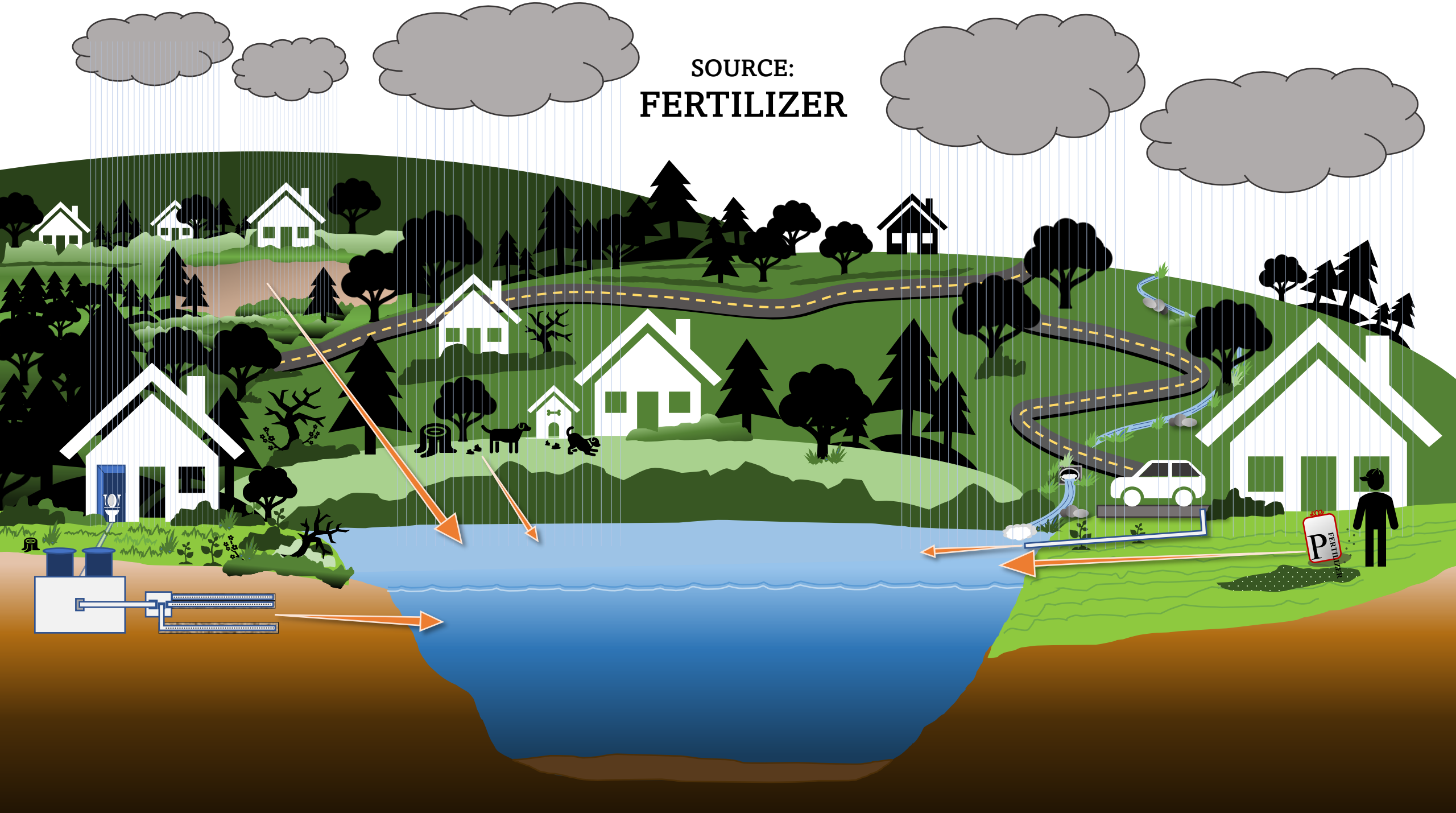
PET & ANIMAL WASTE




SOURCE:
Pipes from roads, driveways etc.

SOURCE:

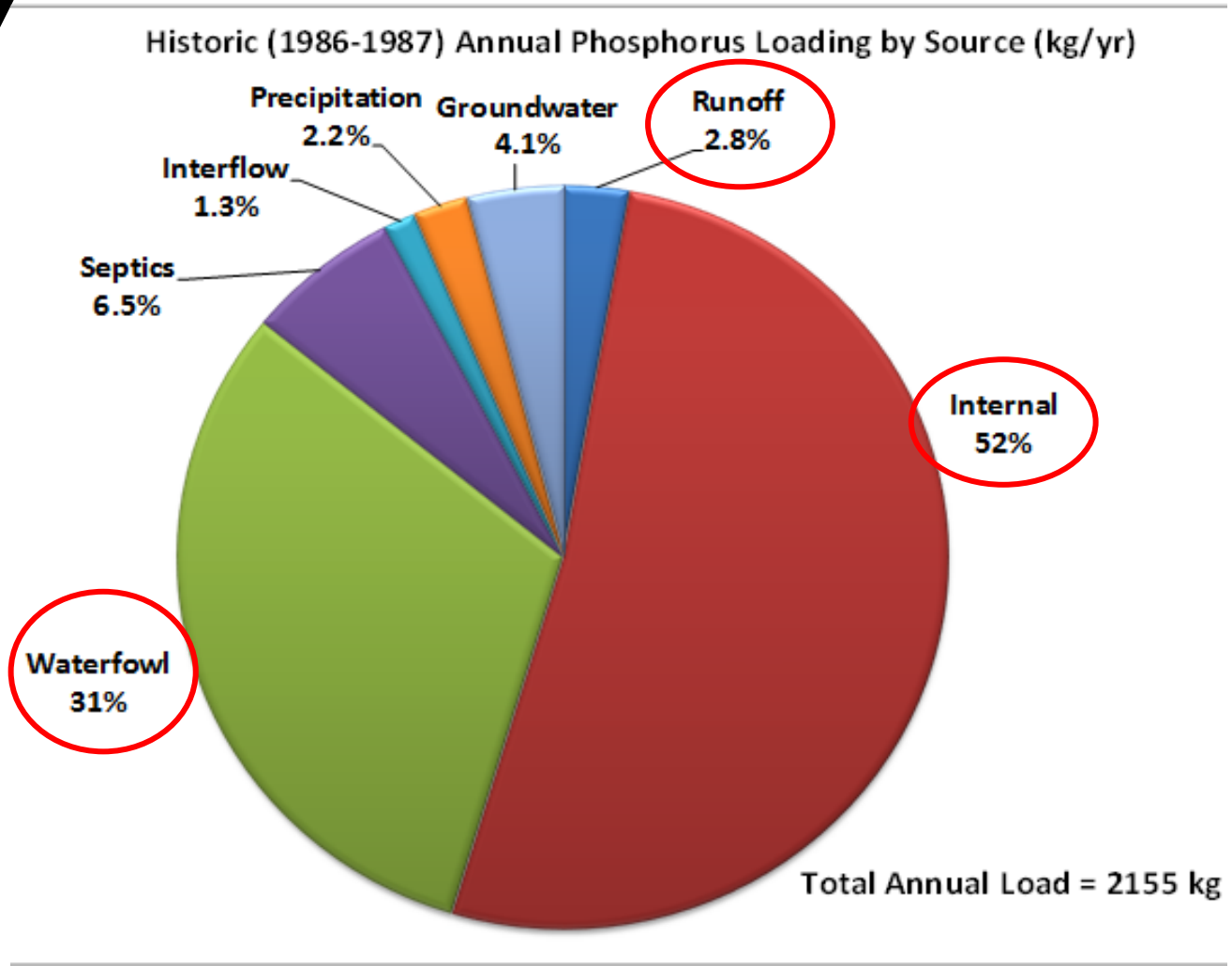
FERTILIZER



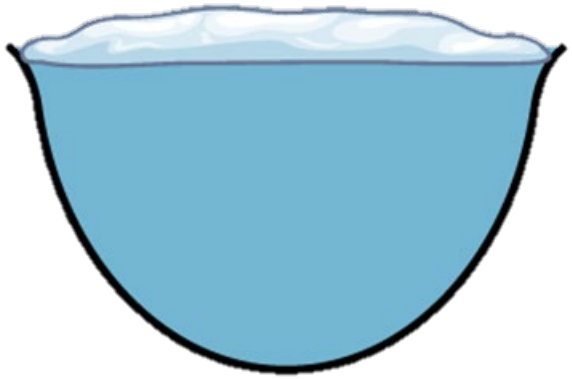
All that Phosphorus builds up at the lake bottom which can recycle back into the water which is called - INTERNAL LOADING

Historic Sources of Phosphorus (1986-1987)

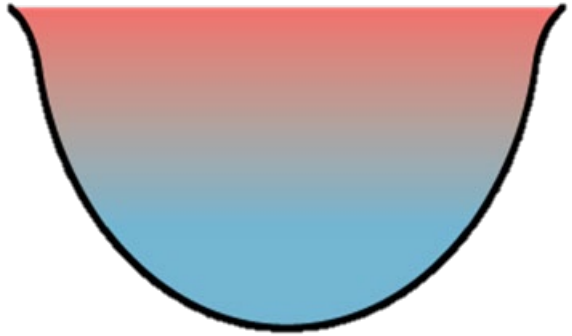
Internal loading mainly occurs when oxygen is low



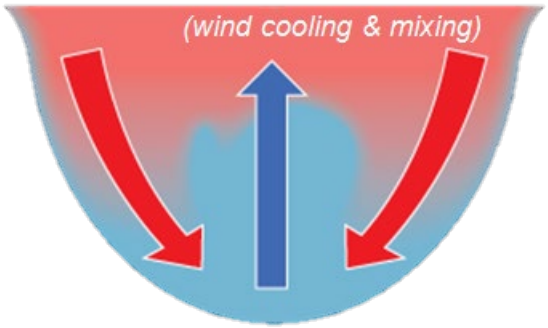
Seasonal Cycle of Lakes - Temperature



Winter

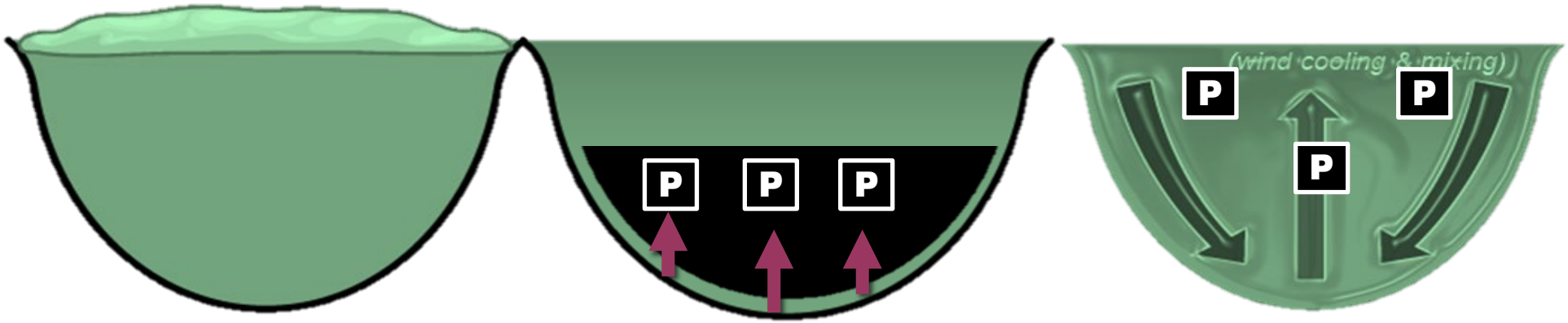


Summer



Fall Turnover

Dissolved Oxygen



Winter

Summer

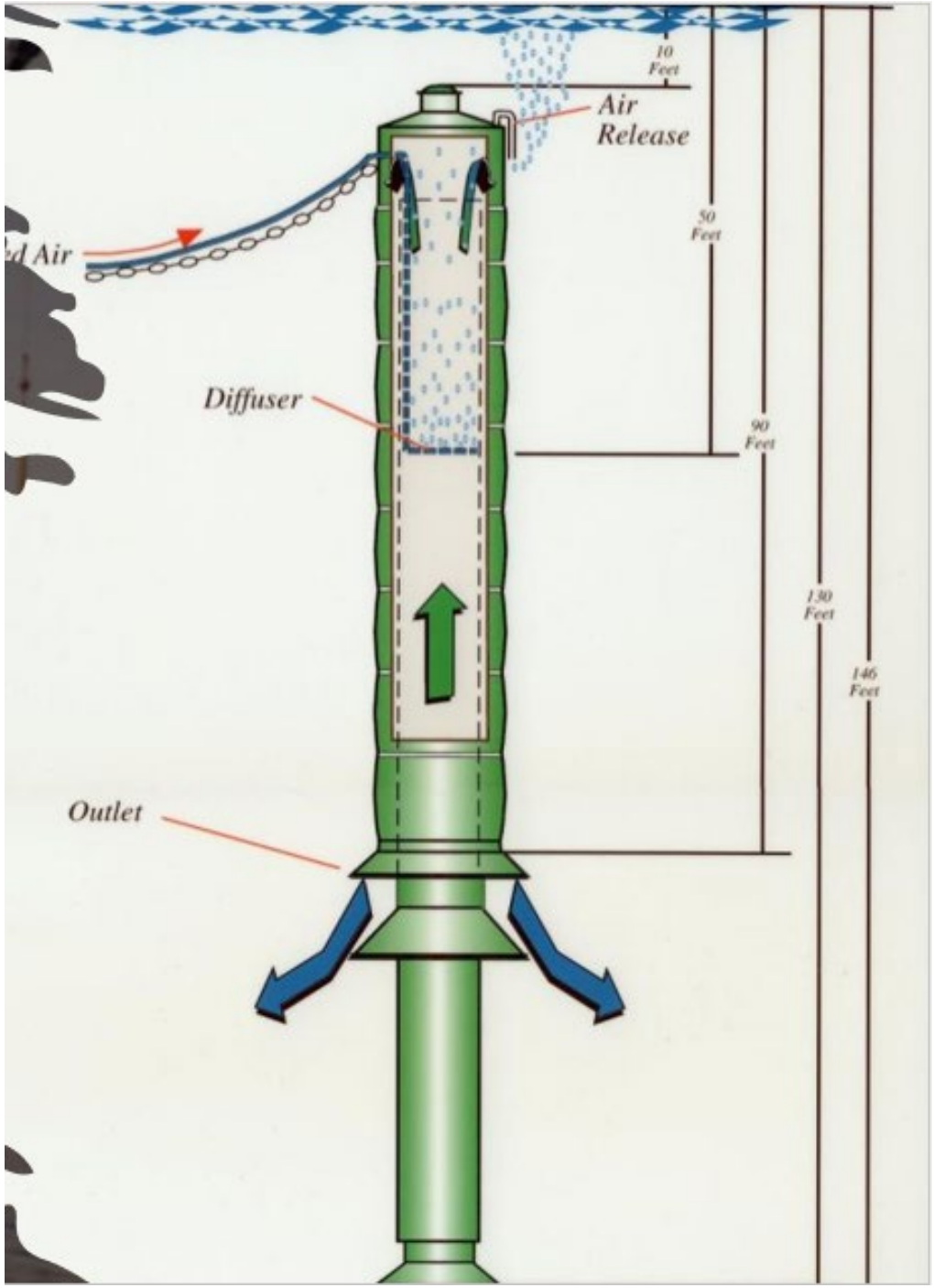
Phosphorus **bound to iron** in lake sediments **is released** when **no oxygen**

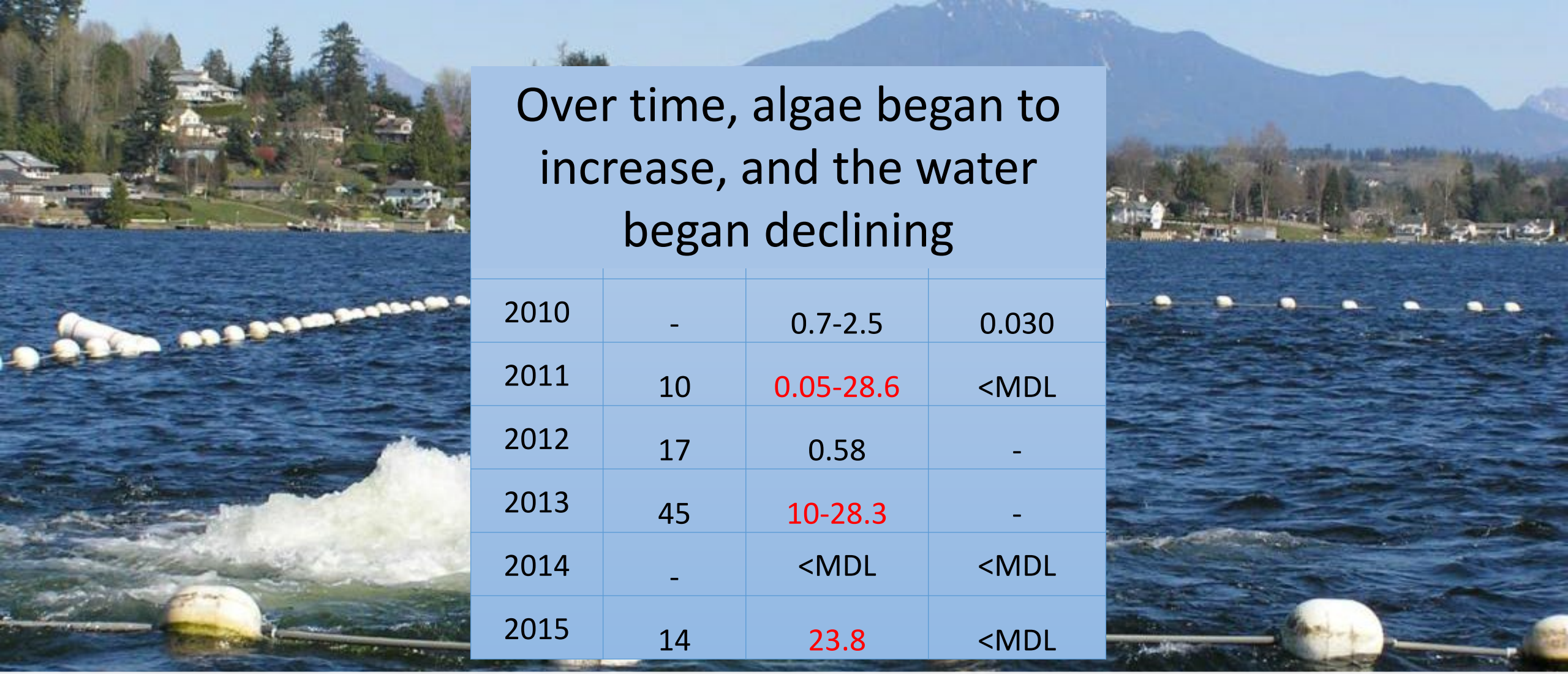
Fall

When the lake mixes it is spread throughout the lake

Lake Management Strategy #1 Aerator

- In 1994, a $1.1 million hypolimnetic aeration system was installed
- The four aerators pull low-oxygen water from the lake bottom, mix it with air, and send the high-oxygen water back to the bottom.
- In the presence of oxygen, iron in the sediments stays bound and holds phosphorus
- Operational 1994- 2012





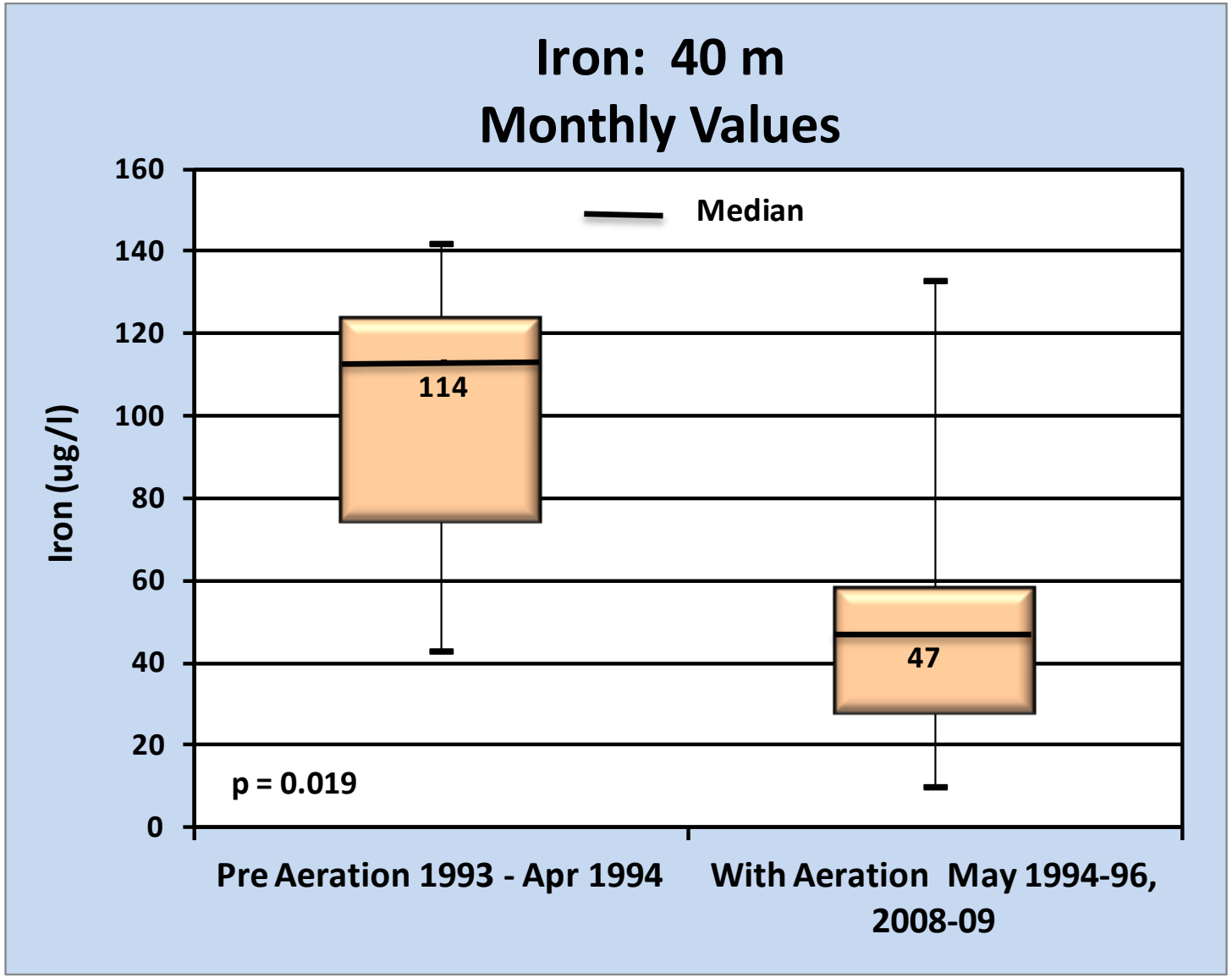
Over time, algae began to increase, and the water began declining

2010	-	0.7-2.5	0.030
2011	10	0.05-28.6	<MDL
2012	17	0.58	-
2013	45	10-28.3	-
2014	-	<MDL	<MDL
2015	14	23.8	<MDL

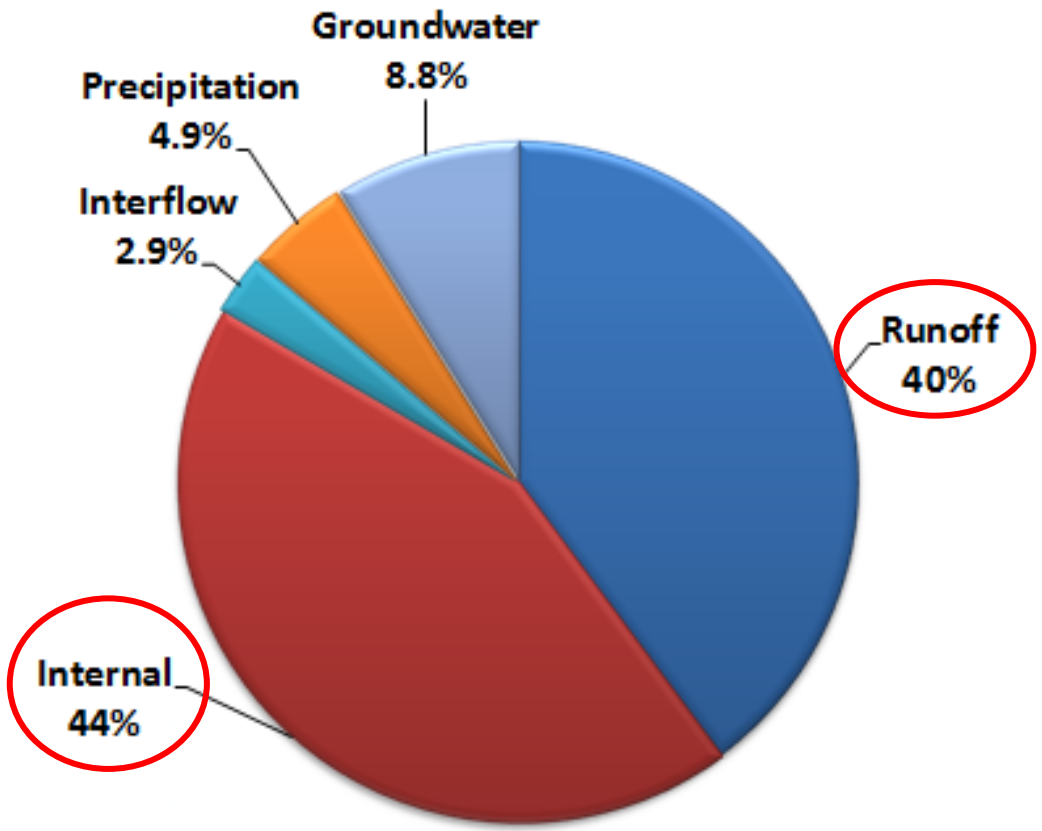
The aeration system provided significant benefits to the lake.

Why did it stop working?

- 2009 sediment study completed
- Finding - Depletion of iron needed to bind all the phosphorus

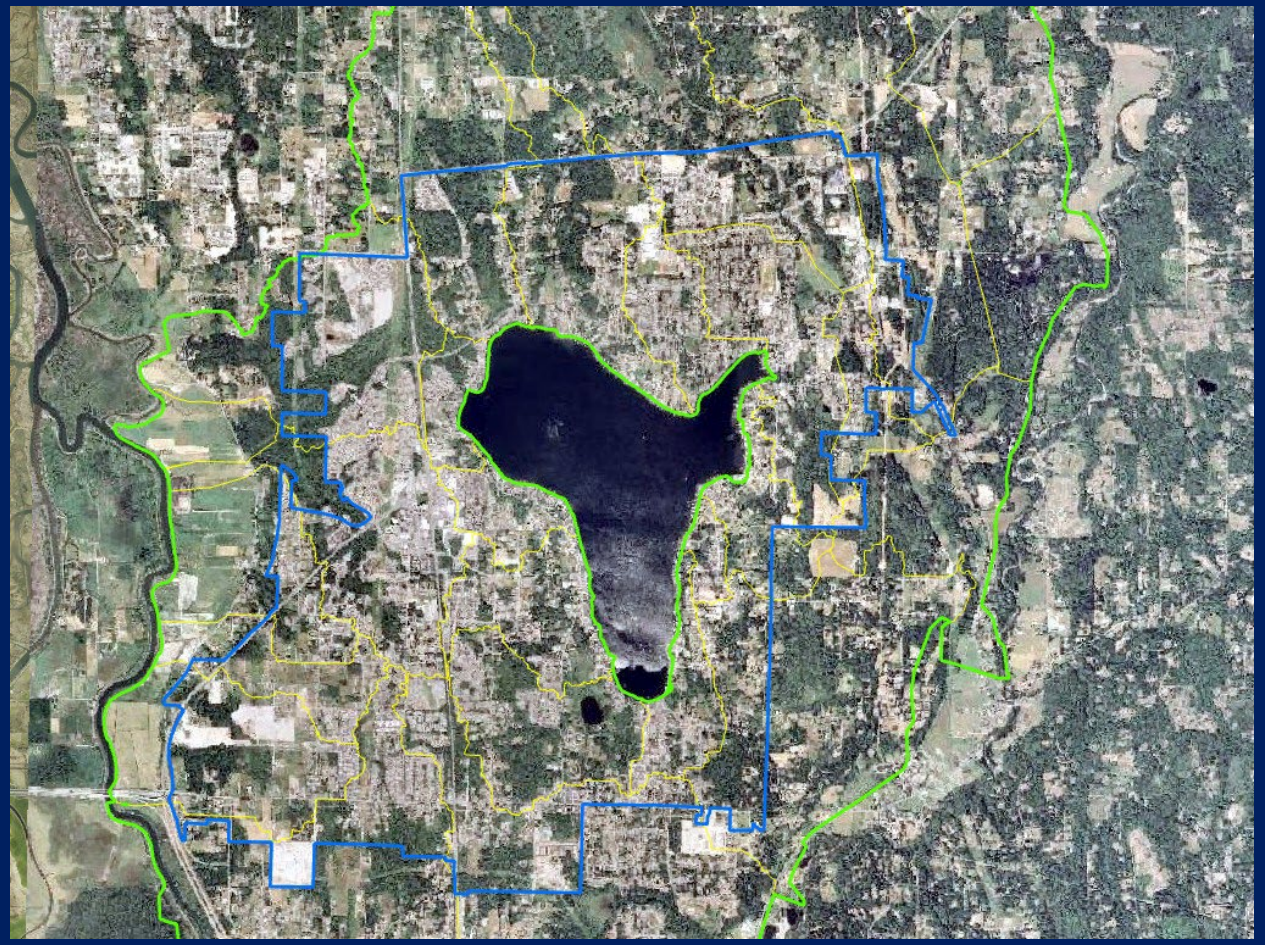


2011 Study

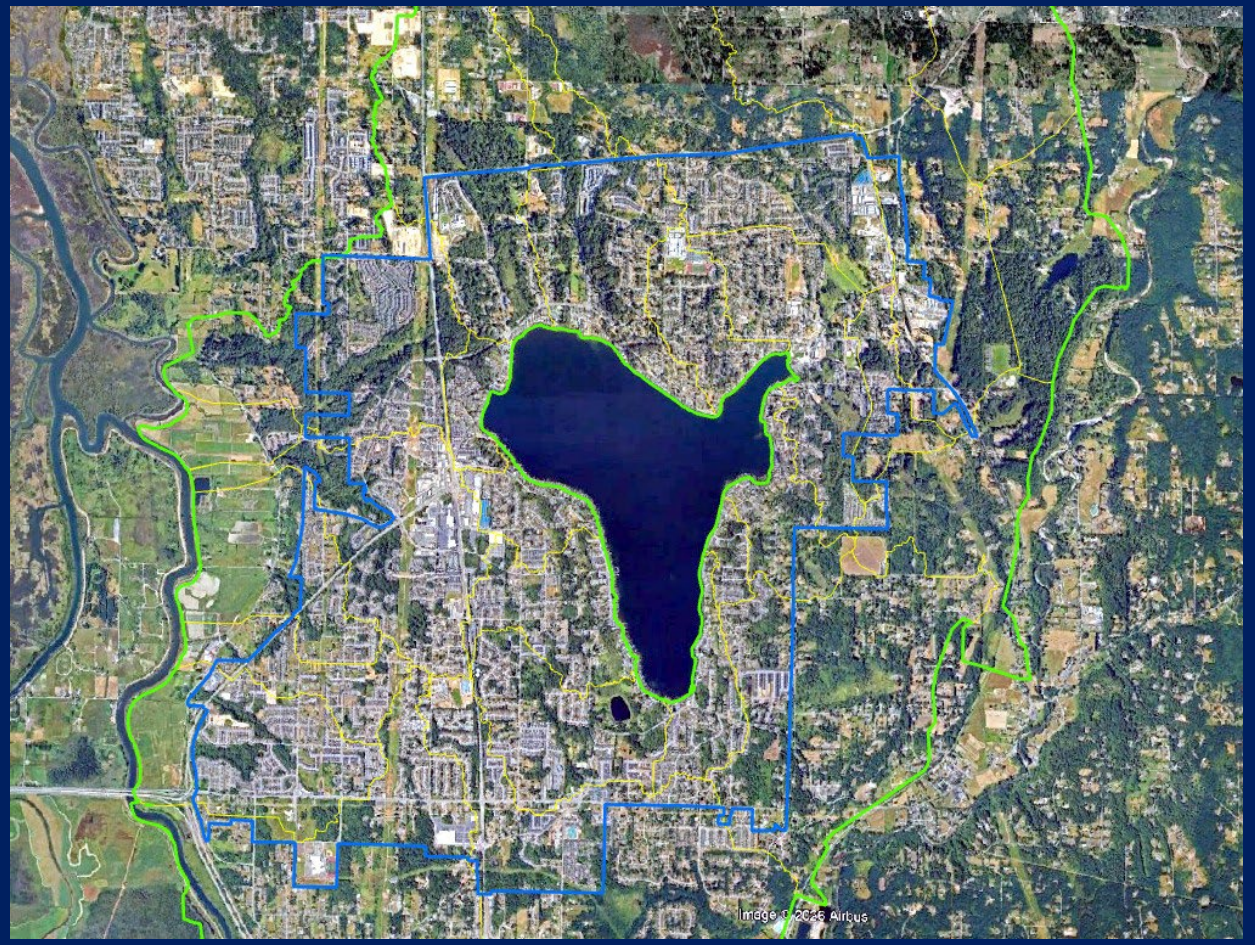


Total Annual Load = 992 kg

Changing Landscape



2006



2025

Lake Management Strategy #2: Alum

- 2013 - PRESENT
- ALUM AND P BONDS WITH LOW O2
- MOST COMMON LAKE RESTORATION METHOD USED TODAY
- SAFE AS USED IN DRINKING WATER TREATMENT, PICKLING (YOU CAN BUY IN A STORE)

Current Lake Management Program

WATER QUALITY MONITORING

Sonde Reading

Biological Sampling

[Lake Management | Lake Stevens, WA - Official Website]

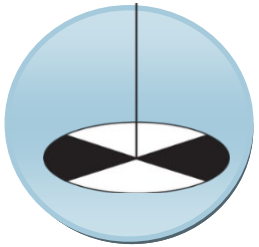
ALGAE AND AQUATIC PLANT MANAGEMENT

Eurasian Water Milfoil

American Pondweed

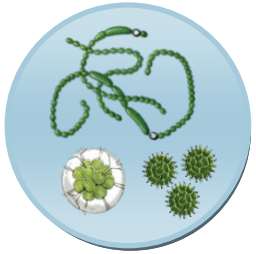
Algae identification

How do we assess lake health?



WATER CLARITY

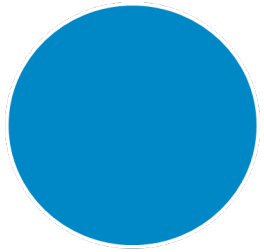
PHOSPHORUS



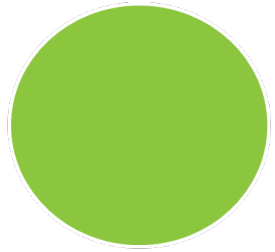
ALGAE

SHORELINE

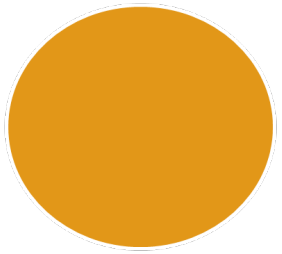
How do we rate health?



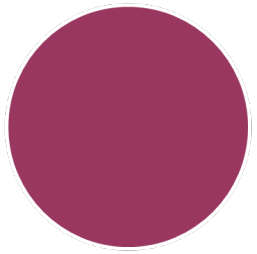
EXCELLENT



GOOD



FAIR

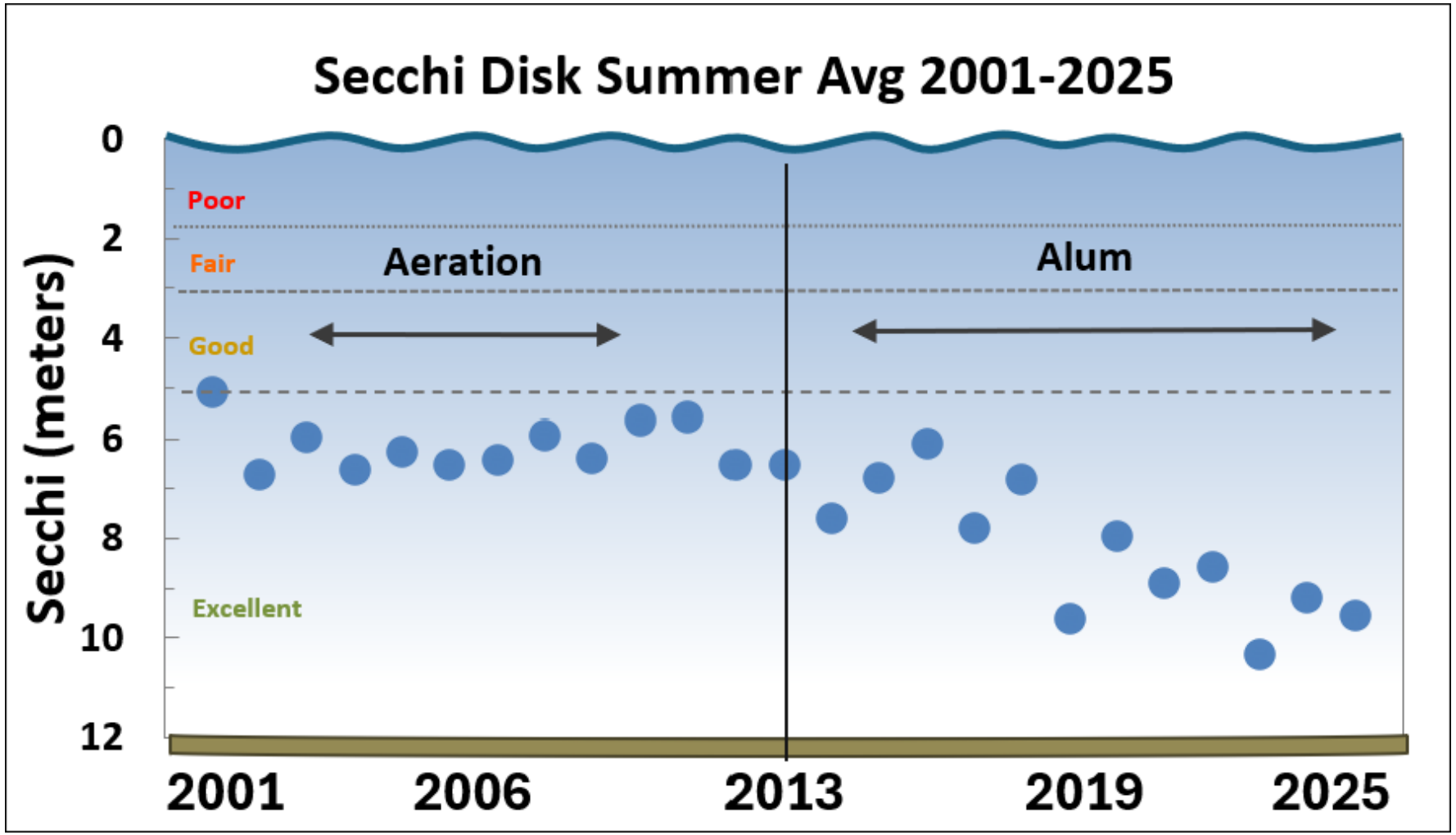


POOR

- Excellent Health . . . with a lot of work

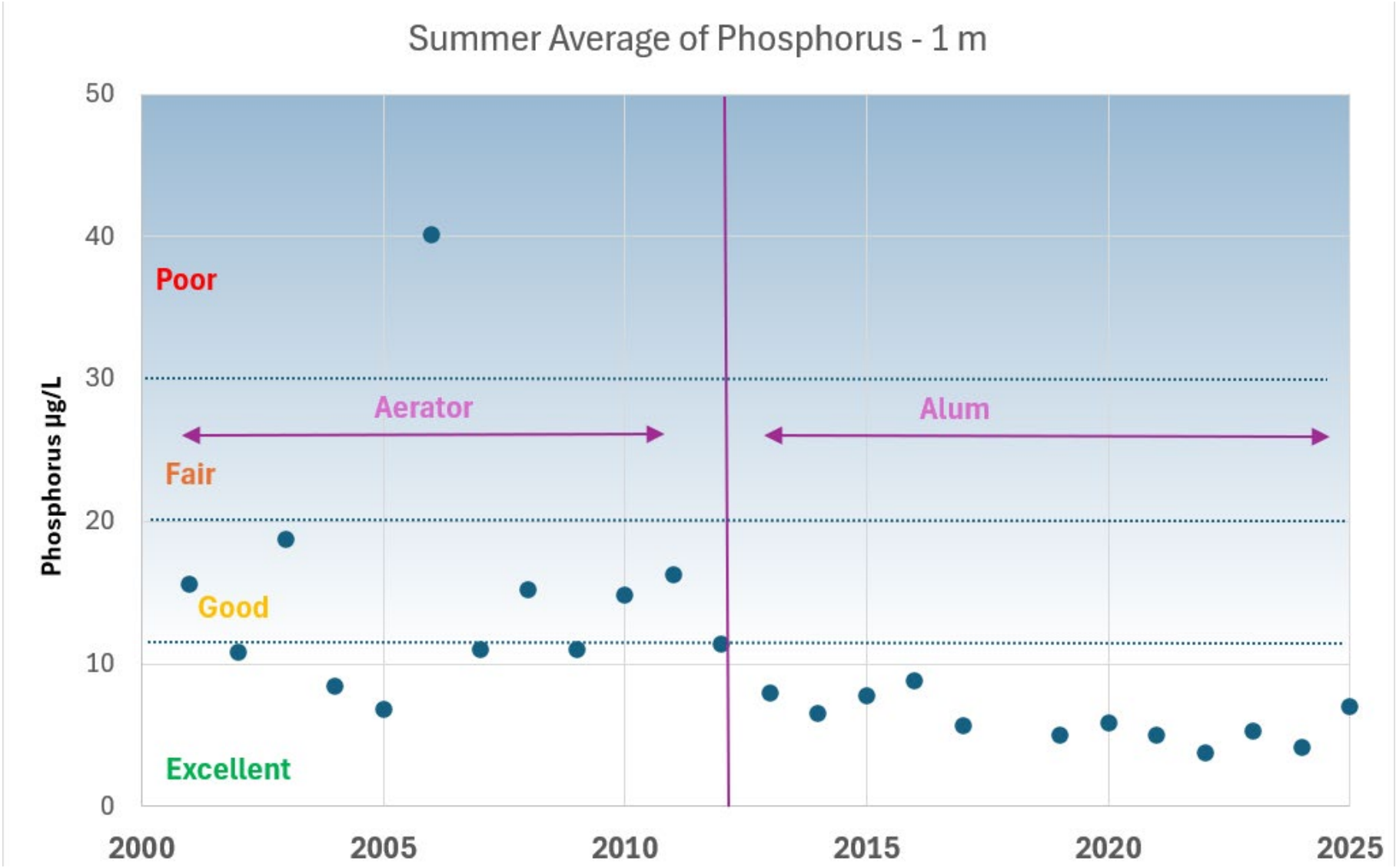
Water Clarity

EXCELLENT



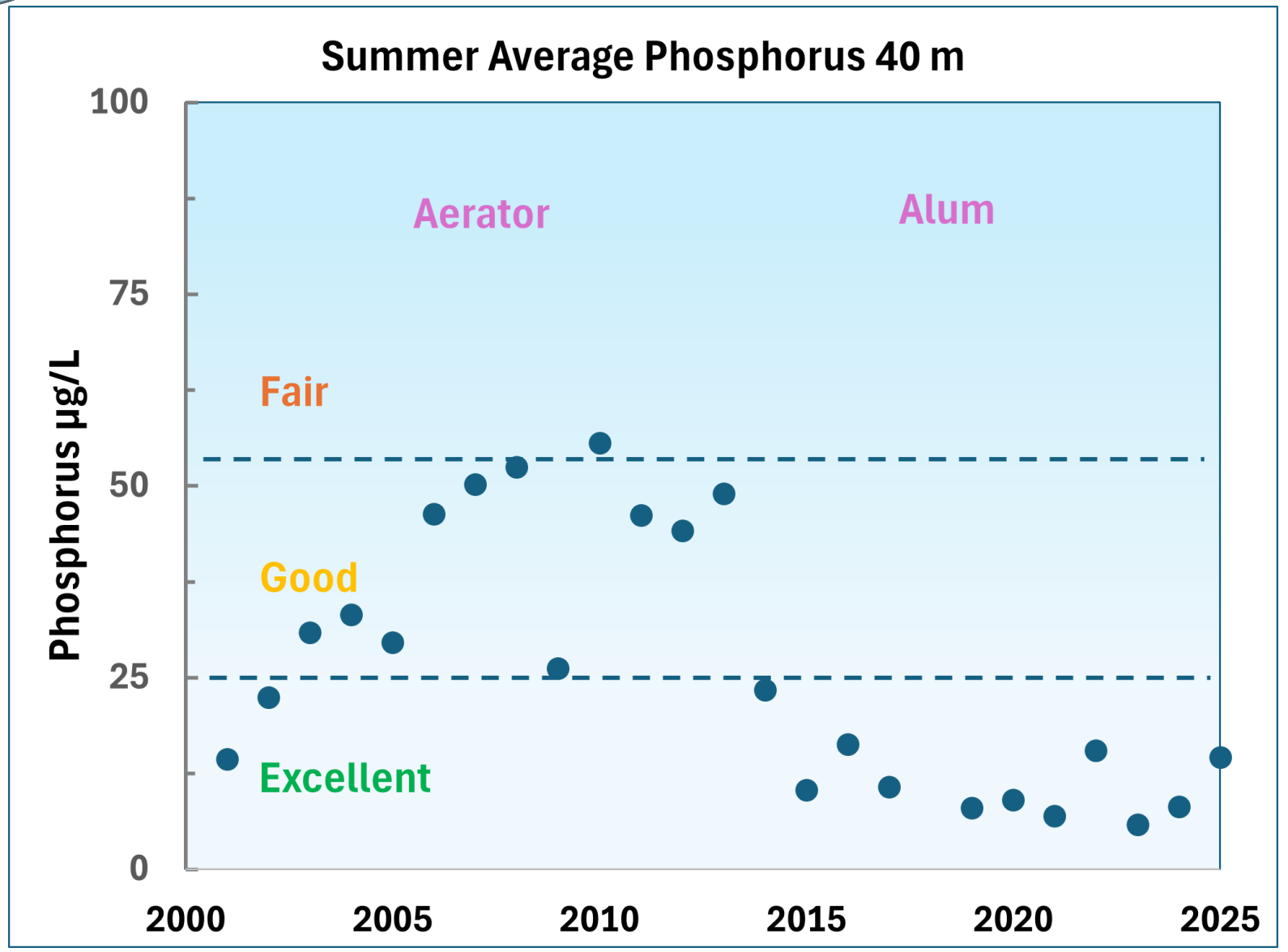
Phosphorus

EXCELLENT



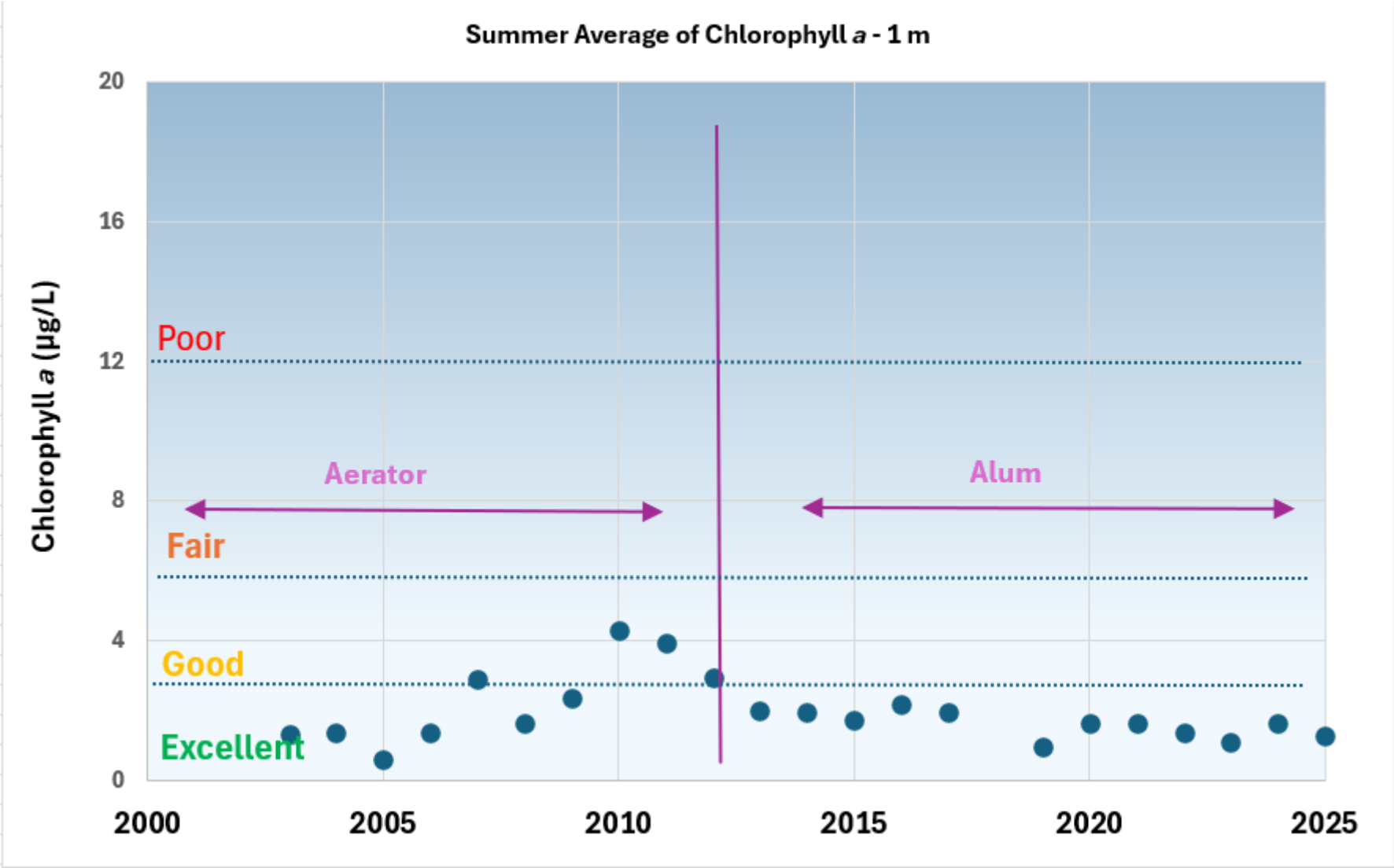
Phosphorus

EXCELLENT



Chlorophyll a

EXCELLENT



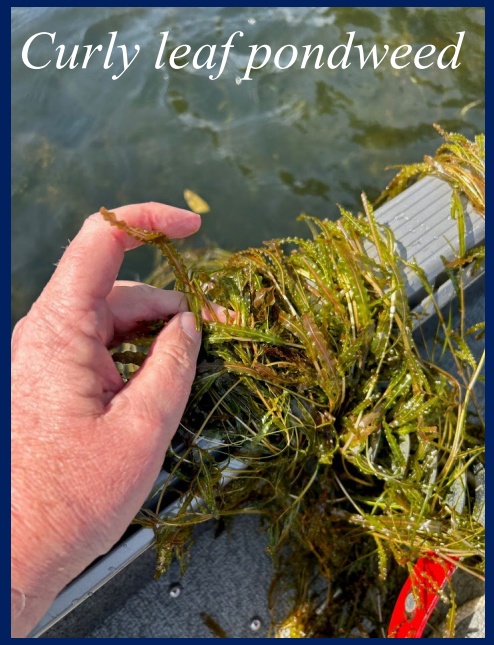
Recent Algae Blooms

Last Alum Treatment - 2022

January 2023

November 2025

Aquatic Plant Management



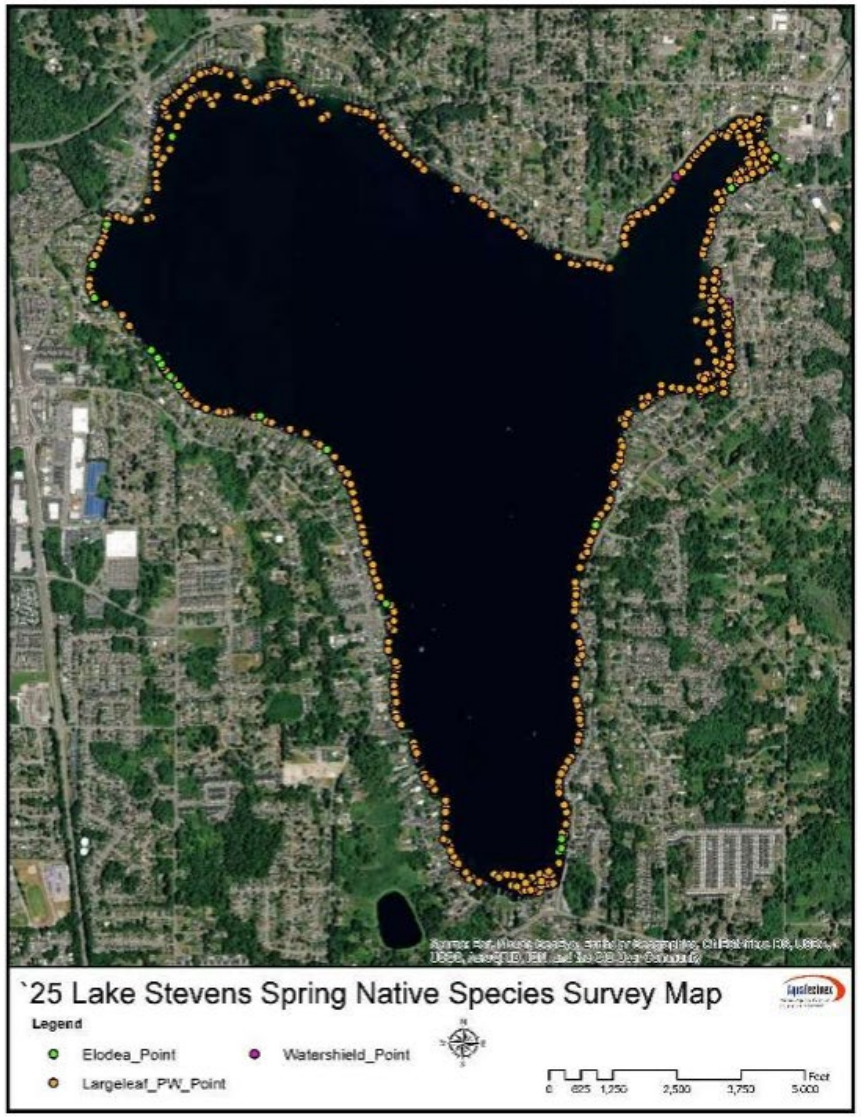
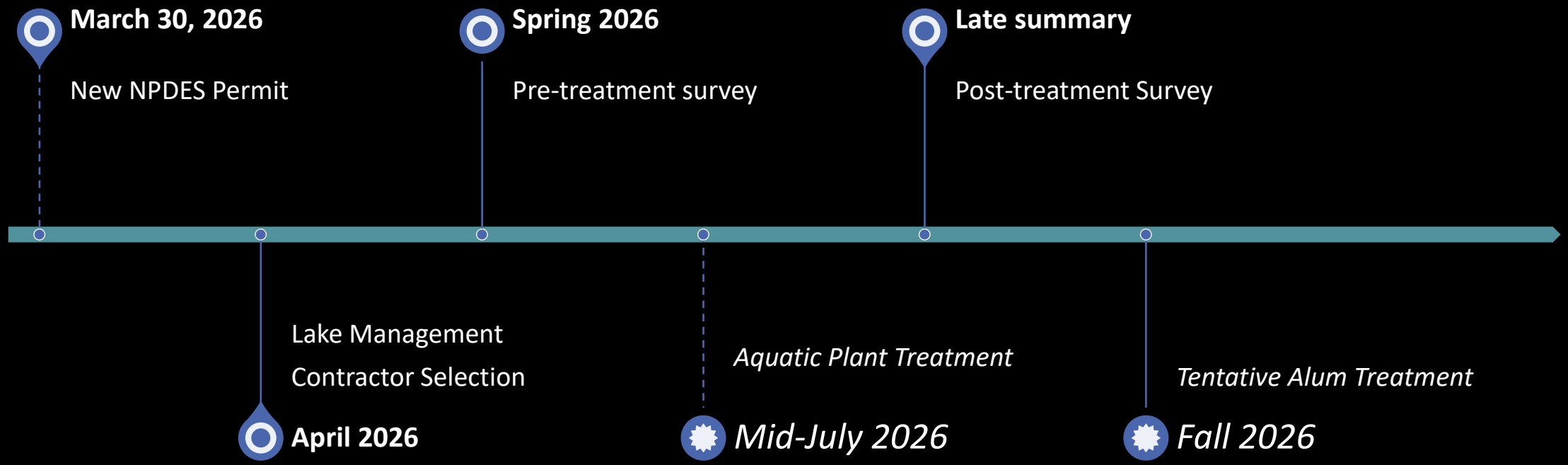


Figure 1: Spring Native Species Map

Figure 2: Spring Invasive Species Map

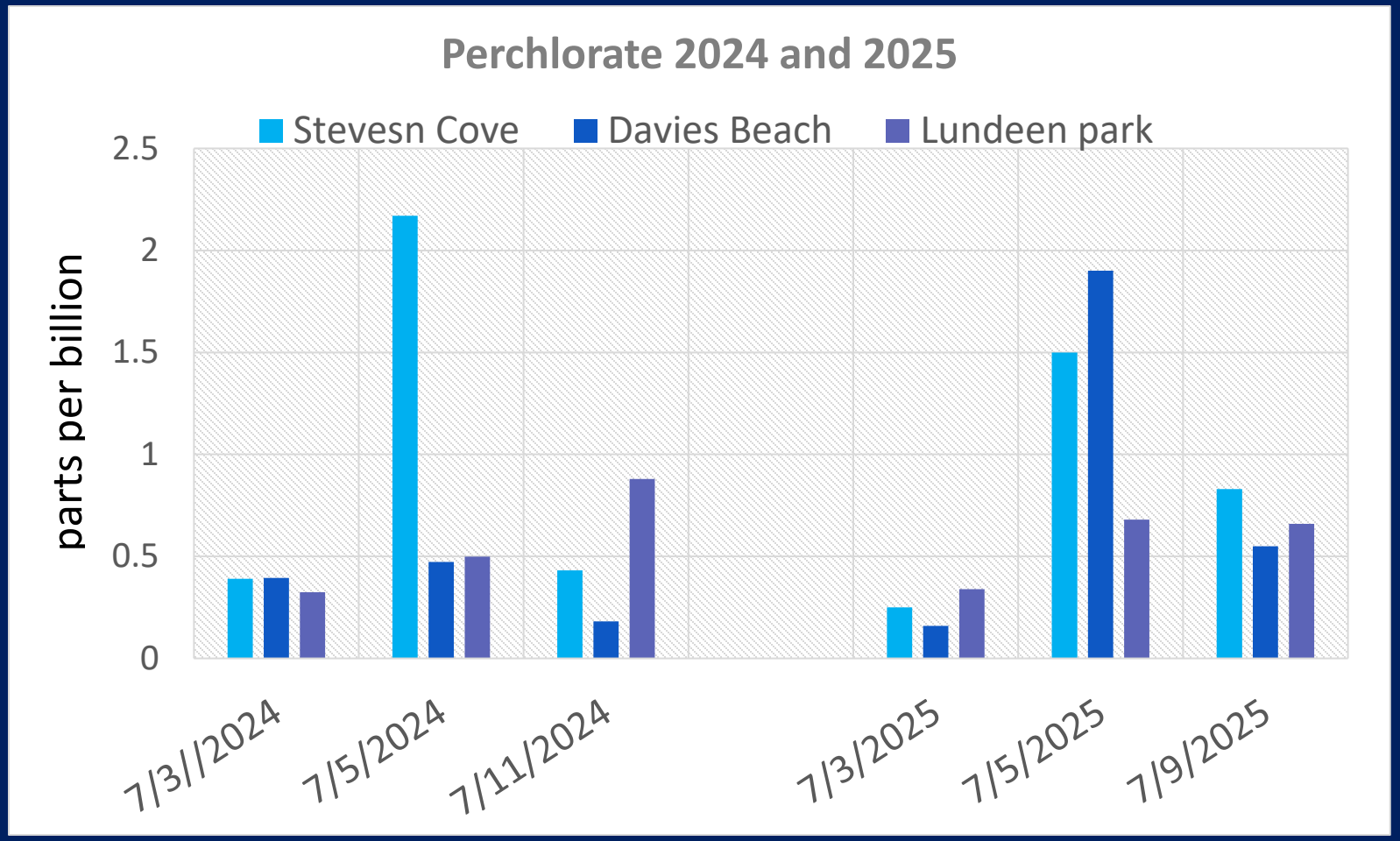
2026 Management Actions



Perchlorate

- Sources (examples):
  - Natural:
    - atmosphere (ozone and chloride aerosols), volcanic eruptions, soils (mostly Southwest USA)
  - Anthropogenic:
    - fireworks, matches, flares, some fertilizers
- Functional distribution:
  - Highly soluble in water and stable
  - Adsorbs into clays
  - May be biologically degraded by microorganisms in anaerobic conditions (potentially including algae)
  - Bioaccumulates in living tissue
- Effects:
  - Still under study
  - Indication of effects on thyroid function in youth

Perchlorate in Lake Stevens



- EPA drinking water maximum contaminant level goal: 20 ppb, effects are detectable at 1 ppb
- Goldfish study showed impacts on the thyroid at concentrations starting around 1,200 ppb
- Continued perchlorate testing: $3,000 - $4,000/year
- Our Recommendation: Sample every 3 – 5 years to establish and track long-term trends

Other Management Programs

Routine Maintenance of Stormwater Infrastructure

- Cleaned 56 Stormwater Detention ponds and Facilities (city-owned)
- Sweep every city street 3+ times
- 900+ tons of material removed from the system
- 1,032 Basins cleaned
- ~68,000 feet of pipes cleaned
- 76 Stormwater filters replaced

NPDES Permit – Water Quality Requirements

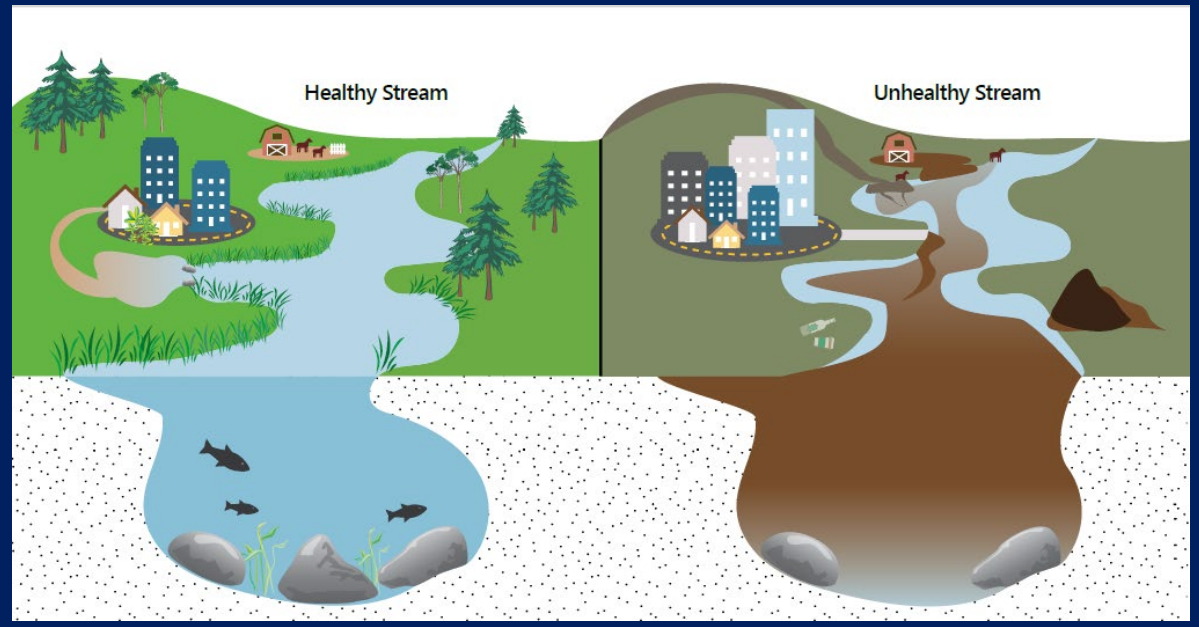
Long Range Plans

- Basins Plan/Comprehensive Plan
- Enhanced Stormwater Maintenance Plan

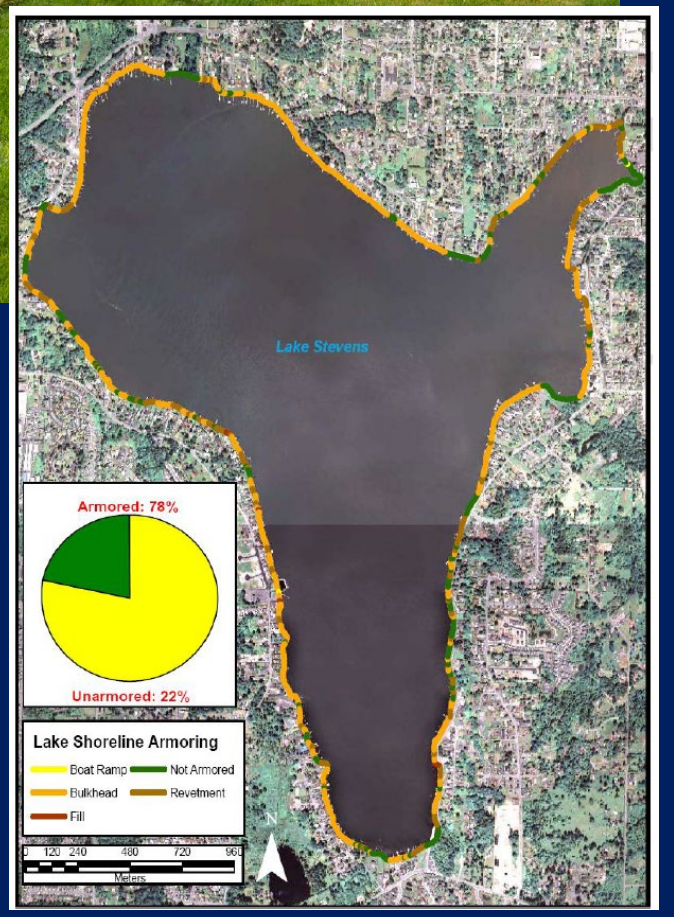
Capital Projects

- Lower Stevens Creek Restoration
- Green Stormwater Infrastructure

Catherine Creek Neighborhood Detention Pond



Community Actions



Questions

Photo Credit: Scott VanOstrand