

Planning For Stream Corridor Protection

Dutchess County Planning
Federation

Aquifer & Stream Corridor
Protection Forum

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Topics

1. Water Quality Issues
2. Need for Planning
3. Tools Available
4. Questions?

All the water that will ever be is, right now

–National Geographic Society

Water is Life

Water today: same water the dinosaurs used

69% of freshwater is frozen

30% of freshwater is in the ground

1% of freshwater is accessible and vulnerable

Water use growing more than twice population growth

Competition for drinking, cooking, bathing, recreation,
power, farms

$\frac{3}{4}$ of all Americans live within 10 miles of polluted water

Water is Vulnerable

Water a universal solvent; Can dissolve more substances than any other liquid

Easily polluted

EPA estimates $\frac{1}{2}$ of all rivers & streams polluted

EPA: $\frac{1}{3}$ of all lakes polluted

EPA: making them unfit for swimming, drinking, fishing

EPA: nutrient pollution is leading contamination



The solution to pollution is dilution

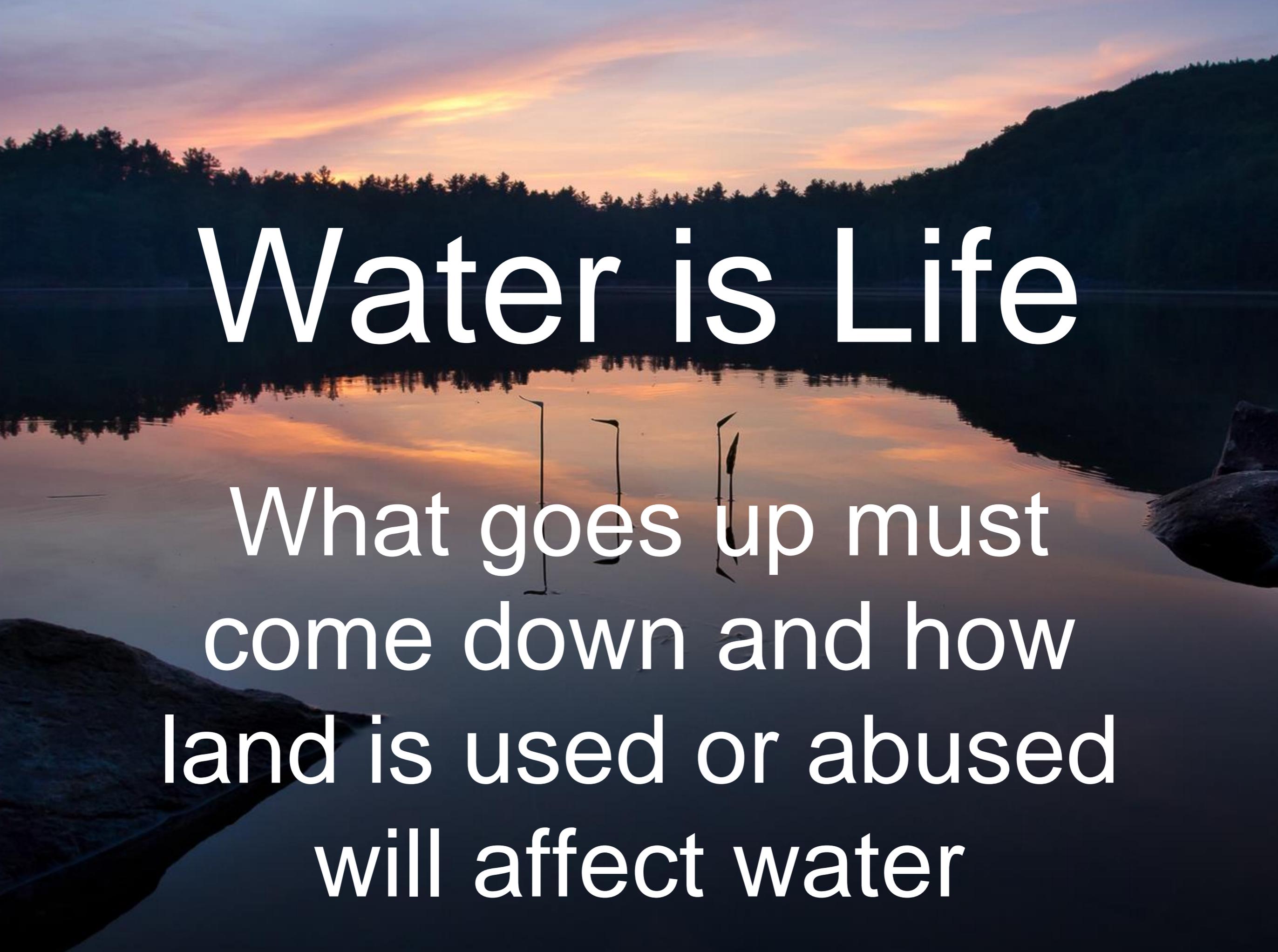


The solution to pollution is prevention



Water is Life

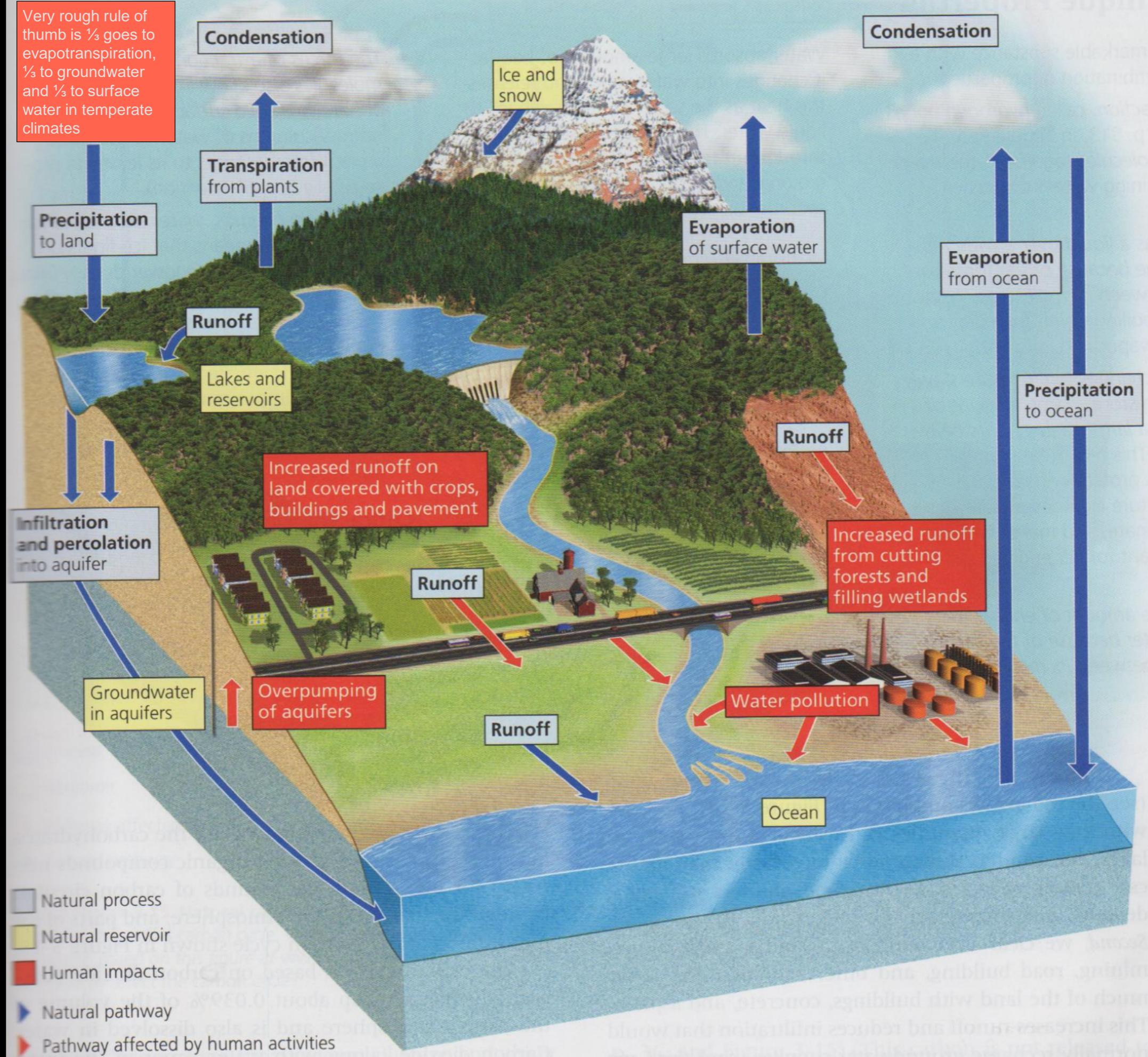
But so is the
Air and Land

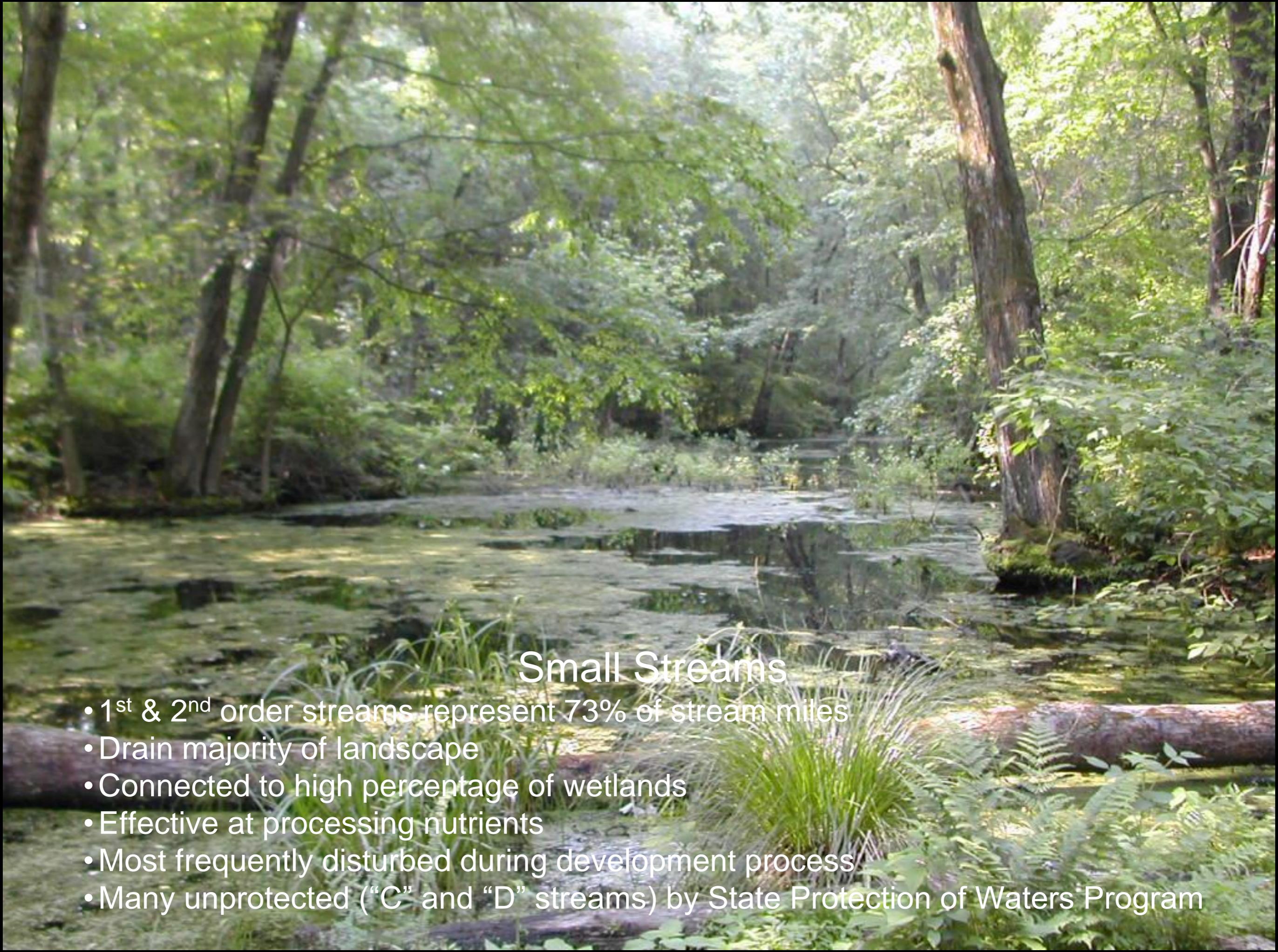


Water is Life

What goes up must
come down and how
land is used or abused
will affect water

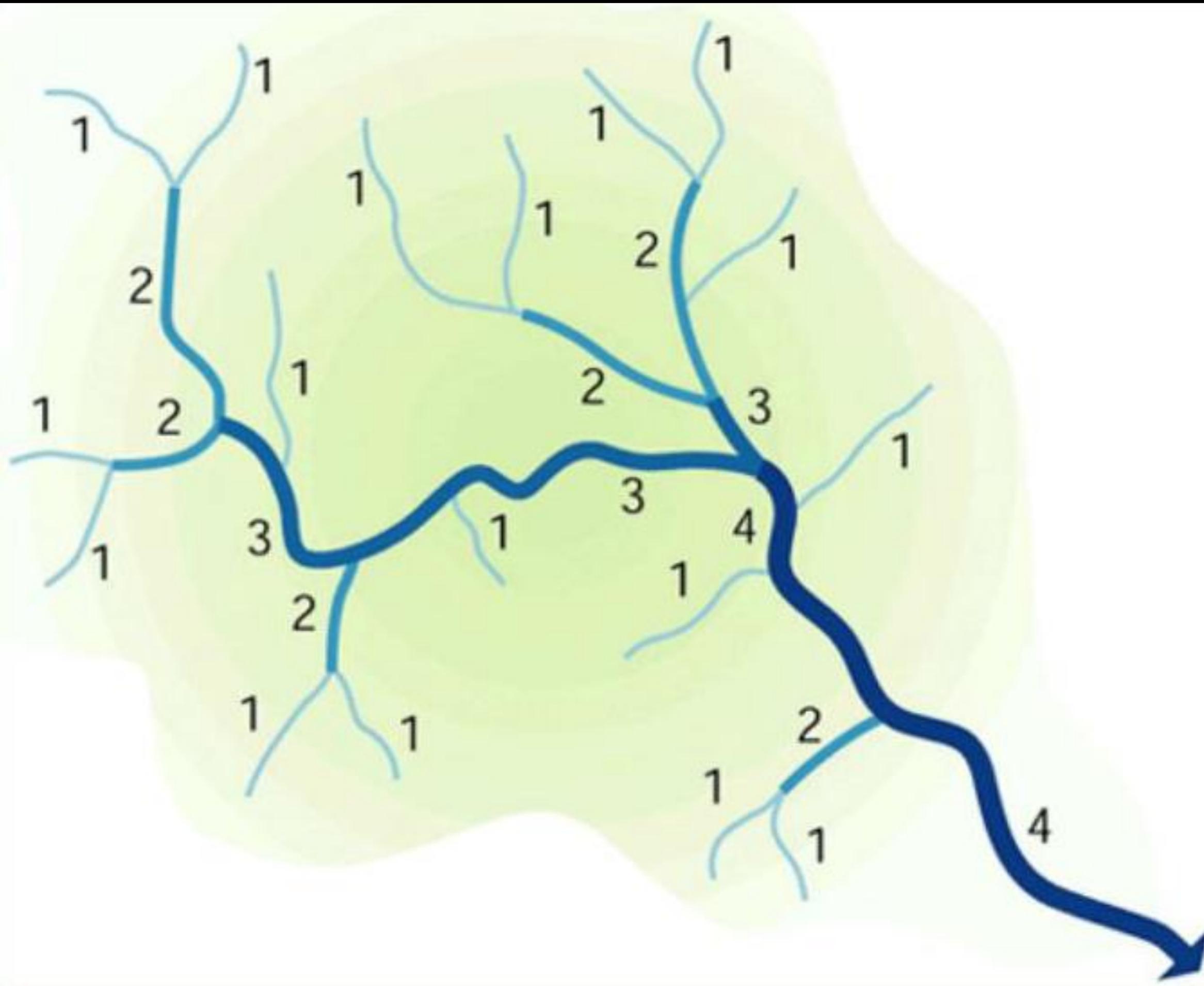
Very rough rule of thumb is 1/3 goes to evapotranspiration, 1/3 to groundwater and 1/3 to surface water in temperate climates





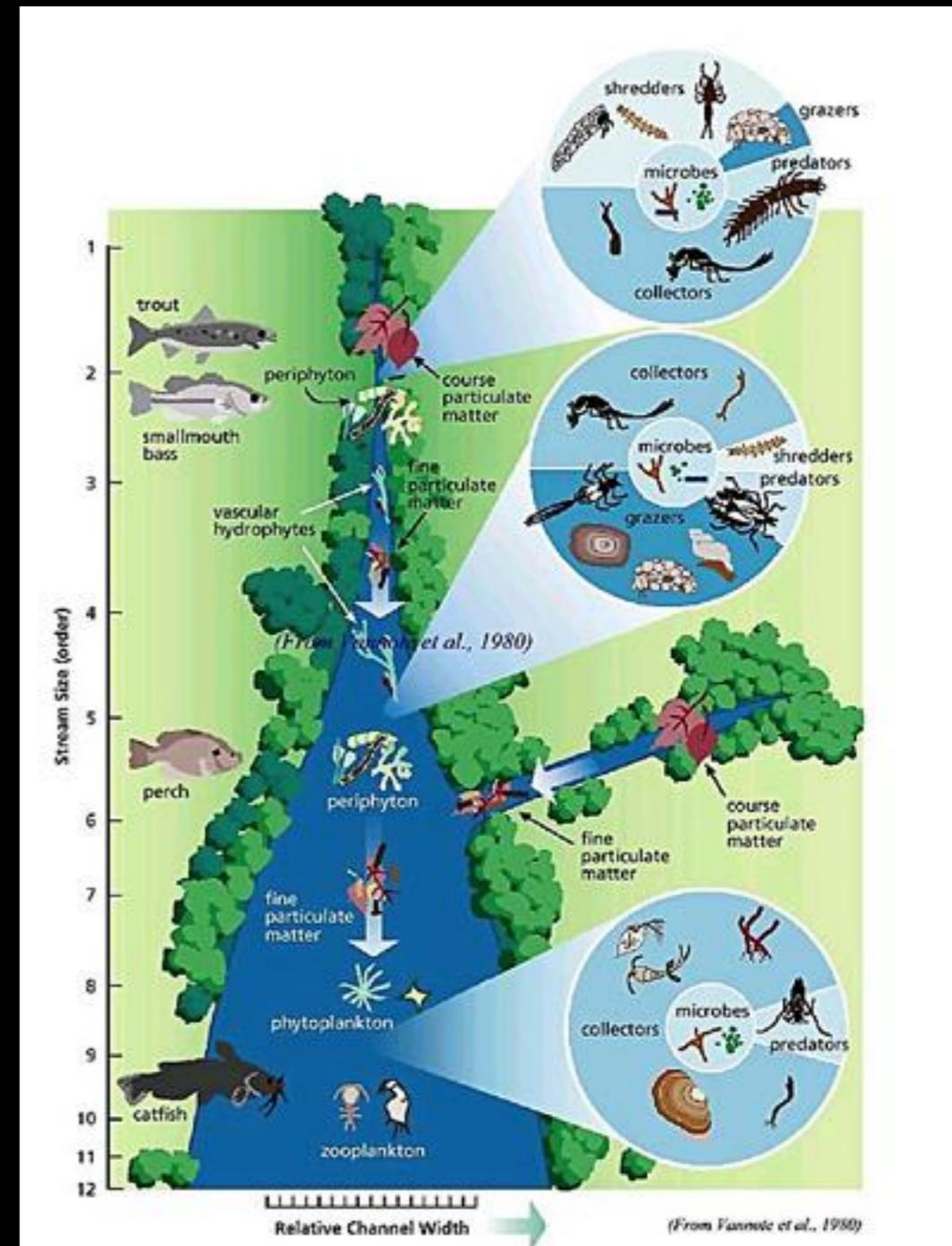
Small Streams

- 1st & 2nd order streams represent 73% of stream miles
- Drain majority of landscape
- Connected to high percentage of wetlands
- Effective at processing nutrients
- Most frequently disturbed during development process
- Many unprotected (“C” and “D” streams) by State Protection of Waters Program

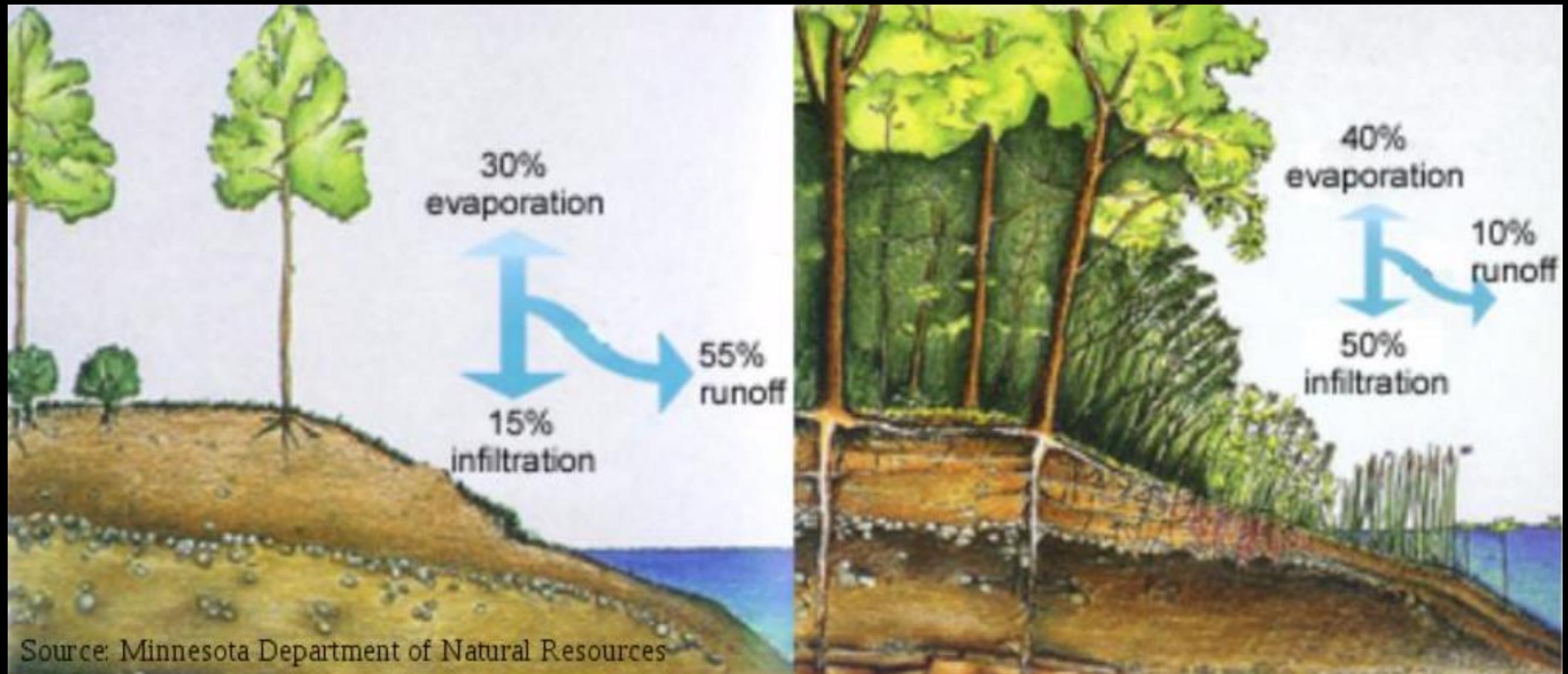


Stream Corridor Buffers

- Science of stream corridors is key
- More than a line on a map
- More than a regulatory setback
- Floodplain is core of buffer
- Management as important as buffer
- Should be continuous buffer



The River Continuum Concept. Source: Stream Corridor Restoration: Principles, Processes, and Practices, 10/98, by the Federal Interagency Stream Restoration Working Group (FISRWG).



Vegetation anchors shorelines preventing erosion, holding back soil and contaminants

The Streamside Forest Buffer



	20'	60'	15'		15'	20'	60'	
	ZONE 3	ZONE 2	ZONE 1		ZONE 1	ZONE 2	ZONE 3	
CROPLAND	RUNOFF CONTROL	MANAGED FOREST	UNDISTURBED FOREST	STREAMBOTTOM	UNDISTURBED FOREST	MANAGED FOREST	RUNOFF CONTROL	PASTURE
Sediment, fertilizer and pesticides are carefully managed.	Concentrated flows are converted to dispersed flows by water bars or spreaders, facilitating ground contact and infiltration.	Filtration, deposition, plant uptake, anaerobic denitrification and other natural processes remove sediment and nutrients from runoff and subsurface flows.	Maturing trees provide detritus to the stream and help maintain lower water temperature vital to fish habitat.	Debris dams hold detritus for processing by aquatic fauna and provide cover and cooling shade for fish and other stream dwellers.	Tree removal is generally not permitted in this zone.	Periodic harvesting is necessary in Zone 2 to remove nutrients sequestered in tree stems and branches and to maintain nutrient uptake through vigorous tree growth.	Controlled grazing or haying can be permitted in Zone 3 under certain conditions.	Watering facilities and livestock are kept out of the Riparian Zone insofar as practicable.

USDA Forest Service: Stroud (PA) Demonstration Project

Water Pollution Sources

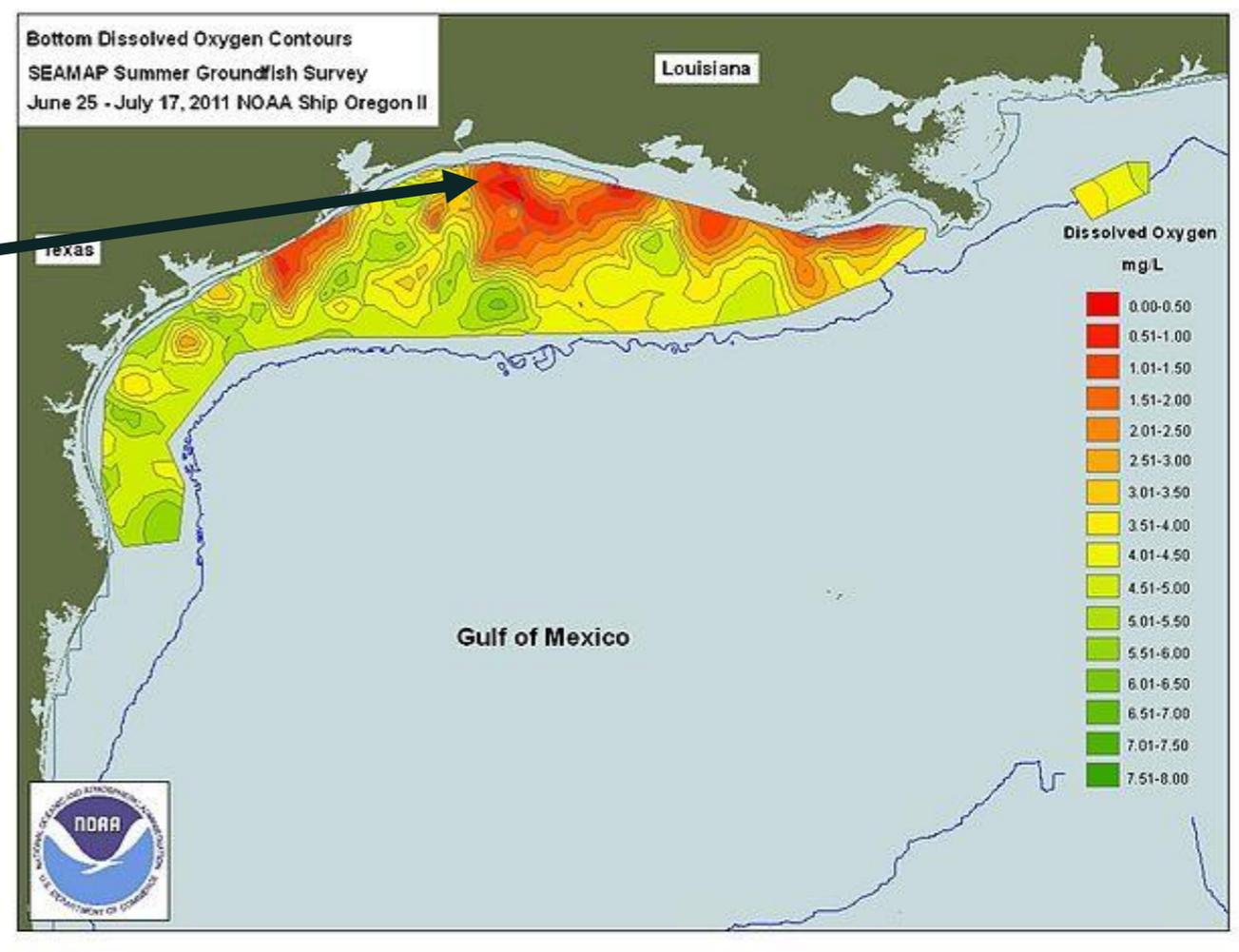
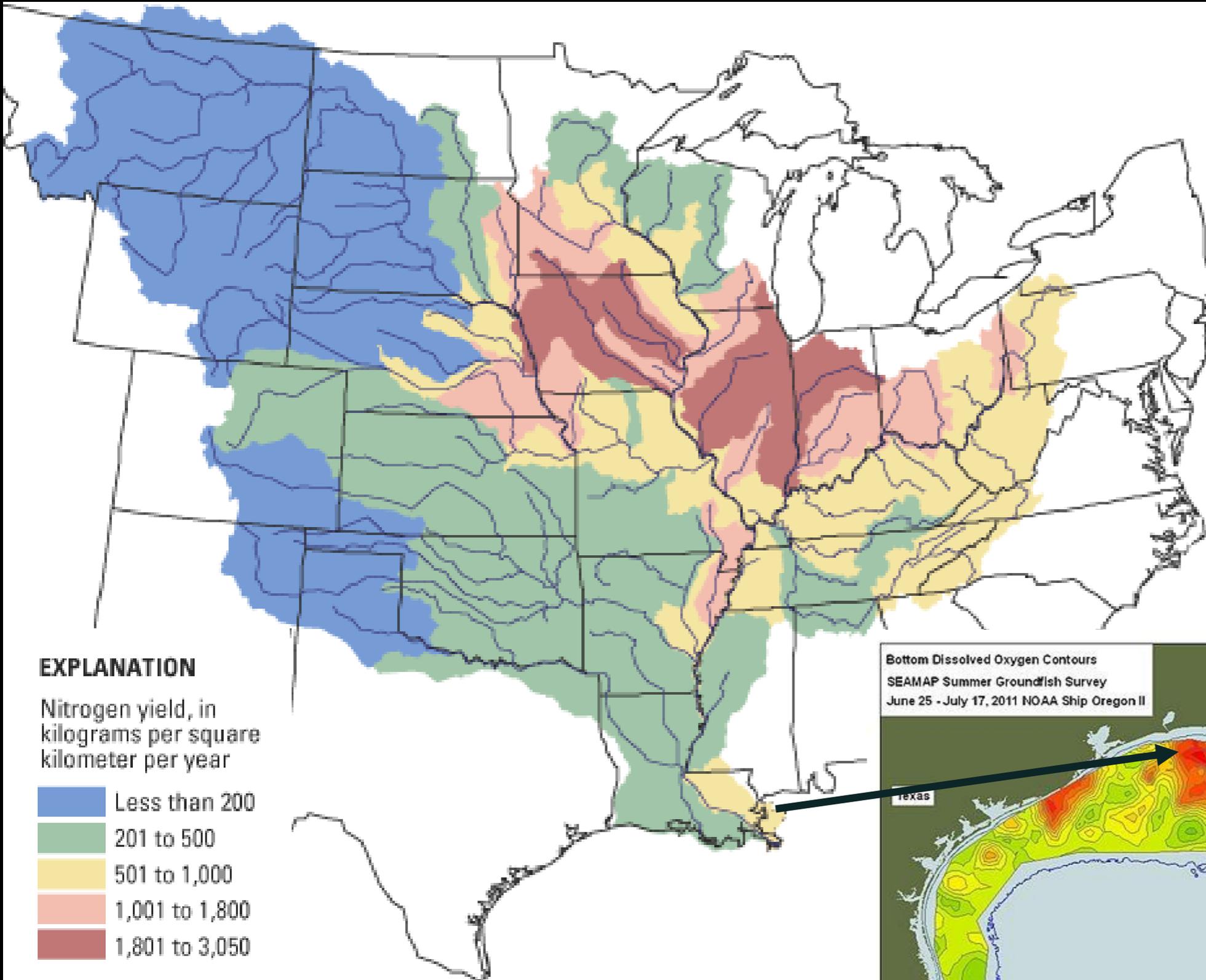
- Eutrophication: farm, animal, human, industrial runoff create excessive concentration of nutrients - leading cause of water pollution
- Phosphorus & nitrogen runoff results in enhanced plant and depleted aquatic life due to lack of oxygen
- Dead zones result



Water Pollution Sources

- Gulf of Mexico dead zone flows from nitrogen applied to corn crops in Iowa
- Pollutants in runoff can travel thousands of miles
- Local lakes and ponds exhibit signs of eutrophication





Water Pollution Sources

- Microplastics from air and land →
- Point sources such as STP's release microplastics, personal care products (PCP), and pharmaceuticals



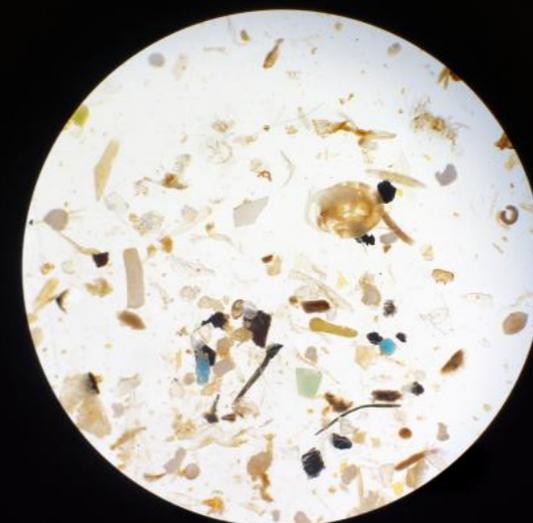
Water Pollution Sources

- Nonpoint sources of microplastics such as car tire dust left on roads
- Study in CA found:
 - 7 T pieces of microplastics from streets (tires) wash into San Francisco Bay each year
 - 300 X the number of microfibers washing off poly clothing



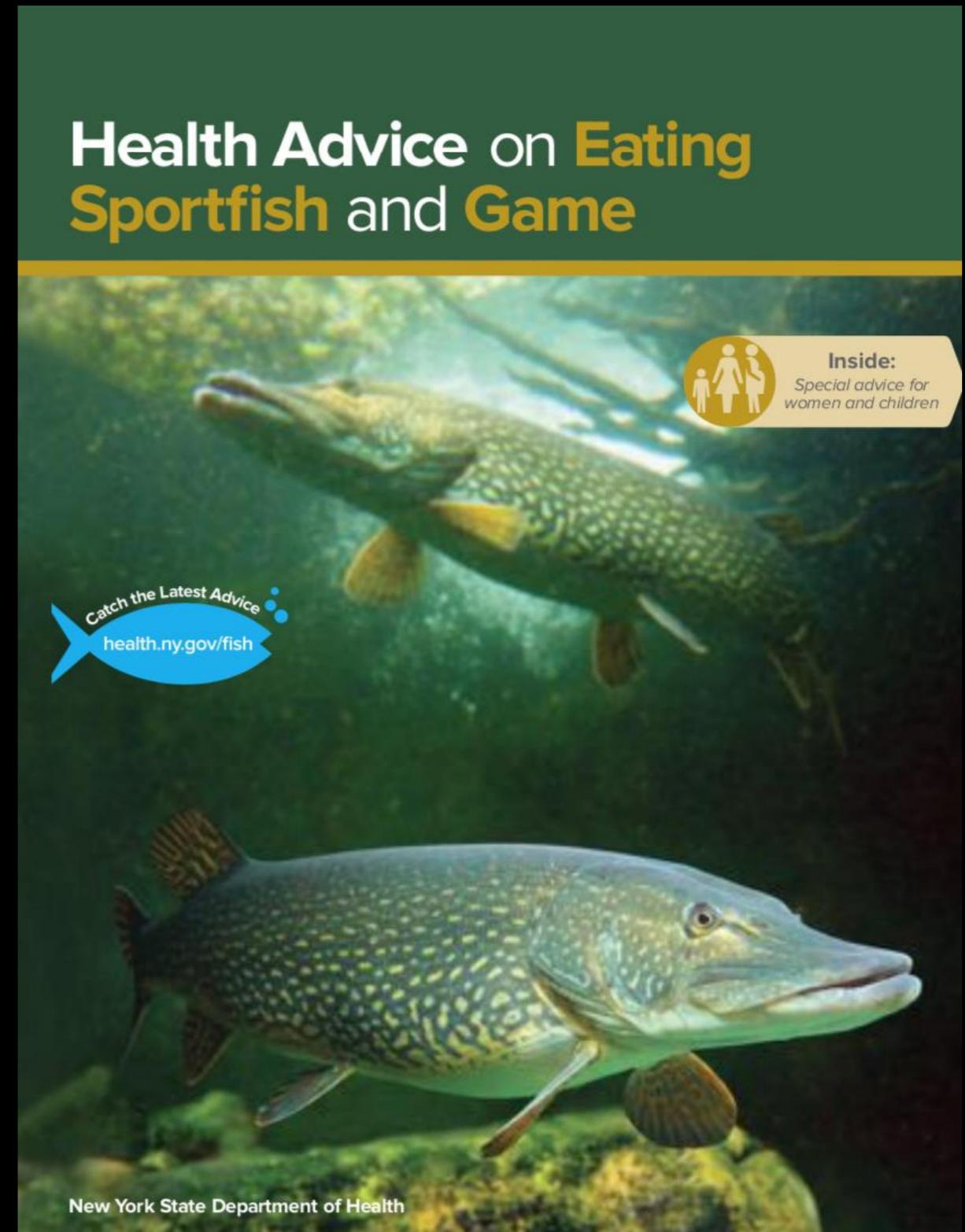
Water Pollution Sources

- Microplastics found in fish, shellfish, bottled water, salt, beer, community water, Mariana Trench, Arctic Ocean and human BM's
- Meta-analysis of 52 studies concluded we consume credit card's worth of plastic each week



Water Pollution Sources

- Mercury and heavy metals from burning fossil fuels
- New York Health Department warns against eating most wild fish caught in the State



Water Pollution Sources

- State's Advice: Don't Eat Locally caught fish or limit amounts mostly because of mercury

Hudson Valley/Capital District Region (Map p.27)

 Waterbody (County) ^{1,2}	 Fish	 Men Over 15 and Women Over 50	 Women Under 50 and Children Under 15	 Chemicals of Concern
All waters NOT listed (Hudson Valley/Capital District Region)	All fish	Up to 4 meals/month	Up to 4 meals/month	
Amawalk Reservoir (Westchester)	Largemouth bass, Smallmouth bass	Greater than 16", up to 1 meal/month; Less than 16", up to 4 meals/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Bog Brook Reservoir (Putnam)	Walleye	Greater than 21", up to 1 meal/month; Less than 21", up to 4 meals/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Boyd Corners Reservoir (Putnam)	Walleye	Up to 1 meal/month	DON'T EAT	Mercury
	Largemouth bass	Greater than 16", up to 1 meal/month; Less than 16", up to 4 meals/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Breakneck Pond (Rockland)	Largemouth bass	Greater than 15", up to 1 meal/month; Less than 15", up to 4 meals/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Cross River Reservoir (Westchester)	Largemouth bass, Smallmouth bass	Greater than 16", up to 1 meal/month; Less than 16", up to 4 meals/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Diverting Reservoir (Putnam)	Walleye	Up to 1 meal/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Dunham Reservoir (Rensselaer)	Walleye	DON'T EAT	DON'T EAT	Mercury
	Smallmouth bass	Up to 1 meal/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Dyken Pond (Rensselaer)	Largemouth bass	Up to 1 meal/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
East Branch Reservoir (Putnam)	Walleye	Up to 1 meal/month	DON'T EAT	Mercury
	All other fish	Up to 4 meals/month	DON'T EAT	Mercury
Hoosic River (Rensselaer, Washington)	Brown trout	Greater than 14", up to 1 meal/month; Less than 14", up to 4 meals/month	DON'T EAT	PCBs
	All other fish	Up to 4 meals/month	DON'T EAT	PCBs
Hudson River	See Hudson River and Tributaries p.28			

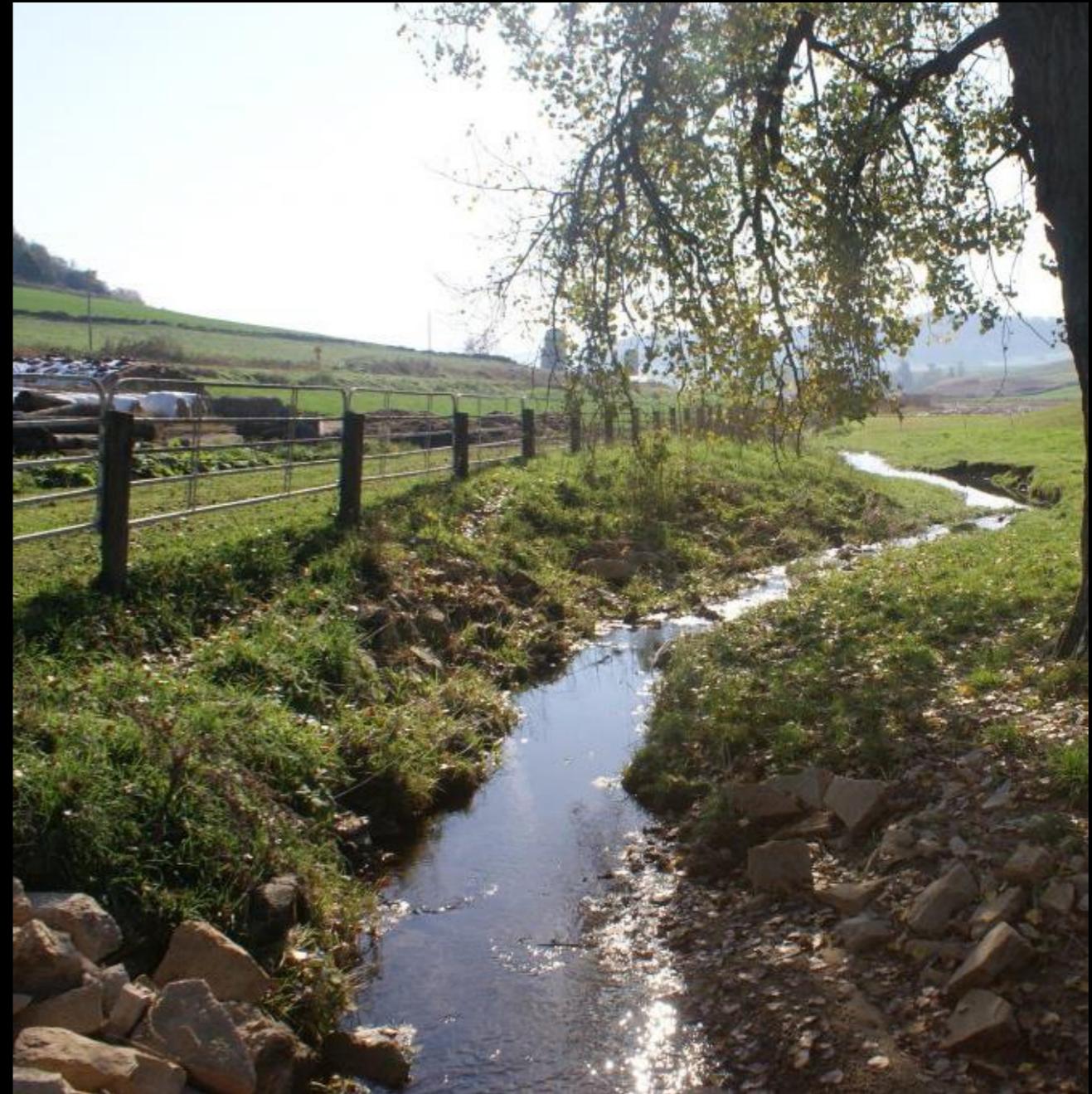
Check the NYS DEC website for updated regulations and special restrictions for certain species: www.dec.ny.gov/outdoor/fishing.html.

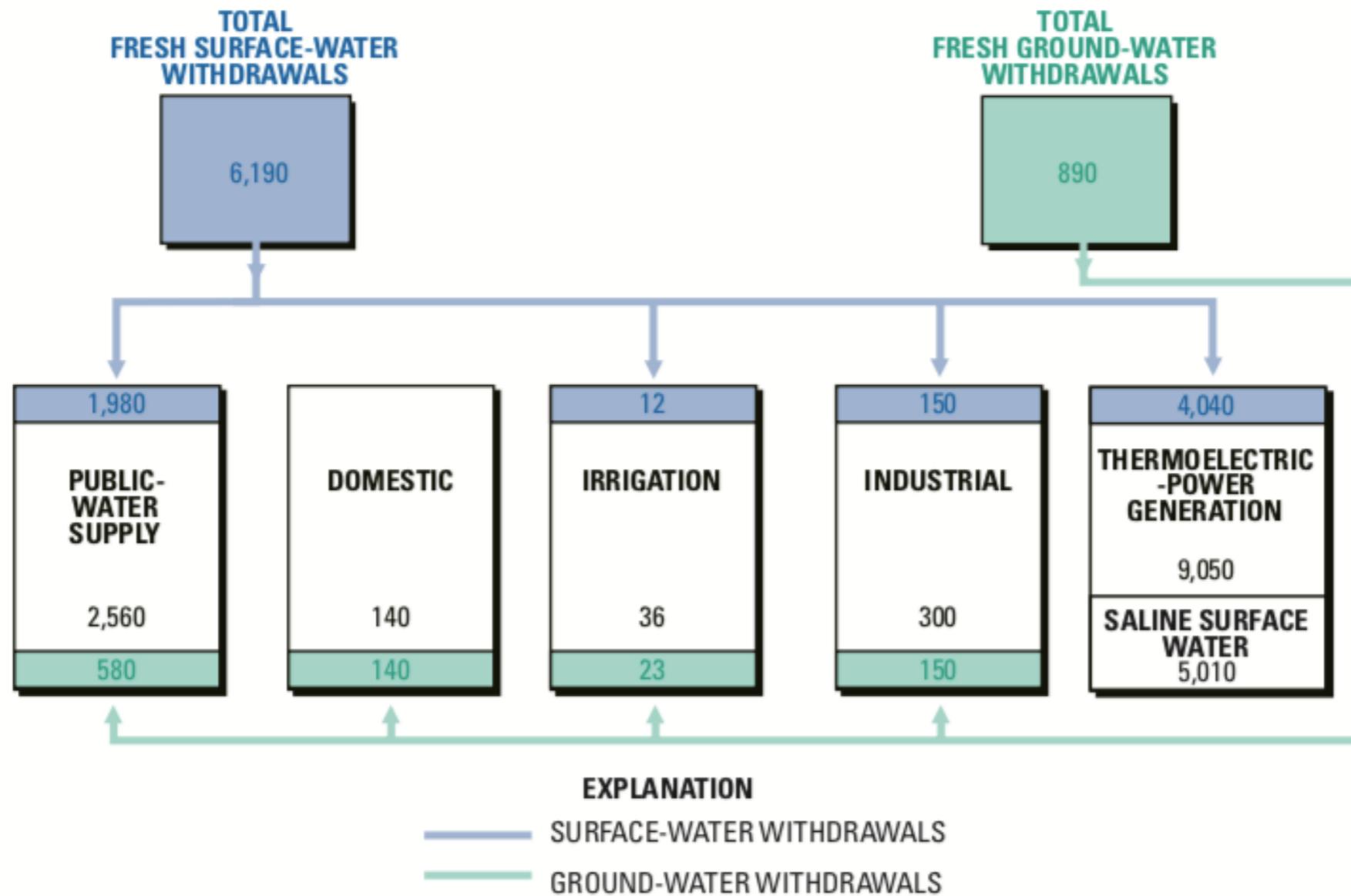
¹ The specific health advisories for the waters listed above also apply to tributaries and connected waters if there are no dams, falls or barriers to stop the fish from moving upstream.

² See the Catskill Region, p. 18-19 for waters with advice in Green and Ulster counties.

Water Pollution Sources

- EPA: Nonpoint sources include fertilizers, herbicides, insecticides from ag and residential
- Oil, grease and toxics from urban runoff
- Sediment from construction, crop and forestland, & eroding streambanks
- Salt from road runoff
- Bacteria & nutrients from livestock & pets
- EPA: *“We know that these pollutants have harmful effects on drinking water supplies, recreation, fisheries and wildlife”* <https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution>

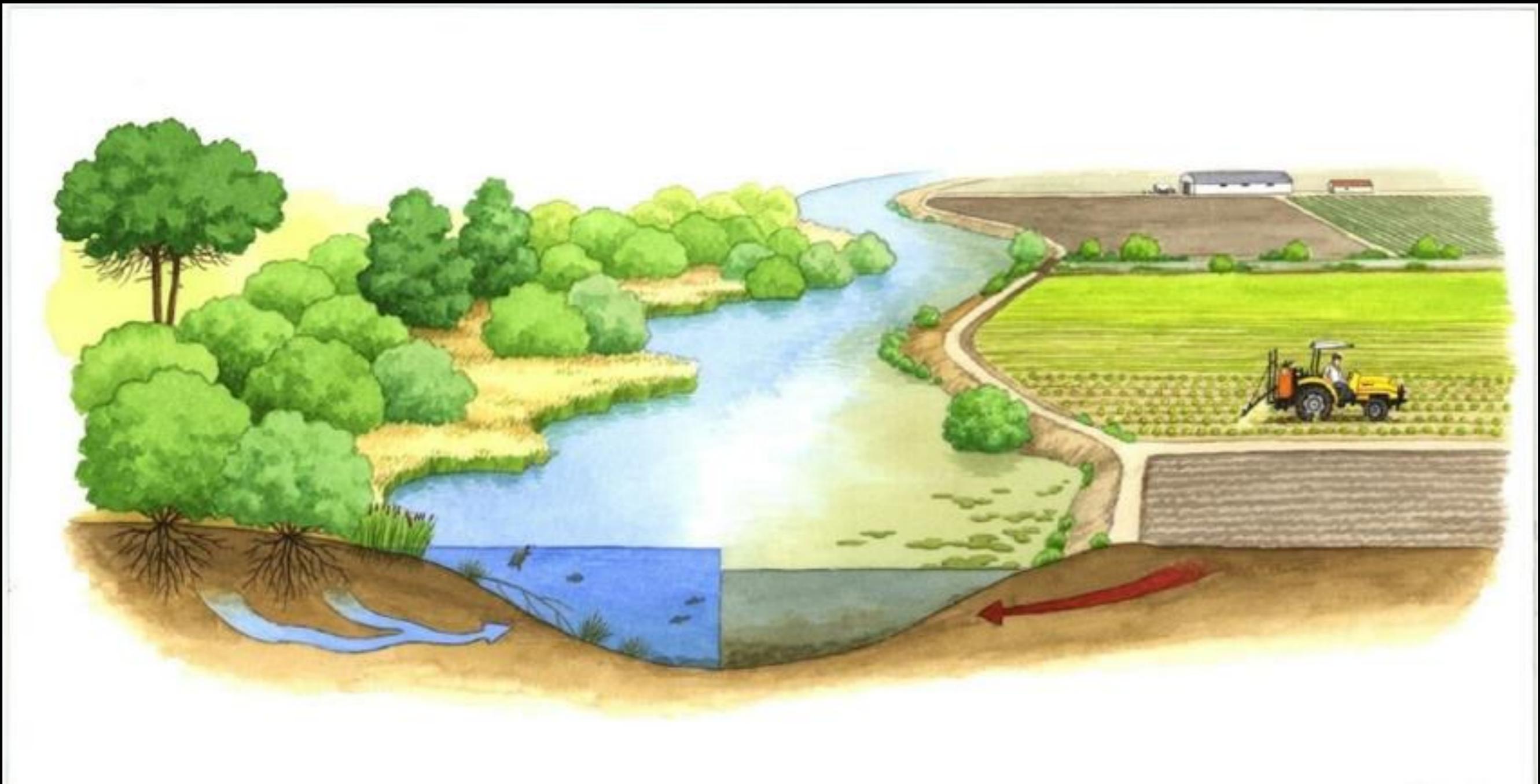




Values are in million gallons per day.
 Values inside the box represents the total withdrawals for that category.
 Note: Values may not add to totals because of rounding.

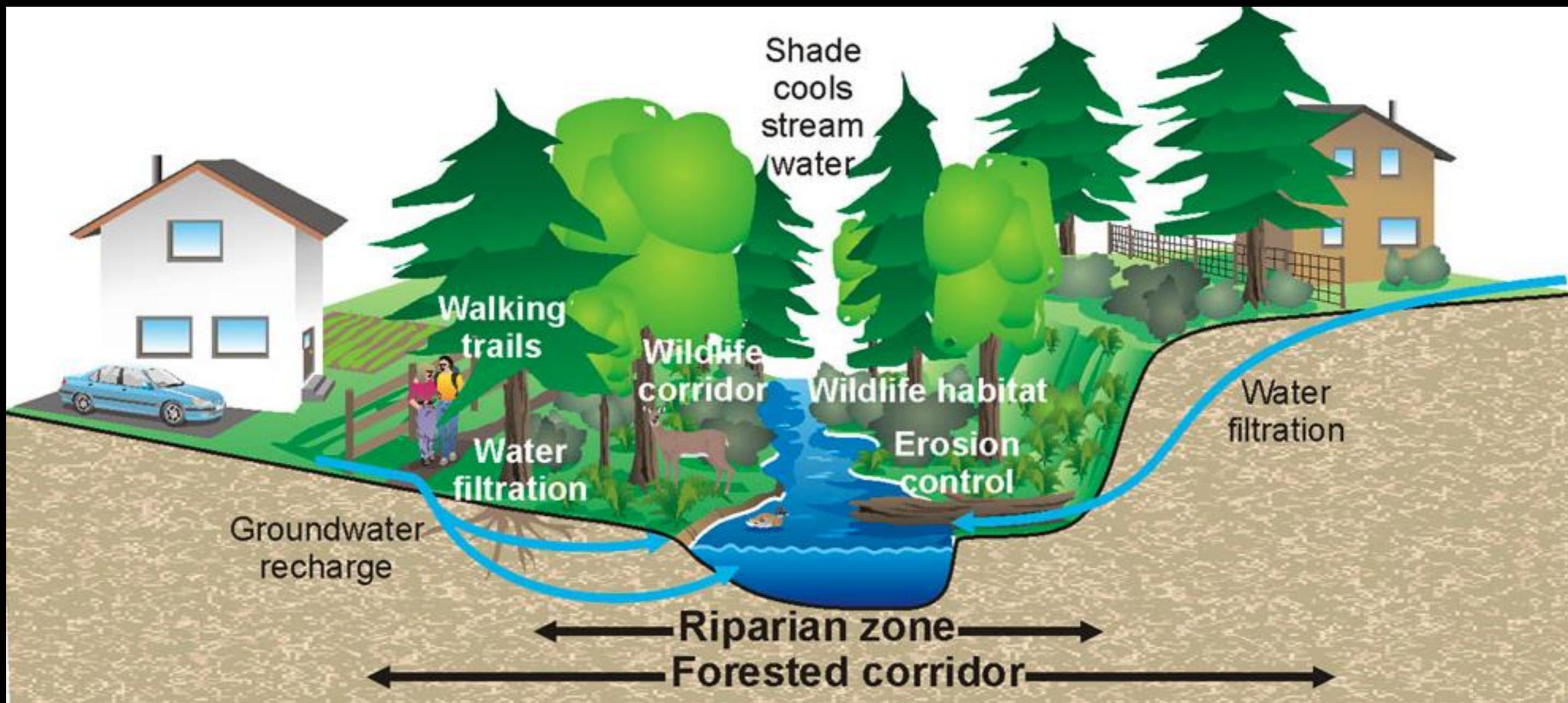
Water Use in NYS

USGS: How do humans use water?



What do we do about it?

Prevent pollutants from entering waterways in the first place



What do we do about it?

Protect stream corridors based on sound science

NYS Legislature:

“Adequate and suitable water for water supply, domestic, municipal, industrial, agricultural and commercial uses, power irrigation, transportation, fire protection, sewage and waste assimilation, the growth of forests, maintenance of fish and wildlife, recreational enjoyment and other uses is essential to the health, safety and welfare of the people and economic growth and prosperity of the state” [ECL § 15-0103.3]



NYS Coastal Management Program & NOAA:

“By our actions, we have altered natural processes to the point where many organisms can no longer exist, once-reliable sources of drinking water can no longer be used, and our ability to use water for recreational purposes has been impaired. To combat pollution, we must understand the nature of the problem and select and implement practices that reduce our impact upon this natural resource.”



NY Updates Planning & Zoning Enabling Acts

- More than 40 statutory changes made over more than two decades of work
- 1990's first updates since 1930s
- Senator Charles Cook provided sustained leadership to accomplish the effort
- Addressed:
 - smart growth
 - flexible zoning techniques
 - codification of case law
 - modernization of basic enabling laws
 - intermunicipal cooperation
 - coordination with other laws



Comprehensive Plans

- All land use controls “*must be*” in accordance with comprehensive plan
- “*Plans for capital projects of another government agency...shall take such plan into consideration.*”
- Zoning but one element of comprehensive plan, not the other way around
- “*The comprehensive plan is the essence of zoning. Without it, there can be no rational allocation of land.*” [NY State Court of Appeals]
- A well written plan sets ground rules for how municipal land use controls are implemented

Smart Growth & Flexible Zoning

- Traditional zoning regulates use, density, and location of permissible uses
- Municipalities can go beyond to protect the environment by regulating:
 - Aquifers, woodlands, wetlands, watersheds, watercourses, lakes, ponds, habitats, floodplains and open space
 - Municipalities can protect steep slopes and woodlands, prevent soil erosion/sedimentation, mitigate pollution from nonpoint sources, control chemical applications, fix locations for solid waste facilities, junkyards, mines, and quarries

Smart Growth & Flexible Zoning

- Examples:
 - Distance developments from natural resources, like watercourses, to prevent nonpoint source pollution through underlying zoning, overlay districts, and performance standards
 - Enact soil erosion and sediment control rules that require permits conditioned on preventing pollution
 - Prohibit tree removal without a permit and require replacement of trees lost
 - Prevent pollution from construction by regulating construction activities to prevent nonpoint source pollution

Getting Started

- What to do if zoning hasn't been updated to protect the environment?
 - Grant to prepare Natural Resource Inventory
 - Conservation Advisory Council
 - Update/prepare comprehensive plan and zoning
 - Create Critical Environmental Areas under SEQR
 - Environmental Review Process under SEQR

Getting Started

- Grant to prepare Natural Resource Inventory
 - Municipal General Funds
 - Private Funding
 - Hudson River Estuary Program
 - Greenway Community Grants
 - NYS Consolidated Funding Application Process
 - Volunteers (after training), students, other sources

Getting Started

- Conservation Advisory Council
 - Created to study and protect local open areas
 - Keeps an inventory and map of local open areas and information on them
 - Identifies areas listed by priority for acquisition or preservation
 - Can be redesignated as Conservation Board to review development applications and make recommendations for impacts on identified open areas
 - CACs and CABs can be assigned other roles by resolution of legislative board

Getting Started

- Recommend updating/preparing comprehensive plan and zoning
 - State enabling laws mandate: *“providing...the maximum intervals at which the adopted plan shall be reviewed.”*
 - Times change, new planning approaches get tested, and opportunities arise
 - Keeping plans and zoning current essential to maintaining environmental quality and meeting resident’s needs
 - State and federal laws change and new priorities emerge

Getting Started

- Create Critical Environmental Areas under SEQR
 - Any local agency (i.e. planning boards, legislative boards, etc.) can designate CEA after public notice and hearing
 - CEA designation requires higher level of environmental review under SEQR
 - Impact on CEA must be evaluated in determination of significance under SEQR [617.14(g)(4)]
 - Broad categories available for designation [617.14(g)(1)]

Getting Started

- Environmental Review Process under SEQR
 - Many avenues available to identify important environmental resources and assess impacts
 - Natural Resource Inventory, if available, is primary building block for protecting stream corridors
 - Applicant studies are secondary source; should be independently verified in review process
 - SEQR becomes foundation and “umbrella” for administration of other municipal planning functions

Getting Started

- Environmental Review Process under SEQR
 - Short EAF for Unlisted Actions - Part 1:
 - Is the proposed action consistent with the predominant character of the existing built or natural landscape?
 - Is the site of the proposed action located in, or does it adjoin, a State listed Critical Environmental Area? (same question on the Long EAF)
 - Would the proposed action physically alter, or encroach into, any existing wetland or waterbody?
 - Does the site of the proposed action contain any species of animal, or associated habitats, listed by the State or Federal government as threatened or endangered?
 - Is the project site located in the 100 year flood plain?
 - Will the proposed action create storm water discharge, either from point or non-point sources?

Getting Started

- Environmental Review Process under SEQR
 - Short EAF for Unlisted Actions - Part 2:
 - Will the proposed action result in an adverse change to natural resources (e.g. wetlands, waterbodies...?)
 - Will the proposed action result in an increase in the potential for erosion, flooding or drainage problems?

Getting Started

- Environmental Review Process under SEQR
 - Long EAF for Type 1 Actions or when more info needed - Part 1:
 - Would the proposed action cause or result in alteration of, increase or decrease in size of, or encroachment into any existing wetland, waterbody...or adjacent area?
 - Describe how the proposed action would affect that waterbody or wetland...?
 - Will the proposed action disturb more than one acre and create stormwater runoff, either from new point sources (i.e. ditches, pipes, swales, curbs, gutters or other concentrated flows of stormwater) or non-point source (i.e. sheet flow) during construction or post construction
 - Where will the stormwater runoff be directed?
 - Will the proposed action (commercial, industrial and recreational projects only) use pesticides (i.e., herbicides, insecticides) during construction or operation?



Legoland NY FEIS

- ✓ Project relied on the NY State Standards for Stormwater Management
- ✓ 2018 FEIS states: *“none of the...stormwater mitigation practices...remove pesticides or herbicides from stormwater.”*

Getting Started

- Environmental Review Process under SEQR
 - Long EAF for Type 1 Actions or when more info needed - Part 1:
 - Does any portion of the project site contain wetlands or other waterbodies (including streams, rivers, ponds or lakes)?
 - Do any wetlands or other waterbodies adjoin the project site?
 - Are any of the wetlands or waterbodies within or adjoining the project site regulated by any federal, state or local agency?
 - Are any of the above water bodies listed in the most recent compilation of NYS water quality-impaired waterbodies?
 - Is the project site in a designated Floodway...100 Year Floodplain...500 Year Floodplain?

Getting Started

- Environmental Review Process under SEQR
 - Long EAF for Type 1 Actions or when more info needed - Part 2:
 - Impact on Land (steep slopes, high water table, pesticides, erosion hazards)
 - Impact on Surface Water (construction in or adjoining water, erosion/siltation, water quality, pesticides)
 - Impact on Flooding (development or change in floodplain or drainage patterns)
 - Impact on Plants and Animals (habitat degradation or loss, pesticides)
 - Impact on Open Space and Recreation (ecosystem services, stormwater, nutrient cycling)
 - Impact on Critical Environmental Areas (change in quantity or quality)
 - Consistency with Community Plans (inconsistent with local plan & zoning or county and regional plans)
 - Consistency with Community Character (inconsistent with natural landscape)

Getting Started

Zoning Models and Studies Addressing Zoning and Stream Corridors

- Town of Rhinebeck - [Development near streams, rivers, wetlands and other water bodies and Water Resources Protection Overlay District](#) (“The protection of stream corridors is essential to the maintenance of water quality. It is, therefore, deemed necessary for the Town of Rhinebeck to create an adequate buffer to protect those stream corridors from development encroachment, erosion and water quality degradation caused by either surface or subsurface runoff.”)
- Town of Warwick - [Biodiversity Conservation Overlay District](#), [Ridgeline Overlay District](#), [Stormwater Management Rules](#)
- [Catskill Streams Buffer Initiative](#)
- [Normans Kill Riparian Corridor Study](#)
- [Stroud Water Research Center: River Continuum Concept](#)
- [NY State Department of Environmental Conservation: Riparian Buffers](#)
- [NY Natural Heritage Program: Riparian Opportunity Assessment](#)
- [Hudson Valley Regional Council: Protecting and Managing Hudson River Streams](#)
- [Pace University Land Use Law Center](#)