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# VOLUNTARY APPROACHES TO AGRICULTURAL WATER POLLUTION REDUCTION

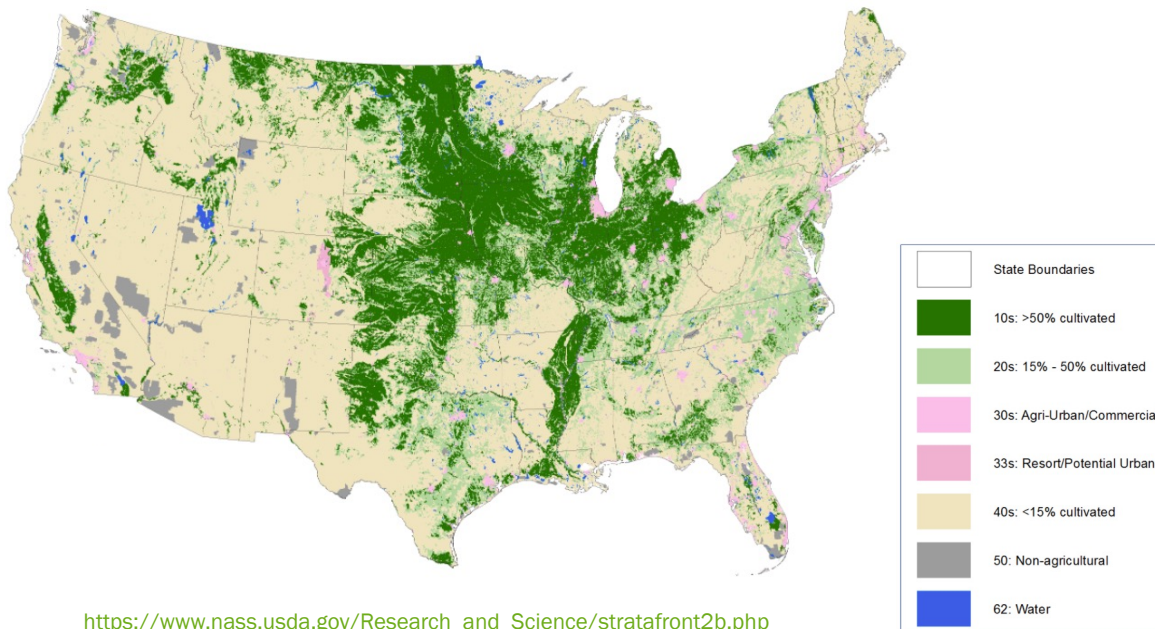
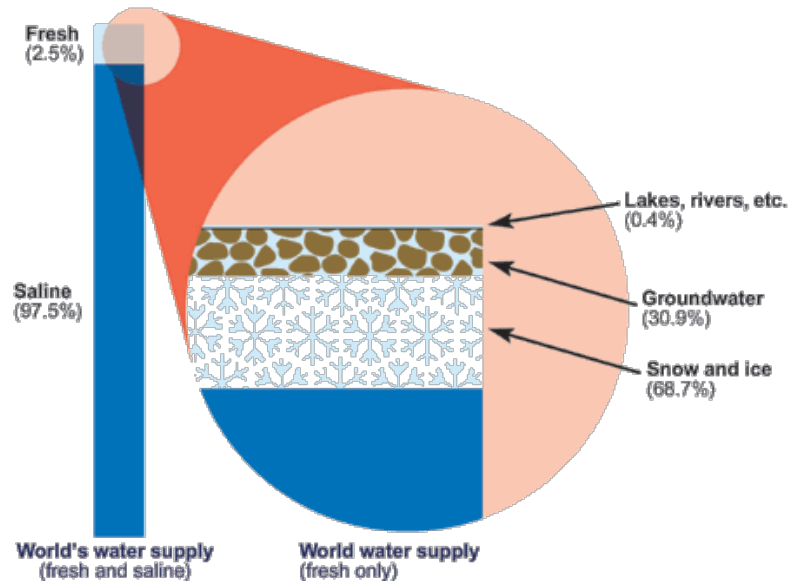
LINDA REID, JD

BENJAMIN EDELSTEIN, MA

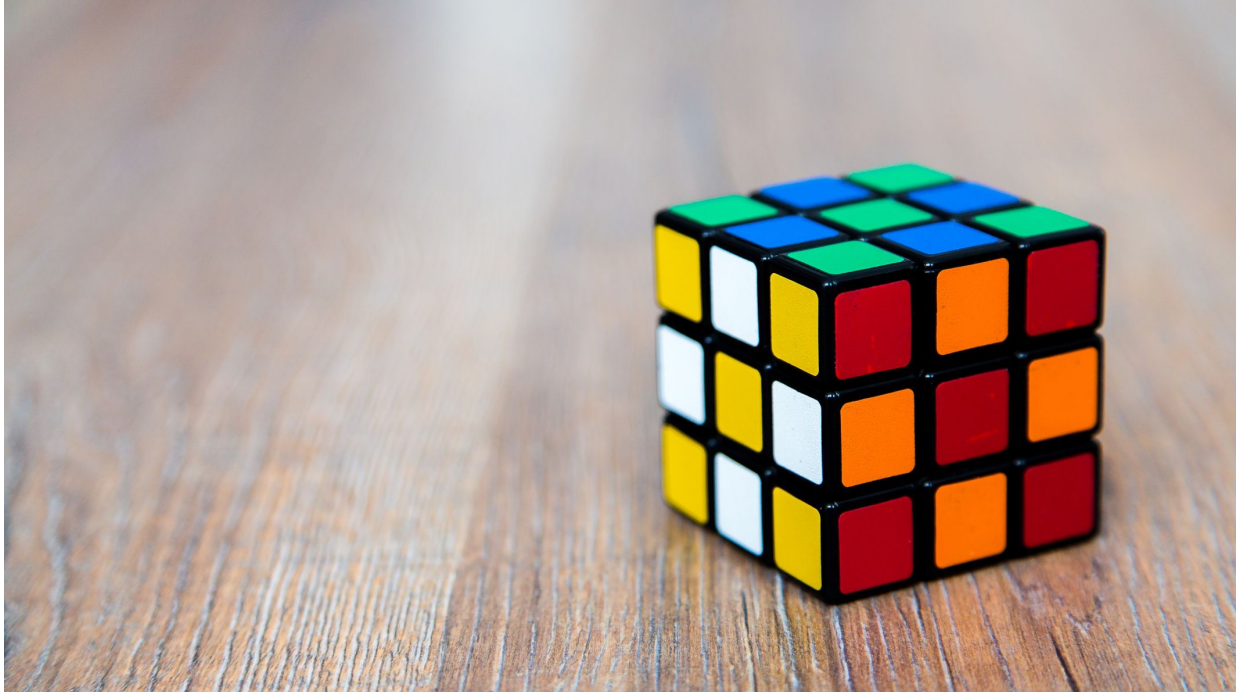


## USDA-REPORTED AG STATISTICS - 2019

- Agriculture, food, and related industries contributed \$1.109 trillion to the U.S. gross domestic product (GDP) in 2019.
- The top 10 agricultural producing States in terms of cash receipts were (in descending order): California, Iowa, Nebraska, Texas, Minnesota, Illinois, Kansas, Wisconsin, North Carolina, and Indiana.
- The 10 largest sources of cash receipts from the sale of U.S.-produced farm commodities were (in descending order): cattle/calves, corn, dairy products/milk, soybeans, broilers, miscellaneous crops, hogs, wheat, chicken eggs, and hay.



[https://www.nass.usda.gov/Research\\_and\\_Science/stratafront2b.php](https://www.nass.usda.gov/Research_and_Science/stratafront2b.php)

A young green plant with several leaves is growing out of a mound of dark brown soil. The background is a soft, out-of-focus green, suggesting a natural outdoor setting.

**EXAMPLES OF AGRICULTURAL POLLUTANTS & THEIR SOURCES**


- Sediment (TSS)
- Nutrients (phosphorus, nitrogen)
- Others (bacteria/fecal coliform, E. coli)
- AG runoff
- CAFO practices
- Overgrazing
- Irrigation
- Pesticides

## REGULATION OF WATER POLLUTION UNDER THE CLEAN WATER ACT




”...to restore and maintain the chemical, physical, and biological integrity of the Nation’s waters.”

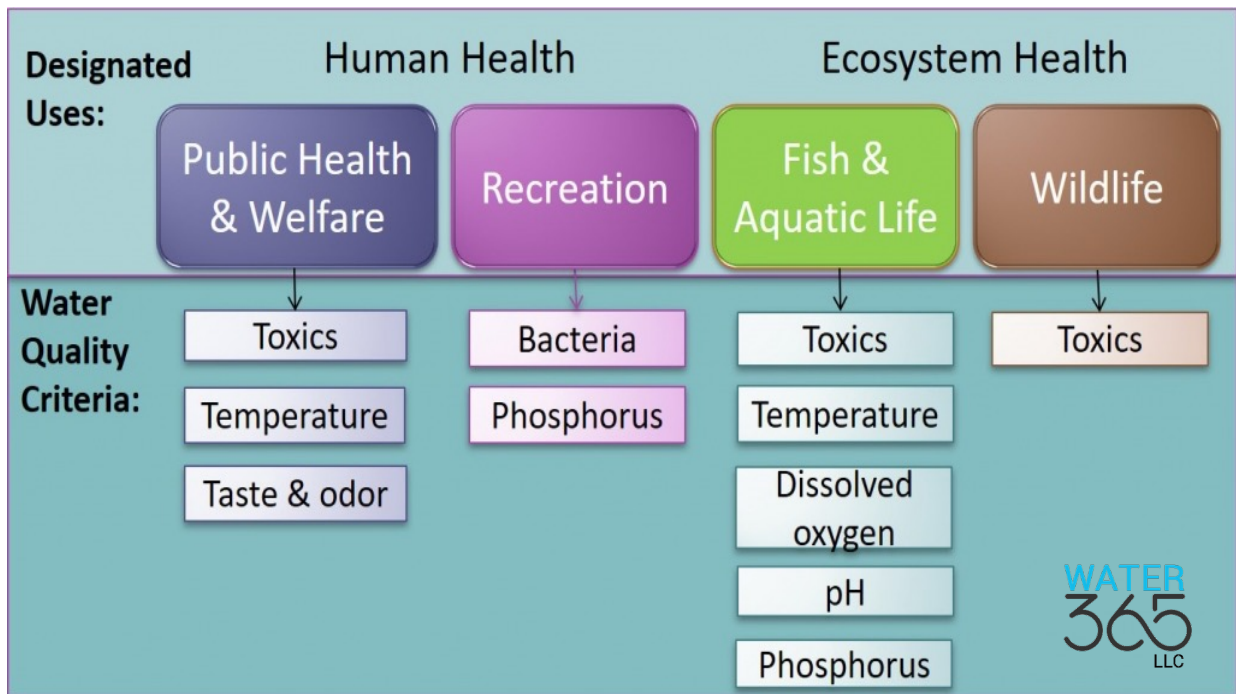


 **Technology- and Water Quality-based Effluent Limitations**

	Technology-based Effluent Limitations (TBELs)	Water Quality-based Effluent Limitations (WQBELs)
→ <b>Goal or Policy:</b>	<ul style="list-style-type: none"> <li>• Zero Discharge of Pollutants</li> </ul>	<ul style="list-style-type: none"> <li>• Fishable and Swimmable Waters</li> <li>• No Toxics in Toxic Amounts</li> </ul>
→ <b>Standards:</b>	<ul style="list-style-type: none"> <li>• Technology</li> </ul>	<ul style="list-style-type: none"> <li>• Water Quality</li> </ul>
→ <b>NPDES Regulations:</b>	<ul style="list-style-type: none"> <li>• 40 CFR 122.44(a), (e)</li> <li>• 40 CFR 125.3</li> </ul>	<ul style="list-style-type: none"> <li>• 40 CFR 122.44(d)</li> </ul>

Develop **TBELs** (derived from technology standards) for all applicable pollutants of concern. Develop **WQBELs** where TBELs are not adequate to meet water quality standards in the receiving water.

 EPA  
United States Environmental Protection Agency





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## **CWA “REGULATION” OF NONPOINT SOURCES**

CWA Section 208 – federal funding mechanism (ended in 1981)

CWA Section 319 – federal funding for NPS pollution management programs / BMPs

## OTHER MECHANISMS

- Nutrient Management Plans
- Application Restrictions
- Applicator Certification Requirements



<https://nationalaglawcenter.org/state-compilations/nutrientmanagement/>

## VOLUNTARY APPROACHES – WATER QUALITY TRADING & ADAPTIVE MANAGEMENT FRAMEWORKS

### Water Quality Trading

- Permittee purchases "credits" in the watershed to achieve permit compliance
- Permit compliance is demonstrated by comparing permittee discharge data and "credits" available to the applicable WQBEL

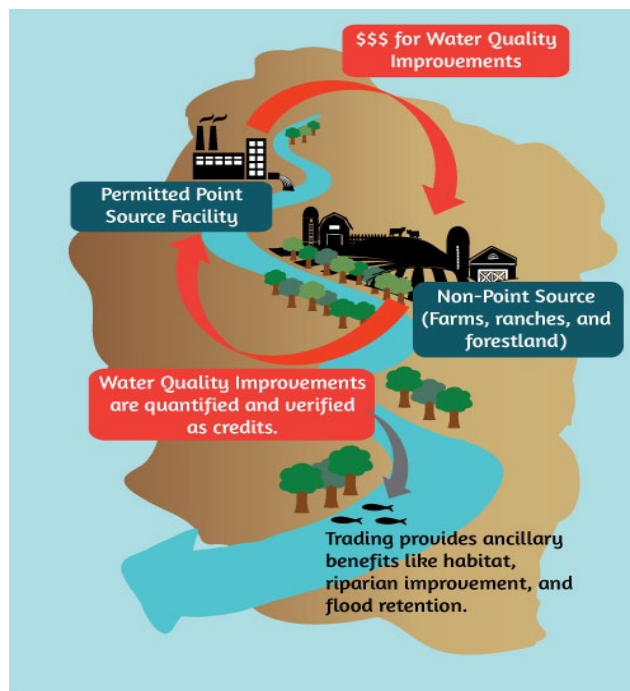
### Adaptive Management

- Permittee improves water quality in a watershed by reducing in-stream phosphorus concentrations
- Permit compliance is demonstrated by reducing in-stream phosphorus concentrations and eventually achieving the phosphorus water quality criteria

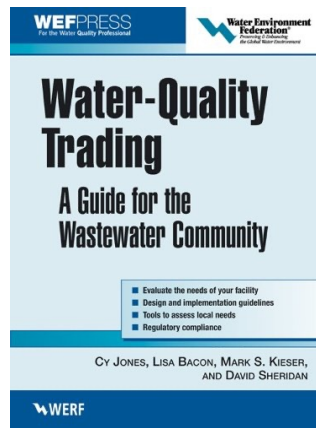
## ELEMENTS OF A WQT PROGRAM

- **Credits** – A unit of pollution reduction (e.g., lbs/year) resulting from restoration projects or implementation of best management practices.
- **Credit Project** – Restoration of a site or implementation of best management practices that result in water quality benefits above what might be required for a given location. Examples include reduced fertilizer applications to crop fields or planting trees along stream banks.
- **Buyers** – Parties interested in improving water quality either voluntarily or to meet required regulations such as facilities operating under a permit issued by the Environmental Protection Agency.
- **Sellers** – Providers of water quality benefits through implementation of credit generating projects.
- **Trading Program** – Trading program rules defining who is eligible to participate and procedures for generating credits, monitoring and tracking credit projects, how transactions are executed, and public transparency.

## WATER QUALITY TRADING



## WQT POLICY GUIDANCE



## WQT - 11 STEPS



<https://www.thefreshwatertrust.org/infographic-11-elements-water-quality-trading>

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## WQT - 11 STEPS



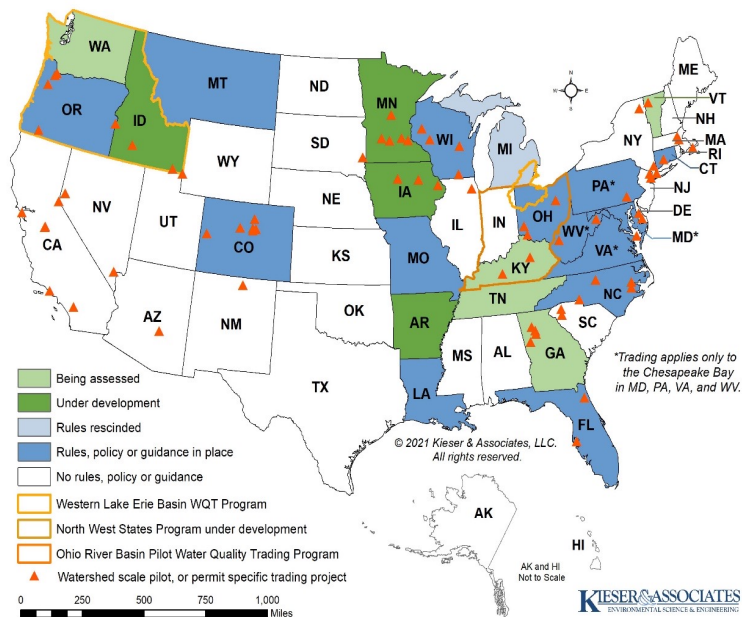
<https://www.thefreshwatertrust.org/infographic-11-elements-water-quality-trading/>

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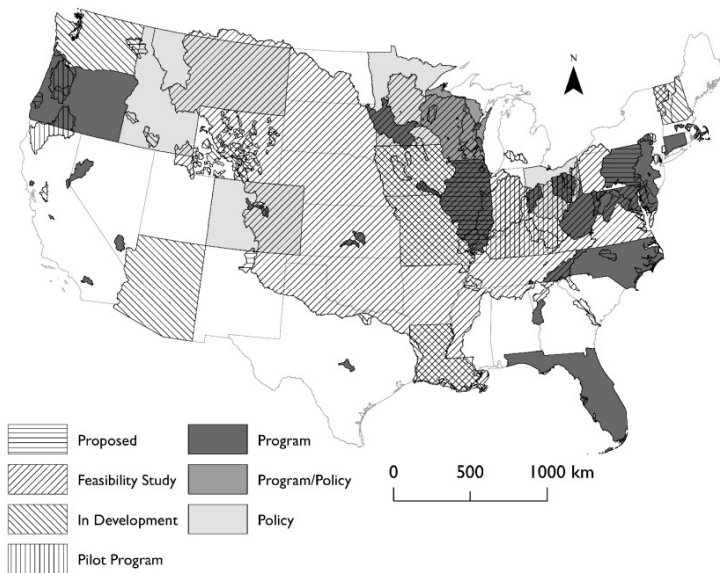
## WQT - 11 STEPS



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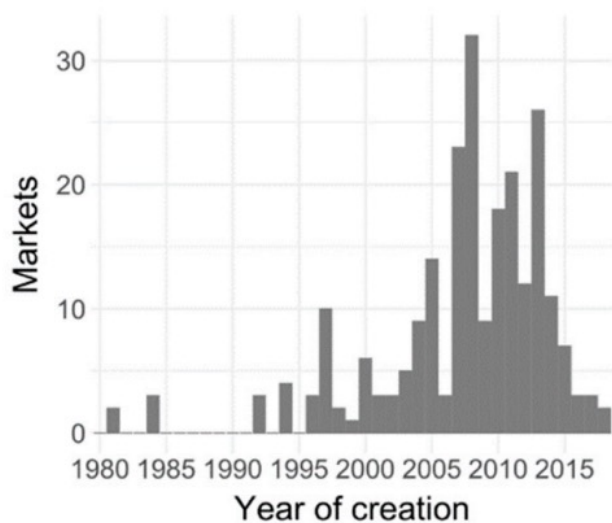
Map of US water quality trading programs and state-wide policies by program stages.



BenDor TK, J, Timmerman D, Madsen B. Predicting the Existence and Prevalence of the US Water Quality Trading Markets. *Water*. 2021; 13(2):185. <https://doi.org/10.3390/w13020185>



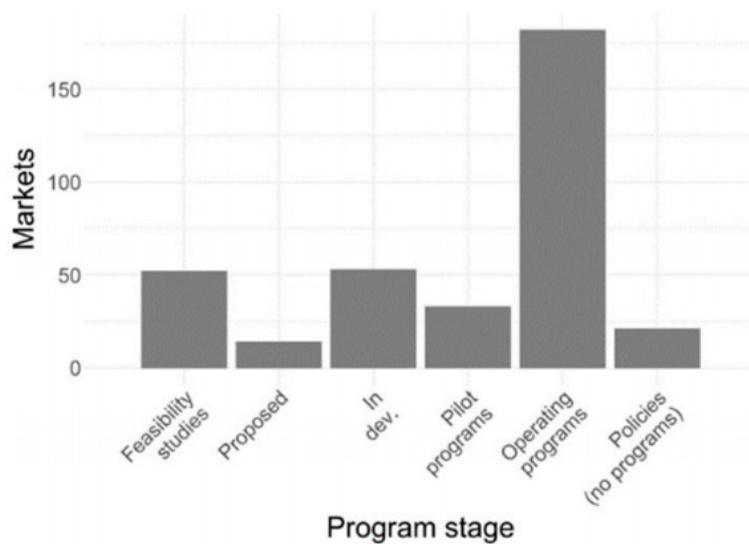
Map of US water quality trading programs by year created.



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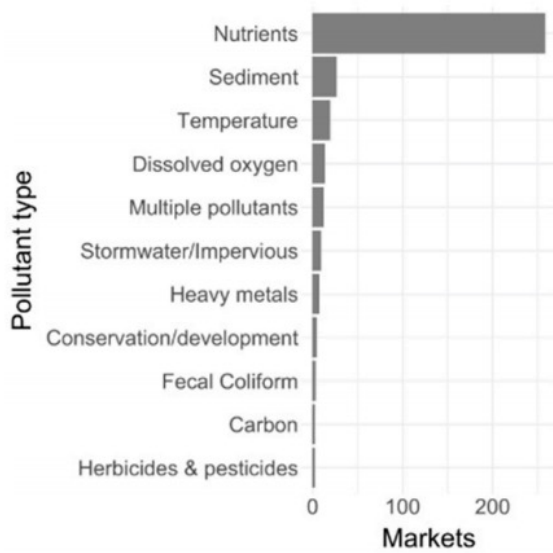
Map of US water quality trading programs by program stages.



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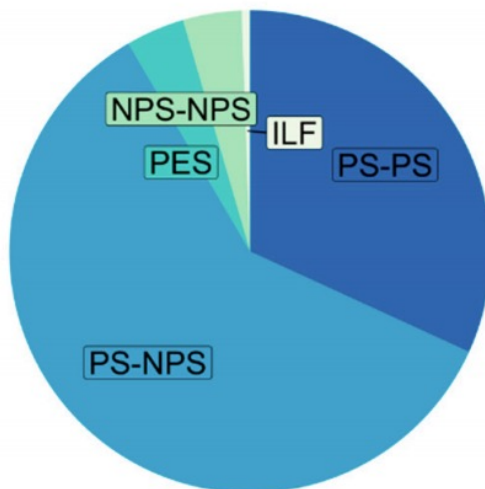
Map of US water quality trading programs by pollutants traded.



BenDor TK, J, Timmerman D, Madsen B. Predicting the Existence and Prevalence of the US Water Quality Trading Markets. *Water*. 2021; 13(2):185. <https://doi.org/10.3390/w13020185>



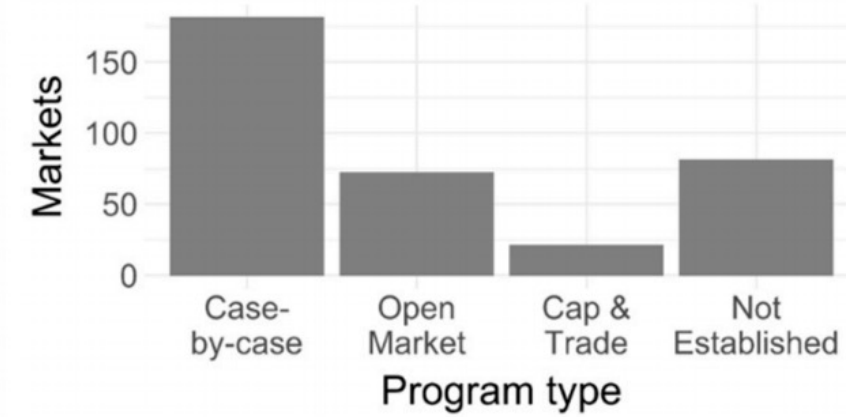
Map of US water quality trading programs by transaction types.



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Table A5. Program enabling authorities by program stage (“NGO” is a nongovernmental organization).

	Program Stage							Total
	1. Proposed	2. Feasibility Study	3. In-Development	4. Pilot Program	5. Program	5. Program/ Policy	Policy Only	
Federal agency	2	0	1	0	0	0	0	3
State agency	4	10	49	9	118	5	21	216
Regional agency	7	0	1	4	35	0	0	47
Local agency	1	1	1	13	15	0	0	31
National NGO	0	13	0	1	0	0	0	14
Regional NGO	0	2	1	5	4	0	0	12
Local NGO	0	0	0	0	1	0	0	1
Research Org.	0	10	0	4	0	0	0	14
University	0	17	0	0	0	0	0	17
<b>Total</b>	<b>14</b>	<b>53</b>	<b>53</b>	<b>36</b>	<b>173</b>	<b>5</b>	<b>21</b>	<b>355</b>

BenDor TK, Branham J, Timmerman D, Madsen B. Predicting the Existence and Prevalence of the US Water Quality Trading Markets. *Water*. 2021; 13(2):185. <https://doi.org/10.3390/w13020185>

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## RISKS & CHALLENGES OF WATER QUALITY TRADING



WATER  
365  
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# CASE STUDIES


# INDIANA



# WISCONSIN



## Water Quality Trading



**POLLUTANTS THAT CAN BE TRADED:**

- Phosphorus
- Total Suspended Solids (TSS)
- Temperature
- Nitrogen
- Other pollutants (excluding toxic, bioaccumulative, chemicals of concern)

**What is Water Quality Trading (WQT)?**

WATER QUALITY TRADING IS...

- A compliance option that provides point sources with the flexibility to acquire pollutant reductions from other sources in the watershed to offset their point source load to comply with a permit limit (WQS).
- A strategy built on partnerships between point source facilities and their trading affiliates including other point sources, landowners, municipalities, private or public entities.
- A compliance approach that must result in an overall reduction in pollutant load.

WATER QUALITY TRADING IS NOT...

- Adaptive management
- The appropriate solution for all point source facilities

**Feasibility in your watershed:**

Although WQT may be an economically viable compliance option in some watersheds, it may not be a feasible option for every source. To determine the trading feasibility in your watershed, DNR recommends that you:

1. **Calculate the pollutant offset needed.** The difference between the pollutant load from the point source and the permit discharge limit.
2. **Identify a credit broker/exchange, if applicable.** The goal of this step is to determine if a credit broker or exchange can be used to establish the trade and identify credit generators in the watershed. A credit broker or exchange does not need to be used, but they can improve the administrative feasibility of water quality trading. County Land Conservation Departments or other entities may be willing to serve as a broker or exchange in your watershed.
3. **Identify potential credit generators.** Any land use feature in your watershed that contributes the pollutant of concern may be a potential trading opportunity. This can include point sources or nonpoint sources. This step helps to verify that trading partners are available in your watershed.
4. **Assess availability of credit.** This step verifies that there is sufficient credit in your watershed to cover the offset needed.


Once you have determined that WQT is a feasible compliance option, and preferable to other options, the next step is to develop a WQT plan.

**ACRONYMS**

- AW: Adaptive Management
- BMPs: Best Management Practices
- DNR: Wisconsin Department of Natural Resources
- MPD: Municipal Pollution Discharge Permit
- WQS: Wisconsin State Water Quality Standards
- WQT: water quality trading

**ROLES OF PARTNERS IN WQT:**

- **Credit User**—The point source using trading credits to comply with its permit limit.
- **Credit Generator**—A permitted discharge or other entity that reduces their own pollutant load so that "credit" is generated.
- **Credit Broker/Exchange**—A third party that brings potential trading partners together. A broker performs the research necessary to match credit users and credit generators based on location, pollutant type, amount, and timing.



Urban BMPs can be used to generate credits for WQT.

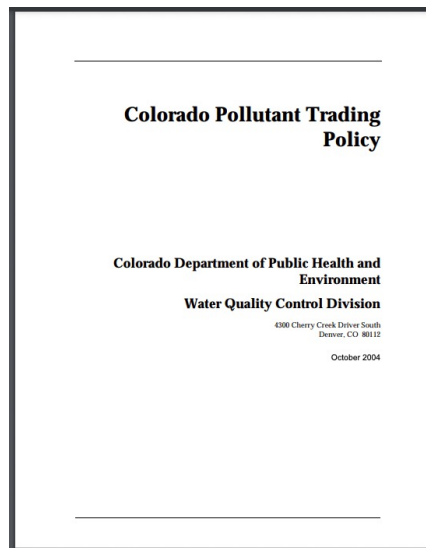
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## IOWA



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## COLORADO

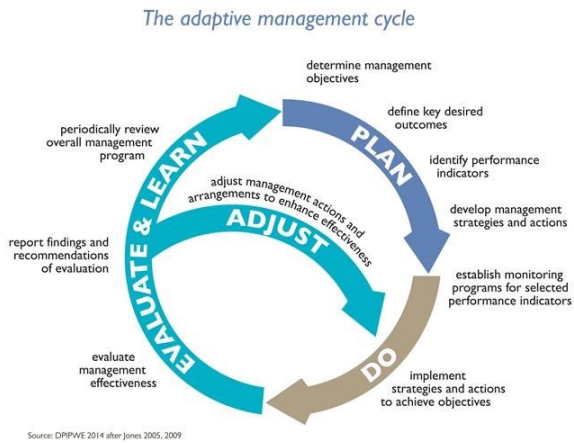


# Adaptive Management

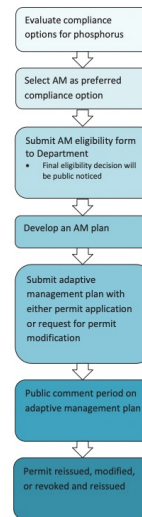


Photograph credit: Pete Van Metre, USGS

Adaptive Management Cycle (generally)



WI Adaptive Management Process for Point Sources



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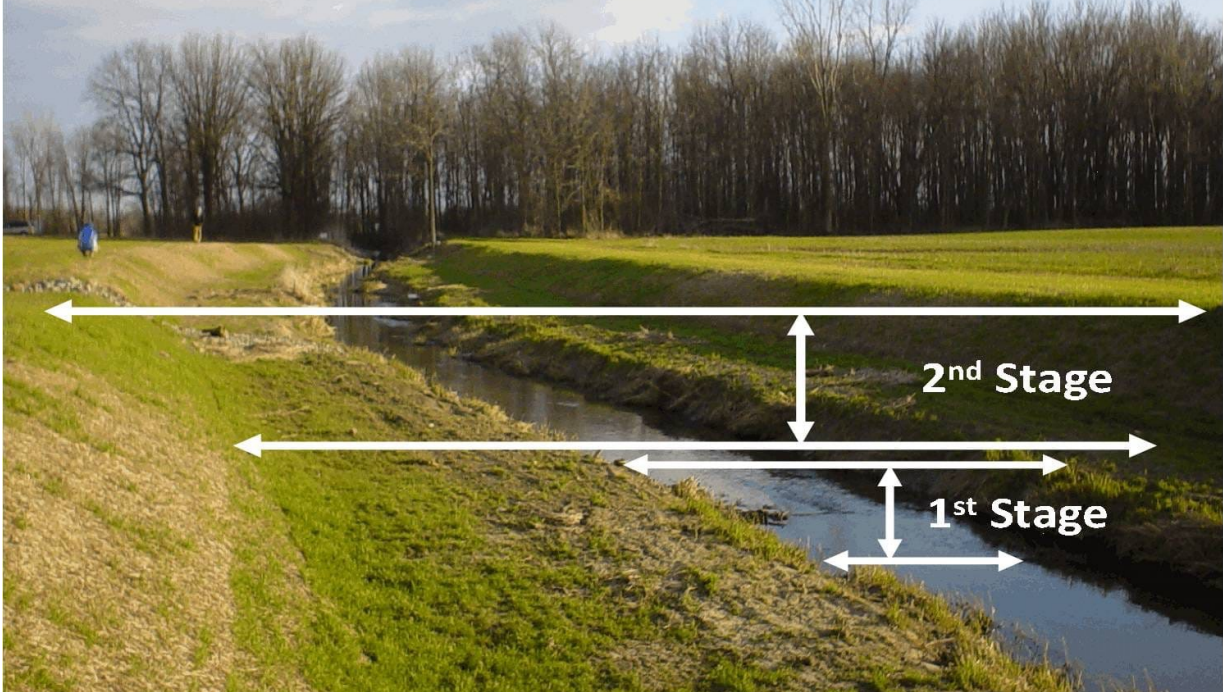
## EXAMPLES OF AGRICULTURAL BEST MANAGEMENT PRACTICES

- **Avoiding** – cover crops, crop rotation, buffer strips, contour farming, grade stabilization, tile system design, conservation tillage
- **Controlling** – rotational grazing, two-stage ditches, culvert sizing, feedlot runoff control
- **Trapping** – filter strips, sediment control basin, wetland restoration, constructed wetlands,













# CASE STUDIES



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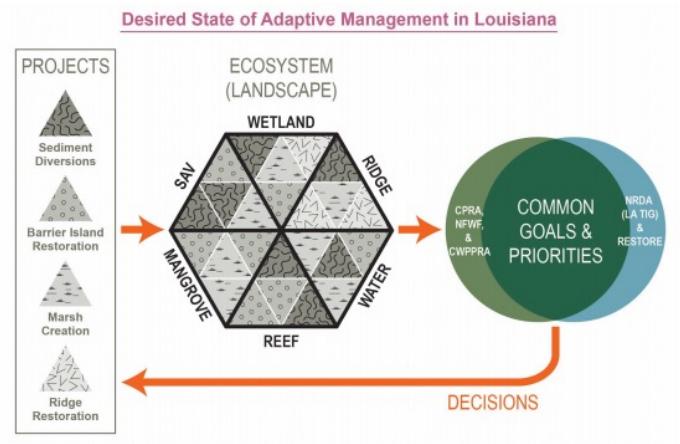
## WISCONSIN

### Madison Metropolitan Sewerage District Adaptive Management Plan



<https://deq.mt.gov/files/Water/WQPB/Standards/NutrientWorkGroup/PDFs/MMSDAdaptiveManagementPlan.pdf>

## LOUISIANA



## MISSOURI





## RISKS & CHALLENGES



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