Community. Science.

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Hudson River Watershed Allliance Water Quality Symposium

NEW YORK STATE

HUDSON RIVER FOUNDAT
for Science & Environmental Rese

Why me?

- Biological Oceanographer
- Environmental Microbiologist
- Secret past……

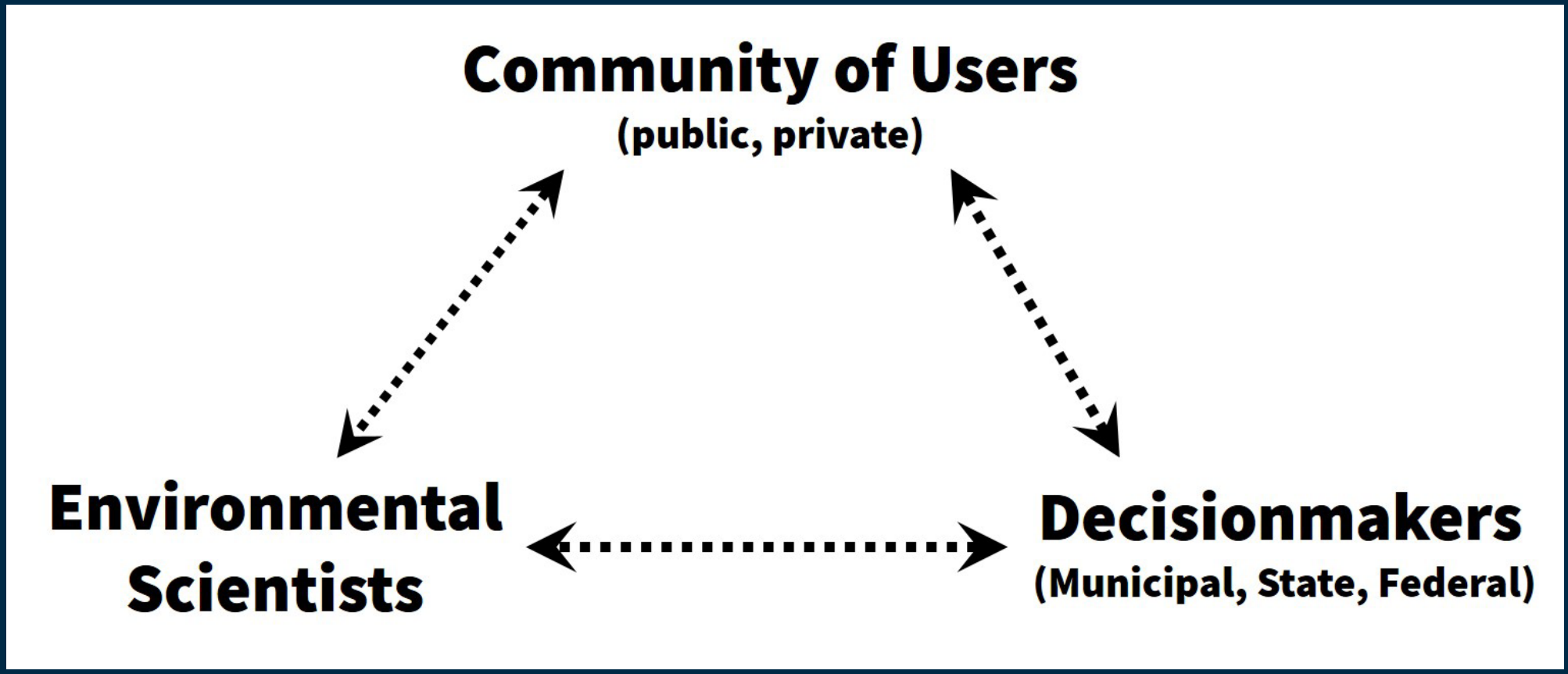
- My philosophy:

  water science + water communities =
  better science and **better** communities

Punchlines

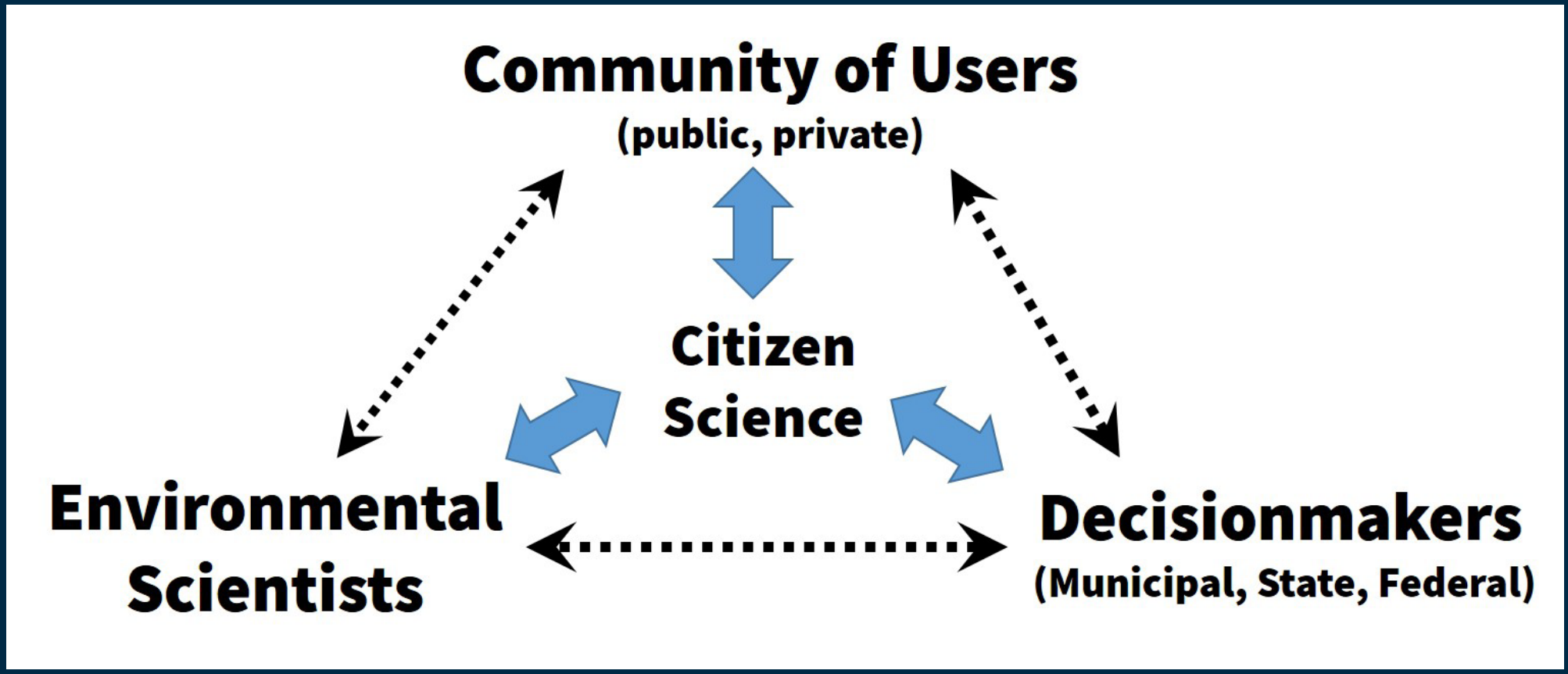
- Put people first, ALL people -- and the fish and clean swimming beaches must follow!
- We need to shift our perspectives from "is it safe to swim?" and "are we protecting the fish?" to "do we all have equal access to clean water?"
- We need to move our citizen science into true community science (functional, defensible, active).
- Community science is our early warning system. We are ALL frontline communities when it comes to water.

Protecting Water Resources



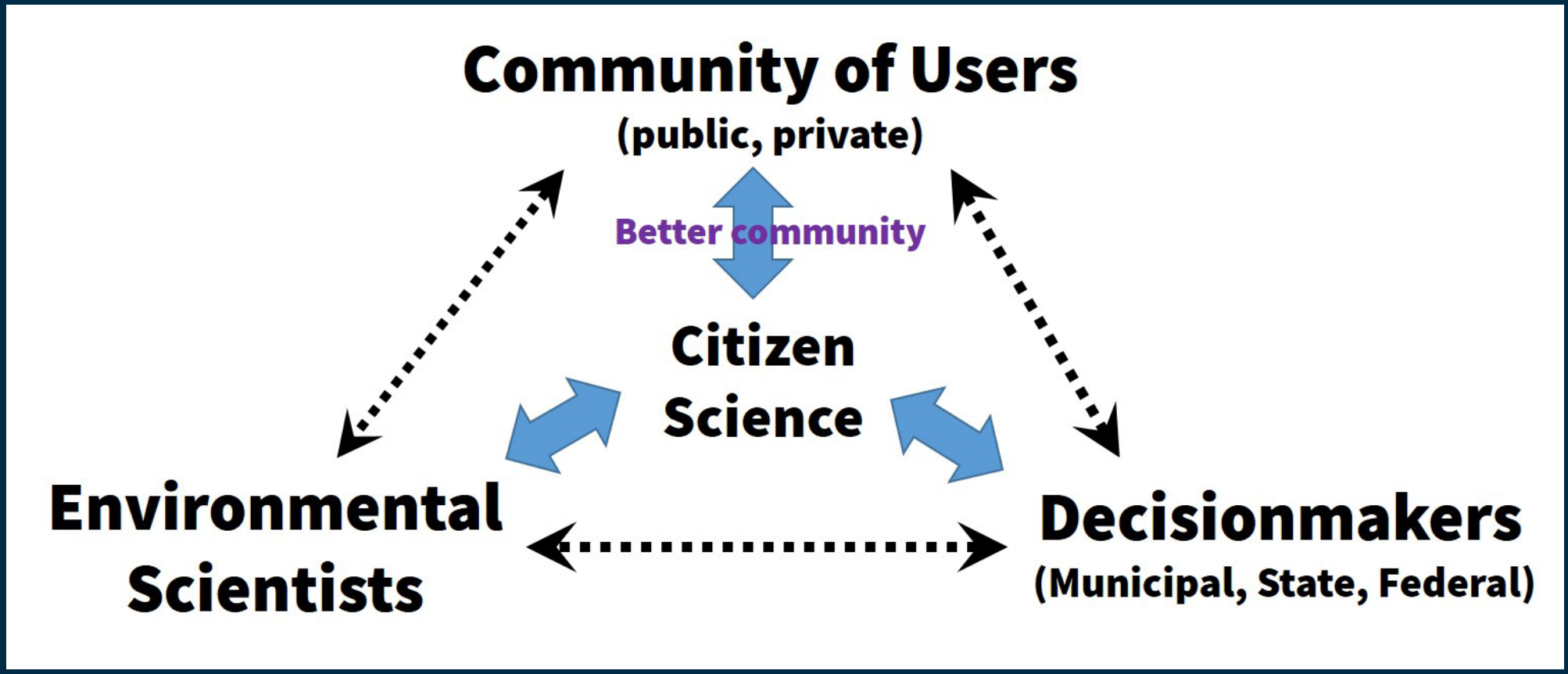
- *Based on a momentous discussion about road salt in Hudson River Tributaries in 2017 with Robyn Smyth (Bard College) and Kate Meierdiercks (Siena College).*
- *We have limited capacity to make meaningful change with current avenues of communication.*

Protecting Water Resources



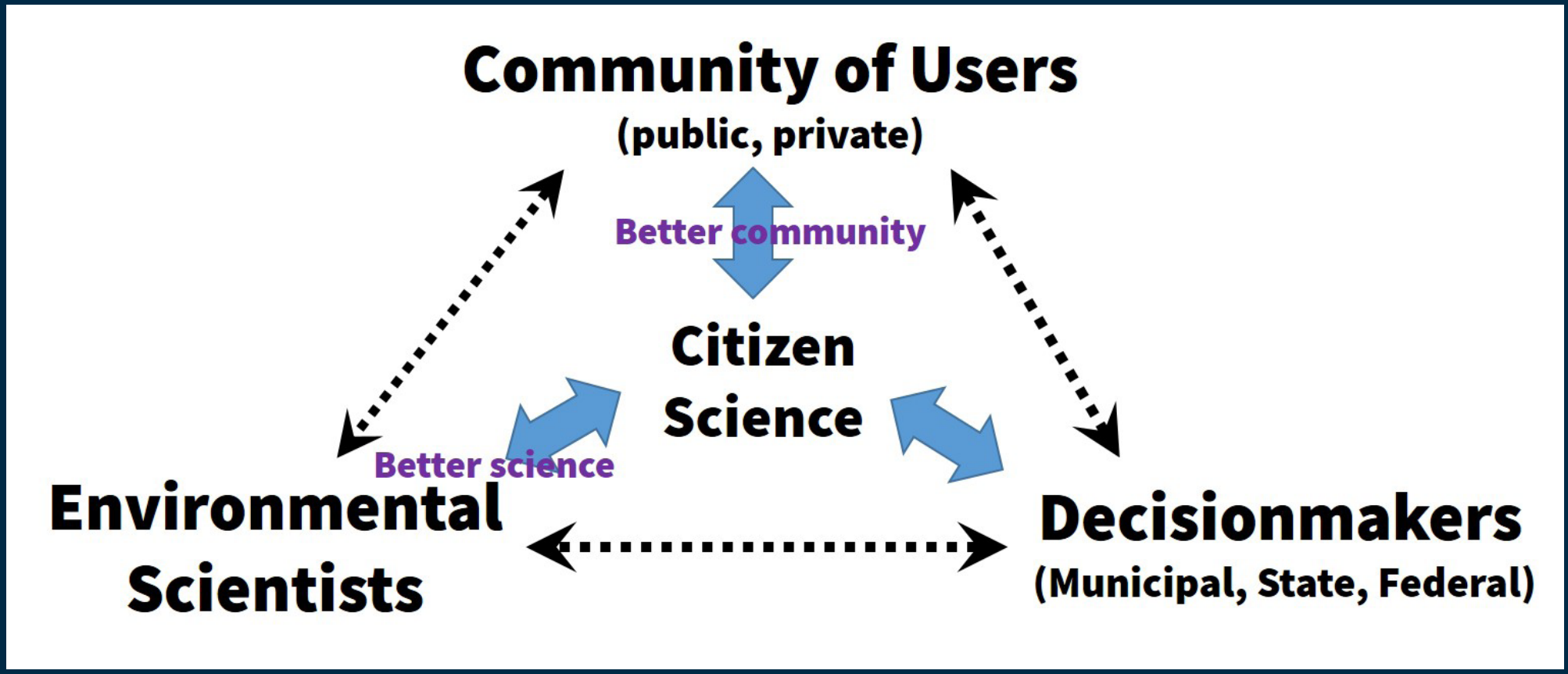
- Need a shared forum -- citizen science?

Protecting Water Resources



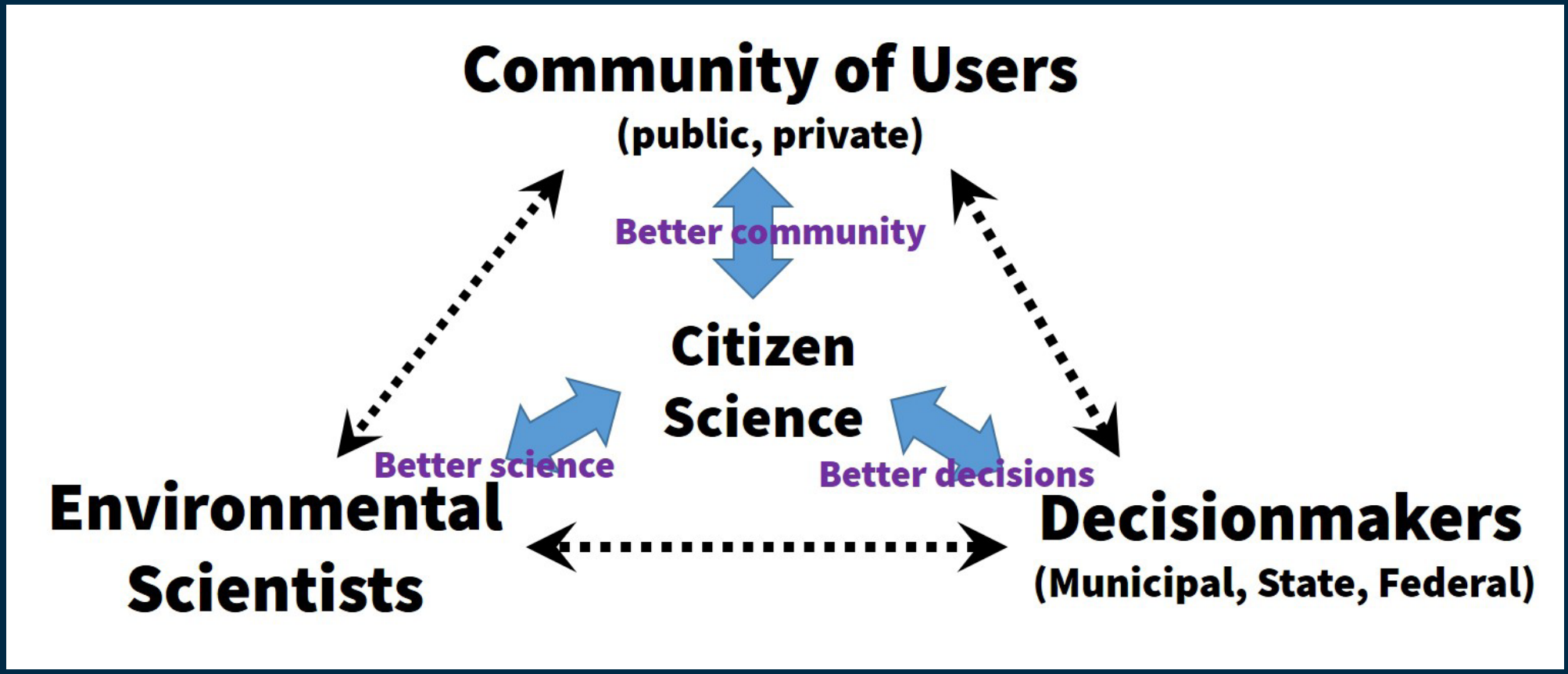
- Organized communities are better equipped to advocate for shared resource management
- Organized communities can collectively shift culture, addressing sources of inequity

Protecting Water Resources



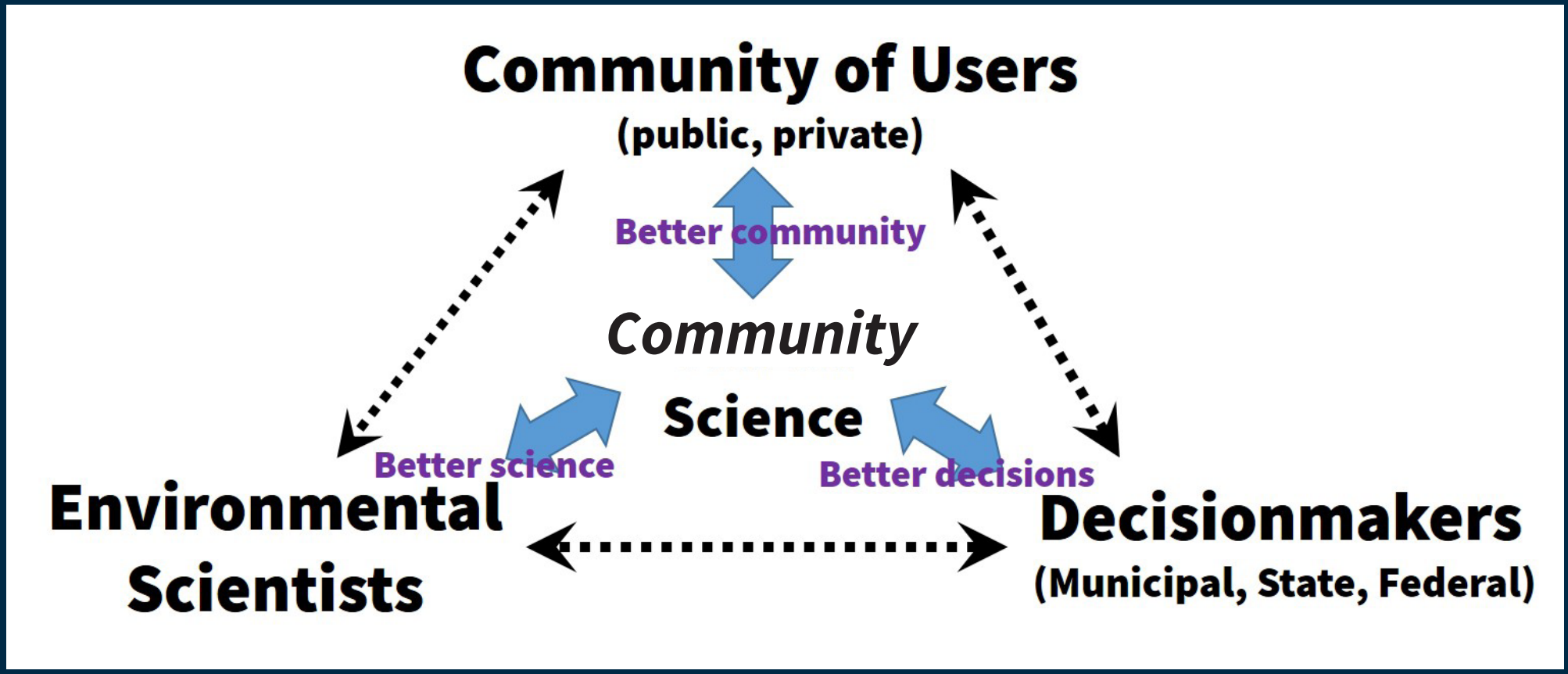
- Science informed by community interest and fueled by community participation will help to shift cultural norms
- Communities ask the best scientific questions, bring creativity to the process

Protecting Water Resources



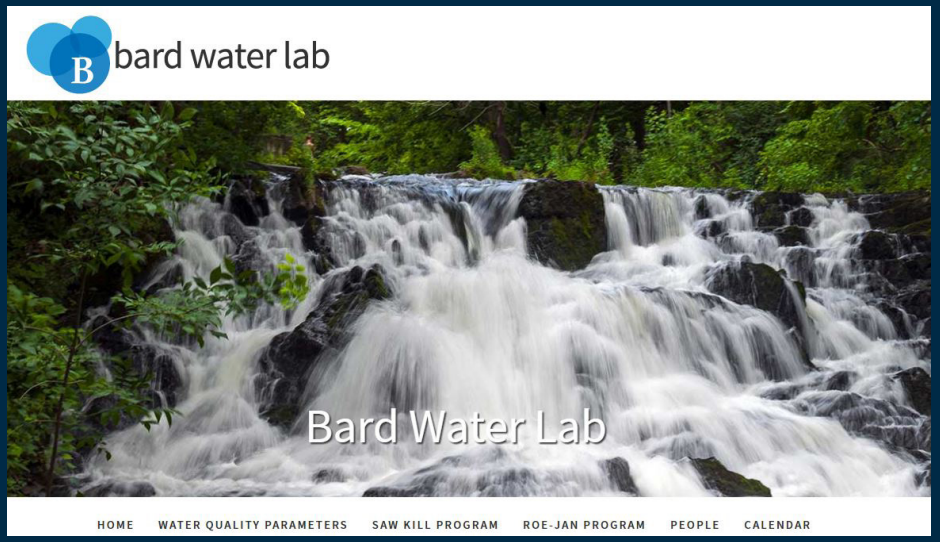
- Supported by better science that is widely understood by (and performed by) the community, decisionmakers can be better informed and more agile in addressing water threats

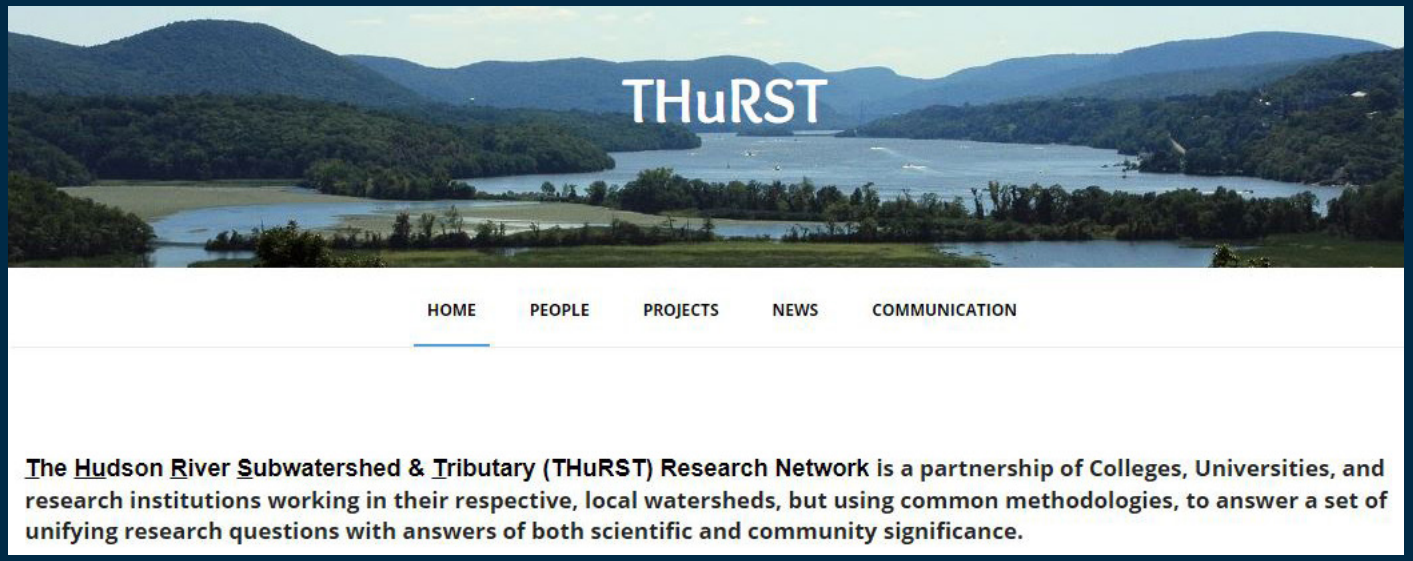
Protecting Water Resources



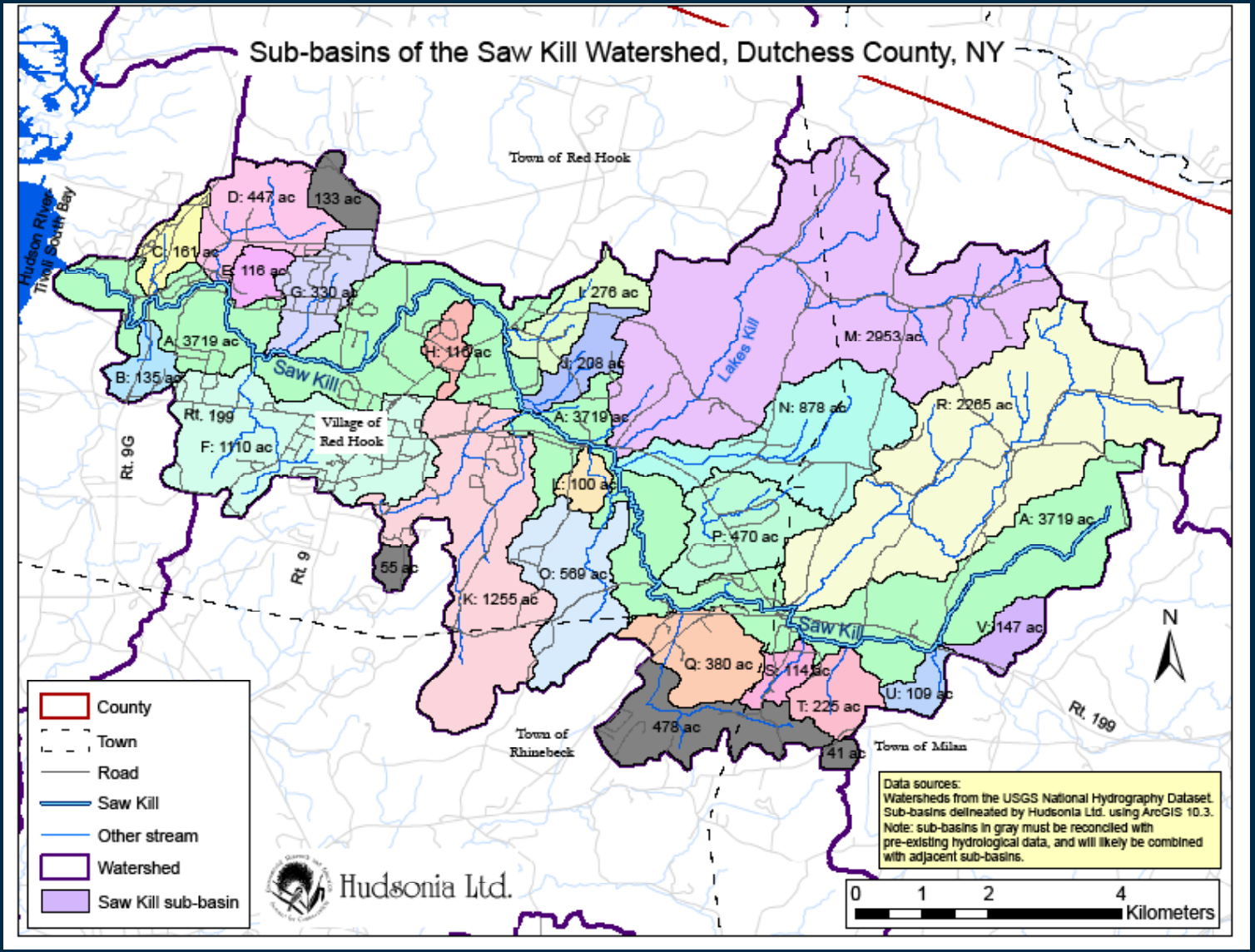
- No longer just "citizen science," however -- it is science that is generated by and used by a full community of stakeholders
- Challenge: how do we ensure that this is how our monitoring data are fully used?

Some Examples





Saw Kill Watershed Community



Are watersheds a new way to think about neighborhoods?

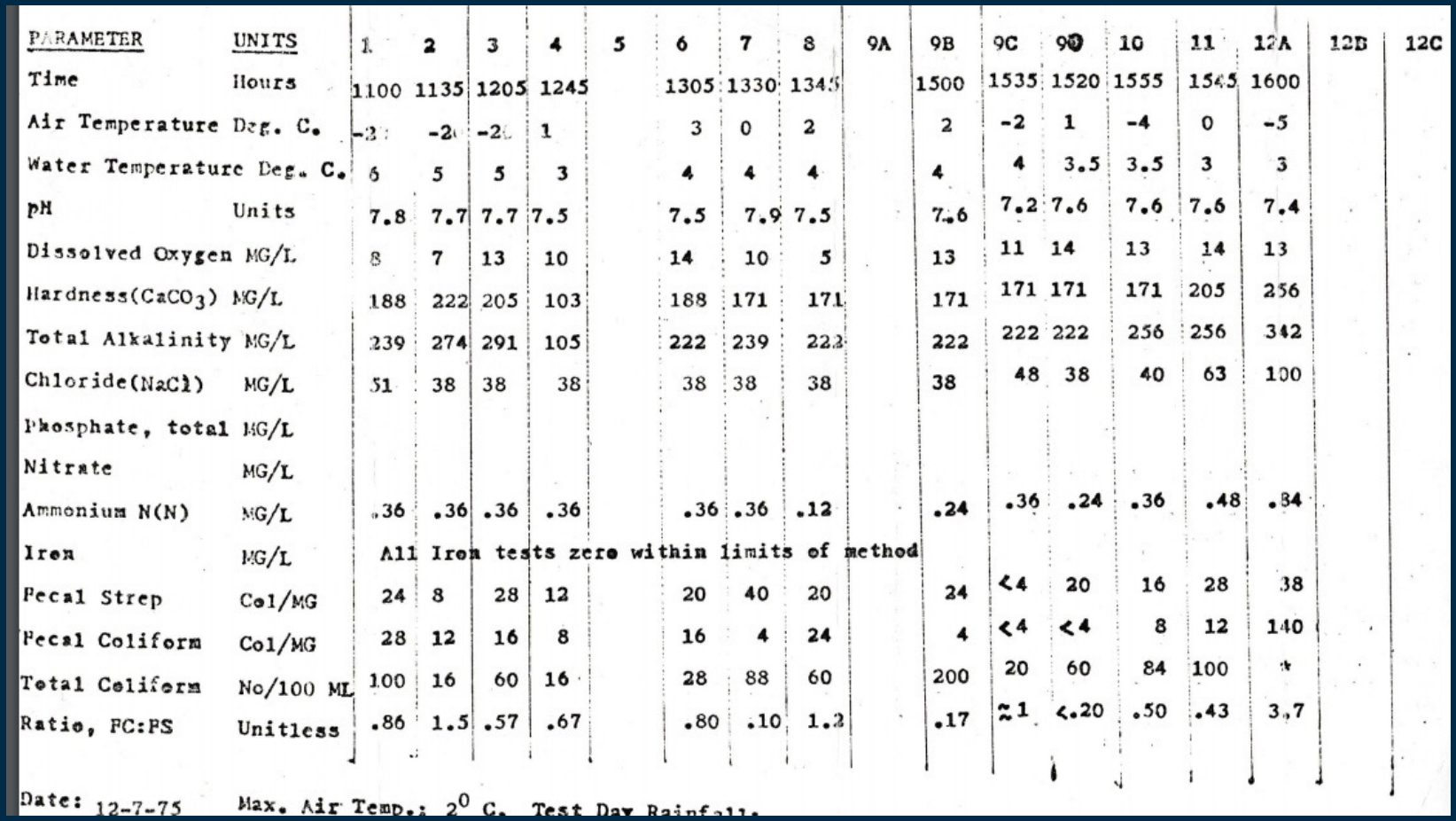
--Bob Wills, Dutchess County

Community Questions:

1. Is nutrient loading an issue on the waterway?
2. Are leaky septic tanks contaminating the waterway and aquifer?
3. How do we better manage floodwaters during extreme weather events?
4. Are road salts a problem for our waterway and/or drinking water?
5. **Is our drinking water protected sufficiently?**

Community Science

- Long history of community/science on the Saw Kill (as early as 1976) and connection with Bard College resources

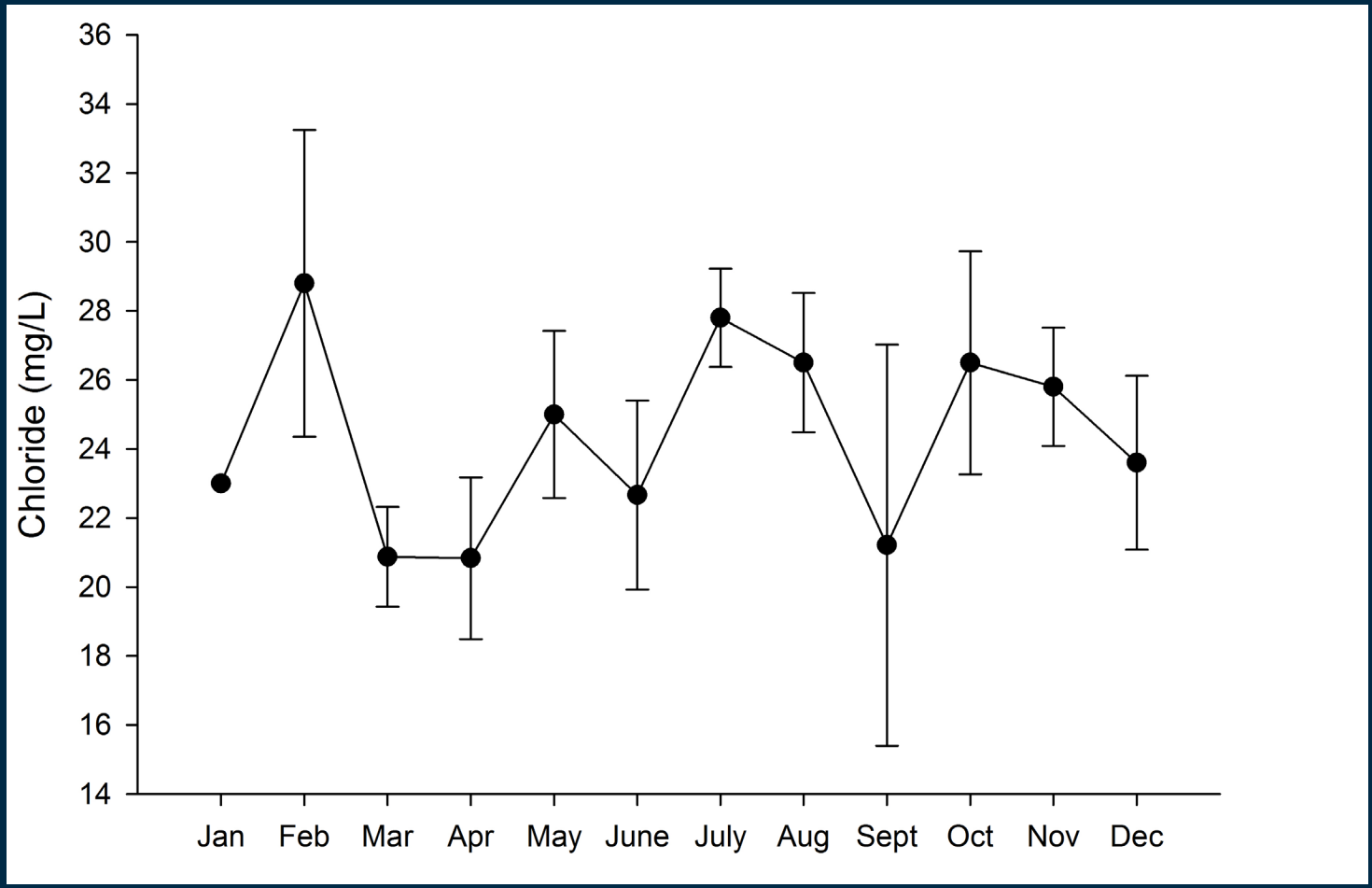


PARAMETER	UNITS	1	2	3	4	5	6	7	8	9A	9B	9C	9D	10	11	12A	12B	12C
Time	Hours	1100	1135	1205	1245		1305	1330	1345		1500	1535	1520	1555	1545	1600		
Air Temperature	Deg. C.	-2	-2	-2	1		3	0	2		2	-2	1	-4	0	-5		
Water Temperature	Deg. C.	6	5	5	3		4	4	4		4	4	3.5	3.5	3	3		
pH	Units	7.8	7.7	7.7	7.5		7.5	7.9	7.5		7.6	7.2	7.6	7.6	7.6	7.4		
Dissolved Oxygen	MG/L	8	7	13	10		14	10	5		13	11	14	13	14	13		
Hardness($CaCO_3$)	MG/L	188	222	205	103		188	171	171		171	171	171	171	205	256		
Total Alkalinity	MG/L	239	274	291	105		222	239	223		222	222	222	256	256	342		
Chloride(NaCl)	MG/L	51	38	38	38		38	38	38		38	48	38	40	63	100		
Phosphate, total	MG/L																	
Nitrate	MG/L																	
Ammonium N(N)	MG/L	.36	.36	.36	.36		.36	.36	.12		.24	.36	.24	.36	.48	.84		
Iron	MG/L	All Iron tests zero within limits of method																
Fecal Strep	Col/MG	24	8	28	12		20	40	20		24	<4	20	16	28	38		
Fecal Coliform	Col/MG	28	12	16	8		16	4	24		4	<4	<4	8	12	140		
Total Coliform	No/100 ML	100	16	60	16		28	88	60		200	20	60	84	100	*		
Ratio, FC:FS	Unitless	.86	1.5	.57	.67		.80	.10	1.2		.17	≈1	<.20	.50	.43	3.7		

Date: 12-7-75 Max. Air Temp.: 2° C. Test Day Rainfall:

Community Science: baseline

- Students and community members digitized and analyzed these data (1976-1982) to begin to answer the road salts question

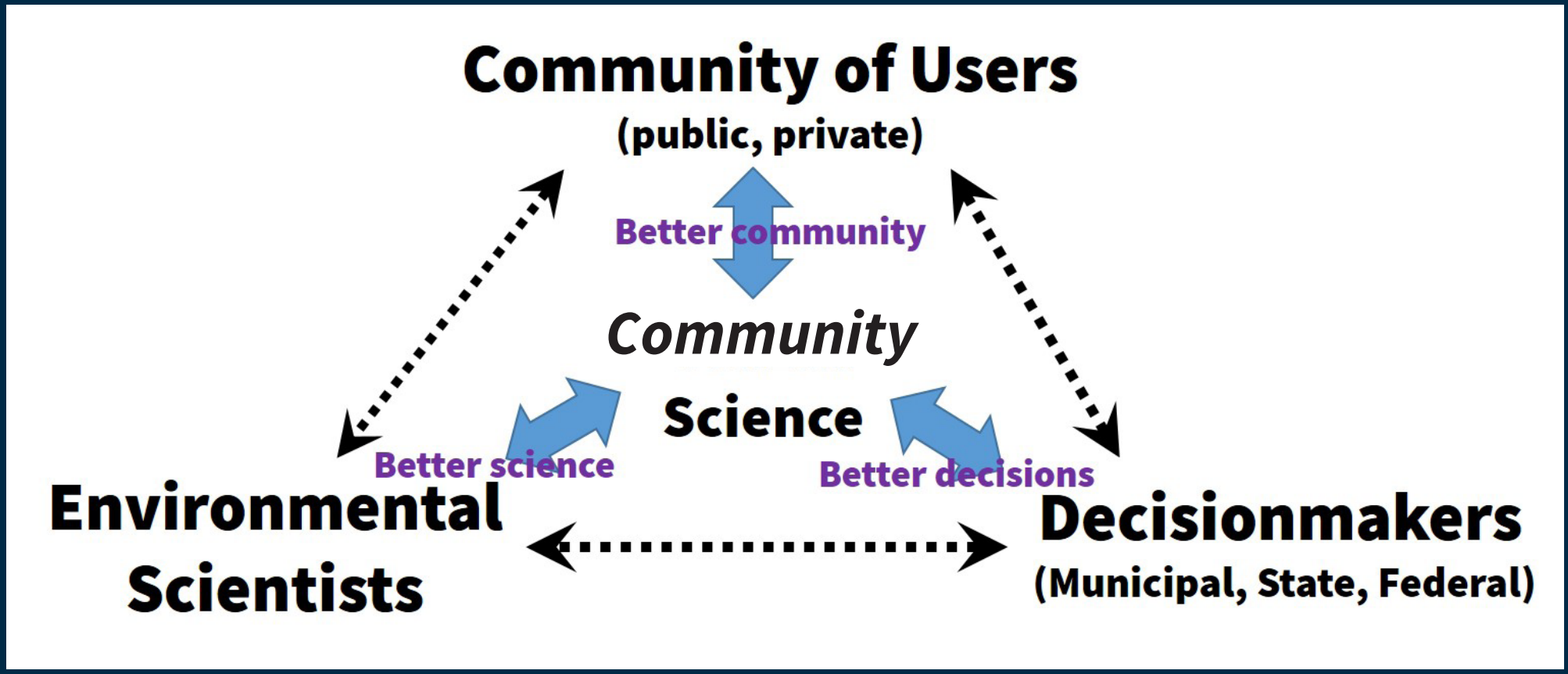


Community Science: monitoring

Bard Water Lab: Water Science for Water Communities

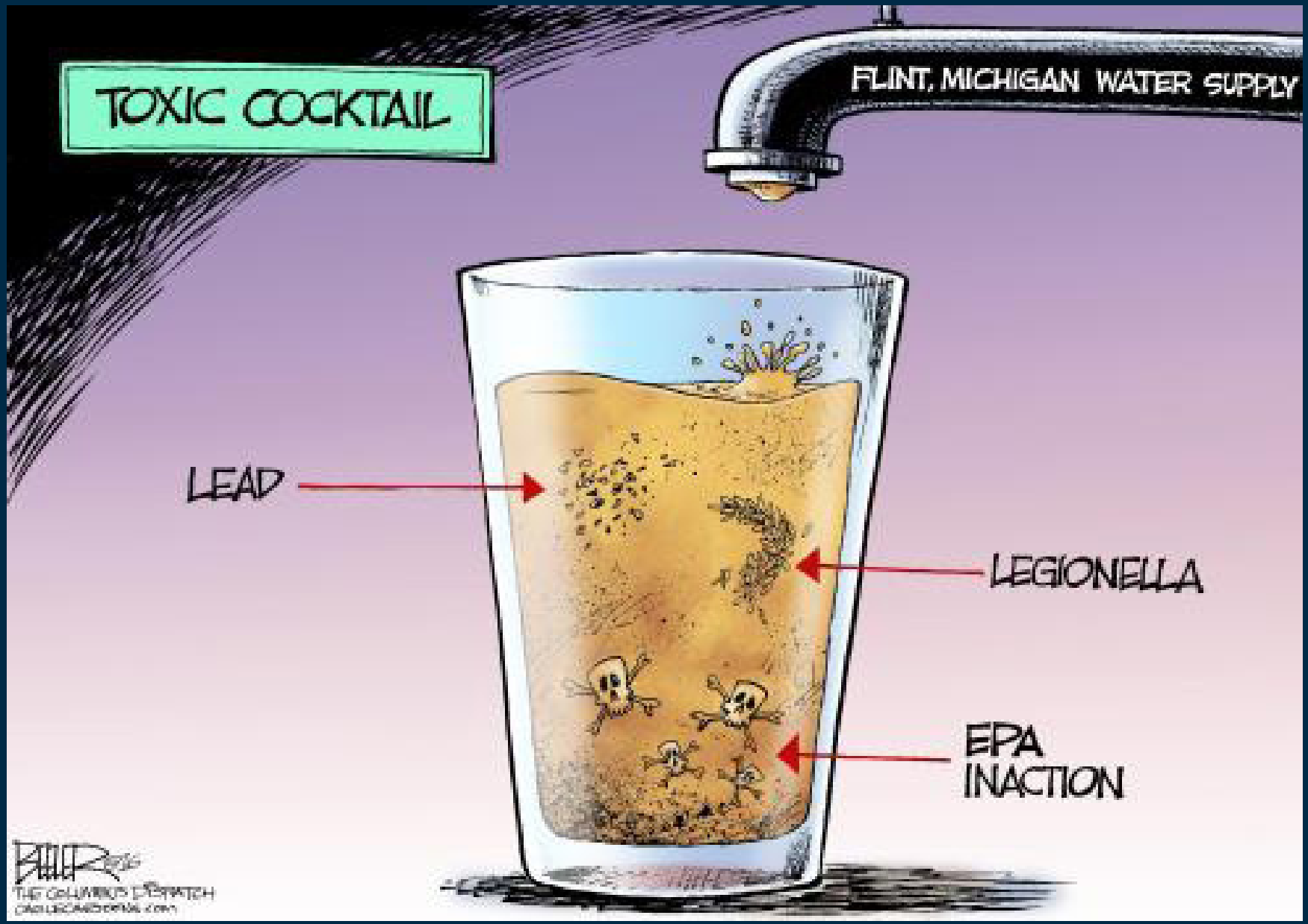
The Bard Water Lab is a student-run, community-centered laboratory devoted to bringing water science to water communities.

Protecting Water Resources



- We are realizing the difference between citizen science and community science.....but we need to take the next step -- reconceptualizing the utility of monitoring, centralizing people and drinking water. Because there is no other option.

We are the front line.



We are the front line. Let's do this.

Possible Next Steps:

- Reconceptualizing and reanalyzing existing data.
- Consolidating and sharing resources.
- Diversifying funding streams: community members and local governments, private foundations.
- Affiliating all monitoring efforts with nearest academic institutions.
- Building community science capacity instead of writing QAPPs and paying ELAP labs.
- Clarify with regulatory agencies (local, state, federal) that your community (taxpayer) science is an early warning system and that you expect prompt response when necessary. Do this BEFORE a crisis.