Using Stormwater Ponds in East Tampa to Promote Sustainable, Healthy Communities: A Community Partnership Approach

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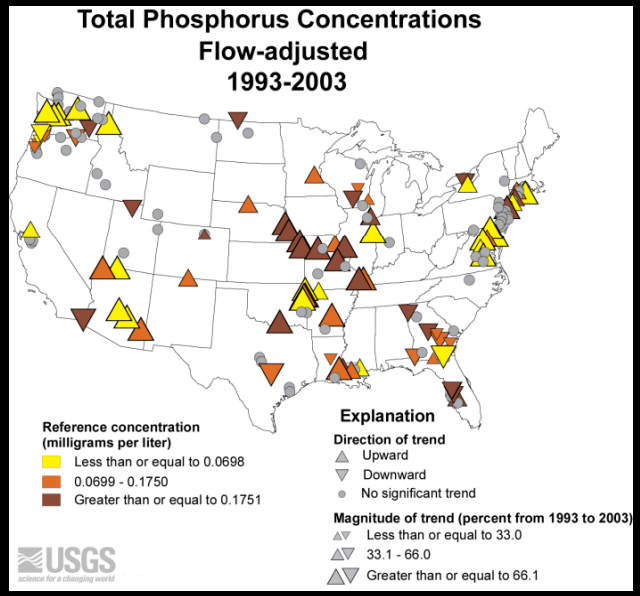
Outline

- Motivation
- About Water Awareness Research and Education (WARE) project
- Monitoring Approach
- Challenges & Opportunities
- Future Outlook
- Acknowledgements

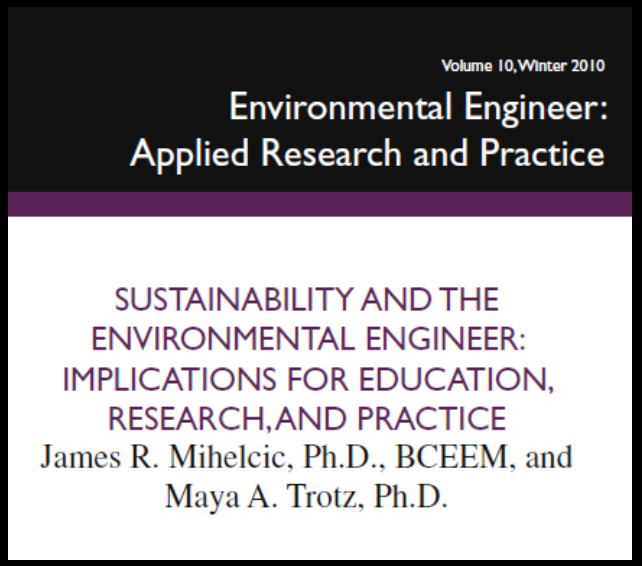
MOTIVATION

THE MENTORING, THE ENGAGEMENT, THE EDUCATION

THE SCIENCE, THE DATA



http://water.usgs.gov/nawqa/



http://www.aaee.net/Downloads/EEJournalV10P1.pdf

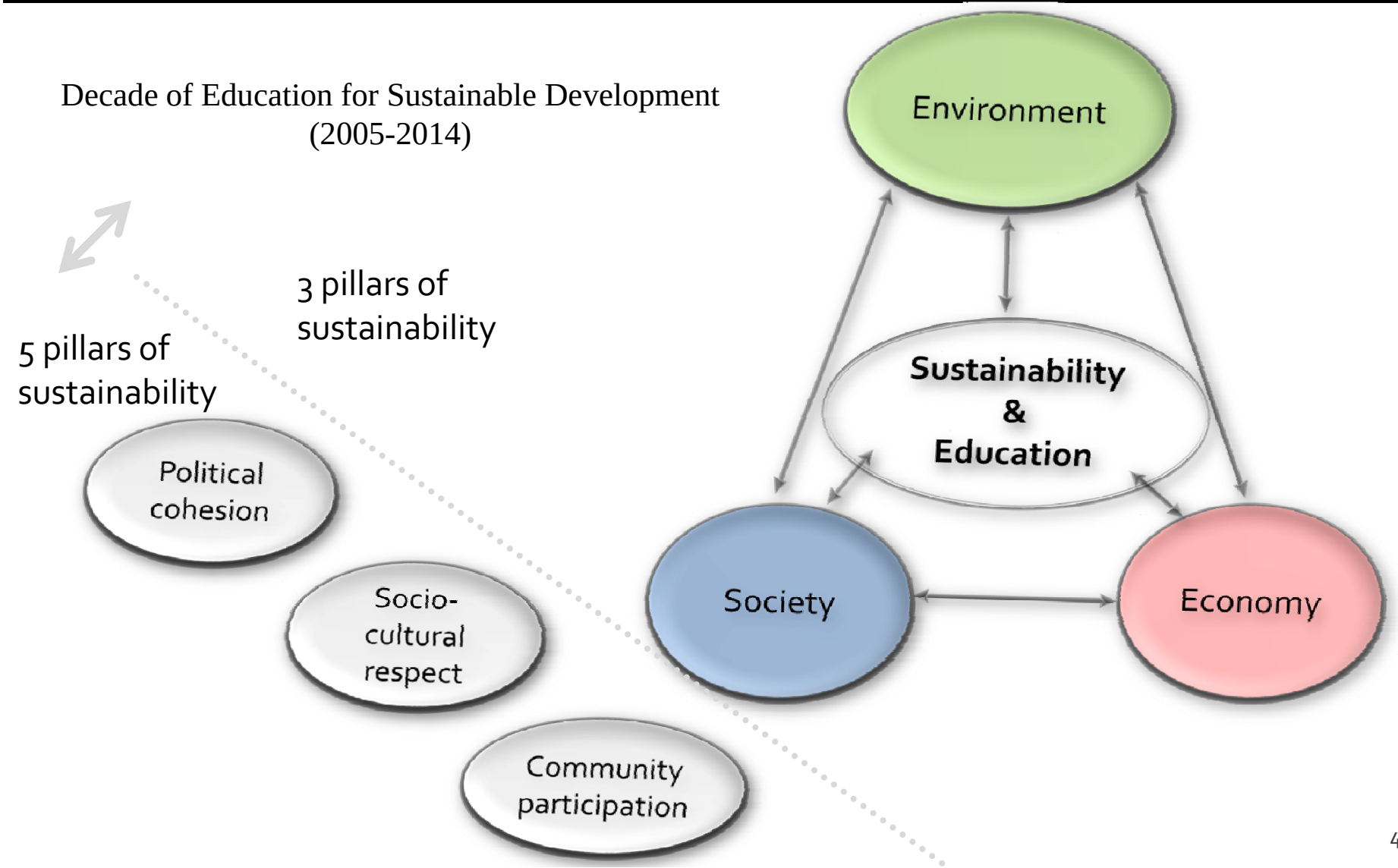
Sustainability

McConville, J.R. and J.R. Mihelcic (2007). Adapting Life Cycle Thinking Tools to Evaluate Project Sustainability in International Water and Sanitation Development Work. *Environmental Engineering Science, 24(7): 937-948*.

Decade of Education for Sustainable Development
(2005-2014)

3 pillars of sustainability

5 pillars of sustainability



Community Based Participatory Research (CBPR)

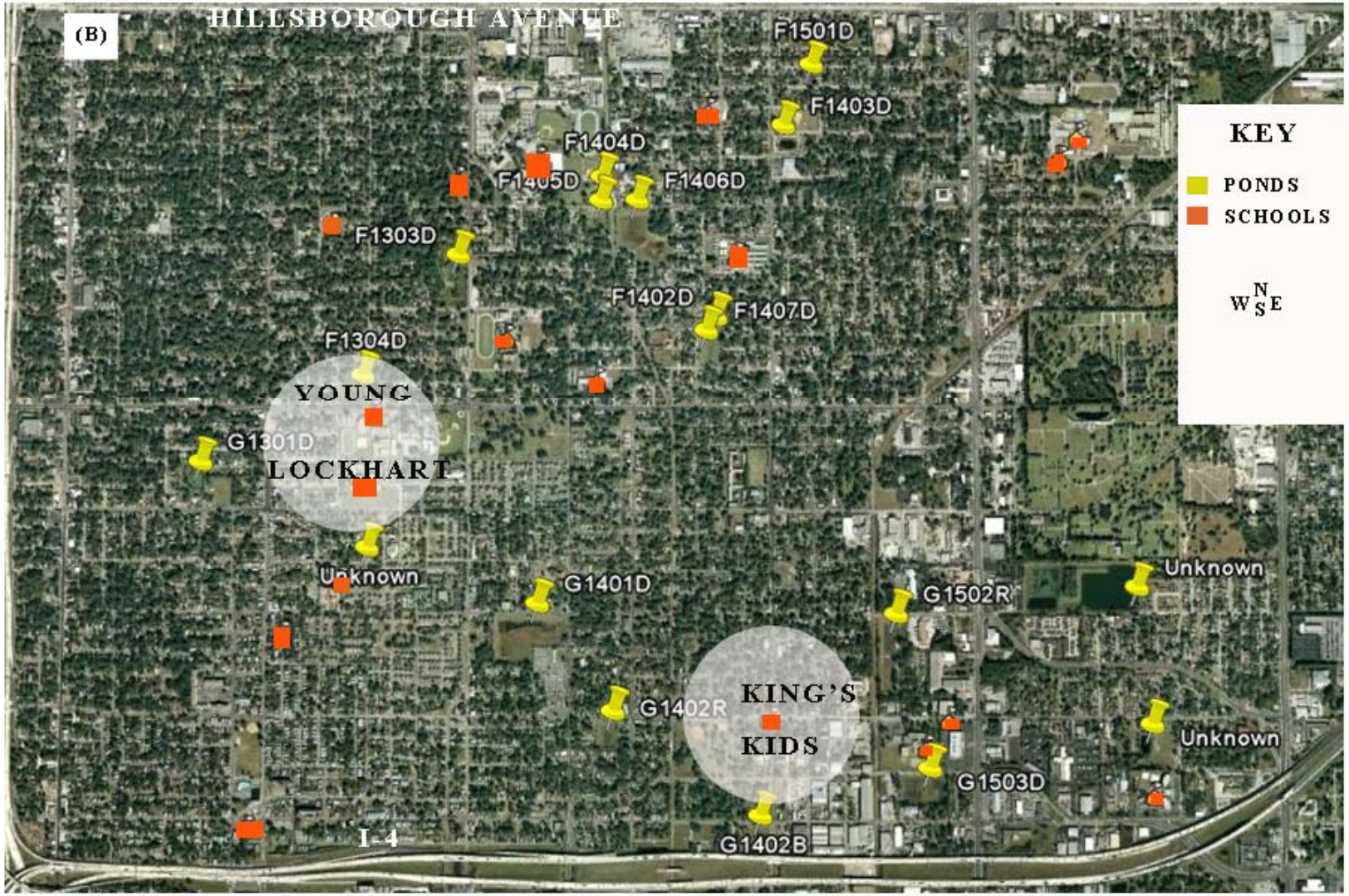
Israel, B.A., Schulz, A.J., Parker, E.A., Becker, A.B. (1998) Review of Community-Based Research: Assessing Partnership Approaches to Improve Public Health. *Annual Review of Public Health* 19: 173-202.

CBPR Guiding Principles	Explanation
1. Recognizes **community** as a unit of identity	A community may be a geographic area, a shared ethnic/racial or other identity.
2. **Builds on strengths** and resource within the community	CBPR supports and expands existing social processes to address community needs.
3. Facilitates **collaborative partnerships** in all phases of the research	Investigators and communities work together to define the problem, collect data, and interpret results.
4. **Integrates knowledge** and action for mutual benefit of all partners	All involved need to determine the mutual benefit of the process and develop an intervention or guide policy.
5. Promotes a **co-learning and empowering** process that attends to social inequalities	Researchers need to enhance their capacity and learn from the process.
6. Involves a **cyclical and iterative** process	Research goals develop over time through many iterative processes used to reflect and evaluate and redefine.
7. **Addresses** sustainability (adapted)	Builds on problems identified by the community, which are often linked by additional sources of data.
8. **Disseminates findings** and knowledge gained to all partners	Community members co-author reports, publications, and other forms of media that reach and are useful to the community.

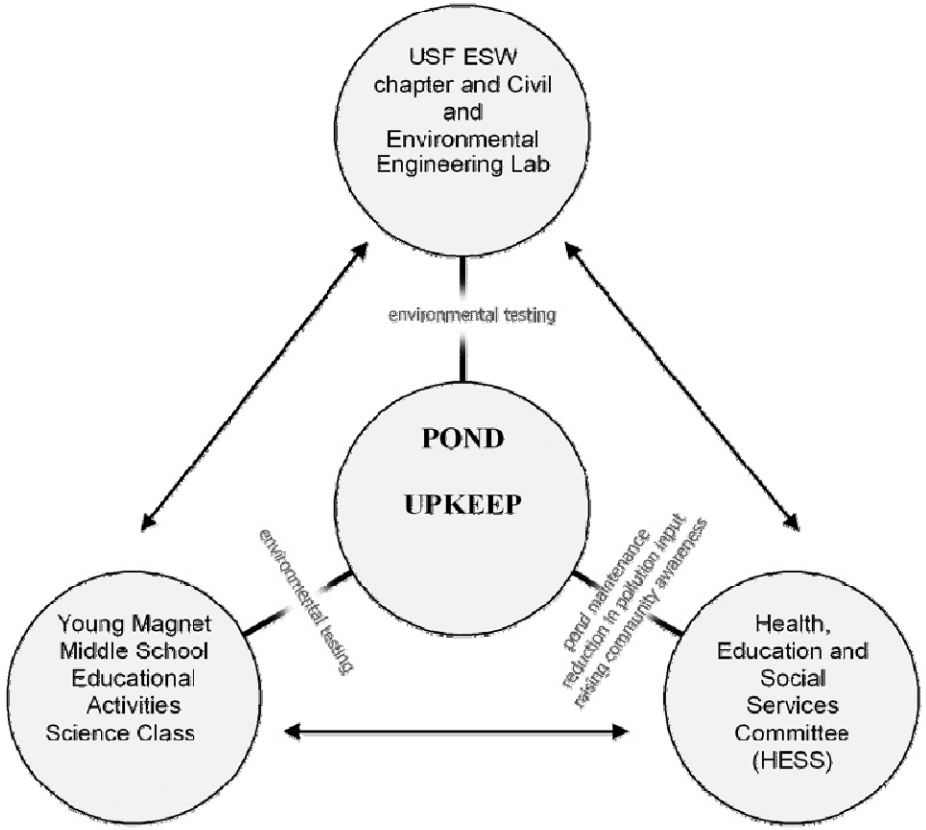
East Tampa Community Revitalization Partnership (ETCRP) – beautification project

ABOUT Water Awareness Research and Education Program (WARE)

Map of East Tampa

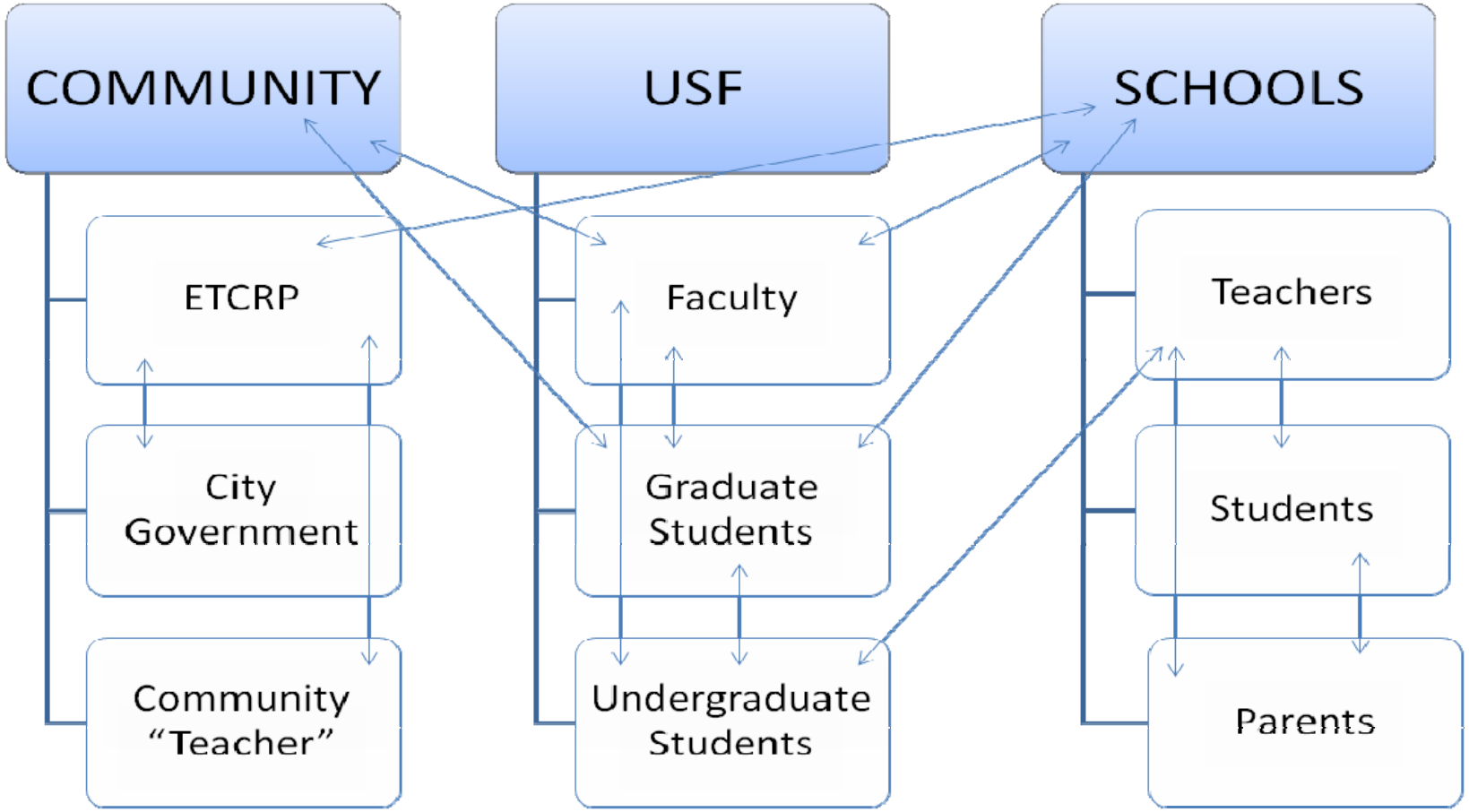


Overview: Water Awareness Research and Education Program (WARE)



- Pilot project funded by EPA P3 Award, 2008 & 2009-2011
- Importance of **stormwater retention ponds** in flood **and pollution control** in communities throughout Florida
- Community **education and awareness** regarding pond **water quality** with links to environmental health

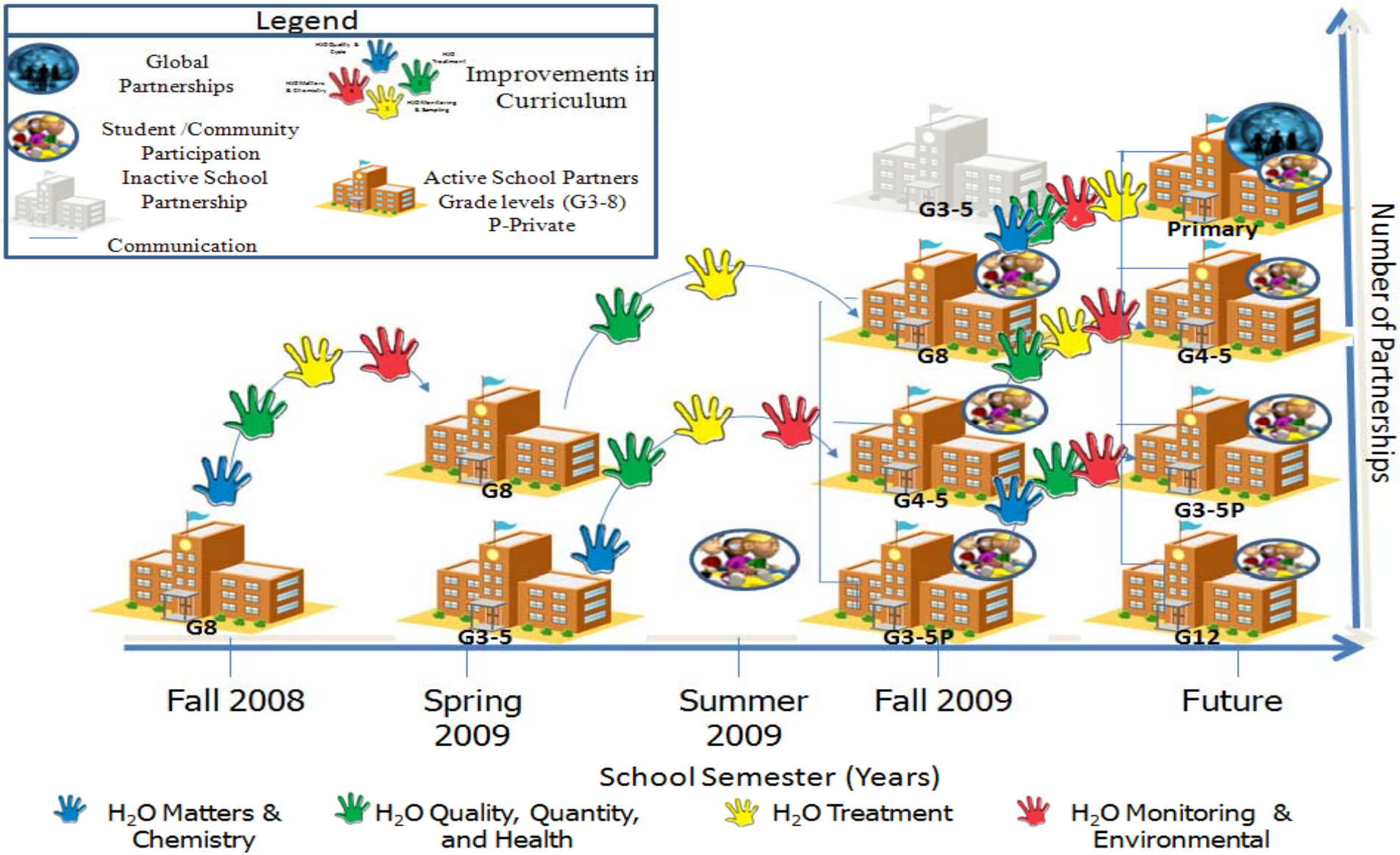
Participatory Groups & Social Network For WARE



Example of Participant Roles and Dissemination Pathways

Participant	Role	Dissemination
ETCRP Chair & HESS committee	Link between community and USF and schools; Provide guided tours of community; Assess and improve WARE. Share WARE with others; Support funding for WARE.	ETCRP community meetings & meeting minutes (monthly); speeches; newsletter; workshop; publication with team.
Engineering Architecture	Develop curriculum & educational material for both K3-5 partners and USF classes; Communicate with community members; Expand project scope through proposals etc.; Work with all members of WARE; Publish WARE material; Train research students.	Radio; presentation at community meetings; newspaper articles; Ware-easttampa.com & faculty website; booths at EPA EXPO, USF Engineering EXPO, Going Green Tampa Bay, Community Survival Day, School events; Workshops; Educational community Kiosk, Class material development; Journal publications, conference presentations.
Graduate student (ESW)	Develop and participate in all WARE activities; Assist teachers during school times; Mentor K5-12 students;	Radio; newspaper articles; Ware-easttampa.com & ESW website; booths at EPA EXPO, USF Engineering EXPO, Going Green Tampa Bay, Community Survival Day, School events; Teaching & training; Educational community Kiosk, Journal publications, conference presentations.

K-12 Interactions

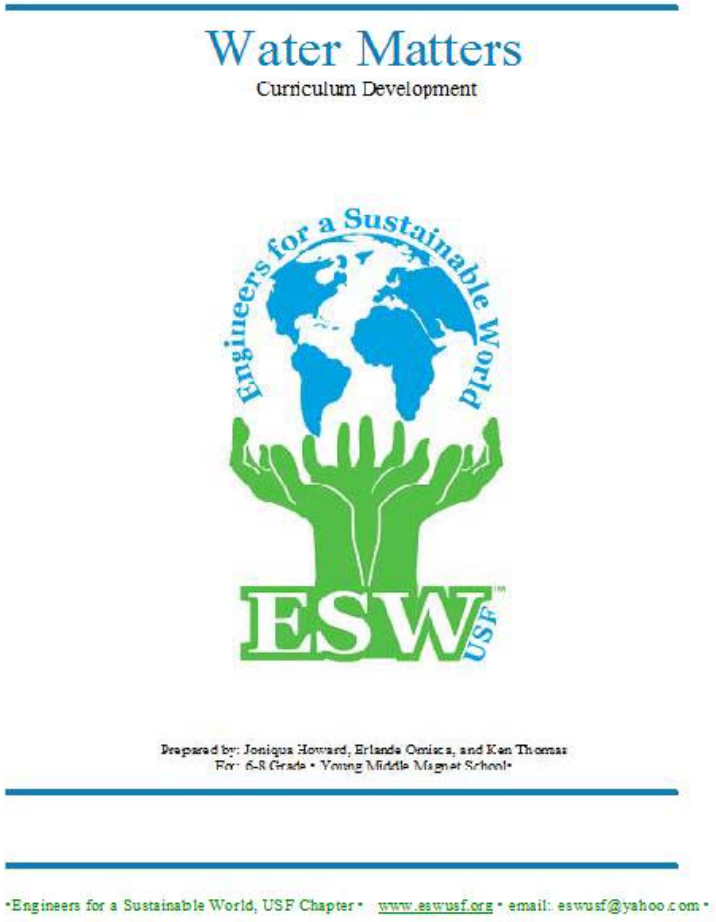


Activities and Assessment Tools: Surveys & Reflective Journaling

- In Class Activities
- Field Trips
- Community Engagement
- Special Programs
  - Research "internship"
  - Radio Show
  - Kiosk Development

Date (d/m/y)	School/Teacher	Activity Name:
Activity Overview	What was the activity?	
	Type of Technology Used?	
Personal	What were your expectations before activity? Were you prepared, if not why not and how can you plan better in future? Did you convey concepts using appropriate language?	
Student Perceptions	Did students appear confused by material, technology etc.? Did students like the activity? Were students excited by the activity? Were students able to recall this exercise and what they learned in the subsequent week?	
Teacher Perceptions	Were teachers actively involved? Did teachers want to learn more? Were teachers able to aid in learning based on your presentation before the activity?	
OVERALL ANALYSIS (Which aspects would you change and why?):		

In Class Time


Water Matters

Curriculum Development

Engineers for a Sustainable World

ESW USF

Prepared by: Joniqua Howard, Erlanda Orriaca, and Ken Thomas
For: 6-8 Grade • Young Middle Magnet School•

•Engineers for a Sustainable World, USF Chapter • www.eswusf.org • email: eswusf@yahoo.com •

Reflections:

•Modifications need to be made according to grade level and location

•Increased memory recall

•Learned troubleshooting techniques

• ↑ Teacher and student initiatives to collect, monitor, test, and report water quality

Field Trips

% CORRECT ANSWERS

Stormwater Bus Tour. 19 Elementary Kids.

	Pre	Post
What is a retention pond	21	90
What is a detention pond	10	84
What civil and environmental engineers do	26	52
Aware of the history of East Tampa	32	74
How nutrients affect a stormwater pond	26	63
The steps involved in the water cycle?	95	90

Wastewater Treatment Tour: 12 Elementary Kids; 6 Middle School Kids..

	Pre-tour		Post-tour	
	Elem	Mid	Elem	Mid
First step in wastewater treatment	58	33	92	67
Pipe color for reclaimed water	58	33	92	100
Final step in the wastewater treatment	58	33	75	67
Products from wastewater treatment	25	100	17	100

Community Outreach and Active Engagement

Night of Ecology, Lockhart Elementary

Community Survival Day, East Tampa

Engineering EXPO, USF

Special Programs

Reflections:

•Participants enjoyed

•Participants developed sense of ownership in tackling a real world problem

•Help to strengthen self confidence and motivation

•Students help researchers keep ideas simple

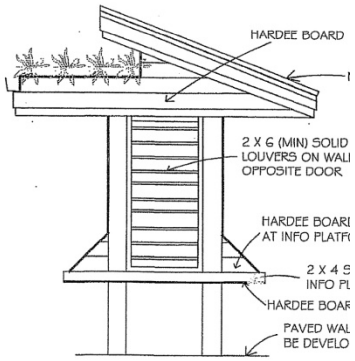
•Cultivates mentorship

Kiosk Development

October 2009

October 2009 - now

March 2010



October 2009

Community's Response to WARE

"…I don't know if I told you [graduate student Joniqua Howard] what a joy your students were! If I had to choose my **most prepared** and **most inquisitive** group of kids from this year's tour groups - your kids would win by a wide margin! They were great and **I loved, loved, loved the questions**. I know this is **a direct result** of the **time** you've [Joniqua] **spent with them** - so kudos to you, too!" - Kathryn Fitzpatrick, Howard Curren Advanced Wastewater Treatment (May 28, 2009)

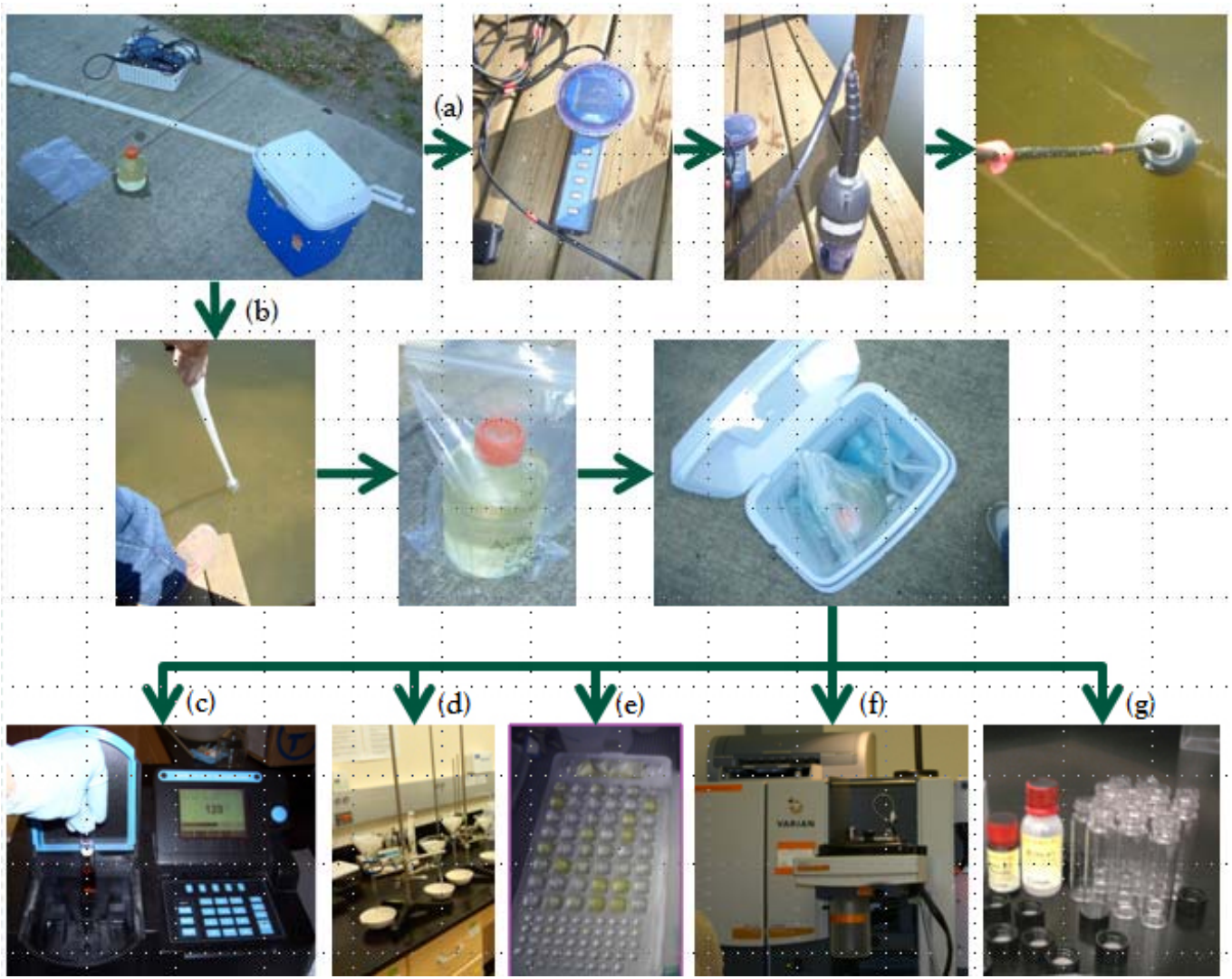
"Joniqua, I want to thank you for creating this opportunity for the students….
It's so **beautiful** that you all are doing this **project in** a **part of town that needs** a lot of **support**, needs a lot of assistance and in an area where people need to be more aware of what is going on in their environment….And the fact that we have these **beautiful children** there in **understanding chemical pollutants** is even better." - Otis Anthony, WMNF 88.5 FM Radio (Feb 14, 2010)

"**As** a **female** and a person of color **your** [graduate student Joniqua Howard] very **presence in the classroom** as a scientist **reinforces** the fact that a **scientist isn't** just an **old white guy** with glasses and a lab coat. You are wonderful with the kids as well. They **love your energy** and have benefitted tremendously from your expertise!" - Jane Kemp, Chiles and Lockhart Elementary

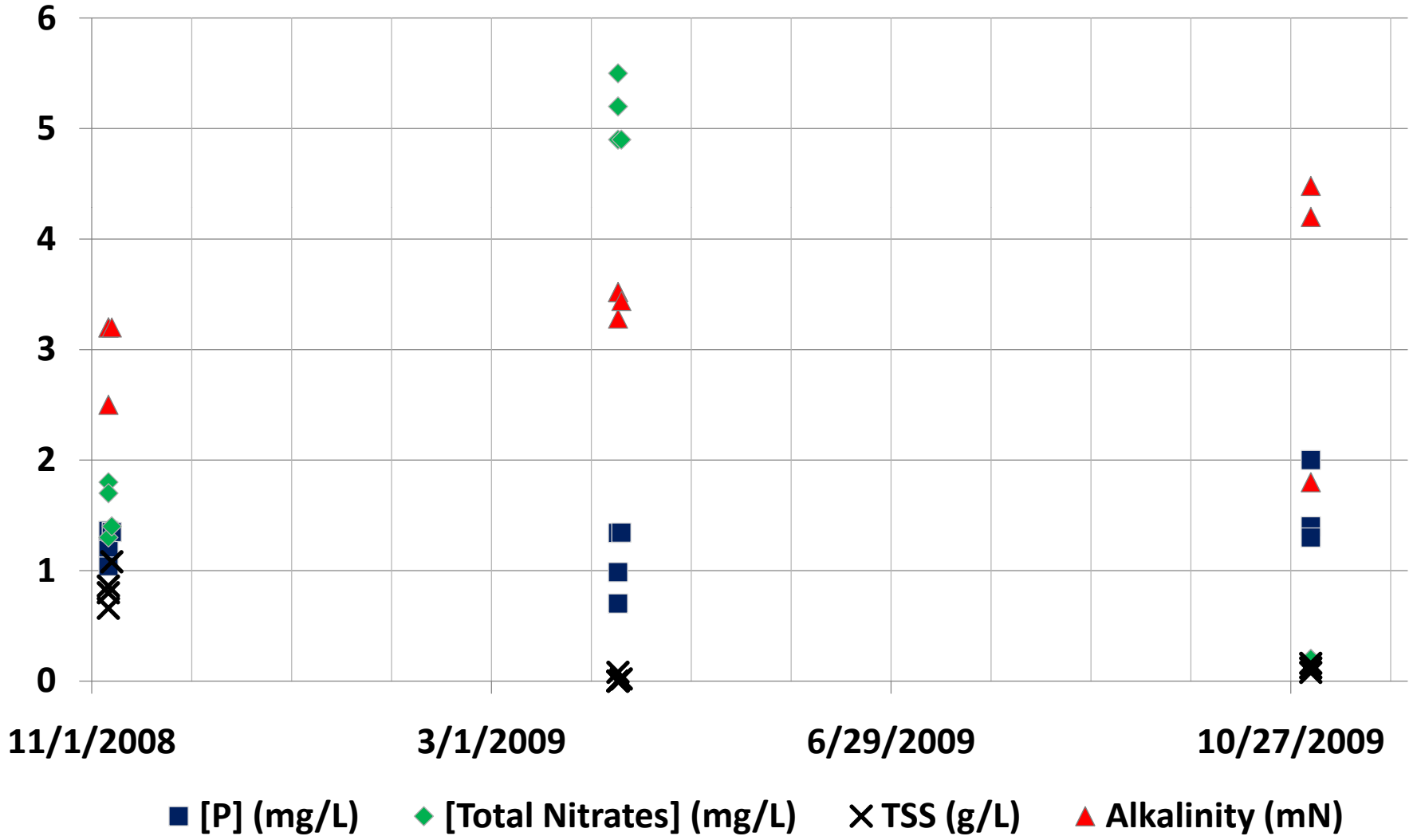
MONITORING APPROACH

USF Environmental Engineering Lab, USF research students

1. Students pay a lab fee.
2. P3 grant pays for some analyses

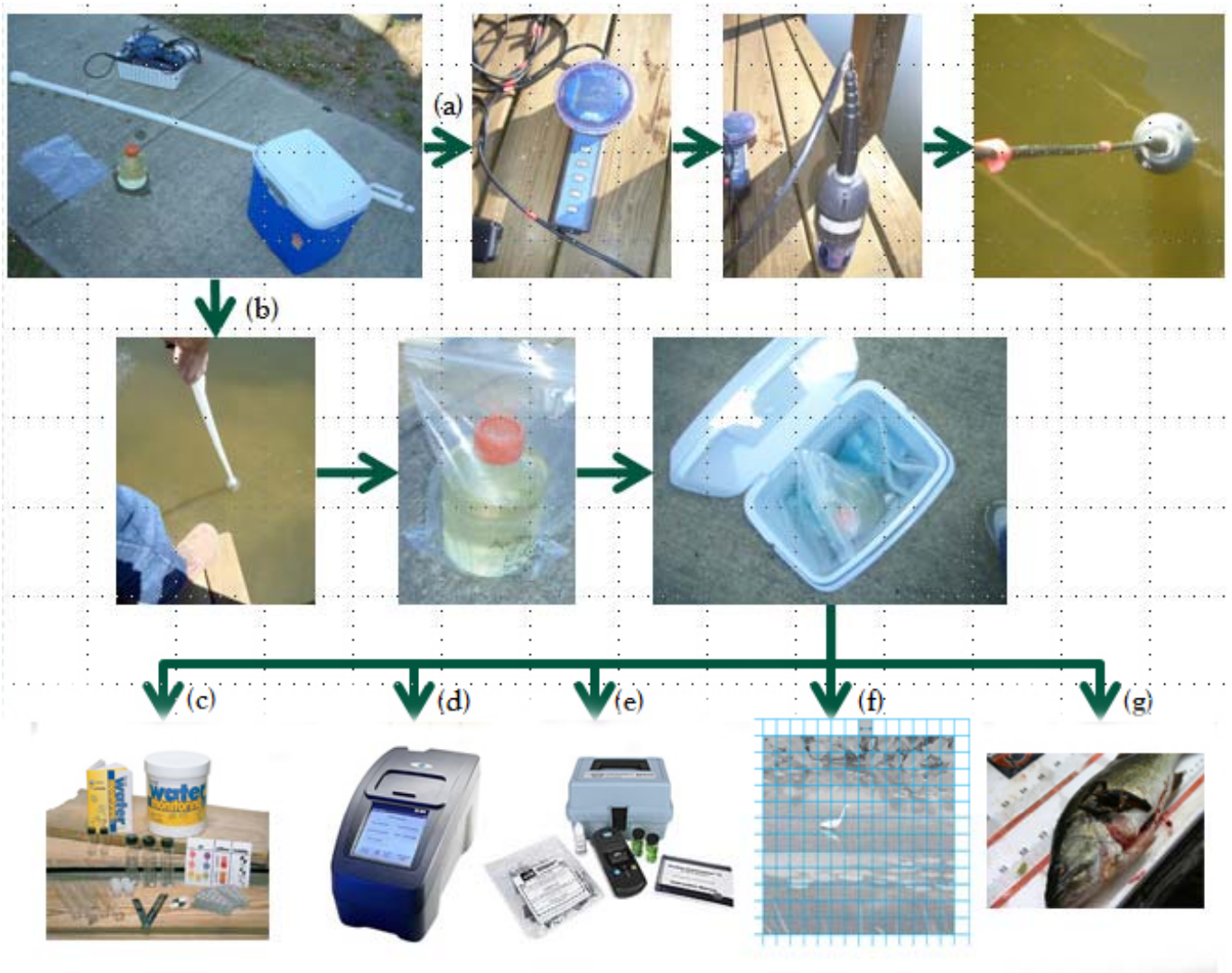


Monitoring: P, N, TSS, Alkalinity, DO, Turbidity, Temperature, Al, Cu, Fe, Pb, Zn, COD, TOT & Fecal Coliform



Elementary & Middle School Students

1. P3 grant pays for some kits.
2. Teachers apply for external grants. E.g. SPLASH grants. http://www.swfwmd.state.fl.us/education/schoolgrants/
3. Teachers include in science budget.



Challenges

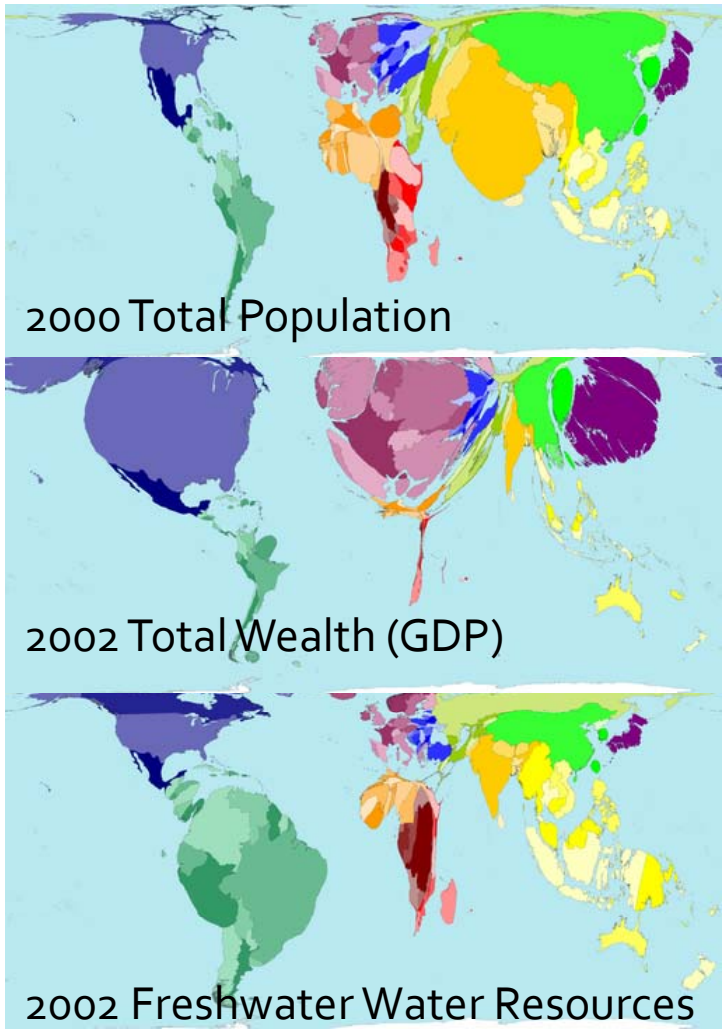
- Varied objectives of multiple stakeholders
  - E.g. CBPR process not well incorporated in kiosk design as city made decision to build based on feedback from educational component – a new and major selling point for pond investment. Time & resources of group stretched on fast schedule.
- Varied levels of experience/exposure of teachers
- Cyberinfrastructure to support project
- Unwanted outcomes
  - Hydrilla invasion
  - Parks & Recreation planting of non native plants & installation of irrigation systems
- Funding
  - Faculty and graduate student volunteer time

OPPORTUNITIES

1. Mihelcic, J.R.; and Trotz, M.A. Environmental Engineer: Applied Research and Practice, in *Environmental Engineer, the Magazine of the American Academy of Environmental Engineers.* Winter, 2010.
2. Trotz, M. A.; Muga, H. E.; Phillips, L.D.; Yeh, D.; Stuart, A.; Mihelcic, J. R. (2009) Non-traditional University research partners that facilitate service learning and graduate research for sustainable development. *Proceedings of the ASEE Annual Conference & Exposition, Austin, TX , June 14-17, 2009.*
3. Trotz, M. A.; Thomas, K. D. (2009) Sustainability concepts through an applied environmental engineering laboratory: Studying stormwater ponds at the university and local communities. *Proceedings of the ASEE Annual Conference & Exposition, Austin, TX, June14-17, 2009*.
4. Thomas, K. D.; Howard, J. A.; Omisca, E.; Green, T.; Trotz, M. A. (2009) Stormwater pond beautification in East Tampa: The basis for University, K-12, and community partnerships that broaden participation in environmental engineering. *Proceedings of the Southeastern Section Meeting of ASEE, Memphis, TN, Marietta, GA, April 5-7, 2009*.

Proposals worth over $8 million dollars submitted using WARE since 2008.

FUTURE OUTLOOK



http://www.worldmapper.org/index.html

- Mainstream monitoring & data interpretation in K-20 curriculum
- Mainstream CBPR in K-20 curriculum & research
- Develop communities of engaged global citizens
- Increase interconnectedness with advances in:
  - Sensor technology,
  - Mobile technology
  - Cyberinfrastructure

found at Acarai Mountain

Wanyakoko fishing ground

Acknowledgements

- **Funding:**
  - The Environmental Protection Agency has provided support for the Water Awareness Research and Education in East Tampa project (P3- SU833946).
  - USF Diversity Fellowship
  - NSF GK-12 STARS, NSF REU site “REU-TIER.NET”
  - NSF Bridge to Doctorate Program
  - SLOAN Minority PhDs
  - ETCRP, Teachers, Students, Parents

Questions? Ware-easttampa.com

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