Citizen Science
&
Volunteer Monitoring

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Public Participation in Scientific Research: Defining the Field & Assessing Its Potential for Informal Science Education

a CAISE Inquiry Report

Models for Public Participation in Scientific Research

Impacts of Public Participation

Opportunities for the Field

Funded by:
Center for Advancement of Informal Science Education, National Science Foundation

Steps in Scientific Process	Steps in which volunteers participate:		
	Contributory Projects	Consulting Projects	Co-created Projects
Choose or define questions of study		X	X
Gather information and resources		(X)	X
Develop hypotheses		(X)	X
Develop study design			X
Collect data	X		X
Analyze samples			X
Interpret data and draw conclusions			X
Disseminate conclusions/translate results into action	(X)		X
Discuss results and ask new questions			X

(Adapted from Bonney, Ballard, Jordan, McCallie, Phillips, Shirk, and Wilderman, 2009)

Contributory Projects--Citizen Science

- Collect the Data
- Disseminate the Conclusions
- Translate the Results into Action

COLLABORATE
Develop monitoring objectives
Design monitoring program
Convey results and findings
Understand, protect, restore our waters
Collect field and lab data
Assess and interpret data
Compile and manage data
COMMUNICATE
COORDINATE

CONTRIBUTORY

ALLARM acid rain monitoring volunteers follow set protocols to test water pH. *Photo courtesy ALLARM*

Volunteers for Spotting the Weedy Invasives attend training sessions before they begin to collect data. *Photo courtesy Spotting the Weedy Invasives*

Seeing young birds up close brought joy and discovery to participants in The Birdhouse Network. *Photo courtesy The Birdhouse Network*

ALLARM acid rain project, Spotting the Weedy Invasive (Rutgers), and The Birdhouse Network (Cornell Lab of Ornithology)

CONTRIBUTORY

A volunteer monitors monarch butterfly populations in Duluth, Minnesota. *Photo courtesy MLMP*

Monarch butterfly. *Photo by Christine Ruffo*

Participants in CoCoRaHS measure amounts of rain, hail, and snow.measure rainfall amounts. *Photo by Henry Reges, CoCoRaHS*

Monarch Larvae Monitoring Project (U Minn) and CoCoRaHS (Community Collaborative Rain, Hail and Snow Network)

CONSULTING model projects

- Top-down, scientist-driven
- Issues studied are community based
- Volunteers participate in refining the study design, collecting data and disseminate findings

Steps in Scientific Process	Steps in which volunteers participate:
	Consulting Projects
Choose or define questions of study	X
Gather information and resources	(X)
Develop hypotheses	(X)

CO-CREATED, Community-based Participatory Research

Steps in Scientific Process	Steps in which volunteers participate:
	Co-created Projects
Choose or define questions of study	X
Gather information and resources	X
Develop hypotheses	X
Develop study design	X
Collect data	X
Analyze samples	X
Interpret data and draw conclusions	X
Disseminate conclusions/translate results into action	X
Discuss results and ask new questions	X

- Bottom up, community-driven
- Issues are usually local
- Volunteers participate in all steps of the scientific process

Participants in Reclam the Bay are helping to restore shellfish to Barnegat Bay, New Jersey.
Image courtesy Reclam the Bay

Co-Created Projects-Volunteer Monitoring

- Choose or Define Questions of Study
- Gather Information & Resources
- Develop Hypotheses
- Develop Study Design
- Collect Data
- Analyze Samples
- Interpret Data & Draw Conclusions
- Disseminate conclusions/Data to Action
- Discuss Results and New Questions

COLLABORATE
COORDINATE
COMMUNICATE
Develop monitoring objectives
Design monitoring program
Collect field and lab data
Compile and manage data
Assess and interpret data
Convey results and findings
Understand, protect, restore our waters

Citizen Science

- Top Down Approach
- Plugging people into a pre designed program
- Short term commitment

Volunteer Monitoring

- Bubble Up Approach
- People define community concerns and design program
- Longer term commitment

Why is Citizen Science so Sexy Right Now?

2011 - 2012 Assessment

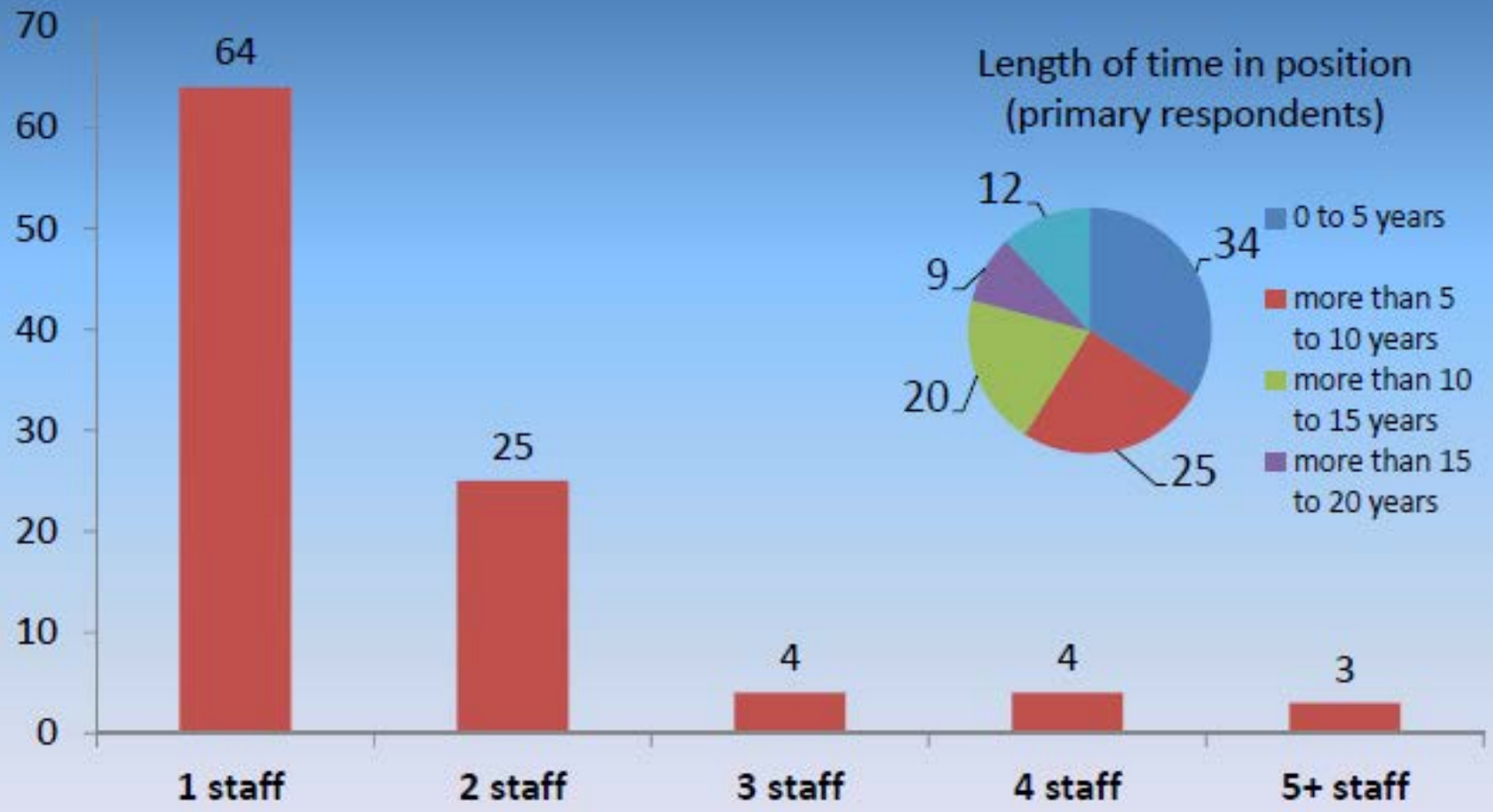
- Recent goal was to determine the **status** of VM programs, including learning how they began, their goals, ongoing efforts, resources, and **needs**.
- Online needs assessment carried out in fall and winter 2011-2012.
  - Contacted thru EPA VM & EVMN listservs
    - 3 rounds of e-requests
    - Begging email to individual EVMN coordinators

Applying knowledge to improve water quality
Volunteer Water Quality Monitoring
National Water Resource Project
A Partnership of USDA NIFA & Land Grant Colleges and Universities

URI WATERSHED WATCH

Staffing of VM Programs

n=100



88% are paid

Applying knowledge to improve water quality
Volunteer Water Quality Monitoring
National Water Resource Project
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Top Program Concerns

- **Funding stability**
- **Funding amount**
- **Staff Time (overworked *and* see above)**
- Use of Program's data
- Volunteer Retention
- Analyzing data and sharing results
- Volunteer support
- Understaffing (*see top 3 above*)

Applying knowledge to improve water quality
Volunteer Water Quality Monitoring
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URI WATERSHED WATCH

Least Concerned about

- Data use
- Data reliability
- Volunteer support/involvement
- # of staff
- Data management and storage
- Integration of efforts with agencies/univs
- Administrative support
- Staff education and networking

Applying knowledge to improve water quality
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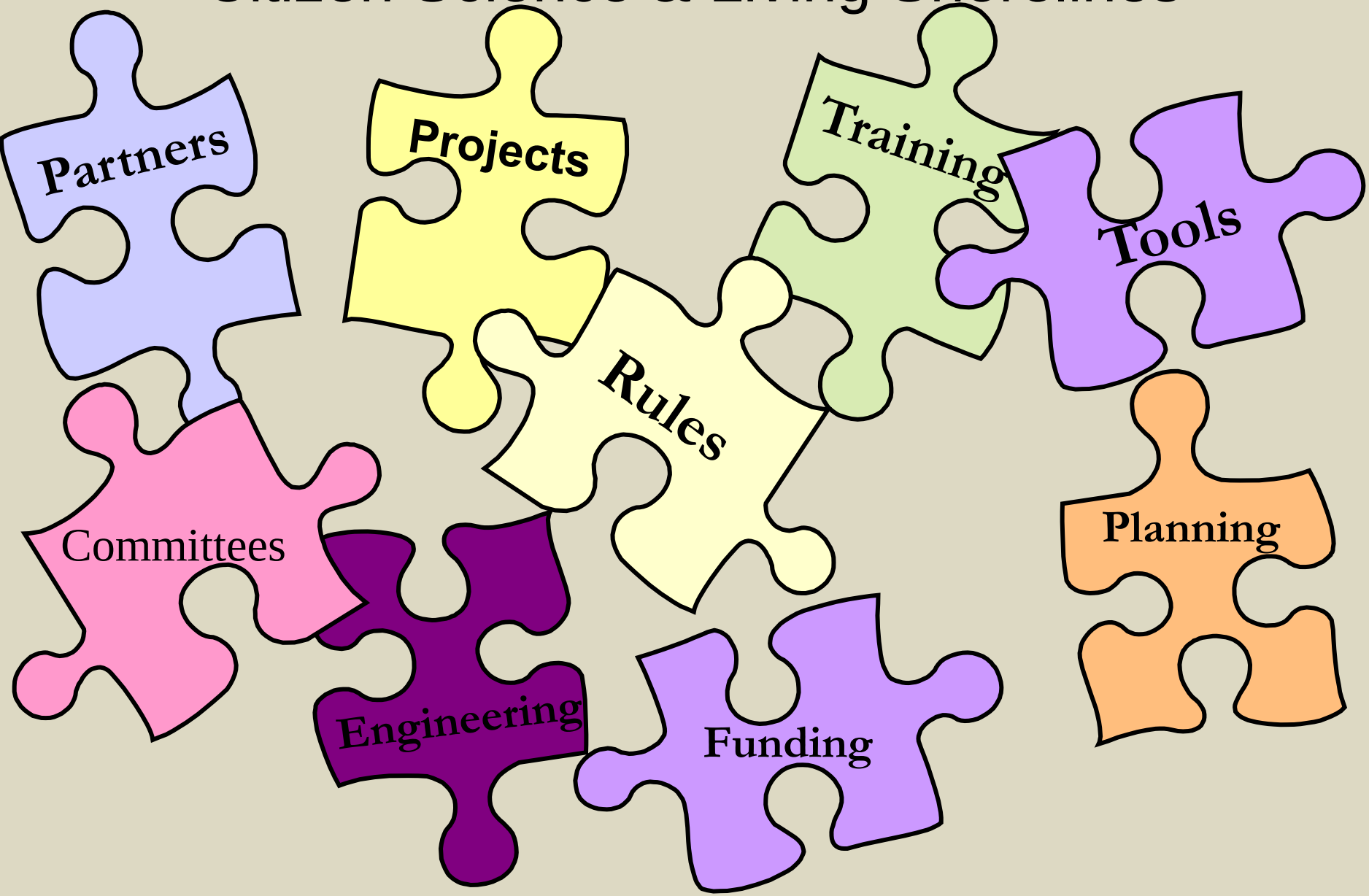
URI WATERSHED WATCH

Citizen Science & Living Shorelines



Citizen Science & Living Shorelines

- Identifying potential project locations
- Monitoring Effectiveness of Coastal Resiliency Projects
  - Performance monitoring
  - Ecological, habitat monitoring
  - Water Quality monitoring
- Data to Action

NJ Living Coastal Restoration Committee

- Science
- Regulatory Requirements
- Statewide Partners
- Geographical Considerations
  - Northern Jersey
  - Southern Jersey

Funding Attention Deficit Syndrome F.A.D.S.

Once the funding is gone, the science is gone, partners are gone…Who's left…

Volunteers

Community Members

Citizen Scientists

References

- Bonney, R., Ballard, H., Jordan, R., McCallie, E., Phillips, T., Shirk, J., and Wilderman, C.C. 2009. Public Participation in Scientific Research: Defining the Field and Assessing Its Potential for Informal Science Education. *A CAISE Inquiry Group Report.* Washington, D.C.: Center for Advancement of Informal Science Education (CAISE)

- Ely, Eleanor, 2008. Volunteer Monitoring & the Democratization of Science, *The Volunteer Monitor*, 19(1), pp.1,3-5.

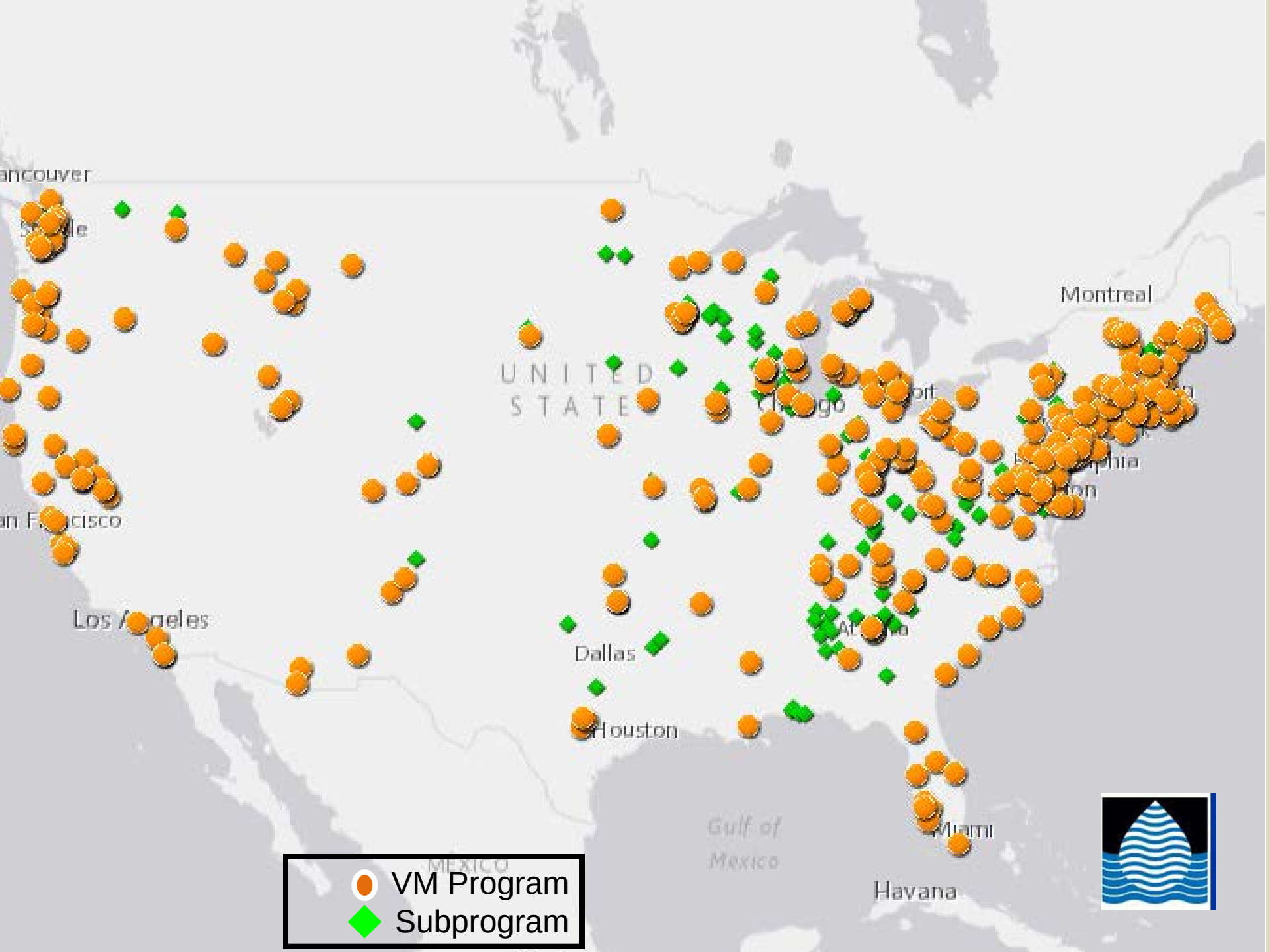
- McEver, C., R. Bonney, J. Dickinson, S. Kelling, K. Rosenburg, and J. Shirk (Editors), 2007. *Proceedings of the Citizen Science Toolkit Conference*, Cornel Laboratory of Ornithology, Ithaca, NY June 20-23, 2007. www.birds.cornell.edu/citscitoolkit/conference/presentations

- Wilderman, C., A. Barron and L. Imgrund, 2003, "The ALLARM program: growth, change, and lessons learned," *The Volunteer Monitor*, 15(1), pp.1-4.

- Wilderman, C. 2006. The taxonomy of community-based monitoring. Presentation at the *5th National Monitoring Conference*, Atlantic City, NJ May 18-22, 2006.

Volunteer Monitoring

- Integration and Support from NWQMC
- Development of a Volunteer Monitoring Council
- National Directory of Programs
- VM Success Stories


Montreal
UNITED
STATE
Dallas
Houston
Gulf of
Mexico
Havana
VM Program
Subprogram