Citizen Science Success Stories from Virginia

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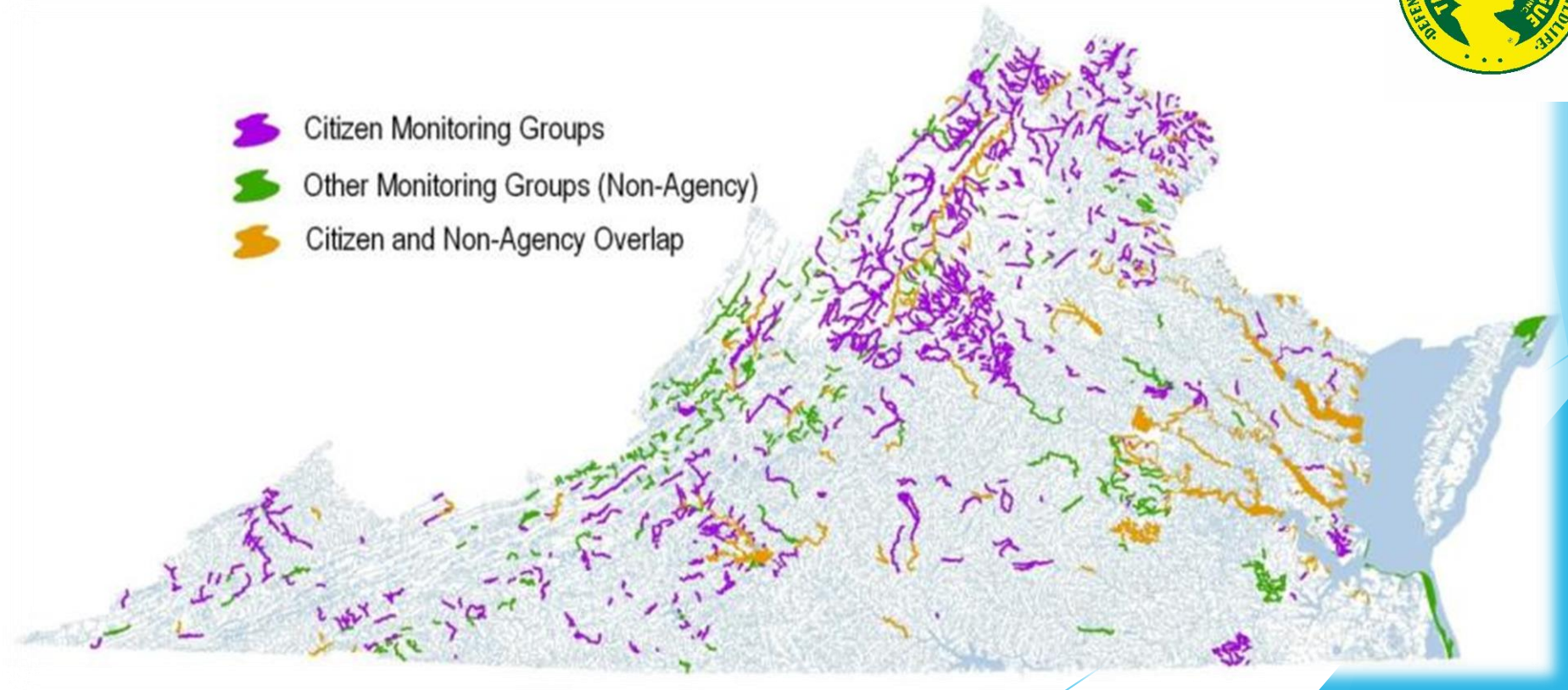

Citizen Science Integration – A Chesapeake Bay-wide Effort

- Partners working together to:
  - Expand volunteer and non-traditional monitoring Chesapeake Bay watershed-wide
  - Provide standardized technical support to ensure high-quality data collection
  - Integrate citizen collected data into the Chesapeake Bay Program monitoring network

- There are many great examples of citizen scientists successfully using scientifically rigorous protocols across the Chesapeake Bay Region

Alliance for the Chesapeake Bay

Defenders of Soil, Air, Woods, Waters and Wildlife. The Izaak Walton League of America, Inc.

Alliance for Aquatic Resource Monitoring. ALLARM. est. 1986

University of Maryland Center for Environmental Science

Chesapeake Bay Program. A Watershed Partnership

VA DEQ & Volunteer Monitoring

- Since 1998 DEQ *has actively partnered with* citizen volunteer and other non-agency water monitors
- In 2003 DEQ *developed a QA/QC program* to allow the agency to incorporate non-agency data to assess water quality
- Continued support by DEQ is resulting in an *unprecedented amount of quality data* submitted to the agency
- Estimated costs/value (annually)
  - DEQ spends $2,500 per station
  - Volunteers *contribute in-kind costs of about $750,000*

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Mileage Tracking

Assessment Cycle	Monitoring Year	Citizen Stations Submitted	Sample Events	Stream Miles	Estuary Mi^2	Lake Ac^2
2008	2001-2006	1,002	15,605	2,371.61	73.74	9,726.15
2010	2003-2008	1,485	23,420	3,499.45	37.48	30,052.98
2012	2005-2010	1,774	30,829	4,124.44	40.15	27,975.46
2014	2007-2012	1,494	31,871	3,559.96	34.48	24,860.47

Virginia has >100,923 miles of rivers and streams

- 117,158 acres of significant lakes and reservoirs
- 2,836 square miles of estuaries

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How DEQ Uses Submitted Data

- Stream Assessment
  - 305(b) assessment of stream health and 303(d) listing
- Tracking
  - Water quality improvement such as during TMDL implementation
- Rapid Response
  - Early detection of pollution events to help alert DEQ
- Outreach
  - Work with local communities in a positive way
- Education
  - Show the importance of water quality to the public

More info:
http://www.deq.state.va.us/Programs/Water/WaterQualityInformationTMDLs/WaterQualityMonitoring/CitizenMonitoring.aspx

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Three Levels of Volunteer Data

Level	Appropriate Data Uses	QA/QC Protocols
III	• List or delist waters on the 303(d) Impaired waters list • Assesses waters for 305(b) Report • Use with DEQ data for TMDL development • All uses listed in Levels I and II	• DEQ-approved Quality Assurance Project Plan and field or lab SOPs. • Field and/or laboratory audit required. • Group provides calibration and quality control associated information to DEQ when submitting data. This information must meet the specific criteria stated in the QAPP.
II	• Identify waters for DEQ follow up monitoring • Track performance of TMDL implementation • All uses listed in Level I	• DEQ-approved Quality Assurance Project Plan and approved field or lab SOPs • At this level, there may be deviation from an approved method if it can be demonstrated that the method collects data of similar quality to an approved method.
I	• Education • Baseline information • Notification of Possible Pollution Events • Local Land Use Decisions • Special Studies	• No Quality Assurance Project Plan (QAPP) or SOP required by DEQ. • Uniform methodology recommended. • QAPP, SOPs and/or lab methods do not meet DEQ quality assurance/quality control requirements. • There is no Virginia Water Quality Standard for parameter the method measures.

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Examples of Citizen Monitoring Groups
(2005-2010 reporting cycle)

Citizen Group	Level III		Level II	
	# of Sites	Parameters	# of Sites	Parameters
Alliance for the Chesapeake Bay	81	Dissolved oxygen, temperature	81	pH
Clean Virginia Waterways	25	E. coli		
Friends of Chesterfield Riverfront			26	DO, E. coli, pH, temperature
Friends of Shenandoah River	220	DO, E. coli, nutrients, pH, temperature		
Lake Anna Civic Association	23	Chlr a, DO, E. coli, pH, nutrients, temperature		
StreamWatch	114	Benthic macroinvertebrates		
Virginia Save our Streams (IWL)			343	Benthic macroinvertebrates

RiverTrends

- Core Parameters
  - Dissolved oxygen
  - pH
  - Salinity
  - Temperature (air and water)
  - Water clarity and depth
- Secondary Parameters
  - Bacteria
  - Nutrients
  - Precipitation

Alliance for the Chesapeake Bay

RiverTrends – Quality Assurance Project Plan

- Monitoring protocols
- Training
- Recertification Sessions
- Data management and quality assurance
- Train-the-Trainer Program

Alliance for the Chesapeake Bay

Virginia Save Our Streams

- 500 volunteers at 200 sites (non-tidal)
- Benthic Macroinvertebrates (to class, order, or family level)
- Level II with potential for Level III (provides 12% of VA DEQ's data)
- Database & Resources – www.vasos.org

Virginia Save Our Streams – Rocky Bottom Method

- Collect macroinvertebrates from 1 square ft area in riffle by rubbing rocks and disturbing bottom for 20 seconds
- All macroinvertebrates are picked off the net, identified, and counted
- Multi-metric index used to determine whether water quality is acceptable or unacceptable

Virginia Save Our Streams – Quality Assurance Project Plan

- Training and certification tests (written and practicum; protocol and id)
- Certified monitor must be part of each team
- Requirements for regional trainers
- Data checks
- Side by side sampling by VA SOS volunteers using VA SOS method and DEQ staff following DEQ protocols –95% accuracy