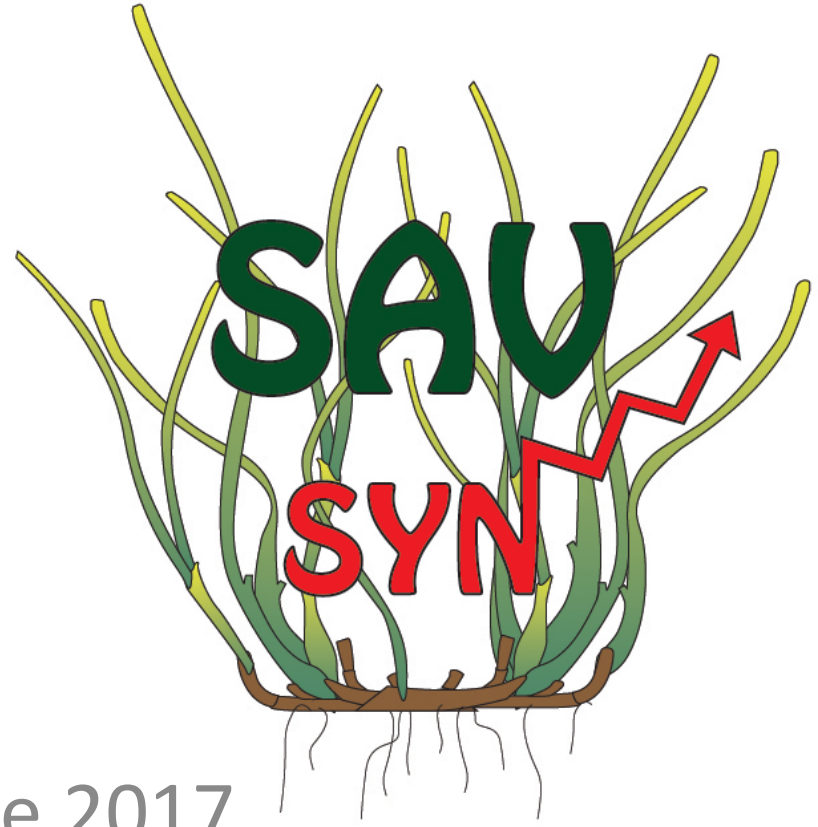
Scientific synthesis at the Chesapeake Bay Program

Bob Orth
Bill Dennison
Jon Lefcheck

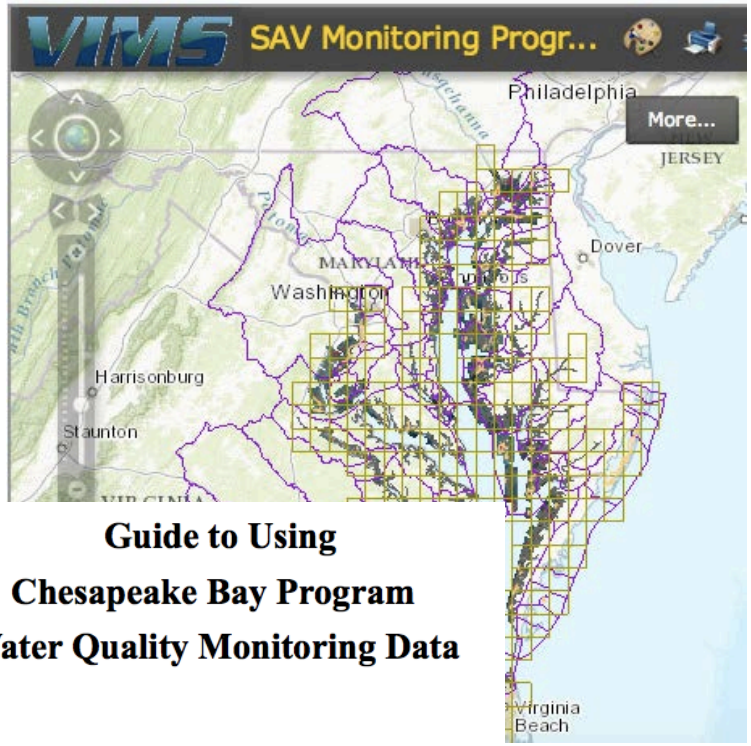


22 June 2017

Annapolis, MD

Why SAV synthesis now?

- Long term, solid data sets available
- Access to new analytical tools and expertise
- Understanding the drivers of SAV trends can have important management relevance
- Input to 2017 TMDL reassessment is timely
- Transition to new generation of scientists



Guide to Using
Chesapeake Bay Program
Water Quality Monitoring Data

Chesapeake Bay Program
A Watershed Partnership

Chesapeake Bay Program RFP issued in 2016: Orth et al responded

OVERVIEW

AGENCY: U.S. Environmental Protection Agency (EPA)

TITLE: Chesapeake Bay Program Office Fiscal Year 2016 Request for Proposals for Chesapeake Bay Submerged Aquatic Vegetation Aerial Survey

ANNOUNCEMENT TYPE: Request for Proposals (RFP)

RFP NUMBER: EPA-R3-CBP-16-01

CATALOG OF FEDERAL DOMESTIC ASSISTANCE (CFDA) NUMBER: 66.466

Workshop justification identified in proposal

- Scientists and funding agencies that will more ***clearly understand the processes*** causing SAV decline, the potential for management ***to restore baywide*** SAV species and habitat diversity, and the ability ***to develop direct linkages*** between the implementation of management actions with a key living resource of Chesapeake Bay
- Our ***basic understanding of factors and processes*** that control the survival of each key SAV species and the tangible value to our society of these habitats. This will be particularly important in anticipating and managing for climate resilience and addressing related impacts on SAV populations.
- NGOs who will understand where they ***should target their conservation efforts*** to protect biodiversity and natural resources.
- Local, state and federal agencies and management councils who will use the information to manage financial and human resources for ***coastal management, habitat conservation and restoration/mitigation***.
- Post-doctoral students and younger staff as it will foster the development of young researchers that signal the ***upcoming transition of the research community.***

Workshop goals

- **Productive**

  Workshop summary produced, document progress, publications

- **Interactive**

  Activities & breakouts lead to input & exchange

- **Condensed**

  Workshops limited to necessary contact hours (2-3 days – intense)

- **Participatory**

  Multiple opportunities for input

- **Fun**

Workshops are expensive but offer a unique opportunity to get input & develop consensus

- Expensive
  - Collective salaries add up quickly
  - Travel expenses & venue costs
  - Planning and follow up activities
- Unique opportunity
  - Collective thinking possible
  - Consensus only possible with face-to-face meetings
  - Responsiveness to emails and phone calls

Therefore, they need to be productive

Our workshop approach: Structured but flexible

- Structured opening & closing plenaries
  - Condensed science content; previewed, preloaded
  - Establish objectives
- Flexible, interactive sessions
  - Multiple breaks
  - Adjustments common
- Meals outside
  - Enhance interactivity
  - Fresh air & movement

Product oriented workshops

- Co-production of workshop products
- Working relationships created
- Tangible product provides collaborative focus
- Participants provide credibility

Submersed Aquatic Vegetation in Chesapeake Bay: Sentinel Species in a Changing World

ROBERT J. ORTH, WILLIAM C. DENNISON, JONATHAN S. LEFCHECK, CASSIE GURBISZ, MICHAEL HANNAM, JENNIFER KEISMAN, J. BROOKE LANDRY, KENNETH A. MOORE, REBECCA R. MURPHY, CHRISTOPHER J. PATRICK, JEREMY TESTA, DONALD E. WELLER, AND DAVID J. WILCOX

Chesapeake Bay has undergone profound changes since European settlement. Increases in human and livestock populations, associated changes in land use, increases in nutrient loadings, shoreline armoring, and depletion of fish stocks have altered the important habitats within the Bay. Submersed aquatic vegetation (SAV) is a critical foundational habitat and provides numerous benefits and services to society. In Chesapeake Bay, SAV species are also indicators of environmental change because of their sensitivity to water quality and shoreline development. As such, SAV has been deeply integrated into regional regulations and annual assessments of management outcomes, restoration efforts, the scientific literature, and popular media coverage. Even so, SAV in Chesapeake Bay faces many historical and emerging challenges. The future of Chesapeake Bay is indicated by and contingent on the success of SAV. Its persistence will require continued action, coupled with new practices, to promote a healthy and sustainable ecosystem.

Global Change Biology

Global Change Biology (2017), doi: 10.1111/gcb.13623

Multiple stressors threaten the imperiled coastal foundation species eelgrass (*Zostera marina*) in Chesapeake Bay, USA

JONATHAN S. LEFCHECK[1], DAVID J. WILCOX[1], REBECCA R. MURPHY[2], SCOTT R. MARION[3] and ROBERT J. ORTH[1]

[1]*Virginia Institute of Marine Science, The College of William & Mary, Gloucester Point, VA 23062, USA,* [2]*University of Maryland Center for Environmental Science, Chesapeake Bay Program, Annapolis, MD 21403, USA,* [3]*Oregon Department of Fish & Wildlife, Marine Resources Program, Newport, OR 97365, USA*

Abstract

Choosing participants...
(why this effort was successful)

- Excellent scientists
- Focus on analysis and interpretation
- Commitment to Chesapeake Bay
- Willingness to work collaboratively towards a common cause

Participants

- Bill Dennison, UMCES
- Cassie Gurbisz, UMCES/SESYNC
- Mike Hannam, SERC/NPS
- Jeni Keisman, USGS
- Brooke Landry, MD DNR
- Jonathan Lefcheck, VIMS
- Ken Moore, VIMS
- Rebecca Murphy, UMCES @ CBP
- Chris Patrick, SERC/Texas A&M
- Bob Orth, VIMS
- Jeremy Testa, UMCES
- Don Weller, SERC
- Dave Wilcox, VIMS

- Rich Batiuk, EPA/CBP
- Emily Trentacoste, EPA/CBP
- Tom Barnum, SERC

SAV SYN

Workshop Timeline

- July 2016 (Annapolis)
- Sept. 2016 (Solomons Isl)
- Jan. 2017 (Annapolis)
- Feb. 2017 Global change online
- May 2017 (Annapolis)
- June 2017 Bioscience online

Rams Head dinner exercise: Chesapeake SAV are . . .

Several blogs posted

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January 19, 2017

Developing scientific stories for Chesapeake Bay submerged aquatic vegetation

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New York Harbor water quality

February 13, 2017

The Chesapeake Sentinels

A new paper on Chesapeake Bay Submerged Aquatic Vegetation (SAV) was published last week by University of

June 5, 2017

SAV SYN One Last Time

We recently g the University fourth and fin remaining pul seagrass trait segment anal developed a c communicatio

February 6, 2017

Lessons on how to synthesize science

We recently completed our third SAV SYN workshop, which is an effort to synthesize (SYN) data related to the submerged aquatic vegetation (SAV) of Chesapeake Bay. We have been analyzing a variety of data sets to better understand how SAV are responding to changes progress of Bay restor collaboration among which elements of this projects.

June 9, 2017

More lessons on how to synthesize science

In a previous blog, I suggested six elements for science synthesis that we have employed in the Submerged Aquatic Vegetation Synthesis (SAV SYN) effort. These six elements were the following:

- Experienced leadership
- Limited size
- Multiple immersive workshops
- Regular communication
- Flexibility
- Product focus

I also discussed the following enabling conditions:

- compelling topic with enabling data
- resource manager support and collaboration
- nominal support for leveraging purposes.

Papers published

Submersed aquatic vegetation in Chesapeake Bay: sentinel species in a changing world

Robert J. Orth[1], William C. Dennison[2], Jonathan S. Lefcheck[1], Cassie Gurbisz[3], Michael Hannam[4], Jeni Keisman[5], J. Brooke Landry[6], Kenneth A. Moore[1], Rebecca R. Murphy[7], Christopher J. Patrick[4,8], Jeremey Testa[9], Donald E. Weller[4], David J. Wilcox[1]

Global Change Biology (2017), doi: 10.1111/gcb.13623

Multiple stressors threaten the imperiled coastal foundation species eelgrass (*Zostera marina*) in Chesapeake Bay, USA

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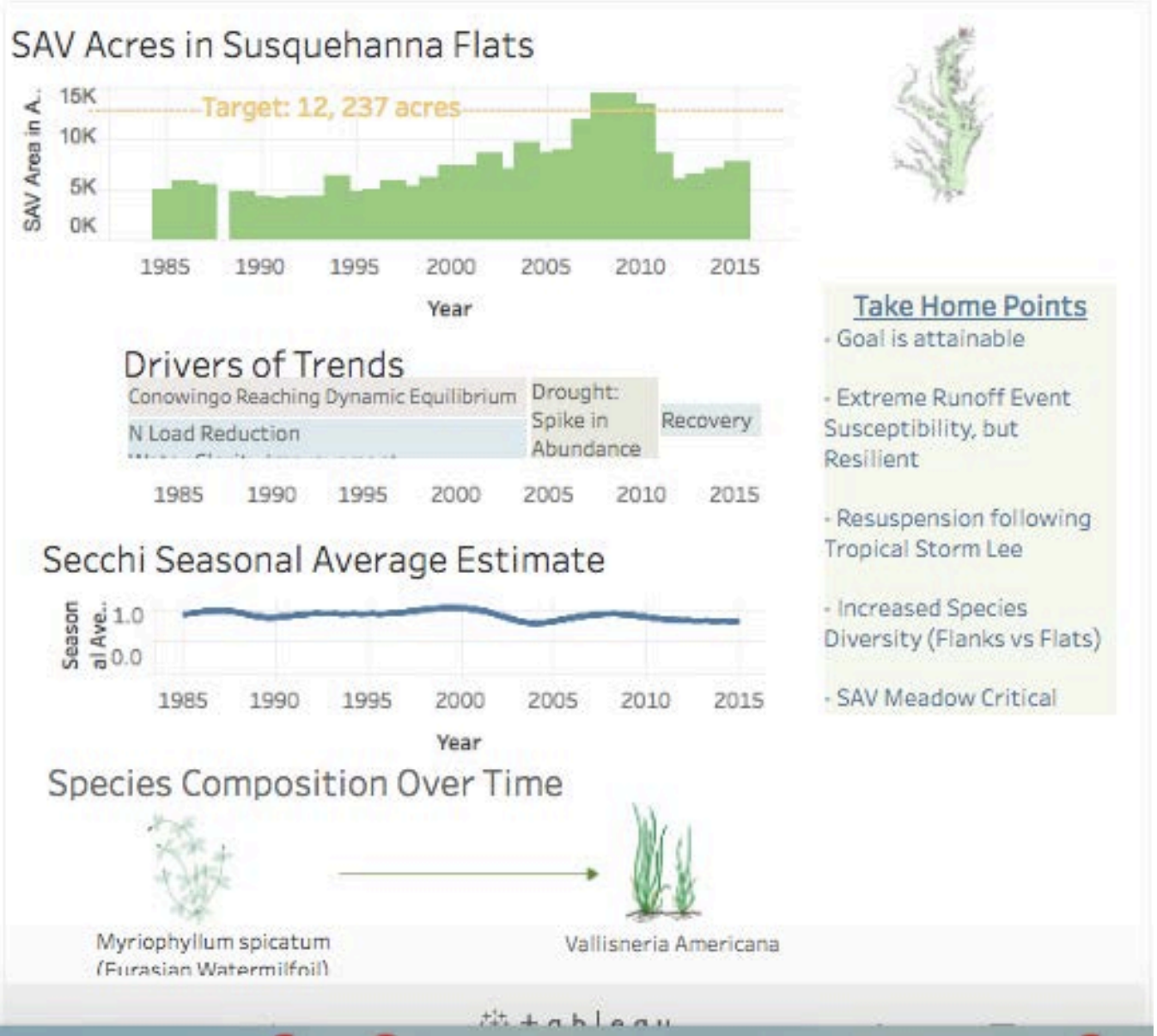
Segment analysis: Tableau



Lessons for synthesis

- Experienced leadership; NCEAS, SESYNC
- Limited size; <12
- Multiple immersive workshops; 4 multi-day workshops
- Regular communication; blogs, JJ emails, participant interaction
- Flexibility; break outs, minimal ppts, composition
- Product focus; co-production peer review papers
- Conducive location; ‘walkability’, good IT, whiteboards, break outs
- Clear goals and objectives; Rich Batiuk’s list, tracking
- Fun; food and drink, breaks, poems & limericks

Enabling conditions for synthesis

- Compelling topic; available data
- Resource manager support & collaboration
- Nominal support; travel, postdoc, leveraging
- Vested interests; Orth & Dennison, publication focus for junior scientists

Recommendations for future synthesis

- Include graduate students/staffers
- Slightly longer immersive workshops
- Flexible funding for specific project tasks

Chesapeake Sentinels

Standing guard, sentinels for Chesapeake Bay
Submerged aquatic vegetation are an important mainstay
They provide homes to many of the little critters
So if we lost the sentinels, the critters would get the jitters.

Defending against erosion and protecting the coastline
These aquatic grasses are not at all benign
They suck up nutrients, and cause sediments to drop out
Cleaning the water in the Bay beyond any doubt.

Indicators for water quality, acting as a coastal canary
Declining when water gets too warm or too cloudy
They are sensitive to subtle changes in nature
So we can recognize signs of imminent danger.

But these Chesapeake sentinels have been under siege
So we have been working to maintain the Chesapeake prestige
Upgrading sewage which help the grasses rebound
Which works to keep the crab populations sound.

We imposed a nutrient diet for Chesapeake Bay
To insure that the Bay gets healthier every day
But we need to enlist these sentinels for further duty
So that the Bay regains its natural beauty.