

*Welcome  
to the*

**SUBMERGED AQUATIC  
VEGETATION  
PROPAGATION  
WORKSHOP**

**3-4 SEPTEMBER 2003  
BALTIMORE, MD**



**US Army Corps  
of Engineers**

**SPONSORED BY: US ARMY CORPS  
OF ENGINEERS RESEARCH AND  
DEVELOPMENT CENTER,  
ENVIRONMENTAL LABORATORY**



**SUBMERGED AQUATIC VEGETATION PROPAGATION WORKSHOP**

**3-4 September, 2003**

**The Maritime Institute Conference Center, Baltimore, MD**

**Sponsored by:**

US Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory

*Schedule of Events*

*for*

*WEDNESDAY, September 3, 2003*

HOURS		TOPIC	SPEAKER
FROM	TO		
9:00	10:00	REGISTRATION	
10:00	10:20	Welcome and Opening Remarks	D. Shafer
10:20	10:40	USACE Role in SAV Restoration in Chesapeake Bay	M. Mendelsohn
10:40	10:50	BREAK	
10:50	13:50	<b>Session 1: Use of Seeds in SAV Restoration Planting</b>	B. Abadie
10:50	11:10	Culture of Eelgrass ( <i>Zostera marina</i> ) for Restoration Projects	C. Tanner
11:10	11:30	Eelgrass Restoration in Chesapeake Bay: Are Seeds the Way to Go?	R. Orth
11:30	12:30	LUNCH	
		<b>Session 1: Use of Seeds in SAV Restoration Planting (continues)</b>	
12:30	12:50	Habitat Restoration and Planting Strategies Using Eelgrass Seeds	S. Granger
12:50	13:10	Buoy-Deployed Seeding: A New Approach to Restoring Seagrass Using Seeds	C. Pickerell
13:10	13:30	Reproductive Potential of Natural Populations of <i>Ruppia maritima</i> and <i>Potamogeton perfoliatus</i> by Seed in the Mid-Chesapeake Bay	S. Ailstock
13:30	13:50	Question & Answer Session 1	B. Abadie
13:50	14:05	BREAK	
14:05	15:25	<b>Session 2: Techniques for SAV Plant Propagation</b>	M. Fritz
14:05	14:25	Propagation and Reproduction of SAV Transplant Stock for Ecosystem Restoration	M. Smart
14:25	14:45	Applications and Limitations of Micropropagation for the Production of Underwater Grasses	S. Ailstock
14:45	15:05	Bay Grasses in Classes	M. Lewandowski
15:05	15:25	Question & Answer Session 2	M. Fritz
15:25	16:40	<b>Plenary Discussion: Survey Questions #1 - #2</b>	D. Goshorn
16:40	17:00	ANNOUNCEMENTS/ADJOURN	D. Shafer

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*THURSDAY, September 4, 2003*

HOURS		TOPIC	SPEAKER
FROM	TO		
8:30	9:00	REGISTRATION	
9:00	9:30	Wednesday Recap and Thursday Overview	D. Shafer
9:30	10:30	<b>Session 3: Feedback Loops in SAV Restoration: Does Existing SAV Enhance Future Planting Success?</b>	R. Orth
9:30	9:50	Use of Colonizing Species of Submersed Aquatic Vegetation as Nurse Crops in Restoration Projects	L. Murray
9:50	10:10	Founder Colonies for Restoration of Aquatic Plant Communities in Unvegetated Freshwater Ecosystems	M. Smart
10:10	10:30	Question & Answer Session 3	R. Orth
10:30	10:45	<b>BREAK</b>	
10:45	11:30	<b>Plenary Discussion: Survey Question #3</b>	D. Goshorn
11:30	12:30	<b>LUNCH</b>	
12:30	14:25	<b>Session 4: Future Directions in Large-Scale SAV Production</b>	D. Shafer
12:30	12:50	Eelgrass Restoration in Chesapeake Bay: The Emerging Issues with Large-Scale Restoration Using Seeds	R. Orth
12:50	13:10	<del>Processes for Developing Large-Scale Commercial Production of Submerged Aquatic Vegetation (Fresh and Brackish)</del>	<del>W. Skaradek</del>
13:10	13:30	The Adaptation and Application of Modern Agricultural Production Practices to SAV Restoration	T. Mazzaccaro
13:30	13:45	<b>BREAK</b>	
		<b>Session 4: Future Directions in Large-Scale SAV Production (continues)</b>	
13:45	14:05	Chesapeake Bay Foundation Presentation	B. Street
14:05	14:25	Question & Answer Session 4	D. Shafer
14:25	16:30	<b>Group Discussions</b>	
16:30	17:00	<b>Closing Remarks/ADJOURNMENT</b>	D. Shafer

# **Submerged Aquatic Vegetation Propagation Workshop**

## **Presenter Bios**

### **Deborah Shafer**

Ms. Shafer is a Research Marine Biologist with the U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory in Vicksburg, MS. She is currently the SAV Research Program Manager and the Lead for this SAV Propagation Workshop.

### **Mark Mendelsohn**

Mark Mendelsohn has been a Biologist for the Army Corps of Engineers Baltimore District for 11 years. He has done work with oysters and Poplar Island for the past 10 years. Previously, he was an engineer at Westinghouse.

### **Chris Tanner**

Dr. Christopher Tanner is a professor of biology at St. Mary's College of Maryland, located on the shore of the St. Mary's River estuary. Originally from the West Coast, Dr. Tanner received his BA in biology at Occidental College in Los Angeles and his Ph.D. in Marine Botany from the University of British Columbia where he worked on the ecology and systematics of green macroalgae. Dr. Tanner is currently the co-director of the St. Mary's River Project, a federally funded project supporting long term monitoring of water quality in the St. Mary's River estuary and watershed and research on SAV, oysters and other estuarine species. Dr. Tanner has been working with students on eelgrass restoration in the St. Mary's and lower Potomac Rivers for the last 7 years. He has also been working on research funded by the Wilson Bridge Mitigation Program and the Chesapeake Bay Trust to develop methods for the propagation of eelgrass in culture. This year, he is collaborating with the Maryland Department of Natural Resources to develop culture facilities at the Piney Point Aquaculture Facility and grow eelgrass for the Wilson Bridge SAV mitigation work in the lower Potomac.

### **Bob Orth**

Bob Orth is a professor of Marine Science at the Virginia Institute of Marine Science. He received a PhD from the University of Maryland, a MS from the University of Virginia, and a BA from Rutgers University. Dr. Orth's research focuses on the biology and ecology of seagrasses, principally in the Chesapeake Bay. His current emphasis is on habitat restoration and conservation and understanding the principles and processes governing the persistence, alterations, and dynamics of these plant communities.

### **Stephen Granger**

Steve Granger is a research scientist at the University of Rhode Island's Graduate School of Oceanography. He received a Bachelor's Degree in Zoology from UVM in 1976 and a Master's Degree in Oceanography at URI in 1990. He has spent 22 years working with Scott Nixon on various projects concerning nitrogen enrichment of coastal waters and the ecological impact on near shore habitats such as seagrass.

# **Submerged Aquatic Vegetation Propagation Workshop**

## **Presenter Bios**

### **Chris Pickerell**

He has a BS in Biotechnology from RIT and a MS in plant and soil science from Cornell University. Chris has worked for Cornell Cooperative Extension of Suffolk County's, Marine Program for the last 11 years. His work involves managing all of CCE's salt marsh and SAV restoration and monitoring programs. Current work focuses on adapting existing techniques and developing new techniques for restoring eelgrass to the waters around Long Island.

### **Steven Ailstock**

Steve Ailstock is the Chair of the Biology Department and Director of the Environmental Center at Anne Arundel Community College. His research interests are submerged aquatic plants, wetlands creation, and Phragmites.

### **Mike Smart**

Mike Smart is an Aquatic Plant Ecologist for the Army Corps of Engineers Research and Development Center, stationed in Lewisville, Texas. He is the Ecological Technology Area Leader for the Aquatic Plant Control Research Program and Director of the Lewisville Aquatic Ecosystem Research Facility. He conducts research on aquatic plant ecology and ecosystem restoration.

### **Mark Lewandowski**

Mark Lewandowski is a Natural Resources Biologist for MD DNR – Tidewater Assessment. He is the coordinator of the Bay Grasses in Classes Program.

### **Laura Murray**

Laura Murray received a BS in Marine Science and a MS in Science Education from the University of West Florida and a Ph.D. in Wetlands Ecology from the College of William and Mary. She served on the Biology faculty at Salisbury University for 12 years. Since 1993, she has been a research associate professor at the University of Maryland, Center for Environmental Science, Horn Point Laboratory. Her research interests have included the impacts of nutrients on submersed aquatic vegetation growth and survival. Recently, her research efforts have included restoration ecology of SAV.

### **Bill Street**

Bill Street is on staff at the Chesapeake Bay Foundation.

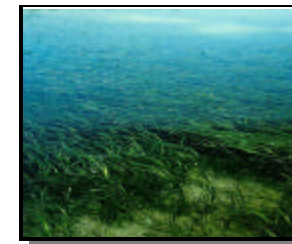
### **Tony Mazzaccaro**

Tony Mazzaccaro is a professor at the University of Maryland Eastern Shore in Princess Anne, MD.

# Submerged Aquatic Vegetation Propagation Workshop

## 3-4 September 2003, Baltimore, MD

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***Chesapeake Bay  
Submerged Aquatic Vegetation  
Restoration Research Program***

***Deborah Shafer***

***US Army Corps of Engineers***

***Engineer Research and Development Center***

FY03 Overview

## **Funding Authorization**

FY 2003 Omnibus Appropriations Bill  
(GI Research and Development)

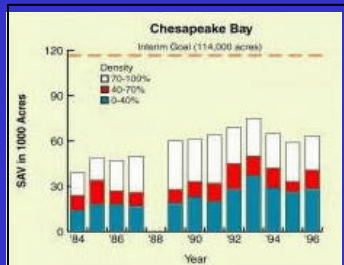
*\$500 K was provided “to conduct investigations, assessment, and demonstrations on large-scale submerged aquatic vegetation restoration techniques and technologies. Appropriate demonstration activities should be considered within the Chesapeake Bay, MD.”*

(from p. 24, Senate Report 107-220)



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## Why is SAV Restoration Important?



Source: Chesapeake Bay Program  
[www.epa.gov/maia/html/es-habitat.html](http://www.epa.gov/maia/html/es-habitat.html)

*Of the more than 600,000 acres of SAV historically present in Chesapeake Bay, less than a tenth remains*

*More than 50% lost since the 1960's*

*More than 20 SAV species have declined*

*Although some increases in recent years, still far below targeted goals*



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## Why is SAV Restoration Important?

SAV Performs many ecosystem functions:

- wave attenuation
- sediment stabilization
- water quality improvement
- primary production
- provide critical habitat structure



Blue Crab



Redhead Ducks

Source: National Zoo Photo Library



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## Problems

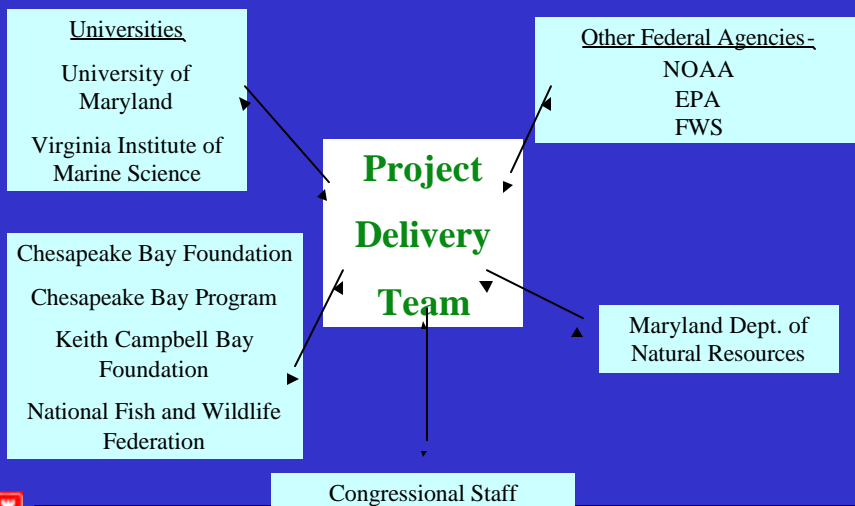
- ✎ Traditional approaches to SAV planting are extremely labor-intensive and costly, with a variable track record of success
- ✎ Significant investments in research and demonstrations must be made to improve our understanding of SAV restoration techniques
- ✎ Managers and stakeholders need guidance on selection of most appropriate methods for large-scale SAV restoration



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## Program Coordination



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## Program Focus Areas

### SAV Production and Planting (FY 03)

#### Potential New Focus Areas

- Engineered SAV Habitats
- SAV Assessment Methods



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## Initial Program Focus Area: SAV Production and Planting



*Eelgrass seeds*

Source: University of Rhode Island

Many SAV restoration projects  
rely on whole plants collected in  
the wild



*Eelgrass seedlings*

Source: University of Rhode Island

Availability of donor sites?

Donor site impacts?



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## FY03 Activities

1. Expand Eelgrass Seed Collection and Storage Capability  
*Piney Point Aquaculture Facility (MDDNR)*
2. Multi-species Pilot Scale Test Planting  
*Poplar Island (Anne Arundel CC)*
3. Demonstration Planting: Potomac River (MDDNR)  
*Comparison of eelgrass plants vs. seeds*
4. Regional Workshop (Sept. 3-4, Baltimore, MD)



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## Information Transfer

- ✍ Goal: Each planting project/work unit documented in the peer-reviewed literature
- ✍ Workshop Proceedings
- ✍ Results will be incorporated into **guidance document** on selection of appropriate methods for SAV restoration
- ✍ **Web links** and information on ongoing projects



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## Benefits

- ✎ **Contribute to the status of the science of SAV restoration**
- ✎ **Provide practical guidance on selection of appropriate methods for SAV restoration**
- ✎ **Improved coordination between Corps and other stakeholders involved in SAV restoration**
- ✎ **Results directly applicable to regions outside Chesapeake Bay**



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## Links to Other Corps Programs

- ✎ Section 206 Aquatic Ecosystem Restoration
- Section 204 Beneficial Uses of Dredged Materials
- Section 227 Shoreline Erosion Control
- Ecosystem Management and Restoration Research Program (EMRRP)
- Aquatic Plant Control Program
- Regional Sediment Management Program (RSM)
- Dredging Operations and Environmental Research Program (DOER)



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## *Future Directions*

- **Demonstration projects need a minimum of 2 years monitoring in order to evaluate success**
- **Additional funding would enable us to expand the scope and direction of the program to include a wider variety of plant species, planting techniques, and locations throughout the Bay**
- **National Workshop planned for FY 04**
- **Dependent on availability of future funding ...**



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## *SAV Propagation Workshop* *September 3-4, 2003*

- **Availability of planting stock is often a critical bottleneck in SAV restoration projects**
- **If we are to meet targeted restoration goals, we must find an economical way to produce and plant large numbers of plant propagules!**
- **The large-scale production of plant propagules must be matched to the needs of those involved in the planting**



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## *Workshop Objectives*

- *Exchange information on the status of the science with respect to SAV propagation and planting*
- *Develop species-specific management recommendations on selection of appropriate methods for SAV planting and propagation*



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## *Workshop Format*

- **Series of technical presentations organized into 4 sessions**
- **2 sessions per day**
- **Lunch (provided in Main Bldg)**
- **Afternoon discussion sessions**
- **Workshop Questionnaire**



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## *Acknowledgements*

**Thanks to the members of the Workshop  
Steering Committee—**

**Mike Fritz, Dave Goshorn, Bob Orth, Madeline  
Broadstone, Bill Dennison**

**Special Thanks to Antisa Webb**



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# SAV Propagation Conference

U.S. Army Corps of Engineers  
Baltimore District

USACE Role in SAV Restoration in  
the Chesapeake Bay

September 3, 2003

Mark Mendelsohn

## SHALLOW CREEK

- Mitigation for small navigation dredging project in Baltimore. (Near Beth Steel)
- Species mitigated for was Eurasian millfoil
- USFWS did the work. USACE paid
- Area characterized by Secchi of .5 meter
- Salinity ranges of 2.5 to 15 ppt
- Mute Swans

## Shallow Creek (cont.)

- 3 species planted: redhead, wild celery, and sago pondweed-Grown at AACC and USDA
- June 1999, 2,000 shoots of each species. Unfenced. Cost was \$12,7000
- June 2000, 4,000 shoots of 3 species, Fenced. Cost was \$18,100
- September 2001, 600 shoots of redhead, Fenced, Cost was \$3,950
- Cost did not include monitoring

## Shallow Creek Results

- It depends on WQ, salinity and swans.
- Redhead did best
- Wild Celery did OK
- Sago pondweed didn't do well
- For details call Peter Bergstrom now at NOAA

## Poplar Island

- 1140 acre man-made island using clean dredged material in mid-bay.
- First planting in Spring 2003 outside of constructed site.
- Fall Planting in 2003 inside the site and outside planned and funded by WES.

## Poplar Island

- Steve Ailstock AACC is lead
- Redhead planted will be 1,044 lbs of seed
- Rupia will be 1,956 lbs of seed
- Cost is \$41,000
- Channel area in site is around 4 acres.

## Isle of Wight

- Project constructed for purpose of replacing saltmarsh and as a site for beneficial use of dredged material. Near Ocean City.
- SAV developed in site after EIS was completed
- SAV transplanted out of the site using new “sod” technology

## Isle of Wight (cont.)

- 4 by 5 foot areas 10 inches deeps were moved
- 4/10ths of an acre transplanted to approximately 1 mile
- Eel grass and Widgeon grass
- Seems to be working



## Saxis 206 Island Aquatic Ecosystem Restoration

- Proposed by Norfolk District - Near MD and VA border
- Not approved yet by CENAD
- Ready to go into plans and specs
- Purpose of project is restoring beach , dunes, riparians and intertidal wetlands

## Saxis 206 Island Aquatic Ecosystem Restoration

- Breakwaters will be constructed suitable for 1.3 -8 acres of SAV colonization
- District may seed - but lots of propagules floating around in area

## Woodrow Wilson Bridge Mitigation

- Location is Potomac River on DC beltway
- Mitigation required by Corps permit
- Some transplants came from Maryland Coastal Bays