

# Strategic Initiatives and New Ventures

February 4, 2015



WILLIAM & MARY

CHARTERED 1693

# Creating & Enhancing a Biomedical and Healthcare Cluster in the Richmond - Hampton Roads Region

Mr. Thomas R. Frantz, Esquire

CEO & Chairman, Williams Mullen

Chairman, Virginia Beach Biomedical and Healthcare Task Force

**The College of William & Mary | Board of Visitors | February 5, 2015**



**VIRGINIA BEACH BIO TASK FORCE**

# Introduction

*“It’s time to establish Virginia Beach as a destination for groundbreaking research and development, and headquarters of some of the world’s leading innovators in healthcare, bio-technology, pharmaceutical development and healthcare delivery systems. Partnering with Tidewater Community College, Old Dominion University, Eastern Virginia Medical School, Hampton University, Regent University, Virginia Wesleyan College, the College of William and Mary, Sentara Healthcare, Bon Secours Health System, LifeNet Health, and WellPoint’s Amerigroup, we will attract the best minds, and establish a healthcare and pharmaceuticals research and policy center... where ideas of the future are generated and incubated — ideas that lead to new inventions, new alliances, and new frontiers in healthcare. This will be the newest sector in our economy! By doing so, we can create more jobs, we can strengthen and diversify our economy, and we can enhance our quality of life. And students who go to college and concentrate in STEM fields will be able to come home to the best jobs — right here in Virginia Beach and Coastal Virginia.”*

— Mayor William D. Sessoms, Jr.

# Biomedical & Healthcare Task Force

- The mission of the Bio Task Force is to develop a plan for a bio-medical and healthcare hub, beginning in the Princess Anne Commons area of Virginia Beach.
- The plan should encompass the research, resources, and opportunities of our existing regional assets.
- Task Force Leadership
  - Chair
    - Tom Frantz, Williams Mullen
  - Vice Chair
    - Rony Thomas, LifeNet Health

# Task Force Members

- Bon Secours
  - Mr. Michael Kerner
- College of William & Mary
  - Mr. Taylor Reveley
- Children's Hospital of the King's Daughters
  - Mr. Jim Dahling
- Eastern Virginia Medical School
  - Dr. Richard Homan
  - Dr. Jerry Nadler
- Eden Capital
  - Paul Hirschbiel
- Hampton University
  - Dr. William Harvey
  - Mr. Keith Gregory
- Jefferson Lab
  - Mr. Drew Weisenberger
- MCV Hospital
  - Mr. John Duval
- Norfolk State University
  - Mr. Eddie Moore, Jr.
- Old Dominion University
  - Dr. John Broderick
- Operation Smile
  - Dr. Bill Magee
  - Mr. Wayne Zinn
- Riverside Health System
  - Mr. William Downey
- Sentara Healthcare
  - Mr. David Bernd
  - Mr. Joseph Butz
  - Dr. Carl Hartman
  - Mr. Thomas Thames
- Tidewater Community College
  - Dr. Edna Baehre-Kolovani
- Virginia Biotech Park
  - Ms. Carrie Roth

# Advisory Committee Members

- **College of William & Mary**
  - Ms. Julie Summs
- **Eastern Virginia Medical School**
  - Dr. William Wasilenko
- **Health Diagnostic Laboratory, Inc.**
  - Ms. Tonya Mallory
  - Mr. Robert Bohannon
  - Ms. Anna McKean
- **Healthcare Services of Hampton Roads, Inc.**
  - Ms. Linda Bright
- **Jefferson Lab**
  - Dr. Robert McKeown
- **Kaufman & Canoles**
  - Ms. Ann Crenshaw
- **LifeNet Health**
  - Mr. Gordon Berkstresser
- **National Center for Collaboration in Medical Modeling & Simulation**
  - Mr. Bob Armstrong
- **Naval Medical Center Portsmouth**
  - Rear Admiral Elaine Wagner
- **Old Dominion University**
  - Dr. Morris Foster
- **Sentara Healthcare**
  - Mr. Robert Broermann
- **The Aegis Technologies, Inc.**
  - Mr. Richard Severinghaus
- **University of Virginia**
  - Mr. Pat Hogan
  - Dr. Thomas Skalak
- **Virginia Biotech Association**
  - Mr. Jeffrey Gallagher
- **Virginia Commonwealth University**
  - Dr. Mike Rao
- **Virginia Modeling, Analysis, & Simulation Center (VMASC)**
  - Dr. John Sokolowski
- **Virginia Oncology Associates**
  - Dr. Edward George

# A Region in Need of a New Economic Driver

## PROBLEM: Reliance on Department of Defense

- Over the next ten years, sequestration will cut \$600 billion from the defense budget.
- Some studies estimate that over 40% of Hampton Roads' GRP is military/defense-based.

## SOLUTION? Rapid Growth in Bioscience Industry

- Healthcare sector will be close to 25% of U.S. GDP in 20 years according to *Brookings*.
- The region is home to many major universities, healthcare providers, and bio-medical firms.

# A Call to Action from the Commonwealth

In December, Governor McAuliffe unveiled a new Virginia Bioscience initiative, stating:

*“The bioscience industry in Virginia is strong, and can be even stronger with this focused initiative. Our charge today is to use the Commonwealth’s extensive assets, including our excellent research universities and world class businesses, to catalyze the growth of this strategic sector and the new Virginia economy.”*

-Governor Terry McAuliffe

The initiative is designed to do things like “leverage extramural funding, launch new businesses, recruit investment, and create high paying jobs by focusing on areas of competitive research and industry advantage.”



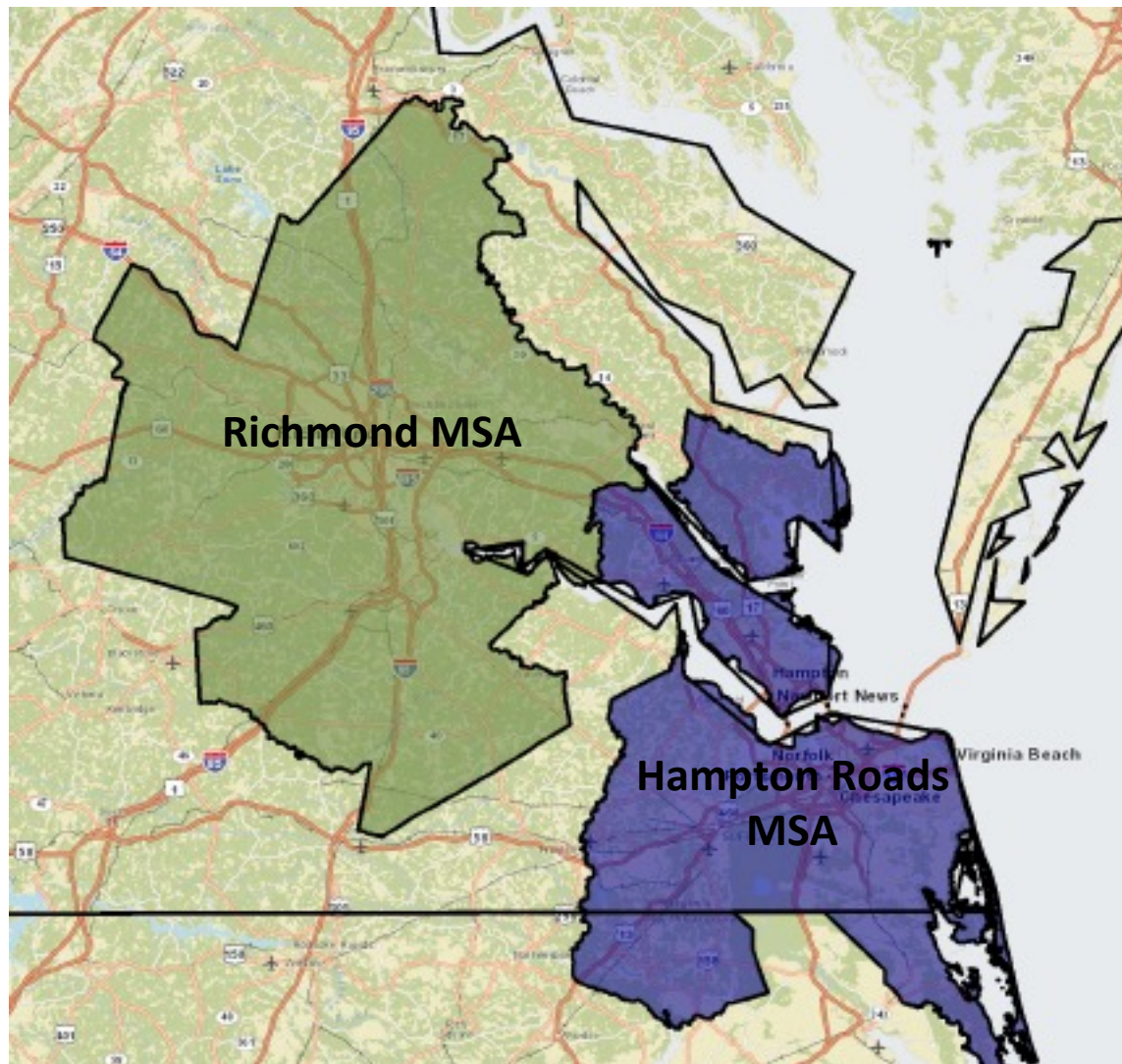
# Task Force's Guiding Principles

- Establish our region as the center for advanced biomedical and healthcare research and industry "on the East Coast"
  - Establish a hub in Virginia Beach's Princess Anne Commons.
  - Physical location of hub participants will be region-wide.
- Must be an economic driver for the regional economy.
- Must drive substantial job creation in the region (focus on higher-income jobs).
- Progress should be measurable and reportable annually.
- Use existing regional assets and resources in hub development when appropriate.
- All institutions of higher education, hospitals and large healthcare enterprises in the region will be asked to partner in achieving the mission.
- Regional governmental authorities and private entities will work together.
  - Obtain state and federal funding for hub development and attract required private equity investment.

# Task Force's Goals

- Capitalize on our areas of expertise (which were affirmed and further defined by Facility Logix)
- Attract companies from the following sectors:
  - Big Data
  - Analytics
  - Healthcare Population Management, Analysis, & Informatics
  - Centers of Excellence in Treatment and Research
  - Life Sciences
  - Bio-Medical and Advanced Healthcare Manufacturing
- Attract public funding and private equity to assist in the process.

# Region Covered



# Areas of Focus

- Diabetes
- Cardiovascular Disease
- Neuroscience
- Traumatic Brain Injury / Wounded Warrior-Related Injuries

# Recommendations

After completion of the market assessment and consultation with Task Force leaders, Facility Logix developed the following recommendations designed to:

- Capitalize on current strengths and promote future benefits
- Diminish weaknesses and prevent potential problems
- Spur economic development and create high-paying, sustainable jobs

# Recommendation One:

## Enhance the Vertical Entrepreneurial Support Ecosystem

The region should focus on enhancing efforts to grow indigenous companies, which could result in long-term, sustainable benefits including diversifying and growing the overall economy and creating high-paying jobs. The horizon for implementation and subsequent realization of success based on this recommendation will be long-term. This is particularly important due to the fact that the region has had limited success recruiting large life science and biomedical companies to the region.

# Recommendation One:

## Enhance the Vertical Entrepreneurial Support Ecosystem

### **Actions**

- Create a Virginia Impact Grant that offers small awards to start-up companies for a variety of uses such as business plan analysis, market analysis, product development, etc.
- Determine sources of funding that could be used to address the high cost of laboratory fit-out for poorly capitalized life science firms. This could take the form of lease guarantees; fit-out laboratory suites; or capital improvement funding grants or loans.
- Create a sector-specific seed fund to invest in early stage ventures.
- Provide life science and biomedical specific resources such as Mentors and Coaches at existing co-work, incubation, and accelerator facilities. Build a roster of advisors and mentors from outside the academic community.
- Offer programs such as Small Business Innovation Research Grant (SBIR) workshops to educate the region's higher education researchers on how to obtain SBIR grants and/or other funding opportunities. If programs are offered currently through any of these institutions, open the enrollment to include faculty from other schools. Partner as appropriate to align and better leverage resources.

# Recommendation One:

## Enhance the Vertical Entrepreneurial Support Ecosystem

### **Suggested Timeline and Budget**

- Six months to ongoing. Needs to be provided and funded for a minimum of five (5) – ten (10) years.
- Significant effort and financial requirement.
- Funding will likely be needed on an annual basis and be split among private participants, as well as federal, state, and local governments.

### **Desired Outcome**

- Enhanced entrepreneurial activity leading to economic diversification and job creation.

### **Measuring Success**

- Increased number of sector-focused new company formations
- Increased angel investment in regional companies



# Recommendation Two:

## Enhance Translational Research & Commercialization Competitiveness

Bolster the translational research competitiveness from among the region's core focus areas, which include diabetes, cardiovascular disease, neuroscience, and traumatic brain injury/wounded warrior-related injuries. This enhanced focus on research will serve to create a “deeper bench” of entrepreneurial researchers who generate commercializable discoveries.

# Recommendation Two:

## Enhance Translational Research & Commercialization Competitiveness

### **Actions**

- Help a newly established regional organization secure funding to support the recruitment of at least two star research hires. This effort will likely extend across a seven to ten year time frame.
- Establish Co-Principal Investigator relationships between higher education institutions. Collaborative arrangements are more likely to meet with success in securing grants and would allow the region's investigators to co-label and co-market their expertise with well-regarded global researchers such as Dr. David Cifu at VCU.
- Leverage experts in the region, such as Dr. Jerry Nadler and his reputation and expertise in the field of diabetes research.
- Explore campus wide approaches to sector-specific entrepreneurship by working with regional institutions and the military.
- Streamline and enhance the technology licensing process at the region's institutions.
- Support efforts to enhance regional broadband connectivity, allowing researchers to perform more in depth analysis in fields including bioinformatics and data analytics.
- Hold networking events that will allow discussion to continue among community leaders.

# Recommendation Two:

## Enhance Translational Research & Commercialization Competitiveness

### **Suggested Timeline and Budget**

- Six months to ongoing. Needs to be provided and funded for a minimum of five (5) – ten (10) years. Significant effort and financial requirement. Funding will likely be needed on an annual basis and be split among private participants, as well as federal, state, and local governments.

### **Desired Outcome**

- Enhanced entrepreneurial activity leading to economic diversification and job creation.

### **Measuring Success**

- Increased number of sector-focused new company formations
- Increased angel investment in regional companies
- Enhanced research competitiveness within and beyond the Commonwealth of Virginia as measured by the ability to compete for and secure Commonwealth funded opportunities as available.

# Recommendation Three:

## Develop and Launch an Organizational Entity to Support Bold Development Plan

Establish a public-private organizational entity that would lead efforts to secure the funding and support needed to “prime the pump” and grow the region’s life science and biomedical cluster. This organization will assist economic development efforts in guiding and implementing an economic gardening strategy to exploit regional expertise in the targeted life science and biomedical sector.

# Recommendation Three:

## Develop and Launch an Organizational Entity to Support Bold Development Plan

### **Actions**

- Hold meetings with the leadership of similarly successful organizations from around the country, such as BioHealth Innovation (BHI) and Cortex, to evaluate pro's and con's and discuss lessons learned.
  - Funding for each of the above suggested models came from corporate and community stakeholders.
- Develop a plan and annual and capital budgets for the organization
- Solicit financial contributions from stakeholders and partners to underwrite establishment of the selected model
- Select and implement model
- Recruit an industry-seasoned veteran with private sector commercialization experience to lead new organization
- Develop a memorandum of understanding or partnership agreement that includes all of the region's municipalities and counties, as well as institutions of higher education, and aligns their interests and strategic plans with that of the new organization.

# Recommendation Three:

## Develop and Launch an Organizational Entity to Support Bold Development Plan

### **Next Steps**

- The Biomedical and Healthcare Task Force will remain in place until this new organizational entity is formed and a CEO/Executive Director is hired.
- The Task Force will also solicit input from life science and biomedical business development specialists from all regional municipalities and counties. Their mission will be to define the criteria for membership and to create a job description for the new organization's first leader.
- Once a leader is selected, he/she will craft a strategic plan which should fall in line with those of all member institutions and organizations. The CEO/Executive Director will also bring a plan for funding back to the state legislature before the end of 2015.
- After the organizations' structure and financial needs are outlined, the work of the Task Force will be folded into the new organizational entity.

# Recommendation Three:

## Develop and Launch an Organizational Entity to Support Bold Development Plan

### **Suggested Timeline and Budget**

- Six months to one year.
- Significant effort and financial requirement from multiple partners.
- Funding will be required on an annual basis and be split among the organization's members/ participants as well as federal, state, and local government entities.

### **Desired Outcome**

- A single, regional entity that becomes the home for this sector-focused regional economic development effort.

### **Measuring Success**

- Formation of a public-private entity
- Entity leadership in place
- Funding support for entity secured

**Questions?**





# Translational Research



WILLIAM & MARY

CHARTERED 1693

# Marine Debris and Commercialization

Jason McDevitt  
Director, Technology Transfer  
jpmcde@wm.edu

Inventors: Kirk Havens, Donna Marie Bilkovic, David Stanhope, Kory Angstadt



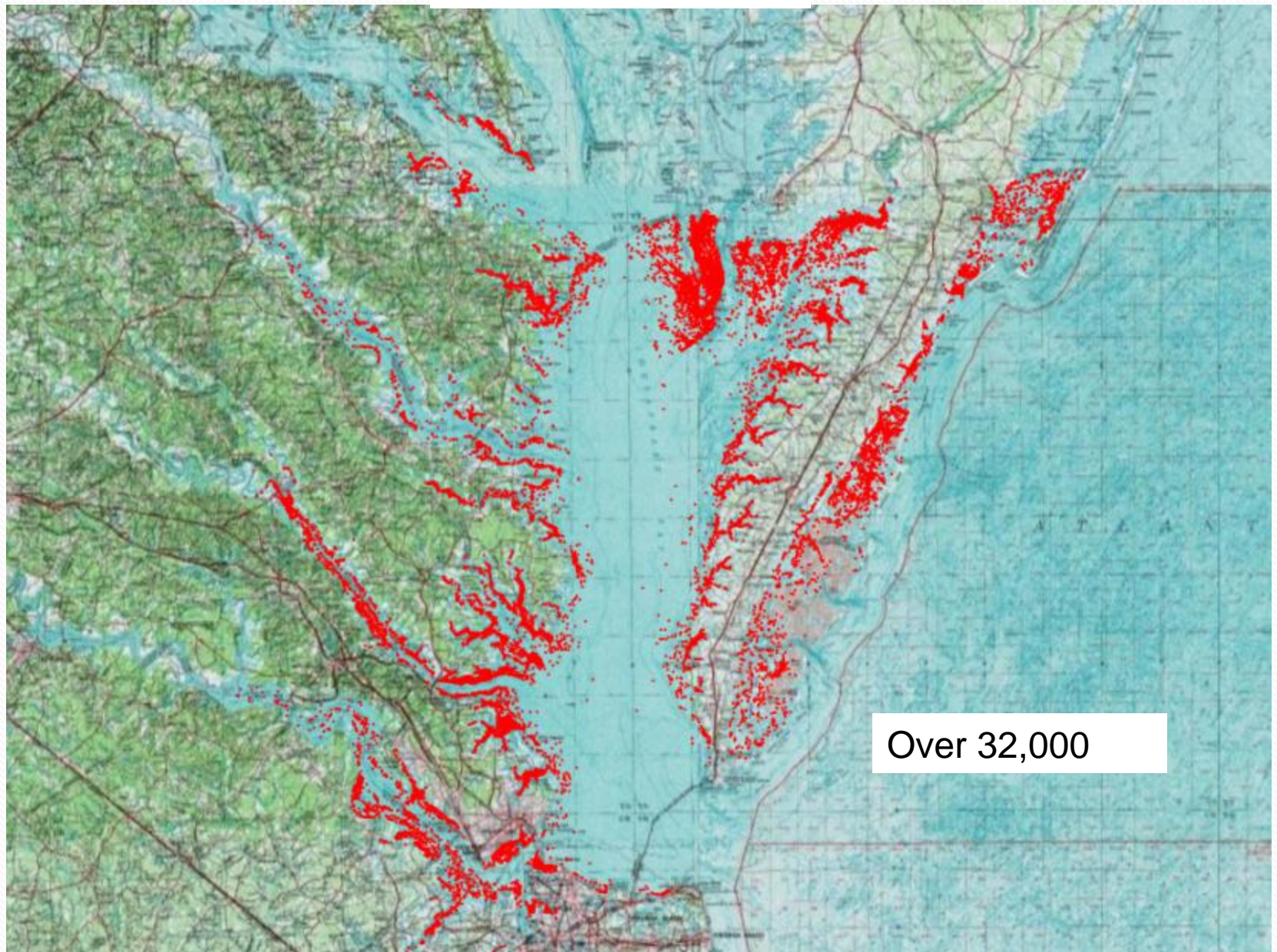


Courtesy NBC Nightly News with Brian Williams



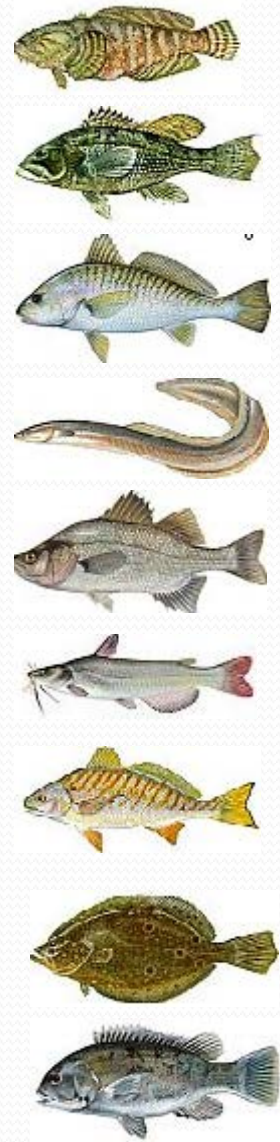


## Total Pots Removed



Derelict traps keep fishing.

# FISH CATCH IN DERELICT POTS



FISH - Bycatch	ABUNDANCE	% of TOTAL	Cumulative %
OYSTER TOADFISH	3348	66.8	66.8
BLACK SEABASS	415	8.3	75.1
ATLANTIC CROAKER	313	6.2	81.3
AMERICAN EEL	184	3.7	85.0
WHITE PERCH	174	3.5	88.5
CATFISH SPP	171	3.4	91.9
SPOT	93	1.9	93.7
FLOUNDER	52	1.0	94.8
TAUTOG	52	1.0	95.8
MINNOW	47	0.9	96.7
UNKNOWN FISH	43	0.9	97.6
SHEEPSHEAD	29	0.6	98.2
STRIPED BASS	24	0.5	98.7
PIGFISH	19	0.4	99.0
ATLANTIC SPADEFISH	6	0.1	99.2
REDDRUM	6	0.1	99.3
STARGAZER	5	0.1	99.4
MULLET	4	0.1	99.5
PUFFERFISH	4	0.1	99.5
BUTTERFISH	3	0.1	99.6
ATLANTIC MENHADEN	2	0.0	99.6
HOGCHOKER	2	0.0	99.7
BLACK DRUM	2	0.0	99.7
SOLE	2	0.0	99.8
STRIPED BURRFISH	2	0.0	99.8
BOWFIN	1	0.0	99.8
CUNNER	1	0.0	99.8
PORGY SPP	1	0.0	99.9
SCUP	1	0.0	99.9
BLUEFISH	1	0.0	99.9
FEATHER BLENNY	1	0.0	99.9
PINFISH	1	0.0	99.9
SHAD	1	0.0	100.0
SPADEFISH	1	0.0	100.0
STRIPED KILLIFISH	1	0.0	100.0

*9 species groups  
made up >95%  
of catch*

Oyster toadfish  
Black Sea Bass  
Atlantic croaker  
America eel  
White perch  
Catfish  
Spot  
Flounder  
Tautog

*5,112 total fish  
during winter*





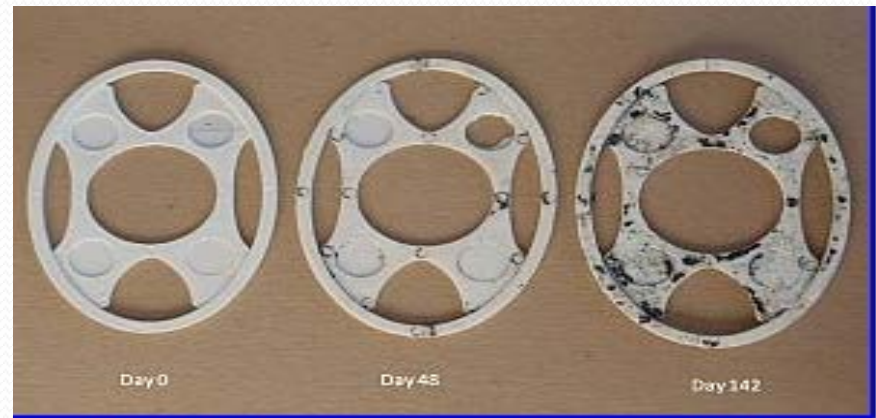
In addition to being an environmental hazard, derelict traps deplete fisheries.

- About 15% of traps become abandoned annually.
- Aggregate catch among derelict traps is estimated to be 18% of the annual harvested catch.



# Solution: Biodegradable Panel

- Biochemical Solution:  
Escape panel made from  
a biodegradable polymer.
- PHA
  - natural biopolymer
  - energy storage - bacteria
  - biodegrades on land and  
at sea



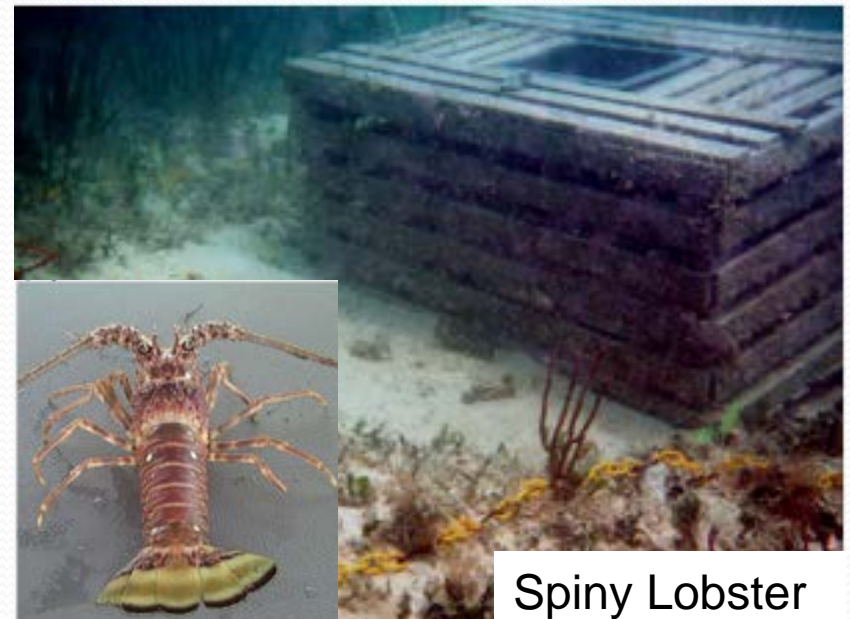
Dungeness Crab



American Lobster



Stone Crab



Spiny Lobster



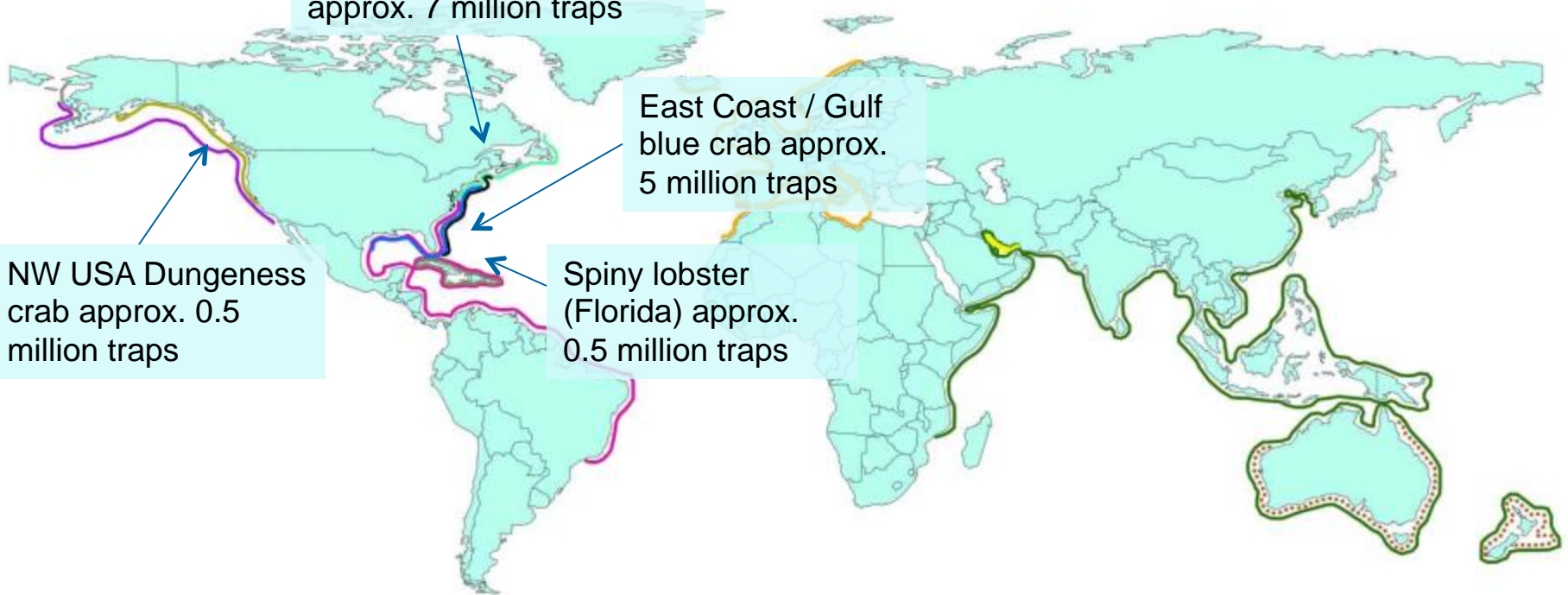
- |   |  |  |
|---|--|--|
| American Lobster, <i>Homarus americanus</i>     | Dungeness Crab, <i>Cancer magister</i>     | Red King Crab, <i>Paralithodes camtschaticus</i> |
| Black Sea Bass, <i>Centropristis striata</i>    | Finfish/multispecies (Antillean)           | Sablefish, <i>Anoplopoma fimbria</i>             |
| Blue Crab, <i>Callinectes sapidus</i>           | Finfish/multispecies (Gargoor)             | Snapper, <i>Pagrus auratus</i>                   |
| Blue Swimming Crab, <i>Portunis spp.</i>        | Norway Lobster, <i>Nephrops norvegicus</i> | Tanner Crab, <i>Chionoecetes bairdi</i>          |
| Caribbean Spiny Lobster, <i>Panulirus argus</i> | Octopus, <i>Octopus vulgaris</i>           |  |

NE USA / Canada lobster  
approx. 7 million traps

East Coast / Gulf  
blue crab approx.  
5 million traps

NW USA Dungeness  
crab approx. 0.5  
million traps

Spiny lobster  
(Florida) approx.  
0.5 million traps



[Home](#)[About Us](#)[Our Products](#)[Team](#)[Contact Us](#)

## Welcome

Mobjack Binnacle Products, LLC specializes in developing innovative ideas into products for the marketplace. Mobjack's primary focus is the manufacturing and distribution of specialized products for individual or commercial use.

Our targeted market segment is retailers who carry specific environmentally friendly products for, but not limited to, watermen, hunters, commercial and individual fishermen, outdoorsmen, and those who recreate outdoors. Mobjack strives to provide products that enhance the outdoor experience while

## Our Mission

Mobjack uses state of the art, environmentally responsible materials to produce high quality products that support a sustainable environment for professionals and outdoor enthusiasts.

[MORE](#)

## Our Products

Mobjack's products are a fail safe against lost crab, lobster and fish traps (known as "ghost pots" or "ghost fishers"). Our products use our patented technology to prevent traps from continuing to catch and kill marine life.

Mobjack products degrade completely into naturally occurring, environmentally friendly microbes. Our products address the ghost pots issue that depletes marine resources.

[MORE](#)

# Plastic and microplastic



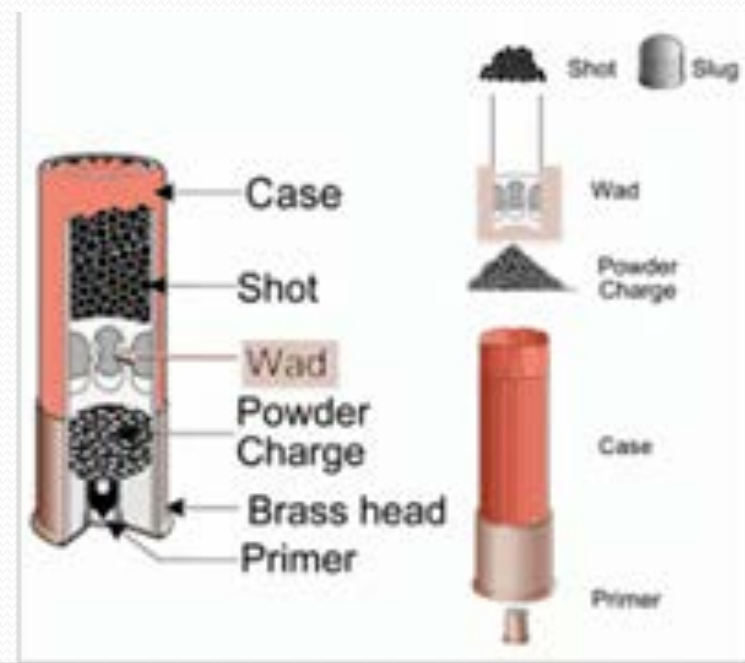
Approximately 500 billion pounds of plastic is produced annually.



# Shotgun Wads



- 5 - 10 billion shotgun shells are produced annually in the USA.
- Shotguns are becoming the preferred weapon both commercially and by the military.
- Over 1 million sportsmen self-identify as waterfowl hunters in the USA.







Plastics become miniplastics  
and then microplastics.



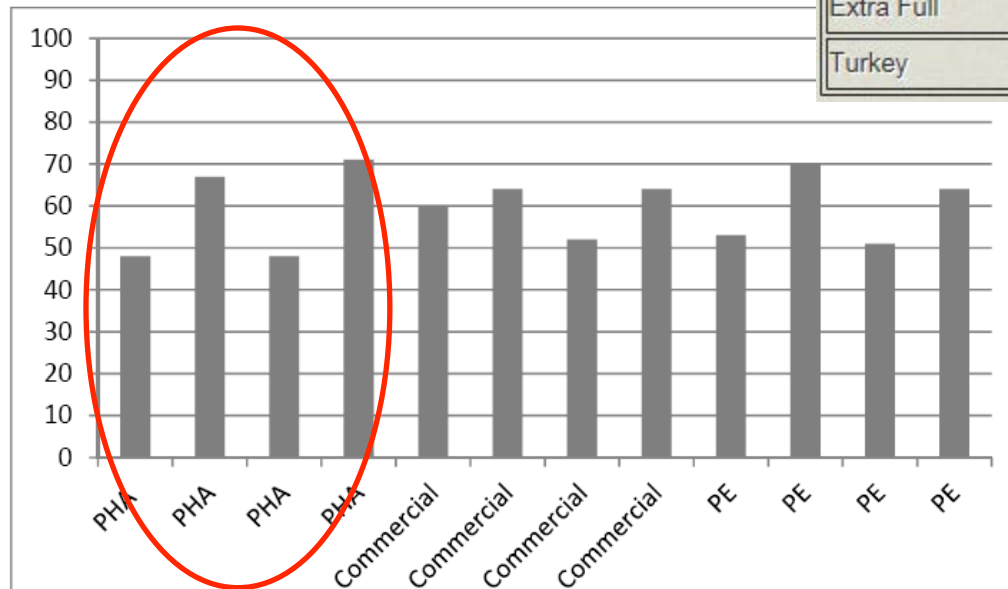
**Solution: PHA Biodegradable Shotgun Wads**



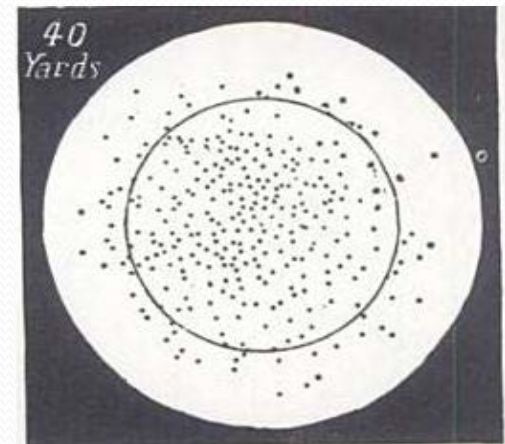
Figure 3. PHA wad structure captured in ballistic gel.

Choke	Constriction	Percent	Identification (Notches)
Cylinder	.000	40 at 40 yd 70 at 25 yd	IIII notches
Skeet 1	.005	45 at 40 yd 75 at 25 yd	
Improved Cylinder	.010	50	IIII notches
Skeet 2 (light Mod.)	.015	55	
Modified	.020	60	III notches
Improved Modified	.025	65	II notches
Full	.030	70	I notch
Extra Full	.040	73	
Turkey	.045 plus	75 plus	

Percentage in Circle

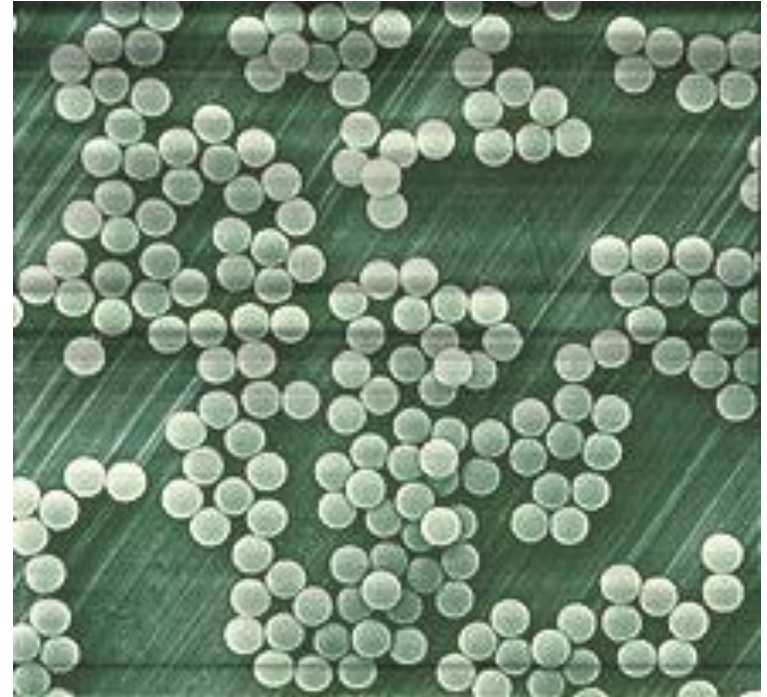


Material



# Plastic Microbeads in Cosmetics and Toiletries

- Varying sizes and shapes
- Abrasive cleaning agents
- Spherical microbeads
  - Improve feel
  - Fill in fine wrinkle lines



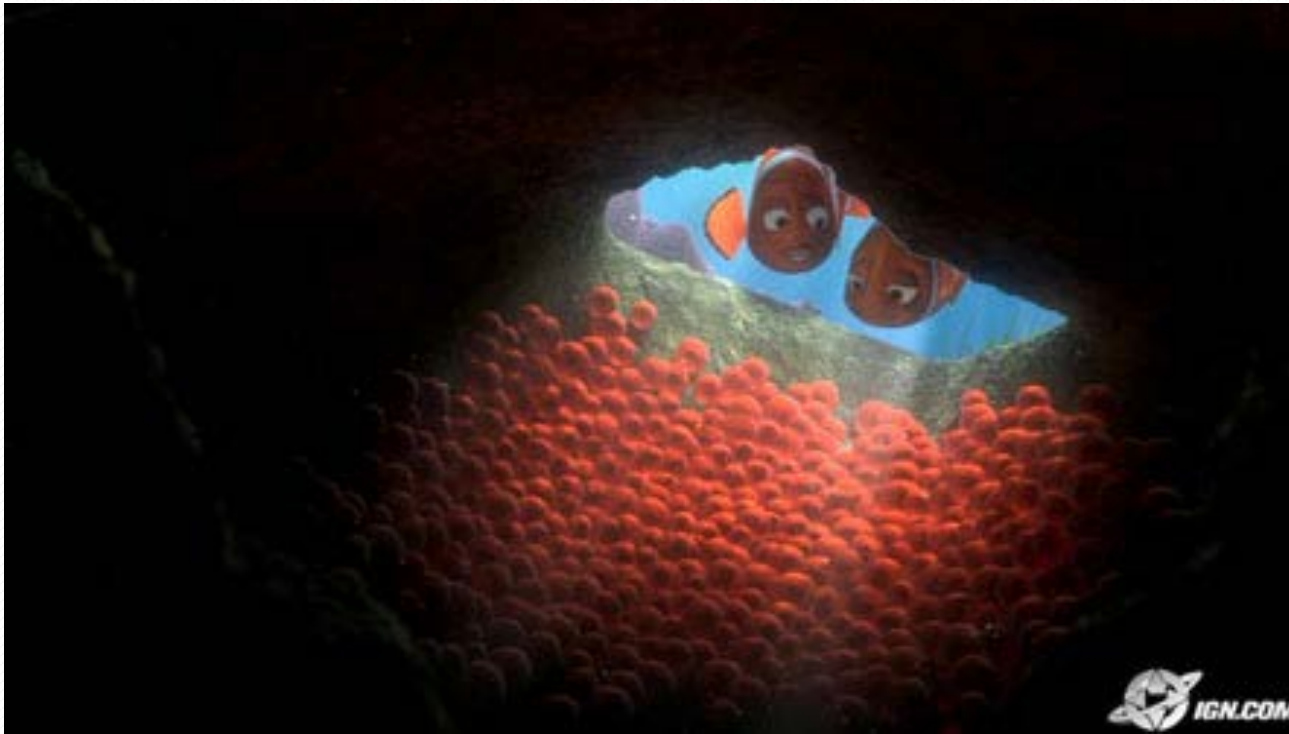


# Plastic microbeads are great for cosmetics, but bad for the environment



“All drains lead to the Ocean” (*Finding Nemo*, Walt Disney Pictures)





“Hey, wait a minute, those aren’t eggs...”

# Microplastics, and the toxins they adsorb, propagate through the food chain.



Microplastics



Zooplankton



Mussels



Blue Crab



Shore birds



Turtle

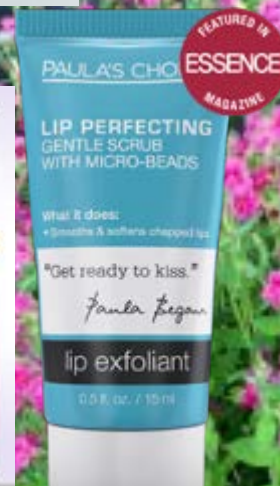
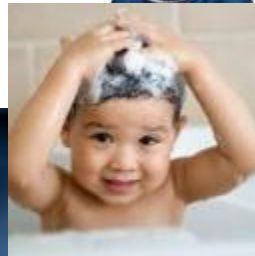


Striped Bass



Labeled microbeads taken up by benthic worm.







# Solution: PHA Microbeads

- Drop-in Replacement for Conventional Plastic Microbeads.
- Typical loading: 2% of product.
- Increases cost of final packaged good by a cent or two.
- P&G, L'Oreal, J&J, Unilever all voluntarily phasing out plastic microbeads.

A great idea is like being on the 1-yard line, right? Most of the work is already done - just don't do anything stupid.



# A good idea is only the tip of the iceberg.

- IP
- Cost
- Distribution
- Marketing
- Regulations
- Engineering
- Stability
- Legislation
- Poor strategy
- Insufficient capital

# W&M Commercialization

- About 1 in 4 universities nationwide are net profitable from technology transfer operations.
- Good technologies in the pipeline.
- Several commercial products generating royalty revenues.

# Improving Commercialization at Universities: Possible Approaches

- Researchers are already incentivized financially – what about professionally: tenure, teaching commitment
- Engage alumni
  - Mentoring
  - Investment in translational research or W&M spinoffs
- Translational Research Fund
- Post-transaction Venture Fund

*Interesting exercise to graph these with x, y, and z-axes of political resistance, financial costs, and expected benefits.*

# Translational Research: From Liberal Arts to Commercialized Product

John P Swaddle

[jpswad@wm.edu](mailto:jpswad@wm.edu)

Institute for Integrative Bird Behavior Studies

Biology Department

College of William & Mary



# Birds Can Be Destructive





# Birds Can Be Destructive



200  
starlings





# Birds Can Be Destructive

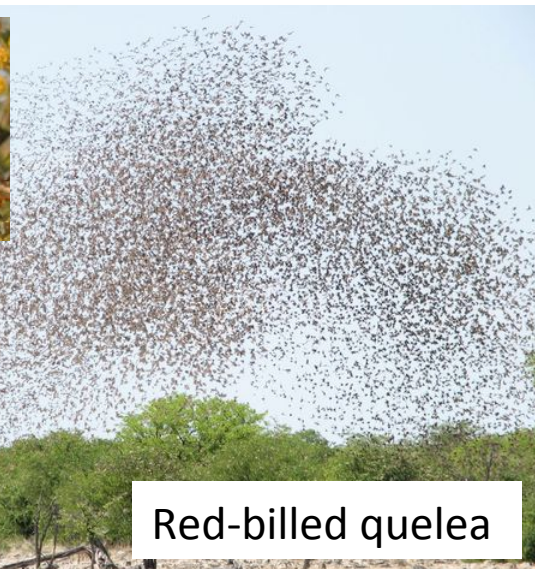




# Small-Holder Farms in Developing Nations



Millet



Red-billed quelea



Maize



Hunger vs Education

# No Effective Ways to Remove Birds Sustainably

- Current technology repeatedly fails
  - Birds habituate to scares/startles
  - Bird-poisons are environmentally harmful and generally don't affect population sizes



Propane cannons



Avicide

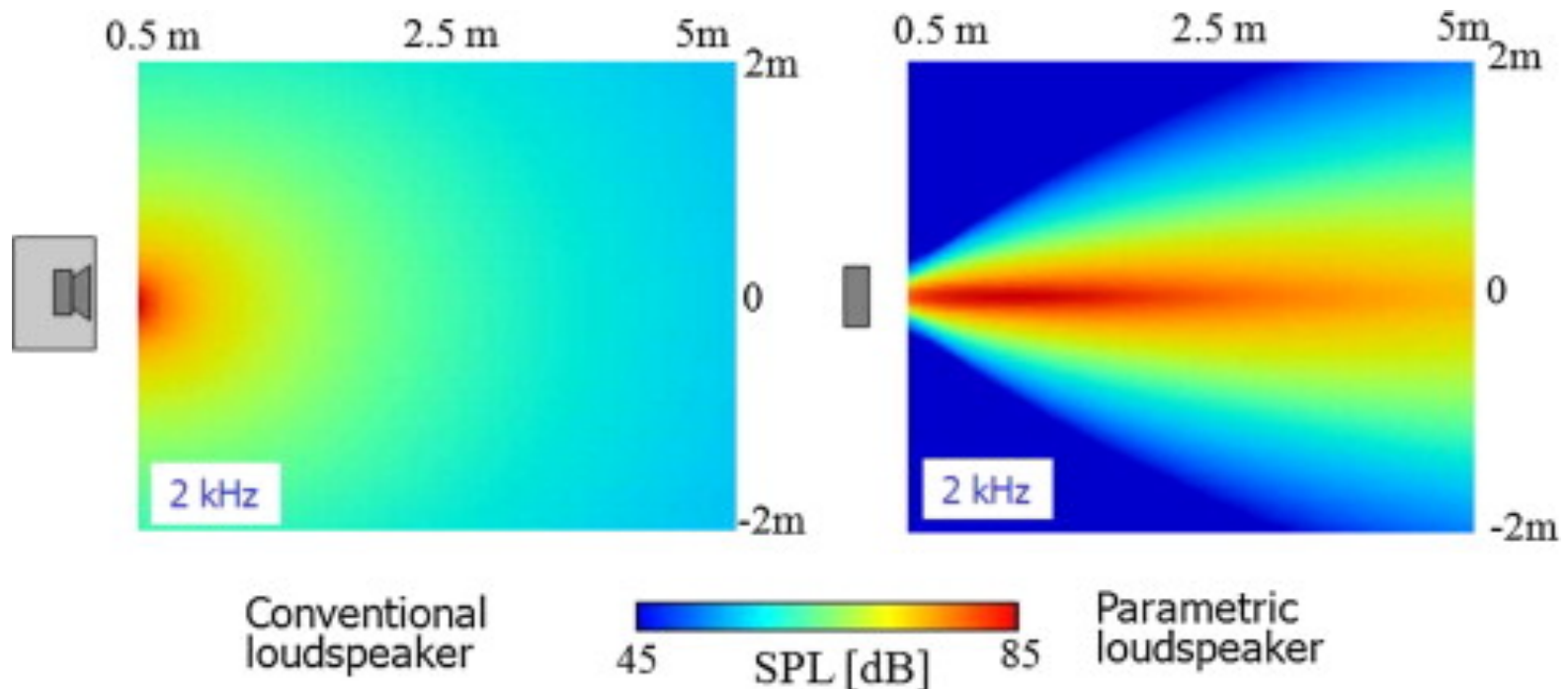
# Our Insights

- Work on noise pollution with W&M students
  - Noise that blocks vocal communication for birds reduces breeding and key behaviors
- Therefore, deliberately introduced noise should displace birds AND lower population sizes
  - Started collaboration with Prof. Mark Hinders (Applied Science)

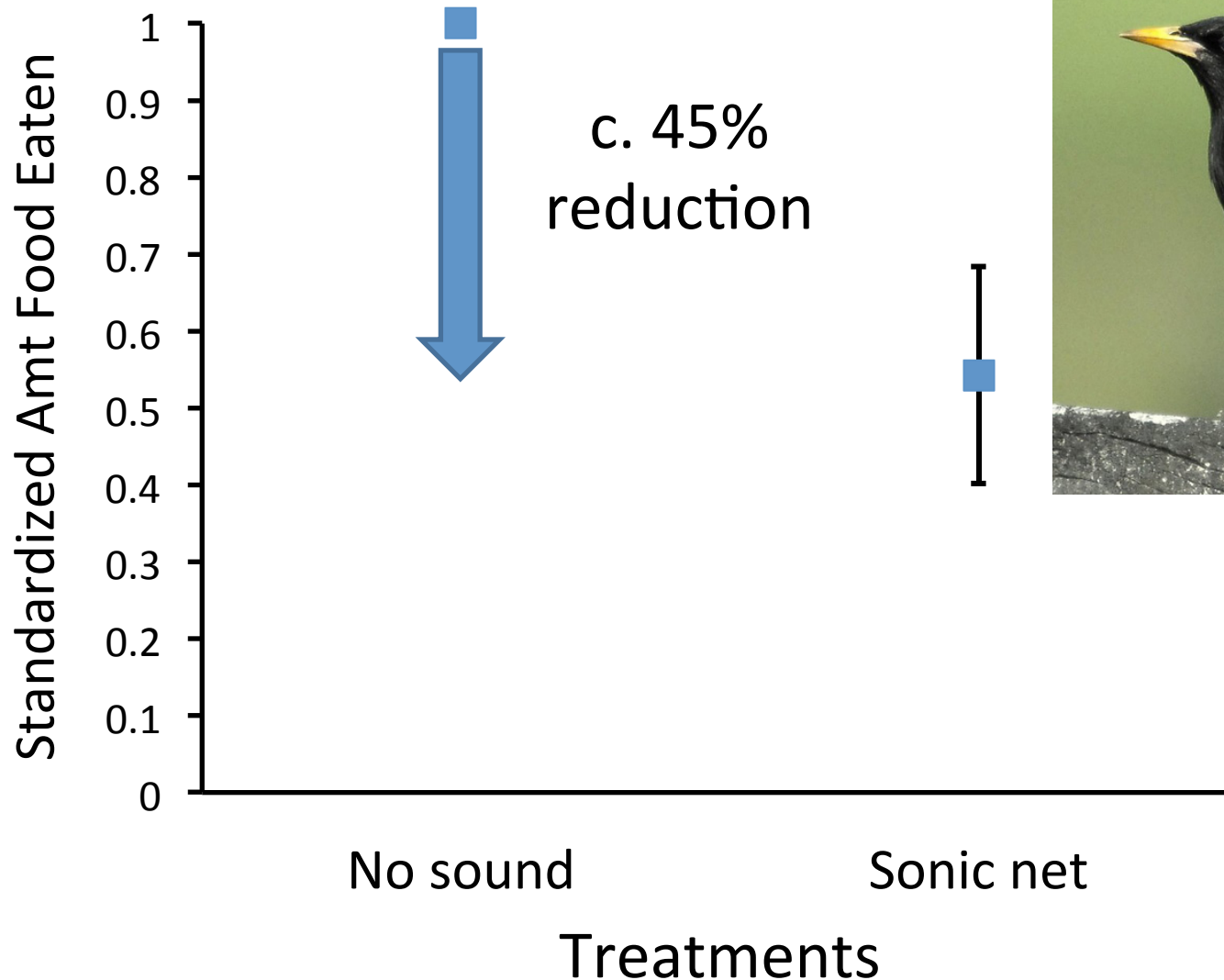


# “Sonic Net”

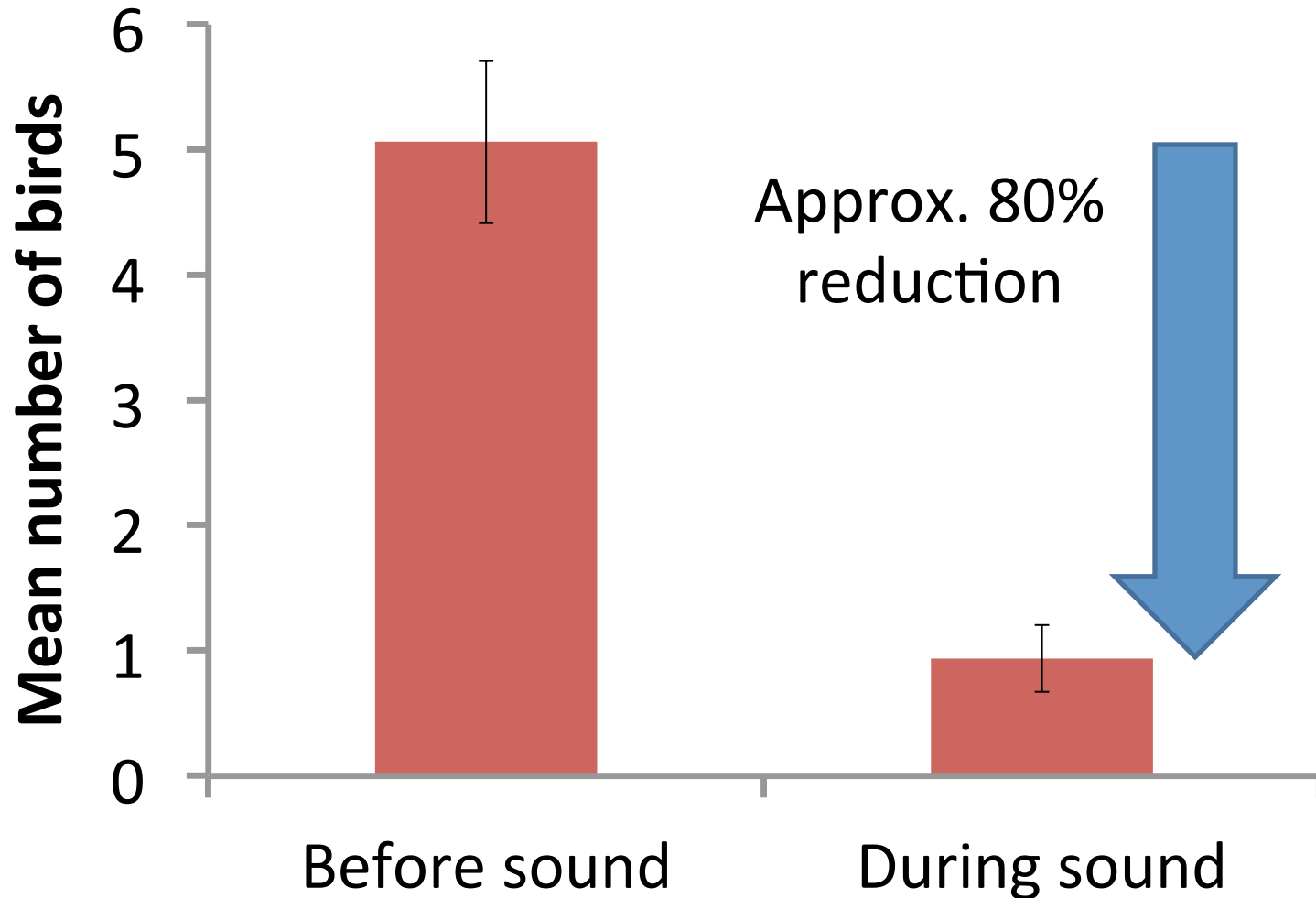
- Sonic net: Highly directional sound that blocks vocal communication



# The Sonic Net Reduces Food Damage



# The Sonic Net Reduces Birds at Airfield





# Potential Applications of Sonic Nets

- Farms: protect crops
- Airports/planes: reduce bird strike
- Buildings/structures: reduce damage and collisions



# Pathway to Commercialization

- Hinders working with Mason School's Entrepreneurship Center (market opportunities)
- Grant from Virginia's Center for Innovative Technology (CIT): Commonwealth Research Commercialization Fund (CRCF)
- Hinders contact with Midstream Technology (pre-existing relationship)
- Filed IP, and licensed to Midstream
- First commercial customers (in Ireland and Los Angeles)

# Diagnostic Features of Our Success

