City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Luanne Wood Date: 8/20/18

Address: 800 Golden Beach Blvd

City: Venice State FL Zip 34285

Telephone: 941 483 1663

Organization (if any): _____

Please Check One

☐ Audience Participation

☐ Agenda - Topic: Red Tide

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 8 day of AUG 2018, is truthful.

Signature: Luanne Wood

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City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: William Woods Date: 8/20/18

Address: 600 Pond Willow Lane

City: Venice State: FL Zip: 34292

Telephone: 941 412 8356

Organization (if any): _____

Please Check One

☑ Audience Participation

☐ Agenda - Topic: RED TIDE

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I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of AUG 20 18 is truthful.

Signature: William Woods

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: JOE ERNST Date: 8/20/2018

Address: 911 E SHANNON CT

City: VENICE State FL Zip 34293

Telephone: _____

Organization (if any): _____

Please Check One

☒ Audience Participation

☐ Agenda - Topic: RESPIRATORS FOR CLEANUP CREW

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I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

Emilio Carlesimo

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Salvation Army Date: _____

Address: _____

City: _____ State _____ Zip _____

Telephone: _____

Organization (if any): _____

Please Check One

□ Audience Participation

□ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

THE SALVATION ARMY DOING THE MOST GOOD

August 17, 2018

Mayor John Holic and Members of Venice City Council,

Thank you for taking this time to discuss the impact the Red Tide has had on our community. As you know, The Salvation Army has served the economically and spiritually fragile members of our community for the last 20 years.

The Red Tide has hit this part of our community especially hard. From loss of income due to less hours at work, or not being able to work due to respiratory issues, many members of our community are experiencing financial hardship. In our Social Service Office, we have seen a 40% increase in the requests for our food pantry and a 40% increase in the need for emergency financial services, including utility and rent assistance, over the last 30 days. For utility assistance, we are seeing FPL bills that are 2 and 3 months past due. This is the same pattern of need that we saw in the aftermath of Hurricane Irma.

We anticipate that the economic impact of the Red Tide on the community that we serve will continue to increase as the businesses they work for are negatively impacted. In the coming weeks, we will be looking for help from our Community Partners to decide, as a community, the best plan of action to assist those individuals and families who are experiencing financial hardship due to the Red Tide.

Thank you again for giving us an opportunity to share our perspective with you.

Best Regards,

Emilio Carlesimo, Advisory Board Member
Nichole Bell, Captain
Amy D'Angelo, Director of Program Services

The Salvation Army 1051 Albee Farm Road, Venice, FL 34285
P.O. Box 69, Venice, FL 34285
Phone: 941/484-6227; Fax: 941/485-7618
www.salvationarmyvenice.com

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Chris Simmons Date: 8/20

Address: 179 Toscavilla

City: Venice State FL Zip 34275

Telephone: 571-201-7209

Organization (if any): SW FL Environmental Council

Please Check One

☐ Audience Participation

☐ Agenda - Topic: _____

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I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of Aug 20 18 is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Delynn Solomon Date: 8/20/18

Address: 262 Tampa Ave E, P3

City: Venice State: FL Zip: 34285

Telephone: 360-701-2990

Organization (if any): _____

Please Check One

☐ Audience Participation

☒ Agenda - Topic: Can we access through Florida Land Acquistion Fund ~~t~~ though the Land & Water Conservation Fund even

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of August 2018 is truthful.

Signature: DS Solomon

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Valerie Jameson Date: 9/20/18

Address: 1622 Biscourt Dr

City: Venice State: FL Zip: 34292

Telephone: 941-416-3363

Organization (if any): _____

Please Check One

☑ Audience Participation

☐ Agenda - Topic: _____

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I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing held this ____ day of _____ 20____ is truthful.

Signature: Valerie Jameson

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Nadine Marcadi Date: 8-20-18

Address: 1905 Tempest Harbor Loop

City: Venice State: FL Zip: 34285

Telephone: 941-277-6624

Organization (if any): Clean Water Tribe

Please Check One

☐ Audience Participation

☐ Agenda - Topic: Clean Water

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: Nadine Marcadi

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

"City on the Gulf"

Request to Speak (print legibly)

Name: Karen Ann Hitt Date: 8/20/18

Address: 147 Tampa Ave E #904

City: Venice State: FL Zip: 34285

Telephone: 941 586 0207

Organization (if any): Local Artist/Founder Venice Plein Air Painting group

Please Check One

☒ Audience Participation

☐ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

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Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Gloria Nova-Fuson Date: 8-20-18

Address: 565 Conrad Rd.

City: Venice State Fl Zip 34293

Telephone: 239-910-2276

Organization (if any): YES ON 13

Please Check One

☑ Audience Participation

☐ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of Aug 2018 is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Mike Cosentino Date: 8/20/18

Address: 617 Avenida De Mayo

City: Sarasota State Fl Zip 34242

Telephone: 941-346-2584

Organization (if any): Reopen Beach Road

Please Check One

☒ Audience Participation

☐ Agenda - Topic: _____

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I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: Mike Cosentino

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Bob Reagy Date: 8-20-18

Address: 307 Warfield Way

City: Nokomis State: FL Zip: 34275

Telephone: 941-441-7119

Please Check One

Organization (if any): _____

☑ Audience Participation

☐ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of AUG 2018 is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

XFINITY Connect **rbrigby@comcast.net**

± Font Size -

RFP 2018007 Harmful Algal Bloom Management Services

From : Lori L Anderson <Lori.L.Anderson@dep.state.fl.us> Mon, Jan 29, 2018 03:15 PM

Subject : RFP 2018007 Harmful Algal Bloom Management Services 1 attachment

To : Lori L Anderson <Lori.L.Anderson@dep.state.fl.us>

Good afternoon,

This is a courtesy email notifying you that Solicitation No. 2018007 has been posted to the Vendor Bid System (VBS) and is assessible at the link below. It is the responsibility of the Respondent to check VBS on a regular basis for updates. Please note that the Proposals are due on **February 28, 2018** by 4:00 P.M.

http://www.myflorida.com/apps/vbs/vbs_www.ad_r2.view_ad?advertisement_key_num=137714

Thank you,

Lori L. Anderson

Lori L. Anderson, FCCN, FCCM
Purchasing Analyst
Florida Department of Environmental Protection
Division of Administrative Services
Bureau of General Services
Telephone Number: 850-245-2355
Email: lori.l.anderson@dep.state.fl.us

Dep Customer Survey

image001.png
12 KB

1221-669

US006982031B1

(12) **United States Patent**
Rigby

(10) **Patent No.: US 6,982,031 B1**
(45) **Date of Patent: Jan. 3, 2006**

(54) **ORGANISM KILLER DISPENSER SYSTEM**

(76) Inventor: **Robert B. Rigby**, P.O. Box 83, Nokomis, FL (US) 34274

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **11/035,598**

(22) Filed: **Jan. 14, 2005**

(51) **Int. Cl.**
C02F 1/50 (2006.01)

(52) **U.S. Cl.** **210/85**; 114/266; 210/170; 210/209; 210/242.1; 210/764

(58) **Field of Classification Search** 210/85, 210/96.1, 121, 143, 149, 170, 198.1, 209, 210/242.1, 747, 749, 764, 242.2; 114/61.1, 114/264–266
See application file for complete search history.

(56) **References Cited**

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3,620,512 A * 11/1971 Muskat et al. 261/92
4,119,541 A * 10/1978 Makaya 210/242.1
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5,330,639 A * 7/1994 Murphree 210/170
6,022,476 A * 2/2000 Hausin 210/610
6,778,887 B2 * 8/2004 Britton 701/21
2001/0035381 A1 * 11/2001 Allen et al. 210/749

* cited by examiner

Primary Examiner—Joseph Drodge
(74) *Attorney, Agent, or Firm*—Edward P. Dutkiewicz

(57) **ABSTRACT**

A manifold assembly is formed of a pipe. The pipe has an open interior. A fluid handling assembly has a plurality of downwardly facing spaced apertures in the manifold. A flexible tube extends downwardly from each aperture. The fluid handling assembly also has a supply of fluid. The fluid is adapted to kill and manage dinoflagelents. A line couples the supply with the tubes for the dispensing of the fluid. At least one water craft with a line couples the central water craft to the manifold. A sensor is provided to determine ambient conditions. The sensor is adapted to analyze the sensed ambient conditions and dispense the fluid at an appropriate rate.

4 Claims, 3 Drawing Sheets

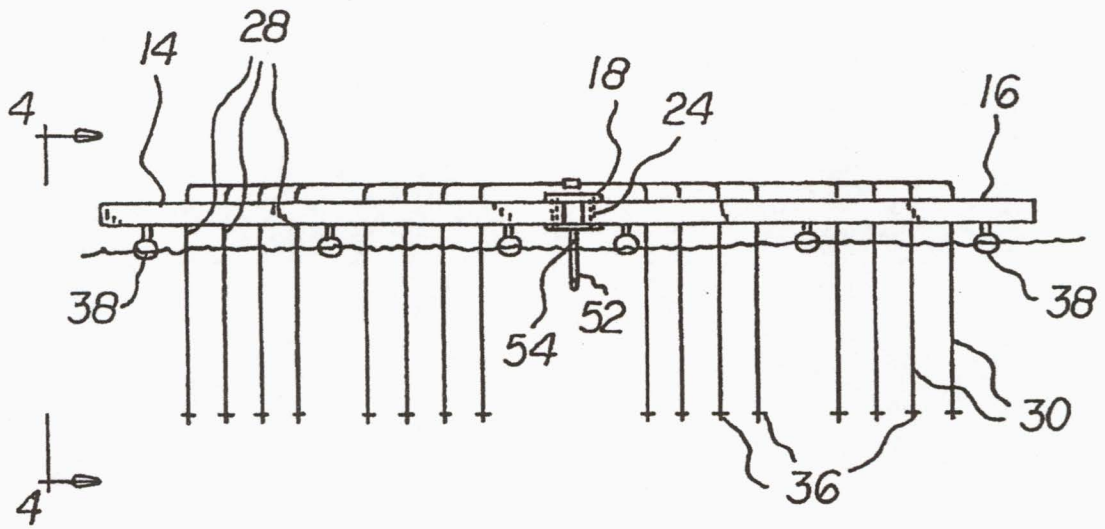
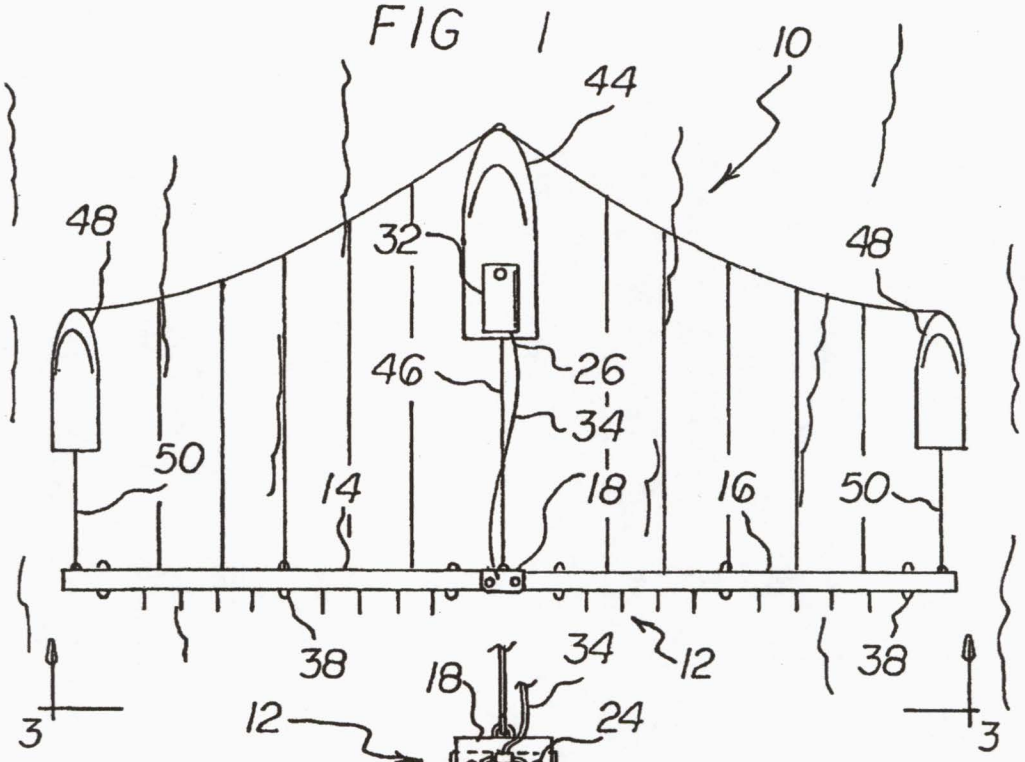


FIG 1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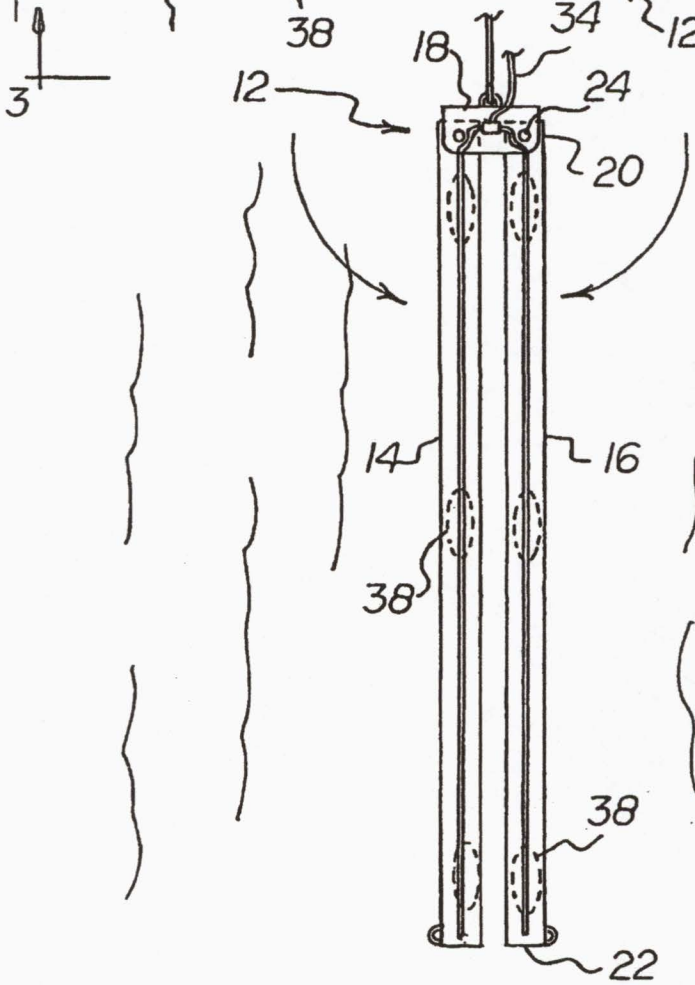
18
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FIG 2

FIG 3

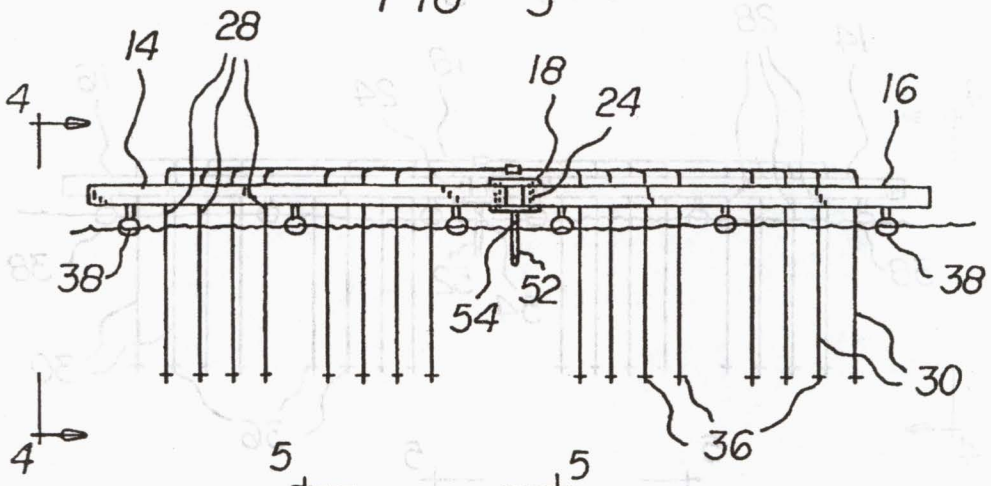


FIG. 4

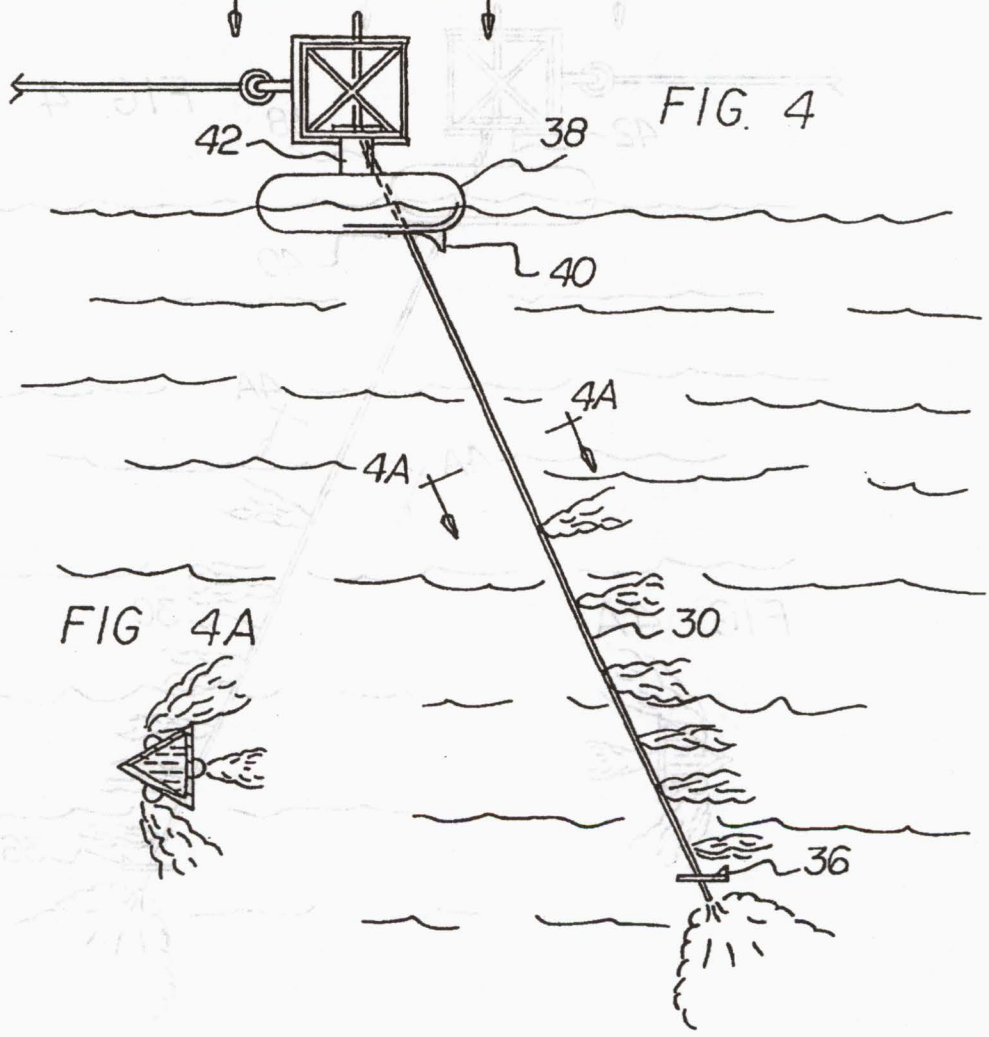


FIG 4A

FIG 5

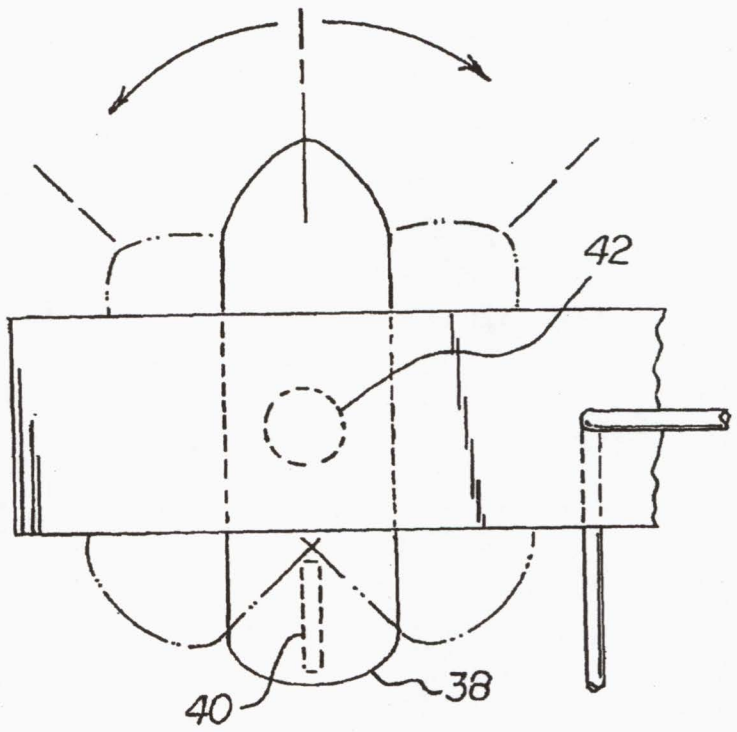
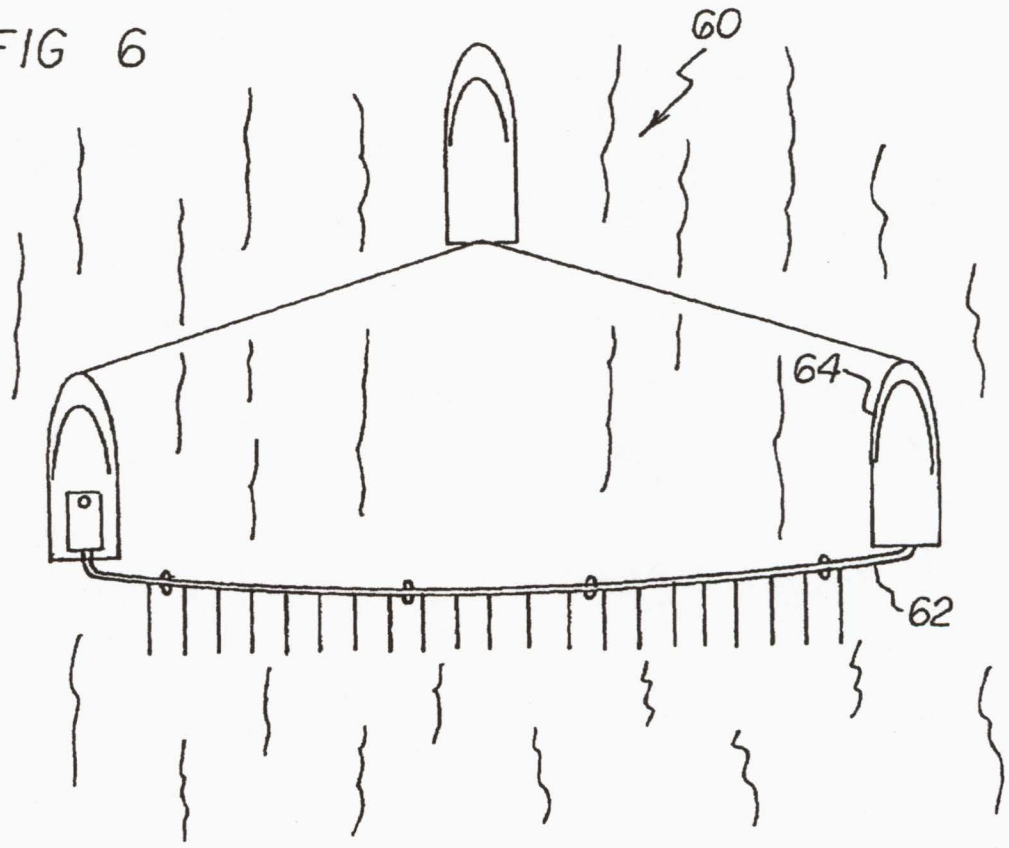


FIG 6



ORGANISM KILLER DISPENSER SYSTEM

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to an organism killer dispenser system and more particularly pertains to killing and managing red tide and other dinoflagelents.

2. Description of the Prior Art

The use of water treatment devices of known designs and configurations is known in the prior art. More specifically, water treatment devices of known designs and configurations previously devised and utilized for the purpose of treating contaminated water through known methods and apparatuses are known to consist basically of familiar, expected, and obvious structural configurations, notwithstanding the myriad of designs encompassed by the crowded prior art which has been developed for the fulfillment of countless objectives and requirements.

By way of example, U.S. Pat. No. 4,119,541 issued Oct. 10, 1978 to Makaya relates to an arrangement for disposing fluid floating matter. U.S. Pat. No. 4,818,416 issued Apr. 4, 1989 to Eberhardt relates to a method and apparatus for treating bodies of water. U.S. Pat. No. 5,185,085 issued Feb. 9, 1993 to Borgren relates to a water craft and method for treating a body of water. Lastly, U.S. Published Patent Application Number U.S. 2001/0035381 published Nov. 1, 2001 to Allen relates to a containment slick dispersal apparatus and method.

While these devices fulfill their respective, particular objectives and requirements, the aforementioned patents do not describe organism killer dispenser system that allows for killing and managing red tide and other dinoflagelents.

In this respect, the organism killer dispenser system according to the present invention substantially departs from the conventional concepts and designs of the prior art, and in doing so provides an apparatus primarily developed for the purpose of killing and managing red tide and other dinoflagelents.

Therefore, it can be appreciated that there exists a continuing need for a new and improved organism killer dispenser system which can be used for killing and managing red tide and other dinoflagelents. In this regard, the present invention substantially fulfills this need.

SUMMARY OF THE INVENTION

In view of the foregoing disadvantages inherent in the known types of water treatment devices of known designs and configurations now present in the prior art, the present invention provides an improved organism killer dispenser system. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved organism killer dispenser system and method which has all the advantages of the prior art and none of the disadvantages.

To attain this, the present invention essentially comprises a manifold assembly. The manifold assembly is formed of a first rectilinear pipe, a second rectilinear pipe and a central coupling component. The central coupling component is between the first and second rectilinear pipes. Each pipe has an open interior end and a closed exterior end. A hinge pin is provided. The hinge couples the interior end of each pipe to the coupling component. In this manner the pipes may pivot between an operative orientation during use and an inoperative orientation during storage and transportation. In an operative orientation the pipes are in a common linear array. In an inoperative orientation the pipes are parallel with respect to each other.

A fluid handling assembly is provided. The fluid handling assembly includes a plurality of downwardly facing spaced apertures in the pipes. The fluid handling assembly includes a flexible tube. The flexible tube extends downwardly from each aperture. The fluid handling assembly also includes a supply of fluid. The fluid is of the type adapted to kill and manage red tide and other dinoflagelents. The fluid handling assembly further includes a line. The line couples the supply with the tubes. In this manner the fluid may be dispensed to contaminated waters. Each flexible tube has a rudder. The rudder holds the lower end of the tube at a submerged location and faces in the direction of motion of the pipes.

A plurality of pontoons is provided next. The pontoons are at spaced apart locations beneath the pipes. The pontoons have a keel. The keel extends downwardly from each pontoon into the water. The pontoons have a rotatable support post. The rotatable support post is provided between each pontoon and its associated pipe to maintain the pontoons facing in the direction of motion of the pipes.

Further provided is a plurality of water crafts. The plurality of water crafts includes a central water craft. The central water craft has a central line. The central line couples the central water craft to the coupling component. The plurality of water crafts also includes two lateral water crafts. The two lateral water crafts have two end lines. The two end lines couple the lateral water crafts to the exterior ends of the pipes. The central water craft supports the supply of fluid to be dispensed during operation and use.

Provided last is a sensor. The sensor extends downwardly from the central component. The sensor has a lower extent. The lower extent extending into the water. The sensor has an upper extent. The upper extent is located above the water. The upper and lower extents of the sensor are adapted to determine the ambient conditions. The ambient conditions include, but are not limited to, air temperature and direction, water temperature and direction, air and water speed, concentration of contaminants, and the like. The sensor is adapted to analyze the sensed ambient conditions and dispense the fluid at an appropriate rate.

There has thus been outlined, rather broadly, the more important features of the invention in order that the detailed description thereof that follows may be better understood and in order that the present contribution to the art may be better appreciated. There are, of course, additional features of the invention that will be described hereinafter and which will form the subject matter of the claims attached.

In this respect, before explaining at least one embodiment of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or illustrated in the drawings. The invention is capable of other embodiments and of being practiced and carried out in various ways. Also, it is to be understood that the phraseology and terminology employed herein are for the purpose of descriptions and should not be regarded as limiting.

As such, those skilled in the art will appreciate that the conception, upon which this disclosure is based, may readily be utilized as a basis for the designing of other structures, methods and systems for carrying out the several purposes of the present invention. It is important, therefore, that the claims be regarded as including such equivalent constructions insofar as they do not depart from the spirit and scope of the present invention.

It is therefore an object of the present invention to provide a new and improved organism killer dispenser system which has all of the advantages of the prior art water treatment devices of known designs and configurations and none of the disadvantages.

It is another object of the present invention to provide a new and improved organism killer dispenser system which may be easily and efficiently manufactured and marketed.

It is further object of the present invention to provide a new and improved organism killer dispenser system which is of durable and reliable constructions.

An even further object of the present invention is to provide a new and improved organism killer dispenser system which is susceptible of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale, thereby making such organism killer dispenser system economically available.

Even still another object of the present invention is to provide an organism killer dispenser system for killing and managing red tide and other dinoflagelents.

Lastly, it is an object of the present invention to provide a new and improved organism killer dispenser system. A manifold assembly is formed of a pipe. The pipe has an open interior. A fluid handling assembly has a plurality of downwardly facing spaced apertures in the manifold. A flexible tube extends downwardly from each aperture. The fluid handling assembly also has a supply of fluid. The fluid is adapted to kill and manage dinoflagelents. A line couples the supply with the tubes for the dispensing of the fluid. At least one water craft with a line couples the central water craft to the manifold. A sensor is provided to determine ambient conditions. The sensor is adapted to analyze the sensed ambient conditions and dispense the fluid at an appropriate rate.

These together with other objects of the invention, along with the various features of novelty which characterize the invention, are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and the specific objects attained by its uses, reference should be had to the accompanying drawings and descriptive matter in which there is illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood and objects other than those set forth above will become apparent when consideration is given to the following detailed description thereof. Such description makes reference to the annexed drawings wherein:

FIG. **1** is a plan view of an organism killer dispenser system constructed in accordance with the principles of the present invention.

FIG. **2** is a plan view of the system shown in FIG. **1** but with the manifold in a folded orientation to facilitate transportation.

FIG. **3** is a rear elevational view of the system taken along line **3**—**3** of FIG. **1**.

FIG. **4** is a side elevational view of the system taken along line **4**—**4** of FIG. **3**.

FIG. **4**A is a cross sectional view taken along line **4**A—**4**A of FIG. **4**.

FIG. **5** is a plan view of the system taken along line **5**—**5** of FIG. **1**.

FIG. **6** is a plan view similar to FIG. **1** but illustrating an alternate embodiment of the invention.

The same reference numerals refer to the same parts throughout the various Figures.

DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawings, and in particular to FIG. **1** thereof, the preferred embodiment of the new and improved organism killer dispenser system embodying the principles and concepts of the present invention and generally designated by the reference numeral **10** will be described.

The present invention, the organism killer dispenser system **10** is comprised of a plurality of components. Such components in their broadest context include a manifold assembly, a fluid handling assembly, a plurality of pontoons, at least one water craft and a sensor. Such components are individually configured and correlated with respect to each other so as to attain the desired objective.

First provided is a manifold assembly **12**. The manifold assembly is formed of a first rectilinear pipe **14**, a second rectilinear pipe **16** and a central coupling component **18**. The central coupling component is between the first and second rectilinear pipes. Each pipe has an open interior end **20** and a closed exterior end **22**. A hinge pin **24** is provided. The hinge couples the interior end of each pipe to the coupling component. In this manner the pipes may pivot between an operative orientation during use and an inoperative orientation during storage and transportation. In an operative orientation the pipes are in a common linear array. In an inoperative orientation the pipes are parallel with respect to each other.

A fluid handling assembly **26** is provided. The fluid handling assembly includes a plurality of downwardly facing spaced apertures **28** in the pipes. The fluid handling assembly includes a flexible tube **30**. The flexible tube extends downwardly from each aperture.

The fluid handling assembly also includes a supply **32** of fluid. The fluid is of the type adapted to kill and manage red tide and other dinoflagelents. The fluid handling assembly further includes a line **34**. The line couples the supply with the tubes. In this manner the fluid may be dispensed to contaminated waters. The tube **30** is preferably formed with a triangular cross sectional configuration with the apex facing forward. It is of a length of between 5 feet and 25 feet with dispensing apertures at spaced points along the lower extent of the tube on all three faces for dispensing laterally and rearwardly. Each flexible tube has a rudder **36**. The rudder holds the lower end of the tube at a submerged location and faces in the direction of motion of the pipes.

A plurality of pontoons **38** is provided next. The pontoons are at spaced apart locations beneath the pipes. The pontoons have a keel **40**. The keel extends downwardly from each pontoon into the water. The pontoons have a rotatable support post **42**. The rotatable support post is provided between each pontoon and its associated pipe to maintain the pontoons facing in the direction of motion of the pipes.

Further provided is a plurality of water crafts. The plurality of water crafts includes a central water craft **44**. The central water craft has a central line **46**. The central line couples the central water craft to the coupling component. The plurality of water crafts also includes two lateral water crafts **48**. The two lateral water crafts have two end lines **50** and a front line coupling the front of the central water craft with the fronts of the two lateral water crafts. The two end

lines couple the lateral water crafts to the exterior ends of the pipes. The central water craft supports the supply of fluid to be dispensed during operation and use.

Provided last is a sensor. The sensor extends downwardly from the central component. The sensor has a lower extent **52**. The lower extent extending into the water. The sensor has an upper extent **54**. The upper extent is located above the water. The upper and lower extents of the sensor are adapted to determine the ambient conditions as well as the organism count of the water to be treated. The ambient conditions include, but are not limited to, air temperature and direction, water temperature and direction, air and water speed, concentration of contaminants, and the like as the organism count. The sensor is adapted to analyze the sensed ambient conditions and dispense the fluid at an appropriate rate. The rate of dispensing is controlled by a valving at the reservoir. In an alternate embodiment, the dispensing is controlled by a plurality of valves in the tubes. The preferred technique includes at least one metering valve to dispense an exact amount for the conditions. The fluid dispensed is in a manner to give the greatest coverage to the total volume of receiving water to be treated.

As can be seen in FIG. **6**, the present invention includes an alternate embodiment of the invention. The manifold assembly of the alternate embodiment is formed of a single pipe **62**, preferably with limited flexibility and resilience. Laterally spaced water crafts **64** are coupled to the end of the pipe by lines. The reservoir with the fluid to be dispensed is located in one of the spaced water crafts. A central water craft with lines to the end water crafts are employed to assist in pulling the load.

Preferred compositions including red tide organism killers for being dispensed by the system of the present invention are set forth in co-pending U.S. patent application Ser. No. 11/035,597 filed concurrently herewith.

As to the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation will be provided.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable modifications and equivalents may be resorted to, falling within the scope of the invention.

What is claimed as being new and desired to be protected by Letters Patent of the United States is as follows:

1. An organism killer dispenser system comprising:

a manifold assembly formed of a pipe having an open interior;

a fluid handling assembly including a plurality of downwardly facing spaced apertures in the manifold with a flexible tube with a lower end extending downwardly from each aperture, each flexible tube having a rudder to hold the lower end of the tube at a submerged location, the fluid handling assembly also including a supply of fluid adapted to kill and manage dinoflagelents with a line coupling the supply with the tubes for the dispensing of the fluid;

a plurality of pontoons at spaced apart locations beneath the manifold;

at least one water craft with a line coupling the central water craft to the manifold; and

a sensor to determine the ambient conditions, for use in analyzing the sensed ambient conditions and then dispensing the fluid at an appropriate rate.

2. The system as set forth in claim **1** wherein the manifold assembly is formed of a first rectilinear pipe and a second rectilinear pipe and a central coupling component there between, each pipe having an open interior end and a closed exterior end with a hinge pin coupling the interior end of each pipe to the coupling component for pivoting the pipes between an operative orientation during use with the pipes in a common linear array and an inoperative orientation during storage and transportation with the pipes parallel with respect to each other.

3. The system as set forth in claim **1** wherein the manifold assembly is formed of a single pipe with laterally spaced water crafts coupled to the end of the pipe.

4. An organism killer dispenser system for killing and managing red tide and other dinoflagelents including gymnodinium breve, karenia brevis, ptychodiscus, pfiesteria piscicida and the like comprising, in combination:

a manifold assembly formed of a first rectilinear pipe and a second rectilinear pipe and a central coupling component there between, each pipe having an open interior end and a closed exterior end with a hinge pin coupling the interior end of each pipe to the coupling component for pivoting the pipes between an operative orientation during use with the pipes in a common linear array and an inoperative orientation during storage and transportation with the pipes parallel with respect to each other;

a fluid handling assembly including a plurality of downwardly facing spaced apertures in the pipes with a flexible tube extending downwardly from each aperture, the fluid handling assembly also including a supply of fluid of the type adapted to kill and manage red tide and other dinoflagelents with a line coupling the supply with the tubes for the dispensing of the fluid to contaminated waters, each flexible tube having a rudder to hold the lower end of the tube at a submerged location and facing in the direction of motion of the pipes;

a plurality of pontoons at spaced apart locations beneath the pipes with a keel extending downwardly from each pontoon into the water and a rotatable support post between each pontoon and its associated pipe to maintain the pontoons facing in the direction of motion of the pipes;

a plurality of water crafts including a central water craft with a central line coupling the central water craft to the coupling component and two lateral water crafts with two end lines coupling the lateral water crafts to the exterior ends of the pipes, the central water craft supporting the supply of fluid to be dispensed during operation and use; and

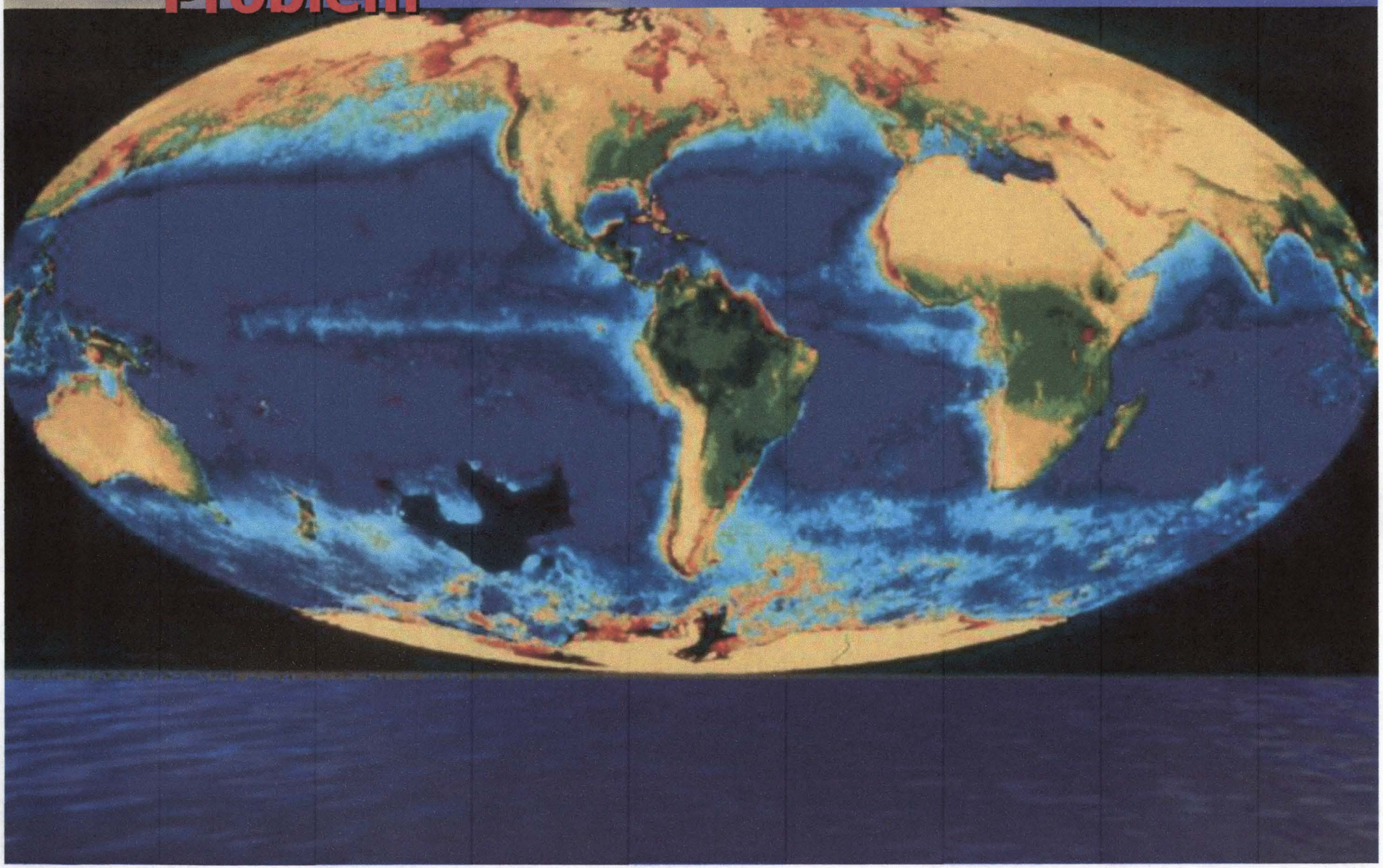
a sensor extending downwardly from the central component with a lower extent extending into the water and an upper extent located above the water, the upper and lower extents of the sensor adapted to determine the ambient conditions including, but not limited to, air temperature and direction, water temperature and direction, air and water speed, concentration of contaminants, and the like, for use in analyzing the sensed ambient conditions and then dispensing the fluid at an appropriate rate.

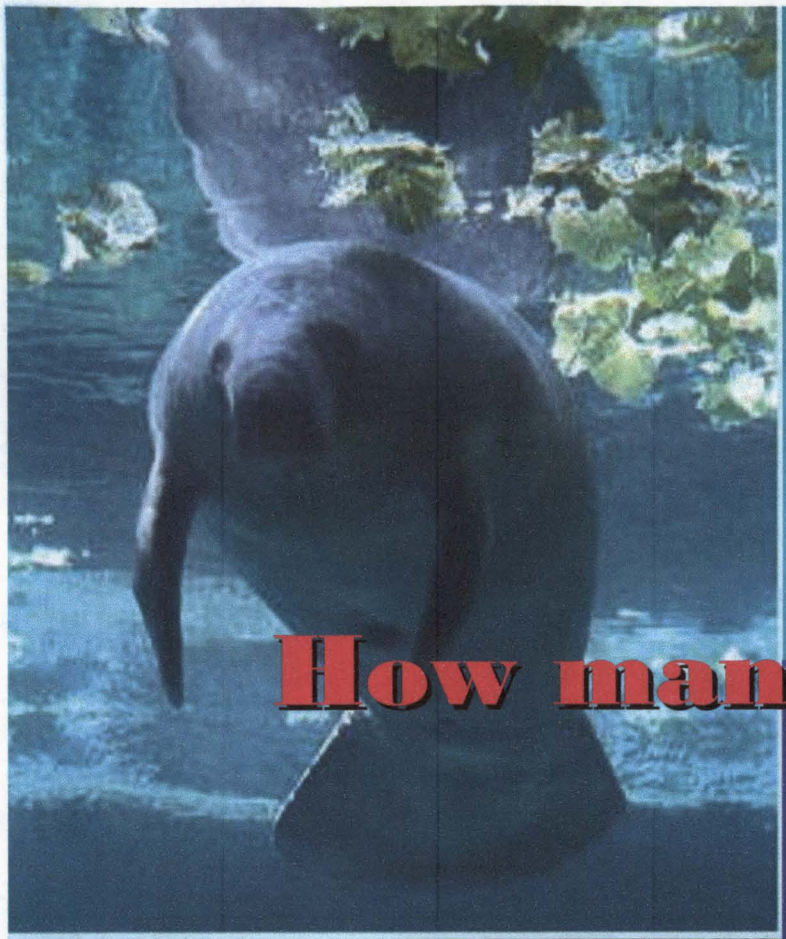
* * * * *

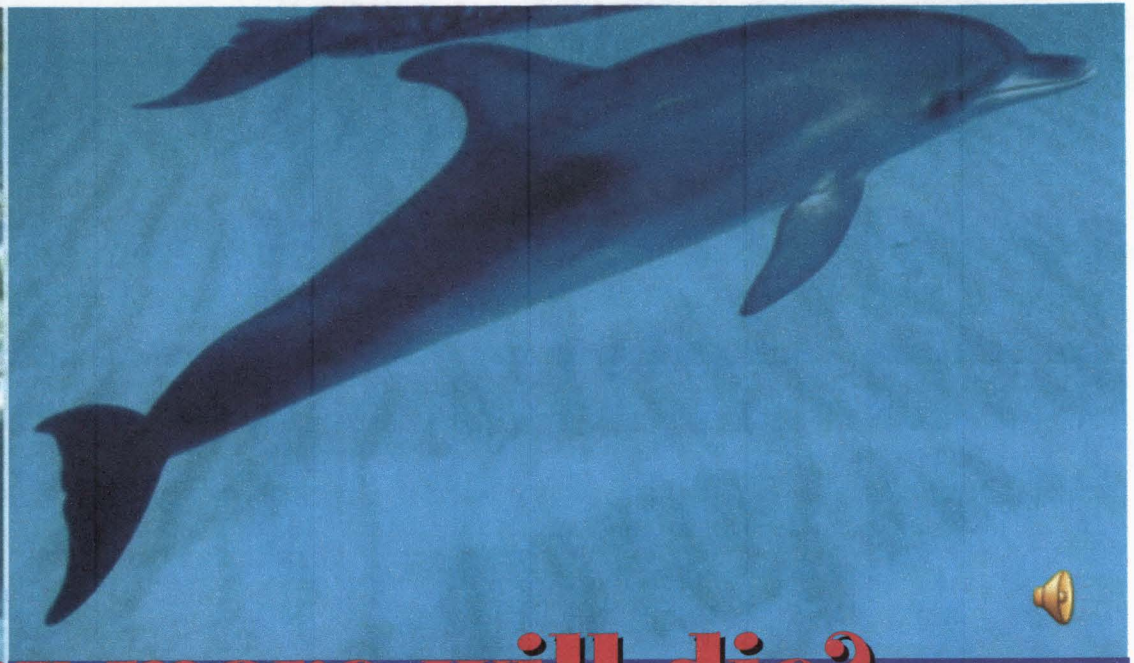
VENICE HIGH SCHOOL

RED TIDE RESEARCH

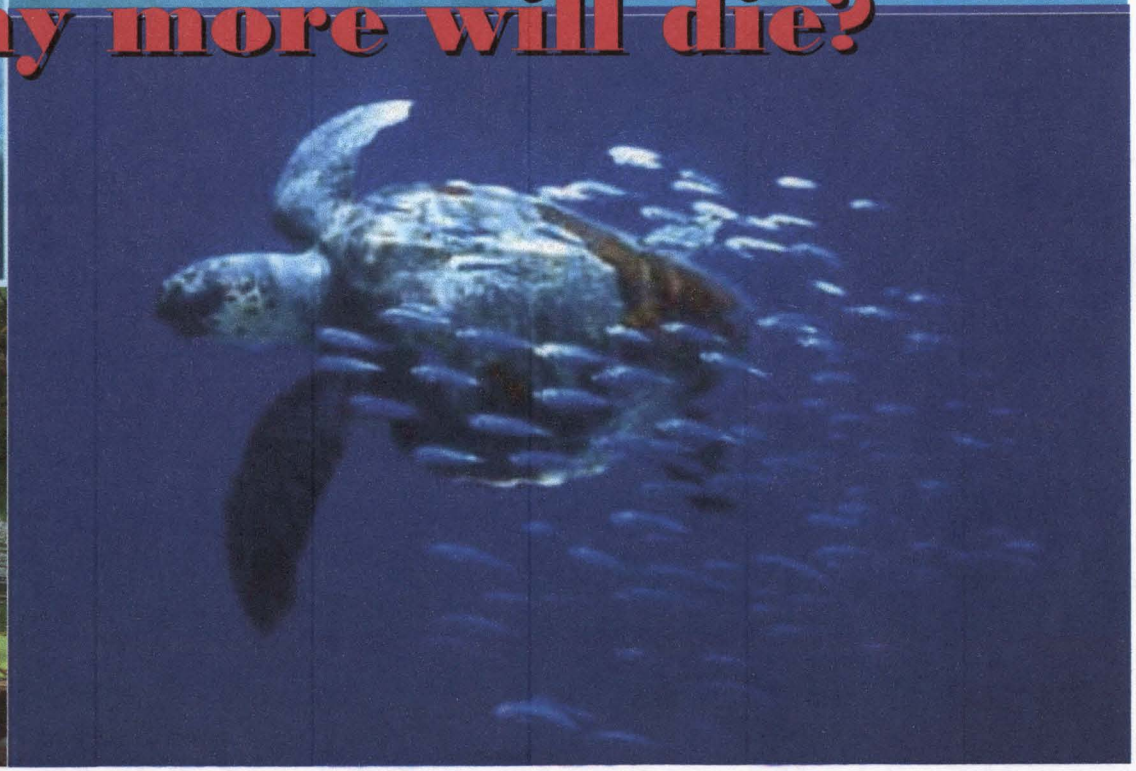
Red Tide Is A World-Wide Problem







How many more will die?



MARINE LIFE KILLED BY RED TIDE IN 2005

✓ 85 Manatees

✓ 600 Sea Turtles (1000's of hatchlings not incl.)

✓ 116 Dolphins/Porpoise

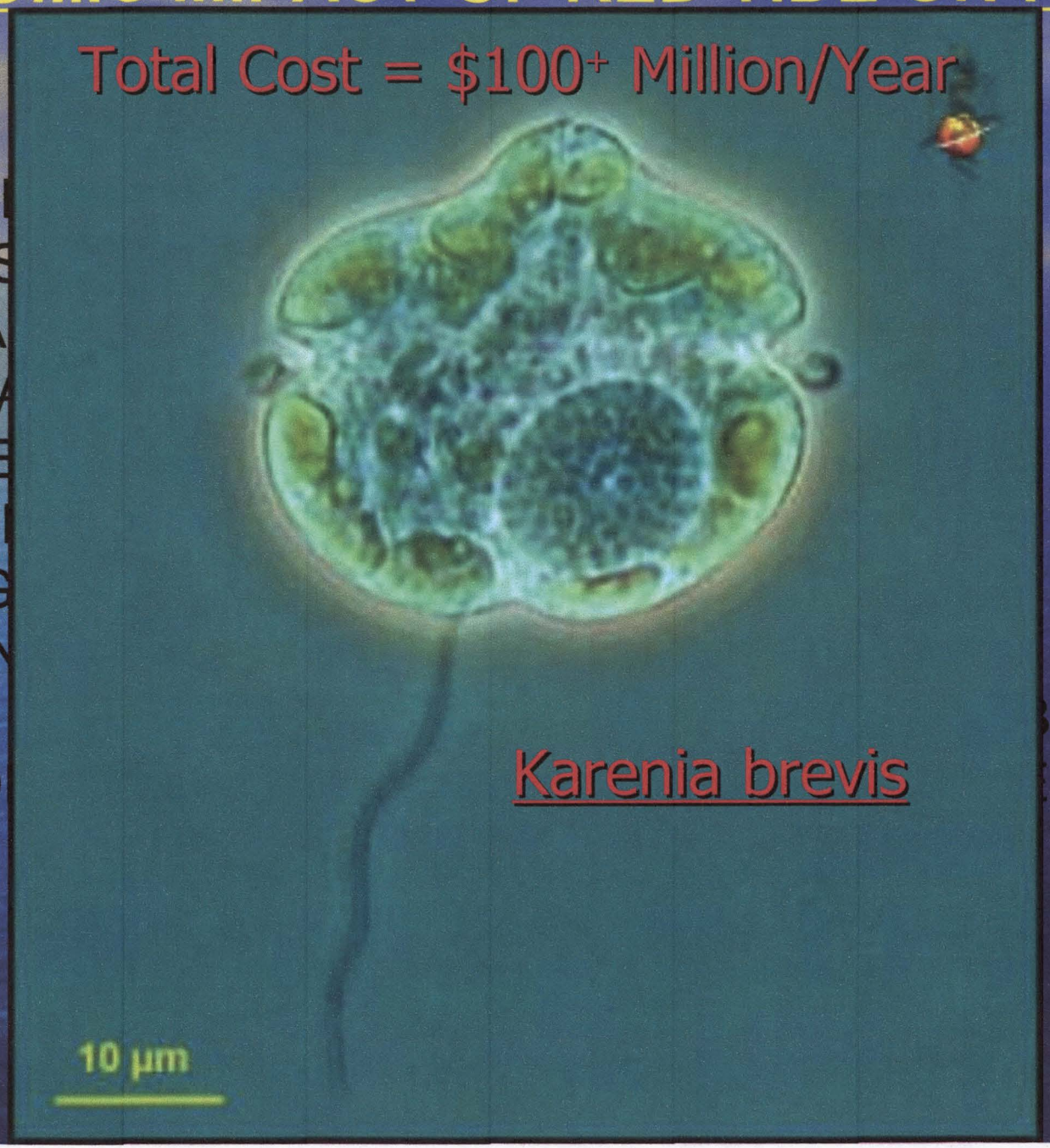
✓ Thousands of Sea Birds (countless)

✓ Millions of fish (616 separate fish-kill incidents)

Red Tide sickens another manatee

ECONOMIC IMPACT OF RED TIDE ON FLORIDA

Total Cost = $100+ Million/Year



Karenia brevis

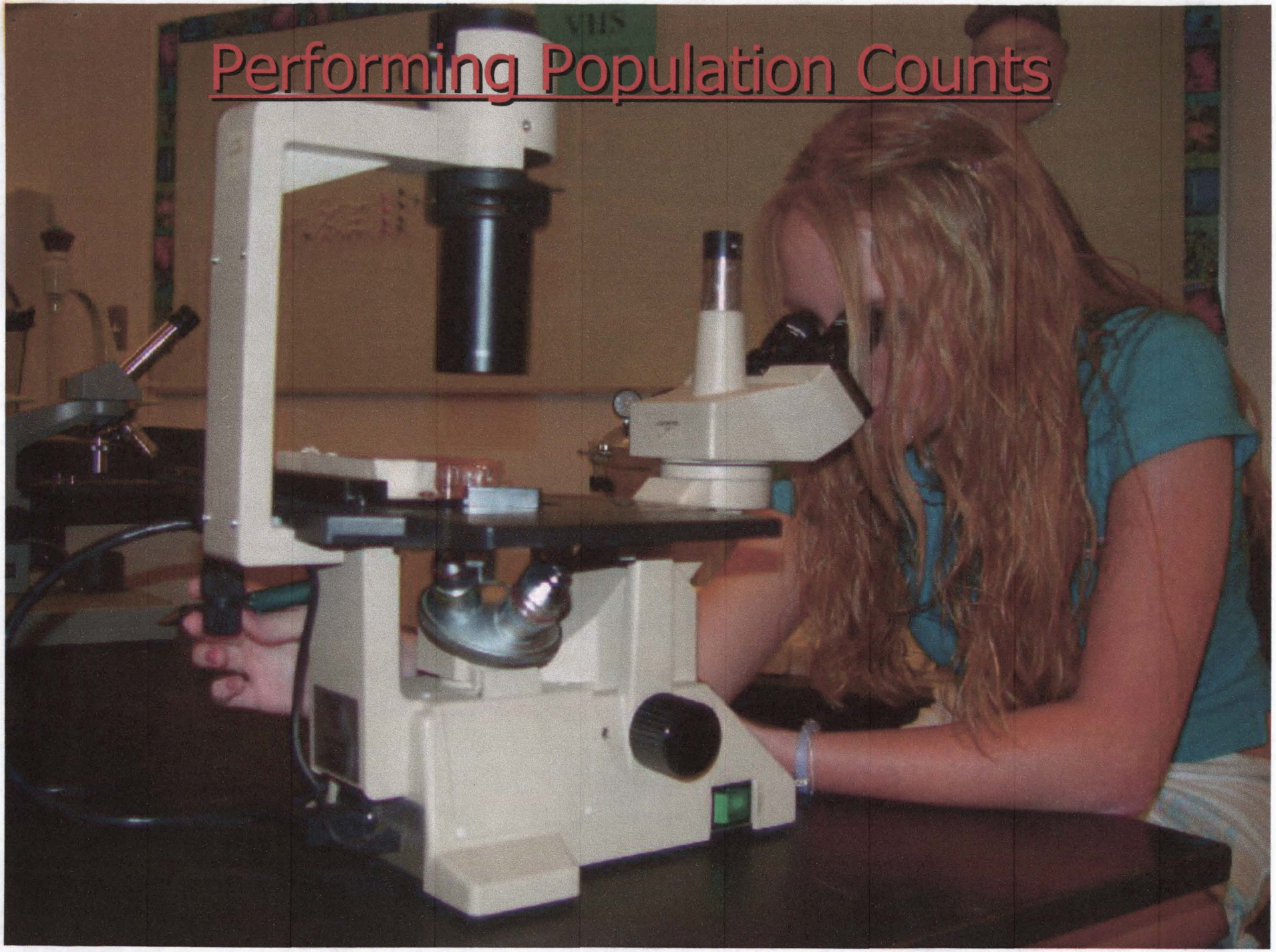
- ✓TOURISI
- ✓REAL ES
- ✓MARINA
- ✓BOAT SA
- ✓CHARTE
- ✓SHELLFI
- ✓FISHING
- ✓PERSON
- ✓HUMAN
- ✓COST O

LEMS

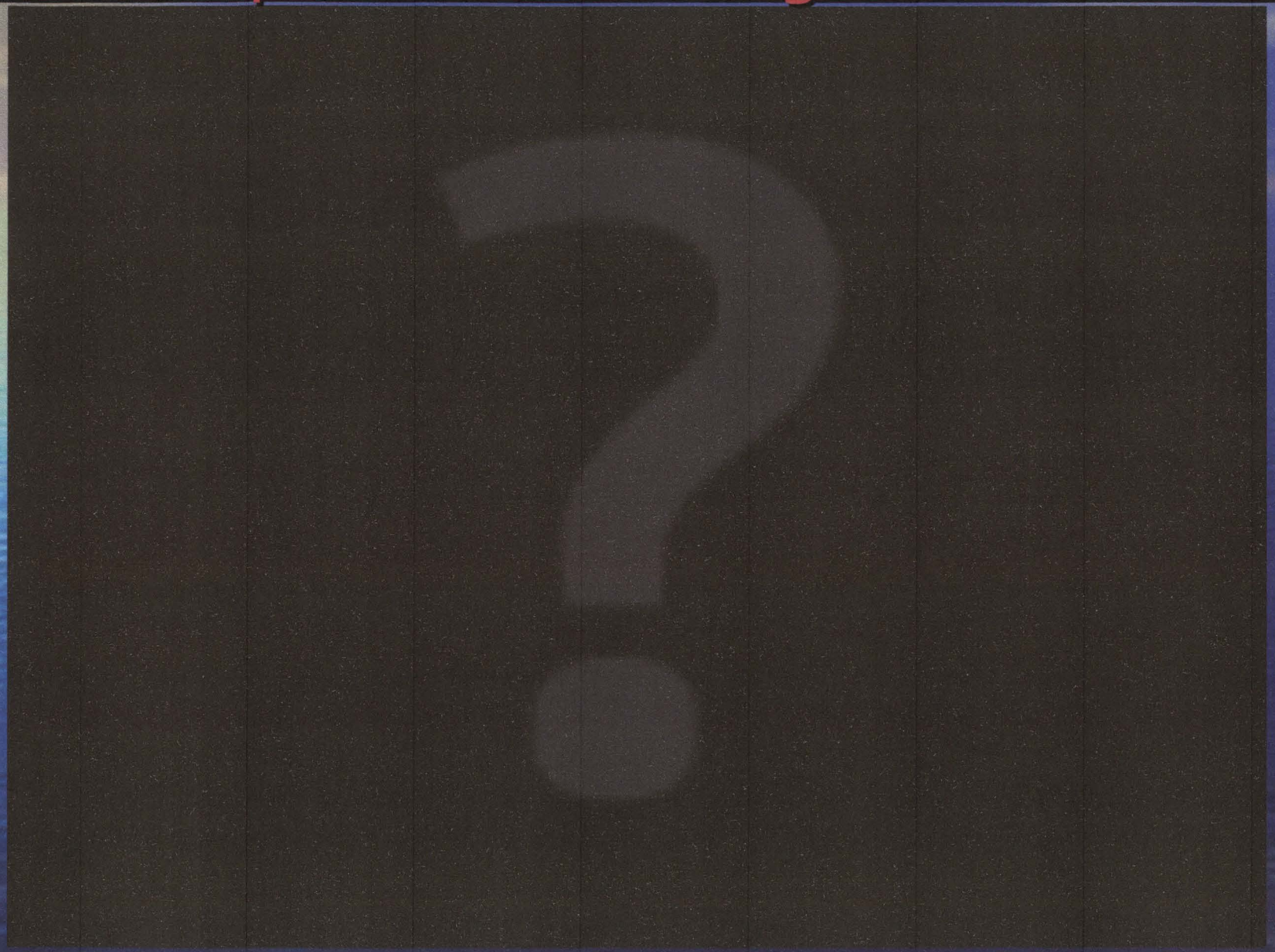
RNMENTS

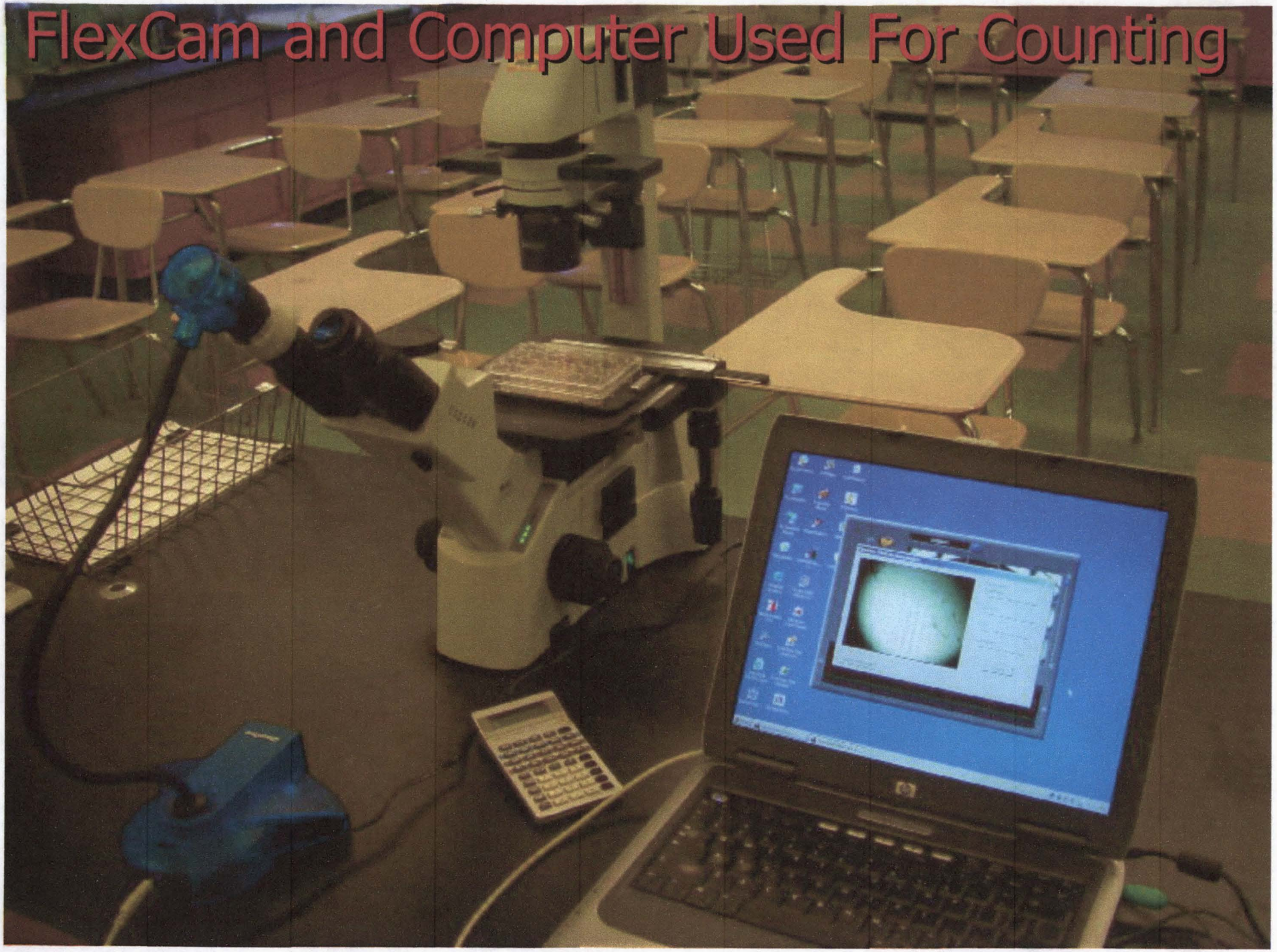
Growing Red Tide Cultures

Performing Population Counts

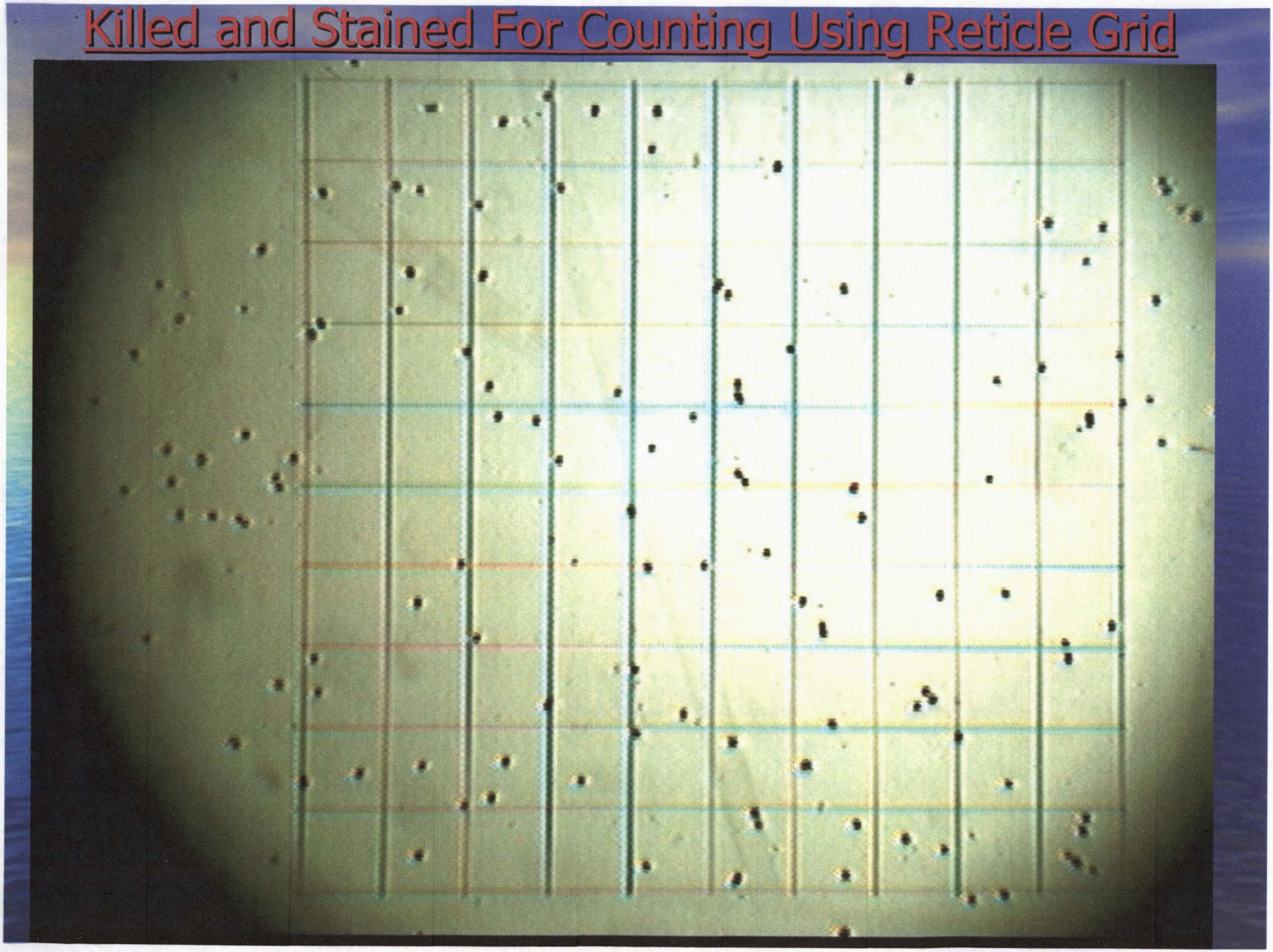


Microscopic View of Living *Karenia brevis*

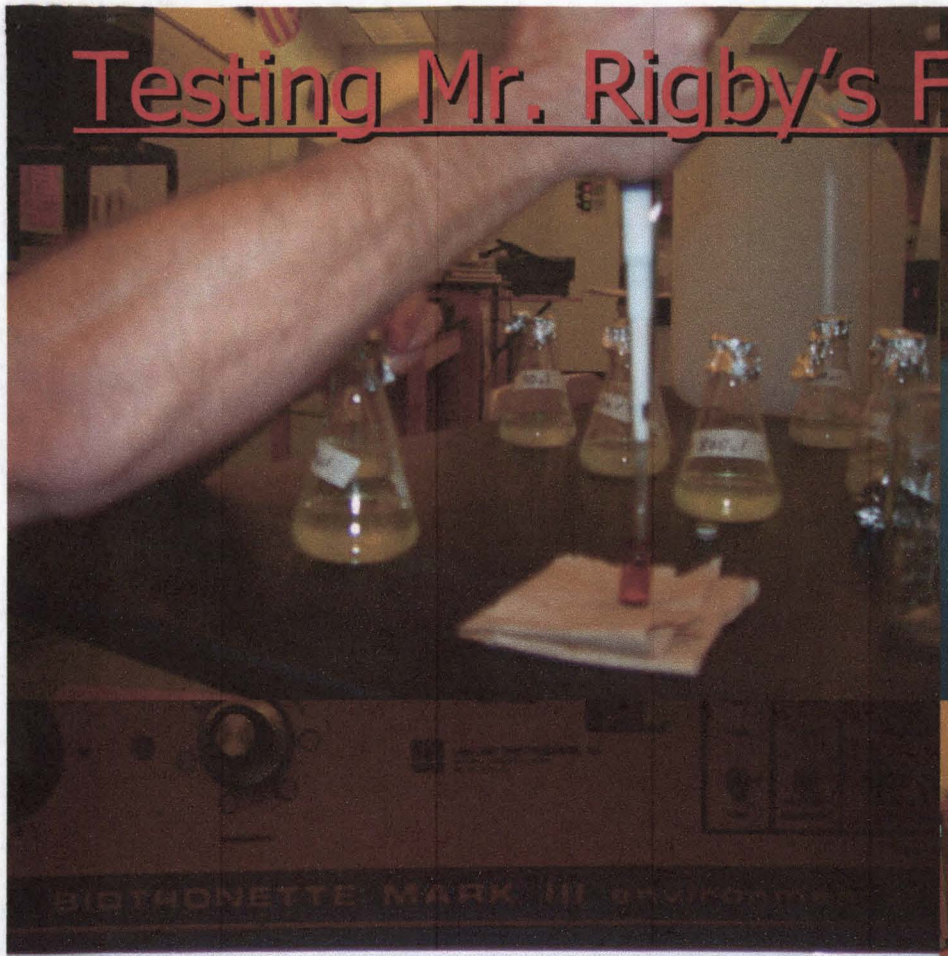


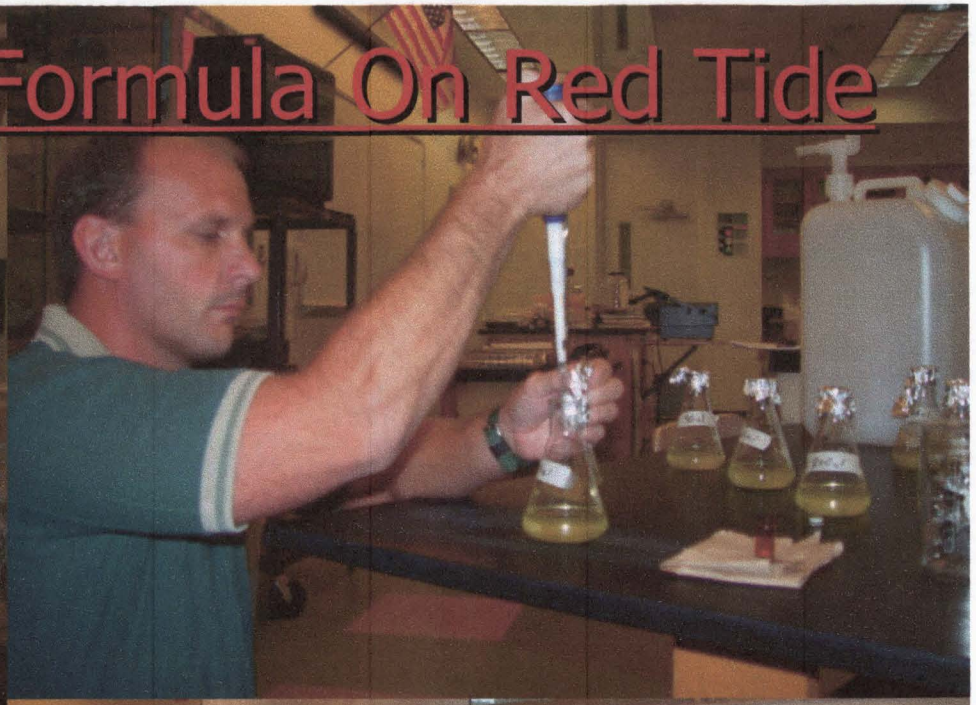

FlexCam and Computer Used For Counting

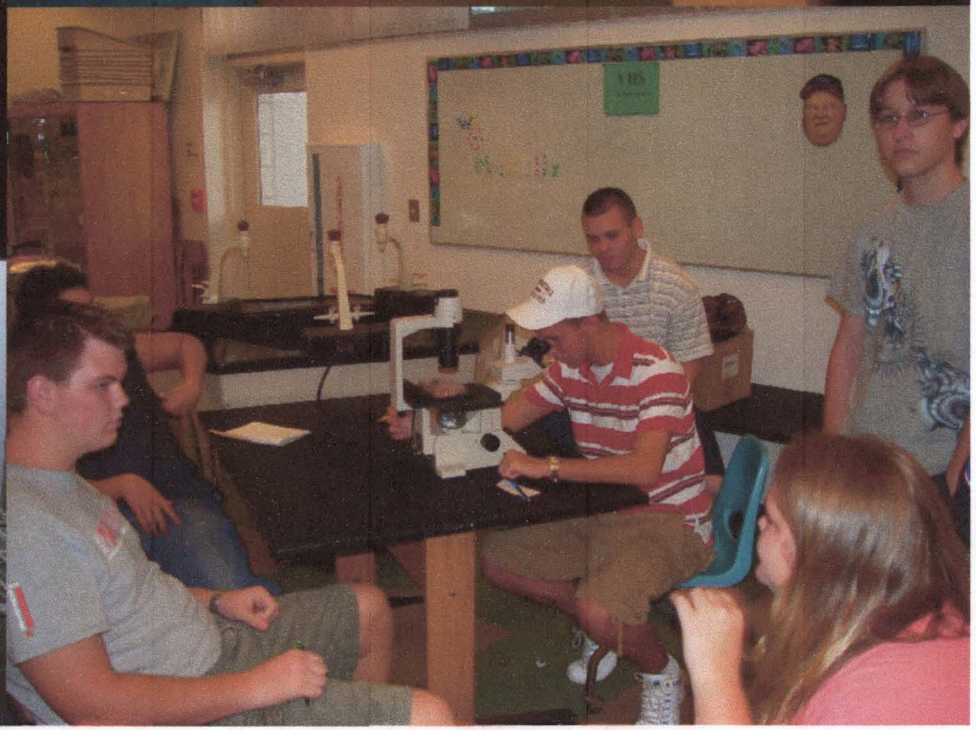
Killed and Stained For Counting Using Reticle Grid



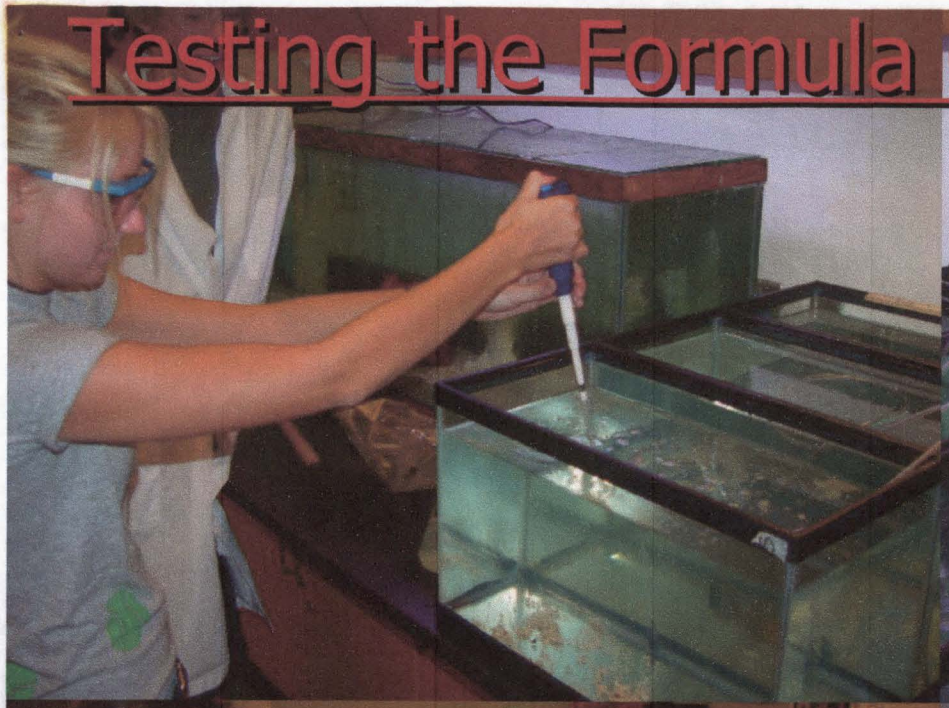
Testing Mr. Rigby's Formula On Red Tide

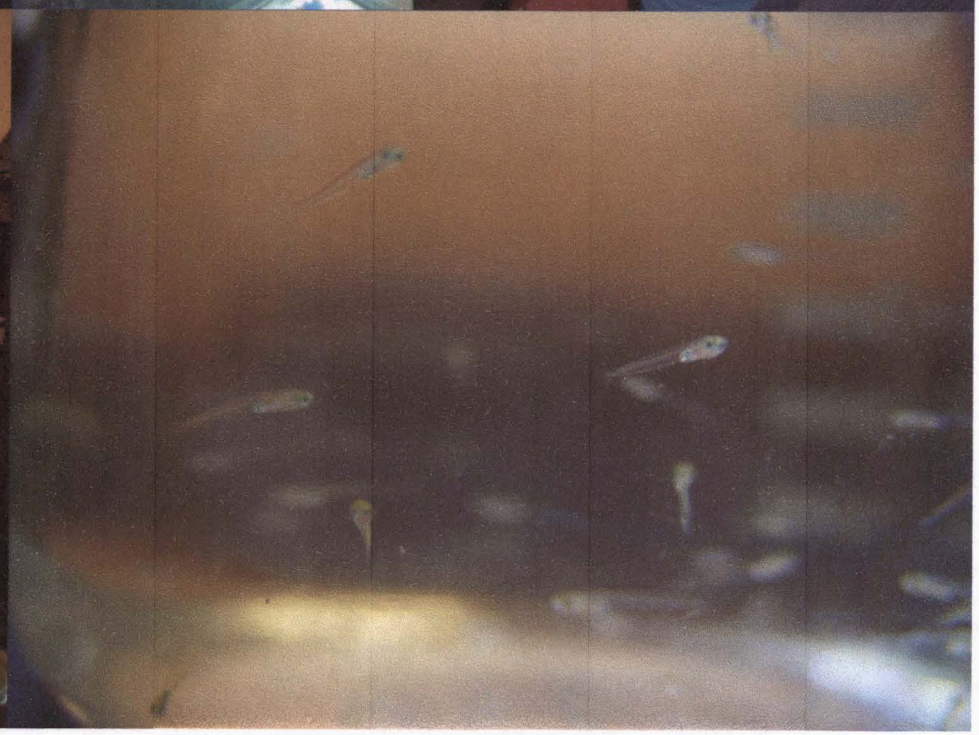






Testing the Formula On Other Organisms



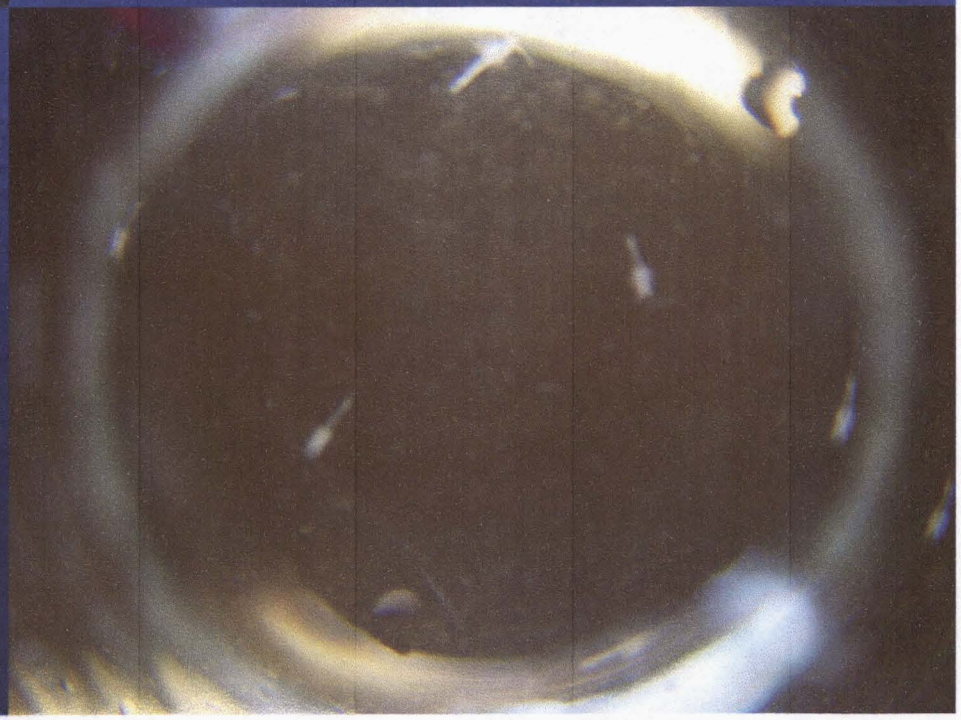


EPA Approved Organism
For Environmental Testing

Menidia beryllina
(Silversides)

EPA Approved Organism
For Environmental Testing

Mysidopsis bahia
(Opossum Shrimp)



Results of Formula Testing on Silversides – November, 2006

	Silversides						
Group #	Names	Period	ppm	Day 0	Day 1	Day 2	Day 3
1	Fox, Duffy, Kadar	2	12	10	3	3	2
2	Montisano, Wildasin, Shock, Sturton	2	12	10	9	9	9
3	Rogers, Goff, Spicer	4	14	7	2	1	1
4	Carter, Rossitto, Ponomarenko,	4	14	15	2	2	2
5	Lawless, Mosko, Sanders, Rajan	2	12	11	11	11	10
6	Kopp, Conner, Nelson	4	14	10	3	3	3
7	Ellingsen, Deegan, Kling, Schlenger	2	12	10	0	0	0
8	Drury, Melchin, Ojeda, Waltman	2	12	10	7	6	6
9	Collier, Jones, Hertel, Cangelosi	4	14	12	0	0	
10	Reinert, Hayes, Wagner, McGrain	2	12	12	12	11	10
11	Esliger - Control	4	0	11	11	11	11
12	Maxwell, Best, Evans, Morrell	2	12	10	1	1	1
13	Romanski, Stahura, Mann	4	14	11	5	4	4
14	Young, Hotz, Florea, Johnson, Porter	4	14	11	6	5	5
15	Vasilevskiy, White, Costanzo	4	14	19	0	0	0

Percent Silversides Surviving Three Days

	Day 0	Day 1	Day 2	Day 3
Silversides @ 12 ppm of formula	73	43	41	38
Percent Silversides Alive	100.00%	58.90%	56.16%	52.05%
Silversides @ 14 ppm of formula	85	18	15	15
Percent Silversides Alive	100.00%	21.18%	17.65%	17.65%
Control Silversides	100.00%	100.00%	100.00%	100.00%

Test Results From November, 2006

Results of Formula Testing on Opossum Shrimp – Nov., 2006

	Opossum Shrimp						
Group #	Names	Period	ppm	Day 0	Day 1	Day 2	Day 3
1	Fox, Duffy, Kadar	2	12	10	10	10	10
2	Montisano, Wildasin, Shock, Sturton	2	12	10	10	10	10
3	Rogers, Goff, Spicer	4	14	10	4	3	2
4	Carter, Rossitto, Ponomarenko,	4	14	10	10	10	10
5	Lawless, Mosko, Sanders, Rajan	2	12	12	12	12	9
6	Kopp, Conner, Nelson	4	14	10	9	9	9
7	Ellingsen, Deegan, Kling, Schlenger	2	12	10	10	10	10
8	Drury, Melchin, Ojeda, Waltman	2	12	10	10	10	10
9	Collier, Jones, Hertel, Cangelosi	4	14	X	X	X	X
10	Reinert, Hayes, Wagner, McGrain	2	12	10	10	10	10
11	Esliger - Control	4	0	10	9	9	9
12	Maxwell, Best, Evans, Morrell	2	12	10	10	10	9
13	Romanski, Stahura, Mann	4	14	X	X	X	X
14	Young, Hotz, Florea, Johnson, Porter	4	14	10	10	8	8
15	Vasilevskiy, White, Costanzo	4	14	X	X	X	X

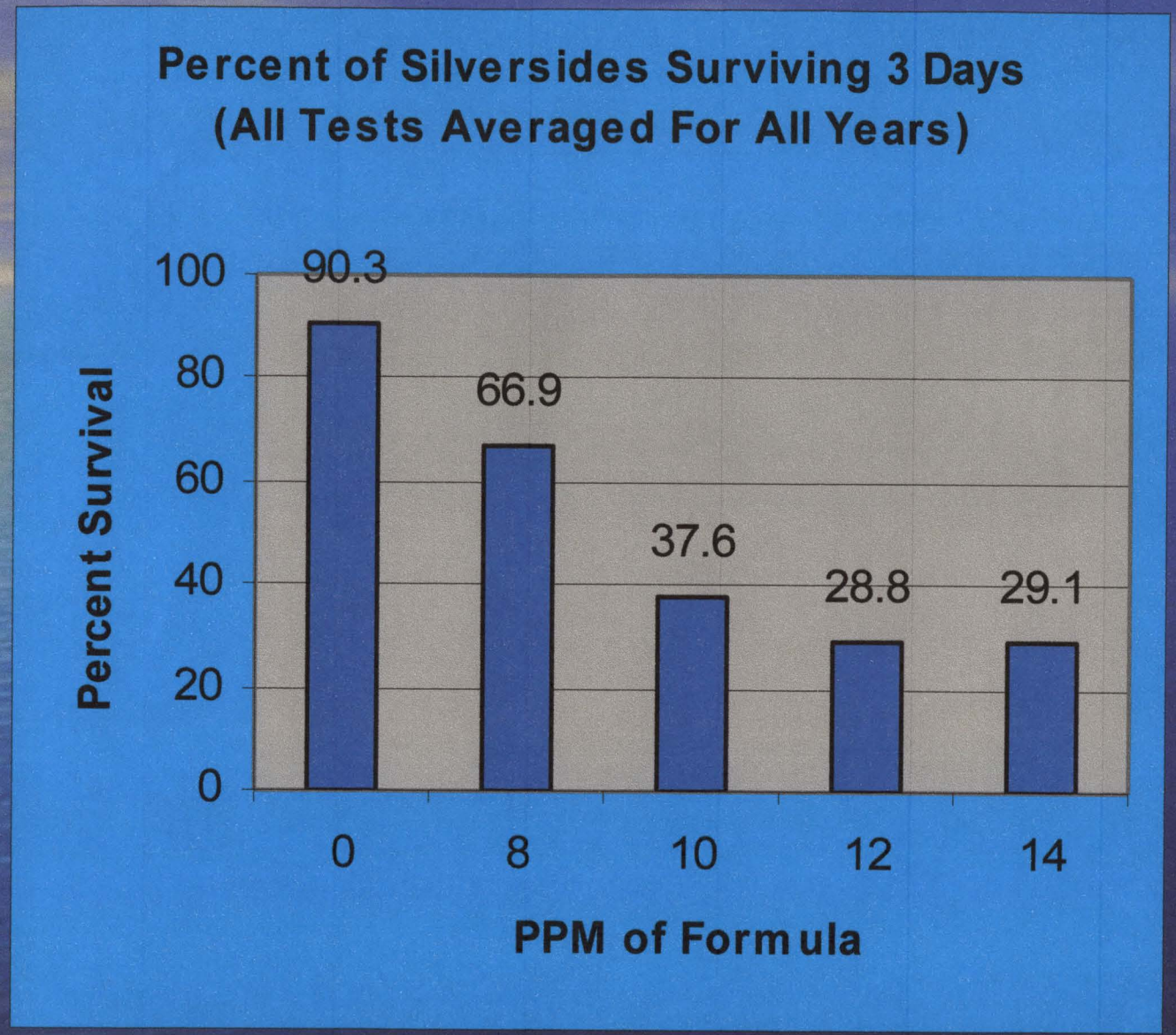
Percent Opossum Shrimp Surviving Three Days

	Day 0	Day 1	Day 2	Day 3
Opossum Shrimp @ 12 ppm	72	72	72	68
Percent Opossum Shrimp Alive	100.00%	100.00%	100.00%	94.44%
Opossum Shrimp @ 14 ppm	40	33	30	29
Percent Opossum Shrimp Alive	100.00%	82.50%	75.00%	72.50%
Control Shrimp	90.00%	90.00%	90.00%	90.00%

Test Results From November, 2006

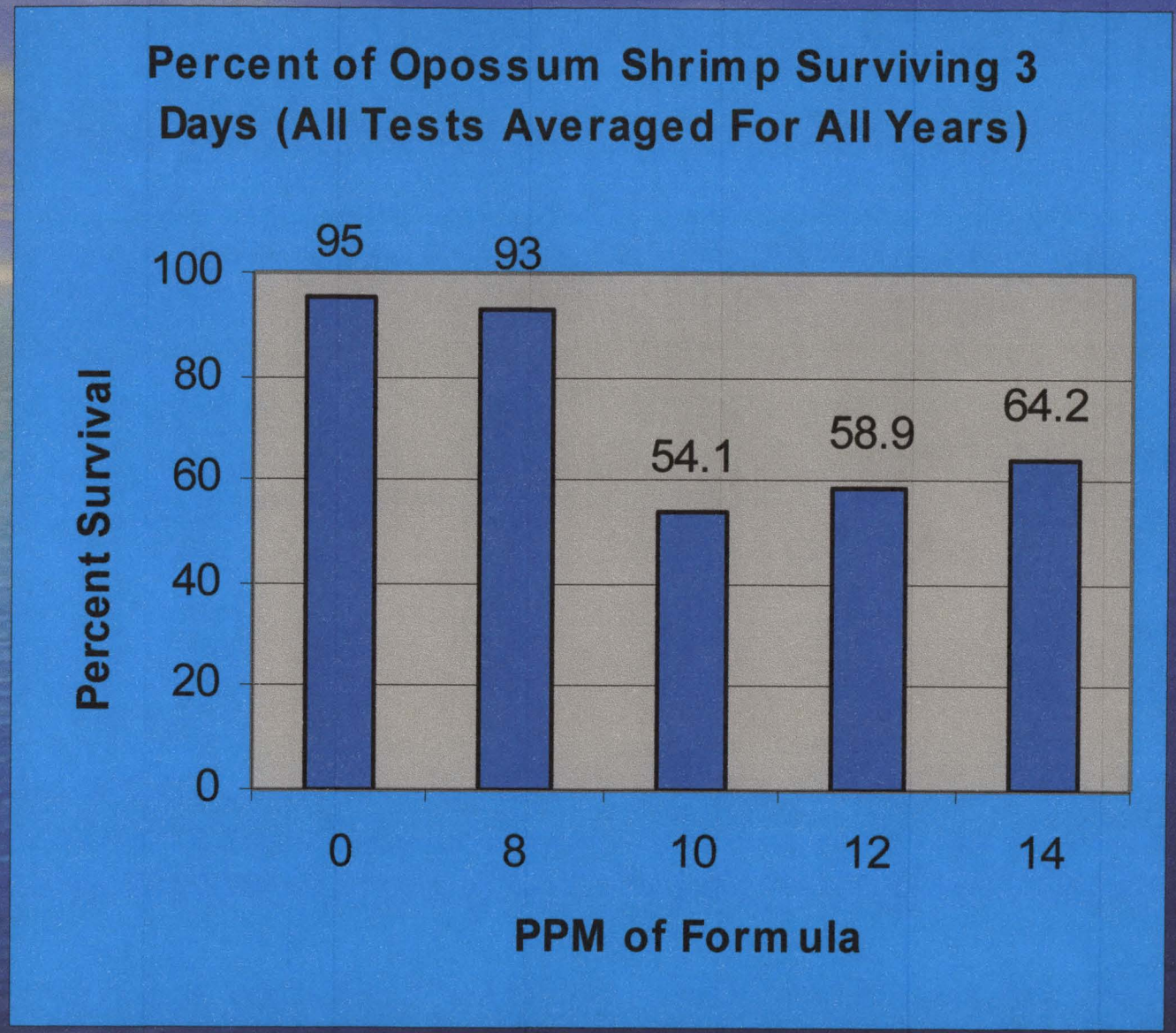
Results of All Tests To Date

PPM of Formula	Percent of Silversides Surviving 3 Days	Fraction
0	90.3	159/176
8	66.9	81/121
10	37.6	176/468
12	28.8	134/466
14	29.1	46/158


Percent of Silversides Surviving 3 Days
(All Tests Averaged For All Years)
Percent Survival
100
80
60
40
20
0
90.3
66.9
37.6
28.8
29.1
0
8
10
12
14
PPM of Formula

Results of All Tests To Date

PPM of Formula	Percent of Opossum Shrimp Surviving 3 Days	Fraction
0	95.0	95/100
8	93.0	67/72
10	54.1	164/303
12	58.9	145/246
14	64.2	77/120


Percent of Opossum Shrimp Surviving 3 Days (All Tests Averaged For All Years)
Percent Survival
100
80
60
40
20
0
95
93
54.1
58.9
64.2
0
8
10
12
14
PPM of Formula

Some Results of the Formula on Karenia brevis

Date	Observations	ppm
9/27/06	8,710,000 cells/Liter population count (Culture Started 9/9/06)	10
9/28/06	less than 5 cells/mL (5,000 cells/Liter) seen alive; only 1 swimming normally	-
10/30/06	23,795,000 cells/Liter (Culture Started 10/9/06)	30
10/31/06	Population effectively dead. However, 3 or 4 K.b. seen swimming slowly. A few smaller, unidentified microorganisms seen swimming around.	20
11/1/06	There are still a few K.b. swimming, but slowly. Still see unidentified microorganisms swimming. They appear to have flagella.	30
11/2/06	Only one K.b. was seen alive. It was swimming slowly and not in a normal manner. Other microorganisms still viewed, but fewer in number.	-
	Total ppm for all days =	80
3/16/07	58,965,000 cells/Liter (Culture Started 2/3/07)	40
3/17/07	Greatly reduced numbers; sparse; few dozen/mL alive instead of 1000's	10
3/18/07	K.b. population effectively dead. Only 1-2 K.b. cells/mL still seen alive and swimming sluggishly. Other microorganisms seen alive.	-
	Total ppm for all days =	50

Our Expenditures For Three Years

- $2750 – 1 Inverted Compound Microscope
- $425 – 24 x 10-Gallon Aquariums & Equipment
- $450 – 8 Fernbach Culture Flasks
- $377 – 24 x 1000 mL Beakers (Heavy Duty)
- $240 – Instant Ocean Sea Salts
- $300 – Chemical Nutrients
- $450 – 4 Micropipettes
- $300 – Adaptive Camera Equipment
- $120 – Lighting For Culture Growth
- $300 – Autoclave (Pressure Cooker For Sterilization)

❖ $5712 = TOTAL

✓ $2000 = City of Venice Contribution ($1000/year for 2 years)
✓ $1000 = Standing Watch
✓ $ 100 = Purmort & Martin Insurance Agency, Inc.
✓ $1000 = START
✓ $ 2612 = VHS Science Dept. Budget

Special Thanks To:
Fish & Wildlife Research Institute
In St. Petersburg, Florida

For Our Red Tide Cultures, Equipment & Growth Nutrients, and Their Helpful Knowledge

And

Marinco Bioassay Laboratory
In Sarasota, Florida

For The Silversides, Mysids, and Helpful Expertise!

Venice, Florida
"City on the Gulf"

STANDING WATCH

Florida's largest boater advocacy group

Fighting for Your Boating and Water Access Rights

MARINCO BIOASSAY LABORATORY

Purmort & Martin Insurance Agency, Inc.

FLORIDA FISH AND WILDLIFE CONSERVATION COMMISSION

FISH AND WILDLIFE RESEARCH INSTITUTE

START

Solutions To Avoid Red Tide, Inc.

Venice High School Thanks You!

To View More Detailed Results of Our Research,
Click On The Link Below

http://www.sarasota.k12.fl.us/vhs/science/redtide/


No More!

VENICE HIGH SCHOOL RED TIDE RESEARCH

In April of 2004, four of our VHS science teachers visited the Florida Marine Research Institute (FMRI) in St. Petersburg, Florida, to learn about growing and culturing the organism that causes our local red tides. Since that time the FMRI has changed its name to the FWRI (Fish and Wildlife Research Institute). The FWRI is involved in many different kinds of research; their ongoing red tide research has lasted many years.

2004 – 2005 School Year

In August of 2004, the beginning of the new school year, Mr. Dan Kelly and Mr. Charles Powell picked up two culture flasks of *Karenia brevis*, the dinoflagellate that causes our red tides, from the FWRI. At the same time they also borrowed an inverted microscope and some other equipment that were loaned to Venice High School for the red tide research. The initial nutrient materials needed for culturing the red tide organism were also provided.

From August through mid-October we only cultured the *Karenia brevis* in Fernbach (2.8 Liter) culture flasks in an environmental chamber. We then started testing the effectiveness of Mr. Bob Rigby's formula on controlling the red tide population. We transferred samples of the *Karenia brevis* populations to smaller Erlenmeyer flasks. The total liquid volume of the cultures in each of these smaller flasks was 100 mL. Initially we were only able to test the formula in concentrations of 50 parts per million or greater. At those concentration levels none of the *Karenia brevis* cells survived. We then purchased some additional micropipettes so we could lower the concentration levels of the formula to as low as 0.5 ppm. In our next series of tests we decided to dilute Mr. Rigby's formula by one-half. Under these conditions the formula had slight effects on reducing population numbers at concentration levels of 2-8 ppm. As we applied the same dose (concentration) of the formula daily over a period three days, we noticed that the formula greatly reduced or totally killed all of the population of Karenia brevis in our testing flasks. We tested and retested these results several times for confirmation. The half-concentration formula was consistently effective in eliminating the red tide population at 10-15 ppm. This means that the fully concentrated formula would be effective at 5-8 ppm. The important part of the experiment is that the "lethal dose" of the formula does not have to be given all at once, but we can build up to the lethal level through a series of applications.

VHS students, primarily from our marine science club along with a few other interested students, were involved in observing, performing our population counts, and in making our nutrient solutions for culturing the *Karenia brevis*. Additional students from some of our marine science classes were involved in the second phase of our testing.

The next phase of our testing did not involve *Karenia brevis*. We tested the effects of Mr. Rigby's formula on other marine organisms. At up to 15 parts per million of the half-strength formula there was no apparent lasting, harmful effects on three different species of saltwater damsel fish (blue damsels, yellow tails, and dominoes). The fish were observed for up to three weeks after the formula was added to their tanks. The fish were then placed in a larger community tank where there was no formula. These are common species of fish used by many marine aquaria hobbyists. We chose to use them for our investigation because, at the time, our local red tide had already greatly diminished local fish populations and stressed the remaining populations. The fish were purchased from a local pet store, Venice Pet Center. However, we also discovered that the fish could not tolerate the half-strength formula at a level of 30 ppm. When 15 ppm of the formula was added to an aquarium on two successive days, the damsels succumbed.

We also tested the formula on recently hatched Silversides (*Menidia beryllina*), a very common species of local fish found in the Gulf and in our estuaries, and on *Mysidopsis bahia*, (specifically the opossum shrimp

in this case). The larval stage of shrimp is called mysids (or a mysis). These were provided to us free by MARINCO Bioassay Laboratory in Sarasota, Florida. They are a company that specializes in aquaculture and testing the effects of environmental pollutants on aquatic organisms. Private individuals, companies, and governmental agencies contract them for their service. The Silversides and Mysids are organisms approved and recommended by the Environmental Protection Agency (our federal EPA) for testing the effects of environmental pollutants. They are like the "canary" for the coal mine.

In our first test with the formula on these young organisms everything died. However, we then realized that we had made an error by using the formula full strength instead of half-strength. Even though we used smaller amounts of the formula in ppm, it was inconsistent with what we had used earlier on the *Karenia brevis*. When we repeated the tests we got similar results with the Silversides, but all of the mysids survived. One Silverside fish did survive 24 hours at a level of 2 ppm of the half-strength formula. However, all of these tests were performed in a water volume of only 200 mL (0.2 L). We did test 0.5 ppm of the half-strength formula on a volume of 1.0 L containing Silverside fish. All of them survived. Our concern was that the small volume of water used in the testing could be the factor with the greatest influence on the results. If the fish swam through an area where the formula was concentrated, before the formula had time to diffuse evenly throughout the entire volume of water, then it might have a drastic effect on them. There was also concern that our micropipettes were not that differentiating at formula samplings below 1 ppm—amounts we had to use when working with smaller volumes of water. In fact, there appeared to be no visible difference in the amounts of formula added in the 0.2-0.8 ppm range when using our micropipettes. So we decided to test again before the end of the school year. This time we used water volumes of 1.0 Liters or greater in our tests (mostly 1 Liter). We were very careful to make sure of the exact volume and the amount of half-strength formula used in microliters (1 microliter equals 1 ppm in 1.0 Liters total volume). The results of these tests were completely different. All of the mysids survived at up to 15 ppm of the formula, as expected. All of the Silverside fish survived at up to 10 ppm. At 15 ppm we discovered that only about one third (1/3) of the Silversides survived beyond a few hours. It appeared as if most all of the fish that survived those first few hours at 15 ppm were still living five days later without any visible signs of harm. We did not test the fish at levels between 10 and 15 ppm, but it appears that the critical point for them is somewhere between these two concentration levels. We do not have time for any more testing this school year, but we do have plans to continue our testing and red tide research next school year. We hope to repeat all of our tests again for additional confirmation. We also need to check the longer term health effects of the formula on the Silversides and mysids and additionally check to see how it affects their reproductive potential.

The results so far indicate that the application of Mr. Rigby's formula at specific lower level concentrations may definitely have potential for controlling our red tides without disastrous effects to our environment and other organisms. However, more testing needs to be done before any conclusions can be made.

2005 – 2006 School Year

In our first tests of 2005-2006 we performed additional tests on young Silversides and Mysids. We were seeking more empirical data to support our findings from the end of the last school year. Our experiments have provided us with much information.

It appears that Mr. Rigby's formula loses some of its potency with time after being diluted. Although we cannot be 100 % certain of this statement, our results so far this year give us that indication. The diluted formula solution we used at the end of last year had been stored in a sealed container in a refrigerator for a few weeks. We now make up fresh diluted formula solutions with each test. We have also learned that mixing the formula with the test water before the fish or mysids are added will give different results (and more correct

results) than adding and mixing the formula to the test water already containing the fish or mysids. Using larger volumes of test water, 500 mL or greater, works better than smaller volumes of water.

In our first tests, testing the half-concentrated formula at 10 parts per million concentrations up to 15 ppm, all of the silversides died. The silversides in the control (no formula added) survived. All of the experimental mysids survived, but most of them died within 2-3 days. However, the diluted formula was mixed in the test water already containing the Silversides or mysids. Even though all the test water volumes were approximately 5 Liters, the fish or mysids evidently encountered areas of higher concentrations of the formula before it had time to totally diffuse throughout the total water volume. The fish and mysids are also very susceptible to infections caused my microorganisms. Microorganisms could have been introduced into the water with the food supply for the fish and mysids that is usually newly hatched brine shrimp (Artemia sp.). According to the scientists at MARINCO, brine shrimp usually have bacteria and other microorganisms on them that may cause harm to the Silversides and mysids. The brine shrimp have to be rinsed before adding them as a food source. On a side note, the brine shrimp were basically unaffected by the formula and continued to live and grow. One additional quick test was performed on one aquarium that contained Silversides that had been one of our control samples. After adding the diluted formula at a 10 ppm concentration, nine out of twenty fish survived and have survived for over three weeks as of the time of this report.

In our second round of tests for this year we went back to using 1-Liter beakers instead of aquariums. Each beaker contained exactly one Liter of salt water at the concentration of 20 parts per thousand of marine salts—the concentration needed for the newly hatched Silversides and mysids in brackish water. The diluted formula was added and mixed well with the water in the beakers using a magnetic stirrer. The concentrations of the formula tested were 0, 8, 10, 12, and 15 ppm. The fish and mysids are tested separately and were added to the beakers after the formula was completely mixed in the water. With this round of tests we have noted no mortality at all in the mysids at all concentration levels. They have now survived one week without any signs of ill-effects. All of the Silversides in the 15 ppm water died, although three of the twenty-seven Silversides survived a few hours and one of those survived about a day. However, all of the fish showed signs of stress from the very beginning of being exposed to the formula and it was obvious that they would probably not survive. The signs of stress are universally seen on all of the fish exposed to the formula, but progressively much less so at the lower concentrations. About one-third of the fish survived the 15 ppm in the last test we did at the end of last year. However, we did use a diluted formula solution that had been stored for a period of time.

In our 12 ppm test on the Silversides this year, over half of them (about 27 out of 43 originally) are still alive one week later. However, eight of them died the first day, six more the second day, one more the third day, and one more the fifth day. We try to do all of our tests with about the same number of organisms in each beaker, but the Silversides are very delicate and fragile in transferring and are difficult for our students to count in higher numbers because of their continual swimming and small size.

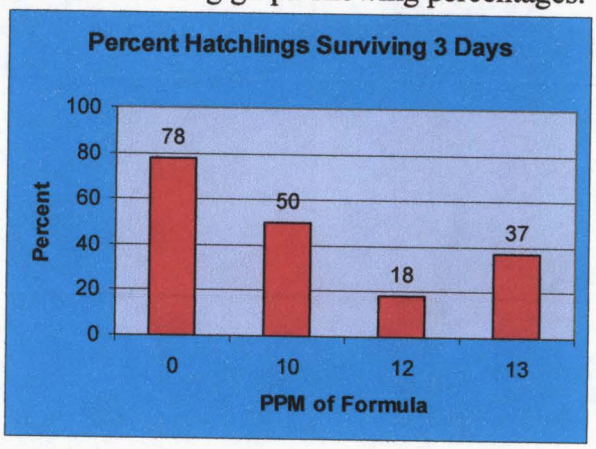
In the latest 10 ppm test, over half of the Silversides survived. One died the first day, six more the next day, and three more on the third day. Twelve out of twenty-two of these fish are still alive a week later. In the 8 ppm test over twenty of the fish are alive one week later. Of the 8 ppm fish, three died the first day, three on the second day, and one more died the third day. Our control (0 ppm, no formula) has fourteen fish still alive out of an original sixteen. One of those died the first day and one on the fifth day.

The results of our third series of tests with Mr. Rigby's formula this year are shown in the table below. These tests were performed only on the Silversides. The dead/alive population count numbers are not cumulative. They represent the additional dead and "remaining alive" population counts for each day.

Formula (1/2 dilute)	Day 1		Day 2		Day 3	
Concentration	Dead	Alive	Dead	Alive	Dead	Alive
10 ppm	30	43	3	40	0	40

10ppm	21	0	0	0	0	0
10 ppm	9	25	1	24	0	24
12 ppm	26	2	1	1	1	0
12 ppm	19	12	2	10	6	4
12 ppm	63	29	6	23	0	23
13 ppm	26	0	0	0	0	0
13 ppm	10	21	0	21	0	21
0 ppm (control)	11	40	0	40	0	40

These results are summarized in the following graph showing percentages.



The young hatchling fish were placed in water containing the formula concentrations shown in the table. This was done on Tuesday, October 18, 2005. We did not officially observe the Silversides beyond Friday, October 21, 2005, the third day after the original exposure to the formula. The weekend and Hurricane Wilma prevented us from observing them on a daily basis after the third day. However, it is interesting to note that after 10 days most of the fish that had survived to the third day after exposure to the formula were still alive, but all of the control fish had died.

A few of the population count numbers shown above are very close approximations. Some of our students had difficulty in counting the Silversides while they were alive and swimming. There were also a few students who were not as careful as they should have been in following procedure and placed too many of the Silversides into a beaker. The goal was to put twenty into each beaker. This series of tests was also the first time that we used a very fine mesh net to catch the Silversides and transfer them to a beaker. We knew that using a net could be a potential mortality risk factor because the fish are so delicate at that young age. The control fish were the only fish that were not netted. It was hoped that netting the fish would save us time in the transfer and give us more control over the number of fish transferred to each beaker. If the fish are netted carefully and transferred quickly, they should have a better chance of surviving the netting transfer. Some of the Silverside mortality numbers indicated in the table could have been caused by the shock of netting transfer. This is probably the case for those beakers where all of the fish died within the first day, because this did not happen in duplicate beakers. Note that most of the fish in one of the 13 ppm beakers lived beyond three days. Again, we have observed that most of the fish that survive beyond 48 hours after original exposure to Mr. Rigby's formula usually have very good chance of continuing survival.

With the results of all of our tests so far, there are indications that the 12 ppm – 13 ppm is close to the LC50 (the lowest concentration where 50 % survival is observed). It will still take further tests to confirm this. We work hard to eliminate other variables that can influence the results.

On December 20, 2005, a special demonstration was given in one of our science laboratory rooms at VHS. Special guests in attendance were the following: Jon Thaxton (Sarasota County Commissioner), Tom Moore (Charlotte County Commissioner), Christina Knight (representing US Senator Mel Martinez), someone representing a Sarasota City Commissioner, and other interested citizens. The purpose of the demonstration was to tell about our red tide research and to directly show the results of Mr. Rigby's formula on *Karenia brevis* and also on Silversides. Some beakers of the Silversides were set up about two hours in advance with Mr. Rigby's formula already added at concentration levels of 10 ppm and 12 ppm. The guests in attendance got see living *Karenia brevis* (taken directly from one of our culture flasks at that very moment) using our inverted microscope. They also were able to see that none could be found after adding 12 ppm of Mr. Rigby's formula to the culture flask. The guests were also able to see that most of the Silverside hatchlings showed little to no effects from the same concentration (12 ppm) of Mr. Rigby's formula being added to their container. This was also done in their presence as a "live" demonstration.

Nikolas Soulandros, a seventh grade middle school student from Pine View School in Osprey, Florida, a school only for students enrolled in the gifted program in Sarasota District Schools, recently completed a science fair research project involving the red tide organism, *Karenia brevis*. He investigated the effects of adding nutrient fertilizers, Miracle-Gro in this case, to red tide cultures. The correlation was to see if the addition of nutrients to our Gulf waters might trigger red tide blooms. Nikolas came to us for help and supervision. His hypothesis was stated as follows: "If a solution of Miracle Grow and water is added to three cultures of *Karenia brevis* at three different concentrations with two cultures of *Karenia brevis* as a control, then, the three cultures with Miracle Grow will have a higher algal population count than the cultures without any of the Miracle Grow solution." The "algal population count" in this case is directly referring to *Karenia brevis*. His data generally supported his hypothesis; however, there appeared to be an optimum amount of Miracle-Gro for the best results. Too much Miracle-Gro lowered the population count. The population of Karenia brevis clearly grew much faster with Miracle-Gro. His results are shown in the following data table.

	Flask #1	Flask #2	Flask #3	Flask #4	Flask #5
Algal Count 1	6,810,000	5,910,000	18,140,000	11,610,000	14,580,000
Algal Count 2	12,160,000	10,800,000	14,110,000	10,330,000	13,150,000
Average	9,485,000	8,355,000	16,125,000	10,970,000	13,865,000

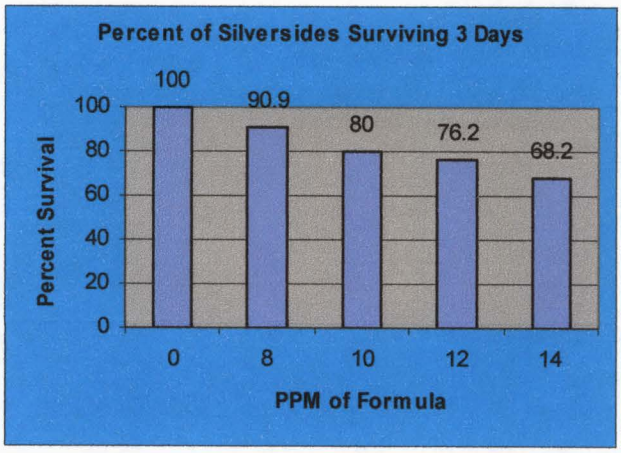
Flask #'s 1 & 2 were the controls. Flask #'s 3, 4, & 5 had increasing concentrations of the Miracle-Gro solution. In this case, an increasing number of drops of the Miracle-Gro solution were added to flasks 3, 4, & 5 respectively. The solution was made according to the manufacturer's specifications.

Congratulations to Nikolas Soulandros on winning the Regional Science Fair (February 2006) for his grade level in the field of microbiology!

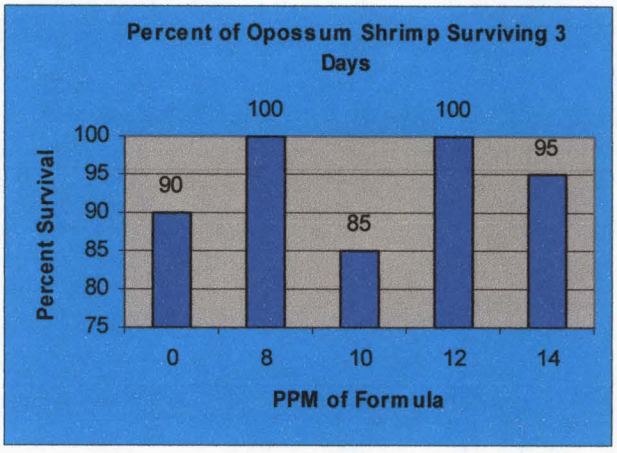
Our March, 2006, results of our research with Mr. Rigby's formula and the Silversides (*Menidia*) and Opossum Shrimp (*Mysidopsis*) can be seen in the tables and graphs shown below.

PPM of Formula	Percent of Silversides Surviving 3 Days
0	100
8	90.9
10	80

12	76.2
14	68.2



PPM of Formula	Percent of Opossum Shrimp Surviving 3 Days
0	90
8	100
10	85
12	100
14	95



The March 2006 results are different than the October 2005 results probably due to better handling/observing techniques used by the students in March. We believe the results from March are more correct than the October results because of other variables that were present in October (too many fish in a beaker, catching with a net, students using less care). The March results show that increasing the concentration of Mr. Rigby's formula on the Silversides means a lower survival rate. However, the majority still survive in the concentration range that will kill all of the *Karenia brevis*.

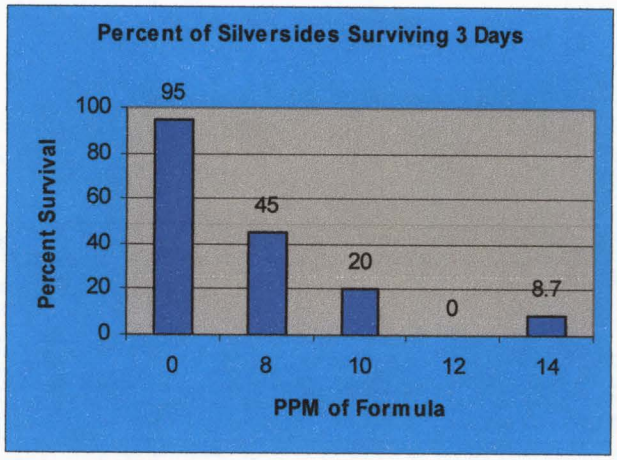
Once again, the formula appears to have very little or no affect on the opossum shrimp. There was basically close to 100 % survival rate with the opossum shrimp exposed to the formula at these concentration levels. Note that some of the control shrimp died. Some death is a natural occurrence and is to be expected.

Although we can and have observed the Silversides and opossum shrimp for periods of time longer than 3-4 days, other variables can enter the experiment after that period of time because students are not in school on weekends to observe the organisms and make counts. We have also discovered that most Silversides and opossum shrimp that die because of exposure to the formula will die within 2-3 days anyway (usually even sooner). It is expected that a few organisms will die of natural causes or other potential variables after a few days—just like in nature.

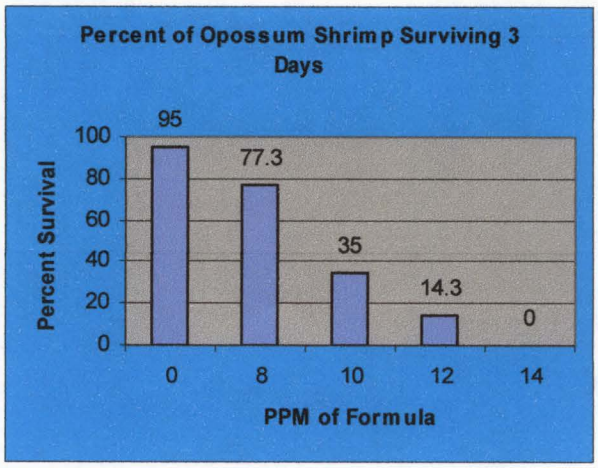
The initial test results for April, 2006 were somewhat surprising. There was a much higher death toll than expected. Two days after the initial set-up for the April testing the supervising teacher, Charles Powell, and a student aide repeated the testing with remarkably different test results. Although it is not known for sure what caused the significantly different test results, it is thought that the transfer and handling procedure used by the students in the initial tests may have had something to do with it. In both the initial and follow-up tests fresh formula was used and was mixed well with the one liter of 20 ppt saltwater in each beaker before the silversides or mysids were added. The transfer and handling of the silversides and mysids performed by the students was not supervised even though the addition and mixing of Mr. Rigby's formula was observed and supervised for accuracy. It is always our plan and intention to report the truth and not to conceal any test results, no matter whether those results are considered good or bad. The results of our initial and follow up test results for April, 2006 are shown below in data tables and graphs. The same control groups were used for both sets of tests.

Initial Tests April, 2006

Formula (1/2 dilute)	**Silverside Hatchlings Alive**			
Concentration in PPM	**Day 0**	**Day 1**	**Day 2**	**Day 3**
0	10	9	9	9
0	10	10	10	10
8	10	9	9	9
8	12	0	0	0
10	10	8	4	4
10	10	0	0	0
12	10	0	0	0
12	10	0	0	0
14	10	3	2	2
14	13	0	0	0

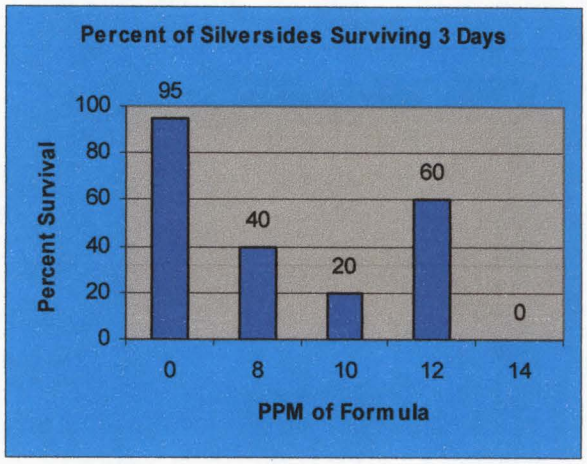


Formula (1/2 dilute)	Opossum Shrimp Alive			
Concentration in PPM	Day 0	Day 1	Day 2	Day 3
0	10	10	10	10
0	10	10	10	9
8	10	9	7	6
8	12	12	11	11
10	10	0	0	0
10	10	10	9	7
12	10	3	3	3
12	11	0	0	0
14	10	0	0	0
14	10	0	0	0

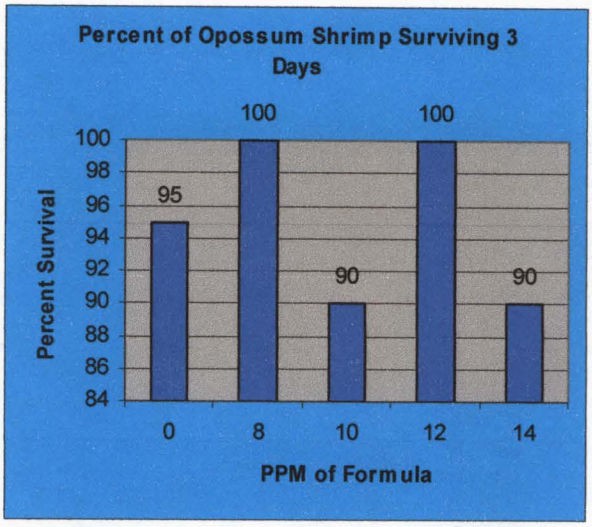


Follow-up Tests April, 2006

Formula (1/2 dilute)	Silverside Hatchlings Alive			
Concentration in PPM	Day 0	Day 1	Day 2	Day 3
8	10	4	4	4
10	10	3	2	2
12	10	6	6	6
14	10	0	0	0



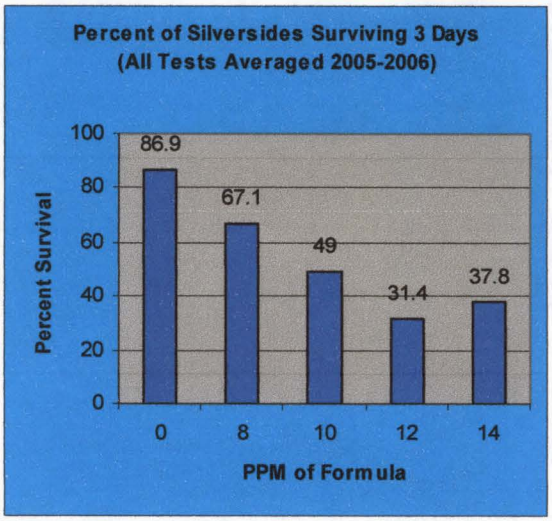
Formula (1/2 dilute)	Opossum Shrimp Alive			
Concentration in PPM	Day 0	Day 1	Day 2	Day 3
8	10	10	10	10
10	10	9	9	9
12	10	10	10	10
14	10	10	9	9



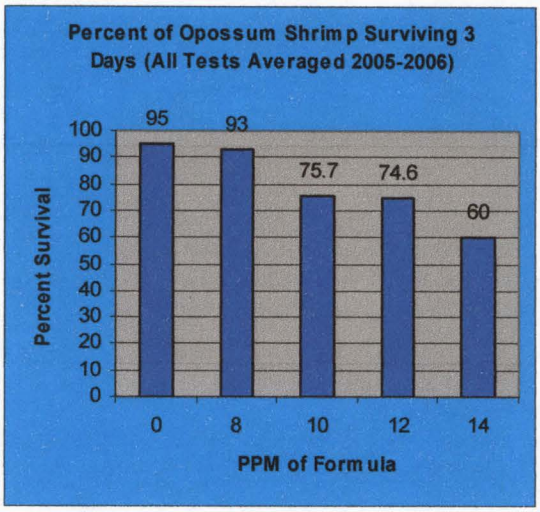
The combined results of all of our testing from last school year and this school year with Mr. Rigby's formula on the silversides and opossum shrimp are shown in the following tables and graphs. All of these tests were performed using the same standard procedures; however, there were some slight variations in the transfer and handling techniques among the different tests. The results do not show the 15 and 13 ppm tests that were performed because of the limited testing we performed at those levels.

Results of All Tests

PPM of Formula	Percent of Silversides Surviving 3 Days	Fraction
0	86.9	93/107
8	67.1	53/79
10	49	98/200
12	31.4	77/245
14	37.8	17/45



PPM of Formula	Percent of Opossum Shrimp Surviving 3 Days	Fraction
0	95	57/60
8	93	67/72
10	75.7	53/70
12	74.6	53/71
14	60	48/80



Our results indicate that the opossum shrimp tolerate Mr. Rigby's formula much better than the young silversides do. Our data indicates that the LC50 for the opossum shrimp is above 15 ppm for Mr. Rigby's formula. Several of our tests showed no significant loss of life in the opossum shrimp even when exposed to concentration levels of 14 ppm of the formula.

Looking at the combined results of all of our tests with Mr. Rigby's formula it appears that the LC50 for the silversides is 10 ppm. However, we still believe that it is really around 12 ppm. Varied results are noted between 12 and 14 ppm. Some silversides will die of natural causes anyway (note results of the controls) and they are so sensitive that some will die during handling and transfers. Although our tests show that it is possible to have some silversides survive when exposed to the formula at concentration levels of 14 and 15 ppm, the evidence from the majority of our tests does show that most of them will die at these concentration levels. It is important to note that all of the *Karenia brevis* can be killed at lower concentration levels of the formula.

We were not able to reach all of our research goals for this school year because of increased curricular requirements and standardized testing (ex. FCAT). However, the results we have obtained so far provide very valuable information.

2006 – 2007 School Year

The emphasis of our research this school year is centered primarily on repeating earlier tests we performed with Mr. Rigby's formula and our red tide cultures. However, some experimentation with the Silversides and Opossum Shrimp is also being repeated.

We have improved our techniques for testing and performing population counts. We have even developed some of our own techniques and modified some tools that have greatly helped us in our research. The fact that we are now able to grow more cultures of *Karenia brevis* at one time and in greater volumes with higher population counts is definitely aiding our research. Our cultures also last longer than they did during our

first year of research. A faster method for us to perform population counts on *Karenia brevis* has been developed without sacrificing accuracy. The tools and techniques we now use in handling the Silversides and Opossum Shrimp have reduced the possibility of population loss through handling.

To perform population counts on *Karenia brevis*, we now use a Flex-cam camera that is aligned with the one reticle grid ocular on our inverted microscope. The Flex-cam is also plugged into a computer. Our population counts are so high that no one would be able to count all of the individual cells in a culture. After making sure the cells are evenly distributed by gently swirling the flask culture of *Karenia brevis*, a one milliliter sample is extracted from the flask with a graduated pipette. Most of our culture flasks contain a volume of about 1 – 1.5 Liters of the Karenia brevis culture. The cells are then killed and stained with one drop of a special iodine solution. They would be impossible to count while alive and swimming. Nine milliliters of water are then added to the one milliliter of the stained culture so that it is diluted to 1/10 of its original volume. After mixing well, one milliliter of this 10-mL sample is then placed in a Corning clear well microplate with a lid and placed on the stage of the inverted microscope. The microplate is moved with precision back and forth and from top to bottom along the microscope stage so that all of the *Karenia brevis* cells can be viewed and counted. The reticle grid ocular enables us to get accurate counts because we count only the cells that appear in the grid and it also keeps us from counting the same cells more than one time. Each time the microplate is moved, a picture is taken using the Flex-cam and its associated computer software. It requires about 40-42 individual photographs to make a complete count of the 1-mL sample found in one well of the microplate. These photographs are then printed on paper. The counts are performed by trained students in our marine science classes. Students are divided into groups and are responsible for counting the number of *Karenia brevis* cells shown on 5-6 different pages of photographs. These counts are then totaled. Groups of students from other classes provide confirmation of numbers. Averages are used, but the numbers usually agree within a reasonable range (usually less than 5 % variation). It takes about 1 ½ - 2 hours to set up the sample for counting and then to take all of the pictures. It then takes only about 20 minutes to get an accurate population count using trained student groups. Many more students are involved by using this method and it is faster than the original way we performed population counts. Since the sample was only one milliliter of the original culture and it was diluted to 1/10 its original volume before counting, we know that the original culture contains 10,000 times the sample population count for every one Liter of culture. This sampling, counting, and calculating method has worked very well for us. Some of the population counts of our *Karenia brevis* cultures have been very close to 50,000,000 cells/Liter. Our curricular requirements do not allow us to perform population counts more than one time during a one-week period and we do not perform counts every week. We take population counts right before testing known concentrations of Mr. Rigby's formula on an entire culture flask of *Karenia brevis*. We no longer divide the culture into several smaller flasks for testing. After adding precise, known amounts of the formula to a culture flask, the population is observed and checked daily, but no official counts are made. More formula is added on a daily basis as needed to bring the population count down to zero, or at least a safe level. The count we look for is five or fewer living (swimming) cells per milliliter which equates to 5,000 or fewer cells per Liter without any dilution of the living culture. The amount of formula (specific known concentration) that was effective on that population is then known. ***See photographs on this web site.**

The modification of a simple tool has helped us reduce the risk of injury and trauma to the delicate Silversides and Opossum Shrimp during transfer to the test beakers. We just cut off the narrow, pointed ends of our soft, pliable plastic laboratory pipettes. Then they are ideal for capturing and transferring these specimens to the 1-Liter beakers containing known concentrations of Mr. Rigby's formula. The fish and shrimp are transferred with smaller volumes of their original water. For the most accurate test results, the least amount of the original water added to the test beakers is desired. The handling and transferring of the fish and shrimp by this method means there is less chance of a negative influence on our population count numbers. The specimens have a better chance of survival.

We are very pleased with the amount of research that we have completed so far this school year. The research has been fascinating, but there have been frustrations too. The fascination is in the research itself, the knowledge we have gained, and the amount we have accomplished. The frustrations have occurred in trying to make some predictions that did not always come true.

It was interesting to observe a sample of a living culture of *Karenia brevis* through the inverted microscope and then to add a small micro-droplet of Mr. Rigby's formula to the sample. The cells would be swimming around rapidly and then die instantaneously as the formula diffused and reached the place where they were swimming.

The results of this year's tests with the formula on populations of *Karenia brevis* may seem to contradict the results of our first year's tests. However, we do not believe that the results of our first tests are erroneous. This year we have been dealing with much larger volumes of living *Karenia brevis* that had much larger population counts than what we were working with during our first year of research. So far, our results from this year indicate that it takes higher concentrations of the formula to kill larger population concentrations of *Karenia brevis*. At times we were able to predict the amount and concentration of formula needed to kill the population (or render it safe), but there were also times that we were not able to predict the amount. Sometimes it took far more formula than we anticipated. All of our results indicate that the formula and its effectiveness will dissipate with time after it is mixed with water (or a culture). It appears that a lethal or near lethal initial dose of the formula on the *Karenia brevis* works best, but that it is possible to build up to the total amount of the lethal dose by increments over a few days. Many other hypotheses could easily be developed from the results of our research. It would be good to have the time to test some of these in the future.

There are a couple of things we are quite curious about and hope to discover the answers. Is there a way to predict the correct amount of formula to use based on the population count? Is there a minimal lethal dose of the formula that would kill a population of *Karenia brevis*, no matter how high the population count? These are questions with great challenges that are worth pursuing. However, we may be unable to obtain the highest population counts of *Karenia brevis* in our laboratory setting that are sometimes achieved by nature in the Gulf of Mexico. Our testing will continue.

Our most recent test results tend to indicate that the amount of formula needed to control a red tide outbreak having a very high population count might substantially exceed the safe amount of formula that would ensure the survival of the Silversides and Opossum Shrimp. However, these organisms approved for EPA testing are found normally in estuaries—the hatching and nursery grounds for great numbers of aquatic marine species. Unfortunately, rivers and estuaries are where most chemical pollutants enter the aquatic environment before being carried out into the ocean (or Gulf in this case). That is why these delicate organisms (Silversides and Opossum Shrimp) are approved for EPA testing. The outbreaks of red tide originate many miles out in the Gulf of Mexico and then are carried toward shore primarily by currents and to a lesser degree by tides and waves. The Gulf may be a safe place to use the formula in higher concentrations without harming our shore and in-shore organisms. Additionally, if the population is discovered and treated early in its bloom, then much less formula would probably be needed to control it. However, any of these statements about the use of this formula, either for or against, may be considered premature at this point. Our goal is to learn by experimenting, to discover the truth, and then report the truth of our discoveries.

Our recent test results with the formula on red tide populations are shown below in a table.

Karenia brevis Population Counts and Amounts of Formula Used

Date	Observations	ppm
9/9/2006	Culture Started	-
9/27/2006	8,710,000 cells/Liter population count	10
9/28/2006	less than 5 cells/mL (5,000 cells/Liter) seen alive; only 1 swimming normally	-

9/27/2006	Culture Started	-
10/11/2006	49,47,500 cells/Liter	12
10/12/2006	It appeared that over half of the *Karenia brevis* was dead.	3
10/13/2006	It appeared that one-fourth to one-third of the Karenia brevis was still alive.	5
10/14/2006	Substantial population reduction.	5
10/15/2006	About the same as the day before.	5
10/16/2006	About the same as the day before.	5
10/17/2006	About the same as the day before.	5
10/18/2006	There appeared to be some population reduction.	5
10/19/2006	Not much change.	5
10/20/2006	Not much change.	10
10/21/2006	No observations made.	-
10/22/2006	No observations made.	-
10/23/2006	Population increased again after no formula was added on the weekend.	15
10/24/2006	There was a population reduction, but there is still a viable population.	15
10/25/2006	Population appeared more abundant once again.	15
10/26/2006	Small population still alive.	15
10/27/2006	More population reduction, but still alive and sufficient.	15
10/28/2006	Mostly dead population. Very small living population.	15
10/29/2006	No observations made.	-
10/30/2006	Everything dead--nothing seen alive.	-
	Total ppm of formula added for all days =	150
early Sept.	Culture Started	-
10/2/2006	43,430,000 cells/Liter	10
10/3/2006	Population reduced in number but still alive.	2
10/4/2006	More reduction, but still alive.	3
10/5/2006	More reduction, but still alive.	3
10/6/2006	More reduction, but still alive.	2
10/7/2006	More reduction, but still alive.	3
10/8/2006	More reduction, but still alive.	2
10/9/2006	Population dead.	5
	Total ppm for all days =	30
10/2/2006	Culture Started	-
10/24/2006	28,390,000 cells/Liter	15
10/25/2006	Still fairly abundant population.	15
10/26/2006	Substantial number dead. Still viable population.	15
10/27/2006	Small population, but sufficient.	15
10/28/2006	Mostly dead. Very small living population.	15
10/29/2006	No observations made.	-
10/30/2006	Population effectively dead, although a couple of living K.b. was viewed.	-
	Total ppm for all days =	75
10/9/2006	Culture Started	-

10/30/2006	23,795,000 cells/Liter	30
10/31/2006	Population effectively dead. However, 3 or 4 K.b. seen swimming slowly. A few smaller, unidentified microorganisms were seen swimming around.	20
11/1/2006	There are still a few K.b. swimming, but slowly. Still see unidentified microorganisms swimming. They appear to have flagella.	30
11/2/2006	Only one K.b. was seen alive. It was swimming slowly and not in a normal manner. Other microorganisms still viewed, but fewer in number.	-
	Total ppm for all days =	80
10/13/2006	Culture Started	-
11/7/2006	36,645,000 cells/Liter	30
11/8/2006	Population greatly reduced; probably still a few hundred cells/mL left alive.	30
11/9/2006	No K.b. seen alive. Other microorganisms viewed (appear flagellated).	-
	Total ppm for all days =	60
9/27/2006	Culture Started	-
11/13/2006	44,850,000 cells/Liter	45
11/14/2006	No K.b. left alive. A few cell remnants seen. Unidentified organisms seen.	-
	Total ppm for all days =	45
11/3/2006	Culture Started	-
11/29/2006	40,210,000 cells/Liter	40
11/30/2006	Population numbers greatly reduced. Many dead K.b., but viable population.	10
12/1/2006	Surprisingly, substantial population of K.b. still alive.	20
12/2/2006	Population much less than previous two days, but still viable.	20
12/3/2006	K.b. population effectively dead. Less than 5 K.b. cells seen alive in 1 mL volume. Substantial number of other microorganisms seen alive.	-
	Total ppm for all days =	90
10/20/2006	Culture Started	-
12/6/2006	37,140,000 cells/Liter	40
12/7/2006	Population definitely reduced, but still quite substantial living numbers.	20
12/8/2006	No apparent reduction; still prolific population.	30
12/9/2006	Possibly a slight population reduction, but still good numbers of K.b. alive.	45
12/10/2006	Very significant reduction; only a few dozen/mL swimming slowly.	15
12/11/2006	A little more reduction; 1-2 dozen seen alive, but swimming slowly.	20
12/12/2006	Finally, nothing seen remaining alive.	-
	Total ppm for all days =	170
2/3/2007	Culture Started	-
3/16/2007	58,965,000 cells/Liter	40
3/17/2007	Greatly reduced numbers; sparse; few dozen/mL alive instead of 1000's	10
3/18/2007	K.b. population effectively dead. Only 1-2 K.b. cells/mL still seen alive and swimming sluggishly. Other microorganisms seen alive.	-

	Total ppm for all days =	50
3/15/2007	Culture Started	-
4/12/2007	34,885,000 cells/Liter 55 ppm added to 1.375 L =	40
4/13/2007	Population mostly dead; maybe a few dozen/mL left alive but swimming sluggishly. Some smaller microorganisms seen alive (as before).	10
4/14/2007	It appears that there may be slightly fewer K.b. than the previous day but there are still a few dozen/mL left alive. Other microorganisms still alive as well.	20
4/15/2007	Population numbers effectively diminished; approx. a half dozen/mL remaining alive, but swimming very slowly. Other smaller microorganisms still seen alive.	10
4/16/2007	Eight live K.b. cells were counted in 1mL of culture, but swimming very slowly. Significant number of other microorganisms seen alive.	20
4/17/2007	None remain alive; although population probably effectively dead two days earlier after a total of 70 ppm were added	-
	Total ppm for all days =	100
3/9/2007	Culture Started	-
5/2/2007	42,540,000 cells/Liter 76 ppm added to 1.520 L culture =	50
5/3/2007	Large number of dead cells seen; significant number of K.b. cells still alive	20
5/4/2007	Population effectively dead; only about a half dozen K.b. cells still alive per mL. However, a significant number of other unidentified microbes are still alive.	-
	Total ppm for all days =	70
4/6/2007	Culture Started	-
5/8/2007	38,280,000 cells/Liter 86 ppm added to 1.720 L culture =	50
5/9/2007	Only 2 K.b. cells seen alive in 1 mL and swimming slowly; other smaller, unidentified microorganisms still seen alive. K.b. effectively dead.	-
	Total ppm for all days =	50

It should be noted that there were some unidentified plankton species that survived when *Karenia brevis* did not.

More tests were performed on the Silversides and Opossum Shrimp. Even one year ago we thought that the LC50 for the Silversides was about 12 ppm of Mr. Rigby's formula instead of the 10 ppm that some of our results had shown. We believe this is due to poorer handling techniques by students in our early tests. The techniques have improved and the results now tend to indicate that we may be correct in predicting that the LC50 for the Silversides is 12 ppm of the formula. The LC50 for the Opossum Shrimp appears to be over 15 ppm of the formula. We have not performed chronic testing (long term effects) of the formula on these organisms or any tests on their reproduction after exposure to the formula. All tests have been acute tests with the living specimens surviving in a 1-Liter test beaker containing a one-time mixing of a known concentration of the formula. This year's test results are shown below in tables. Additional tables and graphs show the cumulative results of all of our years of testing.

Formula Testing on Silversides – October 2006

Group #	Names	Period	ppm	Day 0	Day 1	Day 2	Day 3
1	Fox, Duffy, Kadar	2	8	13	13	13	13
2	Montisano, Wildasin, Shock, Sturton	2	12	10	3	2	2
3	Rogers, Goff, Spicer	4	8	9	9	8	7
4	Carter, Rossitto, Ponomarenko,	4	8	10	5	5	4
5	Lawless, Mosko, Sanders, Rajan	2	10	11	9	9	7
6	Kopp, Conner, Nelson	4	14	10	10	10	10
7	Ellingsen, Deegan, Kling, Schlenger	2	12	10	4	3	3
8	Drury, Melchin, Ojeda, Waltman	2	8	10	5	5	4
9	Collier, Jones, Hertel, Cangelosi	4	14	10	5	2	2
10	Reinert, Hayes, Wagner, McGrain	2	10	11	10	10	9
11	Esliger - Control	4	0	10	9	9	9
12	Maxwell, Best, Evans, Morrell	2	14	8	3	2	2
13	Romanski, Stahura, Mann	4	12	10	10	10	10
14	Young, Hotz, Florea, Johnson, Porter	4	10	10	10	10	10
15	Vasilevskiy, White, Costanzo	4	12	13	4	4	4
16	Esliger - Control	4	0	10	10	10	10

Totals	0	20	19	19	19
	8	42	32	31	28
	10	32	29	29	26
	12	43	21	19	19
	14	28	18	14	14
Grand	Total	165	119	112	106

%	0	100	95	95	95
	8	100	76.19	73.81	66.67
	10	100	90.63	90.63	81.25
	12	100	48.84	44.19	44.19
	14	100	64.29	50	50
	Total	100	72.12	67.88	64.24

Formula Testing on Silversides and Opossum Shrimp – November 2006

	Silversides						
Group #	Names	Period	ppm	Day 0	Day 1	Day 2	Day 3
1	Fox, Duffy, Kadar	2	12	10	3	3	2
2	Montisano, Wildasin, Shock, Sturton	2	12	10	9	9	9
3	Rogers, Goff, Spicer	4	14	7	2	1	1
4	Carter, Rossitto, Ponomarenko,	4	14	15	2	2	2

5	Lawless, Mosko, Sanders, Rajan	2		12		11	11	11	10
6	Kopp, Conner, Nelson	4		14		10	3	3	3
7	Ellingsen, Deegan, Kling, Schlenger	2		12		10	0	0	0
8	Drury, Melchin, Ojeda, Waltman	2		12		10	7	6	6
9	Collier, Jones, Hertel, Cangelosi	4		14		12	0	0	
10	Reinert, Hayes, Wagner, McGrain	2		12		12	12	11	10
11	Esliger - Control	4		0		11	11	11	11
12	Maxwell, Best, Evans, Morrell	2		12		10	1	1	1
13	Romanski, Stahura, Mann	4		14		11	5	4	4
14	Young, Hotz, Florea, Johnson, Porter	4		14		11	6	5	5
15	Vasilevskiy, White, Costanzo	4		14		19	0	0	0

	Opossum Shrimp								
Group #	Names	Period		ppm		Day 0	Day 1	Day 2	Day 3
1	Fox, Duffy, Kadar	2		12		10	10	10	10
2	Montisano, Wildasin, Shock, Sturton	2		12		10	10	10	10
3	Rogers, Goff, Spicer	4		14		10	4	3	2
4	Carter, Rossitto, Ponomarenko,	4		14		10	10	10	10
5	Lawless, Mosko, Sanders, Rajan	2		12		12	12	12	9
6	Kopp, Conner, Nelson	4		14		10	9	9	9
7	Ellingsen, Deegan, Kling, Schlenger	2		12		10	10	10	10
8	Drury, Melchin, Ojeda, Waltman	2		12		10	10	10	10
9	Collier, Jones, Hertel, Cangelosi	4		14		X	X	X	X
10	Reinert, Hayes, Wagner, McGrain	2		12		10	10	10	10
11	Esliger - Control	4		0		10	9	9	9
12	Maxwell, Best, Evans, Morrell	2		12		10	10	10	9
13	Romanski, Stahura, Mann	4		14		X	X	X	X
14	Young, Hotz, Florea, Johnson, Porter	4		14		10	10	8	8
15	Vasilevskiy, White, Costanzo	4		14		X	X	X	X

						Day 0	Day 1	Day 2	Day 3
	Silversides @ 12 ppm of formula					73	43	41	38
	Percent Silversides Alive					100.00%	58.90%	56.16%	52.05%

						Day 0	Day 1	Day 2	Day 3
	Opossum Shrimp @ 12 ppm					72	72	72	68
	Percent Opossum Shrimp Alive					100.00%	100.00%	100.00%	94.44%

						Day 0	Day 1	Day 2	Day 3
	Silversides @ 14 ppm of formula					85	18	15	15
	Percent Silversides Alive					100.00%	21.18%	17.65%	17.65%

						Day 0	Day 1	Day 2	Day 3
	Opossum Shrimp @ 14 ppm					40	33	30	29
	Percent Opossum Shrimp Alive					100.00%	82.50%	75.00%	72.50%

	Control Silversides					100.00%	100.00%	100.00%	100.00%
	Control Shrimp					90.00%	90.00%	90.00%	90.00%

Based upon the results of earlier tests with the formula on the Silversides and Opossum Shrimp, the results in the last half of this school year were surprising. However, the tests in April were very close to what might have been predicted. The results of three more series of tests are shown below.

Formula Testing on Silversides and Opossum Shrimp – February 2007

Group #	Names **FEBRUARY 2007 SILVERSIDES 12 PPM**	Period	Day 0	Day 1	Day 2	Day 3	
2	Criola, Allen, Holland, Sheehan	2	10	0	0	0	
6	Layne, Miller, Miller, Darr	2	10	0	0	0	
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	0	0	0	
8	Pez, Prohaska, Adami, Vittori	2	14	0	0	0	
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	10	0	0	0	
M2	Sall, Trautman, Thomas, **CONTROL (0 ppm)**	2	10	10	8	8	
4	McIntosh, Poinsett, Jacobs, Cooney	4	10	0	0	0	
9	Gudnason, Kirk, Johnson, Clarke	4	11	0	0	0	
11	McNeeley, Grimes, Crowe, Damiano **CONTROL (0 ppm)**	4	8	8	8	8	
12	Nichols, Maieli, Millwater	4	10	0	0	0	
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	10	0	0	0	
M1	Esliger, May, Boyd, Juani	4	10	0	0	0	
	Silversides Results February 2007						**Percent**
	CONTROL TOTALS		18	18	16	16	88.89
	12 PPM EXPERIMENTAL TOTALS		105	0	0	0	0
	OPOSSUM SHRIMP Results February 2007 12 PPM						
Group #	Names	Period	Day 0	Day 1	Day 2	Day 3	
2	Criola, Allen, Holland, Sheehan	2	10	4	4	1	
6	Layne, Miller, Miller, Darr	2	10	10	9	5	
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	10	8	0	
8	Pez, Prohaska, Adami, Vittori	2	10	10	9	8	
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	13	13	7	4	
M2	Sall, Trautman, Thomas,	2	10	9	9	6	
4	McIntosh, Poinsett, Jacobs, Cooney	4	11	5	3	?	
9	Gudnason, Kirk, Johnson, Clarke	4	10	5	0	0	
11	McNeeley, Grimes, Crowe, Damiano **CONTROL (0**	4	10	10	10	10	

	ppm)						
12	Nichols, Maieli, Millwater	4	10	3	0	0	
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	10	8	4	0	
M1	Esliger, May, Boyd, Juani	4	10	7	0	0	
	? = data not reported and not used in final percent						**Percent**
	CONTROL TOTALS		10	10	10	10	100
	12 PPM EXPERIMENTAL TOTALS		114	84	53	24	23.3

Formula Testing on Silversides and Opossum Shrimp – April 2007

Aquarium #	Names **APRIL 2007 SILVERSIDES 10 PPM**	Period	Day 0	Day 1	Day 2	Day 3
2	Criola, Allen, Holland, Sheehan	2	10	6	6	6
6	Layne, Miller, Miller, Darr	2	10	10	8	7
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	0	0	0
8	Pez, Prohaska, Adami, Vittori	2	10	9	7	7
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	10	8	8	8
M2	Sall, Trautman, Thomas,	2	10	7	7	5
4	McIntosh, Poinsett, Jacobs, Cooney	4	10	0	0	0
9	Gudnason, Kirk, Johnson, Clarke	4	10	8	7	4
11	McNeeley, Grimes, Crowe, Damiano	4	10	0	0	0
12	Nichols, Maieli, Millwater	4	-	-	-	-
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	12	5	5	5
M1	Esliger, May, Boyd, Juani	4	10	10	9	9
	Silversides Control		10	10	10	10
	10 PPM EXPERIMENTAL	TOTAL	112	63	57	51
		%	100	56.25	50.89	45.54
	OPOSSUM SHRIMP RESULTS 10 PPM					
2	Criola, Allen, Holland, Sheehan	2	10	10	10	10
6	Layne, Miller, Miller, Darr	2	10	10	10	5
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	0	0	0
8	Pez, Prohaska, Adami, Vittori	2	10	10	9	8
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	10	10	10	5
M2	Sall, Trautman, Thomas,	2	11	11	11	10
4	McIntosh, Poinsett, Jacobs, Cooney	4	12	12	11	8
9	Gudnason, Kirk, Johnson, Clarke	4	10	10	10	10
11	McNeeley, Grimes, Crowe, Damiano	4	10	9	5	1
12	Nichols, Maieli, Millwater	4	10	6	3	1
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	10	10	10	10
M1	Esliger, May, Boyd, Juani	4	10	10	6	4
	Opossum Shrimp Control		10	10	10	10
	10 PPM EXPERIMENTAL	TOTAL	123	108	95	72
		%	100	87.80	77.24	58.54

Formula Testing on Silversides and Opossum Shrimp – May 2007

Aquarium #	Names **MAY 2007 SILVERSIDES 10PPM**	Period	Day 0	Day 1	Day 2	Day 3

2	Criola, Allen, Sheehan	2	10	0	0	0
6	Layne, Miller, Miller, Darr	2	10	0	0	0
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	0	0	0
8	Pez, Prohaska, Adami, Vittori	2	11	0	0	0
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	10	0	0	0
M2	Sall, Trautman, Thomas,	2	10	0	0	0
4	McIntosh, Poinsett, Jacobs, Cooney	4	10	0	0	0
9	Gudnason, Kirk, Johnson, Clarke	4	10	1	1	1
11	McNeeley, Grimes	4	10	0	0	0
12	Nichols, Maieli, Millwater	4	10	0	0	0
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	13	0	0	0
M1	Esliger, May, Boyd, Juani	4	10	0	0	0
	Silversides Control		10	10	10	10
	10 PPM EXPERIMENTAL	TOTAL	124	1	1	1
		%	100	0.81	0.81	0.81
2	Criola, Allen, Holland, Sheehan **OPOSSUM SHRIMP**	2	10	0	0	0
6	Layne, Miller, Miller, Darr	2	10	10	9	6
7	Trentalange, Coppens, Merchant, Ponomarenko, Martens	2	10	6	1	0
8	Pez, Prohaska, Adami, Vittori	2	10	8	8	1
L2	Waldron, Czuprynski, Nixon, Goodman, Olsen, Tarpley	2	0	0	0	0
M2	Sall, Trautman, Thomas,	2	10	10	10	6
4	McIntosh, Poinsett, Jacobs, Cooney	4	10	9	9	6
9	Gudnason, Kirk, Johnson, Clarke	4	10	6	5	3
11	McNeeley, Grimes	4	10	10	9	3
12	Nichols, Maieli, Millwater	4	10	7	6	3
L1	Duke, Sheremet, McBreen, Wood, Jimenez, Damasco	4	10	10	10	7
M1	Esliger, May, Boyd, Juani	4	10	6	6	4
	Opossum Shrimp Control		10	10	9	9
	10 PPM EXPERIMENTAL	TOTAL	110	82	73	39
		%	100	74.55	66.36	35.45

It is not easy to determine possible explanations for the different experimental results with the Silversides and Opossum Shrimp from one set of trials to the next. The Silversides and Opossum Shrimp tolerated significantly higher concentrations of the formula in some trials compared to other trials conducted in the same way. The last half of this school year we were using formula that had been stored in its original container before dilution and testing. In all other tests before this time, the formula had been stored in different sealed containers before dilution and testing. The formula used in 2007 may have been slightly more concentrated because it was stored in the original container, although the same concentration of the original formula has always been used. The formula does lose strength with time, especially after it is diluted with water.

The Silversides and Opossum Shrimp are also very delicate and there could be other variables causing our results in addition to the formula. Even when these organisms are handled properly, slight differences in the temperature and salinity of the experimental water can create additional stress on them. If students do not wipe off the tip of the pipette before adding the formula to the water, then the water will contain a slightly greater

concentration of the formula. This formula is definitely harmful to these organisms in higher concentrations. However, the Silversides and Opossum Shrimp may be able to tolerate slightly higher concentrations than those indicated by the average results over the last three years.

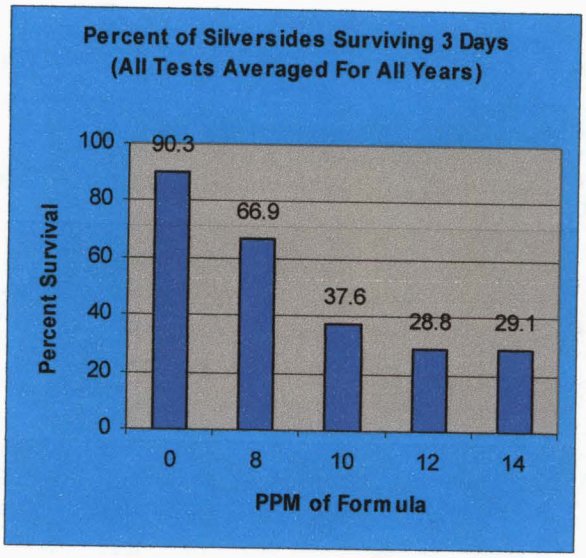
It is somewhat easier to offer potential explanations as to why there are differences in the amounts of formula needed to kill Karenia brevis. It is obvious that it requires more formula to kill larger populations of Karenia brevis than it does to kill smaller population counts. For differences that are sometimes seen in similar population counts, it could depend on the phase of growth of the population. If the population had already reached its peak and had begun the "death phase," it would be easier to kill. If the population was still in the "growth phase," it would probably be more difficult to kill. Some flasks of Karenia brevis cultures received additional nutrients after a period of time to keep them going until testing could begin. If this was done, it was usually done after some of the culture was removed to start a new flask culture. Additionally, Karenia brevis cultures that receive a near-lethal dose of the formula from the beginning of testing will usually require less of the total amount of formula to kill them. Those cultures receiving lower doses over a period of time would have time to rebound (recover). It is important to determine that lethal or near-lethal dose. We may be very close to that answer.

We accomplished much in our research this school year in spite of restraints from time and the required curriculum. This was the best year we have had in growing and propagating the Karenia brevis cultures. Although testing results were varied, we feel we are much closer to answers.

None of our results over the last three years have been withheld. The true and complete results of all of our testing is stated and shown here. A summary of our testing results on the Silversides and Opossum Shrimp for the last three years is shown in the tables and graphs that follow.

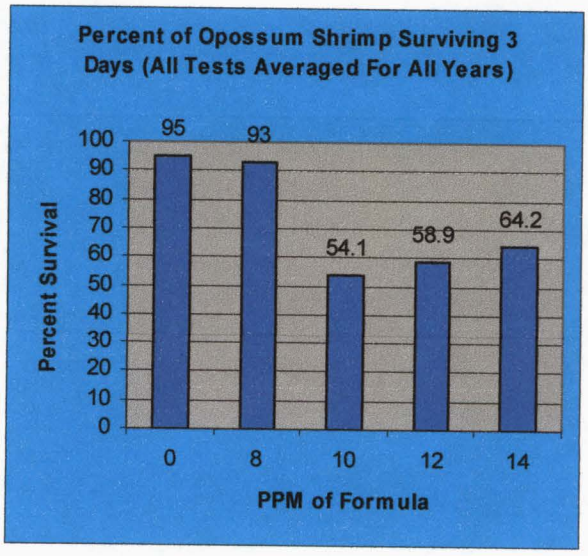
Summary of All Test Results for All Years (Aug. '04 – May '07)

PPM of Formula	Percent of Silversides Surviving 3 Days	Fraction
0	90.3	159/176
8	66.9	81/121
10	37.6	176/468
12	28.8	134/466
14	29.1	46/158



Summary of All Test Results for All Years (Aug. '04 – May '07)

PPM of Formula	Percent of Opossum Shrimp Surviving 3 Days	Fraction
0	95	95/100
8	93	67/72
10	54.1	164/303
12	58.9	145/246
14	64.2	77/120



Personal Note: In the year 2000, after thirty years of teaching at my alma mater (Venice High School), I decided to sign up for the Deferred Retirement Option Plan (DROP). This was a decision that I thought was

best for me and my family. I do not regret that decision. At that time the DROP would only allow me to teach five more years. During those five years the State of Florida passed legislation to allow up to three additional extension years of DROP. The decisions about extensions are the responsibility of the Superintendent's of each individual school district. I received two years of DROP extensions. Our school district is no longer offering DROP extensions to anyone and now I must retire. State legislation now allows us to retire for 30 days and be rehired for teaching in the classroom without losing our retirement or DROP sum of money. I do plan to reapply. I still have a great desire to teach and I believe that I still have a lot to give in trying to make a positive difference in the lives of others. I would like to continue my teaching career at Venice High School for several more years. However, as of this writing, there are no current science teacher positions available at VHS because of a projected decline in enrollment. If I do not return to VHS, it is doubtful that this red tide research will continue. If I do return, I expect to continue with our red tide research and future results will be posted on this website.

I have really enjoyed my thirty-seven years of teaching at Venice High School. There are many wonderful memories. It has been a great experience for me to direct our red tide research for the last three years. It was good to have students involved in genuine "hands-on" scientific research and in something that could make a real difference in their lives. It was an experience that I am sure all of them will remember.

I believe that it is important to continue to monitor our red tide outbreaks and to study them. However, I believe that it is equally important to try to do something to solve the problem. Red tides are now ecologically and economically ruining the Gulf Coast states and there are other kinds of red tides causing great problems around the world. We need to do something. Mr. Rigby's formula may have potential if used in the right way. We must find answers and solve the problem of red tides. I hope that I will have the opportunity to continue the research and work with students to help find those answers.

Charlie Powell
Venice High School
Science Department Chairperson

Please see recognitions given below.

This research project has been a great learning experience for our students who have been involved in it. It has also been an opportunity that has proven to be very positive for Venice High School. **United States Senator Mel Martinez** sent us a letter dated November 20, 2006, recognizing and commending our work in red tide research. We thank him for this honor. Many thanks to **Mr. Bob Rigby**, the **FWRI**, and **MARINCO Bioassay Laboratory** for all of their help and assistance in this project and to **City of Venice**, **Purmort & Martin Insurance Agency, Inc.**, **Standing Watch** (the largest boater's coalition/advocacy organization for Florida), and the **START** organization (**Solutions To Avoid Red Tide, Inc.** – esp. **Manasota Chapter**) for their financial assistance. We also thank our community and the local media for your encouraging support. Special thanks to all of our students who have participated in this project and to those who may be working in our continuing research.

STATE OF FLORIDA

OFFICE OF THE GOVERNOR
EXECUTIVE ORDER NUMBER 18-221

(Emergency Management – Red Tide)

WHEREAS, in the month of November 2017, a red tide algae bloom developed in the Gulf of Mexico off the coast of Southwest Florida; and

WHEREAS, red tide events typically subside before or during summer, this event has continued throughout the year and has intensified and is currently in its tenth month; and

WHEREAS, the red tide bloom has persisted inshore and has impacted several counties; and

WHEREAS, the duration and intensity of the current red tide is something that Florida has not experienced since 2006; and

WHEREAS, red tide is a naturally-occurring microscopic alga that has been documented along Florida's Gulf Coast since the 1840s and occurs nearly every year. Blooms, or higher-than-normal concentrations, of the Florida red tide alga, *Karenia brevis*, frequently occur in the Gulf of Mexico; and

WHEREAS, red tides produce toxic chemicals that can affect both marine organisms and humans. The Florida red tide organism, *K. brevis*, produces brevetoxins that can affect the central nervous system of fish and other vertebrates, causing these animals to die. Wave action can break open *K. brevis* cells and release these toxins into the air, leading to respiratory irritation. For people with severe or chronic respiratory conditions, such as emphysema or asthma, red tide can cause serious illness; and

WHEREAS, this red tide has caused harm to marine life, including widespread fish kills, and has unreasonably interfered with the health, safety, and welfare of the State of Florida. The Department of Health has issued red tide advisories to beaches in the impacted areas. The red tide

has caused harm to Florida's environment and fragile ecosystems, including beaches and wildlife; and

WHEREAS, during my tenure as Governor, Florida has invested more than $17 million for research to support our biologists' efforts to study and mitigate red tide; and

WHEREAS, the Florida Fish and Wildlife Conservation Commission has indicated the following counties are experiencing the harmful impacts of red tide or may be at risk: Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, and Collier counties; and

NOW, THEREFORE, I, RICK SCOTT, as Governor of Florida, by virtue of the authority vested in me by Article IV, Section 1(a) of the Florida Constitution and by the Florida Emergency Management Act, as amended, and all other applicable laws, promulgate the following Executive Order, to take immediate effect:

Section 1. Because of the foregoing conditions and on-going threat of red tide, I declare that a state of emergency exists in Pinellas, Hillsborough, Manatee, Sarasota, Charlotte, Lee, and Collier counties.

Section 2. I designate the Director of the Division of Emergency Management as the State Coordinating Officer for the duration of this emergency and direct him to execute the State's Comprehensive Emergency Management Plan and other response, recovery, and mitigation plans necessary to cope with this emergency.

I designate the Florida Department of Environmental Protection as the lead agency for all crisis management responsibilities related to this emergency. The Florida Department of Environmental Protection shall advise the State Coordinating Office on all emergency response activities.

Pursuant to section 252.36(1)(a), Florida Statutes, I delegate to the State Coordinating Officer the authority to exercise those powers delineated in sections 252.36(5)-(10), Florida

Statutes, which he shall exercise as needed to meet this emergency, subject to the limitations of section 252.33, Florida Statutes. In exercising the powers delegated by this Order, the State Coordinating Officer shall confer with the Governor to the fullest extent practicable. The State Coordinating Officer shall also have the authority to:

A. Invoke and administer the Emergency Management Assistance Compact ("EMAC") (sections 252.921-252.9335, Florida Statutes) and other compacts and agreements existing between the State of Florida and other states, and the further authority to coordinate the allocation of resources from such other states that are made available to Florida under such compacts and agreements so as best to meet this emergency.

B. Seek direct assistance and enter into agreements with any and all agencies of the United States Government as may be needed to meet the emergency.

C. Direct all state, regional and local governmental agencies, including law enforcement agencies, to identify personnel needed from those agencies to assist in meeting the response, recovery, and mitigation needs created by this emergency, and to place all such personnel under the direct command and coordination of the State Coordinating Officer to meet this emergency.

D. Designate additional Deputy State Coordinating Officers, as necessary.

E. Suspend the effect of any statute, rule, or order that would in any way prevent, hinder, or delay any mitigation, response, or recovery action necessary to cope with this emergency.

F. Enter orders as may be needed to implement any of the foregoing powers; however, the requirements of sections 252.46 and 120.54(4), Florida Statutes, do not apply to any such orders issued by the State Coordinating Officer; however, no such order shall remain in effect beyond the expiration of this Executive Order, to include any extension.

Section 3. I find that the special duties and responsibilities resting upon some State, regional, and local agencies and other governmental bodies in responding to the emergency may require them to suspend the application of the statutes, rules, ordinances, and orders they administer. Therefore, I issue the following authorizations:

A. Pursuant to section 252.36(1)(a), Florida Statutes, the Executive Office of the Governor may suspend all statutes and rules affecting budgeting to the extent necessary to provide budget authority for state agencies to cope with this emergency. The requirements of sections 252.46 and 120.54(4), Florida Statutes, do not apply to any such suspension issued by the Executive Office of the Governor; however, no such suspension shall remain in effect beyond the expiration of this Executive Order, to include any extension.

B. Each State agency may suspend the provisions of any regulatory statute prescribing the procedures for conduct of state business or the orders or rules of that agency, if strict compliance with the provisions of any such statute, order, or rule would in any way prevent, hinder, or delay necessary action in coping with the emergency. This includes, but is not limited to, the authority to suspend any and all statutes, rules, ordinances, or orders which affect leasing, printing, purchasing, travel, and the condition of employment and the compensation of employees. For the purposes of this Executive Order, "necessary action in coping with the emergency" means any emergency mitigation, response, or recovery action: (1) prescribed in the State Comprehensive Emergency Management Plan ("CEMP"); or, (2) ordered by the State Coordinating Officer. The requirements of sections 252.46 and 120.54(4), Florida Statutes, shall not apply to any such suspension issued by a State agency; however, no such suspension shall remain in effect beyond the expiration of this Executive Order, to include any extensions of this Order.

C. In accordance with section 252.38, Florida Statutes, each political subdivision within the State of Florida may waive the procedures and formalities otherwise required of the political subdivision by law pertaining to:

1) Performance of public work and taking whatever prudent action is necessary to ensure the health, safety, and welfare of the community;
2) Entering into contracts;
3) Incurring obligations;
4) Employment of permanent and temporary workers;
5) Utilization of volunteer workers;
6) Rental of equipment;
7) Acquisition and distribution, with or without compensation, of supplies, materials, and facilities; and,
8) Appropriation and expenditure of public funds.

Section 4. I find that the demands placed upon the funds appropriated to the agencies of the State of Florida and to local agencies are unreasonably great and may be inadequate to pay the costs of coping with this disaster. In accordance with section 252.37(2), Florida Statutes, I direct that sufficient funds be made available, as needed, by transferring and expending moneys appropriated for other purposes, moneys from unappropriated surplus funds, or from the Budget Stabilization Fund.

Section 5. All State agencies entering emergency final orders or other final actions in response to this emergency shall advise the State Coordinating Officer contemporaneously or as soon as practicable.

Section 6. All actions taken by the Director of the Division of Emergency Management with respect to this emergency before the issuance of this Executive Order are ratified. This Executive Order shall expire 60 days from this date unless extended.

IN TESTIMONY WHEREOF, I have hereunto set my hand and caused the Great Seal of the State of Florida to be affixed, at Tallahassee, this 13th day of August, 2018.

GOVERNOR

ATTEST:

SECRETARY OF STATE

FILED
2018 AUG 13 PM 3:53
DEPARTMENT OF STATE
TALLAHASSEE, FLORIDA

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Ronald Courtney Date: 8/20/19

Address: 435 Horse Creek Dr

City: V State: Fl Zip: 34292

Telephone: 941 484 2062

Organization (if any): Environmental Advisory Board

Please Check One

☐ Audience Participation

☐ Agenda - Topic: Blue/Red Tide

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of August 20 19 is truthful.

Signature: Ronald Courtney

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: SAL PUSATERI Date: 8-20-18

Address: 2014 MESIC HAMMOCK WAY

City: VENICE State FL Zip 34292

Telephone: 516 343 3595

Organization (if any): _____

Please Check One

☒ Audience Participation

☐ Agenda - Topic: OKEECHOBEE RUNOFF + EVERGLADES PURCHASE

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of AUGUST 20 18 is truthful.

Signature: Sal Pusateri

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

"City on the Gulf"

City of Venice

Request to Speak (print legibly)

Name: Kimberly Lemonde Date: 8/20/18

Address: 1888 Neptune Drive

City: Englewood State FL Zip 34223

Telephone: 941-416-5231

Organization (if any): _____

Please Check One

☐ ~~Audience Participation~~

☐ ~~Agenda~~ - Topic: red tide

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held ~~this~~ 20 ~~day~~ of Aug 2018 is truthful. (N/A)

Signature: Kimberly Lemonde

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: MIKE PACHOTA Date: _____

Address: _____

City: _____ State: _____ Zip: _____

Telephone: _____

Organization (if any): SHARKY'S ON THE PIER

Please Check One

☐ Audience Participation

☐ Agenda - Topic: RED TIDE

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: Sue Baldwin Date: 8/20/18

Address: 700 GoldenBeach Blvd

City: Venice State: Fl Zip: 34285

Telephone: 513-515-9651

Organization (if any): _____

Please Check One

□ Audience Participation

□ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this ____ day of _____ 20____ is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.

City of Venice

Request to Speak (print legibly)

"City on the Gulf"

Name: SUZANNE CUSTAR Date: 8/20/2018

Address: 401 DARLING DRIVE

City: VENICE State: FL Zip: 34285

Telephone: 941-726-0003

Organization (if any): Citizen

Please Check One

☑ Audience Participation

☐ Agenda - Topic: _____

If you are going to present evidence and/or testimony during a public hearing, you are required to complete and sign the following oath. You are not required to sign the oath if you are speaking at Audience Participation or at a workshop.

I swear or affirm, under penalty of perjury, that the evidence or factual representation, which I am about to give or present at the public hearing, held this 20 day of AUG 2018 is truthful.

Signature: _____

Comments at public hearing and during audience participation are limited to five minutes per speaker unless otherwise noted.