CSU Summer COAST Internship

Julia Maddox| Marine Invasive Species Program| May 31st-August 12th,2017

About Me

- I am a senior at Humboldt State University

  -I study geology and as a result, I collect rocks like a madman.

About Me

- I am a senior at Humboldt State University

  -I study geology and as a result, I collect rocks like a madman.

  (Geology? How did she end up at the Marine Invasive Species Program?)


Magic!
quickmeme.com

About Me

- I am a senior at Humboldt State University

  -I study geology and as a result, I collect rocks like a madman.

  (Geology? How did she end up at the Marine Invasive Species Program?)

- I applied!

About Me

- I am a senior at Humboldt State University

  -I study geology and as a result, I collect rocks like a madman.

  (Geology? How did she end up at the Marine Invasive Species Program?)

- I applied!
- Lesson learned, always go for on opportunity even if you think it is out of reach.

About Me

- I am a senior at Humboldt State University

  -I study geology and as a result, I collect rocks like a madman.

  (Geology? How did she end up at the Marine Invasive Species Program?)

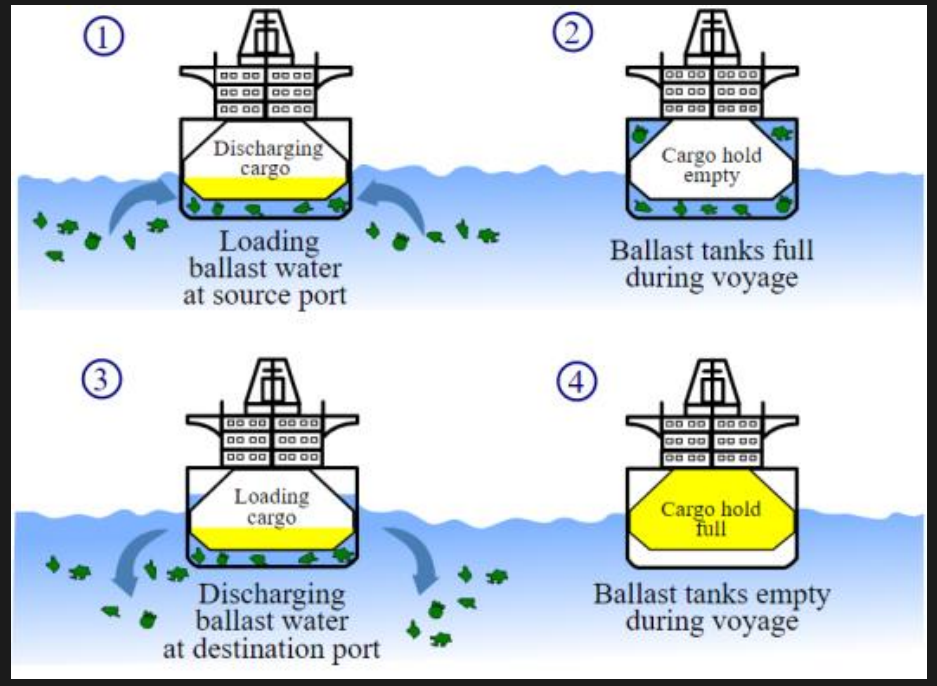
- I applied!
- Lesson learned, always go for on opportunity even if you think it is out of reach.
- I applied, got the job, and felt successful, the only issue was…

“Do You Know Anything about Ballast Water?”

Ballast Water

- What is it?

Fresh or salt water, sometimes containing sediments or plankton, held in tanks on ships to increase stability and maneuverability during transit.



Ballast Water

- What is it?

  **Fresh or salt water, sometimes containing sediments or plankton,
  held in tank on ships to increase stability and maneuverability during transit.**

- That sounds great!

  Since the introduction of steel hulls on ships 120 years ago, ballast water has been a mainstay in the shipping industry. It is a smart way to aid in ship stability, but like everything else, it is not perfect…

Ballast Water

- What is it?

  Fresh or salt water, sometimes containing sediments or plankton, held in tank on ships to increase stability and maneuverability during transit.

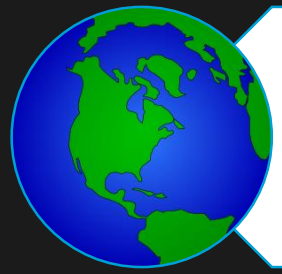
- That sounds great!

  Since the introduction of steel hulls on ships 120 years ago, ballast water has been a mainstay in the shipping industry. It is a smart way to aid in ship stability, but like everything else, it is not perfect…

- Let’s talk about the plankton

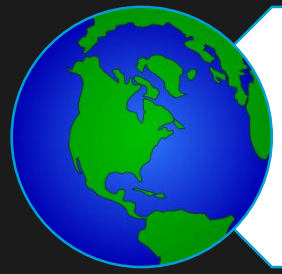
Marine Invasive Species

Some ballast water can contain *marine invasive species*- **aquatic** organisms that invade ecosystems beyond their natural, historic range.



Marine Invasive Species

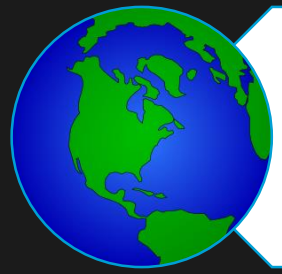
Some ballast water can contain *marine invasive species*- **aquatic** organisms that invade ecosystems beyond their natural, historic range.



It is estimated that unmanaged ballast water moves more than 7,000 species around the world on a daily basis, with a single vessel ballast water discharge having the potential to release over 21.2 million individual planktonic animals.

Marine Invasive Species

Some ballast water can contain *marine invasive species*-**aquatic** organisms that invade ecosystems beyond their natural, historic range.



It is estimated that unmanaged ballast water moves more than 7,000 species around the world on a daily basis, with a single vessel ballast water discharge having the potential to release over 21.2 million individual planktonic animals.

The Marine Invasive Species Program seeks to be a world-leading program that reduces the risk of aquatic nonindigenous species introduction into California's waters.

Ballast Water-Marine Invasive Species Internship

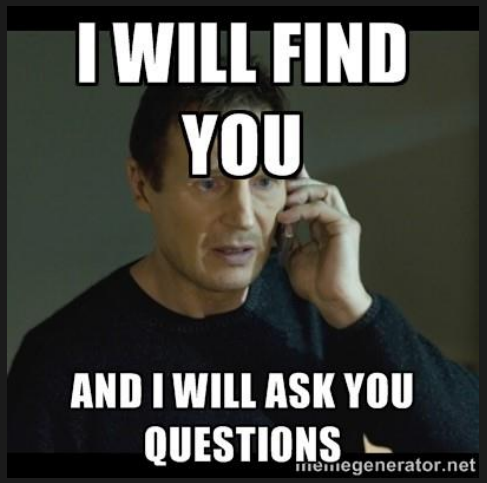
My experience

Sacramento

- After lots of introductions and lots of questions, I got down to work.

Sacramento

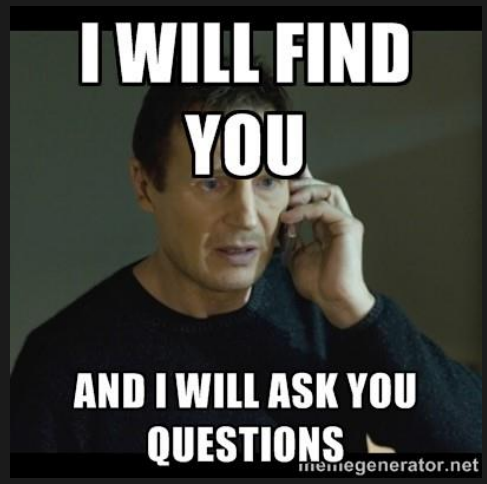
- After lots of introductions and lots of questions, I got down to work.



Sacramento

- After lots of introductions and lots of questions, I got down to work.
- My first task was data entry. I entered a form titled:

  “Ballast Water Treatment Technology Annual Reporting Form”



California State Lands Commission
Marine Invasive Species Program
Ballast Water Treatment Technology Annual Reporting Form
Public Resources Code Section 71205(g)
July 1, 2010

Vessel Name:	
Official / IMO Number:	
Responsible Person's Name and Title:	
Date Submitted (DD/MM/YYYY):	

Treatment System Information

1. List the treatment system installed on board the vessel:

Manufacturer/Company: _____

Product Name: _____

Model Number: _____

1a. Mode(s) of Action (check all that apply):

Filtration ☐	Cavitation ☐	Hydrocyclone ☐	Deoxygenation ☐
Active Substance/Biocide ☐	Ultra Violet Irradiation ☐	Heat ☐	
Other ☐, please describe:			

1b. List all substances (i.e. chemicals, biocides, flocculants, neutralization agents) created or used by the treatment system (if any), and indicate whether or not the Material Safety Data Sheet is kept on board for each substance.

Substance	MSDS on Board?
	Yes ☐ No ☐ N/A ☐
	Yes ☐ No ☐ N/A ☐
	Yes ☐ No ☐ N/A ☐
	Yes ☐ No ☐ N/A ☐
	Yes ☐ No ☐ N/A ☐
	Yes ☐ No ☐ N/A ☐
N/A ☐, No substances used by system.	

California State Lands Commission
Marine Invasive Species Program
Ballast Water Treatment Technology Annual Reporting Form
Public Resources Code Section 71205(g)
July 1, 2010

Vessel Name:	
Official / IMO Number:	
Responsible Person's Name and Title:	
Date Submitted (DD/MM/YYYY):	

Treatment System Information

1. List the treatment system installed on board the

Manufacturer/Company:
Product Name:
Model Number:

1a. Mode(s) of Action (check all that apply):

Filtration ☐	Cavitation ☐	Hy
Active Substance/Biocide ☐	Ultra Violet Ir	
Other ☐, please describe:		

1b. List all substances (i.e. chemicals, biocides,
or used by the treatment system (if any), and ind
Data Sheet is kept on board for each substance.

Substance	MS
	Ye
	Ye
	Ye
	Ye
	Ye
	Ye

N/A ☐, No substances used by system.

Official/IMO Number:

1c. Are manufacturer's technical guides, publications and/or manuals for the treatment system kept on board? Yes ☐ No ☐

2. When did the system installation receive classification society approval?
   Date (DD/MM/YYYY):

3. Did the system installation occur (check all that apply):
   - As part of a scheduled out of water dry docking? Yes ☐ No ☐
   - During a special/non-routine out of water dry docking? Yes ☐ No ☐
   - Without the need for out of water dry docking? Yes ☐ No ☐

4. Has there been any significant upgrade/modification to the system since classification society approval? (Do not include repairs. See instructions for more information and definition of significant.)

Yes ☐	Date of Upgrade (DD/MM/YYYY):
Describe upgrade:	
No ☐	

5. Has any unscheduled or emergency maintenance been performed on the system since classification society approval (or since the previously submitted Ballast Water Treatment Technology Annual Reporting Form)?

Yes ☐	Date of Most Recent Event (DD/MM/YYYY):
Describe most recent maintenance event:	
No ☐	

6. Is the vessel in compliance with the requirement to maintain a ballast water treatment performance log on board? (This log may be incorporated into the existing ballast water management log. See form instructions for minimum requirements). Yes ☐ No ☐

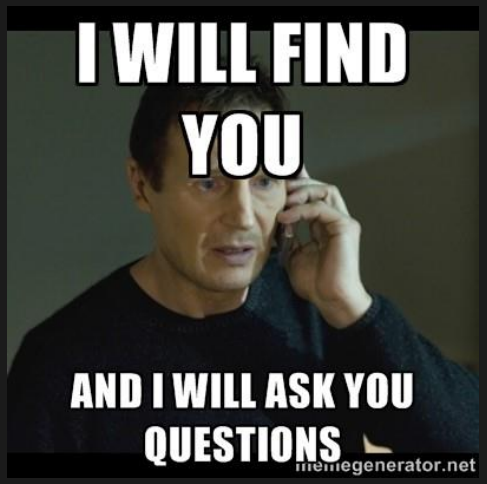
7. Is system performance (i.e. biological efficacy) verified on a regular basis? Verification is not a requirement by the State of California, however, regular performance testing will allow the vessel to ensure the system is working properly.

Yes ☐				
How often:	Weekly ☐	Monthly ☐	Yearly ☐	Every 2 years ☐
	Other ☐, describe:			
No ☐				

Sacramento

- After lots of introductions and lots of questions, I got down to work.
- My first task was data entry. I entered a form titled:

  “Ballast Water Treatment Technology Annual Reporting Form”



- My second task, a database update, ties to the information gathered from the Reporting Form

  “Database Table Update 2017”

The most popular treatment system was a combination of filtration and ultra violet light.

Cyclonic Separation

Biocides

Ultra Violet Light

Electrolysis

Filtration

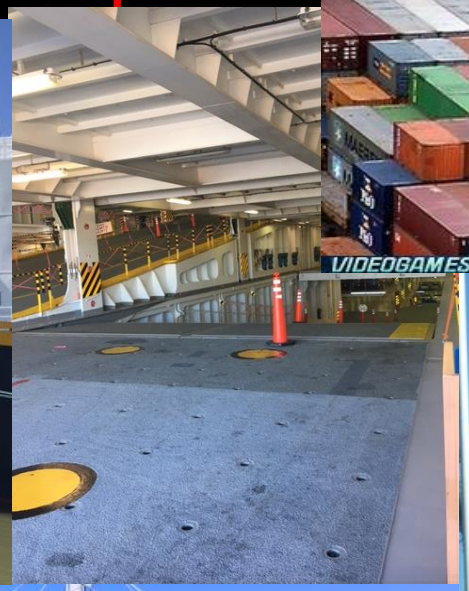
Cavitation

Deoxygenation

Electrolytic chlorination

Hercules

Ships, Ships, Ships!



Science “Week”

- Collected samples from the Golden Bear, Cal Maritime’s Research Vessel
  - 2 ambient water samples (I essentially threw a bucket over the side of the ship)
  - 2 treated samples from the active ballast water treatment system on board

Science “Week”

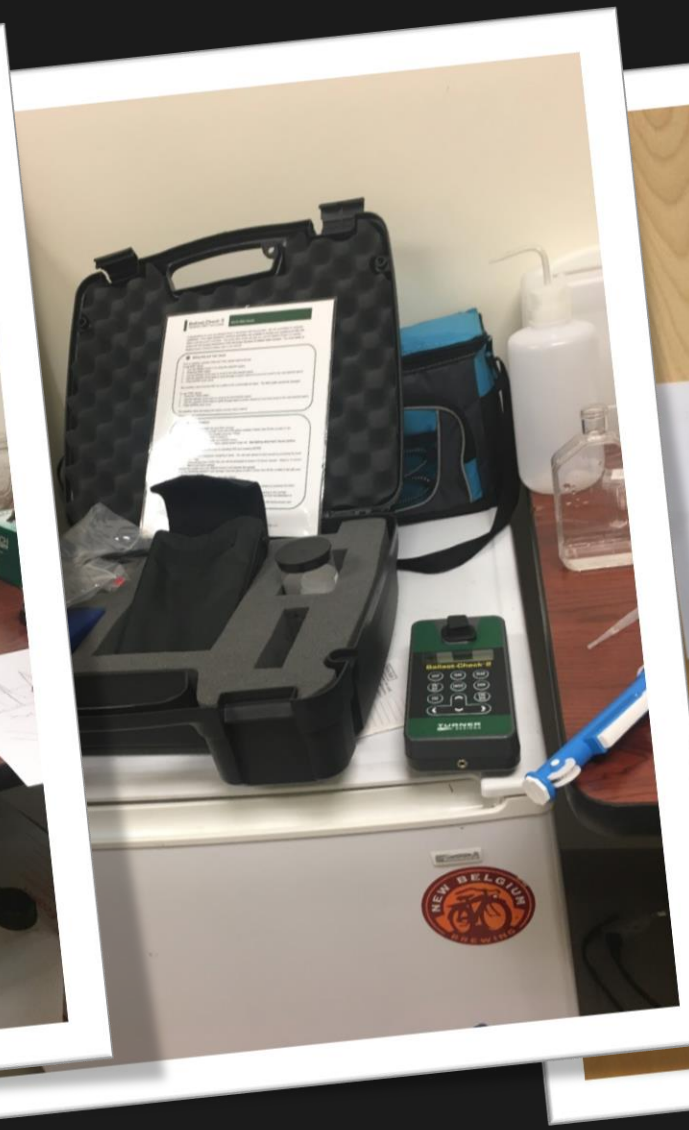
- Collected samples from the Golden Bear, Cal Maritime’s Research Vessel
  - 2 ambient water samples (I essentially threw a bucket over the side of the ship)
  - 2 treated samples from the active ballast water treatment system on board
- Used FDA (**Fluorescein diacetate)** graciously donated by the Golden Bear, to stain the plankton in both the treated and untreated water samples. The dye causes the plankton to glow under UV light, making them easily observable and thus easy to count.

Science “Week”

- Collected samples from the Golden Bear, Cal Maritime’s Research Vessel
  - 2 ambient water samples (I essentially threw a bucket over the side of the ship)
  - 2 treated samples from the active ballast water treatment system on board
- Used FDA- (graciously donated by the Golden Bear) to stain the plankton in both the treated and untreated water samples. The dye causes the plankton to glow under UV light, making them easily identifiable thus easy to count.
- We compared treated and untreated samples, with both our counting observations and by using an indicative tool, with the conclusion that the treatment system on board the Golden Bear is effective at treating ballast water.


BALLAST ON
DO NOT USE


KIMTECH


NEW BELGIUM
BREWING


Science in
Progress
Do Not
Disturb

Shipping Facts

There are 5 main types of ships:

Passenger

Tanker

Bulk

Container

Car Ship

90% of the worlds trade is carried out through the shipping industry

The shipping industry employs ~1.5mil people

The largest ships can cost more than $200 million USD

Shipping is the greenest form of mass transport

Thank you!

Any Questions?

In remembrance

Works Cited

Definitions provided by

1. Wikipedia-https://en.wikipedia.org/wiki/Ballast
2. State Lands Commission-Marine Invasive Species Information Sheet-*slc.ca.gov*