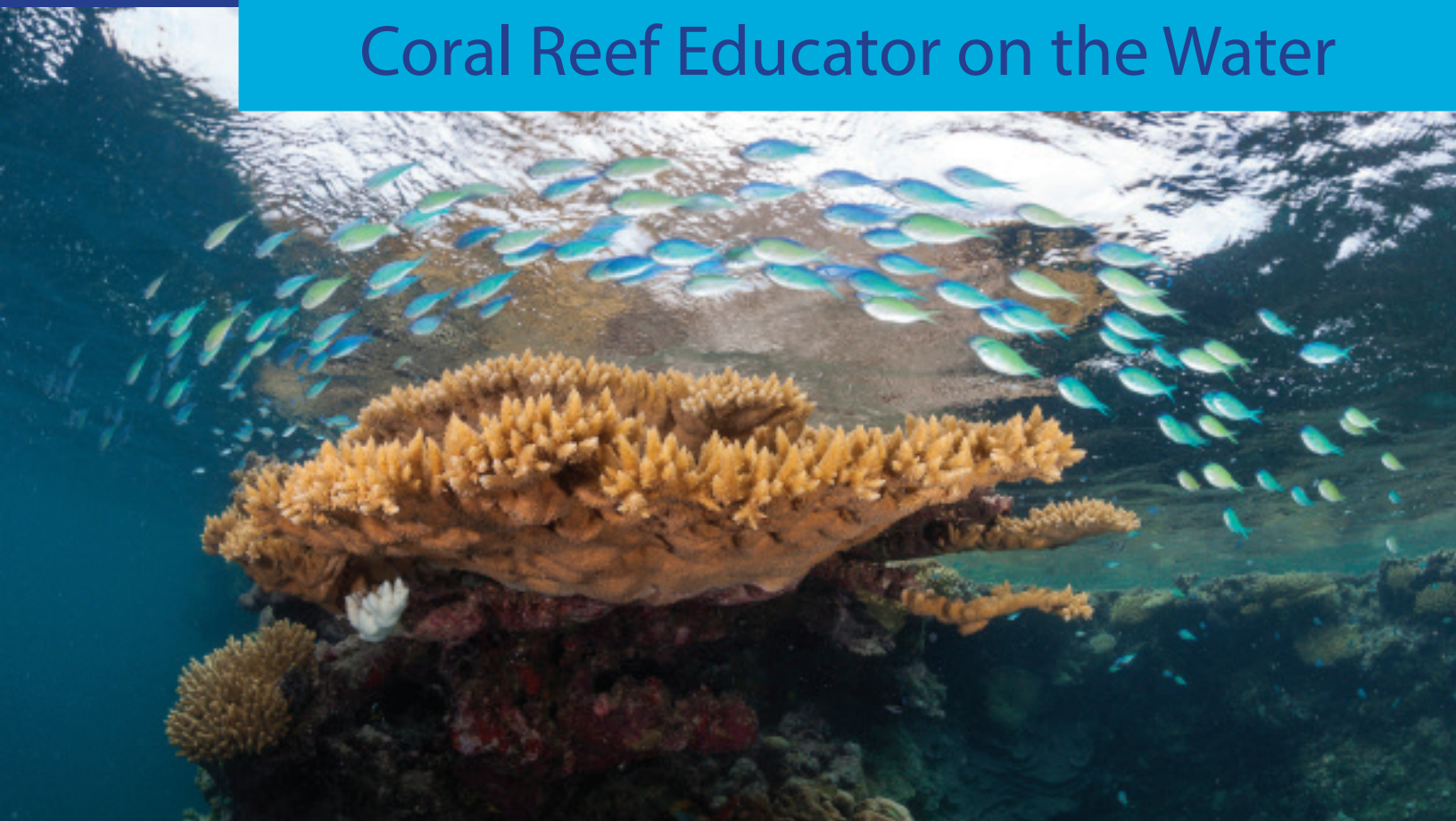
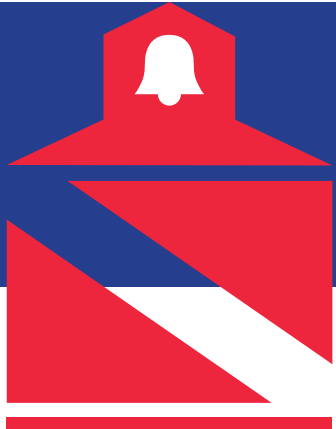


C.R.E.W.

Coral Reef Educator on the Water





C.R.E.W.

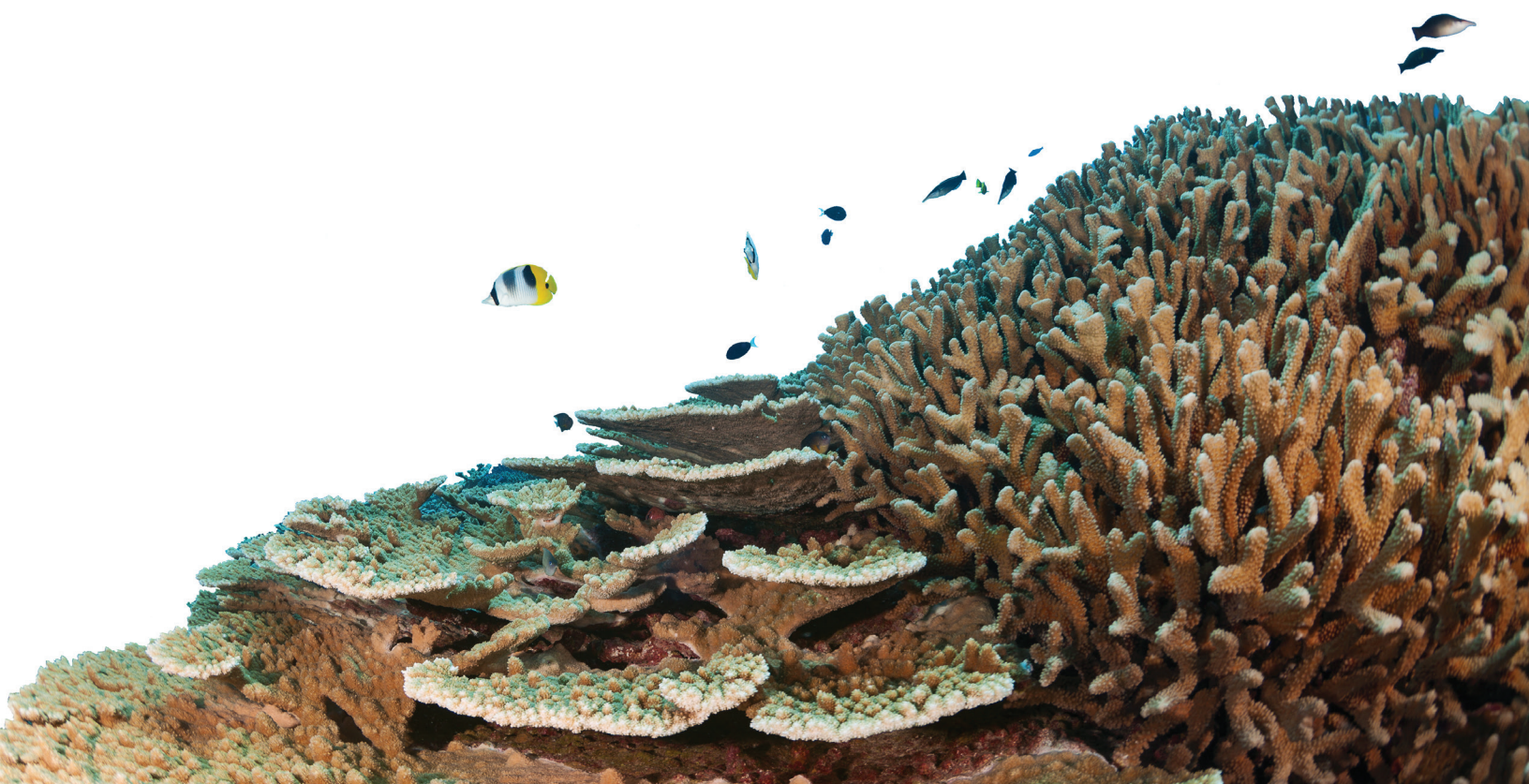
Coral Reef Educator on the Water Manual



Khaled bin Sultan Living Oceans Foundation
8181 Professional Place, Suite 215
Landover, MD 20785
www.livingoceansfoundation.org

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ABOUT LIVING OCEANS FOUNDATION

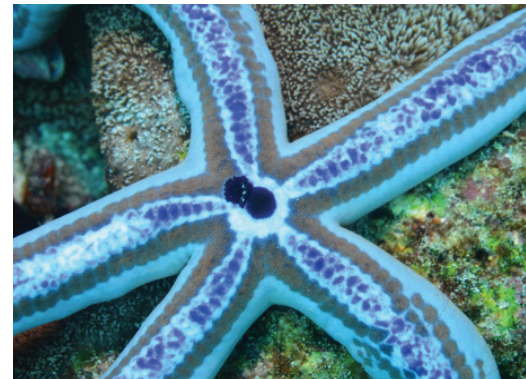
The Khaled bin Sultan Living Oceans Foundation is a US-based, non-profit foundation dedicated to preserve, protect, and restore the world's oceans through applied science, education and outreach, and working with local partners and governments to promote coral reef conservation.

The Foundation was set up in 2000 by His Royal Highness (HRH) Prince Khaled bin Sultan of the Kingdom of Saudi Arabia

and has the use of a sophisticated research vessel known as the *M/Y Golden Shadow*.

HRH Prince Khaled bin Sultan understands the challenges of conserving Earth's coral reefs across oceans and political boundaries, and recognizes that collaboration is vital to ocean conservation. Inspired by the working approach of Medecins Sans Frontiers, Prince Khaled proposed the philosophy 'Science Without Borders®.'

Science Without Borders® is the overarching theme of the Foundation. As such, the Foundation has formed partnerships with scientists and conservationists around the world to leverage resources, commitment, and ideas necessary to make substantial progress in the grand challenge of ocean conservation and sustainable usage.



GLOBAL REEF EXPEDITION (GRE)

The Khaled bin Sultan Living Oceans Foundation, using the state-of-the-art research vessel *Golden Shadow*, has launched a multi-year (2011-2016) Global Reef Expedition program. HRH Prince Khaled bin Sultan generously funds the research vessel and scientific operation for this historic scientific journey.

The anticipated principal outcome of the Global Reef Expedition is to provide applied scientific knowledge to local resource managers and relevant government environmental agencies,



bridging science with management to achieve the long-term goal of ensuring healthy and sustainable coral reef ecosystems around the globe.

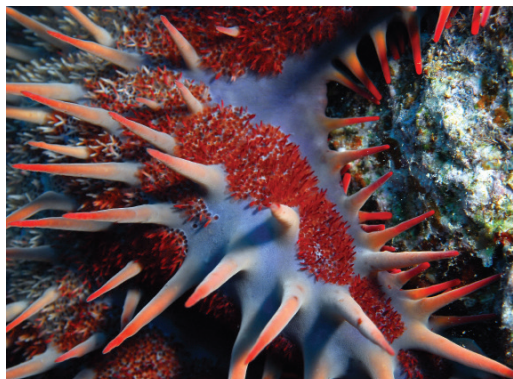
A team of international coral

reef scientists are employing standardized protocols to map, characterize, and evaluate coral reefs throughout the western Atlantic, Pacific, and Indian Oceans, and the Red Sea. Comparative assessments of coral reef community structure, environmental conditions, and human pressures will help us understand the status of coral reefs, identify major threats, and determine processes and factors that control the health and resilience of reef ecosystems worldwide.

GRE RESEARCH GOALS

The primary scientific goals of the Global Reef Expedition are to:

1. Map and characterize the extent, spatial distribution, and structure of different habitats within coral reef ecosystems with an emphasis on poorly studied, remote reefs and reefs near urban centers.
2. Characterize the community structure and health of reef fishes, stony corals, algae and other ecologically and economically important organisms from coral reef ecosystems around the globe.
3. Identify the current status of coral reefs and major threats affecting them, and examine factors that enhance their capacity to resist, survive, and rapidly recover from disturbance.



WHAT IS C.R.E.W.?

The Coral Reef Educator on the Water (C.R.E.W.) program offers science teachers the opportunity to join the Global Reef Expedition (GRE) aboard the *M/Y Golden Shadow*. The program is designed to give first-hand experience of life on board a working scientific research vessel, gain teaching experience in another country, obtain a greater understanding of the importance of coral reefs, and give inspiration to convey what they have learned to their students and members of their community.

In January 2012, the Foundation established an education department that is extending its work beyond government partners and academia through a variety of methods and products. A coordinated program related to the Global Reef Expedition is making the Foundation's research more accessible to a wide range of audiences allowing for greater understanding of marine issues leading to greater ocean literacy.

Through the Global Reef

Expedition, the Living Oceans Foundation has the ability to provide real-time access to coral reefs and coral reef health to educators creating a unique opportunity for the Foundation to increase ocean literacy. An increased engagement in ocean literacy will further advance the conservation and restoration of living oceans - the core of the Foundation's mission.





ATLANTIC OCEAN

- Cay Sal, Bahamas
- Inaguas, Bahamas
- Andros, Bahamas
- Colombia
- Jamaica
- Navassa Island
- St. Kitts & Nevis



RED SEA & INDIAN OCEAN

- British Indian Ocean Territories (BIOT)
- Madagascar
- Saudi Arabia

PACIFIC OCEAN

- Galapagos Islands
- French Polynesia
- Cook Islands
- Fiji
- Tonga
- New Caledonia
- Great Barrier Reef, Australia
- Solomon Islands
- Palau
- Indonesia
- Philippines



THE SHIP

The *M/Y Golden Shadow* is a 220 foot motor yacht. It has a total capacity of 48; there are 24 beds for the scientific team and 24 for the crew. One of the *Golden Shadow's* most important assets is its stern elevator platform. This system is used to launch and recover various small-boat tenders. The stern elevator has a lifting capacity of 12 tons. The platform is also invaluable for diving access and recovery of vessels in difficult sea conditions. To ensure diving safety in remote locations, the *Golden Shadow* has a recom-

pression chamber capable of accommodating one casualty and one medic. Fully qualified medical staff members are present during all dive operations.

The *Golden Shadow* carries a variety of support boats, has satellite communications, as well as a worldwide internet connection. Built to the most stringent safety regulations she carries four life rafts, for a total of 100-person lifesaving capacity. Her bridge is an array of flat screen technology. Coupled

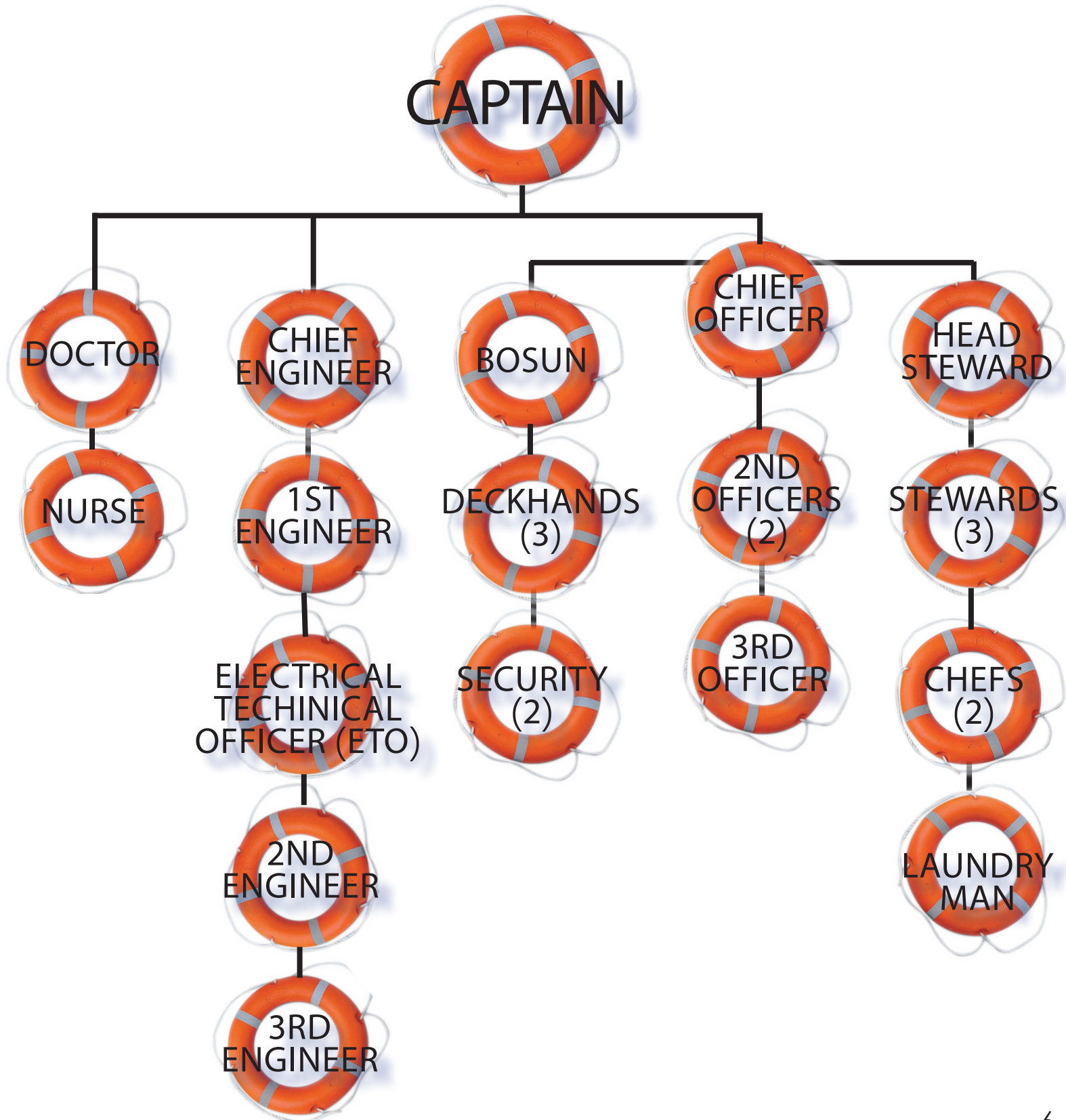
with digital charts and satellite navigation, she is one of the safest ships in the world.

A large galley with a huge walk in refrigerator and freezer means that she can travel up to four weeks before needing to resupply. A garbage management system, including an incinerator, ensures that all waste is processed to the most stringent regulations. Water makers, which convert salt water to fresh water, produce up to 50,000 liters of potable water per day.



OFFICERS & CREW

All of our research is assisted by the officers and crew of the *M/Y Golden Shadow*, currently led by Captain Steve Breen. They plan and carry out our ship based itinerary, steering us through every port and remote reef along the way. Below is a hierarchical diagram of the officers and crew aboard the *Golden Shadow*.

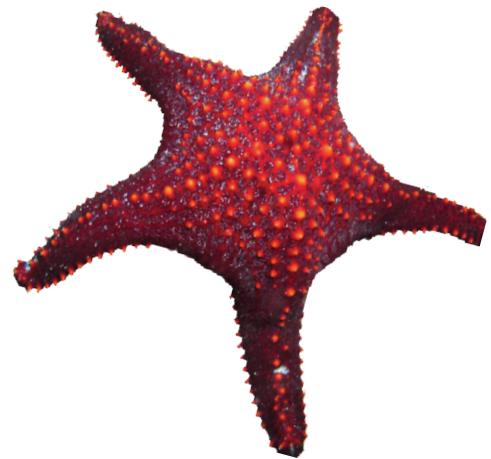




SCIENCE TEAM

The scientific team fluctuates depending on the objective of each mission. Here is list of potential team members:

- Executive Director
- Chief Scientist
- Director of Communications
- Director of Education
- Coral Reef Ecologist
- Research Assistant
- Remote Sensing and Groundtruthing Team
- 2 Benthic Survey Researchers
- 2 Fish Survey Researchers
- 2 Coral Survey Researchers
- Ocean Chemistry Researcher
- 2-5 Foundation Research Fellows
- 2-4 local Visiting Scientists
- Local Government Representative
- Dive Safety Officer (DSO)





SCIENTIFIC RESEARCH

The Foundation conducts groundtruthing, surveys, and research within the coral reef ecosystem to characterize the different habitats and determine the community structure, health, and resilience of each coral reef. For each mission they bring a team of trained scientific divers to conduct standardized surveys to collect the most comprehensive data possible. The information they collect and the tools they develop help governments, environmental managers, and local residents gain a better understanding of the status of their local reefs and threats affecting them so they can better manage and protect them. Here are the different surveys that the Science Team conducts:

CORAL SURVEY

The coral survey consists of 1m X 10 m belt transects conducted from 30 m to 5 m depth. Within each belt all corals are identified, their size is measured, and the amount of partial tissue loss (if any) is recorded. Stressors affecting the corals (bleaching, disease, predators, overgrowth, breakage and other damage) are documented. In addition, quadrats (25 cm X 25 cm squares) are used to assess the numbers of recruits (baby corals) occurring along each transect. These transects provide information on the population structure and the health of corals.

BENTHIC SURVEY

The benthic survey involves 10 m point intercept transects conducted along the same depth gradients as the coral survey. The diver records the organism or substrate found on the bottom every 10 cm, with 100 points recorded for each transect. These transects provide information on the quality of the substrate and the amount of the bottom that is covered by coral, algae, or other organisms.

FISH SURVEY

Fish surveys involve 30 m X 4 m belt transects, with divers logging the size, species and number of a select group of fish (commercially harvested and ecologically important species), with additional roving surveys conducted to document species diversity. This helps scientists characterize the diversity, abundance, and biomass of reef fish and can help determine if certain species are being overfished or are at abnormal population abundances.

By conducting the same surveys using the same methods on every dive the Foundation is able to compare observations from one site to another. This lets them see the differences in reef health and resilience between sites, reefs, islands and even countries.



SHIP LIFE

Life on the ship is not for everyone. Due to inclement weather, equipment failure, and other unforeseen circumstances, boat life is unpredictable and participants must be flexible with their schedule. Just as in normal boating protocol, the Captain has ultimate command of the ship. All orders from the Captain, Executive Director, and Chief Scientist should be followed respectfully. The same applies with the Dive Safety Officer (DSO) when scuba diving.

Scuba diving and ship life is strenuous and exhausting. One

must be able to cope with the long days on top of these strenuous activities.

Living and work space on the ship is limited. Participants must be mindful of each other's space and privacy. Sound on the boat carries and volume of any electronic devices and voices should be kept to a minimum. The scientific team works long hours often from 7 am to 10 pm. Please be respectful of their time and space.

There are people from around the world that participate in the

GRE mission. All should be considerate of each other's cultures and beliefs. Additionally, as a C.R.E.W. member, you will be exposed to the local culture and when conducting land-based programs you must adhere to their cultural and traditional customs. For example, in Fiji it is customary for men and women to wear sulus (sarongs) in the villages. All participants who went on land adhered to their custom by wearing sulus.

If you are unable to comply with the above, then ship life is not for you.



LIVING QUARTERS

The scientific team is housed on the 3rd deck. There are two single bed cabins, seven double bed cabins, and two quad bed cabins. The living arrangements are determined by the number of women and men on the team. The C.R.E.W. teacher must be flexible and willing to share a living space with team members of the same sex.

Each cabin is equip with a bathroom including a shower stall, toilet, and sink. The C.R.E.W. teacher should bring their own toiletries. Linens, pillows, and towels are provided in your

room, and towels are provided on dive boats. Laundry service will be provided twice a week. There is no need to bring laundry detergent or dryer sheets.

There is limited room on the ship. If possible, bring a soft duffle bag. Hard-sided suitcases take up too much space and will not fit in the room. There are cabinets and drawers to stow clothing and other personal affects. Remember that during rough weather most things have a tendency to move around and this could be hazardous. CREW teachers will be

responsible for securing their personal belongings.

Each room has a temperature gauge. Before adjusting, please be mindful that you are sharing a room with someone else. The air conditioning throughout the ship can be set low, so it's best to bring one set of warm clothes.

There are European 220v plugs and US 110v plugs on board the ship. Should you have a different plug type, you will need to bring an adapter.



MEALS

There are three meals provided by the crew every day. The mealtimes are scheduled around the daily diving schedule; however, typically mealtimes are as follows:

Breakfast: 6:00 – 7:15 am

Lunch: 12:30 – 1:30 pm

Dinner: 6:30 – 7:30 pm

Additionally, there are snacks and beverages in the staff galley and on the dive vessel, so there is no need to bring additional food. There is NO food allowed in the cabins.

If you have any food allergies or dietary restrictions, prior to the trip, please contact the Director of Education.

COMMUNICATION

There is internet on the ship; however, due to the remote nature of the trips, the internet connection tends to fluctuate, especially when an increase of participants are online. Please do not plan on uploading or downloading large amounts of information. Skype will also be limited on the ship. There is no Skype video capability. Due to the large amount of bandwidth needed, video streaming is blocked on the ship.



There is a computer room on the third deck with one shared

computer and a printer. This room is intended for sharing files, print capabilities, and privacy during Skype calls. Please bring your own laptop and charger.

Should there be an emergency, the ship is equipped with satellite phones that are monitored 24 hours a day. The CREW teacher will be given this information prior to the trip.

SEASICKNESS

If you are prone to motion sickness in a car, train, or airplane then you should bring seasickness medicine. Even if you have never been seasick before being on a large ship is completely different. During

rough weather, the *M/Y Golden Shadow* pitches and rolls. It's suggested that you bring seasickness medicine regardless of whether you have ever been seasick. Scopolamine is a patch that lasts for 72 hours. It

must be prescribed by a doctor. This seasickness medicine has shown to be successful for past participants; however it is not guaranteed. For more information, please consult your physician.

MEDIA

All participants need to sign a waiver stating that the Foundation may photograph and record them during the research mission, and that the Foundation can use these images to help promote ocean conservation and education. The waiver also states that the C.R.E.W. participant will give the Foundation copies of all photos and footage that they take while on the research



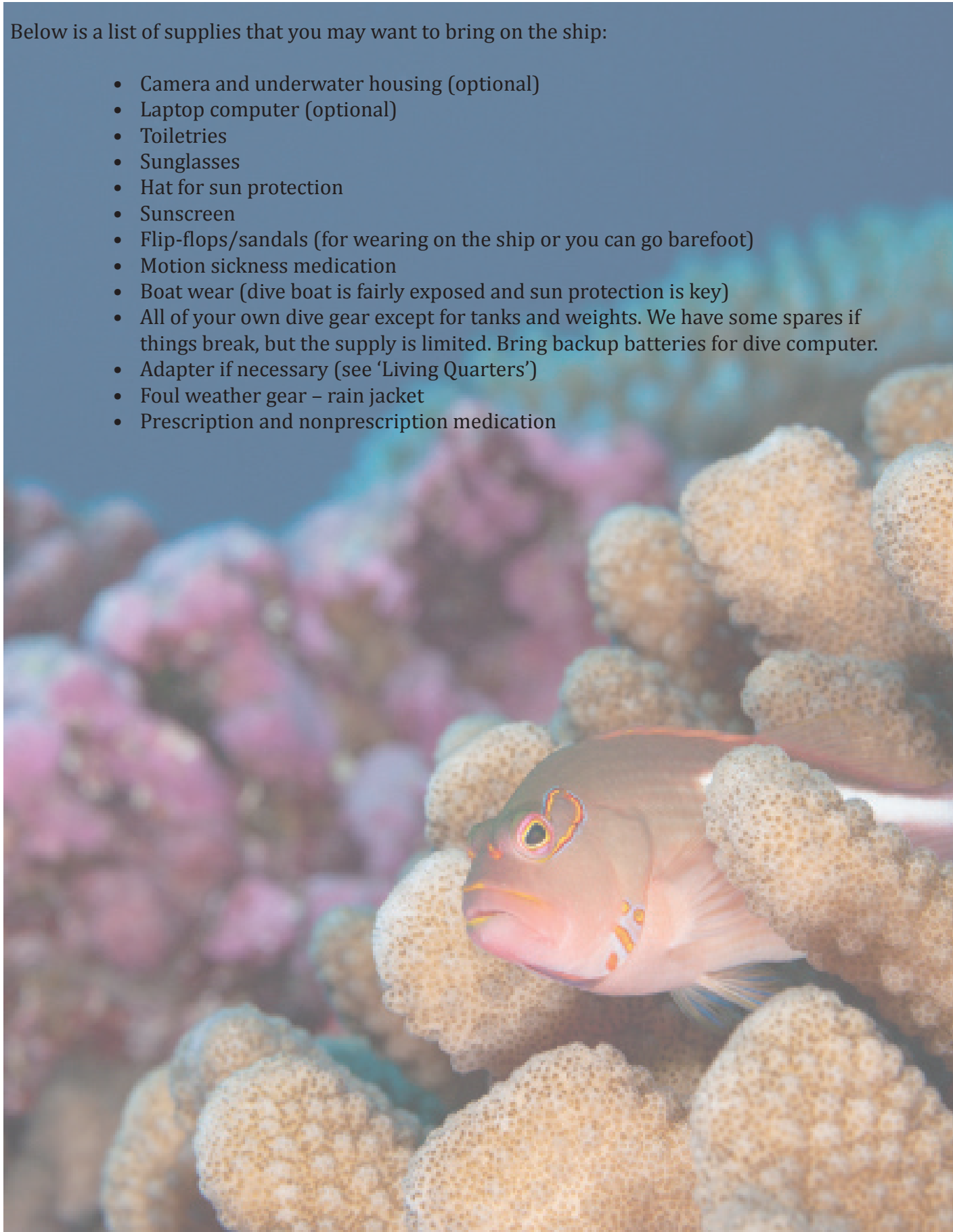
mission, and that the Foundation may use these as they please.

Due to filming and photography on the ship be mindful of what you are wearing. Always wear at least a t-shirt and shorts and change into appropriate clothing when changing out of your wetsuit.

WHAT TO BRING?

Below is a list of supplies that you may want to bring on the ship:

- Camera and underwater housing (optional)
- Laptop computer (optional)
- Toiletries
- Sunglasses
- Hat for sun protection
- Sunscreen
- Flip-flops/sandals (for wearing on the ship or you can go barefoot)
- Motion sickness medication
- Boat wear (dive boat is fairly exposed and sun protection is key)
- All of your own dive gear except for tanks and weights. We have some spares if things break, but the supply is limited. Bring backup batteries for dive computer.
- Adapter if necessary (see 'Living Quarters')
- Foul weather gear – rain jacket
- Prescription and nonprescription medication





WHEN ARE C.R.E.W. MISSIONS?

C.R.E.W. missions are dependent upon availability of space on the ship and budget constraints. Mission dates sometimes fluctuate due to weather

and other unforeseen events. When C.R.E.W. missions are available, announcements will be made on the Foundation's website and various listserves.

To sign-up for the Foundation's education listserve, please contact the Director of Education. (See 'Contact Information')

ELIGIBILITY

Applicants must possess the following qualifications in order to apply for the C.R.E.W. program. (Successful qualification does not guarantee a place.)

- You must currently be employed full-time, and for at least one additional year, as a science educator.
- If diving, you must have, or can rent, your own dive gear including a dive computer. All gear should be well-maintained. Your regulator needs to have been serviced within the past year. (Access to replacement equipment is extremely limited once out at sea.)
- You must have a valid passport.
- If diving, you must be a qualified scuba diver and provide copies of certification cards and dive log.
- You must provide evidence of your good health. (See 'Medical Evaluation')
- You must provide evidence of your school's support for your participation.
- You must be computer literate.
- You must speak English.

COSTS

The Foundation will provide free room and board, roundtrip airfare, and a substitute teacher during the GRE mission. Travel and local transportation is arranged by the Foundation. Incidental costs (airport parking,

taxi, meals during transit) can be reimbursed upon discussion with the Education Director. It is essential to keep the receipts for costs incurred.

It's suggested that the teacher

brings the selected country's currency for souvenirs. If the teacher cannot convert money prior to the mission, they can exchange money in the airport.

MEDICAL EVALUATION

C.R.E.W. members will show proof of a dive physical prior to the mission. Please see Appendix B for medical forms.



OBLIGATIONS

As part of C.R.E.W. with the Global Reef Expedition, you must be willing to complete the following:

- Interact with science team to develop content applicable to your school/course.
- Host two live question and answer session from the ship with your class and/or students from other institutions.
- Conduct advanced research on the ecology of the country.
- Contribute to the creation of a primer for educators on the Global Reef Expedition.
- Write two detailed lesson plans for posting on the GRE education website. Supporting videos and photos can be provided by the GRE as needed.
- Scuba dive or snorkel a portion of the research dives to gain first-hand experience.
- Write at least three blog post for GRE, and post an additional blog on at least one other educational blog or list serve.
- Develop a step-by-step plan outlining the ways you will incorporate the experiences and research skills learned with GRE into your classroom.
- Develop conservation action challenges for your classroom.
- Post a testimonial on the GRE CREW web page about your experience.
- Post every day to personal and LOF social media.

CREW TEACHER SCHEDULE

Each day will vary for the C.R.E.W. teacher. He/She must be flexible and adaptable to schedule changes. See Appendix A for a sample schedule.

CONTACT INFORMATION

For more information, please contact the Director of Education, Amy Heemsoth. See Appendix C for additional resources.

Amy Heemsoth
Khaled bin Sultan Living Oceans Foundation
8181 Professional Place, Suite 215
Landover, MD 20785
Email: heemsoth@lof.org
301.577.1288 ext. 205



SECTION 1:GENERAL INFORMATION

First Name	Family Name	Preferred Name
------------	-------------	----------------

School Name

School Address

City	State	Zip Code	Country
------	-------	----------	---------

Primary Phone Number	Email Address
----------------------	---------------

	Female	Male	Yes	No
Date of birth (Day/Mo/Yr)	Sex		Have you applied before?	

SECTION 2:BACKGROUND INFORMATION

List the grade(s) do you teach.

Which subjects(s) do you teach?

Highest dive certification	Date certified	Approx. # dives	Date of last dive (Day/Mo/Yr)
----------------------------	----------------	-----------------	-------------------------------

SECTION 3:SHORT ESSAY QUESTIONS

1. How do you currently use marine education themes in your classroom? (max 150 words)

2. What do you hope to gain from the C.R.E.W. program? (max 150 words)

3. What benefit would the C.R.E.W. program bring to your students? (max 200 words)

4. Please attached a marine focused lesson plan that you created.

SECTION 4: SUBMITTING APPLICATION

Please electronically submit your signed application form and lesson plan to the Director of Education, Amy Heemsoth at heemsoth@lof.org.

You can also mail your application to:

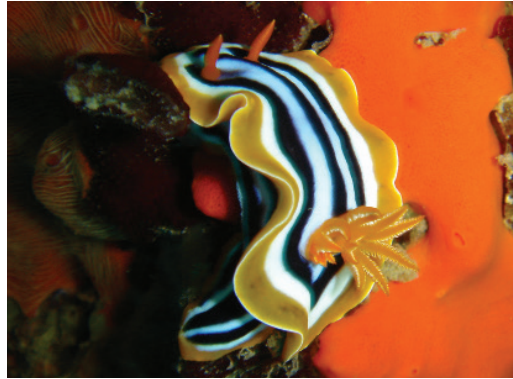
Coral Reef Educator on the Water (CREW)
Khaled bin Sultan Living Oceans Foundation
8181 Professional Place, Suite 215
Landover, MD 20785

SECTION 5: SIGNATURE

By entering your name, you electronically approve that the information that you provided in the above document is true.

Applicant's electronic signature

APPENDIX A - C.R.E.W. TEACHER SCHEDULE



Time	Day 1	Day 2	Day 3	Day 4	Day 5
6:30 am	Breakfast	Breakfast	Breakfast	Breakfast	Breakfast
7:15 am	Arrive at <i>Golden Shadow</i>	Load dive equipment	Help prepare for ship tour and workshop	Skype call with students	Boat leaves for land-based education program
7:30 am		Boat leaves			
8 am		Dive #1	Secondary school tour of Golden Shadow & Coral Ecology Workshop		
9 am	Tour of <i>Golden Shadow</i>	Surface interval		Primary school Coral Ecology Workshop	
10 am		Dive #2		Work on lesson plans, blogging, Facebook, Tweeting	Travel to next village/town
11 am	Ship safety briefing	Dive commences	Blog, Facebook, Twitter	Facebook, Tweeting	Secondary school Coral Ecology Workshop
11:30 am		Boat returns to <i>Golden Shadow</i>			
12:00 pm	Lunch	Lunch	Lunch	Lunch	Lunch on island
1:30 pm	Meeting with Education Director	Work on lesson plans, blogging, Facebook, Tweeting	Boat leaves	Boat leaves	General public Coral Ecology Workshop
2:00 pm			Dive #3	Dive #3	
3:30 pm			Boat returns to <i>Golden Shadow</i>	Boat returns to <i>Golden Shadow</i>	
4:00 pm	Prepare for ship's departure		Prepare for Skype call with students	Prepare for night dive	Return to <i>Golden Shadow</i>
5:00 pm				Dive #4 Night Dive	
6:30 pm	Dinner	Dinner	Dinner		Dinner
7:30 pm	Blogging, Facebook, Tweeting	Meet with Education Director to go over lesson plan creation	Video interview of scientists	Dinner	Blogging, Facebook, Tweeting
8:00 pm				Free	
9:00 pm					
10:00 pm					

APPENDIX B - MEDICAL FORM



APPENDIX C - ADDITIONAL RESOURCES



C.R.E.W. Teacher Testimonial

- <http://www.livingoceansfoundation.org/coral-reef-educator-on-the-water-crew/>

Foundation Blog

- <http://www.livingoceansfoundation.org/updates-media/#media-blog>

Foundation Facebook Page

- <https://www.facebook.com/livingoceansfoundation>

Foundation Twitter

- <https://twitter.com/LivingOceansFdn>

Foundation Website

- www.livingoceansfoundation.org

YouTube C.R.E.W. Video

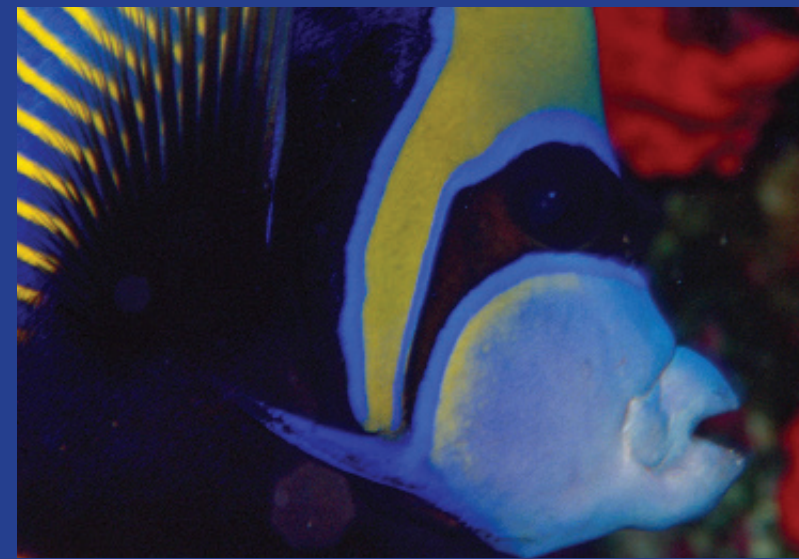
- https://www.youtube.com/watch?v=Uctv0DtOtBw&list=PLlOe1Mr8YbsoMyMFju9Yz8l4V5qa0_Ln-&index=16

YouTube Education Video

- https://www.youtube.com/watch?v=Kqo_Z1jO2Vs&list=PLlOe1Mr8YbsoMyMFju9Yz8l4V5qa0_Ln-&index=1







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