Marine Mammals and Plastic Pollution
EarthEcho Expeditions: PlasticSeas Virtual Field Trip with Dr. Kate Charlton-Robb and the Marine Mammal Foundation
Thursday, May 2nd, 2019
11:00 AM AEDT
www.earthecho.org
Virtual Field Trip begins at 11:00 AM AEDT

To Interact & Submit Questions:

- YouTube: Use the Chat space
- EarthEcho website: Use the Google Form beneath the viewer

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Australian Standards

- Questions and Possibilities
  - Examine how different kinds of questions can be used to identify and clarify information, ideas, and possibilities

- Understanding Concepts
  - Examine how problems may contain more than one ethical issue

- Decision Making and Actions
  - Explore the significance of ‘means versus ends’ by considering two ways to act when presented with a problem: one that privileges means and one ends
  - Discuss the role and significance of conscience and reasoning in ethical decision-making

- Science
  - Scientific understandings, discoveries, and inventions are used to inform personal and community decisions and to solve problems that directly affect people’s lives
  - With guidance, pose questions to clarify practical problems or inform a scientific investigation, and predict what the findings of an investigation might be based on previous experiences or general rules
  - Suggest improvements to the methods used to investigate a question or solve a problem
  - Communicate ideas and processes using evidence to develop explanations of events and phenomena and to identify simple cause-and-effect relationship

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Next Generation Science Standards

- **MS-ESS3-2.** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

- **MS-ESS3-3.** Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.

- **ESS3.C:** Human Impacts on Earth Systems • Human activities have significantly altered the biosphere, sometimes damaging or destroying natural habitats and causing the extinction of other species. But changes to Earth's environments can have different impacts (negative and positive) for different living things. • Typically as human populations and per-capita consumption of natural resources increase, so do the negative impacts on Earth unless the activities and technologies involved are engineered otherwise.

- **MS-ESS3-4.** Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems.

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Ocean Literacy Principles

- Principle 6: The ocean and humans are inextricably interconnected.
  - The ocean affects every human life. It supplies freshwater (most rain comes from the ocean) and nearly all Earth’s oxygen. The ocean moderates the Earth’s climate, influences our weather, and affects human health.
  - Everyone is responsible for caring for the ocean. The ocean sustains life on Earth and humans must live in ways that sustain the ocean. Individual and collective actions are needed to effectively manage ocean resources for all.
Virtual Field Trip will begin shortly...

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Stay Connected

education@earthecho.org

EarthEcho International

@EarthEcho

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The Northrop Grumman Foundation sponsors Expeditions and continues to generously support EarthEcho International.
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EarthEcho Expeditions: PlasticSeas

NORTHROP GRUMMAN Foundation

EARTH ECHO INTERNATIONAL www.eartthecho.org
EarthEcho Expedition PlasticSeas: Resources

- Exciting videos hosted by Philippe Cousteau documenting our plastic journey in Australia
EarthEcho Expedition PlasticSeas: Resources

- STEM Career Close Up videos on the experts we met on Expedition
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- Youth In Action Videos highlighting amazing youth working in their community against ocean plastic pollution
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○ Lesson Plans
Guest Host

Dr. Kate Charlton-Robb
Executive Director
The Marine Mammal Foundation
Marine Mammal Foundation

OUR VISION

MMF's vision is to be the leading Australian marine mammal conservation and research organisation, advancing the natural marine environment through applied research, community engagement and next generation learning.

OUR MISSION

CONDUCT APPLIED RESEARCH
Working with Australian and international scientists and researchers, to establish and advance the knowledge, conservation, and protection of Australia's marine mammals.

APPLY FINDINGS
To apply the findings and learnings from our research to achieve informed and effective conservation outcomes.

RAISE AWARENESS
To raise community and stakeholder knowledge of marine conservation issues and empower change through greater awareness and action opportunities.

PROVIDE EDUCATION
To encourage and support the next generation, from early learners through to tertiary students, to ensure that what we do today, creates a better tomorrow.

www.earthecho.org
A bit about me...

• Bachelor of Science degree at Monash University
• Genetics as a tool for cryptic species

• Honours project 2003
• Dean’s Postgraduate Research Scholarship
• Doctor of Philosophy 2006-2012

• Sixteen years experience
• Vet trained to conduct gross necropsy and scientific sampling
• Conducted 40+ gross necropsies
• Lectured at Monash University
• Research Associate: Museum Victoria, Monash and Deakin University
• President Australian Marine Sciences Association – Victorian branch
• Founding Director Marine Mammal Foundation
Marine Mammals - seals
Marine Mammals - dolphins
Marine Mammals - whales
Marine Mammals and plastic

Dead whale washed up in Philippines had 40kg of plastic bags in its stomach

Marine biologists horrified to find 16 rice sacks and multiple shopping bags inside Cuvier’s beaked whale

This pregnant whale died with 50 pounds of plastic in her stomach

A pregnant sperm whale washed up dead on a beach in Sardinia, Italy. Its stomach was full of plastic.

COURTESY OF SERME SARDINIA

ENVIRONMENT | PLANET OR PLASTIC?

Darrell Butchley pulling plastic out of the juvenile male Cuvier’s beaked whale. Photograph: Darrell Butchley/D Bone Collector Museum Inc.

www.earthecho.org
Dead whale found with 115 plastic cups and two thongs in its stomach

Update: 21 Nov 2016, 10:15am

Pregnant whale dies from ingested rubbish

A pregnant whale that washed up on a beach in Melbourne's western suburbs was struck by a stomach filled with plastic and kelp, an autopsy has revealed.

The 2.4-metre pygmy sperm whale was spotted in distress on a beach at Williamstown in late May and euthanised after rescue attempts failed.
Why do we use plastic?

- Accessible
- Durable
- Inexpensive
- Lightweight
Many types of plastic

Polyethylene terephthalate (PET)

High-density polyethylene (HDPE)

Polyvinyl chloride (PVC)

Low density polyethylene (LDPE)

Polypropylene (PP)

Polystyrene (PS)
How long until it’s gone?

Plastic Grocery Bags 10-200 years

Cigarette Butt 1-5 years

Monofilament Fishing Line 600 years

General/Micro Plastics 20-1000 years

Aluminum Cans 200 years

Glass bottles 1 million years

Balloons 4 years
How long until it’s gone?

Plastic Grocery Bags: 10-200 years
Cigarette Butt: 1-5 years
Monofilament Fishing Line: 600 years
General/Micro Plastics: 20-1000 years

Aluminum Cans: 200 years
Glass Bottles: 1 million years

Never really gone!
How long until it’s gone?

www.earthecho.org
How long until it’s gone?
Our Impact
Marine Litter Project
Marine Litter Project

We all know litter is an issue...

BUT it can all just seem too much for us do to anything about!
There is a recognised disconnect between our actions and litter, and its effect on marine environments

A holistic, engaging and interactive program designed to inspire appreciation of, and foster connection to, marine environments and empower action to reduce the litter threat RE THINK attitudes towards plastic use

www.earthecho.org
The Burrunan dolphin

A New Dolphin Species, the Burrunan Dolphin *Tursiops australis* sp. nov., Endemic to Southern Australian Coastal Waters

Kate Charlton-Robb1,*, Lisa-ann Gershwin1,*, Ross Thompson2, Jeremy Austin3,4, Kylie Owen4, Stephen MacIvor1

1 Centre for Environmental Stress and Adaptation Research, School of Biological Sciences, Monash University, Clayton, Victoria, Australia; 2 Australian Centre for Blacktown, School of Biological Sciences, Monash University, Clayton, Victoria, Australia; 3 Tassie Museum and Art Gallery, Hobart, Tasmania, Australia; 4 South Australian Museum, Adelaide, South Australia, Australia; 5 Australian Centre for Antarctic (CVA) University of Adelaide, Adelaide, South Australia, Australia; 6 Science Department, Museum Victoria, Carlton Gardens, Melbourne, Victoria, Australia

Abstract:

Small coastal dolphins endemic to south-eastern Australia have variously been assigned to described species *Tursiops truncatus*, *T. aduncus* or *T. mac格环is*; however, the specific affinities of these animals is controversial and have recently been questioned. Historically, the southern Australian *Tursiops* was identified as unique and was formally named *Tursiops mac格环is* but was later synonymised with *T. truncatus*. Morphologically, these coastal dolphins share some characters with both aforementioned recognised *Tursiops* species, but they also possess unique characters not found in either. Recent mtDNA and microsatellite genetic evidence indicates deep evolutionary divergence between this dolphin and the two currently recognised *Tursiops* species. However, in accordance with the recommendations of the Workshop on Cetacean Systematics, and the United Species Concept, the use of molecular evidence alone is inadequate for describing new species. Here we describe the morpho-ontological, colouration and coastal characters of these animals, assess the available and new genetic data, and conclude that multiple lines of evidence clearly indicate a new species of dolphin. We demonstrate that the specimen material of *T. mac格环is* comprises two different species, one of which is the historical ‘southern form of *Tursiops*’ most similar to *T. truncatus*, and the other is representative of the new species and requires formal classification. These dolphins are here described as *Tursiops australis* sp. nov., with the common name of ‘Burrunan Dolphin’ following the Australian Aboriginal tradition. The recognition of *T. australis* sp. nov. is particularly significant given the existence of this new species in a small geographic region of southern and south-eastern Australia, where only two small resident populations in close proximity to a major urban and agricultural centre are known, giving them a high conservation value and making them susceptible to numerous anthropogenic threats.
The Burrum dolphin
The Burrunan dolphin
What do we know?
Listed as ‘Endangered’ under Victoria's Flora and Fauna Guarantee Act
To Interact & Submit Questions:

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QUESTIONS
Educate and Empower
Action
Simple actions

- Avoid single-use plastic bottles.
- Use reusable water bottles.
- Avoid single-use plastic cups.
- Use reusable coffee cups.
- Avoid single-use plastic bags.
- Use reusable shopping bags.
Simple actions
Marine Champions
Marine Champions

You are important. Your actions can make a big difference.

The purpose of this booklet is to give you some ideas on how to make a difference in your community, so that after you go home after a Marine Champions session, you have an idea of what you can do to improve sustainability or further conservation efforts in your school or local area.

All of these initiatives were ideas of Marine Champions. To use this guide, select an action that interests you. Underneath is a general step-by-step process of how to achieve it and things to think about, as well as additional tips and tricks.

If at any point you need help with any of these actions, the Marine Champions leaders are just a email away, and are more than willing to help you.

1. ORGANISING AN EVENT OR FUNDRAISER

1. Decide if you want your event to be school-based, or if you will hold it outside of school. Always ask for permission first.
2. Decide what type of event you want to hold. Do you want a fundraising event like a bake sale, a disco, a movie night, an art show, or a theatre or music performance? Or do you want to run a competition, like a poetry, writing, video, photography or song? competition? Do you want to hold a rude food-day?
3. Decide what the aim of your event is - do you want to fundraise for a group or charity, celebrate something, or raise awareness about an issue?
4. Find people to help you. Running something can get really complicated, and teamwork can help take some of the stress out of organising.
5. Create a plan. If it’s an event, pick a date, time and a venue. Will you be planning multiple events over a week? If it’s a competition, is there going to be a prize? How long will the competition be open for? Who will be the judge? Are you having an awards ceremony?
6. Tell the teacher what your plan is, and see if your idea is possible.
7. If it is, great! Plan when it will run. If it’s an event, will it be a night or during the day? What date will it happen? If it’s a competition, plan when it will be open for entries, when it will close, allocate time for judging, and the day when results are released.
8. Plan addition details. Is there a theme for your competition? What will you need for your event? Will people pay to come, or will they buy things? Will you need a float for change?
9. Once all of these points are planned for, start to advertise! Posters and announcements are very helpful to spread the word. If you’re running an event, invitations or posting online could also be beneficial.
10. Make sure to ask for help if you need it.

2. MORE BINS!

1. Do some research. How many bins does your school have? How much litter do you think is thrown away at your school per day? Why is throwing litter into the wrong bins bad?
2. Talk to a teacher about your research. Suggest reasons why increasing the number of types of bins, such as soft plastic, compost or recycling bins will be a good thing.
3. If that teacher is on board with your idea, do some more research. What types of bins do you think your school needs? How much do they cost? How many do you think you will need? If you do get them, how will you dispose of the waste inside them? Who will you need to talk to about this - maybe other teachers, an environment committee if you have one, or the school dean? You may need to get help from your teacher to answer some of these questions.
4. Once you have a plan, you may need to pitch it, or present it to other people. Remember to be respectful, and understand that these types of changes may not be possible overnight.

TOP TIPS

Ensure you follow the rules of safety and hygiene while disposing of waste. Always use the correct bins for a waste stream. Make sure you know where the bins are, and how to dispose of waste properly. When disposing of waste, make sure to use the correct bins for a waste stream. Always use the correct bins for a waste stream. Make sure you know where the bins are, and how to dispose of waste properly. When disposing of waste, make sure to use the correct bins for a waste stream.
QUESTIONS
Together we can ensure what we do today, creates a better tomorrow.
Upcoming Events

www.earthecho.org
Virtual Field Trip with the Orange Country Water District, Thursday, May 9th at 2:00 PM EST
EarthEcho Expeditions: PlasticSeas
EarthEcho Expedition PlasticSeas: Resources

- Exciting videos hosted by Philippe Cousteau documenting our plastic journey in Australia
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Thank you for joining us!

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