INTERNATIONAL TRAVELLERS

Shorebirds are a group of birds that spend a lot of their time in coastal areas, wetlands and shorelines. They can be broadly divided into two groups: Plovers and Sandpipers.

We can divide shorebirds into a couple of other groups too:

Migratory shorebirds travel huge distances each year to move between where they feed (Southern Hemisphere) and where they raise their chicks (Northern Hemisphere). This is called a **migration.**

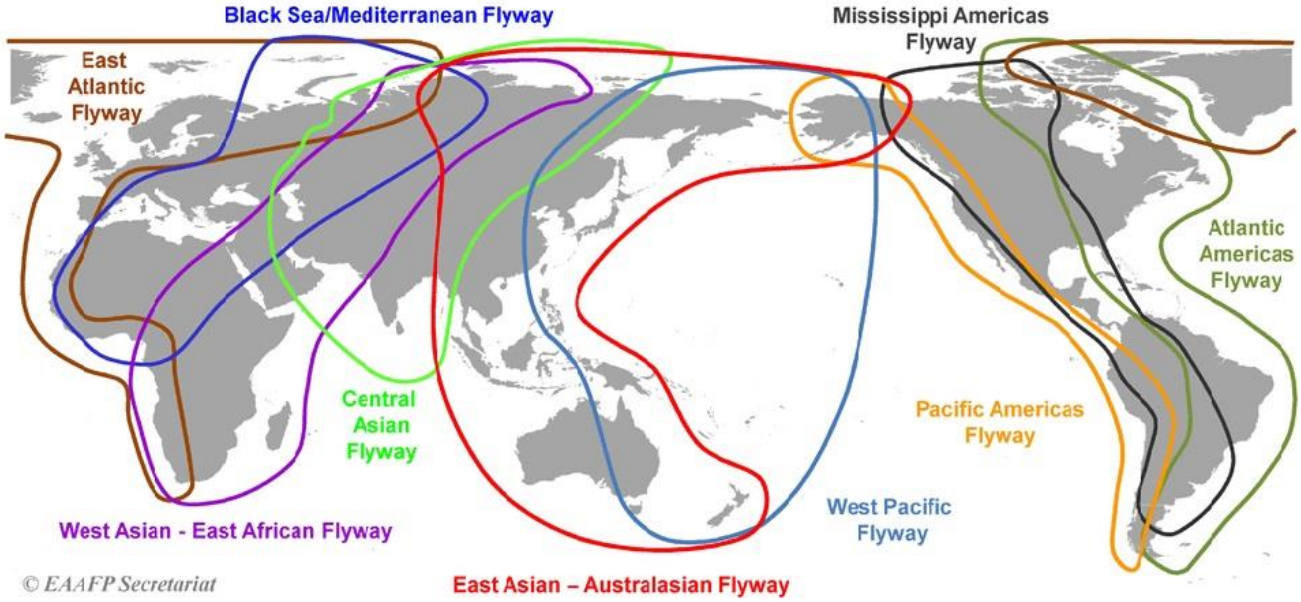
There are some shorebirds that don't make a migration. They have all they need to feed and raise chicks where they already live. These are called resident shorebirds.

Migratory shorebirds are particularly special because they can travel 20,000km each year to their **breeding grounds** and back! They travel along a route called the **East-Asian Australasian Flyway (EAAF)**. This is like a highway that all the birds from Australia use to make their journey north to raise chicks. They can stop along as they go and feed on the way – other birds make only a few stops and can fly 5,000km for 5 days straight!

ACTIVITY

Congratulations – you're going to embark on your own migration along the EAAF Don't forget to fuel up, some shorebirds double their weight before they head off.

Have a look at the map of the EAAF (in red) what countries do you think you will you pass over?



On your trip, you will leave Broome around April. Write a postcard to a friend from one or more of the countries along the way or draw a picture of you at your final destination – Siberia and the Arctic Circle!

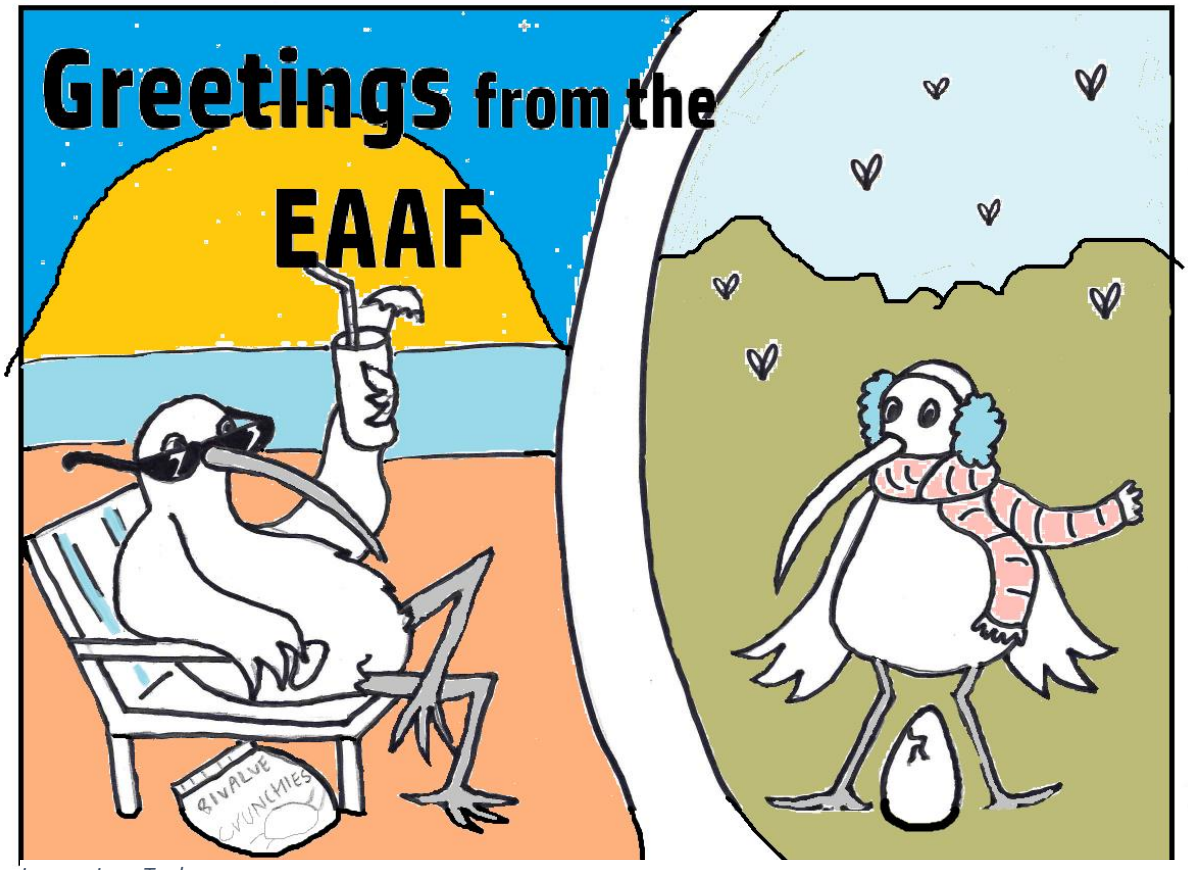


Image: Jane Taylor

How do scientists know that shorebirds travel from Australia to Russia and back again?

A bright flag with a set of letters or numbers is placed by researchers on the shorebirds leg. Every flag has a different combination of letters and numbers. The flag works like a name tag! It is big enough so that a researcher watching the birds through their telescope or binoculars can tell exactly which individual shorebird it is, without having to catch the bird.

Photo: RIc Else

Every state in Australia has its own flag colour for its shorebirds and even some small areas within states have their own colour. For example, in Broome the birds get a yellow flag. If we see a shorebird with a yellow flag we know it must have caught in a researcher's net in Broome. If we saw an orange flag we'd know straight away that this is a shorebird that has been caught in Victoria. These flags are not just like a name tag for the bird but also a passport, we can tell where a bird has visited and been caught by scientists just by seeing which colour it has on its leg.

Different countries have their own set of flags too. Have a look at the list to see how each country and region is represented in shorebird leg flags. These are just for the countries in the East- Asian/ Australasian Flyway.

Shorebird Color Flagging Protocol on the EAAF *(by country)*

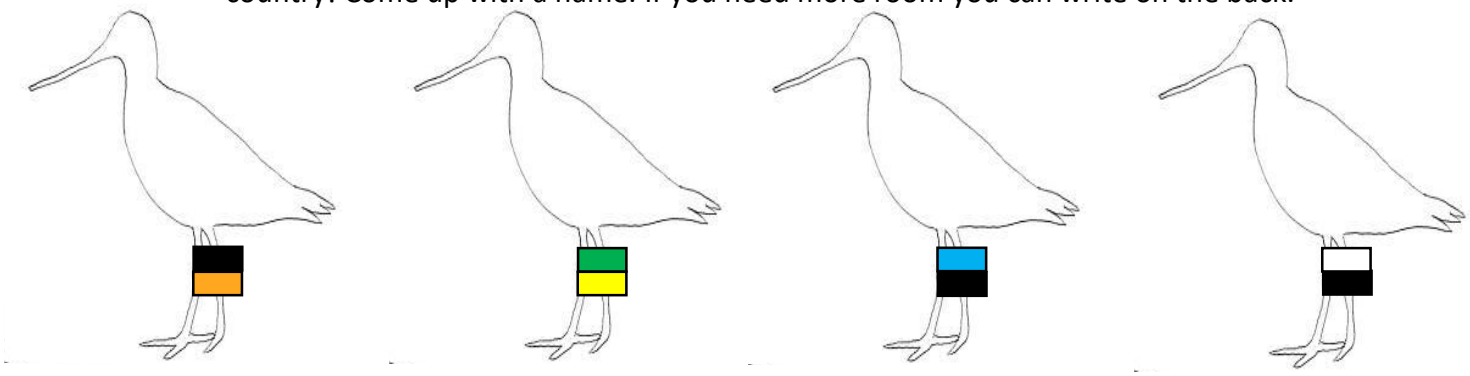
Upper flag	*Lower flag*	*Country*	*Location*
Green	Yellow	AUSTRALIA	Gulf of Carpentaria
Green	*no flag*	AUSTRALIA	Qeensland
Orange	Blue	AUSTRALIA	Tasmania
Orange	Green	AUSTRALIA	New South Wales
Orange	Yellow	AUSTRALIA	South Australia
Orange	*no flag*	AUSTRALIA	Victoria
Yellow	Blue	AUSTRALIA	Northern Territory
Yellow	Orange	AUSTRALIA	SW Western Australia
Yellow	*no flag*	AUSTRALIA	N Western Australia
Green	Black	CAMBODIA	
Black	White	CHINA	Chongming Island
Blue	Black	CHINA	Hainan-Guangxi
Blue	Yellow	CHINA	Bohai Bay
Green	Blue	CHINA	Jiangsu
Green	Orange	CHINA	Yalujiang
White	Black	CHINA	Chongming Island (old)
White	Blue	CHINA	Taiwan
White	Yellow	CHINA	Hong Kong
Black	Orange	INDONESIA	Java & Bali
Orange	Black	INDONESIA	Sumatra
Blue	Blue	JAPAN	Lake Komuke, Northern Hokkaido
Blue	Orange	JAPAN	Kyushu
Blue	White	JAPAN	Tokyo Bay
Blue	*no flag*	JAPAN	Shunkunitai, Eastern Hokkaido
Black	Yellow	MALAYSIA	(proposed)
Blue	Green	MONGOLIA	
Black	Black	MYANMAR	
White	Green	NEW ZEALAND	South Island
White	*no flag*	NEW ZEALAND	North Island
Black	Blue	PHILIPPINES	Philippines
Yellow	Black	RUSSIA	Kamchatka
Yellow	White	RUSSIA	Sakhalin Island
Green	White	SINGAPORE	Singapore
Orange	White	SOUTH KOREA	Eastern Yellow Sea (old)
White	Orange	SOUTH KOREA	Eastern Yellow Sea
Black	Green	THAILAND	Thailand Peninsular & Gulf of Thailand
Yellow	Green	VIETNAM	

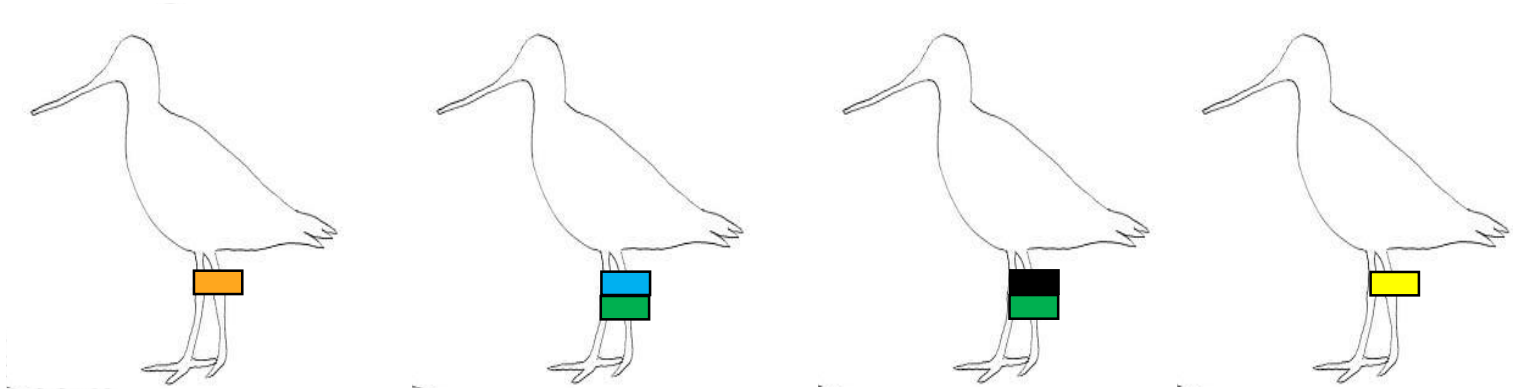
Shorebird Color Flagging Protocol on the EAAF *(by color)*

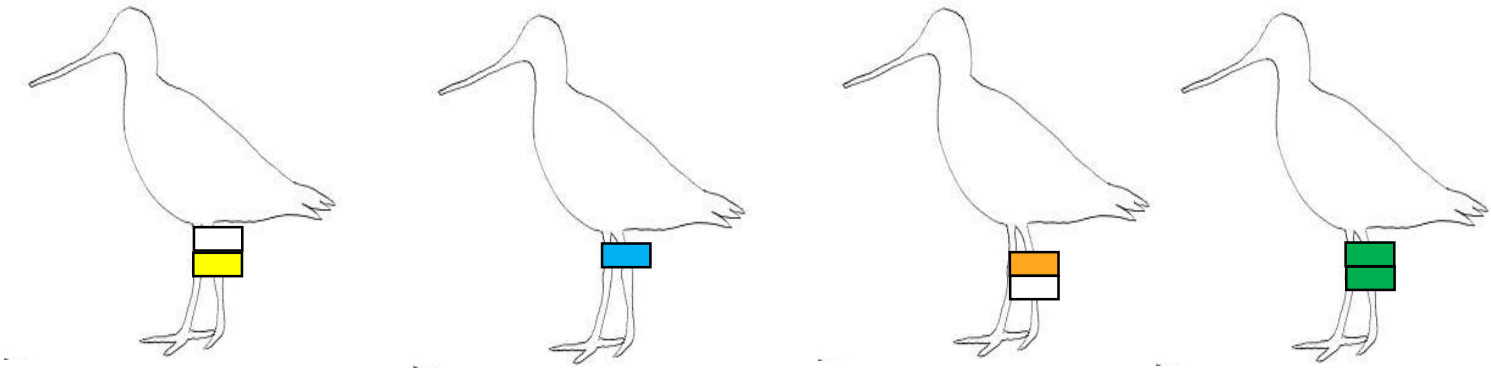
Upper flag	*Lower flag*	*Country*	*Location*
Black	Black	MYANMAR	
Black	Blue	PHILIPPINES	Philippines
Black	Green	THAILAND	Thailand Peninsular & Gulf of Thailand
Black	Orange	INDONESIA	Java & Bali
Black	White	CHINA	Chongming Island
Black	Yellow	MALAYSIA	(proposed)
Black	*no flag*	(not allocated)	
Blue	Black	CHINA	Hainan-Guangxi
Blue	Blue	JAPAN	Lake Komuke, Northern Hokkaido
Blue	Green	MONGOLIA	
Blue	Orange	JAPAN	Kyushu
Blue	White	JAPAN	Tokyo Bay
Blue	Yellow	CHINA	Bohai Bay
Blue	*no flag*	JAPAN	Shunkunitai, Eastern Hokkaido
Green	Black	CAMBODIA	
Green	Blue	CHINA	Jiangsu
Green	Green	(not allocated)	
Green	Orange	CHINA	Yalujiang
Green	White	SINGAPORE	Singapore
Green	Yellow	AUSTRALIA	Gulf of Carpentaria
Green	*no flag*	AUSTRALIA	Qeensland
Orange	Black	INDONESIA	Sumatra
Orange	Blue	AUSTRALIA	Tasmania
Orange	Green	AUSTRALIA	New South Wales
Orange	Orange	(not allocated)	
Orange	White	SOUTH KOREA	Eastern Yellow Sea (old)
Orange	Yellow	AUSTRALIA	South Australia
Orange	*no flag*	AUSTRALIA	Victoria
White	Black	CHINA	Chongming Island (old)
White	Blue	CHINA	Taiwan
White	Green	NEW ZEALAND	South Island
White	Orange	SOUTH KOREA	Eastern Yellow Sea
White	White	(not allocated)	
White	Yellow	CHINA	Hong Kong
White	*no flag*	NEW ZEALAND	North Island
Yellow	Black	RUSSIA	Kamchatka
Yellow	Blue	AUSTRALIA	Northern Territory
Yellow	Green	VIETNAM	
Yellow	Orange	AUSTRALIA	SW Western Australia
Yellow	White	RUSSIA	Sakhalin Island
Yellow	Yellow	(not allocated)	
Yellow	*no flag*	AUSTRALIA	N Western Australia

ACTIVITY: SHOREBIRDS OF THE EAAF

Have a look at the leg flags. Using the Flagging Guide above where do these birds come from? If you find a flag combination that doesn't belong to a location, it can be your own country! Come up with a name. If you need more room you can write on the back.







HOW TO SPOT A SHOREBIRD

When identifying shorebirds, we don't have the luxury of going by their colours or feathers like we do with other bird **species.** Shorebirds are usually grey (although some do change into breeding colours which we'll discuss later). So, when you identify shorebirds a good trick is to become familiar with the overall shape or outline of the bird.

Shorebird bills

We talk about shorebird **bills** a lot because unlike their **plumage** the bills of a shorebird vary a lot.

Why do you think this is?

What would different bill shapes allow different birds to do?

It's got to do with their food. There is so much food in Roebuck Bays mudflats. This food is called the **benthos** or **benthic invertebrates.** Scientists have found that Roebuck Bay has the highest **diversity** of benthos of any mudflat in the world that they know about.

With all this food and all these hungry shorebirds how is there enough food to go around?

Have a think about shorebird bills again. When you eat spaghetti you reach for a fork. When you are eating cereal a spoon does a much better job. Chopsticks are good for noodles but could you cut into a steak with chopsticks? No, that's why you use a different tool, like a knife.

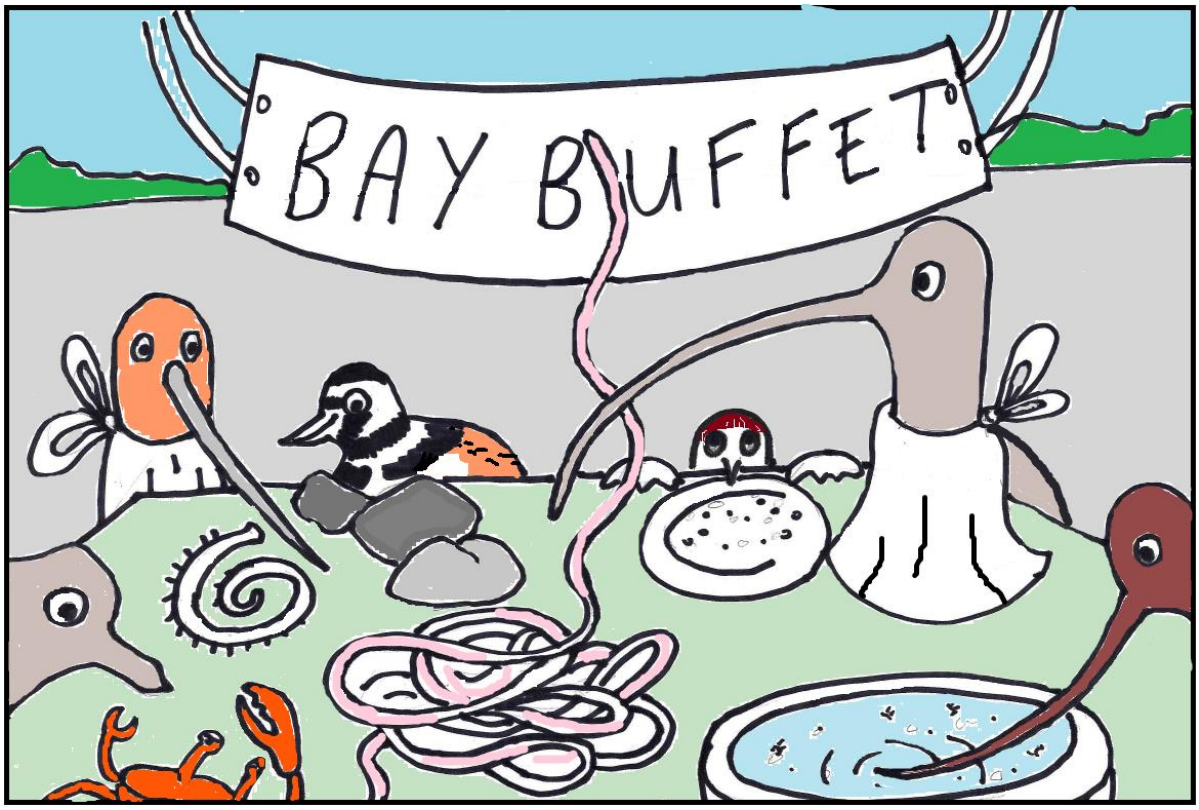


Image: Jane Taylor

The shorebirds bills work the same way. Each species has a very different bill to the next. Just as there is a high **diversity** of benthos (food) there is also a diversity in the shorebirds bills – not every shorebird can eat everything in the benthos, each shorebird species has its own tool to eat what it can reach.

Looking at Shorebird ID booklet as a guide, match the silhouette to the shorebird using the bill and the leg length/ shape of bird to help you. Once you have worked out which silhouette goes with which shorebird then colour it in according to the Shorebird ID booklet.

Shorebird Silhouettes:
https://static1.squarespace.com/static/5722d9faf85082b93efd60dc/t/5ec8d75b063db750f23b232a/1590220636352/Shorebird+SIlhouette.pdf

See that there are breeding and non-breeding colours. The breeding colours are a way to attract a mate but also help the shorebird **camouflage** when they are sitting on their nest in the Northern Hemisphere.

Design your own shorebird
Thinking about breeding plumage, camouflage and bill shape, design your own shorebird to perfectly suit your invented mudflat.
What is its name?
Where does it breed?
What colour plumage would help it camouflage the best?
What does it eat? What kind of bill does it need to reach its choice of food?
Does it have any other special features that help it live in its environment?

Mark on a map of Australia where your migratory shorebird can be found and give it a colour leg flag.

BirdLife Australia Shorebird ID Booklet:
http://www.birdlife.org.au/documents/Shorebird_ID_Booklet_V3.pdf

SHOREBIRDS BY NUMBERS

Using the cm next to each species in the Shorebird ID Booklet and, arrange these shorebird species in order from biggest to smallest:

1	
2	
3	
4	

5	
6	
7	

Broad-billed Sandpiper Eastern Curlew Red-necked Stint Common Greenshank

Wood Sandpiper Red Knot Grey-tailed Tattler

Numbers are very important in science and for shorebirds it is no different. We know that we have approximately 120,000 shorebirds in Roebuck Bay during the **Wet season** and about 20,000 in the **Dry season**. These are such huge numbers, so how do we count that many birds?

If there are a few birds we can count them one by one, but if they are flying or they're packed in tight in a flock it would take too long and then we try other way. Often birds don't always stand still! So, if there is a flock flying we often just have to estimate the number. First we estimate the flock before we properly count them, just in case they take off so at least we can have an idea. A good way to count huge numbers is by counting in blocks of two, five, ten and sometimes 100's.

Have a look at this flock. You've just sat down to count them but you see a Brahminy Kite heading towards them. It might spook the birds very soon so quickly at a glance estimate the number of shorebirds in these flocks:

Now count them one by one and see how close you were.

Photo: Ric Else

Photo: Ric Else

Photo: Ric Else

Here in Broome we have enormous tides. Sometimes tides are so big they can really change the landscape. Years ago, in Broome's historic open air movie theatre, guests would sometimes have sea water flowing around their ankles as it made its way from the beach up over the road and into the cinema!

When the tide is out or low the shorebirds can feed on the mudflats. When the sea comes in for high tide, the mud flats are covered by the sea and so the shorebirds cannot feed as their food is now underwater. We watch shorebirds around high tide. If the tide is out (low tide) there is so much mudflat for the birds to feed on they are spread out far and wide and they are difficult to see. However, when the tide comes in and their food is under the water they must sit of the beach and wait for the tide to turn. This is their chance to have a rest and because they're not so spread out they're much closer and easier to see.
Every day we need to look at our tide chart. Have you seen a tide chart before? Most beaches in Australia have their own tide chart. Look up the tides of your favourite beach here:

http://www.bom.gov.au/oceanography/projects/ntc/tide_tables.shtml

There aren't many places in Australia (or the world) that have bigger tides than Broome. Are you looking at the tide chart? What a muddle of numbers! It might look confusing but these numbers are very important for fishing, surfing, boating, navigating, walking on certain beaches, for the marine wildlife and of course, watching shorebirds.

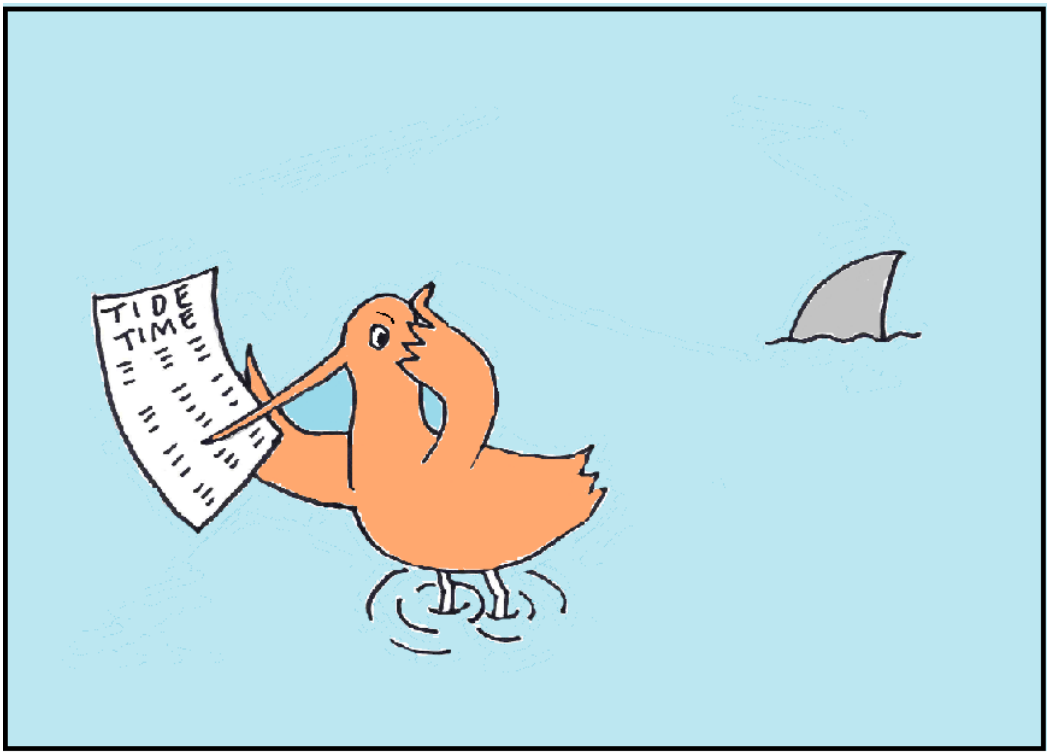
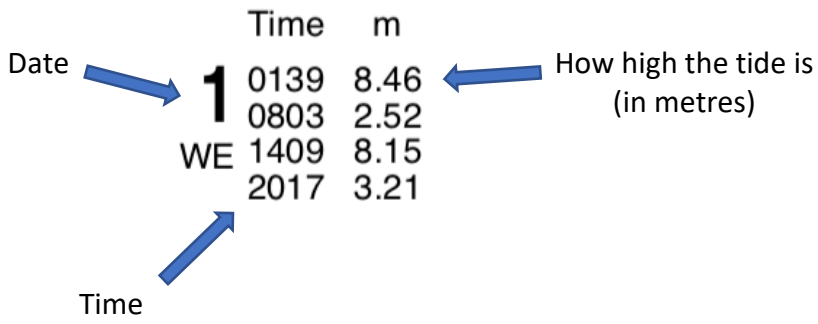


Image: Jane Taylor

How to read a tide chart:



Every beach has different tides. In Australia for the most part, we have two high tides and two low tides each 24 hours. The l*eft-hand column* shows the *time* that the low and high tides are happening. This is using a **24-hour time** which may be different to what you are used to seeing on clocks and telling the time.

24 hour time	**Regular clock**
0100	1:00 am
0200	2:00 am
0300	3:00 am
0400	4:00 am
0500	5:00 am
0600	6:00 am
0700	7:00 am
0800	8:00 am
0900	9:00 am
1000	10:00 am
1100	11:00 am
1200	12:00 midday
1300	1:00 pm
1400	2:00 pm
1500	3:00 pm
1600	4:00 pm
1700	5:00 pm
1800	6:00 pm
1900	7:00 pm
2000	8:00 pm
2100	9:00 pm
2200	10:00 pm
2300	11:00 pm
2400	12:00 midnight

So **0803** is just another way of writing **8:03 am**

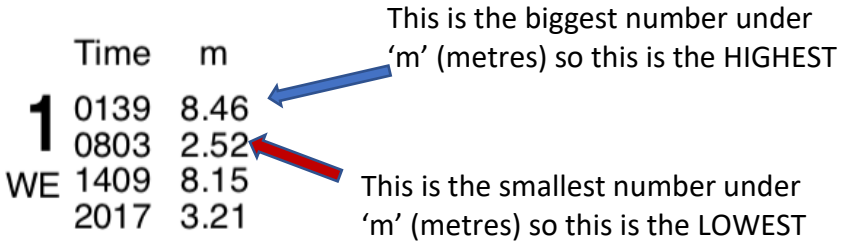
And **1409** is another way of writing **2:09 pm**

The *right-hand side* of our tide chart is the measurement of water in *metres,* or how big the tide will be.

See how there are two bigger numbers and two smaller numbers in the metres (m) side of the tide char?

Which do you think is the HIGH tide and which is the LOW tide?

The two biggest numbers in metres are the HIGH tide. This shows how big the tide is in metres.
The two smallest numbers in metres are the LOW tides.



Every beach is different and is affected by tides in different ways. The wardens at the BBO need to be familiar with the tide so they know when it will be good for them to watch shorebirds. For Roebuck Bay, the best tide to watch the shorebirds is any tide between 7 metres and 9.5 metres. Any lower than this and the birds are too far away to watch. Any bigger and the tide comes in too high for the birds and they fly away for the day.

Using this tide chart, which days would be good for the wardens to watch the shorebirds? Remember – the wardens don't want to watch the birds in the middle of the night!

Which day has the biggest tide in this month?

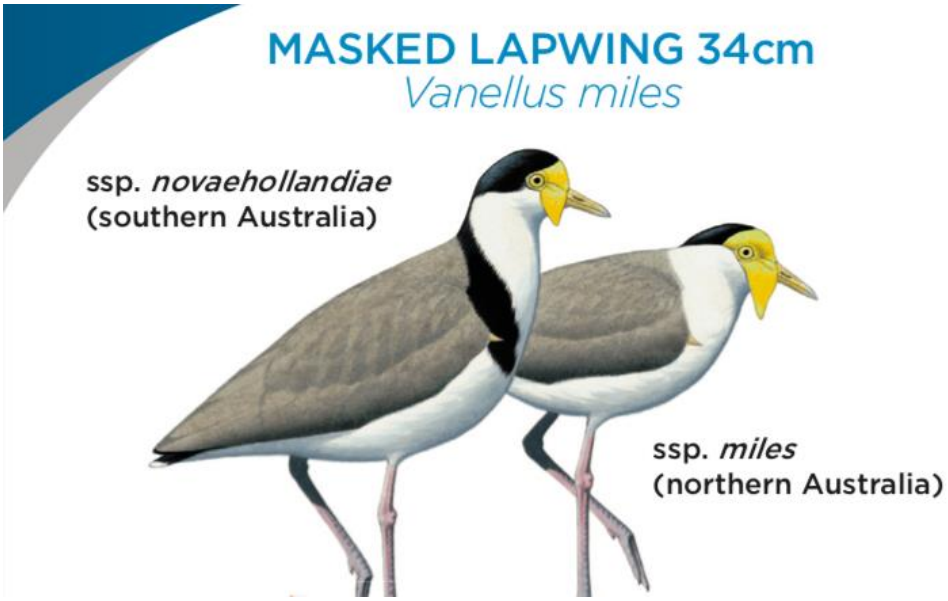
Have you noticed any patterns in the tide numbers?

Are they getting bigger or smaller? How does the changing moon affect the tide?

Is there a difference in how big the gap between a high tide and a low tide is throughout the month? Circle any patterns you find.

WHAT'S IN A NAME?

You'll notice under each species' name there is another, more complicated name written in italics *like this.* This is called the birds scientific name. Every species (including humans!) have a scientific name. It can be difficult to read because it is written in language called Latin.



The birds name up the top is what we call the 'common name', like your first name. Sometimes in different parts of the world – or even in different states of Australia - the same species of bird is known by lots of different common names.

For example, you may hear Masked Lapwings be called Plovers. This can get confusing so scientists give everything in the world a name in Latin which stays the same wherever you are. Someone may not know what you mean when you say Masked Lapwing or Plover but if you say to them: '*Vanellus miles'* they can find out exactly what you're talking about.

But what do these names mean? They can look confusing but scientific names can have clues in them which describes the bird. Latin can be a tricky language but if you look through a field guide you'll start to pick up somethings you can recognise – and link to the bird.

For example: *Charadrius mongolus* (Lesser Sand-Plover). Lesser Sand-Plovers breed in Mongolia (*mongolus)*

Calidris minuta (Little Stint). The word *minuta* is like minute which means small.

Have a look at the shorebirds in the booklet and see if you can work out what the scientific name might be referring to (sometimes they don't refer to anything on the bird!) Use Google or another search engine to look up some of the Latin words to help you out.

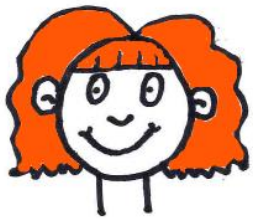
Here are some common Latin words used and what they often mean:

Latin word	Common meaning
ceph	head
melan	black
poly	many
bi	two
Ruf/ rufus	red
rostris	Nose/beak
longi	long

Have a look at some of the other birds you know or common birds you might see in your garden. Using the internet or a Field Guide look up the scientific names of your familiar garden bird and see if you can find some clues in the Latin to see what they are describing.

Our species, humans, have the Latin name; *Homo sapiens*

If you could make a Latin name to describe yourself what would it be?



Jessicus rufuhairus

Ahmed polyfreckles

Glossary

Migration
The movement of people or animals across countries/ continents/ oceans to breed or feed often to make the most of different seasons.

Breeding grounds
The area where shorebirds and other animals breed and often raise their young.

East-Asian Australasian Flyway (EAAF)
The north-south migration route that Roebuck Bay's birds take to breed in the Northern Hemisphere.

Species
A type of plant or animal. For example: an Eastern Curlew is a species, which is different from Red Knot, another species.

Benthos/ Benthic invertebrates
The crustaceans, worms and other critters that live in and under the mudflats.

Bills
Another word for a bird's beak.

Camouflage
The colours or pattern on an animal that help it blend in with its environment or hide from predators.

Diversity
Many different types of things (people, animals, plants) that can be found all together. High diversity means there is a lot of different types in a group. For example: My garden has a high diversity of different flowers.

Plumage
Another word for feathers on a bird.

Wet season
In Northern Australia, Europeans have two seasons: Wet and Dry season. The Wet season is very hot and humid with a lot of rainfall. Usually November – March.

Dry season
In Northern Australia, Europeans have two seasons: Wet and Dry season. The Dry season is warm to hot with cold temperatures at night and clear blue skies for months and months.