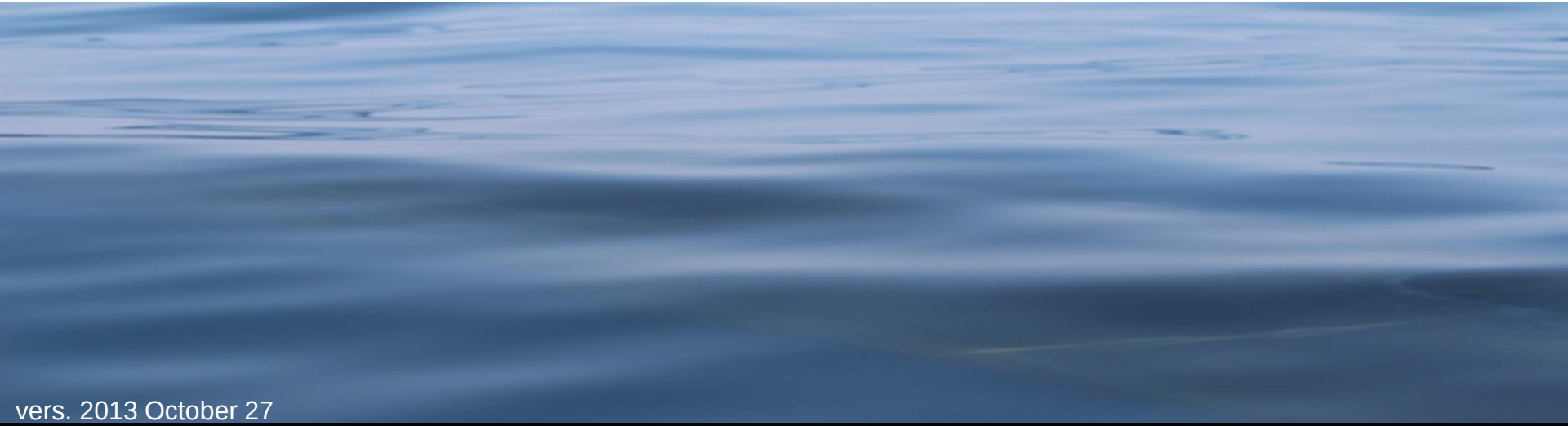
OPSL

Orca Project Sri Lanka



vers. 2013 October 27

OPSL

Orca Project Sri Lanka

Public Science and Photo Identification of orcas in Sri Lanka

Project administration team

Georgina Gemmell, Gehan de Silva Wijeyeratne & Chitral Jayatilake

Contents

Part 1. Introduction to the Orca

Points covered in this section
Introduction to the Orca
Orcas in Sri Lanka

Introduction to the Orca *Orcinus orca*

Orca or Killer Whales, are the apex predator of the ocean and are thought to be one of the most socially complex and intelligent mammals on earth.

They occur in all of the world's oceans. They are the most widely distributed cetacean species, and the 2nd most widely distributed mammal on earth… 2nd only to us humans.

Orca are a member of the Delphinade family, making them the largest species of dolphin.

They are known to occur in several different ecotypes/subspecies that are genetically distinct and differ subtly in appearance. Each of these ecotypes exhibit their own feeding habits, hunting methods, social structure and vocal repertoire…similar to our 'Cultures'

Researchers primarily use passive-acoustic monitoring (recording the whales' calls) and photo identification (identifying and tracking individuals using photos of their unique markings and dorsal fins) to study orca populations.

Orcas are known as Killer Whales because Spanish whalers observed mammal-eating orcas hunting other whales - "killer of whales" but there has been no record of attacks towards humans in the wild. The term orca, comes from the scientific name -Orcinus orca. In the late 70's this name was popularized as a way to rid the orca of its mistaken reputation as a species dangerous to man and hence to be persecuted.

Orcas in Sri Lanka

Still a lot is unknown about the orcas that visit Sri Lankan waters each year but thanks to records of orca sightings in the past, here is what we do know…

Orca have been sighted off Mirissa (north-east), Kalpitya (North-west) and Trincomalee in the north-east. This project began in September 2013 with a record set of around twenty records.

Most of the initial records were off Mirissa. But this may just be due to the number of whale watching boats that operate in the area increasing the chance of an encounter.

It is thought that the orcas off Sri Lanka are **Transient**, meaning that they do not reside around Sri Lanka and their range is unknown.

They are thought to be a mammal-eating ecotype, feeding on other whales and dolphins. This theory has been strengthened due to orcas being observed to stalk and harass a blue whale calf, as well as the well-publicised underwater footage of a pod of 5-6 orca attacking a pod of sperm whales off Mirissa (Shawn Heinrichs/Paul Hilton 2013.04.18)

Orca have been known to move between Mirissa and Kalpitya (per Howard Martenstyn) as well as between Kalpitya, Mirissa and Trincomalee (OPSL). This was found using Photo ID to compare and match individuals sighted in each location.

Orcas in Sri Lanka

And here is what we would like to know…

How many Orca are seen off Sri Lanka?

Are they the same individuals?

How many males, females and calves?

What do they like to eat?

When and where are they most likely to be seen?

Have there been any births or deaths in recent years?

Is there more than one pod…How many pods?

Where do they go when they are not in Sri Lanka?

What social structure do they follow?

With your help, we hope to begin to solve some of these mysteries….

Part 2. Introduction to OPSL (Orca Project Sri Lanka)

Points covered in this section
Introduction and project objective
Key results to date •Sightings log summary •Photo Identification Project Summary: Matches

Introduction to OPSL and project objective

Orca Project Sri Lanka, OPSL is a public science project that aims to collect and compile orca encounter records into a log to be freely accessible to the public via social media platforms such as Flickr and Facebook. This online log will be updated as and when new encounters are reported.

The main objective of the project is to raise awareness of the presence of orca in Sri Lankan waters, and to encourage whale watchers to share any future sightings and images to aid further studies into these enigmatic predators that visit our waters.

Being a public science initiative, the project relies on public submissions of orca sighting data as well as images to be used in the complementary photo identification study.

All images shared are uploaded to the OPSL Flickr page (seen on following page) so that the public can view the catalogue of individuals identified so far…as well as engage with the progress of the project via comments, updates and posts.

OPSL Key Results to Date

Sightings Log Summary

The public access sightings log currently holds 28 orca sightings consisting of 26 Live and 2 deceased between the years 2013 and 1868 though the log continues to grow with past sightings still being sourced and verified.

So far, the majority of reports have come from the year 2012, this may be due to a recent increase in awareness surrounding notable sightings at sea as well as more opportunity to sight the orcas due to increase in whale watching tourism.

Calendar Year	No of Encounters	Dead Orcas
1868	1	
1872	1	
1980s	1	
1986		1
2008	2	
2009	1	
2010	4	
2011	2	1
2012	10	
2013	4	
Total	**26**	**2**

OPSL Key Results to Date

Orca sightings by calendar month

As per the OPSL sightings log, it would appear that orca sightings are highest between the months of March to April which also coincides with the key whale watching seasons of the south and north-east.

Month	Live	Dead
January	4	
February	1	
March	6	
April	5	
May	1	
June		
July		
August		
September	1	
October		
November		
December	4	
Unknown	4	2
Total	**26**	**2**

OPSL Key Results to Date

Orca sightings by calendar month and location

According to the data available, the most sightings occur off Mirissa between December – January and March and April. This coincides with the Blue and Sperm Whale season for the south. It may be that the orcas are in the area to predate on these species as well as the dolphins. There have been documented accounts of orcas 'stalking' a Blue Whale calf (23rd April 2010, Paul Hilton) and the well publicized attack on a group of Sperm Whales (April 18th 2013, Shawn Heinrichs), both events took place off Mirissa during the month of April.

Month	Mirissa	Trincomalee	Kalpitya	Unknown
January	3		1	
February				1
March	3		3	
April	4			1
May		1		
June				
July				
August				
September		1		
October				
November				
December	4			
Location Total	14	2	4	2

OPSL Key Results to Date

Photo Identification Project Summary

Since its launch in August 2013, Orca Project Sri Lanka's photo ID component is already producing some interesting results in the form of three individual matches.

The ID catalogue currently holds 9 individual orcas, these consist of 5 males, 2 females and 2 possible female or juveniles; with images being submitted from all 3 locations in the whale-watching triangle- Mirissa, Trincomalee and Kalpitya. (See summary table below)

The details of each Photo ID match are presented on the following pages.

Code	Name	First sighted (Location and date)		Resighted (Location and date)	
OM001	King	Kalpitya	2010.01.31	Mirissa	2012.01.18
				Trincomalee	2012.09.03
OM002	Nick	Mirissa	2011.12.26	Mirissa	2012.12.03
				Mirissa	2012.12.01
OM003	Rakey	Mirissa	2013.04.17	None	
OM004	Ripple	Mirissa	2013.04.18	None	
OM005	Titan	Mirissa	2013.04.18	None	
OM006	Moon	Mirissa	2013.04.18	None	
OM007	Crush	Mirissa	2013.04.18	None	
OK008	Arya	Kalpitya	2010.01.31	Mirissa	2012.01.18
OM009	Scythe	Mirissa	2012.01.26	None	

OPSL Key Results to Date: Matches

OM001 King

Kalpitya – Mirissa - Trincomalee
First sighted 2010.01.31 in Kalpitya by Lahiri Soysa (with OK008)
Re-sightings (2)
•2012.01.18 in Mirissa by photographer Leif Joensson and Nilantha Kodithuwakku (with OK008)
•2012.09.03 in Trincomalee by Stephen Moss. (with another orca, likely OK008)
This is the first ever record of orca moving between the south, northwest and northeast of the island.

Fin comparison and match carried out by Georgina Gemmell of OPSL.

Mirissa 2012.01.18 © Leif Joensson

Trinco 2012.09.03 © Stephen Moss

Kalpitya 2010.01.31 © Lahiri Soysa

OPSL Key Results to Date

OK008 Arya

Kalpitya - Mirissa
First sighted 2010.01.31 in Kalpitya by Lahiri Soysa (with OM001)
Re-sightings (1)
•Mirissa in 2012.01.18 by Nilantha Kodithuwakku (with OM001)

Note: Orca OM001 was sighted in Trincomalee in 2012.09.03 by Stephen Moss with one other orca, it is likely that the other animal was OK008

Fin comparison and match carried out by Georgina Gemmell of OPSL.

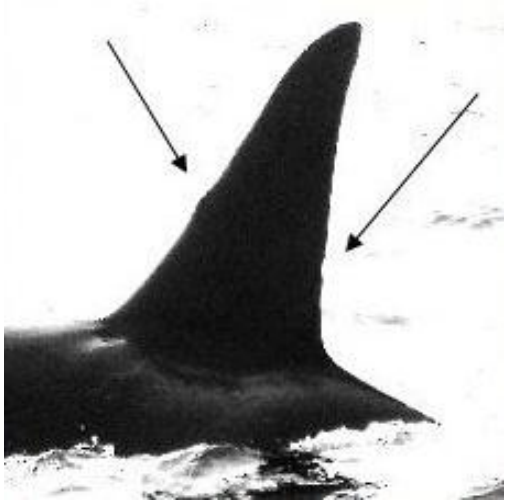
Kalpitya 2010.01.31 © Lahiri Soysa Mirissa 2012.01.18 © Nilantha Kodithuwakku

OPSL Key Results to Date

OM002 Nick

Mirissa-Mirissa
First sighted 2011.12.26 in Mirissa by Sriyan de Silva Wijeyeratne (photographed by Rashmi de Silva Wijeyeratne) with one other unidentified male orca.
Re-sightings (2)
•Mirissa 2012.12.01 by Madhawa Rajapakse (alone)
•Mirissa 2012.12.03 by Sean and Kira Swalwell (alone)

Fin comparison and match carried out by Georgina Gemmell of OPSL.



2011.12.26 © Rashmi de Silva Wijeyeratne

2012.12.01 © Madhawa Rajapakse

2012.01.26 © Sean Swalwell

Part 3. OPSL Photo ID Study

Points covered in this section
Photo Identification: What is it?
How to photograph an orca for identification purposes
3.1 The Sri Lankan Orca ID Catalogue
Cataloguing the individual orcas
Orcas identified so far

Photo Identification: What is it?

Photo Identification is the term used to describe a method of research that allows researchers to monitor a species by identifying individuals using unique markings on the body. These unique markings are recorded in photographs taken of the individual and act as a sort of ID card.

Once an individual has been identified it is named and put into a catalogue of other identified animals. When a new photo comes in, researchers can compare it against others in the catalogue and potentially match it to an individual. This allows researchers to ‘track’ the animal using re-sightings.

Photo ID is a passive form of research, meaning that it doesn’t disturb the animals…but given time, it can reveal many things about the life of the animal subjects- such as movements, sex, births, deaths, population size and so much more.

Each photo-identifiable species requires a certain way of photographing the animals so as to best show the unique markings needed for photo ID….

How to photograph an orca for identification purposes

There are 3 main ways to identify an orca

1. The Dorsal Fin: This is the large fin on the top of the whale's back. The fin often has unique scratches, rake marks (teeth marks from other orca) on the fin itself as well as notches or tears along the outer edge (trailing edge).

See below images for examples of unique features of dorsal fins.

© Madhawa Rajapakse

© Shawn Heinrichs

© Marianne Taylor

How to photograph an orca for identification purposes

There are 3 main ways to identify an orca

1. The Dorsal Fin continued

Telling the difference between males and females using the dorsal fin

Males: Very tall and straight fin that is often in the shape of an isosceles triangle.

Female: Small short fin that is curved towards the back, in a windswept fashion.

Juvenile orcas of both sex look the same until they reach puberty and males start to 'sprout' –and the dorsal fin begins to straighten and grow taller in males. These young males are referred to as 'sprouters'

Female

© Paul Hilton

Male

© Madhawa Rajapakse

How to photograph an orca for identification purposes

2. The Saddle Patch: This is the grey, cape-like area at the base of, and just behind, the dorsal fin, draped along the back. The saddle may have a unique swirling shape or pattern as well as cuts, scratches or rake marks that can be used to recognise the animal.

Ideally, a useful photo for ID would include both the dorsal fin and saddle patch. The saddle is best photographed when the whale arches its back for a dive.

© Shawn Heinrichs

© Shawn Heinrichs

How to photograph an orca for identification purposes

3. The Eye Patch: The ‘post-ocular patch’ or ‘eye-patch’ is the oval, white area just behind the orca’s eye and is perhaps the most recognisable characteristic of the species.

Each orca’s eye-patch is unique in shape, though often subtle, in some cases it may be possible to recognise an orca using a high-res photo of the eye-patch alone or as an added clue along with the dorsal fin and saddle images to confirm the identity of an individual.

3.1 The Sri Lankan Orca Photo ID Catalogue

Points covered in this section
Cataloguing the individual orcas
Orcas identified so far

Cataloguing Individual orcas

Naming and Coding: Each of the orcas in the OPSL Photo ID catalogue are assigned a unique alpha-numerical code beginning ‘O’ (for Orca) then a letter denoting where they were first sighted (K=Kalpitya, M=Mirissa, T=Trincomalee, O=Other) followed by the number of the order they joined the catalogue.

In addition to the code, the whales are also given a common nickname, normally referring to their appearance.

For example. OM003 was first sighted off Mirissa and is the third whale to join the catalogue. The whale’s nickname is ‘Rakey’ due to rake marks (teeth marks from other orca) being visible on the dorsal fin

Individuals identified so far

So far there have been 9 individual orcas identified and catalogued, these consist of 5 males, 2 females and 2 possible female or juveniles; with images being submitted from all 3 locations in the whale-watching triangle- Mirissa, Trincomalee and Kalpitya. (See summary table below)

The following pages are the ‘HR files’ for each individual in the catalogue; giving their names, details of sightings, and the unique characteristics used for identification.

Code	Name	First sighted (Location and date)		Resighted (Location and date)	
OM001	King	Kalpitya	2010.01.31	Mirissa	2012.01.18
				Trincomalee	2012.09.03
OM002	Nick	Mirissa	2011.12.26	Mirissa	2012.12.03
				Mirissa	2012.12.01
OM003	Rakey	Mirissa	2013.04.17	None	
OM004	Ripple	Mirissa	2013.04.18	None	
OM005	Titan	Mirissa	2013.04.18	None	
OM006	Moon	Mirissa	2013.04.18	None	
OM007	Crush	Mirissa	2013.04.18	None	
OK008	Arya	Kalpitya	2010.01.31	Mirissa	2012.01.18
OM009	Scythe	Mirissa	2012.01.26	None	

Individuals identified so far

OM001 – ‘King’ (Possibly Male)

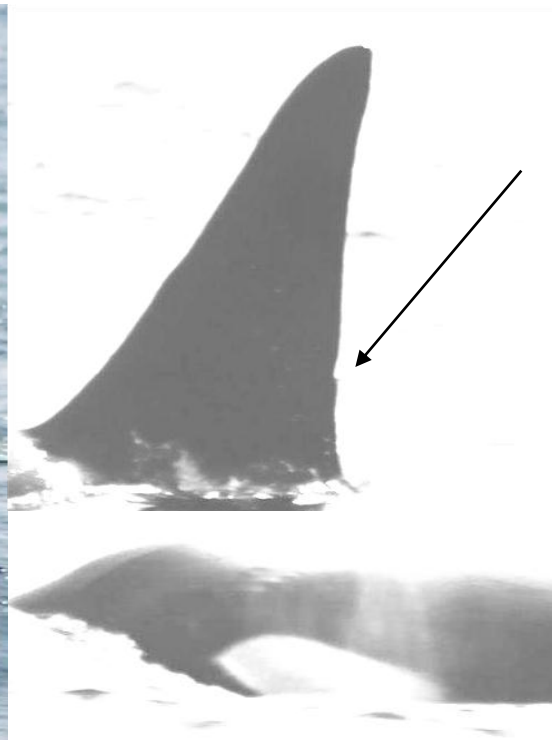
First Sighted: 2010.01.31 in Kalpitya by Lahiri Soysa (with OK008)

Re-sighted: 2012.01.18 in Mirissa (with OK008) by Leif Joensson (and Nilantha Kodithuwakku) and in Trincomalee 2012.09.03 by Stephen Moss

Characteristics: Dorsal fin has three small nicks out of the very top of the trailing edge, creating a soft serrated appearance. Right side of the fin shows scratches. Right eye-patch has distinctive 3 tiered pattern on the tapered edge towards the rostrum. Some scratches visible on right flank, just behind eye patch.

Individuals identified so far

OM002 – ‘Nick’ (Male)



First Sighted: 2011.12.26 in Mirissa by Sriyan de Silva Wijeyeratne, Rashmi de Silva Wijeyeratne and Rob Janson.

Re-sighted: 2012.12.01 in Mirissa by Madhawa Rajapakse and 2012.12.03 in Mirissa by Sean Swalwell

Characteristics: Dorsal fin has a shallow nick on the trailing edge about a quarter of the way up from the base. Small hump on inner-edge of dorsal fin, facing towards the head. Eye patch tapers into one singular point. 3 dimple marks grouped above left eye patch.

Individuals identified so far

OM003 – ‘Rakey’ (Possibly Male)

First Sighted: 2013.04.17 in Mirissa by Marianne Taylor

Re-sighted: None to date

Characteristics: Left side of dorsal fin has distinctive rake marks visible towards top, near the trailing edge.

Individuals identified so far

OM004 – ‘Ripple’ (Female)

© Shawn Heinrichs

© Shawn Heinrichs

First Sighted: 2013.04.18 in Mirissa by Shawn Heinrichs (Pod involved in Sperm whale attack)

Re-sighted: None to date

Characteristics: Distinctive notched dorsal with a torn-style nick (with an overhang, or lip) on the trailing edge towards the tip, followed by sharp triangular notch further down towards the base.

The saddle on the right side displays numerous rake marks and scratches in clear distinctive patterns. One set of rake marks loop into a vertical arch that overlaps both the black area and the saddle. Two small dimple points just before fin on the left flank.

Individuals identified so far

OM005 – ‘Titan’ (Male)

© Shawn Heinrichs

First Sighted: 2013.04.18 in Mirissa by Shawn Heinrichs (Pod involved in Sperm whale attack)

Re-sighted: None to date

Characteristics: Tall triangular male fin. Not many nicks or tears but there are two very clear wounds, like two slices at the base of the dorsal on the trailing edge. Just above the two slices is one shallow nick, creating a dented appearance to the fin silhouette.

Individuals identified so far

OM006 – ‘Crush’ (Female)

First Sighted: 2013.04.18 in Mirissa by Shawn Heinrichs (Pod involved in Sperm whale attack)

Re-sighted: None to date

Characteristics: Small, curved female fin with very unique trailing edge that shows multiple nicks, that create a ‘crushed’ or scrunched appearance. One deep triangular notch just below the tip, creating a defined ‘hook’. Just below is a very shallow nick that gives a ‘bumpy’ appearance between yet another Deep notch… before a final curved notch at the very base. Very distinctive silhouette.

Individuals identified so far

OM007 – ‘Moon’ (Juvenile or female)

First Sighted: 2013.04.18 in Mirissa by Shawn Heinrichs (Pod involved in Sperm whale attack)

Re-sighted: None to date

Characteristics: Small, curved clean fin. No notches or nicks. Right saddle and flank show several rake marks and scratches that will help identify this individual. One set of rake marks ‘slices’ through the saddle, diagonally towards the swirl.

Individuals identified so far

OK008 – ‘Arya’ (female or juvenile)

First Sighted: 2010.01.31 in Kalpitya by Lahiri Soysa

Re-sighted: 2012.01.18 in Mirissa by Nilantha Kodithuwakku

Characteristics: Small, curved female or juvenile fin. A very defined curved notch out of the top portion of the trailing edge. A few shallow nicks directly after the tip, creating a subtle wave appearance. A small but deep notch out of the base (on trailing edge) creating a small point just above the base of the fin.

Individuals identified so far

OM009 – ‘Scythe’ (Juvenile Male)

First Sighted: 2012.01.26 in Mirissa by Whale watching with Geeth

Re-sighted: None to date

Characteristics: Long, tall slightly curved dorsal fin (likely a juvenile male, sprouter). Very clean with no apparent nicks or tears. Small round pimple-like mark just above the right eye-patch.

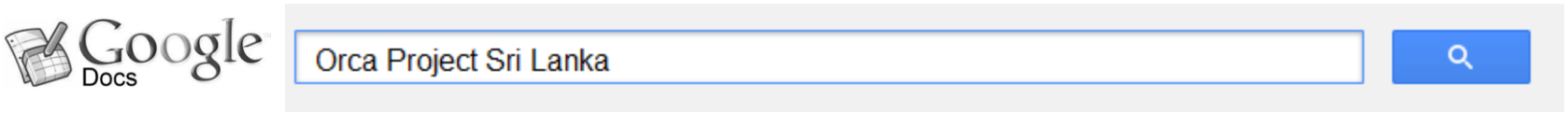
Part 4. Records database

Points covered in this section
Records PDF
OPSL ID Catalogue and sightings log on Flickr
OPSL Facebook page
Records Spreadsheet

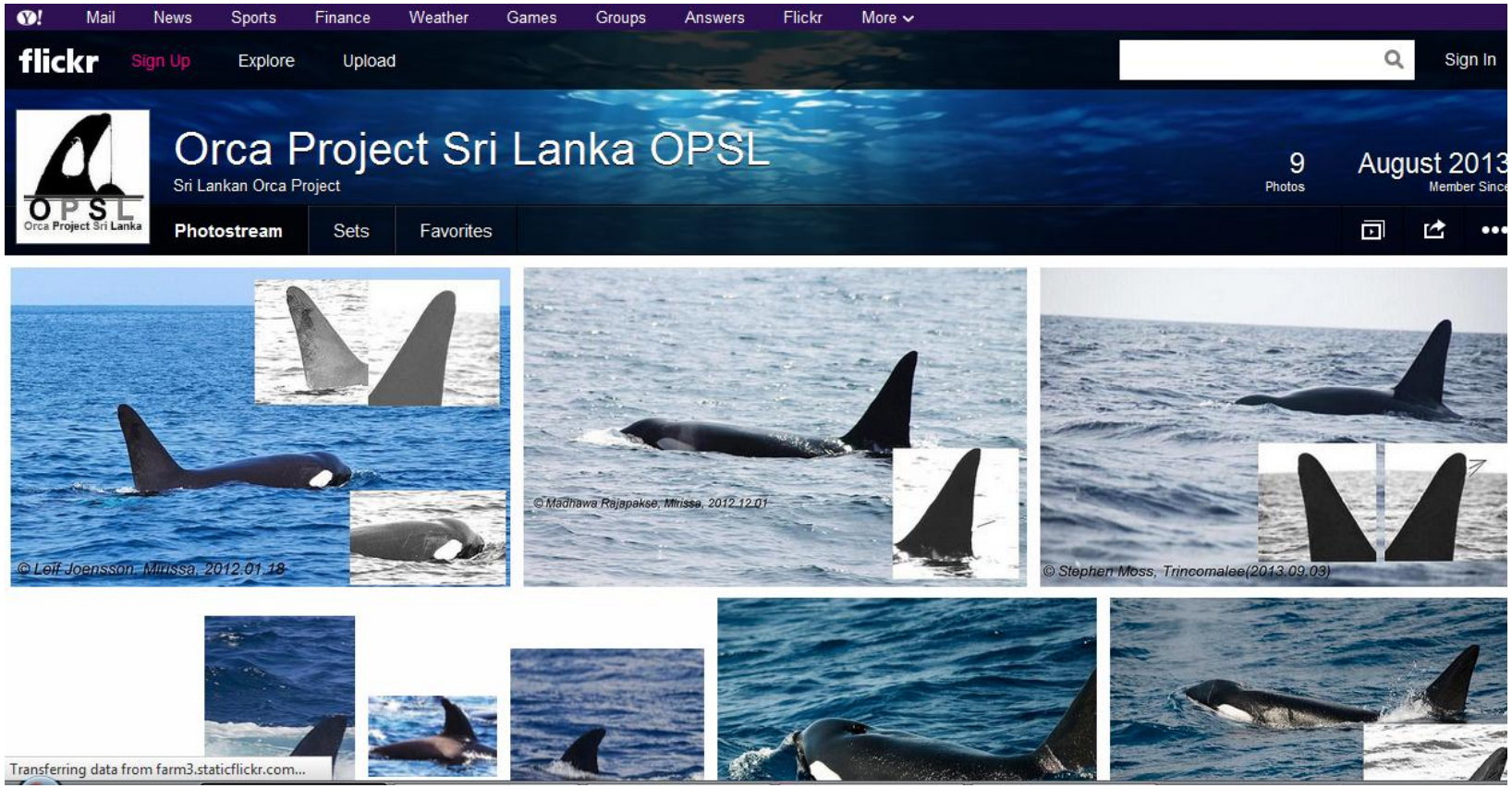
The Records PDF

In addition to providing an online version of the sightings log, a periodically updated PDF version will also be available for download from Google Documents using the search term “Orca Project Sri Lanka”

The updated sightings log will also be viewable on the OPSL social media profiles.



OPSL ID catalogue and sightings log on Flickr

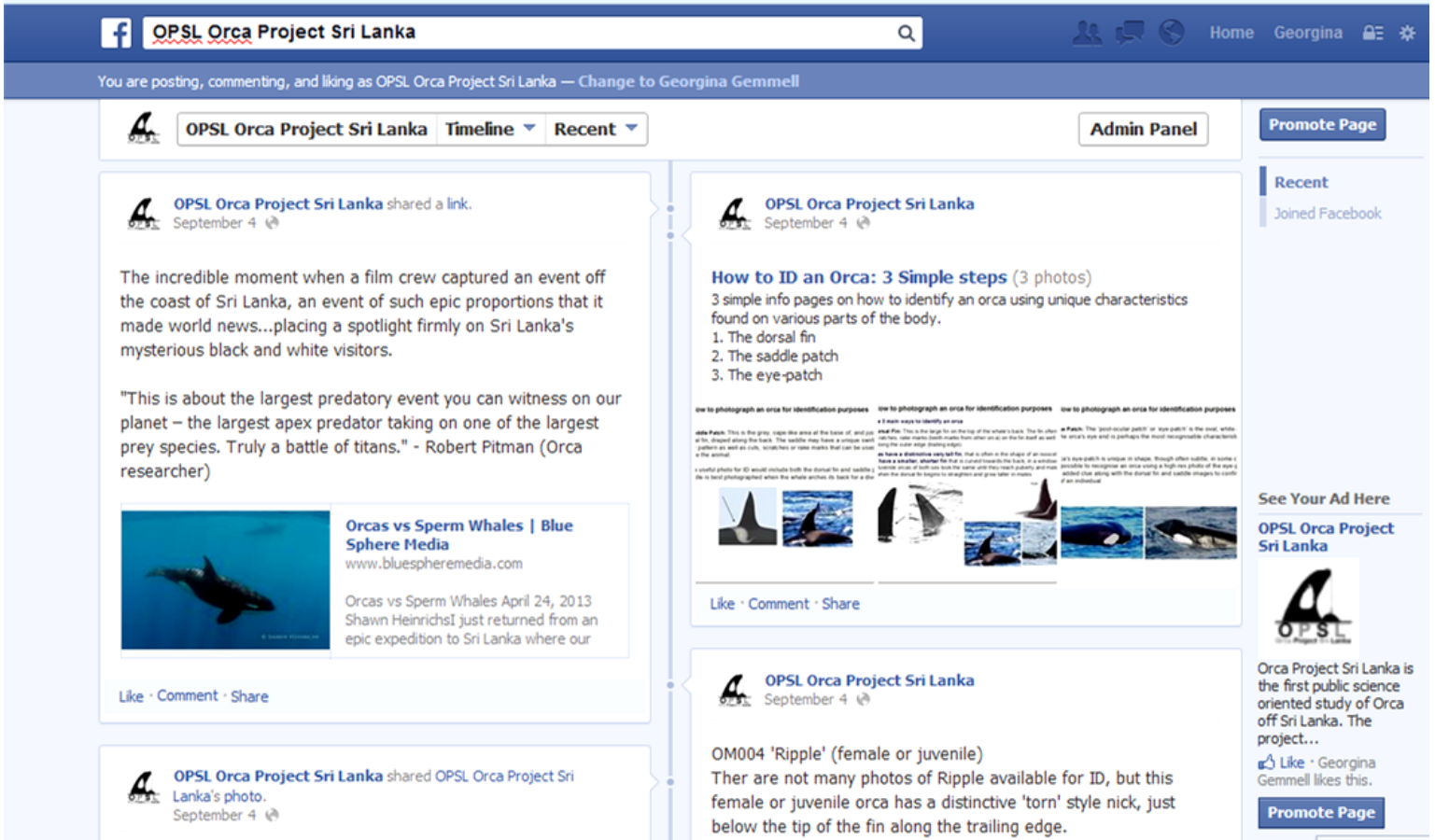


The OPSL Flickr page already has 8 unique individuals identified but with your help we can continue to enhance this catalogue to become an important scientific tool.

The online version of the orca sightings log can also be accessed on the ‘profile’ section of the page.

http://www.flickr.com/photos/100246655@N03/

OPSL Facebook Page



A version of the sightings log can also be viewed via the project Facebook page, where followers can interact with the progress of the project via updates and posts.

https://www.facebook.com/OrcaProjectSriLanka

The Records Spreadsheet

A detailed spreadsheet of the orca sightings log is maintained by Georgina Gemmell. Please feel free to email a request for a copy.

A	B	C	D	E	F	G
Date	Year	Month	Location	Live or dead	Observer (s) or source	Details and commen
21/04/2013	2013	April	N/a	L	Captain Janaka Perera	Sometime in the
18/04/2013	2013	April	Mirissa	L	Shawn Heinrichs and Paul Hi	other filmed a pod of
17/04/2013	2013	April	Mirissa	L	Marianne Taylor	Marianne Taylor obser
26/03/2013	2013	March	Kalpitya	L	Howard Martenstyn, Dolphin I	Per Ashan Seneviratne
01/12/2012	2012	December	Mirissa	L	Madhawa Rajapakse	Madhawa Rajapakse s
03/09/2012	2012	September	Trinco	L	Stephen Moss	Stephen Moss on a
04/05/2012	2012	May	Trinco	L	Ranil Nanayakara	Ranil Nanayakkara rep
31/03/2012	2012	March	Mirissa	L	Suchithra Hetti	Silva's Journal -
10/03/2012	2012	March	Mirissa	L	Howard Martenstyn	recorded an Orca off
18/01/2012	2012	January	Mirissa	L	Leif Joensson	Flickr member '65north
08/01/2012	2012	January	Mirissa	L	Murtaza Mamujee Youtube	by Murtaza Mamujee
15/04/2011	2011	April	Mirissa	L	Thilanka Ranathunga	Flickr member ' Thilank
23/04/2010	2010	April	Mirissa	L	Paul Hilton and Gary Stokes	confirmed by Paul Hilto
07/03/2010	2010	March	Kalpitya	L	Zainab Ibrahim	Zainab Ibrahim texted
09/02/2009	2009	February	Unkown	L	Anouk Illangakoon	Anouk Illangakoon et a
29/12/2008	2008	December	Mirissa	L	Amal Goonetilake, Shiranee	Extracts from Gehan d
15/03/2008	2008	March	Kalpitya	L	Ramani Corea	published in Sri Lankar
1980's	1980	Unknown	Talawila	L	Arjan Rajasuriya	email (9th August 2013
1872	1872	Unknown	Chilaw	L	llangakoon (2002, page 50) q	50) quotes a record fro
1868	1868	Unknown		L	quotes a record from	50) quotes a record fro
Unknown	Unknown	Unknown	Kalpitya	L	Lahiri Soysa on divesrilanaka	'DiveSriLanka.com',

Part 5. Contributors to Orca Project Sri Lanka

Points covered in this section
Contributors of information
Contributors of images

Contributors of information

he following individuals and organizations have helped to build the log of records (which we make publicly available) by sharing their observations directly with us, or by 'publishing' (including on-line social media) or by drawing our attention to observations of others so that we were able follow up.

Riaz Cader

Ramani Corea

Buddika Dhayarathne

Shawn Heinrichs

Suchitra Hettiaratchy

Paul Hilton

Zainab Ibrahim

Anouk Illangakoon

Rob Janson

Chitral Jayatilake

Leif Joensson

Nilantha Kodituwakku

Maithri Liyanage

Murtaza Mamujee

Howard Martenstyn

Jim Martin

Stephen Moss

Ranil Nanayakara

Upali Nissanka

Captain Janaka Perera

Madhawa Rajapakse

Arjan Rajasuriya

Thilanka Ranathunga

Martin Robinson

Lahiri Soysa

Gary Stokes

Kira Swalwell

Sean Swalwell

Marianne Taylor

Gehan de Silva Wijeyeratne

Rashmi de Silva Wijeyeratne

Viraj Yasaratne

The crew of the Dutch Bay Princess

The crew of Mirissa Watersports

Whale watching with Geeth

Contributors of images

The following have helped to develop the first long-term public-science photo ID project of orcas off Sri Lanka, through helping to build a catalogue of identified individuals by kindly sharing their images with the project

Shawn Heinrichs

Paul Hilton

Rob Janson

Leif Joensson

Nilantha Kodithuwakku

Stephen Moss

Madhawa Rajapakse

Lahiri Soysa

Sean Swalwell

Marianne Taylor

Rashmi de Silva Wijeyeratne

Whale watching with Geeth

Part 6. Contact details and administration team

Points covered in this section
Have you seen orcas? How to submit records and images
How it began
Acknowledgements

How to submit sightings records and images to OPSL

Have you seen Orcas… We'd love to hear about it!

Please send your sighting details and images to
georgina.wildoceans@gmail.com

Please include your **full name** as well as the **location** and **date of sighting**.
If you have any other information or GPS, that would be even better!

Any images or information shared with OPSL will remain the full credit of the photographer/observer. All photographs will retain the photographer's full name in the file as well as include a copyright citation on the image itself.

Only low-resolution versions of the images will be uploaded to our Flickr page.

Follow us

How it began

In 2012 and 2013, Riaz Cader who had been out to sea with Gehan de Silva Wijeyeratne, began to press Gehan to pay more attention to sightings of Orca. Riaz thought that Orca sightings were on the increase but Gehan was sceptical. In August 2013 Gehan got in touch with British natural history writer Marianne Taylor in connection with the book launch of Wild Sri Lanka by John Beaufoy Publishing, UK. He was surprised to hear that earlier in the year in April, Marianne had seen two Orcas off Mirissa. He was also impressed with the quality of the images. Extraordinarily, hardly anyone in Sri Lankan cetacean circles seemed to know of this sighting. The people who took Marianne out to sea had not even alerted Riaz who had been involved in her press trip. Gehan realised how orca records may be 'lost'. He also suspected that many of the orca records may relate to a few individuals as in British waters. Gehan began compiling a list of Orca records and discussed plans for a more structured public science project with Georgina Gemmell and Chitral Jayatilake. It was agreed that Georgina will take over and administer the project. Georgina had studied orcas for 6 months in British Columbia and is currently working with John Keells as a naturalist. She also coordinates other public-science marine projects, including a photo id catalogue of Blue Whales (Wild Blue).

Acknowledgements

Orca Project Sri Lanka thanks the contributors of images and information for supporting this initiative.

A special thanks to John Keells Hotels and Cinnamon Nature Trails who encourage Chitral Jayatilake and Georgina Gemmell to include public science projects such as this in their scope of work. Gehan thanks the many people who have helped and kindled his curiosity of the natural world.

Being a public-science initiative, the Orca Project Sri Lanka would not become the success that it is today without the help of many people.

Thank you.