GOVERNMENT OF WESTERN AUSTRALIA

SWAN RIVER TRUST

Dolphin Watch Annual Report 2012-13

DOLPHIN WATCH

Citizen scientists and researchers working together to monitor dolphins in the Swan Canning Riverpark

Preface

The *Dolphin Watch* project is a fine example of how the Perth community relates to the Swan Canning Riverpark – the rivers are a special place for us all and they are made all the more special when the dolphins come and share their space with us.

In just a few years, the *Dolphin Watch* project has captured the hearts and minds of a special group of people who give their time and expertise to help us learn more about the dolphins and to play a part in ensuring their future.

The *Dolphin Watch* Volunteers and their work is recognised and celebrated in the pages that follow.

I add my thanks to the Dolphin Watchers for their tremendous efforts. I also acknowledge the work of agency staff and our research partners who make this project such as excellent example of collaborative citizen science.

I urge you to continue this important work.

Albert Jacob MLA

MINISTER FOR ENVIRONMENT; HERITAGE

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Cover photograph by Gary Gaschk

Foreword

It is hard to believe we are already in our fourth year of the *Dolphin Watch* project.

This past year, we held training courses for a record number of new volunteers, taking our volunteer numbers to 594. We also held up-skilling training for existing volunteers in November 2012. Volunteers enjoyed a cruise on the Swan River with *Dolphin Watch* scientists and photographer John Goldsmith to learn more about the research and the dolphins they are monitoring in the field. The event culminated with a thank you presentation to Water Police Officers who rescued Gizmo, an entangled dolphin calf, from fishing line.

The River Guardians education team has been busy too, visiting schools, businesses and community groups to educate others about dolphins in our rivers and how we can help to reduce nutrients entering the system.

There are also exciting technological developments to help volunteers monitor dolphins with smart phones and other devices, through the Coastal Walkabout project featured in this annual report.

The *Dolphin Watch* team includes our fabulous volunteers, Murdoch and Curtin universities, the Swan River Trust and the Department of Environment and Conservation. Together we are working with the community by:

- training volunteers to assist the Coastal and Estuarine Dolphin Project (CEDP) research as citizen scientists;
- communicating information on river health and dolphins to the broader community through presentations, web content, videos and media interviews;
- producing essential learning tools including lessons for schools and publications such as the third edition of *FinBook*, a catalogue of dolphins seen in the Riverpark; and
- connecting with local business and community groups to support the project and get involved.

I would also like to make special mention of two special *Dolphin Watch* volunteers that are an integral part of our team. Thank you to Jennie Hunt for her tireless work again this year in collating volunteer reports for Dr Chandra Salgado to analyse every week. Jennie has also responded to volunteer queries and is a vital part of the team.

Robert Broadway continues to assist the team with his fantastic data management tool and collating the data is now a breeze.

Our volunteers are invaluable to our ever growing *Dolphin Watch* team. Without them, we could not hope to have such a broad program monitoring hundreds of kilometres of river that makes up the Swan Canning Riverpark. *Dolphin Watch* volunteers - our citizen scientists - are providing valuable information for science, forging new and exciting discoveries about the iconic Indo-Pacific bottlenose dolphins that call the rivers home.

Marnie Giroud
River Guardians Program Manager
Swan River Trust

Dolphin Watch scientists and staff

Associate Professor Lars Bedjer – Murdoch University

MUCRU Research Leader

Dr Lars Bejder is the Research Leader of Murdoch University's Cetacean Research Unit (MUCRU). His areas of expertise fall into three categories: analysing and developing quantitative methods to evaluate complex animal social structures; evaluating impacts of human activity (coastal development, tourism, habitat degradation) on cetaceans; and fundamental biology and ecology, including assessing abundance and habitat use of marine wildlife. He works closely with wildlife management agencies to optimise the conservation and management outcomes of his research.

Karl Beidatsch – Curtin University

Research Scientist

Karl's research is based on work done by Dr Hugh Finn and Kimberley Moiler in 2002-03 and 2007-08, investigating dolphin movements in the Riverpark using a new method of biological modelling. Karl is adapting a method designed for online search engines to model dolphin movements. If the modelling works, biologists and ecologists the world over will have a new method for studying information gathered by volunteers.

Delphine Chabanne – Murdoch University

Research Scientist

Delphine Chabanne is a research scientist with Murdoch University's Cetacean Research Unit (MUCRU) and is working on a Population Assessment project to characterise the population size and structure of dolphins around the Perth region. Delphine's research will help to assess the abundance, habitat use and ranging and residency patterns of dolphins using photo-identification, behavioural sampling, GIS and line transect sampling. Delphine's main research interests focus on the conservation of the Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) population in the Swan Canning Estuary and adjacent waters of Perth. Delphine is currently conducting boat-based surveys to collect biological and ecological data in order to improve assessment of the dolphin population's conservation status.

Dr Hugh Finn – Murdoch University

Post doctoral research fellow, wildlife conservation, conservation biology

Dr Hugh Finn is a post-doctoral fellow at Murdoch University. His research focuses on black cockatoos and bottlenose dolphins. He became involved with dolphins in the Swan Canning Riverpark during his PhD research in Cockburn Sound and the Swan River from 2000 to 2003. Hugh supervises research students and provides training and support for Dolphin Watchers and information and advice to the River Guardians team and the community.

Marnie Giroud – Swan River Trust

River Guardians Program Manager

Marnie Giroud has worked with the Trust for more than five years in the role of River Guardians Program Manager which incorporates the *Dolphin Watch* project. Marnie makes presentations to the community on RiverWise practices including dolphin conservation, trains new *Dolphin Watch* volunteers and coordinates the Trust *Dolphin Watch* team which provides events, education, volunteer management, information and data collation for the CEDP.

Jennifer Green – Swan River Trust

Community Engagement Officer

Jennifer Green has worked with the Trust for eight months in the role of Community Engagement Officer which incorporates the River Guardians program and *Dolphin Watch* project. Jennifer creates River Guardians educational displays such as Creature Feature, *Dolphin Watch* and swan display boards, contributes to community engagement initiatives and helps to coordinate events and presentations for the Trust and River Guardians.

Jennie Hunt

Dolphin Watch Data Volunteer

Jennie Hunt collates data from *Dolphin Watch* volunteers and provides weekly reports on the project for the Trust. Jennie has been in this voluntary role for almost two years and is an invaluable member of the *Dolphin Watch* team. Jennie also volunteers for Kings Park as a guide and mentor for new volunteers and is an active member of Rotary. Jennie recently received the black cockatoo pin from the Department of Environment and Conservation for her huge contribution to the *Dolphin Watch* project and is a recipient of the Chief Scientist's Citizen Scientist award for dolphin monitoring.

Rachel Hutton – Swan River Trust

Community Engagement Officer

Rachel Hutton has worked with the Trust for more than seven years in the role of Community Engagement Officer which incorporates the River Guardians program and *Dolphin Watch* project. Rachel creates River Guardians publications, contributes to community engagement initiatives, helps manage volunteers, provides information for the team and coordinates events and presentations for the Trust and River Guardians. Rachel coordinates *Dolphin Watch* training events and the annual Dolphin Watch Day.

Joselyn Juraszek – Swan River Trust

Education Officer

Joselyn Juraszek has worked at the Trust for two years and manages the River Rangers program and school education. Joselyn educates school students on the importance of river protection and conservation. Joselyn is currently developing *Junior Dolphin Watch* with the *Dolphin Watch* team.

Sarah Marley – Curtin University

Research assistant

Sarah is a research assistant with the Centre for Marine Science and Technology (CMST) at Curtin University. Her main research interests centre around marine mammal behaviour and acoustics, and she has worked on several projects involving blue whales, humpback whales and bottlenose dolphins. One of the projects Sarah is currently working on aims to assess how dolphins use their acoustic environment at various locations. Using a combination of visual and acoustic monitoring methods, Sarah can simultaneously record dolphin sounds and vessel noise from acoustic recorders in the Swan River while also tracking dolphin movements and behaviour from a land-based theodolite station. This will help us to understand aspects of dolphin behaviour in a noisy environment.

Jason Menzies – Swan River Trust

Community Engagement Program Manager

Jason has been with the Trust for two years and manages the community engagement section. Jason is an environmental scientist with over a decade's experience in delivering community engagement programs that affect positive behavioural change across the Perth community. Jason is responsible for developing and delivering the River Guardians program at the Trust and assisting with projects such as *Dolphin Watch*.

Dr Chandra Salgado – Curtin University

Research Fellow Marine Biologist

Dr Chandra Salgado is a Research Fellow with the Centre for Marine Science and Technology. Her main research interests are anthropogenic impacts on marine animals (including noise), vocalisation, distribution, migration patterns of marine mammals, and statistical analysis of biological data. Chandra provides presentations and training for Dolphin Watchers, supervises research students and collates and analyses the data provided by the volunteers. Recent assignments include analysis of blue and humpback whale vocalisation and experimental design and analysis of studies on ecology and behaviour of marine mammals.

Dr Nahiid Stephens – Murdoch University

Lecturer/Researcher

Nahiid is a lecturer in Anatomical Pathology in the School of Veterinary and Life Sciences at Murdoch University. Her research interests include pathology – especially marine mammal and wildlife pathology, disease surveillance in cetaceans, and wildlife as vectors for emerging diseases. As the veterinary pathologist for Murdoch's Marine Mammal Health Project, Nahiid works closely with Dr Carly Holyoake. Their research is focused on investigating mortality events and determining baseline health and epidemiological information on disease levels in marine mammals in Western Australia through opportunistic post-mortem examinations and sampling.

Dr Kerry Trayler - Swan River Trust

Principal Scientist

Kerry has a background in aquatic ecology and over 20 years experience working in research, education and management roles. At the Swan River Trust, she occupies the position of Principal Scientist and oversees the Swan Canning Research and Innovation Program. She is actively engaged in a wide range of research activities that are focused on the river system including those that are focused on the river dolphins. Kerry is always keen to share information about our river system with the community and is excited by the potential to expand citizen science opportunities through the River Guardians program.

Shona Wharton – Murdoch University

Honours Student

Shona Wharton is an Honours research student with MUCRU and has completed a Marine Science degree at Murdoch University. Her research includes work within the Coastal Walkabout Project and she is currently focusing on dolphins within the Perth (including the Swan Canning Riverpark) and Bunbury regions.

Dr Nihal Yatawara

Lecturer/Researcher

Dr Nihal Yatawara is a lecturer at Notre Dame University. He established contact with the Swan River Trust through Dr Chandra Salgado Kent, with whom he does collaborative research on modelling dolphin abundance in the Swan River. Previously, he worked as a lecturer and a researcher at Curtin University for 22 years. Nihal's current research interests are in applications of statistical modelling in ecology as well as applications of time series analysis and spatio-temporal models in climate change monitoring.

Dolphin Watch project

Murdoch and Curtin universities, the Swan River Trust and Department of Environment and Conservation have been working together for four years on the *Dolphin Watch* project, a social science research and education project recording the activities of bottlenose dolphins in the Swan Canning Riverpark.

Dr Hugh Finn, Dr Carly Holyoake, Dr Nahiid Stephens and research scientist Delphine Chabanne from Murdoch University, Dr Chandra Salgado, Dr Nihal Yatawara and researchers Sarah Marley and Karl Beidatsch from Curtin University are leading research into Perth's Swan River dolphin community and investigating how environmental changes in the river and human activities can affect the dolphin community. Research for the Coastal and Estuarine Dolphin Project (CEDP) builds on previous studies of dolphins in the Riverpark and adjacent waters. It provides information on dolphin ecology and interactions with human activity in the Swan and Canning rivers. The aim of CEDP is to improve the scientific basis for management of the Swan Canning Riverpark dolphin community and dolphin habitat.

The Riverpark dolphin community is small and depends upon a handful of females to sustain it. These river dolphins live in an urban estuarine environment that places a lot of stress on the mammals. Dolphins may be affected by rapid salinity changes, loss of habitat, decreasing prey, entanglement in fishing line, boat strikes, rubbish and noise.

There have been several documented cases of dolphins entangled in fishing line within the Riverpark, including the calf Gizmo and the adult male Fingers, two well-known dolphins often sighted in the Riverpark. The *Dolphin Watch* team continues to urge the Perth public to look after the Riverpark and use it responsibly to minimise stress and threats to dolphins.

Community members are trained to become *Dolphin Watch* volunteers, citizen scientists who give up their time to monitor dolphins in the Riverpark. Their reports on the presence and absence of dolphins in certain parts of the Riverpark assist CEDP by providing information how dolphins use the Riverpark. This includes areas that experience problems such as low oxygen and algal blooms.

Dolphin sighting reports and photographs by *Dolphin Watch* volunteers also help the Trust and Department of Environment and Conservation track and assist dolphins in trouble in the estuary.

Volunteers have contributed 7,180 records detailing dolphin locations and behaviour since the project began in 2009. Volunteers also provide video and photographs of dolphin sightings which help build a picture of the dolphin community.

Another exciting development is the opportunity for volunteers to use a new smart phone application (or app) to log dolphin sightings while in the field. The application, which is being developed as part of a broader citizen science initiative called Coastal Walkabout, will be available to Dolphin Watchers in the second half of 2013. A training program will be developed to teach Dolphin Watchers to use this exciting new technology.

The *Dolphin Watch* project has grown enormously in the past four years and we will continue to develop the project and engage more members of the community in dolphin monitoring and conservation.

Dolphins in the Riverpark

Since June 2011, researchers have conducted regular boat-based surveys in the Riverpark. Those surveys involve researchers following a systematic survey route from the Inner Harbour of the Port of Fremantle to the Causeway Bridge and to the entrance of the Canning River at the South of Perth Yacht Club. Over the last two years, more than 80 surveys were conducted, including 35 surveys from June 2012 to May 2013 (the basis for the 3rd edition of *FinBook*).

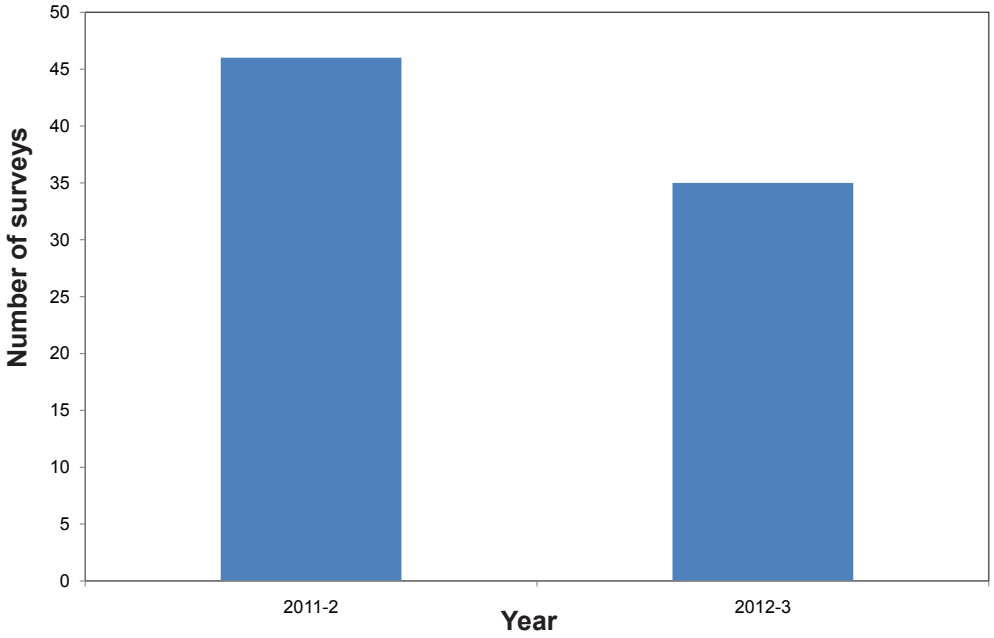


Figure 1 Number of boat-based surveys within the Swan Canning Riverpark per year. Year 1 runs from June 2011 to May 2012 and Year 2 from June 2012 to May 2013.

Although fewer surveys were conducted over the last year (i.e. June 2012-May 2013), researchers encountered similar numbers of dolphin groups and identified similar numbers of dolphins.

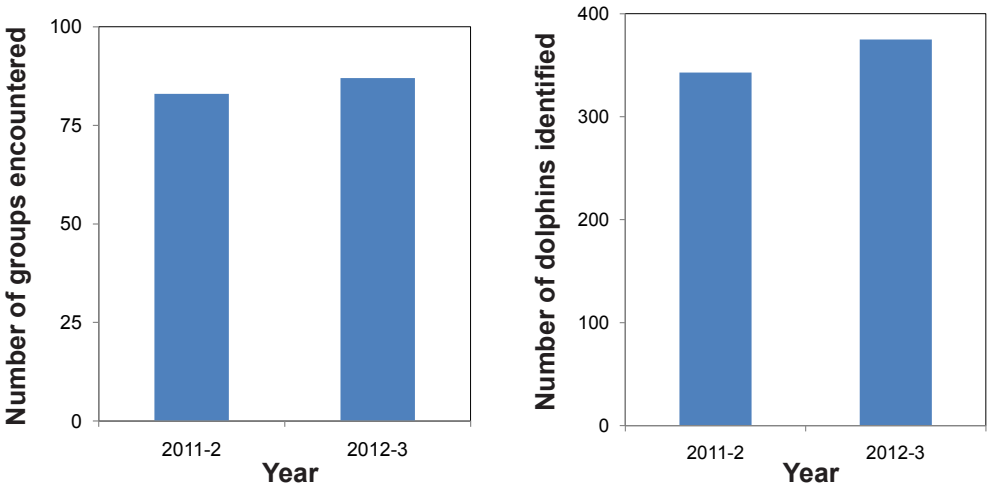


Figure 2 Number of (a) dolphin groups encountered and (b) dolphins identified during boat-based surveys within the Swan Canning Riverpark from 2011 to 2013. Year 1 runs from June 2011 to May 2012 and Year 2 from June 2012 to May 2013.

Researchers observed 40 different individuals in the Riverpark between June 2011 and May 2013. This includes the calf Highhope (calf of Highnitch) who died in January 2013. The discovery curve below shows the progression of new individuals identified in the Riverpark over time (Figure 3). Some of these dolphins are regularly sighted in the Riverpark and are classified as 'residents' (although they also range out to the coastal areas outside the estuary), while others have been sighted once or twice or very occasionally.

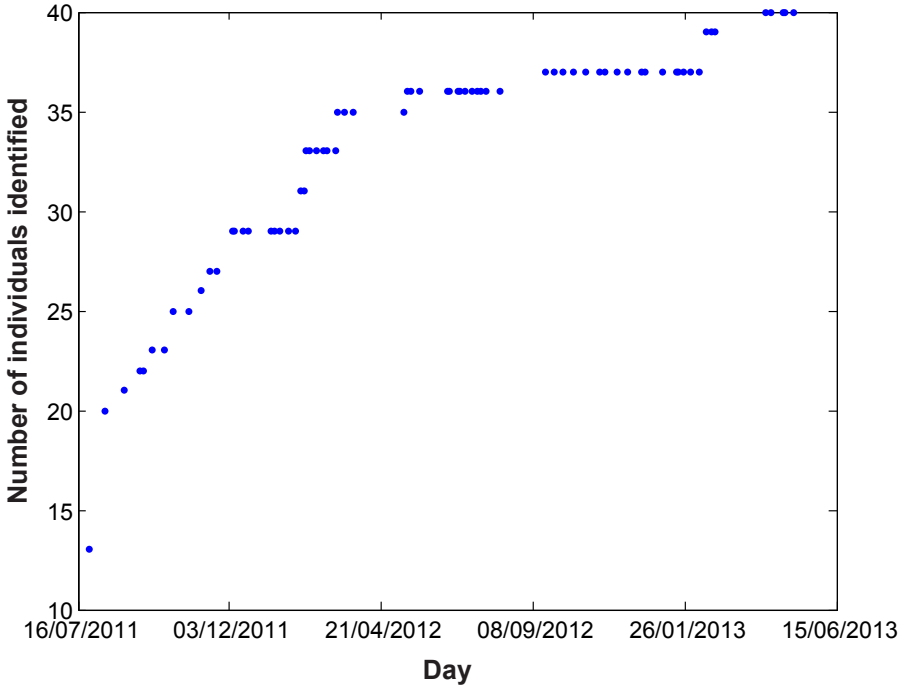


Figure 3 Discovery curve of individual dolphins observed within the Swan Canning Riverpark

The discovery curve shows that the first two surveys in 2011 identified 20 individuals, including five dependent calves. New (i.e. previously unidentified) individuals have been discovered at a low rate since then. These previously unidentified dolphins are often associates (i.e. acquaintances) of the river dolphins who generally reside in the coastal areas outside the Riverpark but may occasionally accompany their river dolphin associates into the estuary. Sometimes these dolphins are coastal females that the river dolphin males are herding. In total, 10 different mother and calf pairs have been observed within the Riverpark.

Researchers can determine which dolphins are consistent year-round users of the Riverpark based upon measures for individuals such as the number of sightings, the monthly and/or seasonal rates of sighting, and the location of sightings. For example, Figure 4 shows the number of sightings per area (Estuary vs. Inner Harbour) for each individual dolphin, including calves.

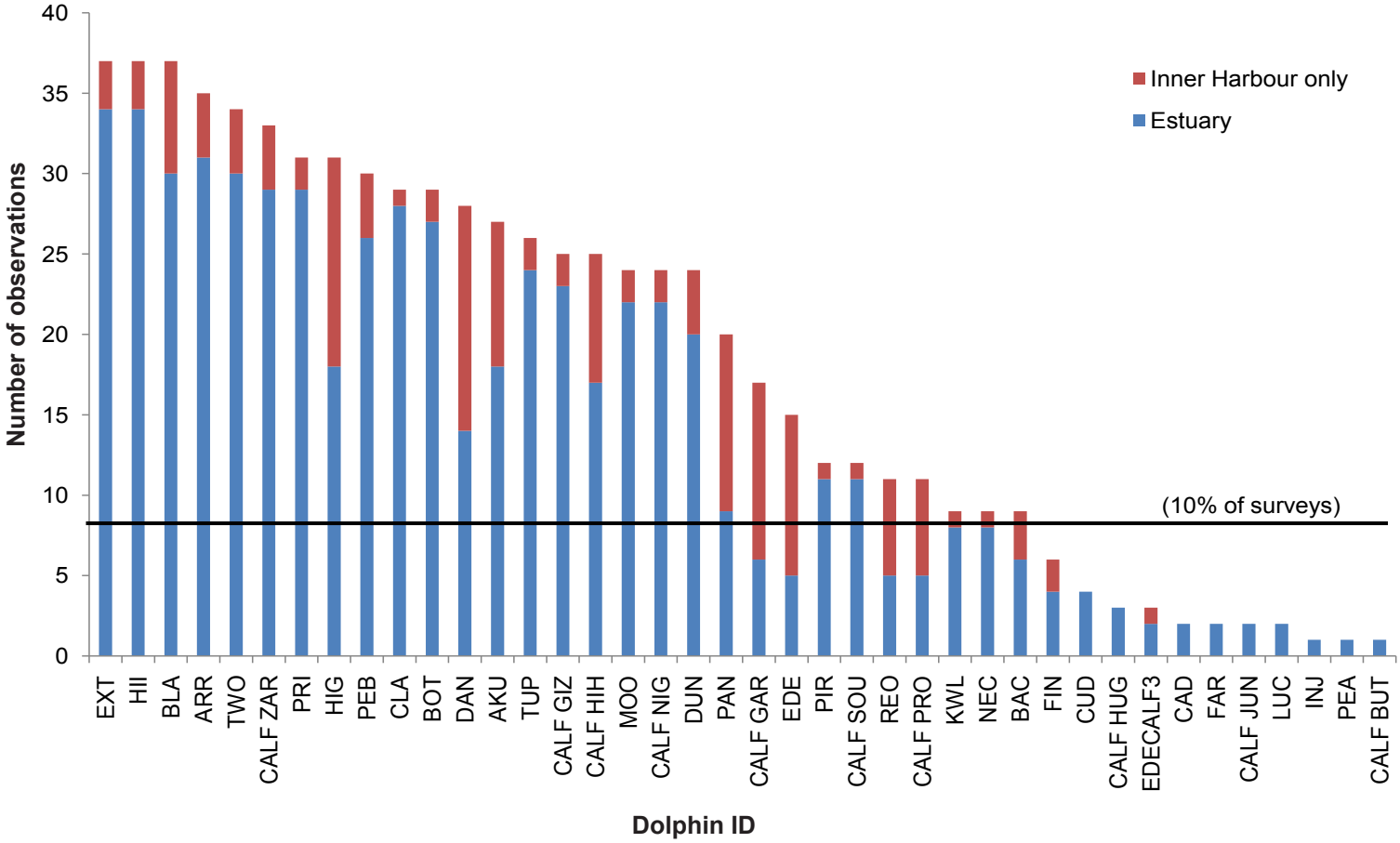


Figure 4: Number of sightings per area (Estuary vs. Inner Harbour of the Port of Fremantle) for each individual dolphin (including calves).

If we limit our sample just to the dolphins that are regularly sighted (i.e. dolphins sighted in at least 10 per cent of our survey days over the last two years), Figure 4 shows that a total of 22 dolphins (including five calves) were regularly observed in the Riverpark and that a total of 29 dolphins (including seven calves) were regularly observed in the estuary and Inner Harbour. Two mother and calf pairs (Eden and her calf Garden, who is now a juvenile, and Resource and her calf Product) were mainly observed in the Inner Harbour Port of Fremantle.

Since the death of Highhope in January 2013, four mother and calf pairs have been frequently observed in the estuary: Tworakes and her calf Zari, Moon and her calf Night, Tupac and her calf Gizmo, and Pirulli and her calf Soul. Based on their size, we think that Zari, Night and Gizmo are four to five years old. Therefore, we expect that over the next couple of years these calves will be weaned and will begin living without their mother by their side and these mothers will mate and become pregnant again.

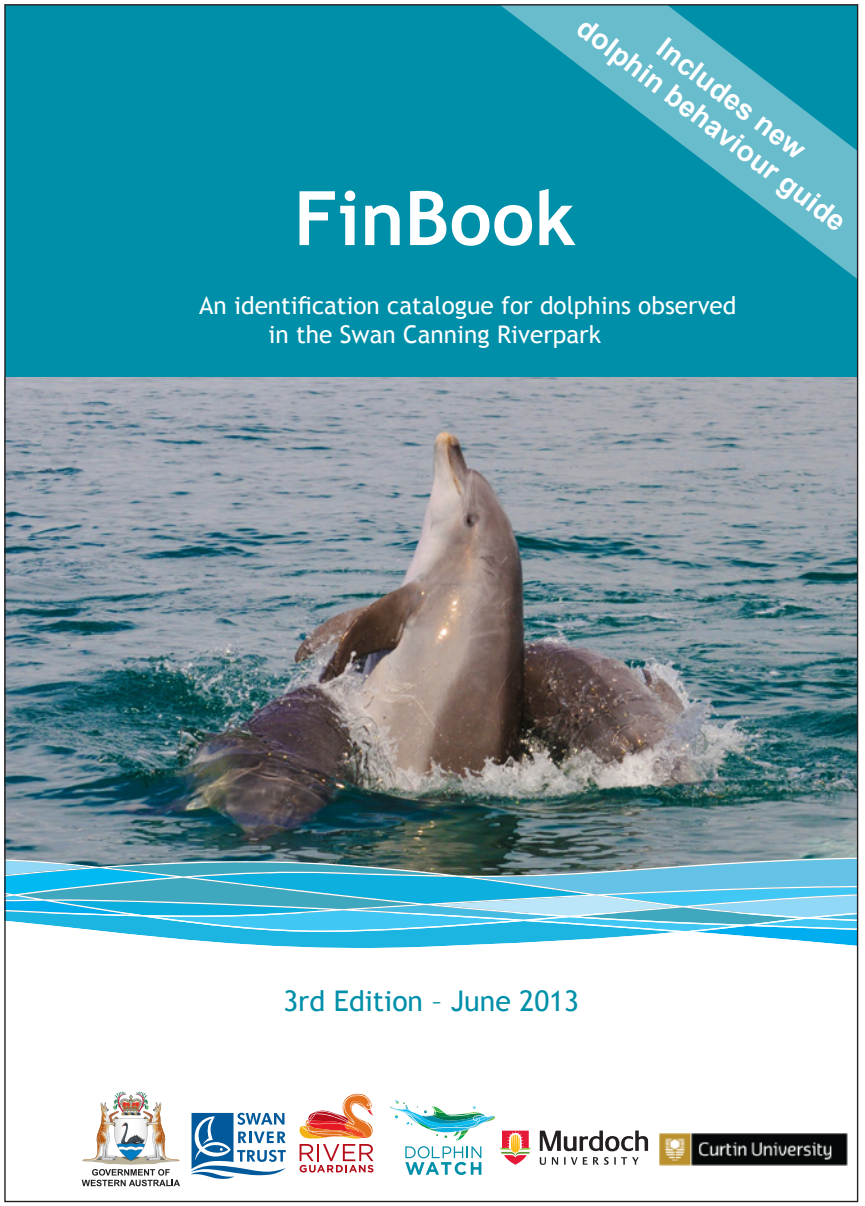
FinBook

FinBook is a catalogue of dolphins observed within the Swan Canning Riverpark created by Delphine Chabanne and Dr Hugh Finn. The 3rd edition includes 28 dolphins (including six dependent calves) observed in the Riverpark. This year, *FinBook* was organised based on how frequently dolphins associate with each other.

It is important that all the dolphins that use the Riverpark are identified, so their long-term welfare can be monitored. *FinBook* gives everyone the ability to participate in this process. Using *FinBook*, community members can recognise individual dolphins and contribute information to assist in monitoring of these unique residents of Perth's rivers.

Dolphins can be identified by the markings and nicks that are present on their dorsal fins. Many of these markings are permanent, which allows individual animals to be monitored over many years. Some dolphins are hard to identify because they lack dorsal fin markings and are known as 'clean fins'. *FinBook* is like a catalogue of 'fin-prints' for dolphins. *FinBook* show the right and left sides of each dolphin's dorsal fin. *FinBook* also describes other unique features that can be used to identify individuals.

To download a free copy of *FinBook*, visit the Identifying Dolphins page in the *Dolphin Watch* section of the River Guardians website www.riverguardians.com.



Caring for dolphins

Dolphins are part of the Riverpark and we all need to look after them by caring for their habitat - the rivers. For river conservation tips check out our website www.riverguardians.com. When out, on or around the Riverpark there are four simple things you can do to help care for dolphins.

Enjoy dolphins from a distance – never approach a wild dolphin. It is illegal to disturb or harass dolphins under the *Wildlife Conservation Act* (1950). Boat-based observers should stay at least 100-150 metres away from dolphins and not attempt to approach them. Shore-based observers should also take care to avoid disturbing river dolphins.

Never feed dolphins – it is illegal and leaves dolphins vulnerable to entanglement, boat strikes, and disease when they come into close contact with humans and boats.

Slow down for dolphins – dolphins often form resting groups in the middle reaches of the estuary, so keep an eye out for dolphins, and slow down if you spot any.

Take your rubbish home – dolphins, particularly calves, can get tangled in fishing line. Make sure you dispose of unwanted line carefully.

Gizmo’s great escape

In April 2012 a member of the public sent a photo of an entangled dolphin calf to the Trust. At first it was thought the dolphin was trailing seaweed before officers from Department of Environment and Conservation (DEC) and the Trust realised fishing line among the seaweed a was cutting into his dorsal fin.

Research scientists from Murdoch University identified the dolphin as Gizmo, a young dolphin calf. The following two months saw a massive effort by DEC, the Trust, Water Police and Murdoch and Curtin universities working together with the public to spot Gizmo and his mum Tupac, to devise a rescue plan.

River Guardians *Dolphin Watch* volunteers were asked to keep an eye out for Gizmo and we received constant updates from our volunteers on Gizmo and Tupac’s movements, which were vital for DEC officers to keep track of the pair.

In late June, after several failed rescue attempts due to a very protective and loving mother, Water Police officers managed to restrain and disentangle Gizmo. Senior Constable Bruce Rodgers spotted a pod of dolphins swimming in the river. He was standing on the wharf looking for the injured dolphin calf when Gizmo swam under the wharf dragging fishing line, which was tangled around his dorsal fin, as well as part of a rope and a mass of seaweed.

Senior Constable Rodgers and two Water Police divers quickly went out in a rigid inflatable boat to locate Gizmo. When they reached the Rocky Bay East Fremantle area the Water Police divers entered the water but were unable to catch Gizmo. They followed Gizmo and his mother along the river to about 100 metres off-shore from the Swan Yacht Club. The divers then re-entered the water in front of the dolphins. Gizmo and his mother Tupac dived under the divers.

Gizmo the dolphin calf entangled in fishing line in 2012. ***Photo: Richard Gorham/Department of Environment and Conservation.***

Constable Brody Baker dived down and managed to grab Gizmo and bring him to the surface. Senior Constable Glenn Bott helped Constable Baker cut Gizmo free from the fishing line and rope immediately, fearing he would swim out of their grasp.

During the rescue, Tupac tried on three occasions to grab Gizmo by the tail and pull him out of the diver’s hands. Tupac calmed down realising the divers were helping Gizmo and the divers managed to swim with him to waist deep water.

A short time later, a DEC officer assisted police to put Gizmo in a stretcher which enabled Perth Zoo Vet Simone Vitali to treat his injuries. Once his injuries were treated, Gizmo was released into his mum's care. Gizmo is doing well now and can be seen with mother Tupac regularly in the Swan Canning Riverpark.

Rubbish including fishing line is a massive problem in the Riverpark. Last financial year Trust officers pulled 11 tonnes of rubbish from the rivers. Remember to take your rubbish home and help protect the wildlife who call the Riverpark home.

Water Police officers came to Gizmo's rescue in June 2012. ***Photo: WA Water Police.***

Gizmo on the mend with mother Tupac. ***Photo: Delphine Chabanne, Murdoch University.***

Monitoring dolphins

Dolphin Watch provides a simple and environmentally-friendly online monitoring process for volunteers to log their sightings. This enables volunteers to quickly and easily log their observations and allows Trust staff to collect volunteer hours for DEC's Community Involvement Unit.

The quality of data has improved since the beginning of the project, with more volunteers completing all parts of the monitoring forms. This has aided the research by providing a full data set. All volunteers are encouraged to fill out monitoring forms even when no dolphins are seen, as well as the time they start and end searching. This will help researchers to calculate 'effort' (i.e. the amount of time that people spend searching for dolphins in various zones). Having this extra information helps researchers understand where high concentrations of dolphins are occurring, rather than just relying on sightings.

A new opportunity for the general community to participate will be through the Trust's new online photo catalogue. Visitors to the River Guardians website (www.riverguardians.com) will soon be able to upload their dolphin photos and help scientists develop an understanding of the animals visiting the Riverpark. The Trust already receives photographs of dolphins spotted in the Riverpark by *Dolphin Watch* volunteers. Photos and details of where and when they are taken will help researchers determine animals that are using the Riverpark on a constant basis.

Dolphin Watch stresses to volunteers the importance of remembering to keep their distance and not disturb dolphins when photographing them. Photographs are most useful if they clearly show the dorsal fin without shadows. This helps scientists identify individual dolphins. Sunlight on the animal helps to capture markings on the body, which may also aid identification.

Currently the *Dolphin Watch* project has 594 trained volunteers who are acting as citizen scientists by helping to collect information on the dolphin community in Perth.

Photographs courtesy of Dolphin Watch volunteers (clockwise from left) Elaine Christie, Peter and Trita Agar, Eleanor Bollam and Junita Chesson.

Coastal Walkabout

What is this all about?

The initiative is an open access, dynamic, citizen science project which utilises smart-phone technology and social media to motivate local communities to gather scientific observations within the marine, estuarine and terrestrial environments. The initiative is a collaborative project between Murdoch University, Duke University and Marine Ventures Foundation.

The approach seeks to integrate structured and unstructured survey data to leverage citizen science engagement. The project will enable data transfer among organisations regionally, nationally and internationally. The vision includes a scalable Western Australian Citizen Hub consisting of three themes: coastal, estuarine and near-shore environments (Coastal Walkabout); terrestrial environment; and an educational/school initiative.

Background

The health of coastal ecosystems in Western Australia (WA) is an increasingly important consideration for urban populations. Considering the spatial scale of WA's marine ecosystems, it is becoming increasingly clear that the traditional scientific approach to environmental impact assessments across the state is challenged, and that local people desire to be more involved in the science and conservation programs used to address pressing environmental issues. These facts point to the development of new ways to collect meaningful data on coastal marine environments, and the creation of science-based engagement pathways to foster social engagement about important marine conservation issues and coastal ocean health.

Vision

The vision is to build a consortium-based fully Open Access citizen science network across WA through the development of open philosophy, novel database technology and strong social engagement platforms.

Dolphin Watch volunteers will soon be able to upload data to the Coastal Walkabout project using customised smart phones APPs (iPhones and Androids) or other devices through Flickr, Instagram and Twitter and contribute to growing understanding of marine and coastal ecosystems in Western Australia.

Research findings 2012-13

Dolphin Watchers spend a substantial amount of time along the banks or boating and kayaking on the Swan Canning Riverpark. Dolphin Watchers began recording the time spent on the river in April 2010. Since that time, volunteers have recorded 6592 observation hours. This equates to one person spending more than six hours a day looking for dolphins in the Riverpark. The time spent by Dolphin Watchers on the look-out for dolphins has steadily increased since effort began to be recorded, and is more than ten times the recorded effort in 2010 (Figure 5).

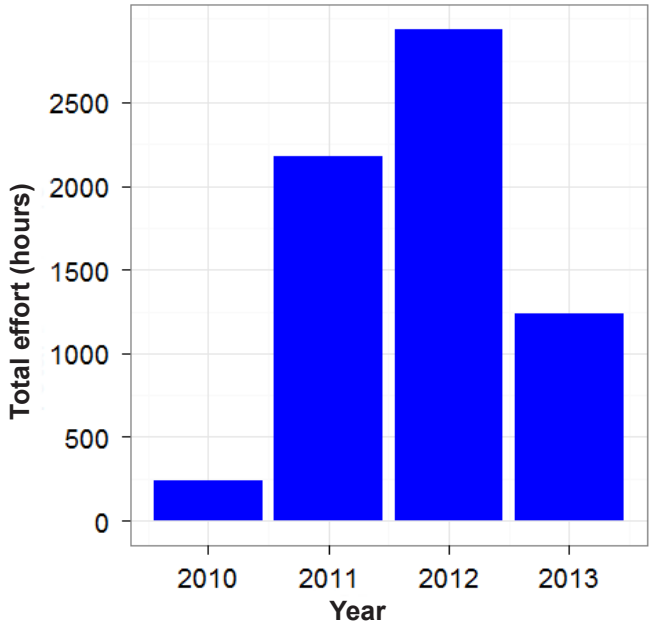


Figure 5 Effort in hours spent by Dolphin Watchers in the Swan Canning Riverpark since effort began to be recorded in 2010 (note that effort in 2013 reflects reporting up to May).

The data in Figure 5 reflect effort reported up until May 2013, and is on track to reaching a similar level of effort as last year, which was the greatest reached since the start of *Dolphin Watch*.

The Riverpark dolphin community frequently uses the river system. The total number of dolphin sightings reported by Dolphin Watchers April 2009 was 4160. This means that on average, if each dolphin in the community of approximately 20 dolphins was sighted equally as often, then each dolphin would have been sighted approximately 50 times a year. The number of sightings has increased over the years (Figure 6), but this is due to an increase in Dolphin Watchers involved in the program and an increase in their reports (see effort in Figure 5).

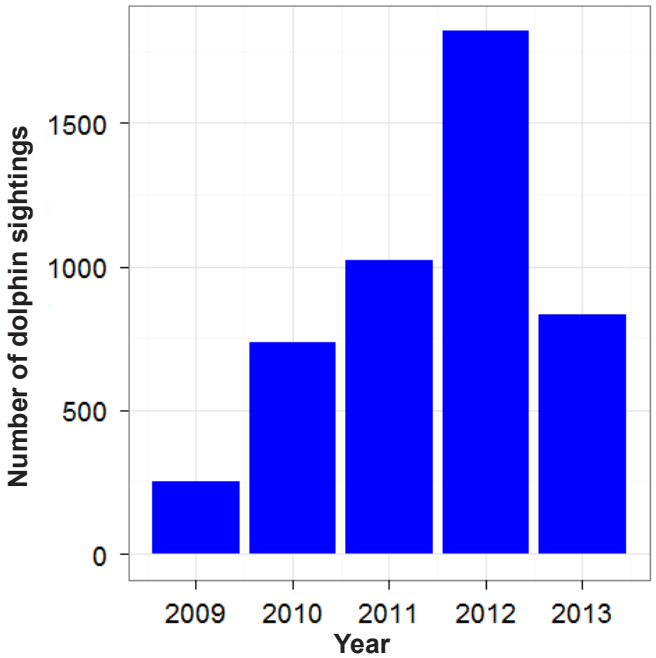


Figure 6 Number of dolphin sightings made by Dolphin Watchers in the Swan Canning Riverpark since the beginning of the Dolphin Watch program in April 2009.

There is very little difference in sighting rate between 2011 and 2012 (the number of dolphins sighted per hour of search effort, Figure 7).

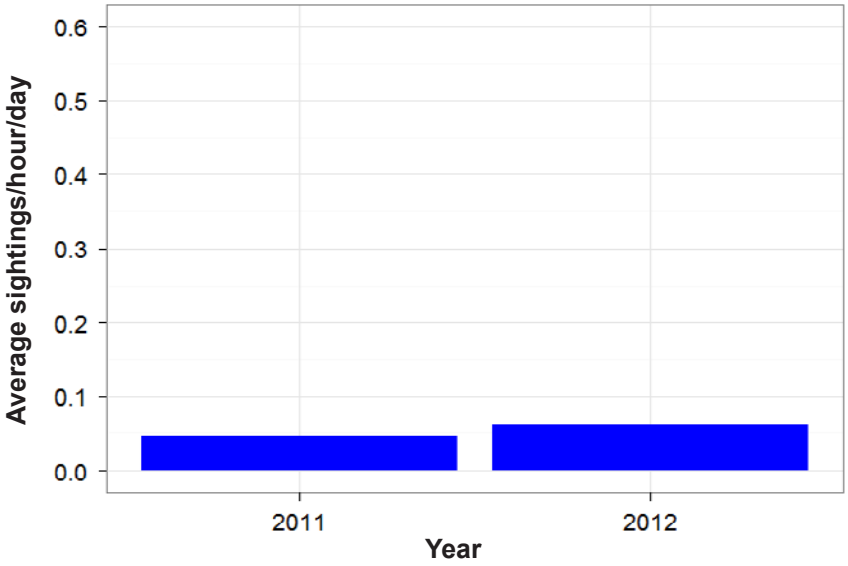


Figure 7 Number of dolphin sightings per hour searching on average per day by Dolphin Watchers in the Swan Canning Riverpark during 2011 and 2012 (effort was recorded for the entire year during these two years).

This means that dolphins on average were using the Swan Canning Riverpark as frequently last year as the previous year. This is an index that can now be used through *Dolphin Watch* to detect major changes in future years, and to date it shows the frequency of sightings has not changed much over the last two years. The amount of coverage and effort made by Dolphin Watchers has been building and it has now reached a point where the sample size is large enough so that data can be used as a measure of large-scale change.

There are some strong indicator zones with high levels of effort, and some zones where we can focus future effort. Zones 2-5, 9 and 13 are consistently strong in effort due to the early establishment of these zones as part of the *Dolphin Watch* program. Zones 21-24 and 29-30 are areas of increasing effort. Zones 15-20, 25-28 and 31-33 are areas for future focus (Figure 8).

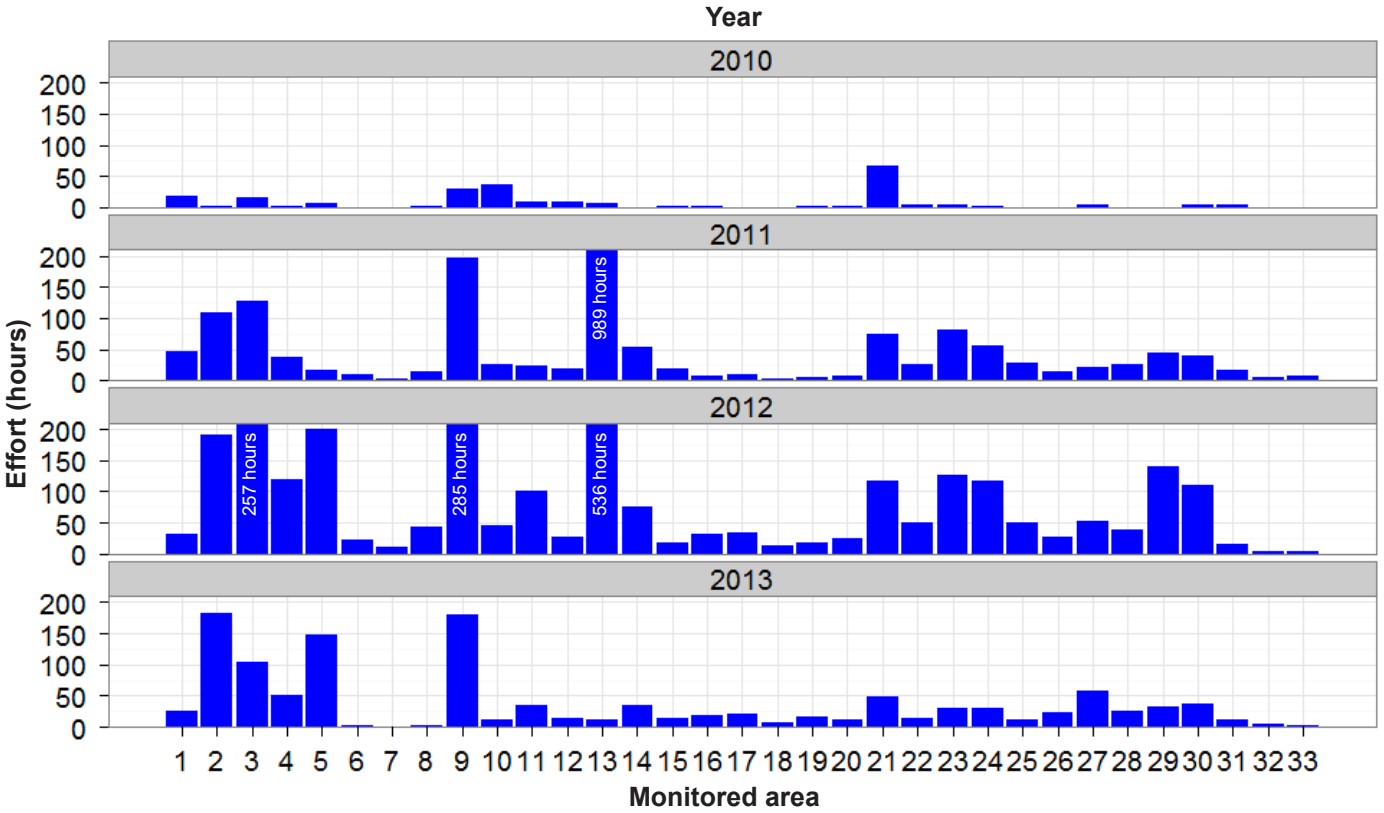


Figure 8 Search effort in hours reported by Dolphin Watchers since 2010 in the 33 zones of the Swan Canning Riverpark. Hours were truncated at 210 hours.

There is mounting evidence that dolphins are relatively frequently using areas near the Inner Fremantle Harbour, in the Canning River, and in Matilda Bay (Figures 9 and 10).

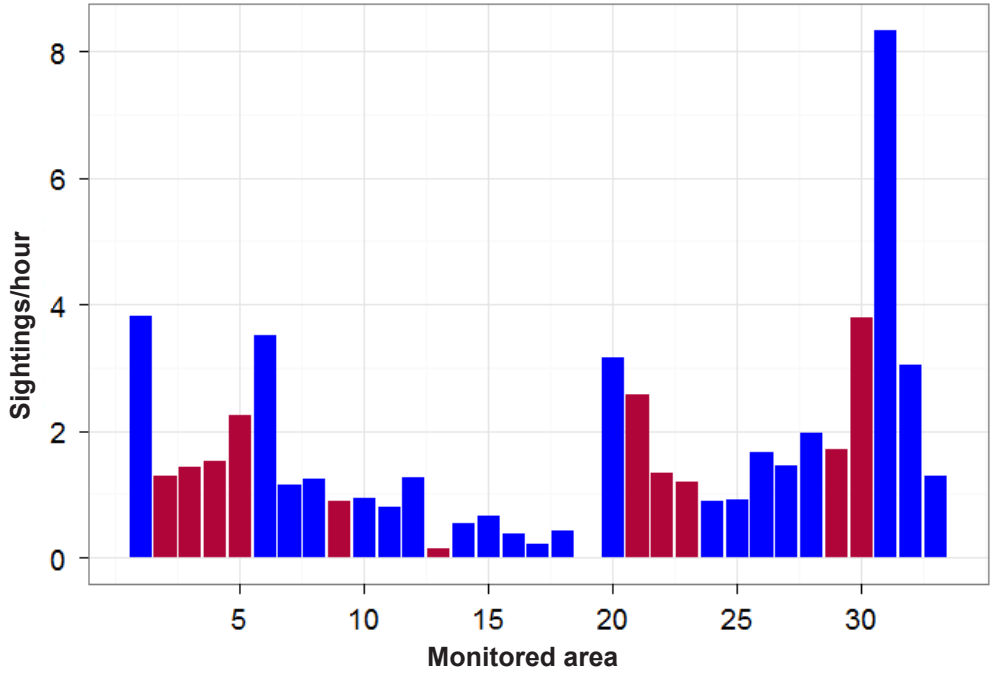


Figure 9 Dolphin sightings per search hour reported by Dolphin Watchers during 2011 and 2012 in the 33 zones of the Swan Canning Riverpark (Zones 2-5, 9, 13, 21-24 and 29-30 [red] present stronger evidence due to the greater effort spent in these areas).

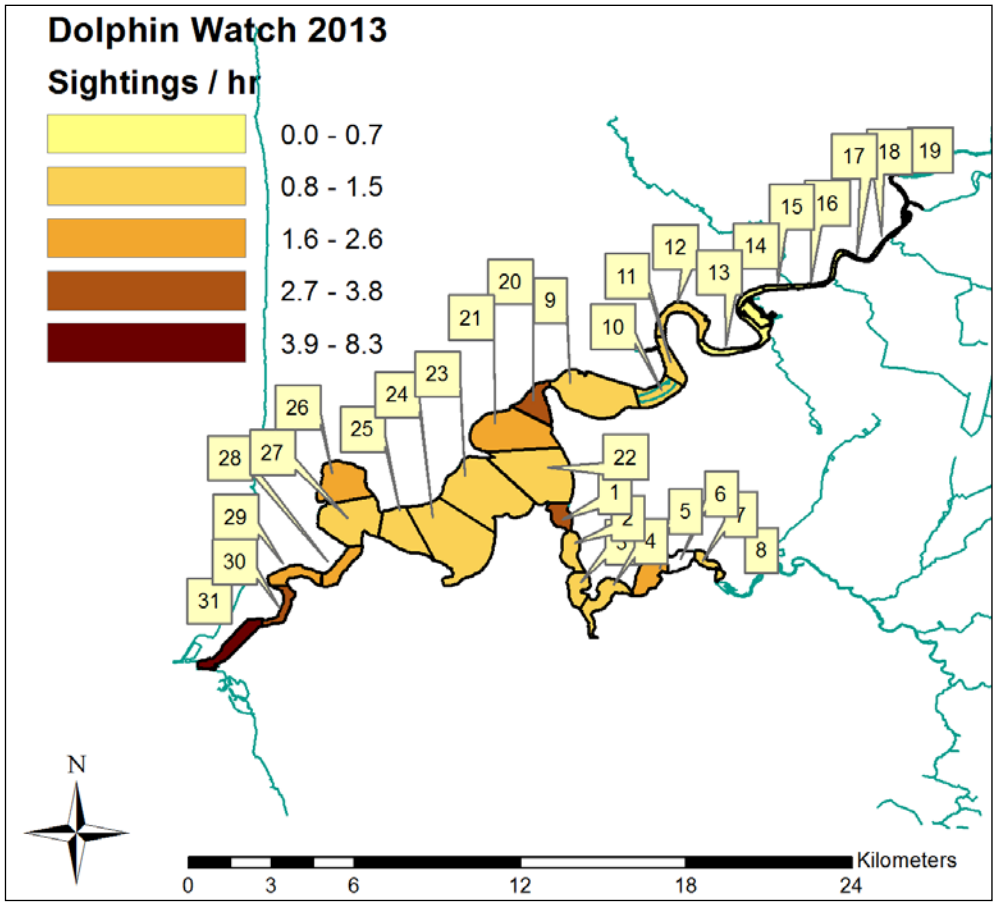


Figure 10 Relative sighting rate across monitoring areas for 2011, 2012 and 2013.

The way the dolphin community uses the Riverpark is likely to change with changes in environmental conditions, fish (prey) movements and aggregations. There is increasing evidence to suggest that potential hotspots of activity occur at particular times in particular years but more evidence is still required to make exact determinations. In exploring sightings in zones with more than 50 hours of effort per year, we see that in 2011 there were relatively higher sighting rates reported in zones 1, 5, 6, 21, 29, 30 and 31 (the Canning River, Matilda Bay, and the Fremantle Inner Harbour) in 2011. In 2012, zones that had spikes were either the same ones, or zones that were close to those with spikes in 2011. These included zones 1, 20, 21 and 31 (Figures 10 and 11).

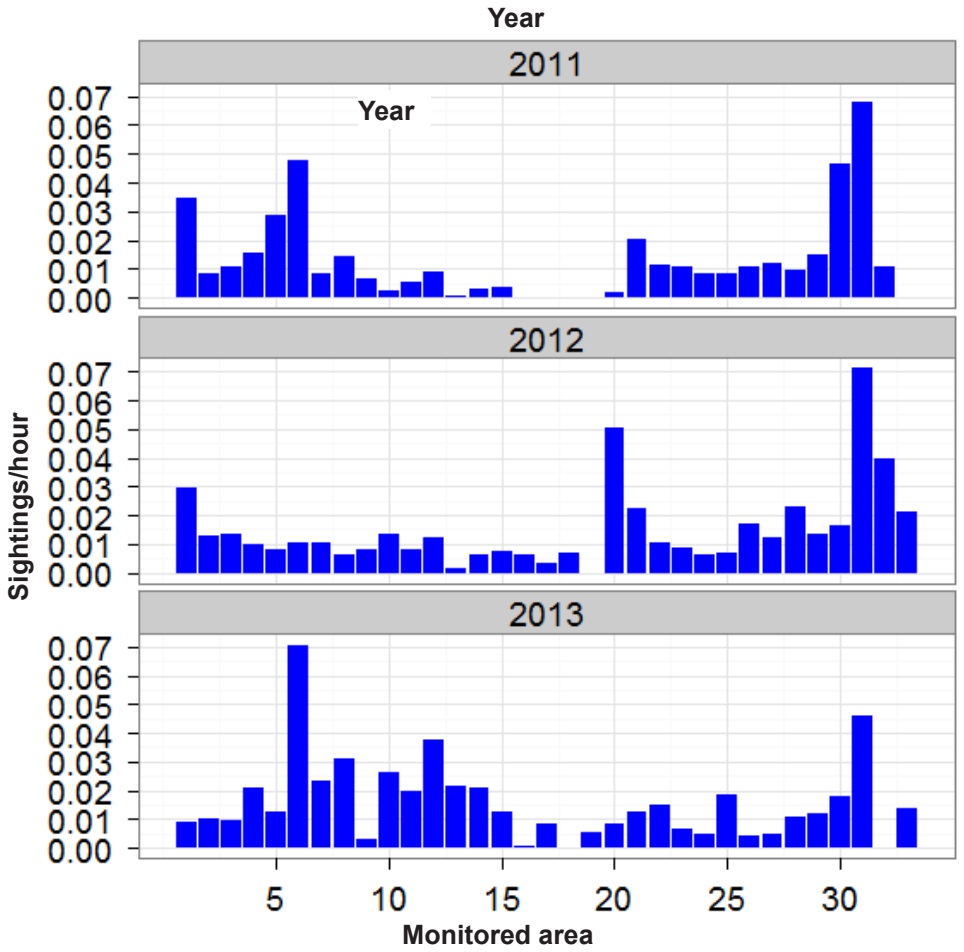


Figure 11 Relative dolphin sighting rates reported by Dolphin Watchers across monitoring zones during 2011, 2012 and 2013 (up to May for 2013).

The largest spike in frequency of dolphin sightings in Zone 20 in 2012 occurred in July (Figure 12b). In 2011, there was a spike in the adjacent zone (21), but this occurred earlier over April to June (Figure 12a). Similarly, the peak in Zone 1 (the mouth of the Canning River) occurred in July in 2012 and one month earlier in June the previous year (2011). Consistent with these earlier peaks in 2011, compared with 2012, the peak near the Fremantle Inner Harbour area occurred in April and May in 2011, and one month later in June (and then later in September) in 2012.

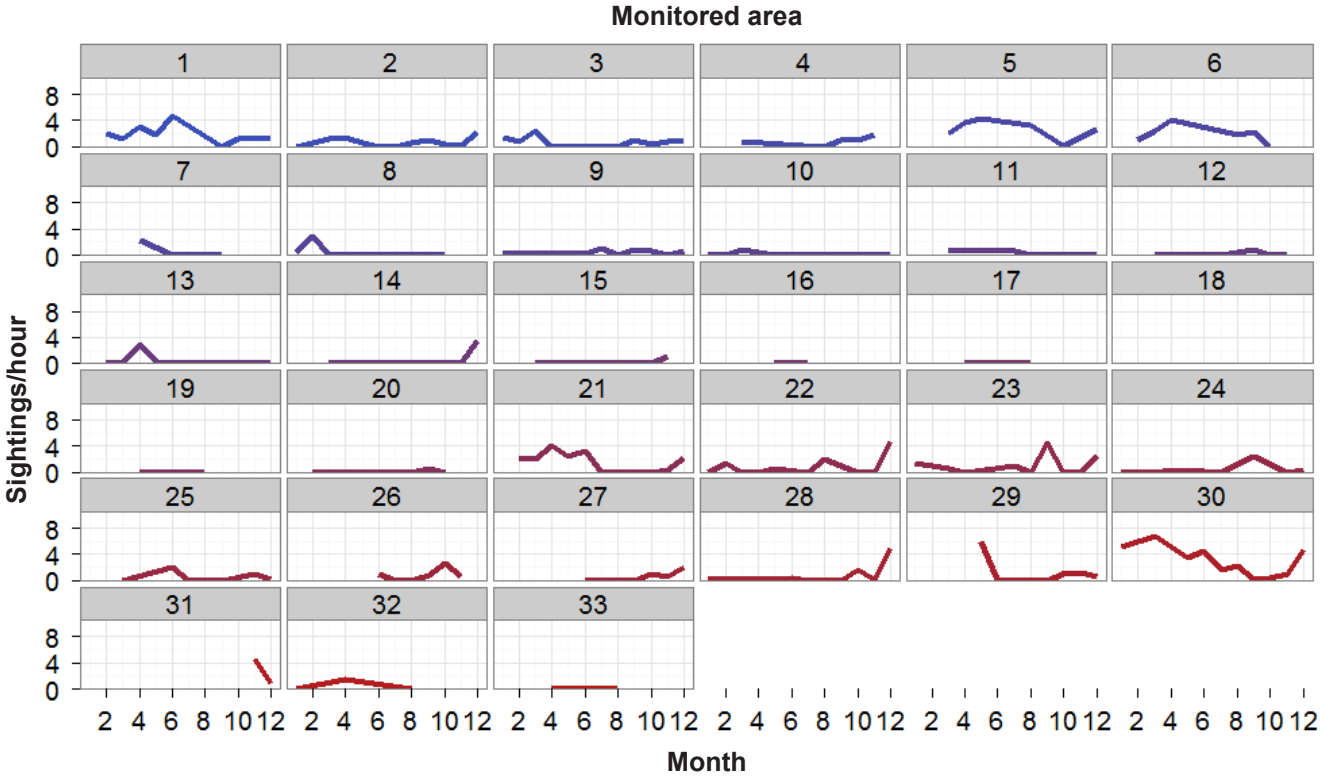


Figure 12a Relative dolphin sighting rates reported by Dolphin Watchers across monitoring zones over the 12 months for 2011 (times with fewer than 50 hours of observation are excluded).

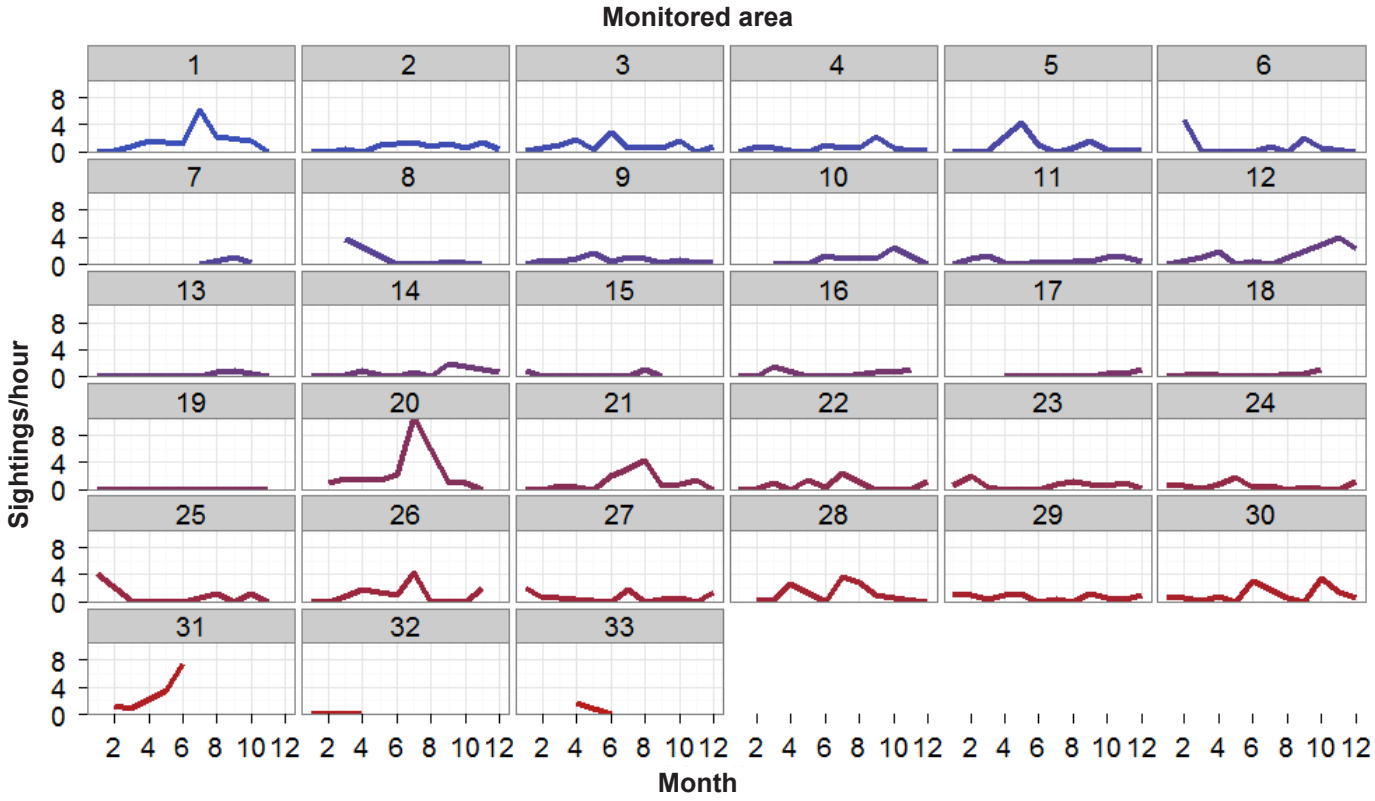


Figure 12b Relative dolphin sighting rates reported by Dolphin Watchers across monitoring zones over the 12 months for 2012 (times with fewer than 50 hours of observation are excluded).

When looking at major activity indicators, Dolphin Watchers' reports showed a relatively large foraging effort in the Fremantle Inner Harbour area (Zone 30) and Matilda Bay, but comparatively more time was spent by dolphins undertaking social interactions or travelling in the upper reaches, eg Zone 13 (Figure 13). These are indicators that dolphins appear to be spending more time in foraging areas, and relatively less time in other areas travelling and socialising.

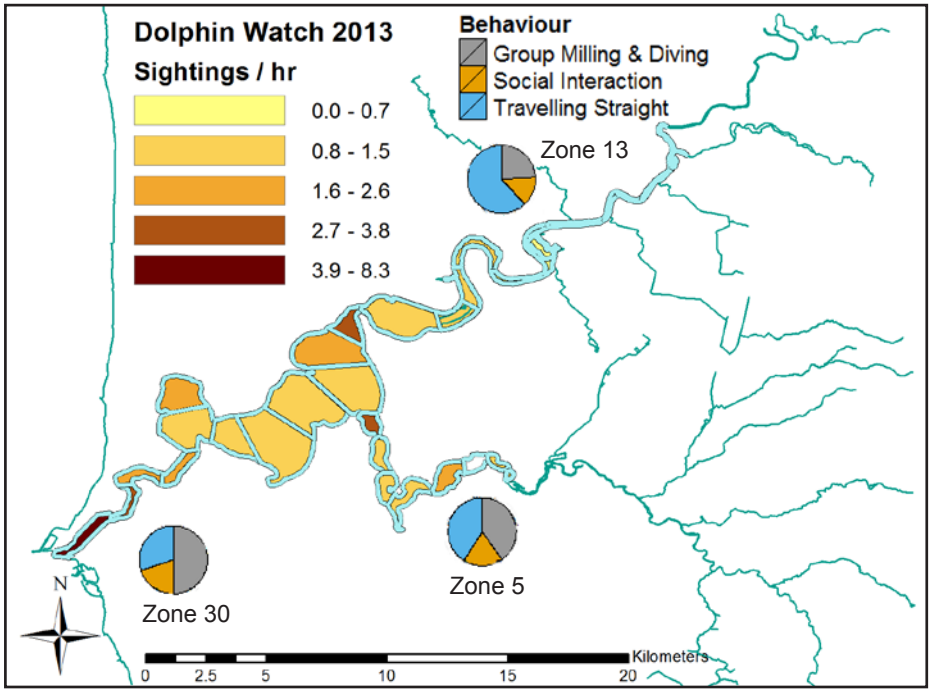


Figure 13 Proportion of times dolphins were sighted by Dolphin Watchers in group foraging, social interactions and travelling activities in three indicator zones (Zone 5, 13 and 30).

The way dolphins are using each zone in the Riverpark is directly tied to the environmental and biological characteristics of the different regions. Factors that can influence dolphin use include prey distribution, and the availability of safe environments where calves can be nurtured and social activity and resting can occur. Temperature, rainfall, salinity, depth, physical features, distance from the mouth of the Swan River and human activities all likely play a role in influencing dolphin presence and activities.

Dolphin Watch data is now being used to trial novel statistical models that will assist in understanding the significant environmental characteristics that influence the way dolphins use the Riverpark. This work has taken the first step in using *Dolphin Watch* data to test advanced statistical techniques for understanding drivers in dolphin distribution over time using what is called 'presence-only' data. Presence-only means that observations are reported only when dolphins are sighted, as opposed to 'presence-absence data' where reports include observations made when no dolphins were sighted as well as when dolphins were sighted.

Preliminary analyses, which compare a subset of data with presence-only to the subset of data that includes presence-absence data, has shown that the advanced statistical methods can be used with presence-only data as an input, with an equally reliable outcome as presence-absence information. These advanced modelling techniques will continue to be refined with larger data sets in future *Dolphin Watch* reporting. If there is continued evidence that presence-only data can be used in this way, an invaluable tool will be available for use by a much broader community of waterway, sea, and ocean users that report unique and interesting sightings (by way of 'presence-only' observations).

Furthermore, the *Dolphin Watch* data set will soon be compared to dedicated transects conducted by boat-based CEDP (Coastal and Estuarine Dolphin Project) researchers to further validate the patterns that are beginning to emerge from the large data set resulting from *Dolphin Watch*.

This work is further described in:

Beidatsch, K. (2012). Machine learning for species distribution modelling: evaluation of a novel method. Honours thesis, Curtin University.

Beidatsch, K., Yatawara, N., Salgado Kent, C., Giroud, M., and Finn, H. (2012). Support vector machines and habitat modelling. Australian Statistical Society Conference. Adelaide, Australia. Jul 9th-10th.

Chabanne, D., Finn, H., Bejder, L. (2013). Community size, composition, and association patterns of Indo-Pacific bottlenose dolphin (*Tursiops aduncus*) in the Swan Canning Riverpark, Perth (WA). Presentation at the 3rd Biennial South West Marine Conference, Pullman Resort, Bunker Bay, WA, 9 May 2013.

Dolphin Watch Awards 2013

2013 Chief Scientist's Citizen Scientist Award
Trudy Klessens

The Chief Scientist's Citizen Scientist Award is a huge honour for the award recipient. Chief Scientist of Western Australia Professor Lyn Beazley hand picked Trudy Klessens from the hundreds of volunteers for her detailed reports on the dolphins in the Riverpark.

2013 Dolphin Watcher of the Year
Peter and Trita Agar

Peter and Trita Agar have won the Dolphin Watcher of the Year Award for their incredible commitment to the project. The couple have been involved with *Dolphin Watch* since its launch in April 2009 and have been consistently reporting on dolphins since that time. This year the couple contributed an incredible 222.8 hours monitoring in Shelley, monitoring zone number 5. In that time they have reported 29 dolphin sightings and have also been reporting absence of dolphins in the area, a huge help to the research to help determine dolphin movements in the Riverpark.

2013 Dolphin Watch Photographer of the Year
Susan Harper

This is a new award this year and was included because of the many photographs that are now coming in from our volunteers. Photographs help boost the research and provide images for publications and guides such as FinBook. Susan Harper has been reporting for the project since 2010 and has often accompanied her reports with dolphin photos. In the last couple of years Susan has honed her photography skills and has provided some fantastic photos for the project.

Dolphin Watcher profile

Laura Nibali
Dolphin Watch Volunteer

Two years ago I saw an ad in the local paper offering training to become a Dolphin Watcher. I decided to attend and it has become one of the best decisions that I have made. It started my journey with the dolphins and the Swan River.

Firstly, I would like to acknowledge everyone at the Swan River Trust, in particular River Guardians/ *Dolphin Watch* workers and Hugh Finn. They are extremely dedicated to our beautiful dolphins in the Swan River and it's always such a pleasure to get involved with them when they have projects to participate in, and for that I want to thank them all.

My experiences whilst being a Dolphin Watcher have been extremely fulfilling. When I am out there walking by the river with my binoculars and camera in hand, the excitement and happiness I feel is indescribable when I see their dorsal fins slicing the water. Chasing fish, leaping out of the water, slapping their tails or just swimming around, I have witnessed all these behaviours and it makes your heart skip a beat. I love our Swan River dolphins and I love being part of this program.

Seeing them every weekend sets me up for a great week. One day in particular, it was a Sunday to be exact, I saw eight dolphins in the one area frolicking and jumping out of the water for nearly two hours. I am positive they knew they had an audience and they were putting on a show of affection for us all that day. I stayed till the end when they decided to leave and swim towards the bridge - a wonderful memory the dolphins gave me that day.

I have participated in many programs that have been run – RiverWise workshops, Swan River Dreaming event, Rivers of Emotion cruise and Dolphin Watch Day. I have also volunteered with clean up days at Point Walter in Bicton while the swans and pelicans were sitting on the sand bank. All of these workshops have given me knowledge and history of the Swan River. It's shown me ways that I can use to help keep the river clean for the dolphins and all the wildlife.

Looking back to the day I joined the *Dolphin Watch* program to the present, I have gained a respect, appreciation and have felt a sense of belonging and love for the Swan River, the dolphins and all the wildlife. I hope they will always be there for us to enjoy and look after. Being a Dolphin Watcher will always be part of my life.

This is my story of the day I decided to be a Dolphin Watcher.

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