Abstract
Zoos are traditionally considered a low key education facility with a passive education role for the general public visiting those institutions, and a more targeted role for assisted school visits by primary, secondary and tertiary students. With the increasing level of relocation of families from one part of the world to another, either voluntarily or in response to civil and cross-border conflicts, a new class of zoo target audience is emerging. This paper describes the results of a pilot education program designed to introduce late-primary and early-secondary school aged children recently arrived in Australia under refugee immigration programs to Australian native fauna. The aim of the program was to facilitate a better understanding of Australian native fauna and to either dispel, or at least put in an appropriate context, the threat posed by some of the fauna.

Introduction
A common international perception of Australia perpetuated in the media, is that of a dangerous and harsh environment filled with some of the world’s most deadly animals. Accompanying this perception is a limited knowledge of how to interact with local Australian wildlife. This is usually based on misinformation and a lack of understanding of the role of these animals in nature and their biology and behaviour. Culturally, many refugees to Australia hold ‘wildlife orientation values’ limited to seeing wildlife either a food source, an unlimited resource, a threat to survival, or of no value at all. Chardonnet et al. (2002) discuss in a socio-cultural context the ambivalent view people may hold about wildlife. “Besides providing positive goods, it [wildlife] is also a negative resource or a non-asset, through human casualties (accidents which wound or kill people), depredation to crops, predation on domestic animals, destruction of houses and crop stores… Native perceptions rise and become very strong when wildlife is considered to be in conflict with human interests.”

The current composition of Australia’s planned refugee or humanitarian arrival intake includes people from Iraq, Burma, Afghanistan, Bhutan, Congo (DRC) and Sudan (Anon. 2013), all of whom have English as a second language. Over the past five years, an average of 12 percent of the humanitarian arrivals, for a total of 5,845 people, settled in Western Australia (Anon. 2015). Newly arrived refugees receive medical and healthcare support, literacy and numeracy training and assistance with housing and formal education upon settlement. During the resettlement process newly arrived refugee families have had limited conservation-focused, exposure to native animals, their habitats and strategies for living harmoniously with wildlife. The Perth Zoo has developed a targeted primary and secondary school level education program called Living with Wildlife newly arrived refugee families and that utilises living examples of native fauna to expose refugees to the unique biology and ecological value of native animals in a family learning environment. The program is designed to be delivered by Perth Zoo’s Mobile Outreach Unit.

The primary goal of the Living with Wildlife program is to nurture an appreciation of, and positive attitude towards, local wildlife while fostering an understanding of the necessity of wildlife conservation. In addition to this humane and non-lethal methods for managing problems with wildlife are also presented to program participants. A pilot study was established to measure the effectiveness of the Living with Wildlife program in achieving its goals of:

• Foster an understanding of the necessity of Australian wildlife and its conservation;
• Promote humane and non-lethal methods for managing problems with wildlife; and
• Provide positive roles models for careers in life sciences and science communication.

Methods
Thirty school-aged children from newly-arrived refugee families participated in the pilot program. These children were enrolled in Save the Children’s ‘Live and Learn’ Program. Participants consisted of three groups: one of mixed gender secondary students (n=6 pre-activity and n=7 post-activity), a group of 9-12 year old primary...
school female students (n=10 pre-activity and 8 post-activity) and a group of 8-13 year old male primary school students (n=14 pre-activity and n=10 post-activity). The pre-activity survey was facilitated by Save the Children staff to minimize bias that could arise from the survey being facilitated by Perth Zoo staff. The surveys were delivered separately to each of the three groups of participants.

The pre- and post-activity surveys utilized the same question (Table 1). To ensure that post-activity survey responses were not based on immediate knowledge recall, the post-activity survey was administered three weeks after the Perth Zoo facilitated activity by Save the Children staff.

Students participated in a two-part facilitated activity lasting 45 minutes in total. The facilitated activity was delivered by Perth Zoo Mobile Outreach Unit staff at locations remote from the Perth Zoo. Each of the groups described above participated in the activity on consecutive days during September 2013. The first part of the activity consisted of students examining hypothetical newspaper headlines focusing on sensationalized animal encounters or potential encounters:

- Surfer has close call with Great White Shark
- Watch out for swooping magpies
- Red-back spiders on the rise
- Summer snake season has started

Students discussed what the reader might think, feel or want to do after reading the newspaper headline. They were then provided with a variety of resources, fact sheets and information packs to help them determine why the animal might be behaving in this way and identify ways to avoid human/animal conflict.

The second part of the activity involved Perth Zoo staff introducing live animals from the Perth Zoo’s education program collection to each of the three groups, and discussing why people might have fears and phobias regarding some native Western Australian animals. The live animals were portrayed in a positive light to emphasize how special these animals are in terms of their adaptations and roles in the ecosystem. The following live animals were utilised:

- Red-Back Spider (*Latrodectus hasseltii*)
- Shingle-back Lizard (*Tiliqua rugosa*)
- Woma Python (*Aspidites ramsayi*)
- Short-beaked Echidna (*Tachyglossus aculeatus*)

The results of the pre- and post-activity surveys were collected and the responses to questions were clustered into logical groups. Chi-square analyses (using Fisher’s Exact test where expected values were less than five) were performed on the data. The null hypothesis was that there would be no difference between the observed responses recorded in the pre-activity survey and those in the post-activity survey.

**Results**

There was no significant difference in the make-up of the participants involved in the pre- and post-activity surveys despite the small reduction in the total number of participants ($X^2=0.52$, d.f.=4, $p=0.77$). In response to question 1 in the pre-activity survey, participants named a broad range of animals from
around the world as well as Australia. Many of the Australian animals listed were iconic Australian animals. Animals named in the post-activity survey were only Australian animals. Interestingly none of the global species identified in the pre-activity survey were named in the post-activity survey.

With regard to the seven most frequently identified species mentioned in the pre-activity and post-activity surveys there was no significant difference in their frequency of occurrence between the two surveys ($X^2=11.00$, d.f.=5, $p=0.088$). Table 2 above.

With regard to the question of how the participants might respond when confronted by a snake (see Table 3 right) in their backyard, there was a significant change in the responses following the activity ($X^2=90.56$, d.f.=4, $p=0.00$; Table 3) A total of 13% of pre-activity survey participants indicated a confrontational response to the situation, i.e. essentially kill it or catch it. During the Perth Zoo facilitated sessions, participants were specifically told to leave the snake alone, back away quietly and tell an adult so everyone knows that a snake is in the area and it should be left alone. The option of calling a professional person to remove the snake if necessary was also discussed. There were zero instances of confrontational responses in the post-activity survey.

The Perth Zoo is actively involved in in situ and ex situ conservation programs involving Australian native and some non-native species. This conservation message is embedded in all of its education programs and interpretive material provided on site and on the Zoo’s webpage. What motivates Perth Zoo staff and how they perceive the importance of animals is a subset of how people from different parts of the world might view animals. In Figure 1 it can be seen that 100% of the participants that responded to survey question 3 considered Western Australian animals to be important in both the pre- and post-activity surveys. The majority of respondents of both identified Western Australian animals as being either ‘Extremely important’ or ‘Very important’, but the emphasis on ‘Extremely important’ decreased significantly from the pre- to the post-activity survey ($X^2=16.81$, d.f.=4, $p=0.002$) but not to the point that any of the respondents considered Western Australian animals to be unimportant.

Having ascertained that the participants considered Western Australian native animals to be ‘important’ it...
was prudent to determine what the motivation for having those views were. The text responses were grouped into six logical groups (Table 4). There was a significant difference between the number of responses in each group for the pre- and post-activity surveys ($X^2=14.81$, d.f.=$4$, $p=0.02$). The responses indicate that as a result of the information provided during the activity, more of the participants appreciated the uniqueness of many Western Australian animals along with the role they played in the ecosystem. At the same time fewer of the participants considered Western Australian animals purely as a potential food source (i.e. bush meat).

On the issue of working with wildlife being a potential vocation (question 5) there was a significant difference ($X^2=8.59$, d.f.=$2$, $p=0.01$) in the pre- and post-activity responses, with an increased proportion of participants indicating that they had not considered getting a job working with wildlife when they finished school.

**Discussion**

The participants named a broad range of animals from around the world as well as Australia (many Australian animals listed were iconic Australian animals such as kangaroo) in the pre-activity survey. Animals named in the post-activity survey were only Australian animals, with none of the global species identified in the pre-activity survey being named in the post-activity survey. It is likely that this dramatic change resulted directly from their experience with Perth Zoo’s Living with Wildlife program, coupled with the short (3-week) interval between the two surveys. Another possible explanation for the significant change may have been flow on effects arising from the discussions between the Save the Children staff and participants between the two survey periods. This can still be seen as a positive outcome as the messages and questions may have initiated further discussion. It is interesting to note that snake, red back spider/spider, blue-tongue lizard/bobtail and echidna, the interaction animals used in the activity, were identified at a high frequency in the post-activity survey. It would appear that the opportunity to meet live animals made an impact on the participants.

The post-activity survey results also indicated a shift in perspective, with no participants listing a confrontational

### Table 4 (above) Why do you think people might feel that Western Australian animals are important?

<table>
<thead>
<tr>
<th>Responses</th>
<th>Pre-activity responses N%</th>
<th>Post-activity responses N%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australian animals/WA animals are unique and can only be found in Australia/WA e.g., Because animals in Australia you can’t find them in the world (sic)</td>
<td>13</td>
<td>32</td>
</tr>
<tr>
<td>Animals play an important role in the ecosystem e.g., Because some of the animals are part of the environment</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>Animals are a food source e.g., Because if there was no WA animals we would not have any meat to eat. Does to makecury, fish for eating. Because they feed us and help our planet</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>They are endangered or might die out e.g., Because they are endangered (sic)</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>People like to be able to see them/interact with them e.g., Because when you go to see the animals at the zoo you will not see them; Because people love animals so they can play with (sic); Because they would like us to look at the animals</td>
<td>13</td>
<td>8</td>
</tr>
<tr>
<td>Other e.g., I am from Africa so I don’t really know about WA animals; Because the animals are kind; Because they are cute</td>
<td>20</td>
<td>12</td>
</tr>
<tr>
<td>Did not respond to question</td>
<td>7</td>
<td>8</td>
</tr>
</tbody>
</table>

### Table 5 (below) Have you ever considered getting a job working with wildlife when you finish school?

<table>
<thead>
<tr>
<th>Responses</th>
<th>Pre-activity responses N%</th>
<th>Post-activity responses N%</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>70</td>
<td>84</td>
</tr>
<tr>
<td>Yes</td>
<td>27</td>
<td>16</td>
</tr>
<tr>
<td>Did not respond to question</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>
response compared to 13% of pre-activity surveys listing a confrontational response to a snake in their backyard. Ninety-six percent of the participants stated that they would carry out at least one aspect of the response that was encouraged during the Zoo staff facilitated activity (i.e. Leave the snake alone; advise others that a snake is in the area). This has important safety implications for new migrants, given the number of venomous snake species that are found in urban and peri-urban cities and towns around Australia.

The positive responses to the importance of Western Australian animals in both the pre- and post-activity surveys indicate that children generally recognise the importance of animals to their local environment. It is important to note though that in some cases their reasoning did not indicate an understanding of the animal's ecological role. For example, some participants related the importance of animals in terms of a food source for people. Others expanded on this to provide a more in-depth understanding, “Because animals like bees make honey…. Bees to make honey, fish for eating”. It was pleasing to see that many participants recognized that some Western Australian animals are unique and can only be found in Western Australia and that other participants felt that animals play important roles in the ecosystem.

The results of survey question 5 indicated that many children did not consider a career working with wildlife, and perversely the number of participants who considered this as a potential career decreased after the activity. The initial planning for delivering the Zoo staff facilitated activity with the refugee children factored in a portion of time for talking about wildlife career paths. However, the high level of interest and large number of questions from the children took up considerably more time than anticipated. This left less time than originally planned to discuss the idea of careers working with wildlife. The activity time could be modified in the future to include more time to discuss career paths, or alternatively the wildlife career aspect could be allocated to another day to allow Zoo staff more time to maximise the interest shown in the live animals by the children. Of the children who indicated interest in a wildlife career, the majority indicated an interest in working with exotic dangerous or charismatic animals. It is also worthwhile noting that the participants have had limited exposure to a broad range of career paths. Doctors, nurses and teachers are likely to have had a higher profile in their settlement process than many other professions.

Assessing the language skills of participants before, and while undertaking this study, proved to be challenging. Reading levels were quite varied and verbal explanations and visual prompts proved to be extremely important in engaging with the participants. Many participants initially showed a high level of reluctance to engage in a hands-on experience with the animals, however this quickly changed when the participants saw how comfortable zoo staff were with the animals and after many of their misconceptions about the animals had been debunked.

This type of program could also have application in helping children who have grown up in densely populated cities better understand what wildlife still exists in their local areas, and within a broader regional and national context.

Acknowledgments
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Literature Cited