

Efficacy of education in changing public attitudes toward flying-foxes

Some preliminary results



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“Urban Bat Wars” Can flying-fox – human conflict be resolved through education and application of Values Theory?

Research Questions

- How do education/interpretation programs affect attitudes?
- What components are most effective in influencing attitudinal change?
- Are there better ways to educate and engage people and deliver messages?



Study Area and Target audience

Study Area

- Urban bat camps mainly Eastern Australia
- Differing levels and histories of conflict

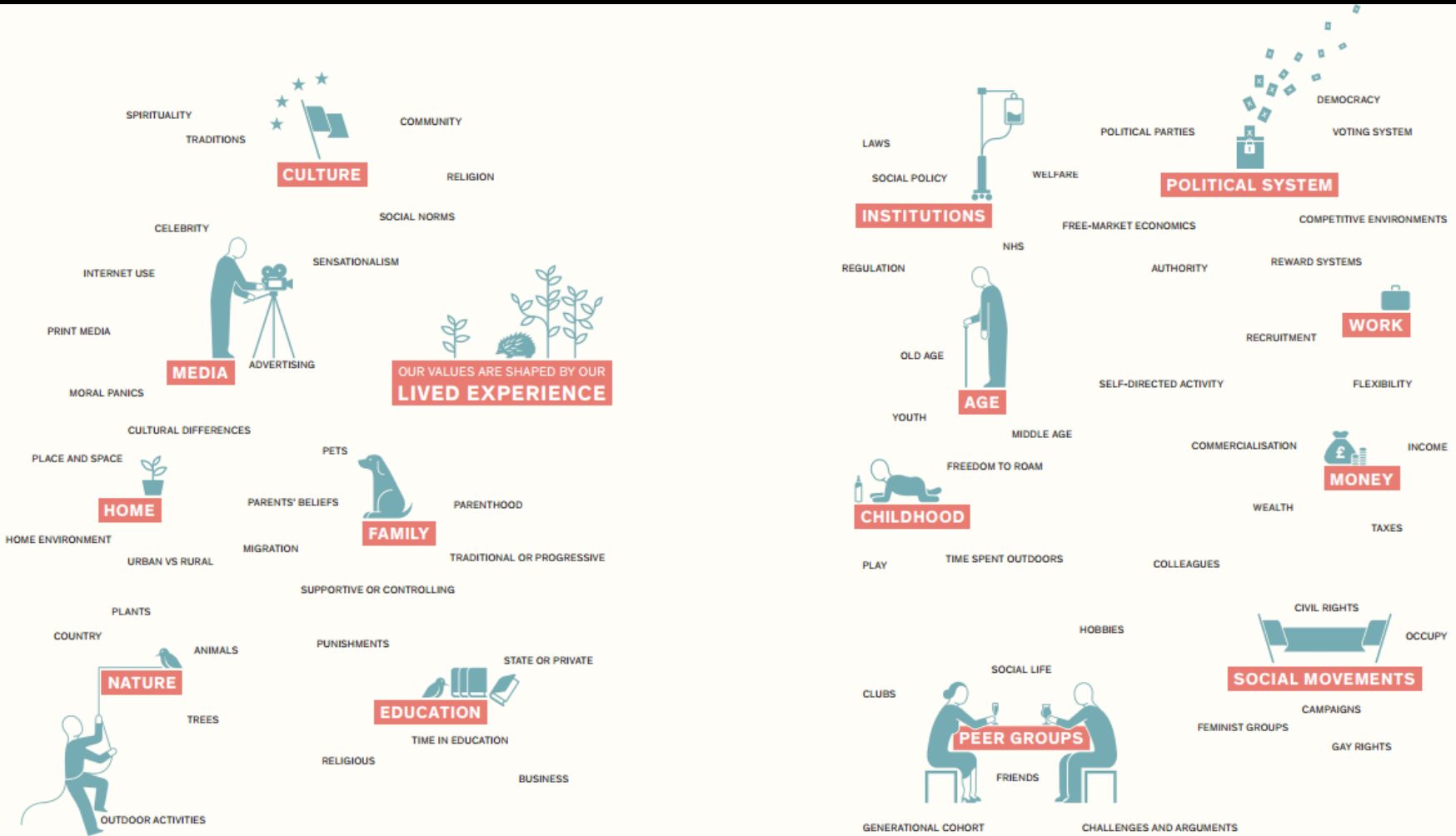
Target audiences

- School children Years 5/6 & 7/8
- Participants of public programs (e.g. Australasian Bat Night) on bats
- Communities with one or more flying-fox camps
- People engaged in citizen science projects on flying-foxes
- Managers, policy makers and volunteers around flying-foxes



Distribution map from Westcott & McKeown

Values Theory



<http://www.commoncause.org.au/>

Our lived experience, cultural norms, and education shape our world views

Wildlife Value Orientations

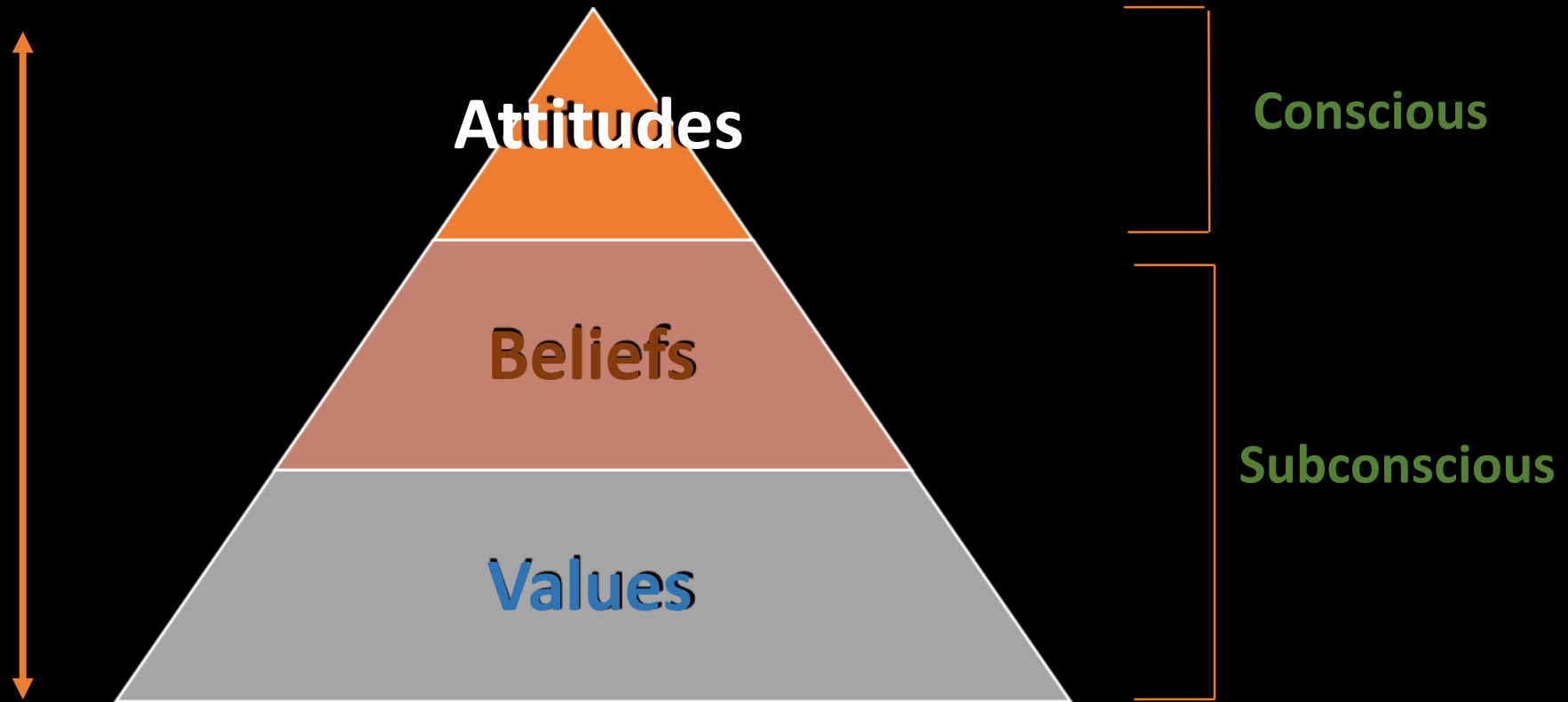
Our world view determines how we think about wildlife

Anthropocentric / eco-centric

- **Utilitarian** - wildlife as useful to humans
- **Naturalistic** – valuing wildlife as part of nature
- **Ecologicistic / Scientific** – wildlife valued for own sake
- **Aesthetic/Symbolic** – valued for beauty and/or symbolism
- **Humanistic** – affection for animals
- **Moralistic** – duty to care for wildlife
- **Dominionistic** – right to control wildlife
- **Negativistic** – fear or indifference to wildlife
- **Neutralistic** – disinterest and apathy. Not connected to nature.

Changing attitudes

Closest to surface – easiest to change



Deepest – hardest to change

Adapted from Fulton 1997

Education potential

Characteristic	Group	Likely effectiveness of education	Priority for education
Attitude towards bats	Positive	improve knowledge only	Low
	Ambivalent	Potential to change attitudes	High
	Negative	Limited	Medium
Potential for bat conservation influence	Decision makers- eg Government	Very important	High
	Influential – eg industry bodies, media	Important	High
	Directly impacted – eg orchardists and residents near camps	Important	High
	Not impacted – general public	Important to build support for bat conservation	Medium

Research overview

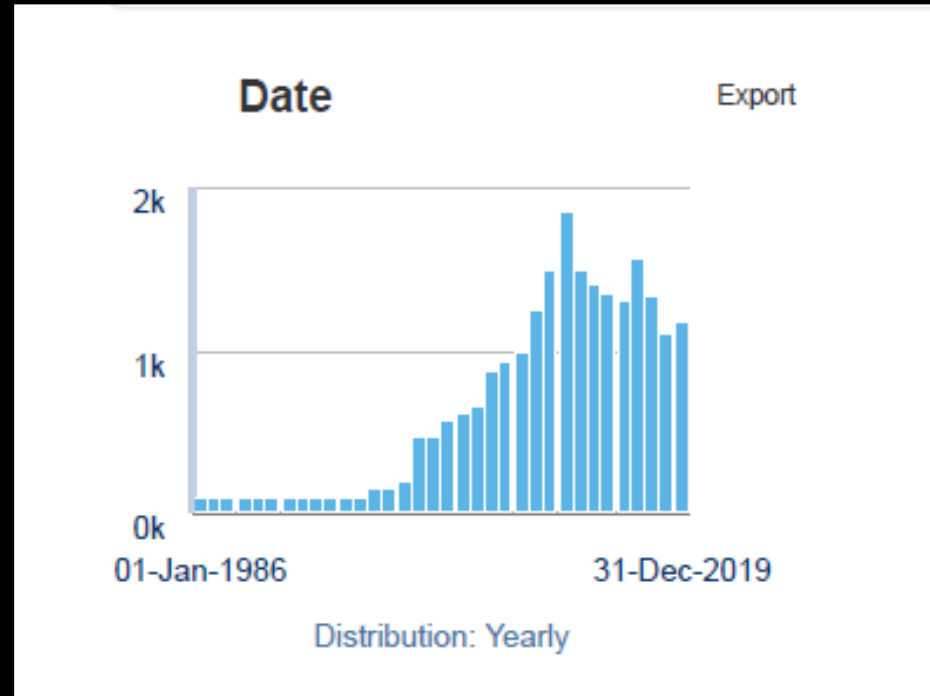
- Media Content Analysis
- Interpretation & signage experiments
(textual content analysis, observation and survey)
- Assess education programs
(before and after questionnaires)
 - Formal education
(School years 5/6 & 7/8)
 - Public interpretive programs
(e.g. Australasian Bat Night)
 - Community Engagement
(residents near camps)
- Host communities and bat tourism (case study: questionnaire)
- Participatory learning (student projects and citizen science: questionnaire and interview)



Photo: Justin Welbergen

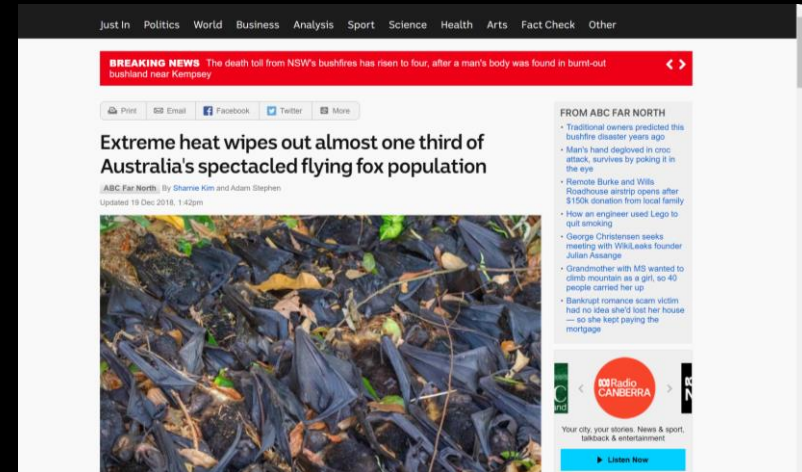
Media- content analysis

- Media a major source of information for public
- Importance of language and framing
- Gives a background and context to education and interpretive assessments
- Methodology: Content analysis
- Historical trends
- Comparison with previous studies (Howard 2006; Lunney 2014)



Media coverage of specific issues

- Previous studies:
 - Disease (Jemison 2017)
- Heat Stress Event 2018
 - Reach
 - Number of stories
 - Positive/negative
 - Outcomes



Interpretation- Information on flying-foxes available to the public

Content analysis

- Government websites particularly local council, community websites, brochures

Framing, language, approaches, prioritising information

11/9/2019 Flying-foxes | Brisbane City Council


[Home](#) [Clean and green](#) [Natural environment and water](#) [Biodiversity in Brisbane](#) [Wildlife in Brisbane](#) [Living with wildlife](#) [Flying-foxes](#)


Flying-foxes

Flying-foxes are the largest flying mammals in the world, are nocturnal and are native to Australia. They are important to the environment as they support biodiversity and play an integral role in the reproduction, regeneration and dispersal of plants across the landscape.

In Brisbane, there are three species of flying-fox that are protected under Queensland's *Nature Conservation Act 1992* including the:

- [black flying-fox \(*Pteropus. alecto*\)](#)



 **Mareeba**
SHIRE COUNCIL

[Council](#) [Region](#) [Community](#) [Emergency Management](#) [Contact Us](#)

Flying Fox Management

[You are here](#) | [Home](#) > [Regulatory Services](#) > [Flying Fox Management](#)

Mareeba Shire Council is currently taking a managed approach to monitor flying fox roosts and to ensure that any dispersal methods are carried out in accordance with the State Government Department of Environment and Heritage Protection Guidelines and Policies. These documents can be viewed on the Department's following [website](#).

Contact Council

Where flying foxes are roosted adjacent to/or on your property and are creating a nuisance please call Council on 1300 308 461 to discuss the impacts and options available to you.

Importance of Flying Foxes on the Environment

Flying foxes are crucial to keeping native forests healthy. They play an important role in dispersing seeds and pollinating flowering plants. Flying foxes' high mobility makes them very effective as forest pollinators. Pollen sticks to their furry bodies and as they crawl from flower to flower, and fly from tree to tree, they pollinate the flowers and aid in the production of honey.

Injured Flying Foxes

Mareeba Shire Council Officers conduct regular inspections of roost sites however if you find an injured bat or flying fox, please contact RSPCA on (1300 264 625) or a local wildlife carer, or the Department of Environment and Heritage Protection (1300 130 372) for assistance.

Interpretive Signage

- Content analysis
 - Key messages
 - Framing
- Signage Experiments
 - Observational experiments
 - Survey for effectiveness of delivery of key messages
 - General public
 - Tourism industry
 - Interpretation specialists
 - Flying-fox experts
- Case studies new interpretive signage
 - Cairns
 - ?

Flying foxes in the Redlands

Gardeners of the night

Flying foxes play an important role in the reproduction, regeneration and dispersal of plants within our bushland. They assist in the production of seed, by pollinating our flowering native plants as they seek out the nectar hidden deep within the flower. They are also capable of flying almost 90 kilometres a night. During this journey they spread pollen and seed over a wide area, with up to 60,000 seeds being 'distributed' each night! This natural process aids the bush in regenerating itself and also helps establish new bushland.

Relationship of co-dependence

Scientists have identified a relationship between native flowering plants and flying foxes that has led to a theory of co-dependence between these species. The theory has established that the continued survival of flowering eucalypts is closely tied to the survival of our flying foxes. Flying foxes pollinate the eucalypts and the eucalypts provide nectar in return, creating a mutually beneficial relationship. This relationship is supported by the distribution patterns of flying foxes and eucalypt forests; the nocturnal production of nectar by eucalypt trees to coincide with flying fox activity; and the biological adaptations flying foxes have to assist them with locating flowering eucalypts. The conservation of flying foxes is crucial to the health of our bushland and the wildlife that depend on it.

What's the noise all about?

Flying foxes use sound as their primary form of communication. With a hearing range very similar to humans, the sounds they produce are easily heard by us. Over 30 different vocalisations have been recorded for the Grey-headed Flying Fox. Their calls are used to identify each other and to defend their territory. Flying foxes are at their noisiest at dawn and dusk when individuals are preparing to move in and out of the camp. Although calls during the day do occur during the autumn mating season; daytime calls are often in response to disturbance. These disturbances can include roaming dogs, birds of prey, loud noises or people walking through the roosting camp. Both noise and smell can be minimised by avoiding these disturbances to the camp.

Safety first

Occasionally juvenile or injured flying foxes may be found on the ground or caught in fencing or netting. For your own safety, do not attempt to handle these animals. Only trained individuals who are protected by vaccination should handle and care for flying foxes.

For all flying fox emergencies:
Redlands Wildlife Rescue
☎ 3833 4031
(24 hours)

Redlands IndigiScapes Centre

Formal Education - Schools

Before and after surveys

Quasi-experiments- learning treatments

Treatments:

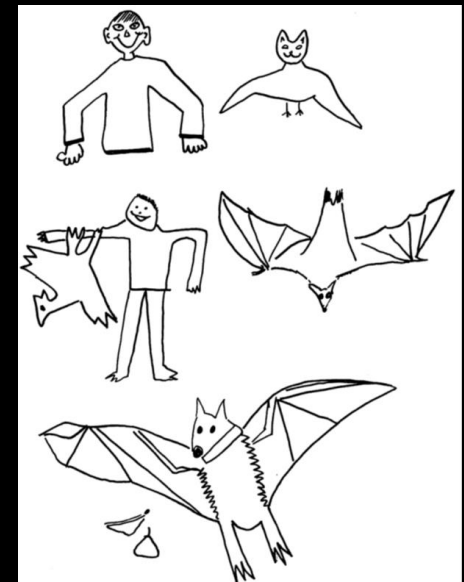
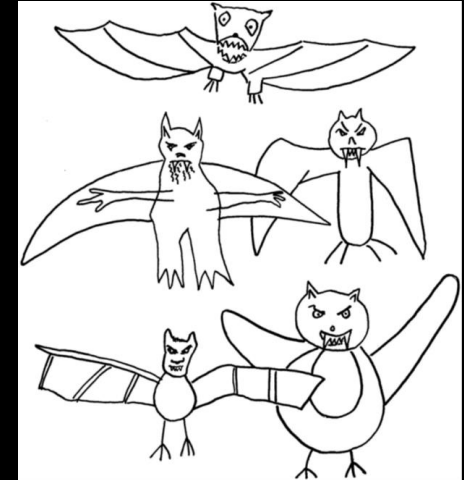
- In curriculum
- School visits
- Excursions
- Student projects (participatory)

Hypothesis:

Meeting a flying-fox is most effective in changing attitudes

What if you can't meet a live flying-fox?

Are there effective alternatives?



Formal Education - getting close up

Alternatives to meeting a live flying-fox

- Virtual reality – up close and personal
- Meet a (pseudo) bat – creating empathy



Formal Education – Preliminary results

- Draw a bat
- Cognitive mapping

Survey questions

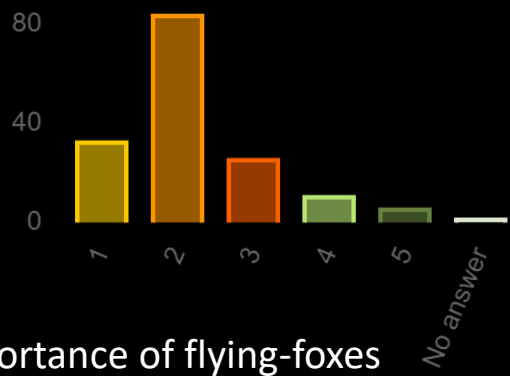
- Key messages
 - Risk and health
 - Ecological Role
 - Humans and flying-foxes
- Do you like flying-foxes more?
- What did you like best?

5 schools 450 students NSW/ACT

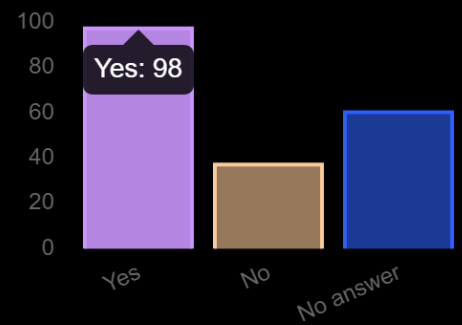
General observations

- Years 5/6 more engaged
- Years 7/8 too cool for bats unless special interest

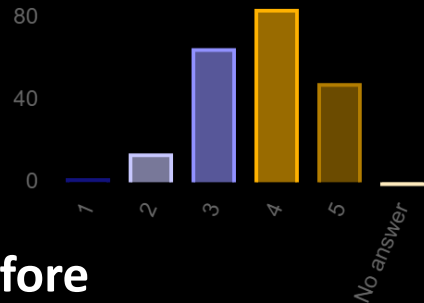
Knowledge of flying-foxes



Importance of flying-foxes



How important to conserve

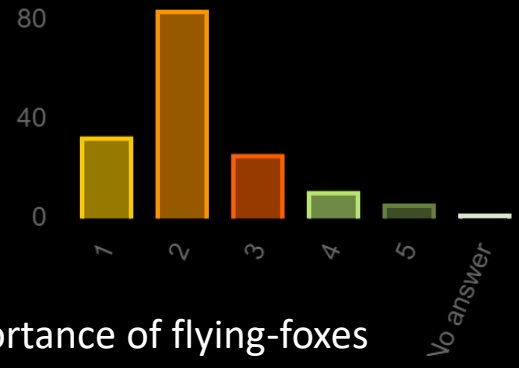


Year 5/6 Before

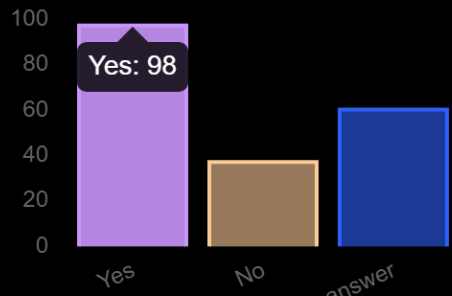
Formal Education – Preliminary results

Year 5/6 Before

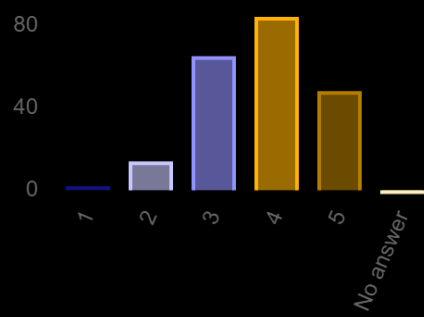
Knowledge of flying-foxes



Importance of flying-foxes

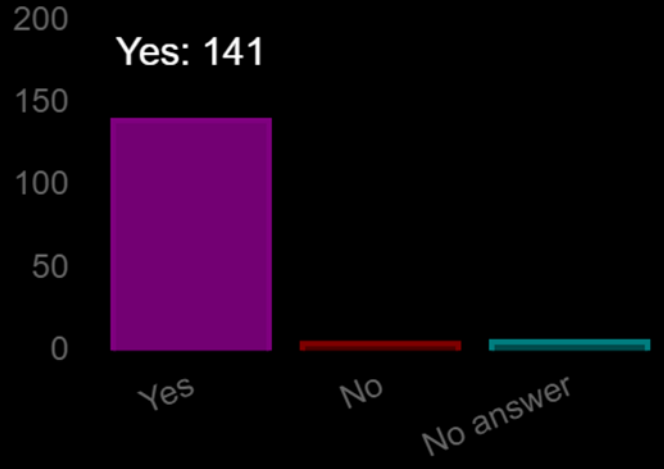


How important to conserve

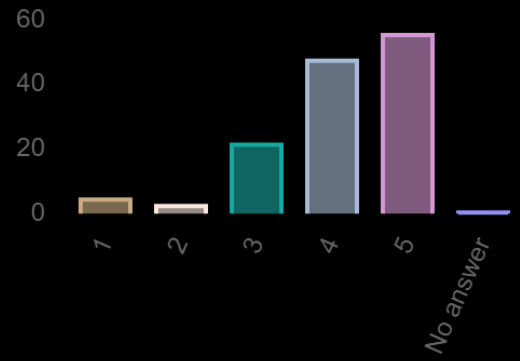


After

Did you learn anything new?



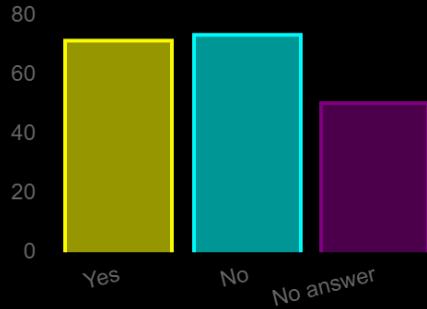
How important to conserve



Formal Education – Preliminary results

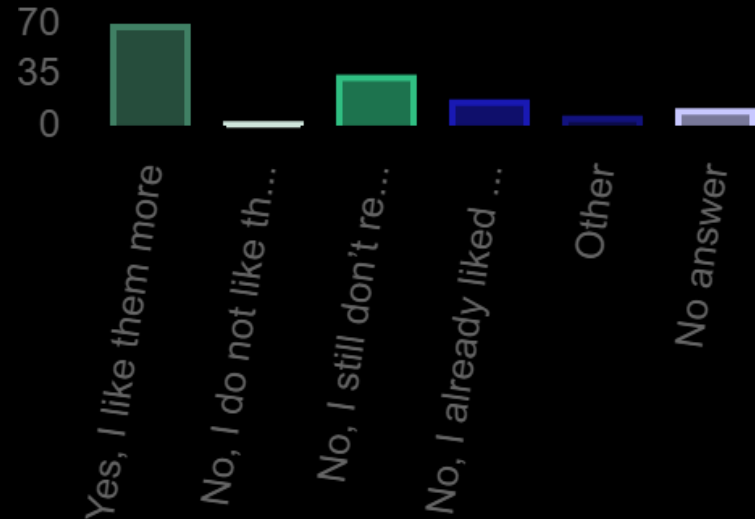
Year 5/6 Before

Knowledge of disease



Year 5/6 after

Did your views change?



After – did your views change about risks of disease?

Yes, I didn't know about risk of disease

Yes, I thought you could get disease from being under bats or from urine or droppings

Yes, No touch, No risk

What did you like best?

- Photos of bats
- Meeting Caro or Sera 'pseudo' bats
- Seeing bats (excursions)

Informal Education – public programs



http://ausbats.org.au/australasian-bat-night
Contact: batnight@ausbats.org.au

An annual bat-themed program of community events coordinated by the Australasian Bat Society

Modelled on European Bat Night, the Australasian Bat Night program began with a handful of events in 2012, and by 2018 had grown to over 100 events in all Australian states and New Zealand.

Raising awareness and promoting appreciation of bats throughout Australasia

- **Community engagement** Local events engage with local communities
- **Partnerships** Local governments and departments, landcare, bat & other community groups, scouts, artists, museums, zoos & parks, schools & individuals
- **Education** Learning from bat experts. Debunking myths. Participating in research projects
- **Fun** Family and kid friendly. Craft & games. Enjoyable bat picnics. Memorable flyouts

Bat Night Resources



People: Bat Speakers
Experienced speakers for general bat talks & walks or specialist talks on latest research



Presentations
Bat Night presentation examples & templates, photos etc



Information
Printed Bat Facts, stickers and materials for children's activities



Ideas for bat nights
Including for Bat talks and walks, flyout picnics, bat festivals as well as bat box, monitoring & citizen science projects

The Australasian Bat Society works with local communities to raise public awareness about bats, their habitats and conservation needs.

An appreciation and understanding of bats can help people to live with bats.

The Australasian Bat Night program is helping to create a more bat ecologically literate community.

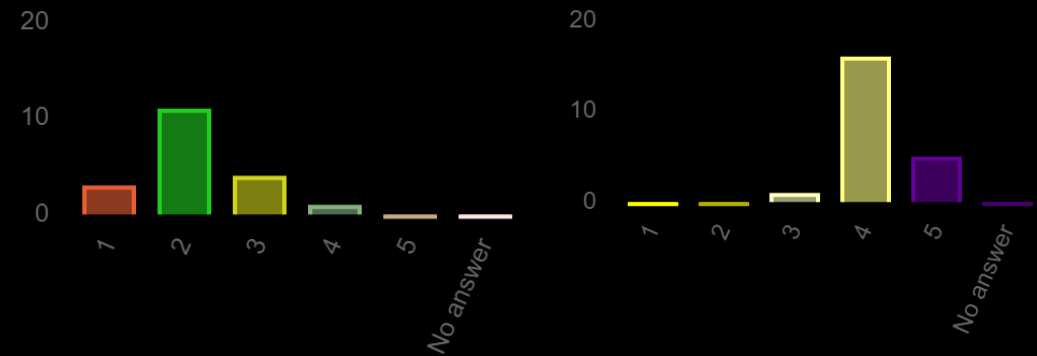
Photo credits and acknowledgements: Australasian Bat Society, Centennial Parklands, Lisa Coanthen, Helen Douglas (Holley Design), Nicola Jenison, Michael Penny, Louise Saunders, Tracy Soreman, Justin Welbergen, David Willis.

Australasian Bat Society ausbats.org.au

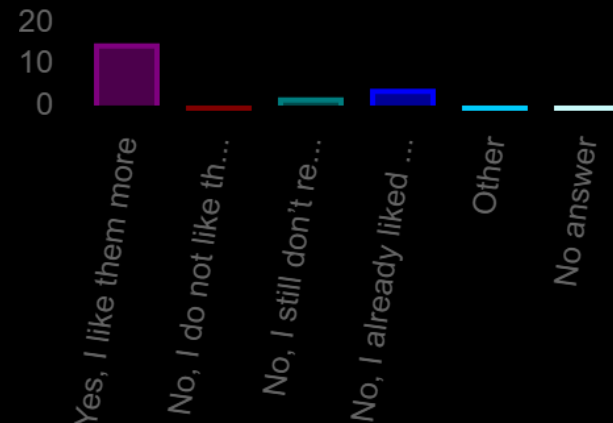
33 responses

Knowledge before

After



Have your views changed?



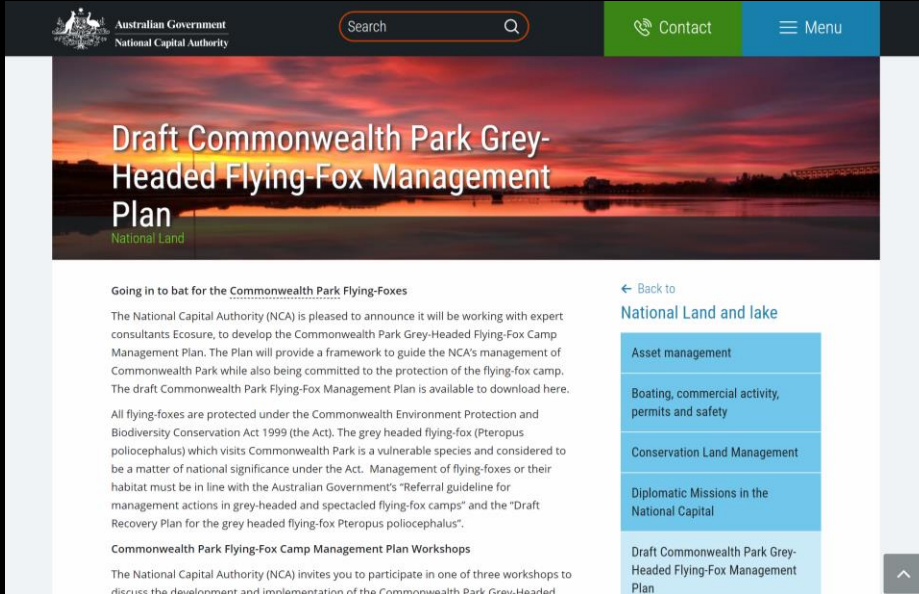
- Target audience- ambivalent / general public
- Survey and interviews of participants and local organisers

Community Engagement

- Are messages getting to the right audiences?
- What interpretive techniques are used to convey messages?
- Target audience: community residents in places with flying-foxes
- Methodology: Surveys and semi-structured interviews
 - before and after educational/engagement program (or stand alone)
 - Surveys can be customised

Canberra workshop survey

<https://prodsurvey.rcs.griffith.edu.au/prodls200/index.php/survey/index/sid/497584/newtest/Y/lang/en>



The screenshot shows a webpage from the Australian Government National Capital Authority. The header includes the organization's name, a search bar, and navigation links for 'Contact' and 'Menu'. The main content area features a large image of a sunset over a body of water, with the title 'Draft Commonwealth Park Grey-Headed Flying-Fox Management Plan' and the 'National Land' logo. Below the image, there is a section titled 'Going in to bat for the Commonwealth Park Flying-Foxes' which contains text about the National Capital Authority (NCA) working with consultants to develop a management plan. A sidebar on the right offers a 'Back to National Land and lake' link and a list of related topics: 'Asset management', 'Boating, commercial activity, permits and safety', 'Conservation Land Management', 'Diplomatic Missions in the National Capital', and 'Draft Commonwealth Park Grey-Headed Flying-Fox Management Plan'.

Host Communities and Bat Tourism

- Is there a market? –Tourist surveys
 - Cairns Bat Chats
 - Yarra Bend Summer guide program
- Can economic benefits to local communities and businesses overcome perceived negative impacts of a flying-fox colony?
- Case Study: Survey of local businesses and residents in Cairns to look at attitudinal change.



Bat Tourism



Preliminary findings

Surveys of tourists

- Bats are a great tourism attraction and should be promoted more
- Bats are fascinating
- Flying-fox camps should be protected
- They wanted to know more about flying-foxes
- They were interested in finding out about their local bats

Surveys of local residents in Cairns

Participatory Learning

Attitudinal change through participation

Understanding → exploration → connection

- Student Projects & Citizen Science
- Examples of projects
 - Observational studies (behaviour)
 - Monitoring (local population counts)
 - Camp and foraging observation
 - Habitat management (restoration and regeneration)
- Questionnaire and interviews



Manager/ Volunteer survey

Manager/volunteer survey:

<https://prodsurvey.rcs.griffith.edu.au/prodls200/index.php/survey/index/sid/256226/newtest/Y/lang/en>

For policy makers, camp managers, and volunteers including flying-fox carers



Call for action

- **What councils and community groups can do?**
- Host a community bat event such as an [Australasian Bat Night](#) disseminate [Community survey](#) to participants.
- Facilitating a community engagement and education meeting with residents who live near a flying-fox camp, and delivering a survey
- Disseminating a community survey to [volunteers](#) in council projects. e.g, flying-fox habitat restoration projects or flying-fox monitoring programs
- Invite staff/volunteers to fill out a [Manager/ volunteer survey](#).
- Participate in an interpretive signage experiment case study

Contact maree.kerr@griffithuni.edu.au

Community involvement and Conservation outcomes



- Save Our Spectacled Flying-foxes Bat watch program
- DES Community Sustainability grant
- Community report sightings of spectacled flying-foxes
 - Identify important foraging and roosting sites
 - Restore habitat inc mid-storey vegetation of most important camps
- 23,000 trees

References and acknowledgements

Children and education: Bogner 1998; Brewer 2001; Ford 2002; Awasthy et al 2012
Cognitive mapping: Fisman 2005; Kitchin 1997

Education effectiveness and conflict: Howard 2006; Madden 2004; Madden & McQuinn 2014; West 2002; Peterson et al 2010, 2013; Marshall et al 2007; Madden 2014; Booth 2007

Education and audience receptivity: Howard 2006; Peterson 2010, 2013; Madden 2014; Ogra 2009; Conover 2002; Rabinowitz et al 2005; Kidd & Kidd 2006

Participatory Education: Brossard et al 2005; Douglas 2010; Squires et al 2016

Flying-fox Perceptions: Lunney 2002, 2012; Ballard 2006; Barnes 2013; Young 2014; Kung et al 2015; Lu 2016; Kingston 2016; Aziz 2016, 2017; Currey et al 2018; Crockford et al 2018

Media: Howard 2006; Jemison 2017; Lunney 2014

Wildlife Tourism inc bats: BCI 1998; Burns 2004; Pennisi et al 2004; Ballantyne et al 2011; Weedon 2011

Values toward wildlife: Sifuna 2011, Kansky 2014; Knight 2008; Howard 2006; Kellert 1996; Kidd & Kidd 1996; Weedon 2011; Kingston 2016

Values theory: Kellert 1996; Fulton 1997;
<http://www.commoncause.org.au/>

