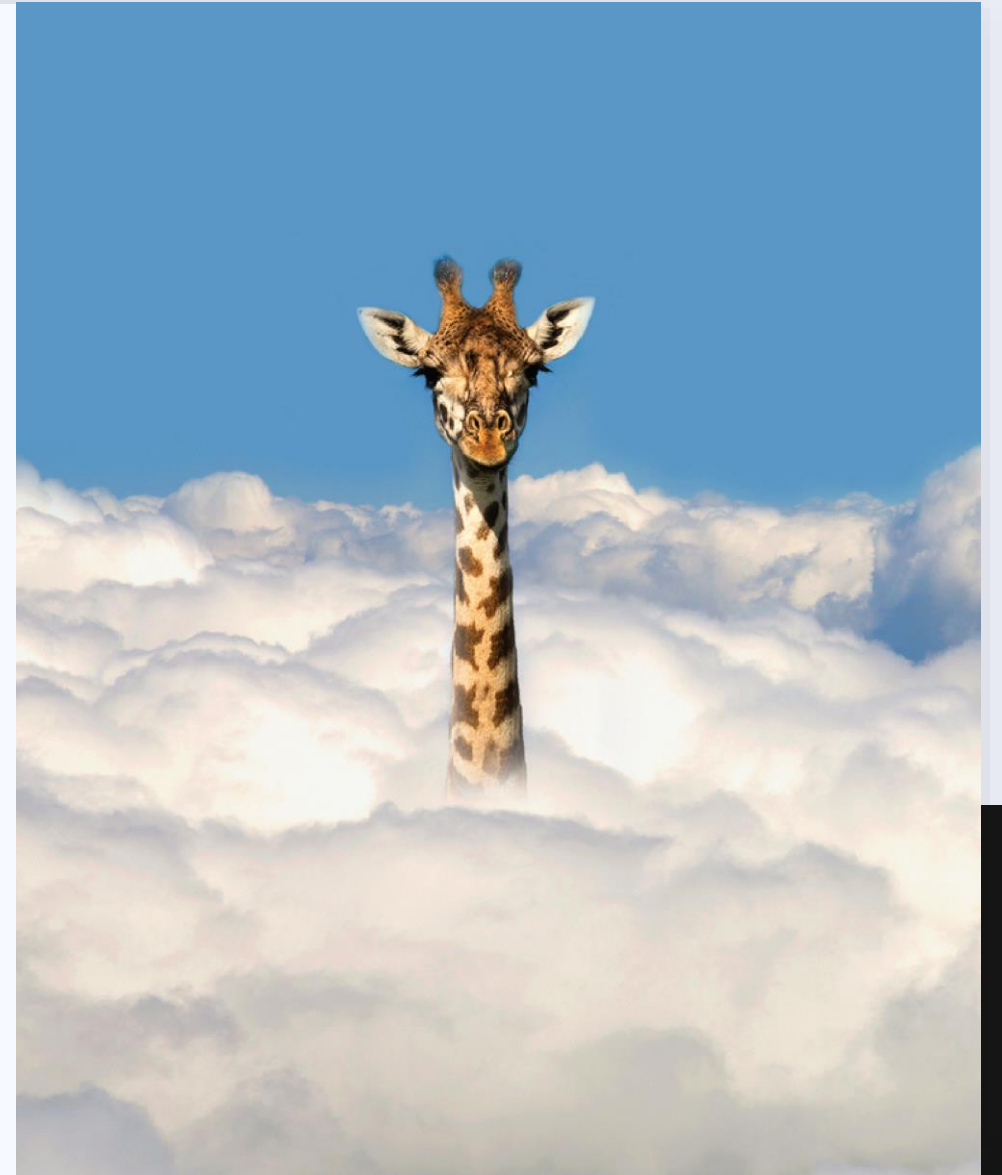


"EMPOWERING
CHANGE THROUGH
CITIZEN SCIENCE:

EXPLORING NATURE
AND SUSTAINABILITY

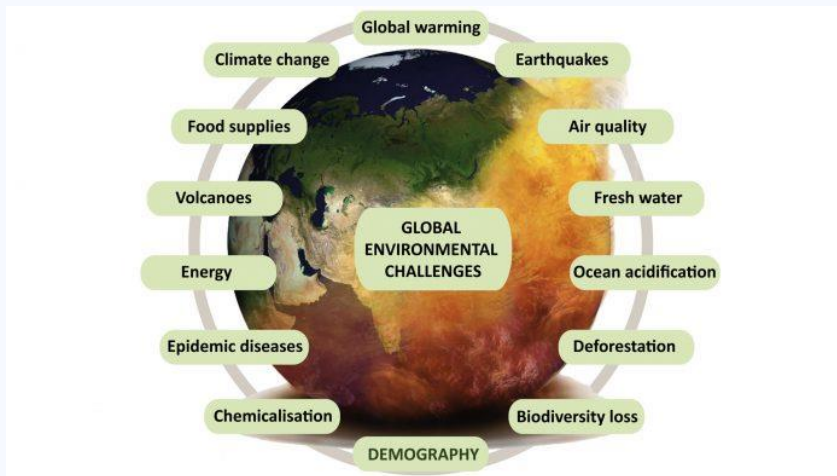
A/PROF RICKY SPENCER
SCHOOL OF SCIENCE
WESTERN SYDNEY UNIVERSITY
1MILLIONTURTLES.COM



INTRODUCTION

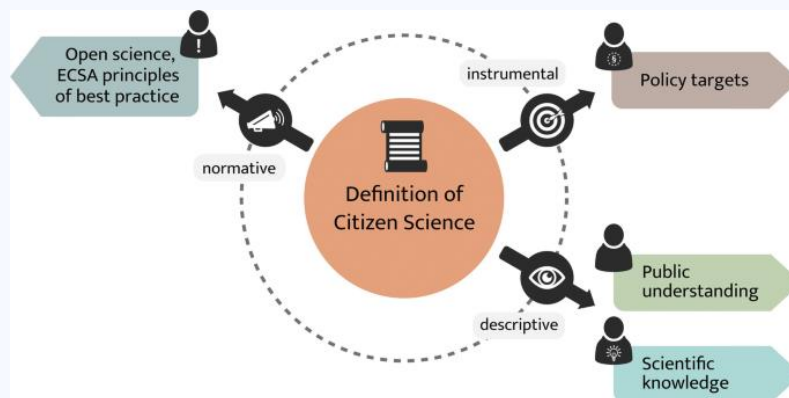
- Welcome to 'Empowering Change through Citizen Science: Exploring Nature and Sustainability.'
- Addressing critical environmental challenges requires collective action.
- Climate change, habitat destruction, and resource depletion demand collaborative solutions.
- Citizen science bridges the gap between individual action and global challenges.
- Through citizen science, anyone, regardless of background, can actively engage in research.
- Over the next 35 minutes, we'll delve into the transformative power of citizen science, exploring its benefits, case studies, and potential for positive change.

THE NEED FOR ACTION



- Planet faces urgent environmental challenges: climate change, biodiversity loss, pollution.
- These challenges transcend borders and affect every individual.
- Collective action is essential; no single entity can address these issues alone.
- Collaboration amplifies impact, harnessing unified purpose and shared knowledge.
- Citizen science embodies the principle of collective action.
- By engaging individuals, citizen science unites diverse voices for positive change.

WHAT IS CITIZEN SCIENCE?



- Bridging gap between research and public engagement.
- Involves everyday individuals in scientific endeavors.
- Challenges notion that research is exclusive to experts.
- Empowers co-creation of knowledge.
- Curiosity and enthusiasm over formal expertise.
- Democratizes scientific discovery for active participation.

CITIZEN SCIENCE SPECTRUM

- Explores diverse levels of engagement in citizen science.
- "Contributory Projects" involve data collection for researchers.
- "Collaborative Projects" entail closer collaboration and expertise sharing.
- "Co-Created Projects" emphasize collaboration in shaping research.
- "Empowerment Projects" go beyond research, empowering action.
- Spectrum accommodates different levels of interest and involvement.



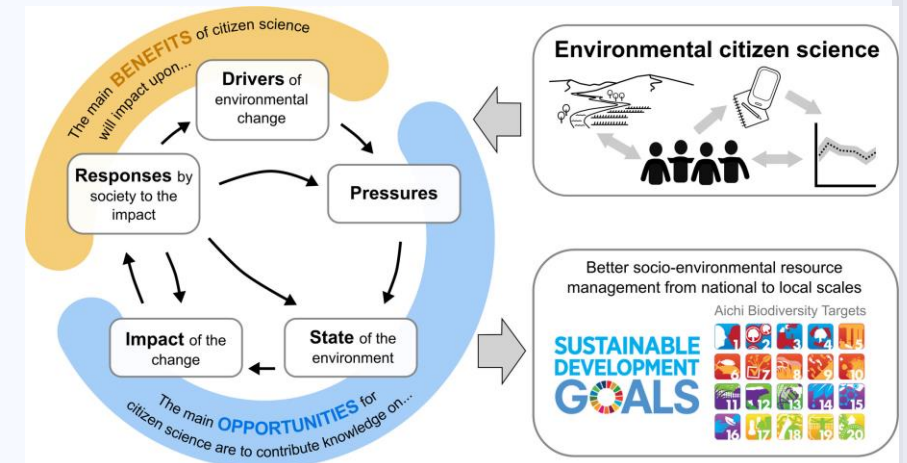


Benefits for Participants

- **Learning:** Engages in scientific process, enhancing critical thinking.
- **Nature Connection:** Heightens awareness of environment's intricacies.
- **Curiosity:** Sparks questions and exploration beyond the project.
- **Stewardship:** Develops responsibility for ecosystems studied.
- **Achievement:** Tangible impact reinforces contribution to science.
- **Empowerment:** Shifts from observer to active change-maker.

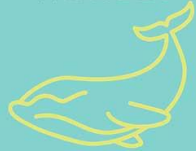
BENEFITS FOR SCIENCE

- **Vast and Diverse Datasets:** Citizen science generates extensive data, surpassing limitations of traditional research methods.
- **Enhanced Understanding:** Diverse data sources validate or challenge existing hypotheses, offering a comprehensive view of natural phenomena.
- **Extended Temporal and Spatial Insight:** Long-term data collection enables the study of trends, patterns, and changes over broader geographic areas and extended timeframes.
- **Local Knowledge Enhancement:** Collaboration with citizen scientists leverages their local expertise, refining research questions and methodologies.
- **Democratization of Research:** Inclusion of diverse participants enriches research credibility and validity, ensuring findings reflect a wider range of perspectives.
- **Collaborative Advancement:** Citizen science transforms participants into collaborators, driving scientific progress through data collection and meaningful insights.



6 ways to be a Citizen Scientist

WATCH FOR WHALES



Share your whale sightings so scientists can track their population trends.

GEOCACHE FOR A GOOD CAUSE



Gather field notes, photos, and GPS data at bench marks for location and height data.

TRACK THE TIDES

Report local water levels and flood impacts to help NOAA better understand and communicate about future floods.

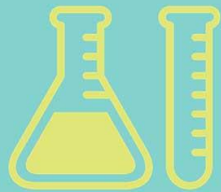


MONITOR MARINE DEBRIS



Record the type and amount of debris on your beach to help scientists tackle the challenge of marine debris.

FIGHT HARMFUL ALGAL BLOOMS



Collect water quality data that helps NOAA respond to harmful algal blooms.

BE A SANCTUARY STEWARD



Pitch in at a local marine sanctuary or estuarine research reserve.

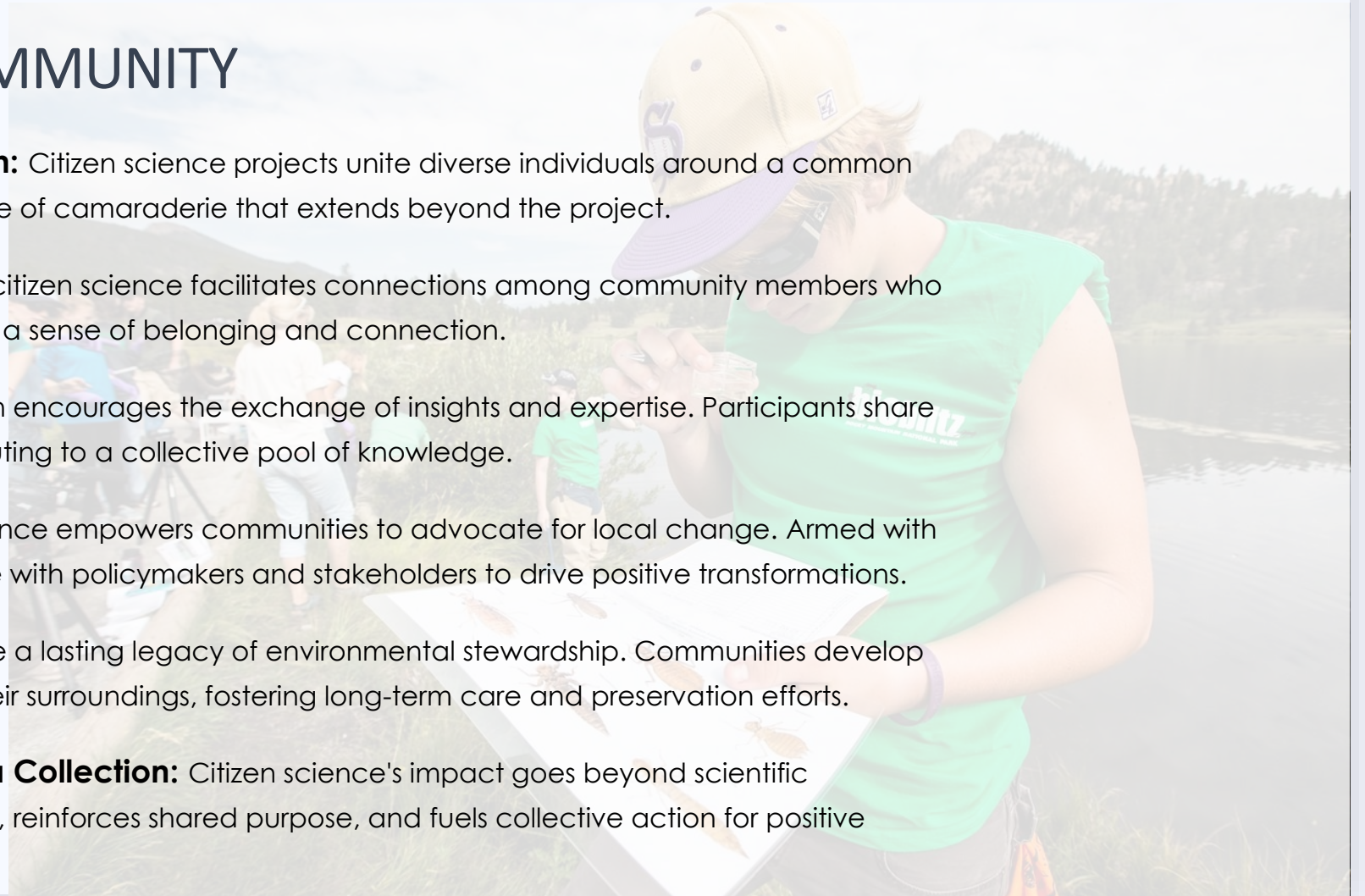
oceanservice.noaa.gov/citizen-science

Types of Citizen Science Projects

- **Biodiversity Monitoring Projects:** Participants track species presence, helping researchers understand ecosystem changes over time.
- **Environmental Quality Projects:** Data collection on air, water, noise quality aids in pollution source identification and impact assessment.
- **Public Health Initiatives:** Contributions regarding disease vectors aid in monitoring outbreaks and developing effective strategies.
- **Participatory Mapping Projects:** Community-generated maps inform urban planning, resource management, and environmental conservation.
- **Ecological Restoration Projects:** Engage participants in hands-on restoration, enhancing local biodiversity and ecosystem health.
- **Cultural Heritage Projects:** Document historical sites and traditions, preserving cultural history while contributing to research.

ENGAGING THE COMMUNITY

- **Shared Purpose and Collaboration:** Citizen science projects unite diverse individuals around a common goal. Collaborative efforts foster a sense of camaraderie that extends beyond the project.
- **Building Social Bonds:** Engaging in citizen science facilitates connections among community members who might not otherwise interact. It nurtures a sense of belonging and connection.
- **Knowledge Exchange:** Participation encourages the exchange of insights and expertise. Participants share observations and experiences, contributing to a collective pool of knowledge.
- **Community Advocacy:** Citizen science empowers communities to advocate for local change. Armed with firsthand data, participants collaborate with policymakers and stakeholders to drive positive transformations.
- **Legacy of Care:** These projects leave a lasting legacy of environmental stewardship. Communities develop a sense of responsibility and pride in their surroundings, fostering long-term care and preservation efforts.
- **Strengthening Bonds Beyond Data Collection:** Citizen science's impact goes beyond scientific outcomes. It forges lasting connections, reinforces shared purpose, and fuels collective action for positive change.





Inspiring Youth Involvement

- **Hands-On Learning:** Engages young participants in real-world data collection and analysis, deepening their understanding of scientific concepts.
- **Curiosity and Exploration:** Encourages youth to ask questions, explore nature, and develop a lifelong sense of wonder and curiosity.
- **Environmental Awareness:** Introduces environmental issues at an early age, fostering a sense of responsibility for addressing challenges like habitat loss and pollution.
- **Critical Thinking and Problem-Solving:** Develops critical thinking skills as youth analyze data, identify patterns, and propose solutions to real-world environmental issues.
- **Empowerment for Change:** Shows young individuals that their actions matter and can lead to positive change. Empowers them to become advocates for environmental conservation.
- **Future Environmental Stewards:** Nurtures a generation of environmentally conscious individuals who are more likely to engage in sustainable practices and contribute to a healthier planet.

CASE STUDY - THE GREAT BACKYARD BIRD COUNT

- **Introduction:** Great Backyard Bird Count.' This annual event engages people worldwide in birdwatching, highlighting the power of collective observations.“
- **Importance of Birdwatching:** Birds are indicators of ecosystem health. Tracking bird populations informs researchers about habitat changes, climate shifts, and disease outbreaks, making birdwatching a valuable tool in conservation.
- **Participation Process:** Participants spend 15+ minutes counting birds in local outdoor spaces like backyards or parks. Observations are submitted online to create a global database used by researchers.
- **Global Impact:** With participants from 100+ countries, 'The Great Backyard Bird Count' is a massive citizen science project. Collected data informs research on bird migrations, climate impacts, and habitat changes.
- **Teaching and Learning:** Participation teaches about bird roles in ecosystems and their ability to reflect environmental changes. It fosters a deeper connection with nature and an appreciation for the world's intricacies.
- **Key Takeaway:** This case study demonstrates how a simple activity like birdwatching can transform into a global effort with significant impacts on avian research and conservation.

THANK YOU!



Great Backyard Bird Count 2023

SUCCESS STORIES - COMMUNITY IMPACT

Restoring Urban Green Spaces: In London, England, 'Green London Project' rejuvenated a neglected park with native trees and wildlife habitats.

•**Monitoring Air and Water Quality:** In Mumbai, India, 'Clean Air Mumbai' revealed pollution sources, advocating for cleaner environments.

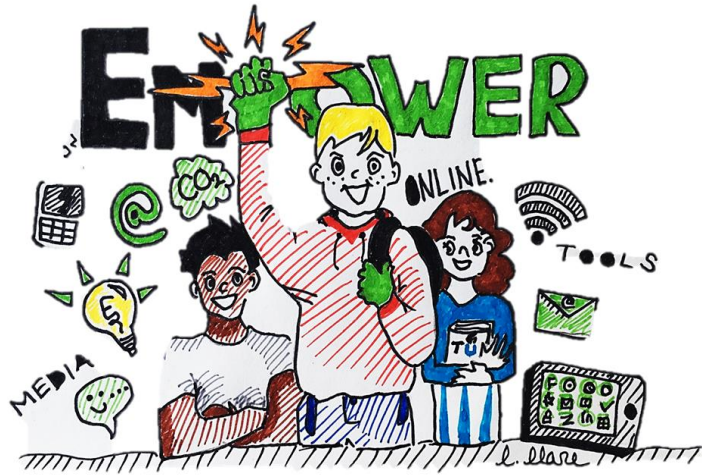
•**Community-Led Conservation:** Sydney's 'Harbor Guardians' protected marine life along the bay's shores through citizen science.

•**Educational Outreach:** Tokyo Elementary partnered with 'Pollinator Watch Japan,' inspiring students to advocate for pollinators.

•**Influence on Policy:** Vancouver's 'Quiet Streets Vancouver' addressed noise pollution near schools, leading to quieter environments.

•**Cultivating Sustainability:** Berlin's 'WasteWise Berlin' fostered awareness and sustainable waste management practices citywide.





Empowerment Through Data

- **"Your Observations Matter:** "Every observation you contribute adds to a larger pool of data that researchers rely on. Your small piece of the puzzle contributes to a greater understanding of our world."
- **"Informed Decision-Making:** "Your data has the power to influence policies and decisions. Whether it's advocating for cleaner air or protecting local biodiversity, your observations can drive change."
- **"Contributing to Science:** "By participating, you're contributing to scientific knowledge. Your data aids researchers in identifying trends, validating theories, and solving real-world challenges."
- **"Community Engagement:** "Through data collection, you engage with your community in meaningful ways. Shared experiences foster connections and collaborative efforts toward positive change."
- **"Education and Discovery:** "As you observe and document, you're continually learning about the natural world. Each discovery deepens your connection and nurtures your passion for the environment."
- **"Personal Empowerment:** "Empowerment through data is not just about numbers; it's about realizing your role as an active participant in creating a sustainable future for generations to come."

Tools

- **"Smartphone Apps:** "Smartphones have revolutionized citizen science. Apps like 'iNaturalist' and 'eBird' make it easy to document observations, snap photos, and contribute data while you're on the go."
- **"Online Platforms:** "Many projects operate through user-friendly online platforms. These platforms allow you to submit your data, view your contributions, and explore the findings of others."
- **"Data Analysis Tools:** "Technology doesn't stop at data collection. Advanced tools help researchers analyze vast datasets, identify patterns, and draw meaningful conclusions."
- **"Community Engagement:** "Social media and online communities foster connections with fellow citizen scientists. You can share your experiences, ask questions, and learn from others across the globe."
- **"Wearable Devices:** "From fitness trackers to environmental sensors, wearable devices offer new ways to collect data. They enable participants to monitor air quality, noise levels, and more."
- **"Drones and Remote Sensing:** "In some projects, technology goes airborne. Drones and remote sensing tools assist in mapping, habitat assessment, and gathering data from otherwise inaccessible areas."





Challenges and Solutions

"Data Quality: "Ensuring accurate and reliable data can be a challenge in citizen science. To tackle this, projects often provide training, guidelines, and validation processes for participants."

"Inclusivity: "Creating inclusive projects that engage diverse communities can be a challenge. Solutions include outreach efforts, providing multilingual resources, and considering cultural perspectives."

"Resource Constraints: "Limited resources can hinder the success of citizen science projects. Collaborations with academic institutions, NGOs, and local organizations can provide additional support."

"Technology Access: "Not everyone has access to smartphones or the internet. Overcoming this challenge involves using diverse data collection methods, such as paper forms or community hubs."

"Long-Term Engagement: "Sustaining participants' interest over time can be difficult. Regular communication, recognition of contributions, and showcasing the impact of their efforts can help maintain engagement."

"Privacy and Ethics: "Collecting data from public spaces raises privacy concerns. Projects address this by anonymizing data, obtaining consent, and adhering to ethical guidelines"

Inclusivity in Citizen Science



Diverse Perspectives Strengthen Research Outcomes: Embracing a diverse range of perspectives and backgrounds among participants enhances the richness and depth of data collected. This diversity leads to more comprehensive and holistic research outcomes.

Inclusion Enhances Scientific Credibility and Validity: A citizen science project that reflects a broad spectrum of society carries greater scientific credibility. Inclusive participation lends greater validity to the findings, as they accurately represent the complexity of real-world situations.

Efforts to Involve Underrepresented Communities: Citizen science initiatives are actively working to involve underrepresented communities, including minorities, marginalized groups, and those with limited access to resources. These efforts aim to bridge gaps in scientific representation and promote equity.

Ensuring Equitable Access to Citizen Science Opportunities: Overcoming barriers to participation is a priority. Initiatives provide opportunities that are accessible to individuals with varying levels of technology access, language proficiency, and physical mobility.

Building a More Inclusive and Comprehensive Knowledge Base: By involving a wider range of participants, citizen science contributes to a more inclusive and comprehensive knowledge base. This empowers communities to address their specific challenges effectively.

Aiming for a Diversity of Voices to Shape Research Agendas: Involving diverse voices in shaping research agendas helps prioritize a broader range of topics. This ensures that citizen science projects address issues that matter most to the communities they serve.

Making a Difference

Citizen Science Leads to Tangible Outcomes and Change: The data collected by citizen scientists directly contributes to real-world outcomes. Whether it's tracking species migrations or monitoring pollution levels, these efforts lead to tangible change.

Participant Contributions Impact Policy Decisions: In the case of the 'Clean Air Mumbai' project, citizens' air quality data was used to advocate for stricter pollution regulations, resulting in improved air quality for the city's residents.

Drive Conservation Efforts and Restoration Projects: The 'Green London Project' brought citizens together to revitalize a neglected park. Their efforts transformed the space into a thriving green haven for both people and wildlife.

Empower Individuals to Become Advocates for Nature: Participation in citizen science nurtures a sense of ownership over local environments. Participants in the 'Harbor Guardians' project actively protected marine life, advocating for conservation and responsible fishing practices.

Transforming from Data Collectors to Change-Makers: Citizen scientists move beyond data collection to influence positive change. In 'Quiet Streets Vancouver,' participants used noise pollution data to push for quieter urban environments, enhancing the quality of life for residents.

Each Participant Plays a Role in Positive Environmental Shifts: The cumulative impact of citizen science is impressive. In 'The Great Backyard Bird Count,' thousands of participants worldwide contribute to a better understanding of bird populations, informing conservation efforts.





Becoming a Citizen Scientist

Engaging in Citizen Science is Accessible to All: The beauty of citizen science lies in its inclusivity. It's open to people of all ages, backgrounds, and levels of expertise. Whether you're an amateur enthusiast or an experienced naturalist, there's a role for you.

Joining Projects Aligning with Personal Interests: The wide variety of projects ensures that there's something for everyone. Whether you're passionate about birds, climate change, historical research, or any other topic, you can find a project that resonates with you.

Connecting with Local and Global Initiatives: Citizen science projects range from local community initiatives to global collaborations. You can choose to contribute data that impacts your immediate surroundings or engage in projects with a broader scope.

Simple Steps to Participate and Contribute: Participating in citizen science is often as easy as observing, recording, and submitting data. Projects provide clear instructions, resources, and sometimes even training to ensure your contributions are valuable.

Online Platforms Facilitate Project Discovery: Numerous online platforms serve as hubs for discovering citizen science projects. Websites like 'SciStarter' and 'Zooniverse' make it easy to explore a range of projects and find ones that match your interests.

Anyone Can Be Part of the Citizen Science Movement: Regardless of your background, age, or location, you can become a citizen scientist. By taking part, you're not only learning and contributing to research but also adding your voice to the global community of change-makers

Personal Experiences

Sharing Stories Enhances the Collective Narrative: When participants share their personal experiences in citizen science, it weaves together a rich tapestry of perspectives. These stories collectively shape the narrative of the movement and demonstrate its impact on individuals and communities.

Audience Members Share Their Own Citizen Science Experiences: I encourage you, as part of this presentation, to share your own citizen science experiences. This interactive exchange allows us to learn from one another and highlights the diversity of projects and passions present in this room.

Exchange Insights, Challenges, and Triumphs: Through personal anecdotes, we gain insights into the challenges faced, the triumphs achieved, and the growth experienced through citizen science. This exchange fosters a deeper understanding of the multifaceted nature of participation.

Mutual Learning and Engagement Through Personal Anecdotes: As we listen to one another's stories, we engage in mutual learning. We discover innovative approaches, effective strategies, and the profound connections that citizen science cultivates.

Celebrating the Diversity of Contributions and Experiences: Every participant brings a unique set of skills, interests, and motivations to citizen science. By sharing our experiences, we celebrate this diversity and recognize the collective impact of our efforts.

Enriching the Discussion Through Shared Perspectives: Discussion becomes richer as we draw from a spectrum of shared perspectives. These personal experiences contribute depth, context, and authenticity to our understanding of citizen science.



Call to Action

Participants Encouraged to Advocate for Citizen Science: As you embark on your journey as a citizen scientist, take on the role of an advocate. Share your experiences, successes, and the positive impact you witness. By becoming a vocal supporter of citizen science, you inspire others to get involved.

Spreading Awareness and Promoting Involvement: Share the message of citizen science with your friends, family, and broader networks. Use your voice on social media, at community gatherings, or in educational settings to encourage others to join the movement.

Each Person Can Become an Agent of Change: You hold the power to make a difference. Whether you're observing birds in your backyard, monitoring water quality in your local stream, or participating in global projects, your actions contribute to collective change.

Amplifying Citizen Science's Impact Through Word of Mouth: One of the most effective ways to expand the reach of citizen science is through word of mouth. By sharing your experiences and successes, you inspire those around you to take part and be part of something larger than themselves.

A Collective Effort Toward a More Sustainable Future: Citizen science is built on the principle that collective efforts drive meaningful change. As you contribute your data and observations, you're joining a global community of change-makers working towards a more sustainable and informed future.

Let's Be the Change We Want to See in the World: Gandhi's famous words resonate deeply in the context of citizen science. By participating and advocating for citizen science, you're actively contributing to the positive change you wish to see in the world.





ABC News

Turtles 'keeping Murray River clean' struggling to survive ...

More than 40 per cent of freshwater turtle species are in danger of extinction, the foundation says, and although the Murray turtles have...

5 Apr 2017



Scientific American

As Predicted, Some of Australia's Turtles Are Going Extinct

A recent study confirms that several turtle species have either drastically declined or disappeared from various sections of the Murray...

7 June 2019



ABC News

Native freshwater turtle populations face extinction in South Australia, scientists call for action

researchers holding up Murray short neck baby turtles. Researchers say turtle populations are crashing and there are barely any baby turtles...

15 Feb 2019



ABC News

Turtles could solve the Murray-Darling's carp problem, research shows

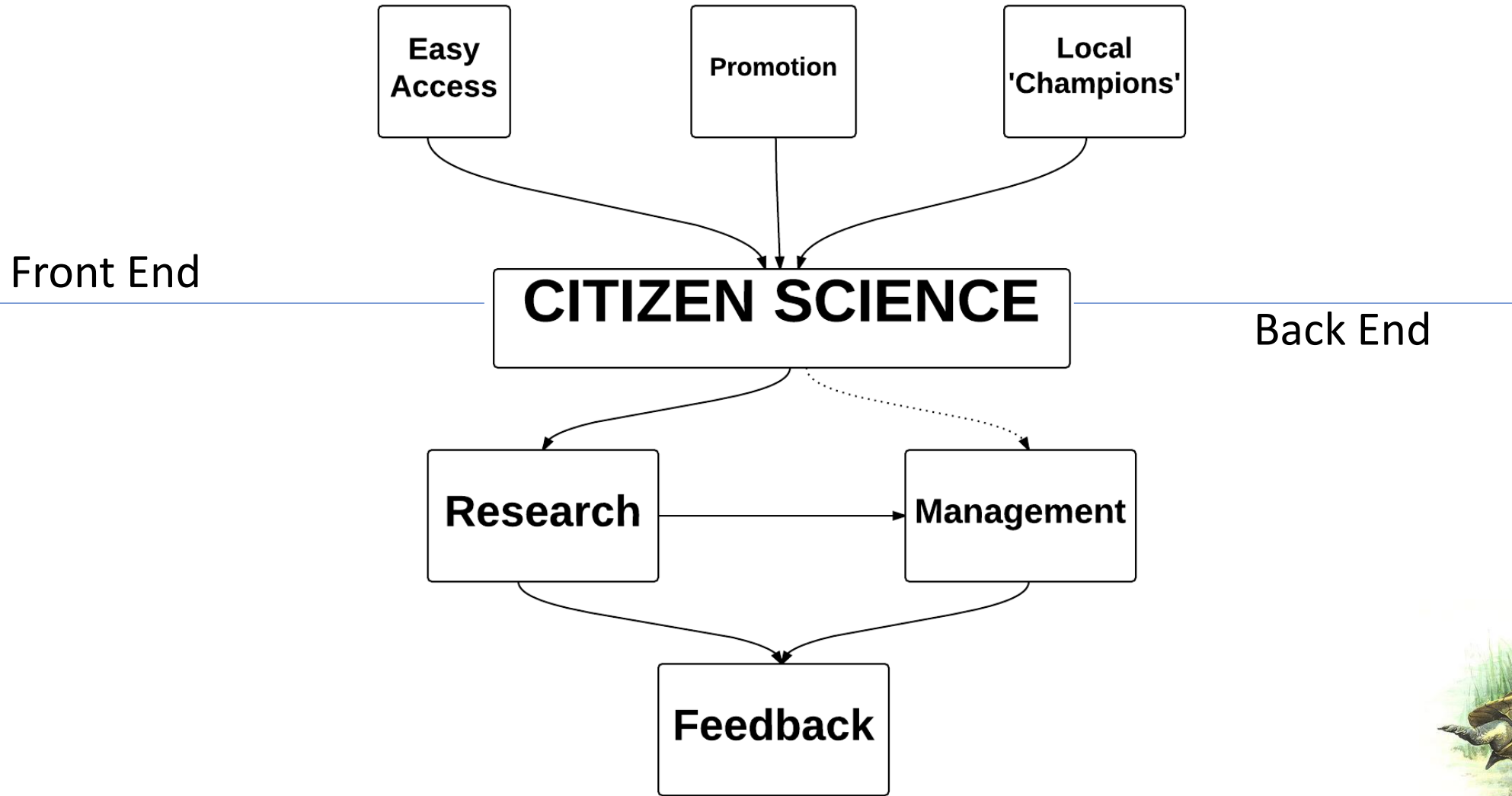
Reintroducing freshwater turtles to the Murray-Darling Basin could be a ... is going to lose if these species go extinct," Ms Santori said.

19 Sept 2020

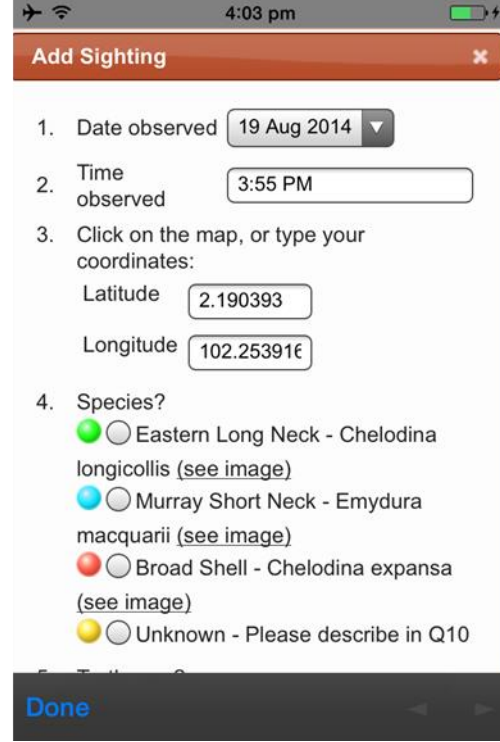
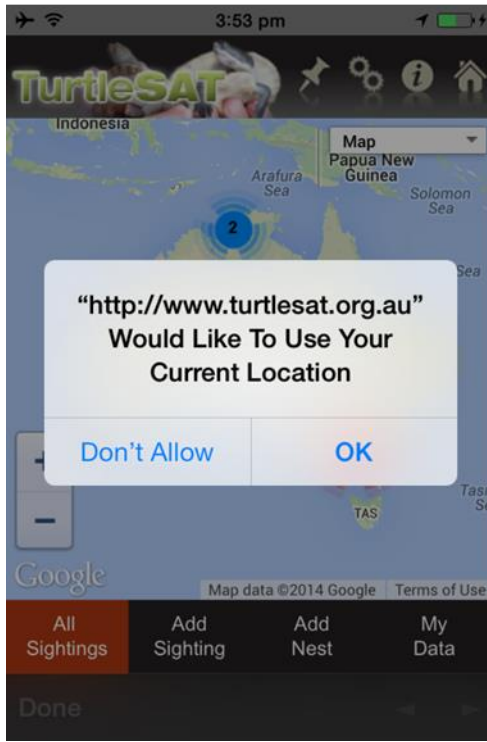
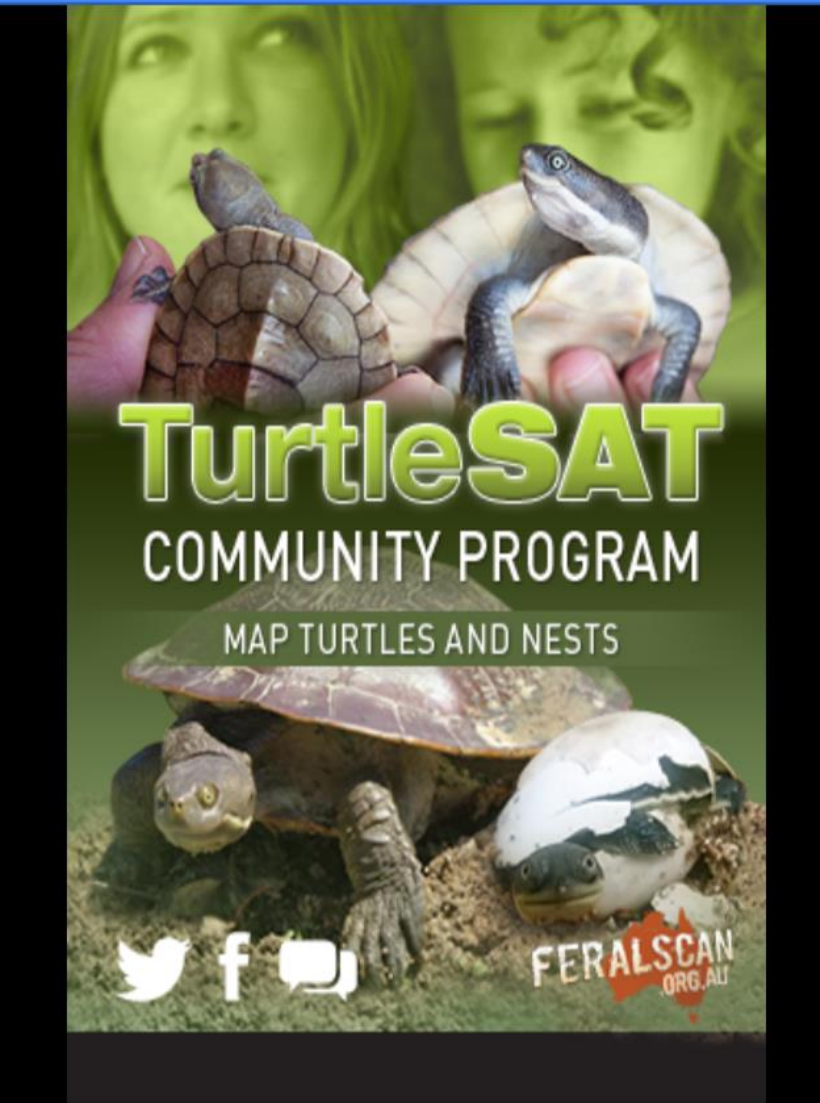


'Turtley' on the path to extinction!

TurtleSAT- Development



TurtleSAT



Sighting
Species.



A large green circular button with a white border and the text "START MAPPING" in white capital letters. In the background, a map of Australia is visible with the text "TURTLE" and "10,44" partially obscured.



Road mortality of the eastern long-necked turtle (*Chelodina longicollis*) along the Murray River, Australia: an assessment using citizen science

Claudia Santori^{A,D}, Ricky-John Spencer^B, James U. Van Dyke^C
 and Michael B. Thompson^A

Nesting habitat of the broad-shelled turtle (*Chelodina expansa*)

Kristen Petrov^A, Heidi Stricker^A, James U. Van Dyke^{A,B,E}, Graham Stockfeld^C, Peter West^D and Ricky-John Spencer^A

+ Author Affiliations

Australian Journal of Zoology 66(1) 4-14 <https://doi.org/10.1071/ZO17061>

Submitted: 21 September 2017 Accepted: 7 March 2018 Published: 3 April 2018



Smartphone citizen science for turtles: identifying motives, usage patterns and reasons why citizens stop participating

Claudia Santori[✉]; Michael B. Thompson; James U. Van Dyke; Camilla M. Whittington; Ricky-John Spencer

Australian Zoologist (2020) 40 (3): 438–448.

<https://doi.org/10.7882/AZ.2020.006>



Research Article | [Open Access](#) | [CC](#) | [i](#)

Changes in participant behaviour and attitudes are associated with knowledge and skills gained by using a turtle conservation citizen science app

Claudia Santori, Ryan J. Keith, Camilla M. Whittington, Michael B. Thompson, James U. Van Dyke, Ricky-John Spencer[✉]

First published: 25 January 2021 | <https://doi.org/10.1002/pan3.10184> | Citations: 3

THE CONVERSATION

Academic rigour, journalistic flair

Search analysis, research, academics...

Arts + Culture Business + Economy Education Environment + Energy Health + Medicine Politics + Society Science + Technology



Our turtle program shows citizen science isn't just great for data, it makes science feel personal

February 18, 2021 3:40pm AEDT



1 Million Turtles

COMMUNITY CONSERVATION PROGRAM

Join Team Turtle

Aussie Ark and the Australian Reptile Park's Response

Australian native freshwater turtles, like many species, are faced with extinction. Freshwater turtles are nature's vacuum, they are critical to our freshwater ecosystems, cleaning up our beautiful river systems, keeping aquatic vegetation in balance, and maintaining the stunning waterways we are so proud of. We simply cannot let them disappear on our watch.

How You Can Help

DONATE
Help us build a brighter future for freshwater turtles by donating towards our conservation work at Aussie Ark.

VISIT
Visit Aussie Ark in the Barrington Forest, once-in-a-lifetime getaway that will be remembered for years to come.

SUPPORT
Aussie Ark's mission is made possible by your support. Together we can make a difference.

Head to aussieark.org.au for more information on how you can help!

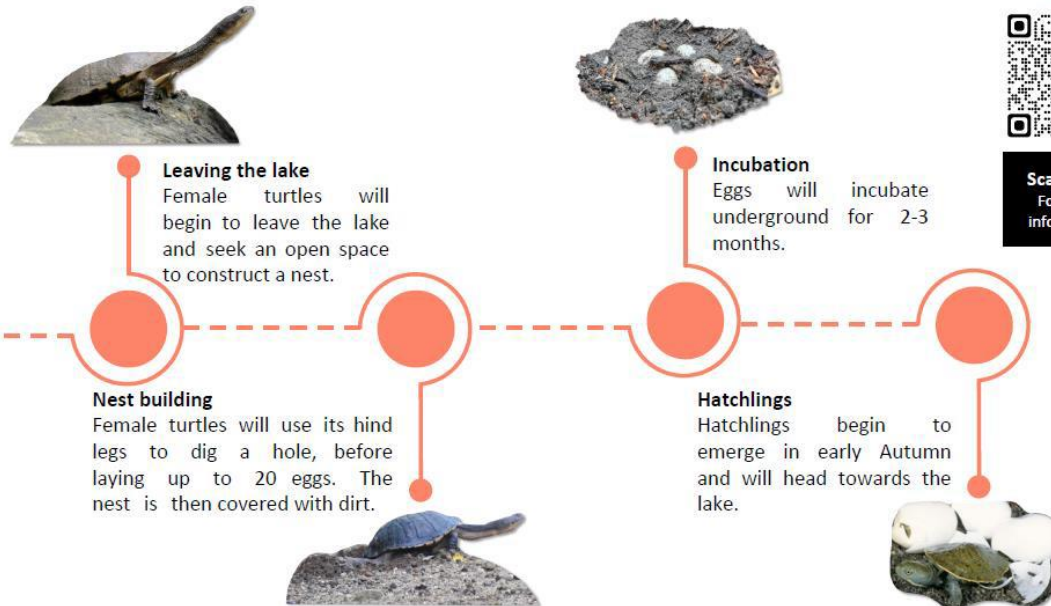
Turtle Nesting



Scan Here
For more
information

Late Spring –
Early Summer

Autumn



Leaving the lake

Female turtles will begin to leave the lake and seek an open space to construct a nest.

Nest building

Female turtles will use its hind legs to dig a hole, before laying up to 20 eggs. The nest is then covered with dirt.

Incubation

Eggs will incubate underground for 2-3 months.

Hatchlings

Hatchlings begin to emerge in early Autumn and will head towards the lake.



The island is an ideal location for nesting as it should be protected from fox predation. During late spring and early summer, keep an eye out for turtles constructing nests.

Please do not disturb turtles building nests or handle hatchlings.



National Nest Predation Survey





Turtles in the Schools

FLOATING TURTLE HABITAT ISLAND CONSTRUCTION



Courtesy - ABC News

Turtle Habitats

Glenbrook Lagoon, Glenbrook

Tuesday 14 May, 2019

1am - 2pm



DESIGNER NESTING BEACHES

- Designer Nesting Beaches create areas around existing wetlands where turtles are attracted to and can nest in.
- Nests are concentrated to a small area, which can be protected by volunteers and wetland managers
- There are several options we are exploring.
 - Firstly, material like clean sand may provide a "beacon" in the environment to attract turtles. A small layer of sand is placed on the ground before nesting season and while turtles may be attracted to the area, incubation of eggs occurs in the natural substrate.
 - Secondly, the creation, or manipulation, of wetland habitat can naturally direct turtles to normal or created nesting areas at a site. This option works well in conjunction with our "Flexible Functional Wetland" idea
 - Lastly, all options can involve the use of temporary fencing around a wetland to direct turtles where to nest, or exclude foxes from the nesting beach. Turtles will often nest along fence lines, making them easy to check and protect.
- A range of temporary and more permanent landscape design options are being explored.



On-ground initiatives

Fauna Road Management System



Partnership

WESTERN SYDNEY
UNIVERSITY



LA TROB
UNIVERSIT



UNIVERSITY OF
DNEPR



AussieArk



Transport
for NSW



Government of South Australia

Department for Environment
and Water



Australian Government
Department of Industry, Science,
Energy and Resources



TURTLES Australia Inc.

turtlesaustralia.org.au