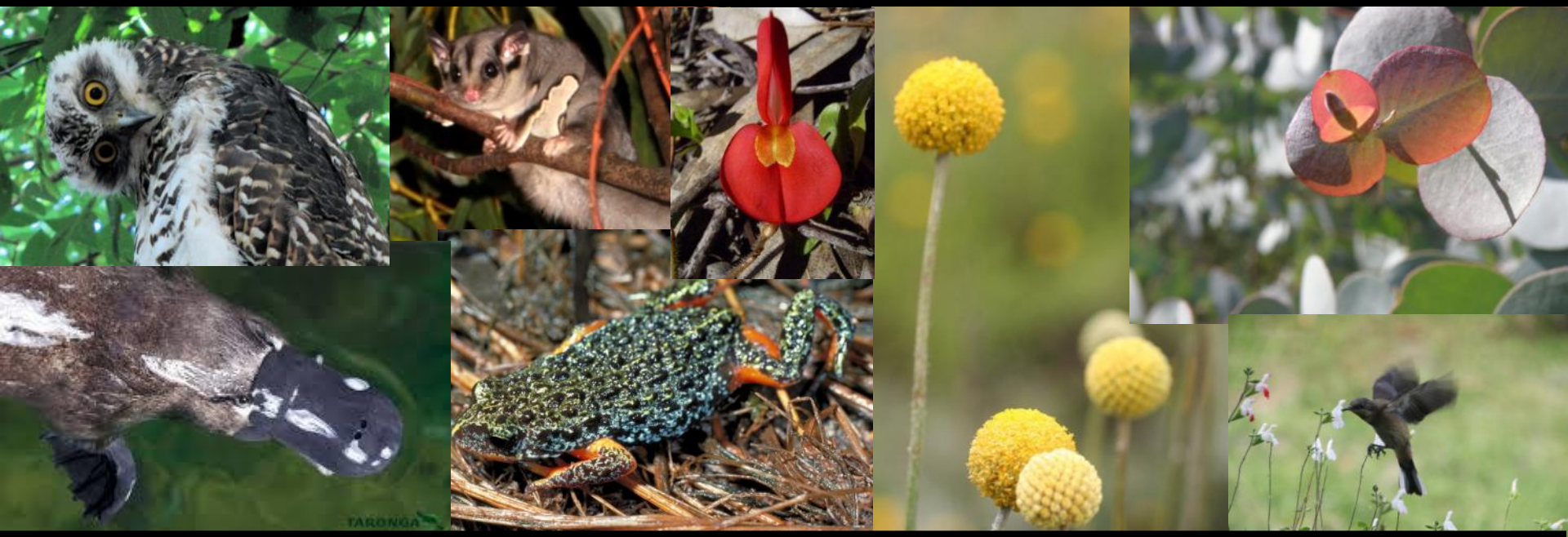
Framework for Biodiversity Monitoring in Melbourne's East

Project Launch 12th August 2015



ROYAL BOTANIC GARDENS VICTORIA

THE UNIVERSITY OF MELBOURNE

Aim of the project

- To provide a resource for council officers to monitor urban biodiversity and habitat ‘health’ under a changing climate.

- Develop a framework that can help to inform management strategies and adaptive management techniques.

The Team

THE UNIVERSITY OF MELBOURNE

POSTERA CRESCAM LAUDE

ROYAL BOTANIC GARDENS VICTORIA

EAGA

EASTERN ALLIANCE FOR GREENHOUSE ACTION

Technical Reference Group

Why biodiversity monitoring is important

- Increasing urbanisation- gradual degradation of urban matrix & biodiversity habitat
- Suburbs in east Melbourne will get hotter and drier
- There will be increases in the intensity of rainfall events in summer and autumn
- Increased number of heat waves
- Likely decline of certain species, but will benefit others
- Many species and EVC's of particular concern
- Councils are taking actions to manage biodiversity under these changes, *but are these actions effective??*

Why Councils?

- Councils are extremely well-placed to make a difference to urban biodiversity and monitor climate impacts
  - Operate at the appropriate scale to measure change
  - Make decisions and carry out actions to manage change
- **But**, each Council is resourced differently, has different natural assets, different priorities and different skill sets
- The task was to develop a framework that accommodated these differences

Biodiversity monitoring in Australia

- Very few examples of biodiversity monitoring in urban areas in Australia
- Some Councils do site specific monitoring
- Some done by CMA's
- Examples of regional monitoring are rare
  - CSIRO provide conservation policy guidance
  - Local and Regional examples from QLD, WA
  - National 'accounting for nature' program

Components of effective monitoring programs

- Conceptual framework or model of the system
- Questions and achievable goals
- Repeatable and appropriate measurements/indicators
- Data and good data management
- Appropriate analysis and interpretation
- Accessible results that can be used by multiple parties
- Good partnerships – between scientists, resource managers, policy makers

Developing a program:

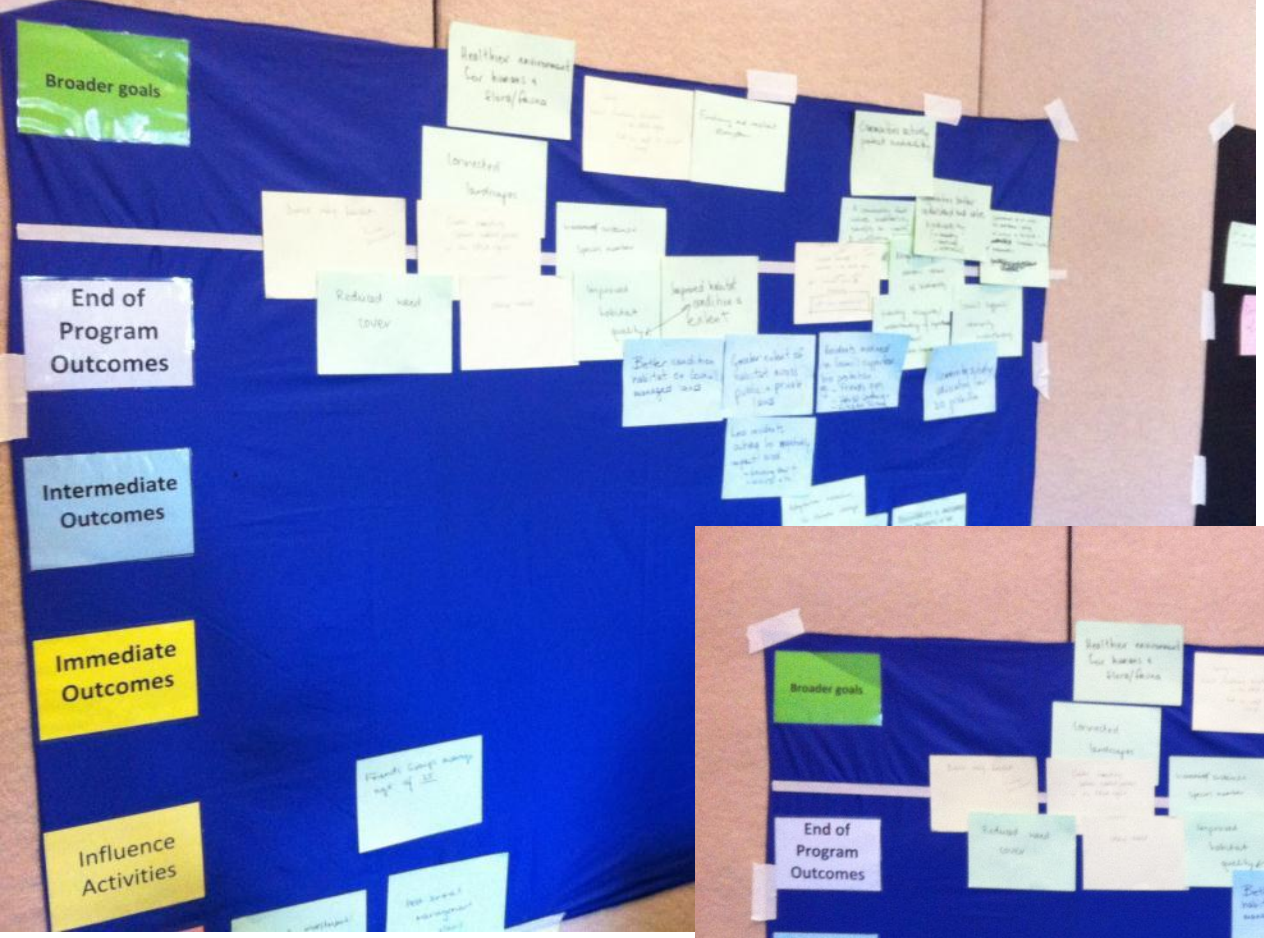
- Step 1:
  - Define the problem and the system to be monitored
  - Define questions to ask and goals of the program
- Step 2:
  - Develop a set of indicators & collection methods
  - These need to capture enough data to meet the goals of the project
- Step 3:
  - Develop pathways for data management, reporting, assessment and adaptive management
- Step 4:
  - Adjust as necessary without compromising the integrity of the program

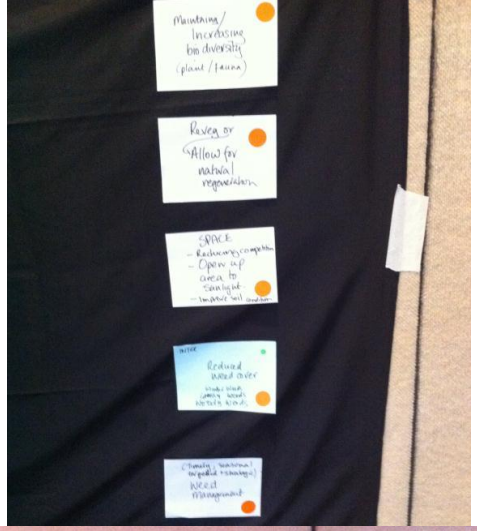
Step 1. Define the problem and system

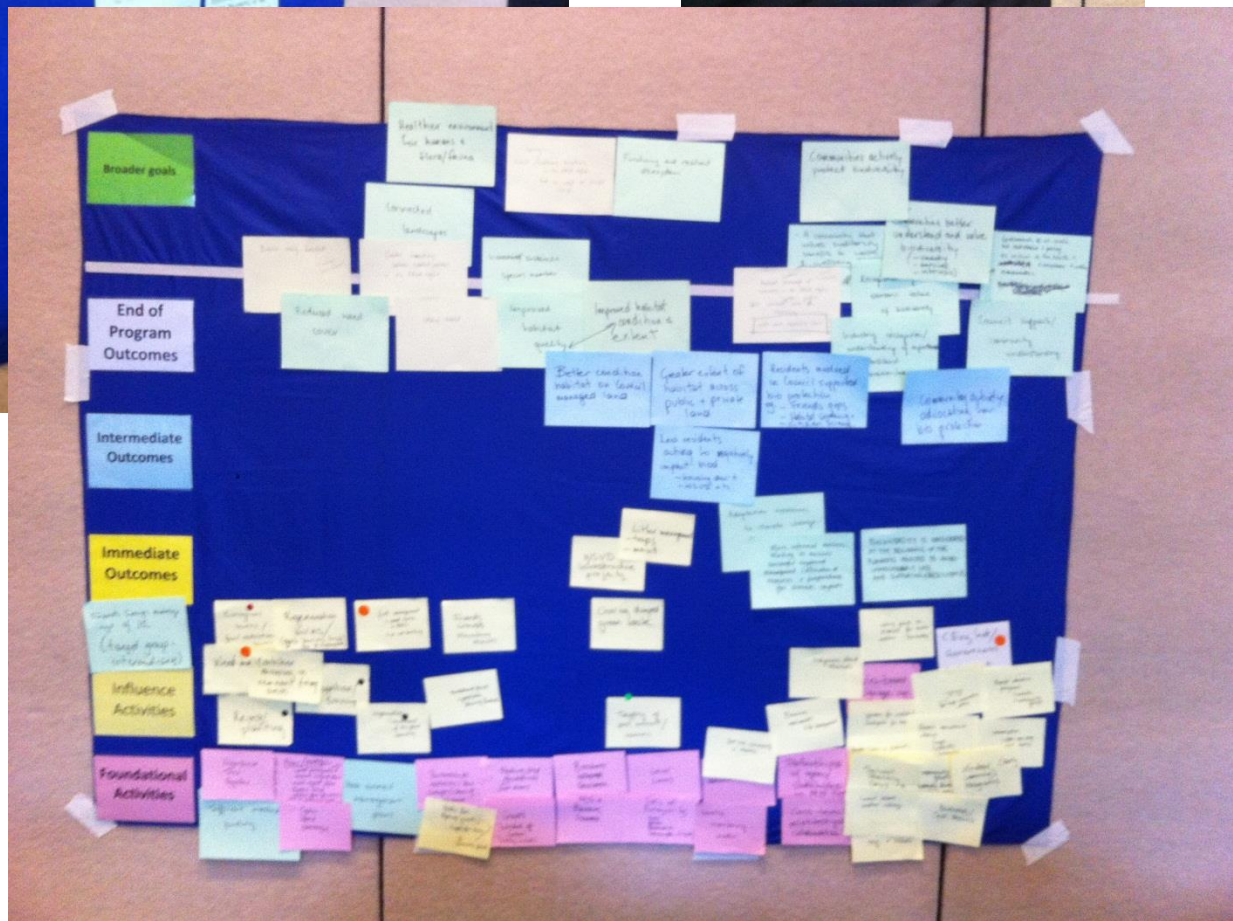
- Initial scoping workshop
  - What good and bad monitoring looks like
  - Began defining framework goals
  - Council's capacity to collect and analyse data
  - Principles for indicator selection
- Extensive document review
  - Review of activities occurring in every LGA & *why*
  - Their frequency and purpose
  - Type of data generated by each activity
  - But this only captures formal activities that appear in documents

Step 1. Define Questions and Goals

- Second workshop used ‘Program Logic’ to capture ALL activities and aspirations of Councils in relation to biodiversity & climate change
- Used PL to link *what* program will do, and *how*
  - Set broad program objectives
  - Listed activities Councils do to reach those objectives
  - Discussed the difficulties of addressing climate impacts, urban impacts and differences between Councils


Broader goals
End of Program Outcomes
Intermediate Outcomes
Immediate Outcomes
Influence Activities


Maintaining/ Increasing bio diversity (plant / fauna)
Raveg or Allow for natural regeneration
SPACE
Reduced weed cover
Weed Management


Broader goals
End of Program Outcomes
Intermediate Outcomes
Immediate Outcomes
Influence Activities
Foundational Activities

Step 1. Define Questions and Goals

Goal: The EAGA region has resilient and functioning ecosystems that can adapt to climate change

- Diverse indigenous habitat, including native flora and fauna
- Reduced weed cover
- Increased or sustained species numbers
- Greater connectivity among habitat patches
- Improved habitat quality (condition and extent)
- Increased or greater value placed on biodiversity by the community

Step 2. Develop Indicators

- Started with a dream list of indicators/measurements
- Things we considered……
  - Measureable
  - Reliable/reproducible
  - Sensitive to change
  - Predictable or well studied
  - Consistent (& accurate), or comparable across a range of settings
  - Respond to management interventions
    - e.g. if you are tracking response against your actions such as weed control, you need data for intervention sites vs control sites

Step 2. Develop Indicators

- To refine the indicators we
  - Ran a series of workshops
  - Discussed what data would be collected, and how it could be used to answer a specific question
- Types of indicators proposed included
  - Plant species and communities
  - Animal species (occurrence on public and private land, including revegetation sites)
  - Weed cover and presence of feral animals
  - Survival of heat intolerant plant species
  - Production of seed

Short-listed Indicators

1. Vegetation extent
2. Vegetation connectivity
3. Vegetation condition
4. Vegetation composition
5. Plant survival
6. Plant or animal phenology
7. Bird communities

Short-listed Indicators

- These were reviewed and ranked by the PWG and TRG
- Ranking based on:
  - Relevance to climate change & biodiversity
  - Capacity
  - Cost
  - Historic data
  - Data management
  - Freq of measurement
  - Opportunity to includes citizen scientists

Final short-listed Indicators

1. **Vegetation extent**
2. Vegetation connectivity
3. **Vegetation condition**
4. Vegetation composition
5. Plant survival
6. **Plant or animal phenology**
7. **Bird communities**

Step 3. Develop Methods

- Pathways to collect the data, including management, storage, analysis and reporting
- We reviewed current methods for short-listed indicators
  - Sub-project on vegetation condition/HH methods being used
- GIS layers available
- Community programs currently in place, others we could build-in

Step 3. Develop Methods

- We developed methodology for each
  - Including developing partnerships with other agencies to facilitate data collection

- Two agencies in the region already had well established programs
- We tailored two of the indicators to existing programs

ClimateWatch
an initiative of Earthwatch Institute

birdlife
AUSTRALIA

Step 3. Develop Methods

Framework Trial Dec 2014 – April 2015

1. Vegetation extent
   - GIS approach used
2. Vegetation *condition/change*
   - Modified HH approach
3. Plant or animal phenology
   - Climate Trails established
4. Local bird communities
   - Birdlife Program established

Step 4. Trial to adjust as necessary

Review of methods

- Quality of data collected
- Did each indicator collect data appropriate to answer each monitoring question?
- If not it was revised
  - All methods, definitions, data capture and data storage processes were revised during this process

Step 4. Trial

Vegetation extent

- Q. What is the extent of native vegetation in the region?
- Q. Has the extent of native vegetation changed over time and if so, where has it changed?
- Creation of GIS layer for each LGA
- Reporting of vegetation extent on Council land:
  - Type 1 - Existing native vegetation under management; OR
  - Type 2 - New, future extent (area proposed to be targeted for future bushland renewal)

Step 4. Trial

Vegetation *change*

- During the trial vegetation *condition* data collected by all councils at:
  - 31 sites, composed of 69 plots
  - Including 24 plots with 2 observers
  - Quality of the data was assessed
    - Significant inter-observer variability
    - Imprecise measurements
    - Many attributes were poor indicators of management actions
    - Therefore of limited value for monitoring
  - New quantitative method developed and implemented

Step 4. Trial

Vegetation *change*

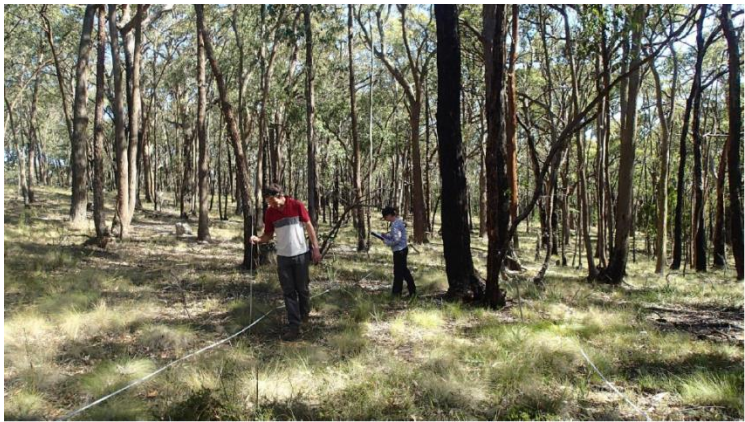
- Condition estimates are typically designed to be rapid and give a coarse indication of the relative quality of the vegetation attributes relative to a pre-determined benchmark
- Monitoring change over time requires a much more sensitive approach because an estimate of change is of little value if it is highly uncertain

Step 4. Trial

Vegetation *change*

- Understorey cover
- Species diversity and composition
- Recruitment of woody plants
- Mortality of woody plants
- Logs
- Tree density
- Tree and large shrub cover
- Recommended

10-20 sites per LGA are included (2 quadrats ea)



Step 4. Trial

Phenology Trails

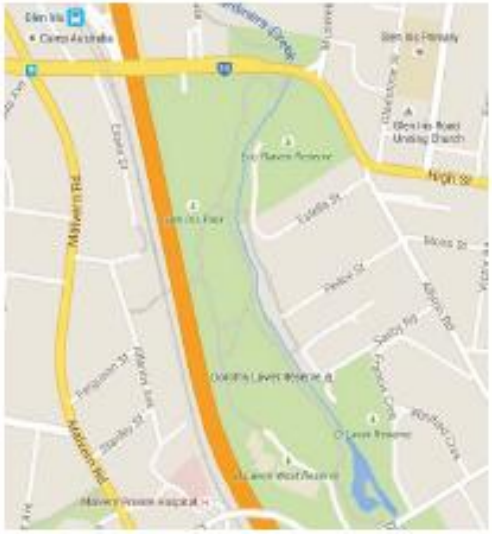
- Changes in the timing of natural events such as nesting, flowering, seed setting
- Q. Is the timing or duration of breeding or flowering of targeted species changing over time?
  - Where is this occurring and for what species?
  - How much change has occurred?
- Sites were selected in Monash, Knox and Stonington
- Trails advertised by ClimateWatch, and to community and School groups

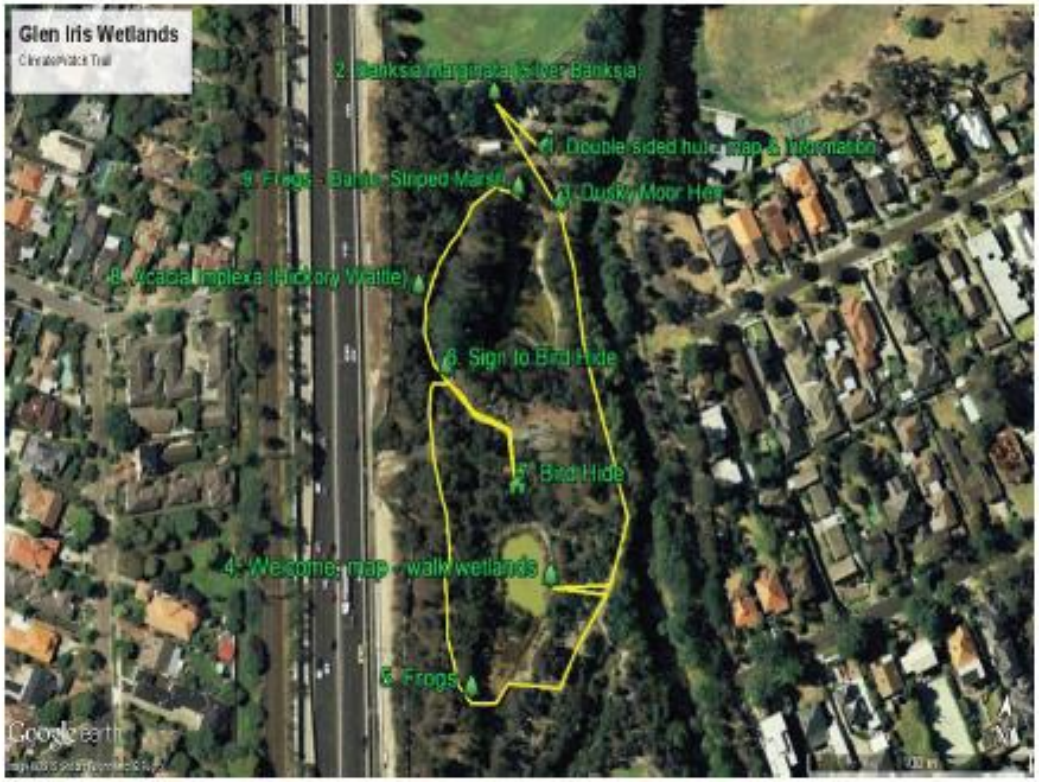
ClimateWatch
an initiative of Earthwatch Institute

EARTHWATCH INSTITUTE

Glen Iris Wetlands ClimateWatch trail

City of STONNINGTON





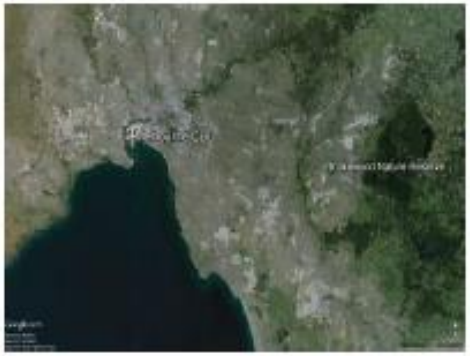
Location	Species	Location	Species
1	**Start of ClimateWatch Trail - Information board**	6	**Sign to Bird Hide**
2	*Banksia Marginata (Silver Banksia)*	7	Australian magpie *(Cracticus tibicen)*, Dusky Moor Hen *(Gallinula tenebrosa)*, Crested Pigeaon *(Ocyphaps lophotes)*, Eastern Spinebill *(Acanthorhynchus tenuirostris)*
3	*Dusky Moor Hen (Gallinula tenebrosa)*	8	Hickory Wattle *(Acacia implexia)*
4	**Wetlands Walk - information board**	9	Striped Marsh Frog *(Limnodynastes peronii)*, Eastern Banjo Frog *(Limnodynastes dumerilii)*
5	Striped Marsh Frog *(Limnodynastes peronii)*, Eastern Banjo Frog *(Limnodynastes dumerilii)*	10	

ClimateWatch
an initiative of Earthwatch Institute

EARTHWATCH INSTITUTE

Lakewood Nature Reserve ClimateWatch trail

Knox City Council



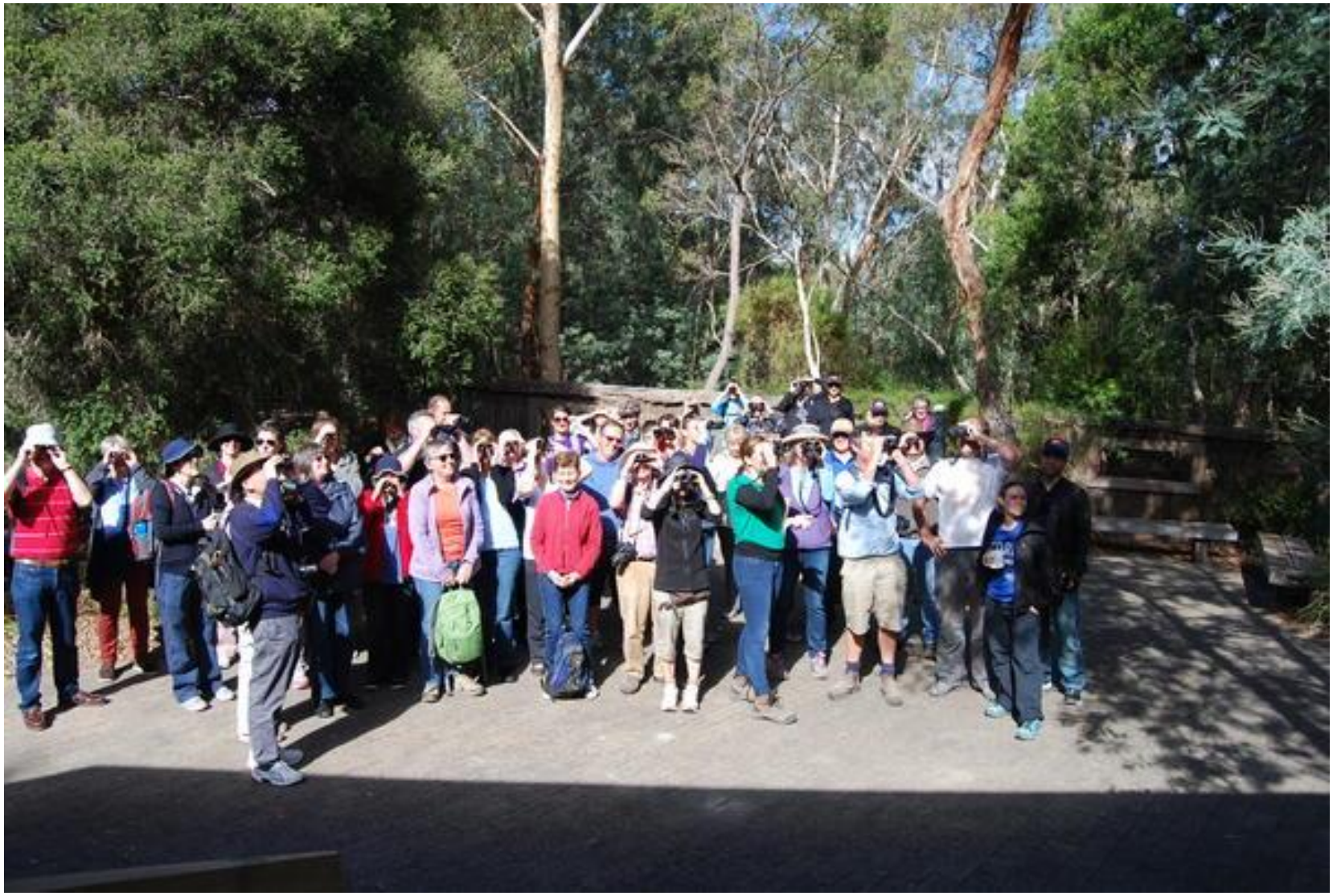
Location	Species
1	**ClimateTrail start/end**
2	**Interpretive sign**
3	Eastern Pobblebonk Frog *(Limnodynastes dumerilli)*
4	Black Swan *(Cygnus atratus)*
5	Australian Magpie *(Cracticus tibicen)*, Grey Fantail *(Rhipidura albisca)*, Common Brown Butterfly *(Heteronympha merope)*, Garden Skink - Southern *(Lampropholis guichenoti)*
6	Australian Magpie *(Cracticus tibicen)*, Grey Fantail *(Rhipidura albisca)*, Common Brown Butterfly *(Heteronympha merope)*, Garden Skink - Southern *(Lampropholis guichenoti)*
7	Blackthorn *(Banksia spinosa)*

Step 4. Trial

Bird Communities

- 36 sites selected for inclusion
  - Ranged in condition
  - All had baseline condition assessments
  - Community groups have already started bird surveys
  - More sites can be added in the future
- **Workshop 1 – council training** (29 attended)
- **Workshop 2 – community training** (80 members of the public attended)
  - Outlined the survey requirements and methods
  - Training in bird identification and surveys
  - Training in data collection and reporting

http://birdlife.org.au/projects/biodiversity-monitoring-in-melbournes-east



Lessons

- Under a changing climate, we can't manage biodiversity as a static entity
- The EAGA Councils now have greater capacity to monitor biodiversity under a changing climate
    - And tested methods to do so
- Less is more
  - Four indicators have very detailed methodology, and Councils are committed and able to collect data for each
- Capturing existing formal and informal monitoring was important to get buy in

Successes

- **This partnership is successful because:**
  - It links science, policy, and on-ground actions
  - Facilitates cross-tenure collaborations (species will move)
  - It is user friendly, flexible and acknowledges differences in resourcing
  - Provides data to identify stories for the community
  - Provides a springboard for future partnerships (NGO's, Universities, Government agencies) & a resource for others

Part I and Part II Framework documents

EAGA BIODIVERSITY MONITORING FRAMEWORK 2015

- PART I – DISCUSSION PAPER
- PART II – INDICATOR IMPLEMENTATION GUIDE

http://eaga.com.au/projects/biodiversity-monitoring-in-melbournes-east/

Acknowledgements

- Thank you to the PWG and TRG
- Project partners
- Community groups
- Funding Agencies

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