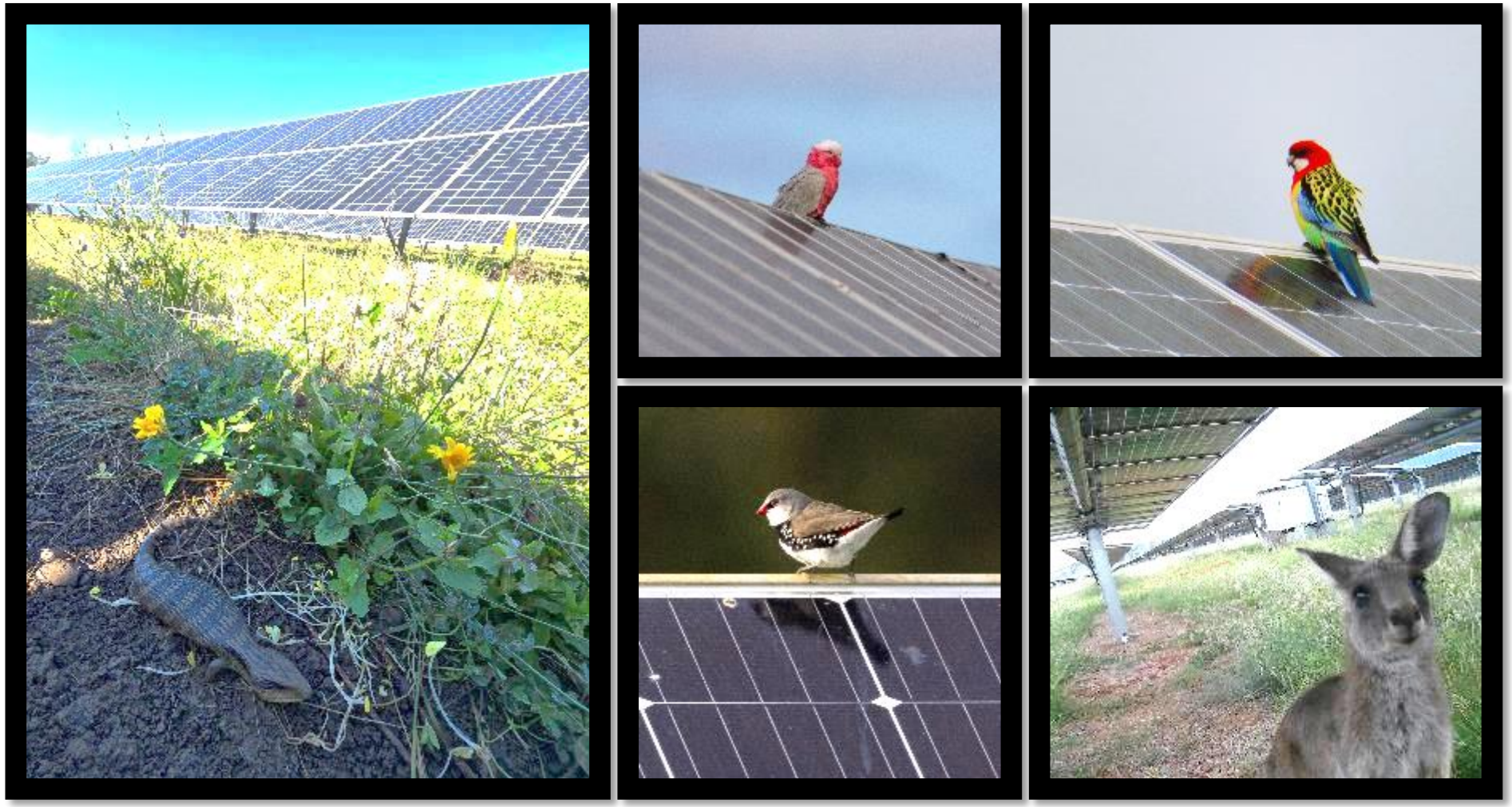
Planning Solar for Nature



Dr Eric Nordberg & Distinguished Prof. Lin Schwarzkopf
University of New England
James Cook University

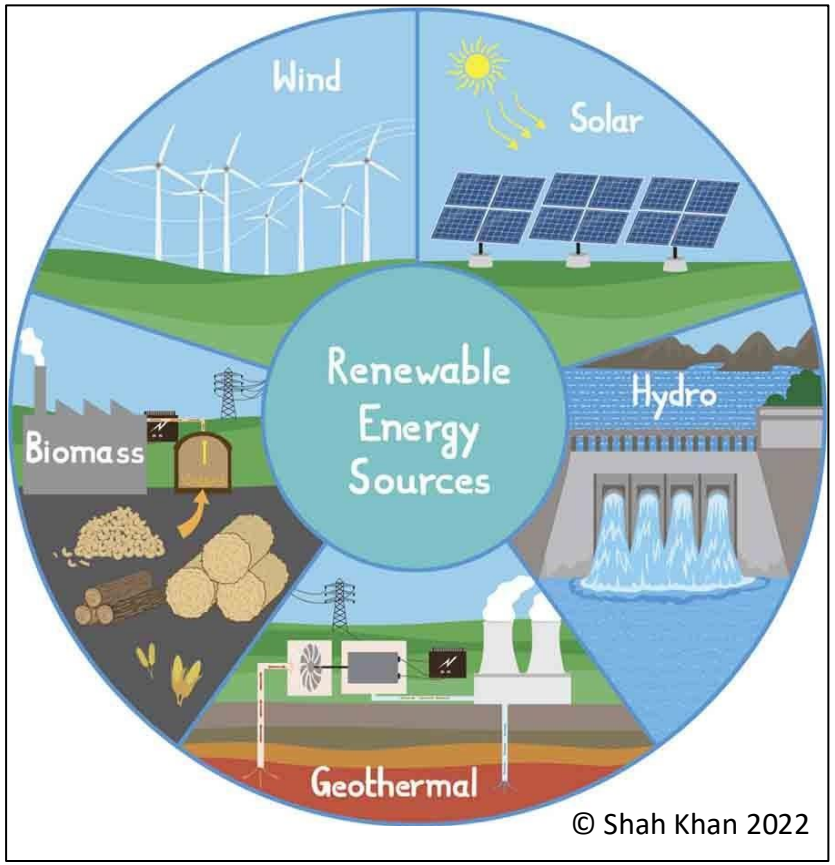
Acknowledgement of Country

We acknowledge the Traditional Custodians of the many lands from which we join this online meeting today. We pay our respects to Elders past, present and emerging, and celebrate the diversity of Aboriginal and Torres Strait Islander peoples and their ongoing cultures and connections to the lands and waters of Australia.

Pictured: **Warwick Keen** “Always was, always will be” 2008
Gifted by the artist to UNE in 2008

Renewable energy – growing land-use

- Dramatic increase in renewables
- Great step away from fossil fuels



Gielen et al. 2019; Boscarino-Gaetano et al. 2024

Renewable energy – growing land-use

- But there are concerns about their impacts

Gielen et al. 2019; Boscarino-Gaetano et al. 2024

Land-use conflicts

"Renewables are taking up prime agricultural land!"

- Large, cleared areas = good for solar farms
- Land can be purchased or leased
- Farmers may want to run livestock under panels… but is it crap?

Weselek et al. 2019; Gross 2020; Hiker et al. 2024

Land-use conflicts

"Renewables are destroying wildlife habitat!"

- Remember… *large, cleared areas are good for solar farms*
- Expensive and time consuming to have to clear areas
- More red tape with threatened species etc.

Weselek et al. 2019; Gross 2020; Hiker et al. 2024

Land-use conflicts

"Renewables are destroying wildlife habitat!"

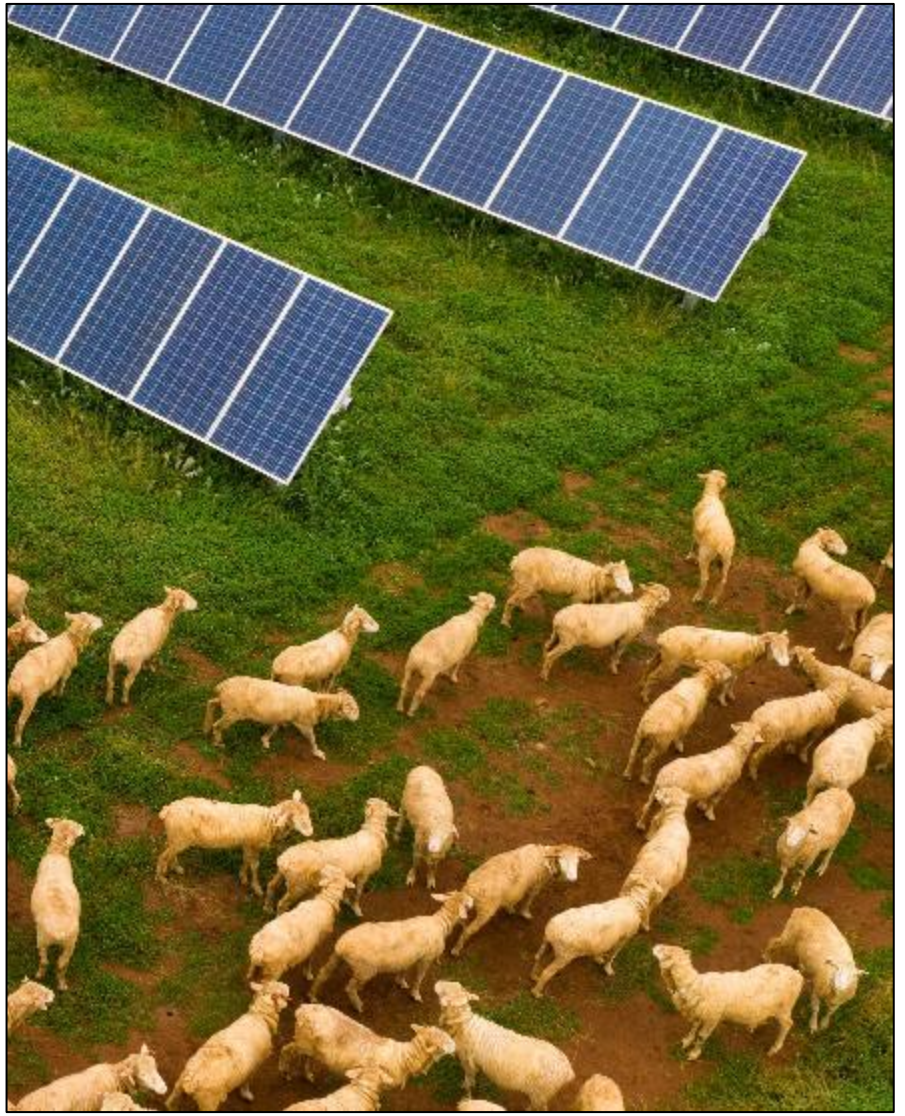
Weselek et al. 2019; Gross 2020; Hiker et al. 2024

Land-sharing opportunities

- *Agrivoltaic* systems (**Agri**culture + Photo**voltaic** energy production) are becoming more popular
  - win-win systems

- Solar farms can use grazing livestock for vegetation management
  - Farmers can lease the land to solar farms
  - And still use it to feed livestock

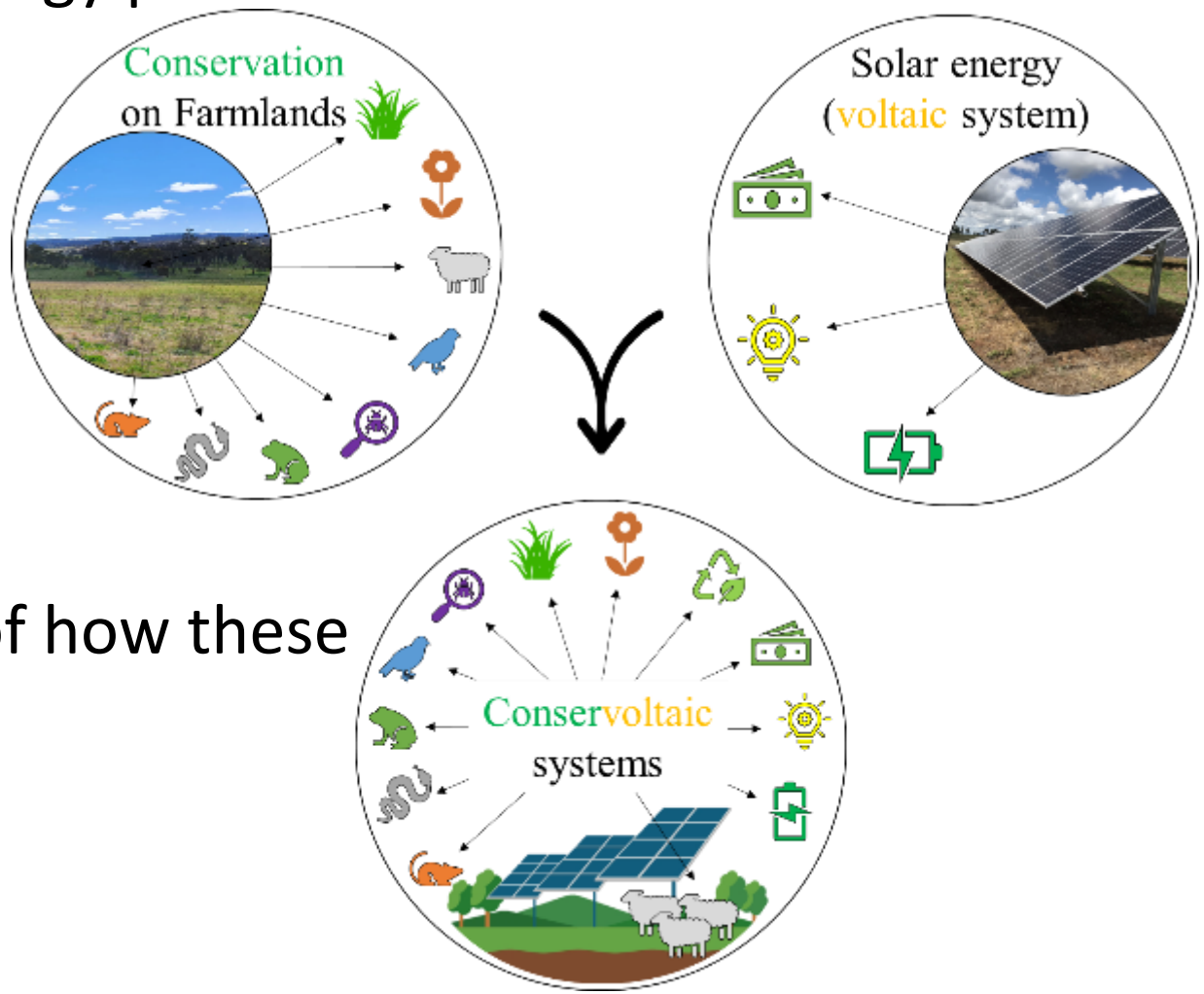
- Shade-tolerant crops can grow under panels



Dinesh et al. 2016; Nordberg et al. 2021; Sturchio et al. 2024

Can solar farms support wildlife?

- Nature **conser**vation + Photo**voltaic** energy production
- Conservoltaic / Ecovoltaic systems
  - Another win-win?
  - Or… *win-win-win*?!



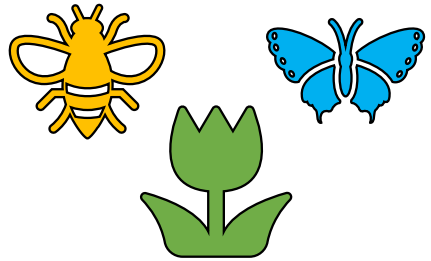
- Rate of construction > our knowledge of how these systems function

Nordberg et al. 2021; Nordberg and Schwarzkopf 2023

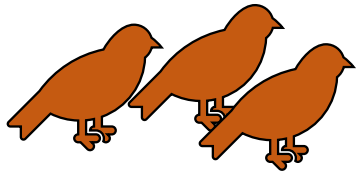
Can solar farms support wildlife?

- Studies from Europe & USA suggest solar arrays can be effective wildlife habitat

- Increased pollinators on solar farms compared to pre-existing farmland (when combined with native vegetation/wildflowers)



- Increased bird activity

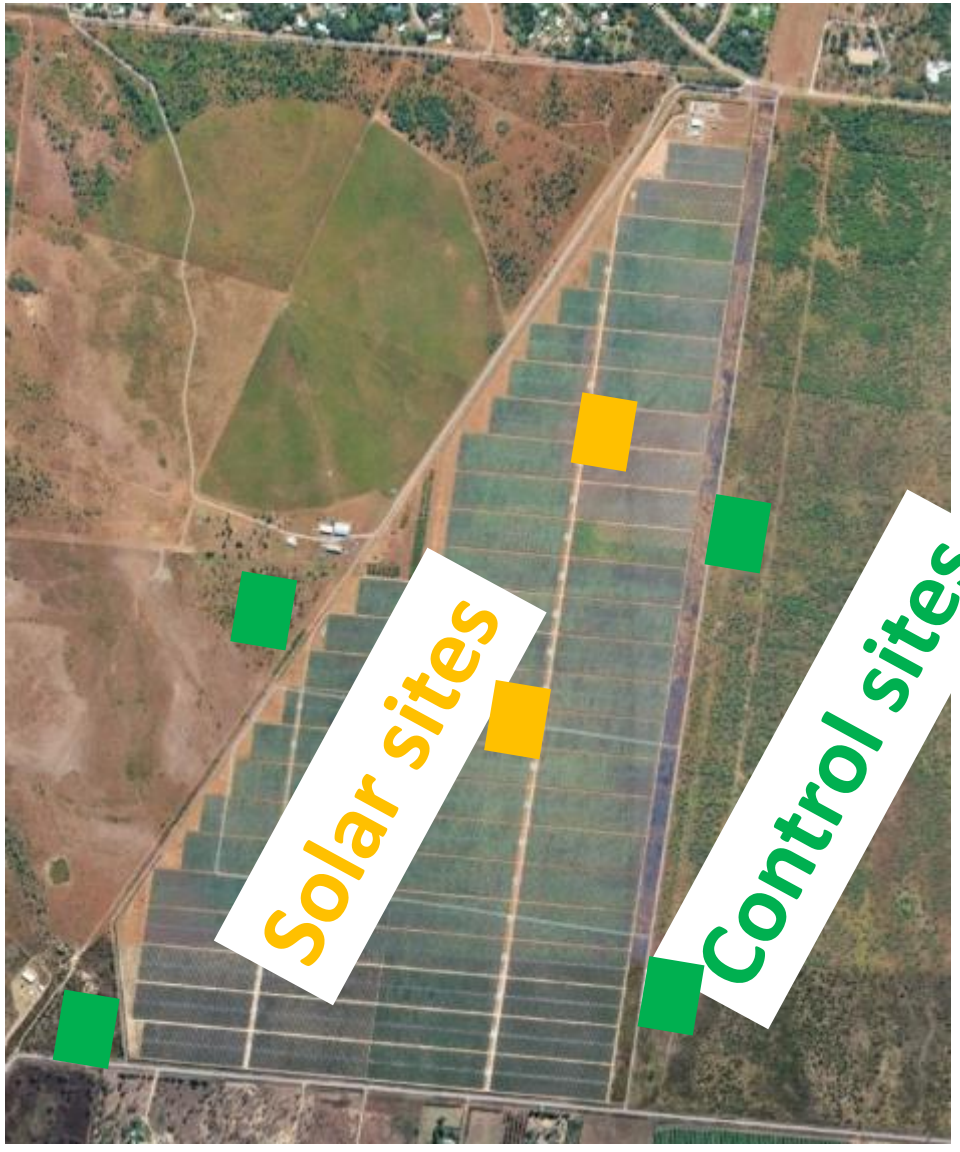


Walston et al. 2023; Blaydes et al. 2024; Jarcuska et al. 2024; McCall et al. 2024

Preview from Ross River Solar Farm

- Special thanks to Palisade Group
- Michael & Angela Sacilotto
- Seb Hoefer and team!

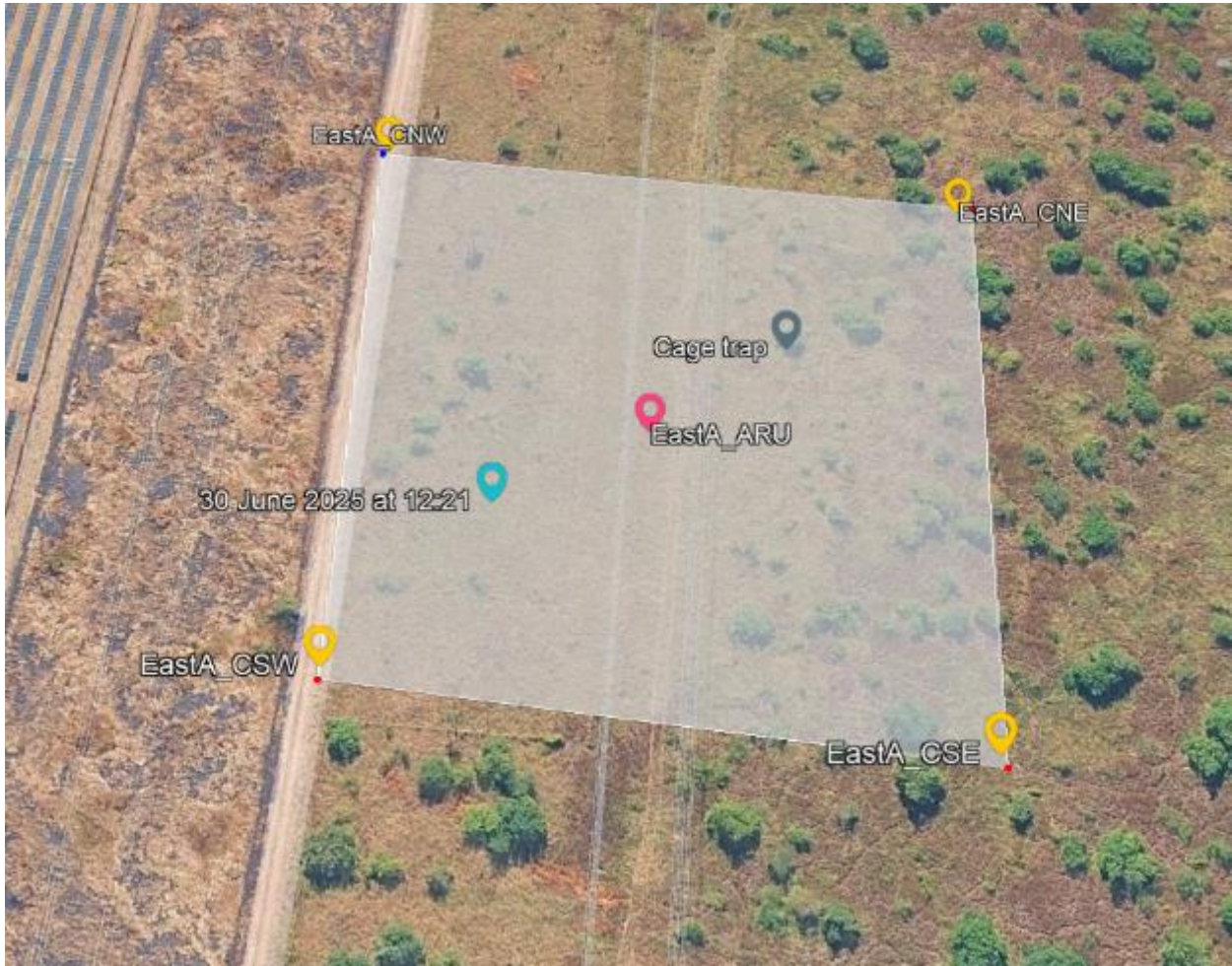
- June 2025
  - 7-day on-ground surveys
    - Bird surveys
    - Pit-fall traps
    - Small/medium mammal traps
    - Acoustic recorders
    - Wildlife cameras
    - Spotlighting



Preview from Ross River Solar Farm

Within solar arrays

Within adjacent (control) areas



Preview from Ross River Solar Farm

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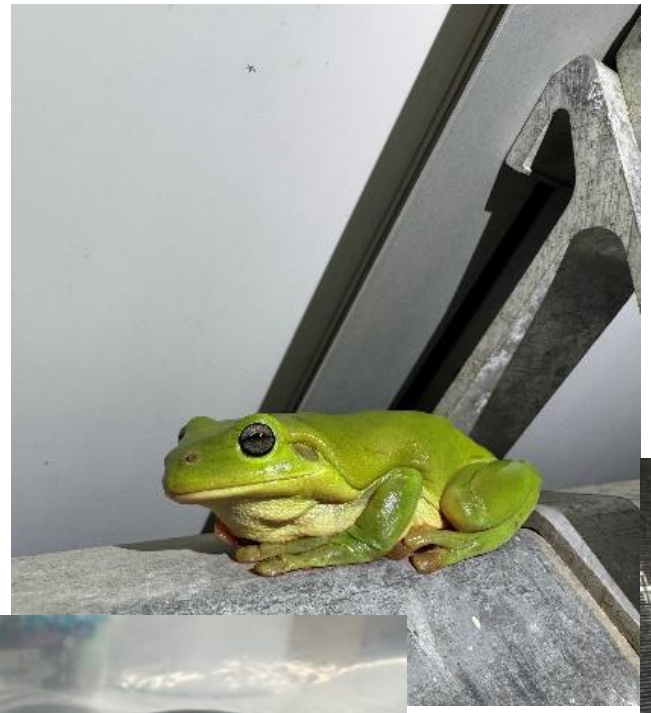
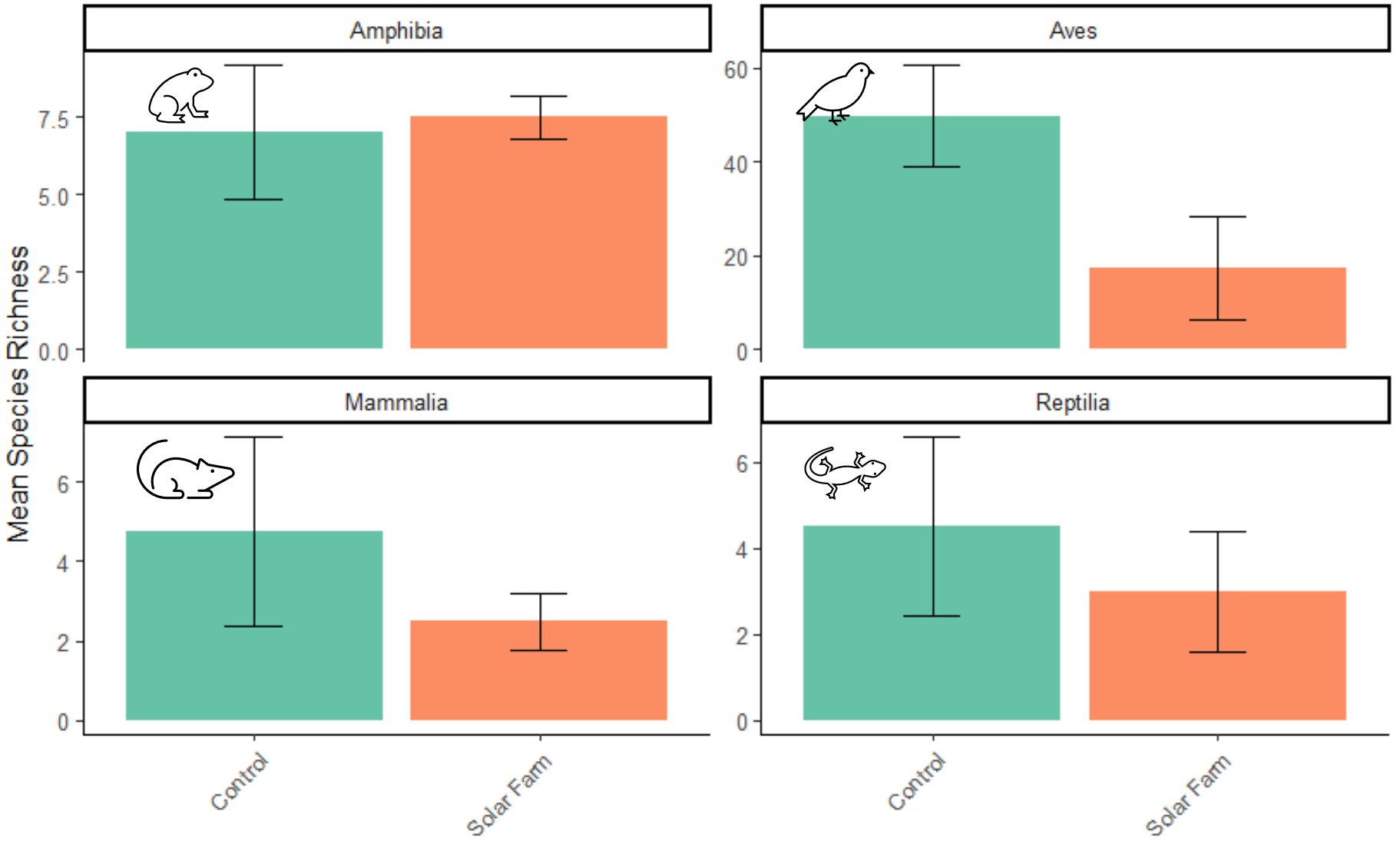


Prelim results



How can we ensure that solar farms support wildlife habitat and biodiversity?

1. Targeted research
   - Preliminary data supports this is possible in Australia

2. Access and partnerships with solar farm companies/sites
   - Engagement is key

3. Engage in long-term data collection and monitoring
   - Otherwise, we don't know if these actions are worth continuing

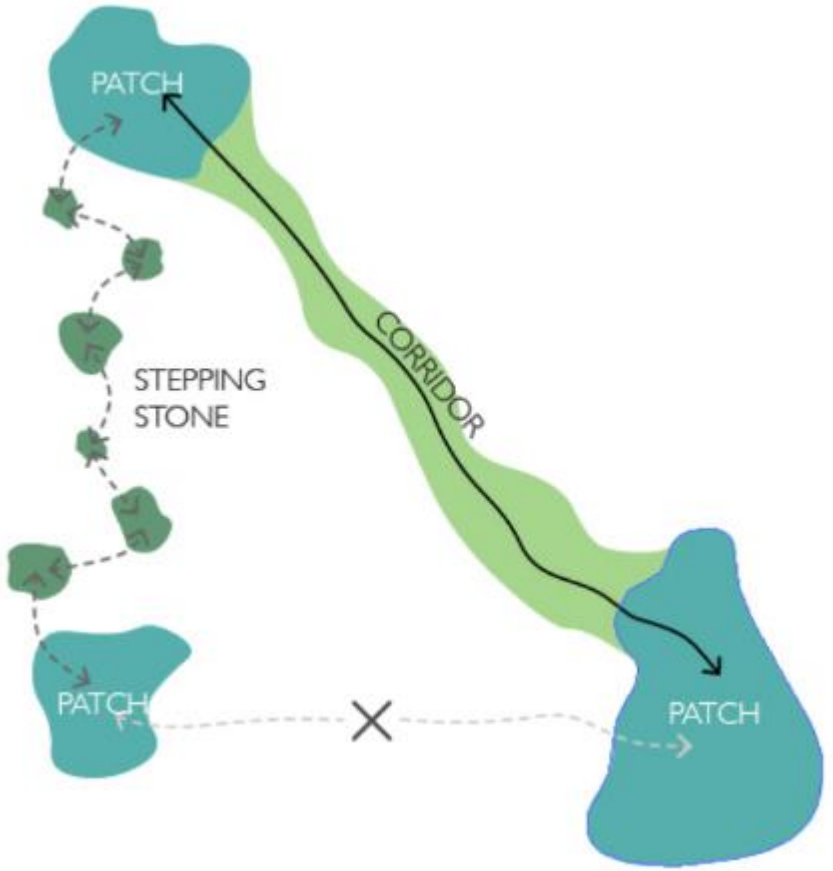
How can this be achieved?

- Minimise complete clearing/habitat loss

Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

How can this be achieved?

- Minimise complete clearing/habitat loss
- Maintain connectivity



Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

How can this be achieved?

- Minimise complete clearing/habitat loss
- Maintain connectivity
- Rehabilitate/re-establish lost microhabitats

Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

How can this be achieved?

- Avoid a sea of panels

Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

How can this be achieved?

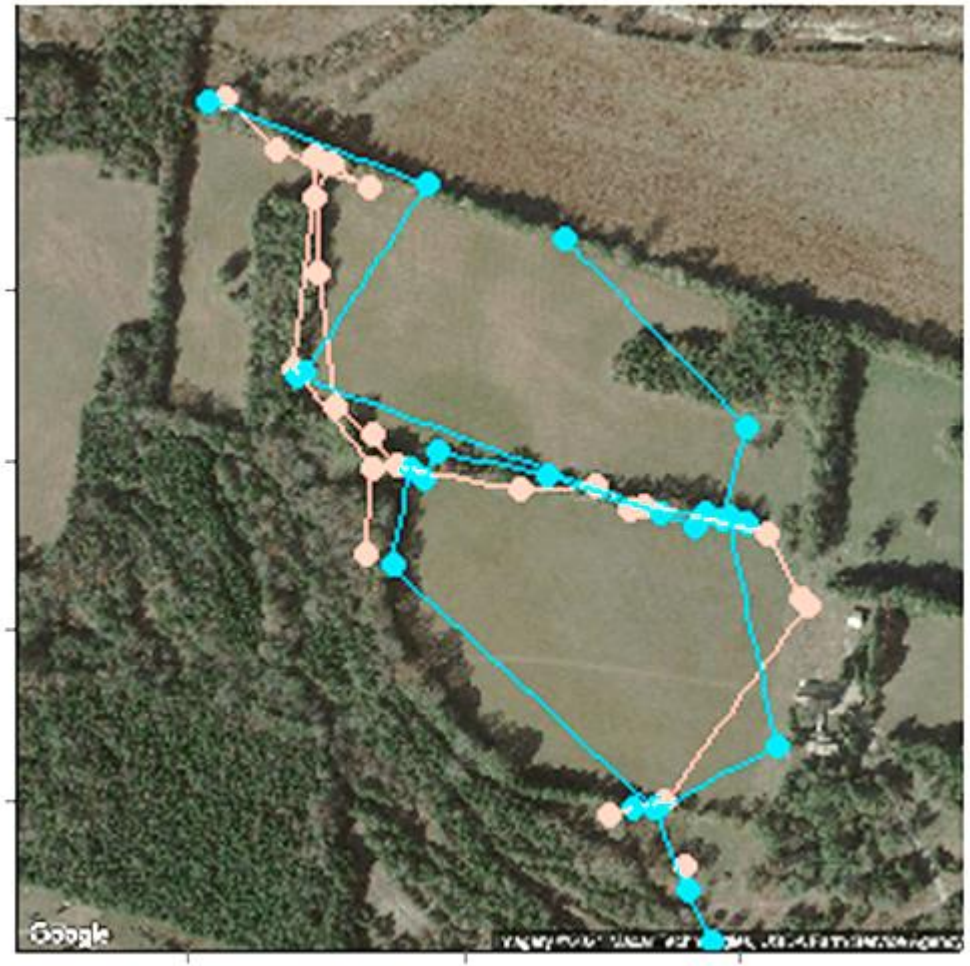
- Avoid a sea of panels
- Patchy is better

Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

How can this be achieved?

- Avoid a sea of panels

- Patchy is better
  - Animals use fence rows/tree lines to navigate fragmented landscapes



Nordberg et al. 2021

Roe and Georges 2007; Pullinger and Johnson 2010; Nelson et al. 2021

What other factors should be considered?

- Reptiles & amphibians
  - Missing habitat features (logs, rock piles)

Nordberg et al. 2021; Boscarino-Gaetano et al. 2024

What other factors should be considered?

- Reptiles & amphibians
  - Missing habitat features (logs, rock piles)

- Mammals
  - Perimeter fences
  - However, ‘life finds a way’ – Dr Ian Malcolm

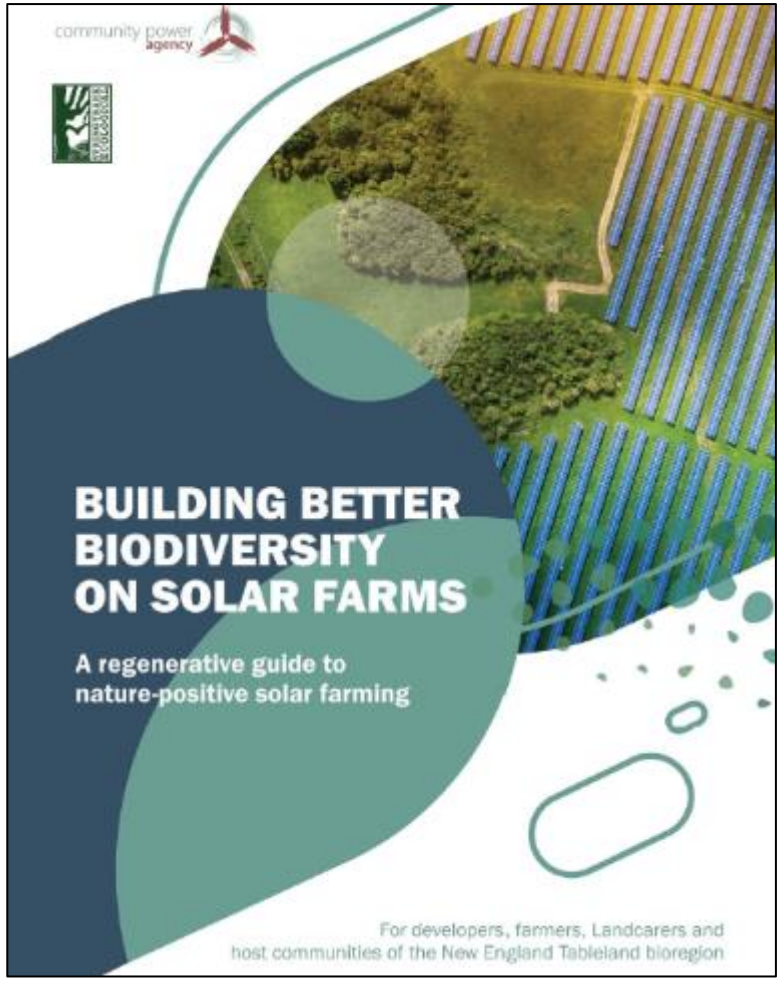
Nordberg et al. 2021; Boscarino-Gaetano et al. 2024

How can we ensure a win-win?

- Develop guidelines to ensure more strategic solar farm developments and management

- Involve ecologists, site designers, industry engineers, etc. in *early discussions*
  - Easier to modify before construction

- Identify co-benefits wherever possible
  - Think about multi-use landscapes



Carr et al. 2024

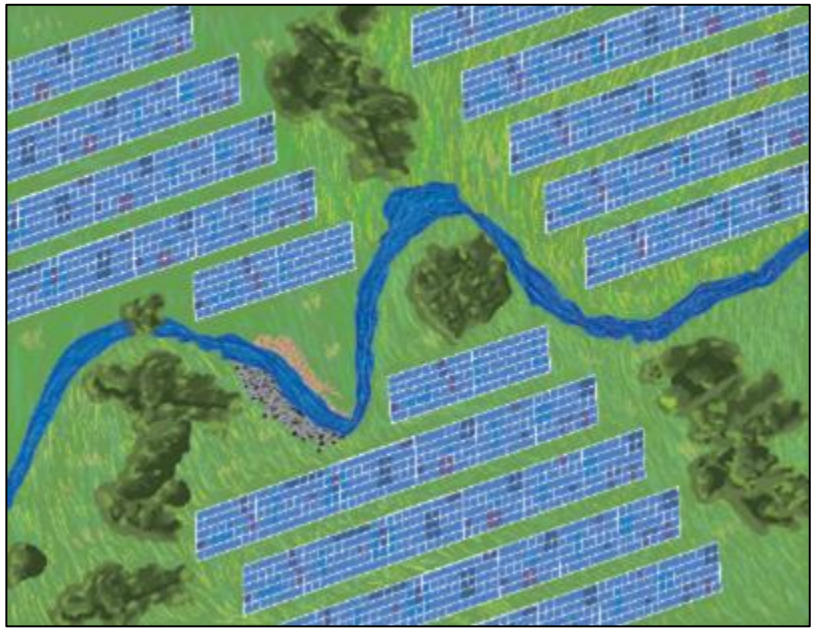
Recommendations

- Strategic placement
  - Low productivity landscapes (if *not* agrivoltaic)
  - Moderate productive land (if agrivoltaic)
  - Avoid areas of high biodiversity
  - Minimise clearing

Grove et al. 2016; Kampherbeek et al. 2023; Widmer et al. 2024; Carr et al. 2024

Recommendations

- Purpose built designs
  - Remnant habitat (avoid sea of panels)
  - Increase habitat connectivity
  - Buffers around creeks and riparian zones
  - Retain/create habitat clusters



Correa Ayram et al. 2016; Nordberg et al. 2021; Blaydes et al. 2021; Carr et al. 2024

Recommendations

- Strategic management
  - Revegetate with natives/wildflowers
  - Strategic veg (for biodiversity, grazing feed, or low growing species)
  - Recreate missing habitat features (e.g., rock piles, logs, hollows)

McDougall et al. 2016; Michael et al. 2021; Roberts et al. 2024; Carr et al. 2024

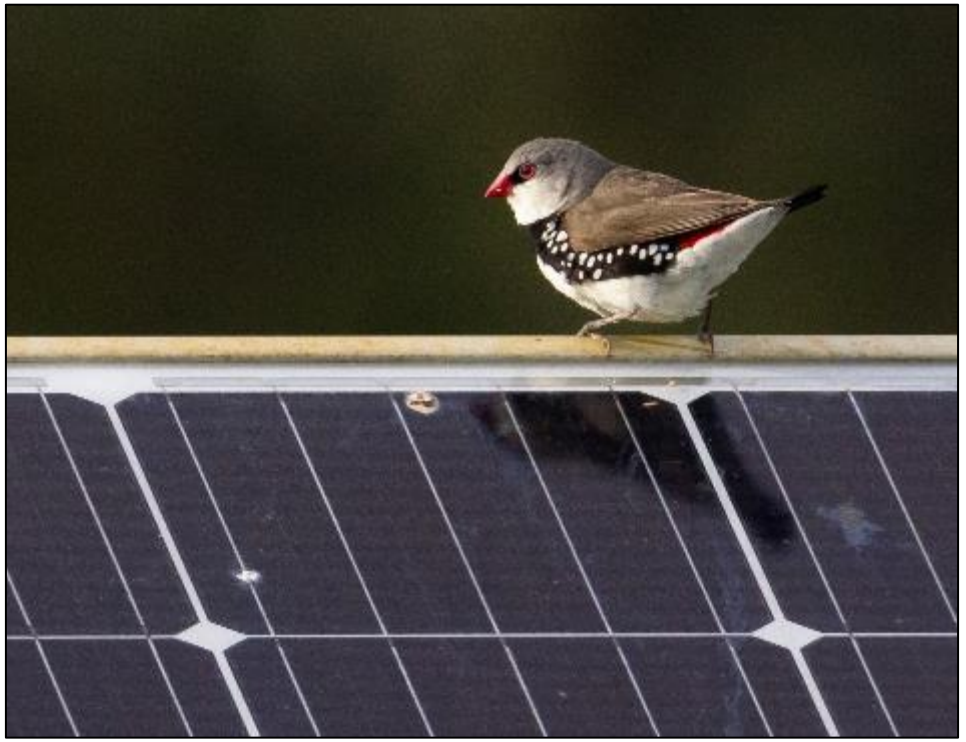
Recommendations

- Long-term monitoring
  - Recolonisation (lag-time)
  - Wildlife-friendly perimeter fences
  - Temporal (and spatial) data required to identify impacts
  - Be proactive in this space

Jakes et al. 2018; Dowling et al. 2024; Carr et al. 2024

Take-home

- Strategic planning, design, and management can support biodiversity on solar farms
- Early involvement leads to best practices and public acceptance
- Long-term monitoring is required



Jakes et al. 2018; Dowling et al. 2024; Carr et al. 2024

Happy to take questions…

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Biodiversity on solar farms guide

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