# Four Years of Dunlin Nest Survival Without Human Disturbance

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# Levels of human disturbance

- GPS-monitored
  - Least disturbance

- Temperature-monitored
  - Intermediate disturbance

- Human-monitored
  - Highest disturbance

# GPS-monitored

- Tagged pre-breeding
- Bird rarely seen again
- GPS point every 15 min
- Use package 'nestR'
  - Find nest locations
- Determine days spent at nest and fate
- "True" nest survival



Milsar NanoRadio Tag-3

# Temperature-monitored nests

- TinyTag temperature probe
  - Nest found and probe placed shortly after
  - Rarely visited again, same nest marking as human-monitored
  - Reading every minute

# Human-monitored nests



- Human-monitored on USFWS plots
  - Nest visit every five days
  - Hatch checks more frequently
  - Eggs measured/floated
  - Adult may be banded
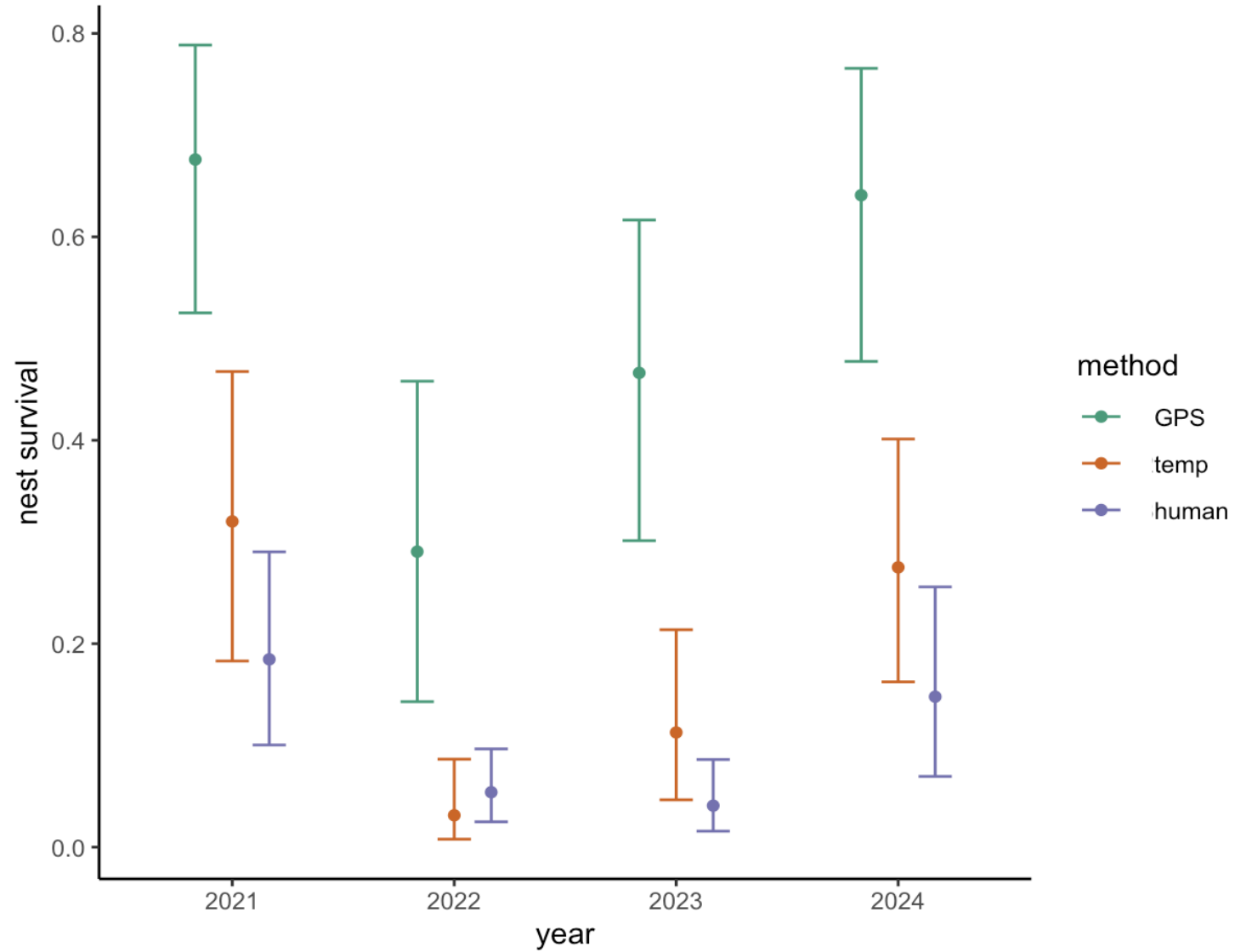  - Nest marked
  - Observers on plots every day

# Nest survival model results

|  | **2021** | **2022** | **2023** | **2024** |
|---|---|---|---|---|
| GPS-monitored | 14 | 15 | 17 | 11 |
| Temperature-monitored | 15 | 17 | 27 | 31 |
| Human-monitored | 40 | 39 | 45 | 33 |

- Covariates:
  - monitoring method, initiation date, age, year, if an adult was handled

- Top model= Year + Method + Age

# Nest survival results

# Implications

- Remotely monitoring nests is feasible (GPS, TinyTags)
  - Decrease human bias
  - More nest information
- Human visits negatively bias nest survival
- Assess the impacts we have on our studies
  - Account for biases, apply corrections
  - Minimize the number of nest visits

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