# Automated digital recording systems as effective tools for the monitoring of tropical vertebrates

**Note: Pictures removed from PDF**

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# A New Generation of Research on Amphibian Declines

- Research needed to determine declines:
  - Long-term and large-scale monitoring
  - Monitoring of other groups

Are amphibians declining more than other groups?

What is the situation of other groups?

# Available Comparisons

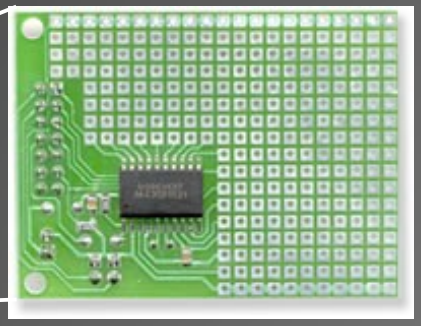
- Top to down comparisons have limited application
- GAA compared IUCN Red List listings
  - Species listed as “Data Deficient”
    - Amphibians: **22.5%** (1294/5743; Stuart, *et al*., 2004)
    - Birds: **0.007%** (78/10445; Butchart, *et al*., 2004)

# Objective

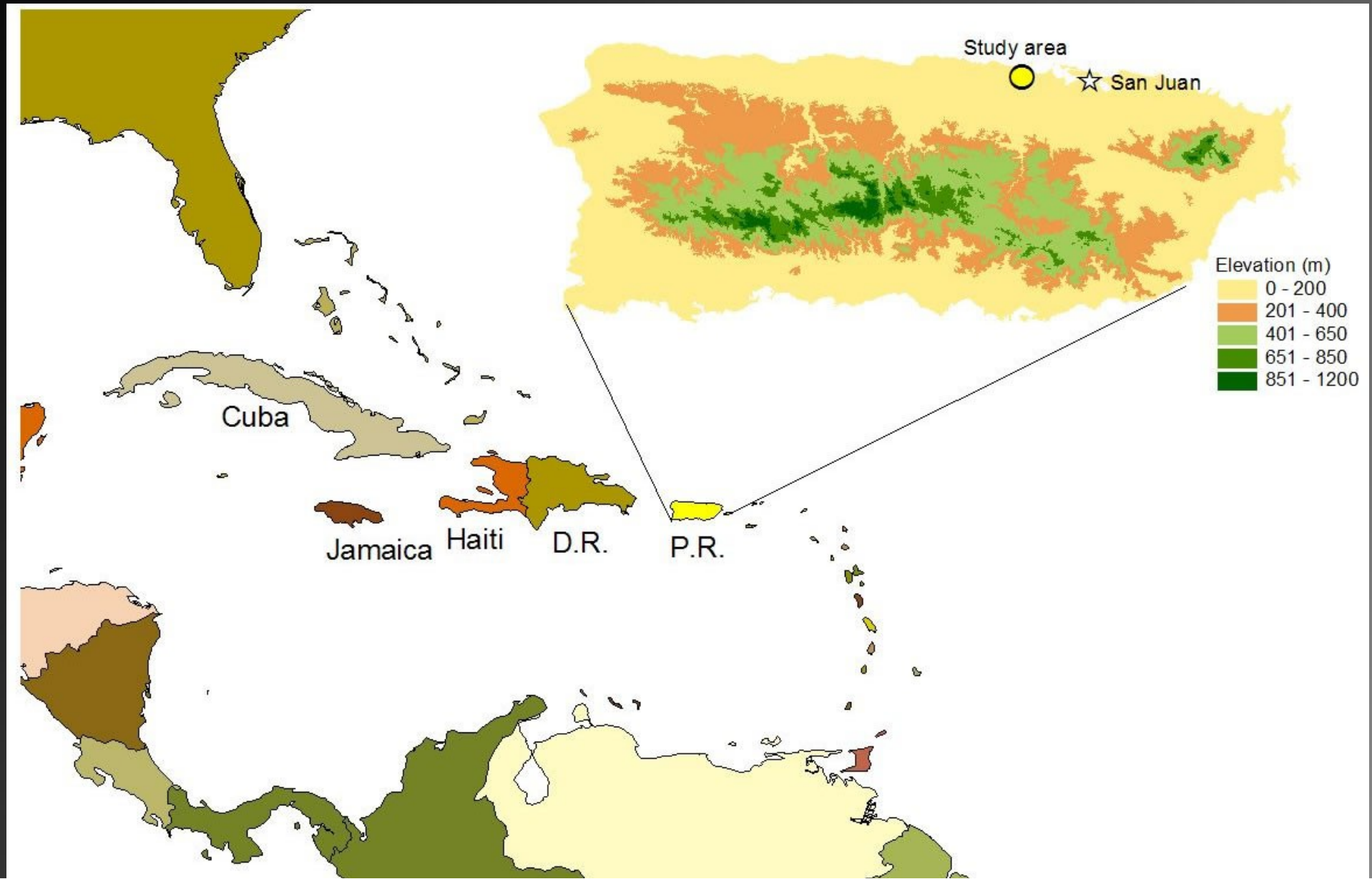
- Test an Automated Digital Recording System (ADRS) for the monitoring of amphibians and birds
  - Use ADRS for a multiple groups long-term and large-scale monitoring project

# Methods

- ADRS:
  - Marantz PMD 670 recorder
    - 44.1 kHz .wav
  - Sennheiser omni-directional microphone
  - Custom controller

# Study Area


Study area
San Juan
Elevation (m)
0 - 200
201 - 400
401 - 650
651 - 850
851 - 1200
Cuba
Jamaica
Haiti
D.R.
P.R.

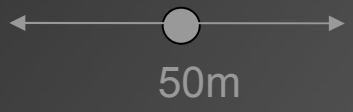
# Study Area

- Mangrove/brackish forested wetland
- *Pterocarpus officinalis* and Red Mangrove

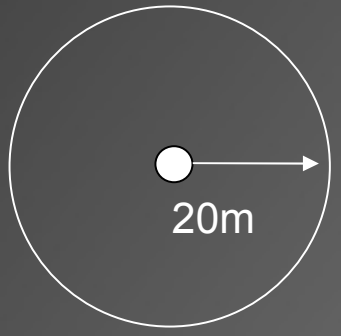
- 10 sites with >100m between each site

# Surveys

- ADRS recorded 7 min/h for 24 h (7:00)
  - Species identified by call
- Amphibians: 2 x 50 m VES (20:00)



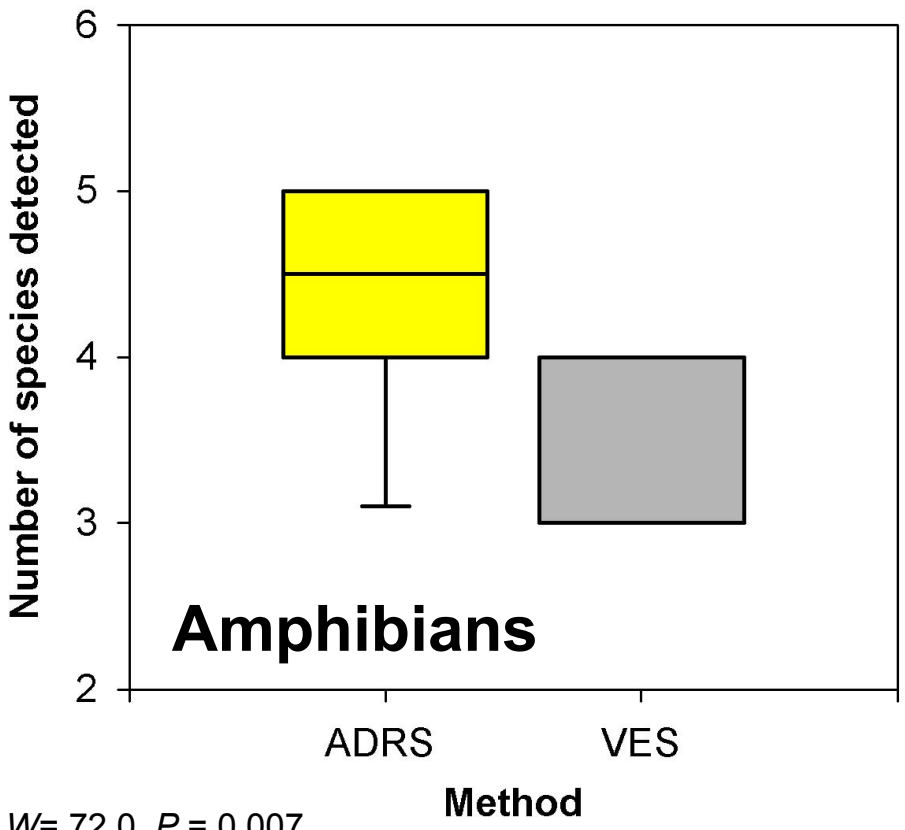

- Birds: 20 m fixed-radius point-count during 10 min (7:00)



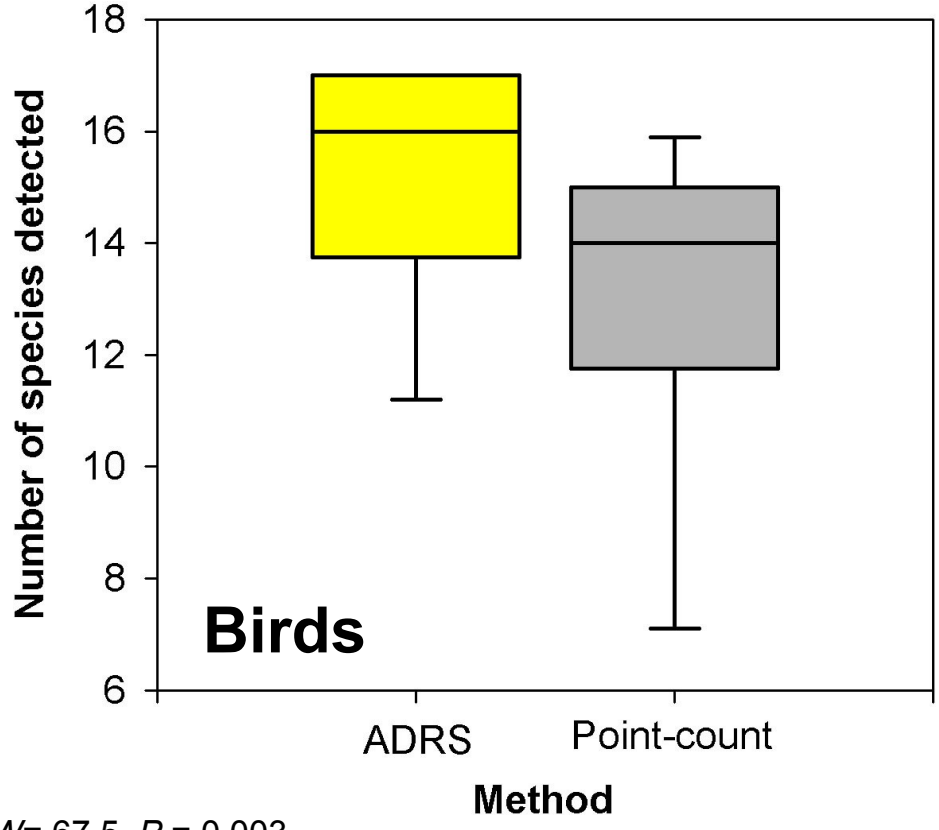
# Data Analysis

- Species identified with ADRS vs. species identified with surveys
  - Mann-Whitney test

# Per Site Results




*W*= 72.0, *P* = 0.007
n = 10




*W*= 67.5, *P* = 0.003
n = 10

# Overall Results - Amphibians

| **Amphibian Species** | **ADRS** | **VES** |
|---|---|---|
| *Bufo marinus* | X | X |
| *Eleutherodactylus coqui* | X | X |
| *Leptodactylus albilabris* | X | X |
| *Rana grylio* | X | X |
| *Eleutherodactylus antillensis* | X | |
| **Total** | **5** | **4** |

# Overall Results - Birds

| Bird Species | ADRS | Point-count |
|---|---|---|
| 14 species | X | X |
| *Columba leucocephala* | | X |
| *Estrida melpota* | | X |
| *Buteo jamaicensis* | X | |
| *Dendroica petechia* | X | |
| *Spindalis portoricensis* | X | |
| **Total** | **17** | **16** |

# Summary

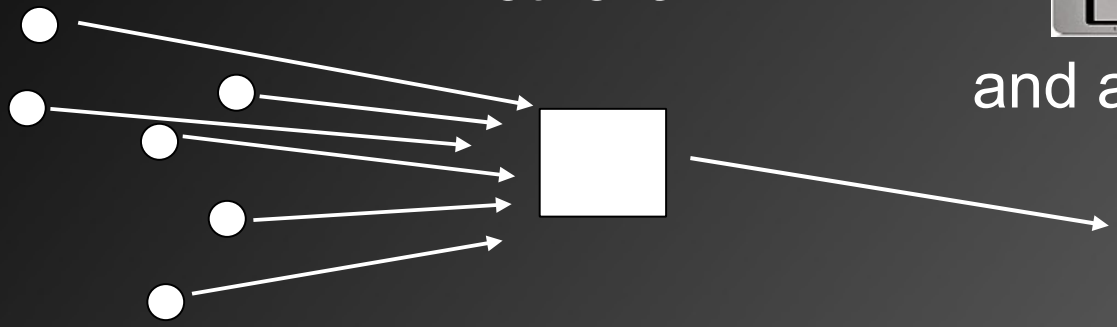
- The ADRS method identified more species per site than the other surveys
- The ADRS method identified 4 more species overall
  - Amphibians: lowland generalist
  - Birds: top predator, endemic and generalist

# Advantages of the ADRS

- Easy to transfer to computer
  - Analysis with software
  - Dissemination
  - Archive
- Negligible drift in time
- Reduced weight and size

# Future long-term and large-scale monitoring project

ADRS → Data retrieval →

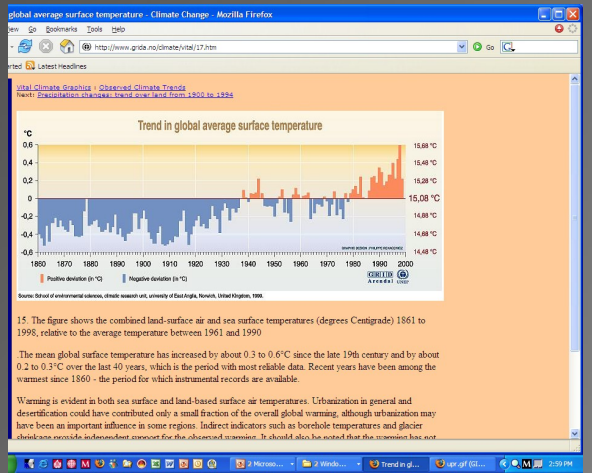


Data analysis

and automatic species identification

| Species | 12:00 | 13:00 | 14:00 | 15:00 |
|---|---|---|---|---|
| *E. coqui* | 0.6 | 0.6 | 0.6 | 0.6 |
| *E. gryllus* | 0.8 | 0.8 | 0.8 | 0.8 |
| *E. hedricki* | 0.3 | 0.3 | 0.3 | 0.3 |
| *E. richmondi* | 0.9 | 0.9 | 0.9 | 0.9 |
| *E. cooki* | 0.5 | 0.5 | 0.5 | 0.5 |

Several artificial intelligence methods are being tested



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# Questions?

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