OCCUPANCY SURVEYS FOR A CRITICALLY ENDANGERED, HIGHLY CRYPTIC, SINGLE ISLAND ENDEMIC, THE PUAIOHI

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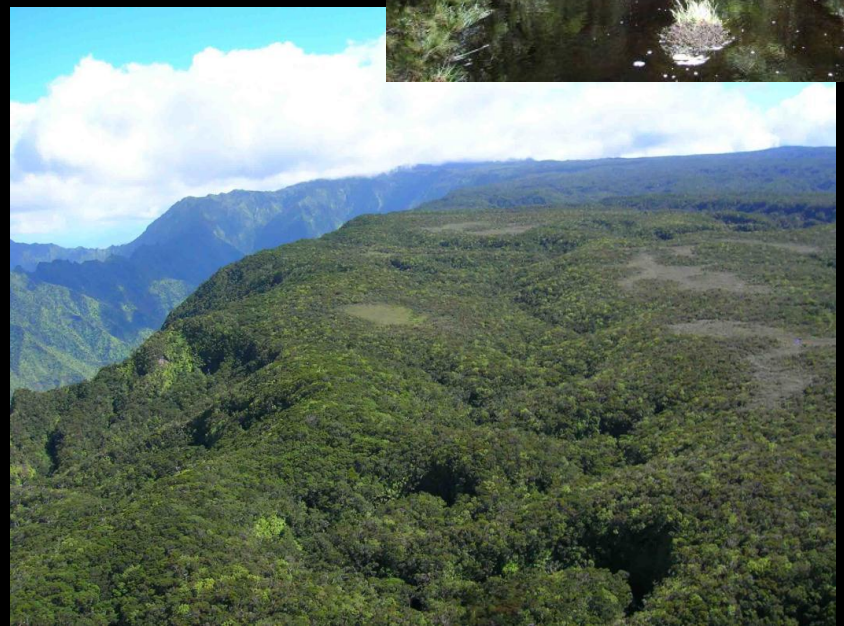
Background

- “Small Kauai Thrush”
- Endemic to Kauai
- Frugivorous
- Never considered common
- Listed as endangered in 1967
- Yet population info still lacking!

Challenges to Estimating # Puaiohi

- Cryptic
- Stream habitat
  - Usually nests on vertical faces
- Low detection probability (~50%)
- Straight-line transects and distance sampling not feasible

→ Occupancy Surveys!



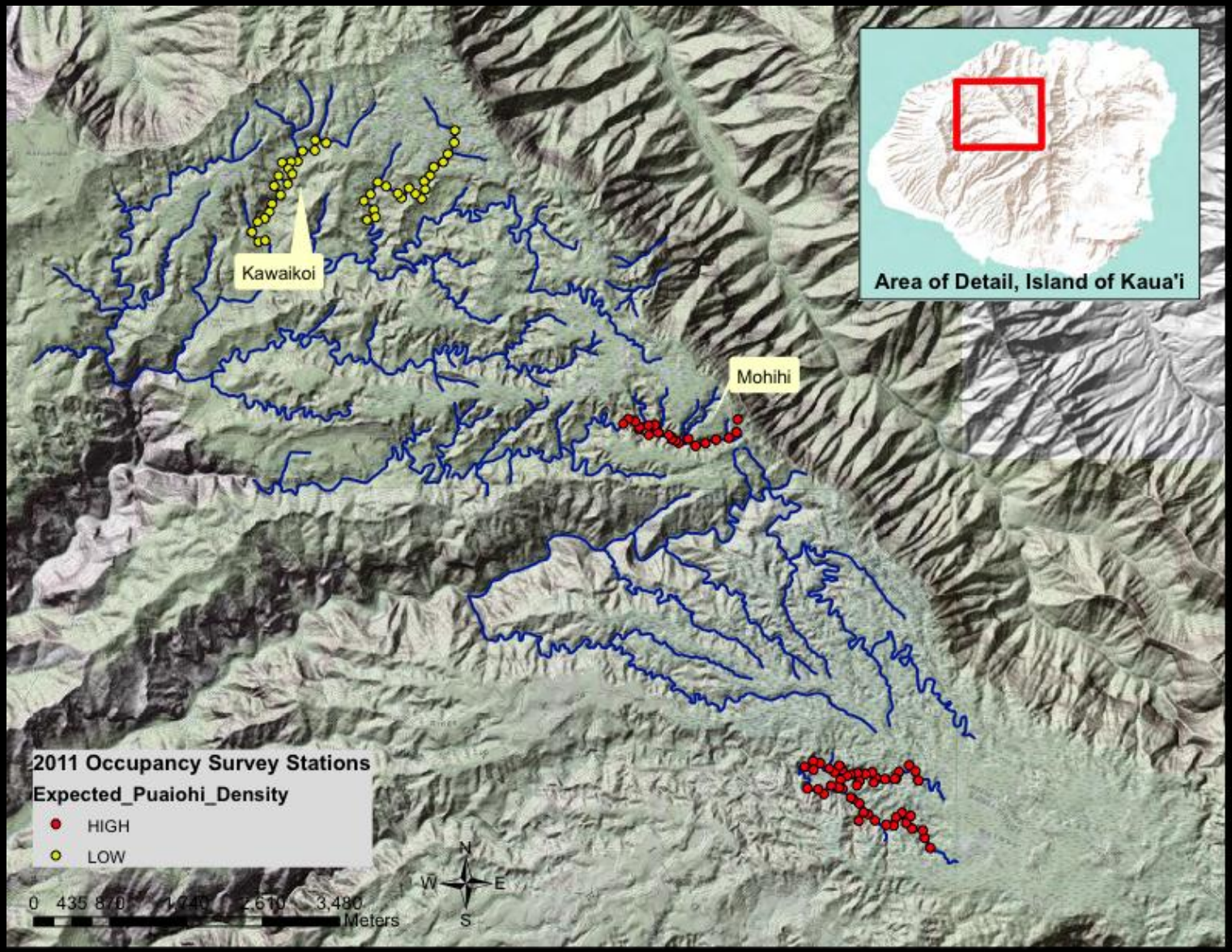
Objectives

- Develop and refine occupancy survey protocol
- Determine occupancy probability of randomly selected streams
- Determine habitat predictors of occupancy probability
- Use to model density and abundance

Pilot Occupancy Survey

- Informed by territory length (mean: 100 m), and range-wide scouting (2003-2006)
- 20 stations/stream, 150m apart
- 5 streams: 3 “high” and 2 “low” density

Streams Surveyed in 2011



Pilot Occupancy Survey

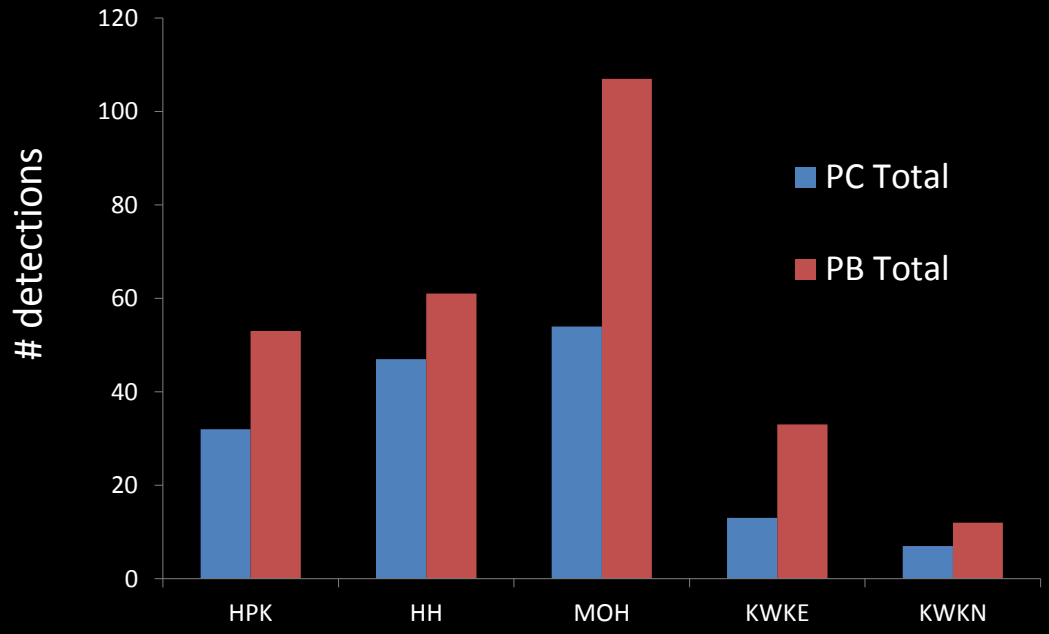
- Also informed by detection probability from brief study
- Each station surveyed 6x
- Each survey consisted of:
  - 2, 4-min “base” point counts
  - 8.5-min playback (30s PB/1 min observing, 30s PB/1 min observing, 30s PB, 5 min observing)

Pilot Occupancy Survey Results

- Best model: occupancy (stream 13 - 81%), detection (observer 37 – 73%, stream noise, playback)
- More detections occurred early in base point count period than the end
- Detection increased with additional visits until the 5th visit

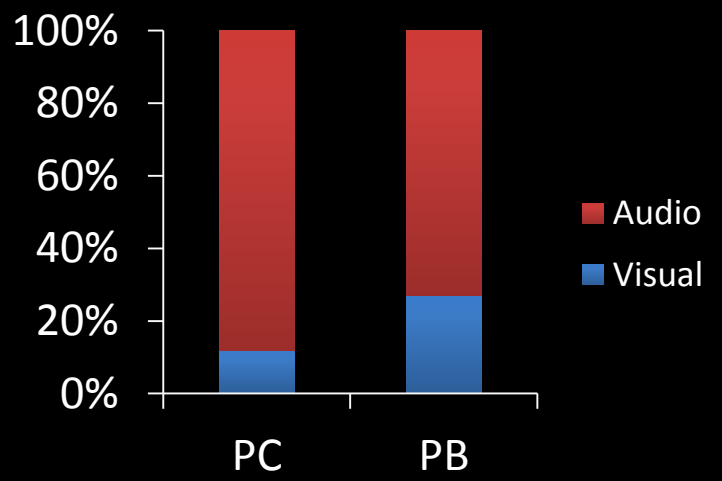
Effect of Playback-2011

More detections:



- Detection probability increased from 50% during point count to 53% after playback

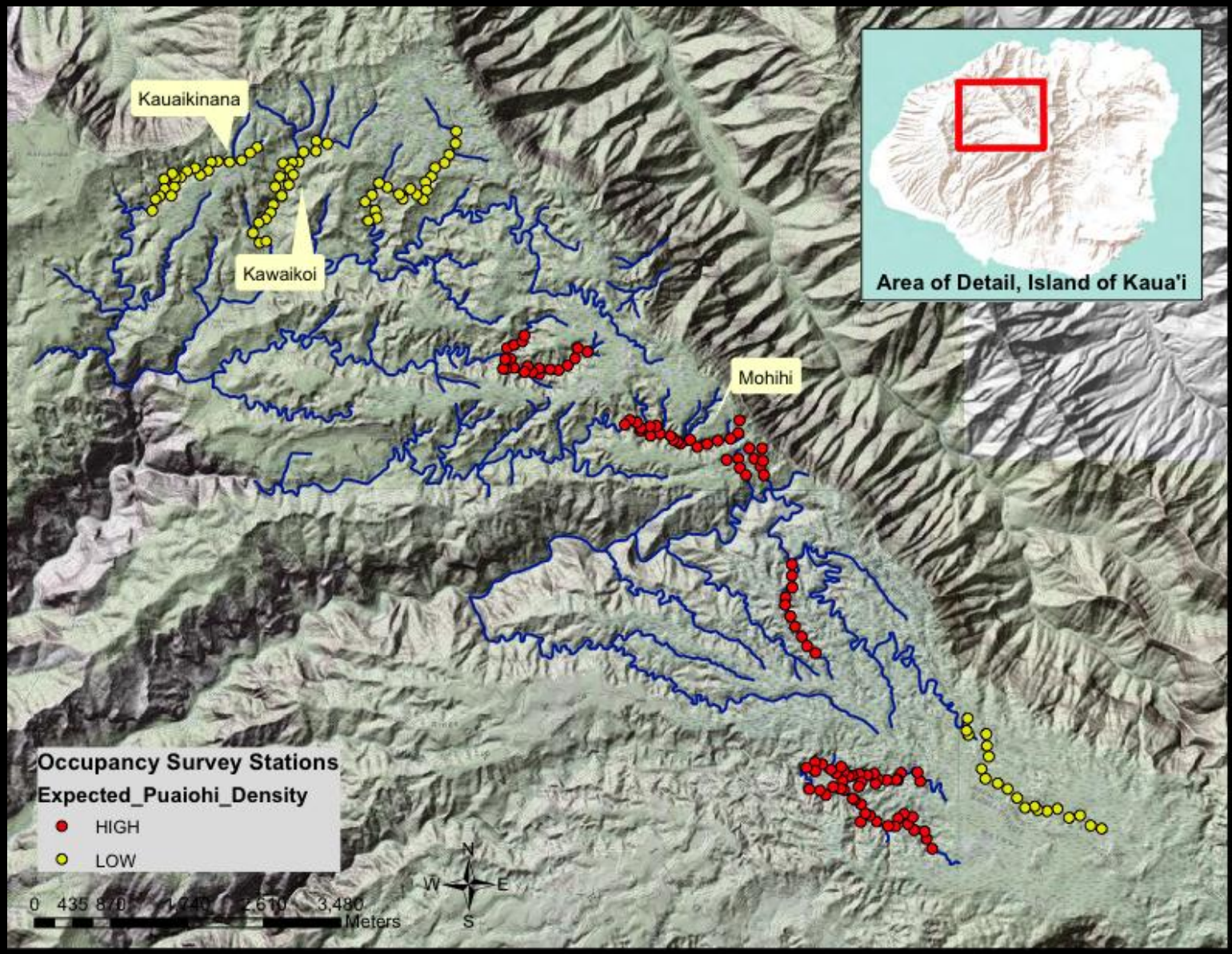
More visuals:



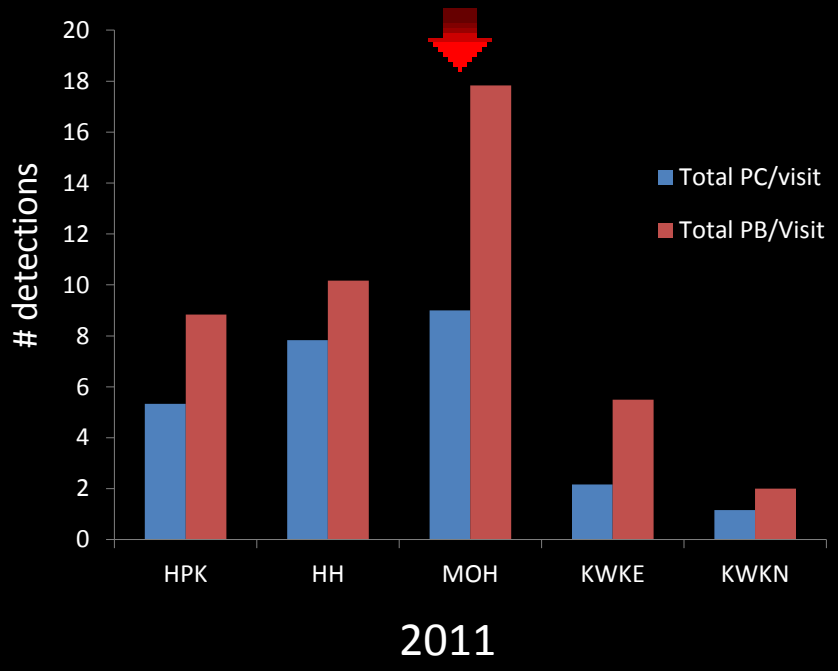
Occupancy Surveys – v2.0

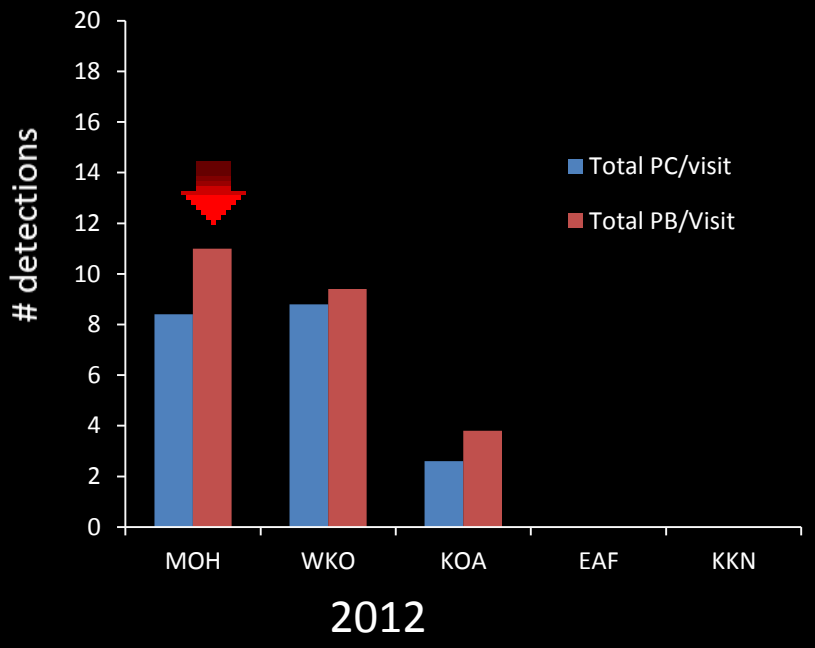
- Revisited: # visits/station, PB vs. counts, duration of PB and counts, # stations
- # visits/station decreased from 6 to 5
- # observers restricted and well distributed
- Avoid noisy sections
- Resurvey 1 high density stream
- Randomly select other streams
  - 2 high, 2 low

Streams Surveyed To Date



2011 vs. 2012 Comparison

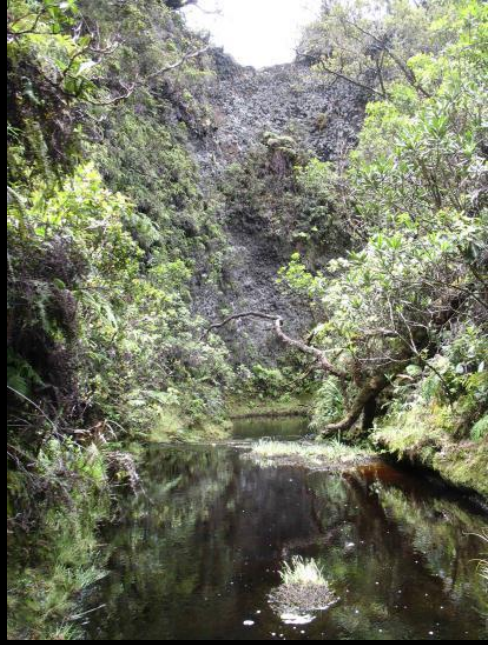




- In 2012, playback contributed only 54% (vs. 64%) of detections
  - Most decline in audio (50% vs. 59%)

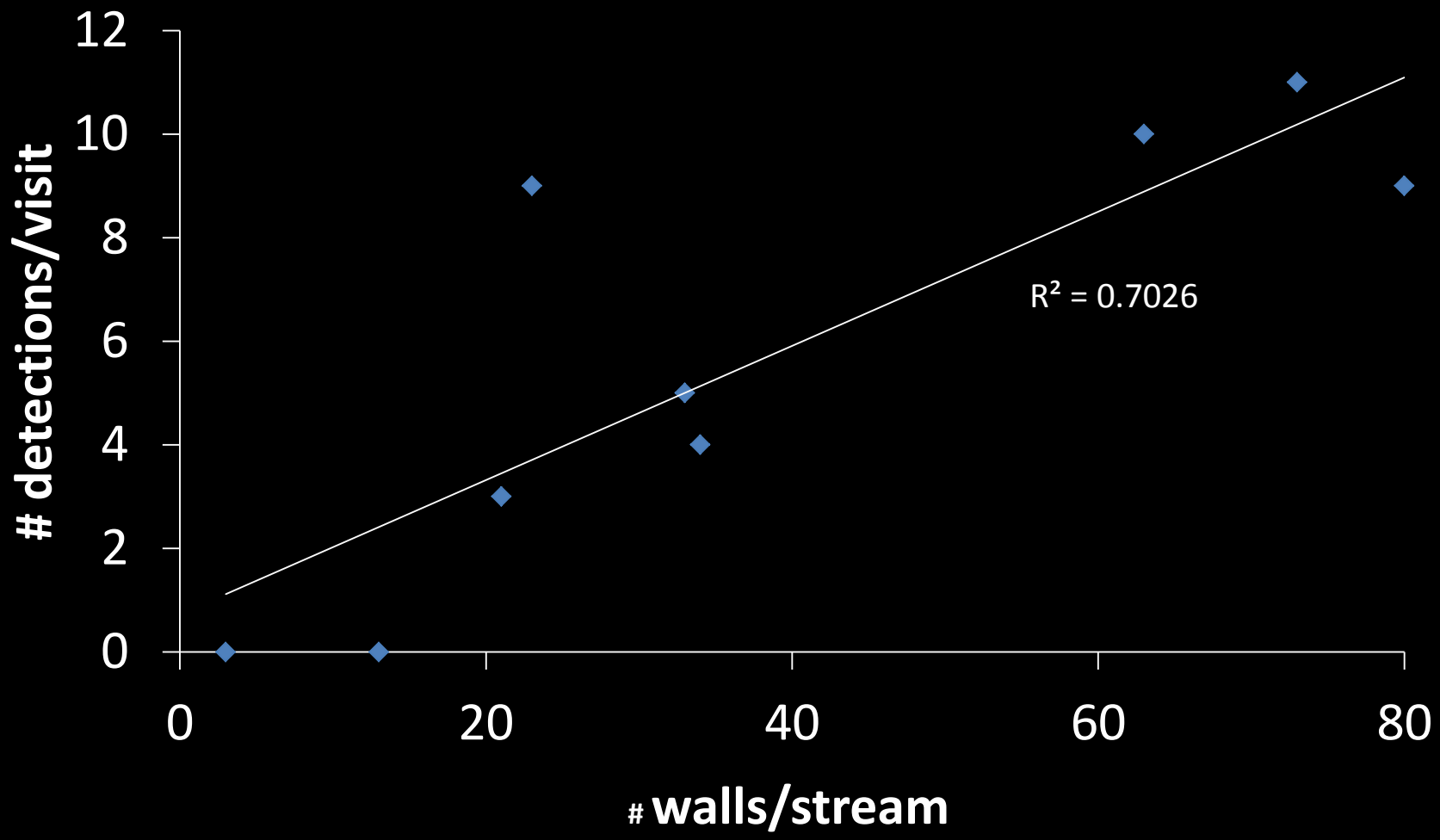
- Fewer detections at Mohihi , especially after playback
  - Real or habituation?

Habitat Data



- Mapped location of all cliff walls
- Measured slope of bank at stations
- Other data TBD:
  - Vegetation structure or composition (fruit trees?)
  - Wall/bank height
  - Ideas? ☺

Walls and Detections



Conclusions to Date

- Protocol still needs refinement
  - Playback helps, especially visuals and in 2011
    - Habituation? Add new playback tracks
  - Protocol time consuming

- Occupancy on surveyed streams varies widely
  - Cliffs?

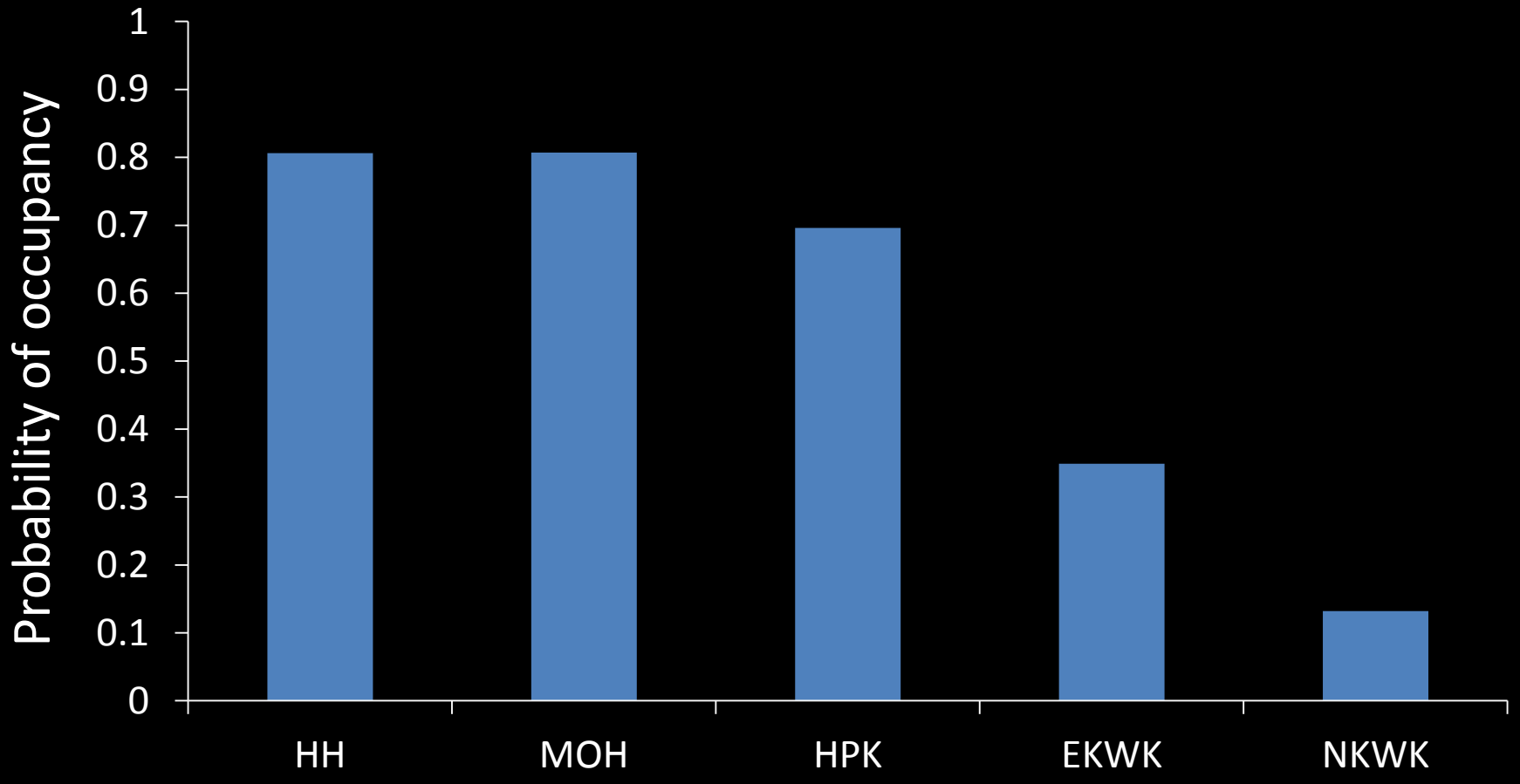
What's next?

- Survey ≥ 2 more streams + Mohihi ; collect habitat data
  - Examine possibility of habituation
- Analyze correlations between occupancy and habitat
- Use occupancy + habitat info + territory size to estimate density by habitat stratum
- Use remote sensing or scouting to identify potential habitat by stratum
- Extrapolate density to range

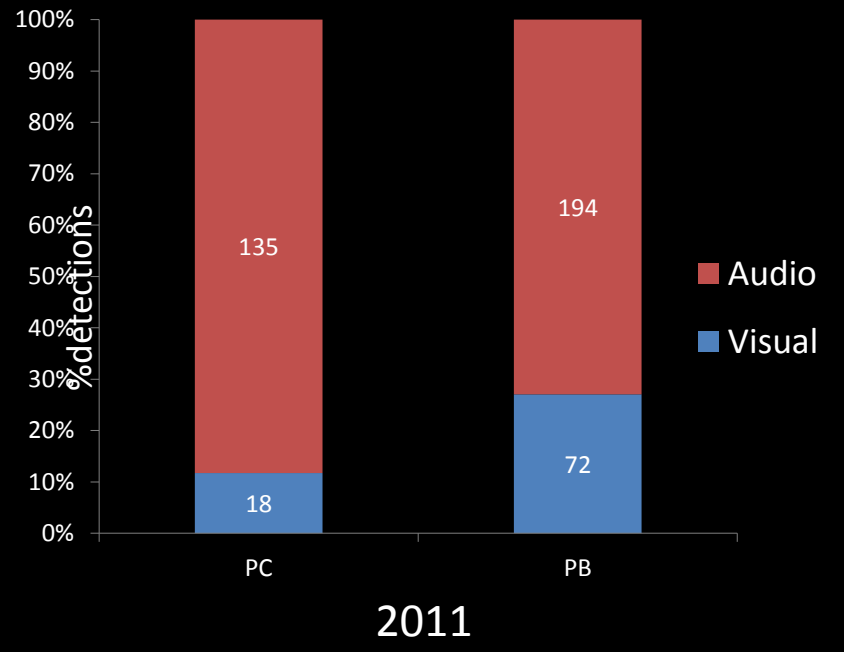
Mahalo!

- UH Hilo HI Cooperative Studies
- HI Div. of Forestry and Wildlife
- US Fish and Wildlife Service
- E. Vanderwerf
- KFBRP staff and field crews, especially T. Savre, P. Roberts, L. Behnke, and L. Solomon

Occupancy by Stream



Effect of Playback Comparison



- 63% of detections from playback in 2011; 53% in 2012
- Increases visual detections
- Only increases audio in 2011

Modeling Approach

- With: Occupancy Data + Habitat Info + Territory Size + > 1 Survey Station / Territory

  We can estimate: Density by stratum

- Use remote sensing or scouting to identify potential Habitat by stratum

- Extrapolate density to range