

VHF Radio Telemetry Case Studies

Micronesian Kingfisher
Tuamotu Kingfisher
Red-cockaded Woodpecker
Black-backed Woodpecker
Greater Prairie Chicken

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Major Considerations

Study Design, Challenges, and Technology

- Study objectives
- Bird behavior
- Bird morphology
- Technology selections

Pacific Island Kingfishers

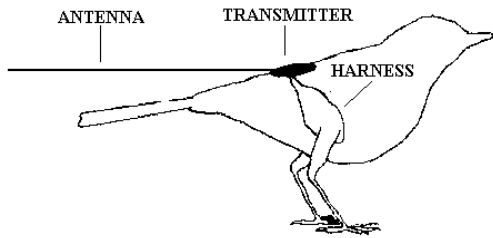


- *Todiramphus cinnamominus*
- *Todiramphus gambieri*
 - Geographic location
 - Small islands of Pohnpei and Niau
 - Island forest, coconut, and agroforest
 - Natural History and Conservation
 - Endangered
 - Cavity nest
 - Territorial species
 - “Pounce” on prey
 - Few predators
 - Morphology
 - ~65g (*T. c.*) ~42g (*T. g.*)
 - Kingfisher
 - Strong legs
 - Annual molt(?)

Kingfisher Investigation

- Objectives
 - Conservation
 - Territoriality
 - Dispersal
 - Resource influence on movement
 - Social influence on movement
- Technology considerations
 - Short distance detections
 - Good access to area
 - Medium and small birds





Telemetry Solution

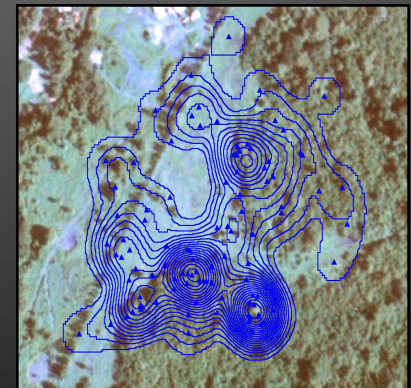
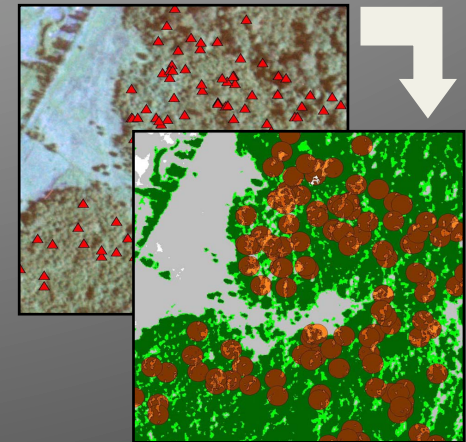
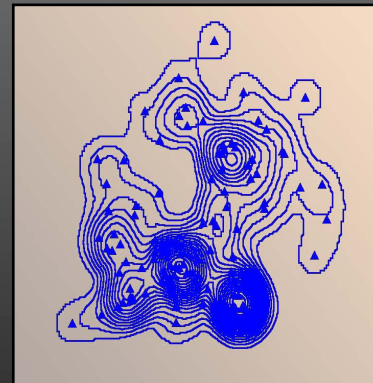
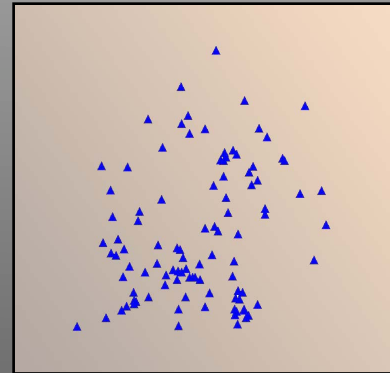
- Leg-loop harness
 - Long retention
 - Central weight
- Weak link system
 - Endangered
 - Jettison after radio failure
- Equipment
 - Holohill BD2 (~2.2 g) and PD2 (~1.6 g)
 - 3.3% and 3.8% body weight
 - Low power
- Sampling!
 - Search until find birds



Kingfisher Resource Use

Movement and Resources

- Movement
 - Daily radio telemetry
 - Home range
 - Proportional coverage
- Resource Map
 - Visual spectrum aerial photographs
 - ERDAS imagine
 - Habitat coverage

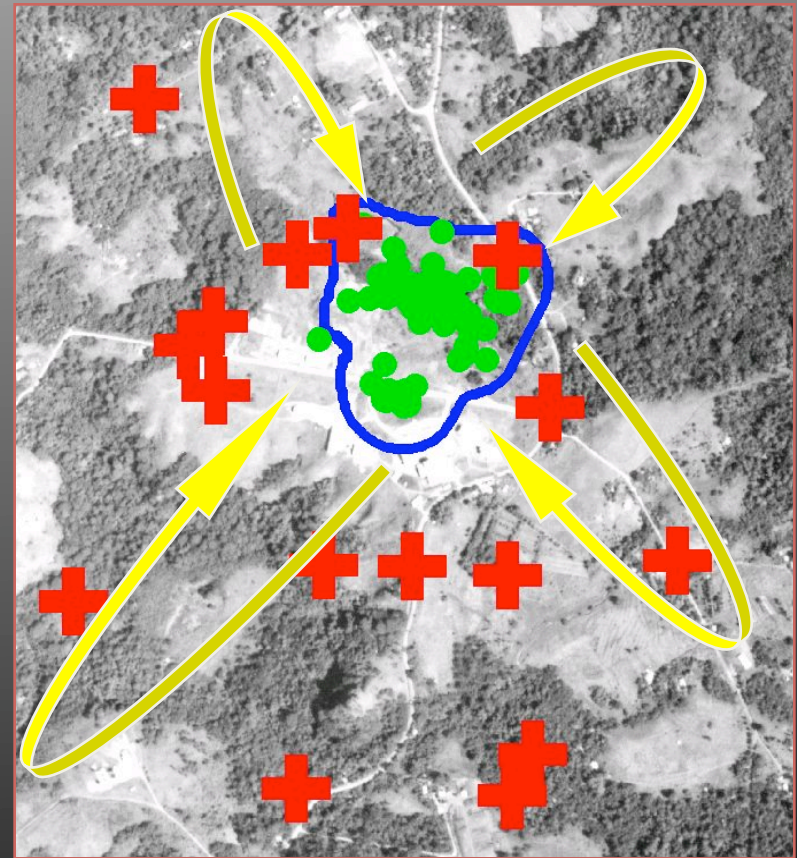


Kingfisher Dispersal



Prospecting Behavior

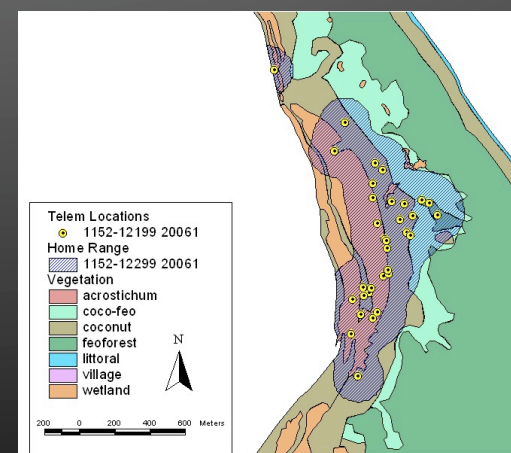
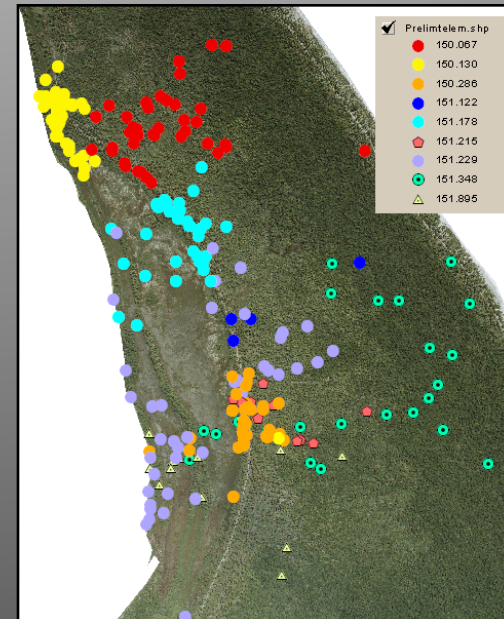
- Deliberate forays off territory and back
- Interaction with neighboring birds
- Covert reproduction
- Repeated homesteading movements



Tuamotu Kingfisher

Information to Establish Second Population (in progress)

- Territorial species
- Home range ~6 ha
- Forest resources
- Edge habitat is important
- Dispersal within 2 km.



Red-cockaded Woodpecker

Picoides borealis

- **Geographic location**
 - Southeastern U.S.
 - Eastern *Pinus* spp. forests
- **Natural History**
 - Pine woodpecker
 - Picks prey from trees
 - Territorial species
 - Family groups
 - Cavity nester
 - Resin
 - Hole size
- **Morphology**
 - ~42g
 - Small *Picoides* woodpecker
 - Tree climbing
 - Strong retraces



Red-cockaded Woodpecker

- Objectives
 - Dispersal
 - Resource influence on movement
 - Social influence on movement
- Challenges
 - Cavity nest
 - Long distance detections
 - Fast movements
 - Small birds



Telemetry Solution

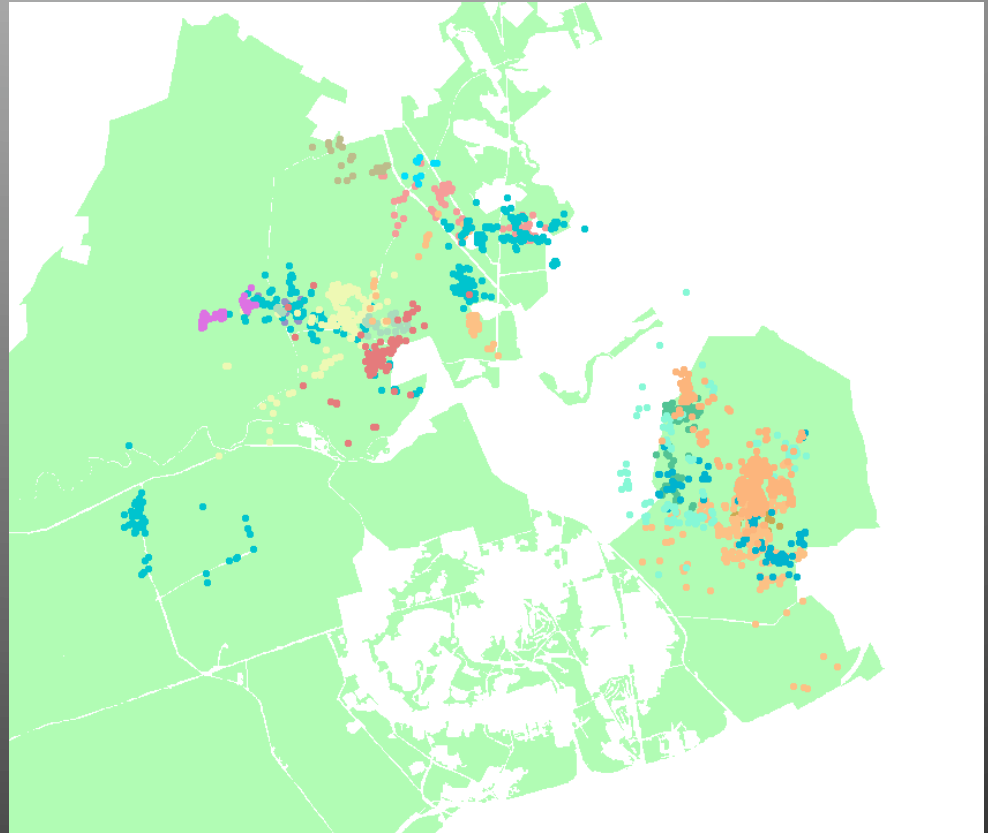
- Tail-mount
 - Short retention
 - No risk of cavity entrance problems
 - Strong woodpecker tail
- Equipment
 - Holohill PD2 (~2g)
 - Tail-mount
 - 3.8 % body weight
 - High power, shorter life
- Sampling
 - Search until find birds
 - Spiral searches
 - Landscape access



Red-cockaded Woodpecker

Prospecting statistics

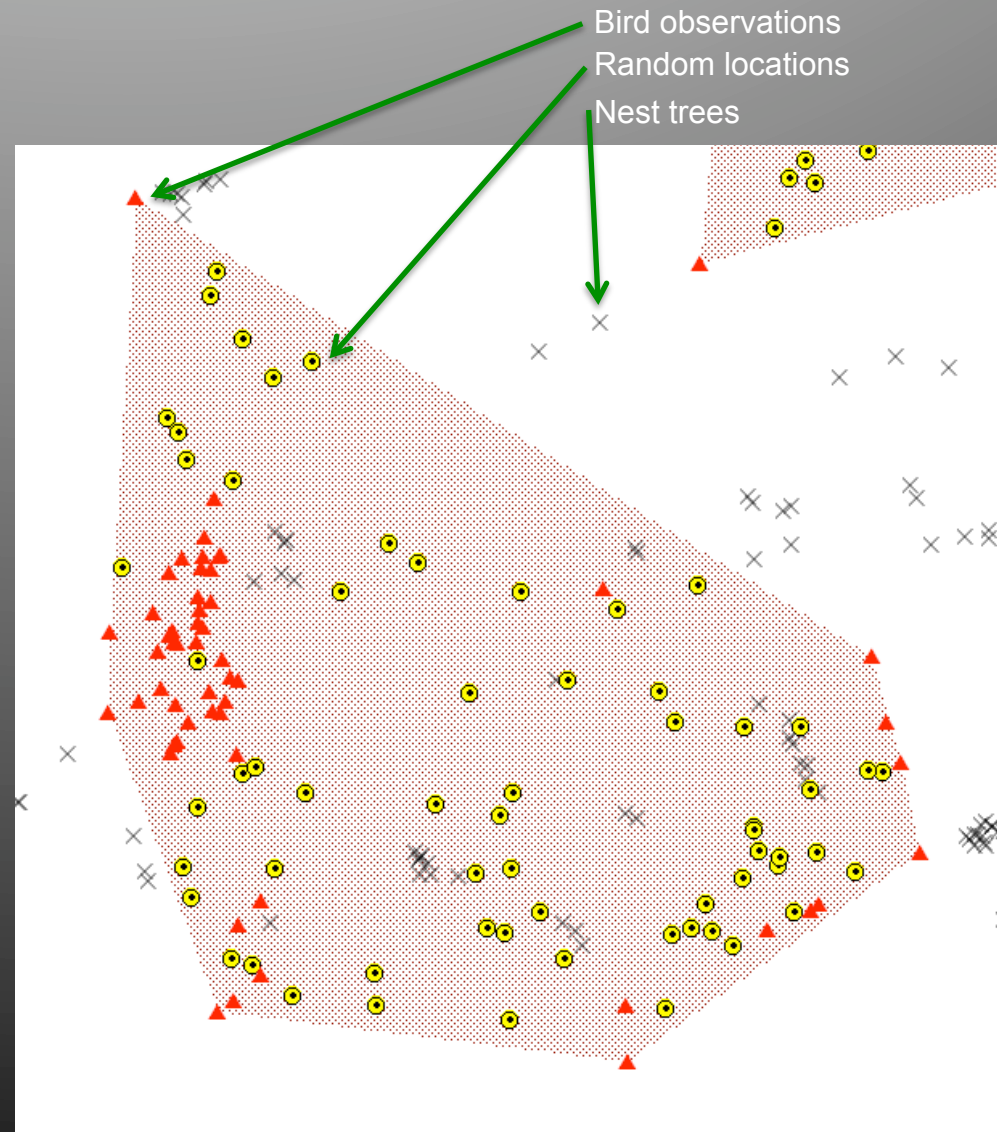
1. Prospecting area
mean MCP = 416 ha.
2. Territory visits
mean = 4.3.
3. Prospecting distance
daily max = 2.03 km.
4. Dispersal distances
similar to
prospecting.



Red-cockaded Woodpecker

Factors influencing movement (obs. vs. rand.).

1. Is movement random?
 - Direction not random.
 - Distance not random.
2. Is movement associated with forest?
3. Is movement associated with nesting resources?
 - Prospecting birds near nest trees.



Black-backed Woodpecker

Picoides arcticus



- Geographic location
 - Mountain U.S. and Canada
 - *Pinus* spp. Forests
 - Burned forests
 - Insect compromised forest
- Natural History
 - Pine woodpecker
 - Territorial species
 - Pairs
 - Cavity nest
- Morphology
 - ~60-80g
 - Large *Picoides* woodpecker
 - Tree climbing
 - Strong retricies
 - Strong legs

Black-backed Woodpecker Investigation

- Objectives
 - Use of burned habitat
 - Use of Insect infestations
 - Dispersal
- Challenges
 - Cavity nest
 - Long movements
 - Study area access
 - Topography inhibiting telemetry



Telemetry Solution

- Leg-loop harness
 - Long retention
 - Apparently! No risk of cavity entrance problems
 - Strong woodpecker leg musculature
- Design
 - ATS 1060 (~2.7g)
 - 3.6% body weight
 - Leg-loop harness
 - High power radios
- Sampling
 - Flight survey
 - Ground survey



Greater Prairie Chicken

Tympanuchus cupido

- Geographic location
 - Central U.S.
 - Prairie grasslands
- Natural History
 - Open prairie species
 - Lekking species
 - Long movements
 - Forages on ground
 - Ground nester
- Morphology
 - ~700-1200g
 - Galliform/grouse figure
 - Males display with wings out
 - Large frontal crop



Greater Prairie Chicken

- Objectives
 - Dispersal
 - Resource influence on movement
 - Translocation settlement
 - Demography



Telemetry Solution

- Necklace mount
 - Long retention
 - Elevated antenna
 - Crop-weighting
- Design
 - ATS Radios Neck harness ~20g
 - 2.5% body weight
 - Very high power
 - 1.5 year battery life
- Sampling
 - Search vehicles
 - Computerized real-time triangulation
 - Flight surveys



Photo by Noppadol Paothong



Major Considerations

- Study requirements
 - Resource use
 - Prospecting
 - Dispersal
 - Demography
- Technology restrictions
 - Radio package size
 - Radio transmission power
 - Radio attachment
- Bird behavior
 - Flight requirements
 - Display requirements
 - Movement distances
 - Nesting and foraging locations
- Bird morphology
 - Bird size
 - Body shape



Photo by Noppadol Paothong