Parental Investment at the Nest in Wild Maui Parrotbill (*Pseudonestor xanthophrys*): Implications for Captive Propagation and Recovery Efforts

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Maui Parrotbill

(*Pseudonestor xanthophrys*)

- Critically Endangered
- Long term monogamy between pairs
- Insectivorous
- Clutch size of 1
- Juvenile dependency of 5-17 months

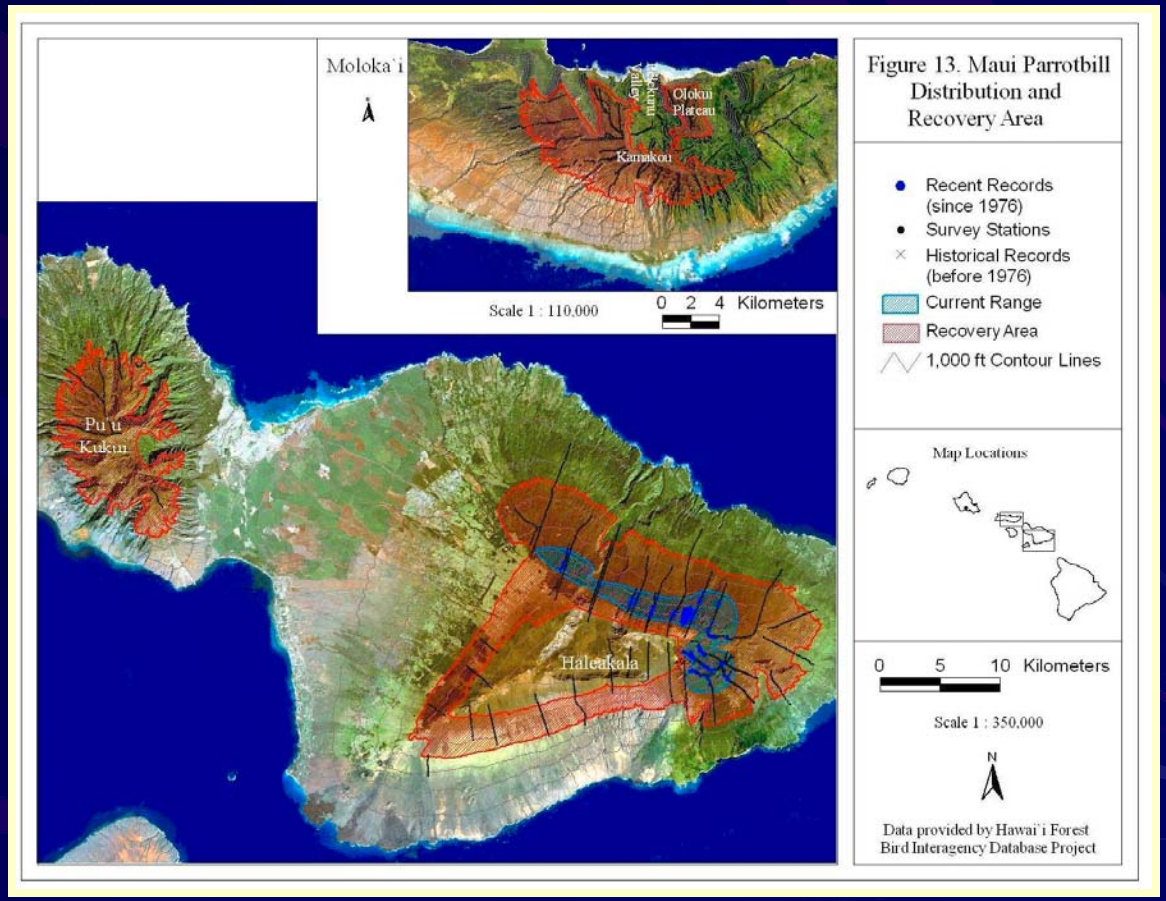
Maui Parrotbill Population and Range

Population estimate:

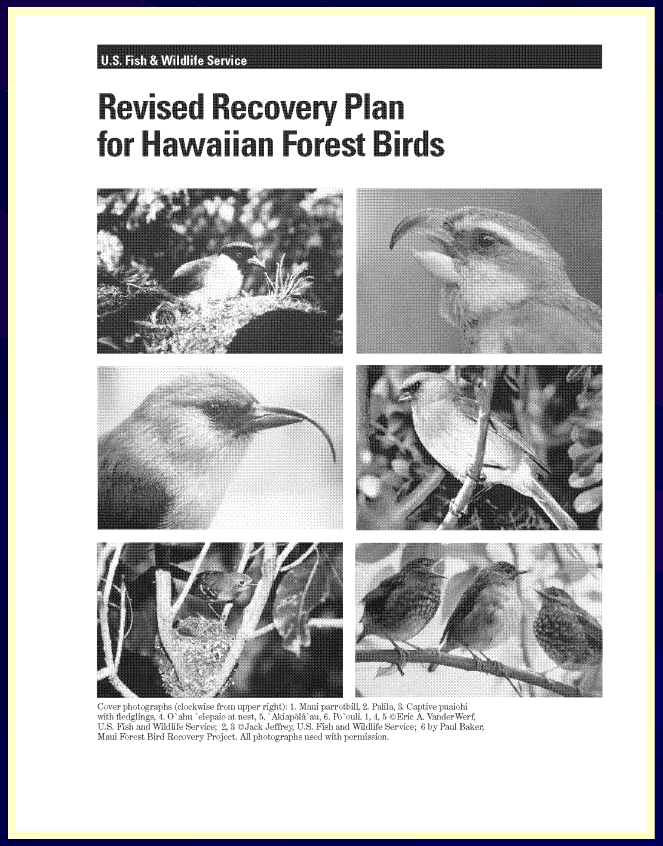
502 ± 116 [1980]

Area of Occupancy:

1 population in 50 km2



Recovery Strategy


U.S. Fish & Wildlife Service

Revised Recovery Plan
for Hawaiian Forest Birds

Cover photographs (clockwise from upper right): 1. Maui parrotbill, 2. Palila, 3. Captive puaiohi with fledglings, 4. O`ahu `elepaio at nest, 5. `Akiapōlā`au, 6. Po`ouli. 1, 4, 5 ©Eric A. VanderWerf, U.S. Fish and Wildlife Service; 2, 3 ©Jack Jeffrey, U.S. Fish and Wildlife Service; 6 by Paul Baker, Maui Forest Bird Recovery Project. All photographs used with permission.

- Forest restoration
- Protection and management
- Research on disease and predation threats
- Captive propagation

Re-establishment of a second population on leeward Haleakala (2012?)

Possible Known Population Limitations Include…

- Restriction to suboptimal habitat by disease
- Low Fecundity
- Small population size
- Predation
- Severe weather
- Egg inviability

Parental Investment???

Why Study Wild Behaviors?

Complex social and foraging behavior

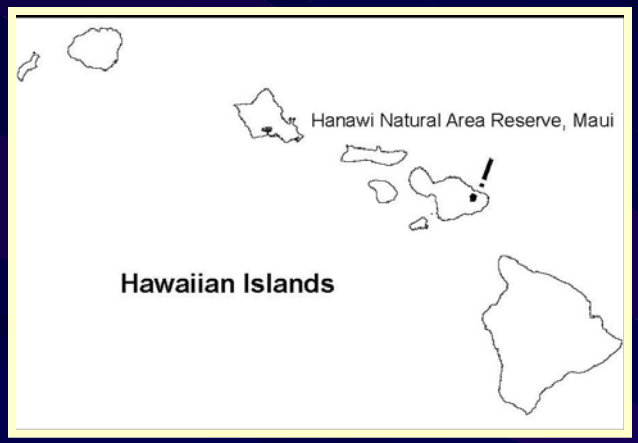
In order to develop and implement recovery techniques

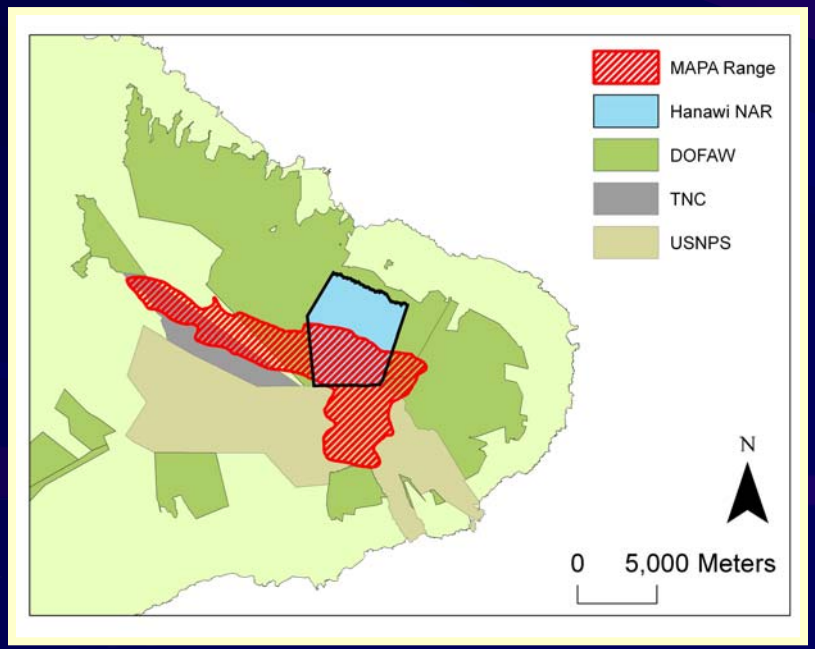
Nest Studies

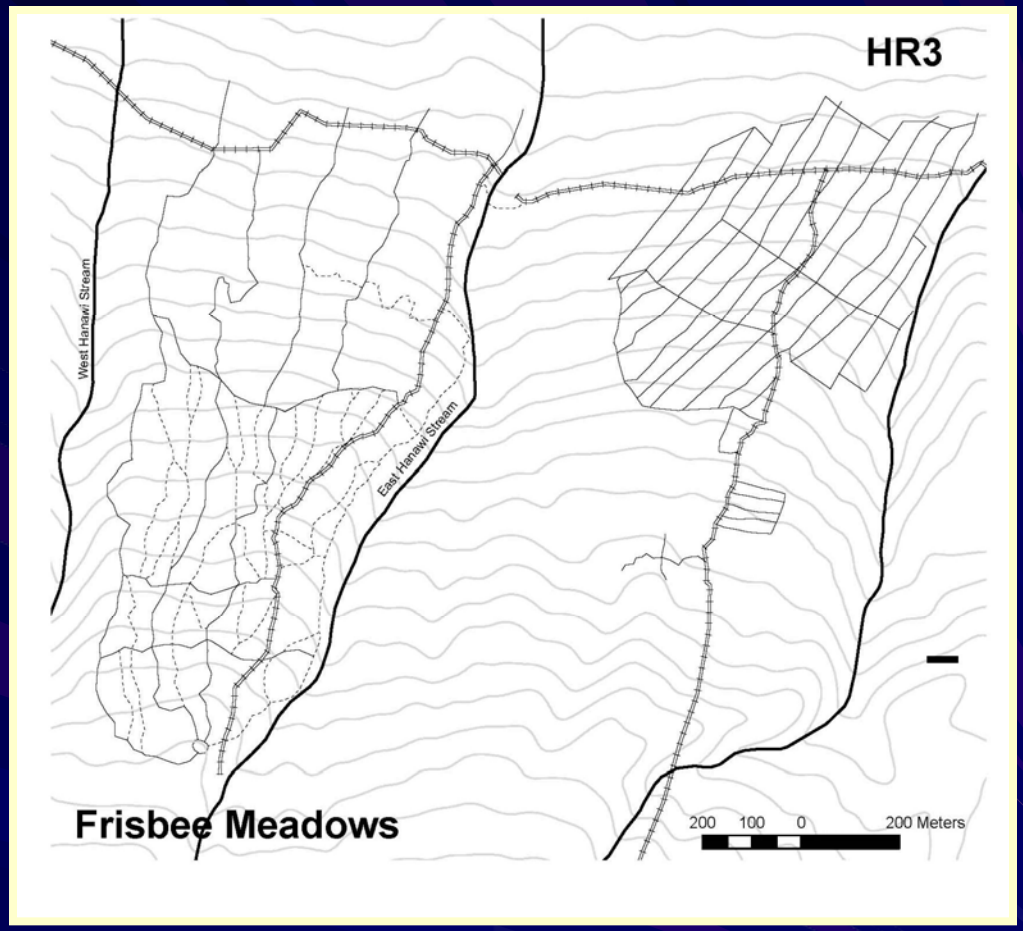
2006-2008

- What are the major factors limiting nest success?
- Does parental behavior predict nest success or failure?

Study Area



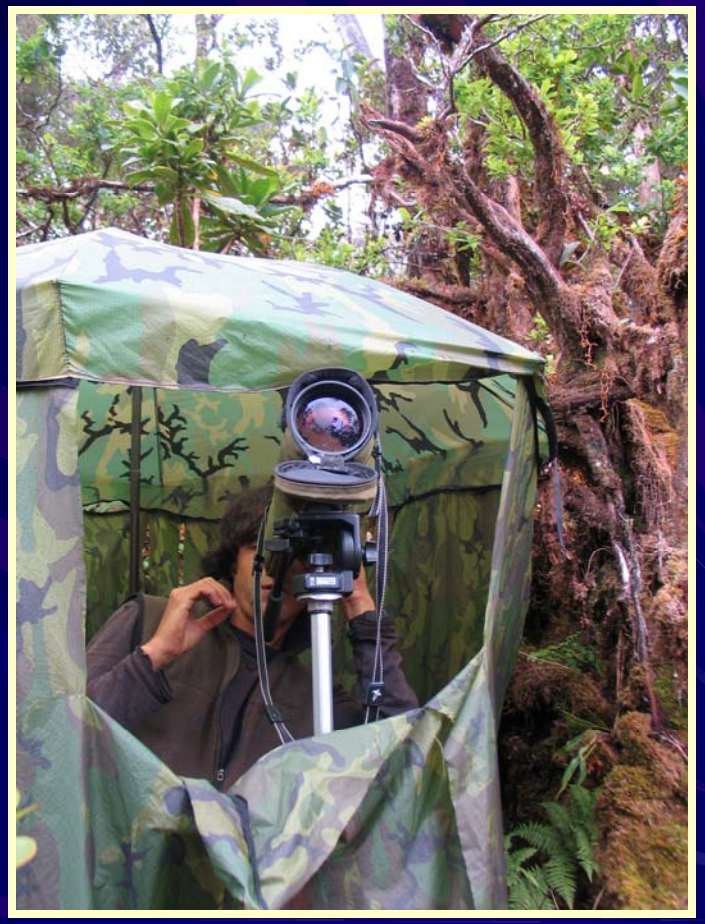




- Frisbee Meadows (FSB) ~70 ha without predator control
- HR3 ~35 ha with predator control

Methods

- Nests located January-May
- Monitored 3 hours/day
  0600-1800
- Data included:
  - Weather
  - Female time spent on or near nest
  - Time spent away from nest
  - Male provisioning rates
  - Frequency of male vocalizations



If Parental Behavior Indeed Predicts Nest Success or Failure….

- We predicted the following all to be lower at failed nests:
  - Time spent on nest by female
  - Provisioning visit rates by the male
  - Combined parental feeding rates
  - Vocalizations by male (male attentiveness)

Nest Fate Results

- 17 nests found
  - 5 – no egg laid
  - 5 – failed during incubation
  - 3 – failed when chick was less than 1wk
  - 4 nests produced a fledgling

- 2 eggs were confirmed as never hatching and 2 were depredated* at chick and egg stage

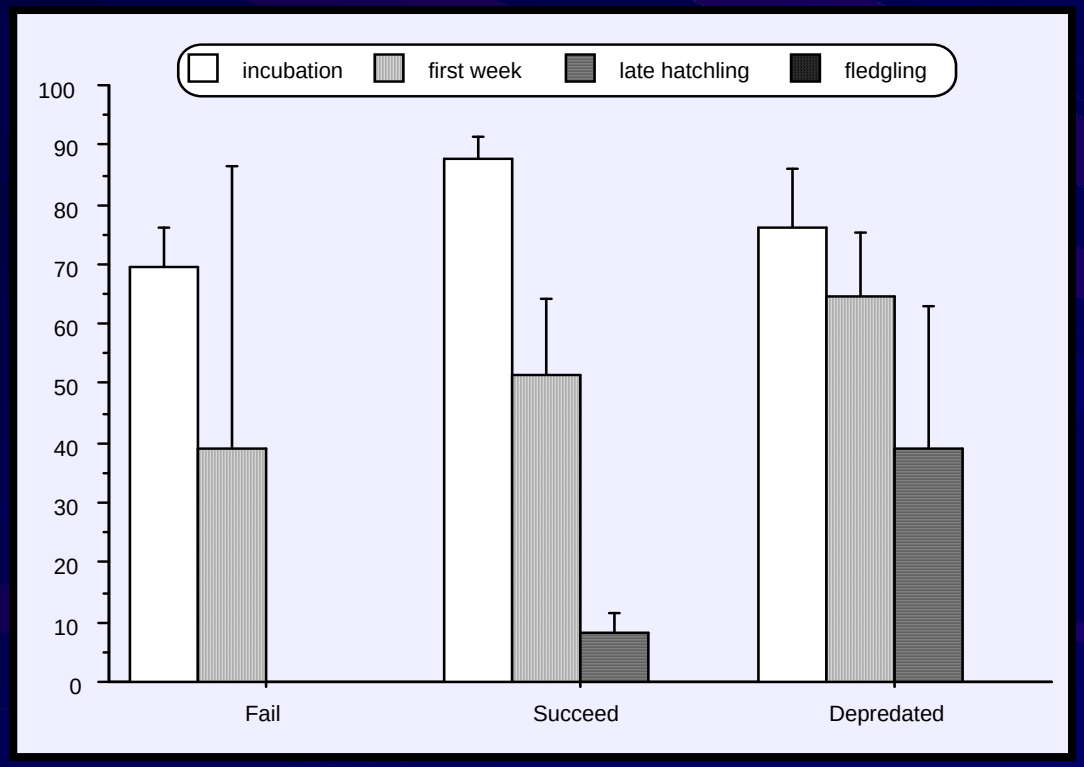
* Pueo confirmed at one depredated nest; rat suspected as predator of other one

Significant Variables

1) Female Investment During Incubation

($ANOVA_{2,105}$ F=4.7, p=0.011)

Failed nests received less incubation (t=2.9, d.f.=96, p=0.004)



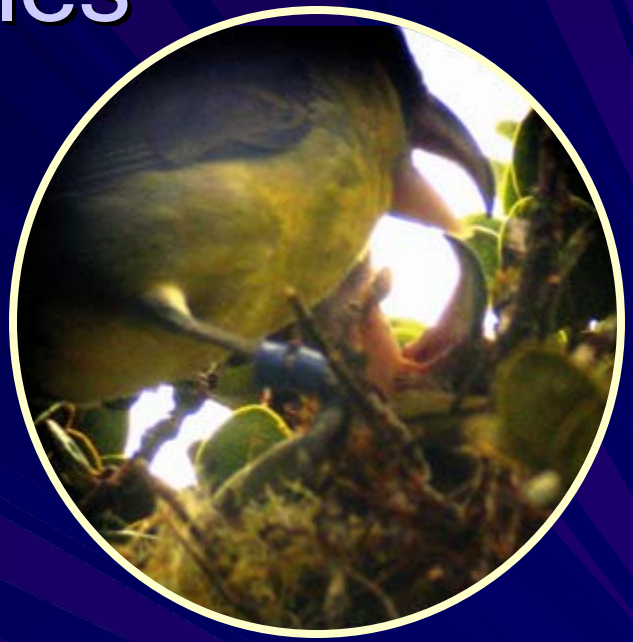
2) Parental Feeding of Chicks

($ANOVA_{2,98}$ F=5.67, p<0.005)

Failed nests received lower feeding rates of chick during week 1

(Fisher's PLSD, p<0.001)

Non-significant Variables

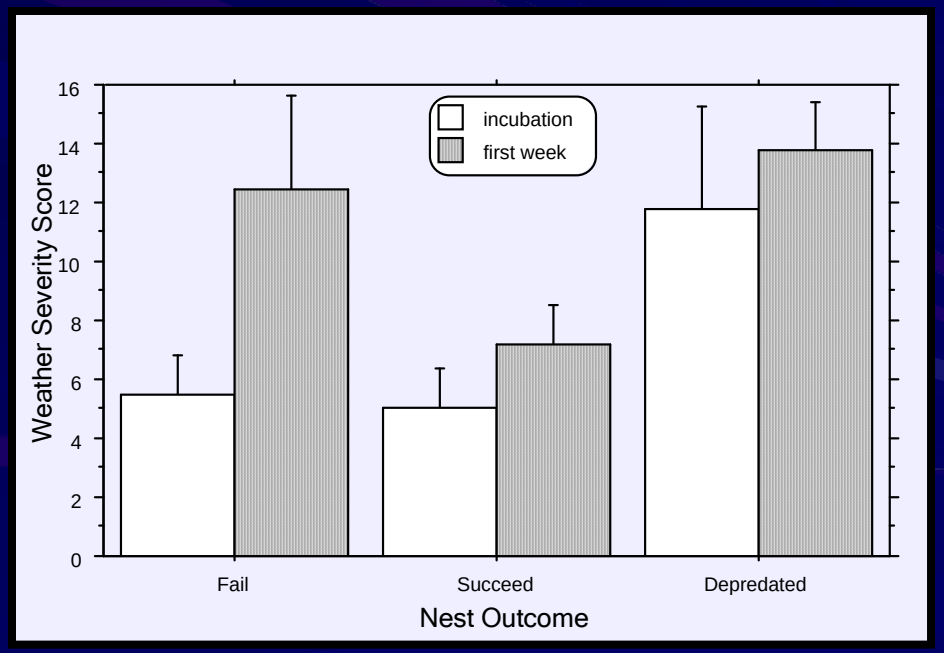


- No difference in provision rates between successful and failed nests
  - Meal quality?

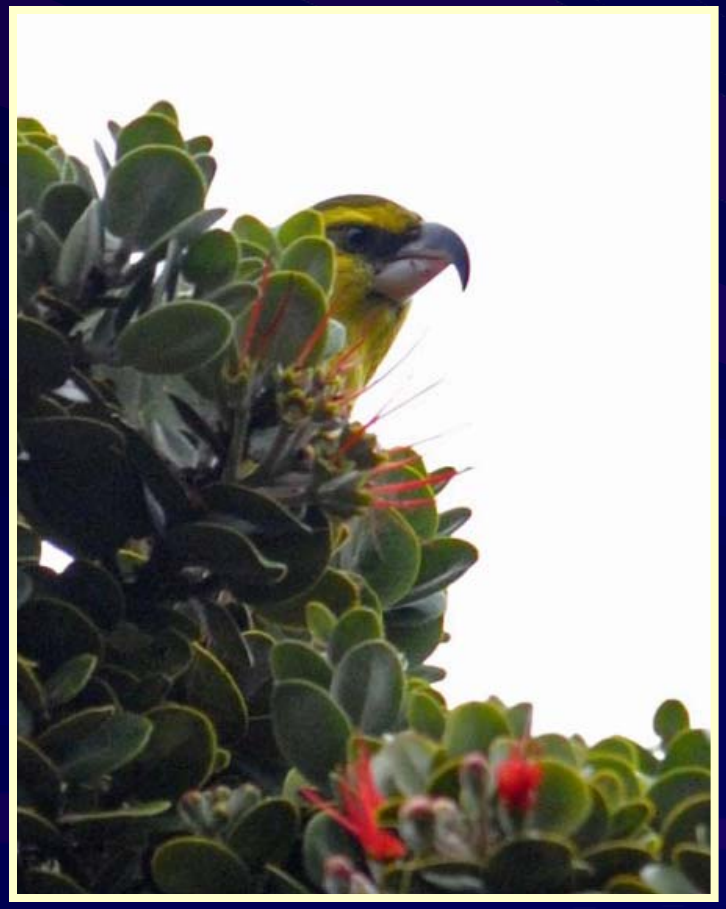
- No difference in male song rates
  - Song function?

Hanawi Weather

- Weather severity significant for early chick mortalities
- Early nests had a higher failure rate than later in the year when the weather improves



Conclusions



- Possible to collect eggs or chicks under 1 week of age without population effects
- Not a reliable recovery option because of logistics and safety issues
- Prompted 2 areas in need of future research

Future Research

1) Supplemental Feeding

2) Genetic Variation

2/7 (28.5%) egg inviability

Great Thanks to…

- DLNR/Division of Forestry & Wildlife
- Natural Area Reserve System
- US Fish & Wildlife Service
- Pacific Cooperative Studies Unit
- Pacific Helicopters
- Windward Aviation
- Haleakala National Park
- Haleakala Ranch
- MFBRP Field Teams