ESRC Annual HCP Review
Kahuku Wind Power and Kaheawa Wind Power I
Observed and Estimated Take (thru FY2019Q2)

- **Hawaiian hoary bat**
  - 2018 observed take: 0
  - Total observed take: 4
  - FY 2019 Q1-Q2 observed take: 0

  Estimated direct take: 9
  Estimated indirect take: 1.5
  Total estimated take: 12

  Tier 1 take: 15; Tier 2 take 8
  Total permitted take: 23
  Projected total estimated take: 28
Kahuku Wind Power

Permit Term Take Estimate

Take Estimate ($M^*$)

Hypothetical Observed Take

- $M^*$ (g = 0.53)
- $M^*$ (g = 0.35)
Take Estimation/Downed Wildlife Monitoring (only FY2018)

› **Hawaiian hoary bat**
  › SEEF: **92.6%**
  › CARE: Mean **13.4 days** (SD 11.4 days)
  › DWP: **70%**
  › Detection Probability: **53.5 %**

› **Seabirds: Hawaiian petrel, Newell’s shearwater; Waterbirds: Hawaiian stilt, moorhen, coot, duck**
  › SEEF: **100%**
  › CARE: Mean **28.0 days** (SD 0 days)
  › DWP: **36%**
  › Detection Probability: **34.4%**
Kahuku Wind Power

Bat Activity (Nights with Detections)
Mitigation

› **Hawaiian hoary bat**
  › Tier 1 (15 bats): complete. DOFAW Kahikinui FR restoration
  › Tier 2 (8 bats): USGS bat research project (3 bats) complete in 2021
    › TBD: (5 bats)

› **Seabirds: Hawaiian petrel, Newell’s shearwater**
  › Tier 1: complete. KESRP Kauai seabird colony assessment and predator control on Kauai and Lehua Island

› **Waterbirds: Hawaiian stilt, moorhen, coot, duck**
  › Tier 1: complete. DOFAW Hamakua Marsh predator control
Observed and Estimated Take (thru FY2019Q2)

- Hawaiian hoary bat
  - 2018 observed take: 1
  - Total observed take: 8 (3 incidental)
  - FY 2019 Q1-Q2 observed take: 1

  Estimated direct take: 26
  Estimated indirect take: 2.8
  Total estimated take: 29

  Tier 1 take: 20; Tier 2 take: 30
  Total permitted take: 50
  Projected total estimated take: 43
Observed and Estimated Take (*thru FY2019Q2*)

- **Seabirds**: Hawaiian petrel, Newell’s shearwater
  - 2018 observed take: 0
  - Total observed take: 6 HAPE (1 incidental), 0 NESH
  - FY 2019 Q1-Q2 observed take: 0

**Hawaiian petrel**:
- Estimated direct take: 12
- Estimated indirect take: 2.6
- Total estimated take: 15

- Tier 1 take: 25; Tier 2 take: 13
- Total permitted take: 38
- Projected total estimated take: 23
Observed and Estimated Take (*thru FY2019Q2*)

- **Hawaiian goose:**
  - 2018 observed take: 1 (4 goslings)
  - Total observed take: 23 (1 incidental outside search area, 5 goslings)
  - FY 2019 Q1-Q2 observed take: 0

- Estimated direct take: 37
- Estimated indirect take: 1.2
- Total estimated take: 39

- Tier 1 take: 60; Tier 2 take: 40;
- Total permitted take: 60 (100 w/minor amend)
- Projected total estimated take: 58
Kaheawa Wind Power I

Take Estimation/Downed Wildlife Monitoring (only FY2018)

› Hawaiian hoary bat
  › SEEF: 95.4%
  › CARE: Mean 14.9 days (SD 11.3 days)
  › DWP: 57.3%, Detection Probability: 45.9%

› Seabirds: Hawaiian petrel, Newell’s shearwater;
  › SEEF: 100%
  › CARE: Mean 28 days (SD 0 days)
  › DWP: 25.6%, Detection Probability: 25.1%

› Hawaiian goose
  › SEEF: 100%
  › CARE: Mean 28 days (SD 0 days)
  › DWP: 38.2%, Detection Probability: 37.9%
Kaheawa Wind Power I

Bat Activity (Nights with Detections)
Mitigation

› **Hawaiian hoary bat**
  › Tier 1 *(20 bats)*: complete. USGS radio tracking study
  › Tier 2 *(30 bats)*: ongoing. HTHarvey Ecological Consultants: Maui research *(15 bats)*, USGS Hawaii research *(1.7 bats)*
    › Complete in 2021: USGS Hawaii research *(13.3 bats)*

› **Seabirds: Hawaiian petrel, Newell’s shearwater**
  › Tier 1 *(25 HAPE, 4 NESH)*: Ongoing. Makamaka’ole colony protection *(0 fledglings accrued)*
    › Ongoing: Lanai colony protection *(39 HAPE fledglings accrued)*

› **Hawaiian goose:**
  › Tier 1 *(60 nēnē)*: Ongoing. DOFAW Haleakala Ranch pen predator control *(50 fledglings accrued 2011-2018)*
Mitigation

› **Seabirds: Hawaiian petrel (HAPE), Newell’s shearwater (NESH)**
› Makamaka’ole seabird colony protection:
  › **NESH only on game cameras in 2018** (no HAPE).
  › HAPE and NESH flyovers continue.
  › BUPE on game cameras (into December).
  › **Three NESH eggs observed** (two collected, third photographed not found, egg fragments in fourth) in repeat burrows.
  › A: 5 burrows visited with photos, 4 burrows visited no photos.
  › B: 4 burrows and 1 natural area visited with photos, 3 burrows no photos.
  › 5 or 8 rats and 3 or 11 mice in both enclosures
  › No mongoose inside, many mongoose and rat outside
  › One barn owl shot believed to be injured but not collected
  › Erosion and rusting continue to require ongoing attention
# Kaheawa Wind Power I

## Enclosure A (calendar year)

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¹ collected

² NESH with egg "stuck" to brood patch (not collected)
| Spec. Code | NS | BP | HP | NS | BP | NS | BP | NS | HP | NS | BP | NS | BP | NS | BP | NS | BP | NS | BP | NS | BP |
|------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Mon.       |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Mar        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Apr        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| May        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Jun        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Jul        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Aug        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Sep        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Oct        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Nov        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Dec        |     |     |    |    |     |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |    |
| Total      | 42 (2) | 5 (1 BP Egg) | 9 | 89 (31) | 1 | 3 | 1 | 23 (1 NS Egg) | 11 | 25 | 14 | 13 | 1 | 2 | 5 | 3 | 89 | 25 | 14 | 13 | 1 | 2 | 5 | 3 |

Photo Nights ("()" = Nights with 2 NESH), Egg = collected
Mitigation

› **Seabirds: Hawaiian petrel, Newell’s shearwater (cont.)**
› 2019: contracted HT Harvey Ecological Consultants
  › Change gravel in burrows to smooth pebbles, add more litter/soil
  › More intensive owl control efforts
  › Change call broadcast types and patterns to mimic seasonal changes
  › Search inside and outside enclosures for extraneous nesting or predation
Mitigation Issues

› **Hawaiian hoary bat**
  › No current issues (Tier 2 complete by 2021 with HTHarvey and USGS research projects)

› **Seabirds: Hawaiian petrel, Newell’s shearwater**
  › Fulfill any HCP requirements for West Maui only mitigation
  › Additional 41 HAPE fledglings required
  › Lanai HAPE colony protection- project ongoing
    › Ensure state/federal access allowed
    › Ensure mitigation secure for years needed
Mitigation Issues (cont,)

› Makamaka’ole colony protection
  › Discontinue focus on HAPE or adaptive management for success; focus only on NESH
  › Reduce NESH permitted take to 2 to 4 total (combine both projects) with minor amendment
    › Total fledglings then required: 7 to 13
› Other NESH alternatives
  › Other contributors or sponsors
  › Take over by other sponsor
Mitigation Issues

- **Hawaiian goose:**
  - 7 years remain on permit to accrue 73 fledglings (~10 fledglings/year)
  - Current accrued annual average at Haleakala Ranch pen (6.25/year, range 1 to 14/year)
  - 2018: 1 fledgling produced (2017: 14 fledglings produced)
  - KWP II Pi‘iholo Ranch pen may not be viable
Mitigation Issues

› Hawaiian goose (cont.):
  › Combine KWP I and KWP II at Haleakala Ranch
  › Enlarge pen or additional pen elsewhere
  › TERP direct contract through RFP to ensure best results and consistent oversight
  › ~$65,000 remains from initial KWP I funding
  › DOT emergency translocation funding supported pen management 2011-2017