Kaua'i Island Utility Cooperative (KIUC) HCP

December 8, 2022

David Zippin, Ph.D., ICF
HCP Project Director

HCP Consultant Team Here Today

Joule Group

- Dawn Huff, Program Manager

ICF

- David Zippin, PhD, Project Director
- Torrey Edell, Project Manager
- Ellen Berryman, MS, Lead Biologist
- John Brandon, PhD, Population Modeling

Archipelago Research and Conservation (ARC)

- Andre Raine, PhD, Hawaii Seabird Expert

Hallux Ecological Restoration (Hallux)

- Kyle Pias, Predator Control Expert

Agenda

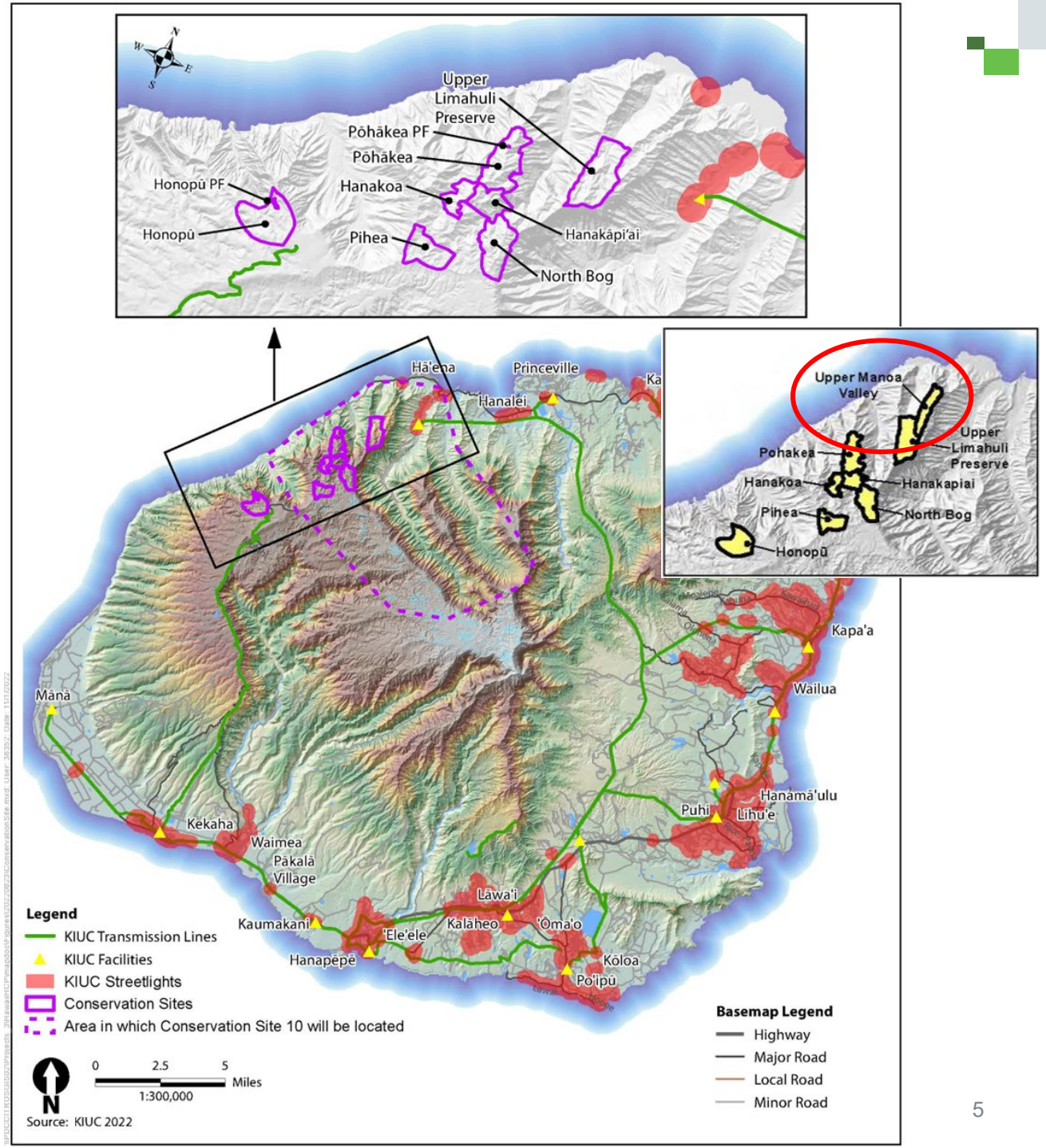
- **Changes Since January 27, 2022, ESRC Presentation**
- **Overview of Key Elements of KIUC HCP (Continued)**
  - Section 1. **Covered Seabirds**: Effects, Conservation Strategy, Monitoring and Adaptive Management
  - Section 2. **Covered Waterbirds**: Effects, Conservation Strategy, Monitoring and Adaptive Management
  - Section 3. **Green Sea Turtle**: Effects, Conservation Strategy, Monitoring and Adaptive Management
  - Section 4. Cost, Funding, and HCP Implementation
- **Presentation Format**

KIUC HCP: January 27, 2022, ESRC Presentation

- **Background of KIUC HCP**
  - HCP Consultant Team
  - Status of Covered Seabirds: Summary
  - KIUC Short-Term HCP (2011-2016)
  - Early Implementation of KIUC HCP (2020-Present)
- **Overview of Key Elements of KIUC HCP**
  - Covered Species
  - Covered Activities
  - Permit Term
  - Understanding Take
  - Conservation Measures Overview
  - Next Steps and Schedule

KIUC HCP: Changes to KIUC HCP Since Last ESRC Presentation

- **Increased requested permit term from 30 years to 50 years**
  - Need additional time to provide net benefit to covered seabirds
- **Replace Upper Manoa Conservation Site**
  - Original site became infeasible
  - KIUC is selecting new site (Site 10 in purple dashed line on map)
  - New site will be selected from Alternative Site List from HCP site feasibility assessment
  - Replacement site will have same or greater benefits than Upper Manoa (already modeled)
  - Site will be selected based on
    - Occupancy by Newell's shearwater
    - Feasibility to construct predator exclusion fence and social attraction site



Habitat Conservation Plan and Environmental Impact Statement Schedule and Next Steps

- **Second Administrative Draft of the KIUC HCP**
  - Submitted Nov. 11, 2022, to USFWS and DOFAW
  - Currently undergoing agency review (comments due 12/23/22)
- **Environmental Impact Statement (EIS) process has begun**
  - Notice of Intent to Prepare EIS released June 8, 2022
  - Solicited public comments for 30 days
  - Public scoping meeting held June 28, 2022 (virtual)
- **Anticipated schedule**
  - Public Draft HCP released on state web site **January 23, 2023**
  - 60-day comment period
  - Public hearing on Kaua'i
  - July 2023– Public Draft of HCP and EIS released (NEPA)
  - Final HCP and EIS: Spring 2024
- **Next steps with ESRC**
  - ESRC review and site visit during 60-day state comment period
  - We have requested the week of March 6-10 for a site visit and public meeting on Kaua'i

Section 1. Effect and Conservation Strategy for the Covered Seabirds

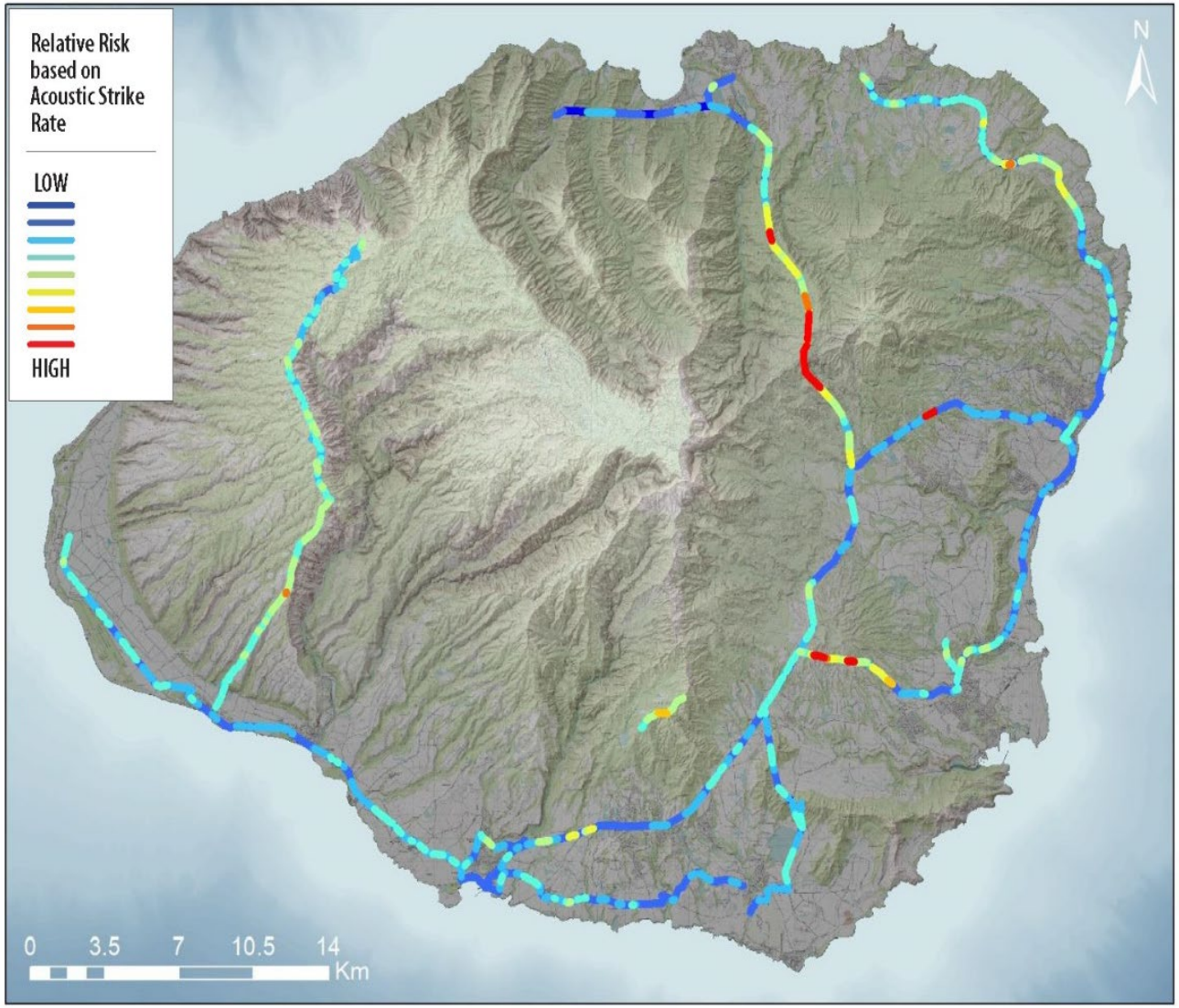
Section 1. Effects and Conservation Strategy for the Covered Seabirds

- Covered Seabird Species
- Estimated Take from Powerline Collisions
- Estimated Take from Light Attraction
- Conservation Measures
- Estimating Population Effects
- Addressing Uncertainty
- Monitoring and Adaptive Management
- Conservation Outcome

Covered Seabird Species

Take from Powerlines: Effects Pathways

- **Species documented**
  - Newell's shearwater and Hawaiian petrel: documented collisions
  - Band-rumped storm-petrel: no documented collisions
- **Collision detection**
  - Acoustic sensors
  - Visual surveys
- **Collision risk factors**
  - Height of powerlines
  - Powerline configuration
  - Number of wires and location
  - Variation by geography



Source: Travers et al. 2020:40

Take from Powerlines: Methods

- **Acoustic monitoring data**
  - Acoustic sensors on lines
  - Collected from 2013 to 2019 to estimate amount of take
  - Bayesian model to estimate annual strike rate while accounting for covariates
  - Major limitations include:
    - Species colliding with powerline unknown
    - Outcome of bird after collision (e.g., injury or mortality) unknown
- **Visual surveys** (Travers et al. 2021)
  - Over 6,000 hours of visual surveys
  - Observed 121 powerline collisions
    - 70% Newell's shearwater, 30% Hawaiian Petrel
    - Deduced outcomes from observed post-collision behavior

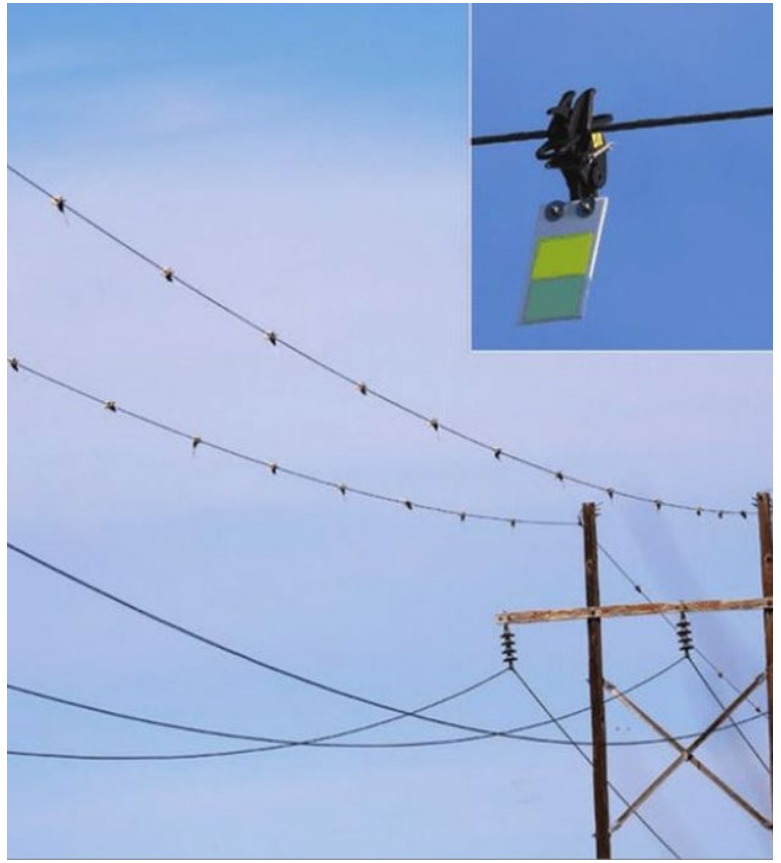
Take from Powerlines: Methods (cont'd)

- We cannot measure injury or mortality directly
- We can estimate **number of *collisions***
- Assumptions of injury and mortality based on Travers et al. 2021
  - 6,000 hours of visual observations (N = 121 collision events)

Observed Events	Assumed Outcome
13.0% immediately grounded	mortality
10.2% immediately grounded or crippled	mortality
5.6% incapable of regaining flight after rehabilitation	mortality
24.5% elevation loss, assumed not grounded	injury

Take from Powerlines: Measurable Unit of Take

- **KIUC requests *all take* associated with estimated powerline *collisions (= strikes)* over 50-year permit for each covered seabird:**
  - Mortality resulting from powerline strikes
  - Injury resulting from powerline strikes
  - Mortality of eggs and chicks as a result of parents being injured or killed from powerline strikes



Take from Powerlines: Methods and Results

- Powerline collision estimate
  - Acoustic sensors on lines, detecting strikes
  - Bayesian model to estimate annual strike rate while accounting for multiple variables
  - Visual observations to estimate proportion by species and post-collision outcomes
  - Population dynamics model factored into future strike rates
- Take limits are based on
  - **65% reduction** in strike rate for existing powerlines and
  - **80% reduction** in strike rate for new powerlines
- For new powerlines, collisions predicted by extrapolating from existing lines

Take from Powerlines: Methods and Results

Species	TOTAL 50 YEARS			
		Estimates by Form of Take		
	Requested # of Powerline Strikes	Estimated Mortality	Est. Non-lethal Injury	Est. Indirect Take of Eggs, Chicks
Newell's shearwater (ʻaʻo)	35,236	10,148	8,633	3,756
Hawaiian petrel (ʻuaʻu)	21,196	6,104	5,193	2,259
Band-rumped storm-petrel (ʻakēʻakē)	22	6	5	2

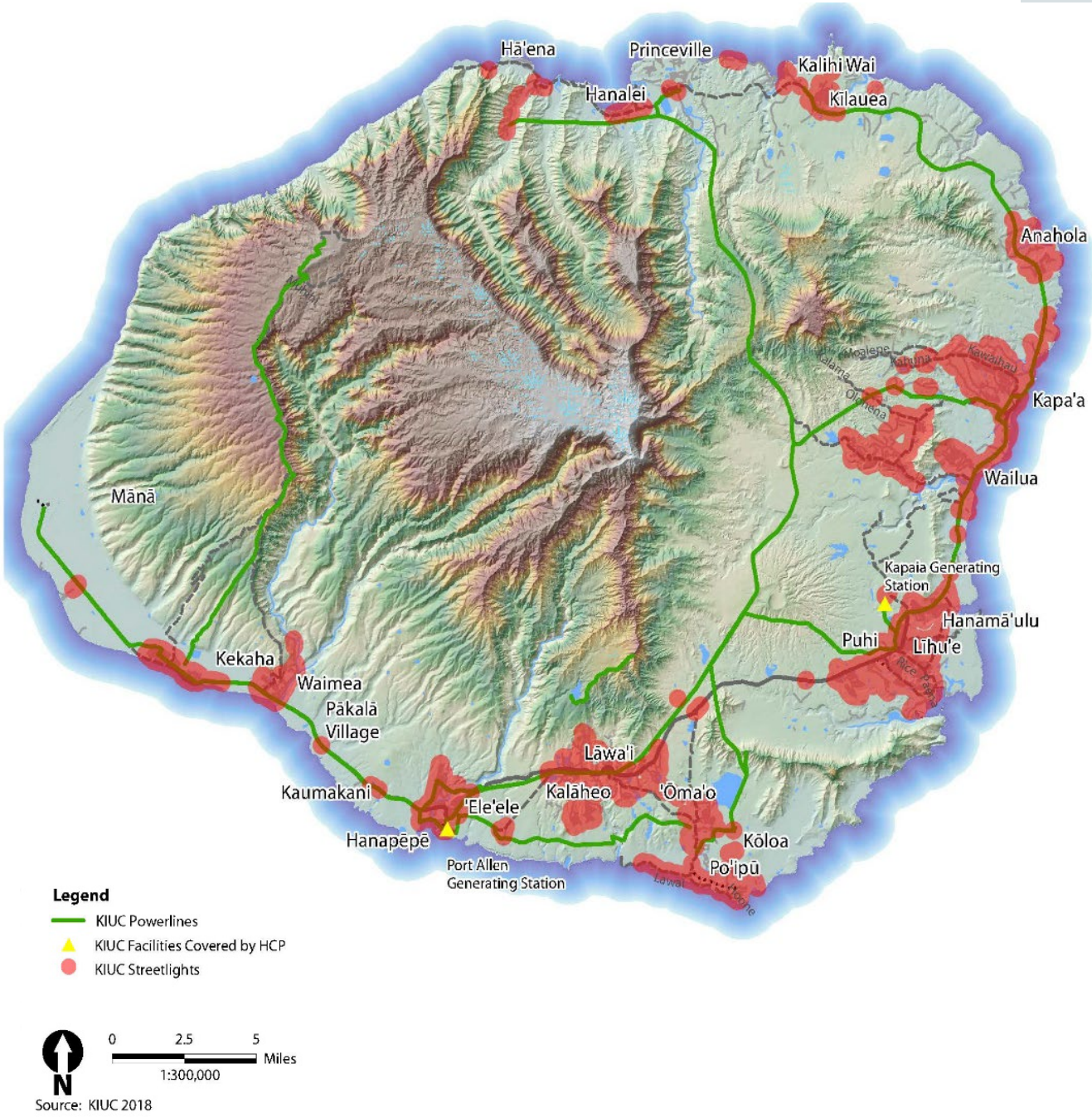
Unit of take = powerline strikes

Estimated form of take based on assumed outcomes:

- 28.8% of strikes result in mortality
- 24.5% of strikes result in non-lethal injury
- 20% of strikes are adults, and strike results in loss of egg or chick

Take from Lights: Effects Pathways

- **Light attraction**
  - **Sources:** KIUC streetlights, facility lights, and nighttime construction (during seabird fledging season)
  - **Species:** Primarily Newell's shearwater but also Hawaiian petrel and band-rumped storm-petrel
- **Factors**
  - Mostly affects fledglings making first trip to sea
  - Fledglings circle artificial lights, tire and fall to ground ("fallout"), where they cannot regain flight
  - Once grounded, they often die from injury, dehydration, starvation, or predators



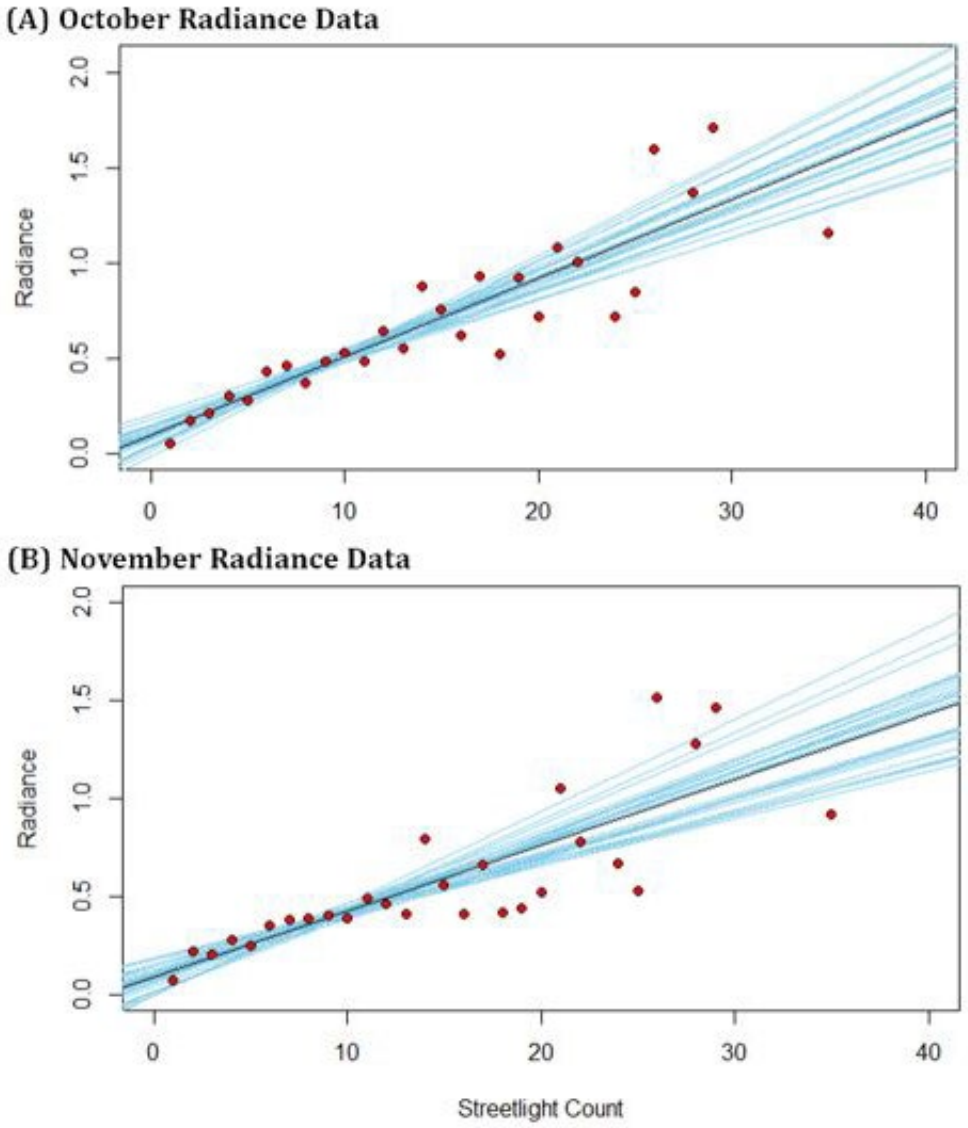
Light Attraction: Methods

Take Estimate

- **Existing streetlights**
  - Light Attraction Modeling by H.T. Harvey & Associates
- **New streetlights**
  - KIUC estimated number of new streetlights for the 50-year term and applied model assumptions
- **Facility lights**
  - Birds found at KIUC facilities between 2011 and 2020
  - Most fallout at Port Allen Generating Station
  - One seabird observed at Kapaia Generating Station
- **Emergency nighttime lighting for restoration of power**
  - KIUC estimated average of 85 hours of night lighting per year
  - Will occur in limited locations for a short duration (lighting for 30 minutes on average)
  - Because the take limit for streetlights conservative (i.e., overestimate), the HCP assumes that any slight increases in take from night lighting are already covered by the streetlight take estimate

Covered Seabirds – Light Attraction: Methods

- **Fallout Estimates for Existing Streetlights**
  - Assessed recent island-wide radiance data from Suomi National Polar Orbiting Partnership Satellite.
  - Partitioned radiance data into existing spatially explicit SOS sectors where streetlights are present.
  - Estimated radiance from a single streetlight based on sample of isolated, remote streetlights.
  - Estimated proportional contribution of streetlights to radiance by sector.
  - Derived estimate of fallout occurring due to streetlights in each sector.
  - Applied correction factor to account for seabirds that were grounded but not detected (10.5% detectability - conservative).



Take from Lights: Methods and Results

Estimated form of take based on assumed outcomes*:

- Combined estimate for streetlights, facilities, and nighttime construction
- 50% of fallout results in mortality
- 50% of fallout results in non-lethal injury
- 0% of fallout is from adults, therefore no indirect loss of egg or chick

*Consistent with Kaua'i Seabird HCP

	TOTAL 50 YEARS			
		Estimated Amount by Form of Take		
Species	Requested Take (Fallout)	Mortality	Non-lethal Injury	Indirect Take of Eggs and Chicks
Newell's shearwater (ʻaʻo)	4,632	2,316	2,316	0
Hawaiian petrel (ʻuaʻu)	266	133	133	0
Band-rumped storm-petrel (ʻakēʻakē)	36	18	18	0

Take from Conservation Strategy: Methods and Results

- Covered seabirds are rarely caught in predator control traps
- Estimated take based on trapping data from 2015 through 2022 at 6 conservation sites

	TOTAL 50 YEARS			
		Estimated Amount by Form of Take		
Species	Requested Take	Mortality	Non-lethal Injury	Indirect Take of Eggs and Chicks
Newell's shearwater (ʻaʻo)	354	42	135	177
Hawaiian petrel (ʻuaʻu)	630	239	76	315
Band-rumped storm-petrel (ʻakēʻakē)	0	0	0	0

BREAK

- **Questions?**
  - Covered seabird species
  - Estimated take from powerline collision
  - Estimated take from light attraction
  - Estimated take from conservation strategy (predator control)

Biological Goals and Objectives

Biological Goal for Newell's shearwater and Hawaiian petrel:

Provide for the survival of the Kaua'i metapopulation of the species and contribute to the species' recovery

- by **minimizing and fully offsetting the impacts of KIUC's taking**
- to an extent that is likely to result in
  - Numbers of breeding pairs
  - Demography and age structure
  - Population growth rate, and
  - Spatial distribution
- that is representative of a **viable metapopulation** on Kaua'i

Biological Goals and Objectives (cont.)

Viable Metapopulation:

- **Breeding pairs:** USFWS and DOFAW estimate that for the Kaua‘i metapopulation, 10,000 individuals (and 2,500 breeding pairs) represents a minimum viable level for the Plan Area, for Newell’s shearwater and Hawaiian petrel
- **Population growth rate:** trends must be stable or increasing
- **Demography and age structure:** growing populations tend to have larger proportion of younger individuals

Biological Goals and Objectives (cont.)

Newell's Shearwater ('a'o)
Increase the number of Newell's shearwater ('a'o) breeding pairs and new chicks produced annually throughout the duration of the permit **at 10 conservation sites combined**.
Metric 1. Maintain an annual minimum of 1,264 breeding pairs as determined by call rates and burrow monitoring.
Metric 2. Reach a target of 2,371 breeding pairs by year 25 of the permit term and 4,313 breeding pairs by the end of the permit term.
Metric 3. Growth rate for breeding pairs annually of at least 1.5% as measured by a 5-year rolling average**.**
Metric 4. Maintain a 5-year rolling average 87.2% reproductive success rate.
Metric 5. Eradicate terrestrial predators within predator exclusion fencing.
Metric 6. Produce at least one breeding pair within each of the four social attraction sites by Year 5 of the permit term.
Metric 7. Ensure that invasive plant and animal species do not preclude meeting the objective metrics above.

Biological Goals and Objectives (cont.)

Hawaiian Petrel (‘ua‘u)
Increase the number of Hawaiian petrel (‘ua‘u) breeding pairs and new chicks produced annually throughout the duration of the permit **at 10 conservation sites combined**.
Metric 1. Maintain an annual minimum of 2,257 breeding pairs as determined by call rates and burrow monitoring.
Metric 2. Reach a target of 2,926 breeding pairs by year 25 of the permit term and 3,751 breeding pairs by the end of the permit term.
Metric 3. Growth rate for breeding pairs annually of at least 1.0% as measured by a 5-year rolling average.
Metric 4. Maintain a 5-year rolling average 78.7% reproductive success rate.
Metric 5. Ensure that invasive plant and animal species do not preclude meeting the objective metrics above.

*Social attraction is not planned for this species

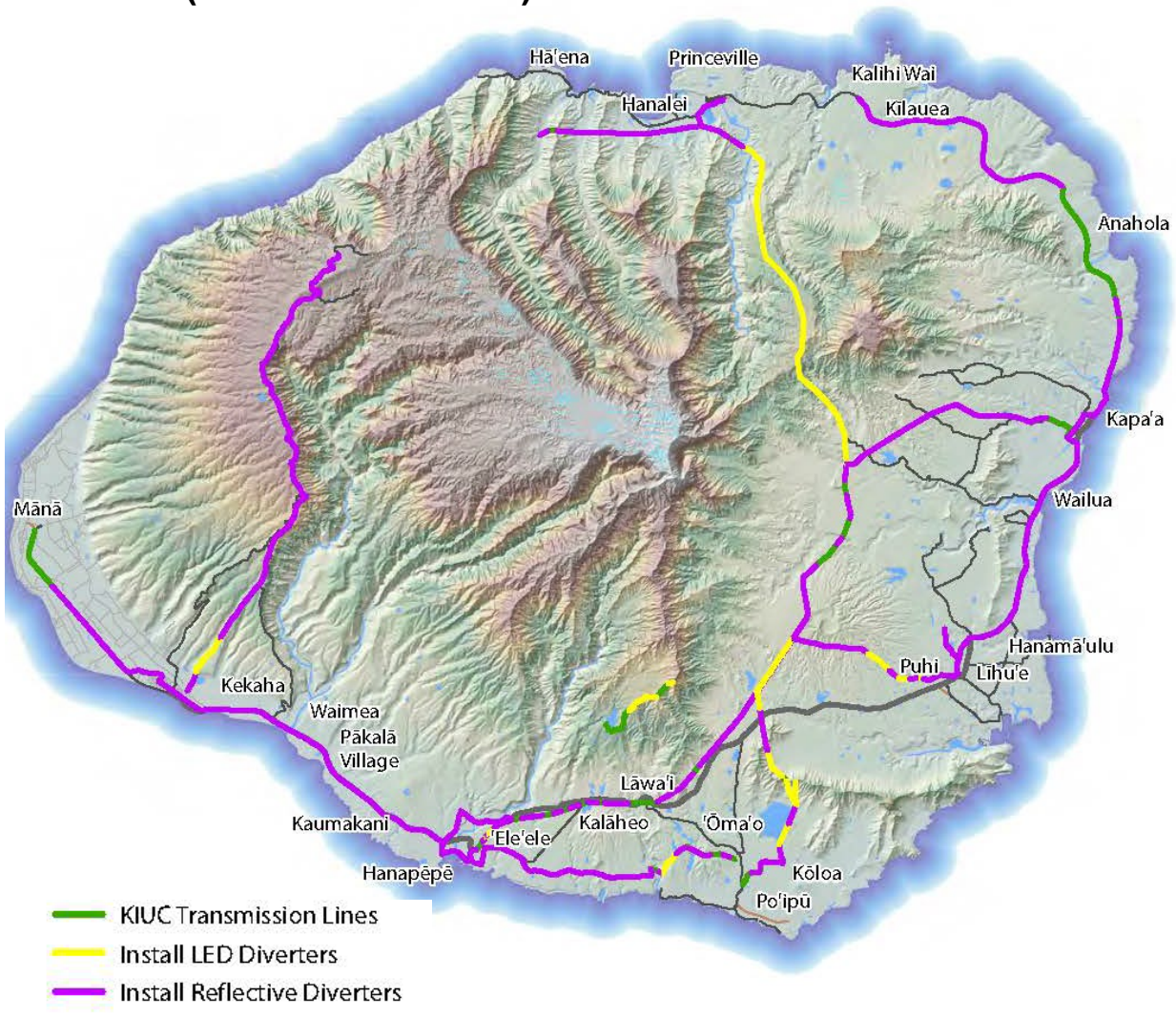
Conservation Measures: Powerline Collision Minimization

- **Types of minimization:**
  - Static wire removal
  - Flight diverters
  - Reconfiguration
- **Expected strike reduction of 65 percent for existing lines**
  - Based on ARC's 2020 Bayesian Model strike estimate and strike reductions with minimization
  - Monitoring until 2026 to confirm strike reduction rates
  - To date, monitoring indicates estimates are accurate
- **80 percent reduction of potential strike risks for new powerlines**
  - Higher than existing powerlines because new powerline can be sighted and constructed to reduce strike potential
- **Requested take limit is based on expected strike reduction**

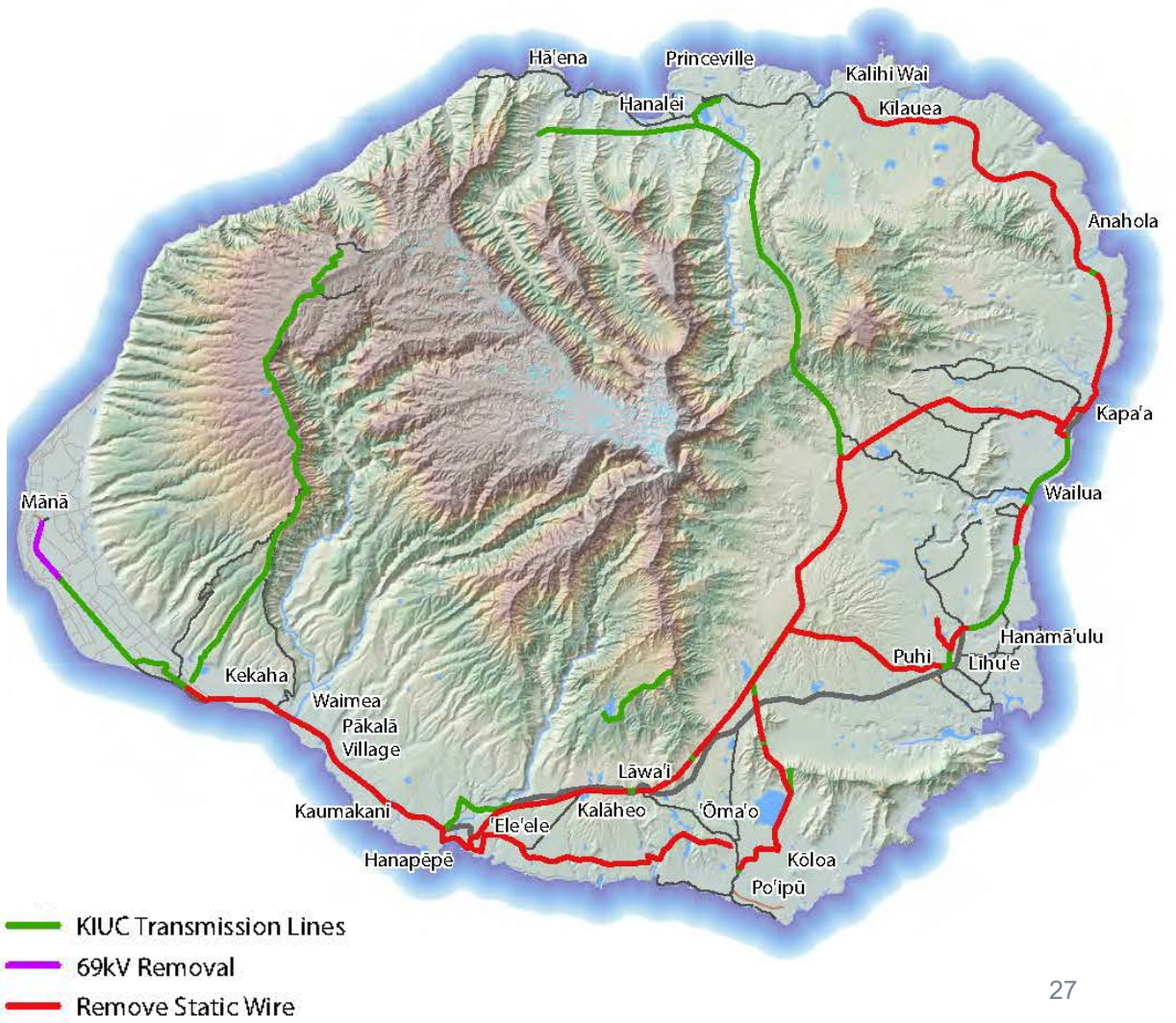
All KIUC powerline minimization projects will be complete by end of 2023

Conservation Measures: Powerline Collision Minimization

Between 2020 and 2023 KIUC will have installed 116.5 miles of bird flight diverters (LED or reflective)



Between 2020 and 2023 KIUC will have removed 71.6 miles of static wire (approximately 81% of all static wires)



Conservation Measures: Minimize Light Attraction

- **Implement Measures to Minimize Light Attraction**
  - Full-cutoff shields direct streetlight light down towards the ground instead of up into the sky
  - **Streetlights**
    - KIUC has already installed full-cutoff shields on **ALL** of its 4,150 existing streetlights
    - KIUC will install same full-cutoff shields on all new streetlights (est. 1,754 new streetlights over 50 yrs)
  - **Facility lights**
    - KIUC shielded exterior facility lights and dims lighting when young seabirds are leaving nests (September 15-December 15)
    - Actions will continue in HCP implementation

@Blanco County Friends of the Night Sky- Lighting Guidelines: How to Prevent Light Pollution

Conservation Measures: SOS Program

KIUC will fund Save our Shearwaters (SOS) Program

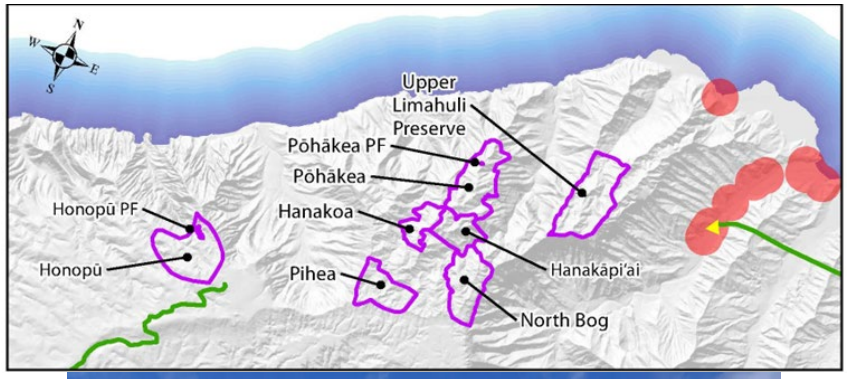
- Rescue, rehabilitate, and release covered seabirds regardless of mortality source
- $300,000 per year, adjusted for inflation each year
- Greater than current funding level (KIUC has funded since 2003)

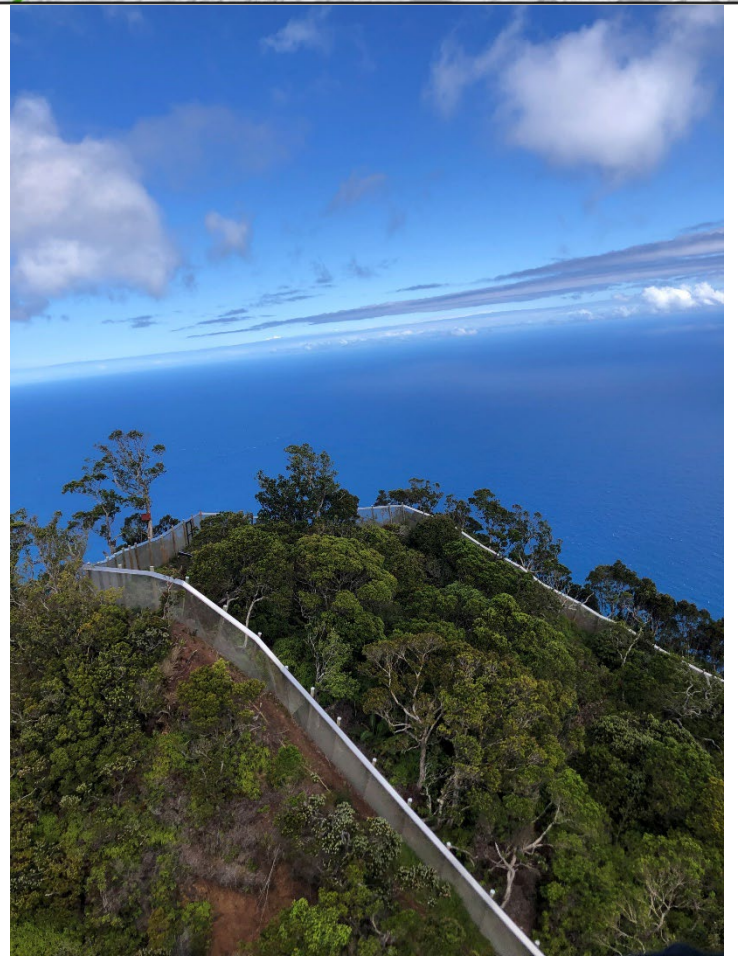
Save Our Shearwaters

Covered Seabirds – Conservation Measures: Conservation Sites

Conservation Site	Construct and Maintain Predator Exclusion Fences	Maintain & Monitor Existing Fence Already Present	Mammal Predator Control	Barn Owl Control	Vegetation Management
Upper Limahuli Preserve	X	--	X	X	X
North Bog	--	--	X	X	--
Pōhākea	--	--	X	X	--
Pōhākea PF	--	X	--	X	X
Honopū	--	X	X	X	--
Honopū PF	--	X	--	X	X
Pihea	--	--	X	X	--
Hanakoa	--	--	X	X	--
Hanakāpiʻai	--	--	X	X	--
Site 10	X	--	X	X	X
Total	**2**	**3**	**8**	**10**	**4**

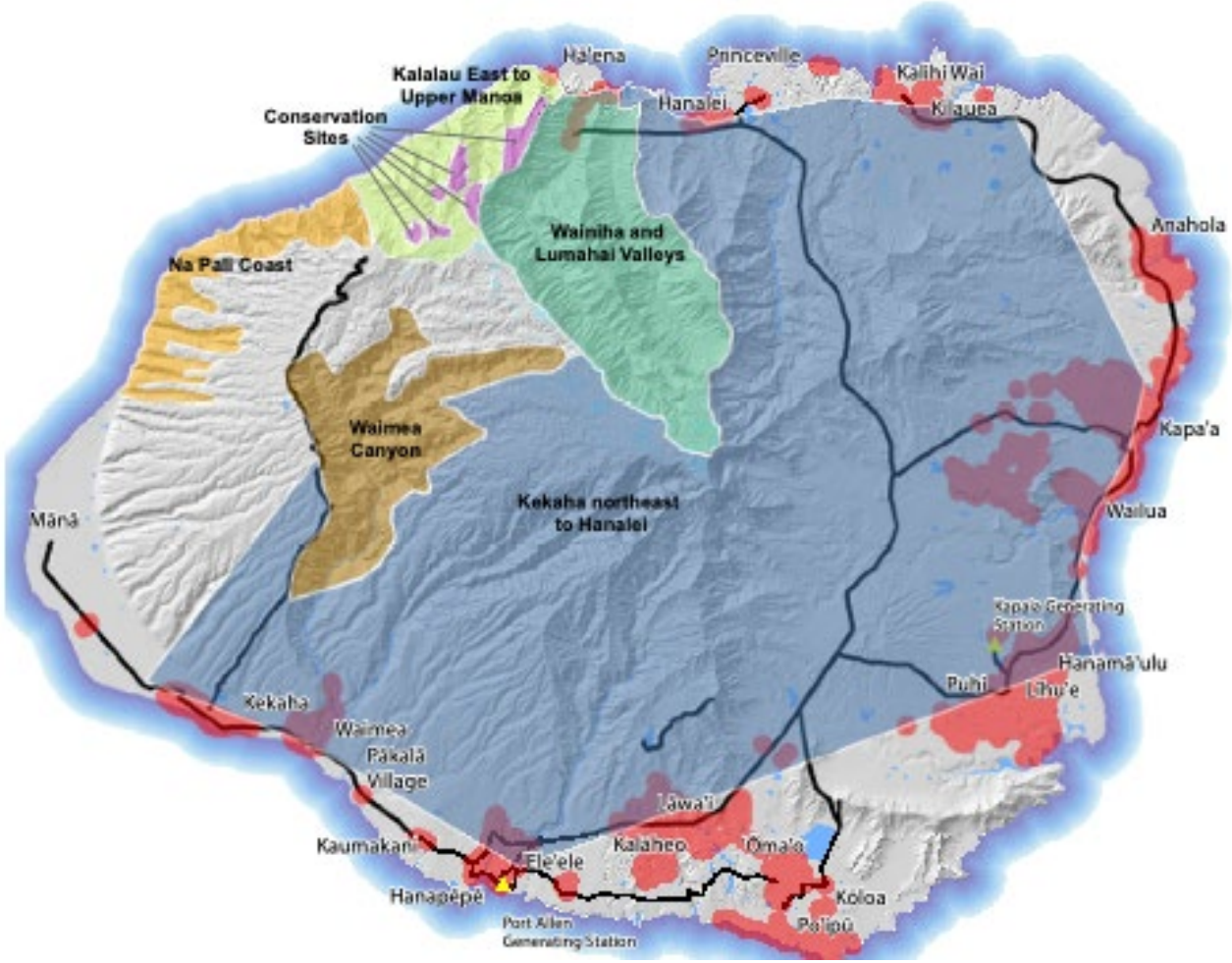
Invasive plant species management occurs primarily in the social attraction sites. Invasive plant species management in other areas within the conservation sites is conducted on an as-needed basis.





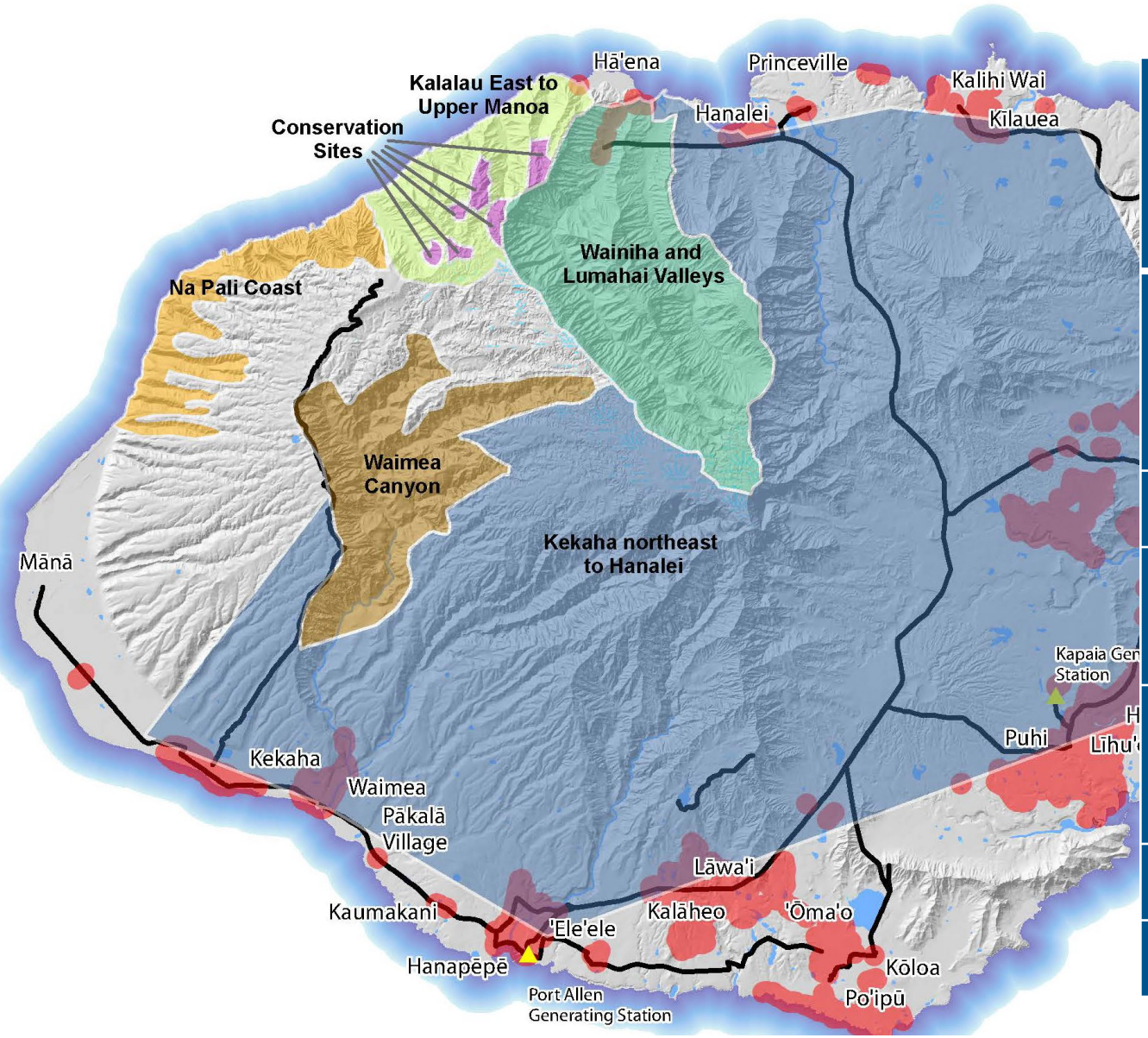
Population Dynamics Model: Introduction

- **Goals:**
  1. Evaluate effects of requested take authorization without mitigation
  2. Quantify benefits of conservation measures
  3. Determine net effects on Kaua'i metapopulation under HCP
- **Spatially explicit model: 15 distinct subpopulations**
  - 10 conservation sites
  - 5 unmanaged areas
- **Assumptions of initial abundance**
  - Could not use at-sea estimates (serious limitations)
  - Estimates based on data available in each subpopulation
  - Multiple data sources are employed



ARC subdivided island into 15 subpopulations with similar types and levels of threats, management protections, and data availability

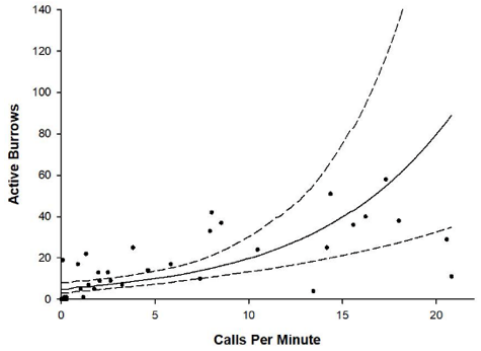
Population Dynamics Model: Introduction (cont.)



Modeled Subpopulation	Data Sources Used for Initial Population Estimate
Conservation Sites	Habitat Suitability Model and nesting densities from burrow monitoring and auditory surveys (based on annual surveys)
Nā Pali Coast	Song Meters/regression analysis
Wainiha and Lumahai Valleys	Habitat Suitability Model and nesting densities estimated from auditory surveys
Kalalau East to Upper Manoa	Habitat Suitability Model and nesting density estimates from auditory survey in Wainiha & Lumahai Valleys
Hanalei to Kekaha	Radar trend and strike estimate
Waimea Canyon	Radar trend and strike estimate

Initial Island-Wide Abundance: Data Sources

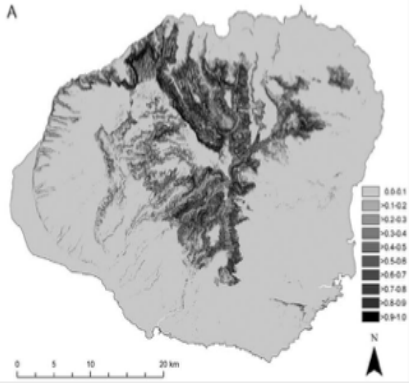
- **Conservation sites (10): Multi-year monitoring studies**
  - 2011-2021 burrow monitoring and acoustic data at 7 conservation sites (published studies by ARC)
  - Refined with published habitat suitability model (Troy et al. 2014), updated in 2021
  - Some conservation sites are new and start at zero
- **Unmanaged sites (5): ARC estimates of breeding pairs**
  - Based on acoustic data where available, combined with published habitat suitability model and expert opinion
  - Based on radar survey trends (1993-2020) where available and powerline monitoring data (e.g., estimated seabird collisions 2013-2019)
  - Resulting abundance level is what is necessary to sustain rate of decline from radar monitoring data while being consistent with strike mortality estimate



BRIEFING DOCUMENT 2 - Using automated acoustic monitoring devices to estimate population sizes of endangered seabird colonies on Kaua'i

André F. Raine, Megan Vynne, Scott Driskill & Matthew McKown

January 2019



Troy et al. (2014)

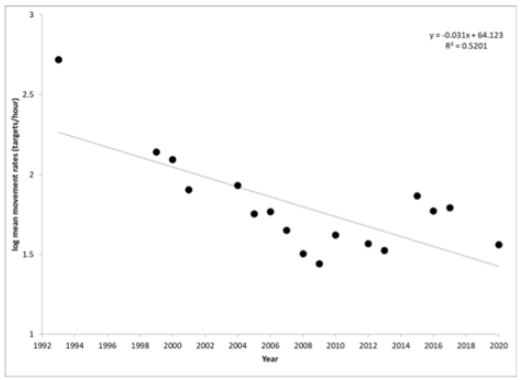
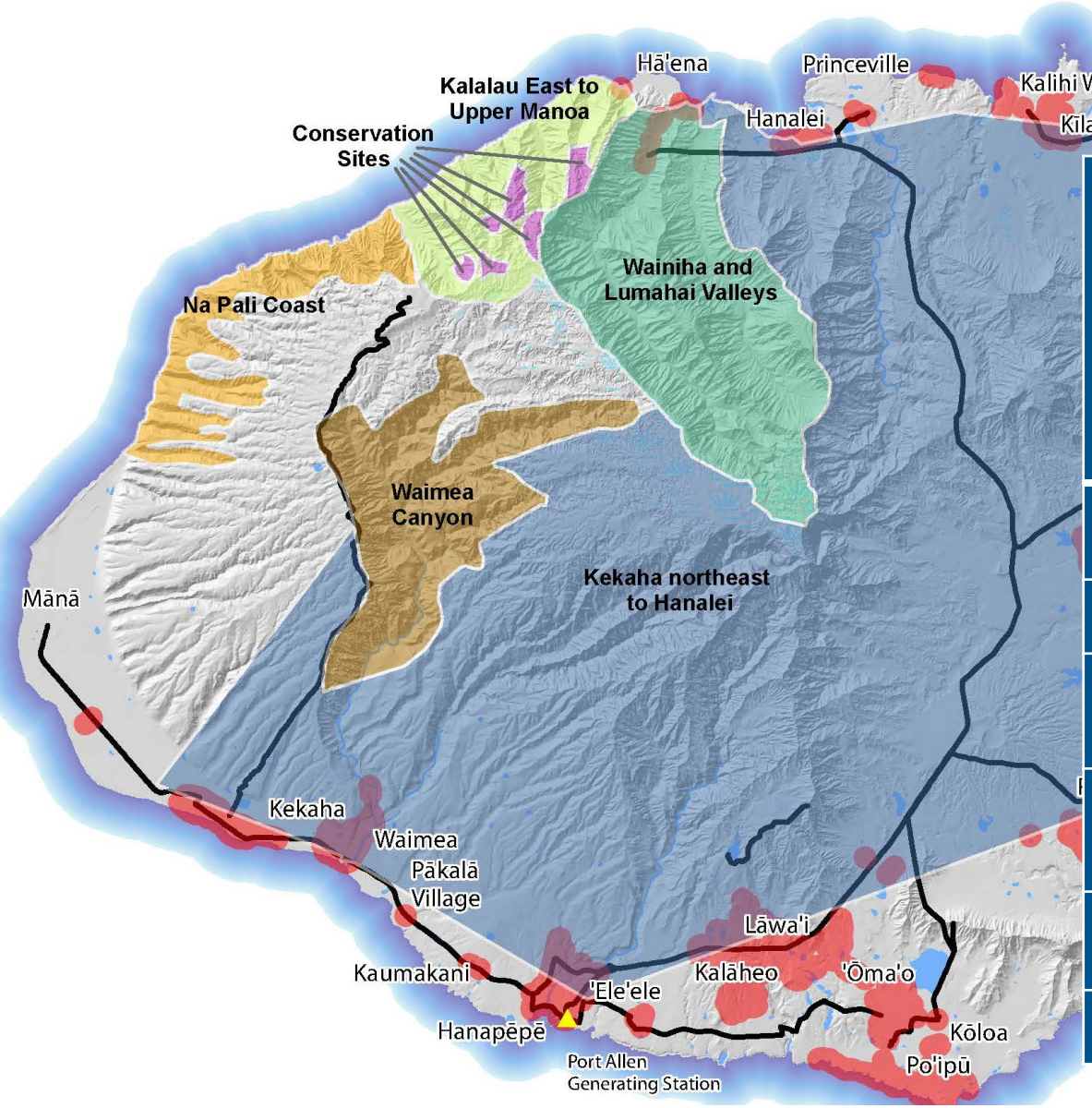


Figure 5. Linear regression of log-transformed mean movement rates (targets/hour) from all 13 sites on radar during Sessions 3 and 4 combined (Newell's Shearwater).

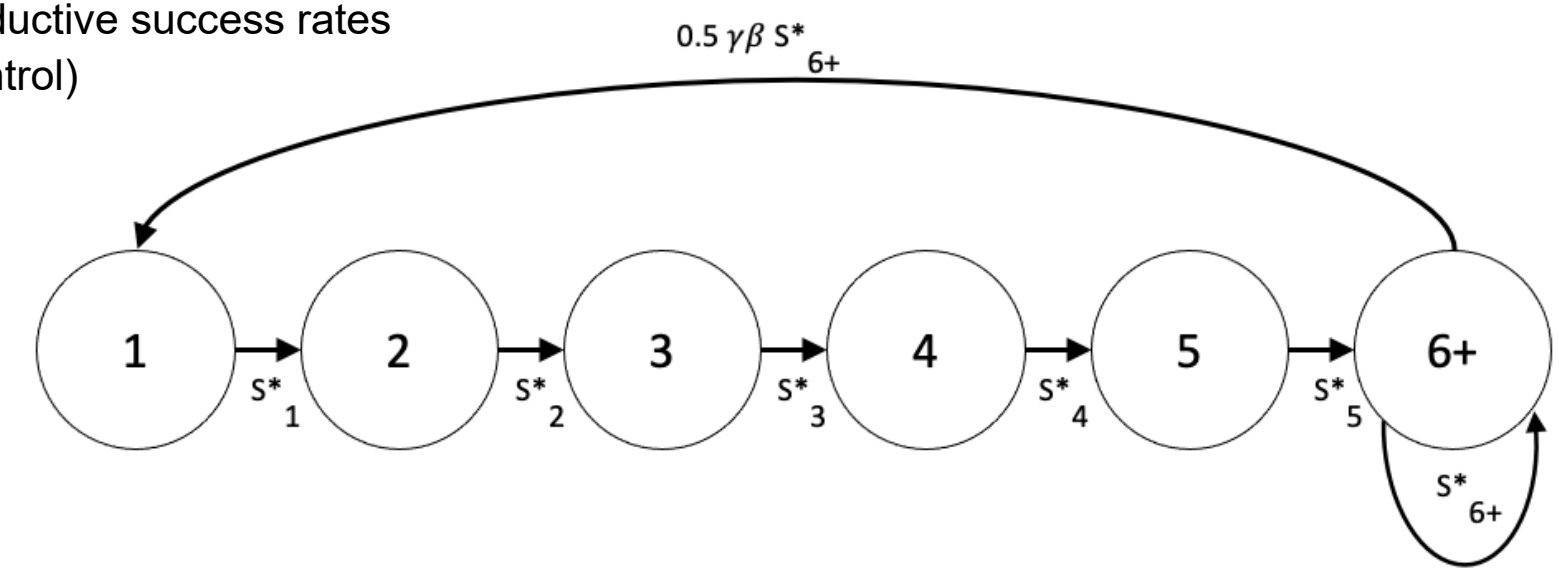
Population Dynamics Model: Introduction (cont.)



Modeled Subpopulation	Relative Population-Level Mortality by Source			Certainty in Abundance Estimate
	Powerlines	**Light Attraction**	**Predation**	
Conservation Sites (10)	Low	Low	Low	High
Nā Pali Coast	Low	Low	Low	Moderate
Wainiha and Lumahai Valleys	Low	Low	Moderate	Moderate
Kalalau East to Upper Manoa	Low	Low	Moderate	Moderate
Hanalei to Kekaha	**High**	Moderate	**High**	**Low**
Waimea Canyon	**High**	Moderate	Low	**Low**

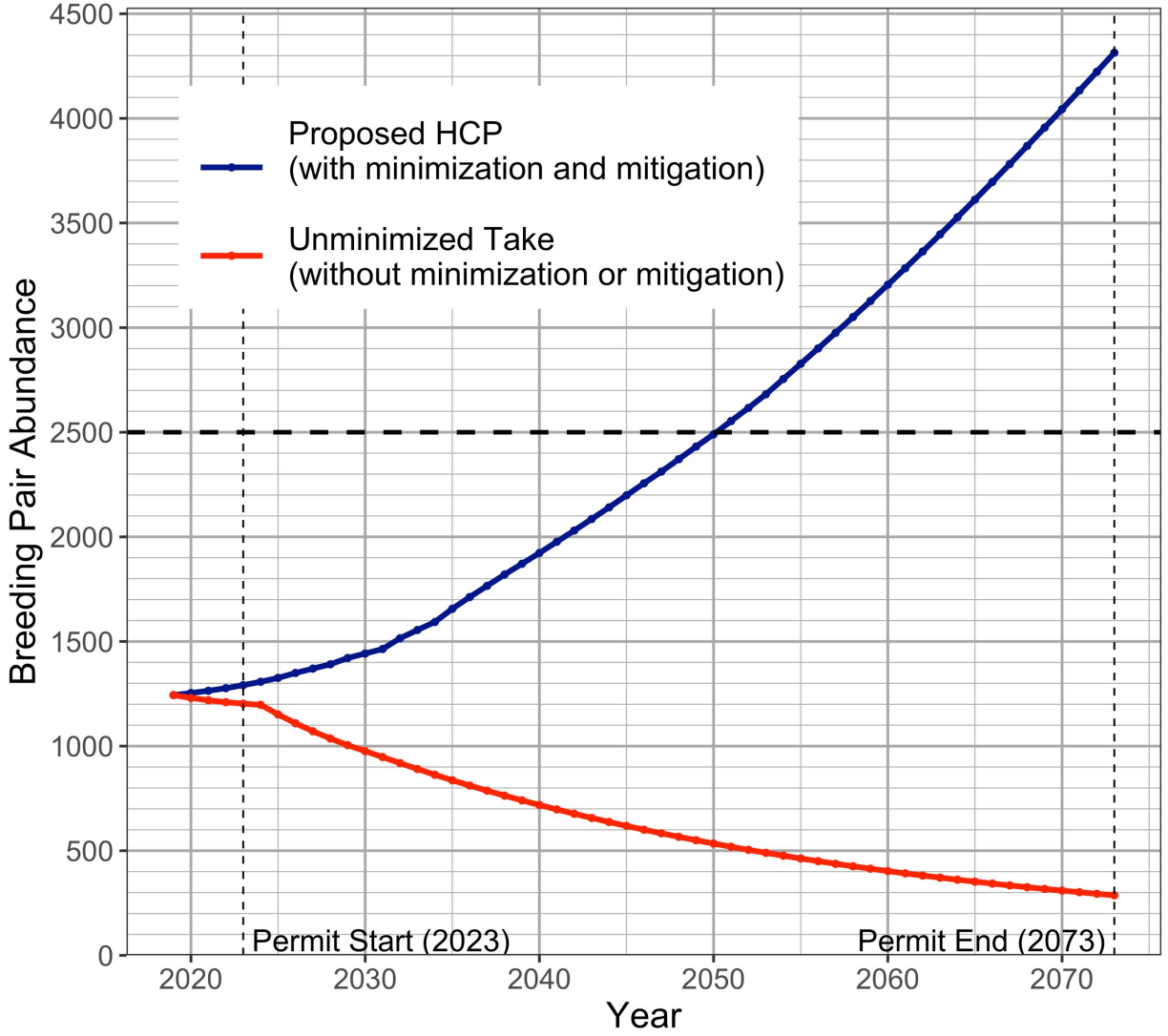
Population Dynamics Model: Parameters

- **Standard Age-Structured Population Model (Lefkovitch Matrix)**
- **Assumptions based on best available data from Kaua'i including long-term monitoring studies at conservation sites (or elsewhere with similar species)**
  - Survival rate at each age
  - Predation mortality rate at each age
  - Powerline mortality rates at each age
  - Fertility rate starting age 6 (given reproductive success rates estimated with and without predator control)
  - Sex ratio
- **Parameters vary by geographic subpopulation**



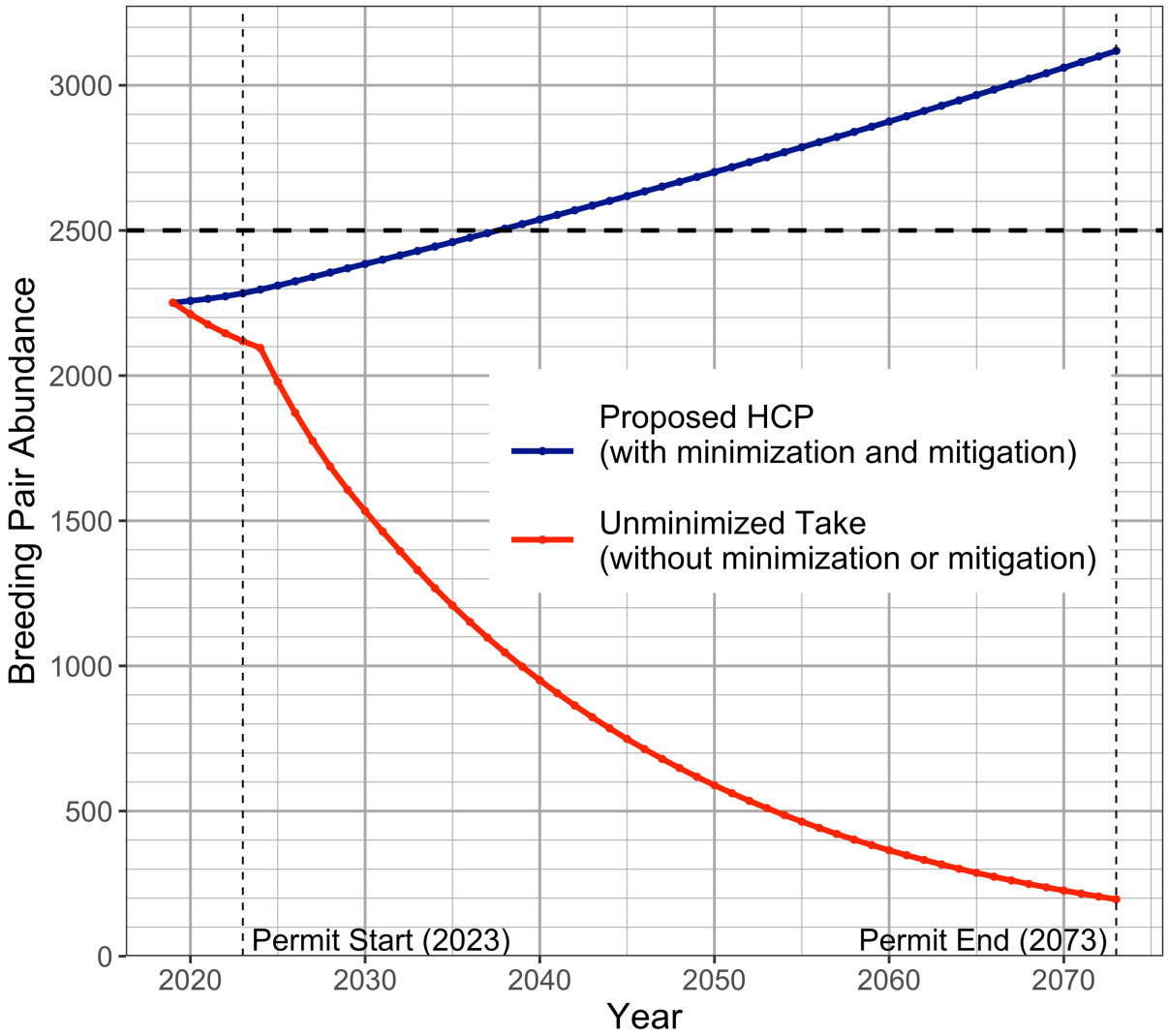
Population Dynamics Model: Effects at Conservation Sites

NEWELL'S SHEARWATER ('a'o) AT ALL CONSERVATION SITES COMBINED, WITH AND WITHOUT HCP



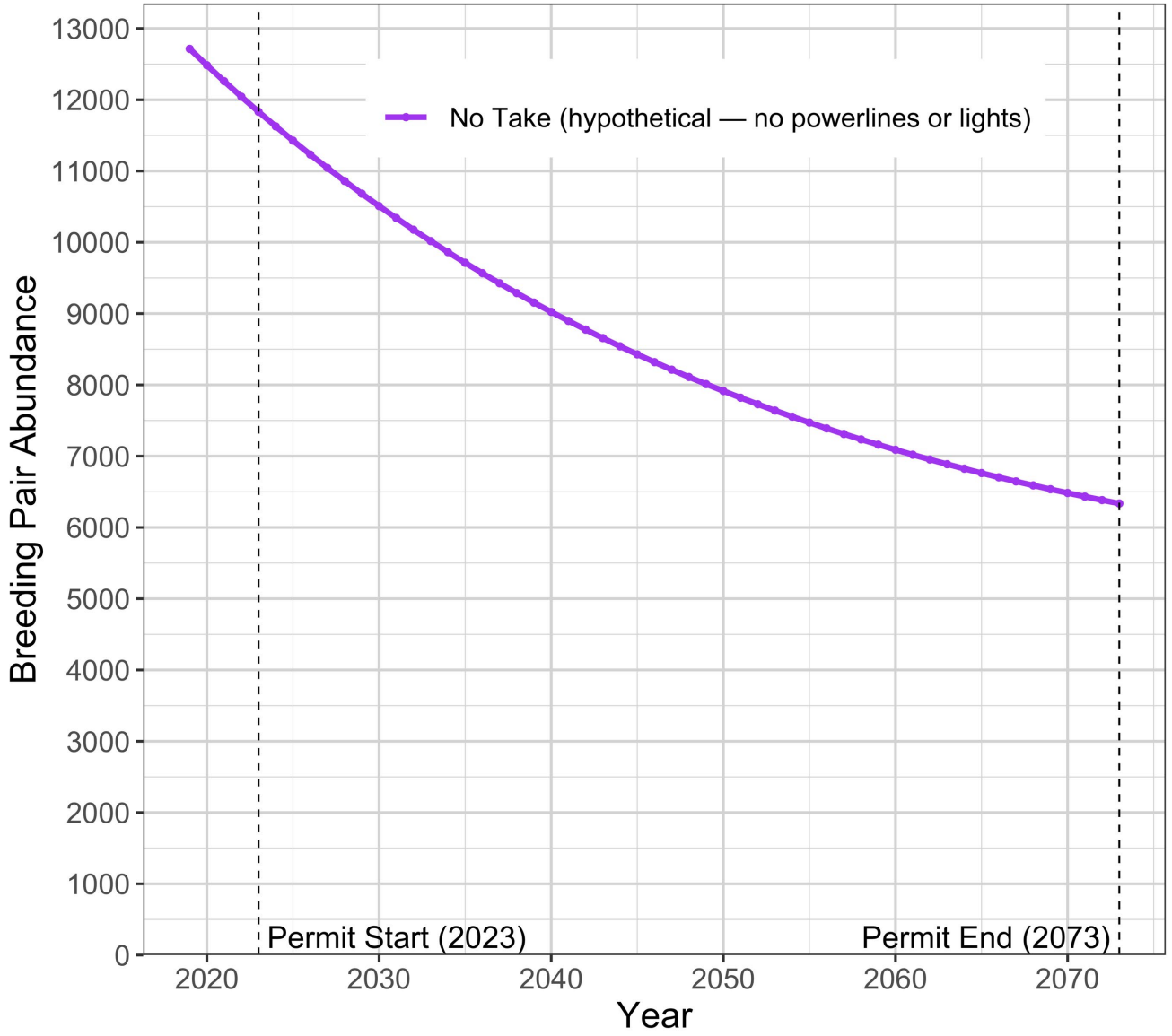
Population Dynamics Model: Effects at Conservation Sites

HAWAIIAN PETREL (‘ua‘u) ALL CONSERVATION SITES COMBINED, WITH AND WITHOUT HCP

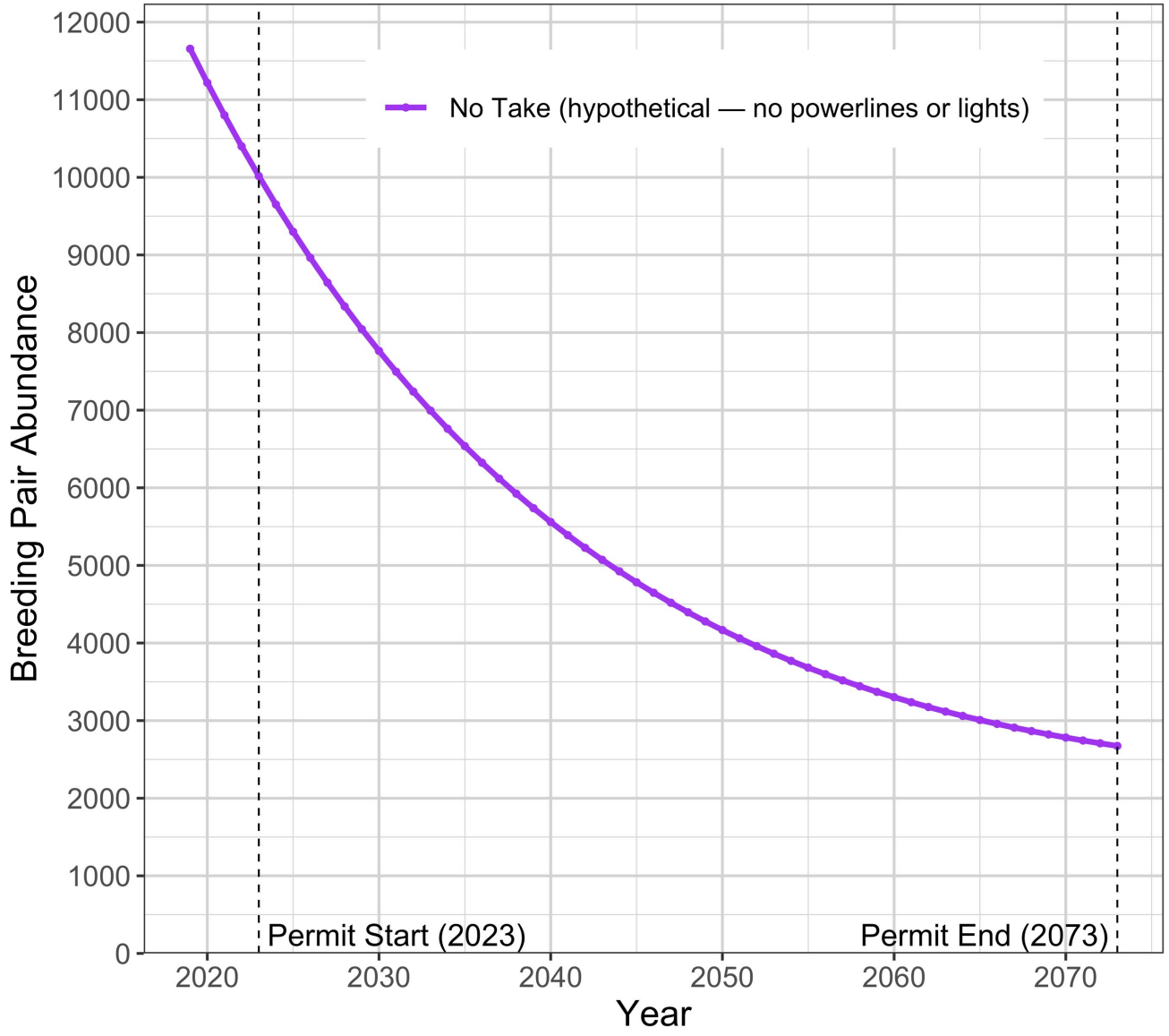


NEWELL'S SHEARWATER ('a'o) - Population Dynamics Model: Overall Effects of Take and Net Effects

- **Minimization effectiveness:** red vs. gray
- **Effect of proposed take:** gray vs. purple
- **Effect of conservation strategy:** gray vs. blue
- **Net effects:** purple vs. blue



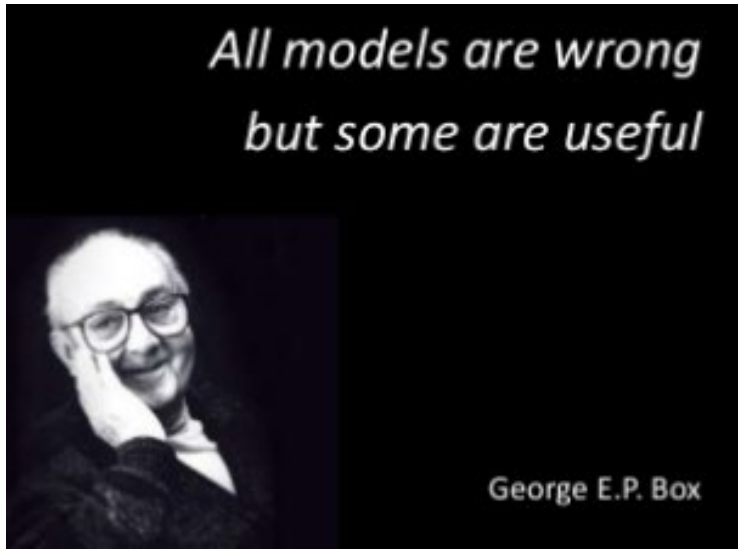
HAWAIIAN PETREL (‘ua‘u) - Population Dynamics Model: Overall Effects of Take and Net Effects (cont.)



- **Minimization effectiveness:** red vs. gray
- **Effect of proposed take:** gray vs. purple
- **Effect of conservation strategy:** gray vs. blue
- **Net effects:** purple vs. blue

Addressing Uncertainty

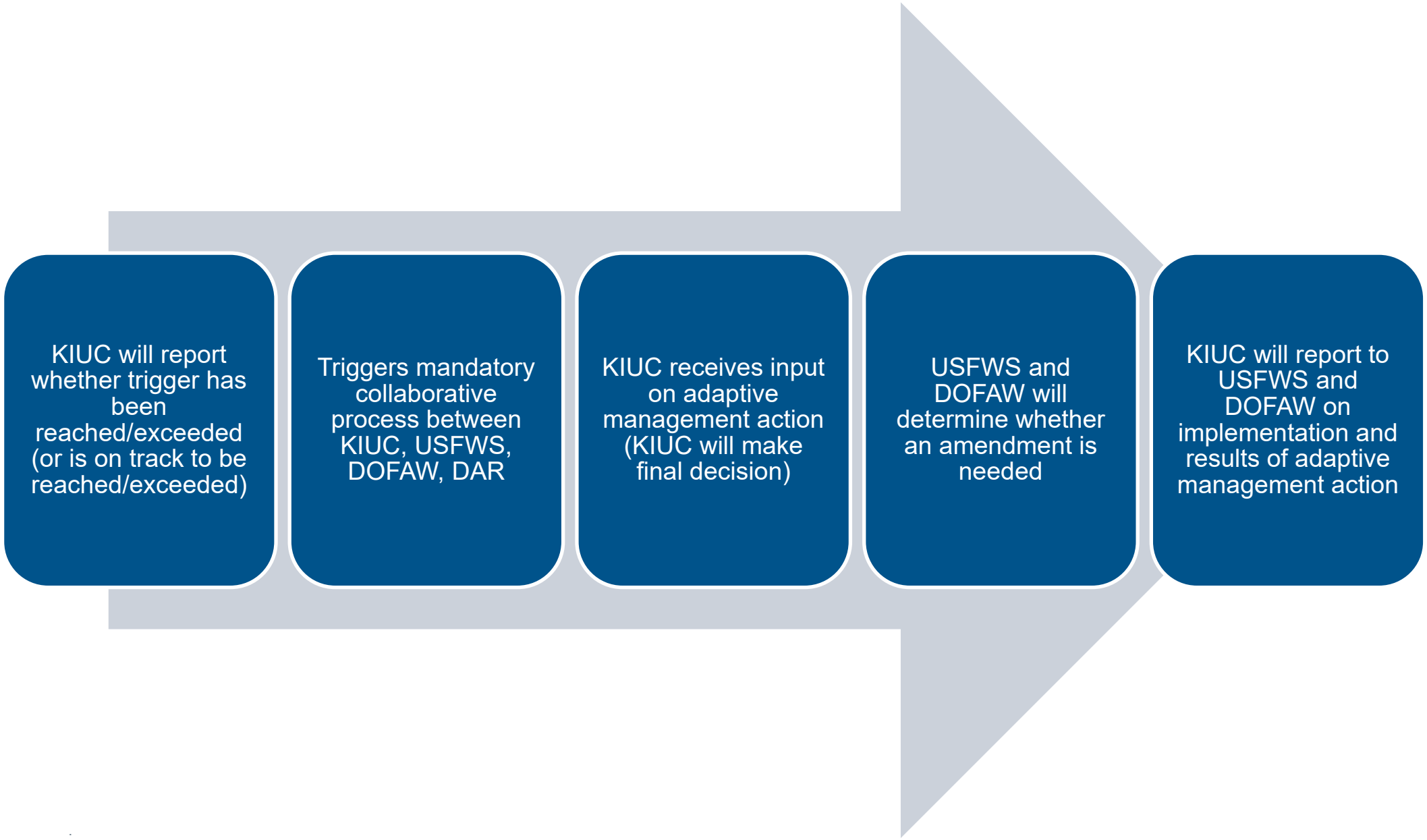
- **Model uses conservative assumptions**
  - Minimum breeding pair estimates at conservation sites
  - Maximum estimated powerline collision grounding rate
  - Maximum rate of decline from radar sites in largest area
  - Low maximum rate of increase (2%/yr growth ceiling)
  - Conservation only from KIUC HCP and Kaua'i Seabird HCP
- **Monitoring and Adaptive Management**
  - Robust program to address uncertainty
  - Will monitor actual outcomes against expected outcomes
  - Triggers to ensure examination by KIUC, USFWS, DOFAW
  - Adjust as needed to improve performance



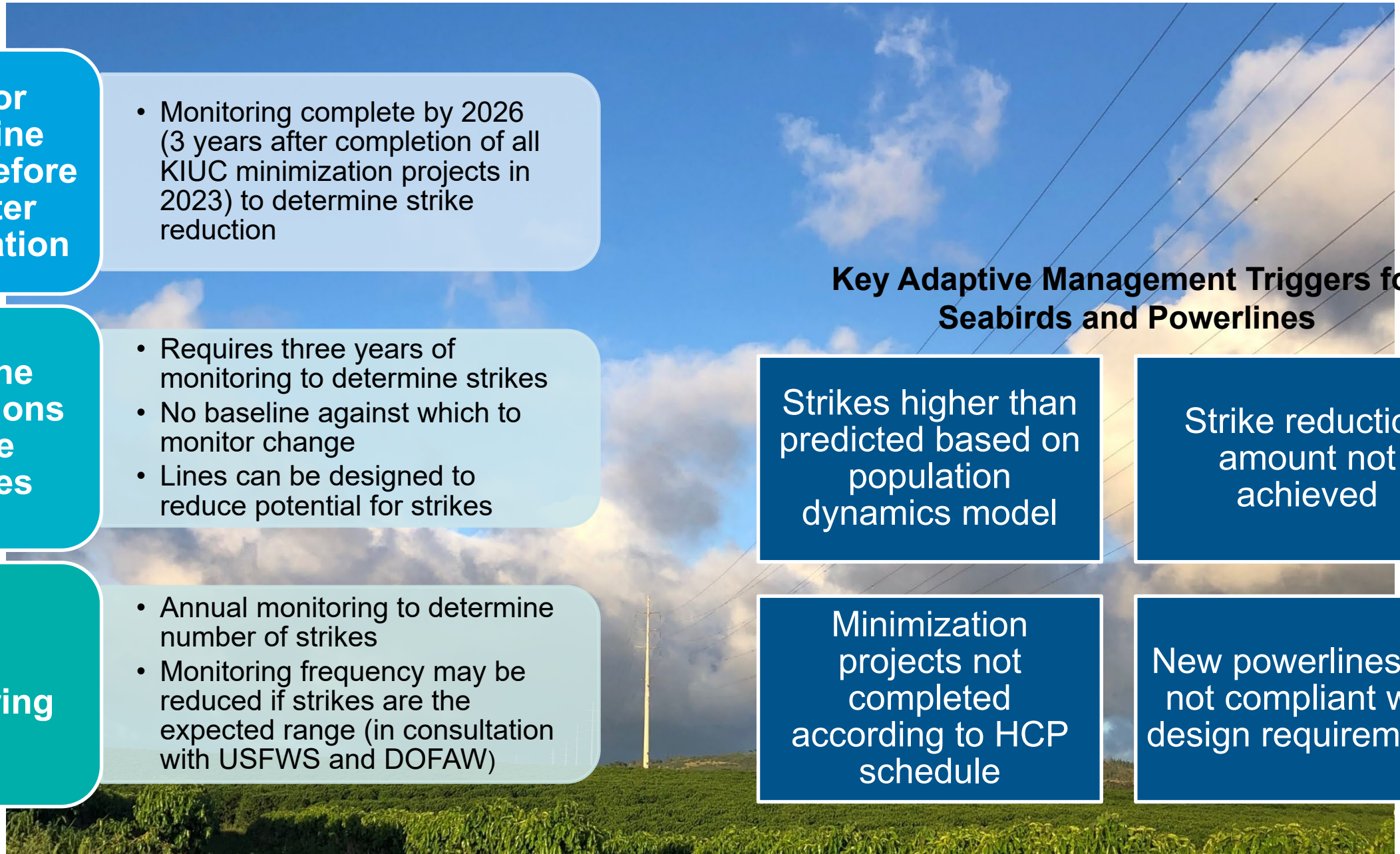
BREAK

- **Questions?**
  - Biological goals and objectives
  - Conservation measures
  - Population dynamics model
    - Methods and assumptions
    - Results

Monitoring and Adaptive Management Program: Decision Making Process



Covered Seabirds – Monitoring and Adaptive Management: Powerlines



Monitor powerline strikes before and after minimization

- Monitoring complete by 2026 (3 years after completion of all KIUC minimization projects in 2023) to determine strike reduction

New line installations or line changes

- Requires three years of monitoring to determine strikes
- No baseline against which to monitor change
- Lines can be designed to reduce potential for strikes

Take monitoring

- Annual monitoring to determine number of strikes
- Monitoring frequency may be reduced if strikes are the expected range (in consultation with USFWS and DOFAW)

Key Adaptive Management Triggers for Seabirds and Powerlines

Strikes higher than predicted based on population dynamics model

Strike reduction amount not achieved

Minimization projects not completed according to HCP schedule

New powerlines are not compliant with design requirements

Covered Seabirds – Monitoring and Adaptive Management: Lights

Streetlights

- Monitoring is infeasible therefore take and efficacy are assumed

Covered Facility Lights

- During seabird fledging season
- KIUC searches for grounded birds according to HCP protocol
- Grounded birds turned into SOS and reported to USFWS and DOFAW immediately

Nighttime Construction

- During seabird fledging season
- KIUC will search for grounded birds according to HCP protocol
- Grounded birds will be turned into SOS

Key Adaptive Management Triggers for Lights

Lights are not compliant with HCP minimization requirements

Groundings at covered facilities or construction sites higher than expected

Minimization not completed according to HCP schedule

Covered Seabirds – Monitoring and Adaptive Management: Save our Shearwaters

Review and Evaluate SOS Annual Report

- Track the number of covered species handled each year
- Compare three-year average trends to determine if number of covered seabirds is increasing

Funding Level

- Current funding level is sufficient, including a small increase in birds
- Significant increase in number of birds could require additional funding

Increased Funding

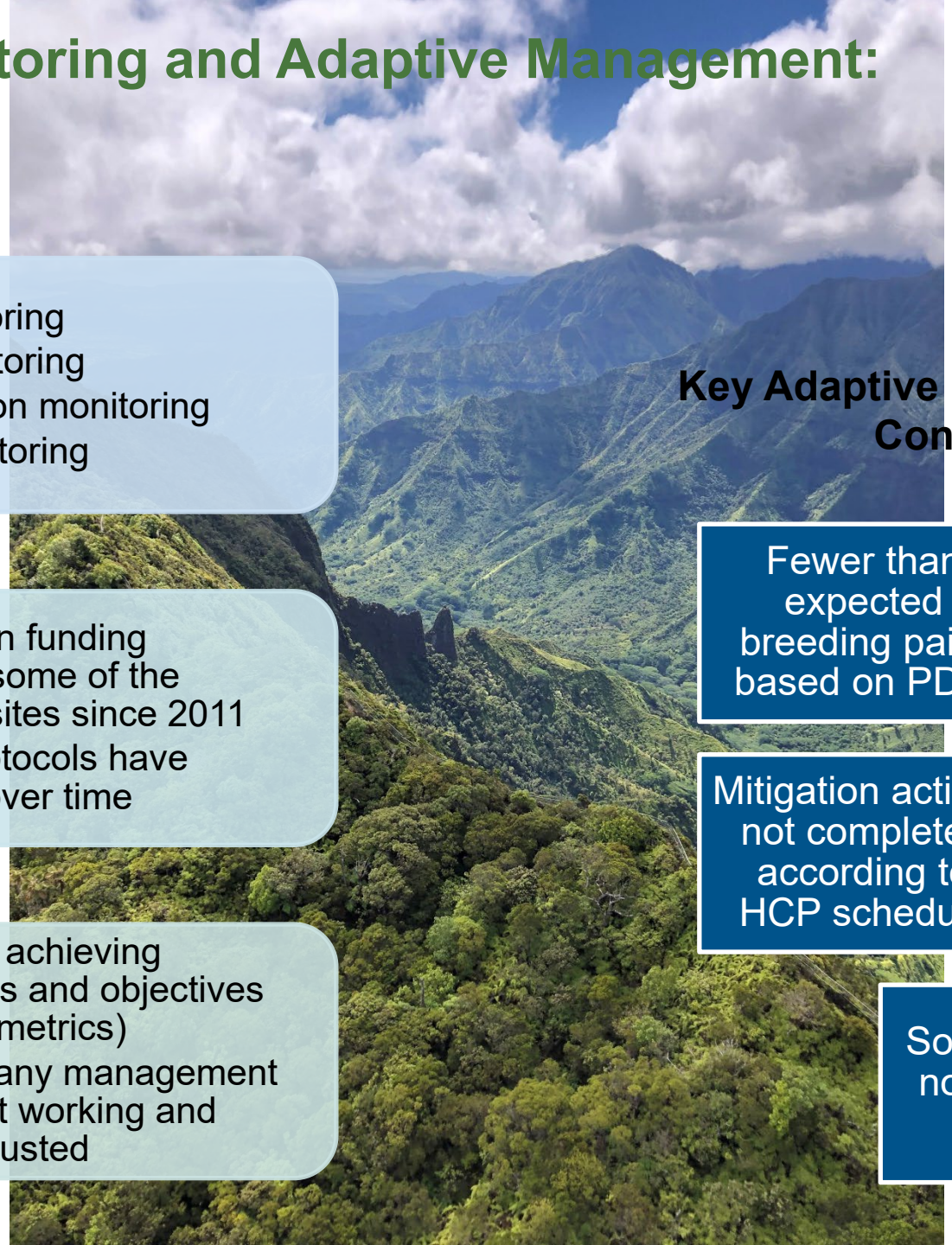
- Funding level is not sufficient to provide rehabilitation for the number of covered species
- KIUC will evaluate increasing funding level relative to the increase in covered species

Key Adaptive Management Triggers for SOS

Funding is not consistent with HCP requirement

Greater number of covered seabirds rehabilitated by SOS (i.e., funding may not be sufficient for increased effort)

Covered Seabirds – Monitoring and Adaptive Management: Conservation Sites



Multiple types of monitoring

- Burrow monitoring
- Call rate monitoring
- Social attraction monitoring
- Predator monitoring

Based on well established protocols

- KIUC has been funding monitoring in some of the conservation sites since 2011
- Monitoring protocols have been refined over time

Data Uses

- Demonstrates achieving biological goals and objectives (performance metrics)
- Determines if any management actions are not working and need to be adjusted

Key Adaptive Management Triggers for Conservation Sites

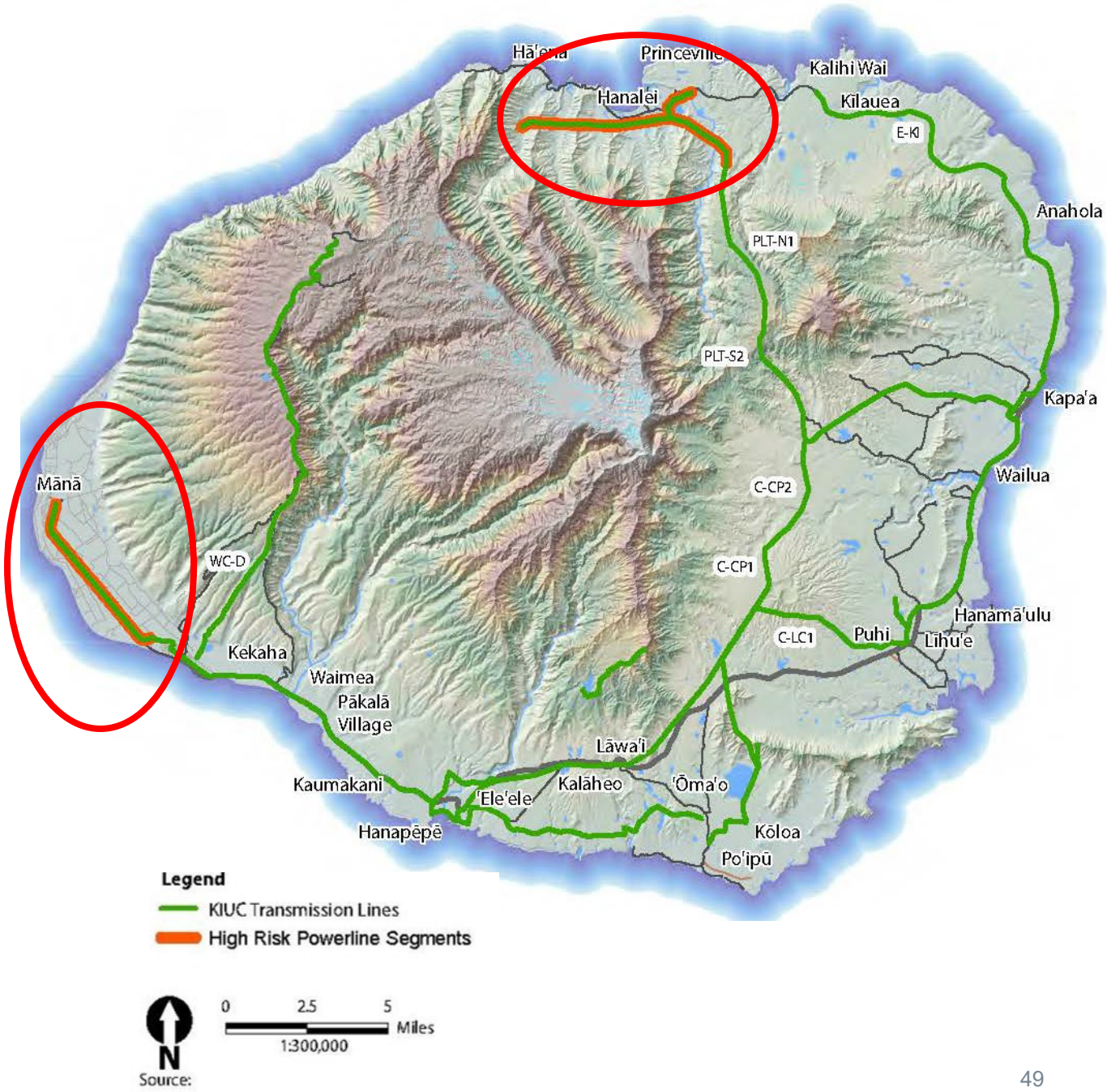
- Fewer than expected breeding pairs based on PDM
- Greater than expected number of seabirds taken by predator traps
- Mitigation actions not completed according to HCP schedule
- Lower than expected reproductive success rate
- Social attraction not working as expected

Section 2
Effects and Conservation Strategy for Covered Waterbirds

KIUC HCP: Covered Waterbirds

Effects on Covered Waterbirds

- Waterbird populations on Kaua'i are relatively stable or increasing
- Waterbird species may be injured or killed by powerline collisions near waterbird habitat
- Two areas of high risk for impact:
  - Mānā (spans 1-113) near Kawai'ele Waterbird Sanctuary and Mana Plain wetland area
  - Hanalei (spans 462-478 and 1297–1328) near Hanalei Wildlife Refuge
- These areas had unusually high numbers of strikes, indicating many strikes can be attributed to waterbirds.
- Visual surveys of movement in vicinity of lines and and SOS data of waterbird injuries/fatalities to assess strike risk.
- Powerline strikes are most commonly associated with lower distribution lines although some strikes have occurred on transmission lines



Effects on Covered Waterbirds

- Limited data to determine powerline strikes (take) for waterbirds
  - Some limited field observations of waterbirds in vicinity of lines from surveys in previous years (actual collisions only observed for Hawaiian goose (nēnē).
  - Acoustic monitoring for seabirds adapted for estimating take
- Estimated number of powerline strikes in Mānā is based on acoustic monitoring data from ARC
  - Between Mana substation and Kekaha substation
- Estimated number of powerlines strikes from Hanalei lines is extrapolated from the amount of powerlines strikes at Mānā
- Strikes by species is unknown; estimates based on observations of waterbirds flying by powerlines:
  - 51% Hawaiian goose (nēnē)
  - 22% Hawaiian duck (koloa)
  - 17% Hawaiian common gallinule (‘alae ‘ula)
  - 7% Hawaiian stilt (ae‘o)
  - 4% Hawaiian coot (‘alae ke‘oke‘o)
- Take limit for covered waterbirds = 74% of all recorded bird strikes along Mānā and Hanalei lines
- Take will be tracked by all waterbird species combined
  - Assume static proportion of all bird strikes in areas with waterbird habitat are covered waterbirds (74%)

Estimated Take for Covered Waterbirds from Powerline Strikes

Species	50-Year Total Strikes	50-Year Grounding	50-Year Injury	50-Year Powerline Mortality
Hawaiian goose (nēnē)	2,488	717	215	502
Hawaiian duck (koloa maoli)	1,084	312	94	219
Hawaiian common gallinule (ʻalae ʻula)	N/A	238	67	167
Hawaiian stilt (aeʻo)	320	92	28	65
Hawaiian coot (ʻalae keʻokeʻo)	N/A	60	17	42
TOTAL	**3,892***	1,419	421	995

* Take will be tracked by total number of strikes of all covered waterbirds

Conservation Measures for Waterbirds

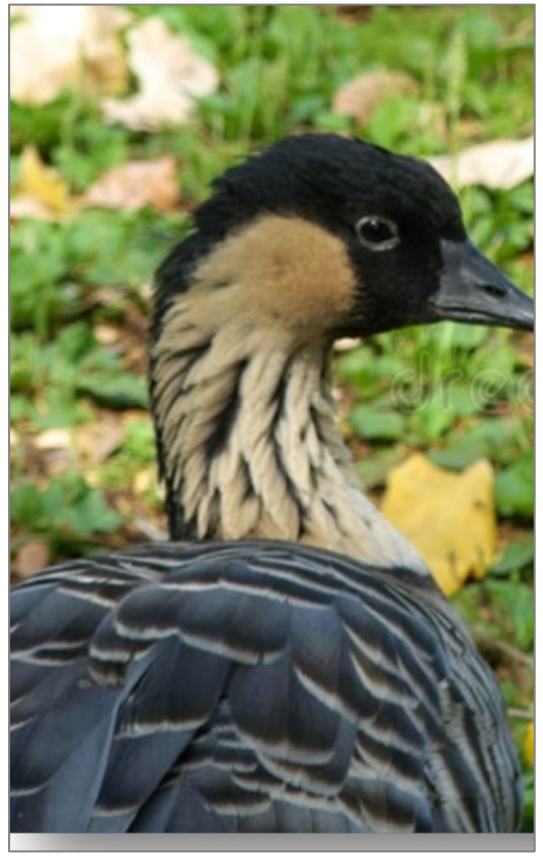
- **Implement Powerline Collision Minimization Projects**
  - High risk powerline spans for waterbirds
  - Types of minimization include (techniques typically used in combination):
    - Static wire removal
    - Flight diverters
  - HCP assumes KIUC will achieve **90 percent** strike reduction
    - In 2022, KIUC began monitoring covered waterbirds in Mānā
    - In 2023, KIUC will continue monitoring covered waterbirds in Mānā and will begin monitoring in Hanalei
    - Monitoring will continue for three years at each location to verify take estimates and strike reduction
    - Data so far indicates KIUC can achieve 90 percent minimization with combination of static wire and reflective diverters

Conservation Measures for Waterbirds (cont.)

- **Provide Funding for the Save our Shearwaters (SOS) Program**
  - KIUC has largely funded and implemented the SOS Program (since 2003)
  - The SOS program will minimize and mitigate the effects of the covered activities on covered waterbirds
  - KIUC commits to funding the SOS Program at a consistent funding level of $300,000 per year (in 2021 dollars)
    - Rescue, rehabilitate, and release covered waterbirds found by SOS Program on Kaua‘i, regardless of injury source
    - Funding will increase over time with accepted inflation rate index to ensure consistent funding stream

Monitoring and Adaptive Management for Waterbirds

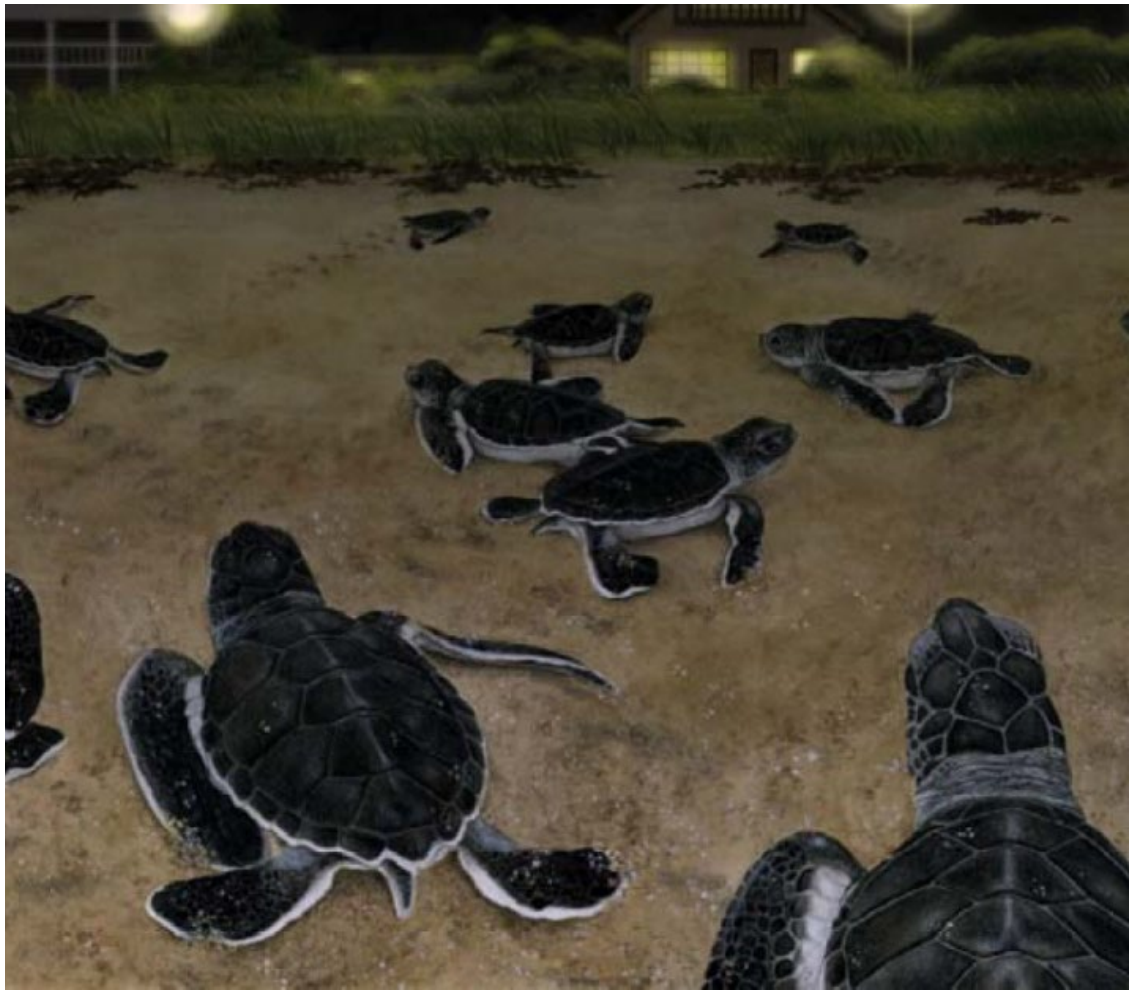
- **Monitor powerline strikes before and after minimization at Mānā and Hanalei**
  - Monitoring for strike reduction will be complete by 2026, except for new line installations or line changes in the future
- **Annual take monitoring will occur only at Mānā**
  - Most accessible area to monitor waterbirds over the long term
  - Will be used to monitor trends (and need for adaptative management) at Hanalei
- **Adaptive management options**
  - Additional minimization
  - Novel minimization techniques
  - Replacing less effective minimization techniques with those of higher efficacy



Section 3
Effects and Conservation Strategy for Green Sea Turtle (Honu)

Why Does the HCP Cover for Green Sea Turtles (Honu)?

- Potential impacts to sea turtles
  - Streetlights can disorient hatchlings away from beach and cause them to move inland where they are at risk of dehydration, starvation, vehicular impact or predation
  - Lights may cause adults to avoid nesting on beaches
- First documented incident with KIUC streetlights
  - September 2020 – In Kekaha
  - Green sea turtle hatchlings were reported crossing roadway towards streetlight
- Conservation measures for green sea turtle (honu) aim to minimize disorientation from KIUC streetlights

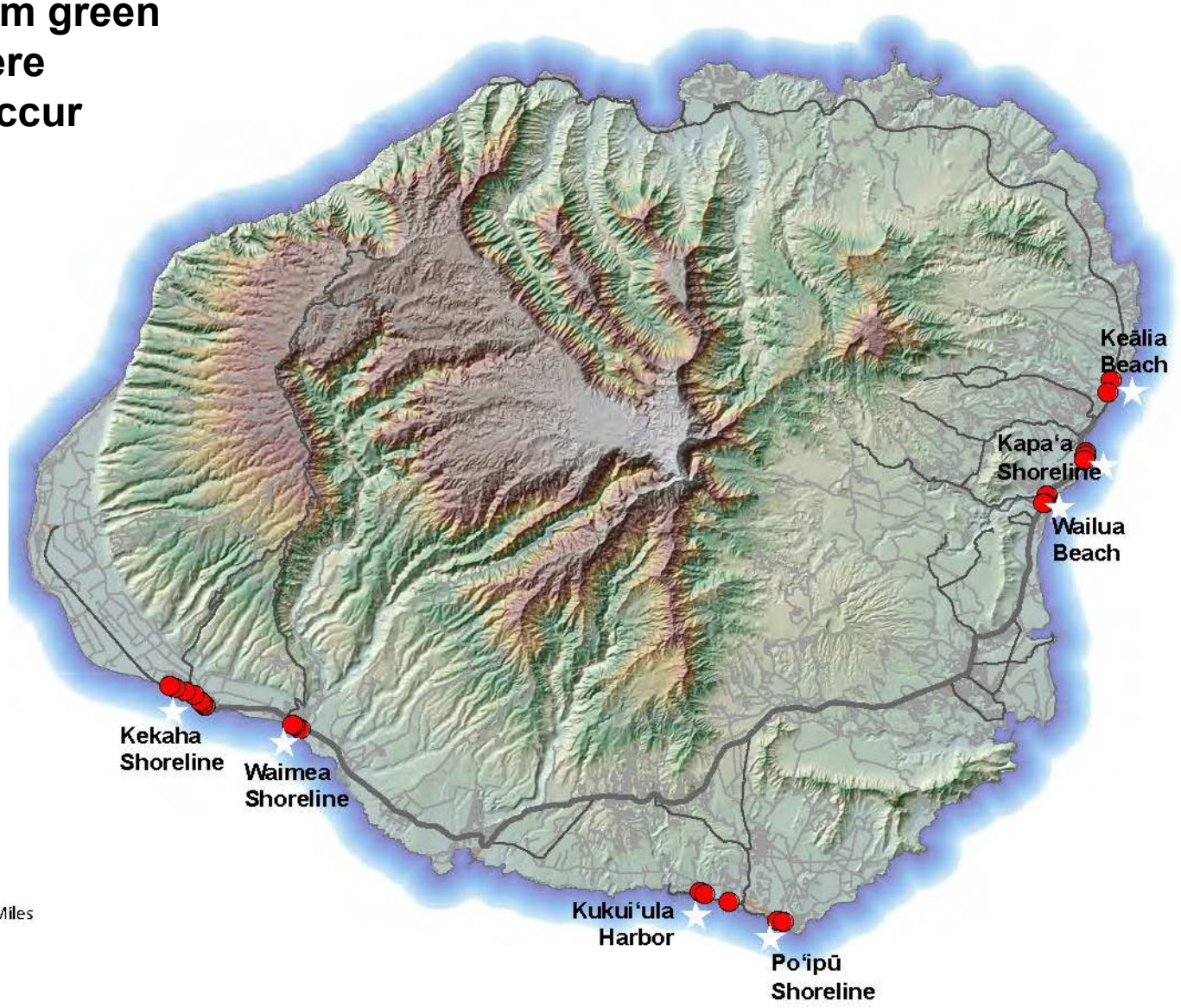


Effects on Green Sea Turtle (Honu) (cont'd)

- In 2019, KIUC with USFWS surveyed all beaches on Kaua'i with streetlights nearby and 2020 KIUC resurveyed these same areas
- 29 streetlight at seven beaches were determined to have sea turtle nesting habitat and streetlight visibility in 2019 and 2020
  - 2 streetlights at Keālia Beach
  - 4 streetlights at Kapa‘a Shoreline
  - 7 streetlights at Wailua Beach
  - 3 streetlights at Po‘ipū Shoreline
  - 3 streetlights at Kukui‘ula Harbor
  - 3 streetlights at Waimea Shoreline
  - 7 streetlights at Kekaha Shoreline
- Affected beaches are expected to shift over time- KIUC will reassess all Kaua'i beaches each year to determine risk
  - Sandy beach conditions will change over the course of the permit term
  - Shielding vegetation or buildings may also be removed or installed
    - E.g., trees were cut down in 2020 between Kuhio Highway and Wailua Beach

Effects on Green Sea Turtle (Honu) (cont'd)

Locations of streetlights visible from green sea turtle (honu) habitat (2020) where management and monitoring will occur



Effects on Green Sea Turtle (Honu)

- The HCP allows for the loss (i.e., take) of 50 nests over 50-year permit term
  - Based on past data, it is conservative to assume 1 nest will be taken per year (on average)
- Take has occurred when one or more green sea turtle (honu) hatchlings becomes disorientated by a KIUC streetlight
- The take limit is based on monitoring data from the Hawai'i Department of Aquatic Resources of the average amount of recorded green sea turtle (honu) nests on Kaua'i between 2015 and 2020
- Actual take will be measured by locating turtle nests and monitoring them at the time of hatching to see if any turtle hatchlings move towards streetlights (or if there are any signs that turtle hatchlings moved towards the light)

Conservation Measures for Green Sea Turtle (Honu)

- **Implement a Green Sea Turtle Nest (Honu) Detection and Temporary Shielding Program**
  - Conservation measure mirrors Kaua'i Seabird HCP, which was reviewed and approved by USFWS, DOFAW, ESRC and BLNR
  - Weekly surveys May 15 to December 15 to locate green sea turtle (honu) nests
  - Temporary shielding of green sea turtle nests from streetlights
    - Install light-proof fencing on beach between turtle nest and streetlight
    - Signage, flagging, and monitoring to prevent vandalism
    - Applies to all beaches identified throughout permit term as having streetlights visible from green sea turtle (honu) habitat
    - Will also be applied on green sea turtle (honu) beaches exposed to new streetlights as they are installed during the permit term

Conservation Measures for Green Sea Turtle (Honu) (cont.)

- **Identify and Implement Practicable Streetlight Minimization Techniques for Green Sea Turtle (Honu)**
  - Identify and Install Practicable Light Minimization Techniques
    - KIUC is working with the County and State to identify a range of practicable minimization measures and their timeline for implementation
  - This conservation measure can eliminate the need for temporary shielding if:
    - KIUC, County, State, USFWS and DOFAW agree to permanent light minimization techniques
    - KIUC permanently shields all existing and new streetlights eliminating the potential for green sea turtle (honu) hatchling disorientation

Monitoring and Adaptive Management for Green Sea Turtle (Honu)

- Monitoring purpose: Track whether nest detection and shielding worked and if there was any take
- Monitoring occurs more frequently as nest approaches estimated hatching date
- Monitors will be present for the hatching event, if possible (if not present will record signs of hatching)
- Adaptive management trigger: Number of nests taken in any year is 2 or greater, or take of any number of hatchlings from undocumented nests
  - Goal: Adjust management and monitoring early to ensure the take limit of 50 nests in not exceeded

Section 4. Cost, Funding, and Implementation of the KIUC HCP

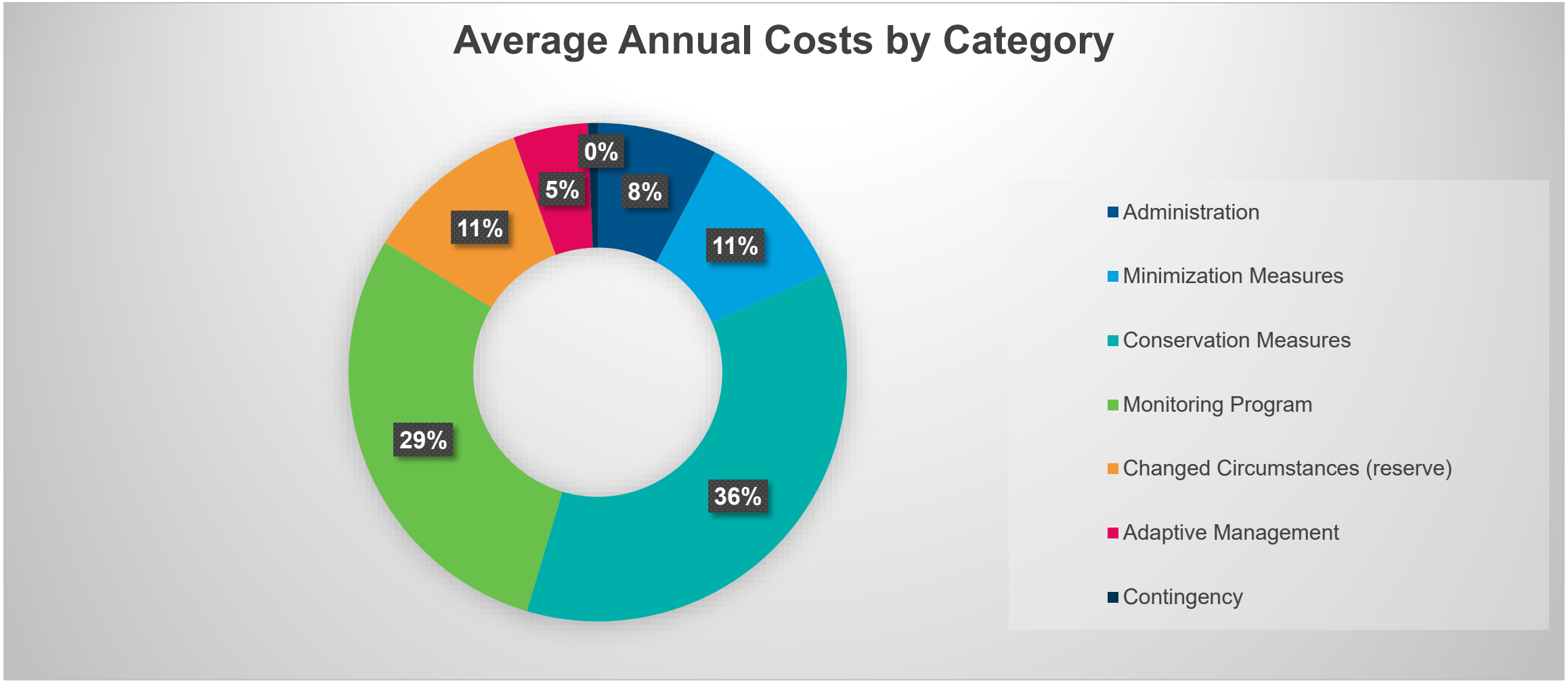
Estimated Cost of KIUC HCP (2023-2073)

- **Costs estimate**
  - Cost expressed in current dollars
  - Costs may change slightly based on agency comments on 2nd Administrative Draft
  - Overall magnitude of costs unlikely to change
  - Annual costs greatest in first two years (2023 and 2024) due to powerline minimization and predator fencing
- **Costs based on**
  - Seabird management and monitoring costs based on ~10 years of work on Kaua'i and refinement of methods
  - Waterbird monitoring costs based on recent management and monitoring on Kaua'i
  - Green sea turtle (honu) costs are estimated based on DAR's experience around the state
  - Contingency varies depending on cost certainty
- **Powerline minimization projects**
  - $23 million over 50-year permit term
  - Pre-implementation: KIUC spent $19.7 million in 2020, 2021, and 2022

Estimated Cost of KIUC HCP (2023-2073)

Cost estimate (current dollars) Cost categories	2023 HCP Costs	2024 HCP Costs	Avg. annual HCP Costs (2025-2073)	50-year total HCP cost (2023-2073)
Plan Administration	$452,500	$412,500	$412,500	$20,665,000
Powerline Collisions Minimization	$3,885,544	$363,141	$390,791	$23,006,640
Save Our Shearwaters Program	$300,000	$300,000	$300,000	$15,000,000
Manage and Enhance Conservation Sites	$3,576,627	$3,196,868	$1,538,202	$80,607,204
Green Sea Turtle Nest Detection and Temporary Shielding Program	$158,900	$96,400	$103,119	$5,205,000
Infrastructure Monitoring and Minimization Program	$539,911	$539,911	$539,911	$26,995,544
Seabird Colony Monitoring Program	$952,993	$952,993	$952,993	$47,649,648
State Compliance Monitoring	$50,000	$50,000	$50,000	$2,500,000
Changed Circumstances	$572,934	$572,934	$572,934	$28,646,679
Adaptive Management	$394,862	$294,183	$253,744	$12,868,745
Contingency	$145,813	$145,813	$30,378	$1,749,762
Total	**$11,030,084**	**$6,924,744**	**$5,144,571**	**$264,894,222**

Estimated Cost of KIUC HCP (2023-2073) (cont'd)



HCP Funding Assurances

- **KIUC has the financial capacity and commits to fully fund all costs of the KIUC HCP**
  - KIUC spent average of $11 million per year over the last three years (2020-2022) on early implementation and ongoing tasks
  - Estimated cost of HCP implementation = $5.1 million per year
- **HCP costs will be part of KIUC's operational costs, which are passed on to ratepayers**
  - All HCP costs are associated with the ongoing operation, maintenance, and construction of utility facilities and as such are expected to be rate based costs
- **Funding mechanisms**
  - Annual budgets for most costs
  - KIUC will secure **letter of credit** for adaptive management and changed circumstances
    - Letter of credit issued by financial institution on behalf of KIUC to guarantee payment up to a specified amount during a specified period of time

Implementation of KIUC HCP

- **Implementation Responsibilities**
  - KIUC is responsible for the day-to-day administration and implementation of the HCP. KIUC will prepare and submit an annual report to USFWS and DOFAW
  - USFWS will have the responsibility to monitor implementation and conditions of the ITP and HCP
  - The DLNR through DOFAW will have the responsibility to monitor implementation and conditions of the ITL and HCP
  - HCP annual reports will be provided to ESRC for review and recommendation for compliance.
- **Changed circumstances**
  - The HCP addresses the following changed circumstances
    1. Severe weather and the effects of climate change: hurricanes, flooding, landslides, and sea level rise
    2. New invasive species
    3. Disease outbreak in covered species
    4. Vandalism at conservation sites
    5. Population declines due to issues at sea

HCP and EIS: Schedule and Next Steps

- **Second Administrative Draft of the KIUC HCP**
  - Submitted Nov. 11, 2022, to USFWS and DOFAW
  - Currently undergoing agency review (comments due 12/23/22)
- **Environmental Impact Statement (EIS) process has begun**
  - Notice of Intent to Prepare EIS released June 8, 2022
  - Solicited public comments for 30 days
  - Public scoping meeting held June 28, 2022 (virtual)
- **Anticipated schedule**
  - Public Draft HCP released on state web site January 23, 2023
  - 60-day comment period
  - Public hearing on Kaua'i
  - July 2023– Public Draft of HCP and EIS released (NEPA)
  - Final HCP and EIS: Spring 2024
- **Next steps with ESRC**
  - ESRC review and site visit during 60-day state comment period
  - We have requested the week of March 6-10 for a site visit and public meeting on Kaua'i

Questions or Comments?

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