# Kauaʻi Endangered Seabird Recovery Project

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The Kauaʻi Endangered Seabird Recovery Project (KESRP) of the Pacific Cooperative Studies Unit, University of Hawaiʻi submits the following comments on the Kauaʻi Island Utility Cooperative (KIUC) Draft Habitat Conservation Plan. Our comments are informed by decades of research, monitoring, and active conservation of endangered seabirds on Kauaʻi.

KIUC's powerline infrastructure has caused substantial mortality of federally endangered Newell's Shearwaters (ʻaʻo) and Hawaiian Petrels (ʻuaʻu) for decades. While we recognize KIUC's efforts to develop this HCP and implement powerline minimization measures along with conservation activities in seabird colonies in the NW part of Kauaʻi, the current proposal contains significant scientific and methodological concerns that undermine confidence in its ability to achieve meaningful recovery of these critically imperiled species.

Our primary concerns center on: (1) requesting maximum possible take based on population modeling that assumes stable trends despite lack of quantified, direct population data in focal colonies; (2) inadequate take monitoring programs that may fail in reliably detecting population declines; (3) weak adaptive management responses with excessive implementation delays; (4) insufficient response mechanisms to changed circumstances; and (5) lack of uncertainty quantification throughout the analysis. In addition to comments related to seabirds, we also present comments related to waterbirds and sea turtles with the contribution from KESRP Principal Investigator Dr. Shaya Honarvar.

Endangered seabird populations with slow life histories and low reproductive rates cannot sustain even modest increases in adult mortality. When authorizing take of these species, the burden of proof must favor conservation. The current HCP shifts this burden by using best-case scenarios to justify maximum take levels, rather than employing precautionary approaches appropriate for species with narrow global range and at risk of extinction.

The following comments identify specific areas requiring revision to ensure this HCP meets the standards necessary for recovery of Kauaʻi's endangered seabirds and waterbirds and mitigate the impact on sea turtle populations.

Respectfully,


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## Comments Related to Seabirds

1. General Comment: KIUC's draft HCP relies heavily on the population dynamics models generated for endangered seabird species. KIUC states that the two population dynamics models presented in the draft HCP represent upper and lower bounds of plausible numbers and trajectories for the Kauaʻi metapopulation of endangered seabirds and the reality probably lies somewhere in between. In this case, using the upper-bound in requesting the maximum amount of take possible ignores the precautionary principle, especially when many model parameters are not directly based on robust population dynamics data collected in Hanalei to Kekaha. The three data sources used in the population dynamics models to claim stable trends are all indirect proxies for population health, each probably with certain biases. Using them to claim stability—and then authorizing maximum take—is problematic because non-significant trends in radar, powerline observations or seabird rehabilitation data do not prove the population is stable. KIUC and relevant agencies should agree and use either an arbitrary model in-between the models presented in the draft HCP or tiered approach where take and health of the Kauaʻi metapopulation of endangered seabirds are monitored more thoroughly and take request is adjusted accordingly.
2. KIUC's activities impact endangered seabird all across Kauaʻi due to widespread area its power grid ranges. Yet the designed monitoring of endangered seabird metapopulation health outside of the conservation sites (i.e., Hanalei to Kekaha) includes only take monitoring, with the major assumption that stable-trend scenario is the real scenario (e.g., the populations of ʻaʻo in this region grows at 4% annually and breeding success is on average 0.55, with breeding probability of 0.99). Adaptive management for Hanalei to Kekaha populations is designed to be triggered only when the take limit is exceeded, which will be monitored only in high-risk spans after the HCP is started. What happens if the population is declining at a larger rate than assumed in the stable-trend model? Currently, KIUC draft HCP does not list anything that would capture the sharper declines in the populations between Hanalei to Kekaha and should include (i) increased take monitoring in representative samples of low and moderate-risk spans across the island, and (ii) different monitoring methods such as indirect indices as bare minimum for Hanalei to Kekaha populations so their health can be tracked.
3. 4.4.1.1 Powerline Collision Minimization Projects: In Section 5.2.1.1 KIUC provides estimated rates of bird strikes per wire span in 2019 (Figure 5-1a). Based on this figure, highest strike rates (above 30 birds) occur along the powerline trail, Anahola, Waimea Canyon, Kilohana and Waipouli Rd. Medium strike rates, on the other hand, occur all around the island, probably including areas with smaller populations of the species and therefore, the population-level impact of this take may be different across the metapopulation. The rate of bird strike reduction in the medium and low risk spans as given in Table 4-2c are much lower than rate of high-risk spans (61%, 59% and 85% respectively). What is the reason for lower reduction along the medium and low strike risk spans? Considering the low level or otherwise lack of monitoring and conservation of seabird populations outside of NW part of the island and considering knowledge gaps on the genomic diversity, connectivity and demographic connectivity within the subpopulations of all three endangered

seabird species, more effort should be allocated in reducing the strike rates in medium and low risk areas -assuming it is feasible and relatively low cost- to effectively offset the impact of past and current take. In addition, minimization coverage in high-risk spans should aim maximum practicable degree if more than 80% of these spans are feasible to minimize.

4. Chapter 5 various pages where they give figures of population dynamics model scenarios: In their draft HCP, KIUC presents two population dynamics models for endangered seabirds. Throughout the document, the two model outcomes are only provided as single lines, lacking confidence intervals around projections, which implies false precision. Also, the majority of the parameters of model used for Hanalei to Kekaha region (i.e., stable-trend model) relies on assumptions rather than robust data collected from these breeding populations. For example, breeding probability parameter of 0.99 is based on burrow occupancy data collected without marking of individuals, which is potentially biased. This data is used for all populations and assumed the same across the island. Similarly, reproductive success rate of 0.56 in stable-trend model comes from current conservation sites in the NW side of the island, collected between 2019-2021. Between 2019 and 2021, ungulate fences were already present in Hono O Nā Pali NAR, providing some degree of protection and habitats were distinctly more pristine in comparison to some of the suspected Hanalei to Kekaha colony locations. KIUC should provide a sensitivity analysis showing how outcomes change if these assumed parameters are different (lower or higher) to enable easier understanding for the range of impact. KIUC should also provide information on which parameters drive uncertainty the most should in these population models.
5. Chapter 5 various pages where they give figures of population dynamics model scenarios. In its draft HCP, KIUC presents two population dynamics models for endangered seabirds. Currently the stable-trend model assumes stable growth rate and calculates how much take the population can sustain based on viable population size provided by USFWS and DOFAW. The current model produces one line showing population trajectory with the calculated level of take. Besides providing uncertainty around these estimates (i.e., confidence intervals), KIUC should show what happens if the growth rate is different (e.g., -1%, -2% etc. or across the rate that radar data provides for 15 different locations) and if sustainable population assumption is robust for requested take across plausible scenarios. At what growth rate does the population start declining despite minimization and mitigation?
6. 5.3.1.2 Powerline Collisions—Methods > Indirect Take of Eggs or Chicks, PDF page: 270. The current models use 80:20 subadult to adult ratio in take, which is based on a limited and potentially biased sample set as acknowledged by KIUC. The draft mentions a recent study based on necropsy of retrieved powerline collision carcasses. If this sample size is larger than 14, it should be considered as best available data and this ratio should be updated. If there is any increase in the adult ratio, the model might be underestimating demographic impact of the requested take as adult mortality has a greater demographic impact on the population. As this metric has a major potential impact on the models, a sensitivity analysis should be provided for this metric by showing plausible scenarios with the change of this 80:20 ratio.
7. 5.3.1.3 Light Attraction and Fallout—Methods, PDF page: 271. KIUC lists using white LED lights at its facilities as one of the mitigation measures. White light emitted by LED lights contains usually

high rates of blue light, which is concluded by many peer-reviewed publications as a factor increasing seabird light attraction. KIUC should consider options with currently accepted standards for dark sky or wildlife friendly lighting. KIUC should also lists these standards such as less than 2% blue light content between 400 and 500nm, CCT lower than 2700 K in all new lights or using amber lenses to reduce blue light content in the existing lights.

8. 5.3.1.3 Light Attraction and Fallout -Methods, PDF page: 274. In Section 5.3.1.3 Light Attraction and Fallout -Methods, Fallout from Lights at KIUC Covered Facilities, KIUC states that stray cats captured at facilities will be removed from the property. KIUC should clearly state what the removal method will be and consider prioritizing euthanasia as other methods are not as feasible in removing cats from the landscape. Also, in the same section, KIUC states that “KIUC covered facilities are fenced and monitored for pests, which greatly reduces predation of downed birds prior to detection and rescue”, unless these are cat-proof fencing, KIUC should not make such a claim of reduced predation due to fencing. Finally, in their claim of reducing the fallout birds to zero in 2019 and one bird in 2020, KIUC should incorporate their searcher efficiency rate in calculating and reporting these numbers (e.g., 10 birds in 2020 when 10% searcher efficiency is applied?)
9. 5.3.1.5 Impacts of the Taking—Methods, PFD page: 276. KIUC's draft HCP does not have consistency in the use of population models. KIUC adopts "worse-case scenario" with population intrinsic growth rate of 1% and low starting population, in assessing the success of their conservation goals. Assuming the subpopulations that are receiving the most conservation effort and located on more pristine habitats has much lower intrinsic growth rate than the rest of the island is not realistic. If as claimed, island-wide metapopulation is stable in the recent decades, starting populations and growth rate at conservation sites may be higher as well (estimates on starting populations in these areas are not coming from robust methods). This means KIUC already reached the goal of 1% growth rate or will reach in short time, creating an inflated, false perception of success. If the take request is based on stable-growth scenario, conservation targets in the NW colonies should also be based on this. Starting and end population sizes and population growth rate should be quantified accordingly based on robust methods such as mark-recapture or systematic counts accounting for detection probabilities.
10. Chapter 6 Adaptive Management Table 6-2 Compliance Monitoring Conservation Measure 2, PDF page:367-368. Metrics of success for Conservation Measure 2: Implement Measures to Minimize Light Attraction should include spectral details that are so far reported to be wildlife or dark sky friendly, such as less than 2% blue light content between 400 and 500nm, CCT lower than 2700 K in all new lights etc.
11. Chapter 6 Adaptive Management Table 6-2 Compliance Monitoring Conservation Measure 2, PDF page: 369. The metric of success "Annual seabird training program prior to the start of the seabird fallout period (September 15 to December 15) using Appendix 6B, KIUC Site Monitoring Protocols and Procedures for Protected Seabirds" is not adequate to ensure that grounded seabirds will be searched and rescued effectively. An additional metric of success showing the learning achieved (e.g., in species identification and search efficacy) should be added and monitored.

12. Chapter 6 Adaptive Management Table 6-2 Compliance Monitoring Conservation Measure 4, PDF page: 370. Adaptive management responses to the trigger of failed predator control implementation and fencing should not be ambiguous. KIUC should list potential tangible actions such as increasing predator proof fences, implementing predator control in additional sites etc. for these metrics. Similarly, response to failures in social attraction are ambiguous without clear timeline "KIUC will identify minimization/or mitigation to ensure Objective 1.3 met" KIUC model should have all the data needed to pre-identify that minimization/ or mitigation action in the HCP. This ambiguity is also present in the invasive plant species management metrics.
13. Chapter 6 Adaptive Management Table 6-2 Compliance Monitoring Conservation Measure 1, PDF page: 374. Adaptive management triggers set by KIUC and listed in Table 6-2 for compliance monitoring are mostly quantitative, meaning they are measurable. Once the trigger has been reached or exceeded, assuming its calculation was accurate, there should not be further ambiguity whether an adaptive response is required. In all of the adaptive response measures given in Table 6-2 Conservation Measure 1. Implement Powerline Collision Minimization Projects, the first step (Adaptive Management Response Step 1) is a seemingly long process of monitoring and evaluating whether adaptive management response is needed. This long process will potentially remove more individuals from the population and delay meaningful actions. Once an adaptive trigger is reached, response should start with Step 2 for all triggers listed in Table 6-2. Immediate response, which is an action that prevents further take and offset to produce/protect additional individuals should be implemented. For example, the second line in Table 6-2 lists "an average of more than 36 miles of new wires in any 5-year period" as adaptive management trigger and the Response Step 1 says "Monitor new powerlines and evaluate, in coordination with DOFAW and USFWS whether powerline collisions may increase due to new powerlines..." If there will be a further monitoring and evaluation following an adaptive management trigger is reached, this is not triggering adaptive management as it supposed to be. As shown by years of powerline and radar monitoring data cited in KIUC's draft HCP, endangered seabirds fly all around Kauaʻi and moderate collision risk spans are located all across the island. Therefore, KIUC should be more proactive in the case of hitting any adaptive management trigger listed for Conservation Measure 1 in the Table 6-2 and improve the urgency of their responses for these triggers.
14. Chapter 6 Adaptive Management Table 6-3 Adaptive Management Triggers for Take and Effectiveness Monitoring. PDF page: 377. In Table 6-3, Conservation Measure 1 Implement Powerline Collision Minimization Projects, exceeding the 5-year rolling average strike rates annually as given in Table 6A-1 and 6A-2 was set as adaptive management trigger. This means, if the number given in Table 6A-1 and 6A-2 is exceeded for a given year, adaptive management should be implemented. Yet in the response table (Table 6-3) the first step of adaptive management response is to discuss with USFWS and DOFAW whether adaptive management is needed in the case of exceeding the number! This adaptive management strategy has critical weaknesses: first of all, 5-year rolling average already smooths out acute high mortality events and potentially avoids any response in the first 5-year of implementation(?). Secondly, the response step 1 includes notifying DOFAW and USFWS within 30 days of receiving the annual report and meeting and conferring if minimization, modifications or monitoring is needed despite

adaptive management has been triggered. Response step 2 mentions possibility of testing novel methods, identifying a practicable plan within 6 months of annual reporting and that timeline for minimization is unclear, depending on the method. Completing annual report for an island-level take data will take minimum to July 1 of the subsequent year as stated by KIUC in Chapter 7. Including KIUC's 6-months long planning and unspecified time of implementation, a response to exceeding the number of requested take will take 13+ months, impacting the subsequent breeding season of the species and potentially more than one season. During this lag, the population may continue experiencing unsustainable mortality. For species with low growth rates, 13+ months of elevated mortality can erase years of recovery, especially if subpopulations are impacted by this mortality unequally. Finally, testing novel techniques during a potential crisis should not be part of the response. KIUC should test novel techniques in their regular implementation and monitoring phase and be proactive for this adaptive management trigger. It is also not clear how the mitigation effectiveness will be monitored and evaluated. Considering the increased take will not just be a number and have population-level impacts, adaptive management response should have a tiered approach. Instead of triggering adaptive management once the 5-year rolling average take number reached or exceeded, KIUC set a percent threshold of annual strike rate, at which reporting or further data analysis is expedited and be ready to implement pre-identified mitigation if/once the annual rate is reached. This pre-identified mitigation can be based on learning in the short-term HCP and following the completion of minimization projects in 2024. Finally, island-wide take calculations from acoustic monitoring data and their reporting should not be on annual basis with a report delivered by July 1 in the following year but at least quarterly to make the compliance monitoring and adaptive management response process faster.

15. Chapter 6 Adaptive Management Table 6-3 Adaptive Management Triggers for Take and Effectiveness Monitoring, PDF page: 379. In Table 6-3, Take Monitoring, Objective 1.3 (Newell's shearwater (ʻaʻo)), Objective 2.3 (Hawaiian petrel (ʻuaʻu)), Adaptive management response for Conservation Measure 4 for both seabirds and waterbirds should include a clear minimum timeframe for the implementation of mitigation or offseting actions. Currently, it's not clear how much time KIUC will take to implement a tangible action.
16. Chapter 6 Adaptive Management Table 6-3 Adaptive Management Triggers for Take and Effectiveness Monitoring, PDF page: 380. In Table 6-3, Effectiveness Monitoring, Objective 1.1 and Conservation Measure 1, KIUC aims to collect monitoring data for three years to quantify the reduction of strikes before triggering adaptive management. This draft HCP doesn't account for connectivity/isolation within the metapopulation and bases its take request on a model where majority of the parameters are assumed and not directly quantified at the relevant breeding populations. Considering this, KIUC's approach to exceeding take should be more precautions and proactive. If one year long monitoring data shows failure in reaching the targeted reduction and if there is a clear learning (e.g., birds continue to collide with unminimized wires of otherwise minimized spans), KIUC should continue implementing minimization measures to the most practicable degree. In addition, KIUC states their first three-year monitoring to quantify targeted reduction will be reached by the end of 2027, yet KIUC sets end of 2028 for identifying additional

minimization to make up the difference. This means failed reduction target will continue to remove individuals from the population for another year. KIUC should be proactive and already identify such additional minimization if the target is failed to reach by the end of 2027. Moreover, KIUC should be proactive in their plan for analyzing and reporting their results from this three-year monitoring to accelerate the response process in case adaptive management is triggered.

17. Chapter 6 Adaptive Management Table 6-3 Adaptive Management Triggers for Take and Effectiveness Monitoring, PDF page: 382. In Table 6-3, Effectiveness Monitoring, Objective 1.3 and Conservation Measure 4, KIUC should be consistent and target 4% growth rate at all conservation sites. Quantification of this metric of success should not be limited to indirect index of population health (bird call rates at colonies) but also include direct population dynamics data collected through mark-recapture approaches in these sites.
18. 6.4.1.2. Take Monitoring of Powerline Strikes, PDF page: 390. KIUC draft HCP states that the scope of powerline strike monitoring will be narrowed to five high-risk locations once the strike reduction monitoring is complete (assumed 2027, following 3-year monitoring after all minimization is completed). These locations are Powerline Trail, Mānā (Kekaha), Waimea Canyon Drive, East Kīlauea, Līhuʻe and Central Region. KIUC argues that because these areas contribute most of the collisions within KIUC's power grid, their take forecasts will be representative for all spans across the island. Inferring trends over the entire powerline system from non-random, and potentially biased samples (because of their differing risk and therefore minimization effectiveness) is statistically invalid. KIUC also argues that conservation sites will become source colonies due to success in predator management and social attraction, and provide individuals to other subpopulations across the island. Based on this, and assumed such dispersal, KIUC's limited powerline monitoring has potential to miss increasing strike rates in otherwise low or moderate-risk spans. These spans are located all around the island as mapped in Figure 5-1a and 5-1b. Given the range of power grid and minimization, KIUC should include a representative sample of low and medium-risk spans from all around the island in addition to high-risk spans in their powerline take monitoring and these areas should also include static sites where acoustic sensors remain at the same location over the entire breeding season in order to have a better understanding on the impact of take on different subpopulations in the future. Because take is not merely a number, it has population-level impacts.
19. 7.3.3 Changed Circumstances Addressed by this HCP, PDF page: 446. In Table 7-3 Changed Circumstances Resulting from Severe Weather and Potential Responses, KIUC details responses to changed circumstances. In Damage, loss, or destruction, to a portion of or the entire predator exclusion fence, KIUC states that "Repair and replacement work must be complete as soon as practically feasible within identification of need, but at the most within 2 years, unless otherwise agreed to in writing by the agencies" For major fence damages, this timeline is understandable, however for smaller repairs the timeline set here gives KIUC a major flexibility while increasing the risk of predator incursion in the fences. KIUC should structure this response based on small, medium and large-scale repairs by defining these categories and coming up with more meaningful, definite timelines for each.

20. 7.3.3.5 Population Declines due to Issues at Sea, PDF page: 458. As a remedial measure to declines in the populations of endangered seabirds due to issues at sea, KIUC proposes to start implementing predator control at one more site that is occupied by Newell's Shearwater and Hawaiian Petrels. One site as a quantity does not make any sense in the context of species recovery. This measure is prioritizing cost over conservation and this response is grossly disproportionate to the threat scenario described in this section (i.e., observable population declines). Considering the severe adult and subadult mortalities caused by KIUC's unminimized power grid for years, the smaller populations of endangered seabirds have certainly become more vulnerable to these kinds of events and KIUC bears responsibility for robust recovery efforts. Besides initiating colony management in new areas, in the case of observable population declines due to issues at sea, the draft HCP should include steps like consideration of immediate reduction of KIUC's authorized take, accelerated powerline minimization to the most practicable degree, enhanced monitoring at all conservation sites etc.

## Comments Related to Waterbirds

1. 5.2.1.3 Powerline Strike Effects Pathways for Covered Waterbird Species, PDF page: 251. In Chapter 5, KIUC seemingly underestimates the impact of powerline collisions on waterbird populations on Kauaʻi. The following statement is not true: "The life history of the covered waterbirds is substantially different than the covered seabirds, resulting in less vulnerability than the seabirds to population effects resulting from powerline collisions." Yes, the life history traits of many waterbird species are making them 'faster-growing' populations relative to seabird populations. But the size of the populations, locations of take and other threats both groups are facing are different and makes this comparison impossible. Some waterbird populations are down to a few hundred individuals across the State. Gorresen et al., 2024 (Technical Report HCSU-113) reports: "on Kauaʻi, the estimate for the koloa maoli was 673 (516–854)." Ten individuals estimated to be removed from this small population each year will likely have a significant impact on the populations' viability, especially combined with the risk of habitat loss, predation and diseases. KIUC should come up with a greater investment for offsetting such impact, such as increasing the breeding success and habitat quality of these species rather than only rehabilitation by Save Our Shearwater program.
2. Chapter 6 Adaptive Management Table 6-3 Adaptive Management Triggers for Take and Effectiveness Monitoring, PDF page: 377. Similar to adaptive management strategy for exceeded seabird strikes in powerlines, the adaptive management response for waterbird strikes that are reached or exceeded the annual limits have critical weaknesses. Response step 2 mentions possibility of testing novel methods, identifying a practicable plan within 6 months of annual reporting and that timeline for minimization is unclear, depending on the method. Completing annual report for an island-level take data will take more than few days, if not months. Including KIUC's 6-months long planning and unspecified time of implementation, a response to exceeding the number of requested take will take 6+ months, impacting the subsequent breeding season of the species. During this lag, these already small populations may continue experiencing unsustainable mortality. Finally, testing novel techniques during a potential crisis should not be

part of the response. KIUC should test novel techniques in their regular implementation and monitoring phase and be proactive for this adaptive management trigger. It is also not clear how the mitigation effectiveness will be monitored and evaluated. If annual take numbers are reached or exceeded, KIUC should immediately implement pre-identified minimization techniques and offset the exceeded take by investing for these species' population increase (through predator control or habitat restoration) and producing 1:1 individual as minimum.

## Comments Related to Sea Turtles

The following comments include the input from KESRP Principal Investigator Dr. Shaya Honarvar, PCSU, University of Hawaii.

1. 4.4.5 Conservation Measure 5. Implement a Green Sea Turtle (honu) Nest Detection and Shielding Program > 4.4.5.1 Nest Detection > Monitoring Program, PDF page: 228. This methodology demonstrates multi-stakeholder coordination but relies on observation by humans (unclear if experts or relatively inexperienced volunteers) that fails to adequately simulate hatchling sensory experience. The binary visible/not-visible approach for light detection oversimplifies a complex phototaxis response. The current method lacks quantitative measurements such as lux/illuminance, sky glow assessment or spectral analysis. Also, "most likely path" assumption is inadequate: Hatchlings don't necessarily take the shortest route; they orient toward brightest areas. If artificial lights are brighter than ocean horizon, they'll create new paths toward lights. Protocol doesn't assess 360-degree light environment from nest and how much KIUC lights contribute to this environment quantitatively. Without quantitative measures this protocol may provide false assurance while hatchlings remain at risk. Depending on the other light sources surrounding KIUC lights, the actual light source causing disorientation in Honu may not be identified reliably. The approach should provide more details for such scenarios where KIUC lights are playing a role in harming the nest but not the sole light source around it.
2. Chapter 6 Adaptive Management Table 6-2 Compliance Monitoring Conservation Measure 6, PDF page: 375. In Conservation Measure 6: Identify and implement practicable streetlight minimization techniques for green sea turtles, metric of success should include a pre-identified minimum time frame for installation of light minimization techniques. As it is, the action timeline is ambiguous, leaving the sea turtle nests in risk of light attraction.
3. General Comment on Sea Turtles: Understanding the balance between effective light shielding and maintaining a natural nesting environment is essential for responsible management and conservation. We would appreciate clarification on the following points:
    a. If the nest is properly shielded and hatchlings emerge and begin crawling toward the ocean, how does the shielding ensure that they are not affected or disoriented by nearby artificial light sources during their crawl?
    b. Does the shielding typically extend all the way to the high tide line to guide hatchlings effectively, or is it only positioned around the nest site?
    c. What materials are commonly used for constructing the shielding? And how close is the shielding typically placed to the nest?

d. Could the shielding cast a shadow on the nest during the day, potentially affecting sand temperature and thus influencing embryo development or hatchling sex ratios?
e. Does the shielding inhibit rainwater from reaching the nest, thereby altering moisture levels or temperature and impacting incubation conditions?"