Understanding Conservation Decision-makers' Preferences for Evidence

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Abstract

1. Effective conservation depends on decisions informed by evidence that is both trustworthy and relevant to specific local contexts. However, little is known about which characteristics of evidence conservation decision-makers prioritise when deciding what information to trust.

2. We explored decision-makers' preferences for different attributes of evidence using a discrete choice experiment in which respondents (n = 62) repeatedly chose between pairs of evidence items described by six attributes: evidence source, type, timespan, habitat similarity, species relatedness and recency. We fitted conditional logit models to estimate the relative importance of attributes and levels within them, complemented by semi-structured interviews (n=10) to understand decision-makers reasoning behind their choices.

3. Species relatedness (32% relative importance) and evidence type (18%) most strongly influenced choices. Participants showed strong preferences for evidence from the same or similar habitats and species, from published evidence reviews, and to a lesser extent, from published scientific studies over unpublished reports and expert opinion.

4. Interviews reinforced the importance of context, especially local ecological relevance, and revealed tensions between valuing long-term datasets and needing timely evidence for decisions; participants often prioritised "the right species in the right habitat" over how recent or long-running a study was. Across methods, participants preferred synthesised evidence that closely matched the focal species and habitat, but were willing to draw on less directly relevant evidence when it was clearly presented and transferable in its context.

Solution: To maximise trust in evidence and its use in conservation decision-making, identifying the contextual similarity between decision-makers' focal setting and the available evidence is important. Contextual information and metadata needs to be clearly communicated in studies, syntheses, and evidence platforms to ensure globally collated evidence can be contextualised to inform decisions for different taxa, locations, and socio-cultural contexts. Guidance is also needed on when and how evidence can be transferred across settings, especially when locally relevant evidence is unavailable.

1 Introduction

Global biodiversity is declining rapidly, reinforcing the need to protect, restore, and sustainably manage ecosystems using approaches that are as effective as possible (Scott et al., 2024). To implement effective actions, conservation decisions need to be informed by reliable evidence that is relevant to specific decision-making and management contexts (Braunisch et al., 2012; Toomey et al., 2016). However, decision-makers must navigate multiple, sometimes conflicting, information sources while facing time, resource, and political constraints (Cook et al., 2013; Sutherland & Wordley, 2017; Christie et al., 2023).

Here, we define evidence as any relevant information, data, knowledge or wisdom gathered to evaluate an assumption, hypothesis or question of interest (Nutley et al., 2013; Salafsky et al., 2019; Christie et al., 2023). Conservation decisions draw on a wide range of evidence types, ranging from experimental and quasi-experimental studies, models, and syntheses (e.g. systematic reviews, maps and meta-analyses), to local case studies, citizen science, monitoring data, reports, expert judgement, as well as practitioner, Indigenous, traditional, and local knowledge (Christie et al., 2023; Cooke et al., 2023; O'Connell et al., 2024). These different evidence types vary in accessibility, perceived rigour, contextual relevance and trustworthiness, which can shape whether and how they are used.

Concepts such as evidence hierarchies and epistemic pluralism offer different lenses on how evidence should be weighted. Evidence hierarchies, originally developed in medicine (Jerkert, 2021) and later adapted to conservation (Dicks et al., 2014; Pullin & Knight, 2003), prioritise certain study designs (e.g. randomised experiments) over others. However, they have been criticised for oversimplifying complex social–ecological decisions and for underplaying context, feasibility and practitioner expertise (Adams & Sandbrook, 2013; Jerkert, 2021).

Epistemic pluralism, by contrast, emphasises that what counts as credible or preferred evidence depends not only on technical quality but also on institutional, cultural and professional backgrounds (Burgman et al., 2023; Guibrunet et al., 2024). Together, these perspectives suggest that understanding conservation decision-making requires attention to both evidence attributes (e.g. type, source, recency) and the preferences, heuristics, and contexts of decision-makers.

Empirical work shows that conservation decision-makers do not simply default to peer-reviewed scientific studies or evidence syntheses. They often prioritise tool- or context-specific information, local monitoring and experiential knowledge, and advice from trusted peers and intermediaries, particularly when management problems are urgent or highly place-based (Cook et al., 2016; Gutzat et al. 2020; Tyllianakis et al., 2023; Sabo et al., 2024). However, most existing research focuses on whether evidence is used at all (Walsh et al., 2014; Pullin et al. 2004; Lemieux et al., 2021), and individuals' attitudes towards different evidence types and sources (Cook et al., 2012; Arias et al., 2021; Kadykalo et al., 2021; Gutzat et al. 2020) rather than on how decision-makers trade off among multiple evidence attributes when making a specific decision. We still know relatively little about how different attributes of evidence influence decision-makers preferences for trustworthy evidence, which attributes are most important, and what reasoning underpins these choices.

Discrete choice experiments (DCEs) provide a structured way to investigate such trade-offs (Street et al., 2007; de Bekker-Grob et al. 2010; Alamri et al., 2023). In DCEs, respondents repeatedly choose between hypothetical options described by a set of attributes (e.g. evidence type, source, recency; Webb et al., 2021), each with different levels (e.g. published scientific study versus internal report; government agency versus NGO; Abiiro et al., 2014). Analysing these choices reveals the relative importance of different attributes and the patterns of preference across attribute levels (Shang & Chandra, 2023; Hertzum, 2025). DCEs have been widely applied in healthcare, environmental and resource economics to elicit preferences for policies, interventions and ecosystem services (Campbell et al., 2006; de Bekker-Grob et al., 2010; Abiiro et al., 2014; Szinay et al., 2021; Hoyos, 2010; Čop & Njavro, 2022). A smaller number of studies have also applied them in conservation contexts to examine preferences and trade-offs such as on decision-makers' biases and environmental attitudes, welfare costs of forest conservation, rewilding preferences, valuing ecosystem conservation, and birders' preferences and willingness to travel (Rakotonarivo et al., 2017; Salvo et al., 2021; Hernandez & da Costa, 2022; Filewod et al., 2023; Dunn-Capper et al., 2024). However, to our knowledge, formal choice experiments have not yet been used to explore which attributes of evidence conservation decision-makers prioritise, their relative importance, and the specific attribute levels that they exhibit preferences for when deciding what to trust.

In this study, we use a DCE, combined with semi-structured interviews, to examine how conservation decision-makers trade off and prioritise different evidence attributes in a hypothetical conservation scenario. Our objectives were to: (1) investigate how decision-makers prioritise different evidence attributes (e.g. evidence type versus recency); (2) identify their preferences for specific attribute levels (e.g. published scientific studies versus unpublished reports); and (3) understand the reasoning and perspectives underlying these preferences. By linking attribute-level choices with qualitative explanations, we aim to generate insights that can inform the design and communication of evidence for conservation practice (Downey et al., 2022; O'Connell et al., 2024).

2 Methods

2.1.1 DCE Context and Ethics

We conducted a DCE to elicit conservation decision-makers' preferences for different characteristics of evidence used in applied decision-making. A DCE was chosen instead of rating or ranking tasks because it allows explicit quantification of trade-offs between attributes and yields utility estimates grounded in random utility theory (Vass, Rigby, & Payne, 2017; Ellis et al., 2021). Ethical approval was obtained from the Centre for Environmental Policy Ethics Committee.

2.1.2 Recruitment and Respondents

Participants were recruited through professional networks of conservation practitioners (e.g. Evidence Champions, Wildlabs), relevant mailing lists (e.g. Cambridge Conservation Initiative mailing lists), and social media (Facebook, LinkedIn) to maximise diversity in roles and organisational backgrounds. Snowball sampling was additionally used to extend reach beyond our immediate networks (Wu, Zhao, & Fils-Aime, 2022). Eligibility criteria, confirmed via screening questions, were: age ≥ 18 years, ability to complete the survey in English, and at least some experience in applied conservation decision-making. To encourage participation, respondents could enter a prize draw, given evidence suggests that modest incentives can improve response rates without systematically biasing responses when transparently implemented (Singer & Ye, 2012).

2.2 DCE Structure

The DCE comprised five key elements (Shang & Chandra, 2023): participants (conservation decision-makers), alternatives (two evidence options per choice task: Evidence A and

Evidence B), attributes, attribute levels, and choice sets (Figure 1). Each choice task presented respondents with two hypothetical evidence profiles, defined by six attributes (Table 1), and asked them to select the option they would rely on when making the decision in the scenario. There were 24 unique choice sets in total, generated as described in Section 2.5 and divided into two blocks of 12 sets each to reduce respondent burden.

Respondents were randomly allocated by the survey platform (Qualtrics) to one of the two blocks (Figure 1), ensuring approximately equal numbers per block, balancing the presentation of attribute-level combinations, and reducing cognitive load (Qualtrics, 2025; Shang & Chandra, 2023). The full survey, including the DCE tasks and additional questions, is provided in Appendix S1.

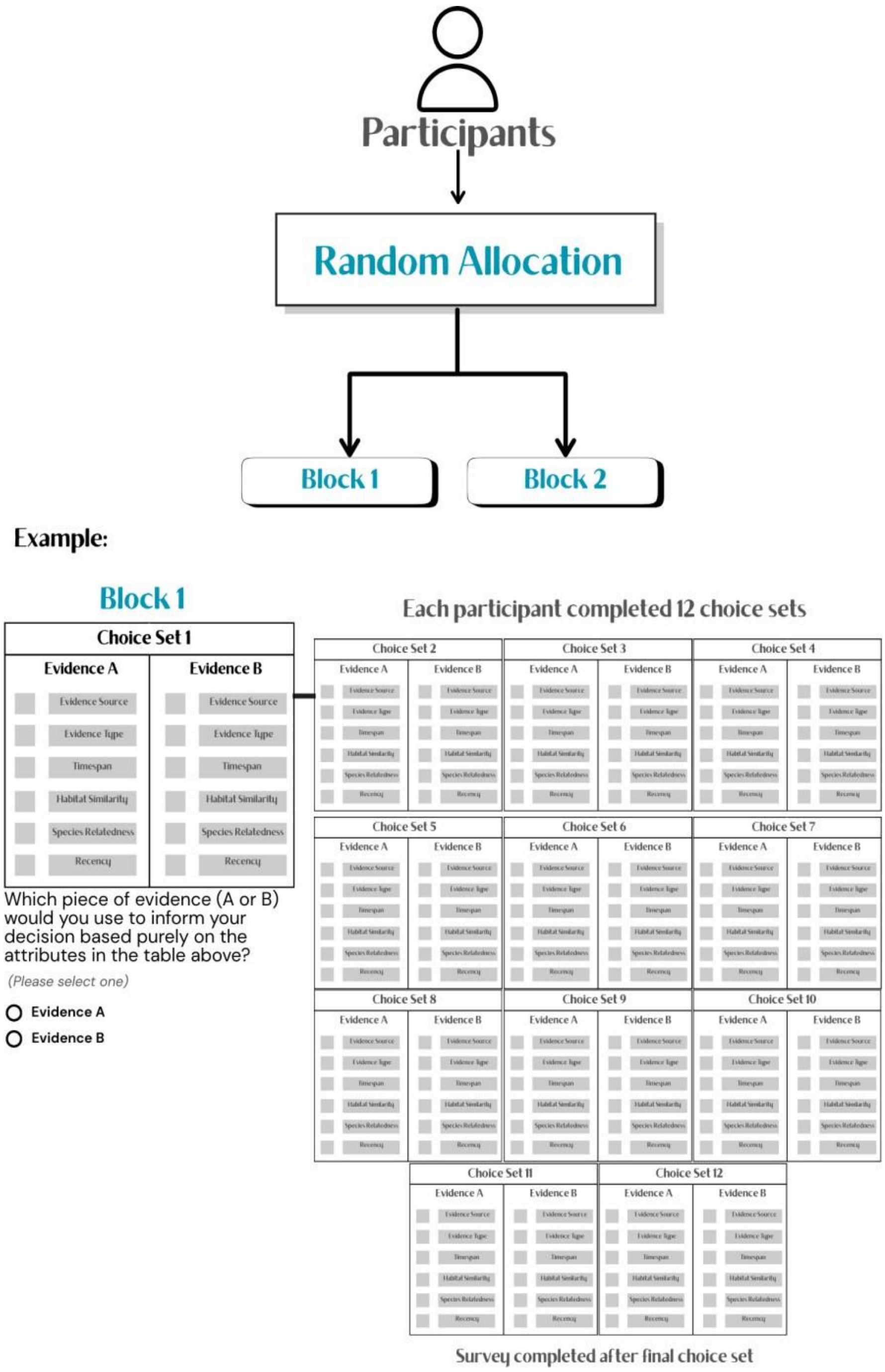

Figure 1. Structure of the DCE. Each participant was randomly assigned to one of two blocks (Block 1 or 2), with each block containing 12 choice sets. A choice set, as shown in the example, offered two alternative evidence options (Evidence A and Evidence B), each characterised by six attributes (e.g., evidence source, type, etc.). Participants selected their preferred option in each set. Once completed 12 times, the DCE concluded, and responses were recorded for analysis.

Table 1. Attributes (first column) and their descriptions (second column) with levels used to define evidence options in the DCE (third column). Each attribute had three to five levels, chosen to reflect realistic variations in evidence types available in practice (fourth column). All attributes had fixed levels across scenarios.

Attribute	**Description**	**Levels**	**Examples of Attributes in Practice**
Source	The provider or origin of information presented.	Academic Research Institute Government Organisation International NGO Ecological Consultancy Local/ National NGO	An *academic research institute* may refer to a university or other organisation that primarily conducts research. A g*overnment conservation organisation* refers to any governmental agency or body involved in conservation practice or policy. An *international NGO* refers to non-governmental organisations involved in conservation work that operate across countries. A *Private Environmental Consultancy* refers to organisations that provide advice and survey work (usually a for-profit business) relating to conservation. A l*ocal/national NGO* refers to non-governmental organisations involved in conservation work that operate within a single country or local region.
Type	The form of information presented, such as the data collection or observation method used.	Published Evidence Review Published Scientific Study Unpublished Report Expert Opinion	A *published scientific study* refers to a primary scientific study that collects quantitative or qualitative data, including expert opinion, that has been peer-reviewed and published in a scientific journal. A *published evidence review* may refer to a type of evidence synthesis (e.g., systematic review, scoping review or rapid review) that collates the findings of multiple scientific studies and potentially unpublished reports (grey literature). An *unpublished report* refers to documents that are not published in a scientific journal (but may be peer-reviewed – they are often known as part of the 'grey literature'). *Expert Opinion* refers to information typically based on a single expert or group of experts communicated in an informal way, drawing from their own knowledge, experience, and wisdom. This could include oral evidence given by a practitioner, a local wildlife expert, Indigenous or local person with a deep knowledge of a particular location or ecosystem.
Time-span	The length of time over which the information was collected or observed.	Days-Weeks Months-Year Multiple years	Research conducted over several days to several weeks Research conducted over several months to a year Research conducted over multiple years

Habitat Similarity	The similarity between the habitat from the evidence and the habitat in the decision scenario.	Same habitat Similar habitat Dissimilar habitat	The same habitat – the evidence relates to the same habitat as the decision scenario (e.g., a mountainous shrubland in California). A similar habitat – the evidence relates to a different, but ecologically similar habitat as the decision scenario (e.g., an upland shrubland in England). A different habitat – the evidence relates to a different habitat that is not ecologically similar to the decision scenario (e.g., an offshore wind farm in China).
Species Related-ness	The similarity between the taxon from the evidence and the taxon of interest in the decision scenario.	Eagle/raptor species Gull species Bat species	The evidence is about an eagle/raptor – i.e. the same species or one that is highly related. The evidence is about a species of gull – i.e. a different species that is not highly related but is from the same broad taxonomic group. The evidence is about a species of bat – i.e. a different species from an unrelated taxonomic group.
Recency	The age of the evidence in terms of how new or recent it is. i.e., when was the information collected or observed?	< 3 years ago 3-10 years ago >10 years ago	Evidence from within the last 3 years Evidence from within the last 10 years Evidence from longer than 10 years

2.3 Attribute and Level Selection

Attributes and levels were selected through an iterative process combining: (i) existing literature on trust in evidence and evidence use by conservation practitioners and related fields (Cook et al., 2013; Dicks et al., 2014; Cvitanovic, 2016; Pullin et al., 2020), (ii) the authors' previous experience working with conservation decision-makers and practitioners, and (iii) pilot testing the DCE survey with practitioners and academics (Section 2.6). We followed established DCE guidance (Bridges et al., 2011; Veldwijk et al., 2024; Webb et al., 2021) to restrict the number of attributes to maintain task simplicity and avoid excessive cognitive load (de Bekker-Grob, Ryan, & Gerard, 2010; Shang & Chandra, 2023). Given these constraints, we chose to explore six attributes focused on the ecological context and how the evidence was derived: evidence source, evidence type, timespan, habitat similarity, species relatedness, and recency of the evidence (Table 1). Each attribute had three to five levels that reflected realistic variation in conservation evidence while remaining easy to describe in a survey format and feasible to analyse based on likely response rates. All attributes and levels were held constant across respondents and choice sets; only the combinations of levels differed across choice sets according to the experimental design (Section 2.5).

2.4 Scenario Selection

To provide a consistent decision context across all choice sets, we developed a single hypothetical but realistic scenario involving Golden Eagles (Aquila chrysaetos) at risk of collision with wind turbines in open shrubland habitat in a mountain pass in California, USA. This was inspired by a real study (Gedir et al., 2024) summarised as a test of a conservation intervention related to this scenario on the Conservation Evidence website (www.conservationevidence.com). The scenario description specified four elements – focal species, habitat, threat, and location – to help respondents anchor their choices while avoiding giving any one attribute or level a systematic advantage beyond their stated preferences (Shang & Chandra, 2023; Veldwijk et al., 2024). The scenario was chosen because it could be understood by a wide audience (widely known taxon and ecological context), the choices between evidence options were plausible, and it allowed us to vary a reasonable range of evidence sources, types, species, and habitats, thereby maintaining realism and generalisability. For example, we chose species with different levels of relatedness, but ensured they were all at least potentially relevant based on their functional and ecological traits – i.e., eagle/raptor, gull, and bat species all fly and are affected by wind turbine collisions, but clearly differ greatly in their relatedness and therefore relevance to the focal eagle species.

Within each choice task, the scenario text was displayed at the top of the screen, followed by a table presenting the attribute levels for Evidence A and Evidence B, and then the response options – an example choice set (Choice Set 1 from Block 1) is shown in Figure 2.

Example Choice Task in Survey

Choice 1

<u>Decision Scenario:</u> Imagine you want to know how to **<u>reduce the number of Golden Eagle collisions with wind turbines in Altamont Pass, California, USA</u>**. This region features **<u>open shrublands in a low mountain pass</u>** and is well known for its high raptor activity and frequent bird collisions with wind turbines.

For each pair below, which piece of evidence (A or B) would you use to inform your decision based purely on the attributes below? You can assume each provides information on the effects of an intervention related to the scenario above.

	Evidence A	**Evidence B**
Evidence Source	Academic Research Institute	International NGO
Evidence Type	Published Scientific Study	Unpublished Report
Timespan	Months-Year	Days-Weeks
Habitat Similarity	Dissimilar habitat	Similar habitat
Species Relatedness	An eagle/raptor species	A species of bat
Recency	3-10 years ago	< 3 years ago

Which piece of evidence (A or B) would you prefer to use to inform your decision based purely on the attributes in the table above?
(Please select one.)

- Evidence A
- Evidence B

Figure 2. An example choice set in the survey viewed and completed by respondents. Each choice task included the decision scenario with the instruction (top), table of evidence attributes with its varying levels for both evidence options (middle) and the evidence option selection (bottom). The figure shows Choice Set 1 from Block 1 as an example.

2.5 DCE Experimental Design

When constructing our DCE, we decided a full factorial design (including all possible combinations of attribute levels) was not feasible because it would have resulted in an impractically large number of profiles and choice sets (Shang & Chandra, 2023). A simple orthogonal design was also inappropriate as some attributes had different numbers of levels (Johnson et al., 2013). We therefore used a D-efficient, fractional-factorial design with naïve priors (all attribute coefficients initially set to zero), which is recommended when prior information on preferences is limited and the aim is to maximise statistical efficiency whilst balancing the cognitive burden placed on respondents (Alamri et al., 2023; Szinay et al., 2021).

We generated the design using R version 4.5.0 (R Code Team, 2024) and the choiceDes package (Horne, 2018), constructing balanced and blocked choice sets under a D-optimality criterion (Mangham et al., 2008; Shang & Chandra, 2023). The design produced 24 unique choice sets, which were then divided into two blocks of 12 sets, with blocking incorporated into the optimisation routine to maintain balance across blocks. Based on the number of parameters, planned sample size, and guidance from previous DCE applications, we judged 12 choice tasks per respondent to be within acceptable cognitive limits while providing sufficient information for parameter estimation (Hanson et al., 2005). Reviews of DCE practice indicate that typical designs include around 8–16 choice sets per respondent (de Bekker Grob, Ryan & Gerard, 2010).

We assessed design efficiency using the D-error statistic (the inverse of the D-efficiency measure), where lower values indicate higher efficiency. The final design had a D-error of 0.047, which is consistent with expectations for a naïve-prior design in an exploratory study with multiple attributes and levels and constrained sample size (Kleinewiese, 2021). In a simulation comparing the design to 1,000 random designs of identical size and structure, our design achieved on average a 17% higher D-efficiency.

2.6 DCE Survey Pilot

The draft survey, including the scenario description, attribute definitions, and DCE tasks, was pilot-tested with seven conservation practitioners and academics who met the eligibility criteria but did not participate in the main study. Pilot participants provided written feedback on clarity, wording, and layout, which we used to revise the scenario text, attribute descriptions, and instructions to improve comprehension and reduce ambiguity.

The final survey was administered online using Qualtrics (2025) as a one-time survey that respondents could pause and resume using a unique survey link. Before the DCE tasks, participants viewed a concise written guide explaining the scenario, each attribute and its levels, and an example choice set; the same information was provided as a downloadable PDF for reference (Appendix S2). After completing the DCE, respondents were asked whether they wished to: (i) enter a prize draw (by providing an email address stored separately from their responses) and/or (ii) be contacted for a follow-up semi-structured interview to discuss their choices in more depth.

2.7 DCE Survey Pilot

Data cleaning was conducted to ensure that analyses were based on respondents who engaged meaningfully with the choice tasks (Newing, 2010). First, we excluded incomplete surveys (respondents who did not finish all 12 choice tasks; n = 11). Second, we removed six completed surveys that either had a total completion time of less than 300 seconds and exhibited non-varying choices (the same alternative chosen in all 12 tasks), as these were indicative of participants that did not thoroughly engaging in the choice tasks, given the time taken and responses given by participants in the pilot survey (Newing, 2010). Respondents who answered “no” to any screening question (e.g. no experience of working in applied conservation decision-making) were excluded to ensure the sample matched our target population. After these exclusions, the final analytic sample comprised 62 respondents (Block 1: 32; Block 2: 30), yielding 744 observed choices (62 respondents × 12 choice tasks), and 1,488 alternatives for the analysis.

2.8 Statistical Analyses of DCE

All statistical analyses were conducted using R version 4.5.0 (R Code Team, 2024). We analysed the DCE using a conditional logit model to estimate how decision-makers traded off between evidence attributes. For analysis, we organised the data in long format, with one row per alternative per choice set and a binary indicator for the chosen option, and defined a stratum variable for each respondent–choice set combination to specify the choice sets in the conditional logit model.

We fitted a conditional logit model in which the systematic utility of alternative j for respondent i, V_{ij}, was specified as a linear function of the six categorical attributes, dummy-coded with one reference level per attribute. The reference levels were: academic research institute (evidence source), published evidence review (evidence type), multiple years (timespan), same habitat (habitat similarity), eagle/raptor species (species relatedness), and evidence collected <3 years ago (recency). Under this model, the probability that respondent i chose alternative j from choice set C_i is:

$$\mathrm{P}\left(y_{ij} = 1 \mid C_i \right) = \frac{\exp\left(V_{ij}\right)}{\sum_{k \in C_i} \exp(V_{ik})},$$

with V_{ij} denoting the systematic utility (linear predictor) that respondent i derives from alternative j, expressed as a linear function of the alternative's attributes (p, for example, $V_{ij} = \beta_0 + \sum_p \beta_p x_{p,ij}$). Model estimation was implemented using the survival package (Therneau, 2024), with the stratum term defining respondent–choice set combinations. The resulting coefficients therefore represent changes in the log-odds of an alternative being chosen relative to the reference level for that attribute, holding other attributes constant. To examine contrasts between levels within each attribute, we obtained estimated marginal means and pairwise comparisons using the emmeans package (Lenth, 2025).

We quantified the relative importance of each attribute by computing the range of utility values across its levels from the fitted conditional logit model. For each attribute, we combined the reference level (with coefficient set to zero) with the estimated coefficients for the non-reference levels, took the difference between the minimum and maximum coefficient as that attribute's utility range, and then expressed each attribute's range as a percentage of the sum of all attribute ranges. These percentages reflect the relative contribution of each attribute to variation in utility within the experimental design and sample.

2.9 Semi-Structured Interviews

A pre-tested script (Appendix S3) aligned with our research aims was used to guide semi-structured interviews (Campoamor et al., 2024; Newing, 2010), including prompts and questions on the choice set approach, key attributes covered by the survey, day-to-day assessment of evidence in the participant's roles, and attributes that participants thought were missing from the DCE. Interviews were designed to only take 10-20 minutes to encourage enough participation for efficient thematic saturation, whilst also covering several key questions (Namey et al., 2016; Newing, 2010). We opted to use semi-structured interviews over focus groups or structured interviews to allow open reasoning and capture context without peer influence. Participants confirmed consent through the participant information sheet (Appendix S4) via checkboxes and had access to reference materials (Appendix S5).

2.10 Interview Analysis

Transcripts were coded thematically to further contextualise survey results, using NVivo software (Lumivero, 2025). Deductive and inductive manual coding followed Newing's (2010) systematic approach for qualitative conservation social science research, with an initial coding framework based on the survey themes that was iteratively refined as new codes emerged. Reflexivity in data interpretation involved focusing on participants' reasoning, maintaining an audit trail of coding decisions, and regular discussion between authors to enhance the credibility and traceability of the analysis (Newing, 2010).

3 Results

3.1 Demographics of study participants

In total, 78 participants started the survey, of whom 62 provided complete and eligible responses for the DCE. Of these, 56 consented to provide demographic information (Table S1). The largest age group was 35–44 years (32%), followed by 26–34 years (27%), and 55–64 (20%), and 44–54 (14%), with no or few respondents aged under 26 (0%) or over 65 (7%). Most respondents currently worked for international or national non-governmental organisations (NGOs; 38% international NGO; 29% local or national NGO), with smaller numbers from government organisations (11%) and academia (11%), and few from consultancy (5%) or other roles (5%). Over half of respondents had more than 10 years of professional conservation experience (57%), and most reported using evidence frequently in their work (43% 'often'; 36% 'always'). The majority were based in the United Kingdom (80%), with the remainder distributed across Australia, Canada, Uganda, the United Arab Emirates, the United States, and multiple regions (including Spain, Poland, Philippines, Kenya, and Indonesia; Table S1). Ten respondents participated in follow-up semi-structured interviews.

3.2 DCE Results

3.2.1 How do conservation decision-makers trade-off between different attributes of evidence and what are their preferences within each attribute?

The conditional logit model (Table S2) provided a good fit to the DCE data (likelihood ratio test $\chi^2_{15} = 511.1, p < 0.001$; concordance = 0.86, SE = 0.02) and showed that several evidence attributes significantly influenced respondents' choices. Wald and score tests were consistent with the likelihood-ratio test, all indicating that the set of evidence attributes jointly explained a substantial proportion of variation in choices (McFadden's pseudo-$R^2 = 0.50$).

Relative importance analysis showed that species relatedness accounted for approximately 32% of the total explained utility range, and evidence type for around 18%, with habitat similarity, timespan, and recency contributing approximately 14% each, and evidence source 8% (Table S3). Species relatedness (to the focal eagle species) showed the strongest effects (Figure 3). Evidence on a gull species (odds ratio [OR] 0.21, 95% CI 0.11–0.40; Table S2) was less likely to be selected than evidence on an eagle or other raptor species, whilst evidence on a bat species (OR 0.05, 95% CI 0.03–0.09) was even less likely to be chosen (Fig. 3).

Within evidence type, respondents showed a strong positive preference for published evidence reviews (Fig. 3). Unpublished reports were much less likely to be chosen (OR 0.23, 95% CI 0.13–0.39; Table S2) and expert opinion was even less favoured (OR 0.47, 95% CI 0.27–0.80), both relative to reviews, while published scientific studies showed a marginal tendency to be preferred (OR 1.20, 95% CI 0.63–2.28). For habitat similarity, evidence from dissimilar habitats was strongly less likely to be chosen than evidence from the same habitat (OR 0.27, 95% CI 0.15–0.49; Table S2), whereas evidence from similar habitats did not differ significantly from evidence from the same habitat (OR 0.84, 95% CI 0.52–1.34).

Preferences for timespan were more modest: shorter studies (days–weeks) were less preferred than multi-year studies (OR 0.28, 95% CI 0.17–0.45; Table S2), whereas intermediate timespans (months–year) did not differ significantly (OR 0.68, 95% CI 0.34–1.38).

For recency, evidence more than 10 years old was substantially less likely to be chosen than evidence collected within the last 3 years (OR 0.28, 95% CI 0.18–0.43; Table S2), while evidence from 3–10 years ago showed a marginal reduction in likelihood (OR 0.74, 95% CI 0.47–1.17; Fig. 3). Similarly, differences among evidence sources (government organisations, international NGOs, consultancies, local/national NGOs) were marginal compared to academic research institutes (Table S2).

Pairwise comparisons from estimated marginal means confirmed these patterns (Table S4), with statistically significant contrasts concentrated among levels of species relatedness, the most out-of-date recency category (>10 years old), evidence type, and habitat similarity.

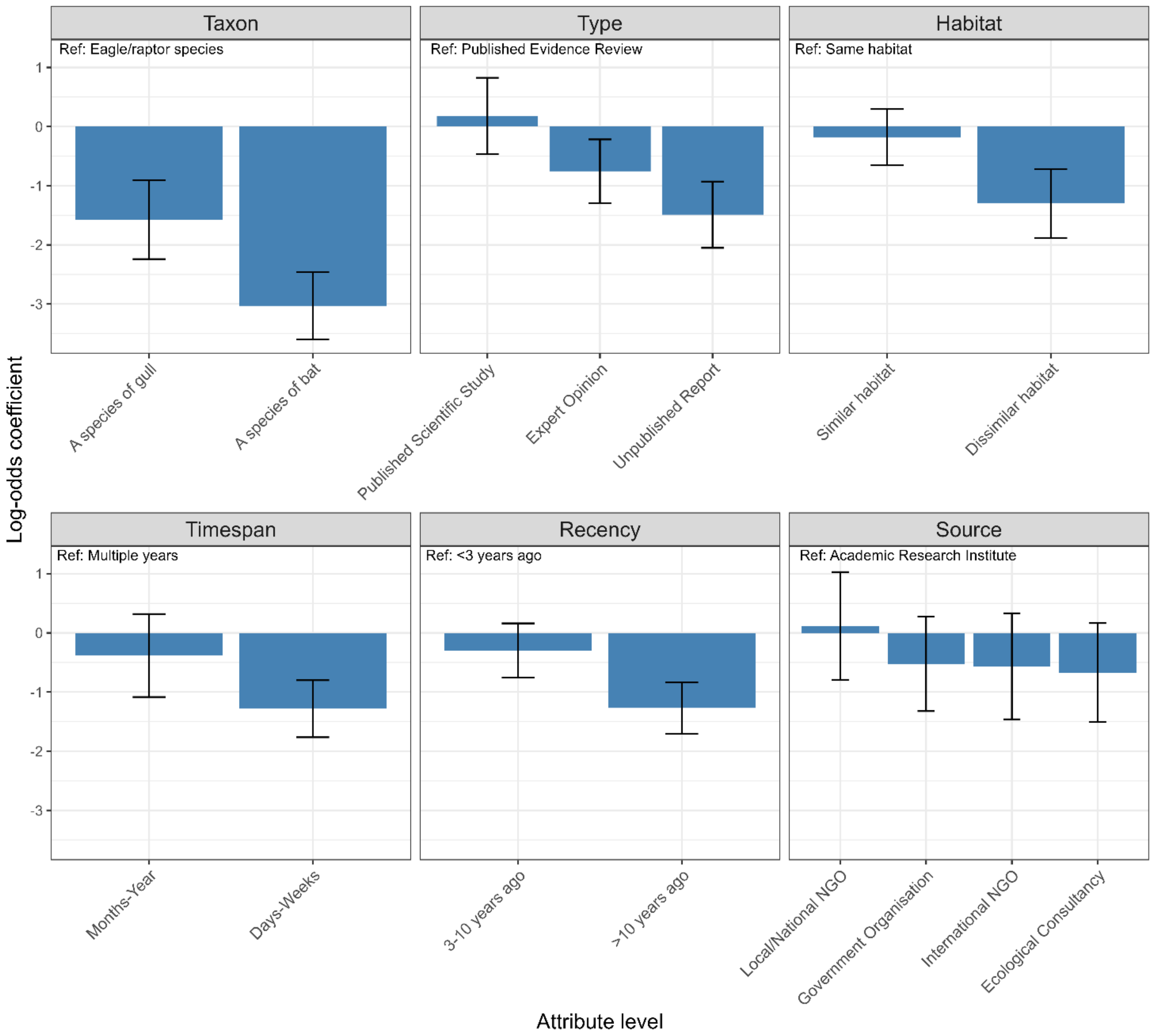

Figure 3. Conditional logit coefficients (log-odds) and 95% confidence intervals for each level of the six evidence attributes, relative to the reference level for that attribute (top left of each panel). More negative coefficients indicate a lower likelihood that an evidence option with that level was chosen, holding other attributes constant.

3.3 What are the reasonings and perspectives influencing evidence preferences from conservation decision-makers?

Ten participants were interviewed (Table 2), and their responses were analysed using a combination of deductive and inductive coding (Table S5), which identified three key themes that structure the findings reported below.

Table 2. Demographic summary of the sector and roles of 10 participants interviewed, distinct from the survey, including their percentages of the overall interview sample.

Sector	Roles Represented	Number of Participants
NGO	Research & Monitoring Manager; Island Restoration Specialist; Conservation Researcher; Technical Specialist (Wildlife Trade)	4
Academia	Postdoc Researcher; Social Scientist (Biology background)	2
Government	Principal Specialist (Evidence Synthesis)	1
Law Enforcement	Police Officer (Wildlife Trafficking)	1
Zoo Sector	Zookeeper / Reptile Keeper	1
Private Sector / Consultancy	Researcher & Consultant (Biodiversity & Business)	1

3.3.1 Theme 1: Local vs Non-Local Evidence

Participants perceived that local relevance was represented through habitat (80%) and species (90%) attributes, considering evidence from more similar habitats and species to be “more relevant”, “within project scope”, “dealing with related species”, “trusted for applied decision-making”, and “significant” for managing species or habitats across regions. For example, a zookeeper from the Middle East emphasised locality's importance on community impact:

> *"I would need to go within the community, maybe either directly or indirectly, tell the people, and let them know why it has to be done"*
>
> (Zookeeper, Interview 2)

Alternatively, a practitioner applied locality to their area of expertise, emphasising their day-to-day application with local evidence, stating:

> *"From my biological understanding, it wouldn't be very relevant to have something which has completely different behaviour".*
>
> (Island Restoration Specialist, Interview 6)

However, a smaller subset of participants (30%) expressed their engagement with local, relevant evidence and how evidence source was considered over ecological similarity or relevancy.

3.3.2 Theme 2: Long-Term vs Short-Term Observations

Preferences varied on trusting long-term over short-term evidence. Several participants (50%) described long-term studies as more "robust", "important", "better", and "ideal". One participant claimed:

> *"Timespan again as long as possible, but a snapshot of a shorter study about the right species in the right habitat, I would give, you know, considerable weight to that as well."*
>
> (Postdoctoral Researcher, Interview 4)

The remaining participants (50%) said this was not a primary factor, with divided opinions on trusting long-term versus short-term observations.

3.3.3 Theme 3: Recent vs Older Studies

There were mixed views on whether recent research is preferred over older studies. Most participants (60%) said recency was not heavily weighted, calling it “relatively important” or “not consciously prioritised”. A UK participant highlighted how ecology does not change drastically within 3-10 years, and another noted recency varies by context, like eDNA technology. However, a smaller number of participants (40%) noted that recent evidence is considered “more relevant than a long time ago”, “better”, or said they “scouted for the publication year”. One participant in Uganda noted:

> *“Recent data is also good for timely decision making.”*
>
> (Wildlife Trafficking Police Officer, Interview 7)

3.3.4 Evidence attributes for future research

All participants identified missing or undervalued attributes and levels considered in daily practice and evidence assessment. These included other levels of evidence type in terms of local knowledge, limitations and methodological robustness in addition to evidence type, socio-political and geographical context, and motivations of those providing the evidence (i.e., more detail on evidence source), among others (Table S6).

4 Discussion

4.1 Key findings

Our study suggests that amongst the evidence attributes that we explored, conservation decision-makers place greater weight on ecological similarity than other factors when deciding what evidence to trust. Species relatedness and habitat similarity together explained almost half of the variation in choices, whereas evidence source was least influential. Decision-makers strongly preferred published evidence reviews, and to a lesser extent published scientific studies, over unpublished reports and expert opinion, but showed only modest sensitivity to recency and timespan. Semi-structured interviews corroborated the importance of local ecological relevance and revealed more nuanced views on timespan and recency, with many participants prioritising “the right species in the right habitat” over how recent or long-running a study was.

4.2 Trade-Off Between Different Attributes

In our DCE, we found that species relatedness was substantially more influential than other attributes. This aligns with previous work showing that practitioners prioritise species-specific and locally relevant information when planning or evaluating conservation actions (Braunisch et al., 2012; Tanner et al., 2020; Gutzat et al. 2020). Habitat similarity also had a strong effect, reinforcing that decision-makers are particularly attentive to ecological comparability between the evidence context and their focal decision context.

By contrast, evidence source contributed relatively little to choices once other attributes were accounted for. This is consistent with research suggesting that, in practice, practitioners often learn through internal sharing, grey literature and word of mouth, and may treat source as a secondary consideration, especially when evidence must be applied under time pressure

(Walsh et al., 2019; Sabo et al., 2024). Together, these patterns suggest that when choosing which pieces of evidence to trust and use in practice, conservation decision-makers may prioritise ecological fit (species and habitat) and evidence type they perceive to be more rigorous, and are less concerned about evidence source, recency, and timespan.

4.3 Preferences for Attribute Levels

For evidence type, the strong preference for published evidence reviews and, more weakly, for published scientific studies is consistent with calls for synthesised, accessible evidence to support conservation decisions (Pullin & Knight, 2003; Sutherland et al. 2004). Evidence syntheses and synopses are designed to reduce the burden of searching and interpreting evidence for decision-makers, providing a more rapid and accessible way to translate scientific findings into clear guidance on intervention effects (Walsh et al., 2014). However, these results sit alongside a substantial literature emphasising the importance of grey literature and expert opinion in real-world decision-making, especially when peer-reviewed evidence is sparse or inaccessible (Martin et al., 2012; Cadotte et al., 2025).

Our findings therefore likely reflect preferences under an “ideal choice” scenario in which syntheses, primary studies, reports and expert opinion are all equally available for the same decision. In practice, decision-makers may rely heavily on reports, internal documents, tacit knowledge and colleagues’ expertise because these are the only sources available or feasible within constraints. The lower utility assigned to unpublished reports and expert opinion in the DCE should thus be interpreted as a conditional preference, not as evidence that these sources are unimportant for conservation decision-making.

Within ecological attributes, decision-makers clearly preferred more taxonomically and functionally relevant evidence on eagles or other raptors (the focal species in the scenario) over evidence from more distantly related gulls and especially bats. They also strongly favoured evidence from the same habitat over dissimilar habitats, and to a lesser extent over similar habitats. These patterns were reinforced by the findings from the semi-structured interviews and supports the view that conservation decisions are highly context-dependent and that decision-makers are wary of extrapolating from ecologically distant systems (Ausden & Walsh, 2020; Christie et al., 2020; Gutzat et al. 2020). Nonetheless, interviewees noted that, in the absence of ideal species or habitat matches, information from other taxa or habitats can still be informative, particularly when mechanisms are comparable (e.g. other flying species affected by wind turbines, including bat species).

Given the taxonomic, language, and geographic biases in the evidence base for conservation interventions (Christie et al., 2020; Amano et al., 2021; Christie et al., 2021; Hordern et al., 2024; Speight et al., 2025; Anjan et al., 2025), the default position for most decision-makers is likely to be that they lack an ideal match between the species and habitats that they are interested in and those present in the evidence base. This underscores the need for tools and guidance that help decision-makers judge when and how to transfer evidence across ecological contexts.

As for the timespan and recency of evidence, effects were more modest. Participants tended to penalise very short studies and very old evidence, but did not strongly differentiate between intermediate categories (information spanning months–year vs multiple years; <3 vs 3–10 years old). Interviews suggested that decision-makers view recency as one heuristic among many, with topical relevance, methodological robustness and ecological comparability often taking precedence. Several interviewees expressed a willingness to rely on shorter-term or older studies when these aligned closely with their management context, were methodologically robust, and were presented in digestible formats (Mahajan et al., 2023; Rapp et al. 2025). Together, these findings are also consistent with concerns that over-emphasising recency risks neglecting long-term ecological datasets that remain highly informative for conservation (Lindenmayer et al., 2012; Davies et al., 2013). However, it is also true that up-to-date information is still desirable, given that practice and policy contexts often change rapidly (Adams et al., 2019; Downey et al., 2022) and that intervention effects in the literature can also change over time, either due to methodological changes in measuring the effects or real changes in the intervention's effectiveness (Koricheva & Kulinskaya, 2019).

Overall, our findings suggest that decision-makers are likely to use a layered process when choosing which pieces of evidence to trust: they may first seek the most ecologically relevant evidence, if available, then evaluate other attributes such as evidence type, timespan, and recency within their organisational norms and constraints. The DCE captured how attributes are traded off when presented in stylised profiles, whilst interviews revealed the heuristics and contextual reasoning that underpin those trade-offs in practice. Combining both suggests that interventions to improve evidence use should focus not only on generating more ecologically relevant evidence based on urgent decision-making needs, but on tailoring formats and communication to highlight ecological relevance, as well as providing guidance and decision-support tools that help decision-makers understand how transferable evidence is likely to be. Contextualising evidence to decision-makers needs and preferences should therefore be a core focus for those producing evidence syntheses and decision-making tools, especially within the context of evidence synthesis and Evidence-based Conservation.

4.4 Limitations and Future Research Directions

Several limitations should be considered when interpreting the results of our study. First, the DCE used a single hypothetical scenario involving Golden Eagles and wind turbines, which standardised the context between participants and choice tasks, but may not reflect the diversity of decisions faced by decision-makers working on other taxa, ecosystems or threats.

Introducing multiple scenarios and taxonomic groups in future work would allow testing whether attribute preferences are robust across decision contexts.

Second, the design did not include an opt-out option and assumed that decision-makers always choose between two clearly specified evidence options. In reality, they may also decide that none of the available evidence is adequate, or they may combine multiple sources. Larger samples would allow more complex choice structures, including opt-out alternatives and attribute interactions, while maintaining sufficient statistical power (Vass, Rigby & Payne, 2017; Shang & Chandra, 2023).

Third, we were constrained to a limited set of attributes and levels to make the DCE feasible. Interviews highlighted additional characteristics that decision-makers routinely consider, such as other aspects of methodological rigour (e.g. study design), more types of evidence (including different knowledge systems), transparency about limitations, geographical and socio-political context that are also important alongside aspects of ecological similarity, and the motivations behind conservation actions. Incorporating these into future DCEs, potentially with more parsimonious attribute sets or staged designs, could better capture the full range of criteria that shape evidence preferences. This also means that attributes that showed the strongest effects within our study (e.g. species and habitat similarity, and evidence type) are not necessarily the most important for decision-makers, but show their relative importance within the set of mostly ecological and methodological attributes we explored. Other attributes that we were unable to integrate may be just as or even more important. For example, ecological similarity is one dimension of the relevance of evidence (Christie et al., 2023), and so other aspects of the contextual similarity between where evidence is derived and a decision-maker's context of interest are likely to be highly important too (e.g. the cultural, governance, and religious systems, as well as the details of the intervention or policy being evaluated).

Finally, our study's modest sample size and geographically constrained participant pool mean that our findings should be viewed as a first, exploratory step towards understanding conservation decision-makers' preferences for trustworthy evidence. Replication with larger, more diverse decision-maker communities, including those from under-represented regions and sectors, as well as including other decision scenarios, and a wider range of evidence attributes and levels, would help to confirm the generality of the patterns observed here.

4.5 Implications and Conclusions

Despite these limitations, the study offers several practical implications for designing and communicating conservation evidence. First, it reinforces that decision-makers actively seek evidence that is ecologically aligned with their decision context, particularly in terms of species and habitat. Evidence providers, intermediaries, bridges can respond by prioritising syntheses and tools that foreground the relevance of evidence, including the ecological and contextual similarity of evidence to a given decision-maker. This could be done, for example by indexing, weighting, and filtering interventions by focal species and habitat (Shackelford et al., 2021; Martin et al., 2023), or by transparently flagging where evidence is being transferred across contexts (e.g., Constraints on Generality statements; Spake et al., 2022).

Second, the strong preference for published evidence reviews suggests that the value of evidence synthesis is recognised and are seen as key resources to help translate science into policy and practice, addressing the scale and fragmentation of the evidence base. When combined with clear statements about context, limitations, and applicability of evidence, they can be powerful tools to help inform decisions alongside other forms of locally derived evidence and knowledge.

Third, the relatively low weight placed on evidence source indicates that, when ecological fit and format are controlled for, decision-makers may be less concerned about whether evidence originates from academia, government or NGOs. This highlights the opportunity for cross-sector collaborations and co-produced products that blend scientific studies, reports and experiential knowledge, provided they are synthesised and clearly communicated.

Finally, our findings have relevance for emerging AI tools that aim to support conservation decision-making (Reynolds et al., 2025), which could help to rank and contextualise evidence based on decision-makers' evidence needs and preferences (Iyer et al., 2025). Systems that summarise and present evidence to decision-makers should consider explicitly integrating and communicating key attributes such as ecological/contextual similarity and evidence type (as a priority above but not necessarily excluding other attributes we found to be relatively less important – e.g., recency and timespan). Embedding these decision-maker-informed preferences into evidence platforms will help better connect reliable and relevant evidence with practice and policy, and improve the design and uptake of effective conservation interventions.

Author contributions

Alec Philip Christie and Abigail Jeevachandran conceived the ideas and designed methodology; Abigail Jeevachandran collected and analysed the data. Both authors led the writing of the manuscript, contributed critically to the drafts, and gave final approval for publication.

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Conflict of interest

The authors have no conflicts of interest.

Data availability statement

Code and data to repeat analyses are available from Zenodo: https://doi.org/10.5281/zenodo.18939190 (Christie & Jeevachandran, 2026).

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