Re: Request for information in relation to The Point Solar Farm application under the Fast-track Approvals Act 2024

Comments on additional avifauna information provided to the panel

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Scope of comments:

I have reviewed the following responses to the Panel in relation to avifauna (bird) issues:

<u>11 March response to RFI 5 dated 29 May 2026</u>

- Applicant's response
- Attachment 2 Appendix T – Applicant's report on avifauna collision risk.
- Attachment 3 - a copy of the original avifauna compensation proposal

My experience is as set out in my statement to the Panel dated 19 March 2026. In preparing these comments, I continue to comply with the Code of Conduct for expert witnesses as also outlined in that statement.

1. Request 3.3(b): Provide a calculation that the benefits associated with this ACS fund are commensurate with, or ideally outweigh, potential impacts?

1.1 The applicant states that the proposed Avian Compensation Strategy (ACS) measures "are commensurate with, and likely to outweigh, the potential residual adverse avifauna effects identified in the assessment."

1.2 I disagree with this assertion, because collision risk is plausible and potentially significant based on the published scientific literature from overseas (O'Donnell 2025), but the magnitude of this risk has yet to be established for this proposed solar farm.

1.3 The applicant's response states that there is "primarily uncertain collision risk" yet then translate this to mean that the residual risks are "low to low-moderate". This conclusion seems unjustified given the lack of certainty about the level of collision risk at this site.

1.4 The initial avifauna compensation proposed may help to address some critical knowledge gaps (e.g., how frequently do tagged kakī fly over the project envelope) and effects related to loss of habitat and the creation of the risk to avifauna of collision. Predator control proposed for the Cass and Godley Rivers will likely contribute to greater breeding success of braided river birds there but whether this will be enough to offset any collisions throughout the life of the solar farm is unknown.

1.5 Overall, the benefits of the ACS package will be dependent on what level of collision is detected over time. If, following a rigorous monitoring programme, collision risk is deemed low based on the evidence, then the ACS would likely be adequate. However, if collision rates are higher, triggering thresholds for adaptive management, and equating to population level effects, then ongoing management and potentially compensation to finance increased management (such as breeding programmes, attempting to establish colonies elsewhere etc.) will be needed over and above what was agreed initially. If the consent were to be granted, conditions would be needed to cover this possibility.

1.6 The applicant continues to conclude that, "following embedded mitigation (anti-reflective panels, panel spacing, night tilt, diverters, and monitoring), residual effects are generally low or low-moderate".

1.7 I remain concerned that these mitigation techniques remain untested both in New Zealand and overseas (O'Donnell 2025). While some might have the potential to reduce collision risk, the outcome remains uncertain and they should be viewed as experimental (and their 'effectiveness' should be monitored closely).

1.8 Anti-reflective coatings are designed to reduce glare in relation to human vision and to absorb as much light as possible. However, bird vision is different from human vision, so it is unclear how birds would perceive anti-reflective coatings or if they would be helpful. Unlike humans, birds have additional cones in their eyes that specifically detect polarised and ultra-violet light; birds have different fields of view, different sensitivity, and the ability to detect and use magnetic fields (Martin 2012).

1.9 Given that the reflection of polarised light off panels seems the most likely driver of collision risk in birds (O'Donnell 2025, 2026a), I would recommend the applicant measures the polarised and UV reflectivity of the panels they propose using against background levels (i.e. compared to adjacent lake and river water bodies, other adjacent habitat types, in different light conditions, and at different panel angles) to determine if bird-sensitive light is reduced through standard coatings. Doing this work now may alleviate some of the concerns about polarised light reflectivity and indicate whether specific bird-sensitive coatings need to be designed and applied.

2. Request 3.3(d) Provide specific details as to the ecological outcomes expected?

2.1 The applicant's response to this query indicates "the predator control component is intended to maintain and improve survival outcomes for kakī, black-fronted tern, banded dotterel, and black-billed gull populations within the Godley and Cass River systems through ongoing predator trapping and management. DOC identifies that the current programme is already improving species survival and supporting release of captive-reared kakī into the area."

2.2 While the investment is likely to maintain current benefits of the predator control on these rivers, what remains uncertain is whether the investment will enhance productivity and survival further or whether increases would be at a scale to offset collisions that may occur during the life of the solar farm.

3. **Request 3.3(e) Provide specific details of the monitoring and adaptive management framework proposed to evaluate the effectiveness of compensatory measures for avifauna?**

3.1 The applicant's response indicates it will monitor ecological outcomes associated with predator control, braided river bird survival, habitat enhancement, and bird movement research within the Mackenzie Basin.

3.2 However, the most critical element of any monitoring programme revolves around measuring survival and population responses of threatened bird species in relation to collision risk. Monitoring survival of a subset of kakī carrying transmitters may provide some data if sufficient numbers are tagged during operation of the solar farm. Whether such a sample size will be adequate to be informative is uncertain. In addition, the necessity of monitoring survival and population trends in other key bird species, such as black-fronted tern and Australasian bittern, is missing from the response.

3.3 While the current Condition set [Attachment 9B - Mackenzie District Council – Land Use Conditions (The Point Solar Farm) (from the Applicant's response to RFI 10 on 18 May 2026)] indicates the Avian Management Plan will include information on monitoring (Condition 91) given the lack of specifics it is difficult to judge whether monitoring will be adequate or not.

3.4 Overall, I consider that Conditions should be clearer about what monitoring will be undertaken to give assurance that outcomes for birds will be unambiguous.

4. **Request 3.3.1 Species-Specific Collision Risk Assessment for all Threatened and At-Risk species using or traversing the site - 3.3.1(a) Provide a species-specific collision-risk assessment for all Threatened and At-Risk species using or traversing the site...**

4.1 The applicant provides none of the information requested on flight frequencies, seasonal and diurnal variation in collision exposure, species specific vulnerability factors.

4.2 The applicant could have invested in gaining such data in the planning stages of this project, as gathering it should be straight forward, and would help inform the debate about the relative magnitude of collision risk.

4.3 DOC has provided data to the applicant on the high volume of black-fronted tern (Nationally Endangered) movements over the site (O'Donnell 2025). These data show 3,445 location fixes over 15 months within the vicinity of the proposal from a small number of terns (36 of the c.700 breeding in the area).

4.4 These findings conflict with the applicant's response to query 3.3.1(a), which notes the "relatively low" bird flight activity in the area. The applicant also states, "The Bramley review (Appendix T) notes that while birds may move between the braided rivers, wetlands, and Lake Benmore habitats surrounding the site, the extent and frequency of these movements across the solar footprint remains uncertain and has not been demonstrated at high intensity". Further, they suggest that this so-called low bird flight activity "aligns with Ussher's qualitative assessment for Haldon, which reached similar conclusions regarding low predicted overflight frequency". These responses are more a comment on the inadequacy of the Wildland's and Ussher's[1] assessment methods to measure bird-flight activity rather the lack of bird activity over the site.

4.5 Regarding the request for 'species-specific vulnerability factors", the applicant provides no response. Again, making such an assessment is possible by comparing morphological and behavioural traits of the species present in the Twizel area and comparing them with the traits of birds recorded in collision assessments overseas. Doing so, reveals that certain species appear more vulnerable to collision risk.

4.6 Regarding the request for 'collision probabilities', the Applicant does not provide any. Rather the Applicant refers to Gary Bramley's review provided as Appendix T to the response where Bramley made subjective risk assessments of "low to moderate but uncertain" risk for kakī, "low and uncertain" risk for Australasian bittern and Australasian crested grebe and "low but uncertain" for other waterbirds. Reading Bramley's report, I could not find reference to any criteria he used for making such an assessment.

4.7 Alternatively, in respect of 'collision probabilities', Smallwood (2022) provides fatality figures per MW of solar generation in California (Table 1). Given that the

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[1] Noting that O'Donnell (2026b) demonstrated frequent flight activity by black-fronted terns over the proposed Haldon solar farm site, albeit at a lower apparent level than The Point.

context in California is different from the Twizel area, it is challenging to infer whether collision rates would be higher, lower or similar to a solar farm around Twizel. What Smallwood's data shows is that risk profiles vary considerably for different types of waterbirds in California. Based on this it seems risky to assign the same risk level equally to all waterbirds.

Table 1. Estimates of water associated bird species collisions with photovoltaic (PV) solar farms in California in 2019 (fatalities/MW/yr) and equivalent species at risk in the Twizel area (estimates from Smallwood 2022).

Species group totals	PV fatalities/MW/yr	Ecologically similar species – The Point area
Waterfowl	0.137	grey duck, NZ scaup
Grebes	0.084	crested grebe
Rails	0.9003	marsh crake, spotless crake, Australian coot
Waders	0.055	kakī, banded dotterel, wrybill, SI pied oystercatcher
Gulls	0.006	black-billed gull
Terns	0.023	black-fronted tern
Shags	0.02	black shag, little shag
Bitterns	0.017	Australasian bittern
Herons	0.273	white heron, white-faced heron
Kingfishers	0	
Swallows	0.02	Welcome swallow
Birds of prey	0.149	NZ falcon
Pipits	0.01	NZ pipit

5. **Request 3.3.2 Panel Technology and Design Risk Analysis - 3.3.2(a) Provide technical assessment of the proposed solar array configuration including:**
   i) Polarisation and UV reflectance signatures of proposed panels
   ii) Evidence for efficacy of anti-reflective coatings in reducing bird attraction
   iii) Comparative collision risk: 60-degree vs vertical night positioning
   iv) Panel spacing effectiveness (3.8-4.8m gaps) in reducing the hypothetical "lake effect"
   v) An updated literature review of proven panel technologies that demonstrably reduce bird mortality

5.1 The Applicant provided little actual detail on any technical assessment, rather referring to previous reports from its consultants, which similarly lack any detail relevant to the request.

5.2 Regarding the request for a **technical assessment of the proposed solar array arrangement**, the applicant refers to the “associated bird risk mitigation measure” being discussed in detail in the Wildlands Draft Avifauna Management Plan (6621h-i, April 2026, Sections 5–6). The versions of this management plan on the Fast-track website are dated February and March 2026, but I could find no reference to design of the solar array in sections 5 or 6 of these plans.

5.3 Regarding the request for an assessment of polarisation and UV reflectance signatures of proposed panels, the applicant still provides no data, yet I suggest these should be relatively easy for them to measure (see my Paragraph 1.9 above).

5.4 Regarding the request for evidence for **efficiency of anti-reflective coatings (ARCs)** in reducing bird attraction, the applicant notes that ARCs are often suggested as a mitigation method. I suggested the same to the applicant in 2024 as a potential mitigation measure that they should investigate. However, I am still unaware of any studies that measure if modern panels reduce attraction to birds. I reiterate points I have made above (Paragraph 1.7 – 1.9 above) and other details provided by O’Donnell (2025, 2026a) that there appears to be no evidence that modern ARCs reduce attractiveness for birds, yet it should be possible experimentally to ascertain whether this is likely or not. While I understand that there is no doubt that modern PV panel coatings increase light absorption efficiency compared to older technology, at least in some spectra (to increase energy capture), it appears unknown whether they reduce polarised light reflectance sufficiently to reduce collision risk.

5.5 Regarding the request for information on **comparative collision risk of different panel stowage angles at night** (60-degree vs vertical night positioning), the applicant provides no further data and again refers to the draft Wildlands Avifauna Management Plan 6621h-i. I could find no reference to this in that plan though I am aware that 90-degree angles are used overseas but have no data on relative collision risk.

5.6 Regarding the request for information on **panel spacing effectiveness (3.8-4.8m gaps) in reducing the hypothetical "lake effect"** the applicant provides no further data but refers the Panel to the “Wildlands Assessment[2] and Appendix T” of their response (Bramley report). In examining these documents, I cannot find any data that demonstrates that the panel spacing proposed by the applicant will reduce collision risk if the lake effect hypothesis explains bird collisions. If birds do interpret panel arrays as water bodies, overseas literature suggests that less structed panel arrays (e.g., not necessarily in straight lines) and even bigger gaps than that suggested <u>may</u> help (an ‘ecovoltaic’ rather than industrial approach to solar farm development; e.g., Tölgyesi et al 2023; Willockx et al. 2023; Krexner et al 2024).

[2] I assume they are referring to the Wildlands AEE here.

5.7 I think it is also important to note that the "lake-effect" is just one hypothesis that may explain collision risk. More complex mechanisms may be at play that involve how birds navigate and perceive the polarised and/or ultraviolet light and how this varies in time or space depending on their approach angles, the angles of the PV panels, and the angle of the sun or moon. Mobile species use polarised light for orientation and navigation and use it to calibrate magnetic compasses, so birds may become disorientated, especially in low light at dawn or dusk (see O'Donnell 2025).

5.8 Regarding the request for **an updated literature review of proven panel technologies that demonstrably reduce bird mortality**, the applicant provides no further review of the literature in the response although refers the Panel to two reports: the Wildlands Avifauna Assessment, 3 April 2026, Section 5.2 and Bramley Appendix T. I could not find a copy of Wildlands April 2026 on the Fast-track website but note that the Wildlands AEE (2023) is brief and does not mention the published scientific literature on collision risk. The Bramley report referred to did not include a comprehensive review of the potential impacts of PV solar farms on birds but rather, was a critique of some initial advice I gave to the applicant on potential effects and mitigation possibilities. For example, while Bramley briefly mentions some of the key references (Walston et al. 2016; Kosciuch et al. 2020, 2021; Smallwood 2022; Conkling et al. 2023), there is no review or analysis of the data they present.

5.9 The applicant's response to this question does state that:

5.9.1 "Mortality rates at modern PV facilities are generally low compared to other anthropogenic sources.

5.9.2 Proven or promising technologies include anti-reflective coatings, textured/patterned surfaces, increased panel spacing, tilted/vertical night positioning, and bird diverters.

5.9.3 Adaptive management (monitoring and response) is widely recommended where uncertainty exists."

5.10 However, these statements are not referenced, and I can find no evidence in the scientific literature that supports these assertions.

6. 3.3.3(a) Provide assessment of bird collision and electrocution risks from non-panel infrastructure:

6.1 In repose to this request, the applicant simply refers the Panel to its Bramley report (Appendix T), stating that "risks from non-panel infrastructure are low when standard mitigations are applied".

6.2 However, this statement is not supported in the published scientific literature. The Supplementary Data files provided by Smallwood (2022) provide a wealth of data on which solar infrastructure elements have been associated with collisions in California.

6.3 These data show that the distribution of deaths among different PV solar elements varied considerably among PV solar farm sites. For example, in respect of fatalities at Blyth PV solar farm in California between March 2016 and August 2017: of these fatalities, the cause of death was not recorded for 71% (n = 177) specimens; of those that were known, two (2.7% of identified fatalities) were preyed on, eight (10.8%) were electrocuted, 46 (62.1%) collided with wires, two each died from collisions with PV panels and vehicles (5.4%) with the remaining 14 birds (18.9%) dying after collisions although from which component of the infrastructure was not specified. In contrast, at Centinela solar farm, 85.7% of fatalities were associated with the solar panels, and only 7.1% each were associated with transmission wiring and fences (Smallwood 2022, Supplementary evidence jwmg22216-sup-0013).

6.4 I suggest the applicant reviews these data in detail as they show that security fencing, electrocution, vehicle and building strikes all combine to an overall collision effect, at least in these Californian solar farms. While sometimes the collision rates are relatively low, when applied to Nationally Critical and Endangered species that are already under severe threat of extinction, this additive mortality may be significant.

6.5 The applicant states in the response that "International studies on solar farm infrastructure risks (e.g., U.S. Department of Energy Solar Energy Technologies Office reports 2023–2025; BirdLife International reviews 2024; papers in Biological Conservation 2023–2025) consistently show that non-panel infrastructure poses lower collision/electrocution risk than panels themselves when standard mitigations are applied."

6.6 I could find no justification for this statement in the publications referred to in Paragraph 6.5. For example, I reviewed the eight scientific papers on solar farms published in the Biological Conservation Journal 2023-2025 (see Appendix 1 below) and could find no information on fatalities associated with non-panel infrastructure and the efficacy of mitigation. The publications discussed a range of topics including the rate of expanse of PV solar in the United Staes, conflict with snow leopard conservation in the Himalayas, enhancement of natural grassland plant communities, enhancement of insect pollinator numbers under PV, and a philosophy for ecovoltaic solar farm development (Appendix 1)

6.7 Similarly, what information I could find from Department of Energy Solar Energy Technologies Office reports largely talked about rates of solar growth and I could not find any data on collision rates of birds or efficacy of mitigation.

6.8 It would be useful if the applicant provided some of these purported references to the Panel if it is claimed they alleviate some of the concerns about bird collision risk.

7. 3.3.4(a) Provide detailed carcass monitoring methodology capable of detecting mortality of Nationally Critical species including …

7.1 I agree that statistically sound carcass monitoring should be undertaken if the proposed solar farm is consented, and there should be clear and certain conditions for compensation and adaptive management should collisions be detected. However, it would be good to see the monitoring design up front to provide some certainty of the approach, as was done for the proposed Haldon solar farm (Hamlin et al. 2026).

7.2 The response cites the Wildlands Draft Avifauna Management Plan (6621h-i, April 2026, Section 7). As this version of the plan does not seem to be appended to the Fast-track website, I cannot at this point provide any comments on the adequacy of the applicant's carcass monitoring.

7.3 However, it is unclear from the response what the applicant's "risk-stratified' carcass monitoring would look like. It seems that the overall lack of certainty around collision risk, lack of any data on relative risks associated with specific species (e.g., kakī), and because birds flying over likely cross the whole site, that a 'whole of solar farm' sampling regime would be needed.

7.4 I note that the applicant has dismissed using eDNA swabbing of panel surfaces to identify collision "smears, or feather spots". Overseas, birds that collide are frequently scavenged by predators, yet these smears or feather spots remain without any other evidence of which species had collided (see Figure 1 below). eDNA analysis has become a standard method for identifying species that collide with solar infrastructure because of this data gap (e.g., Gruppi et al. 2023; Harrigan et al. 2023). Thus, I recommend that eDNA swabbing should be incorporated into a monitoring programme.

8. 3.3.5 Population-Level Impact Thresholds & Adaptive Management Options 3.3.5(a) Provide population viability analysis determining …

8.1 The applicant did not supply the population viability analysis (sustainable mortality rate, population responses, mortality thresholds etc) requested in the RFI. While I think they are correct, that for some species available data may not be sufficient to determine population responses and thresholds (i.e. Australasian bittern, Williams 2024), population parameters and population counts are publicly available for other species such as kakī, black-fronted terns and banded dotterels.

8.2 For kakī, the reason for not undertaking a PVA appears to be that "FNSF does not have access to the detailed demographic data required to calculate maximum sustainable annual mortality rates for the regional kakī population". The applicant's consultants should know that this is not true, as many of the parameters for such modelling are publicly available in the scientific literature, and have been for many years (Keedwell 2004). Notwithstanding this, DOC could make available the most recent population statistics if requested.

References

Conkling TJ, Fesnock AL, Katzner TE 2023. Numbers of wildlife fatalities at renewable energy facilities in a targeted development region. PloS one. 18: e0295552.

Gruppi C, Sanzenbacher P, Balekjian K, Hagar R, Hagen S, Rayne C, Schweizer TM, Bossu CM, Cooper D, Dietsch T, Smith TB. 2023. Genetic identification of avian samples recovered from solar energy installations. PloS ONE 18: e0289949.

Hamlin TJ, Jones TT, MacKenzie DI 2026. Statistical advice for a solar power installation at Haldon Station, Canterbury, New Zealand. Client Report for Lodestone Energy. Proteus Client Report 219. Proteus, Dunedin.

Harrigan RJ, Rajbhandary J, Bossu C, Sanzenbacher P, Dietsch T, Gruppi C, Katzner TE, Smith TB, Ruegg K 2023. Utilizing high-resolution genetic markers to track population-level exposure of migratory birds to renewable energy development. PLOS Sustainability and Transformation 2: e0000088.

Keedwell RJ 2004. Use of population viability analysis in conservation management in New Zealand. Science for Conservation 243. Department of Conservation, Wellington. 60 pp.

Kosciuch K, Riser-Espinoza D, Gerringer M, Erickson W. 2020. A summary of bird mortality at photovoltaic utility scale solar facilities in the Southwestern U.S. PLoS one 15: e0232034.

Kosciuch K, Riser-Espinoza D, Moqtaderi C, Erickson W. 2021. Aquatic habitat bird occurrences at photovoltaic solar energy development in Southern California, USA. Diversity 13: 524.

Krexner T, Bauer A, Gronauer A, Mikovits C, Schmidt J, Kral I 2024. Environmental life cycle assessment of a stilted and vertical bifacial crop-based agrivoltaic multi land-use system and comparison with a mono land-use of agricultural land. Renewable and Sustainable Energy Reviews 196:114321,

Martin GR 2012. Through birds' eyes: Insights into avian sensory ecology. Journal of Ornithology 153: 23–48.

O'Donnell C. 2025. Proposed solar farm – The Point, Twizel. Risks to Threatened and At-Risk bird species from construction and ongoing operation. Department of Conservation, Christchurch.

O'Donnell C. 2026a. Comments on Draft Avifauna Management Plan and Draft Avian Conditions for the Point Solar Farm at Twizel, Canterbury. Department of Conservation, Christchurch.

O'Donnell C. 2026b. Proposed solar farm – Haldon Solar Project. Risks to Threatened and At-Risk bird species from construction and ongoing operation. Department of Conservation, Christchurch.

Smallwood KS 2022. Utility-scale solar impacts to volant wildlife. Journal of Wildlife Management 86: e22216.

Tölgyesi C, Bátori Z, Pascarella J, Erdős L, Török P, Batáry P, Birkhofer K, Scherer L, Michalko R, Košulič O, Zaller JG 2023. Ecovoltaics: Framework and future research directions to reconcile land-based solar power development with ecosystem conservation. Biological Conservation 285:110242.
Walston Jr LJ, Rollins KE, LaGory KE, Smith KP, Meyers SA. 2016. A preliminary assessment of avian mortality at utility-scale solar energy facilities in the United States. Renewable Energy 92: 405-414.
Williams EM 2024. Conservation management of the critically endangered matuku-hūrepo/Australasian bittern. A review of threats and preliminary management techniques. Science for Conservation 341. Department of Conservation, Wellington. 64 pp.
Willockx B, Lavaert C, Cappelle J. 2023. Performance evaluation of vertical bifacial and single-axis tracked agrivoltaic systems on arable land. Renewable Energy 217:119181.

Figure 1. Western grebe (a relative of the local crested grebe) that has collided with solar panels. Note also the smear on the panels; frequently birds that collide are scavenged by predators, yet these ‘feather spots’ remain. eDNA analysis is a standard method for identifying species that collide with solar infrastructure (Source: Desert Sunlight solar farm (Palen Solar power project).

Appendix 1. Scientific papers found in the Biological Conservation Journal 2023-2025 that refer to the search terms "solar", "bird collisions solar", "mitigation birds solar", or "solar farms".

Ascensao F, Chozas S, Serrano H, Branquinho C 2023. Mapping potential conflicts between photovoltaic installations and biodiversity conservation. Biological Conservation 287:110331.

Aycrigg JL, McCarley TR, Martinuzzi S, Belote RT, Bosher M, Bailey C, Reeves M 2023. A spatial and temporal assessment of energy development around wilderness areas. Biological Conservation 279:109907.

Evans MJ, Mainali K, Soobitsky R, Mills E, Minnemeyer S 2023. Predicting patterns of solar energy buildout to identify opportunities for biodiversity conservation. Biological Conservation 283:110074.

Lec'Hvien A, Bienvenu L, Isselin-Nondedeu F, Bischoff A, Gros R, Schatz B 2025. Effects of solar panels and management on pollinators and their interactions with plants in Southern French solar parks. Biological Conservation 307:111209.

Patel J, Khanyari M, Malhotra R, Pawar UR, Bijoor A, Sharma D, Suryawanshi K 2024. Snow leopards or solar parks? Reconciling wildlife conservation and green energy development in the high Himalaya. Biological Conservation 299:110793.

Patel J, Khanyari M, Malhotra R, Pawar UR, Bijoor A, Sharma D, Suryawanshi K 2024. Corrigendum to "Snow leopards or solar parks? Reconciling wildlife conservation and green energy development in the high Himalaya"[Biol. Conserv. 299 (2024) 110793]. Biological Conservation 299:110820.

Smith CI, Sweet LC, Yoder J, McKain MR, Heyduk K, Barrows C 2023. Dust storms ahead: Climate change, green energy development and endangered species in the Mojave Desert. Biological Conservation 277:109819.

Tölgyesi C, Bátori Z, Pascarella J, Erdős L, Török P, Batáry P, Birkhofer K, Scherer L, Michalko R, Košulič O, Zaller JG 2023. Ecovoltaics: Framework and future research directions to reconcile land-based solar power development with ecosystem conservation. Biological Conservation 285:110242.