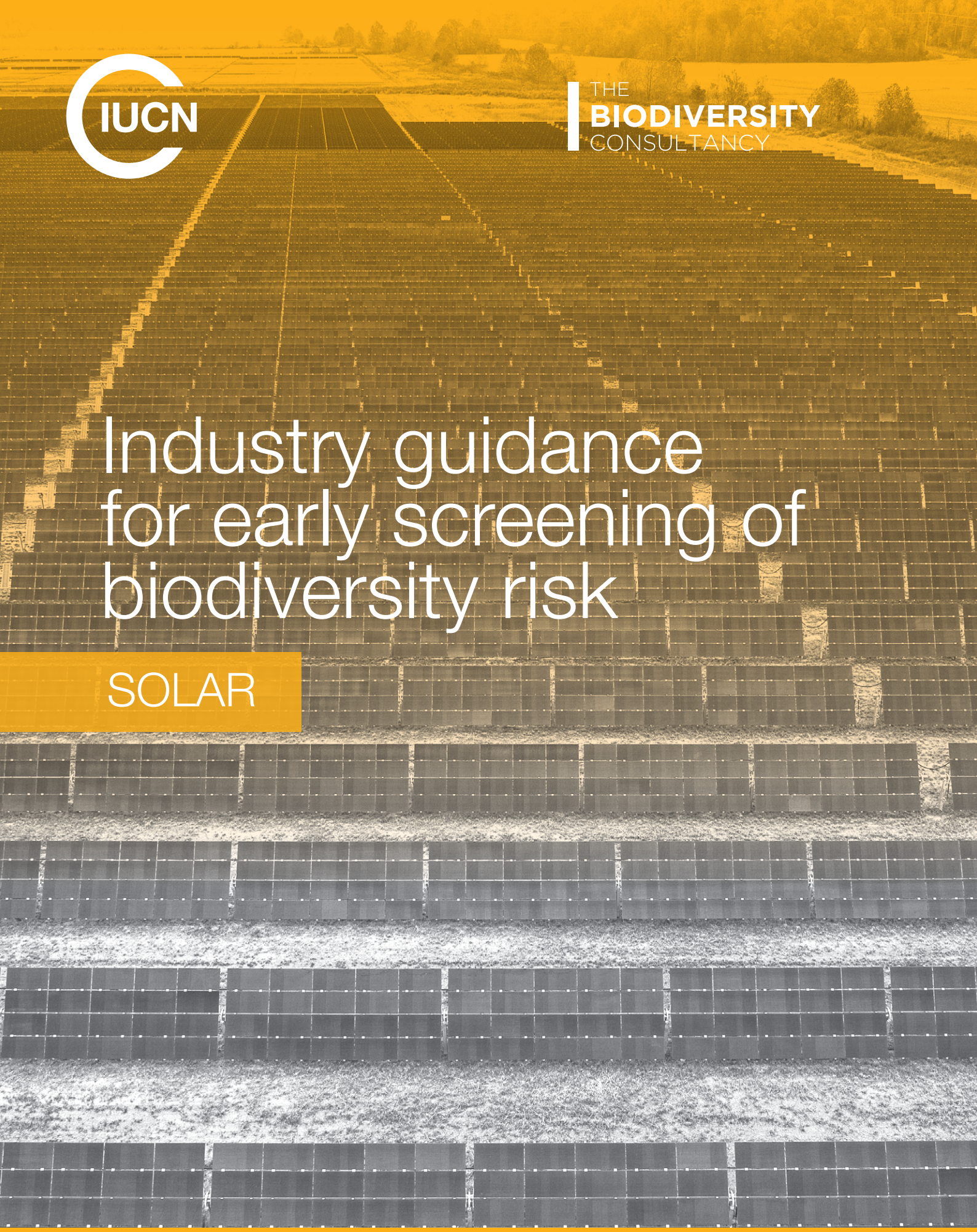

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Industry guidance for early screening of biodiversity risk

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The Biodiversity Consultancy is a specialist consultancy in biodiversity risk management. We work with sector-leading clients to integrate nature into business decision-making and design practical environmental solutions that deliver nature-positive outcomes. We provide technical and policy expertise to manage biodiversity impacts at a project level and enable purpose-driven companies to create on-the-ground opportunities to regenerate our natural environment.

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Introduction

This document provides brief practical guidance on early risk screening for solar projects. It outlines how to identify and avoid areas of high biodiversity sensitivity, based on the IUCN/TBC Guidelines for Mitigating biodiversity impacts associated with solar and wind energy development.[1] It is relevant to both project financers and developers and is applicable to developments around the world.

The guidance focuses on early desk-based risk screening, as part of the early planning and design phase of a development (Figure 1).[2] Siting projects away from sensitive areas (e.g. important wildlife habitat) can help to avoid significant negative impacts, and in turn reduce the need for expensive and prolonged survey, mitigation, and approval processes.

Financers may need to screen projects at different stages of development. The approaches used in early risk screening may be helpful to flag risks for projects that are at later stages of planning, but a range of other due diligence questions may also need to be considered.[3]

1 Bennun, L., van Bochove, J., Ng, C., Fletcher, C., Wilson, D., Phair, N., Carbone, G. (2021). Mitigating biodiversity impacts associated with solar and wind energy development. Guidelines for project developers. Gland, Switzerland: IUCN and Cambridge, UK: The Biodiversity Consultancy. https://doi.org/10.2305/IUCN.CH.2021.04.en

2 See Figure 3.2 in the Guidelines for further detail.

3 See the IBAT briefing note, *Considering biodiversity for solar and wind energy investments.*

Considerations for early risk screening

Early risk screening is a valuable tool to assess if a particular site or sites may pose an elevated biodiversity risk. It does not provide information on whether suitable but less risky locations exist elsewhere. Spatial plans and wildlife sensitivity mapping can provide this information (see Figure 1 and section 3 of the Guidelines).

- Early risk screening can indicate potential elevated risk but does not provide a definitive picture. It is not an alternative to site-specific assessment for mitigation planning. Risks may be present that were not evident during screening, while on the other hand potential risk does not always translate into actual risk (for example, wetlands might be present in the area but not be affected by the water use of the solar farm).
- Risks will depend not only on project location but on the size and design of the project.
- Risk screening results should be interpreted carefully, bearing in mind that:
    - There may be data gaps, especially in less studied regions. Absence of data does not indicate absence of risk.
    - In regions where solar developments are relatively new there may be limited information on which species could be most at risk (e.g. from behavioural displacement or collision with transmission lines associated with the development), although experience from elsewhere provides some indication.
    - For species that occur over a large area at very low densities, are nomadic or make other long-distance movements, the mapped presence of the species overlapping a site may not in itself provide a good indication of risk. Supplementary information or expert advice should be used where possible to aid interpretation.

In addition to informing site selection, a risk screening can help scope further site-specific assessments to assess the presence and status of the full range of sensitive biodiversity features at risk from the project. Multiple rounds of surveys across one or more years may be needed to develop a good understanding of a species' ecological requirements, population and seasonal distribution.

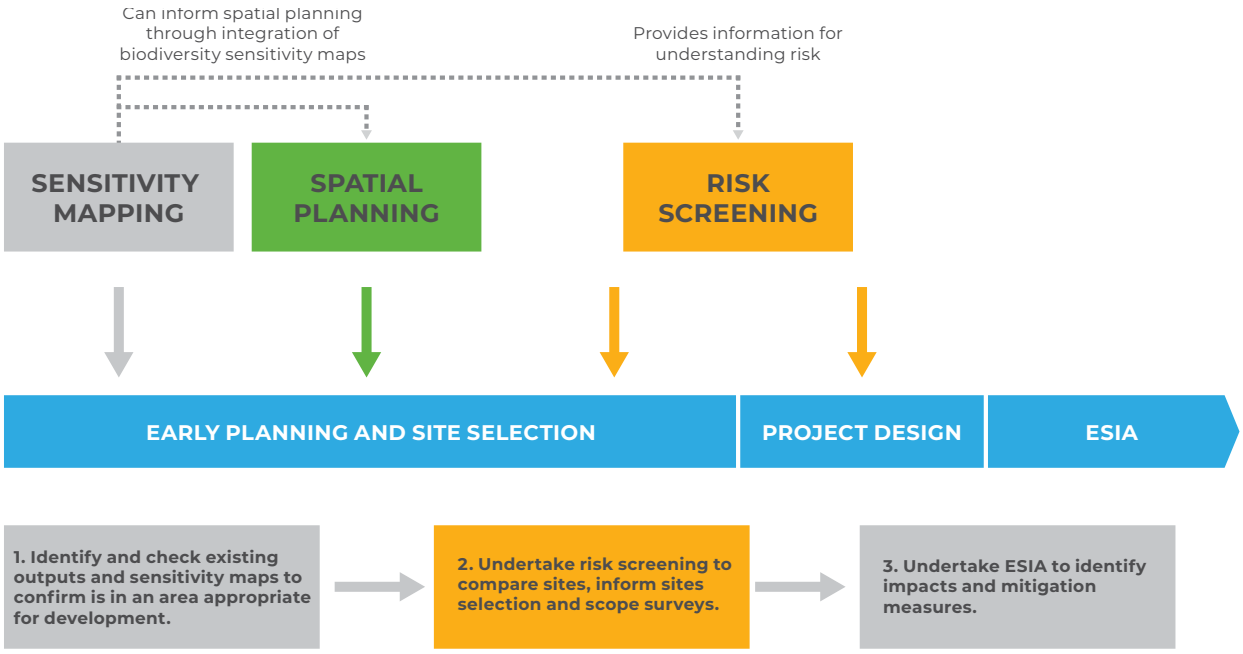

Figure 1. This guidance is applicable to the risk screening stage of the early planning phase of a project. Screening can also be used to inform project design, following confirmation of the project site. Provisional site selection and screening should ideally be guided by spatial planning and/or wildlife sensitivity mapping where these exist. It is important that developers and financers identify such information sources and where available use them to confirm that the proposed development site is not known to overlap with sensitive areas. Additional guidance on sensitivity mapping, spatial planning and Environmental and Social Impact Assessment (ESIA) can be found in Section 3 of the Guidelines.

Biodiversity data sources and interpretation

Important biodiversity data and information sources for early screening are identified in Table 1. Depending on project location, other relevant national or regional datasets may be available.

The Integrated Biodiversity Assessment Tool (IBAT) is a key resource and the usual starting point for screening. IBAT provides commercial users[4] spatial data for global biodiversity from several key datasets, such as the IUCN Red List of Threatened Species™, the World Database on Protected Areas and the World Database of Key Biodiversity Areas (which includes Important Bird and Biodiversity Areas). Reports showing the proximity of a particular area of interest in relation to these features can be generated in IBAT. All of these are critical for identifying sites of high biodiversity significance. In this document we show how these reports can be used to identify potential risks associated with biodiversity features including threatened species.

Additional datasets are needed to assess overlap with other important wildlife habitat or migration routes (e.g. Birdlife's Migratory Soaring Birds Project). Where available, these are included in Table 1.

Screening should consider the wider area around a project site. This is to account for potential direct and indirect impacts associated with the project and its associated facilities (e.g. powerlines and roads), as well as potential movements of wide-ranging species. A buffer of at least 10 km around the proposed solar development is recommended (IBAT allows users to select up to three buffers between 1 km and 50 km in its site reports). This may need to be scaled up if planned new roads or powerlines are more extensive, if water abstraction could cause broader hydrological changes, or if high-risk, wide-ranging species are likely to be present.

It is recommended to work with biodiversity specialists to help undertake the screening and interpret the findings. Specialists will also be able to help investors and developers understand the implications for aligning with biodiversity safeguards and to scope further work, including field surveys and Environmental Impact Assessment.

Further guidance on risk screening can be found in Section 3 of the Guidelines.

4 IBAT data can be accessed either as a pay as you go service or through an annual subscription service. See here for costs and details and here for IBAT's briefing note on considering biodiversity for solar and wind energy investments.

Framework for integrating biodiversity into project planning

Table 1 presents the key types of risk associated with a project's location and specific construction and operational features where relevant, based on three broad categories of impact:

i. **Footprint**: habitat loss, degradation and/or fragmentation (including behavioural change by wildlife) resulting from the project's land-take;
ii. **CSP Infrastructure**: Wildlife mortality due to attraction to evaporation ponds and burning or singeing of birds by CSP infrastructure;
iii. **Collisions**: bird and/or bat mortality due to collisions with transmission lines.

Further context and guidance are provided in Table 1 to help understand risk. The guidance and information sources in Table 1 are not exhaustive – it is important to work with specialists to locate and interpret relevant information. Section 5 of the Guidelines identifies other potential impacts and mitigation approaches, including opportunities to enhance biodiversity through proactive conservation actions such as site enhancement.

Sensitive species groups are referenced where such information is known and supported by scientific research. See Annex 1 for a detailed table of vulnerable species with references. These are examples to aid screening and not intended to be a comprehensive list.

Table 1. Key biodiversity risks associated with solar developments, and means to identify risk based on existing information sources. Specific references to studies on species known to be sensitive to solar developments resources can be found in Annex 1.

Potential impacts	What indicates potentially high risk?	How can I assess risk?	IBAT and additional information sources not available through IBAT
Impact category: Project footprint			
• Loss or degradation of natural vegetation • Habitat fragmentation • Displacement of wildlife • Barriers to wildlife movement • Ecological change owing to water abstraction (primarily for concentrated solar power)	Footprint in or near designated Protected Areas	Protected areas have been mapped globally. Projects within or adjacent to such areas may be incompatible with its objectives, and risk impacting the biodiversity values for which they were designated.	• IBAT Proximity or Multisite reports which include protected areas
	Footprint in or near Key Biodiversity Areas	Key Biodiversity Areas have been identified globally. Projects within such areas risk impacting the biodiversity values for which they were designated, particularly where these have been identified based on significance of birds and bats.	• IBAT Proximity or Multisite reports which includes the World's Database of Key Biodiversity Areas
	Footprint within the range of threatened or restricted-range species	Vulnerable species range maps are available through the IUCN Red List to identify potential overlap. Some threatened birds are known to be at high risk of collision with transmission lines (see below). Open-country species may be displaced from areas around tall structures (i.e., concentrated solar power or transmission-line towers). Threatened and restricted-range species are at highest risk.	• IBAT Proximity or Multisite reports
	Water abstraction sources hydrologically linked to sensitive wetland species or habitats	Where significant water abstraction is anticipated in dry or water-stressed areas, attention needs to be paid to aquatic or wetland species that might be affected. Threatened and restricted-range species, and threatened wetland ecosystems, are at greatest risk. The screening area should consider potential abstraction sources and hydrological connections, for both surface and ground-water.	• IBAT Proximity or Multisite reports • Hydrobasins dataset • See 'Close to wetlands' below for wetland datasets
	Overlapping with a migratory corridor or wildlife movement route, or with known feeding or stopover sites for migratory bird, bat or insect species	Some information on species' movements (especially for large-scale, long-distance migration) is available in IUCN Red List maps and species text accounts. Information may not be directly available on smaller-scale movements, such as amphibians moving locally to and from seasonal breeding grounds. However, if footprint overlaps with threatened/restricted-range species that are known to make such movements, this indicates potentially elevated risk.	• IBAT Proximity or Multisite reports
	Footprint in natural or semi-natural vegetation	Potential areas of Natural Habitat have been mapped globally based on IFC PS6 definitions. Developments within or adjacent to areas of Natural Habitat are likely to be high risk for development. Areas of Modified Habitat such as farmlands and pastures may still support sensitive species so are not necessarily low risk.	• Natural and Modified Habitat map - free for commercial use with appropriate attribution
	Footprint in mapped Critical Habitat	Potential or likely Critical Habitat has been identified and mapped globally based on the IFC PS6 criteria and a range of biodiversity data. Developments within or adjacent to areas of Critical Habitat are likely to be high risk for development.	• Critical Habitat map - free for commercial use with appropriate attribution
Impact category: Wildlife mortality due to attraction to evaporation ponds (primarily for CSP)			
Fatalities or injuries to birds	Footprint within the range of threatened or restricted-range species	Wildlife, including birds, reptiles and mammals, may be attracted to evaporation ponds, particularly in dry areas, posing a risk of poisoning or drowning. Potential impacts are most likely to be significant for threatened and restricted-range species. See "Project footprint" section above.	• IBAT Proximity or Multisite reports
Impact category: Burning or singeing by CSP infrastructure			
Fatalities or injuries to birds	Footprint within the range of threatened or restricted-range species	There are reports of birds being burned or singed by flying through the concentrated solar beam at CSP plants. Potential impacts are most likely to be significant for threatened and restricted-range species. See "footprint within the range of threatened or restricted-range species" section above.	• IBAT Proximity or Multisite reports

Impact category: Collisions with transmission lines, collisions and attraction to solar panels			
Fatalities or injuries to birds and insects	Within range of bird species vulnerable to collisions	Range maps are available through the IUCN Red List. Species known to be vulnerable to transmission line collisions include those with high wing-loading and low manoeuvrability, notably: • Bustards • Cranes • Flamingos • Geese • Ground Hornbills • Spurfowl • Storks Species that are threatened or have a restricted range pose the highest risk. Collisions with solar panels may involve both birds and insects but this appears to be a less serious risk than collisions with transmission lines. So far there are limited data on which species may be most susceptible, which makes it difficult to screen for this risk.	• IBAT Proximity or Multisite reports that include the IUCN Red List
	Close to wetlands	Important wetlands have been identified for most parts of the world. Wetlands often support significant populations of birds at high collision risk. Range maps for most vulnerable wetland bird species are available through the IUCN Red List. Wetland birds known to be vulnerable to collision risk include those with high wing-loading such as: • Cranes • Flamingos • Geese • Pelicans • Storks Birds that are threatened or have a restricted range are at the highest risk.	• Global Surface Water dataset - includes important seasonal and intermittent wetlands • Ramsar site information service - generates site reports which can be downloaded • Regional wetland databases such as the Critical Sites Network • Hydrobasins dataset

Annex 1. Species known to be vulnerable to solar developments

Class	Species group	Potential impacts	References to examples (not comprehensive)
Birds	Various groups (insufficient evidence to show which are more at risk)	Collision with solar panels and associated infrastructure	Kagan et al. 2014 (DOI: 10.1016/j.renene.2016.02.041)
		Singeing (in Concentrated Solar Power facilities)	Ho 2016 (DOI: 10.1063/1.4949164), Kagan et al. 2014 (https://www.ourenergypolicy.org/wp-content/uploads/2014/04/avian-mortality.pdf)
		Poisoning and/or drowning in evaporation ponds (primarily in Concentrated Solar Power facilities)	Jeal et al. 2019 (DOI 10.2989/00306525.2019.1581296)
	Migratory soaring birds (raptors, storks, pelicans, cranes)	Barrier effects (if very large areas on flyway, or important staging grounds, occupied by developments)	BirdLife international 2012 (http://migratorysoaringbirds.undp.birdlife.org/sites/default/files/factsheet%20Solar%20Developer%20v1H. pdf); Ho et al. 2016 (DOI: 10.1063/1.4949164)
Insects	Various groups (insufficient evidence to show which are more at risk)	Attraction to solar panels causing behavioural disruption and mortality	Horváth et al. 2010 (10.1111/j.1523-1739.2010.01518.x)

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