

Solar Photovoltaic Energy Environmental Development Guidelines for Climate and Conservation in California

1. Introduction

The Large-scale Solar Association (“LSA”) is a non-partisan association of solar and battery storage developers that advocates appropriate policies to enable market penetration of utility-scale solar technologies in California and the Western United States. LSA’s members are leaders in the utility-scale solar industry with deep experience in all disciplines necessary to site develop, engineer, construct, finance and operate utility scale solar and battery storage systems.

As the dramatic effects of the climate crisis are being felt across the state, the nation, and the world, LSA member companies are principally responsible for developing most of the operational and planned solar, storage, and clean hydrogen capacity in California today, helping the State to lead the globe in a clean energy transition. And we’re accomplishing this feat with a strong focus on avoiding, minimizing, and mitigating impacts to local wildlife and their habitats.

1.1 Purpose

The California Solar Photovoltaic Energy Environmental Development (“California SPEED”) Guidelines are intended to ensure that utility-scale solar photovoltaic (“PV”) projects sited in California by LSA member companies undergo a rigorous, tiered, risk-based evaluation process and are sited in areas well-suited for the generation, interconnection, and transmission of PV solar energy, while avoiding, minimizing, and/or mitigating major wildlife and habitat conflicts, in order to streamline environmental permitting and preserve natural resources for future generations to the greatest extent feasible. They provide a process for assessing risk to wildlife and their habitats, determining potential impacts, and committing to beneficial practices designed to avoid and minimize, and where appropriate, mitigate for resulting adverse impacts. Importantly, these guidelines also represent a commitment to enhancing wildlife habitat within large-scale solar array areas for special status species that coexist well with solar project operations. These voluntary, California-specific Guidelines were developed by LSA member companies with review and comment by the California Department of Fish and Wildlife (“CDFW”), but they have not been approved, endorsed, or adopted by CDFW or other permitting authorities. LSA members endorse this document as voluntary guidance for the industry. LSA encourages non-LSA solar energy developers to implement these California SPEED Guidelines, which may be updated from time to time.

California is tasked with rapidly decarbonizing its economy. Senate Bill (“SB”) 100 (2018 DeLeon) as modified by SB 1020 (2022 Laird) requires the electric system to be 90% clean by 2035, and 100% clean by 2045. According to the California Public Utilities Commission (“CPUC”), this will require approximately 39 GW of new, utility-scale PV solar to come online by 2035 and another 30 GW by 2045, requiring an estimated 500,000 to 1 million acres of land for solar.

A strong foundation of natural resource, land use, and environmental justice laws and regulations in the State ensure that large-scale solar energy development occurs with more forethought, rigor, transparency, accountability, and public input than anywhere else in the world.

The foundational environmental requirements that govern discretionary land use and environmental decisions in the State include the California Environmental Quality Act (“CEQA”) and the California Endangered Species Act (“CESA”), which are complemented by myriad other state laws and regulations. In addition, the California Energy Commission (“CEC”), the CPUC, and the California Independent System Operator (“CAISO”), in consultation with CDFW, are mandated by law to identify transmission system upgrades that will facilitate the lowest environmental impact land use transition for solar energy development across the State through a combination of Land Use Screens and Transmission System Planning.

1.2 California Environmental Quality Act

Regarded as one of the most stringent, robust, and participatory environmental disclosure laws in the nation, CEQA (made up of the statute [Public Resources Code 21000–21189] and guidelines [Title 14, Division 6, Chapter 3 of the California Code of Regulations]) is intended to inform government decisionmakers and the public about the potential environmental effects of proposed activities and to prevent significant, avoidable environmental damage. CEQA requires lead agencies to perform a comprehensive analysis and disclosure of the potentially adverse direct, indirect, and cumulative environmental and socioeconomic impacts of any proposed large-scale solar project, solicit feedback from the public and incorporate public comments, identify mitigation measures to avoid or substantially lessen the significant environmental impacts to be implemented during construction, operation, and decommissioning of the project, and make findings that the project is in the public interest in advance of project approval. Under current law, no large-scale solar project is exempt from CEQA.

For large-scale solar projects, compliance with CEQA typically results in a process that lasts between 2 and 5 years, costing project proponents millions to tens of millions of dollars to carry out depending on the size and complexity of the project.

In addition, CEQA requires lead agencies to enforce mitigation measures and other conditions of approval imposed upon a solar project during the construction, operational, repowering, and potential decommissioning stages of a project.

CDFW acts as a Trustee and/or Responsible Agency under CEQA and provides the requisite biological expertise to review and comment upon CEQA environmental documents prepared by another Lead Agency. CDFW may also act as Lead Agency when no other State or local public agency has discretionary approval over a project or where CDFW would be the first to act on a discretionary permit for the project.

1.3 California Fish and Game Code

The California Fish and Game Code is written in 13 Divisions, which establish the basis of fish, wildlife, and native plant protections and management in the state. Some of the more notable Divisions of the code include the establishment of CDFW as the agency that oversees and enforces the policies in the

code, hunting and fishing regulations, wildlife refuges and wilderness areas, the California Endangered Species Act (“CESA”), and the Lake and Streambed Alteration Agreement (“LSAA”) permitting process.

1.3.1 California Fish and Game Code Sections 2050-2089.5

CESA (California Fish and Game Code Sections 2050-2089.5) is a California environmental law that conserves and protects plant and animal species at risk of extinction. Originally enacted in 1970, CESA was repealed and replaced by an updated version in 1984 and amended in 1997. Plant and animal species may be designated threatened or endangered under CESA after a formal listing process by the California Fish and Game Commission. Approximately 250 species are currently listed under CESA. A CESA-listed species, or any part or product of the plant or animal, may not be imported into the State, exported out of the State, “taken” (i.e., hunt, pursue, catch, capture, or kill or attempt to do so), possessed, purchased, or sold without proper authorization. Implementation of CESA has reduced and avoided, minimized, and sometimes mitigated impacts to California’s most imperiled plants and animals, has protected hundreds of thousands of acres of vital habitat, and has led to a greater scientific understanding of California’s incredible biodiversity.

An individual or organization may petition the California Fish and Game Commission (“Commission”) to list a species under CESA. If the Commission accepts the petition, the species becomes a candidate for listing and is temporarily afforded the same protections as a state-listed endangered or threatened species. After CDFW’s status report is complete, the Commission must decide at a public meeting whether the petitioned action is warranted and decide whether to list or not list the species.

CDFW is charged with implementing and enforcing the regulations set by the Commission, as well as providing biological data and expertise to inform the Commission’s decision-making process. CDFW works with agencies, organizations, and other interested persons to study, protect, and preserve CESA-listed species and their habitats. CDFW also conducts scientific reviews of species petitioned for listing under CESA, administers regulatory permitting programs to authorize take of listed species, maintains an extensive database of listed species occurrences, and conducts periodic reviews of listed species to determine if the conditions that led to original listing are still present.

Various permitting pathways that allow for incidental take of state listed species are available to large-scale solar and battery energy storage project developers under CESA.

- **Incidental Take Permit.** Under Section 2081(b), CDFW may authorize take of endangered, threatened, or candidate species so long as the take is “incidental to an otherwise lawful activity” and any impacts of the take are “minimized and fully mitigated.” CDFW may authorize management actions that pose a risk of incidental take with appropriate terms and conditions.
- **Candidate Species Incidental Take Rule.** Section 2084 authorizes the Commission to adopt regulations to allow incidental take of candidate species subject to appropriate terms and conditions. Any 2084 Rule adopted only remains valid during the candidacy period for the pending listing petition.
- **Safe Harbor Agreement.** Under Section 2089.6, CDFW may authorize take incidental to an otherwise lawful activity provided that the authorized take will not jeopardize the continued existence of the species if the activities are expected to provide a net conservation benefit to the species. Other conditions require that the landowner has agreed to avoid and minimize incidental take authorized in the agreement, a monitoring program is established to monitor the

effectiveness of the agreement, sufficient funding is available to carry out management activities, and implementation of the agreement does not conflict with other conservation or recovery programs for the species. Safe Harbor Agreements can be entered into to cover conservation of both listed species and those that may become listed in the future.

1.3.2 California Fish and Game Code Section 1602

Fish and Game Code Section 1602 requires any person, state or local governmental agency, or public utility to notify CDFW prior to beginning any activity that may do one or more of the following:

- Divert or obstruct the natural flow of any river, stream, or lake;
- Change the bed, channel, or bank of any river, stream, or lake;
- Use material from any river, stream, or lake; or
- Deposit or dispose of material where it may pass into any river, stream, or lake.

CDFW requires a LSAA when a project activity may substantially adversely affect fish and wildlife resources. Projects are required to delineate the boundaries (bed and bank) of any river, stream, or lake that will be impacted by activities covered by Section 1602 ("CDFW jurisdictional waters") and coordinate with CDFW to establish the project description, impacts from the project, administrative measures, avoidance and minimization measures, compensatory measures, and reporting measures. Issuance of any LSAA triggers CEQA compliance and requires that impacts to CDFW jurisdictional waters and associated fish and wildlife resources be identified and mitigated.

1.5 Land Use Screens and Transmission System Planning

The CEC's 2023 Land Use Screens for Electric System Planning report¹ identifies high-level, potential solar development areas within the state that have the lowest system-wide biodiversity and community impacts based on a comprehensive set of available geospatial data layers and habitat models. The CPUC and CAISO use the land use screens in their electric system planning process to identify transmission system upgrades to accommodate the lowest-impact, highest-benefit clean energy transition. Because large-scale solar facilities can only be sited where there is sufficient contiguous flat land and either 1) a point of interconnection to the high-voltage bulk transmission grid, or 2) a large industrial load, the Land Use Screens and Transmission Planning Process are designed to facilitate the lowest environmental impact siting of new solar generators across the State.

The State land use screens are intended to be directional for state planning purposes only. LSA member companies perform a project-specific, risk-based siting evaluation to further reduce project conflicts, aiming to first avoid, then minimize, and as warranted mitigate substantial adverse impacts on native species and their habitats, as well as on other environmental and community resources.

2. Solar Development Background

Utility-scale solar PV development is only possible where there is either (1) a proximate point of interconnection with sufficient capacity to add power generation that can be economically delivered to

¹ <https://www.energy.ca.gov/publications/2022/land-use-screens-electric-system-planning-using-geographic-information-systems>

an electricity market, or (2) an industrial load that requires a large volume of non-grid tied renewable electricity.

2.1 Solar Development Constraints

While California includes vast areas of undeveloped lands, potentially suitable utility-scale solar development sites are severely limited across the landscape, which necessarily focuses solar development around existing or near-term planned transmission lines and substations or very large industrial loads. Lands available for utility-scale solar are further constrained by landowner willingness, setbacks from local communities, conflicts related to historic or Native American cultural resources, environmental justice considerations, agricultural protection laws and standards, presence of other infrastructure (e.g., easements, roads, rights-of-way), insolation (i.e., how much solar energy reaches the ground), terrain (e.g., steep slopes), geological features (e.g., outcrops), geotechnical conditions, site hydrology, local and state approvals, political boundaries, wildlife and habitat considerations, and many other constraints.

2.2 Agency Communication and Permitting

The Association of Fish and Wildlife Agencies, in collaboration with the American Clean Power Association and the Energy and Wildlife Action Coalition published a voluntary communication framework² for solar energy project proponents and state fish and wildlife agencies (“Communication Framework”). These California SPEED Guidelines incorporate the Communication Framework by reference and adopt them herein. The Communication Framework identifies six stages of communication during solar project development and makes recommendations for early outreach, expectation setting, and ongoing communication throughout all phases of project development, including siting, environmental diligence, permitting, construction, operation, and decommissioning.

Given the unique regulatory regime in California, additional communication considerations and permitting requirements are relevant, as described briefly below.

2.2.1 Communication with CDFW as a CEQA Lead Agency

As described in Section 1.2, CDFW may act as a CEQA lead agency for a large-scale solar and/or battery storage project. Project proponents should seek the advice of land use counsel and coordinate with CDFW early in the planning process to determine whether CDFW may serve as a project’s CEQA lead agency, which occurs infrequently and only under certain circumstances. Prior to proceeding with submitting an application to CDFW that would trigger the initiation of the CEQA process, the proponent should clearly understand the practices, procedures, and timelines that can be expected for all steps in the CEQA process with CDFW as a lead agency, which may include, but are not necessarily limited to: execution of a Memorandum of Understanding between the project proponent and CDFW, and use of a CDFW-contracted environmental consulting firm to prepare the project’s CEQA document.

²https://www.fishwildlife.org/application/files/6317/1770/4984/Communications_Framework_for_Solar_Energy_Project_Proponents_and_State_Fish_and_Wildlife_Agencies_.pdf

2.2.2 Communication with CDFW as a Responsible Agency

CDFW is a responsible agency under CEQA where a proposed project requires a permit under the Fish and Game Code and CDFW is not the CEQA lead agency. All CEQA documents are required to be circulated to responsible agencies, and CDFW reviews and comments on CEQA documents as a responsible agency. CDFW must rely on the CEQA document, findings, and certification of the CEQA lead agency when determining whether to issue a permit under the Fish and Game Code.

2.2.3 Communication with CDFW as a Trustee Agency

A trustee agency is a State agency having jurisdiction by law over natural resources that are held in trust for the people of California, and which may be affected by a project. CDFW always serves as a trustee agency under the Fish and Game Code with regard to the State's fish and wildlife resources. For some large-scale solar projects, CDFW may act only as a trustee agency. For example, under the CEC's Opt-in Certification Program, the authority for permitting under the Fish and Game Code is delegated to the CEC, and CDFW's role is as a trustee agency. CDFW is required to communicate with project proponents subject to a memorandum of understanding, and CDFW must include CEC staff in any communications with project proponents.

3. Site Screening and Risk Characterization

This section presents seven recommended steps for consideration of wildlife and habitat impacts of utility-scale solar PV energy development in California. Each step includes questions to be answered by the end of each step, methods and metrics to accomplish and evaluate results at each step, and decision points to guide pursuing completion of subsequent steps, pursuing continued investment in site development, or discontinuing development where insurmountable obstacles exist based on the informed judgement of the developer as described herein.

To provide adequate time for biological resources site characterization, risk review, and selection of potential beneficial practices to reduce adverse effects on species and their habitats as warranted, Steps 1 through 3 should be initiated a minimum of three to four years prior to the anticipated start of construction, and Steps 4 through 7 should be initiated a minimum of two to three years prior to the anticipated start of construction. The sequential process below should be initiated at the preliminary siting and design phase of a potential project, well before advanced site engineering is initiated, when adjustments to the limits of disturbance of a conceptual layout can still be made.

Site assessments should be conducted both by desktop and field evaluation as described in greater detail below. Experts with knowledge of the local wildlife, vegetation communities, and presence of protected resources should be selected by the proponent to ensure that the appropriate survey methods are used in search of the range of resources that require evaluation. These experts should be familiar with CDFW resources and recommended protocols for evaluating species and habitat presence.

The following risk assessment process begins with a more general, lower-resolution, and lower-cost review before initiating more costly and intensive field studies. The purpose of this approach is to identify protected resources over a broad area of consideration, or Area of Interest ("AOI") early and at

lower expense, enabling preliminary site revision as appropriate and in response to new resource information and validation of resource presence.

Desktop screening for sites that are disturbed and have low suitability for a habitat-limited endemic imperiled species or a broad range of other protected species will lead to faster agency review and permit processing, while sites with protected species presence and the presence of habitat-limited endemic species will require greater agency coordination and, in all likelihood, substantially greater cost during development, construction, and operations phases of a project. It should be noted, however, that even extremely low impact sites, like intensively cultivated agricultural fields that are being transitioned out of agricultural production, or contaminated lands that are not suitable for human land uses, will likely have at least a minimal presence of some protected species (e.g., western burrowing owl and Swainson's hawk).

If at any point during the risk assessment process described below, the project location changes, the project design is substantially modified, or the project's maximum limits of disturbance increase, the project proponent should return to Step 1.

Step 1: Desktop avoidance area screening

Prior to making substantial investments in site control, permitting, procurement, engineering, or power marketing, for each AOI identified by a project proponent, the following preliminary landscape-scale screening diligence should be conducted to ensure avoidance of impacts to the most essential wildlife, habitat, and conservation values, and to lessen impacts on other wildlife, habitat, and conservation values wherever possible.

Questions

1. Are there legally protected areas³ within or overlapping the AOI?
2. Is there mapped critical habitat⁴ within the AOI that could potentially be adversely impacted by the nature of the solar energy development (see Appendix 1)?
3. Are there defined and publicly available intact migration or crucial habitat connectivity corridors⁵ that would be physically blocked or impeded by developing the AOI with a solar energy facility (see Appendix 1)?

³ A legally protected area is a location where large-scale solar and/or battery storage development is prohibited by law, including but not limited to National Parks, National Wildlife Refuges, National Monuments, Wilderness Areas, many State Parks, private or public lands protected under a Conservation Easement, some Native American Reservations, and many public lands that prohibit such development, which may include lands managed by the Department of Defense and the Bureau of Land Management.

⁴ Critical habitat is defined as: specific areas within the geographical area occupied by the species at the time of listing that contain physical or biological features essential to conservation of the species and that may require special management considerations or protection; and, specific areas outside the geographical area occupied by the species if the agency determines that the area itself is essential for conservation.

⁵ For example, the CDFW Habitat Connectivity Viewer in Biogeographic Information and Observation System (see Appendix 1)

4. Does the AOI overlap the range of any special status species⁶ that could be adversely affected by development and/or operations of a solar energy facility, and are there potential vegetation types or water features present within the AOI that are suitable for those special status species (see Appendix 1)?

Methods and Metrics

Publicly available desktop and geospatial data sources and science-based habitat models should be used during this step. Appendix 1 has a list of primary and secondary sources of desktop information and data that may be effective for completing this step. Appendix 1 may be augmented and updated as new sources become available.

Decision Points

If the answer to question 1 is “yes”, the portion of the AOI that conflicts with the requirements of the legally protected area should be removed from further consideration. If the answer is “yes” or “inconclusive” to any of the other questions, the proponent should proceed to Step 2. If the answer is “no” to all of the questions in Step 1, the proponent should still complete at least Steps 2 and 3 to validate these preliminary findings.

Step 2: Desktop critical issues analysis

A desktop critical issues analysis (“CIA”) will be conducted prior to making significant investments in site control, permitting, procurement, engineering, or power marketing if the answers to any of the questions in Step 1 were “yes” or “inconclusive”.

Questions

1. If there is mapped critical habitat within the AOI, is there potentially suitable habitat for that species present within the AOI to qualify the AOI or portions thereof as designated critical habitat (see Appendix 1)?
2. Are there known occurrences of special-status species within the AOI as demonstrated in CNDDDB and other public⁷ or private databases (see Appendix 1)?

⁶ Special status species are those that have been afforded special recognition by federal, state, or local resource agencies or organizations, are often of relatively limited distribution, and typically have unique habitat conditions, which also may be in decline. Special status criteria include: Officially listed or candidates for listing by California or the federal government as endangered, threatened, of special concern, or rare under CESA or the federal Endangered Species Act; Plants or animals which meet the criteria for listing, even if not currently included on any list, as described in Section 15380 of CEQA; BLM Sensitive Species designated by the BLM California State Director; Plants listed in the California Native Plant Society’s Inventory of Rare and Endangered Plants of California (CNPS 2022); Wildlife species identified by CDFW as Species of Special Concern (CNDDDB 2022, Figure 6); Plants or animals included in the CDFW lists of Special Plants or Special Animals (CNDDDB 2022, Figure 6); Considered special-status species in local or regional plans, polices, or regulations such as the Northern and Eastern Colorado Desert Coordinated Management Plan/EIS; Protected under other statutes or regulations (e.g., Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, etc.)

⁷ E.g., <https://wildlife.ca.gov/Data/Analysis/Ace>

3. Is there presence of vegetation types that indicate the potential for threatened, endangered, or candidate species habitat to be present within the AOI plus a reasonable buffer around the AOI (see Appendix 1)?
4. Is there local knowledge and expertise about the site or region that should be considered in assessing the potential impacts of site development on special-status species and their habitats?

Methods and Metrics

A CIA is an expert desktop analysis and aerial photograph interpretation conducted by a biologist and/or natural resources expert with particular expertise in the local species and habitats of the region, including non-resident migratory species that may pass through the region. National conservation groups may also be contacted to identify local affiliates, and local Native American tribes and outdoor recreation groups may offer additional local knowledge, at the discretion of the project proponent.

Decision Points

Following the desktop evaluation, the proponent should proceed to Step 3 to discuss the results with CDFW. The results of Steps 2 and 3 should establish whether a field habitat assessment for protected resources is needed, and whether more in-depth fieldwork is required to understand potential presence and likely effects of a project on these resources.

Step 3: Early agency coordination

The purpose of coordination with CDFW is to share information regarding sensitive natural resources in the refined AOI of a proposed large-scale solar project in support of validating preliminary findings, identifying the timing, intensity, location, and approach of additional field studies, if warranted, and discussing avoidance strategies, site design options, beneficial practices, and potential conservation measures as warranted. The coordination should be initiated as early in the project's development phase as possible, prior to making substantial investments in project-specific permitting, procurement, engineering, or power marketing, and when the site layout is still somewhat flexible. Coordination with CDFW should continue as noted below during specific steps in the evaluation and design development process of a large-scale solar project.

Questions

1. Has all available desktop information been used in characterizing the fish and wildlife resources that may be present within the preliminary project site?
2. Are more intensive field surveys required to accurately characterize the fish and wildlife resources that may be adversely impacted by project development?
3. Does CDFW recommend field techniques or protocols for characterizing those fish and wildlife resources, and what is the anticipated timing, level of effort, and/or protocol cost to complete such surveys?
4. What are the implications of bypassing intensive site surveys and assuming the presence of special-status species?

Methods and Metrics

A meeting may be held in person or by video conference, with representative from the CDFW Region in which the project is located. The proponent and CDFW may wish to include USFWS representatives as appropriate. The proponent should share project maps and geospatial natural resources information identified during the prior steps. Decisions, recommendations, and follow-ups identified during the meeting should be documented in proponent notes, which should be shared with all attending parties shortly after the meeting. All parties should be given an opportunity to review and comment on the meeting notes.

The proponent should subsequently seek a detailed estimate of the cost of completing field work and permitting for any special-status species that may be adversely impacted by project development.

Decision Points

If, after coordination with CDFW staff, receiving answers to all of the questions in Step 3, project development may adversely affect special status species, and upon seeking a reputable cost and schedule estimate of proceeding with the project, the proponent wishes to continue pursuing development of the project, the proponent should complete the remaining steps. If, after completing Steps 1 through 3, project development will avoid and will not adversely affect special status species, the proponent may skip Steps 4 through 6 and proceed to Step 7.

Step 4: Field habitat assessment

This step should be conducted after site control is obtained, and after conversations with CDFW have been initiated, but prior to making significant investments in project-specific permitting, procurement, engineering, or power marketing.

Questions

1. Is there field-verified presence of, or suitable habitat for, candidate, threatened, endangered, or fully protected species under state or federal law that cannot be avoided and/or could be adversely affected by project development?
2. Are there field-verified sensitive habitats such as microphyll woodland, riparian areas, wetlands, wet/dry vegetated/unvegetated washes, or other CDFW jurisdictional resources present within the site that cannot be avoided and/or could be adversely affected by solar energy development?

Methods and Metrics

A field habitat assessment is a reconnaissance-level field survey conducted by a qualified biologist or conducted through the use of emerging technologies (e.g., camera-enabled drones, LiDAR, and AI to name a few). The habitat assessment need not cover the entire AOI and need not be conducted on foot for a large AOI but should be focused on validating the key questions outstanding after the previous steps. For example, if only wetland species are of concern, then only the wetland area would require review. If only tree-nesting hawks could be present, then only trees would be evaluated for nest presence.

Decision Points

If the answer to either of the questions in this step is “yes”, the proponent should proceed to Step 5, and also complete Steps 6 and 7. If the answer to both questions in this step is “no”, the proponent should proceed to Step 5 and may skip Steps 6 and 7.

Step 5: Preliminary site design

Solar PV systems are highly modular and may be designed to avoid sensitive resources and other site constraints as warranted. A preliminary site design allows a proponent to identify whether the capacity requirements of the project can be met while avoiding sensitive resources. This step should be completed prior to making significant investments in project-specific permitting, procurement, or power marketing.

Questions

1. Could impacts to the fish and wildlife resources identified in Steps 3 and 4 be avoided or minimized by site layout or project design changes?
2. Can avoidance strategies still yield an economically feasible project size and configuration?

Methods and Metrics

Site design software and accepted preliminary engineering methods should be used in generating preliminary site design layouts. Designs should not be limited to the solar array areas, but should be comprehensive and include all appurtenant facilities, including but not limited to external access roads, gen-tie lines, substations, operations structures, and battery energy storage systems. It is not necessary to have detailed engineering at this step, but rather the level of engineering necessary to validate whether an economically viable project is feasible for the site. The full extent of potential earthwork, vegetation and tree removal, soil compaction, site contouring, trenching, access, and foundation installation that would be required to develop the site for solar energy generation, battery storage, and electrical interconnection should be characterized.

Decision Points

If the answer to questions 1 and 2 in this step is “yes”, the proponent may proceed to Step 7. If the answer to either question in this step is “no”, completion of Step 6 is recommended.

Step 6: Species and resource specific field surveys

If the results of the habitat assessment and consultation with CDFW indicate the potential for regulated special-status species impacts from the project construction and/or operations of the project, then additional field surveys may be appropriate for the purpose of determining presence or absence, and to characterize in greater detail the extent of suitable habitat. This step should be completed prior to making substantial project-specific investments in procurement, or power marketing.

The survey timing, approach, and methods should be coordinated with and validated by CDFW staff prior to initiation to ensure CDFW's acceptance of the results. Proponents should consider including

USFWS in this process if USFWS-protected resources are potentially present. Surveys should be conducted if they provide useful information to advance site development decision-making and permitting. Surveys that are not able to determine species presence and absence, whether because of inadequate rainfall, ponding of water on the site, or knowledge that negative results for species presence would not lead to a determination of absence, may not be useful since the assumption of presence may remain even after an intensive (and expensive) survey effort.

Coordination with CDFW during development of the survey plans, and then again during review of the survey results, is expected to afford CDFW with relevant development information for the project while providing the proponent with information regarding potential protected resource impacts and the anticipated conservation measures (which will aid in estimating mitigation costs).

Questions

1. Does the precise delineation of CDFW jurisdictional waters on the site indicate impacts would occur, necessitating a permit for these resources?
2. Based on accepted survey, sampling, or modeling methods, is take of a state-listed or candidate species sufficiently likely during project development activities that incidental take coverage is warranted?
3. Would project development conflict with regionally significant habitat connectivity conservation efforts or protected climate resilient habitats?

Methods and Metrics

Field survey and/or modeling methods should be science-based and developed in coordination with CDFW (and other wildlife agencies, as applicable). Surveys should follow either (1) existing published protocol, (2) recommended guidelines, or (3) alternative science-based methodology that offers the same or better characterization of species present at the project site. All survey data should be captured by sub-meter global positioning system (GPS) units, uploaded to a geographic information system (GIS), and reported in narrative and geospatial formats.

Decision Points

If the answer to any of the questions in this step is “yes”, the proponent should seek a reputable internal or external financial and schedule estimate for anticipated permitting, minimization, and mitigation pathways, and may elect to continue or discontinue development of the site based on this estimate. Survey reports should be shared with CDFW. Proponents wishing to pursue the site for development should do so assuming the financial and schedule impacts identified in this step, proceed to Step 7, and pursue CEQA compliance followed by CDFW permits and/or agreements as described in Section 4.

If the answer to all of the questions in this step is “no”, the proponent should complete Step 7 and pursue CEQA compliance, but CDFW permitting as described in Section 4 is not warranted.

Step 7: Identification of appropriate beneficial practices and commitments

In addition to required minimization and mitigation measures identified through agency coordination, or for sites without regulated natural resource impacts, the following questions, methods, and decisions should be carefully considered to further reduce impacts to wildlife and their habitats where no-cost, low-cost, cost-effective, or other voluntary measures are available. This step may be completed after making significant investments in site control, permitting, procurement, and power marketing.

Questions

1. Are there commonly accepted no-cost, low-cost, cost-effective or other voluntary design features or operational practices suitable for the site that may further minimize impacts to wildlife and their habitats?
2. Are there regional or site-specific no-cost, low-cost, cost-effective or other voluntary design features or operational practices suitable for the site that may further minimize impacts to wildlife and their habitats?
3. Are the residual direct impacts to species substantial, warranting incidental take permit coverage or CDFW jurisdictional waters permits, necessitating additional beneficial practices, mitigation, monitoring, or research?
4. Are there available operational habitat restoration activities for special-status species that are compatible with the project that may be incorporated into project operations under a Safe Harbor Agreement, i.e., is habitat restoration likely to result in a net conservation benefit to the species?
5. Are there key ecological research questions that could be answered by making the site available to research scientists for data gathering and hypothesis testing?

Methods and Metrics

A suite of general design features and beneficial practices to avoid and minimize impacts to special status species is included in LSA's Incidental Take Permit Template (see Appendix 2). Species-specific design features and beneficial practices may be available from CDFW.

Decision Points

Proponents should adopt all no-cost measures and should consider adopting all low-cost and other cost-effective measures. Voluntary additional measures should be considered where multiple projects are concentrated in a single region and costs can be spread amongst a larger portfolio. If the answer to Question 3 is "yes," permitting with CDFW is warranted, and the proponent pursue permits as described in Section 4. If the answer to Question 4 is "yes", the proponent should pursue a Safe Harbor Agreement with CDFW as described in Section 4. If the answer to Question 5 is "yes" or "maybe", the proponent is encouraged to contact the Renewable Energy Wildlife Institute⁸ to seek research opportunities for the project.

⁸ <https://rewi.org/>

4. Wildlife and Natural Resources Permitting

When an LSAA is required, project proponents should prepare applications as described in CDFW's Environmental Permit Information Management System ("EPIMS"; see Appendix 2).

When an Incidental Take Permit is warranted and potentially available for a project, it is recommended that proponents use LSA's ITP Template in order to provide consistency, predictability, and streamlined review by CDFW staff (see Appendix 2).

As many as 700,000 acres of land in California is anticipated to be required to build all of the solar PV and battery storage facilities necessary to meet the State's renewable energy and carbon reduction goals by 2045. Some well-sited large-scale solar PV projects have the potential to serve as habitat for special-status and common wildlife, especially where projects are replacing active or recently fallowed agricultural land, and where projects can carry out habitat restoration, vegetation management, and species monitoring activities. Solar projects may result in a net conservation benefit for certain species, if properly incentivized, managed, and monitored. Species for which large-scale solar development has the potential to result in a net conservation benefit include the state threatened Swainson's hawk, the state petitioned western burrowing owl, the federally endangered and state fully-protected blunt-nosed leopard lizard, the state and federally endangered and state threatened San Joaquin kit fox, the federal candidate monarch butterfly, and others. LSA encourages CDFW to make use of the Safe Harbor Agreement statute to offer protections to solar project proponents and owners while incentivizing management actions that result in a net conservation benefit to these species. While not previously used for large-scale solar projects, LSA's Burrowing Owl Conservation Strategy (see Appendix 2) describes this permitting pathway for the western burrowing owl.

5. Best Management Practices

Recommended beneficial practices for construction and operation of solar and battery storage facilities are included in LSA's Incidental Take Permit template (forthcoming). Recommended practices for various permitting pathways for western burrowing owl are included in LSA's Burrowing Owl Conservation Strategy (forthcoming).

Appendix 1: Geospatial Resources

Online mapping tool and GIS shapefile downloads for positive detections of special status species in California (note – lack of positive detections does not necessarily indicate absence of habitat or species):

California Natural Diversity Database ("CNDDDB"): Available online (requires subscription): <https://wildlife.ca.gov/Data/CNDDDB>

Online mapping tool for Areas of Conservation Emphasis, including Climate Resilient Habitats, and the State Wildlife Action Plan in California:

Environmental Conservation Online System ("ECOS"): Available online: <https://ecos.fws.gov/ecp/report/table/critical-habitat.html>

Online mapping tool for Habitat Connectivity, Core Habitat and Linkages, Wildlife Corridors in California: Biogeographic Information Observation System ("BIOS"):
Available online: <https://wildlife.ca.gov/Data/BIOS>

Online mapping tool and GIS shape file downloads for federal Critical Habitat:

Environmental Conservation Online System ("ECOS"): Available online:
<https://ecos.fws.gov/ecp/report/table/critical-habitat.html>

Online mapping tool for protected areas (and other resources and constraints):

Department of Energy's Geospatial Analysis Model:
Available online: <https://gem.anl.gov/>

Appendix 2: Permitting Resources

CDFW's LSAA Permitting Portal, or EPIMS:

Available online: <https://epims.wildlife.ca.gov/index.do>

Incidental take permitting resources:

LSA's ITP Template: <https://largescalesolar.org/>

LSA's Burrowing Owl Conservation Strategy: <https://largescalesolar.org/>

CDFW's ITP information site:
<https://wildlife.ca.gov/Conservation/CESA/Permitting/Incidental-Take-Permits>

CDFW's safe harbor agreement site:
<https://wildlife.ca.gov/Conservation/CESA/Safe-Harbor-Agreements>