DRAFT Wildlife Connectivity Advance Mitigation Guidelines

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DRAFT WILDLIFE CONNECTIVITY ADVANCE MITIGATION GUIDELINES

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1 OVERVIEW

California is home to extraordinary biodiversity, 40 million people, and a large economy, which has led to numerous anthropogenic barriers that inhibit successful aquatic and terrestrial wildlife movement and migration. Improving habitat connectivity and wildlife corridors through a matrix of natural and developed areas is critical to conserving California's biodiversity and ecosystem resiliency now and into the future. To successfully maintain biodiversity and ecosystem resilience, wildlife will need to be able to move through the existing and developing system of built infrastructure. An important strategy to facilitate this movement is through wildlife crossings. Yet to date, few incentives have been in place to promote construction of such crossings.

The ability of California's wildlife to move and migrate has been diminished due to habitat loss, fragmentation, and degradation and made worse by stressors such as climate change and invasive species. Development and built infrastructure such as railroads and highways have blocked, or limited, movement corridors. Infrastructure and development impede wildlife movement and can be significant sources of mortality, affecting population demographics, gene flow, pollination, resilience, and, potentially, the persistence of California's biodiversity.

Thousands of miles of built infrastructure such as roads, railroads, and canals crisscross the California landscape that wildlife navigate for daily and seasonal movements to secure the resources they need, such as foraging habitat, breeding habitat, and cover. Additionally, climate change, which is shifting habitat ranges for many species and exposing others to new threats (e.g., drought, catastrophic wildfires), compounds the need for connectivity as species migrate to different latitudes or altitudes to locate suitable habitat to survive.

Actions to address habitat connectivity are also needed to prevent genetic isolation and to maintain California's significant biodiversity. In addition to species benefits, habitat connectivity across roadways improves public safety by reducing wildlife-vehicle collisions. Well placed, designed, and maintained wildlife connectivity projects like underpasses and overpasses can help facilitate the safe movement of wildlife across the landscape. However, these projects can be costly and require extensive planning and coordination to develop, build, and maintain.

One tool to incentivize and increase habitat connectivity projects in California is Senate Bill 790. The California Legislature enacted Senate Bill 790, codified as Fish and Game Code Section 1955-1958, to promote wildlife connectivity improvements through the California Department of Fish and Wildlife's (CDFW) Conservation and Mitigation Banking Program and Mitigation Credit Agreements (MCAs), a part of CDFW's Regional Conservation Investment Strategy (RCIS) Program[1]. Specifically, it clarified that CDFW

[1] Fish & G. Code, § 1955, subdivision (f)

has authority to create credits under these Programs for actions that improve wildlife connectivity, such as construction of an underpass or overpass that helps wildlife safely cross or bypass built infrastructure.[2] This increases mitigation options by incentivizing connectivity projects and by meeting the diverse needs of California's biodiversity and economic development and sustainability opportunities.

Sponsors who develop a conservation or mitigation bank (bank) or MCA with a wildlife connectivity action project(s), as part of a bank or MCA, can sell mitigation credits created through such projects to third parties needing compensatory mitigation. Sponsors can, therefore, offset their mitigation costs or earn a return on their investment by selling credits created as part of the wildlife connectivity action.

CDFW provides these Wildlife Connectivity Advance Mitigation Guidelines (Guidelines) to implement the code. In these Guidelines, the terms "shall" or "must" are used for provisions that are required, while the terms "may" or "should" indicate recommendations for sponsors.

1.1 LEGISLATION

Senate Bill 790 became effective on January 1, 2022, and is codified as Fish and Game Code section 1955 *et seq.*, titled "Wildlife Connectivity Actions." This new statute reinforces the values and importance of wildlife habitat connectivity and authorizes the development and issuance of these Guidelines.

Senate Bill 790 gives CDFW the ability to approve compensatory mitigation credits for a "wildlife connectivity action," as defined in the statute, through its Banking or RCIS Programs. Applicable wildlife connectivity actions can be wide ranging, including road overpasses or underpasses solely for use by wildlife.

The credits created can be used to fulfill compensatory mitigation requirements established under state or federal environmental laws, including but not limited to the California Environmental Quality Act (CEQA), the California Endangered Species Act (CESA), and Fish and Game Code Section 1600, *et seq.* (LSA Agreements).[3]

The legislation includes a non-exhaustive list of crediting considerations and subcategories which CDFW may consider in determining the value of credits for wildlife connectivity actions.[4] These include the value of the habitat connected, benefits to species, critical linkages, and the value of the particular location in improving connectivity. CDFW may also consider other parameters it deems relevant (e.g., ecological engineered design).

[2] Fish & G. Code, § 1957, subdivision (c)(1)
[3] Fish & G. Code, § 1957, subdivision (e)
[4] Fish & G. Code, § 1957, subdivision (c)

Additionally, the legislation requires that the real property comprising a wildlife connectivity action(s), or where such action(s) are sited, must be permanently protected if feasible [5]. CDFW may determine, on a case-by-case basis, if permanent protection is infeasible in whole or in part. In these instances, the real property shall be permanently protected where feasible, and where infeasible, shall have long-term durability[6].

1.2 Purpose

These Guidelines implement Fish and Game Code section 1955 *et seq*., "Wildlife Connectivity Actions".[7] These Guidelines provide requirements and instructions for the development, review, and approval of wildlife connectivity actions through CDFW's Banking and RCIS Programs[8]. They are intended to provide information and assist sponsors, public agencies, private entities, the public, and CDFW staff. **These Guidelines are meant to be supplemental to both the RCIS Program guidelines and the Banking Program guidelines**. CDFW intends to update these Guidelines as additional information becomes available.

These Guidelines outline how wildlife connectivity actions, specifically, will be implemented within the established Banking and RCIS Programs. When proposing a bank prospectus or draft MCA package with a wildlife connectivity action, the sponsor will need to include the additional information outlined in these Guidelines regarding credits for the wildlife connectivity action. These Guidelines provide the crediting considerations for sponsors to use in proposing credit amounts for the wildlife connectivity action and lists information or documentation required for the credit proposal. CDFW staff will then review and evaluate the credit proposal using these Guidelines, and the crediting considerations listed within, to determine final credit types and credit amounts for the wildlife connectivity action.

These Guidelines focus on crediting for wildlife connectivity actions related to linear built infrastructure barriers, such as, but not limited to, roads, canals, rail lines, and walls, as these are common connectivity barriers. However, these Guidelines could also be applied to other types of connectivity barriers. These Guidelines will be updated as more information becomes available to address other wildlife connectivity actions that address additional types of built infrastructure or habitat fragmentation.

1.3 Abbreviations and Acronyms

ACE- CDFW Areas of Conservation Emphasis

[5] Fish & G. Code, § 1957, subdivision (b)(1)
[6] Fish & G. Code, § 1957, subdivision (b)(1)(B)
[7] Fish & G. Code, § 1958
[8] Fish & G. Code, § 1957, subdivision (a)

Bank- Conservation or Mitigation Bank

Banking- CDFW Conservation and Mitigation Banking Program

BEI- Bank Enabling Instrument

BIOS- CDFW Biogeographic Information and Observation System

Caltrans- California Department of Transportation

CBEI- Conservation Bank Enabling Instrument

CDFW- California Department of Fish and Wildlife

CEQA- California Environmental Quality Act

CESA- California Endangered Species Act

CNDDB- California Natural Diversity Database

Fish and G. Code- Fish and Game Code

PAD- Passage Assessment Database

LSA- Lake or Streambed Alteration

MCA- Mitigation Credit Agreement

MCA Guidelines – Section 5 of the RCIS Program guidelines

NCCP - Natural Community Conservation Plan

RCIS- Regional Conservation Investment Strategy

WCA- Wildlife connectivity action, when refers to credit type

1.4 Terms and Definitions

Any terms below that use the word "Department" in the definition are referring to CDFW.

Term	Definition
Compensatory mitigation credit (credit)	A credit that may be used to fulfill, in whole or in part, mitigation requirements under applicable federal, state, or local law.[9]

[9] Fish & G. Code, § 1956, subdivision (a)

Term	Definition
Critical linkage	Essential areas of connected habitat that facilitate target species movement, migration, and dispersal between protected lands with sustainable core populations or facilitate target habitat ecosystem functions. The linkage also acts as suitable habitat for the target species. Aquatic linkages can be considered critical for terrestrial movement as well.
Fish	A wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals.[10]
Long-term durability	Doing both of the following: (1) Providing a plan approved in writing by the Department, that ensures the long-term success, maintenance, repair, and upkeep of a wildlife connectivity action. If the wildlife connectivity action is used to create one or more mitigation credits pursuant Fish and G. Code Division 2, Chapter 13.5, the plan shall ensure the wildlife connectivity action remains in effect until, at minimum, the site of the environmental impacts is returned to preimpact ecological conditions. (2) (A) Providing secure, long-term funding for implementation of the plan developed pursuant to paragraph (1) in a form approved in advance in writing by the Department. Transportation funding identified in the State Highway System Management Plan provides secure, long-term funding for a structure, but not the habitat thereon, on the state highway system.[11]
Permanently protect or **permanent protection**	Doing both of the following: (1) Recording a conservation easement, in a form approved in advance in writing by the Department, or establishing perpetual protection of land in a manner consistent with draft or approved natural community conservation plans within the area of the applicable wildlife connectivity action and approved in writing by the Department, that prevents development, prohibits inconsistent uses, and ensures habitat for focal species is maintained. (2) Providing secure, perpetual funding for management of the land, monitoring, and legal enforcement, in a form approved in advance in writing by the Department.[12]

[10] Fish & G. Code, § 45
[11] Fish & G. Code, § 1956, subdivision (b)
[12] Fish & G. Code, § 1956, subdivision (c)

Term	Definition
Sponsor	Either a bank sponsor, as defined in Fish & G. Code, § 1797.5 subdivision (c), or a Mitigation Credit Agreement sponsor, which is the person(s) or entity(ies) responsible for preparing, establishing, and operating a Mitigation Credit Agreement.
Standard bank or MCA lands	Bank or Mitigation Credit Agreement lands that do not constitute or are not otherwise part of a wildlife connectivity action. These lands will be reviewed through the standard banking or Mitigation Credit Agreement crediting process.
Surrounding lands	Lands not proposed to be included in the bank or Mitigation Credit Agreement but may be important to the larger scale connectivity for the target species or target habitat.
Target habitat	Habitat benefiting from the wildlife connectivity action and for which credits are sought or allocated.
Target species	Species benefiting from the wildlife connectivity action and for which credits are sought or allocated.
Wildlife	Includes all wild animals, birds, plants, fish, amphibians, reptiles, and related ecological communities, including the habitat upon which the wildlife depends for its continued viability.[13]
Wildlife connectivity action	An action that measurably improves aquatic or terrestrial habitat connectivity, or wildlife migration, recolonization, and breeding opportunities inhibited by built infrastructure or habitat fragmentation. A wildlife connectivity action may include, but is not limited to, a road overpass or underpass solely for use by wildlife.[14]
Wildlife connectivity structure	Any structure (e.g., road overpass or underpass), primarily designed to improve aquatic or terrestrial habitat connectivity, wildlife migration, movement, recolonization, or breeding opportunities inhibited by built infrastructure or habitat fragmentation. A wildlife connectivity structure can be part of the wildlife connectivity action.

1.5 CDFW Banking and RCIS Programs

CDFW can approve credits for wildlife connectivity actions taken under the Banking Program or the RCIS Program.[15] Table 1 below provides a comparison of the

[13] Fish & G. Code, § 89.5
[14] Fish & G. Code, § 1956, subdivision (d)
[15] Fish & G. Code, § 1957, subdivisions (a)(1 & 2)

requirements for each program. Both programs require fees for CDFW staff review of bank and MCA components. The fees are adjusted annually for inflation. For the latest fees, see the Conservation and Mitigation Banking Review Fees web page or the RCIS Program web page.

1.5.1 Banking Program

Fish and Game Code sections 1797 – 1799 guide CDFW's Banking Program. The terms "conservation bank" and "mitigation bank" are defined in Fish and Game Code section 1797.5. Broadly speaking, in exchange for permanently protecting, managing, and often improving land for the benefit of natural resources, which can include wildlife and wildlife habitat, according to a written agreement with CDFW and other signatory agencies, the sponsor is issued credits that may be sold to project proponents who need compensatory mitigation for project related environmental impacts. The sponsors provide an optional draft prospectus, prospectus, and then a bank enabling package that includes either a Mitigation Bank Enabling Instrument (BEI) or a Conservation BEI (CBEI) for review. Once signed, the BEI or CBEI is a written agreement between the sponsor, bank property owner, and the signatory natural resource regulatory agencies identifying the conditions and criteria under which the bank will be established, managed, and operated, which includes, among other things, terms for the sale and transfer (use) of credits.

CDFW and seven other state and federal natural resource regulatory agencies have a Memorandum of Understanding Concerning Mitigation and Conservation Banking and In-Lieu Fee Programs in California (MOU) dated September 22, 2011. The MOU guides how the parties work together to develop coordinated approaches to mitigation and conservation banking, such as standardizing Banking Program documents and processes. A natural resource regulatory agency that approves credits through a specific bank's instrument is a signatory agency for that bank. The natural resource regulatory agencies represented in this effort include: the California Natural Resources Agency, CDFW, US Army Corps of Engineers, US Fish and Wildlife Service, US Environmental Protection Agency, US Department of Agriculture - Natural Resources Conservation Service, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, and the California State Water Resources Control Board.

1.5.2 Mitigation Credit Agreements (MCAs)

Under the RCIS Program, a sponsor can develop an MCA to create credits for any number of focal species, non-focal species, and/or other conservation elements identified in a CDFW approved RCIS by preserving, conserving, or taking actions to enhance habitat on land located within the geographic area of the applicable RCIS. Other conservation elements are non-species resources that could include important natural communities, habitat, habitat connectivity, ecosystem processes, water resources, as well as wildlife corridors and barrier removals associated with habitat connectivity actions.

To create credits, an MCA must implement one or more conservation actions or habitat enhancement actions associated with one or more of the resources identified in the

RCIS. Any person or entity, including a state or local public agency, may be a sponsor for an MCA. The approved MCA is within the area of an approved RCIS and authorizes the creation, sale, and use of mitigation credits derived from those actions. The credits may be used by the sponsor or sold by the sponsor to another entity. A habitat connectivity analysis is required for all focal species and other conservation elements identified in the RCIS[16] , so there are usually connectivity-related conservation or habitat enhancement actions identified that may be implemented. An MCA is an agreement between the sponsor, the property owner, CDFW, and any identified acknowledging agencies.

Table 1 Comparison of MCAs and CDFW Banking Program

MCAs	Banking Program
Must occur within a CDFW-approved RCIS	Can occur anywhere in California
Creates permanent and non-permanent credits[17]	Creates permanent credits
Long-term durability agreement (for non-permanent credits) or conservation easement (for permanent credits)*	Requires a conservation easement*
Can occur on publicly owned lands	Generally, do not occur on public lands
Optional framework, a tool for CDFW to review and approve components of a future MCA. These pre-approved components may be used at multiple MCA sites	No framework for establishing a network of banks
MCA Program – CDFW approves the credits; allows other regulatory agencies to acknowledge MCA credits, if desired	Multiple state and/or federal agencies are often signatories to banks; multiple natural resource regulatory agencies may approve credits through the same instrument
Public review required for MCA approval	No public review required for bank approval

[16] Fish & G. Code, § 1852, subdivision (c)(4)
[17] Fish & G. Code, § 1856, subdivision (e)

MCAs	Banking Program
MCA closure **still allows** for the use (transfer) of credits purchased prior to closure	Bank closure stops the sale of credits and transfer (use) of credits that were purchased prior to closure

* The land protection for banks and MCAs described in this table are applicable only to areas outside of the wildlife connectivity action. Long-term durability agreements may be an option within the wildlife connectivity action for both banks and MCAs. MCAs have Long-term Durably Agreements for habitat enhancement actions and these long-term Durability Agreements are distinct and have a different requirements than the LDTA for WCAs For land protection requirements applicable to the wildlife connectivity action, see Section 5.1: Real Estate Instruments.

Both programs require fees for CDFW staff review of bank and MCA components. The fees are adjusted annually for inflation. For the latest fees, see the Conservation and Mitigation Banking Review Fees web page or the RCIS Program web page.

1.6 Wildlife Connectivity Actions

A wildlife connectivity action encompasses the wildlife connectivity structure and associated habitat immediately adjacent and critical to the functioning of the wildlife connectivity action. This habitat enables the target species to successfully access alternate life cycle functions beyond movement (e.g. foraging, resting, breeding habitat, or cover). If a project provides target habitat, then the wildlife connectivity action encompasses the wildlife connectivity structure and associated habitat including lands that are immediately adjacent and critical to the functioning of the wildlife connectivity action, such as the approach. The associated habitat promotes habitat persistence and enhances movement in general for wildlife that use that habitat type. This can include function enhancing features such as design grading, removing impediments, and landscaping elements included at the entrance and throughout the wildlife connectivity action.

Wildlife connectivity actions can vary greatly in size and structure depending on the desired outcomes, location, and target species or target habitat. A few examples of wildlife connectivity actions addressing linear infrastructure barriers are:

- Restoring chinook salmon migration to upstream waters by replacing a culvert under a county road with a full-span bridge, so the location is passable by all life stages of chinook salmon as well as providing passing during a flood events. This would facilitate movement of chinook salmon, steelhead, other aquatic species, and some terrestrial species (e.g., mountain lions).
- Restoring the linkage between upland breeding habitat and ponds to allow populations of California tiger salamander to expand their habitat and population by installing an elevated roadway with openings and associated directional fencing. This could also allow crossings for Alameda whipsnake.

- Building an overpass across a state freeway with directional fencing to allow movement of desert bighorn Sheep, Mohave ground squirrel, and desert kit fox to expand into protected habitat.

1.7 Collaboration

Increasing habitat connectivity across California is a collaborative effort that will take partnerships to implement. Prior to choosing a site for development of a wildlife connectivity action, CDFW encourages sponsors to collaborate planning with regulatory agencies, tribes, land trusts, non-profits and community-based organizations, local species experts, cities, and counties. In addition, the sponsor should also collaborate with stakeholders to gather and obtain the best available science to inform a wildlife connectivity action's location, target species, target habitat, and conceptual design (see Section 4: Ecological Benefit Crediting Considerations).

Wildlife connectivity actions may, in some cases, occur within a right-of-way, which is public property (e.g., county, city, or state roads). In such cases, the sponsor must coordinate with the property owner when proposing a wildlife connectivity action. For most built infrastructure such as roads, this coordination will need to include the road and right of way owner(s). Once a site is determined, all associated collaborators and partners including the applicable transportation agency and landowners should be included, as needed, in early and ongoing communication.

1.8 Contacts

CDFW's Banking and RCIS Programs are supported through the Landscape Conservation Planning Program (LCPP) under CDFW's Habitat Conservation Planning Branch (HCPB). Any general inquiries and notifications of a sponsor's intent to develop a wildlife connectivity action should be sent to:

- The Wildlife Connectivity Advance Mitigation email at MitConnect@wildlife.ca.gov.

Because the approach to wildlife connectivity advance mitigation outlined in these Guidelines is new, some aspects of the crediting is still in development. CDFW will **gather information** on the wide range of potential connectivity needs, constraints, potential solutions, and benefits to species and habitat(s) during a pilot period. The pilot period is an initial set of six approved pilot projects or a period of 24 months, based on CDFW discretion.

During the pilot period, CDFW staff should be included in consultation early, and ongoing, during the development of banks or MCAs involving wildlife connectivity actions.

2 BANKING AND MCA PROCESS WITH A WILDLIFE CONNECTIVITY ACTION

Fish and Game Code section 1955 *et seq*. authorizes CDFW to issue compensatory mitigation credits for wildlife connectivity actions under CDFW's Banking and RCIS Programs. The following provides general information on siting a bank or MCA:

- CDFW's Banking Program has a Bank Site Selection Considerations document and a What Lands are Appropriate for Banking web page that provides assistance to sponsors in evaluating a prospective bank property for important ecological values and attributes, as well as management needs.
- For an MCA, an approved RCIS must be in place, and it must address the target species, target habitats, and/or include other conservation elements for the proposed wildlife connectivity action credits. The MCA must implement actions identified in the RCIS that support focal species and/or other conservation elements and may use the RCIS to help identify priority areas affecting wildlife connectivity. Approved RCISs can be found on CDFW's RCIS web page.

There are also certain siting considerations specific to wildlife connectivity actions, which are discussed in Section 4: Ecological Benefit Crediting Considerations.

A summary of the general banking and MCA processes is below. For banks and MCAs with wildlife connectivity actions, CDFW requires information above and beyond the following to review, evaluate, and determine bank or MCA acceptability. A checklist of these additional requirements is available in Appendix C – Wildlife Connectivity Action Bank Program Checklists and Appendix D – Wildlife Connectivity Action MCA Checklists. These two checklists (posted on CDFW's Landscape Planning Program web page) are provided as separate editable documents and are incorporated into these Guidelines by this reference as if they were fully set forth herein. Section 2.1 outlines information required in the Banking process and Section 2.2 describes the information required in the MCA process.

2.1 BANKING APPLICATION PROCESS

Any person or entity seeking CDFW approval to establish a bank will need to follow a formal phased review process with associated timelines (see Banking Instructions and Templates webpage). A sponsor may begin the process by submitting an optional draft prospectus, followed by a prospectus and a bank agreement package, which are required submittals for CDFW review. This phased approach allows CDFW to consider and provide initial feedback on a bank concept and initial proposal before the sponsor invests the time and resources to prepare a bank agreement package. For example, a sponsor can begin the bank application process by submitting an optional draft

prospectus which is intended to identify potential issues early so that the sponsor may attempt to resolve the issues prior to the start of the formal review process. The sponsor could choose to begin the formal review process, submitting a prospectus, without submission of the optional draft prospectus. If the prospectus is deemed acceptable, the sponsor can then submit a bank agreement package.

Consistent with the 2011 MOU, except for banks where CDFW is the only agency with authority, bank applications are typically jointly reviewed by either an Interagency Review Team for mitigation banks, or a Conservation Bank Review Team for conservation banks that can be comprised of federal, tribal, state, and local regulatory or resource agencies with authorities and/or mandates directly affecting, or affected by the establishment, operation, or use of a bank.

Additional information on the bank application process and document submittal can be found on CDFW's Conservation and Mitigation Banking Instructions and Templates web page.

2.1.1 Draft Prospectus (optional)

A draft prospectus is a concept-level proposal that is optional but recommended when a sponsor is scoping the concept for a bank, contemplating a specific mitigation or conservation bank idea, or is new to the banking process. The draft prospectus is intended to identify potential obstacles early so that the sponsor may rectify the issues, revise the proposal, or decide not to pursue the Bank prior to preparing a prospectus (see Section 2.1.2: Prospectus).

The information required in a draft prospectus is found in the optional draft prospectus checklist, and includes, among other things, the bank purpose, maps, crediting or a credit proposal, baseline site conditions, regional context, and a conceptual plan. In addition to the information required by the Banking Program, a draft prospectus proposing a wildlife connectivity action must also contain the required information in Appendix C: Wildlife Connectivity Action Bank Draft Prospectus Checklist. **A draft prospectus is highly recommended for bank wildlife connectivity action proposals so CDFW can review the proposed credit types earlier in the process.**

2.1.2 Prospectus

The prospectus is the first required step in the banking process. It is prepared by the sponsor and submitted to CDFW for review, evaluation, and acceptability determination. The information required in a prospectus is found in the prospectus checklist, and includes, but is not limited to, the bank purpose and need, maps, credit evaluation and credit release schedule, baseline site conditions, conceptual development plan, and proposal to conserve the Bank site in perpetuity. Additional information is required in the prospectus if the proposed bank includes a wildlife connectivity action (see Appendix C: Wildlife Connectivity Action Bank Prospectus Checklist).

2.1.3 Bank Agreement Package

If CDFW determines that a prospectus is acceptable, the sponsor may prepare a bank agreement package. The information required in a bank agreement package is found in the draft bank enabling instrument (BEI) checklist. This information includes, but is not limited to, the BEI, the development and interim management plan, security analyses and schedules, bank management and operation documents (e.g., endowment fund analysis, long-term management plan), bank crediting and credit transfers, biological resources survey, and if applicable, an aquatic resource delineation. Additional information is required in the bank agreement package if the proposed bank includes a wildlife connectivity action (see Appendix C: Wildlife Connectivity Action Draft Bank Enabling Instrument Checklist). Additional information must also be provided with any proposal to amend a bank to include a wildlife connectivity action.

2.2 MCA Process

Any person or entity seeking CDFW approval to establish an MCA will need to submit a series of documents during the application process as listed under the MCA requirements below. An MCA has a number of specific eligibility requirements that need to be met prior to consideration which are outlined in Section 5 of the RCIS Program Guidelines (MCA guidelines) and in the MCA template. Most notably, an MCA must be located within an approved RCIS area. Appendix D – Wildlife Connectivity Action MCA Checklists contains specific requirements for the MCA as related to additional items required by Senate Bill 790 for a wildlife connectivity action.

2.2.1 MCA Pre-submittal options

A sponsor seeking CDFW approval for an MCA can choose to submit an MCA concept or framework prior to submitting the draft MCA package. An MCA concept is a brief, concept-level proposal that is optional but recommended when a sponsor is scoping for an MCA or contemplating a specific MCA idea, or for those new to the MCA process. **An MCA concept is highly recommended for MCA wildlife connectivity action proposals so CDFW can review the proposed credit types earlier in the process.**

The Framework is an optional submittal that allows the sponsor to submit portions of the full MCA package to CDFW for approval. The Framework must be submitted with the MCA framework checklist. This checklist includes the minimum components outlined for the Framework and any number of other MCA components noted on the checklist.

2.2.2 Draft MCA Package

The sponsor must complete and submit to CDFW a draft MCA package including a draft MCA including all relevant exhibits, MCA checklist, fees, and any necessary letters (see MCA guidelines for more details).

The information required in an MCA is found in the MCA checklist and the RCIS Program guidelines - Section 5.3, which includes, but is not limited to the MCA template, information on the supporting RICS, MCA purpose, MCA site declarations and review, a

natural resource evaluation, real estate documents, financial securities and funding, credit types, quantities, release schedule and reporting. Additional information is required in the draft MCA package if the proposed MCA includes a wildlife connectivity action (see Appendix D: Wildlife Connectivity Action MCA Checklist).

3 WILDLIFE CONNECTIVITY ACTION CREDITING

The sponsor must provide CDFW a credit proposal with justification for review, evaluation, and if appropriate, approval in accordance with the standard bank or MCA process. When a sponsor proposes a wildlife connectivity action, the credit proposal must describe the proposed credit type(s) and amount(s) for the wildlife connectivity action as well as provide biological justification for the proposed credits. CDFW staff will review and evaluate the wildlife connectivity action credit proposal in accordance with these Guidelines. The following sections provide information on credit types, credit amounts, the credit process and credit review.

3.1 CREDIT USES

Credits associated with a wildlife connectivity action can be used to compensate for mitigation requirements established under federal or state environmental laws, including CEQA, CESA, and LSA, as determined by the applicable regulatory agency.[18] All credits and types created from the wildlife connectivity action will be labeled as "WCA" for wildlife connectivity action to make a distinction from non-WCA bank or MCA credits. Below are examples of the types of credits that can be proposed for a wildlife connectivity action.

- **CEQA[19]** – Species and habitat credits from wildlife connectivity actions may be able to satisfy connectivity and non-connectivity related mitigation requirements under CEQA with the written approval of the CEQA lead agency. The wildlife connectivity action credit proposal for any credits that may provide compensatory mitigation for CEQA requirements must clearly address impacts identified in the CEQA review process.
- **CESA[20]** – Species credits from wildlife connectivity actions that benefit target species that are listed under CESA may be able to be used for connectivity and non-connectivity impacts under CESA with the written approval of CDFW. The wildlife connectivity action credit proposal for any credits that may provide compensatory mitigation for CESA requirements must identify the target species and clearly indicate the ecological benefit of the wildlife connectivity action for the target species.
- **LSA Agreement[21]** – Habitat credits from wildlife connectivity actions that will offset habitat impacts authorized under LSA Agreements may be able to be used for connectivity and non-connectivity impacts under LSA Agreements with the written approval of CDFW. The wildlife connectivity action credit proposal for

[18] Fish & G. Code, § 1957, subdivisions (e)(1 - 3)
[19] beginning with Fish & G. Code, § 15000
[20] beginning with Fish & G. Code, § 2050
[21] beginning with Fish & G. Code, § 1600

any LSA Agreement must identify the target habitat types and clearly indicate the ecological benefit of the wildlife connectivity action for the target habitat type that may relate to LSA Agreement mitigation credit requirements.

- **Other regulatory requirements** – Credits from wildlife connectivity actions may be able to satisfy connectivity and non-connectivity related mitigation requirements under other state and federal regulatory requirements with the written approval of the applicable regulatory agency (see Section 3.5: Agency Coordination During Credit Review).

3.2 Credit Amount by Type

Wildlife connectivity actions may provide ecological value beyond the acreage they occupy. For detailed definitions of the considerations below see Section 4: Ecological Benefit Crediting Considerations. Credit amounts will be based on the ecological benefit of the wildlife connectivity action. The sponsor must use the crediting considerations in calculating a wildlife connectivity action's ecological benefit to formulate a credit proposal. The crediting considerations are:

- Ecological Engineered Design;
- Value of the Habitat Connected;[22]
- Value of the Particular Location;[23]
- Critical Linkages;[24]
- Population-level Benefits to Target Species;[25] and
- Any other factor CDFW, in its discretion, deems relevant.[26]

Each crediting consideration is further broken down into several subcategories for additional specificity.

Credit amounts will be individually determined for each species and habitat using the process outlined in these Guidelines. Bundled credits in a wildlife connectivity action bank or MCA are based upon the total credit types and amounts. the credits will be bundled together in an amount that is based on the smallest amount of the credit type. This will repeat until only one credit type remains. The credit type with the largest amount of credits will be the only credit type that is not bundled for any remaining credits.

[22] Fish & G. Code, § 1957, subdivision (c)(2)
[23] Fish & G. Code, § 1957, subdivision (c)(5)
[24] Fish & G. Code, § 1957, subdivisions (c)(4 & 6)
[25] Fish & G. Code, § 1957, subdivision (c)(3)
[26] Fish & G. Code, § 1957, subdivision (c)(6)

For example, if a wildlife connectivity action is approved for 5 spring-run Chinook salmon credits, 10 riparian credits, and 12 longfin smelt credits, the credit bundling would be as follows:

- 5 spring-run Chinook salmon (CS-WCA)/riparian (R-WCA)/longfin smelt (LS-WCA) credits;
- 5 riparian (R-WCA)/longfin smelt (LS-WCA) credits; and
- 2 longfin smelt (LS-WCA) credits.

Credit Type	Credit Amount
CS-WCA+R-WCA+LS-WCA	5
R-WCA +LS-WCA	5
LS-WCA	2
Total Available Credits	12

The sponsor can acquire credits for a wildlife connectivity action that is a required built infrastructure replacement or retrofit which improves existing connectivity conditions. Credit amounts will be evaluated on a case-by-case basis depending on the corresponding legal requirements for the replacement or retrofit.

3.3 Credit Determination

The sponsor must use the process outlined below to determine proposed credit amounts for wildlife connectivity actions. When the sponsor is proposing credits for a wildlife connectivity action, the sponsor must use the quantification value of the ecological benefits from the scoring matrix (see Section 3.3.2) and the scoring factor (see Section 3.3.3) to determine the amount of credits.

See below for the description of the three-step process for calculating wildlife connectivity actions.

1. **Credit type threshold determination**: The wildlife connectivity action must pass the ecological benefit threshold for key crediting considerations for each credit type (see Section 3.3.1: Step 1: Credit Type Threshold Determination). If the threshold is not met, zero credits for that credit type will be approved for the wildlife connectivity action and there is no need to continue to Step 2 for that credit type. The wildlife connectivity action may still be eligible to go through the standard banking or MCA process.
2. **Credit scoring**: The ecological benefit for each credit type must be evaluated and scored based on the crediting considerations for either species or habitat, as applicable (see Section 3.3.2: Step 2: Credit Scoring). The scoring represents a quantification of the wildlife connectivity action's ecological benefit to the target species or target habitat.

3. **Crediting factor**: The crediting factor is used to convert the credit score, which is based on a scale of 0 to 100, into a specific number of credits for a target species or target habitat (see Section 3.3.3: Step 3: Crediting Factor).

The sponsor must use the foregoing process and include a proposed credit score for each target species and target habitat with its wildlife connectivity action Bank draft prospectus or prospectus, or MCA package. The sponsor must specifically include:

- A completed scoring template(s) for each proposed credit type (see Appendix B – Scoring Templates); and
- A written justification for the proposed score based on the information listed in Section 4: Ecological Benefit Crediting Considerations. If the sponsor believes a specific crediting consideration element is not applicable to the proposed wildlife connectivity action, the sponsor must provide justification for why it is inapplicable. Reference the applicable program checklist (see Appendix C – Wildlife Connectivity Action Bank Checklists and Appendix D – Wildlife Connectivity Action MCA Checklists) for the timing of when information is required within the applicable bank or MCA review process.

3.3.1 Step 1: Credit Type Threshold Determination

The potential credit types for the proposed wildlife connectivity action will be determined with an ecological benefit threshold evaluation. The sponsor shall provide a qualitative score of high, medium, low, or zero with written justification (see Section 4: Ecological Benefit Crediting Considerations) for each subcategory of crediting considerations in the initial ecological benefit threshold evaluation. No numeric scores are needed for this step. The sponsor shall provide a conceptual engineering design for the wildlife connectivity action for the bank draft prospectus, bank prospectus, or MCA concept for credit type threshold determination.

Ecological Benefit Threshold Determination: There are select ecological benefit threshold evaluation subcategories for species credits and habitat credits (below). The project must receive a qualitative score of a high or medium for each of the ecological benefit threshold evaluation considerations to move to Step 2, in most instances. CDFW will not authorize credits for subcategories that receive 0 or low without a reasonable and substantial justification CDFW may allow some credit types for unique or particularly complex project types that do not initially pass the threshold evaluation on a case-by-case basis. If any of the subcategories receive a zero or a low quantitative score, the sponsor should contact CDFW staff to determine if the wildlife connectivity action provides sufficient ecological benefit for credit determination. CDFW recommends reaching out to CDFW staff before continuing to Step 2 as there is little ecological benefit for this credit type.

Species Credit Ecological Benefit Threshold Determination Subcategories:

In order to progress to Step 2, the project must receive a score of medium or high in each of the following subcategories listed below. Species subcategories are marked

with an asterisk in Table 2. For definitions and details about the below subcategories, see Section 4.1: Ecological Engineered Design.

- Structure Dimensions.
- Sound and Light Minimization Measures.
- Surface Substrates and Vegetation.
- Hydrogeomorphic Components.
- Existing Conditions.
- Approaches.
- Fencing or Other Directional Implements.
- Designing for Resilience to Climate Change.
- Additional Species-specific Elements.
- Habitat Quantity.
- Habitat Quantity.
- Protection of the Land.
- Topography.
- Watercourse or Other Natural Pathway.
- Vegetation and Other Cover.
- Human Impacts.

In addition to the threshold evaluation for the subcategories, the wildlife connectivity action must be within the current geographic range of the target species to receive credit for that species.

Habitat Credit Ecological Benefit Threshold Evaluation Subcategories:

Habitat subcategories are marked with an asterisk in Table 3. For definitions and details about the below subcategories, see Section 4.1: Ecological Engineered Design.

- Surface Substrates and Vegetation.
- Hydrogeomorphic Components.
- Designing for Resilience to Climate Change.
- Approaches.
- Topography.
- Regional Connectivity.

In addition to the threshold evaluation for the considerations, the habitat in or on the wildlife connectivity action must be the same as the surrounding natural matrix habitat and cover that supports species diversity.

3.3.2 Step 2: Credit Scoring

The credit types that have passed the initial threshold evaluation can then be scored to provide a basis for crediting factors and to quantify ecological benefits of the wildlife connectivity action for each credit type which provides the ecological value.

The scoring results in a number which represents a percent because the total is out of 100. The final score represents how well the project meets the needs of the target

species or target habitat. This final score will be used in Step 3 (Crediting Factor) to determine the credit amounts.

Species Credit Scoring (for CEQA or CESA credit types): Five ecological crediting considerations (Section 4: Ecological Benefit Crediting Considerations) will be used to determine the species' ecological benefit of the wildlife connectivity action. Some crediting considerations impact the ecological benefit of the wildlife connectivity action more than others. Therefore, the five crediting considerations are assigned different maximum scores. The justification for the scoring is outlined below. CDFW can add an additional 5 points to the total for **Unique Project Characteristics**[27] that might not be accounted for in the crediting considerations. The sponsor may choose to provide additional unique information about the proposed wildlife connectivity action for justification; however, this is not required to be allotted points for this category.

- **Ecological Engineered Design (27 points)** makes the project viable. The design facilitates the use of the crossing by the target species, which is essential to enable other potential ecological benefits. For example, this crediting consideration includes subcategories on the approach, fencing, and structure dimensions.

- **Value of the Habitat Connected (27 points)** makes the project viable. Suitable habitat must be present and immediately adjacent to both ends of the structure. Wildlife can potentially reap other benefits like dispersing to other areas to adapt to climate change. This crediting consideration includes subcategories on the protection of the land and the habitat quality.

- **Value of the Particular Location (21 points)** addresses the potential of the target species to come to the location and use the crossing; this includes subcategories such as human use which could lead to a lower score. If human access is available for the wildlife connectivity action, a low score should be given. The particular location crediting consideration includes information on topography, cover, movement, and mortality data that can show if individuals of the target species are likely to be present in the immediate vicinity. However, particular location was not given the highest maximum score value because the benefits of this crediting consideration are contingent on effective design and value of the connected habitat.

- **Critical Linkages (10 points)** assesses the overall importance of connectivity in the area by looking at regional or statewide data or analyses. However, critical linkages information is less specific to the wildlife connectivity action itself and potentially less specific to the target species than the other crediting considerations and is therefore assigned a lower maximum score.

[27] Fish & G. Code, § 1957, subdivision (c)(6)

- **Population-level Benefits to Species (10 points)** addresses issues that might have caused the species' decline. Benefits can include removal of movement barriers or mortality caused by infrastructure so that individuals can gain access to new populations for breeding. CDFW also recognizes that there might be limited data, such as genetic data, available depending on the target species, so this is assigned a lower maximum score.

The Species-specific Scoring Matrix for Wildlife Connectivity Actions (Table 2) includes the maximum point values for high, medium, and low for each subcategory and the total possible score for each crediting consideration for species credits. Sponsors should reference this when using the scoring template (see Appendix B – Scoring Templates) in their credit evaluation. Categories with ranges will be based on analysis and ecological benefit. Project proponents will provide an initial score and CDFW will review.

Table 2 Species-specific Scoring Matrix for Wildlife Connectivity Actions

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
1. Ecological Engineered Design	**3**	**2**	**1**	**27**
A. Structure Dimensions*	3	2	1	3
B. Sound and light Minimization Measures*	3	2	1	3
C. Surface Substrates and Vegetation*	3	2	1	3
D. Hydrogeomorphic Components*	3	2	1	3
E. Existing Conditions*	3	2	1	3
F. Approaches*	3	2	1	3
G. Fencing or Other Directional Implements*	3	2	1	3
H. Designing for Resilience to Climate Change*	3	2	1	3
I. Additional Species-specific Elements*	3	2	1	3
2. Value of the Habitat Connected	**7-9**	**4-6**	**1-3**	**27**
A. Habitat Quantity*	9	6	3	9
B. Habitat Quality*	9	6	3	9
C. Protection of the Land*	9	6	3	9
3. Value of the Particular Location	**3**	**2**	**1**	**21**
A. Topography*	3	2	1	3
B. Watercourse or Other Natural Pathway*	3	2	1	3
C. Vegetation and Other Cover*	3	2	1	3
D. Movement and Mortality	3	2	1	3
E. Permeability and Built Infrastructure Characteristics	3	2	1	3
F. Other Wildlife Connectivity Actions	3	2	1	3
G. Human Impacts*	3	2	1	3
4. Critical Linkages	**4-5**	**3**	**1-2**	**10**
A. Regional Connectivity	5	3	2	5
B. Local Connectivity	5	3	2	5
5. Population-level Benefits to Target Species	**4-5**	**3**	**1-2**	**10**
A. Genetic Diversity and Breeding Opportunities	5	3	1	5
B. Species Adaptation to Climate Change	5	3	1	5

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
Unique Project Characteristics	N/A	N/A	N/A	**5**
Total	-	-	-	100

* Indicates the subcategory is used for the ecological benefit threshold evaluation (Step 1).

Habitat Credit Scoring (can be applied to CEQA or LSA mitigation requirements)**:** Some of the five ecological crediting considerations (Section 4: Ecological Benefit Crediting Considerations) are valuable in determining the habitat ecological benefit of the wildlife connectivity action. The subcategories that are applicable to target habitats are listed below and all have been given the same maximum points (8 points). CDFW can add in an additional 4 points for **Unique Project Characteristics**[28] that might not be accounted for in the crediting considerations. The sponsor can choose to provide additional unique information about the proposed wildlife connectivity action for justification; however, this is not required to be allotted points for this category.

The Habitat Scoring Matrix for Wildlife Connectivity Actions (Table 3) includes the maximum point values for high, medium, and low for each subcategory and the total possible score for each crediting consideration for habitat credits. Sponsors should reference this when using the scoring template (see Appendix B – Scoring Templates) in their credit evaluation.

Table 3 Habitat Scoring Matrix for Wildlife Connectivity Actions

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
1. Engineering and Ecological Engineered Design	**6-8**	**3-5**	**1-2**	**40**
A. Structure Dimensions	8	5	2	8
C. Surface Substrates and Vegetation*	8	5	2	8
D. Hydrogeomorphic Components*	8	5	2	8
F. Approaches*	8	5	2	8
H. Designing for Resilience to Climate Change*	8	5	2	8
2. Value of the Habitat Connected	**6-8**	**3-5**	**1-2**	**24**
A. Habitat Quantity	8	5	2	8
B. Habitat Quality	8	5	2	8
C. Protection of the Land	8	5	2	8
3.Value of the Particular Location	**6-8**	**3-5**	**1-2**	**24**
A. Topography*	8	5	2	8

[28] Fish & G. Code, §1957, subdivision (c)(6)

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
C. Vegetation and Other Cover	8	5	2	8
F. Human Impacts	8	5	2	8
4. Critical Linkages	**6-8**	**3-5**	**1-2**	**8**
A. Regional Connectivity*	8	5	2	8
Unique Project Characteristics	-	-	-	**4**
Total	-	-	-	**100**

*** Indicates the subcategory is used for the ecological benefit threshold evaluation (Step 1).**

3.3.3 Step 3: Crediting Factor

The sponsor must multiply the final score (the percent) from Step 2 by a crediting factor to provide the final amount of credits for that credit type for the proposed wildlife connectivity action. The crediting factor depends on a combination of characteristics including habitat type, wildlife connectivity structure, and target species. Each credit type may have individual crediting factors.

Credit Amount = Crediting factor * Credit scoring (as a percent)

Because this approach is new, **the crediting factors are not included in this version of these Guidelines to allow more time to gather information** on the wide range of potential connectivity needs, constraints, potential solutions, and benefits to species and habitat(s). However, if the Sponsor successfully passes through Step 1: Credit Type Threshold Determination, the credit type will receive an allocation greater than the acreage of the wildlife connectivity action. Crediting factors will be determined through an iterative approach using the lessons learned from an initial set of six approved pilot projects or a period of 24 months, based on CDFW discretion. Crediting factors will be provided in a future iteration of these Guidelines after CDFW has evaluated different project types across a range of species and locations to better understand feasibility, viability, and ecological benefits. During the initial pilot period, the crediting factor will be determined on a case-by-case basis. Sponsors shall propose a crediting factor for each credit type, including a clear written justification in the proposal based on best available information, to be reviewed by CDFW. Sponsors should coordinate closely with CDFW during this process.

3.4 Credit Proposal Review

During the pilot period, CDFW will evaluate all credit proposals on a case-by-case basis. CDFW will evaluate proposed wildlife connectivity actions based on the likelihood that the proposed wildlife connectivity action's ecological gains will benefit the target species or target habitats (see Section 4: Ecological Benefit Crediting Considerations) using the justification documents and scoring provided by the sponsor. CDFW's evaluation will account for the best available science on wildlife connectivity and

related issues (e.g., population or occurrence status and trends of species or habitat), as well as the unique characteristics of each wildlife connectivity action and the target species' or target habitats' needs.

CDFW may identify additional ecological values that support CDFW priorities in the "Unique Project Characteristics" category. CDFW will work with the sponsor if additional justification is needed to determine the credit factor and will work with the sponsor on discussing any modifications of the credit scoring and credit factor. The final credit factors will be determined by CDFW and based on the sponsor's justification.

3.5 Agency Coordination During Credit Review

In addition to credits that satisfy mitigation obligations imposed by CDFW, sponsors can consider proposing credits (e.g., wetlands, federally listed species credits) for a wildlife connectivity action that may satisfy other state and federal agency regulations. In these cases, sponsors must use the applicable bank or MCA process for coordinating with other agencies for credits. As this program develops, CDFW will work with these agencies to develop procedures for coordination. Sponsors shall help with early coordination and maintain open communication throughout the entire process to ensure that the credits created will be acceptable and meet any other regulatory agencies' requirements.

4 ECOLOGICAL BENEFIT CREDITING CONSIDERATIONS

This section addresses the process for determining the ecological benefit for the remediation of barriers caused by built infrastructure, such as, but not limited to, roads, canals, rail lines, and walls. This section applies to Step 1 (Credit Type Threshold Determination) and 2 (Credit Scoring) described in Section 3. Habitat and species credits will be determined by evaluating the ecological benefit of the wildlife connectivity action. CDFW will evaluate proposed wildlife connectivity actions based on the five key ecological benefit crediting considerations (see Section 3.4: Credit Proposal Review) listed below:

- Ecological Engineered Design;
- Value of the Habitat Connected;[29]
- Value of the Particular Location;[30]
- Critical Linkages;[31] and
- Population-level Benefits to Target Species.[32]

The sponsor shall provide CDFW with a credit proposal which includes justification for the five crediting considerations. Each ecological benefit crediting consideration is broken into subsections. These subsections include:

- Required and recommended information for the credit proposal to evaluate the ecological benefit of the crediting consideration or subcategory; and
- A high, medium, and low scale for determining point amounts for the subcategory. A zero score is possible if there is no or little benefit for the consideration.

The sponsors' credit proposal and supporting justification must use the best available science including, but not limited to, monitoring data collected or obtained by the sponsor, CDFW species data, peer-reviewed literature, pre-existing citable publicly available datasets, and reports from government agencies and universities. Where site-specific data are not available, efforts to find data from other parts of the species' range, relevant life history data for the species, or use of data from similar species that can act as species proxies can be utilized. The credit proposal and supporting justification may require new surveys as part of the standard bank or MCA process.

The credit proposal information and documents for the wildlife connectivity action required in the below subsections will be in addition to what is already required for either the banking guidelines or the MCA guidelines. (see Appendix C – Wildlife Connectivity Action Bank Checklists and Appendix D – Wildlife Connectivity Action

[29] Fish & G. Code, § 1957, subdivision (c)(2)
[30] Fish & G. Code, § 1957, subdivision (c)(5)
[31] Fish & G. Code, § 1957, subdivisions (c)(4 & 6)
[32] Fish & G. Code, § 1957, subdivision (c)(3)

MCA Checklists for the timing of when this information is needed within the review process).

The terms "shall" or "must" are used for provisions that are required in the credit proposal, while the terms "may" or "should" indicate recommendations that may aid in additional credit allocations. If any required section does not apply to the wildlife connectivity action, indicate so with an explanation, as needed. Because this approach is new, these sections may be refined in subsequent versions of the guidelines as more information on the process is obtained.

4.1 Ecological Engineered Design

This section focuses on the ecological engineered design components of wildlife connectivity actions, such as overpasses and underpasses. Each site is unique, and conditions will often require solutions tailored to the site. Solutions should emulate natural systems and be sustainable with appropriate level of required maintenance for the crossing solution.

The sponsor should consider a range of criteria beyond structural integrity that pairs the ecological engineered design of the wildlife connectivity action with appropriate ecological components while considering both existing and future landscape context. The wildlife connectivity action should facilitate and encourage use by the target species. The sponsor should describe anticipated changes in target species' movement in relation to barriers following the construction of the wildlife connectivity action.

When the proposed credit type is a target habitat, the ecological engineered design should enhance movement for many species in the habitat type.

The wildlife connectivity action's ecological design should durably enhance connectivity and improve ecological deficiencies associated with built infrastructure. The long-term maintenance and monitoring needs for the wildlife connectivity action must be included in the Interim Management Plan **and** Long-term Management and Monitoring Plan (see Section 6.3: Long-term Management and Monitoring Plan).

The sponsor shall provide CDFW with a full set of engineered design plans that include, but are not limited to:

A. Existing conditions (see Section 4.1.5: Existing Conditions);
B. Wildlife connectivity structure dimensions and a written description of how these structure dimensions allow for the movement of the target species;
C. Wildlife connectivity action approaches;
D. Engineered drawings in plan, elevation, longitudinal profile and cross-sectional views depicting the 2-, 5-, and 100-year hydraulic events including potential debris flow and how the service life of the design has taken into consideration how each of these events will be increasing due to climate change (if applicable);

a. The sponsor should consider including the 500-year floodplain as an indicator of future climate risk (see Appendix A: Aquatic Specific Resources); and

E. Fencing or other directional implements (if applicable).

These design elements are expected to be more conceptual early in the bank or MCA process. Please refer to the checklists provided in Appendix C and D for more detailed information on what is required in the various bank and MCA stages.

The sponsor shall also provide CDFW with a complementary written description of the proposed ecological engineered design. The description must include, at minimum, information on the following components:

A. Structure Dimensions;
B. Sound and Light Minimization Measures;
C. Surface Substrates and Vegetation;
D. Hydrogeomorphic Components;
E. Existing Conditions;
F. Approaches;
G. Fencing or Other Directional Implements;
H. Designing for Resilience to Climate Change; and
I. Additional Species-specific Elements.

The required information for each subcategory is described in depth below in Sections 4.1.1-4.1.9.

While it is important for CDFW to understand the structure's overall design to ensure the species can use the structure or that the habitat is available, CDFW will review the considerations primarily from an ecological and connectivity perspective. **The sponsor is responsible for complying with all laws, standards, and practices pertaining to a wildlife connectivity action's structural design, construction, and maintenance.**

CDFW will consider ecological engineered designs when evaluating the sponsor's credit proposal. The sponsor must use the qualitative scoring scale below to aid in determining the ecological benefit of the ecological engineered designs. CDFW will use the same qualitative scoring scale when reviewing the proposal.

The sponsor shall evaluate each of the ecological engineered design subcategories separately using the high, medium, and low scoring in completing the scoring table in Appendix B – Scoring Templates (also see Section 3.3.2: Step 2: Credit Scoring). If the proposed wildlife connectivity action does not address any design components for the target species or target habitat for any ecological engineered design subcategory, then that subcategory should be given a score of zero.

General Scoring Scale for Species

High – The proposed wildlife connectivity action addresses all or most applicable design elements to maximize connectivity between all or most life stages for the target species

via dispersal, movement, and/or migration. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium – The proposed wildlife connectivity action addresses some applicable design elements to maximize connectivity between some life stages for the target species via dispersal, movement and/or migration. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low – The proposed wildlife connectivity action addresses few applicable design elements to maximize use for the target species at one life stage via dispersal, movement and/or migration. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero - The proposed wildlife connectivity action design does not suite the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

The qualitative scoring for subcategories that relate to target habitat credit types, will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use the habitat.

4.1.1 Structure Dimensions

Wildlife connectivity structure dimensions shall facilitate the successful crossing for the target species. The structure should be linear with no turn segments and as short as possible.

High openness ratios may encourage the use of underpasses, however this may not be true for some species. underpass openings should be sufficiently large to accommodate the target species and designs should increase in width as length of the undercrossing increases. Additionally, the height of the underpass opening should be tall enough to accommodate the target species while also maximizing potential use by other species. Most wildlife species are deterred from entering dark, enclosed places so a direct line-of-sight through the wildlife connectivity action is ideal.

The sponsor shall provide CDFW with a written description of how the wildlife connectivity structure dimensions could facilitate successful crossings for the target species for all or most life stages. The description must include at minimum:

A. The crossing width, length, and height;
B. The openness ratio (calculated in meters) for underpasses, and its suitability for the target species. The openness ratio is defined as the structure's (width x vertical clearance) / length.; and
C. Whether there is a direct line-of-sight and justification if not.

The sponsor must include information on the items above, for target habitat credit types, that will promote habitat persistence and enhance movement in general for wildlife that use the habitat.

4.1.2 Sound and Light Minimization Measures

Many wildlife species are wary of human-caused noise and light, and these disturbances should be minimized both within and around the wildlife connectivity structure. Light and noise can be minimized using various techniques such as earth berms, solid walls, sound attenuating walls, dense vegetation, or a combination of these. In addition, various landscaping techniques could be employed on the approaches to the wildlife connectivity structure (see Section 4.3.1: Topography).

The sponsor shall provide CDFW with a written description of how the design minimizes the intensity of noise and light coming from the built infrastructure (e.g., road), traffic, or the wildlife connectivity structure itself. The description must include at minimum:

A. Baseline light and sound conditions; and
B. Designs implemented to account for sound and light minimization measures to encourage use by the target species.

4.1.3 Surface Substrates and Vegetation

The natural substrates and native vegetation incorporated into designs for terrestrial and aquatic wildlife connectivity actions, should provide continuity with the habitat around and through the wildlife connectivity action.

The sponsor shall provide CDFW with a written description of the surface substrates used in the design. The description must include at minimum:

A. The vegetation used for the design;
    a. Description of how the vegetation is appropriate for the target species, including vegetation approaching the crossing and in/on the crossing;
    b. When vegetation may not be feasible for undercrossings or other shaded structures, the design should focus on items B-D below;
B. The soil substrates used or imported materials for the design to mimic natural conditions;
C. A rationale if the substrates are not from the area;
D. How the chosen vegetation and designed habitat complexity best suits the target species; and
E. A list of the appropriate escape and resting cover elements (e.g., large woody debris, rocks) in the design for the target species.

The written description for aquatic wildlife connectivity actions must include:

A. How the design simulates characteristics of the natural stream system, providing ecological continuity based on the upstream and downstream structural complexity (e.g., logs, rocks, pools, riffles, moisture regime); and
B. A discussion on the flexibility and resilience of streambed and streambank substrates based on hydraulic and geomorphic principles.

The sponsor must include information on the items above, for target habitat credit types, that will promote habitat persistence and enhance movement in general for wildlife that use that habitat. For undercrossings or other shaded structures where vegetation may not be feasible, design should maximize other target habitat features.

4.1.4 Hydrogeomorphic Components

In addition to removal of any wildlife movement barriers, the watercourse should be restored to as natural a functioning state as possible, and where feasible the wildlife connectivity action should fully span the geomorphic dimensions of the watercourse. Proposed designs should attempt to improve conditions if deficiencies are present and provide for continuity of physical, hydraulic, and geomorphic processes such as the movement of debris and sediment, vegetation distribution, and microclimate. When full span, vegetated solutions are not feasible, shelving or pathway structures that provide passage for terrestrial species while also allowing waterflow for aquatic species or hydrology concerns may be appropriate to provide year-round access for terrestrial species when placed above the flood stage zone.

The sponsor shall provide CDFW with a written description of how the hydrogeomorphic components were incorporated into the design to facilitate use by aquatic and terrestrial species, as applicable. The description must include at minimum:

A. An analysis of the existing hydrogeomorphology of the wildlife connectivity action's site and the adjacent up- and downstream sections;
B. How continuity of physical, hydraulic, and geomorphic processes have been incorporated into the design; and
C. How the design accounts for how the stream grade, velocity, water depth, and flow capacity over a range of flow events might affect the movement of the target species at all or most life stages.

The description should include at minimum:

A. Data on floodplains and elevated benches that would allow for terrestrial crossings during flood events; and
B. How terrestrial species movement needs, in addition to aquatic species, have been incorporated into the design.

The sponsor must include information on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat.

4.1.5 Existing Conditions

New design features should maximize potential use of the wildlife connectivity action given the constraints of the site, but also remove as many wildlife movement constraints as possible. The sponsor shall provide CDFW with engineered design drawings and/or figures of other existing on-site conditions that have been incorporated into the design

to maximize the use of the wildlife connectivity action. The design drawings and/or figures must include at minimum:

A. All existing built infrastructure associated with the proposed wildlife connectivity action and how it is incorporated into the design;
B. Existing landscape conditions and associated movement pathways, and the incorporation of them into the design planning (see Section 4.3: Value of the Particular Location);
C. The existing length of the barrier proposed to be remediated, traffic volume patterns, utilities, watercourse, shoulder widths, median barriers, fencing, side slopes, and local landscape features (e.g., forest, cliff, riparian) and how they impact potential new design features; and
D. How current obstacles to wildlife movement are addressed by the wildlife connectivity action's proposed design, including consideration of complete structure replacement versus retrofitting the existing structure to provide passage through existing built infrastructure.
E. How the design includes elements that prevent unauthorized human use or trespass while allowing wildlife.

4.1.6 Approaches

Careful consideration shall be given to how the wildlife connectivity structure is integrated into the adjacent landscape. For example, when mimicking the surrounding landscape is not possible, the steepness of the approach (see Section 4.3.1: Topography) to the openings should be minimized as much as possible.

The sponsor shall provide CDFW with a written description of how the approach to the wildlife connectivity structure was designed to be attractive to target species to facilitate use of the wildlife connectivity action. The description must include at minimum:

A. How the approach mimics the surrounding landscape contours, substrates, and vegetative composition to facilitate target species movements;
B. How incorporating elements to increase the target species' sense of safety, such as providing some sunlight within underpasses, was incorporated into the design based on the target species' needs; and
C. How any potential hydraulic deficiencies caused by existing built infrastructure (based on upstream and downstream conditions) were accounted for in the design for aquatic wildlife connectivity actions.

The sponsor must include information on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat.

4.1.7 Fencing or Other Directional Implements

When needed for the target species, an overpass or underpass must be accompanied by directional fencing, one-way doors or gates, and/or escape ramps specifically

suited for the target species. When directional fencing and escape implements are needed, a wider range of species that may also find and use the wildlife connectivity structure should be considered as well. Aquatic species may not require fencing if they are entirely dependent on access to water; however, fencing, or directional implements must not impact aquatic species movement.

The sponsor shall provide CDFW with a written description of fencing or other directional implements that will be used and how the design is based on the needs of the target species. The score for this subcategory will include both Section 4.1.7.1 "directional fencing" and Section 4.1.7.2 "escape ramps or other similar structures." The description must include at minimum:

A. A description of the fencing or other direction element (e.g., escape ramp), locations, and design based on the needs of the target species. Or an ecological justification if fencing or other directional elements are not proposed.

The description should include at minimum:

A. A description of how the fencing or other direction elements suit the needs for a wider range of species that may also find and use the wildlife connectivity structure.

4.1.7.1 Directional Fencing

When needed for the target species, directional fencing shall be designed to funnel individuals of the target species and preferably as many species as possible towards the wildlife connectivity action. Fence configurations, construction specifics, design alternatives, and maintenance will all vary depending on the target species. Directional fencing should be tall enough to keep the target species from moving onto the built infrastructure (e.g., road). Smaller species may require smaller mesh sizing or solid fencing along the ground. When the target species' behaviors involve digging, the fencing should be buried underground to limit individuals' access to the barrier structure (e.g., roads or canals) where there is risk of injury or mortality.

The length of fencing arrays should take into consideration the most mobile target species. For less mobile species, appropriate resting cover should be included in the design. Fence ends along roads should occur on straightaways where line of sight distance is better for drivers, or at locations where other topographic features may act as additional barriers (e.g., steep rocky embankments for ungulates). Depending on the target species, the sponsor should consider fence ends that include a wrap-around or diagonal arm so that individual animals following the fence arm are directed back to the wildlife connectivity structure.

If applicable, the sponsor shall provide CDFW with a written description of the directional fencing design and how it is based on the needs of the target species. The description must include at minimum how the target species' needs informed the following:

A. How the design directs individuals of the target species including any wrap round or diagonal arms;
B. The directional fencing height;
C. The fence style, including material, mesh sizing, and whether mesh sizing is consistent;
D. If fencing will be buried or flush to the ground; and
E. The length and location of the fencing array and any resting cover incorporated in the design.

4.1.7.2 Escape ramps or other similar structures

Wildlife can become trapped inside fenced areas, and features like escape ramps can allow them to safely exit. Openings in medians may support the ability of wildlife to escape from entrapment on roadways. When needed for the target species, the type and installation of escape ramps or other similar structures shall be based on species and location specifications. Private roads that occur within the fencing area should be fitted with double cattleguards where ungulates are common, and single cattleguards otherwise to ensure continuity of the fence. High-quality wildlife gates appropriate for excluding the target species are another option.

Escape ramps should be tall enough so the target species cannot easily jump on it but should be able to safely jump down. They should also not be overly tall to prevent use by smaller or young wildlife. Escape ramps or other one-way implements should be placed on both sides of the built infrastructure (e.g., roadway). Landing and escape zones should be clear of obstructions that would prevent use or affect successful operation.

If applicable, the sponsor shall provide CDFW with a written description of any escape ramps or jumpouts incorporated into the design and how the design is based on the needs of the target species. The description must include at minimum:

A. The escape ramps or jumpouts design and placement based on the species in the area and location specifications; and
B. If and where any cattle guards are included in the design.

4.1.8 Designing for Resilience to Climate Change

Wildlife connectivity actions need to be climate durable both in terms of structural integrity and maintenance. Potential future stochastic events affecting the structure such as shifting rainfall patterns, changes in temperature, flooding, drought, hydrology, erosion, wildfire, and sea-level rise shall be factored into the design, where applicable, to ensure the structure and all connectivity design components will remain operational during such events. In addition, wildlife connectivity actions should include climate resilient or diverse native vegetation assemblages to support the longevity of the wildlife crossings.

The sponsor shall provide CDFW with a written description of how the wildlife connectivity action has been designed to account for future climate conditions. The description must include at minimum:

A. How the wildlife connectivity action has been designed for longevity considering the potential for flooding and wildfire; and
B. How the vegetation in the design is climate resilient.

The sponsor must also include information on the items above for target habitat credits that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.1.9 Additional Species-specific Elements

The subcategories listed in the ecological engineered design section are not exhaustive considering the diverse array of potential target species in California. The sponsor should thoroughly review the life history needs of all target species and design wildlife connectivity actions that are effective and durable through time. Examples of other features include home range sizes, territoriality, energy expenditure requirements, social structure, diet across seasons, and foraging and breeding patterns (see Section 4.5: Population-Level Benefits to Target Species)

The sponsor shall provide CDFW with a written description of how any additional species-specific elements have been incorporated into the design to facilitate use of the wildlife connectivity action by target species at all or most life stages.

4.2 Value of the Habitat Connected

CDFW shall consider the value of the habitat connected by the wildlife connectivity action when evaluating the sponsor's credit proposal.[33] The sponsor should consider the habitat quantity, habitat quality, and level of protection and/or conservation of the surrounding lands. The information CDFW will use to evaluate the sponsor's credit proposal includes existing and proposed protection mechanisms, existing and proposed city or county zoning, acres of habitat connected, existing habitat types, and use of habitat by the target and other native species. The sponsor shall provide the information, as described below, to CDFW in the form of map(s), table(s), and written descriptions. CDFW recognizes that accessing all the information requested below on surrounding lands might sometimes be infeasible (i.e., private lands). In these cases, provide what information is publicly available and indicate where no information was able to be found.

[33] Fish & G. Code, § 1957, subdivision (c)(2)

Maps

The sponsor shall include maps containing the information listed below. If access to properties are infeasible, the sponsor may need to use public data to provide the following information:

A. Coordinates (latitude/longitude in decimal degrees) of the proposed wildlife connectivity action;
B. Boundary of the wildlife connectivity action (See wildlife connectivity action definition in Section 1.4 Terms and Definitions);
C. The surrounding lands relative to the target species' maximum dispersal distance that contain the target species' habitat connected by the wildlife connectivity action;
D. Labels identifying existing and proposed protection mechanism(s) for the surrounding lands connected by the wildlife connectivity action. The existing protection mechanism(s) labeled on the map shall be the current protection mechanism(s) at the time of the sponsor's map submission. Examples of protection mechanisms include, but are not limited, to conservation easements; federal, state, local public agency, non-profit, or special district owned lands protected for fish, wildlife, or habitat; deed restrictions that restrict development or construction; open space; and parks;
E. Labels identifying existing and proposed city or county zoning of the surrounding lands relative to the target species' maximum dispersal distance connected by the wildlife connectivity action. Existing zoning shall identify the zoning designation at the time of the sponsor's map submission. Examples of city and county zoning include but are not limited to industrial, open space, parks; green space, recreational, commercial, agricultural, single-family residential, multiunit residential, and schools;
F. Locations of all watercourses (e.g., ephemeral creeks, ponds, wetlands, etc.) in the surrounding lands connected by the wildlife connectivity action. If the proposed wildlife connectivity action is connecting watercourses or removing aquatic barriers, maps showing the benefit of the action to the whole watershed would be appropriate;
G. Identify habitat types located within the surrounding lands relative to the target species' maximum dispersal distance that are connected by the wildlife connectivity action. Use publicly available resources and/or aerial imagery;
H. Location of known built infrastructure, natural or man-made hazards, and barriers to species dispersal on habitat in the surrounding lands connected by the wildlife connectivity action;
I. A map showing the California Natural Diversity Database (CNDDB) records (or other appropriate dataset of species distribution or occurrence) within the maximum dispersal distance for the target species in the surrounding lands connected by the wildlife connectivity action; and
A habitat suitability map, if available, such as the California Habitat Relationships (CWHR) Predicted Habitat Models or other scientific source.

Tables

The sponsor shall include table(s) containing the information listed below. If access to properties is infeasible, the sponsor may need to use general or public data information sources to obtain the following information about the surrounding lands:

A. Land ownership (if privately owned, indicate "private") in the surrounding lands relative to the target species' maximum dispersal distance connected by the wildlife connectivity action;
B. Total habitat acreage and, if applicable, total acreage of watercourses by type (e.g., pond, wetland, etc.) and linear feet of stream in the surrounding lands relative to the target species' maximum dispersal distance connected by the wildlife connectivity action. Acreages shall be separated by existing and proposed protection mechanisms and city and county zoning; and
C. Existing habitat types in the surrounding lands relative to the target species' maximum dispersal distance connected by the wildlife connectivity action. Existing habitat types shall identify the habitat types present at the time of the sponsor's table submission. When identifying habitat types, the sponsor should consider using scientific literature, aerial or satellite imagery, LiDAR (Light Detection and Ranging), Vegetation Classification and Mapping Program vegetation maps, or other resources to determine which habitat types occur beyond the bank or MCA if physical access to the sites are infeasible.

Written Description

The sponsor shall include a written description containing the information listed below. The sponsor may use public data to provide the following information on surrounding lands:

A. Known quality of habitat in the surrounding lands relative to the target species' maximum dispersal distance connected by the wildlife connectivity action. The description must include at minimum, as applicable:
    - General condition of the vegetation and habitat features (streams, ponds, woody cover, etc.) including a list of native species, vegetation type, size, landscape structure, and density;
    - Ability of the habitat to support target and special status species. Include known or existing supporting documentation, surveys, and/or scientific studies;
    - Extent of known degradation of vegetation and habitat features (e.g., construction, built infrastructure, human usage, roads, trails, presence of invasive species, etc.) within the surrounding lands that are connected by the wildlife connectivity action, if applicable;
B. Known future construction projects, including county/state regional transportation plans and country general plans, that may impact the area;
C. Known hydroperiod and water quality (see BIOS datasets 232-234 for U.S. EPA's impaired waters) of watercourses;

D. Vulnerability of habitat to climate change including whether the habitat type is projected to experience changes in inundation, fire regimes, temperature, hydroperiod, water quality, or vegetation quality;
E. Whether the habitat in the surrounding lands relative to the target species' maximum dispersal distance that are connected by the connectivity action is currently utilized by the target species and other species. The description must include at minimum:
    - All presence information for the target species, such as scientific literature, research, biological surveys, CNDDB, etc., that identifies use of the habitat.

The sponsor must include information on the items above, for target habitat credit types, that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

CDFW will consider the surrounding lands relative to the target species' maximum dispersal distance and the standard bank or MCA lands when evaluating the value of the habitat connected by the wildlife connectivity action. The sponsor must use the qualitative scoring scales below to aid in determining the quality of the habitat connected by the wildlife connectivity action. CDFW will use the same qualitative scoring scale when reviewing the proposal.

4.2.1 Habitat Quantity

CDFW will consider the amount of habitat connected to evaluate the sponsor's proposed credit amount by the following:

High – The amount of habitat in the surrounding lands relative to the target species' maximum dispersal distance standard bank or MCA lands connected by the wildlife connectivity action is sufficient on both sides of the wildlife connectivity action to support all or most life stages of the target species and many other native species.

Medium – The amount of habitat in the surrounding lands relative to the target species' maximum dispersal distance and standard bank or MCA lands connected by the wildlife connectivity action is sufficient on both sides of the wildlife connectivity action to support some life stages of the target species.

Low – The amount of habitat in the surrounding lands relative to the target species' maximum dispersal distance and standard bank or MCA lands connected by the wildlife connectivity action provides minimal support on both sides of the wildlife connectivity action to a single life stage of the target species.

Zero – The amount of habitat in the surrounding lands relative to the target species' maximum dispersal distance and standard bank or MCA lands connected by the wildlife connectivity action provides no support on one or both sides of the wildlife connectivity action for the target species.

The qualitative scoring will be based on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.2.2 Habitat Quality

CDFW will consider the quality of habitat connected to evaluate the sponsor's proposed credit amount by the following:

High – The habitat in the surrounding lands connected by the wildlife connectivity action has been limitedly disturbed, has features that support all or most life stages of the target species and is resilient to climate change. The habitat is utilized by the target species and many other native species.

Medium – Some of the habitat in the surrounding lands connected by the wildlife connectivity action are disturbed and has some features that support some life stages of the target species and is moderately resilient to climate change. The habitat is utilized by the target species.

Low – The habitat in the surrounding lands connected by the wildlife connectivity action is moderately developed, minimally climate resilient, and/or not utilized by the target species, but has potential to be.

Zero – The habitat in the surrounding lands connected by the wildlife connectivity action does not support the target species.

The qualitative scoring for target habitat credit types will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.2.3 Protection of the Land

CDFW will consider the existing protection of surrounding land to evaluate the sponsor's proposed compensatory mitigation credit amount by the following:

High – Most of the surrounding lands connected by the wildlife connectivity action with target species habitat have a conservation easement recorded on them or another long-lasting conservation mechanism such as fee title ownership by a park agency, or state or federal public lands maintained for conservation values. Gap Analysis Program (GAP) Status Ranks 1 and 2 as provided in the California Protected Areas Database (CPAD) generally have the most conservation protections. The California Conservation Easements Database (CCED) is a resource for lands with conservation easements. GAP Status Rank 3 will be considered, for high, if the type of land management and disturbance is anticipated to have no or minimal impact on the target species.

Medium – Some of the surrounding lands connected by the wildlife connectivity action with target species habitat are protected by a conservation easement. The remaining lands that are not zoned for development or have no plans for development in the foreseeable future. Some lands might be working lands with no plans for development in the foreseeable future.

Low – Lands with target species habitat on one side of the wildlife connectivity action are protected by a conservation easement or other protection mechanism. The remaining lands that are and will not be protected, although there are no plans for development in the foreseeable future.

Zero –There is no protection from development on both sides of the wildlife connectivity action, the land is heavily developed or future development is planned, **and** land protection is only possible within the right-of-way.

The qualitative scoring for target habitat credit types will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.3 VALUE OF THE PARTICULAR LOCATION

The sponsor shall describe the ecological value of improving connectivity at the location of the proposed wildlife connectivity action.[34] The sponsor should consider the needs of target species at the particular location including topography, presence of watercourses or other aquatic resources, vegetative and other cover, movement and mortality data, permeability and built infrastructure (e.g., road) characteristics, human impacts, and other proposed or completed wildlife connectivity actions nearby.

CDFW will consider the value of the particular location when evaluating the sponsor's proposal using the subcategories below.

4.3.1 Topography

The sponsor shall provide CDFW with a written description of how the existing topography of the proposed wildlife connectivity action location meets the suitability of the target species' needs in the sponsor's proposal. A site that does not currently have topographic relief that is considered suitable for the target species may still be considered if the sponsor is able to add or remove substrate or implement other topographical modifications (e.g., rock weirs, roughened channels), to make the site's topography suitable for target species. The description must include at minimum:

A. The wildlife connectivity action site's current slope gradient and topographic barriers and how those are proposed to change based on the proposal;
B. A description of the target species' likelihood to navigate through the wildlife connectivity structure based on the topography-related cues that the target species is likely to rely on, including but not limited to line-of-sight, sound, light, etc. (also see Section 4.5: Population-Level Benefits to Target Species and Section 4.1: Ecological Engineered Design); and
C. A description of any proposed topography changes referencing the construction plan with an explanation of the ecological need for the changes.

[34] Fish & G. Code, § 1957, subdivision (c)(5)

The sponsor must include information on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

CDFW will consider the topography when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to evaluate topographic characteristics at the wildlife connectivity action's particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The site's final topography is well suited for the target species' needs to facilitate use of the wildlife connectivity action.

Medium – The site's final topography is moderately suited for the target species' needs to facilitate the use of the wildlife connectivity action.

Low – The site's final topography is minimally suited for the target species' needs and minimally facilitates the use of the wildlife connectivity action.

Zero – The site's final topography is not suited for the target species' needs and does not facilitate the use of the wildlife connectivity action or may have potential negative impacts.

The qualitative scoring for target habitat credit types will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.3.2 Watercourse or Other Natural Pathway

The presence of a watercourse or other natural pathway is important for wildlife movement and may indicate good locations for wildlife connectivity actions. Other pathway types known to be used by wildlife include riparian corridors, canyons, ridgeways, and other natural pathways for movement. Watercourses and other pathways provide multiple benefits such as access to water, safe movement opportunities, and connectivity for multiple life stages (e.g., connectivity between ponds and uplands). These features should be present, or the appropriate features for a target species should be part of the proposal.

The sponsor shall provide CDFW with a written description of the species' need, or lack of need, for aquatic features or other pathways. The description must include at minimum:

A. The watercourses or other pathways currently present at the wildlife connectivity action's site and how they meet the needs of the target species; and
B. Any impacts of perennial, ephemeral, or intermittent watercourses to species movements, and a strategy to address impacts (see Section 4.1: Ecological Engineered Design).

CDFW will consider the proposed watercourse or other pathway presence when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining the wildlife value of the watercourse or other pathway at the wildlife connectivity action's particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The watercourse or other pathway required for the target species is ideal to facilitate the use of the wildlife connectivity action.

Medium – The watercourse or other pathway required for the target species is moderate and may facilitate some use of the wildlife connectivity action.

Low – The watercourse or other pathway required for the target species is poor and is likely to facilitate little use of the wildlife connectivity action.

Zero – A watercourse or other pathway required for the target species is not present and is unlikely to facilitate any use of the wildlife connectivity action or could have potentially negative impacts on the target species.

4.3.3 Vegetation and Other Cover

Many species require the presence of cover (e.g., herbaceous and/or woody vegetation) to facilitate movement across a landscape and through a proposed wildlife connectivity action. Suitable cover types and landscape structures may vary from species to species. For example, species' requirements may include a specific percent of cover, density of vegetation, distribution of patches, or vegetation community types. When target species require cover, the wildlife connectivity action area should already have the appropriate cover, or the sponsor should include a plan to add the appropriate cover as part of the proposal.

The sponsor shall provide CDFW with a written description of the target species' need, or lack of need, for cover and how the vegetation cover in this particular location was considered based on the species or habitat. The description must include at minimum:

A. The current wildlife connectivity action site's vegetation (or other) cover conditions and how it currently meets the target species' needs; and
B. Proposed vegetation plantings and/or placement of other cover types (e.g., ledges) and how the proposed vegetation and other cover will meet the target species' needs (see Section 4.1: Ecological Engineered Design).

The sponsor must include information for target habitat credit types on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

CDFW will consider the vegetation and other cover of the wildlife connectivity action's particular location when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining the ecological benefit of vegetation and other cover at the wildlife connectivity action's particular location.

CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The vegetation and other cover well suits the needs of the target species.

Medium – The vegetation and other cover moderately suits the needs of the target species.

Low – The vegetation and other cover minimally suits the needs of the target species.

Zero – The vegetation and other cover do not suit the needs of the target species or may have potential negative impacts on the target species.

The qualitative scoring for target habitat credit types will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.3.4 Movement and Mortality Data

Data showing species that either approach or successfully cross over or under built infrastructure (e.g., roadway) may be used as an indicator for where a wildlife connectivity structure is needed. Mortality data, information on target species deaths due to crossing barriers, and game pathways may be used for species with a relatively small dispersal distance. Locations of high mortality may not necessarily indicate the best location for a wildlife connectivity structure for wider-ranging species. Instead, additional information should also be considered when available, such as non-fatal crossing data or other species-specific movement studies. Additionally, absence of a mortality hotspot does not necessarily indicate a lack of a barrier. Barriers can also exist where animals do not attempt to cross built infrastructure (e.g., roadways), typically multi-lane highways with high-traffic volume.

The sponsor shall provide CDFW a written description of how best available wildlife movement (e.g., wildlife collar data, camera trap data, etc.) and mortality information (e.g., wildlife collar data, camera trap data, etc.) for the target species was used to develop the wildlife connectivity action. The description must include at minimum:

A. Key target species findings from:
    - Mortality data;
    - Species-specific movement studies including non-fatal successful crossing data, as available; and
    - Information about historical use (e.g., historical fish use of a stream reach that is currently blocked at the proposed wildlife connectivity action's site).

For example, the sponsor should consult the California Roadkill Observation System and California Department of Transportation's (Caltrans') Large Mammal-vehicle Collision Hot Spot Analyses for terrestrial species mortality data. However, these data sets are observational and not comprehensive across the state for species or spatial coverage.

CDFW will consider movement and mortality data when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to evaluate movement and mortality data at the wildlife connectivity action's particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The movement and mortality data indicate that the wildlife connectivity action's particular location will be highly effective for the target species.

Medium – The movement and mortality data indicate that the wildlife connectivity action's particular location will be moderately effective for the target species.

Low – The movement and mortality data indicate that the wildlife connectivity action's particular location is unlikely to be effective for the target species.

Zero – The movement and mortality data indicate that the wildlife connectivity action's particular location will not be effective for the target species and could have potentially negative impacts on the target species.

4.3.5 Permeability and Built Infrastructure Characteristics

Permeability is the degree to which an area is conducive to wildlife movement and sustaining ecological processes. Built infrastructure (e.g., road) characteristics, such as the speed of the traffic and the number of lanes, impact the permeability of a built linear feature. The permeability of a particular built linear feature will likely vary widely depending on the target species and may depend on components such as the species' dispersal distance, active period (e.g., diurnal vs. nocturnal), speed of movement, etc. The existing permeability will also vary depending on the built infrastructure (e.g., road) characteristics., The light and noise generated by the roadway should be discussed as part of the built infrastructure (e.g., road) characteristics, including both existing and proposed for species that are sensitive to light or noise.

The sponsor shall provide CDFW with a written description of the current permeability and built infrastructure (e.g., road) characteristics of the particular location. The description must include at minimum:

A. The traffic speed and volume. Traffic volume for the state highway system can be accessed through the Caltrans Traffic Census Program and spatial geographic information system (GIS) data are also provided;
B. The number of lanes;
C. The existing built infrastructure (e.g., road) barriers; and
D. Current and ambient light or noise levels and any current light or noise barriers.

CDFW will consider the permeability and built infrastructure (e.g., road) characteristics of the particular location when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to evaluate the permeability and certain built infrastructure (e.g., road) characteristics of the particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The permeability of the wildlife connectivity action's particular location is low and the built infrastructure (e.g., road) characteristics present a significant barrier to movement for the target species. The proposed wildlife connectivity action will substantially increase permeability for the target species.

Medium – The permeability of the wildlife connectivity action's particular location is moderate and the built infrastructure (e.g., road) characteristics present a moderate barrier to movement for the target species. The proposed wildlife connectivity action will increase permeability for the target species.

Low – The permeability of the wildlife connectivity action's particular location is already high and the built infrastructure (e.g., road) characteristics present a minimal barrier to movement for the target species. The proposed wildlife connectivity action will not significantly increase permeability for the target species.

Zero –The proposed wildlife connectivity action will not significantly increase permeability and may have negative impacts for the target species.

4.3.6 Other Wildlife Connectivity Actions

The sponsor shall provide CDFW with a written description of any other wildlife connectivity actions that were considered in siting the particular location of the proposed wildlife connectivity action. The description must include at minimum:

A. A summary of any other existing or planned wildlife connectivity actions nearby, including what species are known to, or are expected to, use them; and
B. An explanation of the ecological value of adding the proposed wildlife connectivity action at the proposed location.

CDFW will consider other existing and planned wildlife connectivity actions near the particular location when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining the ecological benefits of existing and planned wildlife connectivity actions near the particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – Existing and planned wildlife connectivity actions near the proposed wildlife connectivity action do not address the connectivity issues at the proposed wildlife connectivity action location.

Medium – Existing and planned wildlife connectivity actions near the proposed wildlife connectivity action address some of the connectivity issues at the proposed wildlife connectivity action location. However, the proposed wildlife connectivity action will provide additional connectivity benefits for the target species.

Low – Existing and planned wildlife connectivity actions near the proposed wildlife connectivity action have addressed the target species' connectivity issues. The proposed wildlife connectivity action will provide minimal additional connectivity benefits for the target species.

Zero – Existing wildlife connectivity actions on or near the proposed wildlife connectivity action have addressed the target species' connectivity issues. The proposed wildlife connectivity action will provide no additional connectivity benefits for the target species.

4.3.7 Human Impacts

Human presence near and human use of wildlife crossings have been shown to decrease use of the crossing by wildlife. For this reason, the wildlife connectivity action must exclusively be for the use by wildlife (see Section 6: Bank and MCA Modifications).

The sponsor shall provide CDFW with a written description of the human impacts in the particular location. The description must include at minimum:

A. A list of all human impacts in the area that could impact the success of the wildlife connectivity action, such as distance to urban edge, human population density, recreation, trails, trespass in the area, etc.;
B. For working lands (e.g., rangeland, agriculture), provide an assessment of potential negative impacts, if any, to the target species; and
C. Any measures that will be used to ensure that the wildlife connectivity action remains for wildlife use only.

The sponsor must include information for target habitat credit types on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

CDFW will consider the human impacts near the particular location when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to evaluate the human impacts for the particular location. CDFW will use the same qualitative scoring scale when reviewing the proposal as follows:

High – The wildlife connectivity action is in a rural area and is not near areas with heavy human density, recreation, or trails, or if near human use the proposed measures to ensure the wildlife connectivity action is solely for wildlife use are likely to be highly effective. No human recreation trail system or human access is in proximity to the wildlife connectivity action where human presence may modify animal behavior.

Medium – The wildlife connectivity action is near, but not adjacent to, low-density human use areas, or the proposed measures to ensure the wildlife connectivity action is solely for wildlife use are likely to be moderately effective. Trail system or human access near the wildlife connectivity action that may modify animal behavior.

Low – The wildlife connectivity action is adjacent to or within high-density human use areas, such as urban areas, or the proposed measures to ensure the wildlife connectivity action is solely for wildlife use are minimal or not likely to be effective. The wildlife connectivity action is part of a trail system or can be directly accessed by humans.

Zero – The wildlife connectivity action is within high-density human use areas, such as urban areas **and** the proposed measures to ensure the wildlife connectivity action remains for wildlife use are not likely to be effective. The wildlife connectivity action is part of a high use trail system or is commonly accessed by humans.

The qualitative scoring for target habitat credit types will be based on the items above that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

4.4 CRITICAL LINKAGES

CDFW shall consider the improvement of connectivity in critical linkages for determining the value of credits.[35] Examples of critical linkages include, but are not limited to, the Santa Monica Mountains and Rim of the Valley Corridor, Santa Ana Mountains, San Gabriel Mountains, San Bernardino Mountains, Santa Cruz Mountains, and the Gabilan Mountain Range.[36] For the purposes of these Guidelines, the term, critical linkage is broadly defined, including both aquatic and terrestrial linkages.

When developing the credit proposal, the sponsor shall use the resources below and other recent and best available science to help determine if a wildlife connectivity action would improve connectivity in a critical linkage. It is the intent of these Guidelines that the sponsor may use existing data and does not need to conduct biological surveys for the critical linkages if the critical linkages are not part of the wildlife connectivity action site. The sponsor's justification shall focus on improving connectivity for target species, the value of the linkage for those species, and depend on several subcategories that can be examined across a regional to local scale. The sponsor's justification may also address multi-species benefits to non-target species. The sponsor must consider the regional context such as the wildlife linkages and connectivity, and the local context, including fish and wildlife barriers and migration and dispersal routes.

CDFW will consider these subcategories in valuing credits using a high, medium, low scale as discussed further below.

4.4.1 Regional Connectivity

The statewide ACE Terrestrial Connectivity layer and the CDFW Biogeographic Information and Observation System (BIOS) Habitat Connectivity Viewer are important resources for determining the regional connectivity of a wildlife connectivity action. The Habitat Connectivity Viewer includes regional linkage assessments that are often finer scale than ACE and include modeled linkages based on a range of species with differing life history needs (see Appendix A – Wildlife Connectivity Action Resources). Many of these assessments also include detailed reports which can be used by the

[35] Fish & G. Code, § 1957, subdivision (c)(4)
[36] Fish & G. Code, § 1957, subdivision (c)(4)

sponsor to identify key linkage areas for each species. For aquatic resources, state and federal data sources such as the US Fish and Wildlife Service Critical Habitat layers, National Oceanic and Atmospheric Administration's Critical Habitats and Map Viewer; and various layers available on the BIOS system (Appendix A – Wildlife Connectivity Action Resources) can help inform the regional connectivity of a proposed site.

Regional conservation plans may reference linkages that are important for conservation. These plans can include multiple species Habitat Conservation Plans, Natural Community Conservation Plans (NCCP), RCISs, terrestrial and aquatic species recovery plans, watershed plans, climate adaptation plans, and any relevant science-based regional or local plans or reports that address connectivity (e.g., wildlife connectivity and fish passage assessment reports).

The sponsor shall provide CDFW with a written description of the regional connectivity for the proposed wildlife connectivity action. The description must include at minimum, if available:

A. The ACE terrestrial connectivity rank for the proposed wildlife connectivity action's site;
B. Any regional linkage systems (using BIOS Habitat Connectivity Viewer) that the proposed wildlife connectivity action's site is within;
C. If the proposed wildlife connectivity action's site is within federally designated critical habitat for the target species;
D. If the proposed wildlife connectivity action's site is within federally designated critical habitat for non-target species; and
E. List of regional conservation plans that reference the proposed wildlife connectivity action's site.

The sponsor must include information on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type.

CDFW will consider wildlife linkages and connectivity when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining the ecological benefits of certain wildlife linkage and connectivity characteristics. CDFW will use the same qualitative scoring scale when reviewing the proposal.

High – The site is located in ACE terrestrial connectivity Ranks 4 or 5; or the site is within federally designated critical habitat for the target species; or the site is named as a priority in a conservation plan for the target species. If the site is located in ACE Rank 2 or 3 areas, the sponsor should include additional data that supports a high value for the target species (e.g., connecting isolated patches of high-quality or federally designated critical habitat, or providing an alternate movement pathway between two patches/populations that are currently only connected by a single pinch-point).

Medium – The site is located in ACE Ranks 2 or 3 with limited data supporting value for target species; or the site is located in federally designated critical habitat but not for

the target species; or the site is generally named for having conservation benefits in a conservation plan.

Low – The site is located in ACE Rank 1; or the site is not located in federally designated critical habitat; or the site is not part of a conservation plan.

Zero – The site is located in ACE Rank 1; the site is not located in federally designated critical habitat; and the site is not part of any publicly available conservation plan or study.

The qualitative scoring will be based on the items above for target habitat credit types that will promote habitat persistence and enhance movement in general for wildlife that use that habitat type, not including the National Oceanic Atmospheric Administration critical habitat information, which is used for species credits only.

4.4.2 Local Connectivity

In this section, scoring will consider both "Fish and Wildlife Barriers" and "Migration and Dispersal Routes" described below in combination. The highest score within both categories will determine the final score received for Local Connectivity.

Fish and Wildlife Barriers: The CDFW Restoring California's Wildlife Connectivity Report (BIOS data link) reference wildlife infrastructure barriers across California. In addition, CDFW also maintains an expanded spatial dataset of important wildlife movement barriers across the state. The anadromous fish Passage Assessment Database (PAD) and Map Viewer is an ongoing map-based inventory of known and potential barriers to anadromous fish in California. PAD compiles data from more than one hundred agencies, organizations, and landowners throughout California (see Appendix A – Wildlife Connectivity Action Resources for more information on these resources).

The sponsor shall provide CDFW with a written description of the fish and wildlife barriers the proposed wildlife connectivity action would address. The description must include at minimum:

A. Whether the proposed wildlife connectivity action's site is listed in the latest California Wildlife Barriers Report, Restoring California's Wildlife Connectivity Report, or the wildlife movement barriers dataset;
B. Whether the proposed wildlife connectivity action's site is listed in PAD;
C. Whether any other reports or resources list the proposed wildlife connectivity action's site as a wildlife barrier; and
D. Information identifying the target species' geographic ranges and how they are affected by the barriers in the area.

CDFW will consider fish and wildlife barriers when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to evaluate certain fish and wildlife barrier characteristics. CDFW will use the same qualitative scoring scale when reviewing the proposal.

High –The site is identified as a barrier within the two most recent CDFW wildlife barrier reports or the wildlife movement barriers dataset; or the site is on the CDFW fish passage priority list; or the site is a connectivity priority identified by CDFW from other sources (e.g., NCCP, RCIS, CDFW staff expertise); or the site is named as a priority for the target species within other science-based conservation plans or assessment reports. There is substantial evidence that the site functions as a barrier or movement corridor for the target species.

Medium – The site is named within other science-based conservation plans or assessment reports with data supporting the need for connectivity; or the site is identified as a barrier in the PAD. There is moderate evidence that the site functions as a barrier or movement corridor for the target species.

Low – The site is not named within the two most recent wildlife barriers reports or associated datasets; the site is not listed as a barrier in the PAD; or the site is not named as a priority for the target species within other science-based conservation plans. There is limited evidence that the site functions as a barrier or movement corridor for the target species.

Zero – The site is not named within the two most recent wildlife barriers reports or associated datasets; the site is not listed as a barrier in the PAD; or the site is not named as a priority for the target species within other science-based conservation plans. There is no evidence the site functions as a barrier or movement corridor for the target species.

MIGRATION AND DISPERSAL ROUTES: The sponsor should provide data on migration and dispersal routes for target species. For ungulate target species, the CDFW Ungulate Migration Viewer web page depicts home ranges, high and moderate use migration routes, and stopovers for select migratory ungulates (e.g., mule deer, elk, and pronghorn) (Appendix A – Wildlife Connectivity Action Resources). Migration corridors represent movement routes used by ungulates between winter and summer range habitats. These datasets are being updated and are not currently a complete representation of migration routes across the state.

Data availability on migration or dispersal for other, non-ungulate species are likely limited. In these cases, the sponsor can provide migration and dispersal information for any species in the area to highlight the overall importance of the area for connectivity.

The sponsor shall provide CDFW with a written description of the migration and dispersal routes the proposed wildlife connectivity action would address. The description must include at minimum:

A. Any migration and dispersal routes that overlap with the proposed wildlife connectivity action's site including those in the CDFW Ungulate Migration Viewer.

CDFW will consider migration and dispersal routes when evaluating the sponsor's proposal; however, CDFW understands that these data are limited. The sponsor must use the qualitative scoring scale below to evaluate certain migration and dispersal routes. CDFW will use the same qualitative scoring scale when reviewing the proposal.

High – The site is within a high or moderate use migration route or data supports the site would enhance migration or dispersal for the target species.

Medium – The site may be within a high or moderate use migration route, but the supporting data are limited. The site may enhance migration or dispersal for the target species but supporting data are limited.

Low – The site is not within a high or moderate use migration route or the site is not within a migration or dispersal route for target species.

Zero – The site is not within a migration or dispersal route for target species.

4.5 Population-Level Benefits to Target Species

Wildlife connectivity actions that remove, or provide connectivity across, existing barriers to wildlife movement can create new opportunities for movement and migration of native species including terrestrial, aquatic, aerial wildlife (e.g., avifauna, bats, flying insects), and plants. This includes the benefits of reduced mortality and wildlife-vehicle collisions for reproductive adults as a result of the operation of the wildlife connectivity action.

Movement is essential for wildlife to find mates, seasonal habitat, shelter, food, and to adapt to climate change. An interconnected landscape can help to maintain ecosystem services such as pollination of crops and gene flow that helps to maintain biodiversity. Movement is essential for gene flow, which is necessary to maintain genetic diversity and increase the likelihood of long-term persistence of wildlife populations. When populations are isolated in habitat patches and individuals are unable to move through the landscape to reach other populations and habitat patches, they are more susceptible to reduced genetic diversity (and associated deleterious effects), localized loss of habitat, disease, and ultimately extirpation.

At a minimum, the sponsor shall describe the anticipated benefits of the wildlife connectivity action to improve genetic diversity and reproductive opportunities, remove migration barriers, and help species adapt to climate change (including access to additional latitudes and altitudes of potentially suitable habitat), and multi-species benefits.[37] The sponsor should consider all or most life stages for each target species with their ecological and foraging needs and seek to balance conflicting species needs.

[37] Fish & G. Code, § 1957, subdivision (c)(3)

The sponsor should consult and provide species specific and recent observation data such as that in BIOS.

CDFW will consider the value of the particular location when evaluating the sponsor's proposal using the subcategories below.

4.5.1 Genetic Diversity and Breeding Opportunities

Genetic health benefits include increased gene flow, increased genetic variation, reduced genetic drift, reduced genetic bottlenecks/inbreeding depression, and rescue of isolated and/or inbred populations. Wildlife connectivity actions can enable changes such as gender ratios and age-class ranges, birth and death rates (e.g., through reductions in wildlife-vehicle collisions), reproduction, and sustained population viability. Genetic information should be used to identify movement barriers where appropriate.

The sponsor shall provide CDFW with a written description of genetic and breeding opportunities the wildlife connectivity action would improve or create. As applicable, the description must include at minimum:

A. A narrative about the current genetic health, demographic, and population health status, and how the wildlife connectivity action would benefit the species' demographic and population health; and
B. How the wildlife connectivity action could improve the following:
    a. The dispersal and movement opportunities for the target species (e.g., increased access to spawning or breeding habitats);
    b. Colonization/recolonization of unoccupied habitat;
    c. Population fragmentation issues, including demographic rescue of local populations headed for localized extinction, and an understanding of the risk of potential ecological sinks; and
    d. Access to food, mates, and/or available habitat/breeding areas.

CDFW will consider species benefits of improved genetic diversity and breeding opportunities when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining if there is improved genetic diversity and breeding opportunities. CDFW will use the same qualitative scoring scale when reviewing the proposal.

High – Proposed wildlife connectivity action is highly likely to increase genetic diversity, health, and/or breeding opportunities.

Medium – Proposed wildlife connectivity action is likely to increase genetic diversity, health, and/or breeding opportunities.

Low – Proposed wildlife connectivity action may address genetic diversity, health, and/or breeding opportunities.

Zero – Proposed wildlife connectivity action does not address genetic diversity, health, and/or breeding opportunities or may have negative impacts of these attributes for the target species.

4.5.2 Species Adaptation to Climate Change

Habitat connectivity facilitates movement and can potentially aid in climate adaptation and/or ameliorate the negative effects of climate change (e.g. improving access to additional latitudes and altitudes of potentially suitable habitat). Connectivity may allow for safe travel/passage for wildlife fleeing from extreme or catastrophic weather events.

The sponsor shall provide CDFW with a written description of how the wildlife connectivity action may improve target species adaptation to climate change. As applicable, the description must include at minimum:

A. How the wildlife connectivity action could improve access to additional latitudes and altitude of potentially suitable habitat to adapt to climate change;
B. A description of the climate impacts on connectivity at the site, including rising temperatures, floods, drought, wildfires, and mud slides, as well as the effects of climate change impacts such as altered water quality and habitat fragmentation;
C. A description of the target species' climate vulnerabilities at the site based on the climate impacts listed in B above; and
D. A list of strategies used in the wildlife connectivity action to support the target species' adaptation to climate change.

The sponsor should use existing analyses to identify exposure of the area to climate change (e.g., magnitude of projected changes in temperature and precipitation, sea-level rise) and climate vulnerable resources (e.g., vulnerable fish and wildlife). For existing information on climate vulnerability of California species and habitats and links to associated datasets, please refer to CDFW's climate change vulnerability assessment web page.

CDFW will consider how the wildlife connectivity action can benefit species by facilitating adaptation to the effects of climate change when evaluating the sponsor's proposal. The sponsor must use the qualitative scoring scale below to aid in determining the species benefits of adaptation to climate change. CDFW will use the same qualitative scoring scale when reviewing the proposal.

High – The proposed wildlife connectivity action is highly likely to facilitate target species adaptation to climate change.

Medium – The proposed wildlife connectivity action is likely to facilitate target species adaptation to climate change.

Low – The proposed wildlife connectivity action may facilitate target species adaptation to climate change.

Zero – The proposed wildlife connectivity action does not facilitate target species adaptation to climate change and may have negative impacts.

5 REAL ESTATE INSTRUMENTS, MAINTENANCE, AND MONITORING

In order for credits to be issued for a wildlife connectivity action, the land must be protected, managed, and monitored for the benefit of the targeted ecological resource(s). This requires a land protection mechanism, funding for oversight of the land protection mechanism, and secure funding for management and monitoring activities of the land and legal enforcement.[38]

This section will cover feasibility and options for:

- Eligible real estate instruments; and
- Long-term management funding.

This section only applies to the wildlife connectivity action, representing the wildlife action structure and the associated habitat immediately adjacent and critical to the functioning of the wildlife connectivity action that are part of the proposed bank or MCA. The land protection and funding requirements for the standard bank or MCA lands must otherwise follow the applicable banking guidelines or the MCA guidelines.

5.1 REAL ESTATE INSTRUMENTS

A wildlife connectivity action must provide long-term or permanent, as applicable, connectivity benefits for target species and habitat. This is accomplished in part through a legal mechanism ensuring all real property comprising the wildlife connectivity action, or where it is sited, is protected for the benefit of target species and habitat.

The primary legal mechanism for achieving this protection is a conservation easement. A conservation easement, approved by CDFW, must be executed and recorded upon the properties associated with the wildlife connectivity action.[39] The one exception to this requirement is if CDFW determines it is "infeasible" to encumber all or a portion of the wildlife connectivity action property with a conservation easement.

CDFW shall only determine a conservation easement is infeasible if one of the following conditions apply:

1. Federal, state, and local legal restrictions, particularly those limiting the use of real property, prevent, or significantly inhibit, placing a conservation easement on wildlife connectivity action property; or

[38] Providing secure, perpetual funding for management of the land, monitoring, and legal enforcement, in a form approved in advance in writing by the department (Fish & G. Code, § 1956, subdivision (c)(1)).

[39] The sponsor must use the CE template found on the Conservation and Mitigation Banking Instructions and Templates web page.

2. A portion of the wildlife connectivity action is in the right-of-way of an existing state highway or other existing public road.[40]

CDFW will not consider other factors, including but not limited to economic considerations, when determining feasibility.

"Infeasibility" is geographically restricted to the portion of the wildlife connectivity action property that meets one of the two foregoing conditions. This means a conservation easement may be infeasible over a portion of a wildlife connectivity action property but feasible over the remainder. One example is a wildlife connectivity action that includes an overpass spanning a state highway right-of-way and adjacent land on either side of the overpass. In such cases, a long-term durability agreement (discussed below) is only permitted over that portion of the wildlife connectivity action property where a conservation easement is infeasible. Conservation easements must be executed and recorded against the remainder of the wildlife connectivity action property.

If a sponsor believes a conservation easement is infeasible over all or a portion of a wildlife connectivity action property, it must provide CDFW a written explanation of its position, with supporting documentation. This explanation should be provided to CDFW in the bank prospectus (see Appendix C: Wildlife Connectivity Action Bank Prospectus Checklist) or in the MCA concept or the draft MCA (see Appendix D: Wildlife Connectivity Action MCA Checklist). CDFW will review the explanation and make a final feasibility determination.

5.1.1 Long-term Durability Agreement

A long-term durability agreement is an enforceable legal instrument required for any portion of a wildlife connectivity action where a conservation easement is infeasible, and will be reviewed and approved in writing by CDFW on a case-by-case basis. A long-term durability agreement must ensure the legal real estate, maintenance, and repair requirements for the mitigation. Sponsors should consult with CDFW early during the review process to discuss the appropriateness of any particular durability instrument, as not all instruments can be used for all wildlife connectivity actions. A wildlife connectivity action with a Long-term Durability Agreement would result in compensatory mitigation credits for permanent impacts.

The following is a list of items that must be addressed in a long-term durability agreement:

- Authorities of all parties;
- Roles and responsibilities;
- Access rights for CDFW and other applicable parties;

[40] Fish & G. Code, § 1957, subdivision (b)(2)(B)

- Prohibited uses;
- Subordination of incompatible uses as required by CDFW to the wildlife connectivity action;
- Explanation regarding how the long-term durability of the site will be ensured;
- Long-term performance metrics and requirements;
- Long-term management;
- Long-term maintenance;
- Long-term monitoring;
- Reporting schedule and requirements;
- Remediation procedures;
- Replacement or retrofit procedures to ensure long-term durability; and
- Enforcement language to include CDFW and third parties.

5.2 LONG-TERM MANAGEMENT FUNDING

Both the Bank and MCA Programs require that the long-term protection and management of the site are adequately funded; typically, this is accomplished through an endowment. A wildlife connectivity action has similar requirements to ensure wildlife passage in perpetuity. The sponsor must provide secure funding to ensure a wildlife connectivity action will be successful.

When a portion of a wildlife connectivity action is protected by a conservation easement, the funding mechanism must provide secure, perpetual funding for management of the land, monitoring, and legal enforcement. This is typically accomplished through an endowment.

When a wildlife connectivity action is protected by a long-term durability agreement, the funding must provide for implementation for the duration of that agreement. That includes, but is not limited to, funding for the long-term success, maintenance, repair, and upkeep of the wildlife connectivity action.

Specifically, when using a long-term durability agreement for a wildlife connectivity action, transportation funding in the State Highway System Management Plan can cover the long-term funding of the wildlife connectivity structure on the state highway system but not the habitat on or under the structure.[41] Therefore, the long-term management of the habitat must be included in another long-term funding mechanism.

The funding mechanism required for long-term management for a wildlife connectivity action that will be protected by either a long-term durability agreement or conservation easement must be in a form approved in advance, in writing by CDFW. In rare instances, CDFW may approve other funding mechanisms beyond endowments,

[41] Fish & G. Code, § 1956, subdivision (b)(2)(B)

including transportation funding resulting from needs identified within the State Highway System Management Plan if they satisfy the applicable legal requirements. Sponsors proposing other funding mechanisms should consult CDFW early in the banking or MCA review process.

Therefore, a wildlife connectivity action may have multiple long-term funding mechanisms depending on the specifics of the project. For example, one funding mechanism for maintenance of a wildlife connectivity structure (an overpass) that is infeasible to encumber, and another for management and monitoring of the overlying and adjacent habitat included in the wildlife connectivity action that is encumbered by a conservation easement.

See Section 6.1: Credit Release, Fees and Securities for information on other funding requirements.

6 BANK AND MCA MODIFICATIONS

As outlined in these Guidelines, wildlife connectivity actions and credits will impact standard banking and MCA processes and documents. Edits to existing BEI or MCA templates and their associated exhibits may be needed to address necessary changes, such as in the development, interim, and long-term management (and monitoring) plans, and potentially, financial securities. The following sections cover how to address these changes.

6.1 CREDIT RELEASE, FEES, AND SECURITIES

The sponsor is responsible for providing financial security for the successful completion of habitat construction, management, performance, monitoring, and remedial actions of the wildlife connectivity action in accordance with the banking guidelines and MCA guidelines. However, the security in relation to the wildlife connectivity action will be separate from the security required for the general bank and MCA.

Credits from wildlife connectivity actions can be used similar to those from a bank or MCA but they will be tracked and categorized separately as they have a separate release schedule, performance standards, and potentially long-term funding mechanism related to the wildlife connectivity structure. Differences in the securities and credit releases for banks or MCAs are as follows:

- **Credit Release** – The first credit release for a wildlife connectivity action within a bank or MCA will be after the following have been completed:

    - Bank or MCA has been established, in accordance with the approved BEI or MCA; and
    - Construction of the wildlife connectivity action is complete, the sponsor has submitted as-built drawings to CDFW for review and approval, and the wildlife connectivity action is usable for the target species or habitat. Complete construction of the wildlife connectivity action includes completion of the wildlife connectivity structure and any construction needed on the lands that are immediately adjacent and critical to the functioning of the wildlife connectivity action. This may include fencing, ramps, and the approach construction.

    Subsequent credit releases are based on, but not limited to, performance standards, long-term management funding, completed monitoring and management, and submission of annual reports. The schedule for subsequent credit releases will be determined on a case-by-case basis in the applicable BEI or MCA template. Some traditional bank or MCA lands adjacent to the wildlife connectivity action may not be eligible for credit releases until the construction of the wildlife connectivity action is complete. This would be determined on a

case-by-case basis and incorporated into the credit release schedule accordingly.

- **Credit Ledger** – Credits from the wildlife connectivity action will be tracked in a ledger like those from a bank or MCA. The credits from the wildlife connectivity action will be denoted as "WCA" (for wildlife connectivity action) credits or similar.
- **Fees** – These Guidelines will not alter the existing fee structure for the MCA or Banking Programs. Refer to the appropriate fee schedule for each program for the most up to date fee amounts and schedule.
- **Securities** – Securities for the wildlife connectivity action will be different compared to standard bank or MCA lands.
    - **Construction Security** – As stated above, all construction associated with the wildlife connectivity action must be completed before credits associated with the wildlife connectivity action can be released. Therefore most, if not all, wildlife connectivity actions will not require a construction security. This will include any associated minor structures, habitat, and target habitat associated with the structure itself. This also includes the structure and lands that are immediately adjacent and critical to the functioning of the wildlife connectivity action such as fencing, ramps, approach, and the right of way, which enables the target species to successfully access alternate life cycle functions (e.g., foraging, resting, breeding habitat). In rare instances, requests to release credits prior to the completion of all onsite wildlife connectivity action construction components may be reviewed and approved by CDFW on a case-by-case basis. In these instances, the wildlife connectivity structure construction must be completed, and a construction security will be provided for the remainder of the wildlife connectivity action still to be constructed (e.g., the associated habitat critical to the functioning of the wildlife connectivity action).
    - **Performance and Compliance Securities** –The construction costs for the wildlife connectivity action for both the Banking and MCA Programs will be calculated based on the costs for only habitat development on and under the wildlife connectivity action, but otherwise will follow the requirements for each program. This includes the associated minor structure(s) and lands that are immediately adjacent and critical to the functioning of the wildlife connectivity action. The rest of the bank or MCA that is not part of the wildlife connectivity structure will use the standard bank or MCA security calculations.
    - **Interim Management Security –** The interim management security is also required for banks or MCAs with wildlife connectivity actions.

For more information regarding banking securities please see the Conservation and Mitigation Banking Instruction and Templates web page for the latest banking guidelines, checklists (Draft Prospectus, Prospectus, and Draft BEI), and BEI. For more

information regarding MCA securities please see the MCA guidelines found on the RCIS Program web page.

6.2 Development Plan

The sponsor shall include a separate section in the Development Plan that addresses the specific requirements in these Guidelines that are separate from the development of the standard bank and MCA lands and also include, but not limited to, the following:

A. If the project is an MCA, indicate whether any portion of the wildlife connectivity action is required for a project(s)-specific mitigation requirement, and if so, the ecological gains beyond the mitigation requirement; and

B. Provide a map clearly indicating which areas of the wildlife connectivity action will be permanently protected and which areas are proposed to be infeasible for a conservation easement and therefore will require a long-term durability agreement. Indicate the total acreage for each.

6.3 Long-term Management and Monitoring Plan

The sponsor shall include a separate section in the Long-term Management and Monitoring Plan that describes specific activities required for the wildlife connectivity action that are separate activities from the standard bank and MCA lands. Sponsors must include the following, if:

- A map clearly indicating which areas of the wildlife connectivity action will have a conservation easement and which areas are proposed to be infeasible for a conservation easement and therefore will have a connectivity long-term durability agreement. Indicate the total acreage and associated maps for each;
- Frequent monitoring and maintenance of fencing associated with the wildlife connectivity action;
- Monitoring of wildlife connectivity action structure(s) and any associated structures (e.g., wildlife jump outs/escape ramps, created habitat structures, fencing, etc.) to ensure functionality of the wildlife connectivity action;
- Monitoring the wildlife passage, wildlife use, and any associated vegetation to ensure functionality of the wildlife connectivity action;
- Stockpiling and budgeting for spare wildlife connectivity action structure materials (e.g., fencing) to facilitate repairs;
- Monitoring for any unauthorized use by humans, such as trespass or recreation, to ensure wildlife connectivity actions are used solely by wildlife;
- Adaptive management for the wildlife connectivity action and structures; and
- Additional annual reporting needs (e.g., wildlife strike data and mortality monitoring) regarding the wildlife connectivity action.

6.4 PERFORMANCE STANDARDS

In determining the second and subsequent credits releases for the wildlife connectivity action, CDFW shall consider the measurable improvement to habitat connectivity and wildlife migration[42] due to the wildlife connectivity action as measured through performance standards (see Section 6.1: Credit Release, Fees, and Securities for more information of credit releases). The sponsor must include ecologically based performance standards for each proposed credit type that will be used to measure the net ecological gain from implementing the wildlife connectivity action (see Section 4: Ecological Benefit Crediting Considerations). Performance standards must be met, along with other requirements, before credits are released (see banking or MCA guidelines for details).

Data to monitor the performance of the wildlife connectivity action may include but are not limited to:

- Species surveys comparing pre- and post- wildlife connectivity actions;
- Movement patterns;
- Remediation of barrier issues;
- Number of successful crossings;
- Number and type of species using the crossing;
- Movement of multiple life stages;
- Reduction in wildlife-vehicle collisions and traffic accidents within the length of project fence); and
- Genetic data related to gene flow.

Performance standards for wildlife connectivity actions can be measured using techniques such as:

- Mortality data;
- Collar data;
- Telemetry/camera/hair snare data demonstrating use of the structure;
    - Confirmation of structure use with an entry and exit image capture of the same individual specimen;
    - HALT (Hobbs Active Light Trigger) camera deployment;
    - Genetic testing or e-DNA utilization for smaller species in conjunction with camera trap monitoring;
    - Track plate monitoring; and
    - Drone/Unmanned Aerial Vehicle (UAV) monitoring

A reference site that has the target species or target habitat present may be useful in creating the Development Plan and for determining performance standards at the wildlife connectivity action site. Documented improvements to the target species or target habitat compared to the reference site could result in meeting the performance

[42] Fish & G. Code, § 1957, subdivision (c)(1)

standards. Credits will be released over time when the associated performance standards or other requirements are met for the credit type based on the credit release schedule.

APPENDIX A – WILDLIFE CONNECTIVITY ACTION RESOURCES

CDFW recommends using the resources listed below to aid in the development of proposed wildlife connectivity actions. Please note that the list is a non-exhaustive list of resources available as of September 2023. The sponsor must confirm that these resources are the most up to date resources and/or reference the best available science and data at the time it is proposing a wildlife connectivity action.

Additional information about Fish and Wildlife Connectivity can be found on CDFW's Connectivity and Planning for Fish and Wildlife web page.

WILDLIFE CONNECTIVITY ACTION LOCATION RESOURCES

The below resources can be used to identify where connectivity actions are needed.

Hot Spot Resources

These resources can be used to identify priority locations for wildlife connectivity actions.

- **Biogeographic Information and Observation System (BIOS):** BIOS is a system designed to enable the management, visualization, and analysis of biogeographic data collected by CDFW and its partner organizations. There are two datasets for wildlife connectivity hot spots:
    - **CDFW Fish Passage Priorities:** A map-based representation of an ongoing inventory of known and potential barriers to anadromous fish in California. It compiles currently available fish passage information from more than two hundred data sources, and allows past and future barrier assessments to be standardized and stored in one place. The inventory is to be used to identify barriers suitable for removal or modification to restore spawning and riparian habitat for salmon and steelhead, and to enhance aquatic and riparian habitat.
    - **CDFW Wildlife Movement Barrier Priorities:** This dataset represents barriers to terrestrial wildlife movement in California that are high priority for remediation, as identified by CDFW staff.. Reports can be found at the Terrestrial Habitat Connectivity web page under the Wildlife Barriers menu. To access this dataset, enter "wildlife movement priorities" into the add BIOS data search bar.
- **California Roadkill Observation System (CROS):** CROS combines agency and volunteer-collected carcass data including where wildlife vehicle collisions occur, what animals are involved, on what roads collisions are frequent, and other data that can help inform policy, management, and financial investment in actions that can reduce roadkill. Annual reports generally include a

representation of the wildlife-vehicle conflict density and clusters, and account for societal costs from wildlife-vehicle conflicts on state highways.

- **Caltrans' Large Mammal-Vehicle Collision Hot Spot Analyses, California, USA**: A hot spot report prepared by the Western Transportation Institute that provides the methods and results of hot spot analyses of large wild mammal-vehicle collisions, with a specific focus on mule deer, on all state managed highways in California.

- **Connectivity Priority Lists:** A variety of local, state, federal, and non-profit organizations have developed wildlife connectivity priority lists. These lists can be used to identify areas where a wildlife connectivity action is needed.

Landscape-Scale Connectivity Resources
Additional resources that can be used to help identify where landscape-scale wildlife connectivity actions are needed include:

- **CDFW Habitat Connectivity Viewer**: This CDFW curated version of the BIOS 6 Viewer is pre-loaded with all available statewide and regional linkage datasets.

- **The Nature Conservancy Omniscape:** Omniscape identifies areas within California where plant and animal species movement are restricted by developed and agricultural land uses. Omniscape also incorporates areas presenting relatively low movement difficulty (i.e., mortality risk) because of low human modification.

- **California Protected Areas Database (CPAD)**: A GIS dataset depicting lands that are owned in fee and protected for open space purposes by over 1,000 public agencies or non-profit organizations.

- **California Conservation Easement Database (CCED)**: A GIS dataset that contains lands protected under conservation easements.

- **US Fish and Wildlife Service Critical Habitat layers and Map Viewer**: Contains the spatial data for active proposed and key components critical habitat for US Fish and Wildlife Service only and Joint US Fish and Wildlife Service/National Oceanic and Atmospheric Administration threatened and endangered species.

Aquatic Specific Resources
Additional resources that can be used to help identify wildlife connectivity action locations for aquatic species include:

- **Fish Passage Assessment Database (PAD) (data on BIOS):** This CDFW database is an ongoing map-based inventory of known and potential barriers to anadromous fish migration in California. This database may be helpful to identify and remediate man-made barriers to anadromous fish migration.

- **California Fish Passage Forum**: The forum coordinates agency programs and private sector activities across jurisdictions to target high-priority fish passage and riverine connectivity projects, and to improve the timeliness and cost-effectiveness of fish passage restoration efforts. The forum may be helpful to identify specific high-priority fish passage and riverine connectivity projects.

- **National Oceanic and Atmospheric Administration's Critical Habitat and Map Viewer**: This spatial layer and map viewer contains federally designated critical habitat data for some federally listed fish species. In general, National Oceanic and Atmospheric Administration defines critical habitat 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. However, critical habitat designations also consider economic, national security, and other relevant impacts that are not ecologically based. Thus, the importance of areas outside of federally designated critical habitat should also be assessed based on local or species-specific components.

- **U.S. Geological Survey StreamStats:** This web application provides access to an assortment of GIS analytical tools that are useful for water-resources planning and management, and for engineering and design purposes. The map-based user interface can be used to delineate drainage areas for user-selected sites on streams, and then get basin characteristics and estimates of flow statistics for the selected sites anywhere this functionality is available.

- **California Department of Water Resources (DWR) Best Available Maps (BAM):** DWR develops the Best Available Maps (BAM) which cover all counties in the State and to include 100-, 200-, and 500-year floodplains.

Terrestrial Specific Resources

Additional resources that can be used to help identify wildlife connectivity action locations for terrestrial species include:

- **Areas of Conservation Emphasis (ACE):** ACE is a CDFW effort to gather spatial data on wildlife from across California, and then synthesize this information into thematic maps to help inform discussions on the conservation of biodiversity, habitat connectivity, and climate change resiliency. The ACE maps provide a coarse level view of information for conservation planning purposes. ACE draws from multiple sources of vetted species occurrence data, as well as predictive species modelling efforts. The ACE Terrestrial Connectivity Layer is pre-loaded in both the Habitat Connectivity Viewer and the ACE Viewer. This layer summarizes information on terrestrial connectivity per 2.5 square mile hexagon, including the presence of mapped corridors or linkages; the juxtaposition of large, contiguous, natural areas; climate resilient corridors and refugia; the relative landscape intactness score; and The Nature Conservancy's Omniscape. Hexagons with

Ranks 4 (Conservation Planning Linkages) and 5 (Irreplaceable and Essential Corridors) are particularly important for maintaining connectivity across the landscape. However, Ranks 3 (Connections with implementation flexibility) and 2 (Large Natural Habitat Areas) could be considered if a wildlife connectivity action can be supported based on local or species-specific components (e.g., wildlife-vehicle conflict).

- **BIOS species-specific connectivity datasets:** These datasets identify the best swath of habitat available for specific species to move from one landscape block to another based on predicted suitable habitat. Datasets depicting home ranges and migration routes for ungulate species (mule deer, elk, and pronghorn) are pre-loaded in the CDFW Ungulate Migration Viewer. To access additional datasets, type in "connectivity" in the "Add BIOS Layer" search bar.
- **California Natural Diversity Database (CNDDB)**: This is an inventory of the status and locations of rare plants and animals in California. CNDDB staff work with partners to maintain current lists of rare species, as well as to maintain an ever-growing database of GIS-mapped locations for these species. Not all species are covered in this dataset.

- **California Essential Habitat Connectivity Project:** A statewide assessment of essential habitat connectivity. The 2010 project identified large remaining blocks of intact, contiguous natural habitat (natural landscape blocks) and modeled linkages (essential connectivity areas) between them to best maintain habitat connectivity across the landscape. These connections provide a broad-scale view of habitat connectivity needs at the statewide scale, but they should be supplemented with, or superseded by, fine-scale connectivity analyses at a regional scale, when available, and more up-to-date data.

    - **Science and Collaboration for Connected Wildlands Regional Connectivity Analysis:** As an extension of the California Essential Habitat Connectivity Project, South Coast Wildlands created local and regional connectivity analyses that are at a finer scale. These analyses may be helpful for sponsors looking to create wildlife connectivity actions in the San Francisco Bay area, California desert, south coast, or Carrizo Plain.

- California Wildlife Habitat Relationships (CWHR) Predicted Habitat Suitability: This dataset represents areas of suitable habitat within the species ranges based on California Wildlife Habitat Relationships model and a statewide best-available vegetation map. Habitat suitability ranks of low (less than 0.34), medium (0.34-0.66), and high (greater than 0.66) suitability are based on the mean expert opinion suitability value for each habitat type for breeding, foraging, and cover.

- **USGS Database of Habitat Quantification Tools:** A database compiled by the United States Geological Survey (USGS) that lists biodiversity and habitat quantification tools used for market-based conservation in the United States. CDFW does not endorse nor certify any of these or any other biodiversity or

habitat quantification tools. Entities should independently evaluate their applicability for use as a wildlife connectivity action is being contemplated.

- **Conservation Lands Network Regional Land Conservation Report and Dataset:** The Conservation Lands Network (CLN) is a regional conservation strategy for the San Francisco Bay Area, with a set of goals and science-based decision-making tools that support strategic investments in land protection and stewardship. In 2019, CLN released the Conservation Lands Network 2.0 Report and GIS Datasets which updated and incorporated the importance of habitat connectivity, corridors for wildlife movement, and climate resilience.

Scientific Literature, Data, and Reports

Wildlife connectivity and movement research is ongoing. Recent scientific literature, data, indigenous knowledge, reports on species specific movement data, radio telemetry, camera data, use of wildlife connectivity actions, federal data sources, and federal and state species status reviews can provide additional information on whether a wildlife connectivity action would benefit species and/or inform ecological design at a proposed bank wildlife connectivity action bank or MCA.

Wildlife Crossing Action Design Resources

Wildlife crossing design is a relatively new field, and it is difficult to standardize considering the wide variety of potential target species that may need specific design elements. The most studied species in the U.S. are ungulates, which are large and highly mobile species (e.g., deer and sheep) that may require vastly different structural designs than less mobile species (e.g., reptiles and amphibians). The resources provided below provide some design guidelines and plans for various species.

- Arizona Department of Transportation. 2019. Design Details: Wildlife Escape Measures.
- Arizona Department of Transportation. 2019. Design Details: Wildlife Funnel Fencing.
- Brehme, C.S. and R.N. Fisher 2021. Research to Inform Caltrans Best Management Practices for Reptile and Amphibian Road Crossings. USGS Cooperator Report to California Department of Transportation, Division of Research, Innovation and System Information, 65A0553.
- CDFW California Salmonid Stream Habitat Restoration Manual, Volume I. State of California, The Resources Agency, California Department of Fish and Game, California Department of Fish and Game. Sacramento, CA.
- CDFW California Salmonid Stream Habitat Restoration Manual, Volume II. State of California, The Resources Agency, California Department of Fish and Game, California Department of Fish and Game. Sacramento, CA.
- Clevenger, A.P. and M.P. Huijser. 2011. Wildlife Crossing Structure Handbook, Design and Evaluation in North America, Publication No. FHWA-CFL/TD-11-003. Department of Transportation, Federal Highway Administration, Washington D.C., USA.

- Clevenger A.P. and A.T. Ford (editors). 2022. A Before-After-Control-Impact Study of Wildlife Fencing Along a Highway in the Canadian Rocky Mountains. 701-18-803 TO 3 Research Report TPF-5(358). Nevada Department of Transportation, Carson City, NV.
- Langton, T.E.S. and A.P. Clevenger. 2021. Measures to Reduce Road Impacts on Amphibians and Reptiles in California. Best Management Practices and Technical Guidance. Prepared by Western Transportation Institute for California Department of Transportation, Division of Research, Innovation and System Information.
- McGuire, T.M., R. Ament, R. Callahan, and S. Jacobson. 2016. Innovative strategies to reduce costs of wildlife overpasses. ARC Solutions report.
- Shilling, F.M., D. P. Waetjen, T. Longcore, W. Vickers, S. McDowell, A. Oke, A. Bass, and C. Stevens. 2022. Improving Light and Soundscapes for Wildlife Use of Highway Crossing Structures. Institute of Transportation Studies. University of California, Davis, Research Report UCD-ITS-RR-22-13.

HABITAT RESOURCES

Below are resources that can be used to aid in habitat type identification.

- Vegetation Classification and Mapping Program: Vegetation Classification and Mapping Program (VegCAMP): VegCAMP develops and maintains California's expression of the National Vegetation Classification System through assessment and mapping projects in high-priority conservation and management areas, training programs, and by working continuously on best management practices for field assessment, classification of vegetation data, fine-scale vegetation mapping, and archiving of vegetation data. The goal of the program is to complete a state-wide vegetation map and classification in collaboration with other agencies and organizations.

APPENDIX B – SCORING TEMPLATES

Sponsors must complete the table below to determine the score for the proposed wildlife connectivity action for each target species and target habitat. For the "Sponsor Proposed Score" column sponsors should provide a score based on the considerations and subcategories in Section 4: Ecological Benefit Crediting Considerations. The final score is the addition of all rows and will be out of a total of 100 which includes the CDFW determined Unique Project Characteristics score.

Below are the templates for Step 1: Credit Type Determination and Step 2: Credit Scoring.

- For Step 1, the sponsor should highlight or bold their proposed general scoring of high, medium, low or zero for each of the Ecological Benefit Threshold evaluation subcategories (indicated with *).
- For Step 2, the sponsor should highlight or bold their proposed general scoring of high, medium, low or zero for each of the remaining subcategories. For each subcategory, the sponsor should provide a point score based on the justification provided to CDFW. The point score listed in the "Sponsor Proposed Score" column represents the maximum for that category. For example, a medium general score for habitat quantity for species can receive 4 to 6 points. Scoring within a general score will be based upon project specific characteristics.

Add the total scores for each consideration to determine the "final score" for that credit type which will be used in Step 3: Crediting Factor. CDFW will review and evaluate the sponsor's proposed score, and then assign its own score in the "CDFW Score" column.

The sponsor must provide the completed table to CDFW as a Word document.

SPECIES-SPECIFIC SCORING TEMPLATE FOR WILDLIFE CONNECTIVITY ACTIONS

Bank/MCA name: _____ Date: _____

Target Species/Credit type: _____

Crediting Considerations and Subcategories	High	Medium	Low	Zero	Sponsor Proposed Score	CDFW Score
1. Ecological Engineered Design	**3**	**2**	**1**	**0**	N/A	N/A
A. Structure Dimensions*	H	M	L	0	/3	/3

Crediting Considerations and Subcategories	High	Medium	Low	Zero	Sponsor Proposed Score	CDFW Score
B. Sound and Light Minimization Measures*	H	M	L	0	/3	/3
C. Surface Substrates and Vegetation*	H	M	L	0	/3	/3
D. Hydrogeomorphic Components*	H	M	L	0	/3	/3
E. Existing Conditions*	H	M	L	0	/3	/3
F. Approaches*	H	M	L	0	/3	/3
G. Fencing or Other Directional Implements*	H	M	L	0	/3	/3
H. Designing for Resilience to Climate Change*	H	M	L	0	/3	/3
I. Additional Species-specific Elements*	H	M	L	0	/3	/3
2. Value of the Habitat Connected	**7-9**	**4-6**	**1-3**	**0**	N/A	N/A
A. Habitat Quantity*	H	M	L	0	/9	/9
B. Habitat Quality*	H	M	L	0	/9	/9
C. Protection of the Land*	H	M	L	0	/9	/9
3. Value of the Particular Location	**3**	**2**	**1**	**0**	N/A	N/A
A. Topography*	H	M	L	0	/3	/3
B. Watercourse or Other Natural Pathway*	H	M	L	0	/3	/3
C. Vegetation and Other Cover*	H	M	L	0	/3	/3
D. Movement and Mortality	H	M	L	0	/3	/3

Crediting Considerations and Subcategories	High	Medium	Low	Zero	Sponsor Proposed Score	CDFW Score
E. Permeability and Built Infrastructure Characteristics	H	M	L	0	/3	/3
F. Other Wildlife Connectivity Actions	H	M	L	0	/3	/3
G. Human Impacts*	H	M	L	0	/3	/3
4. Critical Linkages	**4-5**	**3**	**1-2**	**0**	N/A	N/A
A. Regional Connectivity	H	M	L	0	/3	/3
B. Local Connectivity	H	M	L	0	/3	/3
5. Population-level Benefits to Target Species	**4-5**	**3**	**1-2**	**0**	N/A	N/A
A. Genetic Diversity and Breeding Opportunities	H	M	L	0	/5	/5
B. Species Adaptation to Climate Change	H	M	L	0	/5	/5
Unique Project Characteristics	N/A	N/A	N/A	N/A	N/A	/5
Total out of 100	N/A	N/A	N/A	N/A	N/A	**/100**

* Indicates the subcategory that is used for the ecological benefit threshold evaluation. The proposed wildlife connectivity action must receive a high or medium for each of these subcategories for credits to be approved for that credit type.

HABITAT-SPECIFIC SCORING TEMPLATE FOR WILDLIFE CONNECTIVITY ACTIONS

Bank/MCA name: _____ Date: _____

Target Habitat Type/Credit Type: _____

Crediting Considerations and Subcategories	High	Medium	Low	Zero	Sponsor Proposed Score	CDFW Score
1. Ecological Engineered Design	**6-8**	**4-5**	**1-3**	**0**	N/A	N/A
A. Structure Dimensions	H	M	L	0	/8	/8
C. Surface Substrates and Vegetation*	H	M	L	0	/8	/8
D. Hydrogeomorphic Components*	H	M	L	0	/8	/8
F. Approaches*	H	M	L	0	/8	/8
H. Designing for Resilience to Climate Change*	H	M	L	0	/8	/8
2. Value of the Habitat Connected	**6-8**	**4-5**	**1-3**	**0**	N/A	N/A
A. Habitat Quantity	H	M	L	0	/8	/8
B. Habitat Quality	H	M	L	0	/8	/8
C. Protection of the Land	H	M	L	0	/8	/8
3. Value of the Particular Location	**6-8**	**4-5**	**1-3**	**0**	N/A	N/A
A. Topography*	H	M	L	0	/8	/8
C. Vegetation and Other Cover	H	M	L	0	/8	/8
F. Human Impacts	H	M	L	0	/8	/8
4. Critical Linkages	**6-8**	**4-5**	**1-3**	**0**	N/A	N/A
A. Regional Connectivity	H	M	L	0	/8	/8
Unique Project Characteristics	N/A	N/A	N/A	N/A	N/A	/4
Total out of 100	N/A	N/A	N/A	N/A	N/A	/100

* Indicates the subcategory that is used for the ecological benefit threshold evaluation. The proposed wildlife connectivity action must receive a high or medium for each of these elements for credits to be approved for that credit type.

APPENDIX C – WILDLIFE CONNECTIVITY ACTION BANK CHECKLISTS

The Wildlife Connectivity Action Bank Checklists are provided as a separate document and are incorporated into these Guidelines by this reference as if they were fully set forth herein.

APPENDIX D – WILDLIFE CONNECTIVITY ACTION MCA CHECKLISTS

THE WILDLIFE CONNECTIVITY ACTION MCA CHECKLIST IS PROVIDED AS A SEPARATE DOCUMENT AND IS INCORPORATED INTO THESE GUIDELINES BY THIS REFERENCE AS IF THEY WERE FULLY SET FORTH HEREIN.