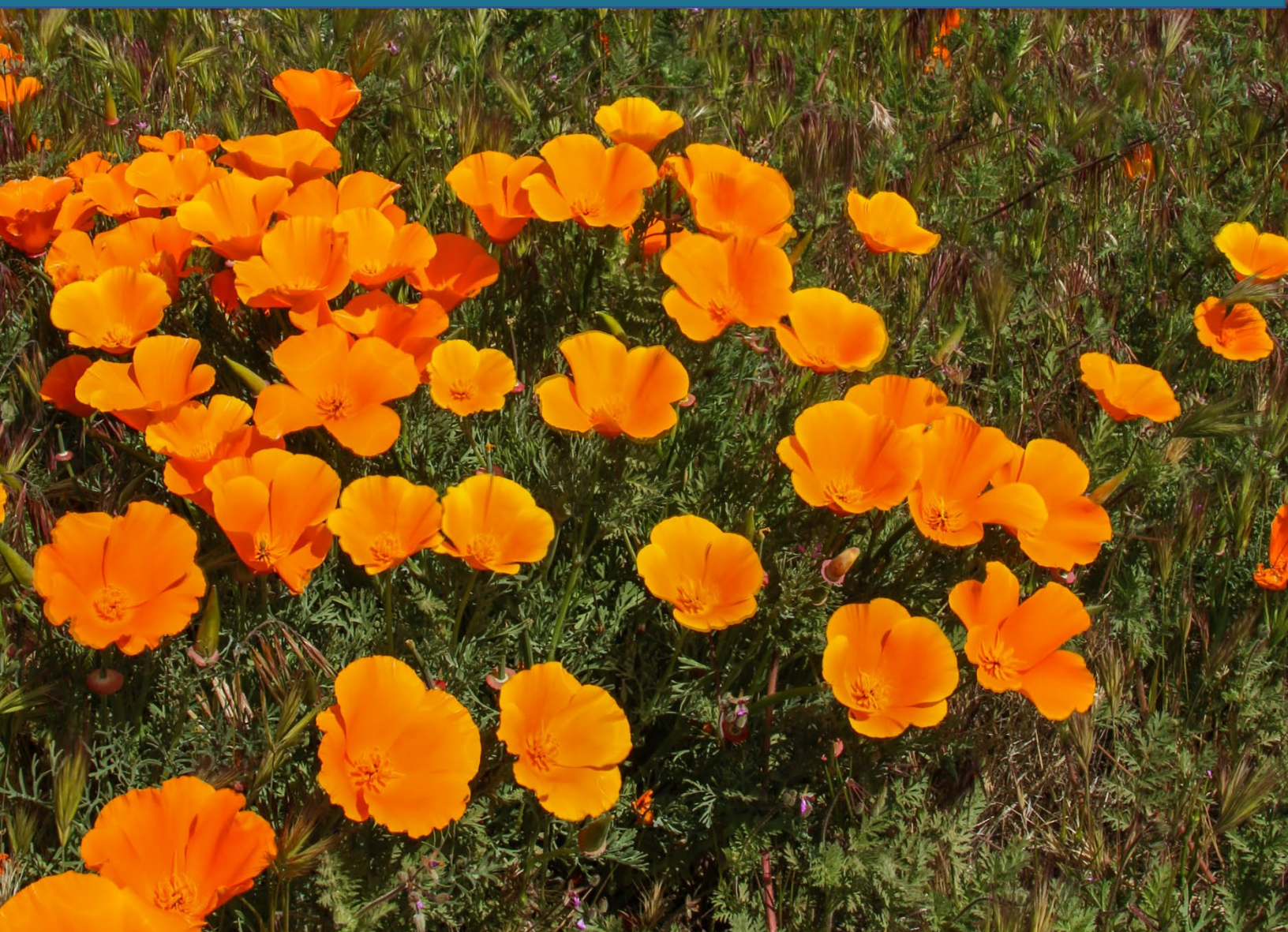
Wildlife Connectivity Advance Mitigation Guidelines

September 2024



WILDLIFE CONNECTIVITY ADVANCE MITIGATION GUIDELINES

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September 2024

California Department of Fish and Wildlife. September 2024. Wildlife Connectivity Advance Mitigation Guidelines. West Sacramento, CA.

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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 aquatic and terrestrial wildlife movement, including migration. Improving habitat connectivity and wildlife corridors through a mosaic 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 (e.g., roads, highways). An important strategy to facilitate this movement is through the creation of wildlife crossings. Yet to date, few incentives have been in place to promote construction of these projects.

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, highways, aqueducts, and canals have blocked, or limited, movement for many species. Additionally, infrastructure and development impede wildlife and can be significant sources of mortality, affecting population demographics, gene flow, pollination, resilience, and, potentially, the persistence of California's rich biodiversity.

Thousands of miles of built infrastructure such as roads, railroads, and canals crisscross the California landscape that wildlife navigate in their daily and seasonal movements to secure the resources they need, such as food or foraging habitat, breeding habitat, or to find a mate. 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 elevation 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 may improve public safety by reducing wildlife-vehicle collisions. Well placed, designed, and maintained wildlife connectivity projects like underpasses and overpasses and associated habitat protection and enhancement 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 the creation of wildlife crossing 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 (Banking) Program and Mitigation Credit Agreements (MCAs), a part of

CDFW's Regional Conservation Investment Strategy (RCIS) Program.[1] Specifically, it clarified that CDFW has authority to create compensatory mitigation credits (credits) under these programs for actions that improve wildlife connectivity, such as construction of an underpass or overpass and associated habitat protection and enhancement that helps wildlife safely cross or bypass-built infrastructure.[2] This increases mitigation options by incentivizing connectivity projects and provides a tool to help meet the diverse needs of California's biodiversity and economic development.

If a sponsor of a conservation or mitigation bank (bank) or MCA includes a wildlife connectivity action within a proposal, CDFW can issue species or habitat mitigation credits for the wildlife connectivity action. The sponsor can then sell the mitigation credits to third parties needing compensatory mitigation, required by regulatory agencies, or they can retain the credits for themselves to fulfill expected future mitigation needs. Bank or MCA sponsors can, therefore, offset their costs from developing and constructing a wildlife connectivity action or earn a return on their investment by selling credits.

CDFW provides these Wildlife Connectivity Advance Mitigation Guidelines (Guidelines) to implement Fish and Game Code and provide sponsors with the information CDFW is seeking when a sponsor proposes a bank or MCA with a wildlife connectivity action. Bank or MCA credits use or transfer to permit obligations requiring compensatory mitigation are at the discretion of regulatory agencies and not the focus of these Guidelines. 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 statute reinforces the values and importance of wildlife habitat connectivity and authorizes the development and issuance of these Guidelines.

Fish and Game Code section 1955 et seq. 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 include road overpasses or underpasses solely for use by wildlife.

The credits created can be used to fulfill compensatory mitigation requirements established under local, 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]

[1] Fish & G. Code, § 1955, subdivision (f)
[2] Fish & G Code, § 1957, subdivision (c)(1)
[3] Fish & G Code, § 1957, subdivision (e)

The legislation includes a non-exhaustive list of crediting considerations 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 improving connectivity at a particular location. CDFW may also consider other parameters it deems relevant (e.g., ecological engineered design).

Additionally, the legislation requires the 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 as determined by CDFW, 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 credits for 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 supplement both the RCIS Program Guidelines and the Banking Program Guidelines** and are hereby incorporated by reference into those two sets of guidelines.[9] In the event that the RCIS or Banking Program guidelines conflict with these Guidelines, then these Guidelines shall supersede.

When submitting a bank prospectus, MCA concept (recommended), or a MCA package with a wildlife connectivity action, the sponsor will need to include the additional information outlined in these Guidelines regarding the creation of credits for the wildlife connectivity action. These Guidelines provide the crediting considerations for sponsors to use when proposing credit amounts for the wildlife connectivity action and lists information or documentation required for the wildlife connectivity action credit proposal. CDFW staff will then review and evaluate the wildlife connectivity action 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,

[4] Fish & G Code, § 1957, subdivision (c)
[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)
[9] Fish & G. Code, § 1958

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, including to address wildlife connectivity actions that improve connectivity inhibited by other types of built infrastructure or habitat fragmentation.

1.3 Abbreviations and Acronyms

ACE- CDFW Areas of Conservation Emphasis

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

Credit- Compensatory mitigation credit

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- label for credit types related to a wildlife connectivity action

1.4 TERMS AND DEFINITIONS

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

Term	Definition
Adjacent Lands	The lands immediately adjacent to a wildlife connectivity action. Adjacent lands are the area necessary to ensure access to the wildlife connectivity action in perpetuity. The adjacent lands may or may not extend beyond a right of way and can extend to all contiguous proposed (in this application) bank and MCA lands on either side of the wildlife connectivity action.
Compensatory mitigation credit	A credit that may be used to fulfill, in whole or in part, mitigation requirements under applicable federal, state, or local law.[10]
Critical linkage	Essential areas of connected habitat that facilitate target species movement, migration, or dispersal between lands with sustainable 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 both aquatic and terrestrial movement.
Fish	A wild fish, mollusk, crustacean, invertebrate, amphibian, or part, spawn, or ovum of any of those animals.[11]
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.[12]

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

Term	Definition
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.[13]
Sponsor	The person(s) or entity(ies) responsible for either: (1) establishing and operating a bank (bank sponsor), or (2)preparing, establishing, and operating a Mitigation Credit Agreement (Mitigation Credit Agreement sponsor).
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. (These Guidelines do not apply to standard bank or MCA lands).
Surrounding lands	For target species, lands within the species relevant dispersal distance radius that are important or relevant to understand the greater benefits of the wildlife connectivity action; or, for target habitat, the lands within a 5-mile radius of the wildlife connectivity action that are important or relevant to understand the greater benefits to the target habitat. The wildlife connectivity action represents the center point for the radius for both the target species and target habitat. These surrounding lands are not a part of the wildlife connectivity action but may include standard bank or Mitigation Credit Agreement lands.
Target habitat	The type of habitat for which the sponsor proposes to create compensatory mitigation credits on or through the wildlife connectivity action based on the ecological benefits.
Target species	The species for which the sponsor proposes to create compensatory mitigation credits based on the ecological benefits of the wildlife connectivity action.

[13] Fish & G Code, § 1956, subdivision (c)

Term	Definition
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.[14]
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.[15]
Wildlife connectivity action credit proposal	The documentation the sponsor provides to CDFW to propose credit types and amounts for the wildlife connectivity action. This includes the target species or target habitat scoring sheet and the scoring justification materials for each credit type.

1.5 CDFW Banking and RCIS Programs

CDFW can approve credits for wildlife connectivity actions taken under the Banking Program or the RCIS Program.[16] Table 1 below explains the primary differences between the two programs.

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 applicable signatory natural resource regulatory agencies which identifies 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.

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

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 agencies 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 who signed the MOU include: CDFW, California Natural Resources Agency, California State Water Resources Control Board, National Oceanic and Atmospheric Administration - National Marine Fisheries Service, US Army Corps of Engineers, US Department of Agriculture - Natural Resources Conservation Service, US Environmental Protection Agency, and US Fish and Wildlife Service.

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 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. Each RCIS is required to provide a habitat connectivity analysis for all focal species and other conservation elements identified in the RCIS,[17] so there are usually connectivity-related conservation or habitat enhancement actions identified that may be implemented under a connectivity action. An MCA is an agreement between the sponsor, the property owner, CDFW, and any applicable acknowledging agencies.

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

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[18]	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
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 only for areas where permanent protection as determined infeasible by CDFW (when conservation easements are not feasible). This is possible for both banks and MCAs.

MCAs also have long-term durability agreements[19] for habitat enhancement actions which creates non-permanent credits. This is a different type of credit and requirement than the long-term durability agreements required for wildlife connectivity actions. For

[18] Fish & G. Code, § 1856, subdivision (e)
[19] RCIS Guidelines Section 5.3.7.4 – Real Estate Instrument

land protection requirements applicable to the wildlife connectivity action, see Section 6.1: 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

For the purposes of these Guidelines, a wildlife connectivity action is any structure (e.g., road overpass, underpass), designed to improve aquatic or terrestrial habitat connectivity, wildlife migration, movement, recolonization, or breeding opportunities inhibited by built infrastructure.

Wildlife connectivity actions can vary greatly depending on the desired outcomes, location, species, or 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 resulting in upland habitat under the bridge, so the location is passable by all life stages of chinook salmon, as well as providing passage during flood events. This would facilitate movement of chinook salmon, steelhead, other aquatic species, and some terrestrial species (e.g., mountain lions, mule deer) and the creation of riparian habitat.
- Restoring the linkage between upland habitat and breeding 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 Alameda whipsnake to move under the roadway as well.
- Building an overpass across a state freeway with directional fencing to allow movement of mountain lions, desert bighorn sheep, and Mojave ground squirrel to expand into protected habitat.
- Enlarging an existing 10-inch diameter culvert with a 50-inch diameter culvert to allow larger species, such as ringtail, to use the culvert to cross under the roadway.

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 with regulatory agencies, tribes, open-space districts, land trusts, non-profits and community-based organizations, local species experts, cities, and counties during the planning process. In addition, sponsors should collaborate with stakeholders to gather and obtain the best available science to inform a wildlife connectivity (see Section 4: Target Species Benefit

Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Considerations).

Wildlife connectivity actions may, in some cases, occur within a right-of-way, which is public property (e.g., city, county, or state roads). In such cases, the sponsor must coordinate with the responsible agency for the public property 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 infrastructure agency and landowners should be included, as needed, in early and ongoing communication.

1.8 CONTACTS

Any general inquiries and notifications of a sponsor's intent to develop a wildlife connectivity action should be sent to the Connectivity Advance Mitigation (CAM) email at MitConnect@wildlife.ca.gov

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. 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 with a wildlife connectivity action 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. These review teams 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 submission can be found on CDFW's Conservation and Mitigation Banking Instructions and Templates web page. Wildlife Connectivity Action Bank Checklists contains the standard requirements and the items required for when a bank includes a wildlife connectivity action. 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.

CDFW's Banking Program has a Bank Site Selection Considerations document and a What Lands are Appropriate for Banking web page that aids sponsors in evaluating a prospective bank property for important ecological values and attributes, as well as management needs.

There are also certain siting considerations specific to wildlife connectivity actions, which are discussed in Section 4: Target Species Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Considerations.

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 evaluation, baseline site conditions, regional context, and a conceptual plan. **A draft prospectus is highly recommended for bank wildlife connectivity action proposals so CDFW can review the proposed credit types early 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.

2.1.3 Bank Agreement Package

Should CDFW determine 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. If seeking an amendment to add a wildlife connectivity action to an existing bank, please reach out to CDFW.

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. Some of the requirements are:

- An MCA must be within the geographic area of an approved RCIS (approved RCISs can be found on CDFW's RCIS web page);
- MCA must address the target species (focal or non-focal) and/or other conservation elements for the proposed wildlife connectivity action credits;
- MCA must implement conservation and/or habitat enhancement actions identified in the RCIS that support focal or non-focal species and/or other conservation elements; and
- MCA may use the RCIS to help identify priority areas affecting wildlife connectivity.

Wildlife Connectivity Action MCA Checklists contains the standard requirements for MCA review and the items required for when an MCA includes a wildlife connectivity action. 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. There are also certain siting considerations specific to wildlife connectivity actions, which are discussed in Section 4: Target Species Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Considerations.

2.2.1 MCA Pre-submittal options

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

Prior to submitting a MCA concept, a sponsor can submit an optional framework which allows the sponsor to submit portions of the full MCA package to CDFW for approval that, once approved, can be used to develop multiple MCAs. The framework must be submitted with the Framework Checklist. This checklist includes the minimum components outlined for the framework and any number of other MCA components noted on the checklist. If a sponsor is considering a framework, please reach out to CDFW before submittal (see MCA Guidelines for more details).

2.2.2 Draft MCA Package

To propose an MCA, the sponsor must complete and submit to CDFW a draft MCA package including a draft MCA, 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 RCIS, 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.

3 WILDLIFE CONNECTIVITY ACTION CREDITING PROCESS

When a sponsor proposes a bank or MCA with a wildlife connectivity action, the sponsor must provide CDFW with a wildlife connectivity action credit proposal for each credit type being proposed. The wildlife connectivity action credit proposal must be submitted to CDFW during the following bank and MCA process (see Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklist):

- Prospectus
- MCA concept (recommended)
- MCA Package

A wildlife connectivity action credit proposal is only for the wildlife connectivity action area and is used to determine whether CDFW will approve credits greater than the physical space occupied by the wildlife connectivity action (see Section 3.2.3: Crediting Factor). If the proposed bank or MCA also contains standard bank or MCA lands (lands that are not part of the wildlife connectivity action), the sponsor will have to provide separate crediting information, as required in the bank or MCA processes. **However, the bank or MCA shall ensure that the wildlife connectivity action provides wildlife connectivity in perpetuity, such as by providing land protection with a long-term durability agreement in the right of way and typically a conservation easement in adjacent lands (see Section 6: Real Estate Instruments, Maintenance, and Monitoring).** A wildlife connectivity action also includes a long-term management endowment, long term management plan and other documents to support the lands in perpetuity under the conservation easement or the long-term durability agreement (see Section 6: Real Estate Instruments, Maintenance and Monitoring and Section 7: Bank and MCA Modifications.

CDFW staff will review and evaluate the wildlife connectivity action credit proposal in accordance with these Guidelines. The wildlife connectivity action credit proposal must include:

- Target species or target habitat scoring sheets; and
- Scoring justification for the proposed credits.

The following sections provide information on credit types, credit amounts, and the process for providing scoring justification for the proposed credit type.

3.1 CREDIT TYPES

Credits associated with a wildlife connectivity action can be used to compensate for mitigation requirements established under federal or state environmental laws, including but not limited to CEQA, CESA, and LSA Agreements, as determined by the

applicable regulatory agency.[20] Below are examples of the types of credits that can be proposed for a wildlife connectivity action.

- **CEQA**[21] – Species and habitat credits from wildlife connectivity actions may be used to satisfy connectivity and non-connectivity related mitigation requirements under CEQA with the written approval of the CEQA lead agency.
- **CESA**[22] – Species credits from wildlife connectivity actions that benefit CESA listed target species may be used for non-connectivity related mitigation requirements under CESA with the written approval of CDFW.
- **LSA Agreement**[23] – Habitat credits from wildlife connectivity actions that will offset habitat impacts authorized under LSA Agreements may be used for related mitigation requirements under LSA Agreements with the written approval of CDFW.
- **Other regulatory requirements** – Credits from wildlife connectivity actions may be able to satisfy connectivity and non-connectivity related mitigation requirements under other local, state, and federal regulatory requirements, as approved by the applicable regulatory agency (see Section 3.3: Wildlife Connectivity Action Credit Proposal Review). When a sponsor is developing a bank or MCA, the sponsor is required to receive all necessary permits and approvals from regulatory agencies.

For the purposes of these Guidelines, if the sponsor is proposing species credits, the information the sponsor will provide in the wildlife connectivity action credit proposal is referred to as target species. If the sponsor is proposing habitat credits, the information the sponsor will provide in the wildlife connectivity action credit proposal is referred to as target habitat.

3.2 Credit Amount

Wildlife connectivity actions may provide ecological benefits beyond the acreage they occupy. The sponsor and CDFW shall base wildlife connectivity action credit amounts on the ecological benefits of the wildlife connectivity action. If a sponsor proposes multiple credit types, then the wildlife connectivity action shall be evaluated for the ecological benefit it provides for each credit type.

The sponsor can create credits for a wildlife connectivity action that provides ecological benefit uplift beyond the required built infrastructure replacement or retrofit. CDFW will evaluate these credit amounts on a case-by-case basis depending on the corresponding legal requirements for the replacement or retrofit.

[20] Fish & G. Code, § 1957, subdivisions (e)(1), (2), & 3)
[21] beginning with Pub. Resources Code, § 21000
[22] beginning with Fish & G. Code, § 2050
[23] beginning with Fish & G. Code, § 1600

3.2.1 Crediting Process

A sponsor shall use the two-step process outlined below to determine whether CDFW will approve credits greater than the physical space occupied by the wildlife connectivity action. The process is based on the quantification of the ecological benefits for each credit type. The ecological benefits are based on the following considerations:

- Ecological Engineered Design;[24]
- Value of the Habitat Connected;[25]
- Value of the Particular Location;[26]
- Critical Linkages;[27]
- Population-level Benefits to Target Species;[28, 29] and
- Any other factor CDFW, in its discretion, deems relevant.[30]

Each crediting consideration is further broken down into several subcategories to determine specific ecological benefits.

The two-step process consists of Credit Scoring and Crediting Factor.

1. **Credit Scoring**: The ecological benefit for each credit type must be evaluated and scored from 0 to 100 based on the crediting considerations for the target species or target habitat (see Section 3.2.2: Step 1: Credit Scoring). The calculated score represents the quantified ecological benefits for each credit type associated with the wildlife connectivity action. Along with the scoring sheet, the sponsor shall provide a written narrative scoring justification (see Section 4: Target Species Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Considerations)
2. **Crediting Factor**: The crediting factor is used to convert the credit score into a specific number of credits for each target species or target habitat (see Section 3.2.3: Step 2: Crediting Factor).

The sponsor must use the above process for each target species or target habitat and detail the process within the wildlife connectivity action credit proposal by including a complete scoring sheet and credit scoring justification for each proposed credit type.

[24] Fish & G. Code, § 1957, subdivision (c)(6)
[25] Fish & G. Code, § 1957, subdivision (c)(2)
[26] Fish & G. Code, § 1957, subdivision (c)(5)
[27] Fish & G. Code, § 1957, subdivisions (c)(4)
[28] Fish & G. Code, § 1957, subdivision (c)(3)
[29] Population-level Benefits to Target Species crediting consideration is not used for evaluating the ecological benefit for target habitat credit types.
[30] Fish & G. Code, § 1957, subdivision (c)(6)

Reference the applicable program checklist (see Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklists) for the timing of when information is required within the applicable bank or MCA review process.

3.2.2 Step 1: Credit Scoring

The sponsor shall numerically score the wildlife connectivity action based on the proposed credit type. The resulting numeric credit score will be a percentage in the total score out of 100. The final score represents the project's ecological benefit potential to meet the movement needs of the target species, or the connectivity for the target habitat. This final score will be used in Step 2 (crediting factor) to determine the credit amounts.

If any subcategory falls within the low or zero scoring for a credit type, then the sponsors should pause and reach out to CDFW before completing the scoring sheet for that credit type.

Below is the credit scoring process for target habitat and target species and information on the scoring justification.

3.2.2.1 Target Species Scoring

The sponsor shall fill out the Target Species Scoring Sheet to provide a numerical value for each of the ecological crediting considerations and subcategories. The Target Species Scoring Sheet is provided as a separate document and is incorporated into these Guidelines by this reference as if they were fully set forth herein. The sponsor shall base the score on the information in Section 4: Target Species Ecological Benefit Crediting Considerations.

The Target Species Scoring Matrix for Wildlife Connectivity Actions (Table 2) below includes the total possible score for each crediting consideration and breaks down the point values into ranges for high, medium, and low for each subcategory. Subcategories with numeric ranges should be given a single numeric value based on the information in Section 4: Target Species Ecological Benefit Crediting Considerations. Sponsors should reference this matrix when using the Target Species Scoring Sheet in their credit evaluation.

Some of the crediting considerations have a greater ecological benefit than others, therefore, the target species crediting considerations are assigned different maximum scores and weightings (see Appendix B: Scoring Maximums Justification). If an ecological crediting consideration has insufficient information, the sponsor shall reflect it in the score. CDFW can add an additional 5 points to the total for **Unique Project Characteristics**[31] that might not be accounted for in the other crediting considerations.

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

Table 2 Target Species Scoring Matrix for Wildlife Connectivity Actions

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
1. Ecological Engineered Design	N/A	N/A	N/A	**24**
A. Structure Dimensions	5-6	3-4	1-2	6
B. Noise and Light Minimization Measures	3	2	1	3
C. Surface Substrates and Vegetation	3	2	1	3
D. Approaches and Fencing or Other Directional Implements	7-9	4-6	1-3	9
E. Designing for Resilience to Climate Change	3	2	1	3
2. Value of the Habitat Connected	N/A	N/A	N/A	**24**
A. Habitat Quantity	6-8	3-5	1-2	8
B. Habitat Quality	6-8	3-5	1-2	8
C. Protection of the Land	6-8	3-5	1-2	8
3. Value of the Particular Location	N/A	N/A	N/A	**21**
A. Topography, Aquatic Resource or Other Natural Pathway	5-6	3-4	1-2	6
B. Existing Vegetation and Other Cover	3	2	1	3
C. Movement and Mortality	5-6	3-4	1-2	6
D. Existing Conditions	3	2	1	3
E. Human Impacts	3	2	1	3
4. Critical Linkages	N/A	N/A	N/A	**16**
A. Regional Connectivity	6-8	3-5	1-2	8
B. Local Connectivity	6-8	3-5	1-2	8
5. Population-level Benefits to Target Species	N/A	N/A	N/A	**10**
A. Genetic Diversity and Breeding Opportunities	4-5	2-3	1	5
B. Species Adaptation to Climate Change	4-5	2-3	1	5
Unique Project Characteristics	N/A	N/A	N/A	**5**
Total	N/A	N/A	N/A	100

3.2.2.2 Target Habitat Scoring

The sponsor shall fill out the Target Habitat Scoring Sheet to provide a numerical value for each of the ecological crediting considerations and subcategories. The Target Species Scoring Sheet is provided as a separate document and is incorporated into these Guidelines by this reference as if they were fully set forth herein. The sponsor shall

base the score on the information in Section 5: Target Habitat Ecological Benefit Crediting Considerations.

The Target Habitat Scoring Matrix for Wildlife Connectivity Actions (Table 3) below includes the total possible score for each crediting consideration and breaks down the point values into ranges for high, medium, and low for each subcategory. Subcategories with numeric ranges should be given a single numeric value based on the information in Section 5: Target Habitat Ecological Benefit Crediting Considerations. Sponsors should reference this matrix when using the Target Habitat Scoring Sheet in their credit evaluation.

Some of the crediting considerations have a greater ecological benefit than others, therefore, the target species crediting considerations are assigned different maximum scores and weightings (see Appendix B: Scoring Maximums Justification). If an ecological crediting consideration has insufficient information, the sponsor shall reflect it in the score. CDFW can add an additional 5 points to the total for **Unique Project Characteristics**[32] that might not be accounted for in the other crediting considerations.

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

Table 3 Target Habitat Scoring Matrix for Wildlife Connectivity Actions

Crediting Considerations and Subcategories	High	Medium	Low	Total Possible Score
1. Ecological Engineered Design	N/A	N/A	N/A	**32**
A. Structure Dimensions	9-12	5-8	1-4	12
B. Noise and Light Minimization Measures	4	2-3	1	4
C. Surface Substrates and Vegetation*	9-12	5-8	1-4	12
D. Designing for Resilience to Climate Change	4	2-3	1	4
2. Value of the Habitat Connected	N/A	N/A	N/A	**36**
A. Habitat Quantity	9-12	5-8	1-4	12
B. Habitat Quality	9-12	5-8	1-4	12
C. Protection of the Land	9-12	5-8	1-4	12
3.Value of the Particular Location	N/A	N/A	N/A	**16**
A. Topography	4	2-3	1	4
B. Existing Vegetation and Other Cover	6-8	3-5	1-2	8
C. Human Impacts	4	2-3	1	4
4. Critical Linkages	N/A	N/A	N/A	**12**
A. Regional Connectivity	9-12	5-8	1-4	12
Unique Project Characteristics	N/A	N/A	N/A	**4**
Total	N/A	N/A	N/A	**100**

3.2.2.3 Scoring Justification

In addition to the scoring sheet, the sponsor shall submit a justification for the scoring sheet scores. The sponsor shall use the target species and target habitat ecological benefit crediting considerations for the justification (see Section 4: Target Species Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Considerations). A checklist of all the justification items in Section 4 and Section 5 are each combined in the Target Species Scoring Justification Checklist and Target Habitat Scoring Justification Checklist, which are provided as a separate document and is incorporated into these Guidelines by this reference as if they were fully set forth herein.

Within the scoring justification, the sponsor may provide additional unique project characteristic information about the proposed wildlife connectivity action to identify whether CDFW should allocate unique project characteristics to the wildlife connectivity action.

The scoring justification must use the best available science including, but not limited to, monitoring data collected or obtained by the sponsor, 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 may be utilized. The wildlife connectivity action credit proposal and scoring justification may require new surveys as part of the standard bank or MCA process. If an ecological crediting consideration has insufficient information, the sponsor should reflect it in Step 1 (Credit Scoring).

3.2.3 Step 2: Crediting Factor

The sponsor must multiply the scoring sheet final score (as a percent) from Step 1 by a crediting factor to calculate a proposed credit total for that proposed wildlife connectivity action credit type. The crediting factor depends on a combination of characteristics including habitat type, type of wildlife connectivity action, adjacent lands acreage, target species, and target habitat. For example, the greater acreage of the adjacent lands that the sponsor proposes as part of the bank or MCA, the higher the crediting factor. Each credit type or project type may have different crediting factors.

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

Because this approach is new, **crediting factors are not included in this version of these Guidelines to allow for valuable stakeholder input through pilot projects**. Crediting factors will be determined through an iterative approach using the lessons learned from the stakeholder engagement pilot period (See Section 3.2.3.1: Stakeholder Engagement Pilot Period) and input from sponsors proposing wildlife connectivity actions. Crediting factors will be provided in a future iteration of these Guidelines after CDFW has evaluated different projects across a range of credit types and locations to better understand feasibility and ecological benefits.

During the pilot period, sponsors shall propose a crediting factor for each credit type, including a clear written scoring justification in the wildlife action credit proposal based on best available information, for CDFW review. The final credit factors will be approved by CDFW in coordination with the project sponsor and determined on a case-by-case basis.

3.2.3.1 Stakeholder Engagement Pilot Period

Because the approach to wildlife connectivity advance mitigation outlined in these Guidelines is new, the crediting factor 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 stakeholder engagement pilot period to inform the crediting factor. The stakeholder engagement pilot period will last until an initial set of six pilot projects have been approved, using wildlife connectivity action credit proposals, or a period of 24 months has elapsed, based on CDFW

discretion. CDFW will update the Guidelines after the stakeholder engagement pilot period.

During the pilot period, prospective sponsors should consult with CDFW staff early, and often. CDFW will evaluate all wildlife connectivity action credit proposals on a case-by-case basis.

3.3 WILDLIFE CONNECTIVITY ACTION CREDIT PROPOSAL REVIEW

CDFW will review proposed wildlife connectivity actions based on the ecological benefits to the target species and/or target habitats (see Section 4: Target Species Ecological Benefit Crediting Considerations and Section 5: Habitat Species Ecological Benefit Crediting Consideration). CDFW will evaluate the proposal using the scoring justification, the best available science, and scoring provided by the sponsor.

If the sponsor proposes credits (e.g., wetlands, federally listed species credits) that may satisfy other state and federal agency regulations, the sponsor must help coordinate with those applicable agencies. In these cases, sponsors must use the applicable bank or MCA process for coordinating review by other agencies for credits. If needed, as this program develops, CDFW will work with these agencies to develop procedures for coordination specifically for creating wildlife connectivity action credits. 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 TARGET SPECIES ECOLOGICAL BENEFIT CREDITING CONSIDERATIONS

This section addresses the process for determining species-specific ecological benefits 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 Scoring) described in Section 3. Target 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 listed below:

- Ecological Engineered Design;[33]
- Value of the Habitat Connected;[34]
- Value of the Particular Location;[35]
- Critical Linkages;[36] and
- Population-level Benefits to Target Species.[37]

Each ecological benefit crediting consideration is broken into subsections. These subsections include:

- Required and recommended information for the wildlife connectivity action credit proposal that evaluates the target species 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 little or no benefit for the consideration, or if not enough information is provided or available.

The wildlife connectivity action credit proposal information and documents required in the subsections below, are in addition to what is already required for either the banking Guidelines or the MCA Guidelines (see Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklists for the timing of when this information is needed within the review processes). A checklist of the items required for the scoring justification items in Section 4 are combined in the Target Species Scoring Justification Checklist.

The terms "shall" or "must" are used for information or documents that are required in the wildlife connectivity action credit proposal, while the terms "may" or "should" indicate recommendations that can aid in additional credit allocations. If any required section does not apply to the proposed wildlife connectivity action, indicate so with an

[33] Fish & G. Code, § 1957, subdivision (c)(6)
[34] Fish & G. Code, § 1957, subdivision (c)(2)
[35] Fish & G. Code, § 1957, subdivision (c)(5)
[36] Fish & G. Code, § 1957, subdivision (c)(4)
[37] Fish & G. Code, § 1957, subdivision (c)(3)

explanation, as needed. Because this approach is new, these crediting considerations and their corresponding subsections may be refined in subsequent versions of these Guidelines as more information on the process is obtained.

CDFW acknowledges the importance of wildlife connectivity actions in urban areas and will take into consideration constraints in urban areas.

4.1 Ecological Engineered Design

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

The wildlife connectivity action's ecological design should 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 7.3: 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;
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)[38].

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

These design elements are expected to be more conceptual early in the bank or MCA process. Please refer to the checklists provided in Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklists for more detailed information on what is required in the various bank and MCA stages.

CDFW will consider ecological engineered designs when evaluating the sponsor's wildlife connectivity action credit proposal. The sponsor shall also provide CDFW with a written description explaining the engineered design and its benefit to the target species. At a minimum, the description must include the following subcategories, which are described in depth below in Sections 4.1.1-4.1.5:

A. Structure Dimensions;
B. Noise and Light Minimization Measures;
C. Surface Substrates, Vegetation and Hydrogeomorphic Components;
D. Approaches, Fencing or Other Directional Implements; and
E. Designing for Resilience to Climate Change.

The sponsor is responsible for complying with all laws, standards, and practices pertaining to a wildlife connectivity action's structural design, construction, and maintenance.

4.1.1 Structure Dimensions

Wildlife connectivity structure dimensions shall facilitate the successful movement 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 underpass increases. Additionally, the height of the underpass opening should be tall enough to accommodate the target species while also maximizing potential use by other (larger) species. In addition, some wildlife species are deterred from entering dark, enclosed places so a direct line-of-sight through the wildlife connectivity action may be ideal. In addition, use of overpasses may facilitate potential use by species that are reticent to pass under structures.

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

A. The wildlife connectivity structure width, length, and height (if applicable);
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;
C. If there are turns in the crossing, justify why; and
D. Whether there is a direct line-of-sight and justification if not.

The sponsor must use the scoring scale below to aid in determining the ecological benefit of the structure dimensions of the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (5-6 points) – The proposed wildlife connectivity action addresses all or most applicable design elements for structure dimensions to maximize connectivity for all or most life stages of the target species. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium (3-4 points)– The proposed wildlife connectivity action addresses some applicable design elements for structure dimensions to maximize connectivity for some life stages of the target species. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low (1-2 points) – The proposed wildlife connectivity action addresses few applicable design elements for structure dimensions to maximize use for target species at one life stage. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero – The proposed wildlife connectivity action's structure dimensions does not suit the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

4.1.2 Noise and Light Minimization Measures

Many wildlife species are wary of anthropogenic noise and light, and these disturbances should be minimized both within and around the wildlife connectivity action. Noise and light can be minimized using various techniques such as earth berms, solid walls, noise attenuating walls, vegetation, or a combination of these. In addition, various landscaping techniques could be employed on the approaches to the wildlife connectivity action (see Section 4.3.1: Topography, Aquatic Resources, or Other Natural Pathway).

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

The sponsor must use the scoring scale below to aid in determining the ecological benefit of noise and light minimization measures in the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (3 points) – The proposed wildlife connectivity action addresses all or most applicable noise and light minimization measures to maximize connectivity for all or

most life stages of the target species. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium (2 points)– The proposed wildlife connectivity action addresses some applicable noise and light minimization measures to maximize connectivity for some life stages of the target species. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low (1 point) – The proposed wildlife connectivity action addresses few applicable noise and light minimization measures to maximize use for target species at one life stage. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero – The proposed wildlife connectivity action's noise and light minimization measures do not suit the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

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.

In addition to removal of any wildlife movement barriers, the aquatic resource should be restored to as natural a functioning state as possible, and where feasible the wildlife connectivity action should fully span the physical, hydraulic, and geomorphic processes of the aquatic resource. Proposed designs should attempt to improve geomorphic processes, if deficiencies are present, and connect physical, hydraulic, and geomorphic processes such as the movement of debris and sediment, vegetation distribution, and microclimate. When including vegetation is infeasible, 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 if placed above at least the 100-year flood event.

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

A. The vegetation used for the plan;
    - Proposed vegetation plantings by type and quantity;
    - How the proposed vegetation will meet the target species' needs, including vegetation within or on top of the structure, as well as both sides of the approach to the wildlife connectivity action;
    - When vegetation may not be feasible for underpasses or other shaded structures, the description should focus on items B-D below;

B. The soil substrates or imported materials used for the design to mimic natural conditions;
C. A rationale if the substrates are not sourced from the project area; and
D. A list of the appropriate escape and resting cover elements (e.g., large woody debris, rocks) for the target species and spacing between the elements.

The written description for aquatic wildlife connectivity actions, as applicable, 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);
B. A discussion on the flexibility and resilience of the proposed streambed and streambank substrates based on hydraulic and geomorphic principles.
C. An analysis of the existing hydrogeomorphology of the wildlife connectivity action's site and the adjacent up- and downstream sections;
D. How the wildlife connectivity action is designed to connect the hydraulic and geomorphic processes; and
E. How the design accounts for how the sheet flow, 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 written description for aquatic wildlife connectivity actions, as applicable, should include at minimum:

A. Data on floodplains and elevated benches that would allow for terrestrial species crossings during at least a 100-year flood event; and
B. How terrestrial species movement needs, in addition to aquatic species, have been incorporated into the design.

The sponsor must use the scoring scale below to aid in determining the ecological benefit of the surface substrates and vegetation of the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal as follows:

High 3 (points) – The proposed wildlife connectivity action addresses all or most applicable surface substrates and vegetation design elements to maximize connectivity for all or most life stages of the target species. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium (2 points)– The proposed wildlife connectivity action addresses some applicable surface substrates and vegetation design elements to maximize connectivity for some life stages of the target species. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low (1 point) – The proposed wildlife connectivity action addresses few applicable surface substrates and vegetation design elements to maximize use for target species at one life stage. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero – The proposed wildlife connectivity action's surface substrates and vegetation do not suit the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

4.1.4 Approaches and Fencing or Other Directional Implements

The sponsor shall consider how the wildlife connectivity action is integrated into the landscape. For example, when mimicking the surrounding landscape is not possible, the steepness of the approach (see Section 4.3.1: Topography, Aquatic Resource, or Other Natural Pathway) should be minimized as much as possible. The approach design should facilitate the target species' movement through the wildlife connectivity action.

Most wildlife connectivity actions should 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 action should be considered as well. Aquatic target 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.

When appropriate, 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 barrier (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). 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 action.

Wildlife can become trapped inside fenced areas, and features like escape ramps can allow them to safely exit. Openings in medians likely support the ability of wildlife to

escape from entrapment on roadways. When appropriate, the type and installation of escape ramps or other similar structures shall be based on target 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 is another option.

Escape ramps should be tall enough so the target species cannot easily jump on top and access the infrastructure barrier but also able to safely jump down when escaping. They should also not be so tall as 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. Landing and escape zones should be clear of obstructions that would prevent use or affect successful operation.

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

A. How the approach design mimics the surrounding landscape elevation, slope, topography and ruggedness, 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;
C. For aquatic target species, how any potential hydraulic deficiencies caused by existing built infrastructure (based on upstream and downstream conditions) were accounted for in the design(e.g., step pools and constructed riffles);
D. A description of the fencing or other directional 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;
E. A list of any proposed openings or gates to the fencing;
F. 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;
G. How the design directs individuals of the target species including any wrap around or diagonal arms;
H. The directional fencing height;
I. The fence style, including material, mesh sizing, and whether mesh sizing is consistent with the target species;
J. If fencing will be buried or flush to the ground;
K. The length and location of the fencing array and any resting cover incorporated in the design;
L. The escape ramps or jumpouts design and placement based on the species in the area and location specifications (if applicable); and

M. If and where any cattle guards are included in the design.

The sponsor must use the scoring scale below to aid in determining the ecological benefit of the approaches and fencing or other directional implements associated with the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (7-9 points) – The approaches and fencing or other directional implements associated with the proposed wildlife connectivity action addresses all or most applicable elements to maximize connectivity for all or most life stages of the target species. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium (4-6 points)– The approaches and fencing or other directional implements associated with the proposed wildlife connectivity action addresses some applicable elements to maximize connectivity for some life stages of the target species. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low (1-3 points) – The approaches and fencing or other directional implements associated with the proposed wildlife connectivity action addresses few applicable elements to maximize use for target species at one life stage. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero – The approaches and fencing or other directional implements associated with proposed wildlife connectivity action does not suit the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

4.1.5 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 wildlife connectivity action 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 action 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 connectivity actions.

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 use the scoring scale below to aid in determining the ecological benefit of the wildlife connectivity action's design for resilience to climate change. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (3 points) – The proposed wildlife connectivity action addresses all or most applicable design elements for resilience to climate change to maximize connectivity for all or most life stages of the target species into the future. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the infrastructure at the site.

Medium (2 points)– The proposed wildlife connectivity action addresses some applicable design elements for resilience to climate change to maximize connectivity for some life stages of the target species into the future. The wildlife connectivity action addresses some other ecological deficiencies caused by the infrastructure at the site.

Low (1 point) – The proposed wildlife connectivity action addresses few applicable design elements for resilience to climate change to maximize use for target species at one life stage into the future. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

Zero – The proposed wildlife connectivity action's design elements for resilience to climate change do not suit the needs of the target species. The wildlife connectivity action does not address other ecological deficiencies caused by the infrastructure at the site.

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 wildlife connectivity action credit proposal.[39] The sponsor should consider the habitat quantity, habitat quality, and level of protection and/or conservation of the surrounding lands given the habitat matrix of the area. The information CDFW will use to evaluate the sponsor's wildlife connectivity action 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 within the wildlife connectivity action credit proposal, as described below, to CDFW in the form of map(s), table(s), and written descriptions.

4.2.1 Maps

CDFW will consider the surrounding lands when evaluating the value of the habitat connected by the wildlife connectivity action. The sponsor shall include maps

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

containing the information listed below. The sponsor should 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. Locations of the surrounding lands 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; parks; and if parcels are associated with easements (See RCIS Guidelines – Section 4.3.4.3 for resources on protected areas);
E. Label private lands in the surrounding lands;
F. Labels identifying existing and proposed city or county zoning of the surrounding lands. 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;
G. Locations of all aquatic resource features (e.g., ephemeral creeks, ponds, swales, wetlands, etc.) within the target species dispersal range connected by the wildlife connectivity action. If the proposed wildlife connectivity action is connecting aquatic resources or removing aquatic barriers, maps showing the benefit of the action to the whole watershed would be appropriate;
H. Target species' habitat in the surrounding lands. Use publicly available resources and/or aerial imagery;
I. Location of known built infrastructure, natural or man-made hazards, and barriers to target species dispersal to habitat in the surrounding lands;
J. A map showing the California Natural Diversity Database (CNDDB) records (or other appropriate dataset of species distribution or occurrence) in the surrounding lands; and
K. A habitat suitability map, if available, such as the California Habitat Relationships (CWHR) Predicted Habitat Models or other scientific source.

4.2.2 Tables

The sponsor shall include table(s) containing the information listed below:

A. Land ownership (if privately owned, indicate "private") in the surrounding lands connected by the wildlife connectivity action;

B. Total habitat acreage and, if applicable, total acreage of aquatic resources by type (e.g., pond, wetland, watercourse, etc.) and linear feet of stream in the surrounding lands 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 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.

4.2.3 Written Description

The sponsor shall provide 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 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 vegetation density;
    - Ability of the habitat to support target 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 (If the project is an MCA, sponsors can consult the RCIS for this information.);
C. Known future restoration projects that would benefit the target species' habitat;
D. Known hydroperiod and water quality (see BIOS datasets 232-234 for U.S. EPA's impaired waters) of aquatic resource features;
E. 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;
F. Whether the habitat in the surrounding lands is currently utilized by the target 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.

CDFW recognizes that accessing all the information requested above regarding surrounding lands might sometimes be infeasible (e.g., private lands). In these cases, provide what information is publicly available and indicate where no information was able to be found.

The sponsor must use the scoring scales below to aid in determining the quality of the habitat connected by the wildlife connectivity action.

4.2.4 Habitat Quantity of the Surrounding Land

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

High (6-8 points) – The amount of habitat in the surrounding lands is sufficient on both sides of the wildlife connectivity action to support the full dispersal distance of the target species and many other native species.

Medium (3-5 points) – The amount of habitat in the surrounding lands is sufficient on both sides of the wildlife connectivity action to support a moderate dispersal distance of the target species.

Low (1-2 points) – The amount of habitat in the surrounding lands provides minimal support on both sides of the wildlife connectivity action to support a minimal dispersal distance of the target species.

Zero – There is insufficient habitat in the surrounding lands to support the target species.

4.2.5 Habitat Quality of the Surrounding Land

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

High (6-8 points) – The habitat in the surrounding lands connected by the wildlife connectivity action has been minimally disturbed, has features that do, or are anticipated to 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 (3-5 points) – Some of the habitat in the surrounding lands connected by the wildlife connectivity action are disturbed, have 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 and other native species.

Low (1-2 points) – The habitat in the surrounding lands connected by the wildlife connectivity action is or is anticipated to be 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.

4.2.6 Protection of the Surrounding Land

CDFW will consider the existing protection of surrounding land to evaluate the sponsor's wildlife connectivity action credit proposal by the following:

High (6-8 points) – 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.

Medium (3-5 points) – Some of the surrounding lands connected by the wildlife connectivity action with target species habitat are protected for conservation values. The remaining lands are either 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. GAP Status Rank 3 will be considered if the type of land management and disturbance is anticipated to have no or minimal impact on the target species.

Low (1-2 points) – Lands with target species habitat on one side of the wildlife connectivity action are protected for conservation values. The remaining lands are not 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 built infrastructure right-of-way.

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.[40] The sponsor should consider the needs of target species at the particular location including topography, presence of aquatic resources, vegetation and other cover, movement and mortality data, permeability and built infrastructure 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 wildlife connectivity action credit proposal using the crediting considerations subcategories below.

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

4.3.1 Topography, Aquatic Resource, or Other Natural Pathway

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 wildlife connectivity action credit 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 presence of an aquatic resource (e.g., watercourse, pond, or wetland) 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. Aquatic resources 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).

The description must include at minimum:

A. The wildlife connectivity action site's current slope gradient, topographic barriers to wildlife;
B. A description of the target species' likelihood to navigate through the wildlife connectivity action based on the topography-related cues that the target species is likely to rely on, including but not limited to line-of-sight, noise, light, etc. (also see Section 4.5: Population-Level Benefits to Target Species and Section 4.1: Ecological Engineered Design);
C. A description of any proposed topography changes with an explanation of the ecological need for the changes. The description should reference the construction plan;
D. The aquatic resource or other natural pathways currently present at the wildlife connectivity action's site and how they meet the needs of the target species; and
E. Any impacts of aquatic resources or other natural pathways to species movements, and a strategy to address impacts (see Section 4.1: Ecological Engineered Design).

The sponsor must use the scoring scale below to evaluate topographic characteristics and proposed aquatic resource or other natural pathway at the wildlife connectivity action's particular location. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (5-6 points)– The site's final topography and aquatic resource or other natural pathway is well suited for the target species' needs and facilitates the use of the wildlife connectivity action.

Medium (3-4 points)– The site's final topography and aquatic resource or other natural pathway is moderately suited for the target species' needs and facilitates the use of the wildlife connectivity action.

Low (1-2 points) – The site's final topography and aquatic resource or other natural pathway is poorly suited for the target species' needs and minimally facilitates the use of the wildlife connectivity action.

Zero – The site's final topography and aquatic resource or other natural pathway 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.

4.3.2 Existing Vegetation and Other Cover

Many species require the presence of cover (e.g., herbaceous and/or woody vegetation, rock outcrops, rockpiles, and brush piles) to facilitate movement across a landscape and through a proposed wildlife connectivity action. Cover types and landscape structures that facilitate dispersal 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 should consist of the appropriate cover, or the sponsor should include a plan to incorporate the appropriate cover as part of the proposal.

CDFW will consider the existing vegetation and other cover of the wildlife connectivity action's particular location when evaluating the sponsor's wildlife connectivity credit 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 existing wildlife connectivity action site's vegetation (or other) cover conditions and how it currently meets the target species' needs.

The sponsor must use the scoring scale below to aid in determining the ecological benefit of the existing vegetation and other cover at the wildlife connectivity action's particular location. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (3 points) – The existing vegetation and other cover well suits the needs of the target species.

Medium (2 points) – The existing vegetation and other cover moderately suits the needs of the target species.

Low (1 point) – The existing vegetation and other cover location poorly suits the needs of the target species.

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

4.3.3 Movement and Mortality Data

Data showing species that either approach or successfully cross over or under built linear infrastructure may be used as an indicator for where a wildlife connectivity action is needed. While locations of high mortality may provide good information in certain instances, it may not necessarily indicate the best location for a wildlife connectivity action for wider-ranging species. 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 exist where animals do not attempt to cross existing linear infrastructure such as multi-lane highways with high-traffic volume. These barriers may be observed if there is a difference in genetics on each side of the roadway (e.g., desert bighorn sheep at the I-10 Banning Pass). Wildlife-vehicle collision hotspots impacting numerous different species may indicate that a connectivity action in this location would benefit multiple species.

CDFW will consider movement and mortality data when evaluating the sponsor's wildlife connectivity action credit proposal. The sponsor shall provide CDFW a written description of how best available wildlife movement (e.g., wildlife satellite collar data, camera trap data, etc.) and mortality information (e.g., wildlife satellite collar data, roadkill surveys, 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).

In addition, 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 opportunistic and not comprehensive across the state for species or spatial coverage.

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

High (5-6 points)– The movement and mortality data indicate that the wildlife connectivity action's particular location will be highly effective for the target species.

Medium (3-4 points)– The movement and mortality data indicate that the wildlife connectivity action's particular location will be moderately effective for the target species.

Low (1-2 points)– 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.

4.3.4 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. Built linear infrastructure characteristics, such as the speed of traffic, the number of lanes, traffic volume, light (lumens), and noise (dB) effects the permeability for wildlife crossing a built linear feature. Permeability is the degree to which an area is conducive to wildlife movement and sustaining ecological processes. 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 linear infrastructure characteristics.

The sponsor shall provide CDFW with a written description of the existing conditions at the particular location. The description must include at minimum:

A. The extent of the barrier, such as the width or 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, if applicable;
B. Current and ambient light or noise levels and any potential light or noise barriers;
C. A summary of any other existing or planned wildlife connectivity actions nearby, including what species are known to, or are expected to, use them;
D. An explanation of the ecological value of adding the proposed wildlife connectivity action at the proposed location; and
E. 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.

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. Utilities, aquatic resources, shoulder widths, median barriers, fencing, side slopes, and local landscape features (e.g., forest, cliff, riparian) and how they may impact new design features.

CDFW will consider the existing conditions of the particular location when evaluating the sponsor's wildlife connectivity action proposal. The sponsor must use the scoring scale below. CDFW will use the same scoring scale when reviewing the proposal as follows:

High (3 points) – The built infrastructure characteristics present a significant barrier to movement for the target species. The proposed wildlife connectivity action will substantially increase permeability for the target species. 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. The existing conditions are fully incorporated into the wildlife connectivity action to provide seamless passage and reduce any existing barriers to movement.

Medium (2 points)– The built infrastructure characteristics present a moderate barrier to movement for the target species. The proposed wildlife connectivity action will moderately increase permeability for the target species. 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. The existing conditions are generally incorporated into the wildlife connectivity action to provide seamless passage for the target species, though some minor barriers may remain.

Low (1 point)– The built infrastructure 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. Existing and planned wildlife connectivity actions near the proposed wildlife connectivity action have largely addressed the target species' connectivity issues. The proposed wildlife connectivity action will provide minimal additional connectivity benefits for the target species. The existing conditions are not well incorporated into the wildlife connectivity action and provide limited passage, leaving some existing barriers to movement.

Zero –The proposed wildlife connectivity action will not significantly increase permeability and may have negative impacts for the target species. 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. The existing conditions are not incorporated into the wildlife connectivity action and serve as barriers to movement.

4.3.5 Human Impacts

Human presence near and human use of wildlife connectivity structures have been shown to decrease use of structures by wildlife. For this reason, the wildlife connectivity action must exclusively be created for use by wildlife (see Section 7: Bank and MCA Modifications).

CDFW will consider the human impacts near the particular location when evaluating the sponsor's wildlife connectivity action credit proposal. 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, public infrastructure, 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;
C. How the wildlife connectivity action design includes elements that prevent unauthorized human use or trespass while allowing wildlife usage; and
D. Any measures that will be used to ensure that the wildlife connectivity action remains for the use of wildlife only.

The sponsor must use the scoring scale below to evaluate the human impacts for the particular location. CDFW will use the same scoring scale when reviewing the wildlife connectivity action credit proposal as follows:

High (3 points)–No trail system or authorized public access is within 1,500 feet of the wildlife connectivity action and where human presence is legally restricted so that modification of animal behavior is limited due to human presence.

Medium (2 points)–A trail system or authorized public access is within 1,500 feet but not part of the wildlife connectivity action and where human presence may substantially modify animal behavior.

Low (1 points)–The wildlife connectivity action is part of a trail system or can be directly accessed by the public.

Zero –The wildlife connectivity action is part of a high use trail system or is commonly accessed by the public or is in close proximity to an official or unofficial motorized trail.

4.4 CRITICAL LINKAGES

CDFW shall consider the improvement of connectivity in critical linkages (as defined in Section 1.4: Terms and Definitions) for determining the value of credits.[41] When developing the wildlife connectivity action credit proposal, the sponsor shall use the

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

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 their own biological surveys for critical linkages data. The sponsor's justification in the wildlife connectivity action credit proposal shall focus on improving connectivity for target species, and the value of the linkage for those species. The sponsor's scoring 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 sponsor to identify key linkage areas for each species. Additional information to help assess regional connectivity of a proposed site is available through 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).

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 regional or local reports that address connectivity (e.g., wildlife connectivity and fish passage assessment reports).

CDFW will consider wildlife linkages and connectivity when evaluating the sponsor's proposal. 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 ranking for the proposed wildlife connectivity action's site;
B. Any regional linkage systems (using the BIOS Habitat Connectivity Viewer) that the proposed wildlife connectivity action's site is within;

C. Determine if the proposed wildlife connectivity action's site is within federally designated critical habitat for the target species and for non-target species; and
D. List of regional conservation plans that reference the proposed wildlife connectivity action's site.

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

High (6-8 points)– 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 (3-4 points)– 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 (1-2 points)– 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.

4.4.2 Local Connectivity

The CDFW Restoring California's Wildlife Connectivity Report (BIOS data link) identifies 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 should provide data on the migration and dispersal routes for target species. Data is available for ungulate target species, including the CDFW Ungulate Migration Viewer web page which 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.

CDFW will consider local connectivity when evaluating the sponsor's proposal. The sponsor shall provide CDFW with a written description of the local connectivity that 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; and
E. Any migration and dispersal routes that overlap with the proposed wildlife connectivity action's site including those in the CDFW Ungulate Migration Viewer.

The sponsor must use the scoring scale below to evaluate local connectivity. CDFW will use the same scoring scale when reviewing the proposal.

High (6-8 points)–The site is identified as a barrier within one of 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 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. The site is within a high or moderate use migration route, or available data supports that the site's location would enhance migration or dispersal for the target species.

Medium (3-5 points)– 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. The site may be within a high or moderate use migration route, although supporting data is limited.

Low (1-2 points)– The site is not named within one of 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. The site is not within a high or moderate use migration route, or the site is not within a potential or known migration or dispersal route for target species.

Zero – The site is not named within one of 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 that the site functions as a barrier or movement corridor for the target species. The site is not within a potential migration or potential dispersal route for target species.

4.5 POPULATION-LEVEL BENEFITS TO TARGET SPECIES

Wildlife movement is essential for individuals to find mates, seasonal habitat, shelter, food, and for species 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. Wildlife movement is essential for gene flow, which is necessary to maintain genetic diversity and increase the likelihood of long-term persistence of species populations. When wildlife populations are isolated in habitat patches from other same species populations, they are more susceptible to reduced genetic diversity (and associated deleterious effects), localized loss of habitat, disease, and ultimately extirpation.

Wildlife connectivity actions that remove, or provide connectivity across, existing barriers to wildlife movement can create new opportunities for movement 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 and dispersing juveniles as a result of the operation of the wildlife connectivity action.

At a minimum, the sponsor shall describe within the wildlife connectivity action credit proposal 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 elevation of potentially suitable habitat), and multi-species benefits. [42] 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. Examples of other life history characteristics include home range sizes, territoriality, social structure, diet across seasons, and foraging and breeding patterns.

The sponsor should provide in their scoring justification species-specific and recent observation data such as that in BIOS.

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

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 influence 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.

CDFW will consider species benefits of improved genetic diversity and breeding opportunities when evaluating the sponsor's proposal. The sponsor shall provide CDFW with a written description of how the wildlife connectivity action would improve or create genetic and breeding opportunities for the target species. As applicable, the description must include at minimum:

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

The sponsor must use the scoring scale below to aid in determining if the wildlife connectivity action would improve genetic diversity and breeding opportunities for the target species. CDFW will use the same scoring scale when reviewing the proposal.

High (4-5 points)– The proposed wildlife connectivity action would significantly increase genetic diversity, health, and/or breeding opportunities.

Medium (2-3 points)– The proposed wildlife connectivity action is likely to substantially increase genetic diversity, health, and/or breeding opportunities.

Low (1 point)– The proposed wildlife connectivity action may address weaknesses in genetic diversity, health, and/or breeding opportunities.

Zero – The proposed wildlife connectivity action does not address weaknesses in 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 wildlife movement and can potentially aid in species climate adaptation and/or ameliorate the negative effects of climate change (e.g. improving access to additional latitudes and elevation of potentially suitable habitat). Connectivity may also allow for safe travel/passage for individuals to flee from extreme or catastrophic weather events.

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 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. A discussion on how the wildlife connectivity action could improve access to additional latitudes and elevation of potentially suitable habitat;
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 utilize existing analyses to identify exposure of the area to climate change (e.g., magnitude of projected changes in temperature, precipitation, and sea-level rise) and climate vulnerable resources (e.g., vulnerable fish and wildlife). Please refer to CDFW's Climate Change Vulnerability Assessment Web Page for existing information and links to associated datasets on climate vulnerability of California species and habitats.

The sponsor must use the scoring scale below to aid in determining the species benefits of adaptation to climate change. CDFW will use the same scoring scale when reviewing the proposal.

High (4-5 points)– The proposed wildlife connectivity action is highly likely to facilitate target species adaptation to climate change.

Medium (2-3 points)– The proposed wildlife connectivity action is likely to facilitate target species adaptation to climate change.

Low (1 point)– 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 TARGET HABITAT ECOLOGICAL BENEFIT CREDITING CONSIDERATIONS

This section addresses the process for determining habitat-specific 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 scoring) described in Section 3 for habitat-specific scoring. Target habitat credits will be determined by evaluating the ecological benefit of the wildlife connectivity action and how that action would promote habitat persistence and enhance movement for native wildlife. CDFW will evaluate proposed habitat-specific wildlife connectivity actions based on four key ecological benefit crediting considerations (see Section 3.3: Wildlife Connectivity Action Credit Proposal Review) listed below:

- Ecological Engineered Design;[43]
- Value of the Habitat Connected;[44]
- Value of the Particular Location; [45] and
- Critical Linkages.[46]

Each ecological benefit crediting consideration is broken into subsections. These subsections include:

- Required and recommended information for the wildlife connectivity action credit proposal to evaluate the habitat-specific 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 or if not enough information is provided.

The wildlife connectivity action credit proposal information and documents required in the below subsections are in addition to what is already required for either the banking Guidelines or the MCA Guidelines. (see Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklists for the timing of when this information is needed within the review process). A checklist of the items required for the scoring justification items in Section 5 are combined in the Target Habitat Scoring Justification Checklist.

The terms "shall" or "must" are used for information or documents that are required in the wildlife connectivity action 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

[43] Fish & G. Code, § 1957, subdivision (c)(6)
[44] Fish & G. Code, § 1957, subdivision (c)(2)
[45] Fish & G. Code, § 1957, subdivision (c)(5)
[46] Fish & G. Code, § 1957, subdivisions (c)(4)

explanation, as needed. Because this approach is new, these crediting considerations and their corresponding subsections may be refined in subsequent versions of these Guidelines as more information on the process is obtained.

5.1 ECOLOGICAL ENGINEERED DESIGN

This section focuses on the ecological engineered design components of wildlife connectivity actions. 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 connectivity 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 enhance movement for native species that utilize the habitat type. The sponsor should describe anticipated changes in native wildlife movement in relation to barriers following the construction of the wildlife connectivity action.

The wildlife connectivity action's ecological design should 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 7.3: Long-term Management and Monitoring Plan).

CDFW will consider ecological engineered designs when evaluating the sponsor's wildlife connectivity action credit proposal. The sponsor shall provide CDFW with a full set of engineered design plans that include, but are not limited to:

A. Existing conditions;
B. Wildlife connectivity action dimensions and a written description of how these structure dimensions allow for the movement of native wildlife;
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);
    - 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).[47]

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

These design elements are expected to be more conceptual early in the bank or MCA process. Please refer to Wildlife Connectivity Action Bank Checklists and Wildlife Connectivity Action MCA Checklists for more detailed information on what is required in the various bank and MCA stages.

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

A. Structure Dimensions;
B. Surface Substrates, Vegetation, and Hydrogeomorphic Components;
C. Approaches; and
D. Designing for Resilience to Climate Change.

The required information for each subcategory is described in depth below in Sections 5.1.1-5.1.4.

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

5.1.1 Structure Dimensions

Wildlife connectivity structure dimensions shall facilitate the successful crossing for native 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 native 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 largest local species while also maximizing potential use by midsized to small species. In addition, some wildlife species are deterred from entering dark, enclosed places so a direct line-of-sight through the wildlife connectivity action may be ideal.

The sponsor shall provide CDFW with a written description of how the wildlife connectivity structure dimensions could facilitate successful crossings for native species and enhance movement in general for wildlife that use the target habitat. The description must include at minimum:

A. The crossing width, length, and height (if applicable);
B. The openness ratio (calculated in meters) for underpasses, and its suitability for native species. The openness ratio is defined as the structure's (width x vertical clearance) / length.;
C. If there are turns in the crossing, justify why; and

D. Whether there is a direct line-of-sight and justification if not.

The sponsor must use the scoring scale below to aid in determining the ecological benefit for structure design in the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal.

High (9-12 points)– The proposed wildlife connectivity action addresses all or most applicable design elements for structure design to maximize connectivity upstream and downstream for aquatic resources or establishes and connects the target habitat. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the existing infrastructure barrier and restores, as closely as possible, the target habitat.

Medium (5-8 points)– The proposed wildlife connectivity action addresses some applicable design elements for structure design to maximize connectivity upstream and downstream for aquatic resources or establishes and connects the target habitat. The wildlife connectivity action addresses some other ecological deficiencies caused by the existing infrastructure barrier and restores, to some level, the natural habitat on either side.

Low (1-4 points)– The proposed wildlife connectivity action addresses a few applicable design elements for structure design to maximize connectivity. The wildlife connectivity action does not address other ecological deficiencies caused by the existing infrastructure barrier.

Zero - The proposed wildlife connectivity action structure design does not maximize connectivity. The wildlife connectivity action does not address any ecological deficiencies caused by the existing infrastructure barrier.

5.1.2 Noise and Light Minimization Measures

Many wildlife species are wary of anthropogenic noise and light, and these disturbances should be minimized both within and around the wildlife connectivity action. Noise and light can be minimized using various techniques such as earth berms, solid walls, noise attenuating walls, vegetation, or a combination of these. In addition, various landscaping techniques could be employed on the approaches to the wildlife connectivity action (see Section 5.3.1: 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 action itself. The description must include at minimum:

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

The sponsor must use the scoring scale below to aid in determining the ecological benefit for the noise and light minimization measures in the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal.

High (4 points)– The proposed wildlife connectivity action addresses all or most applicable noise and light minimization measures to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the existing infrastructure barrier and restores, as closely as possible, the target habitat.

Medium (2-3 points)– The proposed wildlife connectivity action addresses some applicable noise and light minimization measures to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat. The wildlife connectivity action addresses some other ecological deficiencies caused by the existing infrastructure barrier and restores, to some level, the natural habitat on either side.

Low (1 point)– The proposed wildlife connectivity action addresses a few applicable noise and light minimization measures to maximize connectivity. The wildlife connectivity action does not address other ecological deficiencies caused by the existing infrastructure barrier.

Zero - The proposed wildlife connectivity action's noise and light minimization measures do not maximize connectivity. The wildlife connectivity action does not address any ecological deficiencies caused by the existing infrastructure barrier.

5.1.3 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. In addition to removal of any wildlife movement barriers, the aquatic resource should be restored to as natural a functioning state as possible, and where feasible the wildlife connectivity action should fully span the physical, hydraulic, and geomorphic processes of the aquatic resources. Proposed designs should attempt to improve geomorphic processes if deficiencies are present, and connect physical, hydraulic, and geomorphic processes such as the movement of debris and sediment, vegetation distribution, and microclimate. When including vegetation is infeasible, 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 if placed above the flood stage zone.

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

A. The vegetation used for the plan;
    - Proposed vegetation plantings by type and quantity;
    - How the proposed vegetation is appropriate for the target habitat, including vegetation within or on top of the structure, as well as both sides of the approach to the wildlife connectivity structure;
    - When vegetation may not be feasible for underpasses or other shaded structures, the description should focus on items B-D below;
B. The soil substrates imported materials used for the design to mimic natural conditions;
C. A rationale if the substrates are not sourced from the project area; and
D. A list of the appropriate escape and resting cover elements (e.g., large woody debris, rocks) in the design to enhance movement in general for wildlife that use the target habitat.

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);
B. A discussion on the flexibility and resilience of the proposed streambed and streambank substrates based on hydraulic and geomorphic principles.
C. An analysis of the existing hydrogeomorphology of the wildlife connectivity action's site and the adjacent up- and downstream sections;
D. How the wildlife connectivity action is designed to connect the hydraulic and geomorphic processes; and
E. How the design accounts for how the sheet flow, grade, velocity, water depth, and flow capacity over a range of flow events might affect the target habitat's function.

The written description for aquatic wildlife connectivity actions, as applicable, must include:

A. Data on floodplains and elevated benches that would allow for terrestrial species 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 use the scoring scale below to aid in determining the ecological benefit of the surface substrates and vegetation of the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal.

High (9-12 points)– The proposed wildlife connectivity action addresses all or most applicable surface substrates and vegetation design elements to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat. The wildlife connectivity action addresses all or most other

ecological deficiencies caused by the existing infrastructure barrier and restores, as closely as possible, the target habitat.

Medium (5-8 points)– The proposed wildlife connectivity action addresses some applicable surface substrates and vegetation design elements to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat. The wildlife connectivity action addresses some other ecological deficiencies caused by the existing infrastructure barrier and restores, to some level, the natural habitat on either side.

Low (1-4 points)– The proposed wildlife connectivity action addresses a few applicable surface substrates and vegetation design elements to maximize connectivity. The wildlife connectivity action does not address other ecological deficiencies caused by the existing infrastructure barrier.

Zero - The proposed wildlife connectivity action's surface substrates and vegetation do not maximize connectivity. The wildlife connectivity action does not address any ecological deficiencies caused by the existing infrastructure barrier.

5.1.4 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 connectivity actions.

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 use the scoring scale below to aid in determining the ecological benefit of the wildlife connectivity action's design for resilience to climate change. CDFW will use the same scoring scale when reviewing the proposal.

High (4 points)– The proposed wildlife connectivity action addresses all or most applicable design elements for resilience to climate change to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat into the future. The wildlife connectivity action addresses all or most other ecological deficiencies caused by the existing infrastructure barrier and restores, as closely as possible, the target habitat.

Medium (2-3 points)– The proposed wildlife connectivity action addresses some applicable design elements for resilience to climate change to maximize connectivity upstream and downstream for aquatic resources or to establish and connect the target habitat into the future. The wildlife connectivity action addresses some other ecological deficiencies caused by the existing infrastructure barrier and restores, to some level, the natural habitat on either side.

Low (1 point) – The proposed wildlife connectivity action addresses a few applicable design elements for resilience to climate change to maximize connectivity into the future. The wildlife connectivity action does not address other ecological deficiencies caused by the existing infrastructure barrier.

Zero - The proposed wildlife connectivity action's design elements for resilience to climate change do not maximize connectivity. The wildlife connectivity action does not address any ecological deficiencies caused by the existing infrastructure barrier.

5.2 VALUE OF THE HABITAT CONNECTED

CDFW shall consider the value of the habitat connected by the wildlife connectivity action when evaluating the sponsor's wildlife connectivity action credit proposal.[48] The sponsor should consider the habitat quantity, habitat quality, and level of protection and/or conservation of the surrounding lands given the habitat matrix of the area. The information CDFW will use to evaluate the sponsor's wildlife connectivity action 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 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 (e.g., private lands). In these cases, provide what information is publicly available and indicate where no information was able to be found.

5.2.1 Maps

CDFW will consider the surrounding lands relative to the target habitat when evaluating the value of the habitat connected by the wildlife connectivity action. The sponsor shall include maps, with corresponding scale, containing the information listed below. If access to properties is infeasible, the sponsor should use public data to provide the following information:

A. Coordinates (latitude/longitude in decimal degrees) of the proposed wildlife connectivity action;

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

B. Boundary of the wildlife connectivity action (See wildlife connectivity action definition in Section 1.4: Terms and Definitions);
C. The surrounding lands connected by the wildlife connectivity action; and
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; parks; and if parcels are associated with easements (See RCIS Guidelines section 4.3.4.3 for resources on protected areas).;
E. Labels identifying existing and proposed city or county zoning of the surrounding lands 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 aquatic resource features (e.g., ephemeral creeks, ponds, swales, wetlands, etc.) in the surrounding lands connected by the wildlife connectivity action. If the proposed wildlife connectivity action is connecting aquatic resources or removing aquatic barriers, maps showing the benefit of the action to the whole watershed would be appropriate;
G. Target habitat in the surrounding lands 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 in the surrounding lands;
I. A map showing the California Natural Diversity Database (CNDDB) records (or other appropriate dataset of species distribution or occurrence) within the surrounding lands.; and
J. A habitat suitability map, if available, such as the California Habitat Relationships (CWHR) Predicted Habitat Models or other scientific source.

5.2.2 Tables

The sponsor shall include table(s) containing the information listed below. If access to properties is infeasible, the sponsor should 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 wildlife connectivity action;
B. Total habitat acreage and, if applicable, total acreage of aquatic resources by type (e.g., pond, wetland, watercourse, etc.) and linear feet of stream in the

surrounding lands. Acreages shall be separated by existing and proposed protection mechanisms and city and county zoning; and

C. Existing habitat types in the surrounding lands. 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.

5.2.3 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. 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 vegetation density;
   - Ability of the habitat to support native 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 (If the project is an MCA, sponsors can consult the RCIS for this information).;

C. Known future restoration projects that would benefit the target habitat.;

D. Known hydroperiod and water quality (see BIOS datasets 232-234 for U.S. EPA's impaired waters) of aquatic resource features;

E. Vulnerability of target habitat to climate change including whether the target habitat type is projected to experience changes in inundation, fire regimes, temperature, hydroperiod, water quality, or vegetation quality;

F. What native species are known to use the target habitat in the surrounding lands. The information must include at minimum:
   - All presence information for native species, such as scientific literature, research, biological surveys, CNDDB, etc., that identifies use of the target-habitat.

The sponsor must use the scoring scales below to aid in determining the quality of the habitat connected by the wildlife connectivity action. CDFW will use the same scoring scale when reviewing the proposal.

5.2.4 Habitat Quantity

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

High (9-12 points)– The proposed wildlife connectivity action connects large areas of habitat on both sides that supports dispersal of native species that use the target habitat and adjacent supporting habitats.

Medium (5-8 points)– The proposed wildlife connectivity action connects patches or narrow corridors of the target habitat.

Low (1-4 points)– The proposed wildlife connectivity action provides minimal connectivity across a patchwork of the target habitat.

Zero – The proposed wildlife connectivity action does not connect patchworks or corridors of the target habitat.

5.2.5 Habitat Quality

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

High (9-12 points)– The target habitat within the surrounding lands connected by the wildlife connectivity action has been minimally disturbed and supports a matrix of habitat types that reflects the surrounding lands while supporting native wildlife biodiversity and is resilient to climate change.

Medium (5-8 points) – Some of the target habitat within the surrounding lands connected by the wildlife connectivity action is disturbed and has some features that support native wildlife biodiversity and is moderately resilient to climate change.

Low (1-4 points)– The habitat within the surrounding lands connected by the wildlife connectivity action is moderately developed, minimally climate resilient, and has minimal native wildlife biodiversity.

Zero – The habitat within the surrounding lands connected by the wildlife connectivity action does not support native wildlife.

5.2.6 Protection of the Land

CDFW will consider the existing protection of surrounding land to evaluate the sponsor's wildlife connectivity action credit proposal by the following:

High (9-12 points)– Most of the surrounding lands connected by the wildlife connectivity action with the target 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 as high, if the type of land management and disturbance is anticipated to have no or minimal impact on the habitat.

Medium (5-8 points) – Some of the surrounding lands connected by the wildlife connectivity action with the target habitat are protected by a conservation easement or other appropriate real estate instrument protection. The remaining lands that are not zoned for development or have no plans for development in the foreseeable future. Lands may include working lands with no plans for development in the foreseeable future.

Low (1-4 points) – Lands with the target habitat on one side of the wildlife connectivity action are protected by a conservation easement or other appropriate real estate instrument protection. The remaining lands 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.

5.3 VALUE OF THE PARTICULAR LOCATION

The sponsor shall describe the ecological value of improving connectivity at the location of the proposed wildlife connectivity action.[49] The sponsor should consider the needs of native species at the particular location including topography, vegetative and other cover, and human impacts.

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

5.3.1 Topography

CDFW will consider the topography when evaluating the sponsor's proposal. 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 native species' needs in the wildlife connectivity action credit proposal. A site that does not currently have topographic relief that is considered suitable 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 native species. The description must include at minimum:

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

A. The wildlife connectivity action site's current slope gradient and topographic barriers and how those are proposed to change based on the wildlife connectivity action;
B. A description of the likelihood for native species to navigate through the wildlife connectivity action based on the topography-related cues that native species are likely to rely on, including but not limited to line-of-sight, noise, light, etc. (also see Section 5.1: Ecological Engineered Design); and
C. A description of any proposed topography changes with an explanation of the ecological need for the changes. The description should reference the construction plan.

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

High (4 points)– The wildlife connectivity action's final topography replicates as closely as possible the natural landscape features (e.g., canyon, ridge, riparian corridor) in the surrounding area.

Medium (2-3 points)– The wildlife connectivity action's final topography somewhat replicates the surrounding area.

Low (1 point)– The wildlife connectivity action's final topography does not replicate the surrounding area.

Zero – The wildlife connectivity action's final topography does not replicate the surrounding area and may have potential negative impacts to native wildlife.

5.3.2 Existing Vegetation and Other Cover

Many species require the presence of cover (e.g., herbaceous, woody vegetation, rockpiles, and brush piles) to facilitate movement across a landscape and through a proposed wildlife connectivity action. 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. The wildlife connectivity action and adjacent lands should already have the appropriate cover, or the sponsor should include a plan to add or enhance cover in general for wildlife as part of the wildlife connectivity action credit proposal.

CDFW will consider the existing vegetation and other cover of the wildlife connectivity action's particular location when evaluating the wildlife connectivity credit proposal. The sponsor shall provide CDFW with a written description of native species needs, or lack of need, for cover and how the vegetation cover in this particular location was considered based on the habitat. The description must include at minimum:

A. The existing wildlife connectivity action site's vegetation (or other) cover conditions and how it currently meets native species' needs.

The sponsor must use the 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 scoring scale when reviewing the proposal as follows:

High (6-8 points)– The existing vegetation and other cover mimics as closely as possible the natural habitat matrix in the surrounding area.

Medium (3-5 points)– The existing vegetation and other cover somewhat mimics the surrounding habitat structure.

Low (1-2 points)– The existing vegetation and other cover does not mimic the surrounding area structure.

Zero – The existing vegetation and other cover does not mimic the surrounding area structure and may have potential negative impacts on native wildlife.

5.3.3 Human Impacts

Human presence near and human use of wildlife connectivity structures have been shown to decrease use of the structure by wildlife. For this reason, the wildlife connectivity action must exclusively be for the use by wildlife (see Section 7: Bank and MCA Modifications).

CDFW will consider the human impacts near the particular location when evaluating the sponsor's wildlife connectivity action credit proposal. 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 native species; and
C. Any measures that will be used to ensure that the wildlife connectivity action remains for wildlife use only. Including, but not limited to how the wildlife connectivity action design includes elements that prevent unauthorized human use or trespass while allowing wildlife use.

The sponsor must use the scoring scale below to evaluate the human impacts for the particular location. CDFW will use the same scoring scale when reviewing the wildlife connectivity action credit proposal as follows:

High (4 points)–No human recreation trail system or human access is within 1,500 feet of the wildlife connectivity action where human presence may modify animal behavior or degrade target habitat.

Medium (2-3 points)–A trail system or human access is within 1,500 feet but not part of the wildlife connectivity action and may modify animal behavior or somewhat degrade target habitat.

Low (1 point)–The wildlife connectivity action is part of a trail system or can be directly accessed by humans.

Zero –The wildlife connectivity action is part of a high use trail system or is commonly accessed by humans or is close proximity to an official or social motorized trail.

5.4 Critical Linkages

CDFW shall consider the improvement of connectivity in critical linkages for determining the value of credits.[50]

When developing the wildlife connectivity action 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 scoring justification shall focus on improving connectivity for native 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 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.

5.4.1 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 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 depict 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

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

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).

CDFW will consider wildlife linkages and connectivity when evaluating the sponsor's wildlife connectivity action proposal. 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 the 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; and
D. List of regional conservation plans that reference the proposed wildlife connectivity action's site.

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

High (9-12 points)– The site is located in ACE terrestrial connectivity Ranks 4 or 5; or the site is named as a priority linkage in a conservation plan or similar document.

Medium (5-8 points)– The site is located in ACE Ranks 2 or 3; or the site is generally named for having conservation benefits in a conservation plan or similar document.

Low (1-4 points)– The site is located in ACE Rank 1; or the site is not part of a conservation plan or similar document.

Zero – The site is located in ACE Rank 1; and the site is not part of any publicly available conservation plan or similar document.

6 REAL ESTATE INSTRUMENTS, MAINTENANCE, AND MONITORING

In order for credits to be created for a wildlife connectivity action, the land must be protected, managed, and monitored for the benefit of the targeted species and/or target habitat. The bank or MCA shall also ensure that the wildlife connectivity action provides wildlife connectivity in perpetuity, such as by providing land protection with a long-term durability agreement in the right of way and typically a conservation easement in adjacent lands. 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.[51]

This section will cover feasibility and options for:

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

This section applies to the wildlife connectivity action property and where it is sited. The funding requirements for the standard bank or MCA lands must otherwise follow the applicable banking Guidelines or the MCA Guidelines.

6.1 REAL ESTATE INSTRUMENTS

A wildlife connectivity action must provide connectivity benefits for target species and target habitat in perpetuity. This is accomplished through legal mechanisms ensuring all real property comprising the wildlife connectivity action is protected for the benefit of the target species and target habitat.

The primary legal mechanism for achieving this protection is a conservation easement. A conservation easement, as approved by CDFW, must be executed and recorded upon the properties associated with the wildlife connectivity action.[52] The one exception to this requirement is if CDFW determines that it is "infeasible" to place a conservation easement on all or a portion of the wildlife connectivity action property.

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;[53] or

[51] 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)(2)).
[52] The sponsor must use the CE template found on the Conservation and Mitigation Banking Instructions and Templates web page.
[53] (Fish & G. Code, § 1957, subdivision (b)(2))

2. A portion of the wildlife connectivity action is in the right-of-way of an existing state highway or other existing public road.[54]

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

"Infeasibility" is restricted to the portion of the wildlife connectivity action property or where it is sited that meets one of the two conditions above. This means a conservation easement may be infeasible over a portion of a wildlife connectivity action property or where it is sited but feasible over the remainder. For example, a wildlife connectivity action includes an overpass spanning a state highway right-of-way and adjacent land on either side of the overpass. In this case, a long-term durability agreement (discussed below), as determined by CDFW, would be used to protect the portion of the wildlife connectivity action where a conservation easement is infeasible. The remaining areas of the wildlife connectivity action must be protected by a conservation easement.

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 optional draft prospectus and bank prospectus (see Wildlife Connectivity Action Bank Prospectus Checklist) or in the MCA concept or the draft MCA (Wildlife Connectivity Action MCA Checklist). CDFW will review the explanation and make a determination in writing.

6.1.1 Long-term Durability Agreement

A long-term durability agreement is an enforceable legal instrument required for any portion of a wildlife connectivity action property or where it is sited where a conservation easement is determined infeasible by CDFW. A long-term durability agreement must ensure the legal real estate, maintenance, replacement and repair requirements for the wildlife connectivity action. If a sponsor believes that they will need a long-term durability agreement to protect a portion or all of the wildlife connectivity action, the sponsor should consult with CDFW early during the review process to discuss whether a long-term durability agreement is appropriate.

A wildlife connectivity action protected by a long-term durability agreement would result in the creation of compensatory mitigation credits for permanent impacts. To clarify, this review and process is separate and different from an MCA with a long-term durability agreement for habitat enhancement actions resulting in non-permanent credits.

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

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

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

6.2 LONG-TERM MANAGEMENT FUNDING

Both the Bank and MCA Programs require that the long-term protection and management of the site are adequately funded by the sponsor; typically, this is accomplished through an endowment(s). When a bank or MCA includes a wildlife connectivity action, the sponsor must provide secure funding to ensure a wildlife connectivity action will function and be successful in perpetuity.

When a portion of a wildlife connectivity action or where it is sited 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 or where it is sited 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.

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 approved in advance, in writing by CDFW. Please review the Banking and MCA Guidelines for more specific information. Sponsors proposing other funding mechanisms should consult CDFW early in the banking or MCA review process.

See Section 7.1: Credit Release, Fees, and Securities for information on other funding requirements.

7 BANK AND MCA MODIFICATIONS

Under these Guidelines, a sponsor will develop and protect a wildlife connectivity action as a bank or an MCA. The wildlife connectivity action will require all items under the Banking or RCIS Guidelines, including the funding of a long-term management endowment and long-term management plan. However, there are specific modifications to the bank and MCA requirements when a sponsor proposes a wildlife connectivity action. The following sections cover how to address these modifications.

7.1 CREDIT RELEASE, FEES, AND SECURITIES

The sponsor is responsible for providing financial security for the successful completion of the construction, performance, interim management, and compliance 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 calculated separately from the security required for the standard bank and MCA lands.

Credits created 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 will have a separate release schedule, performance standards, and potentially long-term funding mechanism related to the wildlife connectivity action. 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 target habitat. Complete construction of the wildlife connectivity action, including ramps and approaches.

  Subsequent credit releases are based on, but not limited to, performance standards, sufficient long-term management funding for credits released, 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 standard 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.
- **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 the wildlife connectivity action within the right of way, which enables the target species or native 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 complete, and a construction security will be provided for the habitat on or under the wildlife connectivity action (e.g., planting of target habitat or habitat for the target species, installation of directional fencing).
    - **Performance and Compliance Securities** – The performance and compliance securities may be based on construction costs. When a bank or MCA includes a wildlife connectivity action, the construction costs will be based on the costs for habitat installation on and under the wildlife connectivity action. This includes project features that will help species enter and exit the structure (e.g., directional fencing, jumpouts) 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 action 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 and is the same as a standard bank or MCA.

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.

7.2 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 must include, but is 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 as determined by CDFW. Indicate the total acreage for each.

7.3 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:

A. 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 long-term durability agreement as determined by CDFW. Indicate the total acreage and associated maps for each;
B. Frequent monitoring and maintenance of fencing associated with the wildlife connectivity action;
C. Monitoring of wildlife connectivity action and associated features (e.g., wildlife jump outs/escape ramps, created habitat structures, fencing) to ensure functionality of the wildlife connectivity action;
D. Monitoring the wildlife passage, wildlife use, and any associated vegetation to ensure functionality of the wildlife connectivity action;
E. Stockpiling and budgeting for spare wildlife connectivity action materials (e.g., fencing) to facilitate repairs;
F. Monitoring for any unauthorized use by humans, such as trespass or recreation, to ensure wildlife connectivity actions are used solely by wildlife;
G. Adaptive management for the wildlife connectivity action and associated features; and
H. Additional annual reporting needs (e.g., wildlife strike data and mortality monitoring) regarding the wildlife connectivity action.

7.4 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[55] due to the wildlife connectivity action as measured through performance standards (see Section 7.1: 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: Target Species Ecological Benefit Crediting Considerations and Section 5: Target Habitat Ecological Benefit Crediting Consideration. 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:

A. Species surveys comparing pre- and post- wildlife connectivity actions;
B. Movement patterns;
C. Remediation of barrier issues;
D. Number of successful crossings;
E. Number and type of species using the structure;
F. Movement of multiple life stages;
G. Reduction in wildlife-vehicle collisions and traffic accidents within the length of project fence);
H. Genetic data related to gene flow;
I. Native vegetation cover; and
J. Percent planted vegetation survival.

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

A. Mortality data;
B. Satellite Collar data;
C. Telemetry/camera trap/hair snare data demonstrating use of the structure;
    - Confirmation of structure use with an entry and exit image capture of the same individual;
    - Hobbs Active Light Trigger (HALT) camera trap installation;
    - 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

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

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 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 geographic information system designed to enable the management, visualization, and analysis of biogeographic data collected by CDFW and its partner organizations. The BIOs connectivity bookmark enables viewers to get more detail on regional linkages. 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. These datasets are periodically updated so the most current version should be used when referencing.
- **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.
- The Nature Conservancy's **Resilient Lands tool** is a proposed conservation network of representative climate-resilient sites designed to sustain biodiversity and ecological functions into the future under a changing climate.

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 location 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 select 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 the California Wildlife Habitat Relationships models 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 wildlife connectivity action bank or MCA.

Wildlife Connectivity Action Design Resources

Wildlife connectivity action 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 (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 MAXIMUMS JUSTIFICATION

The justification for the target species scoring maximums is outlined below.

- **Ecological Engineered Design (24 points)** makes the project viable, and therefore has the highest number of potential points, along with Value of the Habitat Connected. The design facilitates the use of the wildlife connectivity action by the target species, which is essential to enable other potential ecological benefits. For example, this crediting consideration includes subcategories on the approaches, substrate, fencing, noise, light, and structure dimensions.

- **Value of the Habitat Connected (24 points)** makes the project viable therefore has the highest number of potential points, along with Ecological Engineered Design. Dispersal habitat must be present and immediately adjacent to both ends of the structure to facilitate successful movement. 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 and quantity.

- **Value of the Particular Location (21 points)** addresses the potential of the target species to come to the location and use the wildlife connectivity action. The value of the particular location crediting consideration includes information on topography, aquatic resources or other natural pathways, movement and mortality data, cover, and human impacts that can show if target species are likely to be present in the immediate vicinity. Since the benefits of a particular location are contingent on effective design and value of the connected habitat often implemented by other entities external to the wildlife connectivity action proposal, comparatively fewer points are available for this crediting consideration.

- **Critical Linkages (16 points)** assesses the overall importance of connectivity in the area by looking at regional or statewide data and/or analyses of movement and migration pathways of target species. 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 point value.

- **Population-level Benefits to Species (10 points)** addresses issues that might have caused the target 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 point value.

The justification for the target habitat scoring maximums is outlined below.

- **Value of the Habitat Connected (36 points)** establishes the connection of habitat and creates contiguous habitat. This crediting consideration includes subcategories on the protection of the land and the habitat quality. The connected habitat has the highest number of potential points to limit projects creating small patches of unconnected habitat. Native species can also use the contiguous habitat to disperse into lands immediately adjacent to both ends of the structure.

- **Ecological Engineered Design (32 points)** makes the connectivity aspect of the project viable. This crediting consideration includes subcategories on the surface substrate and vegetation and structure dimensions. The design enables the functioning of the target habitat like the use of the wildlife connectivity action by native species and geomorphic processes. The design therefore has a high number of potential points but not the highest because the habitat connected is the most important for habitat credits.

- **Value of the Particular Location (16 points)** addresses the potential of native species, essential to the target habitat, to come to the location and use the wildlife connectivity action. The value of the particular location crediting consideration includes information on topography, existing vegetation and cover, and human impacts. Since the benefits of a particular location are contingent on effective design and value of the connected habitat, comparatively fewer points are available for this crediting consideration.

- **Critical Linkages (12 points)** assesses the overall importance of connectivity in the area by looking at regional or statewide data and/or analyses. However, critical linkages information is less specific to the wildlife connectivity action itself and is therefore assigned a lower maximum point value.