Attachment 4

Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for California Tiger Salamander (CTS) Habitat

HM lands protected as compensatory mitigation for impacts to CTS upland habitat shall be approved in writing by CDFW and meet the following criteria:

- HM lands shall meet the minimum habitat requirements for the Covered Species including, but not limited to one or more aquatic features on-site which have been documented to support successful California tiger salamander breeding in an average or below average rainfall year (abundance and distribution) or adjacent to aquatic features which have been documented to support successful California tiger salamander breeding in an average or below average rainfall year (abundance and distribution) and already conserved and managed to the satisfaction of CDFW for the California tiger salamander; no less than 100 acres of suitable upland or adjacent to suitable upland already conserved and managed for the California tiger salamander
- Suitable upland habitat shall include grassland and may include oak savanna or oak woodlands
- HM lands shall be protected and managed in perpetuity for California tiger salamander.
- Grasslands, associated vernal pools, and alkali seasonal wetlands will be protected in perpetuity as compensation for effects on CTS if CTS have been documented to be present. HM lands will be prioritized based on the following characteristics:
    - Large continuous landscapes, ideally greater than 1000 acres, that consist of grasslands, vernal pool complex, and alkali seasonal wetland complex and encompass the range of vegetation, hydrologic, and soil conditions that characterize these communities.
    - Lands that maintain connectivity with protected grassland, vernal pool complex, alkali seasonal wetland complex landscapes near the Project Area, including connectivity with lands that have been protected or may be protected in the future, minimally 100 acres with no barriers (such as roads, aqueducts, canals, agricultural fields and landfills) to ensure connectivity between upland and aquatic habitat.
        - Upland habitat (e.g., grasslands with rodent burrows and other suitable refugia for CTS) must be within 1.3 miles of suitable aquatic habitat
            - Grass height managed for CTS (ideally four to six inches)
            - Identification of active rodent populations (e.g., California ground squirrels) within upland habitat
            - No use of rodenticides on/near the property
    - Adjacent or connected to occupied CTS upland or aquatic habitat

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM lands protected as compensatory mitigation for impacts to CTS aquatic habitat shall be approved in writing by CDFW and meet the following criteria:

- Aquatic breeding habitat that is created or enhanced for CTS shall be subject to success criteria approved by CDFW. Success criteria shall include, but is not limited to,
    - Demonstration of three years of successful breeding by the California tiger salamander on the property
    - Demonstration of successful metamorphosis of California tiger salamanders on the property. Successful metamorphosis of California tiger salamanders shall be determined by comparison to a CDFW-approved reference site and observation of larval development relative to hydroperiod in ponds at the mitigation site.
    - Demonstration of an overall increasing or stable population trend of California tiger salamanders over the first 10 years of monitoring. Using the monitoring data on tiger salamander breeding collected for criteria #1 and #2 above, an estimate of the number of tiger salamander larvae present in each pond, and on the mitigation site as a whole, will be determined during each year of monitoring. This success criterion will have been satisfied if tiger salamander abundance (a) is higher in year 10 than in year 1 and (b) shows increasing trends in at least six of the first 10 years, or if relative abundance of tiger salamander larvae in ponds on the mitigation site is similar to abundance in similar ponds on CDFW-approved reference sites.
    - Demonstration that the created ponds hold water for a sufficient length of time for successful breeding by red-legged frogs and/or tiger salamanders to occur.
- Breeding ponds buffered by a minimum of 2,067 feet (630 m) from incompatible upland uses (such as development, vineyards or other agricultural fields) to the maximum extent practicable to minimize fragmentation and maintain connectivity with suitable upland habitat within 1.3 miles of the pond (e.g., rodent burrows, burrow complexes, other suitable refugia).
- Breeding ponds managed (e.g., drained yearly and dredged periodically to maintain depth if a managed man-made pool) to maintain a minimal to no presence of invasive aquatic CTS predators, such as bullfrogs, crawfish, and nonnative fish species (e.g., centrarchids like bass and bluegill, mosquitofish).

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Giant Garter Snake (GGS) Habitat

HM lands protected as compensatory mitigation for impacts to GGS aquatic and associated upland habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of GGS within HM lands.
- HM lands shall be protected and managed in perpetuity for GGS.
- Restored or protected nontidal marsh will be characterized by sufficient water during the GGS' active season (May 1 – October 1) to supply constant, reliable cover and sources of food such as small fish and amphibians.
- Restored or protected nontidal marsh will consist of still or slow-flowing water over a substrate composed of soil, silt, or mud characteristic of those observed in marshes, sloughs, or irrigated canals.
- Restoration designs will not create large areas of deep, perennial open water that will support nonnative predatory fish. The restored marshes will be characterized by a heterogeneous topography providing a range of depths and vegetation profiles consisting of emergent, herbaceous aquatic vegetation that will provide suitable foraging habitat and refuge from predators.
- Aquatic margins or shorelines will transition to uplands consisting of grassy banks, with the dense grassy understory required for sheltering. These margins will consist of approximately 200 feet of high ground or upland habitat above the annual high-water mark (highest level to which water rose that year) to provide cover and refugia from floodwaters during the dormant winter season.
- The upland habitat will have ample exposure to sunlight to facilitate GGS thermoregulation and will be characterized by low vegetation, bankside burrows, holes, and crevices providing critical shelter for snakes throughout the day. All GGS upland and aquatic habitat will be established at least 2,500 feet from urban areas (e.g., vehicle routes) or areas zoned for urban development.
    - Grass height managed for CTS (ideally four to six inches)
    - Identification of active rodent populations (e.g., California ground squirrels) within upland habitat
    - No use of rodenticides on/near the property
- The restored wetlands will provide sufficient water during the active season (May 1 – October 1) to supply constant, reliable cover and sources of food (e.g., small fish and amphibians) for GGS.
- The restored wetlands will be designed to mute or reduce flows; provide still or slow-flowing water over a substrate composed of soil, silt, or mud characteristic of those observed in marshes, sloughs, or irrigation canals; and avoid fast-flowing water over sand, gravel, or rock substrate.
- The restored wetlands will be designed (e.g., through grading) to facilitate extended hydroperiods in shallow basins that experience only small, gradual (i.e., slower than tidal

flooding/draining) changes in inundation. Design features may include notched or lowered levees that prevent full draining during low tides, intertidal dendritic channels with variable bottom elevations, and other features that retain water such as potholes, ponds/pannes, and shallow isolated backwaters.

- The restored wetlands will not include large areas of deep, open water that will support nonnative predatory fish.
- The restored wetlands will be characterized by a heterogeneous topography that provides the range of depths and vegetation profiles (i.e., emergent, herbaceous aquatic) required for suitable foraging habitat and refuge from predators at all tide levels.
- The restored wetlands will be designed to provide adjacent terrestrial refuge – grasslands above the high-water mark – for GGS.
- Topography of the restored wetlands will be designed to provide adjacent terrestrial refuge persisting above the high-water mark. Terrestrial features will be sited in close proximity to aquatic foraging areas at all tide levels, with slopes and grading designed to avoid exposing largely denuded intertidal mud flats during low tide.

Emergent wetland plants recommended for GGS habitat:

- Hard stem bulrush (*Scirpus acutus*)
- California bulrush (*Scirpus californicus*)
- Additional wetland plantings may include:
    - Cattail (Typha spp.), water primrose (Ludwigia peploides), or Baltic rush (Juncus balticus)

Upland plantings/Low-growing cover on or adjacent to banks recommended for GGS habitat:

- California blackberry (*Rubus vitifolius*) or wild grape (*Vitis californica*)
- Upland plantings/hydroseeding mix:
    - Disturbed soil surfaces such as levee slopes should be hydroseeded to prevent erosion.
    - A mix of at least 20-40 percent native grass seeds [such as annual fescue (Vulpia spp.), California brome (Bromus carinatus), blue wildrye (Elymus glaucus), and needle grass (Nassella spp.)], 2-10 percent native forb seeds, five percent rose clover (Trifolium hirtum), and five percent alfalfa (Medicago sativa) is recommended.
    - Approximately 40-68 percent of the mixture may be non-aggressive European annual grasses [such as wild oats (Avena sativa), wheat (Triticum ssp.), and barley (Hordeum vulgare)].

- Restoration designs will not include aggressive non-native grasses, such as perennial ryegrass (*Lolium perenne*), cheatgrass (*Bromus tectorum*), fescue (*Festuca* spp.), giant reed (*Arundo donax*), medusa-head (*Taeniatherum caput-medusae*), or Pampas grass (*Cortaderia selloana*) in the hydroseed mix.
- Restoration designs will not include endophyte-infected grasses in the mix. Mixes of one-hundred percent native grasses and forbs may also be used and are encouraged. Riparian plantings are not appropriate because shading may result in lack of basking sites. Native plantings are encouraged except where non-natives will provide additional values to wildlife habitat and will not become invasive in native communities.

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Swainson's Hawk (SWHA) Habitat

HM lands protected as compensatory mitigation for impacts to SWHA nesting habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of SWHA within HM lands.
- HM lands shall be protected and managed in perpetuity for SWHA.
- SWHA suitable nesting habitat includes mature trees (20 feet or greater) in riparian systems as well as in single, isolated and roadside trees.
- Nest sites are generally adjacent to or within 10 miles of alfalfa or hay fields or other habitats or agricultural crops which provide an abundant prey source.
- The following tree types are known to be preferred by SWHA:
    - Valley oaks (Quercus lobata)
    - Fremont's cottonwood (Populus fremontii)
    - Willows (Salix spp.)
    - Sycamores (Platunus spp.)
    - Walnuts (Juglans spp.)

HM lands protected as compensatory mitigation for impacts to SWHA foraging habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of SWHA within HM lands.
- Foraging habitat shall be protected within 3 miles of a known SWHA nest tree and within 50 miles of the Project Area.
- Protected foraging habitat shall have land surface elevations equal to or greater than -1 foot NAVD88 to minimize the risk of flooding and loss of suitable habitat due to future sea level rise.
- Individual patches of foraging habitat shall be at least 40 acres in size.
- SWHA prey populations shall be supported by establishing 20- to 30-foot-wide hedgerows along field borders and roadsides at a minimum rate of 400 linear feet per 100 acres of protected cultivated lands.
- Cultivated lands shall be maintained in non-permanent crop types as follows, and as described in Table A4-1:
    - At least 37.5% of SWHA HM lands will be in Very High Value foraging habitat on an annual basis

- The amount of SWHA HM lands in Very High Value habitat shall increase to at least the amount impacted as a result of Covered Activities, if it is more than 37.5% of the total SWHA foraging habitat
- At least 25% of SWHA HM lands shall be in High Value foraging habitat and other grasslands managed for SWHA use on an annual basis
- No more than 15% of SWHA lands shall be in Low Value foraging habitat on an annual basis
- No SWHA HM lands shall be in No Value foraging habitat

Table A4-1. Swainson's Hawk Foraging Habitat Value Classes

Foraging Habitat Value Classes	Assigned Agricultural Crops/Habitats	Rationale for Assignment of Agricultural Crop Class	Information Sources
Very High Value	Alfalfa	Alfalfa has the highest value because it is semi-perennial (up to 5 years before rotation), which increases prey abundance; has a relatively low profile such that prey is accessible season-long; and has a management regime (mowing and irrigation) which further increases prey accessibility.	Estep 1989, 2009; Swolgaard et al. 2008
High Value	Native pasture, mixed pasture, clover, miscellaneous grasses, non-irrigated native pasture and pasture, upland herbaceous	These pasture types provide a relatively consistent vegetation structure and rodent prey populations. There is less seasonal variability with respect to prey abundance and accessibility compared with grain and vegetable crops, but they lack the management practices that enhance prey accessibility found in alfalfa.	Estep 1989, 2009; Swolgaard et al. 2008
Medium Value	Grasslands, managed wetlands, alkali seasonal wetlands, vernal pool complex, tomatoes, beets, wheat, oats, miscellaneous grain and hay, non-irrigated miscellaneous grain and hay, mixed grain and	Certain row crops, such as beets and tomatoes, have a relatively high value because they support large rodent prey populations, are accessible season-long because of their relatively low vegetation profile, and they are harvested prior to migration, when an abundance of prey becomes available. Most grain crops (primarily wheat) provide value during and	Estep 1989, 2009; Swolgaard et al. 2008

Foraging Habitat Value Classes	Assigned Agricultural Crops/Habitats	Rationale for Assignment of Agricultural Crop Class	Information Sources
	hay, non-irrigated mixed grain and hay	following harvesting, when prey becomes accessible. Grasslands are generally available season-long but provide lower prey abundance compared with higher value agricultural habitats, don't provide a peak period of high-value abundance and accessibility like some agricultural crops (e.g., tomatoes), and in some cases grass height reduces prey accessibility during a portion of the breeding season.	
Low Value	Cole crops, sudan crops, dry beans, field crops, corn, grain sorghum, young perennials, miscellaneous truck crops, carrots, melons, squash, cucumbers, onions, garlic, peppers, lettuce, truck/nursery/berry crops, miscellaneous field, safflower, sunflower	These agricultural types are suitable for a portion of the breeding season depending on their structure and planting/harvesting regime. In general, they produce less prey abundance and less prey availability than the other agriculture types listed above.	Estep 1989, 2009; Swolgaard et al. 2008
No value	Rice, orchards, vineyards (i.e., permanent crops)	Permanent crops have little use because they are very difficult for SWHA to access prey in them.	Estep 1989, 2009; Swolgaard et al. 2008

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Tricolored Blackbird (TRBL) Habitat

HM lands protected as compensatory mitigation for impacts to TRBL nesting habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of TRBL within HM lands.
- HM lands shall be protected and managed in perpetuity for TRBL.
- Occupied or recently occupied (within the last 15 years) stands of bulrush/cattail emergent vegetation.
- Wetland marsh habitat that contains standing water to a depth of 1 foot in most years from late January through late July to encourage dense development of cattail and bulrush vegetation
- Alternative nesting habitat may be considered based on best available science (e.g., protection of upland TRBL nesting habitat including blackberries or some of the other upland vegetation species frequently used by TRBL for nesting).

HM lands protected as compensatory mitigation for impacts to TRBL foraging habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of TRBL within HM lands.
- Large continuous landscapes that consist of high or very high-quality cultivated lands, grasslands, vernal pool complex, and alkali seasonal wetland complex (see Table 2).
- Lands are within 3.11 miles (5 kilometers) from suitable nesting habitats.
- Cultivated lands that provide opportunities to maintain a mosaic of crop types and allow for the periodic rotation of essential crop types (those crop types with very high, high, and moderate foraging habitat values) to nonessential crop types to ensure acreage commitments.
- Cultivated lands that expand upon or provide connectivity between existing conservation lands.

Table A4-2. Tricolored Blackbird Foraging Habitat Value Classes

Foraging Habitat Value Classes	Breeding Season Foraging Habitat	Nonbreeding Season Foraging Habitat
Very high	Native pasture, non-irrigated native pasture, annual grasslands, wetlands, vernal pool grasslands, alkali grasslands, unsprayed alfalfa, unsprayed sunflower, unsprayed mixed alfalfa	Native pasture, non-irrigated native pasture, annual grasslands, wetlands, vernal pool grasslands, alkali grasslands, unsprayed alfalfa, unsprayed sunflower, unsprayed mixed alfalfa, livestock feed lots
High	Sunflower, alfalfa and mixed alfalfa, mixed pasture, induced high water table native pasture, non-irrigated mixed pasture, dairies	Corn, sunflower, millet, alfalfa/mixed alfalfa, mixed pasture, native pasture, induced high water table native pasture, non-irrigated native pasture, rice, dairies, annual grasslands, vernal pool grasslands, alkali grasslands
Moderate	Miscellaneous grass pasture, fallow lands cropped within three years, new lands prepped for crop production, livestock feed lots, organic rice	Miscellaneous grass pasture, non-irrigated mixed pasture, fallow lands cropped within three years, new lands prepped for crop production, organic rice
Low	Wheat, mixed grain and hay, farmsteads, rice	Wheat, oats, mixed grain and hay, farmsteads

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Crotch's Bumble Bee (CBB) Habitat

HM lands protected as compensatory mitigation for impacts to CBB habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of CBB within HM lands.
- HM lands shall be protected and managed in perpetuity for CBB habitat requirements.
- Large continuous landscapes that consist of CBB's three main habitat requirements: diverse flowering resources that provide pollen and nectar throughout the duration of the colony period (spring, summer, fall), nest sites for the colony, and overwintering sites for dispersing queens.
- Habitat that contains high or very high-quality native flowers with a minimum of three flowering species per season (spring, summer, and fall) with overlapping bloom periods, and are flower-rich (e.g., *Phacelia tanacetifolia, Ceanothus griseus, Escchscholzia californica, Lupinus polyphyllus, Rose nutkana, Asclepia speciosa, Agastache urticifolia, Monardella odaratissima, Helianthus nuttallii, Solidago canadensis*), natural habitats, grassland, and scrub habitats with underground cavities (e.g., animal burrows, abandoned bird nests, empty cavities on ground surface) for nesting.
    - Identification of active rodent populations (e.g., California ground squirrels) within habitat
    - No use of rodenticides on/near the property
- High or very high-quality overwintering and aboveground undisturbed areas with nesting resources like leaf litter or other complex habitat such as wood piles, hollow logs, tufts of grass, or rock walls for additional overwintering habitat.

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Mason's Lilaeopsis (MALI) Habitat

HM lands protected as compensatory mitigation for impacts to MALI habitat shall be approved in writing by CDFW and meet the following criteria:

- HM lands shall be protected and managed in perpetuity for MALI.
- Suitable habitat substate at tidally inundated wave-cut beaches, eroded mudbanks, mudflats, levees, decomposing wooden pilings, logs in upper tidal zones (littoral zones) of freshwater and tidal marshes) in areas with no riprap (revetment) and little human disturbance including recreational trails and other foot traffic.
- Sites with suitable tidal elevation and likelihood of frequent tidal inundation (inundated twice daily, but also exposed much of the day by low tides). Sites with excessive erosion along riverbanks due to flood-causing storm events are unsuitable for MALI.
- Habitat shall be managed to control invasive plant species, such as perennial pepperweed (*Lepidium latifolium)* and water hyacinth (*Eichhornia crassipes*) in restored sites and limit pepperweed and invasive species occurrences to no more than 10% cover at managed sites using vegetation management methods approved by CDFW.
- Vernal pools with sufficient water depth and duration of inundation to allow germination and maturation.
- Habitat sited near extant populations of MALI that provide vegetative or seed propagules and presence of known populations or commonly associated plant species that support MALI within littoral zones and near shore regions.
- Established presence of MALI at new locations where transplanted colonies have proven to persist under a long enough period of time to be exposed to most of the natural processes that impact any given site.

Attachment 4

Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Lands Criteria for Winter- and Spring- Run Chinook (CHNWR, CHNSR) Tidal Perennial Habitat

HM lands protected as compensatory mitigation for impacts to CHNWR and CHNSR tidal perennial aquatic habitat shall be sited in consultation with NMFS, USFWS, and CDFW, within areas of the Delta appropriate for offsetting effects of the project, approved in writing by CDFW, and prioritized based on the following criteria:

- Restoration of tidal perennial aquatic habitat will primarily occur through breaching or setback of levees, thereby restoring tidal fluctuation to land parcels currently isolated behind those levees. Factors to be considered when evaluating sites for potential location and design of tidal perennial habitat restoration include provision of suitable habitat features such as those suggested by San Francisco Institute (2020), Fresh et al. (2006), and Quinn et. al (2005).

- Tidal perennial habitat restoration is not intended to restore large areas of shallow subtidal aquatic habitat, which would collaterally create habitat for nonnative predators; rather, shallow subtidal aquatic habitat restoration is proposed in association with tidal habitat, which will provide more heterogeneity and support pelagic habitat adjacent to emergent wetland.

- When appropriate, portions of restoration sites will be raised to elevations that will support tidal marsh vegetation following levee breaching. Depending on the degree of subsidence and location, lands may be elevated by grading higher elevations to fill subsided areas, importing clean dredged or fill material from other locations, or planting tules or other appropriate vegetation to raise elevations in shallowly subsided areas over time through organic material accumulation. Surface grading will create a shallow elevation gradient from the marsh plain to the upland transition habitat

- Based on assessments of local hydrodynamic conditions, sediment transport, and topography, restoration activities may be designed and implemented in a manner that accelerates the development of tidal channels within restored marsh plains. Following reintroduction of tidal exchange, tidal marsh vegetation is expected to establish and maintain itself naturally at suitable elevations relative to the tidal range. Depending on site-specific conditions and monitoring results, patches of native emergent vegetation may be planted to accelerate the establishment of native marsh vegetation on restored marsh plain surfaces.

HM lands protected as compensatory mitigation for impacts to CHNWR and CHNSR channel margin habitat shall be sited in consultation with NMFS, USFWS, and CDFW, within areas of the Delta appropriate for offsetting effects of the Project, approved in writing by CDFW, and prioritized based on the following characteristics:

- Channel margin restoration will be accomplished by improving channel geometry and restoring riparian, marsh, and mudflat habitats on the water side of levees along channels that provide rearing and outmigration habitat for juvenile salmonids in particular, similar to what is currently done by the USACE and others when implementing levee improvements.

- Channel margin restoration associated with federal project levees will not be implemented on the levee, but rather on benches to the waterward side of such levees, and flood conveyance

will be maintained as designed. Channel margin enhancements associated with federal project levees may require permission from USACE in accordance with USACE's authority under the Rivers and Harbors Act (33 USC § 408) and USACE levee vegetation policy.

- Sites for channel margin restoration will be subject to approval by NMFS and CDFW. Any restoration will be designed, constructed, and maintained to ensure no reduction in performance of the federal flood project.

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Land Criteria for Delta Smelt (DS) Habitat

HM Lands protected as compensatory mitigation for impacts to DS tidal perennial aquatic habitat shall be approved in writing by CDFW and meet the following criteria:

- Restoration of tidal perennial aquatic habitat will primarily occur through breaching or setback of levees, thereby restoring tidal fluctuation to land parcels currently isolated behind those levees. Factors to be considered when evaluating sites for potential location and design of tidal perennial habitat restoration include provision of suitable habitat features such as those suggested by Sommer and Meija (2013)
- Location shall be concentrated within the north Delta Arc or other areas deemed appropriate through consultation with CDFW.
- Habitat restoration is expected to increase the extent of suitable delta smelt habitat with appropriate measures (turbidity, temperature, salinity) providing habitat for occupancy.
- Habitat restoration is expected to increase food web resource production for Delta Smelt both within the restored habitat and through export of food web resources to surrounding areas where DS are present. Habitat restoration is expected to result in an increase in DS population size through the life cycle models. This increase in food availability should fully mitigate the loss of food resources through project impacts.

HM Lands protected as compensatory mitigation for impacts to DS shallow spawning habitat from project construction

- Restoration of shallow spawning habitat will occur in areas that are known to overlap with DS migration route and demonstrate DS occupancy and use for spawning
- Restoration of shallow spawning habitat will have appropriate habitat characteristics, such as substrate type, depth, and velocity, that are amenable for DS spawning.

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Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Land Criteria for Longfin Smelt (LFS) Habitat

HM Lands protected as compensatory mitigation for impacts to LFS mesohaline tidal habitat shall be approved in writing by DFW and meet the criteria as listed under the HM Land Criteria for Longfin Smelt.

- Restoration of mesohaline tidal habitat will primarily occur through breaching or setback of levees, thereby restoring tidal fluctuation to land parcels currently isolated behind those levees. Factors to be considered when evaluating sites for potential location and design of mesohaline tidal habitat restoration include provision of suitable habitat features such as those suggested by Sommer and Meija (2013)
- Location shall be concentrated within the Suisun Bay or other areas of appropriate salinity deemed acceptable through consultation with CDFW.
- Habitat restoration is expected to increase the extent of suitable Longfin Smelt rearing habitat with appropriate measures providing habitat for occupancy.
- Habitat restoration is expected to increase food web resource production for Longfin Smelt both within the restored habitat and through export of food web resources to surrounding areas where LFS are present. Habitat restoration is expected to result in an increase in LFS population size through the life cycle models. This increase in food availability should fully mitigate the loss of food resources through project impacts.

HM Lands protected as compensatory mitigation for impacts to LFS shallow spawning habitat from project construction

- Restoration of shallow spawning habitat will occur in areas that are known to overlap with LFS migration route and demonstrate LFS occupancy and use for spawning
- Restoration of shallow spawning habitat will have appropriate habitat characteristics, such as substrate type, depth, and velocity, that are amenable for LFS spawning.

Covered Species-Specific Criteria for HM Lands Suitable for Compensatory Mitigation

HM Land Criteria for Western Burrowing Owl (BUOW) Habitat

HM lands protected as compensatory mitigation for impacts to BUOW nesting, foraging, overwintering, and dispersal habitat shall be approved in writing by CDFW and meet the following criteria:

- Survey efforts shall identify positive findings of BUOW nesting activity within the last three years within HM lands.
- HM lands shall be protected and managed in perpetuity for BUOW.
    - Permittee shall enhance or expand the number of small mammal burrows and artificial burrows for BUOW breeding, shelter and dispersal opportunity, and remove or control population stressors. HM lands shall demonstrate that there are a minimum of two suitable natural or artificial burrow complexes for each suitable occupied burrow complex removed or owl evicted for Covered Activities.
    - Artificial burrows shall be continuously monitored and maintained twice a year in perpetuity and replaced every five to six years or decommissioned after five years of no use by BUOW.
- HM lands will be prioritized based on the following characteristics:
    - Large continuous landscapes, ideally greater than 300 acres, that maintain connectivity with suitable landscapes containing the vegetation, hydrologic, and soil conditions described below:
        - Lands consist of well-drained, gently sloped or flat grasslands, agricultural and range lands, pasture, vernal pool complex, alkali seasonal wetland complex, and upland herbaceous habitat.
        - Lands that maintain connectivity to adjacent agricultural fields and field edges, fallow fields, canal banks, cut banks, roadsides, rights-of-way, and vacant lots where vegetation structures and useable burrows may be suitable for burrowing owl nesting and foraging habitat.
        - Adjacent or connected to occupied BUOW habitat (known occurrences within the preceding three years).
        - Habitat restoration is expected to increase the extent of suitable BUOW nesting, foraging, and overwintering habitat with appropriate measures providing and enhancing habitat for BUOW occupancy.
        - Identification of fossorial mammals (e.g., ground squirrels, badgers, gophers, skunks) and year-round access to burrows and suitable refugia (e.g., natural rock cavities, dens, culverts, rock or debris piles, and artificial burrows) suitable for nesting, wintering, or migrating BUOW.
- Vegetation shall only be trimmed to four to six inches outside of the BUOW breeding season, or after young are fully fledged, with hand tools limited to string trimmers (e.g., weed whackers) that will not crush burrows or impact the ground, with minimal shrub cover and woody plant encroachment.
- No use of pesticides or rodenticides on/near the property.

- Suitable burrows, burrow complexes, and installed artificial burrows within HM lands shall not be susceptible to long-term flooding.
- Habitat enhancements such as perches and visual barriers near burrows/burrow complexes shall not cause detrimental effects to BUOW such as attracting predators (e.g., other birds of prey, ravens) near burrows and within burrow complexes.
- HM lands shall consider the potential for human and wildlife conflicts or incompatibility and prevent excessive human and human-related disturbances (e.g., human foot and vehicle traffic; predation by cats, loose and feral pets and urban-adapted wildlife; and incompatible species management) that may make the environment uninhabitable for BUOW.