APPENDIX F. COST AND FUNDING

F.5 Introduction

This appendix describes the methods used to develop the Butte Regional Conservation Plan (BRCP) implementation cost estimates presented in Chapter 9, *Costs and Funding Sources*. Cost estimation methods and results are described for the mitigation component[1] and conservation component[2] costs of the BRCP for the following cost categories.

- **Conservation Measures**. Cost estimates are provided for each of the 14 conservation measures described in Section F.6, *Conservation Measure Implementation Costs*. The cost estimates for conservation measures only include, except where noted otherwise, costs directly associated with implementation of the actions required to physically implement each measure (see Chapter 6, *Conditions on Covered Activities*[3]). Costs associated with planning, permitting, monitoring, conducting surveys, and related actions that support the physical implementation of conservation measures are, except as noted in Section F.6, included under other cost categories in this chapter.
- **Environmental Compliance**. This category includes costs associated with complying with other laws and regulations and obtaining associated permits necessary to implement some of the conservation measures. Conservation measures that are expected to require such compliance are those that require vegetation and ground disturbing activities such as restoring habitat (e.g., riparian and wetlands habitat restoration) or require disturbance of streams, such as in-channel placement of spawning gravels and removal of riprap.
- **Monitoring**. This category includes costs associated with implementing the monitoring plan (see Section 7.3, *Monitoring and Adaptive Management Plan Content and Monitoring Requirements*) and conducting pre-land acquisition and other surveys related to the management of conservation lands.
- **Administration and Management**. This category includes costs necessary to administer implementation of the BRCP, including hiring of personnel and the ongoing costs of personnel expenses, office equipment and supplies, contracted services, and other overhead and related expenses. A description of BRCP administrative functions is described in Chapter 8, *Plan Implementation*.
- **Changed Circumstances**. This category includes costs of implementing measures to respond to changed circumstances. The range of measures to address changed circumstances is described in Section 8.5.1, *Changed and Unforeseen Circumstances*.

[1] The mitigation component of costs includes the costs to implement mitigation measures that address the impacts of BRCP covered activities. These costs include administration, land maintenance and management, monitoring, adaptive management necessary to implement the mitigation measures.

[2] The conservation component of costs includes the costs of all actions under the Conservation Strategy that are implemented to conserve natural communities and contribute to the recovery of covered species above and beyond mitigation.

[3] All text, table, and figure references other than those to this appendix are to the main body of the BRCP HCP/NCCP document.

- **Endowment for Post-Permit Implementation**. This category includes the costs associated raising an endowment that would fund ongoing management of conservation lands after the expiration of BRCP incidental take permits 50 years following their issuance.

F.5.1 Mitigation Component Implementation Cost Estimate

The total cost estimate for implementing all BRCP actions, including conservation measures, over the 50-year term of the BRCP is $177.8 million in 2018 dollar terms for the mitigation component of costs (see Tables 9-2 and 9-3). The total mitigation component costs reflect the mitigation requirements if all of the covered activities (see Chapter 2, *Covered Activities*) are implemented (i.e., full build-out of the County's and cities' general plans, transportation plans, and other plans and activities).

The timing of when the covered activities are implemented is uncertain and will depend on fluctuations in the strength of the economy, real estate market, and the availability of public infrastructure funding. As a result, the timing of the associated mitigation, which must occur prior to or concurrently with impacts, would follow the same drivers. Because the timing of impacts and associated mitigation is not known, the mitigation component cost estimate assumes that acquisition of lands to protect and restore habitat for mitigation is implemented on the same schedule as and proportionate to land acquisitions for conservation (See Section 5-2, *Summary of BRCP Implementation Costs by Cost Category*). Recurring costs associated with management and monitoring of mitigation lands will be higher if a larger amount of mitigation is implemented early in the 50-year BRCP implementation period and will be lower if a larger amount of mitigation is implemented late in the 50-year BRCP implementation period. For example, if all mitigation is implemented in the first 10-year implementation period, management and monitoring will need to be funded through the subsequent four 10-year implementation periods, whereas if all mitigation is implemented in the third 10-year implementation period, those costs will only need to be funded through the two subsequent 10-year implementation periods.

F.5.2 Conservation Component Cost Estimate

Total conservation component costs for BRCP over 50 years are estimated to be approximately $263.2 million in 2018 dollar terms (see Table 9-2). Costs are estimated for each of five 10-year implementation periods. Conservation costs are highest during the second, third, and fourth decades of implementation when the majority of conservation lands will be acquired and habitat restoration actions implemented. The acreage of land acquisition is assumed to be lower during the first decade because the initial years of implementation will be devoted primarily to establishing the Implementing Entity and its operating procedures, securing conservation component funding, and to identifying opportunities for acquisition. In the fifth decade, the acreage of land acquisition is assumed to be lower because all land acquisition will need to be completed several years before Implementation Year 50 to enable the permitting agencies to confirm that all BRCP covered species habitat acquisition requirements have been satisfied.

F.6 Conservation Measure Implementation Costs

This section presents assumptions and cost estimates for implementing each of the conservation measures identified in Chapter 5, *Conservation Strategy*.

F.6.1 CM1: Acquire Lands

This section describes the approach used to develop planning-level land value estimates for the types of land that will be acquired as part of BRCP implementation. Total land value estimates are based on the land acquisition goals developed as part of the conservation strategy along with the land value research and conclusions described below. The land valuations are based on available information and represent average land value estimates for land cover types within the large array of potential land acquisitions as part of BRCP implementation.

The term "land acquisition" is used to refer to either fee title acquisition of the land or acquisition of conservation easements on the land that prevent specified land uses. This analysis provides land value estimates in 2018 dollar terms. However, actual land values are likely to change over time for a range of reasons – inflation, fluctuations in economic conditions, real estate market, and the agricultural market, urban growth patterns, changes in the regulatory framework, and diminishing acquisition opportunities, among others.

F.1.1.1 Land Acquisition Assumptions

The BCRP conservation strategy and related analysis determined the land acreage by land cover type that would be required to meet the BCRP conservation goals as well as the land acreage required to mitigate for covered activities, assuming they occur to the maximum extent allowed (i.e., full build-out of general plans, transportation plans, etc.). These land acquisition goals include lands that will be acquired to protect existing habitat and to restore land cover types that support covered species habitats (e.g., wetland restoration). The analysis assumes that all habitat restoration will occur on land acquired in fee title (i.e., purchased outright), while the majority of protection-only land would be acquired using conservation easements (between 40 and 100 percent depending on land cover). The overall mitigation component and conservation component land acquisition targets are shown in Table F-1. *Easement and Fee Title Land Acquisition Cost Estimate Assumptions by Implementation Period (acres)*.

Mitigation component lands will be acquired as covered activities (e.g., real estate development) occur and mitigation provided through protecting and restoring habitat is required. The timing of mitigation and the ultimate total level of mitigation is highly uncertain as it depends on the timing and level of the covered activities. Therefore, all acquisition for mitigation shown in *Table F-1. Easement and Fee Title Land Acquisition Cost Estimate Assumptions by Implementation Period (acres)*. Similarly, the fraction of acquisition for mitigation by fee title or conservation easements will depend, in part, on the nature of actual impacts. The assumptions in Table F-2 are only for determining an estimated cost for implementing the BRCP; the actual amount of land acquired in fee title versus conservation easement will vary from these estimates during BRCP implementation.

Conservation component acquisition of land for conservation will occur over a 50-year period, with the greatest portions occurring in the third and second decades (Table F-1). As noted above, these are assumptions used for determining an estimated cost for implementing the BRCP; the actual amount of land acquired in fee title versus conservation easement may vary from these estimates during BRCP implementation.

Table F-1. Easement and Fee Title Land Acquisition Cost Estimate Assumptions by Implementation Period (acres)

Land Cover	Mitigation Acres			Conservation Acres by Implementation Period													HCP Total		
				Years 1–10		Years 11–20		Years 21–30		Years 31–40		Years 41–50		All Years					
	Conservation Easement	*Fee Title*	*Total*	*Conservation Easement*	*Fee Title*	*Conservation Easement*	*Fee Title*	*Conservation Easement*	*Fee Title*	*Conservation Easement*	*Fee Title*	*Conservation Easement*	*Fee Title*	*Conservation Easement*	*Fee Title*	*Total*	*Conservation Easement*	*Fee Title*	*Total*
Oak Woodland And Savanna	9,315	1,644	10,959	388	69	2,020	356	2,253	398	2,253	398	856	151	7,770	1,371	9,141	17,085	3,015	20,100
Riparian	727	421	1,148	554	172	739	230	1,181	367	812	253	406	126	3,693	1,149	4,842	4,420	1,570	5,990
Wetland	27	129	155	75	100	130	173	130	188	115	138	49	66	498	666	1,165	525	795	1,320
Grassland With Vernal Pools	3,031	1,010	4,041	2,666	889	1,979	660	3,226	1,075	2,534	845	1,152	384	11,557	3,852	15,409	14,588	4,863	19,450
Grassland (Only)	6,289	1,110	7,399	180	32	1,247	220	1,689	298	1,348	238	555	98	5,020	886	5,906	11,309	1,996	13,305
Rice	2,669	471	3,140	774	137	1,936	342	2,323	410	1,936	342	774	137	7,744	1,367	9,110	10,413	1,838	12,250
Irrigated Cropland/ Pasture	2,161	0	2,161	0	0	0	0	0	0	0	0	0	0	0	0	0	2,161	0	2,161
Orchard	0	0	0	19	0	35	0	39	0	39	0	23	0	155	0	155	155	0	155
Total	**24,219**	**4,784**	**29,003**	**4,657**	**1,398**	**8,084**	**1,981**	**10,841**	**2,737**	**9,037**	**2,213**	**3,816**	**962**	**36,436**	**9,291**	**45,728**	**60,655**	**14,076**	**74,731**

Table F-2. Summary of BRCP Implementation Costs by Cost Category

Conservation Measure	Mitigation Costs	Conservation Costs by Implementation Period						HCP Total
		Years 1–10	Years 11–20	Years 21–30	Years 31–40	Years 41–50	All Years	
CM1: Acquire Lands	$92,953,000	$23,660,000	$34,378,000	$47,128,000	$38,122,000	$16,568,000	$159,856,000	$252,810,000
CM2: Develop an Invasive Species Control Program	$23,000	$35,000	$0	$0	$0	$0	$35,000	$58,000
CM3: Identify High Priority Locations for Wildlife Passage Structures and Secure Funding	*Included in Administration and Management Costs and CM5*							
CM4: Develop and Implement Site Specific Wetland and Riparian Restoration Plans	$27,928,000	$75,000	$130,000	$145,000	$100,000	$50,000	$499,000	$28,427,000
CM5: Enhance Protected Natural Communities for Covered Species	$6,527,000	$500,000	$1,492,000	$2,813,000	$4,067,000	$4,757,000	$13,630,000	$20,156,000
CM6: Maintain and Enhance Public and Easement Habitat Lands for Covered Species	$0	$25,000	$75,000	$141,000	$203,000	$238,000	$681,000	$681,000
CM7: Create and Maintain Greater Sandhill Crane Winter Roosting Habitat	$0	$0	$152,000	$32,000	$152,000	$32,000	$370,000	$370,000
CM8: Restore Giant Garter Snake Habitat	$0	$1,741,000	$3,018,000	$3,366,000	$2,322,000	$1,161,000	$11,608,000	$11,608,000
CM9: Replenish Spawning Gravels for Salmonids	$0	$488,000	$759,000	$759,000	$271,000	$0	$2,278,000	$2,278,000
CM10: Remove Impediments to Upstream and Downstream Fish Passage	$0	$14,000	$19,000	$24,000	$24,000	$0	$81,000	$81,000
CM11: Remove, Modify, or Screen Unscreened Diversions	$0	$64,000	$119,000	$119,000	$49,000	$0	$351,000	$351,000
CM12: Conserve Butte County Meadowfoam	*Included in CM1 and CM5*							
CM13: Conduct Surveys to Locate and Protect New Occurrences of Butte County Checkerbloom	*Included in Administration and Management and CM1*							
CM14: Translocate Conservancy Fairy Shrimp, Hoover's Spurge Ahart's Dwarf Rush, Hairy Orcutt Grass, Slender Orcutt Grass, and Greene's Tuctoria	$0	$0	$150,000	$225,000	$0	$0	$375,000	$375,000
Total	**$127,431,000**	**$26,602,000**	**$40,293,000**	**$54,753,000**	**$45,310,000**	**$22,806,000**	**$189,764,000**	**$317,194,000**

F.1.1.2 Other Underlying Assumptions

In addition to the acreages by land cover, other assumptions that affect the land valuation estimates include the following.

- There are sufficient large parcels (i.e. over 160 acres) available with the appropriate land cover types to assume that the large majority of acquisition will be of this scale. Exceptions are assumed where there are greater limitation on land availability; e.g. with Butte County meadowfoan habitat or some aquatic resources.
- The large majority of acquisitions are expected to occur away from the urban edge and, thus, in areas with little to moderate urban speculative value. The one exception is for some of the grasslands with vernal pools that may be required to acquire land for Butte County meadowfoam suitable and occupied habitat, some of which is close to urban areas. Adjustments were made in the land valuation to account for the location premium.
- Land acquisition in the Northern and Southern Orchards Conservation Acquisition Zones (CAZs) will occur on land with limited potential to support orchard crops. It is assumed that the fact that these lands have not been converted to orchard in the past makes them less suitable to orchard uses. As a result, they were valued based on their use for irrigated field crops.
- Land for wetland restoration was assumed to be purchased as rice land, prior to conversion. As rice land has a different value than existing wetlands, the overall wetland cost is a blended rate between wetlands and rice land. During BRCP implementation, however, lands other than rice land that are suitable for wetland restoration may be acquired for wetland restoration.
- Land value estimates represent planning-level estimates in 2018 dollar terms.

F.1.1.3 Land Valuation Methods

The planning level land value average estimates were originally developed in 2011 and have now been updated to 2018 planning-level averages. A number of different sources were consulted in developing these land value estimates, including the following.

- **American Society of Farm Managers and Rural Appraisers (ASFMRA)**. The California Chapter of the American Society of Farm Managers and Rural Appraisers annually publishes a Trends in Agricultural Land and Lease Values report with land value ranges provided for a variety of agricultural land types for regions in California and Nevada. Butte County is tracked as part of the northwestern counties in the Sacramento and Intermountain Valleys region that includes Butte, Colusa, Glenn, and Tehama Counties. Per-acre land value ranges were provided for a number of relevant agricultural land categories, including irrigated field crops, rice, orchards, and rangeland. Estimates from the 2018 Trends report inform BCRP land value estimates, updating prior information.
- **Land Trust Interviews**. Interviews with selected land trust professionals active in Butte County and surrounding Counties provided important insights into the original 2011 land valuations as well as input into the changes in the land market and current trends in 2018.
- **Urban Edge Values**. In general, the BCRP will not focus on land at the urban edge, though some grassland acquisitions may be necessary to support the conservation of certain species. Land values at the urban edge vary considerably based on the current and expected future regulatory constraints and changes, the market for the uses that might ultimately offer the highest and best use, the expected timeframe under which new development might occur if at all, and the presence of resource constraints. The 2011 residual land value analysis of lands inside and

adjacent to cities was updated based on changes in housing prices and other indicators of change in urban land values. The BCRP land value analysis adjusted grassland value upward to reflect that some acquisitions will occur near the urban edge.

- **Review of Land Sales Data**. A review of land sales information concerning recent sales and pending sales was also conducted for grassland areas. These areas included more remote ranchland as well as areas closer to urban development and infrastructure.
- **Encumbered Values**. A large proportion of land acquisitions will occur through conservation easement acquisition. The cost of conservation easement acquisition will represent the difference between the unencumbered fee title land value and the encumbered land value. There are limited transactions of encumbered land (i.e., land with easements in place). Encumbered land values were derived using a number of approaches, including capitalization of annual net land rent estimates for agricultural land and observed relationships between fee title and easements in other areas.

Table F-3. Per-Acre Fee Title Land Value Estimates

Land Value Category	Land Cover Types	Average Fee Title Value Assumption
Rangeland/Remote	Oak Woodlnad and Savanna	$1,600
Riparian/Wetlands	Riparian	$2,500
Raw Land/Moderate Access	Grasslands	$4,900
Agricultural Land – Rice	Rice	$11,000
Agricultural Land – Irrigated Field Crops	Irrigated Cropland/Pasture	$15,000
Agricultural Land – Orchard	Orchards (Almonds, Olives, Walnuts, Prunes)	$25,000

Table F-4. Per-Acre Easement Land Value Estimates

Land Value Category	Average Fee Title Value Estimate (a)	Encumbered Land Value Estimate (b)	Average Conservation Easement Value Estimate (c = a – b)
Rangeland/Remote	$1,600	$550	$1,050
Riparian/Wetlands	$2,500	$250	$2,250
Raw Land/Moderate Access	$4,900	$1,500	$3,400
Agricultural Land - Rice	$11,000	$7,250	$3,750
Agricultural Land – Irrigated Field Crops	$15,000	$5,500	$9,500
Agricultural Land – Orchard	$25,000	$250	$24,750

For the purposes of estimating land acquisition costs associated with BRCP implementation, the land cover types were divided into six value categories based on a combination of proximity to valley floor, agricultural use/potential use, use constraints associated with resources such as wetlands/riparian, and data availability. All land cover types fit within one of the value categories. The valuation categories are described below and their land cover correspondence and estimated average values per acre for fee title and conservation easement acquisition are presented in Table F-3. *Per-Acre Fee Title Land Value Estimates* and *Table F-4. Per-Acre Easement Land Value Estimates*.

1. **Rangeland/Remote**. Remote land distant from the urban areas and the major highways commands lower values due to its limited use options. Remote lands may be used as rangeland if parcel sizes and other conditions are appropriate or potentially for remote rural home sites, though infrastructure provision is costly. Values associated with lands in the rangeland/remote category were used as an indicator of all oak woodland and savanna land cover types.
2. **Riparian/Wetlands**. Riparian areas are substantially constrained in their uses by environmental regulation. The presence of these resources limits land values to modest levels, though value remains, especially as areas of importance to organizations pursuing conservation, such as land trusts, habitat mitigation bankers, and others.
3. **Raw Land/Moderate Access**. The value of grasslands in this category is more determined by proximity to urban areas and transportation infrastructure and other factors that affect their ability to be developed for urban uses or rural residential uses. In the context of Butte County, much of the grasslands are centrally located and, on average, will command a premium above more remote land types, even if their eventual development is highly uncertain and speculative. Grassland was valued as raw land with moderate access, commanding values above those in more remote areas but well below those in urban areas. Grassland with vernal pools was similarly valued, though there was an upward adjustment made to the average value of grasslands with vernal pools due to the need to acquire some of this land in and near to Chico that supports Butte County meadowfoam occupied and suitable habitat.
4. **Agricultural Land – Rice**. Rice land commands value through its agricultural use and income as well as through its access to water. The American Society of Farm Managers and Rural Appraisers conducts direct research of the value range of rice land transactions. Current 2018 land value estimates were used to provide the average land value for rice lands.
5. **Agricultural Land – Irrigated Field Crops**. Irrigated cropland commands value through its agricultural use value as well as its speculative development value. The American Society of Farm Managers and Rural Appraisers conducts direct research of the value range of irrigated cropland land transactions. Current 2018 land value estimates were used to provide the average land value for irrigated cropland lands.
6. **Agricultural Land - Orchard**. Orchard land commands value through its agricultural use and income. The American Society of Farm Managers and Rural Appraisers conducts direct research of the value range of orchard land transactions. The 2018 land value estimates for orchard crops were used to provide the average land value for these lands.

F.1.1.4 Mitigation and Conservation Component Costs

As shown in Table F-5. *Land Acquisition Cost Estimates*, mitigation component land acquisition costs for mitigation of the effects of implementing all covered activities total about $93.0 million. Conservation component land acquisition costs associated with BRCP conservation actions totals

about $159.9 million. Conservation acquisition costs are spread across the five-decade BRCP permit term, with the highest acquisition investment of nearly 30 percent of total cost expected to occur in the third decade.

Table F-5. Land Acquisition Cost Estimates

Land Cover	Mitigation Costs	Conservation Costs by Implementation Period						HCP Total
		Years 1–10	Years 11–20	Years 21–30	Years 31–40	Years 41–50	All Years	
Oak Woodland And Savanna	$12,411,000	$517,000	$2,691,000	$3,002,000	$3,002,000	$1,141,000	$10,352,000	$22,763,000
Riparian	$2,688,000	$1,677,000	$2,238,000	$3,577,000	$2,460,000	$1,230,000	$11,182,000	$13,870,000
Emergent Wetland/ Managed Wetland	$1,402,000	$1,056,000	$1,830,000	$1,995,000	$1,454,000	$701,000	$7,037,000	$8,439,000
Grassland With Vernal Pools	$16,871,000	$14,843,000	$11,015,000	$17,957,000	$14,107,000	$6,411,000	$64,333,000	$81,204,000
Grassland (Only)	$23,862,000	$685,000	$4,730,000	$6,409,000	$5,115,000	$2,108,000	$19,047,000	$42,909,000
Rice	$15,190,000	$4,407,000	$11,017,000	$13,221,000	$11,017,000	$4,407,000	$44,070,000	$59,259,000
Irrigated Cropland/ Pasture	$20,530,000	$0	$0	$0	$0	$0	$0	$20,530,000
Orchards (Almonds, Olives, Walnuts, Prunes)	$0	$476,000	$856,000	$967,000	$967,000	$571,000	$3,836,000	$3,836,000
Total	**$92,953,000**	**$23,660,000**	**$34,378,000**	**$47,128,000**	**$38,122,000**	**$16,568,000**	**$159,856,000**	**$159,856,000**

F.6.2 CM2: Develop an Invasive Species Control Program

CM2, Develop an Invasive Species Control Program provides for development of a Plan Area-wide invasive species control program plan for all non-agricultural lands within the BRCP conservation lands system (see Section 5.4.1.2, *CM2: Develop an Invasive Species Control Program*). Costs for implementing the plan are included in implementation costs for CM5, Enhance Protected Natural Communities for Covered Species. Development of the plan is assumed to require an initial investment of about $58,000 for completion by implementation year 5. Periodic updates to the control plan are performed by the Implementing Entity and these costs are included in Section F.9, *Administration and Management Costs*.

The extent of nonagricultural lands that are protected as mitigation is 23,702 acres, representing about 39 percent of all nonagricultural lands protected under the BRCP. Based on this proportion, mitigation component costs are about $23,000.

The extent of nonagricultural lands that are protected for conservation is 36,618 acres, representing about 61 percent of all nonagricultural lands protected under the BRCP. Based on this proportion, conservation component costs are approximately $35,000.

F.6.3 CM3: Identify High Priority Locations for Wildlife Passage Structures and Secure Funding

Implementation of CM3, Identify High Priority Locations for Wildlife Passage Structures and Secure Funding provides for the Implementing Entity to advise and assist entities with ownership or jurisdiction over linear infrastructure (e.g., roads, railroads, and utilities) regarding potential modification of the structures to improve permeability for wildlife movement and use of habitat. This assistance will be provided to these entities in the form of research and surveys conducted by the Implementing Entity. Costs for implementation of research and planning support under this conservation measure are subsumed under administration of the BRCP (see Section F.9). Costs associated with efforts undertaken by the Implementing Entity to enhance habitat in designated high priority inter-habitat patches within BRCP-protected natural communities to enhance gap permeability (e.g., growing of vegetation and ceasing or reducing mowing) are included in the implementation costs for CM5, Enhance Protected Natural Communities for Covered Species.

Supporting efforts to improve the permeability of linear structures for wildlife is not a BRCP mitigation requirement. Therefore, there are no mitigation component costs associated with this conservation measure. All costs for CM3 as considered a conservation component.

F.6.4 CM4: Develop and Implement Site Specific Wetland and Riparian Restoration Plans and CM8: Restore Giant Garter Snake Habitat

Implementation of CM4, Develop and Implement Site Specific Wetland and Riparian Restoration Plans and CM8: Restore Giant Garter Snake Habitat will entail restoration of riparian, vernal pool complex, and emergent wetland (including giant garter snake habitat). This section provides cost assumptions and estimates related to the restoration of these natural communities. These estimates include costs for planning and design, physical restoration, and initial monitoring and maintenance.

These estimates do not include costs for land acquisition, biological surveys, and long-term monitoring, costs which are included elsewhere in the BRCP.

F.1.1.5 Riparian Restoration Costs

The BRCP will restore 190 acres of riparian habitat with full implementation (see Section 5.4.2.1, CM4: Develop and Implement Site Specific Wetland and Riparian Restoration Plans and Table F-6, Extent of Lands to be Acquired for Protection and Restoration). This restoration action provides mitigation for impacts of the covered activities on riparian forest and willow scrub habitats. Riparian restoration costs include costs associated with restoration design, installation (including fencing where necessary), three years of maintenance (e.g., irrigation, weeding, replanting/seeding), and five years of restoration monitoring. For cost estimating purposes, the typical riparian restoration site is assumed to be 25 acres in size. Grading is assumed to occur at a depth typical of excavation in suitable areas for riparian habitats and would not include excavation in areas of unsuitable landscape locations, blasting, or other construction methods that would be required to convert a site to a riparian condition (i.e., riparian habitat creation is not proposed under the BRCP). Plantings would use small container or bare root plantings. It is assumed that irrigation is readily available with an already developed or nearby water source.

Table F-6. Extent of Lands to be Acquired for Protection and Restoration[1]

Land Cover Types by Natural Community	Mitigation Acres			Conservation Acres		
	Protection	Restoration	Total	Protection	Restoration	Total
Oak woodland and savanna						
All land cover types	10,959	0	10,959	9,141	0	9,141
Grassland						
Grassland	7,399	0	7,399	5,751	0	5,751
Grassland with vernal swale complex	4,041	297	4,041	15,409	0	15,409
Subtotal	*11,440*	*297*	*11,440*	*21,160*	*0*	*21,160*
Riparian						
Cottonwood-willow riparian forest, valley oak riparian forest, and dredger tailings-stream associated	967	181	1,148	4,833	9	4,842
Willow scrub	0	0	0	0	0	0
Subtotal	*967*	*181*	*1,148*	*4,833*	*9*	*4,842*
Wetland						
Emergent wetland	35	120	155	665	500	1,165
Managed wetland	0	0	0	0	0	0
Subtotal	*35*	*120*	*155*	*665*	*500*	*1,165*
Aquatic						
Aquatic-stream channel	0	0	0	310	0	310
Agricultural Lands						
Rice	3,140	0	3,140	9,110	0	9,110
Irrigated cropland/pasture	2,161	0	2,161	0	0	0
Subtotal	*5,301*	*0*	*5,301*	*9,110*	*0*	*9,110*
Total	**28,702**	**598**	**29,003**	**45,219**	**509**	**45,728**

At the higher end of costs, the projected implementation budget for the Santa Clara Valley Habitat Plan estimates that riparian restoration costs will be $74,438 per acre – including plan design and

bid assistance, pre-construction surveys, restoration construction, restoration repair, and post-construction monitoring and maintenance – (Santa Clara Valley Habitat Plan 2010). These action assumptions are comparable to BRCP action assumptions. However, the price of materials and labor in Santa Clara County is considerably higher than in Butte County. In addition, it is likely that restoration sites will be larger in size in Butte County than in the Santa Clara Valley, and larger restoration projects typically have lower per-acre costs as a result of efficiencies that can arise with implementation of larger projects.

The habitat restoration company Restoration Resources provided a cost estimate range for riparian restoration design, installation, maintenance for three years (e.g., irrigation, weeding, replanting/seeding), and monitoring for five years (McKenzie pers. comm.). Lower costs were estimated for sites requiring less grading, such as in gaps in existing riparian vegetation within stream floodplains. Restoration costs at this low end are estimated at $40,000 per acre. Higher costs were associated with sites requiring more grading of the surface to create appropriate physical and hydrological conditions, such as at dredger tailing sites; restoration costs at this high end are estimated at $50,000 per acre. Assuming a similar number of high and low cost restoration sites, the midpoint of this range ($45,000) for restoration implementation was chosen. A restoration design cost of $3,000 per acre was added to this implementation cost to generate an estimated cost of $48,000 per acre total cost for restored riparian habitat, the value used as the unit cost in the BRCP estimate. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre cost of $55,440.

A total of 181 acres of riparian habitat will be restored to provide mitigation for the impacts of implementing all of the covered activities on riparian land cover types and the covered species habitats they support. Applying the $55,440 per acre riparian restoration cost noted above results in a total mitigation component cost of approximately $10.0 million.

A total of nine acres of riparian habitat will be restored for conservation. Applying the $55,440 per acre riparian restoration cost noted above results in a total mitigation component cost of approximately $500,000.

F.1.1.6 Vernal Pools and Swales Restoration Costs

The BRCP will restore an estimated 297 acres of high quality vernal pools and swales with full implementation (see Section 5.4.2.1). This restoration action provides mitigation for impacts of the covered activities on vernal pools and other seasonal wetlands. There is no restoration of vernal pools and other seasonal wetlands in the conservation component of the BRCP. Vernal pool restoration costs include costs associated with restoration design, grading, seeding/planting, fencing where necessary, maintenance for seven years (e.g., weeding), and monitoring in years 1-5, 7 and 10 following restoration. For cost estimating purposes, the typical vernal pool restoration site is assumed to consist of 10 acres of vernal pool and swale restoration within a 100-acre grassland site with suitable subsoil conditions for restoration.

An early estimate for vernal pool restoration, including costs associated with restoration design, erosion control, construction management, best management practices (BMPs), seeding, construction monitoring and reporting, resulted in a wide cost range between $25,000 and $40,000 per acre of pool built (Gause pers. comm.). Seeking to narrow this range, another estimate was developed in 2012. The habitat restoration company Restoration Resources provided an estimated cost range for vernal pool restoration design, grading, seeding/planting, maintenance for seven

years (e.g., weeding), and monitoring in grassland sites with suitable subsoil conditions (McKenzie pers. comm.). At the lower end of the cost range, with less site grading required, restoration costs are estimated at $30,000 per acre. At the higher end, with more grading required to establish appropriate relief, restoration costs are estimated at $32,000 per acre. Assuming a similar number of high and low cost restoration sites, the midpoint of this range ($31,000) was selected. A restoration design cost of $5,000 per acre added to the restoration installation cost ($31,000) generates an estimated total cost of $36,000 per acre for restoration of vernal pools and swales, the value used as the unit cost in the BRCP estimate. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre cost of $41,580.

The entire 297 acres of vernal pools and other seasonal wetlands to be restored is to provide mitigation for impacts of the covered activities on vernal pools and the covered species they support. Consequently, as described above, the total mitigation component cost for restoration of vernal pools and other seasonal wetlands is approximately $12.3 million.

All restoration of vernal pools is for the purpose of mitigating impacts of the covered activities, so no conservation component costs are identified.

F.1.1.7 Emergent Wetland and Giant Garter Snake Habitat Restoration Costs

The BRCP will restore 120 acres of emergent wetland mitigate impacts of covered activities on emergent wetlands and wetlands in agricultural fields as well as 500 acres of giant garter snake habitat for conservation of this species (see Section 5.4.2.1).

Habitat restoration specialists at Restoration Resources provided a cost range for emergent wetland restoration design, installation, maintenance of three years, and monitoring of five years (McKenzie pers. comm.). At the lower end, with less grading required, restoration costs are estimated at $30,000 per acre. At the higher end, with more grading required, restoration costs are estimated at $35,000 per acre. Assuming a similar number of high and low cost restoration sites, the midpoint of this range ($32,500) was selected for restoration of emergent wetland. For cost estimating purposes, it is assumed that emergent wetland restored for mitigation will be restored in typical project sites of 10 acres each. Adding restoration design costs of $7,500 per acre of emergent wetland (smaller project area results in higher cost of design per acre) to the restoration cost of $32,500 per acre generates an estimated cost of $40,000 per acre of restored emergent wetland for mitigation, the value used as the unit cost in the BRCP estimate. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre cost of $46,200.

Restored giant garter snake habitat will consist of emergent wetland, open water, and upland habitats. For the purpose of cost estimating, it is assumed that within a site restored for giant garter snake habitat, 40 percent of the area will be uplands (200 acres of the total 500 acres restored) and 60 percent of the area will be open water and emergent wetland (300 acres of the total 500 acres restored). These proportions are based on observation of aerial imagery of as-built conditions at giant garter snake habitat restoration sites in the Natomas Basin in Sacramento County.

For the purpose of cost estimating, it is assumed that restoration of giant garter snake habitat will typically be conducted at sites of 80 acres that currently support irrigated rice fields. For giant garter snake habitat, the midpoint cost for emergent wetland restoration ($32,500) was used for the

cost of the restoration of emergent wetland and open water together. Adding restoration design costs of $1,000 per acre for giant garter snake habitat (larger project area results in lower cost of design per acre) to the $32,500 per acre cost for restoration generates an estimated cost of $33,500 per acre of restored emergent wetland and open water habitat for giant garter snake, the value used as the unit cost in the BRCP estimate. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre cost of about $38,700. Costs for ongoing management of restored giant garter snake habitat (e.g., water management and infrastructure maintenance) are included in costs for implementation of CM5, Enhance Protected Natural Communities for Covered Species.

A total of 120 acres of emergent wetland will be restored to provide mitigation for impacts of implementing all of the covered activities on emergent wetlands and agricultural wetlands and the covered species habitats it supports. Applying the $46,200 per acre estimate for emergent wetland restoration results in a total mitigation component cost of approximately $5.5 million.

A total of 500 acres of giant garter snake habitat (a mix of emergent wetland, open water, and upland habitat) will be restored to provide conservation for giant garter snake with approximately 60 percent of the total restored area (300 acres) consisting of emergent wetland and open water. Applying the $38,700 per acre emergent wetland and open water restoration cost noted above to 300 acres of giant garter snake habitat, results in a total conservation cost of approximately $11.6 million.

F.6.5 CM5: Enhance Protected Natural Communities for Covered Species

Implementation of conservation measure CM5, Enhance Protected Natural Communities for Covered Species provides for enhancing and managing nonagricultural BRCP protected and restored habitats that are acquired in fee title (see Section 5.4.2.2, *CM5: Enhance Protected Natural Communities for Covered Species*). CM5 includes costs of implementing the invasive species control program developed under CM2.

The estimated cost for enhancing and managing protected and restored habitats is based on the 14,076 acres of mitigation component and conservation component habitat that is assumed to be acquired in fee title (see Table F-1). Generally, the management of lands acquired under conservation easement will be the responsibility of the landowner in accordance with the terms of the conservation easement and, as such, the cost of managing these lands is not included in the cost estimate. The Implementing Entity, however, may fund implementation of site-specific habitat improvements for conservation benefits with concurrence of conservation easement landowners. The entirety of habitat improvements on lands acquired under conservation easement is to provide conservation for covered species and does not include a mitigation component. The cost estimate for implementing these types of improvements is assumed to be 2 percent of the management and enhancement costs estimated for conservation component lands acquired in fee title.

In addition to costs for invasive species control, enhancement and management costs include land management supplies (e.g., fencing) and contracted labor costs. Associated infrastructure maintenance costs on fee title lands may include, but not be limited to:

- Equipment rental.

- Maintenance and operation of field facilities, equipment, tools and supplies.
- Operation and maintenance of wells and water control structures.
- Management and enhancement of covered plant occurrences.
- Maintenance of stock ponds (e.g., dam repair, water control structures).
- Maintenance of grazing infrastructure including grazing fences, leases, etc.
- Operation and repair of gates, roads, bridges, culverts etc.
- Supplies to maintain fire breaks, and implement habitat improvements.

Although costs are expected to increase with the acreage of the fee title conservation lands, costs will not grow proportionally because per-acre management costs are expected to decrease as the size of the BRCP land portfolio grows.

BRCP CM5 implementation costs are developed based on information available for other conservation land management programs. The East Contra Costa HCP/NCCP (Jones & Stokes, 2006) estimated annual maintenance costs of approximately $60 per acre. Preserve management costs for the Western Riverside County Multiple Species Habitat Conservation Plan (Dixon et al. 2008), were estimated to never fall below $45 per acre (2010 dollars), regardless of the size of the preserve. Estimated management costs for preserve lands under the Santa Clara Valley HCP are $44 per acre (ICF International 2010). A sample of 28 case studies of natural lands management costs prepared by the Center for Natural Lands Management using the PAR model (Center for Natural Lands Management 2004) suggest an average per-acre costs of $51 per acre per year (the median was $122 for the sample of preserves, which were biased to smaller sizes).

Based on the available costing information cited above, the estimated per acre annual average BRCP CM5 costs for lands acquired in fee-title is $45 per acre over the term of the BRCP, including costs associated with implementing voluntary habitat improvements on conservation easement lands. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre annual cost of about $52. Though lower than some of the annual per acre land management costs cited above, this per acre value is considered appropriate based on the following BRCP-specific considerations.

- The majority of habitat enhancements generally are anticipated to focused on discrete and highly localized enhancement actions within much larger tracts of conservation land (e.g., weed control treatments within small areas supporting covered plant species, targeted removal of infestations of non-native invasive plants from riparian habitats).
- The majority of lands acquired in fee title are rangelands that support minimal infrastructure (e.g., access roads and fencing) as opposed to lands that support water conveyance-related infrastructure.
- It is anticipated that a majority of fee title lands will be leased back to livestock operators, the revenue of which will contribute to the management costs of these lands.

Enhancement and management of giant garter snake habitat and greater sandhill crane winter roost sites will include the cost of water needed to maintain these habitats. Water supplies to support restored giant garter snake habitat will need to be provided each year. Assuming 4 acre-feet of water will be needed per acre of restored wetland and aquatic habitat (farmed rice requires about 3.5 to 4 acre-feet/acre per year) and that the cost of water is approximately $4/acre-foot, then the cost for water would be $16/acre per year. Adding fees from irrigation and water districts the cost

would be about $20/acre per year (Trimble pers. comm.). Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre annual cost of about $23.

Of the 500 acres of giant garter snake habitat to be restored under the BRCP, approximately 200 would be upland and 300 acres emergent wetland and aquatic (open water) habitat. The total annual cost for water at full build-out of giant garter snake habitat restoration would be roughly $6,900 (300 acres x $23/acre). While the 120 acres of restored emergent wetlands will be supported by natural hydrologic inputs, to ensure that restored emergent wetlands will support habitat for giant garter snake, it is assumed that additional water would be added to increase the ponded area and duration of ponding for snake habitat. Using the same irrigation costs described above for management of restored giant garter snake habitat, management of 120 acres of restored emergent wetland will cost about $2,800 per year.

Annual water supplies will also be needed to support 160 acres of winter roost habitat for the greater sandhill crane. Management of greater sandhill crane winter roost habitat requires shallow flooding of approximately one-half acre-foot of water to be applied annually in winter. With a cost of water at approximately $4/acre-foot, the cost for one-half acre-foot of water would be $2/acre per year. Assuming fees from irrigation and water districts would be about $0.50/acre per year, the total cost per acre would be $2.50/acre per year. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre annual cost of about $2.89. The total annual cost for water at greater sandhill crane winter roost habitat sites would be about $460 (160 acres x $2.89/acre).

A total of 4,784 acres of mitigation lands will be acquired in fee title. Applying the estimated $52 average per acre land enhancement and management cost and estimated costs of water to maintain restored emergent wetland as giant garter snake habitat results in a total mitigation cost component of $6.4 million.

A total of 9,291 acres of lands will be acquired in fee title to provide for the conservation of natural communities and covered species. Applying the estimated $52 average per acre land enhancement and management cost, costs to enhance lands acquired for conservation under conservation easements, and estimated costs of water to maintain restored giant garter snake habitat results in a total conservation cost component of $12.4 million.

F.6.6 CM6: Maintain and Enhance Covered Species Habitat on Public and Easement Habitat Lands

Implementation of CM6, Maintain and Enhance Covered Species Habitat on Public and Easement Habitat Lands (see Section 5.4.2.3, *CM6: Maintain and Enhance Covered Species Habitat on Public and Easement Habitat Lands*) requires the Implementing Entity to enter into cooperative agreements with entities managing existing protected lands to enhance the level of conservation benefits that are provided for specified covered species present on those lands. The entirety of this conservation measure is designed to contribute to the conservation of natural communities and covered species habitats present on existing protected lands and does not include a mitigation component. Costs for funding implementation of habitat improvements that may be included in cooperative agreements are estimated as a per acre proportion of the funding provided for BRCP lands acquired for conservation under CM5, Enhance Protected Natural Communities for Covered Species. The acreage

of existing nonagricultural and aquatic protected lands in the Plan Area (see Table 5–6, *Extent of Natural Communities on Public and Easement Habitat Lands*) represents approximately 74 percent of the total nonagricultural lands that will be protected and restored for conservation under the BRCP (Table 5–3 and 5-4). Because habitat enhancements will be focused only on specific areas of habitat that are located on existing PEHL lands and not on their entirety, the cost estimate assumes that 5 percent of the costs estimated for implementation of CM5, Enhance Protected Natural Communities for Covered Species (see Table F-2) will be sufficient to implement this conservation measure. Costs associated with coordination with entities managing existing protected lands are included in BRCP administration and management costs (see Section F.5) and costs associated with conducting surveys to determine the status and management needs of covered species on these lands are included in monitoring cost estimates (see Section F.4, *Monitoring and Other Survey Costs*).

The enhancement of habitat on existing protected lands is intended to contribute to the conservation of covered species. Therefore, there are no mitigation component costs associated with this conservation measure. The total conservation component cost for enhancing habitat on existing protected lands is estimated to be approximately $681,000 (Table F-2).

F.6.7 CM7: Create and Maintain Greater Sandhill Crane Winter Roost Sites

Implementation of CM7, Create and Maintain Greater Sandhill Crane Winter Roost Sites will annually establish and maintain two greater sandhill crane winter roost sites over a 160-acre area (see Section 5.4.3.1, *CM7: Create and Maintain Greater Sandhill Crane Winter Roost Sites*). Water costs for shallow flooding of created roost sites are included in water costs under CM5 (Section F.2.6). The entirety of this conservation measure is designed to contribute to the conservation of greater sandhill crane and does not include a mitigation component. The creation of the roost sites is expected to require an initial investment of about $1,300 per acre, including design costs, to implement earthwork (e.g., building berms) and establish infrastructure (e.g., water control structures) necessary to annually create and maintain wetted roosting habitat area. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a per-acre cost of about $1,500. These costs could be greater or lesser depending on the existing infrastructure present on lands acquired for roost site creation. About 40 hours of contractor labor, assumed at $80 per hour, will be required annually for habitat maintenance.

The creation and maintenance of winter roost sites is intended to contribute to the conservation of greater sandhill crane, therefore there are no mitigation component costs associated with this conservation measure. The total conservation component cost for creating and annually maintaining greater sandhill crane roost sites is approximately $370,000 (Table F-2).

F.6.8 CM9 to CM11: Conservation Measures for Covered Fish

Implementation of CM9, Replenish Spawning Gravels for Salmonids, CM10: Remove Impediments to Upstream and Downstream Fish Passage, and CM11: Remove, Modify, or Screen Unscreened Diversions are collectively designed to improve covered fish species habitat and survival. Because of their similar purpose, these three conservation measures are included in the same cost category.

F.1.1.8 Replenish Spawning Gravels

The replenishment of spawning gravels will involve placement of up to 30,000 cubic yards of gravels to restore or improve spawning habitat for salmonids in Plan Area streams used for spawning (see Section 5.4.3.3, *CM9: Replenish Spawning Gravels for Salmonids*). The entirety of this action is designed to contribute to the conservation of the covered fish species and does not include a mitigation component. Costs for identifying sites for placement of spawning gravel are included in monitoring costs (see Section F.4). Gravel placement costs include the cost and transport of gravel and the placement cost using either bulldozer or front-loader. Gravel was commercially available and cost in the $23 to $30 per cubic yard range in 2011. Gravel placement costs reported from gravel placement projects for the Sacramento River, the Calaveras River, Stanislaus River, and other locations range from $14 to $27 per cubic yard[4] (inflated into 2011 dollars). The midpoint of these reported gravel and placement costs, approximately $47 per cubic yard, is applied in this cost analysis. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a cost of $54 per cubic yard.

This action also anticipates that hydrodynamic studies will need to be conducted to access the suitability of channel locations for gravel placement (e.g., effects on flood flows, gravel retention time) on up to three gravel placement sites. Depending on the availability of existing information (e.g., hydrodynamic modeling results) and site-specific information needs, these costs are estimated to range from $125,000–$250,000 per gravel placement site, for an average cost of $187,500 per site. Factoring in an inflationary adjustment of 15.5 percent to account for cost increases between 2011 and 2018, the 2018 cost estimate assumes a cost of $216,600 per site.

This conservation measure is estimated to cost $2.3 million, representing almost 85 percent of the total costs for implementing actions to improve covered fish species survival and habitat (Table F-2).

F.1.1.9 Improve Fish Passage

Improvement of fish passage entails removing in-channel barriers to upstream and downstream movement of covered salmonids (see Section 5.4.3.4, *CM10: Remove Impediments to Upstream and Downstream Fish Passage*). The entirety of this action is designed to contribute to the conservation of the covered fish species and does not include a mitigation component. Improving fish passage includes the cost of identifying and prioritizing locations where fish passage could be improved, removing debris from channels, and reconstructing the Iron Canyon Fish Ladder. Fish passage assessments are assumed to require an initial investment of about $14,400 (80 hours of labor and equipment costs) during the first 10 years of BRCP implementation with smaller periodic investments thereafter. Debris removal is assumed to be required for 15 sites and costs about $2,900 per site, including labor costs and backhoe rental.

[4] Sources:
http://www.water.ca.gov/pubs/environment/project_report_sacramento_river_spawning_gravel_restoration__phase_i/sac-spn-grv-rpt.pdf; http://www.sjbfish.com/crfg/docs/New_Hogan_Restor_Plan_DRAFT.doc; and www.sjbfish.com/srfg/docs/Gravel_Placement_Report.pdf.

Implementing fish passage improvements is estimated to be $81,000, representing approximately 3 percent of the total costs for implementing actions to improve covered fish species survival and habitat (Table F-2).

F.1.1.10 Reduce Entrainment Loss of Covered Fish Species

Reducing the loss of covered fish species to entrainment primarily involves the screening of unscreened diversions. Up to 25 diversions will be screened to reduce the potential for entrainment of covered fish species (see Section 5.4.3.5, *CM11: Remove, Modify, or Screen Unscreened Diversions*). The entirety of this action is designed to contribute to the conservation of the covered fish species and does not include a mitigation component. This action involves assessing and prioritizing the entrainment risks at 52 small diversions on Plan Area streams supporting covered fish species and installing screens on up to 25 of the diversions. The per diversion assessment cost is estimated at about $2,100 and the screening cost is estimated to average $9,700 per diversion.[5] Site assessments and screening up to 25 diversions is estimated to cost $351,000 (Table F-2).

F.6.9 CM12: Conserve Butte County Meadowfoam

Implementation of CM12, Conserve Butte County meadowfoam will include three categories of actions, each of which is described below:

- protect occupied and suitable habitat for Butte County meadowfoam in all population groupings;
- detect and protect previously unknown and new occurrences of Butte County meadowfoam; and
- manage protected habitat to maintain and enhance Butte County meadowfoam habitat functions.

F.1.1.11 Protect Butte County Meadowfoam Habitat

Implementation of CM12, Conserve Butte County Meadowfoam involves the acquisition of lands supporting Butte County meadowfoam occupied habitat and suitable habitat (see Section 5.4.3.6, *CM12: Conserve Butte County Meadowfoam*). The estimated costs for the acquisition of land for this conservation measure are included in the mitigation component and conservation component cost estimates for the acquisition of land to protect natural communities and covered species habitats under CM1, Acquire Lands (see Section F.2.1, *CM1: Acquire Lands*). Since some of the grasslands with vernal pools that may be required for Butte County meadowfoam habitat are close to urban areas, adjustments were made in the land valuation to account for the locational price premiums.

F.1.1.12 Detect and Protect Previously Unknown and New Occurrences of Butte County Meadowfoam

The detection and protection of previously unknown and new occurrences of Butte County Meadowfoam involves the acquisition of lands supporting newly located occurrences of Butte County meadowfoam as described in Section 5.4.3.6. The entirety of this action is designed to contribute to the conservation of the Butte County meadowfoam and does not include a mitigation component. The estimated conservation component costs for the acquisition of land supporting

[5] Assumes 12 hours per assessment.

new occurrences of Butte County meadowfoam are included in the cost estimates for the acquisition of land to protect natural communities and covered species habitats under CM1, Acquire Lands (see Section F.2.1).

F.1.1.13 Manage Protected Habitat to Maintain and Enhance Butte County Meadowfoam Habitat Functions

Management of protected habitat to maintain and enhance Butte County Meadowfoam habitat functions involves implementing management actions that will maintain or enhance protected Butte County meadowfoam occurrences as described in Section 5.4.3.6. The estimated mitigation component and conservation component costs for management of protected lands supporting occurrences of Butte County meadowfoam are included in the cost estimates for the enhancement and management of BRCP conservation lands under CM5 (see Section 5.4.2.2).

F.6.10 CM13: Conduct Surveys to Locate and Protect New Occurrences of Butte County Checkerbloom

Implementation of CM13, Conduct Surveys to Locate and Protect New Occurrences of Butte County Checkerbloom involves conducting surveys to locate and protect lands supporting new occurrences of Butte County checkerbloom as described in Section 5.4.3.7, *CM13: Conduct Surveys to Locate and Protect New Occurrences of Butte County Checkerbloom*. The entirety of this conservation measure is designed to contribute to the conservation of Butte County checkerbloom and does not include a mitigation component. The estimated costs for the conducting surveys are included in the conservation component cost estimates for administration and management (see Section F.9). The protection of land supporting new occurrences of Butte County checkerbloom are included in the cost estimates for the acquisition of land to protect natural communities and covered species habitats under CM1, Acquire Lands (see Section F.6.1).

F.6.11 CM14: Translocate Conservancy Fairy Shrimp, Ahart's Dwarf Rush, Hoover's Spurge, Hairy Orcutt Grass, Slender Orcutt Grass, and Greene's Tuctoria

Implementation of CM14, Translocate Conservancy Fairy Shrimp, Hoover's Spurge Ahart's Dwarf Rush, Butte County Meadowfoam, Hairy Orcutt Grass, Slender Orcutt Grass, and Greene's Tuctoria will reestablish two occurrences of each of these species in suitable habitat (see Section 5.4.3.8). The entirety of this conservation measure is designed to contribute to the conservation of these species and does not include a mitigation component. The cost estimate for reestablishing occurrences of these species assumes that, because some of these species are known to coexist in the same vernal pools, occurrences will be established on up to five different site locations. Costs associated with seed acquisition and monitoring of source and reintroduced populations are included in estimated monitoring costs (see Section F.8). Additional costs include expenses associated with site preparation and maintenance of habitat conditions over the reintroduction period. These costs are expected to average about $75,000 per reintroduction site.

The total conservation component cost for establishing five new occurrences is estimated to be $375,000 (Table F-2).

F.7 Environmental Compliance Costs

Environmental compliance costs are applicable to BRCP terrestrial and aquatic habitat restoration projects (see Sections 5.4.2.1, 5.4.3.3, 5.4.3.4, and 5.4.3.5) to provide mitigation and conservation and encompass costs necessary to prepare National Environmental Policy Act (NEPA), California Environmental Quality Act (CEQA), Clean Water Act (CWA), National Historic Preservation Act (NHPA), and other environmental compliance documents and secure associated permits and authorizations. The cost estimates included in this analysis assume an average restoration project size of about 90 acres. The average environmental compliance cost per restoration project is estimated at roughly $133,000, including NEPA and CEQA, CWA, NHPA, and other environmental compliance laws and regulatory costs.[6] The NHPA costs only include the cost of a cultural inventory. If significant cultural resources are found, the NHPA compliance cost could increase considerably. It is assumed that other BRCP implementation actions, such as land acquisition, ongoing maintenance and habitat management, and monitoring and other survey work, will not require environmental compliance and therefore would not incur any costs.

A total of 1,107 acres of terrestrial habitat will be restored over the term of the BRCP to mitigate the effects of covered activities on natural communities and covered species habitats and to contribute to their conservation (Table F-6). Based on an approximate average restoration project size of 40 acres, this cost estimate assumes a total of 28 restoration projects will be implemented over the term of the BRCP.

In addition, aquatic habitat restoration conservation measures (CM9: Replenish Spawning Gravels for Salmonids, CM10: Remove Impediments to Upstream and Downstream Fish Passage, and CM11: Remove, Modify, or Screen Unscreened Diversions) are expected to incur environmental compliance costs through the actions to replenish spawning gravels. The estimated costs for these actions assume that they will require compliance on up to three separate restoration projects.

F.7.1 Mitigation and Conservation Component Costs

A total of 598 acres of habitat will be restored to mitigate for permanent impacts on natural communities and covered species habitats (Table F-7). Based on an approximate average restoration project size of 40 acres, this cost estimate assumes a total of 15 mitigation habitat restoration projects will be implemented. Based on this assumption, mitigation environmental compliance costs are estimated to be $2.0 million.

A total of 509 acres of terrestrial habitat will be restored to provide for the conservation of natural communities and covered species. Based on an approximate average restoration project size of 40 acres, this cost estimate assumes a total of 13 habitat restoration projects will be implemented for conservation purposes. Environmental compliance will also be required for an additional three aquatic habitat restoration projects. Based on the estimated number of projects that will require environmental compliance, conservation environmental compliance costs are estimated to be $2.1 million.

[6] Costs for conducting CWA section 404 wetland delineations are included in monitoring and other survey costs described in Section 7.3.2.

F.8 Compliance Monitoring

Section 7.2 describes the compliance and effectiveness monitoring actions that will be conducted by the Implementing Entity. These monitoring actions and the assumptions used to estimate monitoring and other survey costs are presented in Table F-7. Monitoring and Other Survey Costing Assumptions. Survey costs include surveys necessary to evaluate lands for acquisition into the BRCP conservation lands system, baseline surveys of BRCP protected lands, and surveys necessary to locate spawning gravel replenishment sites, and to collect seed from and monitor effects on plant occurrences from which seed is collected to establish new plant occurrences.[7] Many of the monitoring and other survey actions will be implemented by the Implementing Entity and, as such, those costs are included in the Administration and Management Cost Category. Surveys for implementing BRCP avoidance and minimization measures for BRCP habitat restoration actions (Chapter 6, *Conditions on Covered Activities*) are also included in the cost estimates for the Administration and Management Cost Category and CM4, Develop and Implement Site Specific Wetland and Riparian Restoration Plans. The costs associated with surveys for implementing avoidance and minimization measures for covered activities that are not conservation measures (e.g., development projects, maintenance activities and other activities as described in Chapter 2, *Covered Activities*) are not included in this cost estimate because such surveys will be the responsibility of the project proponents for those covered activities.

Each type of monitoring and other surveys have a specific level of effort, both in terms of labor and in terms of sampling intensity, and monitoring efforts may concentrate on habitat types or species occurrences. The diversity of the monitoring program, coupled with the inherent flexibility of the monitoring program as the prime information gathering process under the adaptive management framework, makes it challenging to calculate monitoring costs due to the uncertainty of specific site conditions and how monitoring actions will evolve over time with increased knowledge and improved techniques. For example, considerable uncertainty exists in the following parameters that can affect monitoring and other survey costs:

- Parcel-size distribution (e.g., many large parcels require less effort to monitor/survey than many smaller parcels comprising the cumulative area of land);
- Habitat type, extent, and condition (e.g., sites supporting a greater range of environmental conditions would be expected to require more monitoring/survey effort than less complex sites);
- Travel requirement to and from monitoring/survey locations (e.g., monitoring/survey travel costs would be greater if conservation lands are spatially more widely distributed in the Plan Area than if they are more concentrated);
- Number of covered species present on a monitoring/survey site (e.g., if the BRCP conservation lands include many parcels that support multiple covered species, species status surveys would be expected to require less monitoring/survey effort than if conservation lands support a lesser diversity of covered species);

[7] Costs associated with conducting surveys necessary to implement avoidance and minimization measures for implementing habitat restoration projects under CM4, Develop and Implement Site Specific Wetland and Riparian Restoration Plans are captured under baseline survey costs.

Monitoring Action[1]	Cost Assumptions	Action Frequency Assumptions used in the Costing Model	Monitoring Continues in the Post-BRCP Permit Period
through conservation easements to be credited as protecting emergent wetland, riparian vegetation, vernal pools and other seasonal wetlands, and other waters of the United States			
CMA4. Document the acreage of section 404 jurisdictional wetlands and waters of the US impacted by the proposed project or BRCP conservation action	• Costs are included in the Administration and Management Cost Category	Not applicable	No
CMA5. Conduct planning surveys	• No cost to Implementing Entity	Not applicable	No
CMA6. Conduct preconstruction surveys	• No cost to Implementing Entity	Not applicable	No
CMA7. Document the injury or killing of a covered species during implementation of covered activities	• No cost to Implementing Entity	Not applicable	Yes (BRCP land management activities only)
CMA8. Document authorized levels of covered species take in accordance with the levels specified in Table 4-4.	• Costs are included in the Administration and Management Cost Category	Not applicable	Yes (BRCP land management activities only)
CMA9. Document implementation of avoidance and minimization measures	• Costs are included in the Administration and Management Cost Category	Not applicable	No
CMA10. Document implementation of habitat protection and restoration actions	• Costs are included in the Administration and Management Cost Category	Not applicable	No[2]
CMA11. Document results of effectiveness monitoring (Section 7.3.3 and Tables 7–2 to 7–4)	• Costs are included in the Administration and Management Cost Category	Not applicable	No[1]
CMA12. Document changes in implementation through the BRCP adaptive management decision making process (Section 7.4)	• Costs are included in the Administration and Management Cost Category	Not applicable	No
CMA13. Document remedial measures implemented in response to change circumstances (Section 8.5.1)	• Costs are included in the Administration and Management Cost Category	Not applicable	No[2]

space, and supplies. The additional workload to implement the BRCP, however, will require expenditure on additional staff, supplies and equipment, and advisory services. Administration and management costs were estimated for the following three subcategories.

- **Implementing Entity Staffing Costs.** The large majority of administrative and management costs are associated with staffing costs, estimated at $25.8 million in total over the 50-year period, an average annual cost of $515,000 (Table F-9. Total Implementing Entity Staff Costing Assumptions and Cost Estimates by Implementation Period). This cost is based on the estimate that 4.5 full-time equivalent (FTE) BCAG staff persons will be required to manage and implement the BCRP between Year 10 and Year 50, with a slightly lower staff requirement of 4.25 FTEs in the first 10 years of implementation. Expected staffing needs were based on the actual implementation experiences of other HCP/ NCCPs and input from BCAG staff.
- **Supplies, Equipment, and Vehicle Costs**. This cost subcategory includes the cost of office space, office equipment, GIS/database equipment, vehicle leasing/maintenance, and insurance. The first three subcategories are assumed to be available at zero cost through the use of existing BCAG office space and equipment. New expenditures will be required for vehicle leasing/maintenance and insurance, together estimated at $23,000 annually throughout the full 50-year period. The total cost associated with this cost category is about $1.2 million over the full 50-year period. These cost estimates were developed in consultation with BCAG staff.
- **CDFW Administrative Costs**. CDFW will coordinate with and provide technical support to the Implementing Entity over the 50 year duration of the BRCP. CDFW staffing costs are assumed to average 1 FTE during the 50 year implementation period at a cost of about $136,000 per year. The total cost associated with this cost category is about $6.8 million.
- **Advisory Services**. Implementation of HCP/NCCPs typically requires outside advisory services, most often related to legal services, financial services, biological services, and public outreach services. These costs often fluctuate by year but are expected to average about $173,000 annually for a total 50-year cost of $8.7 million. The majority of these costs are expected to be associated with biological and legal services. The average cost of legal services is based on input from managers of other California HCP/NCCPs.

In 2018 dollar terms, the total BCRP administrative and management mitigation component and conservation component costs over the 50-year period are estimated at $42.4 million, an average annual cost of $847,000.

Table F-9. Total Implementing Entity Staff Costing Assumptions and Cost Estimates by Implementation Period

Staff Position	Cost Per FTE			FTEs by Implementation Period					Total Cost
	Annual Salary	Annual Benefits	Annual Cost	Years 1–10	Years 11–20	Years 21–30	Years 31–40	Years 41–50	
Executive Director	*Subsumed by existing BCAG operation*			0.25	0.25	0.25	0.25	0.25	-
Assistant Director	$115,440	$57,720	$173,160	1.00	1.00	1.00	1.00	1.00	$8,658,000
Clerical Support	$43,387	$21,694	$65,081	0.50	0.50	0.50	0.50	0.50	$1,627,000
Staff Biologist/ Scientist	$76,248	$38,124	$114,372	1.00	1.00	1.00	1.00	1.00	$5,719,000
Accountant	$80,685	$40,343	$121,028	0.25	0.25	0.25	0.25	0.25	$1,513,000
GIS/ IT Support Services	$75,504	$37,752	$113,256	0.25	0.50	0.50	0.50	0.50	$2,548,000
Real Estate Specialist	$75,868	$37,934	$113,802	1.00	1.00	1.00	1.00	1.00	$5,690,000
Total FTEs				*4.25*	*4.50*	*4.50*	*4.50*	*4.50*	
Total				**$4,924,000**	**$5,208,000**	**$5,208,000**	**$5,208,000**	**$5,208,000**	**$25,755,000**
Average Annual Cost				**$492,000**	**$521,000**	**$521,000**	**$521,000**	**$521,000**	**$515,000**

Table F-10. Total Costing Assumptions and Cost Estimates by Implementation Period

Cost Subcategory	Implementation Period					
	Years 1–10	Years 11–20	Years 21–30	Years 31–40	Years 41–50	Total
Supplies, Equipment, and Vehicle Costs						
Office space capital and maintenance	*Subsumed by existing BCAG operation*					
Office Equipment	*Subsumed by existing BCAG operation*					
GIS/Database equipment	*Subsumed by existing BCAG operation*					
Vehicle Leasing/ maintenance	$116,000	$116,000	$116,000	$116,000	$116,000	$580,000
Insurance	$116,000	$116,000	$116,000	$116,000	$116,000	$580,000
Subtotal	*$231,000*	*$231,000*	*$231,000*	*$231,000*	*$231,000*	*$1,155,000*
Advisory Services						
Legal Services	$1,155,000	$1,155,000	$1,155,000	$1,155,000	$1,155,000	$5,775,000
Other Advisory Services	$578,000	$578,000	$578,000	$578,000	$578,000	$2,890,000
Subtotal	*$1,733,000*	*$1,733,000*	*$1,733,000*	*$1,733,000*	*$1,733,000*	$8,665,000
CA DFW Staff Cost	$1,356,000	$1,356,000	$1,356,000	$1,356,000	$1,356,000	$6,780,000
Total	**$8,244,000**	**$8,527,000**	**$8,527,000**	**$8,527,000**	**$8,527,000**	**$42,352,000**
Average Annual Cost	**$824,000**	**$853,000**	**$853,000**	**$853,000**	**$853,000**	**$847,000**

F.9.1 Mitigation Component Costs

Mitigation component administrative and management mitigation costs are calculated based on the proportion of BRCP conservation lands that provide mitigation for impacts of the covered activities.[8] Mitigation conservation lands comprise about 39 percent of the all conservation lands and, based on this proportion and the total estimated administrative and management costs, total mitigation component administration and management costs are estimated to be $16.4 million over the term of the BRCP, with an annual cost of approximately $329,000. This cost estimate assumes all covered activities are implemented over the term of the BRCP and that the acquisition of mitigation lands occurs at an equivalent pace to the schedule for conservation land acquisition. Mitigation administration and management costs will be greater if mitigation lands are acquired at a faster pace and lower if acquired at a slower pace than the estimated schedule for protecting and restoring habitat for conservation.

F.9.2 Conservation Component Costs

Conservation component administrative and management conservation costs are calculated based on the proportion of BRCP conservation lands that provide conservation for natural communities and covered species.[9] Conservation component lands comprise about 61 percent of the conservation lands and, based on this proportion and the total estimated administrative and management costs, total conservation component administration and management costs are estimated to be $25.9 million over the term of the BRCP (Table F-10), with an annual cost of approximately $518,000.

F.10 Changed Circumstances

Changed circumstances are described in Section 8.5.1, *Changed and Unforeseen Circumstances*. Changed circumstances for which costs are estimated are those that affect covered species habitat conditions on BRCP conservation lands. Any costs associated with changed circumstances that require an administrative response (e.g., coordination with the permitting agencies) are included in administration and management costs (Section F.9). In the event that changed circumstances occur that affect habitat conditions on conservation lands, the Implementing Entity may implement, as appropriate, the planned responses identified for each of the changed circumstances described in Section 8.5.1. Conservation measures that address conservation land habitat conditions are CM4, Develop and Implement Site Specific Wetland and Riparian Restoration Plans and CM5, Enhance Protected Natural Communities for Covered Species.

Reasonably foreseeable changed circumstances that may affect BRCP conservation lands and the estimated costs for BRCP implementation are (1) floods; (2) drought conditions; (3) fire events that remove species habitat; and (4) new infestations or substantial increases of invasive species requiring development of additional actions not already included in CM5. For these reasonably foreseeable changed circumstances, this analysis assumes that the cost for implementing the planned responses to protected and restored habitat affected by floods, drought conditions, and fires that result in changed circumstances will be 10 percent of the total implementation costs for CM4, Develop and Implement Site Specific Wetland and Riparian Restoration Plans and CM5,

[8] The mitigation component proportion of all BRCP conservation lands is 26.6 percent.
[9] The conservation component proportion of all BRCP conservation lands is 73.4 percent.

Enhance and Managed Protected Natural Communities. This assumption is considered reasonable because it is based on a prediction that the habitat functions for covered species on as much as 10 percent of all protected and restored habitats could be reduced by changed circumstances. Based on historic record, this assumption is considered high. Any greater magnitude of habitat failure would be considered catastrophic and beyond the financial resources of the Implementing Entity to address.

A total of 4,784 acres of land owned in fee title will be protected and restored to mitigate impacts of the covered activities, of which remedial measures to address changed circumstances would need to be implemented on an estimated 478 acres (i.e., 10 percent of the mitigation acreage). Based on 10 percent of CM4 and CM5 mitigation costs (Table F-2), the total estimated cost for implementation of planned responses to changed circumstances is approximately $3.4 million. All costs associated with changed circumstances are part of the mitigation component of the Plan.

F.11 Post-BRCP Permits Implementation Costs

At the end of the 50-year permit period, ongoing annual costs will remain that will require funding in perpetuity. Post-BRCP permits ongoing activities include the following:

- **BRCP Administration.** Ongoing administration of the BRCP includes oversight of the program elements described below; ongoing coordination with federal, state, and local governments regarding land use decision making that could affect the environmental conditions on or ability to manage the BRCP conservation lands; ongoing coordination with landowners adjacent to conservation lands; oversight of conservation easements; management of post-BRCP endowment funds and administration of budgets; and preparation of annual reports. During the post-BRCP permit period, all administrative functions are assumed to be addressed with 1.0 FTE of staff time (Table F-11, *Total Post-BRCP Permit Implementation Entity Staff Costing Assumptions and Estimates*).

  This is a reduction of 3.5 FTE's required for BRCP administration during the permit period. This reduction primarily reflects discontinuance of 1 real estate specialist FTE because all properties in the conservation lands system will have been acquired during the permit period and reduced monitoring and reporting costs. As during the permit period, costs for office space, office equipment, GIS/database equipment, vehicle leasing/maintenance, and insurance will be available at zero cost through the use of existing BCAG office space and equipment. Vehicle leasing/maintenance and insurance expenditures are estimated at $5,000 annually, based on a reduction in these costs from the permit period proportionate to the reduction in annual FTEs.

- **Conservation Lands Management.** Ongoing management of conservation lands will be required to maintain their intended functions as over time. Management activities that will continue into the post-BRCP permit period include monitoring and maintenance of infrastructure (e.g., repair of fences and maintenance of fire breaks, roads, water conveyance ditches, and pumps); invasive species monitoring and control; and habitat management activities (e.g., irrigation of restored giant garter snake wetland habitats). During the post-permit period, land management costs are assumed to be approximately 45 percent of these costs during the BRCP implementation period (see Section F.2.6), roughly $23 per acre of per year.

- **Monitoring.** Reduced levels of monitoring will occur in during the post-BRCP permit period. Routine annual monitoring activities are assumed to be conducted by the Implementing Entity and these monitoring costs are included in the BRCP administration costs described above. In

addition, status surveys of covered species on BRCP conservation lands to be conducted every 10 years are assumed require additional contract biologist labor costs for 0.20 FTEs at $116 per hour, representing an annualized cost of about $48,000.

- **Legal Services.** Costs related to ongoing management of BRCP conservation lands, including oversight of conservation easements are anticipated to incur ongoing legal costs, though at reduced levels from the permit period because all conservation lands will have been acquired during the permit period. Contracted legal services are assumed to be reduced from $116,000 per year during the permit period to $58,000 during the post-permit period, reflecting that all conservation lands will have been acquired during the permit period and any associated attorney costs would not apply.

Table F-11. Total Post-BRCP Permit Implementation Entity Staff Costing Assumptions and Estimates

Staff Position	Cost Per FTE			FTEs	Average Annual Cost
	Annual Salary	Annual Benefits	Annual Cost		
Executive Director	*Subsumed by existing BCAG operation*			0.10	-
Assistant Director	$115,440	$57,720	$173,160	0.25	$43,000
Clerical Support	$43,387	$21,694	$65,081	0.10	$7,000
Staff Biologist/ Scientist	$76,248	$38,124	$114,372	0.25	$29,000
Accountant	$80,685	$40,343	$121,028	0.10	$12,000
GIS/ IT Support Services	$75,504	$37,752	$113,256	0.20	$23,000
Staffing Total				**1.00**	**$113,000**
Annual Supplies/ Equipment/ Vehicle Costs					**$5,000**
Conservation Lands Management					**$325,000**
Monitoring					**$48,000**
Legal Services					**$58,000**
Total					**$549,000**

The ongoing costs will be substantially less than costs during the permit period with the primary focus on conservation land management and a modest level of administrative and management costs. In addition, funding for legal and other expenses is generally considered prudent. A preferred approach to accommodating the ongoing cost is to build up, during the permit term, an endowment sufficient to generate average annual interest payments capable of covering the annual ongoing costs without depleting the principal endowment amount. Additional reserve/endowment funding

is also often funded during the permit term to cover, whether through accrued interest or lump-sum payments, post-permit legal and other implementation expenses.

The uncertainty surrounding the level of reserve/endowment funding required is equal to or higher than that related to other BRCP costs. The assumption of the average annual interest rate over time at the end of the permit period has a critical effect on the estimated endowment funding required for stewardship. The average interest rate is highly uncertain and likely to fluctuate substantially over time. At the same time, governance decisions at the end of the permit term might also reduce the endowment funding obligation if a different entity takes on preservation management and is able to bring its own resources and funding.

For the BCRP, estimates of ongoing annual administrative and management costs and conservation land management costs in 2018 dollar terms were combined with an assumed real interest rate of 3 percent to estimate the required endowment at the end of the permit term. An additional legal reserve/endowment was also added based on a review of best practices for conservation/preservation plans. Endowment funding was then split between the mitigation and conservation components based on total acres of the BRCP, consistent with the methodology applied to other permit term administrative and management and other costs.

Endowment funding cost estimates were developed for the two following cost categories:

- **Administrative/Management/Monitoring Endowment**. The required administrative/ management endowment is estimated based on this annual ongoing cost and an assumed real interest rate of 3 percent annually.[10] As a result, the administrative/ management/ monitoring endowment required is $18.3 million (3 percent of which generates about $549,000 annually). The real interest rate available in 50 years is both uncertain and will fluctuate with economic and other conditions. About $10 million in funding for this endowment will be generated by accrued interest from funding placed in the endowment account during the permit term, leaving about $8.3 million to be funded from BRCP fee and non-fee sources. Consistent with the overall protected acreage associated with conservation (61 percent) and mitigation (39 percent), the mitigation component of the endowment is estimated at about $3.2 million and the conservation component at about $5.1 million.
- **Legal Endowment.** The purpose of this endowment is to cover a number of potential legal and related issues and costs that may arise associated with the continued protection of habitat consistent with the BRCP. Many conservation plans have been unable to address these costs at implementation start-up and the level of reserve/endowment required is highly uncertain. Based on a review of a range of information sources, a total reserve/endowment of $4.2 million is recommended for the BRCP.[11] This level of funding would provide direct funding, either through lump-sum payments or use of accrued interest, to address a range of minor and major legal and other disputes/issues arising from BRCP implementation.

The mitigation component post-BRCP permit implementation mitigation costs are calculated for the categories described above over the term of BRCP implementation. As indicated in **Error!**

[10] In other words, the available (nominal) interest rate over time after Year 50 is estimated to be about 3 percent above the inflation rate on average (e.g., 5 percent interest rate versus 2 percent inflation rate). Under this assumption, the "real" (above inflation) portion of the interest rate could be used to fund the ongoing cost without seeing the endowment principal lose real value due to inflation.

[11] Recommended funding approach and estimates based on qualitative and quantitative information from national and State Land Trust Alliances, Lincoln Institute of Land Policy, and other California HCP/NCCPs.

Reference source not found., the mitigation portion of endowment funding is estimated to be approximately $4.8 million.

The conservation component post-BRCP permit implementation conservation costs are calculated for the categories described above over the term of BRCP implementation. As indicated in **Error! Reference source not found.**, the conservation portion of endowment funding is estimated to be approximately $7.6 million.

F.12 Cost Contingency

The BRCP costs presented here are planning-level estimates. To account for uncertainties in costs, contingencies have been added to the costs to help protect against short-term cost overruns. A general contingency of 5 percent is included in the cost model for Administration and Management, Environmental Compliance, Monitoring, Changed Circumstances, Post-BRCP Permits. In addition, the 5 percent contingency is applied to the Conservation Measures, excluding CM1, CM4, and CM8 which involve more cost uncertainty. A contingency of 10 percent is included in the cost model for land and easement acquisitions (CM1). For CM4 and CM 8, habitat establishment measures, the cost analysis applies a 20 percent contingency due to the relative uncertainty associated with these BRCP efforts. Overall, contingency funds have been set at modest levels because the BRCP fee adjustment program allows for modifications to cover changing economic conditions. In total, about 9 percent of the total plan cost ($39 million) is a contingency cost. Table F-12 details the contingency included in the cost estimates.

Contingency funds are relatively modest because Plan fees are designed to keep pace with rising Plan costs, particularly for land acquisition. Contingency funds will be used only when needed to address costs beyond those predicted in this cost estimate and in annual budgets of the Implementing Entity. Contingency funding will generally be used to pay for expected management that simply costs more than budgeted, or for minor adjustments in management that result in higher costs. Adaptive management needs may arise throughout the permit term in response to monitoring results or external data that dictates shifts in management techniques and protocols. Costs for routine adaptive management needs are included in the Conservation Measures cost category. Additional management needs could be addressed through contingency funding. Contingency costs are assumed to be needed only during the permit term because some Plan costs will disappear (e.g., land acquisition) and other costs will drop substantially after the permit term.

Table F-12. Cost Contingency

Cost Category	Contingency	Mitigation Costs	Conservation Costs by Implementation Period						HCP Total
			Years 1–10	Years 11–20	Years 21–30	Years 31–40	Years 41–50	All Years	
Conservation Measures									
Land Acquisition (CM1)	10%	$9,295,000	$2,366,000	$3,438,000	$4,713,000	$3,812,000	$1,657,000	$15,986,000	$25,281,000
Restoration (CM4 & CM8)	20%	$5,586,000	$363,000	$630,000	$702,000	$484,000	$242,000	$2,421,000	$8,007,000
Other CMs	5%	$327,000	$56,000	$138,000	$206,000	$238,000	$251,000	$890,000	$1,218,000
Environmental Compliance	5%	$99,000	$19,000	$29,000	$31,000	$17,000	$8,000	$104,000	$204,000
Monitoring	5%	$336,000	$78,000	$124,000	$186,000	$222,000	$183,000	$793,000	$1,130,000
Administration and Management	5%	$822,000	$252,000	$261,000	$261,000	$261,000	$261,000	$1,296,000	$2,118,000
Changed Circumstances	5%	$172,000	$0	$0	$0	$0	$0	$0	$172,000
Endowment Costs	5%	$242,000	$51,000	$84,000	$113,000	$94,000	$40,000	$382,000	$624,000
Total		$16,880,000	$3,185,000	$4,704,000	$6,212,000	$5,128,000	$2,643,000	$21,872,000	$38,752,000

F.13 References

F.13.1 Printed

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SSC. 2012. Completed CWRGP (Community Wetland Restoration Grants Program) Projects List. Available at http://scc.ca.gov/webmaster/ftp/pdf/sccbb/2012/1208/20120802Board10_Community_Wetland_Restoration_Grant_Ex2.pdf.

F.13.2 Personal Communications

McKenzie, Gregg. Executive Vice President, Restoration Resources. Email to Vanessa Emerzian, SAIC, November 1, 2012.

Trimble, Ted. General Manager and Secretary, Western Canal Water District. Telephone conversation with Paul Cylinder, SAIC, November 15, 2012.