Table 1. Required Ratios and Estimated Preservation, Restoration and Creation Requirements for Aquatic Land-Cover Types under Initial and Maximum Urban Development Area

(Combines tables 5.5a, 5.5b, 5.16 and 5.17 of HCP)

	Preservation Requirements								Restoration & Creation Requirements								
		Estimated Impact[1] (acres)		Estimated Preservation Requirement[1] (acres)		Impact & preservation notes	Minimum Available in Acquisition Analysis Zones[2] (acres)		Availabilty notes	Required Restoration and Creation Ratios (in addition to preservation requirements)		Estimated Restoration/ Creation Requirement[1] (acres)		Restoration or Creation Required to Contribute to Recovery (acres)		Estimated Total Restoration or Creation[1] (acres)		restoration / creation notes
Aquatic Land Cover Type	**Required Preservation Ratio**	Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario	Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario		Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario		Restoration	Creation	Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario	Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario	Initial Urban Development Area Scenario	Maximum Urban Development Area Scenario	
Riparian woodland/scrub	2:1	30	35	60	70		205	205		1:1	–	30	35	20	20	50	55	
Wetlands and Ponds																		
Perennial wetlands[3]	1:1	74	75	74	75	3	231	232	3	1:1	–	74	75	10	10	84	85	7
Seasonal wetlands	3:1	43	56	129	168	3, 4	172	172	3, 4, 5	2:1	–	86	112	20	20	106	132	4, 7
Alkali wetland	3:1	28	31	84	93	4	168	168	4	2:1	–	56	62	5	5	61	67	4
Ponds	2:1	7	8	14	16		80	80		–	1:1	7	8	8	8	15	16	
Slough/channel	0.5:1	72	72	36	36		137	137		1:1 or riparian	–	72	72	0	0	72	72	9
Aquatic (open water)	1:1	12	12		12		123	123		–	0.5:1 (ponds)	6 (ponds)	6 (ponds)	0	0	6 (ponds)	6 (ponds)	9
Total Aquatic Land Cover Types (acres)	–	266	289	397	470		1,117	1,117				331	370	63	63	394	433	
Perennial streams (miles)	2:1	0.3	0.4	0.6	0.8	6	18	184	6, 7	1:1	1:1 if restoration not feasible	0.3	0.4	0	0	0.3	0.4	7,10
Intermittent streams (miles)	1:1	0.3	0.4	0.3	0.4	6	184	184	6, 7	1:1	1:1 if restoration not feasible	0.3	0.4	0	0	0.3	0.4	7,10
Ephemeral streams (miles)	1:1	4	5	4	5		184	184	7	1:1	1:1 if restoration not feasible	4	5	0	0	4	5	7,10

Notes:

[1] Actual impacts, preservation requirements and restoration/creation requirements will be based on field-delineated resources at impact sites and application of the required preservation ratios in this table.

[2] Many land cover types were underestimated in the mapping conducted for this HCP/NCCP, so these figures represent minimum acreages of what is available for preservation. See Chapter 3 for a discussion of the mapping limitations.

[3] Undetermined wetlands could be seasonal wetlands or perennial wetlands (e.g., freshwater marsh). Seasonal wetlands will be mitigated at a preservation ratio of 3:1; perennial wetlands will be mitigated at a preservation ratio of 1:1. This table assumes 75% of undetermined wetlands are perennial wetlands and 25% are seasonal wetlands.

[4] Seasonal and alkali wetland acreage was quantified as the minimum polygon encompassing clusters of seasonal pools or drainages (i.e., wetland complexes). Impacts and land acquisition requirements will be tracked by jurisdictional wetland boundary, so estimates in this table overstate the expected impacts to and preservation of these land cover types. Impact restrictions and preservation ratios apply only to wetted acres.

[5] The actual amount of seasonal wetlands available for preservation in the inventory area is unknown because of a lack of field surveys. The allowable impact to seasonal wetlands by covered activities will be capped at the amount required to preserve seasonal wetlands at the required 3:1 ratio. For example, if only 30 acres are preserved, allowable impacts will be capped at 10 acres.

[6] Maximum allowable impacts for perennial and intermittent streams could not be separately estimated. Cumulative impacts for these two categories were estimated at 0.6 miles for the Initial Urban Development Area and 0.8 for the Maximum Urban Development Area. For the purposes of this table, it is assumed that the impacts are evenly split between the two categories.

[7] The approximate length of all streams of all types in the Acquisition Analysis Zone is 184 miles.

[8] Undetermined wetlands are either seasonal wetlands or perennial wetlands. Mitigation of seasonal wetlands will be accomplished through restoration at 2:1. Mitigation of perennial wetlands will be accomplished through in-kind creation at 1:1. This table assumes 75% of the undetermined wetlands are perennial wetlands and 25% are seasonal wetlands.

[9] Loss of slough/channel will be compensated by either restoring slough/channel at a 1:1 ratio or restoring riparian woodland/scrub at a 1:1 ratio (see text). These calculations assume all slough/channel impacts will be compensated through riparian woodland/scrub restoration because of the limited opportunities for slough/channel creation. Loss of open water will be compensated by creating ponds (see text).

[10] Streams will be restored at a 1:1 ratio where feasible. Where stream restoration is not feasible, out-of-kind creation of seasonal wetlands or permanent wetlands will be required to replace some of the functions of the lost stream at a 1:1 ratio. See Conservation Measure 2.10 for more details.

Table 2: Stream Setback Minimum Requirements for Streams[4]

Stream Reach Type and Location[1]	Buffer Objective/ Function (from Figure 5-11)	Example Sites in Inventory Area	Minimum Setback (from top of bank measured in aerial perspective[2])	Conditions and Limitations on Impacts To Streams[3]		Conditions and Limitations on Impacts Within Setbacks[4]		Comments
				Linear Limitations on Impacts to Streams	Activities for Which Stream Impacts Will Be Authorized	Limitations on Area of Impacts Within Setback[5]	Activities for Which Setback Impacts Will Be Authorized	
1st and 2nd order[6] ephemeral reaches in urban and agricultural areas	N/A	Multiple unnamed tributaries to intermittent and perennial reaches	Avoidance and minimization measures for drainages must be documented but no setback is required	No limitations	Any activities	No limitations	Any activities	These reaches are located in dense urban and intensive agricultural areas, and provide low habitat function for covered species. Avoidance and implementation of Conservation Measure 1.10 will minimize impacts to water quality and hydrologic functions.
Concrete-lined channels	Enhance water quality; retain restoration potential	Reaches of Kirker Creek	20 ft	No limitations	Any activities	No limitations	Any activities	These reaches are located in dense urban areas and provide low habitat function for covered species. A minimal buffer width will reduce sediment and nutrient inputs from surface flows, retain some potential for stream restoration, and provide for recreational opportunities.
1st and 2nd order[6] ephemeral reaches in natural areas	Erosion and nutrient control;	Multiple unnamed tributaries to intermittent and perennial reaches	25 ft	No limitations	Any activities	No limitations	No limitations, but avoidance and minimization must be documented.	Although ephemeral streams play a limited role in providing habitat to covered species, these systems represent the first point of entry for sediment and other contaminants into downstream reaches. Thus, unlike the stream types below, the primary objective of the setback for

[4] Stream setbacks apply Within the Urban Limit Line or City Limits of Brentwood, Clayton, Oakley or Pittsburg.

Stream Reach Type and Location[1]	Buffer Objective/ Function (from Figure 5-11)	Example Sites in Inventory Area	Minimum Setback (from top of bank measured in aerial perspective[2])	Conditions and Limitations on Impacts To Streams[3]		Conditions and Limitations on Impacts Within Setbacks[4]		Comments
				Linear Limitations on Impacts to Streams	Activities for Which Stream Impacts Will Be Authorized	Limitations on Area of Impacts Within Setback[5]	Activities for Which Setback Impacts Will Be Authorized	
								ephemeral streams is to filter out sediment and contaminants before they degrade downstream habitat.
Perennial, intermittent, or 3rd or higher order[6] ephemeral streams in urban areas except Marsh Creek mainstem	Enhance water quality; retain restoration potential	Lower Willow Creek, Lower Kirker Creek, Lower Sand and Deer Creeks	50 ft	300 feet	Necessary bridges and outfalls	Up to 15% of setback area	Necessary bridges and outfalls, access and maintenance roads for flood control, c3 facilities, and trails	These reaches are located mostly in dense urban areas and provide low habitat function for covered species. However, potential may exist for restoration of riparian vegetation and minimal floodplain areas. In addition, a minimal buffer width will reduce sediment and nutrient inputs from surface flows and provide for recreational opportunities.
Perennial, intermittent, or 3rd or higher order[6] ephemeral streams in agricultural or natural areas and Marsh Creek mainstem	Enhance water quality; retain restoration potential	See examples below[7]	75 ft	300 feet	Necessary bridges and outfalls	Up to 15% of setback area	Necessary bridges and outfalls, access and maintenance roads for flood control, trails, and other necessary facilities approved by wetlands agencies	These reaches retain the greatest habitat value and potential for restoration within the Urban Limit Line. The buffer will filter sediment and other contaminants, maintain habitat for covered species, allow for restoration of riparian vegetation and some small floodplain areas, as well as providing recreation opportunities.

[1] Location parameters (e.g., “agricultural areas”, “natural areas”, etc.) describe the setting of the stream at the time of completing this HCP/NCCP and refer to the fee zones and urban landcover shown in Figure 9-1.

[2] Where native woody riparian vegetation is present, minimum setbacks must extend to the outer dripline of the riparian vegetation or the specified number of feet measured from top of bank, whichever is greatest. Riparian vegetation is defined broadly to include oaks and other woody species that function as riparian

corridors. Setbacks must also meet minimum setback requirements of the applicable local land use agency. Contra Costa County has an ordinance regulating impacts near unimproved earthen channels. This Ordinance requires a "structure setback line" that varies between approximately 30 feet and 50 feet from top of bank depending on the height of top of bank above the channel invert (County Code Title 9, Division 914-14.012).

[3] Mitigation is required for all impacts to streams, as described in Chapter 5 of the HCP/NCCP. Restoration requirements are summarized in Tables 5-16, 5-17, and 9-5. Preservation requirements are summarized in Tables 5-5a and 5-5b and may be accomplished through payment of the development fee described in Section 9.3.1 or through provision of land in lieu of fees.

[4] Impacts within setbacks must be mitigated through: a) payment of the development fee described in Section 9.3.1 over the entire property including the setback and the stream channel; and b) through payment of the riparian impact fee (see Table 9-5 of HCP/NCCP) for every acre of impact within the setback or through direct performance of riparian restoration at a 0.5 to 1 ratio on-site or off-site.

[5] Restrictions will be measured as a percentage of the setback area excluding the area the of the stream channel.

[6] Stream order refers to the numeric identification of the links within a stream network. This document follows the stream ordering system of Strahler (1964). In this system, a first order stream is a stream with an identifiable bed and bank, without any tributary streams. A second order stream is formed by the confluence of two first order streams. A third order stream is formed by the confluence of two second order streams, and so on. Addition of a lesser order stream does not change the stream order of the trunk stream.

[7] Perennial streams in agricultural or natural areas within the Inventory Area consist of the following:

a. **Mount Diablo Creek, Russelman Creek, Peacock Creek upstream of the Oakhurst Country Club property, and tributaries to Mount Diablo Creek within Mount Diablo State Park;**

b. **Kellogg Creek in the Foothills/Upper Valley and Delta geomorphic zones;**

c. **Brushy Creek in the Delta and Lower Valley/Plain geomorphic zones;**

d. **Indian, Rock, Sand Mound, Dutch, Piper, and Taylor Sloughs, and False River (does not include reaches in concrete channels); and**

e. **Sand Creek and Oil Canyon Creek in the Montane geomorphic zone.**