APPENDIX E-5

Technical Memo: Fish Species Inhabiting Lower Napa River and San Pablo Bay

APPLIED marine SCIENCES

Technical Memorandum

Fish Species Inhabiting the lower Napa River and San Pablo Bay

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Pelagic (Open Water) Fish Community

Seventeen species of pelagic fish have been documented inhabiting the deep and shallow water areas of San Pablo Bay and the Carquinez Strait adjacent to the Napa River mouth into San Pablo Bay (Table 1,). Six of these species account for over 96 percent of the total abundance, with the dominant species, Northern anchovy (*Engraulis mordax*), comprising 76.5 percent of the fish inhabiting the pelagic community. Pacific herring (*Clupea pallasii*) is the second most common fish species inhabiting the Napa River mouth, accounting for 14.4 percent of the total abundance. The remaining dominant fish species include American shad (*Alosa sapidissima*), Longfin smelt (*Spirinchus thaleichthys*), Striped bass (*Morone saxatilis*) and Bay goby (*Lepidogobius lepidus*) which together account for 5.3 percent of the total abundance inhabiting the water column. Additional pelagic species that are present in low abundance include Chinook salmon (*Oncorhynchus tshawytscha*), Plainfin midshipman (*Porichthys notatus*), Jacksmelt (*Atherinopsis californiensis*), Splittail (*Pogonichthys macrolepidotus*), Threadfin shad (*Dorosoma petenense*), Delta smelt (*Hypomesus transpacificus*), Threespine stickleback (*Gasterosteus aculeatus*), Pacific staghorn sculpin (*Leptocottus armatus*), English sole (*Parophrys vetulus*) and Starry flounder (*Platichthys stellatus*).

Important managed, protected, or special status pelagic zone species that are found in the study area, either seasonally or year-round, include Northern anchovy, Pacific herring, longfin smelt, delta smelt, steelhead, and Chinook salmon (AMS 2014, IEP 2010-2012, USFWS 2013, CDFW 2014). Delta smelt and Winter-run Chinook salmon are currently protected under both the Federal Endangered Species Act (FESA) and California Endangered Species Act (CESA) as endangered. Central California coast DPS steelhead trout are listed under FESA as Threatened and a species of special concern under CESA. Longfin smelt are listed under CESA as threatened and under FESA as a species worthy of protection, but which cannot be formally listed at this time (USFWS 2014).

Northern anchovy is the only managed species under the Magnuson-Stevens Act (Coastal Pelagic Fish Management Plan) observed to be present in the study area (Olberding 2008) and Pacific herring is considered a species of special concern in the San Francisco Bay-Delta by NOAA National Marine Fisheries.

Although juvenile fin clip data collected in the lower Napa River in 2010 suggested that Coastal Coho Salmon might have returned to the watershed, more recent DNA analysis of those samples proved inconclusive (Garza and Crandall 2013). As a result, the potential return of Coho salmon to the Napa River is currently uncertain. Additionally, Klamath River Chinook salmon have been detected in the Napa River (Garza and Crandall 2013).

Demersal (Seafloor) Fish Community

Many different fish species spend all or part of their life cycle in association with the demersal zone. Twenty-five species of fish comprise the demersal region of the Napa River mouth, living in close association with the benthos during their sub-adult and adult life (Table 2) (IEP 2012-2013, AECOM 2013). Of these demersal species, Bay goby (*Lepidogobius Lepidus*) is the dominant species comprising 29.9 percent of the total fish abundance and English sole (*Parophrys vetulus*) is the second most common species accounting for 22.5 percent. The following nine dominant species constitute 43.5 percent of the species commonly inhabiting the seafloor and immediately adjacent waters in both the deep and shallow water regions of the Napa River mouth: Pacific staghorn sculpin (*Leptocottus armatus*), Striped bass (*Morone saxatilis*), Yellowfin goby (*Acanthogobius flavimanus*), Starry flounder (*Platichthys stellatus*), Plainfin midshipman (*Porichthys notatus*), Speckled sanddab (*Citharichthys stigmaeus*), Longfin smelt (*Spirinchus thaleichthys*), Shokihaze goby (*Tridentiger barbatus*) and American shad (*Alosa sapidissima*). Additional demersal species that are present in low abundance include Sand sole (*Psettichthys melanostictus*), Cheekspot goby (*Llypus gilberti*), Shimofuri goby (*Tridentiger bifasciatus*), Brown smoothhound (*Mustelus henlei*), California halibut (*Paralichthys californicus*), Diamond turbot (*Hypsopsetta guttulata*), White croaker (*Genyonemus lineatus*), Pacific herring (*Clupea pallasii*), Shiner perch (*Cymatogaster aggregata*), Bay pipefish (*Syngnathus leptorhyncus*), River lamprey (*Lampetra ayresi*), White sturgeon (*Acipenser transmontanus*), Green sturgeon (*Acipenser medirostris*) and Threespine stickleback (*Gasterosteus aculeatus*).

Managed, protected, or other special status fish species observed inhabiting the demersal zone of the project area include English sole (*Parophrys vetulus*), Starry flounder (*Platichthys stellatus*), , and Sand sole (*Psettichthys melanostictus*), which are managed fish species under the Magnuson-Stevens Act and the Pacific Groundfish Fisheries Management Plan, Longfin smelt (*Spirinchus thaleichthys*), which is a CESA threatened species and a NESA species River lamprey (*Lampetra ayresi*) is a CESA species of special Concern, and green sturgeon (*Acipenser medirostris*) (Table 3) (IEP 2010-2012, AECOM 2013, CDFW 2014).

Anadromous species use the San Francisco Bay estuary on their way up rivers to spawn and as a rearing area for juveniles on their way down from their birthplace in the river to the open ocean (IEP 2010-2012). Anadromous species in the Napa River mouth include Coastal California Chinook salmon (*Oncorhynchus tshawytscha*), Central Valley ESU Steelhead (*Oncorhynchus mykiss irideus*), White sturgeon (*Acipenser transmontanus*), Green sturgeon (*Acipenser medirostris*), American shad (*Alosa sapidissima*) and Striped bass (*Morone saxatilis*) (USFW 2013). San Francisco Bay is designated as essential fish habitat for Chinook salmon, Cojo salmon, steelhead, green sturgeon, and assorted demersal and pelagic fish species found in our study area.

Recreational Fishing in the Napa River

Recreational fishing in the Napa River, especially the estuary region, which includes the VMT project area, appears to be primarily focused on fall run Chinook salmon, steelhead, , striped bass, and white sturgeon

TABLE 1. PELAGIC FISH COMMUNITY COMPOSITION AND ESTIMATED SPECIES ABUNDANCE FOR DEEPWATER AND SHALLOW WATER LOCATIONS NEAR THE NAPA RIVER MOUTH FOR YEARS 2010 THROUGH 2012 BASED ON MONTHLY MID-WATER DEPTH TRAWLING DATA FROM THE INTERAGENCY ECOLOGICAL PROGRAM AT STATIONS 319, 346, AND 447.

Species	Common Name	Abundance				
		2010	2011	2012	Mean	% Comp.
Engraulis mordax	Northern anchovy	4,421,701	2,495,494	5,837,500	4,251,565	76.5%
Clupea pallasii	Pacific herring	621,417	1,600,125	170,689	797,410	14.4%
Alosa sapidissima	American shad	44,435	107,839	148,166	100,146	1.8%
Spirinchus thaleichthys	Longfin smelt	61,698	79,303	81,057	74,019	1.3%
Morone saxatilis	Striped bass	66,993	44,776	70,290	60,686	1.1%
Lepidogobius lepidus	Bay goby	3,589	32,303	139,978	58,623	1.1%
Additional species present include: Chinook salmon, Plainfin midshipman, Jacksmelt, Splittail, threadfin shad, Delta smelt, Threespine stickleback, Pacific staghorn sculpin, English sole, Starry flounder						

SOURCE: Interagency Ecological Program for the San Francisco Bay Estuary (IEP), *San Francisco Bay Study, 2010-2012,* unpublished raw midwater trawl data, 2010-2012.

TABLE 2. DEMERSAL (SEAFLOOR) COMMUNITY COMPOSITION AND ESTIMATED SPECIES ABUNDANCE FOR DEEPWATER AND SHALLOW WATER LOCATIONS NEAR THE NAPA RIVER MOUTH FOR YEARS 2010 THROUGH 2012 BASED ON MONTHLY BOTTOM TRAWLING DATA FROM THE INTERAGENCY ECOLOGICAL PROGRAM AT STATIONS 319, 346, AND 447.

Species	Common Name	Abundance				
		2010	2011	2012	Mean	% Comp.
Lepidogobius lepidus	Bay goby	132455	120273	158227	136,985	29.9%
Parophrys vetulus	English sole	193258	46549	69123	102,977	22.5%
Leptocottus armatus	Pacific staghorn sculpin	72971	65115	32684	56,923	12.4%
Morone saxatilis	Striped bass	39111	59997	50242	49,783	10.9%
Acanthogobius flavimanus	Yellowfin goby	37881	16279	9189	21,116	4.6%
Platichthys stellatus	Starry flounder	15384	27413	8267	17,021	3.7%
Porichthys notatus	Plainfin midshipman	18835	6398	22852	16,028	3.5%
Citharichthys stigmaeus	Speckled sanddab	35776	6040	1919	14,578	3.2%
Spirinchus thaleichthys	Longfin smelt	3839	12795	11569	9,401	2.1%
Tridentiger barbatus	Shokihaze goby	9752	9215	5529	8,165	1.8%
Alosa sapidissima	American shad	1843	9059	7422	6,108	1.3%
Additional species present include: Sand sole, Cheekspot goby, Shimofuri goby, Brown smoothhound, California halibut, Diamond turbot, White croaker, Pacific herring, Shiner perch, Bay pipefish, River lamprey, Threespine stickleback						

SOURCE: Interagency Ecological Program for the San Francisco Bay Estuary (IEP), *San Francisco Bay Study, 2010-2012,* unpublished raw midwater trawl data, 2010-2012.

TABLE 3. MANAGED FISH SPECIES IN SAN FRANCISCO BAY -DELTA UNDER THE MAGNUSON-STEVENS ACT

Fisheries Management Plan	Species, Common Name	Species, Scientific Name	Life Stage	Abundance
Coastal Pelagic	**Northern anchovy**	*Engraulis mordax*	J, A	Abundant
	Jack mackerel	*Trachurus symmetricus*	E,L	Present
	Pacific sardine	*Sardinops sagax*	J, A	Present
Pacific Groundfish	**English sole**	*Parophrys vetulus*	J, A	Abundant
	Sand sole	*Psettichthys melanostictus*	L, J, A	Present
	Curlfin sole	*Pleuronichthys decurrens*	J	Rare
	Pacific sanddab	*Citharichthys sordidus*	E, L, J, A	Present
	Starry flounder	*Platichthys stellatus*	J, A	Present
	Lingcod	*Ophiodon elongatus*	J, A	Present
	Brown rockfish	*Sebastes auriculatus*	J	Present
	Pacific whiting (hake)	*Merluccius productus*	E,L	Present
	Kelp greenling	*Hexagrammos decagrammus*	J, A	Present
	Leopard shark	*Triakis semifasciata*	J, A	Present
	Spiny dogfish	*Squalus acanthias*	J, A	Present
	Skates	*Raja* ssp.	J, A	Present
	Soupfin shark	*Galeorhinus galeus*	J, A	Rare
	Bocaccio	*Sebastes paucispinis*	J	Rare
	Cabezon	*Scorpaenichthys marmoratus*	J	Present
Pacific Coast Salmon	**Chinook salmon**	*Oncorhynchus tshawytscha*	J, A	Seasonally Present
	Coho salmon	*Oncorhynchus kisutch*	J, A	Historically Present, Current Occurrence unknown

NOTES: A = Adult J = Juvenile L = Larvae E = Egg
Bolded common names indicate species that have been documented to inhabit the study area.

SOURCE: Interagency Ecological Program for the San Francisco Bay Estuary (IEP), *San Francisco Bay Study, 2010-2012,* unpublished raw midwater and bottom trawl data, 2010-2012.

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