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Sacramento River Striped Bass Migration History Determined by Otolith Sr/Ca Ratio

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Habitat use has been shown to be an important factor in the bioaccumulation of contaminants in striped bass. This study examines migration in striped bass as part of a larger study investigating bioaccumulation and maternal transfer of xenobiotics to progeny in the San Francisco Estuary. Habitat use, residence time and spawning migration over the life of females ($n = 32$) was studied. Female striped bass were collected between Knights Landing and Colusa on the Sacramento River during spawning runs of 1999 and 2001. Otoliths were removed, processed and aged via otolith microstructure. Subsequently, otoliths were analyzed for strontium/calcium (Sr/Ca) ratio using an electron microprobe. Otolith Sr/Ca ratio is used as a metric of salinity exposure to distinguish freshwater, estuary, and marine habitat use. Results were selectively confirmed by ion microprobe analyses for habitat use. The Sr/Ca data demonstrate a wide range of migratory patterns. Age of initial ocean entry differs among individuals before returning to freshwater, presumably to spawn. Some fish reside in freshwater year-round, while others return to more saline habitats and make periodic migrations to freshwater. Frequency of habitat shifts and residence times differs among fish, as well as over the lifetime of individual fish. Salinity exposure during the last year before capture is examined more closely for comparison of habitat use by the maternal parent to contaminant burden transferred to progeny. While at least one fish spent the year in freshwater, the majority of spawning fish spent their previous year in elevated salinity. However, not all fish migrated to freshwater to spawn in the previous year. The information concerning migration history obtained from these analyses can be combined with contaminant and histological developmental analyses to better understand the

bioaccumulation of contaminants in this Estuary and the subsequent effects they and habitat use have on fish populations. (299 words)