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Two aspects of ecosystem health in the Colorado River delta were investigated as part of the present dissertation. The following is a summary of the most important findings: Contaminants of natural origin (e.g. selenium) and anthropogenic activities (e.g. pesticides) represent a potential threat for humans and wildlife in the Colorado River delta. Fourteen locations were sampled for bottom material and biota from March 1998 to April 2000. Concentrations of selenium in bottom material ranged from 0.6-5.0 _g/g. Concentrations of selenium in biota ranged from 0.5-18.3 _g/g, 23% of these samples exceeded the toxic threshold where reproductive impairment in birds from dietary exposure is reported. Concentrations of DDE exceeded the lower critical dietary level for sensitive species in 30% of biota samples. No clear relationship could be found between the concentration of Se in bottom material and the concentration of Se in fish. Nevertheless, smaller Se concentrations in biota were found at sites that had an outflow and where exposure or physical disturbance of the bottom material was uncommon. Greater concentrations of Se in biota were found at sites with strongly reducing conditions, no output, and subsequent periods of drying and flooding or dredging activities, and at sites that received water directly from the Colorado River.
The southwestern willow flycatcher (*Empidonax traillii extimus*) is an endangered neotropical migrant with only 300-500 breeding pairs. The objective of the second study was to determine the presence/absence of this bird in the Colorado River delta. Surveys were conducted from June to July, 1999 and from May to June, 2000 using an audio tape of this subspecies' songs to elicit responses. We detected a total of 50 willow flycatchers in the Colorado River delta in the months of May to June. None were detected in July, thus, the birds were most likely migrants. Restoration of the intensively used stopover sites of the Colorado River delta appears to be essential for the overall recovery of this subspecies. Additionally, we propose a possible willow flycatcher summer migratory route throughout the series of coastal estuaries found adjacent to the coast of Sonora.