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Selecting the optimum plot size for a California design-based stream and wetland mapping program

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ABSTRACT

Abstract Accurate estimates of the extent and distribution of wetlands and streams are the foundation of wetland monitoring, management, restoration, and regulatory programs. Traditionally, these estimates have relied on comprehensive mapping. However, this approach is prohibitively resource-intensive over large areas, making it both impractical and statistically unreliable. Probabilistic (design-based) approaches to evaluating status and trends provide a more cost-effective alternative because, compared with comprehensive mapping, overall extent is inferred from mapping a statistically representative, randomly selected subset of the target area. In this type of design, the size of sample plots has a significant impact on program costs and on statistical precision and accuracy; however, no consensus exists on the appropriate plot size for remote monitoring of stream and wetland extent. This study utilized simulated sampling to assess the performance of four plot sizes (1, 4, 9, and 16 km^2) for three geographic regions of California. Simulation results showed smaller plot sizes (1 and 4 km^2) were most efficient for achieving desired levels of statistical accuracy and precision. However, larger plot sizes were more likely to contain rare and spatially limited wetland subtypes. Balancing these considerations led to selection of 4 km^2 for the California status and trends program.

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