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## **How accurate are probability-based estimates of wetland extent? Results of a California validation study**

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### **ABSTRACT**

Estimates of wetland and stream extent and distribution form the basis for state and federal monitoring and management programs and guide policy development decisions. The current default approach, comprehensive mapping, provides the most complete information on extent and distribution but is prohibitively expensive across large geographic areas. In contrast, probabilistic mapping produces statistical estimates of extent and distribution at a fraction of the cost of comprehensive mapping. This study provides a direct comparison to address how well probability based estimates of wetland extent approximate results from comprehensive mapping, and the degree to which inter-mapper variability contributes to overall error in probability-based estimates. Two regions of California were selected based on existence of recent, comprehensive wetland and stream maps. Probabilistic sample plot locations were selected by generalized random tessellation stratified sampling and sample plot maps were produced from the same source imagery as the comprehensive maps. Sample maps were compared for inter-mapper variability, plot-by-plot differences between sample and comprehensive maps, and differences between sample estimates and comprehensive totals. On a plot-by-plot basis differences in mapped wetland area between comprehensive maps and probabilistic sample maps approached 50 % in either the positive or negative direction, leading to uncertainty in directly comparing maps derived from these two approaches. With application of standardized protocols and rigorous quality control measures, we were able to achieve a 97 % overall accuracy rate between independent mapping teams applying the probabilistic mapping approach. Our results suggest caution when comparing comprehensive and sample based wetland extent estimates and highlight the importance of mapper intercalibration.

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