

ABSTRACT

We developed and validated an assignment rule based on quantified scale characteristics for the identification of wild and hatchery stocks of Great Lakes steelhead (*Salmo gairdneri*). This rule was used to assess the relative contributions of these stocks to adult steelhead populations in the northwestern Lower Peninsula of Michigan during the period 1983–84 for seven rivers and during the additional periods 1968–70 and 1979–82 for one river. Adults returning during these periods were representative of pre-1983 hatchery production in Michigan, when yearling parr was the typical life stage stocked. Scale samples were collected from steelhead of known wild and hatchery origins. A number of scale characteristics, chosen to provide information on first-year growth patterns, were quantified. One characteristic, Ratio 23 (the relationship between winter and spring growth rates), met our criteria of being distinct between wild and hatchery adults, yet consistent among life stages, years, and geographic locations within each respective wild and hatchery group. Ratio 23 was used to develop an assignment rule and classification error rates. This rule was applied to samples of unknown-origin adult steelhead collected in seven rivers in the northwestern Lower Peninsula of Michigan during 1983–84 to estimate the percentage of wild fish in each river and its variance. The percentage of wild fish in the adult population was estimated to be 100% for an unstocked trout river, 93% for four stocked trout rivers, and 60% for two stocked marginal trout rivers. In summary, an assignment rule developed using the scale character Ratio 23 provided a simple and accurate method of identifying wild and hatchery origins for Lake Michigan steelhead. Application of this rule to samples of unknown-origin adults indicated that past stockings of yearling steelhead parr in trout rivers have contributed little to adult populations in these rivers.