

**WHAT IS THE MINIMUM NUMBER OF SITES NEEDED
FOR PRECISELY ASSESSING
THE ECOLOGICAL STATUS OF MAINSTEM RIVERS?**

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ABSTRACT

The riverscape concept favors study of an entire river and a frequently recommended number for probability sampling designs is 50 sites. However a riverscape census of an entire river and a 50 site sample are both daunting undertakings for most state water quality agencies, and they also limit the number of rivers that can be sampled with limited state resources. On the other hand, one or a handful of water quality samples from bridges underestimates the ecological variability expressed by a large river. We sought to determine the number of sites that would yield relatively precise estimates of physical, chemical, and biological condition for raftable rivers 100-200 km long and 20-120 m wide. We used a probability design to select 20 sites on each of two rivers in Washington and four in Oregon. The rivers were selected to include those draining cold deserts, dry and wet forests, and agricultural plains. All sites were sampled by a four person crew from two rafts. The crews collected physical and chemical habitat and fish and macroinvertebrate assemblage data at each site through use of EMAP-West methods. The reach length for each site was 50 times the mean wetted width of the channel, and crews sampled 1-2 sites per day depending on site size and the distance between sites and access/egress locations. The data indicate considerable ecological change among upper and lower sites in some rivers and little in others, as well as variability in biological assemblages associated with local changes in macrohabitat types. Based on preliminary analyses on these six rivers, our data suggest a high degree of spatial autocorrelation between sites that are < 10-40 km apart. This autocorrelation needs to be taken into account in designing river monitoring surveys.

KEY WORDS

Fish assemblages, macroinvertebrate assemblages, physical and chemical habitat, IBI