

# Session I: Habitat

## Intensively Monitored Watersheds – An Overview

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Millions of dollars have been dedicated to the restoration of freshwater habitat in the Pacific Northwest since the 1980s. The efficacy of these efforts is not fully understood. However, such an understanding is critical in order to most effectively distribute restoration resources and to estimate the contribution of these activities to the recovery of listed salmon ESUs in the Columbia Basin. One of the most effective means of determining the contribution of restoration projects to salmon recovery are watershed-scale experiments. Several organizations in the Pacific Northwest have begun to establish such projects, termed Intensively Monitored Watersheds (IMWs). The premise of this approach is that the complex relationships controlling salmon response to habitat conditions can best be understood by concentrating effort at a few locations. Focusing effort enables enough data on physical, chemical and biological attributes of a system to be collected to develop a comprehensive understanding of the factors controlling salmon production and how these factors are influenced by the application of various restoration measures. Concentration of effort also enables a large number of restoration projects to be deployed over a short period of time, greatly increasing the ability to detect a fish response, should one occur.

Many IMW efforts have been implemented in the last 5 years. Efforts are currently underway in Washington, Oregon and Idaho. Some of these studies are designed to evaluate the efficacy of various land use regulations on aquatic habitat and fish and others are focused on responses to restoration actions. The proliferation of these studies indicates that there is general agreement that this approach is a necessary component of a comprehensive monitoring strategy. The value of IMWs is enhanced by integration into a monitoring program that includes monitoring designed to determine habitat and population status and trends at regional scales.

Two concerns about IMWs have been raised. First, the variability in salmon populations would suggest that the length of time required to obtain meaningful results may be considerable. Also, there is uncertainty in extending IMW results to other locations. IMWs have begun to address these questions. The design of most current IMWs includes untreated, reference watersheds and attempt to account for co-variates (factors influencing the fish but not related to applied treatments). Power analysis of data collected at a Washington IMW using this approach indicates that detecting a 25% response in smolt production should be possible in about a decade. Many IMWs should have a comparable timeline. Uncertainty associated with extending IMW results to other locations will ultimately be reduced as results from the large number of IMWs established recently become available. However, other methods to enhance extension of results are also being developed. Classification of watersheds by geology, climate, land use and other features will enable determination of those locations most comparable to IMW watersheds, and thus, more likely to respond similarly. The information generated by IMWs also will improve the accuracy of the models currently being employed to predict fish response to habitat actions. These improved models will facilitate broad application of IMW results.