BCE(C) is a "conservation-efficiency" frontier, representing the maximum amount of conservation achievable at a given economic cost. W(B,C) measures the social welfare of different combinations of conservation benefits and economic costs (which are the opportunity cost of not consuming all other goods). (B*,C*) represent the optimal levels of conservation and cost, and T* is the slope of BCE(C) and W(B,C) at that point.
If $B_i$ and $C_i$ are independent of the designation status of other areas, a simple threshold rule can be set: Designate all areas with $B_i/C_i > T^*$. Here, the set of all areas in a hypothetical critical habitat designation (for which there is quantitative data on biological effectiveness) are divided into the set of areas to be included and the set to be excluded.
The designation of critical habitat for West Coast salmon and steelhead was based on the choice of watersheds – specifically, fifth field hydrologic unit code areas, or HUC5s – for the 4(b)(2) decision process. In Washington, Oregon, and Idaho, 609 HUC5 watersheds were included in the analysis.
This is an example of how spatial data on federal activities enabled NMFS to estimate their location and volume. This figure shows two watersheds in the Wenatchee River subbasin and the locations of six types of activities, including federal land acreage. In most cases, the spatial data spanned more than one year, which enabled NMFS to estimate the average annual volumes of these activities.
The estimated economic impacts of critical habitat designation show significant variation across watersheds. This figure illustrates that variation for the Puget Sound Chinook salmon ESU by assigning estimated costs to one of five cost categories.
The ratings of conservation value produced by the biological teams also show variation across watersheds. This example is from the Puget Sound Chinook salmon ESU.
For each ESU, all watersheds with a High biological rating were designated as critical habitat. For the other three biological ratings, a threshold was established for each rating that divided the watersheds into those designated automatically and those eligible for exclusion.
This series of figures shows how the initial choice of critical habitat designation would change as the set of thresholds changed. These hypothetical configurations combined with information on their associated economic costs (and other information) could be used to explore the “preferences” for trading off conservation values and economic costs (and other impacts).