

US EPA ARCHIVE DOCUMENT

EMAP-West Communications

How Reference Condition is Used in Surface Water Monitoring

EPA's Environmental Monitoring and Assessment Program is designed to develop the tools to measure the status and trends in the condition of the Nation's surface waters. One of the most important of these tools is a methodology to interpret the ecological indicators being measured by comparing them against a benchmark or "reference condition". Multiple definitions exist for reference condition – each has its own use and interpretation. One of the purposes of EMAP-West is to work collaboratively with the western states and tribes to develop a consistent approach for the development and use of reference condition. This approach will be used in collecting data to support quantitative description of reference condition and, ultimately, in the interpretation of data across the 12 states covered by EMAP-West. After its successful conclusion, this effort should serve as a template for the rest of the Nation.

EMAP-West will rely on two definitions of reference condition for setting benchmarks against which to compare the condition of the streams and rivers being sampled.

Minimally Disturbed Condition (MDC) – the condition of water bodies in the absence of significant, or with minimal, human disturbance. MDC will change little over time, mostly due to natural processes, and thus provides a stable benchmark. Historical information may be used to help describe MDC.

Least Disturbed Condition (LDC) – the best available physical, chemical, and biological conditions given today's state of the landscape. LDC will change overtime as landuse and management practices change thus is not a "target" or upper bound of water quality potential.



In evaluating the ecological condition of streams across 12 western states, EMAP-West is faced with a challenge: how to apply the best scientific principles to assessing reference condition and, at the same time, adopt an approach that is pragmatic; that is, one that can be implemented across the diverse landscape of the West in the timeframe of the Program. EMAP-West has chosen to develop a rigorous, consistent, and repeatable method for describing LDC across multiple states/ecoregions/stream types. Since LDC will change over time, we are also conducting research on techniques to estimate MDC where such conditions do not exist – in fact most areas.

EMAP-West's objectives are summarized as:

1. Adopt the LDC approach for application everywhere in the 12-state region covered by EMAP-West. EMAP will define selection criteria, select, and sample at least 20 reference sites in each state during the time period 2000-2004.
2. To estimate MDC, EMAP will choose 3 pilot areas (one each in Regions 8, 9, and 10) to explore several different approaches to developing MDC.
3. Use the information gathered from the LDC and MDC approaches to stimulate public and scientific discussion about determining the highest achievable goals given the existing degree of human disturbance and the potential for restoration – the significant part of setting management goals.

When completed, the work on reference condition in EMAP-West will form the foundation for a more quantitative and defensible process for conducting the analyses of water bodies necessary to: 1. designate their uses, 2. support assessments of condition, and 3. establish targets for protection and restoration. State and tribal water quality managers are responsible for bringing to a public forum an analysis that predicts the best ecological condition that can be achieved. This analysis must be informed by a rigorous evaluation of reference conditions, and tempered by economic conditions and societal values. A process for establishing reference condition that is transferable across state, tribal, or ecoregional boundaries will greatly improve our ability to meet the requirements of the Clean Water Act.

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