

Multiple Stressors

There is a pressing need for developing and testing a general set of theories in order to provide a confident basis for prediction of multiple stressor effects. Confident prediction is central to confident decision making in water pollution control. Consequently, WERF commissioned this study which has as its goal to provide a study design based on good science that helps establish a general, conceptual approach to multiple stressors. The objectives of the study are to develop a flexible and scientifically defensible conceptual model of the environmental effects of multiple stressors on river and stream ecosystems; develop a study design to test the conceptual model of multiple stressor effects; and, document the process used to arrive at the conceptual model.

The multiple stressor conceptual model includes two main components: (1) a diagram that portrays the main features of the study team's understanding of how multiple stressors would interact and the nature of the effects; and (2) a series of three testable risk hypotheses. These two components follow the guidance provided by the U.S. EPA for ecological risk assessment. The proposed conceptual model encompasses the following key assumptions:

- interactions between the stressor and the ecosystem are dependant upon the existing baseline conditions;
- for each stressor/baseline combination there will theoretically be a functional and a structural response;
- effects on habitat are caused by structural or functional responses to stressors; and
- effects on habitat can cause structural or functional responses.

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