

Review of Bioassay/Bioaccumulation Techniques

David A. Brown, Steven M. Bay and Bruce E. Thompson

¹*Southern California Coastal Water Research Project, Costa Mesa, CA*

ABSTRACT

The purpose of this bioassay review is to briefly describe and critique some of the methods available for assessing the effects of contaminants. Attention will be given to describing information that can be obtained from each regarding effects on the receiving environment. In summary sections, recommendations for usage of assay will be given.

Bioassay are divided into three major categories according to the location of the exposure; that is in the laboratory and in the field either caged or free swimming. Laboratory assays are usually far removed from realistic exposure conditions but provide a controlled environment for comparative toxicity testing and for researching and developing field protocols. Caged studies are a more ambitious effort to provide realistic exposure conditions but under controlled conditions. Measurements which can be made in field-exposed organisms have the greatest promise of providing accurate effects measurement under realistic exposure conditions, but often uncontrolled and often unknown influences can affect test results.

The word bioassay is used here in its broadest sense; that is as a measurement of any perturbation of a biological system. On an individual organism level, responses would range from the crudest measure of survival to the most subtle molecular indice of effect. In field situations, effects at the organismal level may be manifested at the population level. It is important to learn by controlled laboratory experiments, which patterns of effects will have impacts significant enough on survival, growth, reproduction, behavior and performance to influence the potential for survival in field situations. It may not always be possible to distinguish contaminant-related effects from other influences given the uncontrolled and complex nature of field situations. Thus, it is important that relationships between bioaccumulation and effects be determined in the laboratory so that bioaccumulation of contaminants in field-exposed organisms can be attributed to, or excluded from, any effects observed in the field.

Due to distribution restrictions, the full-text version of this article is available by request only.

Please contact pubrequest@sccwrp.org to request a copy.