

ENVIRONMENTAL BENEFITS OF THE PROPOSED CONSOLIDATED TOXIC HOT SPOTS CLEANUP PLAN

In the next section of the FED short-term adverse effects resulting from the remediation activities and possible mitigation strategies are discussed. This section summarizes the types of long-term benefits anticipated to result after remediation occurs. The Water Quality Control Policy for Guidance on the Development of Regional Toxic Hot Spots Cleanup Plans (SWRCB, 1998a) required that the RWQCBs consider the benefits that would be derived by remediating known Toxic Hot Spots. The Policy acknowledged that the benefits derived from remediation would be qualitative in nature and that any assessment of benefits should be based on the SWRCB established beneficial uses of water.

Quantitative information on the benefits derived from remediation are generally not available to make a specific assessment of the economic and biological benefits of remediation. Only a qualitative description of the potential benefits resulting from improvements in ecosystem health as a result of implementing remediation measures is possible because of: (1) the complexity and diversity of California aquatic systems, and the diversity of ecological receptors for toxic pollutants; (2) pollutants and exposure conditions; (3) the complexity of ecosystem structure and function, and uncertainty in the interaction between factors involved in ecosystem recovery and responses; and (4) uncertainty regarding the extent to which remediation will result in toxic loadings reductions or concentrations significant enough to generate appreciable changes in ambient concentration and ecosystem health. The RWQCBs used the beneficial use information presented in the Guidance Policy to assess the beneficial effects of remediation in each known THS (Table 16). The benefits of remediating the high priority toxic hot spots are presented in each Regional Cleanup Plan (Appendix B).

Ecological Benefits

Toxicity may occur with either acute or chronic exposure to pollutants. Current concentrations of pollutants in the identified THSs pose a risk not only to humans through consumption of fish and shellfish but also to resident and migratory biota. Exposure to chronic low levels of pollutants can adversely affect resources by causing physiological and behavioral impairments in organisms or reduction of food-web resources and alteration of habitats. Reduction of pollutant concentration through remediation would

reduce the risk of disturbances to the ecological integrity and important habitats of the biological resources.

TABLE 16. BENEFICIAL EFFECTS OF REMEDIATION

Beneficial effect	Values quantifying these beneficial effects	Beneficial use affected
Lower toxicity in planktonic and benthic organisms	Greater survival of organisms in toxicity tests.	MAR, EST
Undegraded benthic community	Species diversity and abundance characteristic of undegraded conditions.	MAR, EST
Lower concentrations of pollutants in water	Water column chemical concentration that will not contribute to possible human health impacts.	MIGR, SPWN, EST, MAR, REC 1, REC 2
Lower concentrations of pollutants in fish and shellfish tissue	Lower tissue concentrations of chemicals that could contribute to possible human health and ecological impacts.	MAR, EST, REC 1, COMM
Area can be used for sport and commercial fishing.	Anglers catch more fish. Impact on catches and net revenues of fishing operations increase.	REC 1, COMM
Area can be used for shellfish harvesting or aquaculture	Jobs and production generated by these activities increase. Net revenues from these activities are enhanced.	SHELL, AQUA
Improved conditions for seabirds and other predators	Increase in populations. Value to public of more abundant wildlife.	WILD, MIGR, RARE
More abundant fish populations	Increase in populations. Value to public of more abundant wildlife.	MAR, EST
Commercial catches increase	Impact on catches and net revenues of fishing operations.	COMM
Recreational catches increase, more opportunities for angling	Increased catches and recreational visitor-days.	REC 1
Improved ecosystem conditions	Species diversity and abundance characteristic of undegraded conditions.	EST, MAR
Improved aesthetics	Value to public of improved aesthetics. In some cases, estimates of the value to the public of improved conditions may be available from surveys.	REC 2
More abundant wildlife, more opportunities for wildlife viewing	Impact on wildlife populations. Impact on recreational visitor-days.	MAR, WILD, RARE, REC 2

Adverse effects of toxic pollutants include increased susceptibility to disease, reduced growth and development, altered physiology and behavior, impaired reproductive health and behavior, and if concentrations are high enough, death. Any one of these adverse effects can ultimately affect the survival, reproductive success, and overall health of a population, which may affect ecosystem health. These adverse effects can impact ecosystem function and integrity through direct and indirect effects on the biota by altering system processes such as impaired decomposition of organic matter and disruption of predator-prey interactions.

The aquatic ecosystems of California's bays and estuaries include food webs of phytoplankton, invertebrates, fish, birds, mammals, and other organisms that interact with each other through a complex flow of matter and energy. When remediation takes place ambient water and sediment quality improves through reductions in the concentrations of pollutants in the aquatic system and improvement in biological response. Because all components of this ecosystem are linked, improved survival, growth, productivity, and reproductive capacity translate to improved ecosystem stability, resilience, and overall health. Overall, this improvement in ecosystem health results in an enhancement of beneficial uses of the waters of the enclosed bays and estuaries of California.

Human Health Benefits

Bays and estuaries are natural sinks for the toxic pollutants. Concentrations of pollutants in the identified THSs pose a risk to humans through consumption of fish and shellfish. Tissues from fish and shellfish found in sites have been found to contain pollutant loads that exceed FDA and NAS action levels or have an advisory for the consumption of fish and shellfish. These are sites that are influenced by past and present accumulation of pollutants from point and nonpoint source discharges.

Fish consumption advisories are an acknowledgment that the beneficial uses associated with commercial and sport fishing are impacted greatly or lost. Concerns about the health effects of eating contaminated fish reduces the value of the fishery. It also increases the cost of commercial fishing because the fishermen may need to travel longer distances to make their catch. As a result, the sport angler makes fewer fishing trips because of health concerns. Likewise, the overall cost per fish in commercial catches goes up because of increased costs associated with the commercial fishing operation.

In addition, knowledge of toxic pollution and contamination of aquatic organisms at a specific site, regardless of consumption concerns, may not only reduce angler uses of coastal resources but also may decrease participation in non-consumptive uses of water such as water contact and non-contact recreation. A decrease in the level of toxic pollution and contamination through either implementation of remediation measures or active source control may increase ecosystem stability, resilience and overall health. This should translate into fish and shellfish with lower contaminants, possibly higher catch rates and increased angling efforts. An improved perception of water quality will also have a positive impact on the other non-consumptive water-associated recreational uses of water.