APPENDIX C: USE ATTAINABILITY ANALYSIS AND SITE-SPECIFIC OBJECTIVES

Water quality standards under the Clean Water Act (CWA)consist of three elements: Use Classification, Water Quality Criteria, and Antidegredation Policy (CWA 303(c)(2); 40 CFR 130.3, 131.6, 131.10, 131.11). Use Classification, termed "beneficial uses" under California law, are "uses specified in water quality standards for each water body or segment whether or not they are being attained." (40 CFR 131.3(f)). Beneficial uses must be consistent with the goal of CWA Section 101(a)(2), which is to provide for "the protection and propagation of fish, shellfish, and wildlife and ... recreation in and on the water" (the fishable/swimmable uses), unless the state demonstrates that those uses are not attainable. Beneficial uses must also consider, among others, the use and value of water for public water supplies, agriculture and industry, and the water quality standards of downstream waters. (40 CFR 131.10).

Beneficial uses are assigned to surface waters by the appropriate state regulatory agency or, in some cases, by the U.S. Environmental Protection Agency (USEPA). Given the number of surface waters present in many states (including California), it is not surprising that beneficial uses were assigned to some waterbodies without actual direct evaluation. In some cases, uses may have been designated based on known (existing) uses in downstream waterbodies, or in other parts of the same watershed (e.g., the "Tributary Rule" in the Central Valley Region Basin Plan).

Ideally, beneficial uses are determined through a use attainability analysis (UAA). UAAs are "a structured scientific assessment of the factors affecting the attainment of a use which may include physical, chemical, biological, and economic factors…"(40 CFR 131.10(g)). There are four types of situations in which a UAA may be considered (see Figure C-1): (1) when a waterbody is considered impaired (i.e., 303(d) listed) but the use (and therefore, associated water quality standards) appear to be inappropriate or the use does not exist; (2) when adopting subcategories of a use that require less stringent criteria; (3) when the use does not appear to be attainable; and (4) when meeting the use would likely result in substantial and widespread economic and social impact" (40 CFR 131.10(g)).

The regulations at 40 CFR 131.10(g) specify six factors that may provide a legal basis for changing or removing a designated use:

(1) Naturally occurring pollutant concentrations prevent the attainment of the use/

(2) Natural, ephemeral, intermittent, or low-flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating state water conservation requirements to enable uses to be met.

(3) Human-caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place.

(4) Dams, diversions, or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the waterbody to its original condition or to operate such modification in a way that would result in the attainment of the use.

(5) Physical conditions related to the natural features of the waterbody (e.g., the lack of a proper substrate, cover, flow, depth), unless these conditions may be compensated, unrelated to water quality preclude attainment of aquatic life protection uses.

(6) Controls more stringent than those required by Sections 301(b)(1)(A) and (B) and 306 of the Clean Water Act would result in substantial and widespread economic and social impact.

The determination of whether or not a use is "existing" must include an evaluation of both the actual occurrence of the use activity (e.g., have coldwater fish been present or have people used the water as a source of drinking water?) and whether or not the level of water quality necessary to support the use has been achieved at any time since November 28, 1975 (i.e., a level of water quality that has been achieved since that time cannot be deemed unattainable). If the level of water quality necessary to support a use has been achieved since November 28, 1975, the use is considered "existing" and must be protected, regardless of whether or not the use activity has actually occurred.

Documentation requirements for factor (6) above (economic and social impact) have been particularly difficult to identify. Currently, there is no consensus on the information necessary to show that attainment of a beneficial use will result in economic harm. USEPA has held several workshops and work has been proceeding within USEPA to draft more detailed guidance to address this issue.

In practice, SSOs or refinements in the water quality objective are often considered when a numeric objective is in question (e.g., copper or chloride standard) and not the use itself (Figure C-1). Refinements to the objective may be appropriate if the water quality objective was based on questionable or inappropriate water quality information. For example, many priority pollutant metal objectives are based on water hardness. If an incorrect hardness was assumed for a site, the objective would be incorrect as well. In these instances, collection of appropriate water quality data may be used to refine the existing objective for the waterbody in question, and changes are made in terms of the data used to calculate the objective, not the objective itself.

SSOs are used to address potential differences in actual bioavailability of the chemical at the site, or the sensitivity of resident fauna and flora to the chemical (or both) as compared to what was assumed in developing the water quality objective. Thus, SSOs involve a change in the water quality objective itself. USEPA (and California) accept several different ways to develop SSOs including water effect ratios (WERs), chemical translator, and criterion recalculation; however, all SSOs require state and USEPA approval, as well as the public participation process. SSOs for physicochemical water quality objectives, such as temperature or dissolved oxygen, are not easily developed using most approved tools and typically require specialized studies, somewhat similar to a UAA. In theory, SSOs may also apply to other uses (e.g., MUN or public water supply) and standards such as fecal coliform; however, approved methods for developing such SSOs are generally lacking. In these cases, a UAA is more appropriate if the use is not an existing one. If the designated use exists (or existed sometime since November 1975), and SSOs are not appropriate, then a TMDL and applicable control measures are required if the waterbody is not meeting its water quality objectives.

C.1. UAA Requirements

UAAs can be very complex and somewhat difficult to complete, partly because specific requirements have not been defined in many cases. In general, a UAA needs to document (a) existing uses of a waterbody (including those the system is capable of supporting, even if there is no evidence that the waterbody has demonstrated the particular use); (b) the physical, chemical, and biological attributes of the waterbody and surrounding watershed, relevant to the uses under consideration; and (c) a thorough assessment of feasible options that could result in attainability of a given use. The latter point could require evaluating engineering or infrastructure options, which requires stakeholder participation and socioeconomic analyses. Figure C-2 summarizes the steps in completing a UAA. A UAA results in a determination as to whether a particular use is attainable or not and what specific changes are required to attain a given use. The recommended use change requires full public participation and state and USEPA approval before the use and standards for the waterbody can be modified. This process commonly takes between 1 and 2 years to complete, and may take even longer if the waterbody issues are more complex or the stakeholder community has very diverse goals.

C.2. SSOs

SSOs typically begin with the premise that a given use (e.g., type of aquatic life use such as WARM) exists. Depending on the water quality objective and the type of site, one or more methods may be appropriate for developing an SSO. Study requirements will differ depending on the type of SSO method used and some protocols may require substantial new data collection. Depending on the complexities of the waterbody and the type of pollutant under consideration, SSO studies can often take between 1 and 2 years to complete. **Similar to a UAA, an SSO involves modifying a state or basin standard and therefore requires public participation and USEPA approval.** For example, the copper SSO developed for Coyote Creek, a tributary to South San Francisco Bay, took over 2 years of laboratory and field studies, and at least another year of required regulatory proceedings before the SSO was finalized.

Metals such as copper, cadmium, and zinc are often examined with respect to bioavailability at the site because it is known that certain site water characteristics affect the actual toxicity of these pollutants. In this case, WER testing (USEPA, 1994) and/or total dissolved chemical translator studies (e.g., SIP, Appendix B) may be appropriate (Figure C-3). Both of these methods require the development of a study protocol (to be approved by the state), sampling and chemical analyses, and, in the case of WER studies, toxicity testing as well. Recalculation is another USEPA-approved methodology that evaluates the sensitivity of species resident to the site with respect to the chemical of concern and may or may not require field sampling. However, as in the other methods, a study plan is developed before analyses are initiated, and the plan must first be approved by the regulatory agency. In some cases (metals, for example), more than one SSO method may be applied to address both bioavailability and resident species sensitivity issues. In these cases, the results of the different methods are additive because bioavailability and species sensitivity are independent factors.

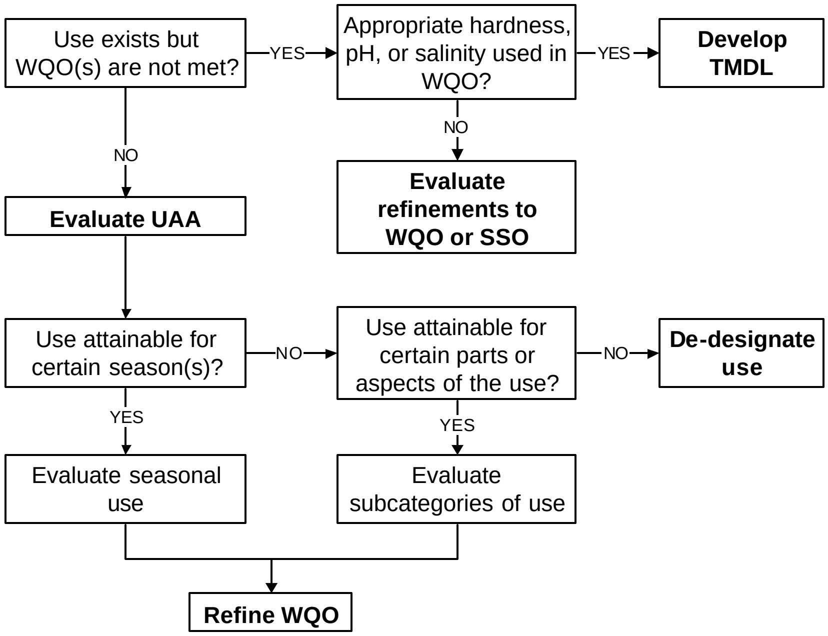

Figure C-1. Flowchart illustrating situations in which a use attainability analysis (UAA), site-specific objectives (SSOs), or refinements to a water quality objective may be appropriate.

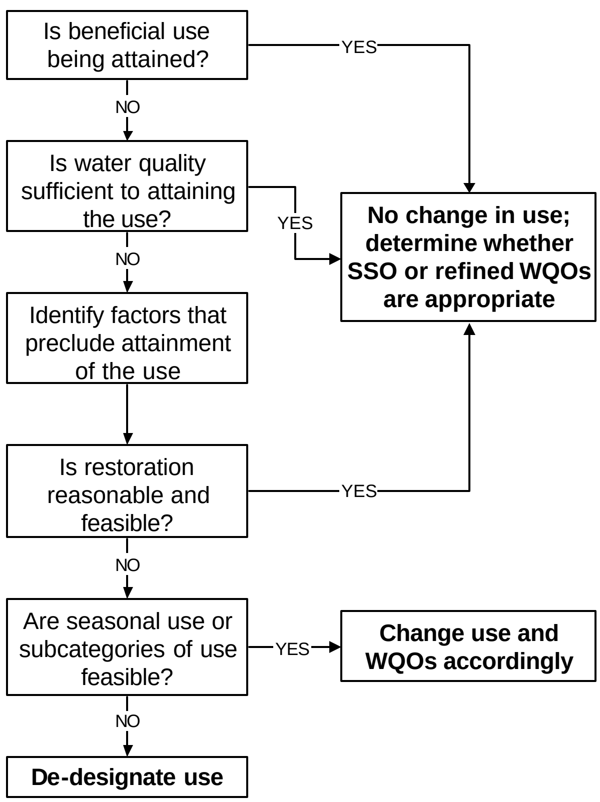

Figure C-2. Summary of steps evaluated for beneficial use attainability in a UAA.

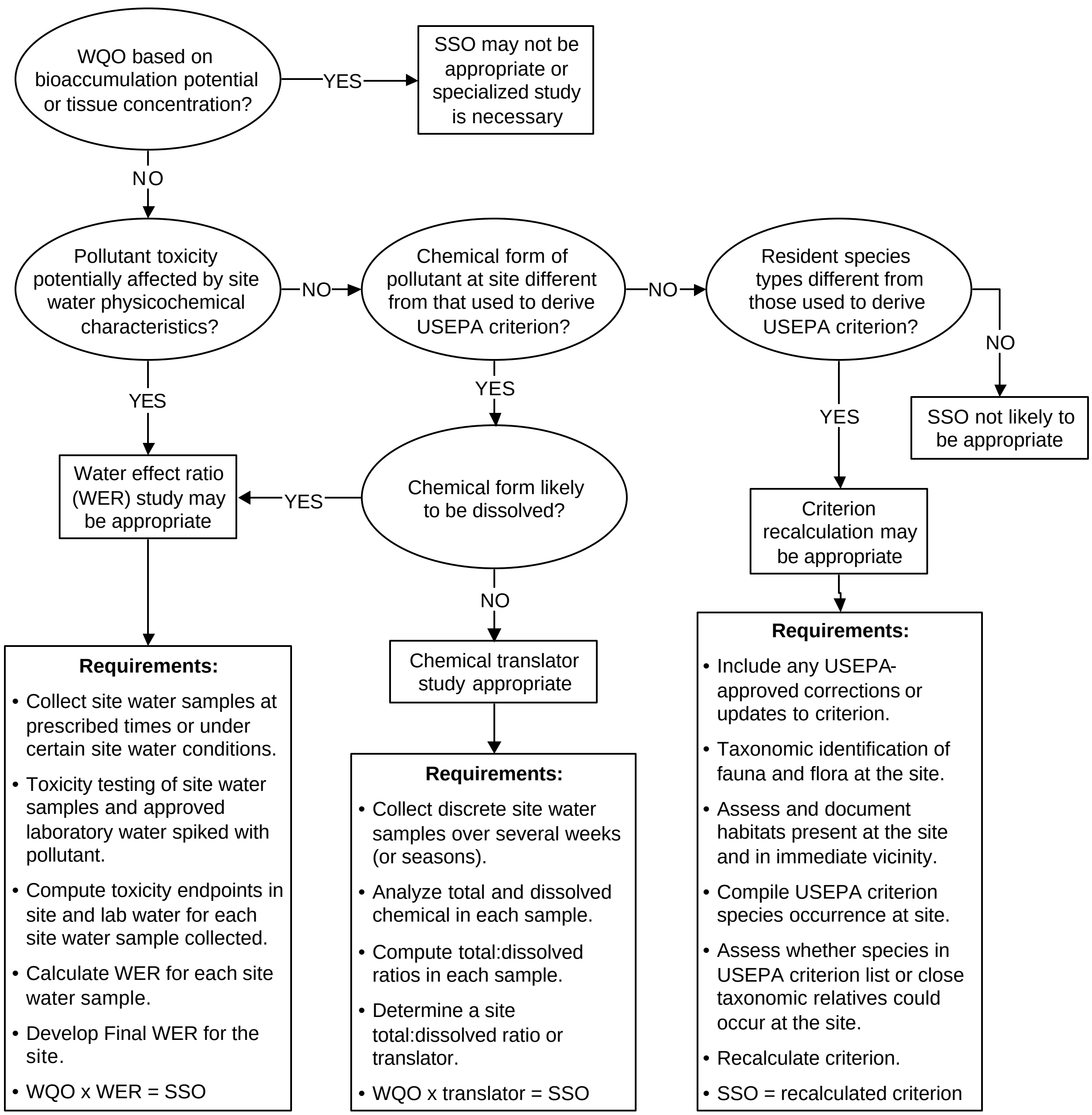

Figure C-3. Flowchart summarizing situations in which three common types of methods are used in developing SSOs, and the general requirements of each.