

**DRAFT STAFF REPORT**

**PROPOSED REVISIONS TO  
SECTION 303(d) LIST AND PRIORITIES FOR  
DEVELOPMENT OF TOTAL MAXIMUM DAILY  
LOADS (TMDLs)  
FOR THE SAN FRANCISCO BAY REGION**

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California Regional Water Quality Control Board  
San Francisco Bay Region  
1515 Clay St., Suite 1400  
Oakland, CA 94612

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## Introduction

Under Federal Clean Water Act regulations, every two years the State is required to report to the U.S. EPA on the status of water quality in the State (Section 305(b) water quality assessment), and provide a list of impaired water bodies (Section 303(d) list). Impaired water bodies are those where water quality standards are not expected to be met after implementation of best available technology controls, which include municipal wastewater treatment plants and stormwater best management practices (BMPs). The 305(b) and 303(d) actions provide the Regional Board a planning tool to identify waters where regulatory programs are not addressing water quality issues of concern to the public.

Once the water bodies are 303(d) listed, the State is required to determine the amount that the pollutants of concern must be reduced to meet the applicable water quality standard and eliminate beneficial use impairment. This allocation of allowable pollutant discharge from various sources is called a *total maximum daily load*, or TMDL. U.S. EPA specifies in its 1991 guidance that a TMDL has essentially two meanings:

- The TMDL process is used for implementing state water quality standards – that is, it is a planning process that will lead to the goal of meeting the water quality standards; and
- The TMDL is a numerical quantity determining the present and near future maximum load of pollutants from point and nonpoint sources as well as from background sources, to receiving water bodies that will not violate the state water quality standards with an adequate margin of safety. The permissible load is then allocated by the state agency among point and nonpoint sources.

A priority ranking for listed waters is required by federal regulations to guide TMDL planning. Preparation of a TMDL is normally a major staff workload, but the TMDL process is the logical way of addressing problems where pollutants, such as mercury, come from many sources, including wastewater, urban runoff, air sources, and abandoned mines. In this sense, the TMDL process becomes part of watershed management.

Federal regulations at 40 CFR 130.7(a)(5) specify that States must “evaluate all existing and readily available water quality-related data and information” when developing the 303(d) list. This requirement provides organizations and the public-at-large the opportunity to suggest changes to the 303(d) list based on recent physical, chemical, and biological data or information. Changes to the 303(d) list may include: (1) adding water bodies and pollutants to the list; (2) de-listing, or removing water bodies and pollutants from the list; or (3) refining the list, using recent data to indicate specific pollutants instead of pollutant classes (e.g., mercury in lieu of metals). This year’s public solicitation set forth the definition of what data and information are considered readily available by the Regional Board, listed in Appendix A.

## Listing Process

For the 2002 303(d) list update, the Regional Board solicited information from the public to consider for the 303(d) list (Attachment A), to be provided by May 15, 2001. In that solicitation, the Board specified that only information generated since the last listing cycle (as early as July 1997) will be considered, unless such information had not been previously brought to the Board's attention in the preparation of the 1998 303(d) list. Beyond this general solicitation, agencies such as California Department of Fish and Game and the National Marine Fisheries Service were actively solicited for any new information to refine or augment the existing 303(d) list based on any new studies (none were identified). Various water districts with watershed monitoring programs were solicited for readily available information on water quality. The Department of Health Services was interviewed to identify any persistent surface water quality problems for drinking water supply sources (none were identified).

This unprecedented public solicitation resulted in 17 individual submittals by agencies and private organizations. Some of the submittals were technical reports focused on watershed assessment, such as fisheries habitat on a watershed scale or geomorphic assessment, some were raw data from water district or U.S. Geological Survey monitoring, and some were brief letters that referred to other studies as a basis for listing or de-listing. The submittals varied widely in content and magnitude, with the Waterkeepers of Northern California submitting the largest amount of technical reports and requests to list water bodies and pollutants/stressors. The submittals included requests to list new water bodies and pollutants, to de-list water bodies and pollutants, and many submittals were simply spreadsheets with water quality data – some without any documentation of quality assurance and quality control (e.g., personnel training or standard analytical or sampling procedures).

In California, it is important to recognize that all water monitoring and assessment is conducted in a decentralized manner. Only since 1990 has ambient monitoring received emphasis by the Regional Boards and U.S. EPA; effluent monitoring has been the programmatic focus since the Clean Water Act of 1972. In the San Francisco Bay Region, dischargers to the San Francisco Bay-Delta Estuary contribute ambient monitoring funding to the San Francisco Estuary Regional Monitoring Program (RMP), which provides high quality data on trace substances and various special studies. In 1998, the Regional Board used data from the RMP, initiated in 1993, to change the 303(d) list. No comparable effort exists in the watersheds of the San Francisco Bay Region, so information on water bodies and water quality data collection designed for 305(b) water body assessment and 303(d) listing is extremely limited outside the estuary.

Indeed, ongoing watershed and beach monitoring by public agencies for assessment purposes is limited to drinking water reservoir areas (for public health, taste, and odor management) and bacterial monitoring of water contact recreation areas. The Regional Board, municipal stormwater agencies, and some local watershed councils are working on development of watershed monitoring and assessment programs, but most are in early stages and do not have adequate funding to provide monitoring data at a spatial and

temporal scale necessary for rigorous assessment. The quality and magnitude of the assessment of water quality information conducted for this 303(d) list update must be considered in the context of this loosely connected fabric of multiple monitoring efforts with multiple, site-specific assessment objectives.

The Regional Boards have been requested to provide recommendations to the State Board in Fall 2001 on the condition of Regional waters. The State Board will consider all Regional Boards' recommendations regarding the conditions of the Region's waters when formulating the 303(d) submission to U.S. EPA. The State's submission revising the list of impaired waters will be considered by the State Board in a public process to be conducted next winter. Opportunities for review of the State Board's proposed submission and public comment on the submission will be announced at a later date.

## **Approach to Listing Waters**

The general factors used by the Regional Board staff to recommend changes to the 303(d) list for surface waters within the San Francisco Bay Region are summarized below. These listing considerations have been developed by representatives of different Regional Boards, State Board, and the U.S. EPA based on listing criteria recommended by U.S. EPA and used by numerous states.

The Regional Board exercises caution in its decisions to place water bodies and pollutants/stressors on the 303(d) list, recognizing the context of the original statute. The Clean Water Act defines impaired water bodies as those navigable waters where water quality standards are not expected to be met after implementation of best available technology controls. This definition is fairly specific, and the issues considered by the Regional Board consequently include (1) spatial and temporal extent of impairment; (2) consideration of tributaries or embayments; (3) seasonality of beneficial uses; and (4) whether technology has been implemented, especially with respect to nonpoint sources of pollutants or pollution, since point source control technology has been implemented in the San Francisco Bay Region.

Implicit in a decision to list (or de-list) is a review of the persistence of impairing conditions across the water body in space and time. In the case of water contact use, spatial coverage may be limited to areas of public access, and temporal coverage limited to the dry season when the use is prevalent and bacterial measurements are more representative of exposure. Environmental indicators such as dissolved oxygen, pH, fecal coliform, or metals in water provide measures of impairment where thresholds are specified in the Basin Plan or the California Toxics Rule. Watershed sediment or fisheries habitat studies provide measures of impairment when these studies demonstrate a departure from expected conditions for beneficial use support. Photo documentation of erosion, siltation, or trash is information the Regional Board can consider in an overall weight of evidence. The Regional Board will not list a water body based on a single toxic hot spot or an episodic event such as a spill or illicit discharge. There are other regulatory mechanisms to deal with these types of water quality problems, such as waste

discharge requirements, cleanup and abatement orders, or general permits for construction or industrial stormwater discharges.

In instances where a mainstem water body in a watershed is listed for a pollutant/stressor, the tributaries are assumed to be impaired as well and would be analyzed eventually with respect to potential sources of pollutants in a TMDL. As such, it is redundant to list tributary water bodies, if the mainstem water body is already listed. The mainstem listing approach also provides a structure to address non-navigable portions of the water body system in a watershed, and prevents the unnecessary proliferation of TMDL processes that are obviously interrelated. This scenario applies to embayments, sloughs, channels, and lagoons within the larger estuary as well. The tributary-based listing approach does not apply to freshwater tributaries of estuarine or marine water bodies.

Beneficial uses of water bodies sometimes have an inherent seasonality, and this aspect is taken into account in the listing recommendations. For instance, there are different temperature sensitivities of various life stages of steelhead, such that a single year-round temperature threshold to assess cold freshwater habitat (or preservation of rare and endangered species) does not exist. Lakes and reservoirs that are mesotrophic and eutrophic, which is the case in the San Francisco Bay Region, stratify in the dry season, with less dense warm water (epilimnion) lying above colder water (hypolimnion). The line between these layers is known as the thermocline, which normally disappears in the wet season when the epilimnion cools and the lake mixes or “turns over.” During the dry season, mesotrophic and eutrophic lakes and reservoirs exhibit low dissolved oxygen (DO) in the hypolimnion during the dry season due to decaying planktonic matter (Goldman and Horne, 1983). Therefore only epilimnion DO is considered during the dry season. Similarly, water contact recreation (swimming or wading) for the majority of the public occurs during the dry season, with a few minor exceptions. In addition, bacterial indicators often lead to “false positives” due to naturally occurring bacteria during the wet season, and for these reasons dry season monitoring forms the basis of the assessment for 303(d) purposes.

The Clean Water Act (CWA) also specifies that impairment determinations for water bodies occur after technology has been implemented to control pollutants. Before listing a water body and pollutant/stressor, the Regional Board must consider whether control measures specified under the CWA have been implemented, prior to determining if a water body is not attaining applicable standards (uses, objectives, and antidegradation). Since the original technology-based standards for point sources are based on technology, and are not water quality-based, the 303(d) list provides a mechanism to either improve point source controls further or identify and address the nonpoint sources that contribute to any water quality excursions

Review of NPDES permitted discharges from industry and publicly-owned treatment works (POTWs) can be a straightforward exercise due to availability of effluent data, but review of the question of whether technology has been implemented to control urban runoff and nonpoint sources is more complex. This is complicated by a number of factors that are directly related to the nature of urban runoff and nonpoint source

discharges. These include the nature of effective controls and the large area over which any controls must be implemented to be effective. For instance, municipal stormwater agencies believe that some performance standards (e.g., trash removal prior to discharge) have not been fully implemented so that it is premature to list urban streams as impaired by trash. In some instances there are sediment management plans, related to flood control, that are on the verge of being implemented, which argues for delay on listing so that technology has a chance to be implemented first. For this year's 303(d) recommendations, including a preliminary list recommended by the National Research Council (NRC, 2001), the Regional Board is weighing these issues in a case-by-case manner.

### **A. Listing Factors**

Water bodies and associated pollutants should be recommended for addition to the 303(d) list if any one of these factors is met:

1. Effluent limitations or other pollution control requirements [e.g., Best Management Practices (BMPs)] are not stringent enough to assure protection of beneficial uses and attainment of SWRCB and RWQCB objectives, including those implementing SWRCB Resolution Number 68-16 "Statement of Policy with Respect to Maintaining High Quality of Waters in California" [see also 40 CFR 130.7(b)(1)]. This does not apply to non-attainment related solely to discharge in violation of existing WDR's or NPDES permit.
2. Fishing, drinking water, or swimming advisory currently in effect. This does not apply to advisories related to discharge in violation of existing WDR's or NPDES permit.
3. Beneficial uses are impaired or are expected to be impaired within the listing cycle (i.e. in next four years). Impairment is based upon evaluation of chemical, physical, or biological integrity. Impairment will be determined by "qualitative assessment", physical/ chemical monitoring, bioassay tests, and/or other biological monitoring. Applicable Federal criteria and the Regional Board's Basin Plan water quality objectives determine the basis for impairment status.
4. The water body is on the previous 303(d) list and either: (a) monitoring continues to demonstrate a violation of objective(s) or (b) monitoring has not been performed.
5. Data indicate tissue concentrations in consumable body parts of fish or shellfish exceed applicable tissue criteria or guidelines. Criteria or guidelines related to protection of human and wildlife consumption include, but are not limited to, U.S. Food and Drug Administration Action Levels, National Academy of Sciences Guidelines, U.S. Environmental Protection Agency tissue criteria.

## ***B. Delisting Factors***

Water bodies may be removed from the list for specific pollutants or stressors if any one of these factors is met:

1. Objectives are revised (for example, Site Specific Objectives), and the exceedance is thereby eliminated.
2. A beneficial use is de-designated after U.S. EPA approval of a Use Attainability Analysis, and the non-support issue is thereby eliminated.
3. Faulty data led to the initial listing. Faulty data include, but are not limited to, typographical errors, improper quality assurance/quality control (QA/QC) procedures, or limitations related to the analytical methods that would lead to improper conclusions regarding the water quality status of the water body.
4. It has been documented that the objectives are being met and beneficial uses are not impaired based upon an evaluation of available monitoring data. This evaluation should discuss foreseeable changes in hydrology, land use, or product use and describe why such changes should not lead to future exceedance.

## ***C. Evaluation Criteria***

In general, the following hierarchy should be used in evaluating data relative to applicable water quality objectives:

1. Applicable numeric water quality objectives (contained in the San Francisco Bay Basin Plan) or water quality standards (contained in the federal California and National Toxics Rules). Both the Basin Plan and federal rules governing a specific parameter should be read carefully, since there can be site-specific applications or exceptions. For instance, many numeric objectives in the Basin Plan are oriented toward discharges (e.g., the temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F above natural receiving water temperature). Also, numeric criteria often include a time element, such as duration of exposure (e.g., 4-day average for chronic metals concentrations) or number of samples within a given time period (5-sample geometric mean taken over 30 days for fecal coliform).
2. Criteria developed by the U.S. Environmental Protection Agency, California Department of Fish, and the California Department of Health Services and other applicable criteria developed by government agencies. Such criteria will be used to interpret narrative water quality objectives.
3. Guidance or guidelines developed by agencies/entities such as the U.S. Food and Drug Administration, National Academy of Sciences, and the Agency for Toxic Substances and Disease Registry and the California Department of Health Services.

Guidelines developed by other agencies should be thoroughly reviewed before applied, since the assumptions and risk factors considered may not be consistent with Regional Board water quality objectives.

4. Criteria or standards developed in other states, regions, or countries. Such criteria should be used with caution. The environmental setting, assumptions, and risk factors considered may not be consistent with Regional Board water quality objectives.
5. Findings in peer-reviewed literature, listing decisions made in similar settings within the State, and/or “weight of evidence” based on information and evaluations performed by outside agencies or groups. Generally, a more extensive description will be needed to justify the impairment (or lack of impairment) determination. Clear links should be described between the literature, findings in similar settings, or outside evaluations and the non-attainment of water quality objectives.

There are no specific minimum data requirements or a specific frequency of exceedance for making a finding that water quality objectives are not attained. In general, more data are needed to interpret environmental results that are very specific to time and geography. Less data would be needed to make a determination based on environmental results that serve as integrators over space or time. So more water column chemistry data would generally be needed to determine impairment than fish tissue chemistry data. Also less water column chemistry data may be needed to make an impairment determination (or lack of impairment determination) if there is other information to support the findings from the water column chemistry (e.g. correlations could be made between pesticide use patterns and the presence of pesticides in surface water).

#### ***D. Data Quality Evaluation***

In order for any data to be evaluated against Basin Plan, California Toxics Rule, or other criteria, it must be of adequate quality and quantity to be representative of beneficial use attainment or impairment. Data quality evaluation is based on U.S. EPA Guidelines for preparation of 305(b) water quality assessment reports and the latest draft guidance from the Consolidated Assessment and Listing Methodology (CALM) (USEPA, 1996; USEPA, 2001).

These federal guidelines recommend a hierarchy of water quality data levels for evaluation of beneficial use attainment, particularly for aquatic life uses. The data hierarchy addresses data quality considerations such as (1) sample collection and analytical technique (grab, composite, series of grabs, or continuous), (2) spatial representativeness (locations in the watershed or water body), (3) temporal representativeness (frequency of sampling, number of seasons or years), and (4) quality assurance procedures (documentation of protocols, metadata, training). The data are rated according to “Level of Information” based on these considerations, which refers to the rigor of sampling and analysis, where 1 = Lowest, and 4 = Highest. However, even a

short period of record can indicate a high confidence of impairment based on well-documented chemical data. Three years of data are not required to demonstrate impairment, for instance where high bacterial counts are recorded in areas of significant public water recreation during the dry season. All data reviewed for consideration for the 2002 303(d) list were ranked according to these recommended criteria, and only data of higher overall level of information were used to make 303(d) listings or de-listings. If data of lower level of information (1 to 2) suggested impairment, the water body/pollutant combination was recommended for the "preliminary" list, triggering more data or information collection for the subsequent listing cycle.

## ***E. Priority Ranking***

A priority ranking is required for listed waters to guide TMDL planning pursuant to 40 CFR 130.7. TMDLs will be ranked into high, medium, and low priority categories based on:

- water body significance (such as importance and extent of beneficial uses, threatened and endangered species concerns and size of water body)
- degree of impairment or threat (such as number of pollutants/stressors of concern, and number of beneficial uses impaired)
- conformity with related activities in the watershed (such as existence of watershed assessment, planning, pollution control, and remediation, or restoration efforts in the area)
- potential for beneficial use protection or recovery
- degree of public concern and involvement
- availability of funding and information to address the water quality problem
- overall need for an adequate pace of TMDL development for all listed waters
- other water bodies and pollutants have become a higher priority

It should be noted that the criteria could be applied in different ways to different water bodies and pollutants. For example, a water body may be severely impaired, but if there is little likelihood of beneficial use recovery than a lower priority might be given. Staff also considered the overall need for an adequate pace of TMDL development for all listed waters, and if other water bodies and pollutants have become a higher priority. New listings were given a lower priority for TMDL development, to allow for early implementation actions already underway.

Schedules for TMDL development after the first two years should be regarded as very tentative. Completion will depend significantly upon the availability of funding, availability of staff, on watershed stakeholder group priorities, and RWQCB Basin Plan amendment priority. The schedules will also depend on further evaluation of the need for and feasibility of TMDLs. If additional water bodies and pollutants are listed in 2002 or subsequent 303(d) listing cycles these schedules will also need to be revised.

## **Information Received and Analyzed**

Appendix A contains a summary of studies and data submitted to the Regional Board for consideration in the 303(d) listing process. Appendix A contains three tables: (1) a general summary of entities submitting information and the water bodies and parameters analyzed; (2) a checklist for information that the public solicitation specified (e.g., metadata, quality assurance plans, etc.); and (3) a summary of data quality evaluation performed by Regional Board staff based on U.S. EPA guidance. As described above, the public solicitation process yielded a wide range of information, including many requests to list water bodies and pollutants, a few requests to de-list water bodies and pollutants, and a number of raw data sets without any request to list or de-list.

The public solicitation required staff to review all levels of information from approximately 90 water bodies throughout the region. Classes of pollutants and stressors considered included general water quality parameters such as dissolved oxygen, pH and temperature; metals; persistent organic pollutants (PCB's, PAH's, etc.); sedimentation/siltation; pathogen indicators; nutrients (nitrates, phosphates, and ammonia); total dissolved solids; chlorides; pesticides (diazinon and chlorpyrifos); lack of flow; habitat degradation (as indicated by macroinvertebrate surveys particularly in Marin County); trash including floatables; and radioactivity.

## ***Assessment Methodology***

Raw data were analyzed with respect to applicable water quality objectives in the Basin Plan or California Toxics Rule (CTR) for beneficial uses where they are either explicitly designated or otherwise where they unquestionably exist based on eyewitness accounts and other factors such as unrestricted public access. For impairment categories not easily quantified, such as sedimentation, trash, habitat degradation, or flow alteration, a weight-of-evidence approach is used, as discussed below.

### **Basin Plan and California Toxics Rule Criteria**

The Basin Plan and the CTR contain certain numeric thresholds for some of the above-listed pollutants or stressors. Numeric thresholds include dissolved oxygen (DO), pH, ammonia, total coliform, fecal coliform, E. coli, enterococcus, and metals and organics in the CTR. Also, a number of parameters have thresholds for drinking water source protection, such as nitrate. Nitrate is an example of a pollutant that has an incomplete number of thresholds in the Basin Plan for all the beneficial uses it can affect. Even

though excessive nitrate can cause impairment related to aquatic life or recreational uses associated with algal blooms, the only threshold in the Basin Plan for nitrate is 10 mg/l as nitrogen to protect drinking water sources. Detailed site-specific information is necessary to assess whether nitrate is impairing recreation or aquatic life, and no such information is readily available in the San Francisco Bay Region.

The Basin Plan establishes a number of narrative objectives for surface waters for several parameters and categories of stressors, which essentially state that such parameters and stressors shall not cause nuisance conditions nor adversely affect beneficial uses. These parameters and categories of stressors include temperature, suspended and settleable material, oil and grease, biostimulatory substances, color, taste and odor, floating material, turbidity, sediment, sulfide, salinity, and population and community ecology. These parameters are typically evaluated under permitting or enforcement programs with respect to discharges, such as upstream and downstream, or pre- and post-project. Interpreting these narrative objectives for 305(b) and 303(d) assessment and listing purposes is possible only if raw water quality data, photographs, or other information are accompanied by information that explains how the water quality information has departed from that expected to support beneficial uses.

### **Sediment**

Sediment impairment assessment (impacts of sedimentation, siltation on beneficial uses) is much more complex than the standard comparison of water column measurements of turbidity or total suspended solids to numeric thresholds. A number of factors have to be assessed including predominant watershed geology, dynamics of sediment delivery to the stream, and beneficial uses sensitive to siltation, such as steelhead spawning (RARE, SPWN, COLD). Regional Board resources for sediment impairment assessment of streams, through the most recent listing, have not been sufficient. Therefore current listings are conservative with regard to resource protection, usually based on professional judgment, and strategic from the standpoint of bioregional conservation priorities.

#### **Basis for Sediment Listings:**

1. Consensus of professional scientists familiar with listed watersheds. Additionally, in Walker Creek and Lagunitas Creek, detailed scientific investigations have been performed (Haible, 1980; Hecht, 1992). In those cases, sediment listing is supported.
2. Listed basins suspected to be regionally significant from a conservation biology standpoint: critical habitat for native stream-riparian species assemblages.
3. Decline of threatened or endangered stream-riparian species is linked to habitat degradation.
4. Changes in sediment supply or transport capability are typically a component in habitat degradation.

5. Studies throughout northwestern California have document human-induced sedimentation and linkage to habitat degradation.
6. Precautionary principle: consequences of inaction, waiting to list until definitive data are available, are substantial. Political and economic consequences of false positive- listed and not impaired - are reasonable because: a) our technical approach emphasizes holistic aquatic species limiting factors assessment, as a first step in the TMDL, to insure that we focus on biologically significant watershed management problems; and b) state and federal resources are now available to develop quantitative limiting factors studies.

All larger streams in the San Francisco Bay Region, without exception, have sediment-related impacts such as downcutting, bank erosion, and sediment delivery from the hillslopes, due to over 150 years of intensive urban and agricultural land use. Historic human activities such as grazing, road construction, and agricultural clearing contribute fine sediments to channels throughout the region. The conclusions of sediment studies that more sediment is entering streams than pre-European settlement does not warrant a regulatory finding of impairment and sediment TMDL process – there must be an analysis that demonstrates a departure from an expected condition for beneficial use support. Regional Board staff acknowledges that urban streams throughout the region exhibit characteristics of entrenchment and bank erosion associated with increased imperviousness, and both urban and rural streams suffer other forms of habitat degradation associated with siltation of the bed. A regulatory impairment finding is not warranted based on the mere presence of sediment-related impacts, but rather in cases where significant sediment discharges threaten sensitive or important aquatic life resources. For instance, the conclusions of a recent Corte Madera Creek geomorphic report were that more sediment could be controlled than present (about 20%), but that control of these sources could lead to bed coarsening that would threaten beneficial uses (Smeltzer et al., 2000). Without a link to beneficial use protection, impairment findings cannot be made based on geomorphic studies alone.

A few streams not already on the 303(d) list were identified during the public solicitation process as potentially impaired due to sediment. These streams include Corte Madera Creek (Marin Bayside), Pilarcitos Creek (San Mateo Coastal), San Pedro Creek (San Mateo Coastal) and Novato Creek (Marin Bayside). After review of technical reports and consultation with sediment experts, only Novato Creek and Pilarcitos Creek warrant consideration for 303(d) listing, considering the factors above, and is discussed below under “Threatened Impairments to Water Quality.”

### **Trash**

Trash is a pollutant of concern to the Regional Board. The Basin Plan, in Table 4-1, explicitly prohibits discharges of “rubbish, refuse, bark, sawdust or other solid wastes into surface waters or at any place where they would contact or where they would be eventually transported to surface waters, including flood plain areas.” Additionally, the narrative objective for floating material states that “waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance

or adversely affect beneficial uses.” As such, trash is a pollutant whose discharge to surface waters should be eliminated consistent with the Basin Plan and state and federal laws and regulations. Observations made by members of the public and Regional Board staff since 1997 indicate a preponderance of trash in, on and near water bodies, particularly in urban portions of streams, lakes, and coastlines throughout the San Francisco Bay Region. Thousands of tons of trash are removed from the Region’s water bodies by volunteers annually during Coastal Cleanup Day, organized by the California Coastal Commission.

### **Impacts of Trash on Beneficial Uses**

Beneficial uses impaired by trash in urban streams, lakes, and coastlines include water contact recreation (REC1), non-contact water recreation (REC2), warm freshwater habitat (WARM), wildlife habitat (WILD), estuarine habitat (EST), marine habitat (MAR), rare threatened or endangered species (RARE), migration of aquatic organisms (MIGR), reproduction and early development of fish (SPWN), commercial and sport fishing (COMM), shellfish harvesting (SHELL), wetland habitat (WET), and cold freshwater habitat (COLD).

These beneficial uses throughout urban portions of the Region are affected by large accumulations of suspended and settled debris. The problem is more acute in bottom portions of watersheds and along the bay and ocean where debris flushed from upper reaches deposits and collects. Common items that have been observed by Regional Board staff include plastic bags, Styrofoam food/drink containers and packing materials, glass and plastic bottles, toys, balls, cans, cigarettes, plastic pellets, motor oil containers, antifreeze containers, construction materials, furniture, appliances, and Christmas trees.

Trash in water bodies causes significant water quality problems, and includes debris that floats and debris that settles. Small and large floatables can inhibit growth of aquatic vegetation, decreasing spawning areas and habitats for fish and other organisms. Floatable debris causes problems in the coastal watershed because it can easily come into contact with aquatic animals, people, boats, fishing nets, and other objects. Thousands of aquatic animals are caught in and strangled by floatable debris each year, and ingestion of various debris, especially plastics, commonly leads to malnutrition and starvation. Coastal communities also lose money when littered beaches must be closed or cleaned up, and the fishing industry and recreational and commercial boaters must spend thousands of dollars annually for the repair of vessels damaged by floatable debris (U.S. EPA, 2001b).

Common settled debris includes glass, cigarettes, rubber, construction debris and more. Settleables are a problem for bottom feeders and dwellers and can contribute to sediment contamination. Some debris such as diapers, medical and household waste and chemicals, are a source of bacteria, viruses, and toxic substances. Floating debris that is not trapped and removed will eventually end up on the beaches or in the open ocean, repelling visitors and residents from the beaches and degrading coastal waters.

Wildlife impacts due to trash occur in creeks, lakes, estuaries, and ultimately the ocean. The two primary problems that trash poses to wildlife are entanglement and ingestion. Marine mammals, turtles, birds, fish, and crustaceans all have been affected by entanglement in or ingestion of floatable debris. Many of the species most vulnerable to the problems of floatable debris are endangered or threatened.

Entanglement results when an animal becomes encircled or ensnared by debris. It can occur accidentally or when the animal is attracted to the debris as part of its normal behavior or out of curiosity. Entanglement is harmful to wildlife for several reasons. Not only can it cause wounds that can lead to infections or loss of limbs, but it can also cause strangulation or suffocation. In addition, entanglement can impair an animal's ability to swim, which can result in drowning or difficulty in moving about, finding food, and escaping predators (U.S. EPA, 2001b).

Ingestion occurs when an animal swallows floatable debris. It sometimes occurs accidentally, but usually animals feed on debris because it looks like food, for instance plastic bags appearing like jellyfish, a prey item of sea turtles. Ingestion can lead to starvation or malnutrition if the ingested items block the intestinal tract, preventing digestion, or accumulate in the digestive tract, making the animal feel "full" and lessening its desire to feed. Ingestion of sharp objects can damage the mouth, digestive tract and/or stomach lining and cause infection or pain. Ingested items can also block air passages and prevent breathing, thereby causing death (U.S. EPA, 2001b).

Some elements of trash are more harmful to beneficial uses than others. Small pieces of plastic called "nurdles" may be among the most harmful floating material in aquatic systems. Nurdles are pre-production virgin material from plastic parts manufacturers, as well as post-production discards that are occasionally recycled. They float at various depths in the ocean and affect organisms at all levels of the food chain. As sunlight and UV radiation render plastic brittle, wave energy pulverizes the brittle material, with a subsequent chain of harmful effects on the various filter-feeding organisms found near the ocean's surface. Studies in the North Pacific Ocean indicate that both large floating plastic and smaller fragments are increasing. As a result of increased reports of resin pellet ingestion by aquatic wildlife and evidence that the ingested pellets are harming wildlife, the Interagency Task Force on Persistent Marine Debris (ITF) identified resin pellets, also known as plastic pellets, as a debris of special concern (USEPA, 1992). When released into the environment, these pellets either float on or near the water surface, become suspended at mid-depths, or may sink to the bottom of a water body. Whether a specific pellet floats or sinks depends on the specific type of polymer used to create the pellet, additives to modify the characteristics of the resin, and the density of the receiving water.

Global scale impacts of discharges of plastic are just beginning to be understood. A 1999 study of marine debris in the mid-Pacific Ocean found that the mass of plastic particles collected was six times higher than the mass of plankton, although the number of planktonic organisms was five times higher than the number of plastic pieces. The even distribution of sampling points in the study design allows for an extrapolation to the breadth of the mid-Pacific Ocean. The number of plastic particles did not increase in

successively smaller size classes as expected, indicating that there may be non-selective removal by mucus web-feeding jellies and salp. In this study, the most common type of identifiable particle, thin plastic film, accounted for 29% of the total. Birds, fish and marine mammals ingest the non-nutritive plastic, leading to untold numbers of starvation-related fatalities (Moore, 1999; Moore et al. 2000).

## **Trash in Waters of the San Francisco Bay Region**

There are excessive levels of trash in virtually all urbanized waterways of the San Francisco Bay Region. Photo and video documentation on the status of trash levels for specific water bodies was submitted for the Regional Board's consideration during the public solicitation. The specific water bodies include Guadalupe River, Guadalupe Creek, Coyote Creek, and Silver Creek in Santa Clara County; San Leandro Creek, Glen Echo Creek, and Lake Merritt in Alameda County. Regional Board staff has noted excessive levels of trash in water bodies during initial field reconnaissance activities associated with the Surface Waters Ambient Monitoring Program (SWAMP) in March 2001. The specific water bodies include the urban portions of San Pablo Creek, Wildcat Creek, Arroyo Las Positas, and San Leandro Creek (and all associated tributaries). Sometimes trash occurs in rural waterways, particularly in public access and recreation areas, but not in heavy accumulations such as those found at the bottom of urbanized watersheds.

Regional Board staff reviewed site-specific data generated for Coastal Cleanup Day from Santa Clara, Alameda, Marin, Contra Costa, and Sonoma counties to evaluate whether such quantified information could yield a regional assessment of relative trash levels, as indicated by tons of trash removed, number of volunteers, and approximate upstream urban drainage area. Such a relative assessment could potentially yield a list of trash hot spots, but the data did not yield such a list. Review of this extensive amount of information showed that all urban areas have a substantial accumulation of trash and recyclable material, but that such data is not useful to perform regulatory assessments, since the amount of trash that is specifically detrimental to beneficial uses (such as plastic "nurdles") is not quantified, and the amount removed depends on so many factors (the productivity of each volunteer, the types of trash that volunteers select for removal, etc.). Observations, photo and video documentations, and Coastal Cleanup Day data together provide a weight of evidence that not enough is currently being done to comply with the Basin Plan's Discharge Prohibition No. 7 (Table 4-1 of the Basin Plan).

Trash removal and management is part of municipal stormwater agencies' performance standards. During the public solicitation, these agencies indicated that they do not believe that the performance standard has been fully implemented, and that it is premature to list urban creeks as impaired by trash because the "best available technology," to control the discharges of trash, whether structural or non-structural, has not been implemented.

Board staff believes there are three options for addressing trash in the 2002 303(d) listing process. First, the creeks for which data or information have been submitted could be listed. Second, all urban creeks could be listed based on the weight of evidence above.

Third, we could make a finding that trash threatens to impair water quality in all urban creeks, lakes, and shorelines, consistent with the recommendations for a preliminary list (NRC, 2001) and the contention that technology has not been implemented yet, and review actions of municipalities during the subsequent 303(d) listing cycle, according to conditions described below. Part of the challenge of carrying forward a listing recommendation this year is the lack of a consistent assessment methodology for trash “impairment,” which requires some description of how beneficial uses are impaired, such as specific risks of wildlife ingestion and harm, and data are not currently collected this way on a water body basis. Additionally, not all trash is equally harmful to human health and aquatic life, and in urban environments where natural complexity of habitat has been removed for purposes such as flood control (e.g. woody debris), some elements of trash, while aesthetically unacceptable, actually benefit aquatic life by providing areas of slow velocity and cover (e.g., shopping carts). The U.S. EPA has released draft guidance for assessment of trash impacts (U.S. EPA, 2001b), which could provide a basis for trash impairment assessment activities carried out by the Regional Board and municipalities prior to the next 303(d) listing cycle.

Regional Board staff favor the third option, making a finding that trash threatens to impair water quality in all urban creeks, lakes, and shorelines, with conditions placed on municipalities to prioritize the implementation of the trash performance standard in the next two years. This recommendation and its implications for the Regional Board and municipalities are described in more detail, below, under “Threatened Impairments to Water Quality.”

## Proposed Changes to the 303(d) List

### *Proposed Listings*

The recommended changes to the 1998 303(d) List are shown in Attachment B. Additions are shown in **bold, highlighted format** and deletions are shown in ~~striketrough format~~.

More information about proposed new listings is shown in Attachment C. This table explains which criteria, data, number of samples, and period of monitoring were used to determine that a water body is impaired due to a specific parameter or pollutant.

The proposed listings include:

#### **Petaluma River Listings**

Petaluma River for diazinon, based on new monitoring information in the watershed that yielded toxicity endpoints consistent with other listed urban creeks in the San Francisco Bay Region (Petaluma Tree Planters, 1999).

Petaluma River for copper and nickel, based on RMP and new monitoring from the Bay Area Clean Water Association (BACWA) special TMDL study (Grovhoug and Salvia,

2000). Only the tidal portion of the mouth of the Petaluma River is specified in this listing, conducted concurrent with a proposed de-listing of the rest of the estuary for copper and nickel, where shoal and channel monitoring indicate consistent compliance with the California Toxics Rule and the Basin Plan, north of the Dumbarton Bridge, and with a proposed site-specific objective for copper and nickel south of the Dumbarton Bridge.

**Urban Creeks Diazinon Refined Listing**

Arroyo Mocho and Arroyo Las Positas are recommended to be listed for diazinon, based on the oversight in listing in 1998 according to criteria used to define urban creeks (listed in Basin Plan; have existing or potential Aquatic Life Uses; and within the jurisdiction of a member of the Bay Area Stormwater Management Agencies Association). Uses for Arroyo Mocho and Arroyo de las Positas are based on those designated for Arroyo de la Laguna, to which they are both tributary and therefore the beneficial uses apply. These two water bodies were added to the Basin Plan in 1995 without any process of designation of beneficial uses. Field reconnaissance by Regional Board staff in March 2001 indicates that aquatic life beneficial uses exist for Arroyo Mocho and Arroyo Las Positas. Arroyo Hondo will be concurrently de-listed because of its erroneous listing in 1998. It is a rural watershed upstream of Calaveras Reservoir, a drinking water source, not within the jurisdiction of a member of the Bay Area Stormwater Management Agencies Association, with no known or suspected sources of diazinon.

Because the Basin Plan is currently being updated to include more water bodies, especially in the San Mateo Bayside and East Bay drainages, Table 1, below, is not considered comprehensive. Example urban creeks that will be added to the Basin Plan and meet the above criteria for “urban creeks” include but are not limited to Pulgas Creek, Redwood Creek, Cordilleras Creek, Belmont Creek, Laurel Creek, Mill Creek, Sanchez Creek, San Bruno Creek, and Colma Creek in San Mateo County; Rheem Creek, Garrity Creek, Baxter Creek, and Cerrito Creek in Contra Costa County; and Codornices Creek, Strawberry Creek, Temescal Creek, Sausal Creek, Peralta Creek, Arroyo Viejo, Ward Creek, Sulphur Creek, Dry Creek, Crandall Creek, and Laguna Creek in Alameda County. Additionally, Refugio Creek in Northwest Contra Costa County (City of Hercules) was added to the Basin Plan in 1995 without any process of designation of beneficial uses, and it is directly tributary to San Pablo Bay, so the tributary rule for aquatic life uses cannot apply without a process of designating uses, although aquatic life uses are expected to exist based on criteria outlined in the Basin Plan (p. 2-5). Adding these creeks for accuracy and consistency would increase the number of listed creeks by 25, increasing the 36 listed creeks to 61.

**TABLE 1**

**URBAN CREEKS IMPAIRED BY DIAZINON  
SAN FRANCISCO BAY REGION**

Urban Creek	Length (miles)	Aquatic Life Beneficial Uses			
		Cold	Warm	Migr	Spwn
<b>Alameda County</b>					
Alameda Creek	51	E	E	E	E
Arroyo de la Laguna	7	P	P	E	E

Urban Creek	Length (miles)	Aquatic Life Beneficial Uses			
		Cold	Warm	Migr	Spwn
Arroyo del Valle	49	E		P	E
Arroyo Mocho*	40	P	P	E	E
Arroyo Las Positas*	10	P	P	E	E
San Leandro Creek	15	E	P	P	P
San Lorenzo Creek	12	E	E	E	E
<b>Contra Costa County</b>					
Mount Diablo Creek	13	E	E	E	E
Pine Creek	13	E	E		E
Pinole Creek	9	E	E	E	E
Rodeo Creek	8		E		E
San Pablo Creek	16		E	E	E
Walnut Creek	9	E	E	E	E
Wildcat Creek	12		E	E	E
<b>Marin County</b>					
Arroyo Corte Madera del Presidio	3	E			E
Corte Madera Creek	4	E	E	P	P
Coyote Creek	3	E	E		
Gallinas Creek	2	E	E		
Miller Creek	9	E	E	E	E
Novato Creek	19	P	P	P	P
San Antonio Creek	18	E	E	P	P
San Rafael Creek	3	E	E		
<b>San Mateo County</b>					
San Mateo Creek	11	P			E
<b>Santa Clara County</b>					
Calabazas Creek	5	E	E		
Coyote Creek	69	E	E	E	E
Guadalupe River	18		E	P	P
Los Gatos Creek	26	E	E	P	P
Matadero Creek	7	E	E	E	E
Permanente Creek	13	E			E
San Felipe Creek	15	P	E		P
San Francisquito Creek	12	E	E	E	E
Saratoga Creek	18	E	E		
Stevens Creek	22	E	E	E	P
<b>Solano County</b>					
Laurel Creek	3	E	E	E	E
Ledge wood Creek	12	E	E	E	E
Suisun Slough	10		E		E
<b>Sonoma County</b>					
Petaluma River*	25		E	E	

Cold Cold Freshwater Habitat—Water that supports cold-water ecosystems, including preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife (including invertebrates).

Warm Warm Freshwater Habitat—Water that supports warm water ecosystems including preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife (including invertebrates).

Migr Fish Migration—Water that supports habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

Spwn Fish Spawning—Water that supports high quality aquatic habitats suitable for reproduction and early development of fish.

E Existing Beneficial Use

P Potential Beneficial Use

Source: RWQCB 1995.

\* Water bodies added to urban creeks list for 2002 303(d) list based on original criteria proposed in 1998. Petaluma River added to list based on data from Abelli-Amen (1999). Arroyo Hondo has been removed from the list because it was erroneously added in 1998 and is located in a rural, protected watershed for drinking water sources. Uses for Arroyo Mocho and Arroyo Las Positas are based on those designated for Arroyo de la Laguna, to which they are both tributary and therefore the beneficial uses apply. These two water bodies were added to the Basin Plan in 1995 without any process of designation of beneficial uses. Field reconnaissance by Regional Board staff in March 2001 indicates that aquatic life beneficial uses exist for Arroyo Mocho and Arroyo Las Positas.

### **High Coliform Count and Beach Closure Listings**

Determination of impairment for this category is based on two separate factors; 1) data indicating exceedance of numeric criteria or 2) closure of beaches by a local agency. The first of these, coliform (total and fecal), E. coli and enterococcus data, was evaluated based on Basin Plan objectives in Tables 3-1 and 3-2, and Ocean Plan water contact standards (for ocean beaches). The impairment assessment focused on dry season data (May-October) when the majority of water contact recreation occurs and bacterial indicator results are not confounded by natural factors. For evaluation of beach closures, as an indication of beneficial use impairment, year-round county beach closure data from 2000 was reviewed (NRDC, 2001), and U.S. EPA guidance used to determine the support status of water contact recreation (Not supporting, i.e., impaired = one bathing closure per year greater than a week's duration or more than one bathing closure per year). In cases where such a "not supporting" determination is made, impairment listing is recommended only at beaches where there was at least one beach closure during the dry season (May-October). In the San Francisco Bay Region, only San Mateo and San Francisco counties conduct beach closure programs. Only San Mateo County conducts the weekly sampling necessary to assess attainment of coliform water quality objectives. Marin County is planning to initiate a program in the near future (Ed Megia, pers. comm., 2001).

The San Mateo County Environmental Health Department conducts comprehensive monitoring of beaches and creeks for total and fecal coliform and E. coli. Trained representatives from Surfrider conduct field sampling, and analysis is carried out by the County's certified laboratory (San Mateo County, 1997-2001). The monitoring is considered comprehensive because in many cases, numerous 5-sample medians or geometric means over 30-day periods can be calculated to assess compliance with Basin Plan and Ocean Plan water quality objectives. Regional Board staff assessed the number of calculated medians (total coliform) and geometric means (fecal coliform) for every data set in the county, spanning the public beaches and publicly accessible creeks from Pacifica in the north to Pescadero Beach in the south. Percent exceedances were calculated for the maximum, median, and geometric mean objectives, and used to determine impairment due to high coliform count. Some beaches had no exceedances of medians and geometric means during the dry season (e.g., Pescadero, San Gregorio, Sharp Park, Montara, Surfer's Beach, San Francisco Bay at Coyote Point), but those that exceeded these objectives were listed as impaired, consistent with U.S. EPA guidance (U.S. EPA, 1996).

For high coliform count, the following water bodies are recommended for listing: Marina Lagoon in the City of San Mateo, San Pedro Creek, San Vicente Creek, Pomponio Creek, San Gregorio Creek, and the Pacific Ocean at Venice Beach, Rockaway Beach, Pillar Point Beach, Fitzgerald Marine Reserve, and Baker Beach (near Lobos Creek mouth) in San Francisco.

For beach closures, the following water bodies are recommended for listing: Pacific Ocean at Fitzgerald Marine Reserve, Pacific Ocean at Pacifica State Beach (also known as Linda Mar or San Pedro Beach), Pacific Ocean at Pillar Point Beach, Pacific Ocean at

Sharp Park Beach, Pacific Ocean at Surfer's Beach, and Pacific Ocean at Venice Beach. All beach closures in San Francisco were based on rainfall events and not actual monitoring data.

## ***Proposed De-Listings***

Several water bodies and pollutants are proposed to be removed from the 303(d) list, based on criteria listed above. Waters proposed for de-listing are summarized below and shown in a strikethrough format in Attachment B.

More information about proposed de-listings is shown in Attachment C. This table explains which criteria, data, number of samples, and period of monitoring were used to determine that a water body is not impaired due to a specific parameter or pollutant.

The proposed de-listings include:

### **Copper and Nickel in San Francisco Bay Segments**

Copper and Nickel from all segments of the San Francisco Estuary north of the Dumbarton Bridge, where shoal and channel monitoring indicate consistent compliance with the Basin Plan and the California Toxics Rule, enacted since the last listing cycle, which implements new dissolved criteria for metals. South of the Dumbarton Bridge, dissolved copper and nickel data are consistently below the proposed site-specific objectives for copper and nickel. This de-listing is conducted concurrent with a proposed listing of Petaluma River for copper and nickel, based on RMP and new monitoring from the Bay Area Clean Water Association (BACWA) special TMDL study (Grovhoug and Salvia, 2000). Only the tidal portion of the mouth of the Petaluma River is specified in this listing.

### **Organic Enrichment in Lake Merritt**

In 1998, the U.S. EPA listed Lake Merritt as impaired by low dissolved oxygen (DO) and organic enrichment. The original data used by U.S. EPA to recommend listing does not meet quality and quantity requirements necessary to support 303(d) listing, specified in U.S. EPA guidance (U.S. EPA, 1996; U.S. EPA, 2001a). No assessment methodology for organic enrichment was followed then nor in the recent submittals by the Lake Merritt Institute, and the organic matter discharged to the lake would probably be better characterized as a source of potential DO impairment, and is therefore recommended for de-listing. As discussed below, DO in Lake Merritt is recommended to remain on the list, pending review of more information during the next listing cycle.

## **Threatened Impairments to Water Quality**

Without an established, formal monitoring and assessment program for the state's water bodies, the Regional Boards have to make decisions on water quality impairment with a wide range of quality and quantity of information. With a few exceptions such as the

Bay's Regional Monitoring Program, ambient monitoring at a level of quality needed for rigorous 303(d) listing considerations is very limited. Indeed, many states struggle to perform adequate monitoring and assessment with the staff and resources they are allocated. In April 2001, the National Research Council (NRC) published a report entitled "Assessing the TMDL Approach to Water Quality Management," produced at the request of the U.S. Congress, examining the scientific basis of the 303(d) and TMDL process. The NRC report underscored the chronic lack of resources at the state level to perform comprehensive water quality assessments. To improve the TMDL process, which currently presumes that scientifically adequate assessments are routinely funded and conducted, the NRC recommended, "***EPA should approve the use of both a preliminary list and an action list instead of one 303(d) list.***" They note that Congress may have to change the law in order to authorize this policy approach, which would better reflect the reality of state water quality assessment capabilities.

Regional Board staff support the concept of two lists – a preliminary list and an impaired water bodies list. TMDLs are developed for the latter list, but a finding of threatened impairment and placement on a preliminary list would result in actions to determine whether or not a water body and pollutant should be added to the impaired list in the subsequent listing cycle. The preliminary list carries with it obligations for more information collection and assessment to resolve the issue of whether there is impairment. The National Research Council (NRC) recommends specific guidelines for creating the preliminary list (NRC, 2001), but one key characteristic is that "no water body should remain on the preliminary list for more than one rotating basin cycle." As such, impairment determinations will be rendered during the next listing cycle for all the water body/pollutant combinations listed below, absent any information between 2000 and the year of the next 303(d) action. Above all, any preliminary list recommended by the Regional Board will implement recommendations of the NRC.

During the public solicitation, a number of substantive water quality problems were brought to the Regional Board's attention, requiring decisions on whether to add over 100 water body/pollutant combinations to the 303(d) list. In many cases, the data or information is not of adequate quality and quantity to support a listing and subsequent TMDL regulatory process, but in the cases below, a finding is warranted that water quality appears threatened and more information must be collected to resolve the question of impairment. In many other cases, the water body/pollutant is already captured in an existing listing (e.g., excessive ammonia in San Antonio Creek, tributary to Petaluma River that is listed for nutrients).

The Regional Board exercises the precautionary approach to water quality protection in the listing process, and has found adequate basis to suggest several water bodies and pollutants that are threatened impairments to water quality, to be acted upon in the subsequent listing cycle based on more information and pending the results of existing water quality improvement programs. Additionally, three water body/pollutant combinations from the 1998 303(d) list warrant placement on a preliminary list, concurrent with de-listing recommendations, with the exception of Lake Merritt dissolved oxygen which is recommended to remain on the 303(d) list. Below are

discussions of water bodies and pollutants that are recommended for preliminary list status.

### **Copper and Nickel in San Francisco Bay Segments**

New information on copper and nickel in San Francisco Bay segments and new CTR and site-specific criteria, described above, suggest there is adequate basis for de-listing. However, dissolved copper and nickel concentrations measured in the RMP and the TMDL special study exceed the CTR criteria at the station at the mouth of the Petaluma River, and dissolved copper values throughout the estuary are not far below applicable thresholds of concern. Regional Board staff recommends that monitoring continue through the next listing cycle to ensure that beneficial uses are protected, and to document any other sites in the estuary that may be exhibiting exceedances similar to the mouth of the Petaluma River. Based on the consistently high levels documented at the Petaluma River mouth, the RMP and special study spatial coverage are not adequate to conclude that un-monitored freshwater/saltwater interfaces or actively dredged riverine channels are meeting the water quality standard for copper and nickel.

### **Dissolved Oxygen and Organic Enrichment in Lake Merritt**

In 1998, the U.S. EPA listed Lake Merritt as impaired by low dissolved oxygen (DO) and organic enrichment. The original data used by U.S. EPA to recommend listing does not meet quality and quantity requirements necessary to support 303(d) listing, specified in U.S. EPA guidance. No assessment methodology for organic enrichment was followed, and the organic matter discharged to the lake would probably be better characterized as a source of potential DO impairment, and is therefore recommended for de-listing as impaired as a result of organic enrichment. Information submitted to the Regional Board during the public solicitation provided anecdotal-level information that DO levels may be inadequate to support beneficial uses, especially when the tide gates are closed by the Alameda County Flood Control District (ACFCD), but the study design did not document surface DO levels, particularly pre-dawn levels, which provide the necessary estimator of DO to support beneficial uses. No evidence of beneficial use impairment, such as number and frequency of fish kills, has been submitted. A quick review of 1997-98 surface DO data from the county indicate that the Basin Plan standard is met, but specific time-of-day information for this data is not available, and therefore this review is inconclusive.

Dissolved oxygen in Lake Merritt needs to be monitored at the surface and at depth to assess whether there is adequate DO to support beneficial uses. Surface values should be measured early in the morning (pre-dawn if possible) to document worst-case conditions. Because of community concern and anecdotal evidence of continued impairment, Regional Board staff does not recommend de-listing at this time, but recommends that DO be monitored systematically by a public agency such as the ACFCD, City of Oakland, Alameda County Public Works Agency, or other stakeholder. This monitoring should be conducted at a minimum at the same sites as Lake Merritt Institute studies, but more frequently than before, continuously where resources allow, to assess whether the lake is truly impaired due to lack of DO. If no data are provided, the Regional Board

may recommend listing or de-listing as available information allows, which includes any description of management actions taken to address depleted oxygen in the water column.

### **Dissolved Oxygen and pH in Lake Merced**

The San Francisco Water Department conducts quarterly monitoring of the different portions of Lake Merced (North Lake, East Lake, South Lake – two locations) for basic water quality parameters such as dissolved oxygen (surface and 15 feet depth) and pH. Data were submitted from the period of September 1997 through December 2000, totaling 14 samples at each location (four sites total). The grab samples were typically taken in the late morning (Dave Dingman, pers. comm., 2001). The Basin Plan Objective for DO in cold freshwater habitat (>7mg/l), designated at Lake Merced, was violated in 36% of surface samples in East Lake, and the Basin Plan Objective for pH (>8.5) was violated in 36% of samples at North Lake. Because DO and pH are such dynamic parameters, the spatial and temporal coverage of this study is not adequate to assess impairment. Surface dissolved oxygen and pH should be measured continuously or with multiple grabs where possible, and DO measured pre-dawn or early morning, and pH in the late afternoon to ascertain the more worst-case conditions. Regional Board staff recommends that DO and pH be monitored systematically by a public agency such as the SFWD, the San Francisco Public Utilities Commission, or other stakeholder. This monitoring should be conducted at the same sites as the SFWD program plus additional sites within the different portions of the lake, and more frequently than before, continuously where resources allow, to assess whether the lake is truly impaired due to lack of DO or elevated pH. In the next listing cycle the Regional Board will re-evaluate DO and pH information, including the 1997-2000 data, and either accept or reject an impairment determination for DO and pH.

### **High Coliform Count in Redwood Creek (San Mateo County – tidal portion)**

San Mateo County recently began monitoring of E. coli in the tidal portion of Redwood Creek in Redwood City. This area contains live-aboard houseboats. Twelve samples were taken in 2001 that suggest water quality impairment compared to Basin Plan objectives (4 out of 12 samples), but the temporal coverage of this study is considered inadequate for a regulatory listing and finding of impairment. Therefore, Regional Board staff recommend that bacterial levels threaten to impair water quality in this water body, and will evaluate San Mateo County data in the next listing cycle to determine if it should be added to the 303(d) list. If no additional data are collected, an impairment finding will be made at that time.

### **Sedimentation/Siltation in Novato Creek**

Dramatic changes due to erosion and sedimentation have been documented in the Novato Creek watershed, and warrant consideration of a 303(d) listing (Collins, 1998). The aquatic life beneficial uses are designated only as *potential* beneficial uses in the Basin Plan, but Novato Creek has been identified as supporting steelhead, a threatened species, in regional native fish surveys (Leidy, 1997). Although erosion and sedimentation are significant in Novato Creek downstream of the Stafford Dam, an explicit linkage to beneficial use impacts, particularly steelhead (RARE, COLD, SPWN, MIGR), has not been made to date, although aesthetic (REC-2) impacts are apparent based on

geomorphic studies (Collins, 1998). The Marin County Department of Public Works (MCDPW) has studied sources of sediment to Novato Creek, and has a draft erosion inventory and sediment control plan out for comment (Prunuske Chatham, 2001). The two sediment reports have resulted from conditions of 401 certifications granted by the Regional Board for dredging permits in lower Novato Creek. Because there is a sediment management planning process underway, Regional Board staff believes that the best available technology has not yet been implemented to control the excess sediment in Novato Creek. Also, the sediment control plan recommends identifying areas of potential and existing salmonid spawning habitat and will better link the effects of sediment input from in-stream (the major source) and hillslope sources on beneficial uses. Depending on the results of the sediment management effort, the Regional Board recommends that sediment threatens to impair water quality in Novato Creek. In the next listing cycle, the planned sediment management and salmonid habitat identification efforts will be evaluated by the Regional Board and an impairment listing either accepted or rejected. If the sediment control plan is not implemented, then the impairment listing will be automatically triggered.

### **Sedimentation/Siltation in Pilarcitos Creek**

Field surveys conducted in development of the Pilarcitos Creek Watershed Restoration Plan (Philip Williams & Associates, 1996) document widespread deposition of a large amount of fine sediment in and on the streambed, clogging spawning sites and filling pools. Widespread occurrence of a large amount of fine sediment in and on the streambed reduces spawning success and juvenile rearing (Philip Williams & Associates, 1996). Increased sediment production to channels may also result in longer periods of elevated turbidity following storms. Such a change in sediment transport duration and/or rate, may make it much more difficult for salmon, steelhead trout (and other stream species that are sight feeders) to successfully capture prey. This type of problem has been identified as a potentially important limiting factor in several streams in northwestern California (L. Reid, 1998; B. Trush and F. Ligon, personal communications, 2000 and 2001). Turbidity monitoring has not been conducted in Pilarcitos Creek so it is not possible, at this time, to determine whether such a problem exists in Pilarcitos Creek. Pilarcitos creek should be listed as threatened by increased sediment production because: 1) there is a clear linkage between sediment and degradation of habitat for steelhead in this watershed; 2) it remains to be determined whether human activities are an important factor; and 3) there is an active watershed restoration program, the Pilarcitos Creek Watershed Advisory Committee (PCWAC), that has broad stakeholder participation and support. The sources of fine sediment are not adequately characterized to support a 303(d) listing at this time.

A rapid sediment budget study is needed for Pilarcitos Creek watershed to determine: a) the significant active processes that are delivering sediment from upslope areas to channels; b) which processes are natural and which processes are caused by or accelerated by human management activities; c) what are the rates and grain-size distributions of sediment delivered from each significant active process. Such information combined with hydraulic, geomorphic, and ecological assessment of channels would lead to an understanding of what percentage of the fine sediment

deposition is the result of human activities and what improvement might be possible through management actions to reduce the amount of sediment production to channels. This is the type of information needed to develop to address sediment-related impacts to steelhead trout and other native fish species in the Pilarcitos Creek watershed.

The PCWAC has obtained some funding from U.S. EPA to perform reconnaissance assessment of sediment. As such, Regional Board staff believes that the best available technology to control sediment has not been implemented, and there is a management process underway. The progress of this effort will be reviewed at the next listing cycle and if there is not progress on developing a rapid sediment budget study described above, an impairment listing will be triggered.

### **PAHs (polynuclear aromatic hydrocarbons) in San Francisco Bay Segments**

PAHs are known carcinogens that accumulate in shellfish tissue, but do not accumulate in fish tissue. The weight of evidence from the RMP indicates that although water quality criteria are almost never exceeded at RMP stations (between 0 and 1 % of RMP water sample individual PAH concentrations exceeded the EPA and CTR criterion) there is evidence that PAHs may be accumulating at higher levels over time and other effects thresholds such as toxicity have been noted. (Hoenicke, Hardin, et al., in prep.; Thompson et al., 1999). Individual PAH criteria were only exceeded for HPAHs (high molecular weight PAHs), having at least 4 rings. Individual PAH concentrations are generally between 0 and 15% of CTR Criteria (Table 2, below), with occasional sampling events of certain compounds as high as 347% of criteria.

In most RMP water samples, PAHs did not exceed the threshold concentrations for adverse effects in fish embryos (Carls et al. 1999; Heintz et al. 1999). Depending on the effects threshold used, between 0 and 64% of RMP site sediment concentrations exceeded the threshold concentrations for adverse effects on biota (SFEI, 2001). Thompson et al. (1999) observed significant correlation between percent mortality of the amphipod, *Eohaustorius estuarius* and concentration of LPAH (low molecular weight PAHs) and HPAH in the Castro Cove, Alameda, and San Bruno Shoal sites of the RMP. PAH sediment concentrations were above ERL and ERM in these sites.

Spies and Rice (1988) linked egg and embryo mortality of starry flounder to activity of the P4501A enzyme, which is PAH inducible. PAHs in transplanted bivalves increased over time in certain regions in the estuary (Hoenicke, Hardin, et al., in prep.), including increases in the total PAHs in the inner estuary during the dry season. Combustion product PAHs increased in the inner estuary, central, and south regions in the dry season. Some decreases in specific regions/seasons were also observed. (e.g. total PAHs in the central region during the wet season). This paper also indicated a significant positive correlation between number of bridge trips (an index of automobile use) and both total PAHs and combustion product PAHs. Pereira et al. (1999) indicated higher concentrations of PAHs since the 1950s than during the late 1800s, presumably resulting from increases in industrialization and urbanization.

**TABLE 2**  
**CONCENTRATIONS OF PAHs IN RMP WATER SAMPLES**  
**(1993-1998) AND CTR CRITERIA<sup>1</sup>**

	<u>Mean %</u>	<u>Median %</u>	<u>Max %</u>
<b>Acenaphthene</b>	0.00%	0.00%	0.00%
<b>Anthracene</b>	0.00%	0.00%	0.00%
<b>Fluorene</b>	0.00%	0.00%	0.00%
<b>Benz(a)anthracene</b>	7.83%	2.41%	205.06%
<b>Chrysene</b>	6.66%	2.90%	90.90%
<b>Pyrene</b>	0.00%	0.00%	0.00%
<b>Benzo(a)pyrene</b>	4.75%	0.00%	110.20%
<b>Benzo(b)fluoranthene</b>	14.62%	5.92%	347.65%
<b>Benzo(k)fluoranthene</b>	5.45%	2.05%	194.63%
<b>Dibenz(a,h)anthracene</b>	1.59%	0.70%	32.70%
<b>Fluoranthene</b>	0.00%	0.00%	0.02%
<b>Indeno(1,2,3-cd)pyrene</b>	11.47%	5.20%	195.82%

**PBDEs (polybrominated diphenyl ethers) in San Francisco Bay Segments**

Little or no data are available in the San Francisco Bay Region for many known or suspected contaminants. The RMP is currently reviewing analytical laboratory information (e.g., gas chromatographs) to identify unknown contaminants. Some of the unknown peaks in the gas chromatographs were recently identified by the RMP as polybrominated diphenyl ethers, or PBDEs, a common flame retardant found in clothing, furniture, and other materials. Concurrently, a paper by She, et al. (2001), in press, documents that levels of PBDEs in San Francisco Bay harbor seal blubber are among the highest reported elsewhere, a dramatic increase in PBDEs in harbor seals was observed over the last ten years, and PBDE levels in human breast adipose tissue from the San Francisco Bay Area are the highest reported to date. Most of the studies on PBDE levels have occurred in northern Europe and Canada. Very few data are available on levels of PBDEs in the United States (She et al., 2001). PBDEs are hydrophobic, persistent compounds expected to bioaccumulate in the food chain, their effects are largely unknown, and they are chemically similar to known carcinogens such as PCBs and dioxins. The weight of evidence of increasing concentrations and their unregulated status warrant a finding that PBDEs threaten to impair water quality in all segments of the San Francisco Bay Estuary, all influenced by wastewater and urban runoff discharges, the likely sources of PBDEs. Actions of dischargers will be reviewed in the next 303(d) listing process regarding discharge characterization, source identification, and pollution prevention of PBDEs. Research literature will be reviewed to ascertain any new information on actual effects thresholds for these persistent bioaccumulative substances. These actions can be conducted regionally through the RMP or the Bay Area Pollution Prevention Group. During the subsequent listing cycle, Regional Board staff evaluation

<sup>1</sup> The percentage indicated is the ratio of the concentration found and the CTR Criterion. Thus, for example, the mean water column concentration of Benz(a)anthracene is 7.83%, or approximately 1/13th, of the CTR Criterion.

of actions to characterize sources and pollution prevention of PBDEs will determine whether an impairment listing is accepted or rejected.

### **Trash in Urban Creeks, Lakes and Shorelines**

Between now and the next 303(d) listing cycle, municipalities will be expected to assess trash impairments in their jurisdiction, as documented in annual reports to the Regional Board. The approach should mirror the standard TMDL approach of defining the problem, identifying the sources (trash hot spots) through monitoring or existing information, and developing a program of action to address the principle sources, which will likely be associated with schools, convenience stores and restaurants, and places where citizens chronically dump excess garbage in violation of existing litter laws. Regional Board staff will review this specific information in the next listing cycle and determine whether specific water bodies warrant 303(d) listing, and note the existence of relatively clean urban streams. In order to ensure that this finding results in characterization, assessment, and management of trash in municipal jurisdictions, urban creeks with no new information by the next listing process will be automatically listed as impaired due to trash.

The prevention and removal of trash in the urban streams, lakes, and coastlines of the San Francisco Bay Region will implement the mission of the Regional Board, to protect beneficial uses of waters, on many levels. Addressing trash as a pollutant ultimately will lead to improved water quality and protection of aquatic life and habitat, expansion of opportunities for public enjoyment of the state's waters, enhancement of public interest in urban waterways, public participation in restoration activities, and propagation of the vision of urban streams as a viable ecosystem and enhancement of the quality of life of nearby residents. The current trashed condition of many urban waterways perpetuates a widespread public perception that such waters are a dumping ground and hold little ecological value. This mis-perception undermines the Regional Board's goals of improving water quality in urban portions of the San Francisco Bay Region, since so much of potential improvement depends on the actions of individuals and their management of pollutants in the diffuse watershed setting. As such, the Regional Board intends to elevate the management of trash in watersheds as part of this 303(d) list review process, and finds that trash threatens to impair water quality in all urban creeks, lakes, and shorelines in the San Francisco Bay Region. Urban creeks were defined during the 303(d) process in 1998, refined for this process, and include 36 creeks, all listed as impaired by diazinon. In addition to aquatic life uses, trash affects the wildlife habitat use (WILD), and designations are indicated in Table 3, below. Urban lakes are defined using the same criteria of having designated aquatic life or wildlife uses and located within the jurisdiction of a Phase I stormwater management program. Urban shorelines will be defined in consultation with stakeholders based on various assessment activities, prior to the next listing cycle.

**TABLE 3**  
**URBAN CREEKS AND LAKES<sup>2</sup>**  
**PRELIMINARY LIST FOR TRASH IMPAIRMENT ASSESSMENT**  
**SAN FRANCISCO BAY REGION**

Water Body	Length (miles) or Area (acres)	Wild	Aquatic Life Beneficial Uses			
			Cold	Warm	Migr	Spwn
<b>Alameda County</b>						
Alameda Creek	51	E	E	E	E	E
Arroyo de la Laguna	7	E	P	P	E	E
Arroyo del Valle	49	E	E		P	E
Arroyo Mocho*	29	E	P	P	E	E
Arroyo de las Positas*	14	E	P	P	E	E
San Leandro Creek	15	E	E	P	P	P
San Lorenzo Creek	12	E	E	E	E	E
Alameda Creek Quarry Ponds	200		E	E		
Lake Merritt**	160	E				E
Lake Temescal	8	E	E			E
Lake Elizabeth	51	E	E	E		E
<b>Contra Costa County</b>						
Mount Diablo Creek	13	E	E	E	E	E
Pine Creek	13	E	E	E		E
Pinole Creek	9	E	E	E	E	E
Rodeo Creek	8	E		E		E
San Pablo Creek	16	E		E	E	E
Walnut Creek	9	E	E	E	E	E
Wildcat Creek	12	E		E	E	E
<b>Marin County</b>						
Arroyo Corte Madera del Presidio	3	E	E			E
Corte Madera Creek	4	E	E	E	P	P
Coyote Creek	3	E	E	E		
Gallinas Creek	2	E	E	E		
Miller Creek	9	E	E	E	E	E
Novato Creek	19	E	P	P	P	P
San Antonio Creek	18	E	E	E	P	P
San Rafael Creek	3	E	E	E		
<b>San Francisco County</b>						
Golden Gate Park Lakes	18	E		E		
Lake Merced	250	E	E	E		E
<b>San Mateo County</b>						
San Mateo Creek	11	E	P			E
<b>Santa Clara County</b>						
Calabazas Creek	5	E	E	E		
Coyote Creek	69	E	E	E	E	E
Guadalupe River	18	E		E	P	P
Los Gatos Creek	26	E	E	E	P	P
Matadero Creek	7	E	E	E	E	E
Permanente Creek	13	E	E			E
San Felipe Creek	15	E	P	E		P
San Francisquito Creek	12	E	E	E	E	E
Saratoga Creek	18	E	E	E		
Stevens Creek	22	E	E	E	E	P

<sup>2</sup> Lakes in this table are considered a preliminary list, based on review of water bodies in the Basin Plan.

Water Body	Length (miles) or Area (acres)	Wild	Aquatic Life Beneficial Uses			
			Cold	Warm	Migr	Spwn
Vasona Lake	40	E	E	E		E
<b>Solano County</b>						
Laurel Creek	3	E	E	E	E	E
Ledgewood Creek	12	E	E	E	E	E
Suisun Slough	10	E	E	E		E
Lake Chabot (Solano)	40	E	E	E		E
Wild	Wildlife Habitat—Water that supports wildlife habitats including preservation and enhancement of vegetation and prey species used by wildlife, such as waterfowl.					
Cold	Cold Freshwater Habitat—Water that supports cold-water ecosystems, including preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife (including invertebrates).					
Warm	Warm Freshwater Habitat—Water that supports warm water ecosystems including preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife (including invertebrates).					
Migr	Fish Migration—Water that supports habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.					
Spwn	Fish Spawning—Water that supports high quality aquatic habitats suitable for reproduction and early development of fish.					
E	Existing Beneficial Use					
P	Potential Beneficial Use					

Source: RWQCB 1995.

\* Water bodies added to urban creeks list for 2002 303(d) list based on original criteria proposed in 1998. Petaluma River added to list based on data from Abelli-Amen (1999). Uses for Arroyo Mocho and Arroyo de las Positas are based on those designated for Arroyo de la Laguna, to which they are both tributary and therefore the beneficial uses apply. These two water bodies were added to the Basin Plan in 1995 without any process of designation of beneficial uses. Field reconnaissance by Regional Board staff in March 2001 indicate that aquatic life beneficial uses exist for these two streams.

\*\* Lake Merritt is already listed as impaired by floatables – Regional Board recommends change to “trash” for statewide consistency.

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**APPENDIX A**

**WATER QUALITY INFORMATION RECEIVED AND  
DATA QUALITY EVALUATION SUMMARY**

**(insert Appendix A, consisting of Tables A-1 and A-2)**



# California Regional Water Quality Control Board

## San Francisco Bay Region



Gray Davis  
Governor

Winston H. Hickox  
Secretary for  
Environmental  
Protection

Internet Address: <http://www.swrcb.ca.gov>  
1515 Clay Street, Suite 1400, Oakland, California 94612  
Phone (510) 622-2300 • FAX (510) 622-2460

### **PUBLIC SOLICITATION OF WATER QUALITY INFORMATION**

The San Francisco Bay Regional Water Quality Control Board (Regional Board) is soliciting the public on behalf of the State Water Resources Control Board (SWRCB) for data and information regarding water quality conditions in surface waters in this Region. The information gathered will be used in various assessments of the State's waters including the development of a submission to US EPA required by the federal Clean Water Act (Section 303(d)). This submission will be developed by the SWRCB and will provide US EPA with a revised list of waters considered by the State to be impaired (not attaining water quality standards) after certain required technology based water quality controls are in place. It is anticipated that this submission will be provided to US EPA by April 2002, as required by federal regulations. The submission will be based on information and data available to the SWRCB and the Regional Water Quality Control Boards. The data and information gathered in this solicitation will also contribute to the preparation of the 2002 federal Clean Water Act Section 305(b) Report on Water Quality.

Anyone, including but not limited to, private citizens, public agencies, state and federal governmental agencies, non-profit organizations, and businesses, possessing information regarding the quality of the Region's waters may provide information.

We are seeking to obtain all readily available data and assessment information generated since July 1997. The Regional Board must receive all data and information you wish to provide by 5:00 p.m. on May 15, 2001. For purposes of this solicitation, information is any documentation describing the current or anticipated water quality condition of a surface water body. We consider data to be a subset of information that consists of reports of measurements of specific environmental characteristics. The data and information may pertain to physical, chemical, and/or biological conditions of the region's waters or watersheds.

#### Information provided should conform to the following considerations:

- The name of the entity or person providing the information.
- Mailing address, phone numbers, and email addresses for a contact person that can answer questions about any of the information provided.
- Two hard copies and an electronic copy of all information provided. For reports Microsoft Word is the preferred software. Please specify the software used to format the information and provide definitions for any codes or abbreviations used.
- Bibliographic citations for all information provided.
- If computer model outputs are included in the information, please provide bibliographic citations and specify any calibration and quality assurance information available.

#### Any data provided should conform to the following considerations:

- Data in electronic form, in a spreadsheet, database or ASCII format. Please specify the format and define any codes or abbreviations used in your database.
- A description of, and reference for your quality assurance procedures.
- Metadata for the field data, i.e., when measurements were taken, locations, number of samples, detection limits, etc.

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- If possible, **two** hard copies of the data, so that we can verify that we have accurately transferred the data to our database.
- In addition, for data from citizen volunteer water quality monitoring efforts:
  - The name of your group;
  - Indication of any training in water quality assessment completed by members of your group;

We would like to receive data and information as soon as possible and no later than **May 15, 2001**. Data and information submitted after May 15, 2001 may be considered if that data or information was not available prior to May 15, 2001, but the Regional Board was notified on or before May 15, 2001 that it would be available in time for the Regional Board to review and incorporate it into its resolution transmitting its recommendations to the State Board.

Please send any information and data you wish to provide to:

Regional Water Quality Control Board  
Atten.: Steve Moore  
1515 Clay St., #1400  
Oakland, CA 94612

Or by e-mail  
303dlist@rb2.swrcb.ca.gov

If you have questions regarding information or data you wish to submit, please contact Steve Moore at (510) 622-2439, or email [smm@rb2.swrcb.ca.gov](mailto:smm@rb2.swrcb.ca.gov).

The Regional Boards have been requested to provide recommendations to the SWRCB in Fall 2001 on the condition of Regional waters. The SWRCB will consider all Regional Boards' recommendations regarding the conditions of the Region's waters when formulating the 303(d) submission. The State's submission revising the list of impaired waters will be considered by the SWRCB in a public process to be conducted next winter. Opportunities for review of the proposed submission and public comment on the submission will be announced at a later date.

After May 15, 2001, Regional Board staff will draft proposed changes to the 303(d) list along with the rationale used for proposed changes and distribute them for comment during Summer 2001. Proposed changes will be based on data and information generated between July 1997 and May 2001 (or afterwards in certain cases), established criteria such as beneficial uses and water quality objectives in the San Francisco Bay Water Quality Control Plan (Basin Plan), and applicable guidance published by USEPA. After receiving comments on the proposed changes, the Regional Board staff will prepare a tentative resolution and accompanying staff report for the Regional Board's consideration in Fall 2001. The tentative resolution will transmit the Regional Board's recommendations to the SWRCB on the condition of Regional waters. The staff report will include recommended changes to the 303(d) list, a description of the rationale used for any recommended changes, and a summary of responses to comments received on the proposed changes.

**ATTACHMENT B**  
**REVISED 303(d) LIST**

**(insert)**

**ATTACHMENT C**  
**303(d) LISTING RATIONALE**

### ATTACHMENT C - LISTING RATIONALE FOR 2001 303(d) LIST

Water Body	Hydrologic Basin	Pollutant	Recommended Action	303(d) Listing or De-Listing Rationale	Total Samples	Monitoring Dates	Data Source(s)
San Francisco Bay Segments North of the Dumbarton Bridge	Suisun Basin, San Pablo Basin, Central Basin, South Bay Basin	Copper	<b><u>De-List</u></b>	<b>De-list all SF Bay segments North of Dumbarton Bridge except for segment including mouth of Petaluma River.</b> Since March 1993, there have been only 21 exceedances of the current objective, 15 of which were at the Petaluma River station. There has not been an exceedance at any other location since 1997 and the one before that was 1995.	466	3/93 – 4/01	RMP and Special TMDL study
San Francisco Bay Segments North of the Dumbarton Bridge	Suisun Basin, San Pablo Basin, Central Basin, South Bay Basin	Nickel	<b><u>De-List</u></b>	<b>Using CTR 8.2 ug/L dissolved as standard: De-list all SF Bay segments North of Dumbarton Bridge except for segment including mouth of Petaluma River.</b> Since March 1993, there have only been 4 exceedances of the CTR objective of 8.2 ug/L dissolved. All of these were at the Petaluma River Station. The most recent exceedance occurred in February 2001 and was twice the Basin Plan objective.  <b>Using 1986 Basin Plan 7.1 ug/L total as standard: <u>List</u> all SF Bay segments North of Dumbarton Bridge except for segment including mouth of Petaluma River.</b> Since March 1993, there have been 102 exceedances of the current Basin Plan objective of 7.1 ug/L total nickel. Of these exceedances, there have been 9 at Davis Point, 13 at Grizzly Bay, 9 at Honker Bay, 13 at Napa River, 19 at Petaluma River, 10 at San Pablo Bay. 36 exceedances in 1998-99 alone.	467	3/93 – 4/01	RMP and Special TMDL study

Water Body	Hydrologic Basin	Pollutant	Recommended Action	303(d) Listing or De-Listing Rationale	Total Samples	Monitoring Dates	Data Source(s)
South San Francisco Bay (south of the Dumbarton Bridge)	Santa Clara Basin	Copper	<u>De-List</u>	<b>Using proposed site-specific objective of 6.9 ug/l dissolved, De-list South San Francisco Bay south of the Dumbarton Bridge.</b> 0 out of 690 samples exceed this proposed SSO. If CTR value of 3.1 ug/l dissolved is used, then 35% of samples exceed and the listing would be retained.	690	2/97 – 12/00	San Jose Copper and Nickel Study
South San Francisco Bay (south of the Dumbarton Bridge)	Santa Clara Basin	Nickel	<u>De-List</u>	<b>Using proposed site-specific objective of 12 ug/l dissolved, De-list South San Francisco Bay south of the Dumbarton Bridge.</b> 0.17% of samples (1 of 604) exceed this objective (once in three years, in compliance with standard). If CTR value of 8.2 ug/l dissolved is used, then 1% of samples (6 out of 604) exceed and the listing would be retained.	604	2/97 – 12/00	San Jose Copper and Nickel Study
Petaluma River	San Pablo Basin	Diazinon	List	California Dept. of Fish and Game Acute Criterion of 80 ng/l violated in 33% of samples, corresponding to effects levels in other Bay Area studies.	36	7/98-11/98	Abelli-Amen, Petaluma Tree Planters, 1999
Marina Lagoon (4 sampling sites-at mouth, rec. ctr, apt. bldg, aquatic park)	South Bay Basin	Total and fecal coliform	List	Basin Plan Objectives violated 1% of samples for total coliform max.(>10,000), 50% of samples for total coliform median (>240), 10% for fecal coliform geomean (>200), and 33% of samples for fecal coliform 90 <sup>th</sup> % ile (>400).	192 samples for total coliform max., 144 samples for total coliform median, 84 samples for fecal coliform geomean, and 84 samples for fecal coliform 90 <sup>th</sup> %ile.	10/7/98-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring <sup>i</sup>

Water Body	Hydrologic Basin	Pollutant	Recommended Action	303(d) Listing or De-Listing Rationale	Total Samples	Monitoring Dates	Data Source(s)
Marina Lagoon (4 sampling sites-at mouth, rec. ctr, apt. bldg, aquatic park)	South Bay Basin	E. coli	List	Basin Plan Objectives violated 31% of samples for max. at designated beach (>235), 28% of samples for max. at moderately used beach (>298), 17% for max. at lightly used beach (>406), and 15% of samples for max at infrequently used beach (>576).	54 samples for all the beach usages	6/14/00-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring
San Vicente Creek (1 sampling site)	San Mateo Coastal Basin	Total and fecal coliform	List	Basin Plan Objectives violated 3% of samples for total coliform max.(>10,000), 100% of samples for total coliform median (>240), 100% for fecal coliform geomean (>200), 100% of samples for fecal coliform 90 <sup>th</sup> % ile (>400) ( <b>Rec 1</b> ). Basin Plan Objectives violated 32% of samples for fecal coliform mean (>2000), and 23% of samples for fecal coliform 90 <sup>th</sup> %ile (>4000) ( <b>Rec 2</b> ).	38 samples for total coliform max., 25 samples for total coliform median, 22 samples for fecal coliform geomean, 22 samples for fecal coliform 90 <sup>th</sup> %ile, 22 samples for fecal coliform mean.	10/6/98-9/26/00	San Mateo County Environmental Health Dept. Beach Monitoring
San Vicente Creek (1 sampling site)	San Mateo Coastal Basin	E. coli	List	Basin Plan Objectives violated 100% of samples for max. at all the beach usages	6 samples for all the beach usages	6/12/00-9/26/00	San Mateo County Environmental Health Dept. Beach Monitoring

<b>Water Body</b>	<b>Hydrologic Basin</b>	<b>Pollutant</b>	<b>Recommended Action</b>	<b>303(d) Listing or De-Listing Rationale</b>	<b>Total Samples</b>	<b>Monitoring Dates</b>	<b>Data Source(s)</b>
San Pedro Creek (9 sampling sites- parking lot, outlet, Linda Mar Blvd, oddstad Blvd, North Fork, South Fork, Middle Fork, Linda Mar Peralta, and Peralta)	San Mateo Coastal Basin	Total and fecal coliform	List	Basin Plan Objectives violated 13% of samples for total coliform max.(>10,000), 98% of samples for total coliform median (>240), 100% for fecal coliform geomean (>200), and 100% of samples for fecal coliform 90 <sup>th</sup> % ile (>400).	99 samples for total coliform max., 56 samples for total coliform median, 6 samples for fecal coliform geomean, and 6 samples for fecal coliform 90 <sup>th</sup> %ile.	5/26/98-8/14/00, 4/24/00-11/13/00	San Mateo County Environmental Health Dept. Beach Monitoring  EPA Region IX Laboratory
San Pedro Creek (1 sampling site-Linda Mar Beach, or Pacifica State Beach)	San Mateo Coastal Basin	Total and fecal coliform	List	Ocean Plan Objectives violated 90% of samples for total coliform 80 <sup>th</sup> %ile, (>1000), 96% of samples for fecal coliform geomean (>200), and 100% of samples for fecal coliform 90 <sup>th</sup> % ile (>400).	41 samples for total coliform 80 <sup>th</sup> %ile., 25 samples for fecal coliform geomean, and 23 samples for fecal coliform 90 <sup>th</sup> %ile.	5/26/98-8/14/00, 4/24/00-11/13/00	San Mateo County Environmental Health Dept. Beach Monitoring  EPA Region IX Laboratory
San Pedro Creek (5 sampling sites- outlet, Linda Mar Blvd, North Fork, Linda Mar Peralta, and Peralta)	San Mateo Coastal Basin	E. coli.	List	Basin Plan Objectives violated 67% of samples for max. at designated beach (>235), 63% at moderately used beach(>298), 57% at lightly used beach (>406), and 54% of samples for max at infrequently used beach (>576).	54 samples for all the beach usages	5/26/98-8/14/00, 4/24/00-11/13/00	San Mateo County Environmental Health Dept. Beach Monitoring  EPA Region IX Laboratory

<b>Water Body</b>	<b>Hydrologic Basin</b>	<b>Pollutant</b>	<b>Recommended Action</b>	<b>303(d) Listing or De-Listing Rationale</b>	<b>Total Samples</b>	<b>Monitoring Dates</b>	<b>Data Source(s)</b>
San Pedro Creek (1 sampling site- beach)	San Mateo Coastal Basin	Enterococcus	List	Basin Plan Objectives violated 40% of samples for max. at designated beach (>104), 40% at moderately used beach(>124), 20% at lightly used beach (>276), and 10% of samples for max at infrequently used beach (>500).	10 samples for all the beach usages	4/24/00-11/13/00	EPA Region IX Laboratory
San Gregorio Creek near Pacific Ocean	San Mateo Coastal Basin	Total and fecal coliform	List	Basin Plan Objectives violated 2% of samples for total coliform max.(>10,000), 73% of samples for total coliform median (>240), 26% for fecal coliform geomean (>200), and 43% of samples for fecal coliform 90 <sup>th</sup> % ile (>400).	56 samples for total coliform max., 45 samples for total coliform median, and 23 samples for fecal coliform geomean and 90 <sup>th</sup> %ile.	9/28/98-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring
San Gregorio Creek near Pacific Ocean	San Mateo Coastal Basin	E Coli.	List	Basin Plan Objectives violated 45% of samples for max. at designated beach (>235), moderately used beach (>298), and infrequently used beach (>576). 18% of samples violated at lightly used beach (>406)	22 samples for all the beach usages	6/12/00-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring

<b>Water Body</b>	<b>Hydrologic Basin</b>	<b>Pollutant</b>	<b>Recommended Action</b>	<b>303(d) Listing or De-Listing Rationale</b>	<b>Total Samples</b>	<b>Monitoring Dates</b>	<b>Data Source(s)</b>
Pomponio Creek near Pacific Ocean	San Mateo Coastal Basin	Total and fecal coliform	List	Basin Plan Objectives violated 64% of samples for total coliform median (>240), 13% for fecal coliform geomean (>200), and 17% of samples for fecal coliform 90 <sup>th</sup> % ile (>400).	44 samples for total coliform median, and 23 samples for fecal coliform geomean and 90 <sup>th</sup> %ile.	9/28/98-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pomponio Creek near Pacific Ocean	San Mateo Coastal Basin	E. coli.	List	Basin Plan Objectives violated 5% of samples for all the beach usages	21 samples for all the beach usages	6/12/00-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Venice Beach	San Mateo Coastal Basin	Fecal coliform	List	Ocean Plan Objectives violated 13% of samples for Total Coliform (80 <sup>th</sup> %ile>1000)	30 samples for Total Coliform 80 <sup>th</sup> %ile	9/28/98-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Pillar Point Harbor, Pillar Point #4, 5, and 7)	San Mateo Coastal Basin	Total Coliform	List	Ocean Plan violated 40% of samples for Total Coliform (80 <sup>th</sup> %ile>1000)	143	5/98-10/98, 5/99-10/99, 5/00-10/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Pillar Point Harbor, Pillar Point #4, 5, and 7)	San Mateo Coastal Basin	Fecal Coliform	List	Ocean Plan Objective violated 9% of samples for log mean (>200) and 35% of samples for 90 <sup>th</sup> %ile (>400)	143 for log mean 113 for 90 <sup>th</sup> %ile	5/98-10/98, 5/99-10/99, 5/00-10/00	San Mateo County Environmental Health Dept. Beach Monitoring

<b>Water Body</b>	<b>Hydrologic Basin</b>	<b>Pollutant</b>	<b>Recommended Action</b>	<b>303(d) Listing or De-Listing Rationale</b>	<b>Total Samples</b>	<b>Monitoring Dates</b>	<b>Data Source(s)</b>
Pacific Ocean at Fitzgerald Marine Reserve	San Mateo Coastal Basin	Total Coliform	List	Ocean Plan Objective violated 43% of samples for Total Coliform (80 <sup>th</sup> %ile>1000)	49	5/98-10/98, 5/99-10/99, 5/00-10/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Fitzgerald Marine Reserve	San Mateo Coastal Basin	Fecal Coliform	List	Basin Plan Objective violated 16% of samples for log mean (>200) and 73% of samples for 90 <sup>th</sup> %ile (>400)	49 for log mean, 37 for 90 <sup>th</sup> %ile	5/98-10/98, 5/99-10/99, 5/00-10/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Rockaway Beach	San Mateo Coastal Basin	Total Coliform	List	Ocean Plan Objectives violated 13% of samples for Total Coliform (80 <sup>th</sup> %ile>1000)	23	5/00-10/00	San Mateo County Environmental Health Dept. Beach Monitoring
Pacific Ocean at Baker Beach (mouth of Lobos Creek)	Central Basin	Total coliform	List	Ocean Plan Objectives violated 9.7% of samples for Total Coliform (80 <sup>th</sup> %ile>1000)	164 samples	7/1/97-5/29/98	EPA STORET
Peytonia Slough (part of Suisun Marsh Wetlands)	Suisun Basin	DO	List	Basin Plan Objectives (<7mg/l) violate 40.4% of samples	47 samples	7/2/97-5/3/01	Fairfield-Suisun Water Treatment Plant Slough Data June 1997- June 2000, NPDES Permit CA0038024

<b>Water Body</b>	<b>Hydrologic Basin</b>	<b>Pollutant</b>	<b>Recommended Action</b>	<b>303(d) Listing or De-Listing Rationale</b>	<b>Total Samples</b>	<b>Monitoring Dates</b>	<b>Data Source(s)</b>
Suisun Slough (part of Suisun Marsh Wetlands)	Suisun Basin	DO	List	Basin Plan Objectives (<7mg/l) violate 56% of samples	144 samples	7/2/97-5/3/01	Fairfield-Suisun Water Treatment Plant Slough Data June 1997-June 2000, NPDES Permit CA0038024
Boynton Slough (part of Suisun Marsh Wetlands)	Suisun Basin	DO	List	Basin Plan Objectives (<7mg/l) violate 38% of samples	144 samples	7/2/97-5/3/01	Fairfield-Suisun Water Treatment Plant Slough Data June 1997-June 2000, NPDES Permit CA0038024

### RATIONALE FOR 2001 PRELIMINARY LIST

Water Body	Hydrologic Basin	Pollutant	Recommended Action	Preliminary List Rationale	Total Samples	Monitoring Dates	Data Source(s)
Lake Merced	San Mateo Coastal Basin	Dissolved Oxygen-Surface	Preliminary List – Review during next Listing Cycle	Basin Plan Objective (>7mg/l) violated 36% of samples at East Lake  Spatial, Temporal Coverage inadequate for listing.	14 samples	9/97-12/00	San Francisco Public Utilities Commission Quarterly Lake Monitoring
Lake Merced	San Mateo Coastal Basin	Dissolved Oxygen-15ft depth	Preliminary List – Review during next Listing Cycle	Basin Plan Objective (>7mg/l) violated 64% of samples at South Police Range, 57% at South Pump Station, 93% at North Lake, and 57% at East Lake  Spatial, Temporal Coverage inadequate for listing.	14 samples each	9/97-12/00 -	San Francisco Public Utilities Commission Quarterly Lake Monitoring
Lake Merced	San Mateo Coastal Basin	pH	Preliminary List – Review during next Listing Cycle	Basin Plan Objective (>8.5) violated 36% of samples at North Lake  Spatial, Temporal Coverage inadequate for listing.	14 samples	9/97-12/00	San Francisco Public Utilities Commission Quarterly Lake Monitoring
Redwood Creek – tidal portion (3 sampling sites)	South Bay Basin	E. Coli	Preliminary List – Review during next Listing Cycle	Basin Plan Objectives violated 33% of samples for max. at designated beach(>235), moderately used beach(>298), and lightly used beach (>406), and 25% of samples for max at infrequently used beach (>576).  Temporal Coverage inadequate for listing (only one season).	12 samples for all the beach usages	6/14/00-10/31/00	San Mateo County Environmental Health Dept. Beach Monitoring

<sup>i</sup> Only Dry Season data (months of May through October) from the San Mateo County Department of Environmental Health and EPA Region IX Laboratory were evaluated corresponding to the predominant period of water contact recreation and eliminating the confounding effects of runoff on bacterial indicators.