Ambient Bay and Lagoon Monitoring Program

The overall objectives of the Ambient Bay And Lagoon Monitoring Program (ABLM) are to develop and implement an environmental study to assess the overall health of receiving bays and lagoons and monitor the impact of urban runoff on ambient water quality. The first step in fulfilling these objectives was to conduct a literature review to determine what information and data were available that could be used to design an appropriate monitoring ABLM program. As such, activities during the 2001-2002 monitoring season in relation to the Ambient Bay And Lagoon Monitoring Program were limited to research and development of the program for subsequent monitoring seasons.

The Ambient Bay And Lagoon Monitoring Program consists of sediment chemistry and toxicity, and benthic assemblage characterizations of 12 bays and lagoons (13 outfalls) in San Diego County. This program will also contribute information to the Southern California Coastal Waters Research Project Bight 2003 coastal survey and will allow the prioritization of lagoon outfall areas for additional investigation in subsequent years of the monitoring program.

The first year of the program is scheduled for implementation during the 2003-2004 monitoring season. Because this program is limited to applications within bays and lagoons, no data specific to the Tijuana River watershed will be collected as part of this program.

Coastal Storm Drain Outfall Monitoring

The overall objective of the Coastal Monitoring Program is to assess the effects of storm drain runoff on coastal (beach) recreational contact (e.g., surfing and swimming) through prescriptive paired sampling. Paired sampling consists of collecting a water sample at select storm drain outlets and a second sample from the surf-zone 75-feet down current where runoff water and ocean waves meet and mix. Paired samples are collected twice monthly between April 1st and October 30th, and once monthly between Nov 1st and March 31st. Samples are analyzed for 3 bacterial indicators: total coliform, fecal coliform, and enterococcus. If an exceedance of recreational use standards occurs, the coastal municipality contacts the County Department of Environmental Health so that signs can be posted on the beach notifying bathers that the ocean water near the mixing zone does not meet applicable standards (as required under State Assembly Bill 411).

Dry Weather Monitoring

The overall objectives of the dry weather monitoring program are to identify sources of pollution reaching the municipal storm drain systems and abate them through strategic monitoring, sampling, and data collection. In an effort to find pollution sources, the dry weather monitoring program focuses on collecting samples at actual storm drain outlets and internal underground structures rather than collecting samples

at creeks, streams, or receiving waters where pollutants are generally diluted and more difficult to track.

Dry weather monitoring is conducted between May 1st and September 30th during non-rainy periods when storm water runoff is negligible and sources of water are likely of typical urban origin (i.e. washing, hosing, irrigation). Additional information and data collected from monitoring activities provide baseline runoff characteristics over fairly extensive spatial and temporal scales.

Data monitored and sampled include:

- General observations such as color, clarity, odor, floatables, discharge (flow), and atmospheric conditions;
- Field screening for pH, electrical conductivity, nitrate, phosphate, ammonia, temperature, and turbidity; and,
- Analytical laboratory analysis for metals (cadmium, copper, lead, and zinc), grease and oil, detergents (MBAS) pesticides (diazinon and chlorpyrifos), and bacterial indicators.

3.c. Water Quality Assessment Strategy and Methodology

As part of the watershed-based water quality assessment, the following steps are taken in the data evaluation and analysis:

- Identify constituents of concern which have been found to exceed administrative water quality reference values as well as the frequency, magnitude and duration of such exceedances;
- Isolate constituents of concern shown to exceed applicable water quality reference values in a persistent and/or recurrent manner;
- As data permits, evaluate whether there are any potential effects which could be a result of co-mingling and/or bioaccumulation effects of recorded constituents and pertinent data/analysis related to source identification investigations or related efforts. Include bacterial indicators in the list of analytical laboratory analyses;
- Examine how any of the constituents of concern identified in step (2) above, may contribute to water quality degradation which would negatively impact designated beneficial uses; and,
- As a longer historical record is developed over multiple years of monitoring, assess constituent of concern data to see if there are any increasing or decreasing trends through time applying statistical analysis.

Over the long term however, Copermittees intend to develop this watershed based water quality assessment as the mechanism that will link all this

information together in a weight of evidence approach. The process of assessing water quality data, prioritizing related issues, and identifying management actions provides an opportunity for each jurisdiction within the watershed to collaborate on these issues under the framework of the watershed program. It also provides an opportunity to focus limited resources in priority areas and ensure consistent approaches throughout the watershed.

Future year assessments, as time and resources permit, will include a review of data and information from several different sources, including (but not limited to) the wet weather and dry weather monitoring, coastal outfall monitoring and special studies or other available information (from grant projects for example, water agencies or university studies) that may be useful in assessing watershed-wide conditions.

The water quality prioritization is flexible and adaptive because the process is iterative. For example, high priority water quality issues identified in this year's assessment (which is based on a very limited data set), can be reassessed after compiling all dry weather data and gathering additional information. The Copermittees have the flexibility to update the water quality related priorities as additional data is integrated in the process. As a result of more complete data sets, issues and priorities can be revised accordingly. As efforts to mitigate water quality priorities are effective, priorities can be readjusted. The iteration process enhances the flexibility and ability to direct resources toward high priority issues.

While required by the Municipal Permit, Copermittees anticipate this document and associated annual reports may be useful for other purposes. The process of identifying water quality issues and remedial actions can be used to seek funding for projects that can be linked directly to water quality benefits because they have been identified in a formal prioritization process using available information and data. Further, this document may be used as a tool for communication between watershed jurisdictions at many levels as well as for other parties interested in the watershed.

The limitations in the 2001-2002 water quality assessments are as follows. First, there is a limited wet weather monitoring data set in many of the watersheds because the 2001-2002 wet weather monitoring was the first of the countywide monitoring program that incorporated a mass loading station at 11 locations throughout the county (the historical data from mass loading stations is only available for the Mission Bay, San Diego Bay, and Carlsbad watersheds). Secondly, the stream bioassessment data are also limited in time. This results in a very limited data set for this initial year assessment. While some preliminary statements regarding water quality may be made at this time, in many cases additional data to be gathered in the next and subsequent yearly assessments may support or refute these assessments. This year's water quality assessment provides a framework and a guideline for how water quality will be assessed in future years as more data becomes available and this is integrated into the process.

Figure 3-2 below provides a graphic presentation of the assessment and prioritization process.

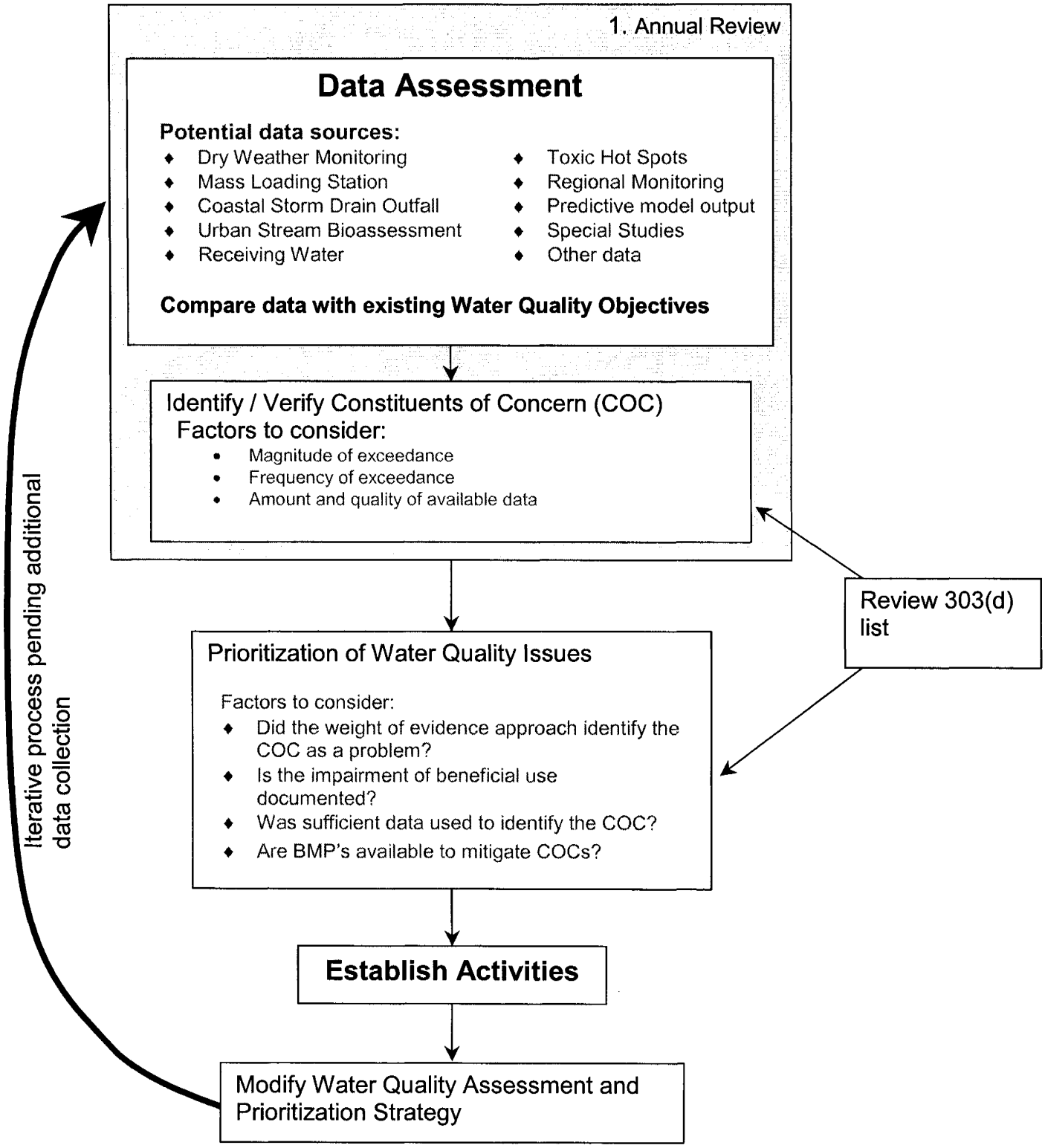
The triad of data (storm water chemistry, storm water toxicity and rapid stream bioassessment data) collected under the Core Monitoring program is also evaluated using the triad decision matrix. This triad of monitoring data is utilized in a 'weight of evidence' approach. Storm water chemistry and storm water toxicity data provide an indication of the pollutant loads during a storm event and potential aquatic impacts during storm events to organisms. The stream bioassessment provides information related to the ecological health of the watershed and an indication of stream health effects from urban runoff. Stream bioassessment data not only provide information about the benthic invertebrate community present in the watershed, but also the quality and condition of the physical habitat.

The triad decision matrix is primarily intended to direct changes in the monitoring program using a consistent and scientific approach. The triad decision matrix is used as one step in the process of identifying additional monitoring needs, such as performing a Toxicity Identification and Evaluation (TIE) study to identify the constituents causing toxicity.

Two constituents of concern not considered in the triad approach are fecal coliform and total dissolved solids (TDS). The bacteria parameters are not considered in the triad because they are not believed to influence toxicity responses in bioassay test organisms. Water quality objectives applied to bacterial indicators are the human health objectives for water contact recreation or non-water contact recreation. Total dissolved solids are not considered because, while this parameter may exceed water quality objectives in the Basin Plan, the objectives were set for municipal drinking water supply and not ecological impacts.

Bacterial indicators and TDS are considered as constituents of concern and assessed by looking at all applicable factors (303(d) listings, beneficial uses, economic impact, etc.) and included as appropriate in the prioritized strategy. Bacterial indicators and TDS may not have the benefit of the added evidence of benthic community and toxicity, yet they may lead to watershed activities when considered with all other constituents of concern in the watershed.

Figure 3-2: Water Quality Assessment & Prioritization Process



3.c.1 Historical Data Trend Assessment

Future water quality assessments are expected to rely more on a historical record that allows for trend analysis using numerous data sources (MLS, dry weather, etc.) instead of individual seasonal data sets. Because of the limited number of data points (three storm events for a majority of the watersheds in San Diego), the analysis is limited in this year's assessment.

An introduction to more comprehensive statistical analysis of constituents of concern is found in Section 3 of the San Diego Region Previous Storm Water Monitoring Review and Future Recommendations - Final Report (August 2001). Other statistical comparisons of wet weather runoff characteristics are found in Section 6 of the Cross-Watershed Comparison of the 2001-2002 Monitoring Report. The statistical methods that may be used in future analysis long tern data sets from mass loading stations may vary depending upon the issue. As noted in the Monitoring Report, scatter plots and trend analysis graphs of constituents of concern can be used as a starting point when comparing levels in different watersheds. It is anticipated that in future years, as the historical record for each mass loading station is built, watershed Copermittees will transition to using these and similar methods to determine water quality issues.

When longer term data is obtained from the monitoring program (e.g. multiple years of monitoring data), data can be evaluated for trends through time. Evaluating concentrations of a potential constituent of concern over time will determine whether the levels are decreasing. Because analytical data sets vary, determining if concentrations of a potential constituent of concern are significantly decreasing or increasing in a watershed requires statistical analysis of the data.

3.c.2 Data Sources to Identify Constituents of Concern

Two comprehensive reports provided most of the water quality data and related information that were evaluated as part of this watershed assessment:

1) San Diego Regional Previous Storm Water Monitoring Review and Future Recommendations Report (MEC August 20, 2001): This report contains a summary of significant findings from copermittee monitoring programs implemented from 1993 to 2000. However, this report contains data and analysis pertinent to the historic monitoring sites (Chollas Creek, Tecolote Creek and Agua Hedionda Creek) and therefore only applies to the San Diego Bay watershed, Mission Bay watershed, and Carlsbad watershed.

2) Urban Runoff Monitoring Report (MEC, October 2002): This report summarizes all data and findings associated with mass loading station and rapid stream bioassessment monitoring

activities conducted during the 2001-2002 season. (This report applies to all watersheds.)

Additionally, the most current (Year 1998) and proposed (Year 2002) Clean Water Act Section 303(d) Lists of Water Quality Limited Segments and associated list of constituents of concern in the watershed were considered as data sources[17].

Generally, salient constituents of concern were identified from the data sources listed above and evaluated against water quality reference values and designated beneficial uses as identified under the San Diego Basin Plan (as described in Section 4.b).

4. MAJOR WATER QUALITY ISSUES

As noted earlier, limited data is currently available and will be available in the initial years as the program evolves. The data set considered to date may be too limited to draw strong conclusions about high priority water quality issues and associated actions. To develop an effective list of activities that properly identifies and addresses significant water quality issues, there may be a need to obtain additional validation. Validation is pursued through the yearly watershed-based water quality assessment and program evaluation process which are part of this plan.

Once the constituents of concern are identified, the high priority water quality issues are identified using a qualitative process which considers watershed-specific conditions using the weight of the evidence approach as well as best professional judgment to interpret the relationships between exceedances, regulatory mechanisms, and beneficial uses. Factors considered include:

- Availability of sufficient qualified data (may include detection levels, number of sample(s), spatial and temporal characteristics);
- Need to integrate additional data;
- Ability to determine conditions at the sub-watershed level;
- Current related concerns and/or priorities expressed by local jurisdictions;
- Stakeholder input; and,
- Human health and ecological health considerations.

Priority water quality issues are addressed by implementing actions that are designated as short and/or long-term activities. Short-term activities are completed within the life of the current Municipal Permit (years 2003-2005). Long-term activities extend beyond the

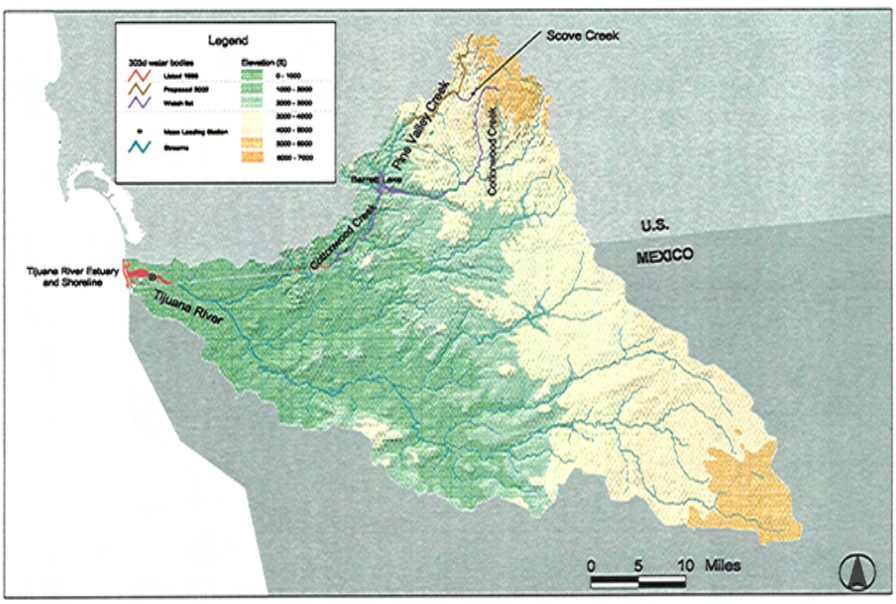
[17] Id reports (Fact Sheet 2002 and watershed doc)

life of the current permit (years 2006 and beyond). The high priority issues as well as other salient constituents of concern are tracked and reassessed through the yearly assessment and reporting process.

4.a. Tijuana River Watershed Data Review

The Tijuana River watershed management area includes the Tijuana River watershed (HU 911.00), which is the largest of the San Diego watersheds covering over 1.1 million acres (Figure 4-1). The watershed is divided by the U.S. / Mexico border with just over 27% lying within the San Diego Region. The watershed is comprised of the following hydrologic areas: Tijuana Valley, Potrero, Barrett Lake, Monument, Morena, Cottonwood, Cameron, and Campo, which includes the major water bodies Tijuana River, Cottonwood Creek and the Tijuana Estuary. The principal aquifer in the watershed is the Lower Tijuana River Valley Basin. Most of the surface water streams in San Diego County are interrupted in character, having both perennial and ephemeral flow regimes. This is a result of the regional rainfall pattern and the development of surface water impoundment. Annual precipitation for the portion of the watershed within the San Diego area ranges from 10.5 inches in the coastal areas to more than 22.5 inches in inland areas.

Figure 4-1: Tijuana River Watershed Map



Land use data sources: CESAR, San Diego State University and SANDAG

Mexico governs the majority of the Tijuana River watershed (72.8%) with the remaining areas belonging to the United States. Unincorporated areas account for 25.7% of the watershed or ~93 percent of the US lands (25.7/27.2) with only small portions falling under the jurisdiction of the Cities of San Diego and Imperial Beach. The majority of the land use within the watershed is undeveloped (58%) with 14% devoted to agriculture, and 9% listed as urban (Figure 4-2). Much of