The Water Resources Research Center (WRRC) co-sponsored a workshop on Total Maximum Daily Load (TDML) at the Pagoda Hotel in Honolulu on October 23-25, 2007.

Total Maximum Daily Load refers to the total quantity (or load) of a pollutant that a stream can carry and still conform to designated uses and fishable/swimmable water quality. TMDL also refers to a regulatory/planning process that States, Territories, and authorized Tribes use to determine allowable pollutant concentrations in streams. The TMDL program was designed to provide a safety net, catching water bodies that were not protected or restored by the implementation of the range of general, broadly applicable, pollution control programs authorized in the Clean Water Act. The TMDL program is aimed specifically at assuring attainment of water quality standards.

In all the states “impaired” waters are identified by state regulatory agencies (the Department of Health in Hawaii’s case). Any water body that does not meet the State’s EPA-approved water-quality standards, whether narrative, numeric, chemical, physical, or biological, after full implementation of existing permits, is considered impaired. (USGS Fact Sheet FS-130-01). This system of identifying “impairment” gives regulatory agencies considerable leeway in deciding which water bodies need attention. Indeed, in some cases the inclusion of a water body is made simply on the basis of a visual inspection.

Under the Clean Water Act’s provisions, the states are required to identify impaired waters for which technology-based controls are insufficient to meet applicable water quality standards, and to prioritize these so-called water
quality limited segments (WQLSs) targeted for TMDL development over the next two years. The priority ranking and the list of waters targeted for TMDL development must reflect the severity of use impairment and the type of uses being impaired. This list of impaired waters is referred to as a state’s 303(d) list and is submitted to EPA every other year. (A TMDL Primer: A guide to understanding total maximum daily loads required under state water quality standards. By Matthew D. Garamone, JD, CHMM [http://www.stevenspublishing.com/Stevens/EPPub.nsf/frame?open&redirect=http://www.stevenspublishing.com/stevens/epPub.nsf/d3d5b4f938b22b6e8625670c006d3c58/ea274c964d2f17c0886256a0000b56f9?OpenDocument]

A feature of the TMDL process is that it allocates proportions of pollutant load to different sources in watersheds, and this allocation is used as the basis for determining who will be responsible for reducing what proportion of the total load each source identified in the watershed needs to eliminate.

As of the 2004 listing for Hawaii, 244 water bodies have been identified as being impaired and 20 TMDLs have been approved by EPA. Most of the impaired (or water quality limited) waters on Hawaii’s list are there due to excess sediment and nutrients.

The October workshop, which focused on how best to develop and implement the TMDL regulations in Hawaii, looked at TDML development across a number of disciplines from engineering and planning to legal and political. The workshop served to introduce TDML and discuss difficulties in the implementation of the process in Hawaii and ways to address these.

WRRC’s Dr. Clark Liu was the first presenter at the workshop. He gave a talk providing some background about the TMDL program and about planning provisions for water quality management in relation to the Clean Water Act.

Paul Freedman from the consulting firm Limno-Tech gave the audience a good overview of the TMDL program and associated challenges nationwide. Other speakers, included Dr. Russell Yost of the UH College of Tropical Agriculture and David Penn, the TMDL Coordinator for the Hawaii Department of Health (DOH). Mr. Penn discussed Hawaii’s experience with TDML including how it is working today and how it will work in the future, along with a look back at past challenges and what the state has learned from them. Speakers from the State Department of Transportation were on hand to talk about their activities in reducing pollutant loads from airports and harbors under their municipal separate storm sewer system (MS4) permits. Peter Kozelka, TMDL Program Leader from EPA Region 9 was on hand to give the federal agency’s perspective to the group.

The workshop participants also benefited from presentations by three members of Virginia Tech’s Center for TMDL and Watershed Studies who came to Hawaii to describe the Virginia experience in conducting TMDLs and implementing pollution reduction measures. One of these gentlemen, Kevin Brannan, later came to the Manoa campus to deliver a WRRC seminar regarding modeling issues in TMDL. Brannan described his group’s use of computer models to develop TDMLs in Virginia. According to Brannan, the majority of the TMDLs that have been developed to date are related to poor benthic community health and excess bacteria. Brannan explained that the two models most often used to address these impairments are the Hydrological Simulation Program-FORTRAN (HSPF) for bacteria, and the Generalized Watershed Loading Functions (GWLF) for benthic community impairments where the dominant stressor is sediment.

Implementation of the TMDL program in Hawaii is complicated by several factors largely stemming from the State’s unique hydrology. It was pointed out during the workshop that even under natural conditions many of Hawaii’s streams do not meet water quality standards due to sediment coming from the steep undeveloped lands in the backs of watersheds, especially those with large wild populations of pigs and goats. The nature of Hawaii’s topography/climate results in very erosive storm events. The extreme steepness and inaccessibility of most of the upper watersheds makes it very difficult to perform adequate inspections in these upper reaches. There is a shortage, or even a complete lack of data for

continued on page 8
many waters in Hawaii, and very little systematic data collection is being done currently. Without monitoring data it is impossible to know if the State’s numerically expressed quality standards are being exceeded or not. Furthermore agricultural concerns are not bound by the findings of TMDL studies, and indeed do not have to permit access to their land to allow inspection of the watershed. It is therefore almost impossible to say what proportion of any pollutant originates on agricultural land, often the largest land use in a watershed.

One of the concerns that emerged during the workshop was that without good monitoring data and without being able to inspect much of the watershed it will be almost impossible to make a good assessment of the source of pollutants. Therefore it could happen that allocation of load (and the responsibility to reduce it) will disproportionately fall on those concerns which are most readily identifiable and not necessarily on those who are actually contributing the contamination.

Other sponsors of the workshop included the Hawaii Local Technical Assistance Program at the UH College of Engineering; the State of Hawaii Department of Health’s Environmental Health Administration Branch; the U.S. Environmental Protection Agency, Region 9; the City and County of Honolulu’s Department of Environmental Services; the Hawaii Department of Transportation, Highways Division; and the UH College of Tropical Agriculture and Human Resources.

Goats: one cause of excessive sediment in Hawaiian streams.