

Waimanalo Stream TMDL Implementation Plan

Prepared by:

**U.S. Environmental Protection Agency
and
State of Hawaii Department of Health, Environmental Planning Office**

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EXECUTIVE SUMMARY

Waimanalo Stream, a 5.5 km long highly altered stream on the windward side of Oahu is an impaired waterbody. Sediments and nutrients (nitrate and phosphorus) from the watershed enter the stream faster than they can be assimilated and recycled. The water quality of Waimanalo Stream is not meeting Hawaii's water quality standards for these pollutants (see Hawaii Administrative Rules, Chapter 11-54).

A report by Hawaii Department of Health (2001), "Total Maximum Daily Loads Estimated for Waimanalo Stream, Island of Oahu, Hawaii¹" (report), describes the reaches of Waimanalo stream where nutrients (nitrate and phosphate) and sediments (total suspended sediments) exceed the stream's capacity for assimilation and recycling of pollutants. The Total Maximum Daily Load (TMDL) is the maximum amount of nutrients or sediments that can enter Waimanalo Stream without violating the State's water quality Standards.

The need for substantial reduction in nitrate load throughout the watershed is the most prevalent pollutant problem identified in the TMDL. Excess levels of phosphate and sediments were also identified at specific stations, but not at all sites. This study likely underrepresented the extent of sediment pollution because the time period of the study, 1999-2000, had below average rainfall. The report also describes impairment to the aquatic life and habitat value of the stream as related to the combination of pollutants and structural alterations in the stream.

This Implementation Plan (Plan) defines projects to reduce the inputs of these pollutants to the stream and/or improve the stream's ability to assimilate them. These projects, together, will aid in restoring the water quality and physical structure of the stream so that Waimanalo stream water complies with numerical and narrative State water quality standards. The Plan was developed with input from a range of concerned residents and responsible government agencies. The Plan is intended to guide the community and agencies in their work to improve Waimanalo stream and to assist them in identifying and obtaining funds to support stream improvement projects.

The Implementation Plan identifies the following 8 actions as priorities for implementing the TMDL for Waimanalo Stream:

1. Increase capacity of community to protect and enhance stream ecosystem.
Key Participants: Residents, Agencies, Elected Officials

¹ To obtain a copy of the Waimanalo TMDL, contact DOH's Environmental Planning Office at (808) 586-4337 or E-mail bmatsunaga@eha.health.state.hi.us

2. Improve the stream's ability to move water, filter pollutants, and support aquatic life.
Key Participants: Residents, DLNR, NRCS, WOSWCD, KBAC, ACOE²
3. Establish vegetated buffers adjacent to stream.
Key Participants: Residents, NRCS, WOSWCD, DLNR, CCH
4. Improve wastewater treatment.
Key Participants: Residents, DOH, CCH, DLNR
5. Assure good agricultural management practices that minimize potential for fertilizer runoff and groundwater contamination.
Key Participants: Farmers, NRCS, WOSWCD, DOA, DLNR
6. Assure good animal waste management practices that minimize potential for runoff and groundwater contamination.
Key Participants: Farmers, HACD, NRCS, WOSWCD, DOA, DLNR
7. Reduce nutrients and sediments in urban runoff.
Key Participants: DOH, CCH, HDOT, Residents
8. Develop methods for stabilizing the stream channel that maintain stream's ability to filter pollutants and support aquatic life.
Key Participants: NRCS, WOSWCD

The Implementation Plan includes an extensive list of control measures to reduce input of pollutants to the stream and improve the stream's ability to assimilate and recycle. It also discusses roles of residents and government agencies, potential sources of funding, and monitoring needs.

² ACRONYMS: ACOE = US Army Corps of Engineers, CCH = City/County of Honolulu, DLNR = Department of Land and Natural Resources, DOA = Department of Agriculture, DOH = Department of Health, HDOT = Hawaii Dept. of Transportation, KBAC = Kailua Bay Advisory Council, NRCS = Natural Resources Conservation Service, WOSWCD = Windward Oahu Soil and Water Conservation District.

Waimanalo Stream TMDL Implementation Plan

I. BACKGROUND

The purpose of this Implementation Plan is to supplement the report “Total Maximum Daily Loads Estimated for Waimanalo Stream, Island of Oahu, Hawaii” (report), prepared by Hawaii Department of Health. The report describes the reaches of Waimanalo stream where nutrients (nitrate and phosphate) and sediments (total suspended sediments) exceed the stream’s capacity for assimilation and recycling of pollutants. These reaches of the stream are said to be impaired by nutrients or sediments. The Total Maximum Daily Load (TMDL) is the maximum amount of pollutants, nutrients or sediments, that can enter Waimanalo Stream without violating the State’s water quality Standards, compiled in the Hawaii Administrative Rules, Chapter 11-54.

This Implementation Plan seeks to define projects to reduce the inputs of these pollutants to the stream and/or improve the stream’s ability to assimilate them. The goal of these projects is to restore the water quality and physical structure of the stream so that Waimanalo stream water complies with numerical and narrative State water quality standards.

Waimanalo Stream has many problems including poor water quality, lack of natural aquatic habitat, altered flow, and flooding. These problems are interrelated. True restoration of the stream to its full potential would involve improvements in each of these areas. An essential element of the solution is a “watershed” perspective that better integrates land and water management throughout the drainage basin of Waimanalo Stream. This is especially challenging because the watershed has many landowners and lessees, and interrelated authorities belong to separate departments of State government, e.g. water quality is regulated by Department of Health, water flows and state leased lands are regulated by Department of Land and Natural Resources. City and County of Honolulu are responsible for clearing and maintaining stream channels and reducing pollutants in urban runoff. Formation of a watershed management process, involving public and private stakeholders, is a recommended next step to integrate the needs and interests within a watershed perspective and oversee implementation projects in Waimanalo.

The restoration of Waimanalo Stream will, of course, be an incremental process that will take many years. Everyone who lives in Waimanalo Stream watershed or owns or leases land there has the potential to pollute or degrade the stream...or to contribute to improving the stream. Stakeholders include residents, landowners (e.g. homeowners, Dept. of Land and Natural Resources, Hawaiian Homelands, Dept. of Defense), lessees, businesses, farmers, schoolchildren, and government agencies. Therefore the solutions require widespread participation to be most effective.

There is incentive funding available through Department of Health’s Polluted Runoff Control Program to assist with the first and most important projects. Over time, it is expected that increased awareness and demonstration of management practices will result in more widespread use of measures to protect and restore the stream. As new information becomes available on water quality, sources of pollution, and effectiveness of controls, this will be considered in guiding new implementation measures.

II. WATER QUALITY PROBLEMS

The report identifies the sites in the stream where excess nutrients (nitrate and phosphate) and suspended sediments occur (Table 1). The largest concern for the TMDL is the need for substantial reduction in nitrate loads in the middle segments of the watersheds. All of the sites with excess pollutants are considered high priority for implementation of pollutant control measures and stream restoration. Refer to Figure 1. for a map of stations and segments.³

Table 1. Summary of pollutant reductions needed in 5 segments of the Waimanalo Stream Watershed. Watershed Segments are arranged from the upper watershed above and the makai (seaward) segments at the bottom. The size of the font indicates whether the required reductions are **large** or small.

UPPER KAHAWAI
WATERSHED

UPPER WAIMANALO
WATERSHED

Nitrate (rainy season)

Phosphorus

MIDDLE KAHAWAI
WATERSHED

MIDDLE WAIMANALO
WATERSHED

Nitrate

Nitrate

**Phosphorus (dry season high
flow)**

Phosphorus
Sediments (rainy season
at Ag Park, above station
7)

LOWER TRIBUTARY WATERSHED

Nitrate (dry season high flow)

³ TMDLs were calculated for the perennial freshwater portions of Waimanalo Stream, because this is the only portion of the stream named on Hawaii’s 1998 List of Impaired Waterbodies. The brackish portion of the stream that flows through Bellows Field was not studied in detail. Reducing pollutants in the perennial portion of Waimanalo stream should benefit water quality in the brackish stream and in Waimanalo Bay.

Although the report identified total suspended solids as a problem in only one segment of the watershed, erosion control measures are also a priority for implementation throughout the watershed for several reasons. Reports from long-term residents indicate a history of erosion, sediment runoff, and turbid stream water during large rain events in Waimanalo. There was unusually low rainfall during the TMDL study period. These dry conditions likely resulted in under reporting of erosion and total suspended solids when compared with more normal rainfall conditions. Excessive runoff and erosion occur under heavier or more prolonged rainfall when the ground is saturated. In addition, residents recently reported several deeply incised erosive areas below the 60 million gallon USDA reservoir that have likely contributed substantial sediments to the stream in the last few years.

Observations by researchers, who collected water samples for the TMDL study, provide some information on the sources of nutrients and sediments at some of the sites in the stream.

- Laws observed high nitrate concentrations that appeared in the stream between stations 18 and 16 on Kahawai and between stations 14 and 8 in Waimanalo stream. He suggested that high nitrate in groundwater seeps was the most likely cause. Groundwater nitrate is likely high in Waimanalo because of the large number of buildings that use cesspools and septic systems and from leaching of agricultural and residential fertilizers and animal waste through the soil.
- DOH observed kennels adjacent to the stream channel between stations 16 and 17. Disposal of dog waste in the stream could be a significant source of high nitrates at station 16.
- Ferentinos observed sediment erosion and transport along the roadside by station 7. The bare roadside is subject to erosion during rainstorms.

The TMDL addresses nutrients and sediments, which are only a portion of the observed problems in Waimanalo Stream watershed. Other problems that have been reported in Waimanalo Stream watershed, that may relate to the high nutrients and suspended sediments include:

- Trash in the stream
- Cesspools adjacent to the stream
- Stream channel choked with alien species of grasses
- Streambank erosion
- Illegal dumping/waste disposal
- Deeply incised channels mauka of sampling stations
- High counts of bacterial indicators
- High water temperatures in sections lined with concrete
- Surface runoff from land use adjacent to stream, including kennels, chicken farms, horses, nurseries, other fertilized agriculture.
- Phytoplankton blooms in Waimanalo Bay

III. CONTROL MEASURES:

The following is a list of control measures to reduce the input of nutrients and sediments to the stream, and improve the stream's ability to assimilate, recycle and transport pollutants. These controls were suggested by residents and agency staff (see Section VI). It is not an exhaustive list; there are other approaches that could also be beneficial.

A. Voluntary approaches and best management practices

- Best management practices for fertilizer use in nurseries, agriculture, taro, golf courses, and lawns, including
 - Slow release fertilizers
 - Compost and animal waste as alternatives to soluble inorganic fertilizers
 - Soil testing to identify specific nutrients needed and applying only the nutrient(s) that are in short supply.
 - Timing fertilizer application to avoid rainfall and runoff
 - Establishing vegetated buffers or retention ponds to intercept runoff before it reaches streams
- Animal waste management for chicken farms, kennels, horses and other animals, such as
 - Dry waste systems
 - Stockpile animal waste away from stream with a berm to prevent runoff
 - Fence stream banks to prevent animals from entering stream
 - Covered manure piles
 - Managed land application of animal waste with BMPs to avoid washing animal waste into stream
 - Divert runoff to prevent water from entering animal facility
 - More composting and export of animal waste to nurseries and agricultural fields
- Erosion control best management practices, including
 - Vegetated buffers along the stream to filter pollutants and prevent from reaching stream
 - Revegetating stream banks with plants that have extensive root systems to hold soil
 - Identifying eroding sections of stream banks and providing toe protection and/or bank protection (e.g. boulders, gabions, vegetative root structure)
 - Reducing erosion in deeply incised gullies above sampling stations
 - Crop residues
 - Low till or no till farming
 - Cover crops
 - Sediment retention basins
 - Timing crops to minimize bare soil exposure during rainy season
 - Erosion management for hiking and horse trails
 - Feral animal and invasive weed control in high elevation conservation land

- Treatment of urban storm water runoff to remove sediments and pollutants before it enters the stream
 - Education and awareness-building about household sources of pollution, safe disposal of household wastes, stream function and history.
 - BMPs to trap sediments at storm drain inlets or catch basins
 - Street sweeping
 - More trash cans in public places
 - Regular cleaning of catch basins
 - Provide convenient and economic disposal of hazardous materials
 - Design new flood control projects with pollutant removal components such as permeable bottoms, sediment retention basins, buffer strips
 - Design new developments with BMPs to minimize stormwater discharge
 - Minimize paved surfaces
 - Drain roofs, driveways etc to vegetated areas
 - Drain parking lots to vegetated areas and dry wells
 - Direct runoff to grassy swales to promote infiltration
 - Vegetated buffers along stream
- Management practices to reduce road/roadside runoff
 - Reduce erosion along roadsides by less use of herbicides, more planting and mowing
 - Add settling basins and catch basins along roadsides to trap road runoff before it reaches the stream
 - Identify areas of roadsides that generate sediment runoff, sites where mud puddles form, and use BMPs such as gravel, vegetation, grassy swales
 - Identify undersized culverts at road crossings replace with larger ones to improve flow, reduce debris clogging
- Best management practices for cesspools
 - Water conservation
 - Avoid use of garbage disposal and discard food waste in trash or compost
 - Use low phosphate detergents
- Upgrade cesspools near stream to septic systems or connect to collection system
- Restore stream channel to more natural structure and function
 - Clear alien grasses from channel
 - Plant trees to provide partial shade
 - Construct low flow channels, especially in sections with concrete
 - Enhance boulders, riffles, pools
 - Recut streambanks to make them less steep, more stable
 - Restore riparian vegetation to stabilize stream banks
 - Eliminate the practice of broadcast spraying herbicides along streambanks and in the stream to denude the banks of vegetation
 - Improve flood storage capacity
 - Remove built-up sediments within the stream channel
- Stream clean up efforts to remove trash and junk from stream bed and sides and to educate community
- Establish a “citizen’s watch” to prevent illegal dumping

- Restore wetlands for flood storage and water quality improvement
- Increase the quantity of water flowing in the stream
 - Fix leaks in irrigation system and direct saved water into stream
 - Remove water-consuming alien vegetation
 - Increase allocations for instream flows
 - Reuse treated wastewater for irrigation purposes and use “saved” water to increase stream flows
- Empower the Waimanalo Watershed Council as a community based advisory group to promote a watershed perspective, advise agencies, educate community, empower residents etc.
- Convert aging reservoirs to sediment retention basins
- Educate all government agencies in a watershed perspective and encourage BMP implementation through their existing responsibilities and programs.
- Establish Waimanalo “Jobs for the Environment” Program. Jobs may include clearing streams, planting and maintaining riparian areas, mowing roadsides, stream cleanups, etc.
- Improve capacity for using conservation plans as a recognized and effective mechanism for working with landowners and lessees to implement voluntary control measures to improve the stream.

IV. PRIORITIES FOR IMPLEMENTATION

There are many approaches that will help to restore the water quality and functions of Waimanalo Stream, as evidenced by the above list of recommended control measures. An effective implementation program would integrate many, or even all, of the recommended control measures. The appropriate solutions are very site-specific and depend on the local land use and geography. It is recommended that implementation projects be conducted in a coordinated fashion within a watershed management process involving cooperation among stakeholders from the community and agencies.

The highest priority for implementation are projects that (a) directly benefit the stream because of proximity to the stream, i.e. instream, riparian, or adjacent to stream, and/or (b) reduce pollutants of concern in segments of the watershed where the TMDLs are not currently being met (see Table 1).

The following activities are high priority for implementation:

- **Increase capacity of community to protect and enhance stream ecosystem.** Establish active watershed council of concerned residents to provide leadership and coordination. Educate residents on what they can do for homes and businesses to reduce water pollution. Establish “environmental job corps”, hold regular stream cleanups to remove trash, community watch for illegal dumping, etc.
Key Participants: Residents, Agencies, Elected Officials

- **Improve the stream’s ability to move water, filter pollutants, and support aquatic life**, especially in middle Waimanalo and Kahawai. This can be achieved by removing alien vegetation, reducing steepness of channel walls, stabilizing stream banks with native or noninvasive plants, establishing shade trees, increasing instream flows.
- **Key Participants: Residents, DLNR, NRCS, WOSWCD, KBAC, ACOE²**
- **Establish vegetated buffer strips** along the stream to filter pollutants and debris in runoff before it enters the stream channel.
- **Key Participants: Residents, NRCS, WOSWCD, DLNR, CCH**
- **Improve wastewater treatment.** Reduce the number of cesspools, especially adjacent to the stream. Educate residents about BMPs for cesspool/septic system use. Hook up homes to existing sewer lines where available. Upgrade wastewater treatment and capacity at Waimanalo Wastewater Treatment Plant.
- **Key Participants: Residents, DOH, CCH, DLNR**
- **Assure good agricultural management practices that minimize potential for fertilizer runoff and groundwater contamination**, especially for properties adjacent to the stream. Increase capacity of NRCS and Windward Oahu Soil and Water Conservation District to develop Conservation Plans and assist residents by additional training, staffing, and funding, soil testing.
- **Key Participants: Farmers, NRCS, WOSWCD, DOA, DLNR**
- **Assure good animal waste management practices that minimize potential for runoff and groundwater contamination.** Increase capacity of HACD to conduct audits, NRCS to develop Conservation Plans, and Windward Oahu Soil and Water Conservation District to review Conservation Plans and assist landowners and lessees.
- **Key Participants: Farmers, HACD, NRCS, WOSWCD, DOA, DLNR**
- **Reduce nutrients and sediments in urban runoff**, especially from roads and roadsides. Incorporate BMP requirements into stormwater permits of City/County of Honolulu and Hawaii Dept. of Transportation. Incorporate pollutant removal into design of drainage systems for new developments.
- **Key Participants: DOH, CCH, HDOT, Residents**
- **Develop methods for stabilizing the stream channel that maintain stream’s ability to filter pollutants and support aquatic life**, i.e. toe protection, vegetative cover, drop structures, armoring stream banks with materials that combine structure with vegetation, restore floodplain.
- **Key Participants: NRCS, WOSWCD**

In addition to the listed priorities, other efforts to improve land stewardship, improve stream habitat and function, implement pollution controls, prevent pollution, establish buffer strips etc. are valuable and will contribute, in an incremental way, to the restoration of the stream and implementation of the TMDL.

V. ROLE OF WAIMANALO RESIDENTS

Waimanalo residents are the force behind improving the stream. There are some actions in the list of priorities that government agencies are required to take. For example, City/County of Honolulu will be required to implement measures to reduce sediments and nutrients in urban runoff under their permit issued by DOH. But the majority of actions needed to restore the stream's water quality, habitat, flood control and aesthetics are optional. In most cases, landowners and lessees are not required to implement specific management practices. Cooperation is voluntary. The success of the TMDL implementation plan relies on the initiative and leadership of residents to bring people together, seek out technical assistance and funding. This Plan is the beginning of a process. It points residents in the direction of working together with agencies to improve the stream.

Polluted runoff, including the nutrient and sediment problems identified in the TMDL, has a myriad of sources. Everyone contributes to the problem...or the solution in the way we use and dispose of household and landscaping chemicals and automotive fluids, conserve or waste water, dispose of green waste, maintain residences and businesses, use garbage disposals, etc. A successful program requires broad participation. This will be challenging.

VI. GOVERNMENT ROLES AND MECHANISMS

1. NPDES Stormwater permits.

Department of Health (DOH) has issued Clean Water Act Section 402 stormwater permits to the following entities:

- o City and County of Honolulu
- o Hawaii Dept. of Transportation

Priority Action: When these permits are renewed, every 5 years, they must include provisions consistent with TMDLs for Waimanalo, e.g. BMPs to reduce nitrogen and sediment inputs to the stream in segments where the TMDLs are not currently met. These can include planting vegetation and mowing roadsides, street sweeping, cleaning catch basins and other BMPs. Priority should be given to the land areas adjacent to Middle Kahawai and Middle Waimanalo segments of the stream. These permit conditions are enforceable by DOH and EPA.

2. DLNR land leases

- Much land in Waimanalo is owned by the State and leased to users by DLNR for a term of 55 years. These leases are required to have a Conservation Plan, but the implementation of conservation plans is discretionary for the lessee.

Priority Action: Improve capacity for development and implementation of conservation plans.

- Violations of state law are also violations of the state land leases. When DOH or City and County of Honolulu reports a Notice of Violation for leased land, DLNR will require that the violation be addressed, or the lessee risks early termination of the lease.

3. Conservation plans

Conservation plans are an accepted mechanism to identify and implement, on a voluntary educational basis, land and water management practices that can protect and improve water quality in Waimanalo Stream. Natural Resources Conservation Service (NRCS) writes the plans and the Windward Oahu Soil and Water Conservation District (SWCD) approves them. Both provide technical assistance in planning and implementing conservation systems to reduce erosion, improve soil and water quality, improve and conserve wetlands, enhance fish and wildlife habitat, improve air quality, improve pasture and range condition, reduce flooding, and improve woodlands.

Examples of practices are given above for fertilizer and animal waste management, and erosion control. One of the most critical practices is the establishment of vegetated buffers or setbacks from the stream bank. These buffers help to trap sediments and remove nutrients in runoff.

Priority Action: Currently there is a backlog of leased properties in Waimanalo that lack Conservation Plans. The TMDL should be a guide to prioritizing the development of conservation plans in the most critical areas, i.e. land adjacent to Waimanalo Stream, and in the Middle Kahawai and Middle Waimanalo Watersheds. The TMDL also identifies the key pollutants (see section II) as a management focus for the conservation plans.

Priority Action: The TMDL is an additional workload for SWCD and NRCS and the availability of funding could be an incentive for increasing local capacity to develop and carry out conservation plans on a voluntary cooperative basis. Increased capacity could mean additional training, funding, and staffing. SWCD, NRCS, and the Farm Bureau are all resources that could play a role in outreach, education, training, and technical assistance to Waimanalo residents.

4. Wastewater improvements

- Department of Health's Hawaii Administrative Rules Chapter 1162 Section 06(l) define the criteria for wastewater treatment in Hawaii. New homes are required to have septic systems, or connect to municipal wastewater systems. A 50 ft setback is required from streams. Homes with a cesspool are required to upgrade to septic system whenever a bedroom is added to the house and (1) the cesspool is creating a nuisance or (2) records show the cesspool was pumped more than once in the preceding 12 months, or (3) if during initial construction, the cesspool intersected the groundwater.
- Existing plans call for improved wastewater treatment and increased treatment capacity of the Waimanalo Wastewater treatment plant. DLNR or City/County can acquire low interest loans from DOH's State Revolving Fund (SRF) to assist with the wastewater improvements and the expansion of the collection system.
- SRF funding can provide low interest loans for upgrading cesspools to septic system. Only government entities are eligible for these loans at this time. However, DOH is developing a "Link Deposit" system that will allow private entities to obtain loans in the near future.

Priority Action: Department of Health has the authority to conduct dye tests for the purpose of identifying cesspool overflows and determining if wastewater is being discharged to the stream. If dye released in a toilet later appears in the stream water, then there is a discharge of wastewater to the stream. DOH can then order the property to correct the problem. DOH should conduct an assessment of cesspools in Waimanalo to determine where they occur, educate homeowners on management practices for cesspools and options for improving wastewater treatment, and order upgrades where needed. Properties adjacent to the stream in the middle Kahawai, Middle Waimanalo and Lower Tributary portions are the highest priority for dye testing of cesspools. The assessment should develop a georeferenced database of wastewater systems in proximity to Waimanalo Stream.

Priority Action: DOH and EPA conduct compliance inspections at Waimanalo wastewater treatment plant to insure safe operations and maintenance.

5. Coastal Zone Act Reauthorization Amendments

Over the next 2 years *Hawaii's Coastal Nonpoint Pollution Control Program Management Plan* will begin to be implemented for agricultural and urban areas. During this period, the State is establishing enforceable policies for the management measures and conducting demonstration projects. The following management measures will be useful to implementing the Waimanalo TMDL:

- Agriculture:
 - a) Erosion and sediment control
 - b) Wastewater and runoff from confined animal facilities
 - c) Nutrients
 - d) Grazing
 - e) Irrigation water
- Urban
 - a) New development
 - b) Watershed protection
 - c) Site development
 - d) Construction site erosion and sediment control
 - e) Existing developments
 - f) New onsite disposal systems
 - g) Operating onsite disposal systems
 - h) Pollution prevention

Priority Action: Waimanalo should be considered as a high priority site for conducting demonstration projects that implement best management practices for the above list of management measures. Funding for these demonstration projects may be possible from DOH or Office of State Planning's CZM Program.

6. Animal Waste Management

HACD has identified the need for staff to work with livestock producers to encourage best management practices for animal waste management. The Hawaii legislature approved funding for new positions statewide.

Dept of Health's Wastewater Branch has authority to assess animal feeding operations and recommend management actions to protect water quality of the streams.

Priority Action: HACD and DOH work together to conduct assessments of livestock in Waimanalo watershed and recommend best management practices to reduce nitrate inputs to groundwater and streams. Apply funding incentives (NRCS, DOH) and assistance (DOH, NRCS, WOSWCD) to implement management practices at livestock facilities.

VII. FUNDING NEEDS AND OPPORTUNITIES.

1. Funding Needs.

- Design and implementation of stream restoration projects and pollutant controls
- Wastewater treatment improvements
- Education and outreach for residents, SWCD, agencies, Watershed Council, etc.
- Increased capacity for NRCS and SWCD to provide technical assistance
- Monitoring to better identify nutrient sources and measure stream improvement over time
- Community organization

2. Funding Opportunities

A. Department of Health

- Polluted Runoff Control Program grants under Section 319(h) of the Clean Water Act. Financial assistance to state and county agencies, or local nonprofit groups, to implement control of a nonpoint source pollutant, develop an innovative practice for polluted runoff control, or promote public awareness. TMDL implementation is a priority for funding. All grants require 100% match. Contact: Denis Lau 586-4309.
- Unified Watershed Assessment Grants. Similar to 319 grants, but available to 5 specific priority watersheds, including Koolaupoko, Oahu. To guide funding of implementation projects, this program requires a coordinated resource management plan such as a watershed plan, Watershed Restoration Action Strategy, or TMDL. Contact: Denis Lau 586-4309.
- The Clean Water Act State Revolving Fund provides low interest (below market rate) loans to carry out nonpoint source control work. Currently only state and county government agencies are eligible for these loans, but it is likely that individuals and landowners will be eligible in the future. Contact: Dennis Tulang 586-4294.

B. Natural Resources Conservation Service (www.nrcs.usda.gov) provides technical and financial assistance through a variety of programs.

Contact: Michael Bajinting 483-8600 x 101.

- Wildlife Habitat Incentives Program (WHIP) offers technical assistance and cost-share payments to landowners who want to develop and improve wildlife habitat on private lands.
- Wetlands Reserve Program (WRP) offers funding to landowners to voluntarily restore and protect wetlands on private property.

- Watershed Surveys and Planning. The purpose of the PL 566 program is to assist Federal, State, and local agencies to protect watersheds from damage caused by erosion, floodwater, and sediment and to conserve and develop water and land resources. Resource concerns addressed by the program include water quality, opportunities for water conservation, wetland and water storage capacity, agricultural drought problems, rural development, municipal and industrial water needs, upstream flood damages, and water needs for fish, wildlife, and forest-based industries. Types of surveys and plans include watershed plans, river basin surveys and studies, flood hazard analyses, and flood plain management assistance. The focus of these plans is to identify solutions that use land treatment and nonstructural measures to solve resource problems.
- The Environmental Quality Incentives Program (EQIP) provides technical, educational and financial assistance to eligible farmers and ranchers to address soil water, and related natural resource concerns on their land in an environmentally beneficial and cost-effective manner. Five to ten year contracts are made with eligible producers. Cost-share payments may be made to implement one or more eligible structural or vegetative practices, such as animal waste management facilities, terraces, filter strips, tree planting, and permanent wildlife habitat. Incentive payments can be made to implement one or more land management practices, such as nutrient management, pest management, and grazing land management. Funding will be targeted at natural resource concerns relating to livestock production.

C. US Environmental Protection Agency (www.epa.gov)

- Environmental Education Grants provide financial support for projects which design, demonstrate, or disseminate environmental education practices, methods or techniques. Local or state education agencies, colleges and universities, nonprofit organizations, state agencies, and non-commercial educational broadcasting agencies are eligible to apply. Contact: Stacey Benfer (415) 744-1161.
- Environmental Justice through Pollution Prevention grants empower low income, minority communities through education on environmental issues and providing pollution prevention resources for addressing these issues. Nonprofit organizations and state/local agencies can apply. Contact: Eileen Sheehan (415) 744-2190.

D. Kailua Bay Advisory Council (KBAC)

- KBAC is a private organization funded by a settlement agreement resulting from a lawsuit against City and County of Honolulu. KBAC will fund projects to improve the water quality of the Koolaupoko area. They are planning to issue Requests for Proposals in summer 2001 under the categories: restoration, education, vegetation of road cuts, and more. For more information contact Maile Bay at 225-9210.

VIII. PUBLIC OUTREACH FOR DEVELOPMENT OF WAIMANALO TMDL IMPLEMENTATION PLAN

| WHO | DATE | TYPE |
|---|------------------------------------|--------------------|
| Waimanalo Watershed Council | December 11, 2000 | Public meeting |
| Lisa Ferentinos, Nancy Glover | January 26, 2001 | Meeting |
| Waimanalo Neighborhood Board | February 12, 2001 | Meeting |
| Informational Meeting for Waimanalo Community on TMDL | February 13, 2001 | Meeting |
| Maile Bay, Kailua Bay Advisory Committee | February 14, 2001 March 8, 2001 | Meeting Meeting |
| Clifford Migata, Floyd McCoy, Dave Krupp, Joe Ryan, Carroll Cox | February 25, 2001 | Meeting |
| Hawaii Farm Bureau Environmental Stewardship Committee | March 14, 2001 | Meeting |
| Waimanalo Ag Assn | March 15, 2001 | Meeting |
| Pat Costales, DLNR DOFAW | March 22, 2001 | Phone |
| Charlene Unoki, DLNR Land Management | April 5, 2001 | Phone |
| Kathleen Dobler, NRCS | April 9, 2001 | Meeting |
| Valerie Mendez, West Oahu Soil and Water Conservation District | April 16, 2001 | Phone |
| Mike Tulang, Hawaii Association of Conservation Districts | May 3, 2001 | Phone |
| David Higa, DLNR Water Commission | | |

IX. MONITORING

Although no specific follow-up monitoring is planned at this time, there are several monitoring needs that have been identified. These include:

- Monitoring to assess water quality improvements as TMDL implementation projects proceed and determine the need for additional controls
- Improved understanding of pollutant sources and relative contributions of cesspools, animal waste, fertilizer, and urban sources to nutrient problems
- Improved understanding of groundwater hydrology and nutrient inputs to groundwater.
- Measuring effectiveness of BMPs and vegetative cover on stream banks

X. SCHEDULE FOR IMPLEMENTATION

- 2001-02 Agencies establish TMDL implementation as a priority for funding:
- DOH: 319 (h), State Revolving Fund
 - NRCS: Wildlife Habitat Incentives Program, Wetlands Reserve Program, Environmental Quality Incentives Program, Watershed Surveys and Planning
 - EPA: Environmental Education Grants

Department of Health's Polluted Runoff Control Program and KBAC issue Requests for Proposals. Projects that support the implementation of the Waimanalo TMDL apply for funding and explore the potential for cost sharing between these two sources.

NRCS and Windward Oahu Soil and Water Conservation District develop plan for improving capacity for developing and implementing conservation plans.

Highest priority Conservation plans are developed by NRCS and approved by SWCD

DOH develops a "Link Deposit" system that allows private entities to obtain SRF loans for septic systems, sewer hookups, and BMPs for pollutant control.

DOH completes assessments of cesspools adjacent to the stream in priority segments.

DOH and EPA conduct compliance inspections at Waimanalo wastewater treatment plant.

Department of Health defines and applies enforceable authorities for polluted runoff control

DLNR and Department of Health begin process of integrating flood control and water quality protection for Waimanalo Stream

Waimanalo Watershed Council improves capacity to serve as a community based advisory group to promote a watershed perspective, advise agencies, educate residents, etc.

Fencing begins in upper watershed to protect the native forest and exclude feral ungulates

Insure implementation of CZARA Management Measures for Agriculture and Urban Lands

2003-04 First set of TMDL implementation projects (i.e. stream restoration, BMPs) funded by 319(h) are completed.

NPDES Stormwater permits are revised to include elements supportive of the TMDL for Waimanalo Stream

Conservation plans for Waimanalo completed with no backlog

Wastewater treatment improvements are completed and increased treatment capacity is available

Proposals are solicited by DOH for further implementation of Koolaupoko WRAS, including Waimanalo TMDL

Monitoring is conducted to determine if further improvements are needed to restore Waimanalo Stream.