2006 STATE OF HAWAII WATER QUALITY MONITORING AND ASSESSMENT REPORT:

Integrated Report To The U.S. Environmental Protection Agency and The U.S. Congress
Pursuant To Sections §303(D) and §305(B), Clean Water Act (P.L. 97-117)

Chapter III
Groundwater

Hawaii State Department of Health
Safe Drinking Water Branch

January 14, 2008

Executive Summary

The Clean Water Act (CWA) requires states to report on the status of their groundwater resources to Congress every two years in the biennial CWA 305(b) report. This 305 (b) Report presents aquifer specific assessments for groundwater resources in the State of Hawai`i for 2004 and 2005.

This Report shows that groundwater contamination continues to occur in Hawai`i. In most cases, once a groundwater source has been contaminated, it remains contaminated for many years. Groundwater can become contaminated through natural processes, but anthropogenic, or human-induced, contamination poses more serious problems. Contaminants may come from herbicides, pesticides, industrial solvents, and other sources that are applied, spilled, or leaked into the ground. Groundwater contamination is a significant concern because nearly all of Hawai`i's drinking water comes from groundwater sources.

The overall quality of Hawai`i's groundwater is generally considered excellent. The chemical contaminant concentrations that have been detected in public groundwater/drinking water sources are generally below state and federal drinking water standards. The percentage of Hawai`i's population served by drinking water in compliance with State and Federal microbial and chemical standards called maximum contaminant levels (MCLs) was 99.1% in 2005.

See attached Hawai`i State Department of Health Indicators of Environmental Quality for drinking water.

Percentage of Hawai`i's Population Served Drinking Water in Compliance with State and Federal Microbiological and Chemical Maximum Contaminant Levels

Explanation: Drinking water microbiological or chemical standards are called Maximum Contaminant Levels (MCLs). Water that exceeds MCLs is believed to be harmful to human health. In 2005, 99.1% of Hawaii's residents and visitors were served drinking water that met all of the MCLs all year long. Population figures are derived by summing the populations each public water system reports.

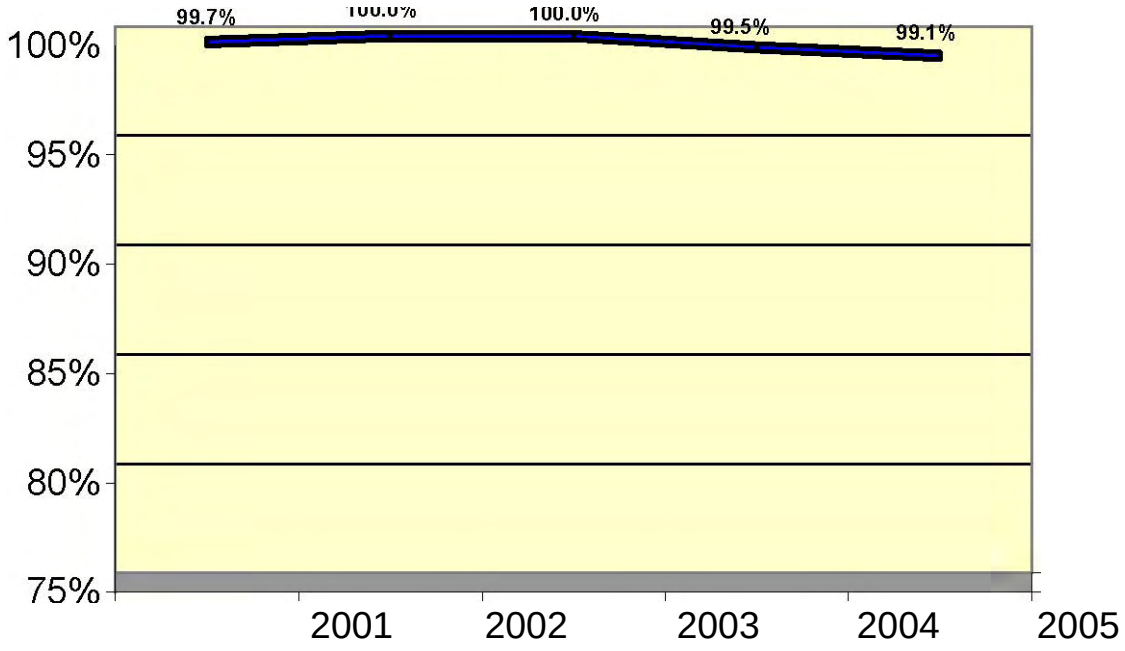
There were a small number of persons (12,217) in six water systems who were served water not in compliance with MCLs for part of the reporting year. This equals a non-compliance rate of 0.91% over Hawaii's population of 1,341,727 people.

Implications: The compliance rate has consistently exceeded 99.0% over the last five years. Whenever a violation is found, the public is notified through electronic media, hand-delivered notices, or published notices.

Data Quality: High (± 5-10% confidence). Source: Ann Zane (SDWB) Data are required by the EPA

FFY	Total Population Served Drinking Water	Population Served Water Below MCLs	Percentage Population Served Water in Compliance with MCLs
2001	1,289,360	1,285,821	99.7%
2002	1,300,251	1,300,251	100.0%
2003	1,300,715	1,300,682	100.0%
2004	1,341,572	1,334,645	99.5%
2005	1,341,727	1,329,510	99.1%

Percentage of Hawai`i's Population Served Drinking Water in Compliance with Maximum Contaminant Levels



Groundwater Assessment

Section 106(e) of the Clean Water Act (CWA) requires State reporting on the status of their groundwater resources to Congress every two years in the biennial CWA 305(b) report. For the 2000 report and subsequent editions, EPA has required aquifer specific assessments for groundwater resources.

Hawai`i's Aquifer assessments are based on John F. Mink and L. Stephen Lau's Aquifer Classification System that identifies and describes groundwater resources throughout the State of Hawai`i based on a hierarchy of descriptors that includes: **Island, AquiferSectors** (large regions with similar hydrogeologic characteristics), **Aquifer Systems**(areas with hydrogeologic continuity, i.e. hydraulic connections among units), and **Aquifer Types** (distinctive hydrologic and geologic features).

Hawai`i's Aquifer assessments are based on Aquifer Systems of the four major populated Hawaiian Islands: Hawai`i, Kaua`i, Maui, and O`ahu. The islands of Moloka`i and Lana`i were not included in this assessment because chemical contaminants have not been detected in the drinking water wells on these two islands. The island of Ni`ihau, privately owned, is also not included in this assessment. The island of Kaho`olawe is transiently visited for restoration purposes and was not considered in this report.

The Groundwater Protection Program (GWPP) in the Department of Health's Safe Drinking Water Branch (SDWB) is responsible for preparing the state's groundwater assessments in this section of the 2006 CWA 305(b) Report for 2004 and 2005.

Hawai`i's groundwater assessments are organized as follows:

Part 1: Major Sources of Existing and Potential Groundwater Contamination

Methodology of Reporting

Table 3-1: Major Sources of Existing and Potential Groundwater Contamination

Part 2: Summary of State Groundwater Protection Programs

Table 3-2: Hawai`i Groundwater Protection Programs

Summary of State Programs and Activities

Table: 3-2.1: Characteristics of Aquifers in Hawai`i

Part 3: Groundwater Contamination Summary

Methodology of Reporting

Table 3-3: Groundwater Contamination Summary

Maps: NPL, CERCLIS, DOD, State Sites

Maps: 2004-2005 LUST Sites Maps: 2005 Underground Injection Control (UIC) Wells

Part 4: Aquifer Monitoring Data

Methodology of Reporting

Table 3-4: Aquifer Monitoring Data

Maps: 2004 Groundwater Contamination Maps

Maps: 2004 Nitrates

Maps: 2005 Nitrates

Part 1: Major Sources of Existing and Potential Groundwater Contamination

Methodology of Reporting

The findings included in Table 3-1 are mostly representative of data obtained from the2004 Department of Health, Safe Drinking Water Branch, Groundwater Contamination Maps.

The true origins of many of the contaminants were not known for reporting purposes. In some cases the reporting was based upon the best-educated-guess method. For example, it may have been shown from the reporting that VOC's were present in the water supply. Based upon the knowledge that was known about the surrounding geography, and from the types of contaminants detected, the contaminant source would be listed as a possible leaking underground storage tank, or a product spill. In other cases, the origin of the detected contaminant source was more evident. This was especially true with respect to land areas under pineapple and sugar cane cultivation, where pesticide and herbicide-related contaminants have been detected.

In cases where insufficient information inhibits determining the true origins of detected contaminants, ongoing and future source water assessments are expected to make future reporting more accurate and complete.

Table 3-1 lists the factors considered in selecting a contamination source. The letters in the table correspond to the following list:

A. Human health and/or environmental risk (toxicity)
B. Size of the population at risk
C. Location of the sources relative to drinking water sources
D. Number and/or size of contaminant sources
E. Hydrologic sensitivity
F. State findings, other findings
G. Documented from mandatory reporting
H. Geographic distribution/occurrence
I. Other criteria

The letters corresponding to the contaminants were selected from the following list:

a. Inorganic pesticides
b. Organic pesticides
c. Halogenated solvents
d. Petroleum compounds
e. Nitrate
f. Fluoride
g. Salinity
h. Metals
i. Radio nuclides
j. Bacteria
k. Protozoa
l. Viruses
m. Other

Table 3-1. Major Sources of Existing and Potential Groundwater Contamination

Contamination Source	Twelve Highest-Priority Sources	Factors Considered in Selecting a Contaminant Source	Contaminants
Agricultural chemical facilities			
Animal feed lots			
Drainage wells			
Fertilizer applications	T	A, D, G, H	e
Pesticide applications	T	A, D, G, H	a, b
On-farm agricultural mixing and loading procedures	T	D, G, H	a, b, d
Storage and Treatment Activities			
Land application (regulated or permitted)			
Material stockpiles			
Storage tanks (above ground)			
Storage tanks (underground)	T	A, D, G, H	c, d, h
Surface impoundments			
Waste piles	T	A, D, G, H	h
Waste tailings			
Disposal Activities			
Deep injection wells			
Landfills	T	A, D, G, H	b, c, d
Septic systems/ Cesspools	T	A, D, H	e, j, k, l, m
Shallow injection wells	T	A, D, H	c, d, h, m
Other			
Hazardous waste generators	T	A, G, H	c, e, h
Hazardous waste sites			
Large industrial facilities			
Material transfer operations			
Mining and mine drainage			
Pipelines and sewer lines	T	A, G	e, d, h, j
Salt storage and road icing			
Salt water intrusion			
Spills	T	A, G	b, c, d, h
Transportation of materials			
Urban runoff			
Small-scale manufacturing and repair shops	T	A, B, D, G , H	c, d, h

Note: Groundwater is the primary source of Hawai`i's drinking water. Consequently, human health is a major factor for each of the major contaminant sources.

Part 2: Summary of State Groundwater Protection Programs Table 3-2.

Programs or Activities	(T)	Implementation Status	Responsible State Agency
Active SARA Title III Program	T	fully established	DOH-HEER
Ambient groundwater monitoring system	T	under development	DOH-SDWB
Aquifer vulnerability assessment	T	fully established	DOH-SDWB/ DLNR-CWRM
Aquifer mapping	T	fully established	DOH-SDWB/ DLNR-CWRM
Aquifer characterization	T	fully established	DOH-SDWB/ DLNR-CWRM
Comprehensive data management system	T	under development	DOH-EPO
Comprehensive State Groundwater Protection Program	T	under review by EPA	DOH-SDWB
Ground water discharge permits		not applicable	
Groundwater Best Management Practices	T	under development	DOH-SDWB, CWB
Groundwater legislation	T	continuing efforts	DOH/DLNR
Groundwater classification	T	continuing efforts	DOH-SDWB/ DLNR-CWRM
Groundwater quality standards		not applicable	
Interagency coordination for groundwater protection initiatives	T	continuing efforts	DOH/DLNR/DO A
Nonpoint source controls	T	continuing efforts	DOH-CWB
Pesticide State Management Plan	T	continuing efforts	DOA-PB
Pollution Prevention Program	T	continuing efforts	DOH-OSWM, CWB, EPO
Resource Conservation and Recovery Act (RCRA)	T	continuing efforts	DOH-SHWB
Source Water Assessment Program	T	fully established	DOH-SDWB
State Superfund	T	fully established	DOH-HEER
State RCRA Program more stringent than RCRA Primacy	T	fully established	DOH-SHWB
State septic system regulations	T	fully established	DOH-WWB
Underground Storage Tank installation requirements	T	fully established	DOH-SHWB
Underground Storage Tank Remediation Fund	T	fully established	DOH-SHWB
Underground Storage Tank Permit Program	T	fully established	DOH-SHWB
Underground Injection Control Program	T	fully established	DOH-SDWB
Vulnerability assessment for drinking water/wellhead protection	T	incorporated into Source Water Assessment Program	DOH-SDWB
Well abandonment regulations	T	fully established	DOH-SDWB/ DLNR-CWRM
Wellhead Protection Program (EPA-approved)	T	continuing efforts	DOH-SDWB
Well installation regulations	T	fully established	DLNR-CWRM

List of Acronyms

DOH		Department of Health
	CWB	Clean Water Branch
	EPO	Environmental Planning Office
	HEER	Hazard Evaluation and Emergency Response
	SARA	Superfund Amendments and Reauthorization Act
	OSWM	Office of Solid Waste Management
	SDWB	Safe Drinking Water Branch
	SHWB	Solid and Hazardous Waste Branch
	WWB	Wastewater Branch
DLNR		Department of Land and Natural Resources
	CWRM	Commission on Water Resource Management
DOA		Department of Agriculture
	PB	Pesticides Branch

Summary of State Programs and Activities

Active Superfund Amendments and Reauthorization Act (SARA) Title III Program:
This program is administered by the State Department of Health Hazard Evaluation and Emergency Response (HEER) program. The Title III program is the Emergency Planning and Community Right to Know Act. The main provisions of the act include planning for chemical emergencies, emergency notification of chemical accidents and releases, reporting of hazardous chemical inventories, and reporting of toxic chemical release.

As part of planning for chemical emergencies the governor of the State appoints a State Emergency Response Commission (SERC), which in turn is divided into Local Emergency Planning Committees (LERC). The LERC formulate local emergency plans to respond to chemical emergencies in the local areas and provide guidelines for hazardous chemical occurrences such as spills and reporting.

Ambient Ground Water Monitoring System: The groundwater monitoring system is not an ongoing State program. Some activities such as the construction of golf courses, underground storage tanks and remediation of leaking underground storage tanks require groundwater monitoring. The State Water Commission requires some groundwater monitoring in the construction of wells to determine water levels and chloride concentration in the groundwater.

Some golf courses have installed lysimeters to monitor soil water conditions and chemical infiltration. A groundwater monitoring plan in conjunction with a best management practices plan for golf courses is recommended to golf courses; however, there commendations are voluntary. The intent of this initiative is to educate golf courses to efficiently manage water resources, and to prevent pesticide and herbicide infiltration into soils and groundwater.

Aquifer Vulnerability Assessment, Aquifer Mapping, and Aquifer Characterization:
The assessments, mapping, and aquifer classifications for the islands of Hawai`i, Kaua`i, Lana`i Maui, Moloka`i, and O`ahu were completed from 1990 to 1993. These reports were the result of a contract between the Department of Health (DOH), and the Water Resources Research Center (WRRC) of the University of Hawai`i.

The WRRC identified general aquifer sectors and smaller aquifer systems for the islands. Each aquifer system was divided into aquifer types that were characterized with hydrologic factors such as basal, high level, unconfined, confined, and confined/unconfined conditions, and geologic factors such as flank, dike, perched, sedimentary, or combination aquifer types. WRRC also identified the status of the aquifer types through identification of their development stages, potability/salinity, utility, uniqueness, and vulnerability to contamination. The vulnerability determination applied in this study was based upon geographical limits of the resource, interconnection among groundwater sources, relatively rapid time of groundwater travel, and familiarity with environmental conditions. Vulnerability was ranked as high, moderate, or low. Refer to Table 3-2.1 for a summary of aquifer identification and classification.

The aquifer study described that aquifer types have varying levels of vulnerability to contamination. Aquifers contained or confined by caprock are less prone to contamination than unconfined aquifers which are typically highly vulnerable to contamination. Table 3-2.1 shows the amount of aquifer units and subunits and represents the unconfined aquifer and vulnerability.

The WRRC studies have provided a comprehensive profile of the location, composition, characteristics, and vulnerability of Hawai`i's aquifers.

Table 3-2.1 Characteristics of Aquifers in Hawai`i

Island	Number of Aquifer Sectors	Number of Aquifer Systems	Number of Aquifer Types	Number and % of Unconfined Aquifers	Number and % of Aquifers Highly Vulnerable to Contamination
Kaua`i	3	13	11	100 83%	120 65%
O`ahu	6	24	8	66 73%	90 73%
Molo ka`i	4	16	5	60 100%	60 98%
Lana`i	4	9	3	22 100%	22 100%
Maui	6	25	6	207 97%	213 81%
Hawai`i	9	24	6	82 100%	82 84%

Comprehensive Data Management System: The State Department of Health (DOH)has been working toward the development and implementation of a comprehensive data management program and is participating in EPA's One Stop Program. DOH's One StopProgram will establish a pilot project that will implement a permitting database for the Clean Air Branch (CAB) and the Clean Water Branch (CWB) initially and create a master facility ID that will be used and shared by all branches. DOH has hired an Environmental Information Manager to oversee the DOH's One Stop Program and is searching for consultant services to create or provide a web-based, user interface for DOH's environmental programs.

It will take some time for DOH and its yet-to-be-selected consultant to create, implement, test and make available a computerized data management system for all branches in DOH's Environmental Management Division. However, it is anticipated that a computerized data management system for DOH's Environmental Management Division will provide locational, technical, monitoring, remediation and other information on accidents, spills, releases and contaminants that can affect groundwater quality and assist the GWPP in monitoring, assessing and reporting groundwater quality.

Comprehensive State Groundwater Protection Program (CSGWPP): Hawai`i's Comprehensive State Groundwater Protection Program Plan is being finalized and will be submitted to the EPA for review and approval in 2006. The Program integrates Hawai`i's Groundwater Protection Strategy with EPA's Comprehensive State Groundwater Protection Program guidance and should guide all relevant State groundwater protection programs.

Ground Water Best Management Practices: The GWPP has developed Best Management Practices (BMPs) for golf courses and includes sections on:

1 Site Selection, Design and Construction
2 Water Usage
3 Operations and Maintenance
4 Integrated Pest Management (IPM)
5 Surface and Groundwater Protection
6 Monitoring Program

The golf course BMPs are intended to accompany the Department of Health's Guidelines to Golf Courses in Hawai`i, July 2002, and can educate golf course developers and operators and the general public about potential impacts that golf course planning, development, operations and maintenance can have on the environment and on groundwater quality.

Maui County has developed BMPs for all construction projects to control erosion and sedimentation. These BMPs were adopted by the Maui County Council and incorporated into the revised grading ordinance. Maui County has also developed BMPs for homes, apartments and condominiums, landscaping, private wells and septic tanks.

Ground Water Discharge Permits: See Underground Injection Control Program.

Ground Water Classification: See Aquifer Vulnerability Assessment.

Ground Water Quality Standards: Ground water quality standards for the State have not been developed at this time. Source Water Assessment and Wellhead Protection Programs may indicate that groundwater quality standards need to be developed in the future.

Interagency Coordination for Ground Water Protection Initiatives: Interagency coordination for groundwater protection continues to be an ongoing activity in relevant programs related to groundwater protection. Where appropriate, groundwater protection is advocated via controls, policies, or recommendations.

Large Capacity Cesspool (LCC) Ban: The EPA promulgated Underground Injection Control (UIC) regulations on December 7, 1999, which prohibit the construction of new large-capacity cesspools, effective April 2000. In addition, all existing large capacity cesspools must be closed or upgraded by April 5, 2005, to prevent contamination of current and potential underground sources of drinking water.

EPA staff has been working with the DOH Safe Drinking Water and Waste Water Branches and other government agencies to inform the public of the large capacity cesspool ban, identify the owners and location of large capacity cesspools, conduct outreach programs through various media, and assist owners with selecting alternative waste treatment systems.

Nonpoint Source Pollution Program: The Polluted Runoff Control Program, Nonpoint Source Program, is administered by the DOH Clean Water Branch and provides grants to parties to reduce and prevent polluted runoff. The program funded 12 multi-year projects totaling approximately $1 million in 2004 and 9 multi-year projects totaling approximately $1.7 million in 2005.

Pesticide State Management Plan: The State Department of Agriculture (DOA), Pesticides Branch, prepared and submitted a State Pesticide Management Plan restricting the use of Atrazine and its substitutes to the EPA for review and approval. DOA is waiting for EPA to promulgate final rules on pesticides.

In the past, groundwater contamination was been detected from the label use of pesticides as well as from accidental spills. The DOA Pesticides Branch has take measures to reduce/prevent groundwater contamination from label use pesticides by screening pesticides that will be used over large areas and identifying pesticides with high leaching potential on O`ahu. This is important when pesticides are used in areas directly located over potable aquifers with shallow water tables. If a chemical shows high leaching potential from preliminary screening evaluation, secondary reviews of the chemical are conducted using in-depth analysis of the soil and pesticide properties and a computer model of leaching using the attenuation factor (AF) approach of Rao el. al. (1985). The model employs a geographic information system (GIS) to incorporate soil hydrologic information such as depth to water, recharge rate, field capacity water content, bulk density, porosity, and soil organic carbon. A pesticide property database is used concurrently with the GIS-based soil properties database to predict the AF. DOA, Pesticides Branch uses this model as a tool to screen pesticides prior to its licensing in Hawai`i. The model also allows the mapping of pesticide use in relationship to

groundwater wells and surface water sources.

DOH completed its contract with the University of Hawai`i (UH) Water Resources Research Center (WRRC) to improve the soil hydrologic database and the pesticides properties database, and updated and compared DOA's pesticides model with the EPA's model for registering new pesticides. It was determined that neither of the EPA's screening models (SC.-GROW nor PETE) offered any distinct advantages over Hawai`i's screening model (CLEARS).

Pollution Prevention Program: The Pollution Prevention Program (P2) is administered by the Office of Solid Waste Management of the DOH. The P2 program has as its goal the prevention of waste generation by changing business processes which generate wastestreams to minimize or eliminate waste generation.

The program is not regularly involved in groundwater protection activities; however, through the minimization of waste, groundwater is less vulnerable to contaminants coming from waste generation and disposal practices.

Resource Conservation and Recovery Act (RCRA) Primacy: The main focus of the RCRA is to regulate solid and hazardous wastes and underground storage tanks (UST).The DOH Solid and Hazardous Waste Branch administers regulations related to solidwaste disposal and engineering requirements for landfill construction to ensure that landfill leachates do not percolate into the soil and groundwater. UST regulations assure that UST's are constructed properly, are non-corrosive, and have leak detection capability. These measures help ensure that contaminants do not leach into the surrounding soils and groundwater.

Source Water Assessment Program (SWAP): The DOH Safe Drinking Water Branch contracted with the University of Hawai`i's Water Resources Research Center (WRRC)to conduct assessments of the state's 450-plus drinking water sources. The WRRC team used MODFLOW, a three-dimensional groundwater flow model, to examine the sources' capture area based on the hydrogeology and the rate and pattern of withdrawal at each source. The Source Water Assessment and Protection Areas (SWAPAs) include three zones: 1) a well site control zone with a 50-meter diameter around each well site where all types of contaminating activities are excluded; 2) a two-year travel time zone for microbiological contaminants; and 3) a ten-year travel time zone for chemical contaminants that are expected to remain in the environment.

Once SWAPAs were established, WRRC identified potentially contaminating activities(PCAs) within each zones. Each PCA was assigned a numeric score depending on the seriousness of the threat it posed, and each source was assigned a score based on the cumulative scores of the PCAs identified within that source's SWAPA. The DOH SDWB completed assessments of the state drinking water sources and distributed sourcewater assessment reports to each water utility to assist them in their source water protection efforts.

State Superfund: Superfund is the Federal government's program to clean up the nation's hazardous waste sites. Under the Superfund program, hazardous waste that pose a current or future threat to human health or the environment are cleaned up. The EPA works closely with communities, Potentially Responsible Parties (PRPs), contractors, state, local and Federal authorities to identify hazardous waste sites, test the conditions of the sites, formulate cleanup plans, and cleanup the sites.

State Resource Conservation and Recovery Act (RCRA) Program: The State RCRA program and requirements are similar to the federal RCRA program requirements.

State Septic System Regulations: The State Septic System Regulations program is administered by the DOH Wastewater Branch (WWB). The program reviews and approves plans for the construction of septic systems. The program oversees final inspections by engineers, responds to complaints, and conducts enforcement actions.

In 2004, the WWB approved plans for 2,578 new individual wastewater treatment systems (IWS), which include septic systems, aerobic units and cesspools in the state and 3,969 IWS in 2005.

Underground Injection Control Program: This program is administered by the DOH Safe Drinking Water Branch, Underground Injection Control Program. The UIC Program regulates underground injection well activity throughout the state by using permitting, construction review, inspections and compliance measures.

The UIC Program issued 63 permits for injection wells in 2004 and 44 permits in 2005.The UIC program reported 16 injection well closures in 2004 and 31 injection well closures in 2005. Well closures include industrial and sewage injection wells, and surface drainage wells. The closure of injection wells reduces the number of wells that can contribute to groundwater contamination.

Underground Storage Tank Permit Program: The Underground Storage Tank Permit Program is administered by the DOH Solid and Hazardous Waste Branch. As of January2000, all new tanks going into the ground must include information on the type of tank, location, diagrams of the tank system, and ownership. Three new underground storage tanks were installed in 2004 and three 2005.

Underground Storage Tank Remediation Fund: The Underground Storage Tank Remediation Fund is a trust fund established to finance the cleanup of contaminated sites as a result of underground storage tank leakages.

Voluntary Response Program (VRP) Site List: The Voluntary Response Program(VRP) allows property owners and prospective purchasers to undertake a voluntary remedial action under the oversight of the Department of Health. At the completion of the response action, the DOH issues a Letter of Completion that exempts prospective purchasers and future owner/tenants form liability related to the contaminants addressed in the voluntary action. The applicant pays the DOH oversight fees as part of the review and approval of the voluntary actions. Five sites have completed contamination cleanups under the VRP. There are currently 14 projects conducting cleanups of contamination under the VRP.

Vulnerability Assessment for Drinking Water/Wellhead Protection: See Source Water Assessment.

Well Abandonment Regulations: Well abandonment regulations are set forth by theState Department of Land and Natural Resources (DLNR), Commission on WaterResources Management (CWRM). The regulations provide minimum standards in the technical aspects of the abandonment of wells, ensure safe and sanitary closures of wells, and give priority to environmental safety, groundwater contamination, and public safety considerations.

Wellhead Protection Program (EPA-approved): The Hawai`i Wellhead Protection Program's (WHPP) goal is to protect groundwater resources that supply drinking water to public water systems from contamination. The WHPP is a long term, on-going, protection program based on the SWAP and will protect wellhead areas from contamination by identifying management areas around wells or well fields; identifying potential sources of groundwater contamination within the area; and working with and educating public water systems and the general public about to managing current and potential future contamination.

The WHPP complements existing regulatory programs and actions and encourages partnerships of stakeholders to develop practical and implementable source water protection measures. DOH has developed a financial assistance program for the WHPP and will make funding for Wellhead/Source Water Protection planning available to county and private water purveyors and county planning agencies as well as futurefunding to implement wellhead protection projects and plans.

Well Installation Regulations: Well installation regulations are set forth by the State Department of Land and Natural Resources (DLNR), Commission on Water Resources Management (CWRM). These standards are considered to be minimum standards for the construction of wells, pumps and pumping equipment, and to ensure safe and sanitary maintenance and operation of wells, the prevention of waste and the prevention of contamination of groundwater aquifers. The Hawai`i Well Construction and Pump Installation Standards

were revised in February 2004 and contain guidelines for optimizing and protecting groundwater resources.

Other Programs or Activities: The following list represents other agencies that are directly and indirectly involved in groundwater protection efforts. These agencies regulate the uses of land and promote safe and healthy environmental practices.

National Resource Conservation Service (NRCS): The National Resource Conservation Service (NRCS), United States Department of Agriculture (USDA),provides technical assistance in the areas of agricultural production and cultivation, and economic management. Conservation plans help conserve soil, water and other natural resources by advocating proper production methods and the use of best management practices (BMPs) to minimize adverse environmental impacts.

State land use and zoning: The State Land Use Commission (LUC), Department of Business, Economic Development, and Tourism (DBEDT), administers the statewide zoning system of Urban, Agricultural, Rural, and Conservation Land Use Districts. The

LUC regulates land use activities for all land use districts greater than 15 acres with the exception of Conservation Districts and decides upon any amendments to reclassify landuse districts. Conservation Districts are administered by the State Board (Department) of Land and Natural Resources and governed by rules promulgated by the State Department of Land and Natural Resources. Counties are responsible for administering land use changes for Urban, Agricultural and Rural Districts under 15 acres.

County planning and land utilization: The County Planning and Land Utilization Departments regulate specific land uses and implement respective zoning and land use laws affecting Urban, Agricultural and Rural Land Use Districts under 15 acres for their respective county. The LUC decides upon land use changes for districts greater than 15acres and for all Conservation Districts.

Part 3: Groundwater Contamination Summary

Methodology of Reporting

National Priority List (NPL) Sites: The NPL is the list of national priorities among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories. The NPL is intended primarily to guide the EPA in determining which sites warrant further investigation.

The State has three NPL sites, which were mapped in geographic information system (GIS).

- **Del Monte Corporation**, O`ahu. The Del Monte Corporation (formerly O`ahu Plantation) site covers 6,000 acres. Soil and shallow groundwater at the site have been contaminated with the fumigants EDB, DBCP and DCP, the solvents TCP and benzene, and the pesticide lindane. Deep groundwater is contaminated with EDB, DBCP and TCP. The site is being addressed in two stages: initial actions and long-term remedial phase focusing on cleanup of the entire site.

- **Naval Computer and Telecommunication Area Master Station** (NCTAMS), Eastern Pacific (EASTPAC), O`ahu. NCTAMS EASTPAC consists of operating facilities located throughout the island of O`ahu and include: Wahiawa, Lualualei, Kokele Pass and various satellite communication locations. The sites are primarily land disposal areas that are no longer in use and PCB transformer sites. Soil contamination depends on the site, but generally the chemicals of concern are PCBs, volatile organics, semi-volatile organics and metals. Removal actions to date are PCB transformer sites.

- **Pearl Harbor Naval Complex** (PHNC), O`ahu. The Pearl Harbor Naval Complex encompasses approximately 12,600 acres of land and water. Soil, groundwater and sediment are contaminated with metals, organic compounds, and petroleum hydrocarbons. The site is being addressed in two stages: early actions, and remedial process focusing on accelerated cleanup by presumptive remedies and removal actions.

Comprehensive Environmental Response, Compensation and Liability InformationSystem (CERCLIS) Sites: CERCLIS contains information on hazardous waste sites, potential hazardous waste sites, and remedial activities across the nation, including sites that are on the National Priorities List (NPL) or being considered for the NPL. The EPA reported that the State of Hawai`i had 91 CERCLIS sites in 2005, of which 27 were mapped in GIS. Groundwater contamination information was not available.

	SITE NAME	CITY	COUNTY	STATE	NPL
1	ALOHA TOWER DEVELOPMENT	HONOLULU, O`AHU	HONOLULU	HI	N
2	ARMY AVIATION SUPPORT FACILITY #2	HILO	HAWAI`I	HI	N
3	BARBERS POINT NAVAL AIR STATION	BARBERS POINT	HONOLULU	HI	N
4	BELLOWS AIR FORCE STATION	WAIMANALO	HONOLULU	HI	N
	BIRD BUILDERS	KAHULUI	MAUI	HI	N
6	BREWER CHEM CORP	EWA BEACH	HONOLULU	HI	N
7	BREWER CHEM CORP	LIHUE	KAUA`I	HI	N
8	CHEMWOOD TREATMENT CO, INC.	EWA BEACH	HONOLULU	HI	N
9	CYPRUS HAWAIIAN CEMENT CORP	EWA BEACH	HONOLULU	HI	N
	DEFENSE REUTILIZATION & MKTG REG-PAC	PEARL CITY	HONOLULU	HI	A
11	DEL MONTE CORP. (O`AHU PLANTATION)	KUNIA	HONOLULU	HI	F
12	EWA SUGAR MILL/O`AHU SUGAR CO.	EWA BEACH	HONOLULU	HI	N
13	EWA SUGAR MILL/O`AHU SUGAR CO. - CORAL WASTE PIT	EWA BEACH	HONOLULU	HI	N
14	EWA SUGAR/O`AHU SUGAR CO. - PESTICIDE MIXING AND LOADING SITE	EWA BEACH	HONOLULU	HI	N
15	EWA SUGAR/O`AHU SUGAR CO. - WAIPIO PENINSULA	WAIPAHU	HONOLULU	HI	N
16	F & M CONTRACTORS, INC.	KAHULUI	MAUI	HI	N
17	FARRINGTON HIGH SCHOOL	HONOLULU	HONOLULU	HI	N
18	FORT KAMEHAMEHA DSPL SITE	HICKAM AFB	HONOLULU	HI	N
19	FORT SHAFTER	FORT SHAFTER	HONOLULU	HI	N
	GOLDEN MELON FARMS	WAIMANALO	HONOLULU	HI	N
21	HAWAI`I MERCURY	HONOLULU	HONOLULU	HI	N
22	HAWAI`I METALS RECYCLING CO.	EWA BEACH, O`AHU	HONOLULU	HI	N
23	HAWAI`I PROJECT MANAGEMENT (HPM)	EWA BEACH, O`AHU	HONOLULU	HI	N
24	HAWAI`I STAGING AND LIGHTING	HONOLULU	HONOLULU	HI	N
25	HAWAIIAN WELLS (6 SITES)	UNAVAILABLE	[Blank County]	HI	N
26	HILO ARSENIC SPILL SITE	HILO	HAWAI`I	HI	N
27	HILO BURRITO	HILO	HAWAI`I	HI	N
28	HONOLULU HARBORS PROJECT	HONOLULU	HONOLULU	HI	N
29	HONOLULU INTL AIRPORT	HONOLULU	HONOLULU	HI	N
30	HONOLULU SKEET CLUB	KAILUA	HONOLULU	HI	N
31	JACKSON CONSTRUCTION LANDFILL	EWA BEACH	HONOLULU	HI	N
32	KAHOOLAWE ISLAND	KIHEI	MAUI	HI	N
33	KAILUA-KONA LANDFILL	KAILUA KONA	HAWAI`I	HI	N
34	KALAMAULA LANDFILL	KAUNAKAKAI	MAUI	HI	N
35	KANAHA POND WEST	KAHULUI	MAUI	HI	N
36	KAPAA LDFL	KAILUA	HONOLULU	HI	N
37	KAPALAMA INCINERATOR	HONOLULU	HONOLULU	HI	N
38	KAUA`I AGRICULTURAL RESEARCH CENTER	WAILUA	KAUA`I	HI	N
39	KEA'AU ARSENIC SITES	KEA'AU	HAWAI`I	HI	N
40	KEEHI LAGOON CANOE FACILITY	HONOLULU	HONOLULU	HI	N
41	KEKAHA SUGAR CO., LTD - FORMER WOOD TREATMENT AND HERBICIDE MIXING PLANT	KAUA`I	KAUA`I	HI	N
42	KEKAHA SUGAR CO., LTD.	KEKAHA	KAUA`I	HI	N
43	KIPAPA FUEL STORAGE ANNEX	MILILANI	HONOLULU	HI	N
44	KURE ATOLL, U.S. COAST GUARD	HONOLULU	HONOLULU	HI	N
45	LEEWARD AUTO WRECKERS, INC.	EWA BEACH, O`AHU	HONOLULU	HI	N
46	LIHUE PLANTATION COMPANY, LTD.	LIHUE	KAUA`I	HI	N
47	MAILI KAI EMERGENCY ACCESS ROAD SITE	WAIANAE	HONOLULU	HI	N
48	MAIPALAOA ROAD	WAIANAE	HONOLULU	HI	N
49	MAKUA MILITARY RESERVATION ORDN DISP	WAIANAE	HONOLULU	HI	N

	SITE NAME	CITY	COUNTY	STATE	NPL
50	MARINE CORPS BASE HAWAI'I	KANEOHE	HONOLULU	HI	N
51	MOUNT KAALA NATURAL AREA RESERVE	WAIALUA	HONOLULU	HI	N
52	NAVAL COMPUTER AND TELECOMMUNICATIONS AREA MASTER STATION EASTERN PACIFIC	WAHIAWA	HONOLULU	HI	F
53	NAVAL MAGAZINE LUALUALEI	EWA BEACH	HONOLULU	HI	N
54	NAVAL SUBMARINE BASE	PEARL HARBOR	HONOLULU	HI	A
55	NRTF LUALUALEI	WAHIAWA	HONOLULU	HI	N
56	OPANA	WAHIAWA	HONOLULU	HI	A
57	PAHE PLANTATION	WAIMANALO	HONOLULU	HI	N
58	PAIA SUGAR MILL	PAIA	MAUI	HI	N
59	PEARL CITY FUEL ANNEX	PEARL CITY	HONOLULU	HI	N
60	PEARL HARBOR NAVAL COMPLEX	PEARL HARBOR	HONOLULU	HI	F
61	PEARL HARBOR NAVAL SHIPYARD	PEARL HARBOR	HONOLULU	HI	A
62	PEARL HARBOR NAVAL STATION	PEARL HARBOR	HONOLULU	HI	A
63	PEARL HARBOR NAVAL SUPPLY CTR	PEARL HARBOR	HONOLULU	HI	A
64	PEARL HARBOR NAVY PUBLIC WORKS CTR	PEARL HARBOR	HONOLULU	HI	A
65	PEARL HARBOR PWC MAKALAPA PESTICIDE PIT	PEARL HARBOR	HONOLULU	HI	A
66	PIONEER MILL COMPANY	LAHAINA	MAUI	HI	N
67	POAMOHO RAG DISPOSAL AREA	SCHOFIELD	HONOLULU	HI	N
68	POHAKULOA TRAINING AREA	HILO	HAWAI`I	HI	N
69	PUKOLOA WOOD TREATING SITE	HONOLULU	HONOLULU	HI	N
70	PUNA GEOTHERMAL VENTURE	PAHOA	HAWAI`I	HI	N
71	SCHOFIELD BARRACKS (US ARMY)	SCHOFIELD	HONOLULU	HI	D
72	SCHOFIELD BARRACKS SAN LDFL	WAHIAWA	HONOLULU	HI	N
73	SCOTT'S PLATING	KANEOHE	HONOLULU	HI	N
74	SHORE INTERMEDIATE MAINTENANCE ACTIVITY	PEARL HARBOR	HONOLULU	HI	A
75	TAKAMIYA PROPERTY	HONOLULU	HONOLULU	HI	N
76	TRIPLER ARMY MEDICAL CENTER	TRIPLER AMC	HONOLULU	HI	N
77	U S NAVY EXCHANGE LAUNDRY FACILITY	PEARL HARBOR	HONOLULU	HI	A
78	U.S. COAST GUARD OMEGA STATION	KANEOHE	HONOLULU	HI	N
79	UNOCAL/IWILEI TANK FARM	HONOLULU	HONOLULU	HI	N
80	USAF WAIKAKALAUA FUEL STORAGE ANNEX	WHEELER ARMY AIRFIELD	HONOLULU	HI	N
81	USN FLEET TRAINING GROUP	PEARL HARBOR	HONOLULU	HI	A
82	VERMICULITE OF HAWAI`I, INC.	HONOLULU	HONOLULU	HI	N
83	WAIAKEA POND/HAWAIIAN CANE PRDTS PLANT	HILO	HAWAI`I	HI	N
84	WAIALUA SUGAR MILL	WAIALUA	HONOLULU	HI	N
85	WAIAWA GULCH	PEARL CITY	HONOLULU	HI	N
86	WAIAWA GULCH-INDUSTRIAL PARK/STREAM	PEARL CITY	HONOLULU	HI	N
87	WAIAWA SHAFT	O`AHU	HONOLULU	HI	R
88	WAIMANALO GROUNDWATER INVESTIGATION	WAIMANALO	HONOLULU	HI	N
89	WAIPAHU ASH DUMP	WAIPAHU	HONOLULU	HI	N
90	WAIPAHU WELLS	O`AHU	HONOLULU	HI	R
91	WHEELER AIR FORCE BASE	WHEELER ARMY AIRFIELD	HONOLULU	HI	N

Key for NPL: A=Part of NPL site, F=Final NPL, R=Removed from NPL, D=Deleted from NPL, N=Not on NPL

Department of Defense (DOD)/ Department of Energy (DOE) Sites: The DOH Hazard Evaluation and Emergency Response (HEER) Office continues to provide oversight to all military site cleanups through the Department of Defense/State Memorandum of Agreement (DSMOA). The military installations listed below are covered by the agreement. The HEER Office database included 183 DOD/DOE sites of which 11 DOD/DOE sites were mapped in GIS. Groundwater contamination information was not included in the HEER database.

Army Installations

1 Camp Smith, O`ahu
2 Fort Shafter, O`ahu
3 Kunia Military Reservation, O`ahu
4 Lualualei Naval Magazine, Schofield Barracks, O`ahu
5 Tripler Army Medical Center, O`ahu
6 Wheeler Army Airfield, O`ahu
7 Schofield Barracks, O`ahu

Navy Installations

1 Barbers Point Naval Air Station, O`ahu
2 Naval Computer and Telecommunications Area Master Station (NCTAMS) Pacific, O`ahu
3 Pacific Missile Range Facility, Kaua`i
4 Pearl Harbor Fleet Industrial Supply Center, O`ahu
5 Pearl Harbor Naval Public Works, O`ahu
6 Pearl Harbor Naval Shipyard, O`ahu
7 Pearl Harbor Naval Station, O`ahu

Air Force Installations

1 Bellows Air force Station, O`ahu
2 Hickam AFB, O`ahu
3 Hickam POL Pipeline and Storage Area, O`ahu
4 Kaala Air Force Station, O`ahu
5 Kaena Point Satellite Tracking Station, O`ahu
6 Kokee Air force Station, Kaua`i

Former Defense Department Sites

1 Firing Range and Camp, Lalamilo, Hawai`i
2 Grove Farm Artillery Range, Kaua`i
3 Gunnery Site, Makawao, Maui
4 Heeia Combat Training Camp, Heeia, O`ahu
5 Lana`i Radar Station, Lana`i
6 Maui Airport, Puunene, Maui
7 Moloka`i Punakua Bombing and Papohaku Ranchland Target Areas, Moloka`i
8 Nansay Hawai`i, North Kohala, Hawai`i
9 Offshore Waianae Sewage Outfall, O`ahu
10 Opana Point, Maui
11 Pakini Bombing Range, Kau, Hawai`i
12 Pali Training Camp, O`ahu
13 Waikane Training Area, O`ahu
14 Waikoloa Maneuver Area, Waikoloa, Hawai`i

Leaking Underground Storage Tank (LUST) Sites: The State DOH Solid and Hazardous Waste Branch (SHWB) maintains databases of underground storage tanks (UST), and leaking underground storage tanks (LUST) but does not include groundwater contamination information in the databases. The Solid and Hazardous Waste Branch reported 193 LUST sites for 2004 and 2005, of which 149 LUST sites were geo-referenced and mapped in GIS. Groundwater contamination information was not included in the SHWB database.

	2004	**2005**
LUST confirmed release	18	24
LUST site cleanup completed*	51	70
LUST site cleanup initiated	13	10
LUST case transferred to HEER office	4	3

*No further action required.

Resource Conservation and Recovery Act (RCRA) Corrective Action Sites: RCRA gave EPA the authority to control hazardous waste from the "cradle-to-grave." This includes the generation, transportation, treatment, storage, and disposal of hazardous waste. RCRA also set forth a framework for the management of non-hazardous wastes.

RCRA Corrective Action is just one of the many tools that EPA and States use to address the cleanup and revitalization of our nation's hazardous waste sites. RCRA sites were not mapped in GIS.

1 Chemwood Treatment Co. Inc., Honolulu, O`ahu
2 Chevron Products Company, Kapolei, O`ahu
3 Hawaiian Western Steel Limited, Kapolei, O`ahu
4 Tesoro Hawai`i, Ewa Beach, O`ahu.

State Listed Sites: The HEER Office Site Discovery, Assessment and Remediation (SDAR) Section has oversight responsibility for the discovery, assessment, remediation and closure for all sites identified through the spill/release notification system after an initial emergency response activity is completed. The HEER Office reported 750 State Sites for 2004 and 2005, of which 352 were mapped in GIS. Groundwater contamination information was not included in the HEER database.

Underground Injection Control (UIC) Sites: The State DOH Safe Drinking Water Branch, Underground Injection Control (UIC) Program maintains files and a database of UIC facilities, wells and well information. The UIC Program issued 63 new permits in 2004 and 44 new permits in 2005. Sixteen injection wells were closed in 2004, and 31 injection wells were closed in 2005.

237 UIC facilities* were mapped in GIS for 2005 and included the following categories.

Sewage wells 124
Drainage wells 67
Industrial wells 37
Aquaculture wells 4
Construction de-watering wells 2
Other wells 2
Geothermal wells 1

*Inventory updates are continuing, and each facility typically has more than one injection well. It is not uncommon for a facility to have multiple injection wells.

Table 3-3 Ground Water Contamination Summary

Hydrogeologic Setting [1] See attached maps.
Spatial Description (optional) [2]
Map Available (optional) [3] See attached maps.
Data Reporting Period [4] January 1, 2004 -December 31, 2005

Source Type [5]	Number of sites [6]	Number of sites with confirmed ground water contamination [6]	Number of sites that are listed and/or have confirmed releases [6]	Contaminants [7]	Number of site investigations (optional)	Number of sites that have been stabilized or have had the source removed (optional)	Number of sites with corrective action plans (optional)	Number of sites with active remediation (optional)	Number of sites with cleanup completed (optional)
NPL	3	3	2	See list.					
CERCLIS (non-NPL)	91	NA	NA	NA					
DOD/DOE	183	NA	NA	NA					
LUST	42	NA	NA	See list.				23	121
RCRA Corrective Action	4	4	4	See list.			4	4	
Underground Injection	237	0	0	NA					
State Sites	750	NA	NA	NA					
Non-point source									
Other (specify)									

NA - Not available

NPL - National Priority List
CERCLIS (non-NPL) - Comprehensive Environmental Response, Compensation, and Liability Information System
DOE - Department of Energy
DOD - Department of Defense
LUST - Leaking Underground Storage Tanks
RCRA - Resource Conservation and Recovery Act

NATIONAL PRIORITY LIST (NPL) SITES

Site Pearl Harbor Naval Complex, O`ahu
Del Monte Kunia, O`ahu
Naval Computer and Telecommunications Area Master Station (NCTAMS), Eastern Pacific (EASTPAC), O`ahu

Contaminants
Mercury, chromium, PCBs, pesticides, trichloroethene, trans-1,2-dichloroethene, and other volatile organic compounds in soil. Tetrachloroethane in soil and groundwater. Bis (2-ethylhexyl) phthalate in sediment. EDB, DBCP, DCP, TCP, benzene, lindane in soil and shallow groundwater. EDB, DBCP and TCP in deep groundwater. PCBs, volatile organics, semi-volatile organics, and metals.

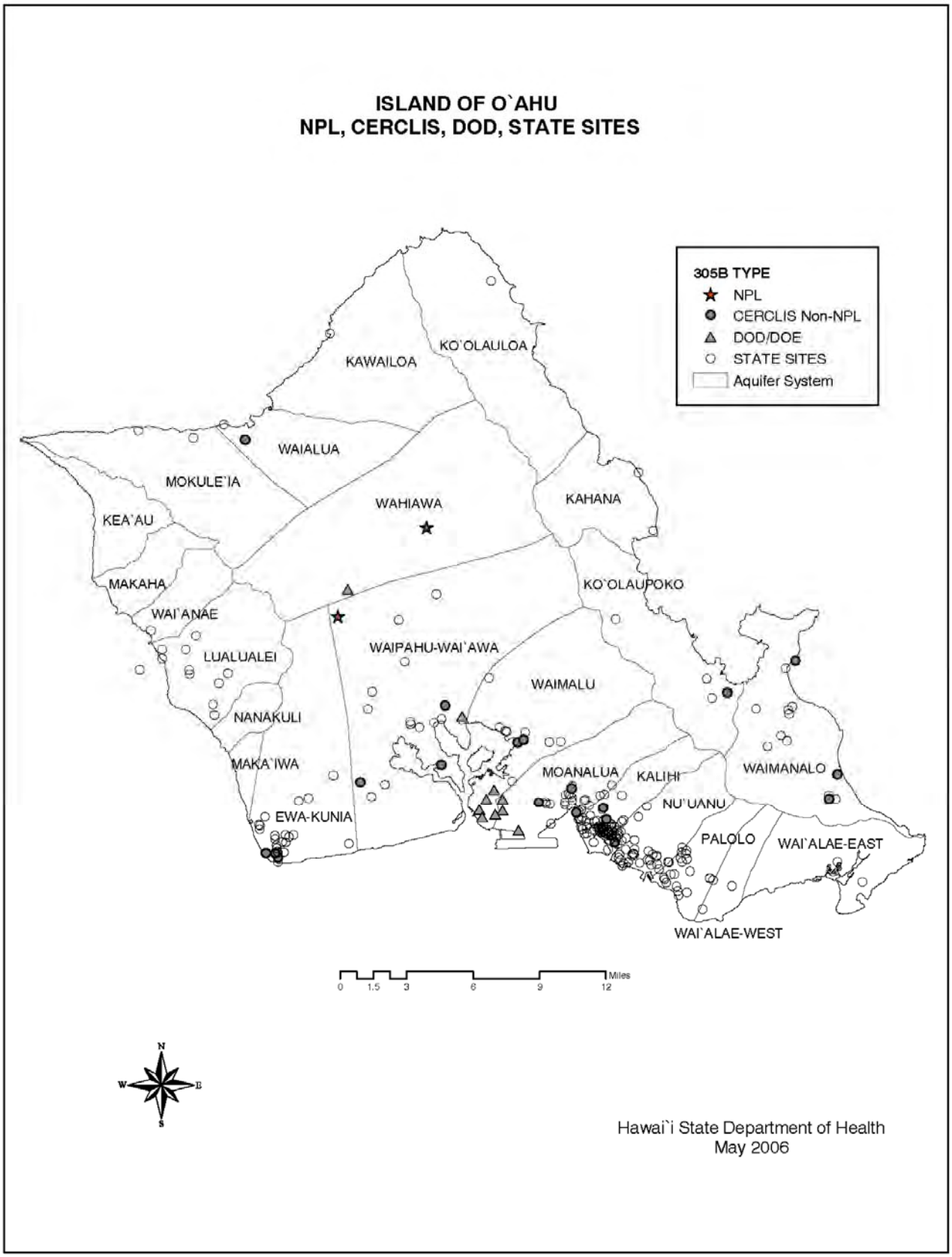
The Environmental Protection Agency will delete a site from the National Priorities List (NPL) when the EPA and the State of Hawai`i Department of Health have determined that the site poses no significant threat to public health or the environment and, therefore, no further remedial measures pursuant to the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) are appropriate.

RCRA CORRECTIVE ACTION SITES

Name	Address	Contaminants
Chemwood	91-466 Komohana St., O`ahu	Pentachlorophenols, heavy metals
Chevron	91-480 Malakole St., O`ahu	Petroleum products
Hawaiian Western Steel	91-227 Hanua St., O`ahu	Heavy metals
Tesoro	91-325 Komohana St., O`ahu	Petroleum products

LUST SITE CONTAMINANTS

Acenaphthene
Benzene
Benzo(a) pyrene
Ethylbenzene
Fluorothene
Methyl tertiary butyl ether (MTBE)
Methylene chloride
Naphthalene
Toluene
Total petroleum, gasoline and diesel
Vinyl chloride
Xylene


ISLAND OF O`AHU
NPL, CERCLIS, DOD, STATE SITES
305B TYPE
NPL
CERCLIS Non-NPL
DOD/DOE
STATE SITES
Aquifer System
KAWAILOA
KO`OLAULOA
WAIALUA
MOKULE`IA
KEA`AU
WAHIAWA
KAHANA
MAKAHA
KO`OLAUPOKO
WAI`ANAE
WAIPAHU-WAI`AWA
LUALUALEI
WAIMALU
NANAKULI
MAKA`IWA
MOANALUA
KALIHI
WAIMANALO
NU`UANU
EWA-KUNIA
PALOLO
WAI`ALAE-EAST
WAI`ALAE-WEST
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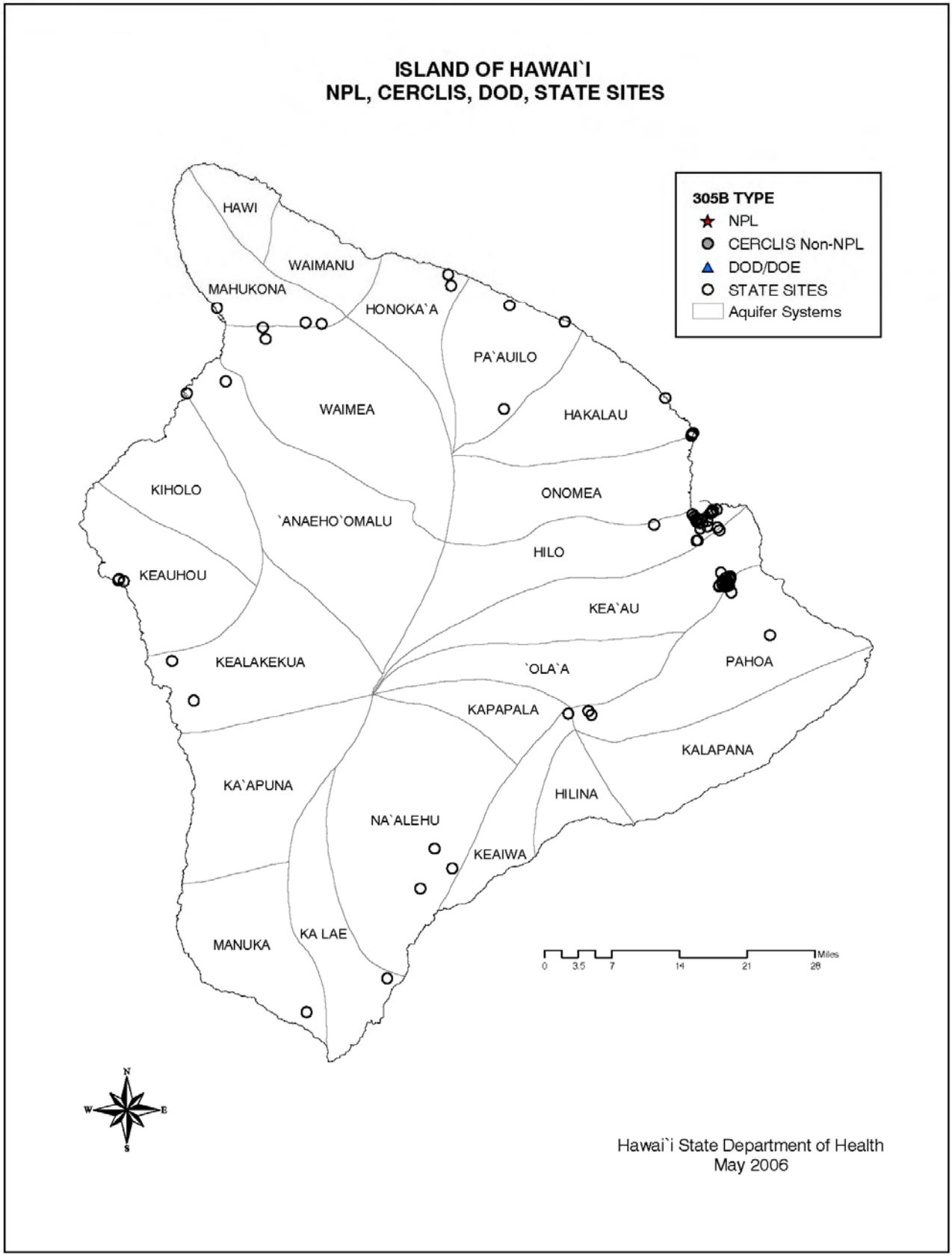
Hawai`i State Department of Health
May 2006


ISLAND OF HAWAI`I
NPL, CERCLIS, DOD, STATE SITES
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CERCLIS Non-NPL
DOD/DOE
STATE SITES
Aquifer Systems
HAWI
WAIMANU
MAHUKONA
HONOKA`A
PA`AUILO
WAIMEA
HAKALAU
KIHOLO
ONOMEA
`ANAEHO`OMALU
HILO
KEAUHOU
KEA`AU
KEALAKEKUA
`OLA`A
PAHOA
KAPAPALA
KALAPANA
KA`APUNA
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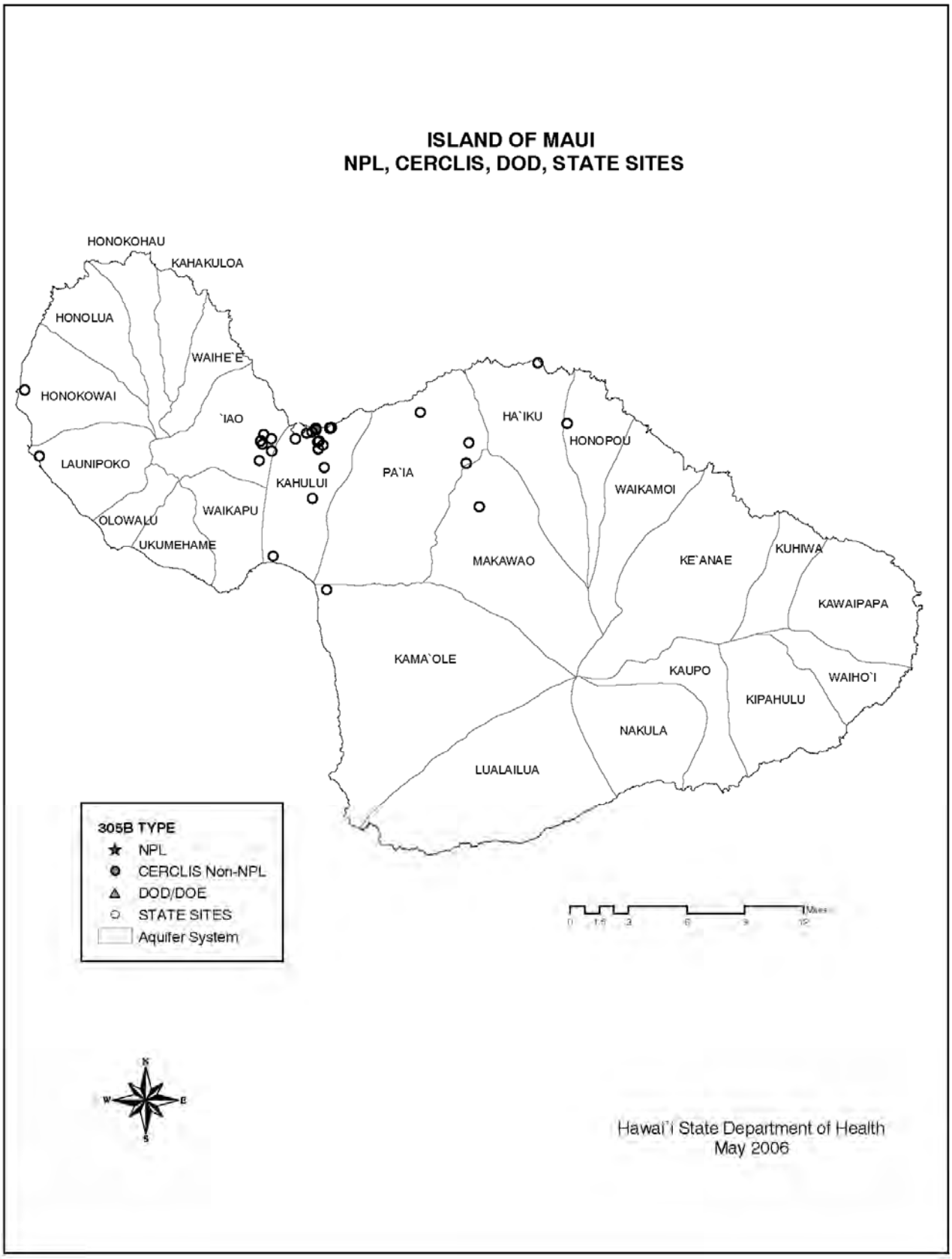
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LAUNIPOKO
KAHULUI
PA`IA
HA`IKU
HONOPOU
WAIKAMOI
WAIKAPU
OLOWALU
UKUMEHAME
MAKAWAO
KE`ANAE
KUHIWA
KAWAIPAPA
KAMA`OLE
KAUPO
WAIHO`I
KIPAHULU
NAKULA
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STATE SITES
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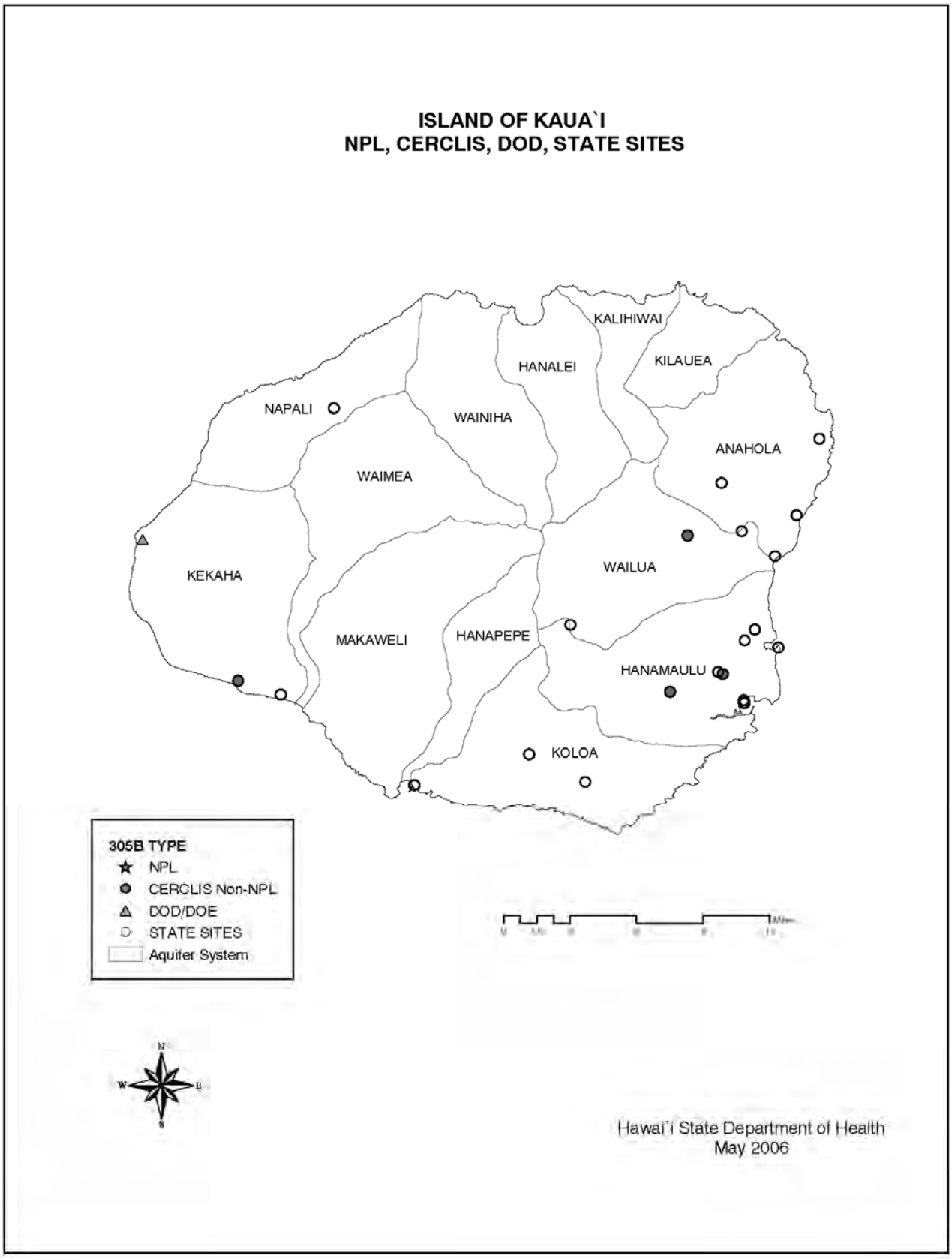
Hawai`i State Department of Health
May 2006


ISLAND OF KAUA`I
NPL, CERCLIS, DOD, STATE SITES
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NAPALI
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WAIMEA
KEKAHA
WAILUA
MAKAWELI
HANAPEPE
HANAMAULU
KOLOA
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STATE SITES
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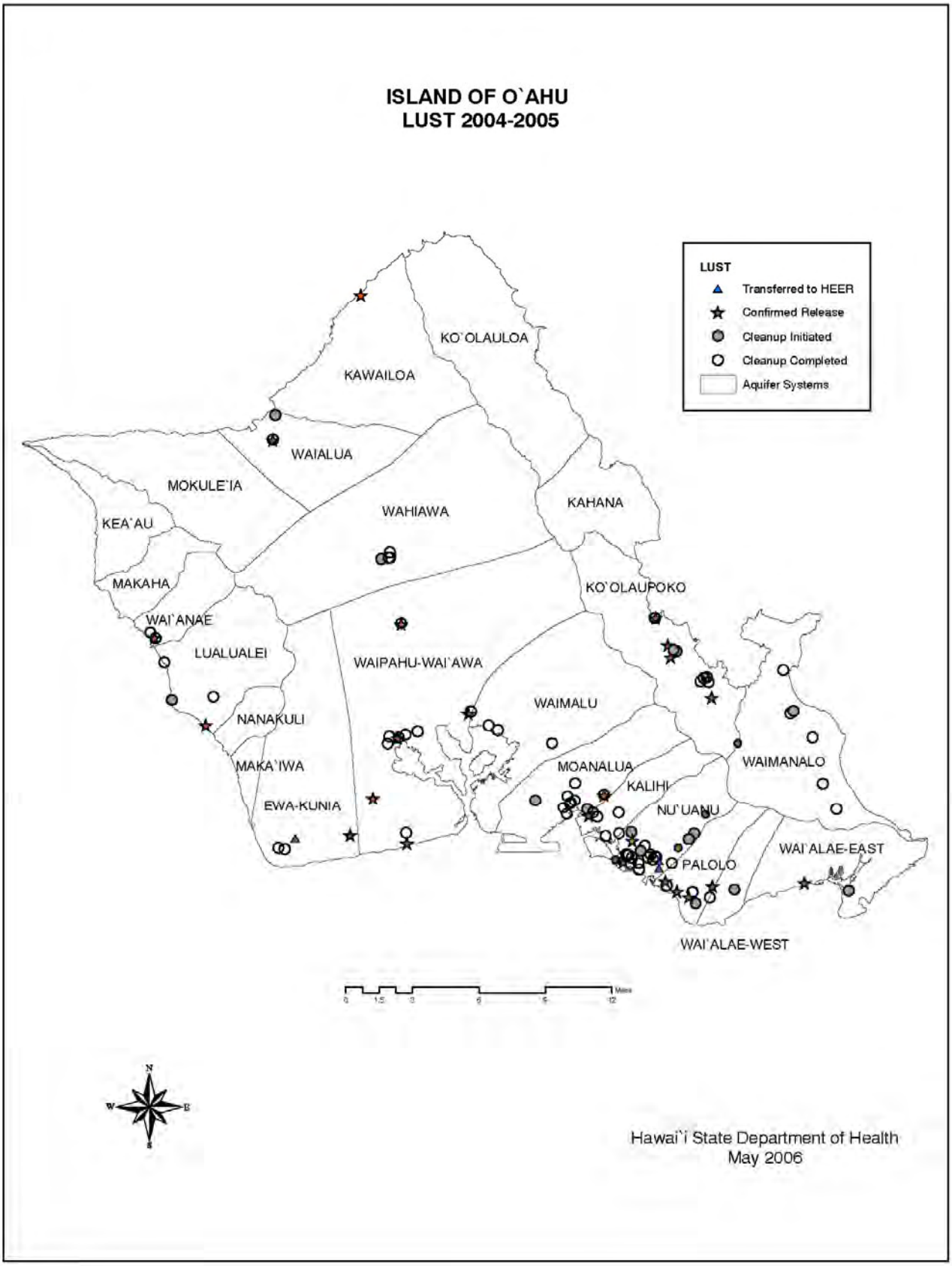
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Cleanup Initiated
Cleanup Completed
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KAWAILOA
WAIALUA
MOKULE`IA
KEA`AU
WAHIAWA
KAHANA
MAKAHA
KO`OLAUPOKO
WAI`ANAE
LUALUALEI
WAIPAHU-WAI`AWA
WAIMALU
NANAKULI
MAKA`IWA
MOANALUA
WAIMANALO
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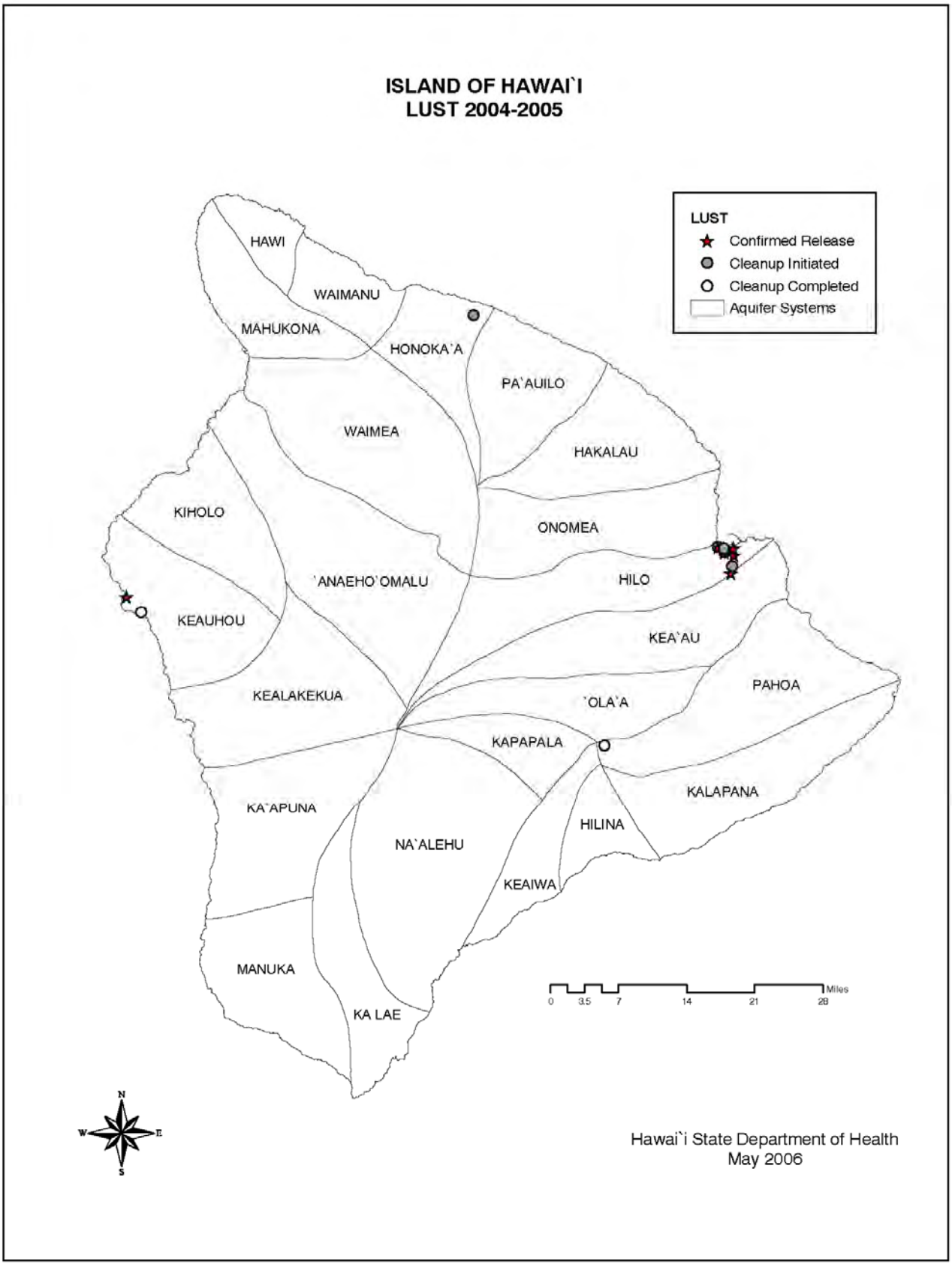
WAI`ALAE-WEST
Hawai`i State Department of Health
May 2006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PAHOA
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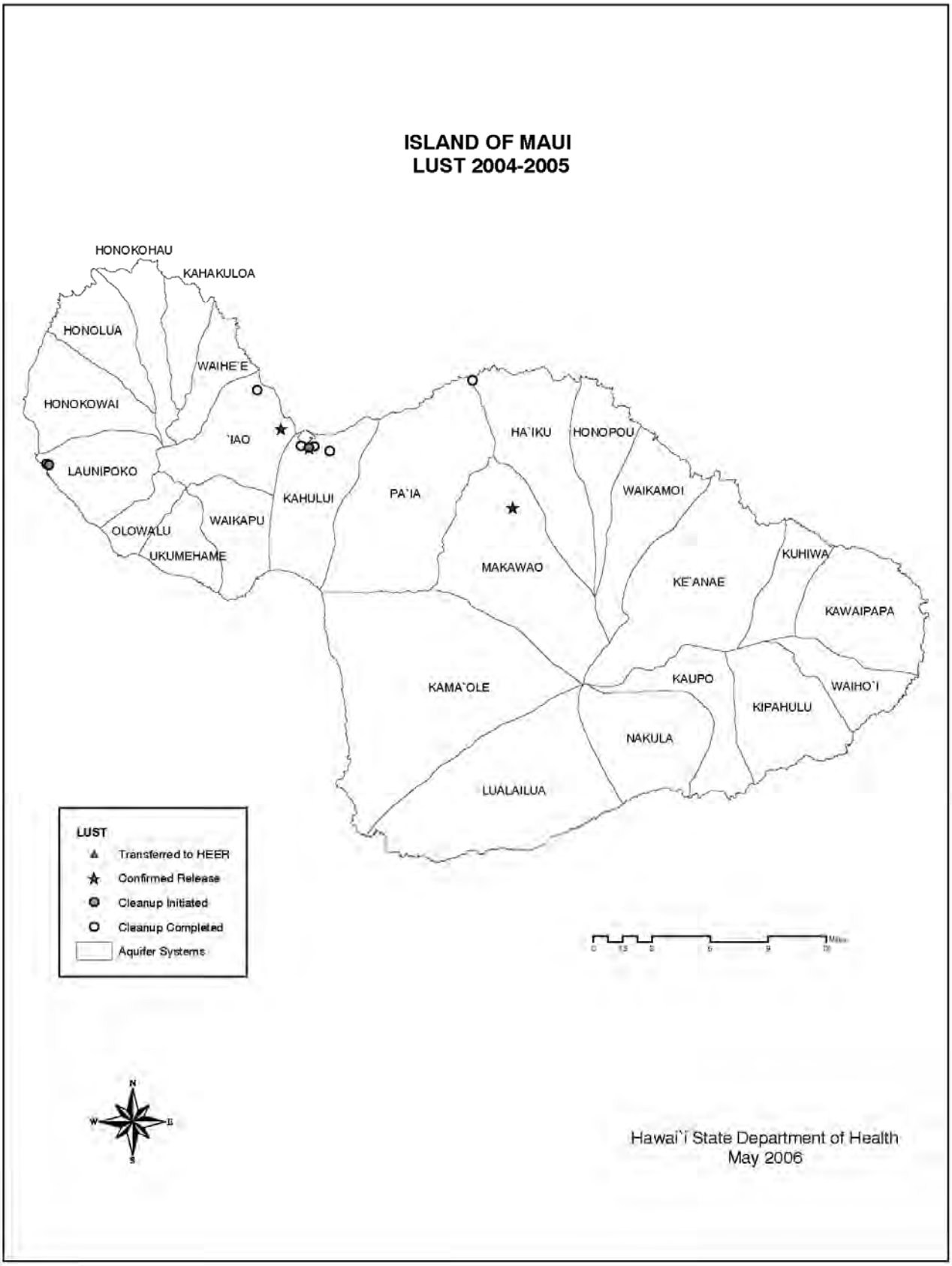
Hawai`i State Department of Health
May 2006


ISLAND OF MAUI
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PA`IA
HA`IKU
HONOPOU
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OLOWALU
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MAKAWAO
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KAUPO
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KIPAHULU
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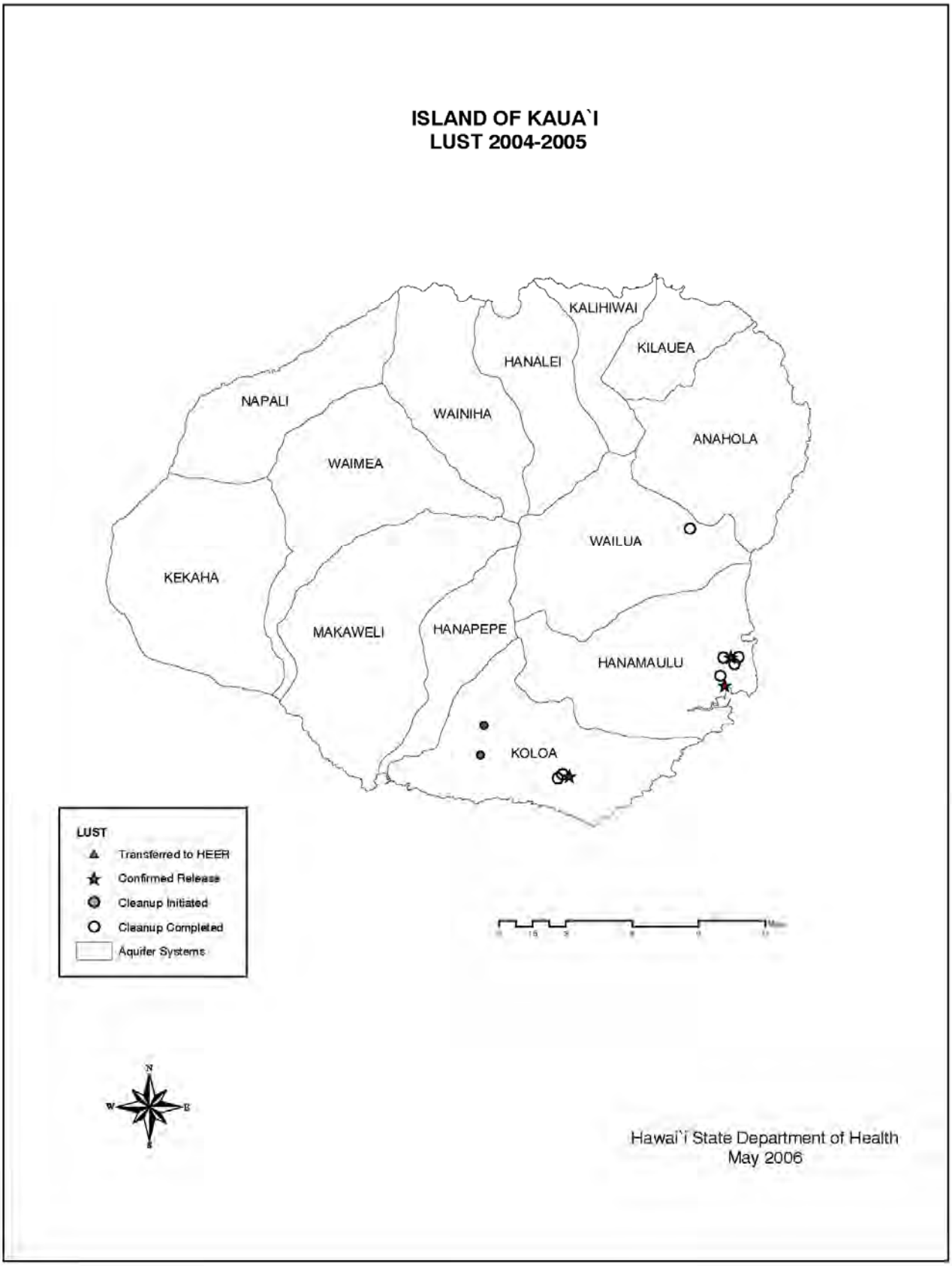
May 2006


ISLAND OF KAUA`I
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WAINIHA
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KOLOA
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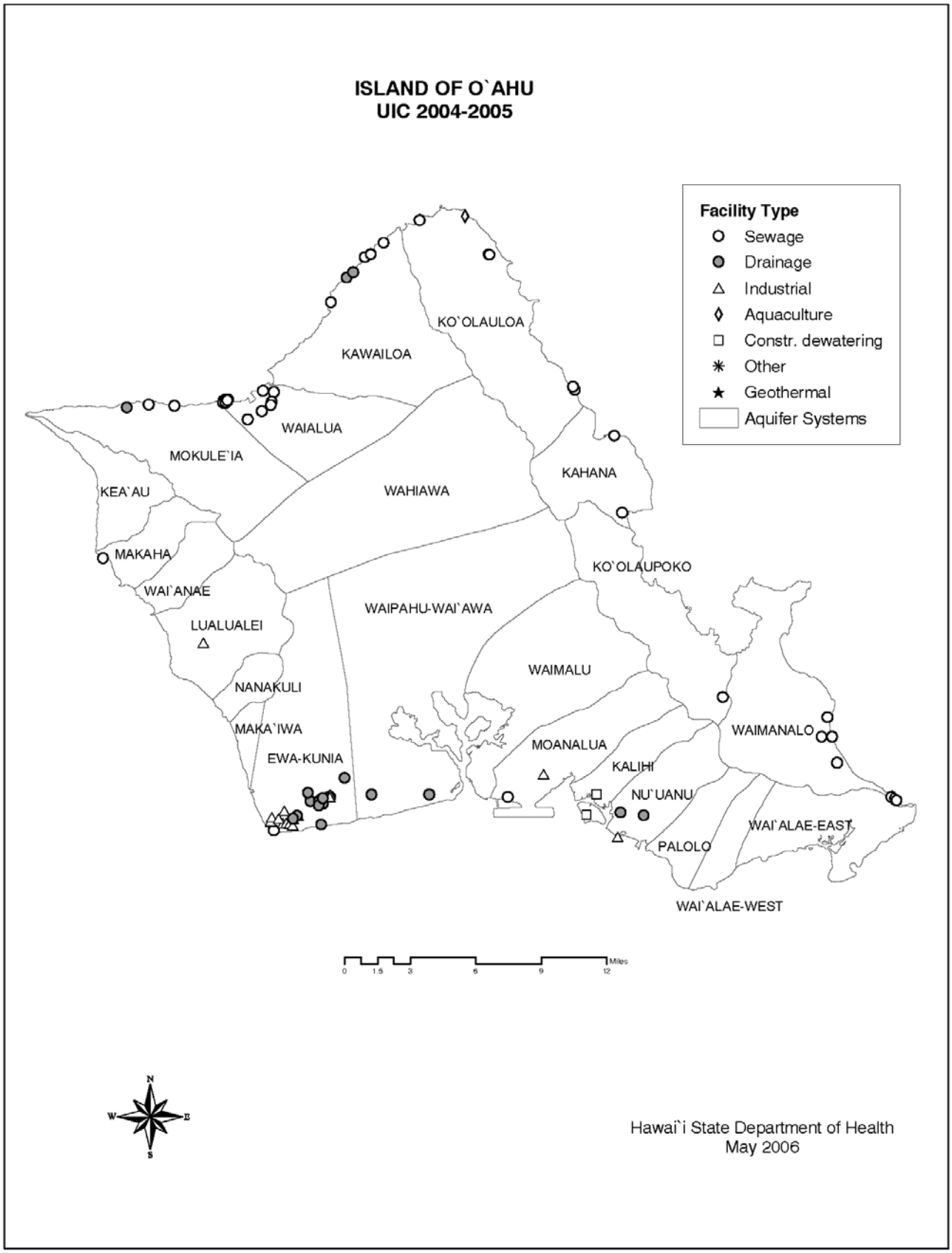
ISLAND OF O`AHU
UIC 2004-2005
Facility Type
Sewage
Drainage
Industrial
Aquaculture
Constr. dewatering
Other
Geothermal
Aquifer Systems
KO`OLAULOA
KAWAILOA
WAIALUA
MOKULE`IA
KEA`AU
WAHIAWA
KAHANA
MAKAHA
KO`OLAUPOKO
WAI`ANAE
WAIPAHU-WAI`AWA
LUALUALEI
WAIMALU
NANAKULI
MAKA`IWA
WAIMANALO
MOANALUA
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KALIHI
NU`UANU
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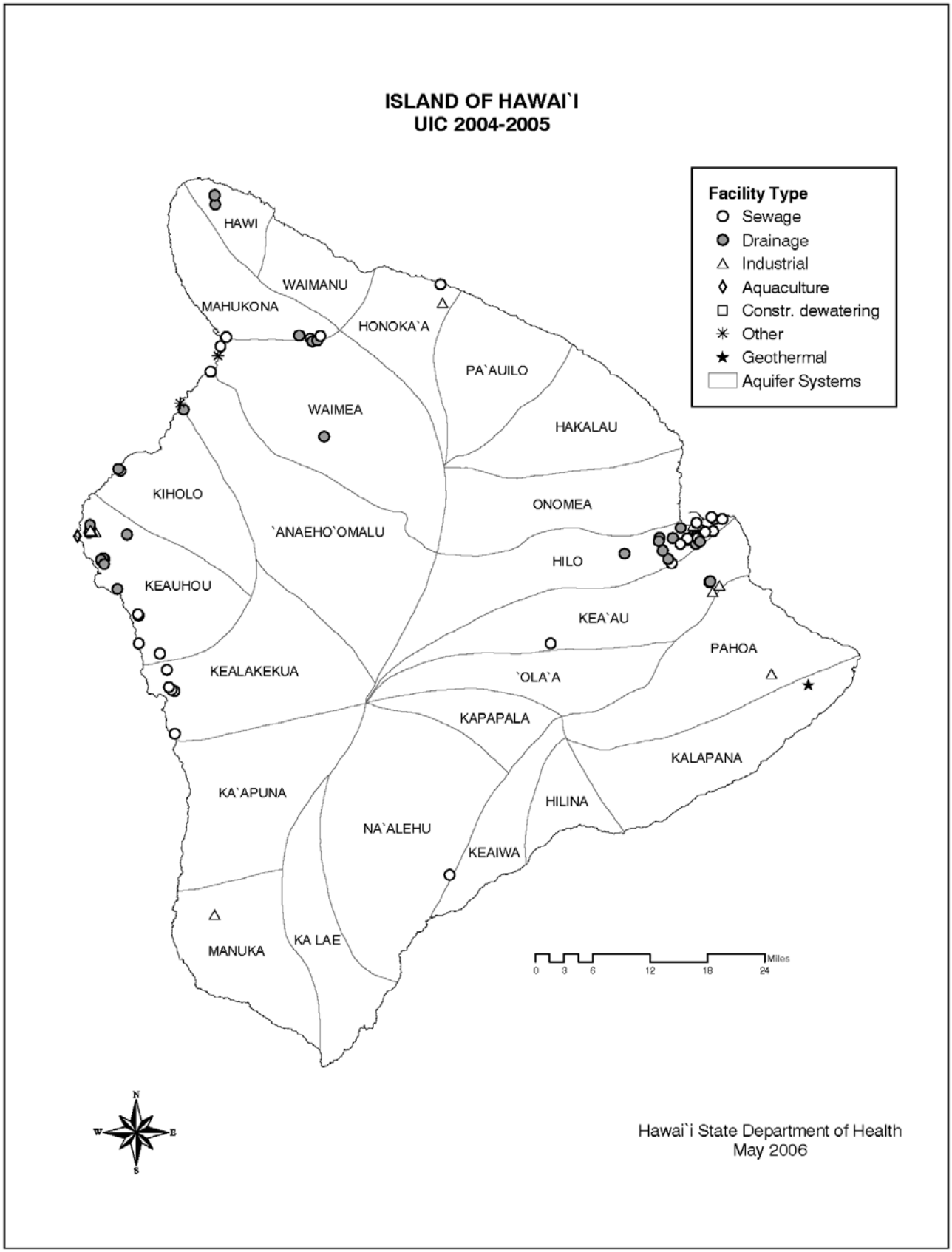
May 2006


ISLAND OF HAWAI`I
UIC 2004-2005
Facility Type
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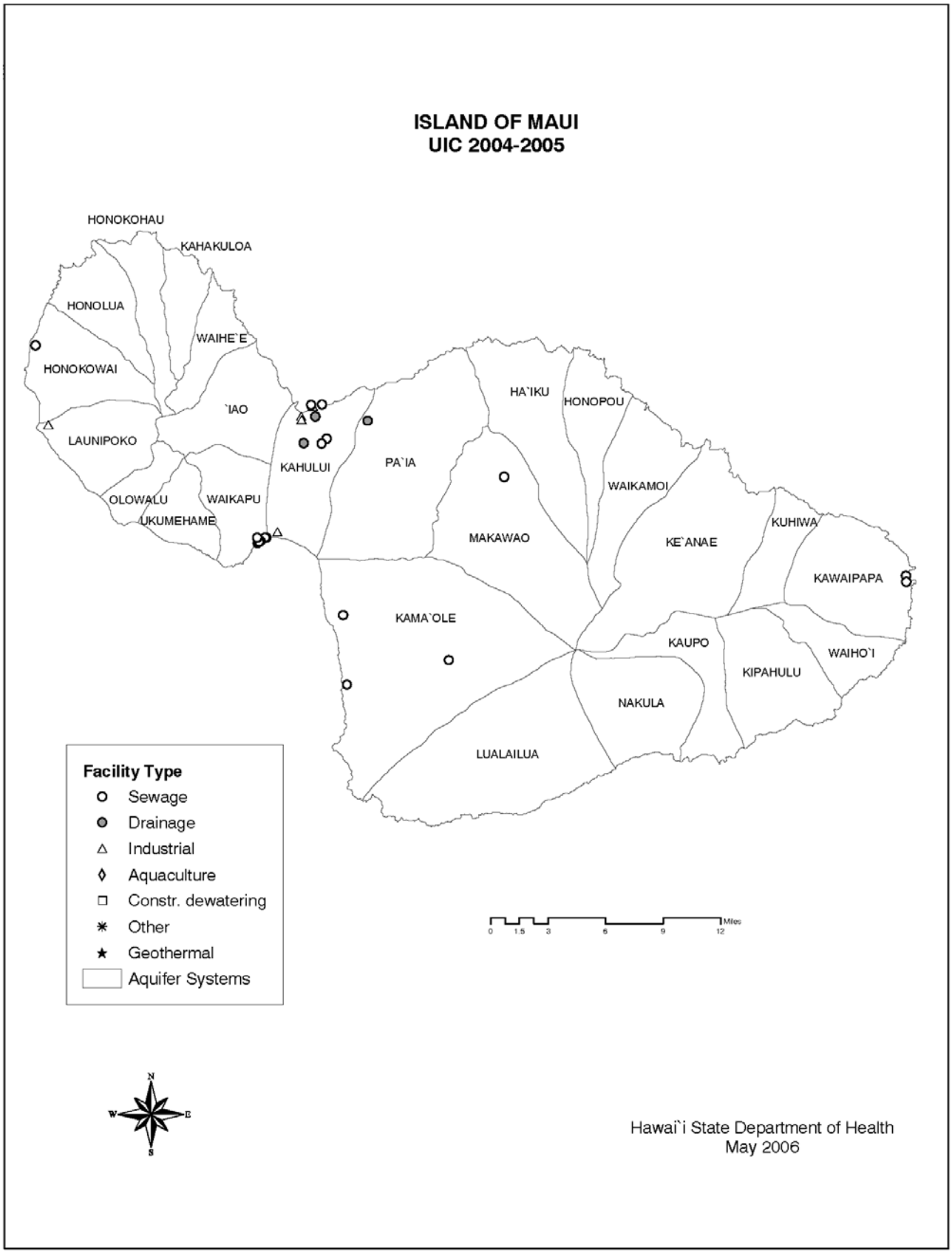
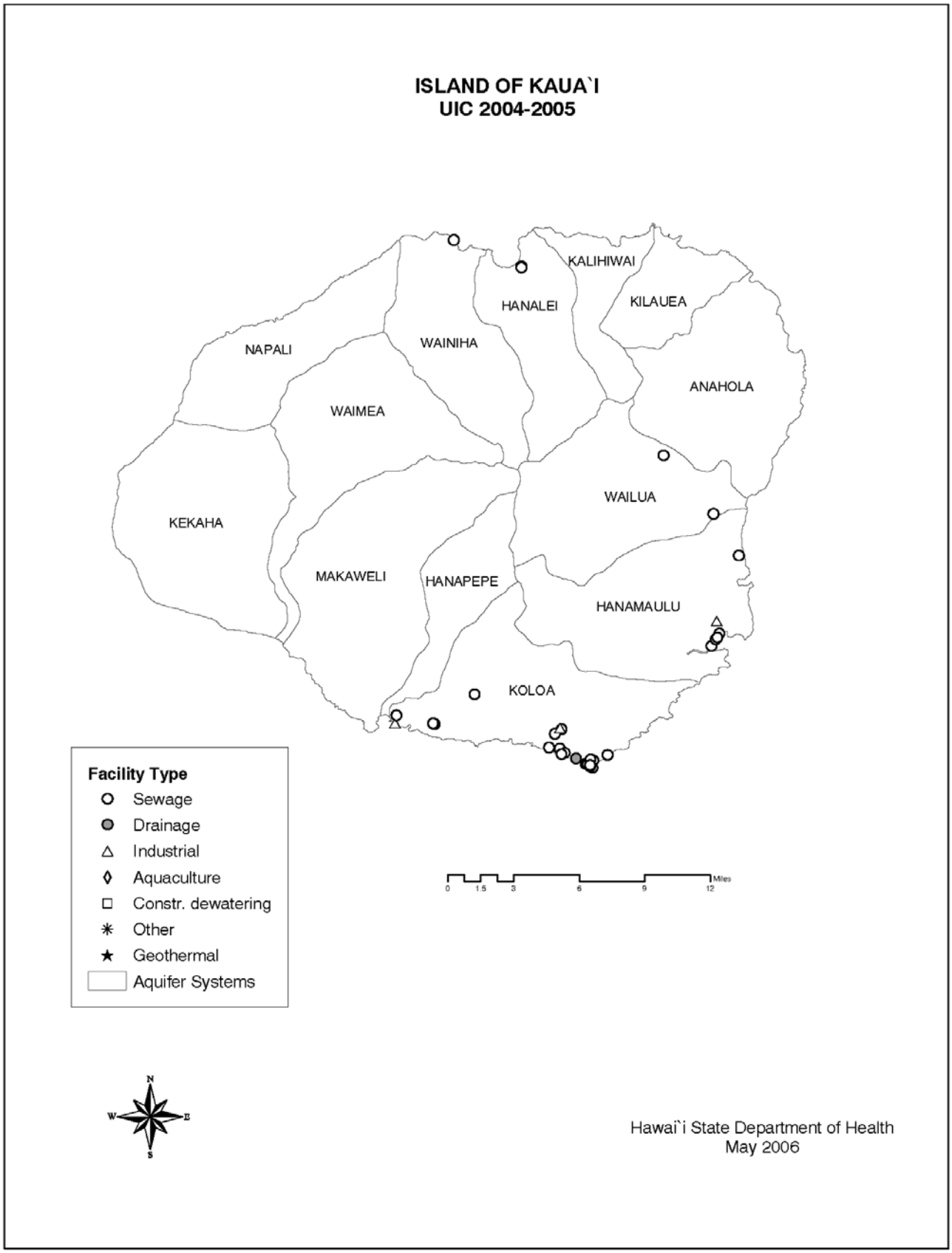
Drainage
Industrial
Aquaculture
Constr. dewatering
Other
Geothermal
Aquifer Systems
HAWI
WAIMANU
MAHUKONA
HONOKA`A
PA`AUILO
WAIMEA
HAKALAU
KIHOLO
ONOMEA
`ANAEHO`OMALU
HILO
KEAUHOU
KEA`AU
PAHOA
KEALAKEKUA
`OLA`A
KAPAPALA
KALAPANA
KA`APUNA
HILINA
NA`ALEHU
KEAIWA
MANUKA
KA LAE
0 3 6 12 18 24 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006


ISLAND OF MAUI
UIC 2004-2005
HONOKOHAU
KAHAKULOA
HONOLUA
WAIHE`E
HONOKOWAI
`IAO
LAUNIPOKO
KAHULUI
PA`IA
HA`IKU
HONOPOU
WAIKAMOI
OLOWALU
WAIKAPU
UKUMEHAME
MAKAWAO
KE`ANAE
KUHIWA
KAWAIPAPA
KAMA`OLE
KAUPO
WAIHO`I
KIPAHULU
NAKULA
LUALAILUA
Facility Type
Sewage
Drainage
Industrial
Aquaculture
Constr. dewatering
Other
Geothermal
Aquifer Systems
0 1.5 3 6 9 12 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006


ISLAND OF KAUA`I
UIC 2004-2005
KALIHIWAI
HANALEI
KILAUEA
NAPALI
WAINIHA
ANAHOLA
WAIMEA
WAILUA
KEKAHA
MAKAWELI
HANAPEPE
HANAMAULU
KOLOA
Facility Type
Sewage
Drainage
Industrial
Aquaculture
Constr. dewatering
Other
Geothermal
Aquifer Systems
0 1.5 3 6 9 12 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006

Part 4: Aquifer Monitoring Data

Methodology of Reporting

The 2004 Groundwater Contamination Maps for the State of Hawai`i were prepared by the Groundwater Protection Program, Safe Drinking Water Branch of the Hawai`i Department of Health (DOH). The Maps represent the most current information available to the DOH up through December 31, 2004, and are based on monitoring data for public drinking water wells and other testing data available to the DOH.

The 2004 Maps identify **organic chemical contaminants that have been detected and confirmed in wells used for drinking water** throughout the state. Groundwater can become contaminated through natural processes, but anthropogenic, or human-induced, contamination poses more serious problems. Contaminants may come from herbicides, pesticides, industrial solvents, and other sources which are applied, spilled, or leaked into the ground. Groundwater contamination is a significant concern because nearly all of Hawai`i's drinking water comes from groundwater sources.

The intent of the Maps is to identify only those wells with detectable levels of groundwater contamination. Some contaminated wells may not be reported because of lack of confirmed data, or the wells have not been tested. The contamination levels in this document refer to reported levels of contamination on a specific sampling date. Levels of groundwater contamination may fluctuate for a number of reasons, including actual diminishing or increasing levels of contamination, chemical breakdown of contaminants, variability in sampling and analytical methods, the effects of pumping rates, and other factors.

Organic chemical contaminant levels that have been detected are generally below the Maximum Contaminant Levels (MCLs) established by the Federal Environmental Protection Agency (EPA) as part of the Federal Drinking Water Standards. This means that as long as concentrations are below these standards and advisory levels, the water is considered safe and does not pose a serious health risk. If contamination levels approach state and federal drinking water standards, the well's owner is required to take steps to reduce the contaminant concentration to a safe level. This could involve the installation of a treatment system, blending of the water with higher quality water, or removing the well from service.

The 2004 Maps show that groundwater contamination continues to occur in Hawai`i. In most cases, once a groundwater source has been contaminated, it remains contaminated for many years. The Maps show that a few wells that were previously not contaminated by a particular chemical have now shown positive detections of chemicals known to be present in nearby wells.

New contaminant(s) were found in the following wells on O`ahu in 2004.

Map #18	Navy Halawa Plant (Well #2255-32)	Chlordane
Map #20	Ho`ae`ae, Pump 3 (Well #2301-37)	Atrazine, Dieldrin
Map #21	Kunia I, Pump 2 (Well #2302-02)	TCE
Map #27	Kunia II, Pump 4 (Well #2402-04)	DBCP, DCP, TCE, TCP
Map #42	Wahiawa II, Pump 2 (Well #2902-02)	CTC, MTBE, PCE, TCP

New contaminants were found in the following wells on Maui in 2004.

Map #8	Maunaolu-Smith Well (Well #5320-02)	DBCP, EDB, TCE, TCP
Map #10	Ha`iku Well (Well #5419-01)	TCP
Map #20	Honokohau A (Well #5838-03)	EDB

No chemical contaminants have been detected in the drinking water wells on Moloka`iand Lana`i since the Maps were first prepared in 1989.

This report contains maps and tables for the islands of O`ahu, Hawai`i, Maui and Kaua`i. The Maps identify the locations of current and historic contaminated wells and well fields (an area where many wells in proximity share the same groundwater source). The tables provide information about the contaminated well, such as the use of the well (e.g.drinking water, irrigation, industrial or inactive), the contaminant(s) detected, the concentration of the contaminant (e.g. detected level), and the sampling date when the contaminant was detected.

Table 3-4.Aquifer Monitoring Data

Hydrogeologic Setting: See attached maps.
Spatial Description (optional)[3]:
Map Available (optional): See attached maps.
Data Reporting Period: January 1, 2004 - December 31, 2004

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l No detections or parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l Other parameters are detected at concentrations exceeding the MDL but are less than or equal to the MCLs	Parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of Wells Requiring Special Treatment	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate 5 mg/l VOC, SOC, and Other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Ambient Monitoring Network (optional)	NA	VOC									
		SOC									
		NO_2									
		Other									
Untreated Water Quality Data from Public Water Supply Wells	NA	VOC									
	NA	SOC									
	NA	NO_2									
	NA	Other									
Finished Water Quality Data from Public Water Supply Wells	484	VOC	436				43	5	NA	36	NA
	484	SOC	402				82	0	NA	0	NA
	342	NO_2	84	NA	257	NA	1				NA
		Other									

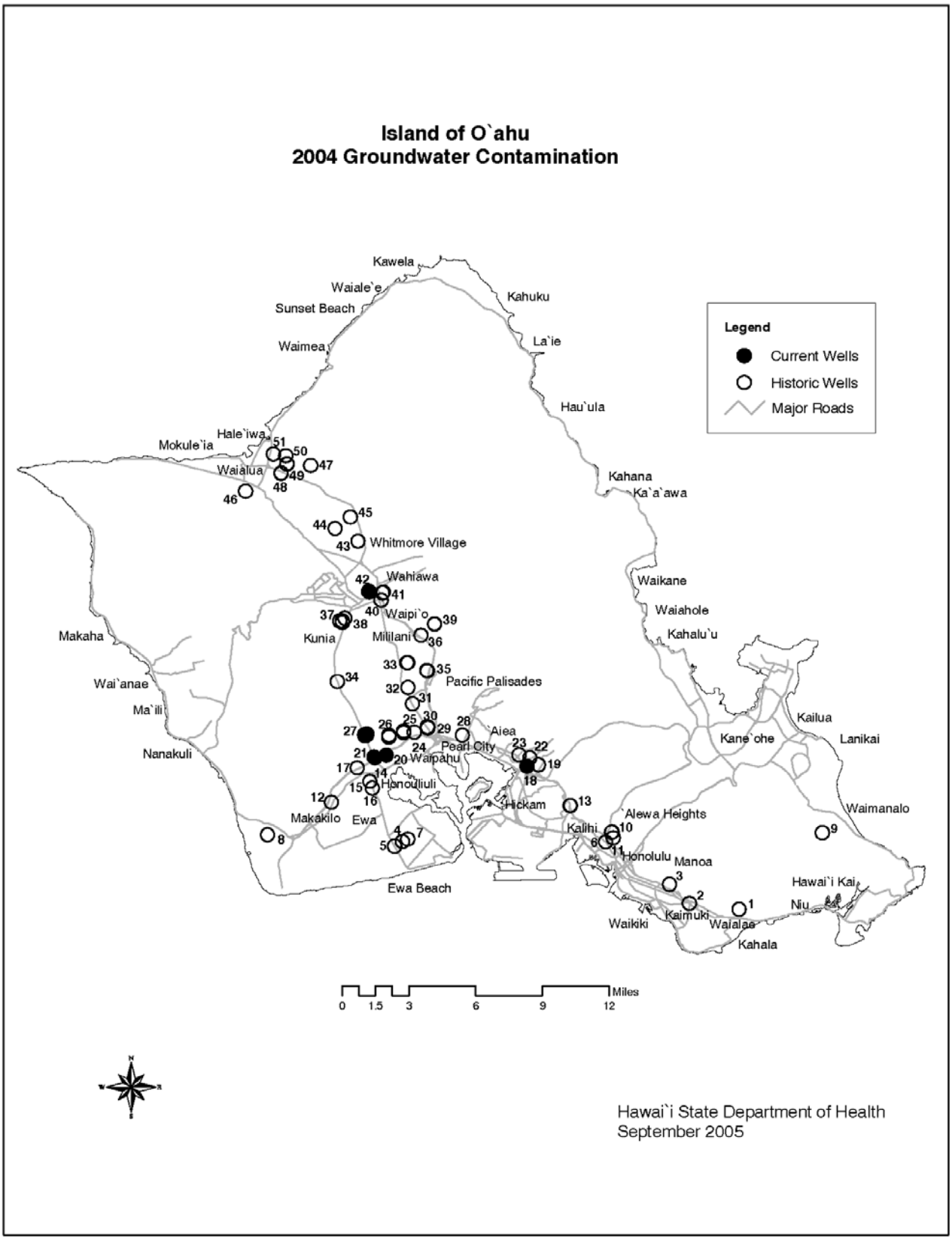
NA - Not available

Table 3-4.Aquifer Monitoring Data

Hydrogeologic Setting: See attached maps.
Spatial Description (optional)[2]:
Map Available (optional): See attached maps.
Data Reporting Period: January 1, 2005 - December 31, 2005

Monitoring Data Type	Total No. of Wells Used in the Assessment	Parameter Groups	Number of Wells								
			No detections of parameters above MDLs or background levels		Nitrate concentrations range from background levels to less than or equal to 5 mg/l No detections or parameters other than nitrate above MDLs or background levels and/or located in areas that are sensitive or vulnerable		Nitrate ranges from greater than 5 to less than or equal to 10 mg/l Other parameters are detected at concentrations exceeding the MDL but are less than or equal to the MCLs	Parameters are detected at concentrations exceeding the MCLs	Number of Wells Removed from service	Number of Wells Requiring Special Treatment	Background parameters exceed MCLs
			ND	Number of wells in sensitive or vulnerable areas (optional)	Nitrate 5 mg/l VOC, SOC, and Other parameters not detected	Number of wells in sensitive or vulnerable areas (optional)					
Ambient Monitoring Network (optional)	NA	VOC									
		SOC									
		NO_2									
		Other									
Untreated Water Quality Data from Public Water Supply Wells	NA	VOC									
	NA	SOC									
	NA	NO_2									
	NA	Other									
Finished Water Quality Data from Public Water Supply Wells	NA	VOC									
	NA	SOC									
	299	NO_2	63	NA	235	NA	1				
	NA	Other									

NA - Not available


Island of O`ahu
2004 Groundwater Contamination
Legend
Current Wells
Historic Wells
Major Roads
Kawela
Waiale`e
Sunset Beach
Waimea
Kahuku
La`ie
Hau`ula
Hale`iwa
Mokule`ia
Waialua
Kahana
Ka`a`awa
Whitmore Village
Wahiawa
Waikane
Waiahole
Kahalu`u
Waipi`o
Mililani
Kunia
Makaha
Wai`anae
Ma`ili
Nanakuli
Pacific Palisades
Aiea
Pearl City
Waipahu
Honouliuli
Hickam
Makakilo
Ewa
Ewa Beach
Kailua
Kane`ohe
Lanikai
Waimanalo
Alewa Heights
Kalihi
Honolulu
Manoa
Hawai`i Kai
Niu
Kaimuki
Waikiki
Waialae
Kahala
Miles
0 1.5 3 6 9 12
Hawai`i State Department of Health
September 2005

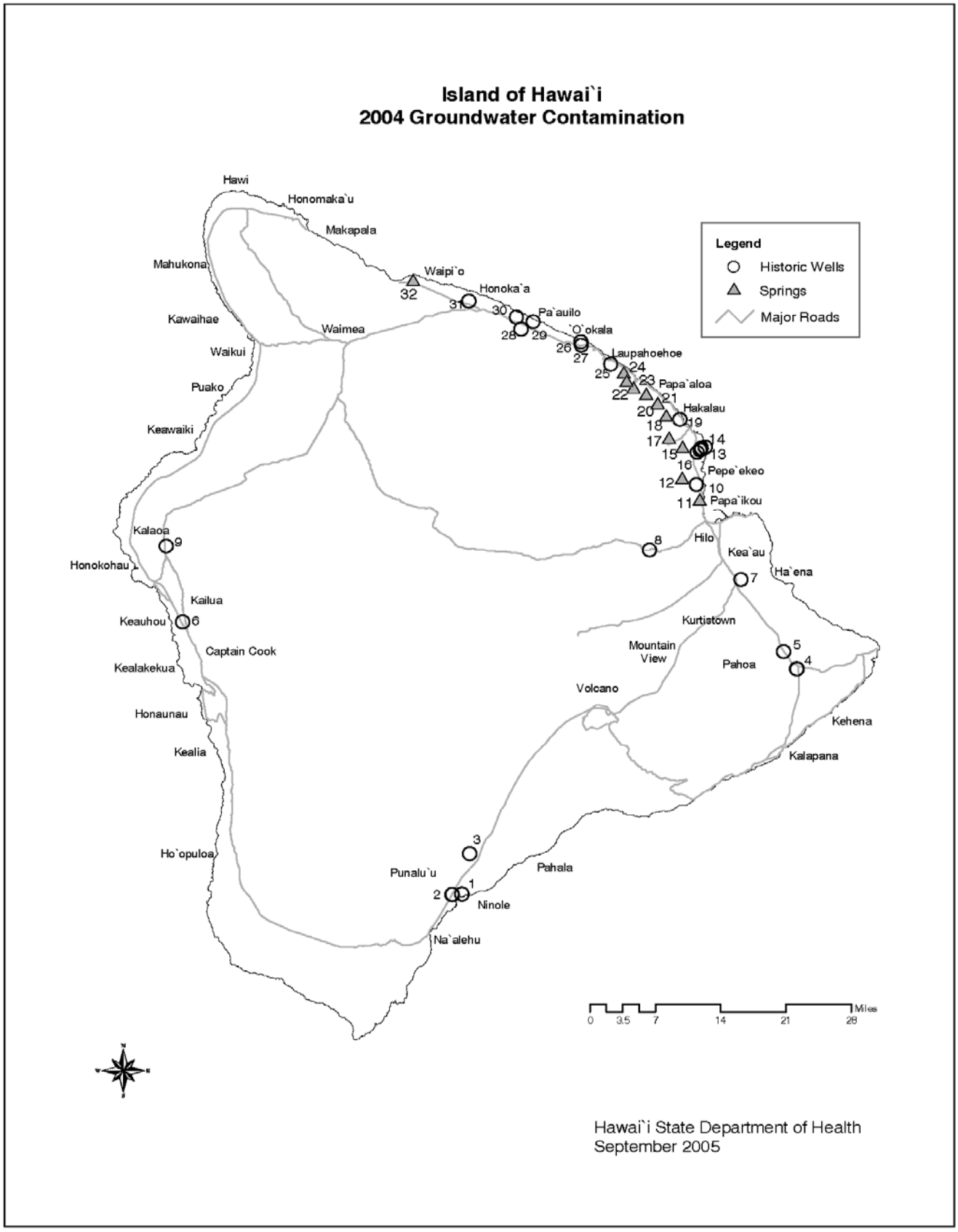
O`AHU 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
1	1746-01	Ainakoa Well	DW	Dieldrin	0.03	07/28/03
2	1748-HS	Kaimuki Station Wells	DW	Dieldrin	0.03	10/06/04
2	1748-LS	Kaimuki Station Wells	DW	Dieldrin	0.02	10/06/04
2	1748-03-10	Kaimuki Station Wells	DW	PCE	0.03	4/23/85*
			*ND after this date. PCE detection levels raised from 0.01 ppb to 0.2 ppb.			
3	1849-14	Wilder Well 1	DW	Dieldrin	0.01	10/06/04
4	1900-01	OSCO Ewa Pump 20	Inactive	Ametryn	NQ <0.05	11/10/92
4	1900-01	OSCO Ewa Pump 20	Inactive	Atrazine	0.71	11/16/93
4	1900-01	OSCO Ewa Pump 20	Inactive	Diamino Atrazine	0.22	11/10/93
4	1900-01	OSCO Ewa Pump 20	Inactive	Desethyl Atrazine	1.20	11/16/93
4	1900-01	OSCO Ewa Pump 20	Inactive	Deisopropyl Atrazine	0.13	11/16/93
5	1901-01	OSCO Ewa Pump 24	Inactive	Ametryn	0.11	11/10/92
5	1901-01	OSCO Ewa Pump 24	Inactive	Atrazine	1.10	11/10/92
5	1901-01	OSCO Ewa Pump 24	Inactive	Diamino Atrazine	0.50	11/10/92
5	1901-01	OSCO Ewa Pump 24	Inactive	Desethyl Atrazine	1.59	11/10/92
5	1901-01	OSCO Ewa Pump 24	Inactive	Deisopropyl Atrazine	0.21	11/10/92
6	1952-HS	Kalihi Station Wells	DW	Dieldrin	0.02	10/06/04
7	2000-01	OSCO Ewa Pump 21	Inactive	Atrazine	0.77	11/16/93
7	2000-01	OSCO Ewa Pump 21	Inactive	Diamino Atrazine	0.25	11/16/93
7	2000-01	OSCO Ewa Pump 21	Inactive	Desethyl Atrazine	1.00	11/16/93
7	2000-01	OSCO Ewa Pump 21	Inactive	Deisopropyl Atrazine	0.13	11/16/93
8	2006-01-11	OSCO Ewa Pump 10	Inactive	Atrazine	NQ <0.10	11/17/92
8	2006-01-11	OSCO Ewa Pump 10	Inactive	Desethyl Atrazine	0.15	11/17/92
9	2043-02	Waimanalo Well 1	Inactive	Alachlor	0.53	01/27/98
10	2052-07	Kamehameha School Well 1	Inactive	Chlordane	NQ <0.30	04/01/98
10	2052-07	Kamehameha School Well 1	Inactive	Dieldrin	0.05	11/16/98
10	2052-11	Kamehameha School Well 2	Inactive	Chlordane	0.40	01/30/97
10	2052-11	Kamehameha School Well 2	Inactive	Dieldrin	0.02	10/23/96
11	2052-12	Jonathan Springs Well	Inactive	Chlordane	0.30	11/08/95
11	2052-12	Jonathan Springs Well	Inactive	Dieldrin	0.06	11/08/95
12	2103-03	Barbers Point Shaft	DW	Atrazine	0.06	10/26/04
12	2103-03	Barbers Point Shaft	DW	Desethyl Atrazine	0.12	11/10/03
13	2153-10	Moanalua Wells P1	DW	Dieldrin	0.01	11/03/04
13	2153-11	Moanalua Wells P2	DW	Dieldrin	0.01	11/03/04
14	2202-03	OSCO Ewa Pump 3	IRR	Atrazine	NQ <0.05	11/10/03
14	2202-03	OSCO Ewa Pump 3	IRR	Desethyl Atrazine	0.12	11/10/03

O`AHU 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
15	2202-05	OSCO Pump 5	IRR	Atrazine	0.07	11/10/03
15	2202-05	OSCO Pump 5	IRR	Desethyl Atrazine	0.08	11/10/03
16	2202-15	OSCO Pump 7A	Inactive	Atrazine	NQ <0.05	11/12/03
16	2202-15	OSCO Pump 7A	Inactive	Desethyl Atrazine	0.01	11/12/03
17	2202-21	OSCO Ewa Pump 15	Inactive	Atrazine	0.15	11/17/92
17	2202-21	OSCO Ewa Pump 15	Inactive	Desethyl Atrazine	0.12	11/17/92
18	2255-32	Halawa Plant (Navy)	DW	Chlordane	NQ<0.30	10/27/04
18	2255-32	Halawa Plant (Navy)	DW	Dieldrin	0.02	10/27/04
19	2255-37	BWS Halawa Well 2	DW	Chlordane	NQ<0.3	10/31/03
19	2255-37	BWS Halawa Well 2	DW	Dieldrin	0.04	04/07/04
19	2255-39	BWS Halawa Well 1	DW	Dieldrin	0.01	07/22/04
20	2301-34	Hoaeae, P1	DW	TCP	0.58	10/29/04
20	2301-35	Hoaeae, P2	DW	TCP	0.40	11/29/04
20	2301-36	Hoaeae, P4	DW	Atrazine	0.06	10/12/04
20	2301-36	Hoaeae, P4	DW	Desethyl Atrazine	NQ<0.05	11/03/03
20	2301-36	Hoaeae, P4	DW	Dieldrin	0.01	10/12/04
20	2301-36	Hoaeae, P4	DW	TCP	0.40	10/29/04
20	2301-37	Hoaeae, P3	DW	Atrazine	0.06	10/12/04
20	2301-37	Hoaeae, P3	DW	Dieldrin	0.012	10/12/04
20	2301-37	Hoaeae, P3	DW	TCP	0.39	10/29/04
20	2301-38	Hoaeae, P5	DW	TCP	0.43	10/29/04
20	2301-39	Hoaeae, P6	DW	TCP	0.35	10/29/04
21	2302-01	Kunia Wells I, P1 (before)	DW	TCE	NQ<0.50	10/06/03
21	2302-01	Kunia Wells I, P1 (before)	DW	TCP	0.69	10/06/03
21	2302-02	Kunia Wells I, P2 (before)	DW	Atrazine	0.06	11/10/03
21	2302-02	Kunia Wells I, P2 (before)	DW	Desethyl Atrazine	0.09	11/10/03
21	2302-02	Kunia Wells I, P2 (before)	DW	TCE	NQ<0.50	07/27/04
21	2302-02	Kunia Wells I, P2 (before)	DW	TCP	1.04	11/10/04
21	2302-03	Kunia Wells I, P3 (before)	DW	TCP	0.87	11/10/04
21	2302-04	Kunia Wells I, P4 (before)	DW	TCE	NQ<0.50	07/27/04
21	2302-04	Kunia Wells I, P4 (before)	DW	TCP	0.58	07/27/04
22	2355-06	Aiea Well Pump 1	DW	Dieldrin	0.02	10/06/04
22	2355-07	Aiea Well Pump 2	DW	Dieldrin	0.01	10/08/04
23	2356-59	Kaamilo Wells	DW	Dieldrin	0.01	04/01/98
23	2356-58 & 59	Kaamilo Wells	DW	PCE	0.03	04/20/85
24	2400-01	Waipahu I, P2 (before)	DW	EDB	NQ<0.04	10/15/04
24	2400-01	Waipahu I, P2 (before)	DW	TCP	0.40	10/15/04
24	2400-02	Waipahu I, P1 (before)	DW	EDB	NQ<0.04	10/15/04
24	2400-02	Waipahu I, P1 (before)	DW	TCP	0.47	10/15/04

O`AHU 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
24	2400-03	Waipahu I, P4 (before)	DW	EDB	NQ<0.04	04/14/99
24	2400-03	Waipahu I, P4 (before)	DW	TCP	NQ<0.50	04/14/99
24	2400-04	Waipahu I, P3 (before)	DW	EDB	NQ<0.04	10/15/04
24	2400-04	Waipahu I, P3 (before)	DW	TCE	NQ<0.50	12/03/04
24	2400-04	Waipahu I, P3 (before)	DW	TCP	0.48	10/15/04
25	2400-05	Waipahu II P1 (before)	DW	TCP	0.76	10/15/04
25	2400-06	Waipahu II P2 (before)	DW	TCP	0.63	10/15/04
25	2400-08	Waipahu II P3 (before)	DW	TCP	0.74	10/29/04
26	2401-04	Kunia III, P1 (before)	DW	TCP	0.19	12/16/04
26	2401-05	Kunia III, P2 (before)	DW	TCP	0.21	11/29/04
26	2401-06	Kunia III, P3 (before)	DW	TCP	0.18	11/29/04
27	2402-01	Kunia Wells II, P1(before)	DW	DBCP	NQ<0.04	07/20/01
27	2402-01	Kunia Wells II, P1(before)	DW	TCE	NQ<0.05	07/20/01
27	2402-01	Kunia Wells II, P1(before)	DW	TCP	1.20	11/09/98
27	2402-02	Kunia Wells II, P2 (before)	DW	DBCP	NQ<0.04	02/06/04
27	2402-02	Kunia Wells II, P2 (before)	DW	DCP	NQ<1.00	03/02/04
27	2402-02	Kunia Wells II, P2 (before)	DW	TCE	NQ<0.50	03/02/04
27	2402-02	Kunia Wells II, P2 (before)	DW	TCP	1.04	02/06/04
27	2402-03	Kunia Wells II, P3 (before)	DW	DBCP	NQ<0.04	07/18/02
27	2402-03	Kunia Wells II, P3 (before)	DW	TCE	NQ<0.50	05/16/03
27	2402-03	Kunia Wells II, P3 (before)	DW	TCP	1.22	05/16/03
27	2402-04	Kunia Wells II, P4 (before)	DW	DBCP	NQ<0.40	07/01/04
27	2402-04	Kunia Wells II, P4 (before)	DW	DCP	NQ<1.00	11/10/04
27	2402-04	Kunia Wells II, P4 (before)	DW	TCE	NQ<0.50	11/10/04
27	2402-04	Kunia Wells II, P4 (before)	DW	TCP	1.22	11/10/04
28	2458-01	Pearl City Shaft (Manana)	DW	PCE	0.03	4/18/85*
28	2458-01	Pearl City Shaft (Manana)	DW	TCP	0.05	10/29/04
			*ND after this date. PCE detection levels raised from 0.01 ppb to 0.2 ppb.			
29	2459-19	Waipio Hts P2	DW	TCP	0.31	10/14/04
29	2459-20	Waipio Hts P1	DW	TCP	0.38	10/15/04
30	2459-23	Waipio Hts I, P1	DW	TCP	0.23	10/14/04
30	2459-24	Waipio Hts I, P2	DW	TCP	0.19	01/16/03
31	2500-01	Waipio Hts. II, P1	DW	TCE	0.60	12/16/04
31	2500-01	Waipio Hts. II, P1	DW	TCP	0.50	12/07/04
31	2500-02	Waipio Hts. II, P2	DW	TCE	0.60	12/16/04
31	2500-02	Waipio Hts. II, P2	DW	TCP	0.83	10/18/04
32	2600-02	Dairy Co. (Kipapa Acres)	DW	TCE	0.50	12/02/04
32	2600-02	Dairy Co. (Kipapa Acres)	DW	TCP	0.65	12/02/04
33	2600-03	Mililani III, P7 (before)	DW	DBCP	0.08	12/02/04
33	2600-03	Mililani III, P7 (before)	DW	DCP	NQ<1.00	12/02/04

O`AHU 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
33	2600-03	Mililani III, P7 (before)	DW	TCP	1.52	12/02/04
33	2600-04	Mililani III, P8 (before)	DW	DBCP	0.09	07/18/02
33	2600-04	Mililani III, P8 (before)	DW	DCP	NQ<1.00	12/13/02
33	2600-04	Mililani III, P8 (before)	DW	TCP	2.29	07/18/02
34	2603-01	Hawaii Country Club (before)	DW	DBCP	0.09	10/14/04
34	2603-01	Hawaii Country Club (before)	DW	EDB	NQ<0.04	10/14/04
34	2603-01	Hawaii Country Club (before)	DW	TCP	0.36	10/14/04
35	2659-02	Waipio Hts III, P2	DW	EDB	NQ<0.04	10/14/04
35	2659-02	Waipio Hts III, P2	DW	TCP	0.47	10/14/04
35	2659-03	Waipio Hts III, P1	DW	TCP	0.45	11/22/04
36	2800-01	Mililani I, P1 (before)	DW	DBCP	0.19	11/12/04
36	2800-01	Mililani I, P1 (before)	DW	DCP	NQ<1.00	11/12/04
36	2800-01	Mililani I, P1 (before)	DW	TCP	2.23	11/12/04
36	2800-02	Mililani I, P2 (before)	DW	DBCP	2.19	11/12/04
36	2800-02	Mililani I, P2 (before)	DW	DCP	NQ<1.00	11/12/04
36	2800-02	Mililani I, P2 (before)	DW	TCP	2.19	11/12/04
36	2800-03	Mililani I, P3 (before)	DW	DBCP	0.15	11/12/04
36	2800-03	Mililani I, P3 (before)	DW	DCP	NQ<1.00	11/12/04
36	2800-03	Mililani I, P3 (before)	DW	TCP	2.89	11/12/04
36	2800-04	Mililani I, P4 (before)	DW	DBCP	0.18	05/12/00
36	2800-04	Mililani I, P4 (before)	DW	DCP	NQ<1.00	06/15/00
36	2800-04	Mililani I, P4 (before)	DW	TCP	2.50	05/12/00
37	2803-03-04	Kunia Battery	IND	Atrazine	NQ<0.05	09/28/93
37	2803-03-04	Kunia Battery	IND	Desethyl Atrazine	NQ<0.05	09/30/92
37	2803-03-04	Kunia Battery	IND	PCE	1.65	04/23/85
37	2803-03-04	Kunia Battery	IND	TCE	3.70	07/24/85
38	2803-05	Del Monte Kunia 3 (before)	DW	CTC	0.80	12/16/04
38	2803-05	Del Monte Kunia 3 (before)	DW	DCP	NQ<1.00	12/16/04
38	2803-05	Del Monte Kunia 3 (before)	DW	PCE	NQ<0.50	12/16/04
38	2803-05	Del Monte Kunia 3 (before)	DW	TCE	4.10	12/16/04
38	2803-05	Del Monte Kunia 3 (before)	DW	TCP	0.15	12/16/04
38	2803-07	Del Monte Kunia 4 (before)	DW	CTC	0.80	12/12/04
38	2803-07	Del Monte Kunia 4 (before)	DW	TCE	4.10	12/16/04
39	2859-01	Mililani II, P5 (before)	DW	DBCP	0.12	02/03/03
39	2859-01	Mililani II, P5 (before)	DW	TCP	2.14	08/19/03
39	2859-02	Mililani II, P6 (before)	DW	DBCP	0.15	11/12/04
39	2859-02	Mililani II, P6 (before)	DW	TCP	2.14	11/12/04
40	2901-02	Schofield Battery (before)	DW	PCE	NQ<0.50	12/14/04
40	2901-02	Schofield Battery (before)	DW	TCE	17.70	12/14/04

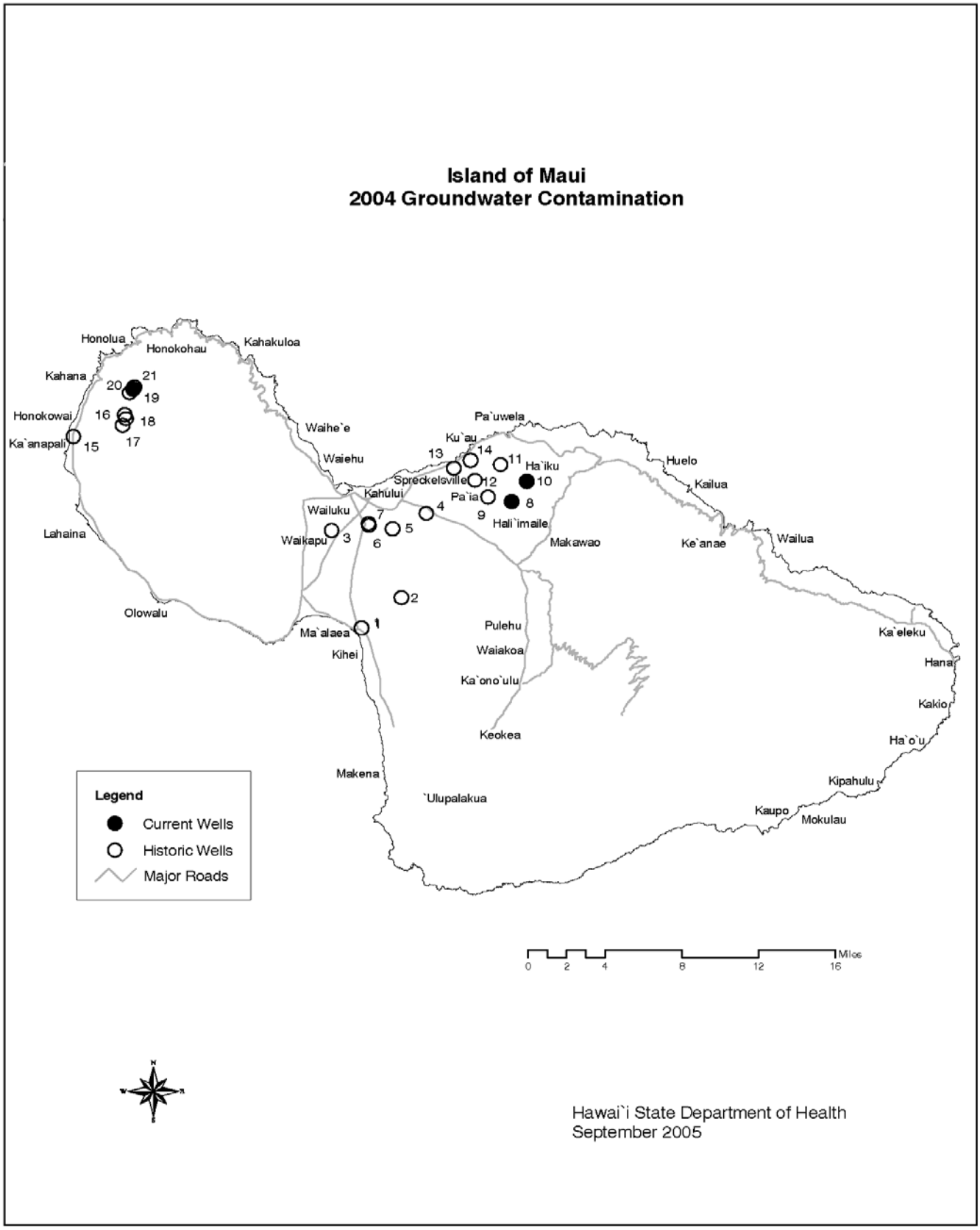
O`AHU 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
41	2901-08	Wahiawa Wells 1, P3	DW	CTC	0.60	02/20/04
41	2901-08	Wahiawa Wells 1, P3	DW	PCE	1.60	02/20/04
41	2901-11	Wahiawa Wells 1, P1	DW	CTC	NQ<0.50	12/06/04
41	2901-11	Wahiawa Wells 1, P1	DW	PCE	0.70	12/06/04
41	2901-11	Wahiawa Wells 1, P1	DW	TCE	NQ<0.50	12/06/04
41	2901-12	Wahiawa Wells 1, P2	DW	CTC	0.60	11/04/04
41	2901-12	Wahiawa Wells 1, P2	DW	PCE	1.00	11/04/04
42	2902-01	Wahiawa Wells II, P1	DW	CTC	NQ<0.50	11/04/04
42	2902-01	Wahiawa Wells II, P1	DW	PCE	0.70	11/04/04
42	2902-01	Wahiawa Wells II, P1	DW	TCP	0.12	11/04/04
42	2902-02	Wahiawa Wells II, P2	DW	CTC	0.70	11/04/04
42	2902-02	Wahiawa Wells II, P2	DW	MTBE	1.20	10/04/04
42	2902-02	Wahiawa Wells II, P2	DW	PCE	2.00	11/04/04
42	2902-02	Wahiawa Wells II, P2	DW	TCP	0.21	11/04/04
43	3102-02	Waialua Sugar P24	IRR	DBCP	0.02	08/20/84
43	3102-02	Waialua Sugar P24	IRR	TCP	0.50	06/03/85
44	3203-01	Waialua Sugar P25	IRR	DBCP	0.12	06/07/83
45	3203-02	Waialua Sugar P26	IRR	DBCP	0.01	06/03/85
45	3203-02	Waialua Sugar P26	IRR	TCP	0.80	06/03/85
46	3307-01	Waialua Battery P2	DW	Atrazine	0.12	11/04/92
46	3307-01	Waialua Battery P2	DW	Desethyl Atrazine	0.15	11/14/92
47	3404-02	Waialua Sugar P17	IRR	DBCP	0.06	11/09/93
47	3404-02	Waialua Sugar P17	IRR	TCP	1.10	11/09/93
48	3405-01	Waialua Wells P1	DW	CTC	NQ<0.50	11/04/04
48	3405-01	Waialua Wells P1	DW	TCE	NQ<0.50	11/04/04
48	3405-01	Waialua Wells P1	DW	TCP	0.58	11/04/04
48	3405-02	Waialua Wells P2	DW	CTC	NQ<0.50	11/04/04
48	3405-02	Waialua Wells P2	DW	TCE	NQ<0.50	11/04/04
48	3405-02	Waialua Wells P2	DW	TCP	0.61	11/04/04
49	3405-03	Haleiwa Well P1	DW	DBCP	NQ<0.04	12/15/04
49	3405-03	Haleiwa Well P1	DW	TCE	0.50	12/15/04
49	3405-03	Haleiwa Well P1	DW	TCP	0.62	12/15/04
49	3405-04	Haleiwa Well P2	DW	DBCP	NQ<0.04	12/15/04
49	3405-04	Haleiwa Well P2	DW	TCE	0.50	12/15/04
49	3405-04	Haleiwa Well P2	DW	TCP	NQ<0.04	12/15/04
50	3505-01-20	Waialua Sugar P3	Inactive	DBCP	NQ<0.04	07/24/97
50	3505-01-20	Waialua Sugar P3	Inactive	TCP	NQ<0.50	07/24/97
51	3506-03	Haleiwa Battery	IRR	Atrazine	0.13	11/04/92
51	3506-03	Haleiwa Battery	IRR	Lindane	0.01	11/12/87


Island of Hawai`i
2004 Groundwater Contamination
Legend
Historic Wells
Springs
Major Roads
Hawi
Honomaka`u
Makapala
Mahukona
Waipi`o
Honoka`a
Pa`auilo
`O`okala
Kawaihae
Waimea
Waikui
Laupahoehoe
Puako
Papa`aloa
Hakalau
Keawaiki
Pepe`ekeo
Papa`ikou
Kalaoa
Hilo
Honokohau
Kea`au
Ha`ena
Kailua
Keauhou
Kurtistown
Mountain View
Captain Cook
Pahoa
Kealakekua
Volcano
Honaunau
Kehena
Kealia
Kalapana
Ho`opuloa
Pahala
Punalu`u
Ninole
Na`alehu
Miles
0 3.5 7 14 21 28
Hawai`i State Department of Health
September 2005

HAWAI`I 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
1	0830-02	Punaluu Th-2	IRR	Atrazine	0.12	12/21/93
1	0830-02	Punaluu Th-2	IRR	Desethyl Atrazine	0.16	12/21/93
2	0831-02	Ninole A	DW	Atrazine	0.08	05/26/04
2	0831-02	Ninole A	DW	Desethyl Atrazine	0.13	01/13/04
2	0831-03	Ninole B	DW	Atrazine	0.08	05/26/04
2	0831-03	Ninole B	DW	Desethly Atrazine	0.11	01/13/04
3	1229-01	Pahala Well	DW	Atrazine	0.16	04/19/04
3	1229-01	Pahala Well	DW	Desethyl Atrazine	0.14	01/13/04
4	2986-01	Pahoa Well 1	DW	Diuron	0.80	08/05/91
4	2986-02	Pahoa Well 2	DW	Diuron	0.80	08/05/91
5	3188-02	Keonepoko Nui 2	DW	Isophorone	0.50	04/24/01
6	3557-02	Kahaluu Well B	Inactive	Isophorone	0.80	08/04/98
7	3802-03-04	Keaau	IND	Ametryne	0.88	02/27/84
7	3802-03-04	Keaau	IND	Atrazine	0.26	02/27/84
8	4110-01	Saddle Road Well A	DW	Isophorone	0.58	11/04/03
9	4258-03	Hualalai Well	DW	Isophorone	0.60	08/07/00
10	4706-01	Papaikou Deep Well	DW	Atrazine	0.20	9/5/03"
10	4706-01	Papaikou Deep Well	DW	Simazine	0.05	9/5/03"
11	4708-99	Papaikou Spring	DW	Atrazine	0.20	9/5/03"
11	4708-99	Papaikou Spring	DW	Simazine	0.05	9/5/03"
12	4708-99	Kaieie Spring	DW	Atrazine	0.25	04/19/04
12	4708-99	Kaieie Spring	DW	Desethyl Atrazine	0.52	12/09/03
12	4708-99	Kaieie Spring	DW	Simazine	0.05	9/5/03"
						"Composite
13	5005-01	Pepeekeo Sugar Makai	Inactive	Atrazine	NQ<0.50	01/22/96
13	5005-01	Pepeekeo Sugar Makai	Inactive	Desethyl Atrazine	0.80	12/14/93
13	5005-01	Pepeekeo Sugar Makai	Inactive	Diuron	0.50	08/05/91
13	5005-01	Pepeekeo Sugar Makai	Inactive	Hexazinone	0.30	08/05/91
13	5005-02	Pepeekeo Sugar	Inactive	Atrazine	0.26	12/08/03
13	5005-02	Pepeekeo Sugar	Inactive	Desethyl Atrazine	0.26	12/08/03
13	5005-02	Pepeekeo Sugar	Inactive	Diuron	0.80	08/05/91

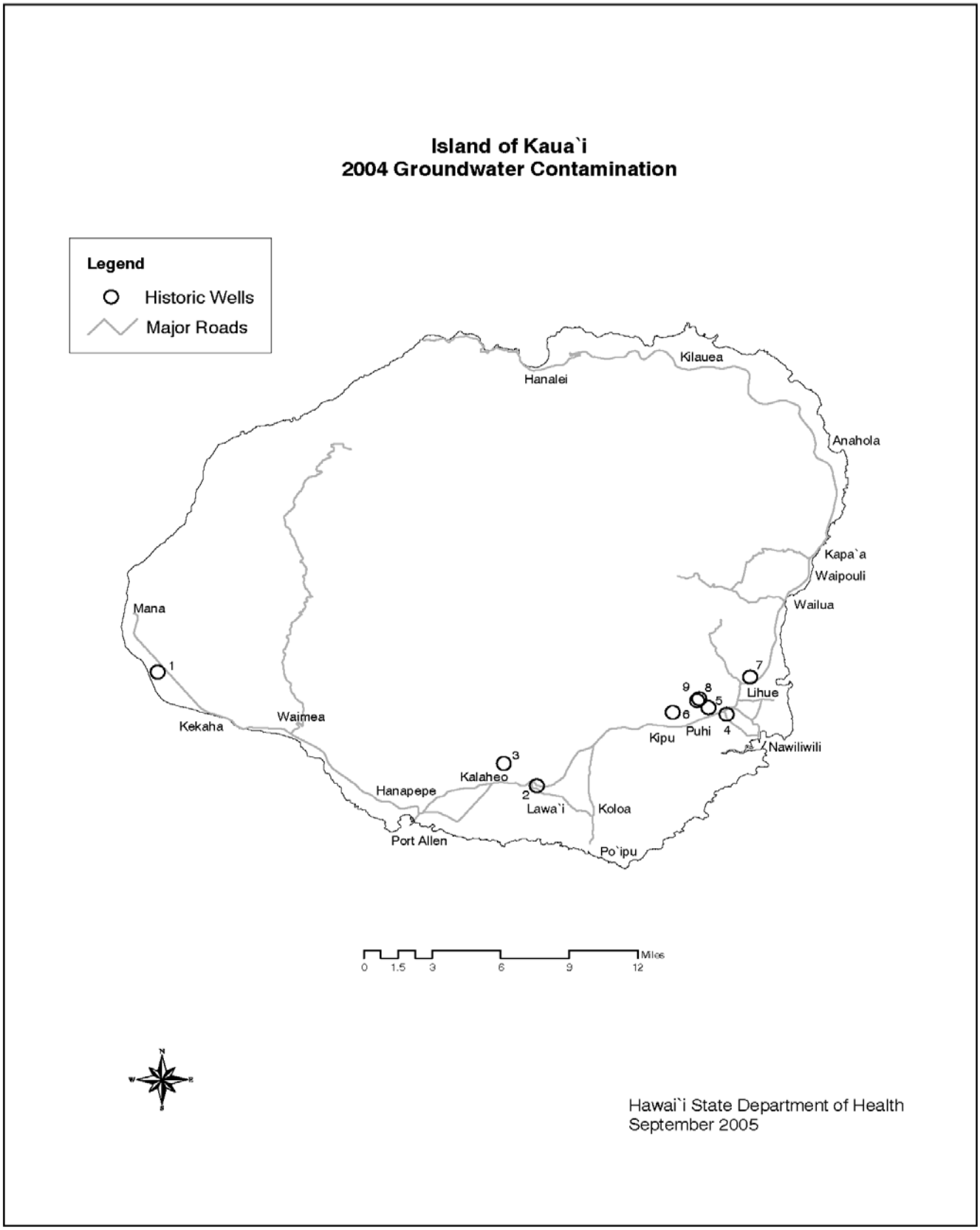
HAWAI`I 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
14	5005-03	HCPC Makai Well 2	Inactive	Atrazine	0.30	12/08/03
14	5005-03	HCPC Makai Well 2	Inactive	Desethyl Atrazine	0.29	12/08/03
14	5005-04	HCPC Makai Well	Inactive	Atrazine	0.30	12/08/03
14	5005-04	HCPC Makai Well	Inactive	Desethyl Atrazine	0.29	12/08/03
15	5006-99	Maukaloa Spring	DW	Atrazine	0.11	04/19/04
15	5006-99	Maukaloa Spring	DW	Desethyl Atrazine	0.09	12/09/03
15	5006-99	Maukaloa Spring	DW	Deisopropyl Atrazine	0.08	12/09/03
15	5006-99	Maukaloa Spring	DW	Simazine	0.05	12/09/03
16	5006-01	Kulaimano Deep Well	DW	Atrazine	0.28	04/19/04
16	5006-01	Kulaimano Deep Well	DW	Desethyl Atrazine	0.13	112/8/03
16	5006-01	Kulaimano Deep Well	DW	Diuron	0.60	08/05/91
16	5006-01	Kulaimano Deep Well	DW	Simazine	0.05	9/5/03"
17	5109-99	Akaka Falls Spring	DW	Atrazine	0.10	9/5/03"
18	5210-99	Hakalau Iki Spring	DW	Atrazine	0.10	9/5/03"
						"Composite
19	5307-01	Hakalau Well	DW	Atrazine	0.18	10/26/04
19	5307-01	Hakalau Well	DW	Desethyl Atrazine	0.46	12/15/03
19	5307-01	Hakalau Well	DW	PCE	0.13	5/6/1985*
				*Detection level changed from 0.01 ppb to 0.2 ppb.		
20	5610-99	Chaves Spring	DW	Atrazine	0.18	04/21/04
20	5610-99	Chaves Spring	DW	Desethyl Atrazine	0.14	12/09/03
21	5611-99	Kaiaakea Spring	Inactive	Atrazine	0.14	12/09/03
21	5611-99	Kaiaakea Spring	Inactive	Desethyl Atrazine	0.10	12/09/03
22	5613-99	Kihalani Spring	Inactive	Hexazinone	0.57	09/09/86
23	5713-99	Papaaloa Spring	Inactive	Atrazine	0.56	02/28/95
24	5814-99	Manowaiopae Spring	Inactive	Atrazine	0.13	6/6/2002**
					** Composite with Laupahoehoe	
25	5814-01	Laupahoehoe Well 1	DW	Atrazine	0.08	4/21/2004**
25	5814-01	Laupahoehoe Well 1	DW	Desethyl Atrazine	0.13	12/16/03
25	5814-02	Laupahoehoe Well 2	DW	Atrazine	0.10	04/21/04
25	5814-02	Laupahoehoe Well 2	DW	Desethyl Atrazine	0.17	12/16/03
				**Composite w/Manowaiopae replaced by newer results.		
26	6017-05	Ookala Well	DW	Atrazine	0.42	04/21/04
26	6017-05	Ookala Well	DW	Desethyl Atrazine	0.93	12/16/03
26	6017-05	Ookala Well	DW	Hexazinone	0.24	12/16/03
26	6017-05	Ookala Well	DW	Isophorone	0.70	7/26/00***
					***Composite with Paauillo	

HAWAI`I 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
27	6117-01	Ookala Shaft	Inactive	Atrazine	0.60	09/11/96
27	6117-01	Ookala Shaft	Inactive	Desethyl Atrazine	1.00	01/12/93
27	6117-01	Ookala Shaft	Inactive	Deisopropyl Atrazine	0.16	01/12/93
27	6117-01	Ookala Shaft	Inactive	Diamino Atrazine	0.15	01/12/93
28	6223-01	Paauilo Well	DW	Atrazine	0.56	10/26/04
28	6223-01	Paauilo Well	DW	Desethyl Atrazine	1.14	12/16/03
28	6223-01	Paauilo Well	DW	Deisopropyl Atrazine	0.05	12/16/03
28	6223-01	Paauilo Well	DW	Diamino Atrazine	0.05	12/16/03
28	6223-01	Paauilo Well	DW	Hexazinone	0.24	12/16/03
28	6223-01	Paauilo Well	DW	Isophorone	0.70	7/26/00***
					***Composite with Ookala	
29	6321-02	Paauilo Shaft	Inactive	Atrazine	0.59	02/28/95
29	6321-02	Paauilo Shaft	Inactive	Hexazinone	1.10	09/09/86
30	6323-01	Big Island Meat	Inactive	Atrazine	0.27	12/15/03
30	6323-01	Big Island Meat	Inactive	Desethyl Atrazine	0.39	12/15/03
30	6323-01	Big Island Meat	Inactive	Hexazinone	0.31	12/15/03
31	6528-01	Haina Well	DW	Atrazine	0.37	10/26/04
31	6528-01	Haina Well	DW	Desethyl Atrazine	0.60	12/08/03
31	6528-01	Haina Well	DW	Hexazinone	0.15	12/08/03
32	6734-99	Waiuliuli Spring	DW	Atrazine	0.14	04/20/04
32	6734-99	Waiuliuli Spring	DW	Desethyl Atrazine	0.17	12/15/03

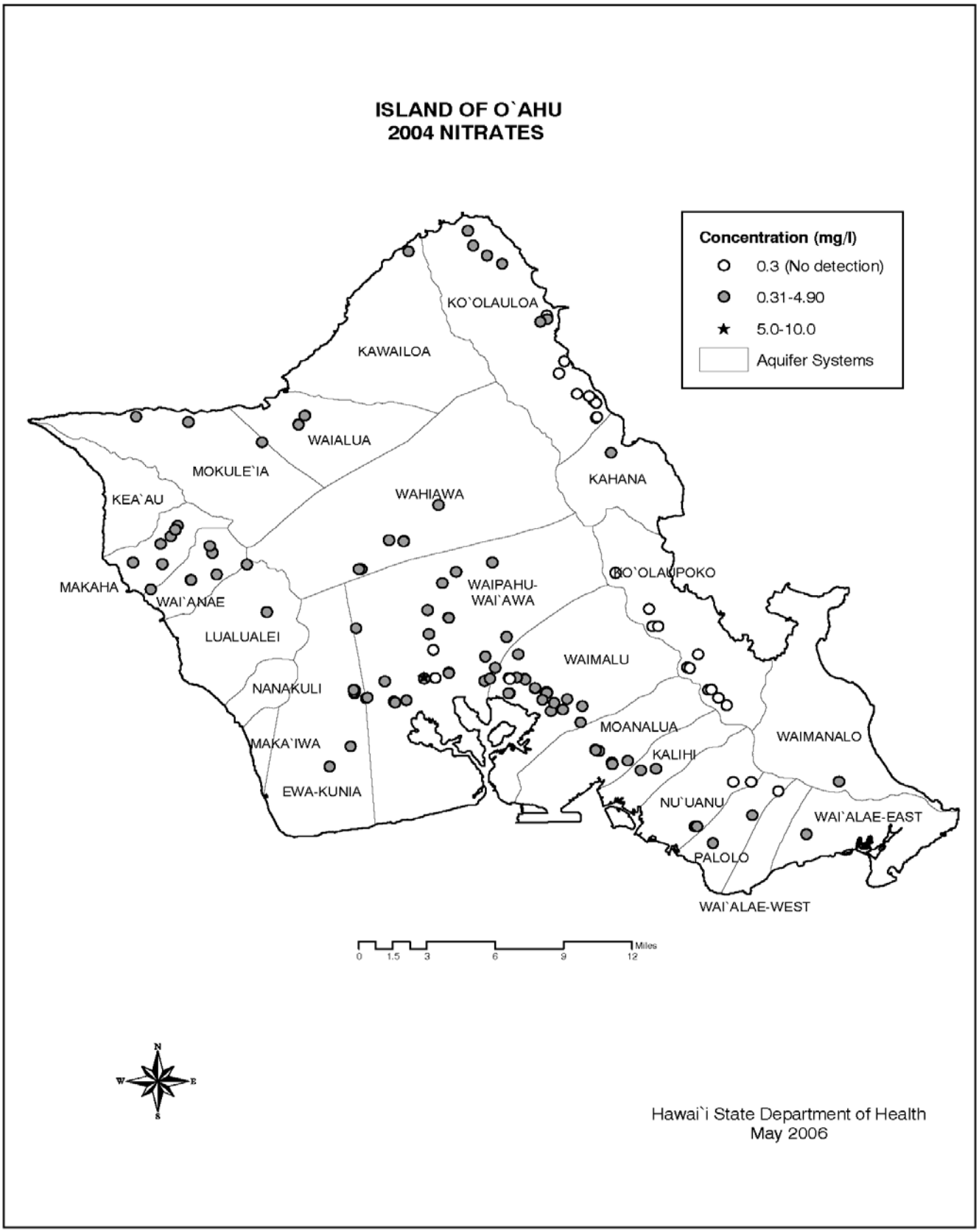

Island of Maui
2004 Groundwater Contamination
Honolua
Honokohau
Kahakuloa
Kahana
Honokowai
Ka`anapali
Lahaina
Olowalu
Waihe`e
Waiehu
Pa`uwela
Ku`au
Ha`iku
Huelo
Kailua
Spreckelsville
Pa`ia
Kahului
Wailuku
Waikapu
Hali`imaile
Makawao
Ke`anae
Wailua
Ma`alaea
Kihei
Pulehu
Waiakoa
Ka`ono`ulu
Keokea
Makena
`Ulupalakua
Ka`eleku
Hana
Kakio
Ha`o`u
Kipahulu
Kaupo
Mokulau
Legend
Current Wells
Historic Wells
Major Roads
Miles
0 2 4 8 12 16
Hawai`i State Department of Health
September 2005

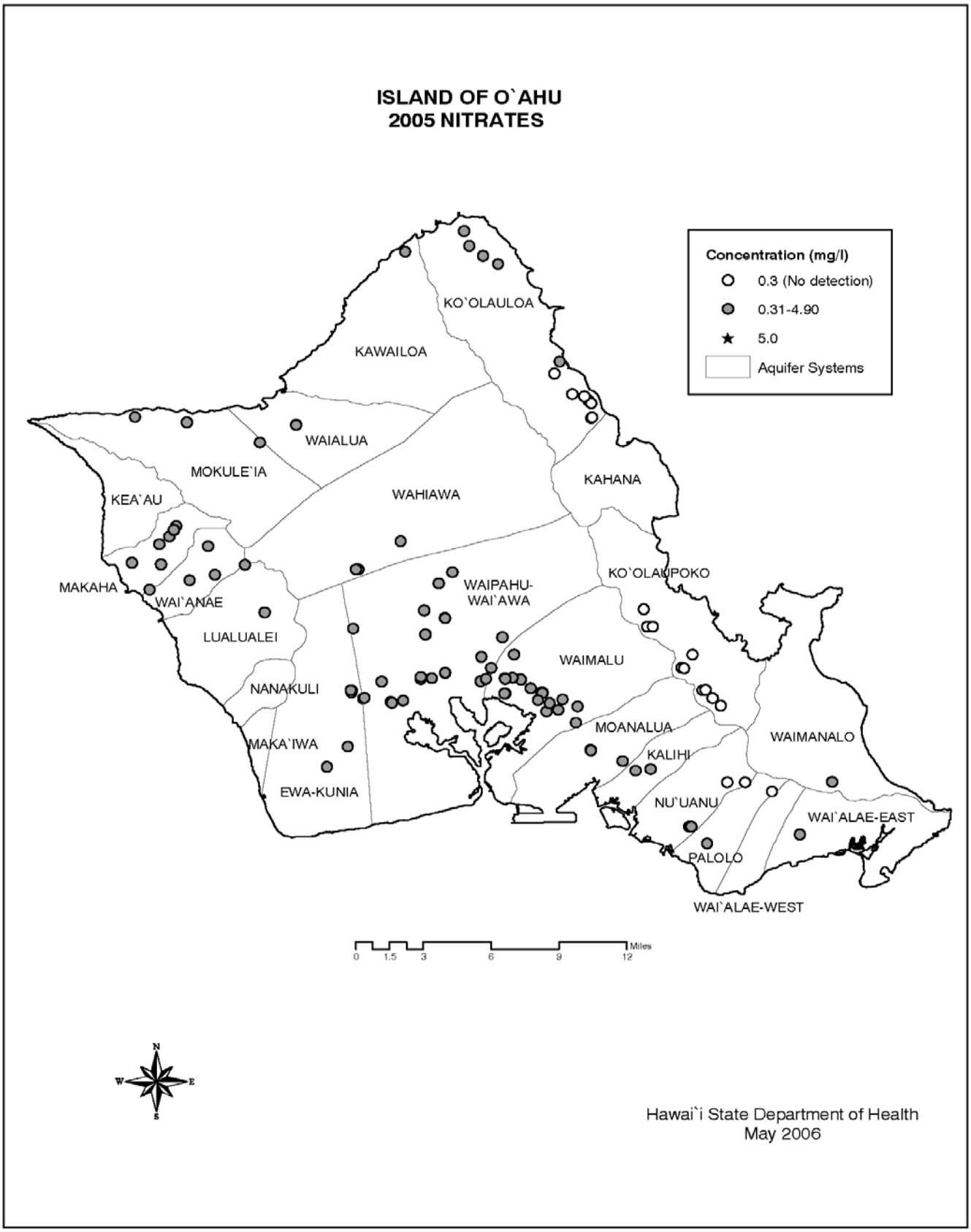
MAUI 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
1	4727-01	Kihei Well 1	IRR	Atrazine	0.12	11/24/03
1	4727-01	Kihei Well 1	IRR	Desethyl Atrazine	0.24	11/24/03
1	4727-01	Kihei Well 1	IRR	Diamino Atrazine	0.07	11/24/03
2	4825-01	Kihei Well 3	IRR	Atrazine	0.05	11/24/03
2	4825-01	Kihei Well 3	IRR	Desethyl Atrazine	0.14	11/24/03
3	5129-01	Reynolds Well #1	Inactive	DBCP	NQ<0.04	02/16/93
4	5224-02	Puunene Pump 9	IRR	Desethyl Atrazine	0.06	11/24/03
5	5226-02	Puunene Pump 6	IRR	Atrazine	0.08	11/24/03
5	5226-02	Puunene Pump 6	IRR	Desethyl Atrazine	0.10	11/24/03
6	5227-04	Puuene Pump 7A	IND	Desethyl Atrazine	0.09	11/25/03
6	5227-04	Puuene Pump 7A	IND	EDB	0.04	03/12/85
7	5227-05	Puunene Mill Pump 19	IRR	Atrazine	0.08	11/24/03
7	5227-05	Puunene Mill Pump 19	IRR	Desethyl Atrazine	0.13	11/24/03
8	5320-02	Maunaolu-Smith Well		DBCP	NQ<0.04	11/03/04
8	5320-02	Maunaolu-Smith Well		EDB	0.19	11/03/04
8	5320-02	Maunaolu-Smith Well		TCE	NQ<0.50	11/15/04
8	5320-02	Maunaolu-Smith Well		TCP	0.73	11/03/04
9	5321-01	Kaheka #18	IRR	DBCP	0.02	08/16/89
9	5321-01	Kaheka #18	IRR	EDB	0.05	08/16/89
9	5321-01	Kaheka #18	IRR	TCP	0.13	08/16/89
10	5419-01	Haiku	DW	TCP	0.15	11/08/04
11	5420-01	Maui High School	IRR	DBCP	0.09	03/04/85
11	5420-01	Maui High School	IRR	EDB	0.07	03/04/85
11	5420-01	Maui High School	IRR	TCP	0.43	03/04/85
12	5422-02	Paia #7	IRR	Atrazine	0.23*	03/11/97
12	5422-02	Paia #7	IRR	EDB	0.03	03/04/85
13	5423-02	Paia #16	IRR	Atrazine	0.10*	3/17/98
13	5423-02	Paia #16	IRR	Atrazine	NQ<0.50	11/25/03
13	5423-02	Paia #16	IRR	Bromacil	0.42	11/25/03
13	5423-02	Paia #16	IRR	Desethyl Atrazine	0.09	11/25/03
					*DOA	
14	5522-01	Kuau Pump 12	IRR	TCP	0.43	03/04/85
15	5641-01	Kaanapali Pump D	IRR	Ametryn	0.21	12/02/03
16	5738-01	Kaanapali P5 (before)	DW	DBCP	0.08	10/11/04
16	5738-01	Kaanapali P5 (before)	DW	TCP	0.82	10/11/04

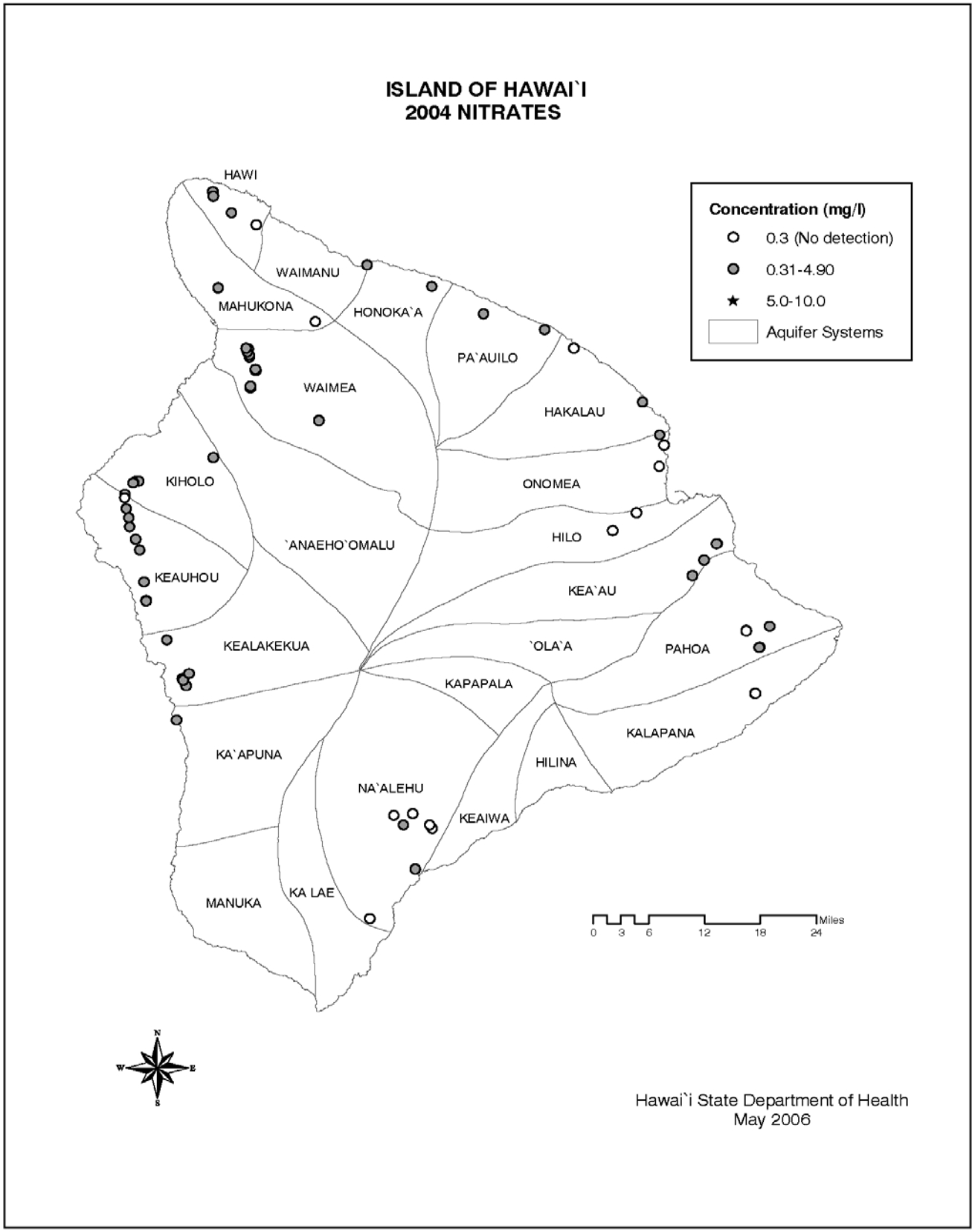
MAUI 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
17	5739-01	Kaanapali P4 (before)	DW	DBCP	NQ<0.04	10/11/04
17	5739-01	Kaanapali P4 (before)	DW	TCP	0.42	10/11/04
18	5739-02	Kaanapali P6 (before)	DW	DBCP	0.27	10/11/04
18	5739-02	Kaanapali P6 (before)	DW	TCP	0.67	10/11/04
19	5838-01	Napili A	Inactive	DBCP	0.36	6/4/93
20	5838-03	Honokohau A (Napili D)	DW	DBCP	0.04	11/22/04
20	5838-03	Honokohau A (Napili D)	DW	EDB	0.01	11/22/04
20	5838-03	Honokohau A (Napili D)	DW	TCP	0.06	11/22/04
21	5838-04	Napili C	DW	DBCP	NQ<0.04	11/23/04
21	5838-04	Napili C	DW	TCP	0.07	11/23/04

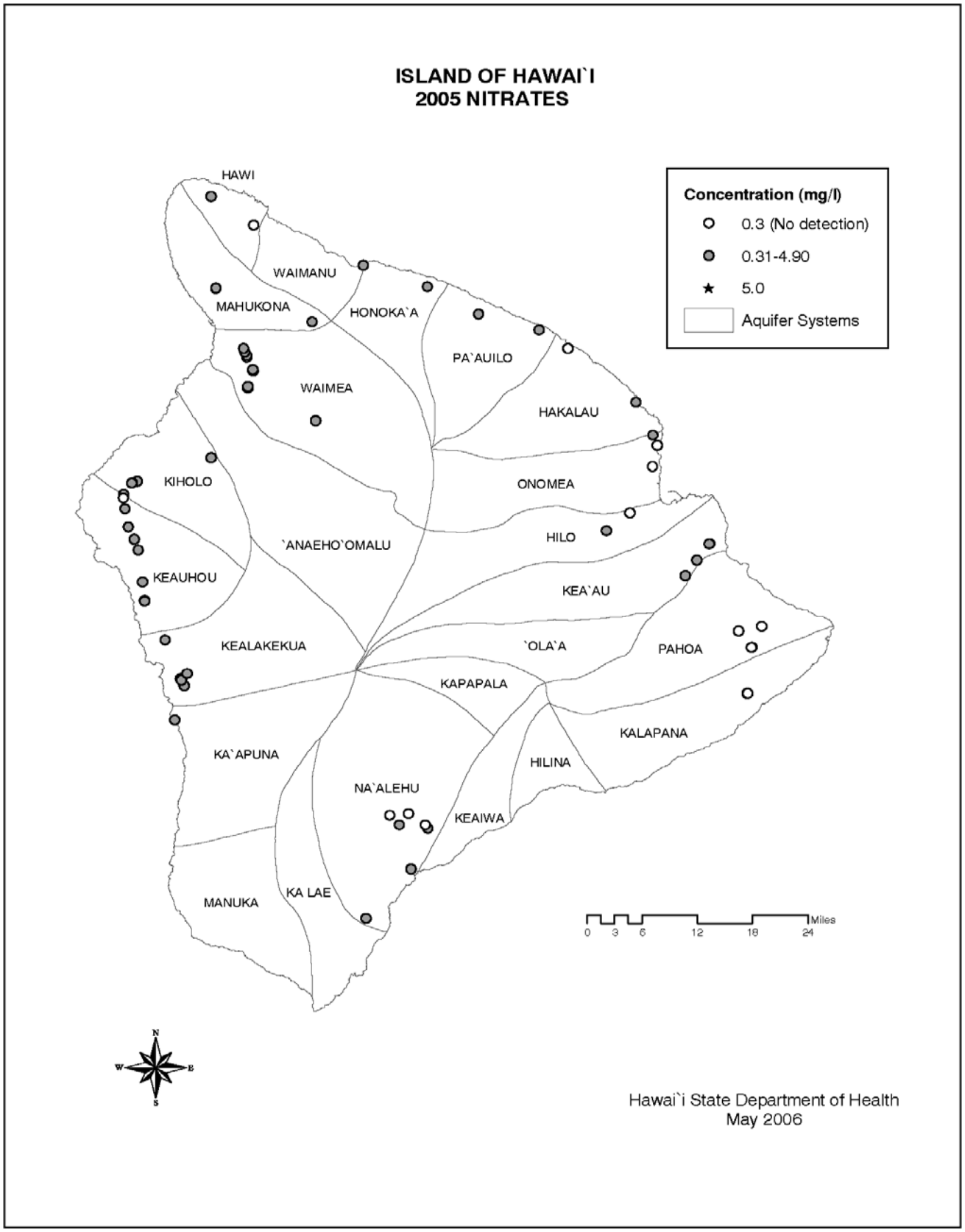

Island of Kaua`i
2004 Groundwater Contamination
Legend
Historic Wells
Major Roads
Hanalei
Kilauea
Anahola
Kapa`a
Waipouli
Wailua
Mana
Kekaha
Waimea
Lihue
Kipu
Puhi
Nawiliwili
Kalaheo
Hanapepe
Lawa`i
Koloa
Port Allen
Po`ipu
1
2
3
4
5
6
7
8
9
0 1.5 3 6 9 12 Miles
Hawai`i State Department of Health
September 2005

KAUA'I 2004 Contamination Map						
Map #	Well #	Well Name	Use	Contaminant	Detected Level (ppb)	Date
1	0045-04	Barking Sands	IRR	Ametryn	0.80	07/12/88
1	0045-04	Barking Sands	IRR	Atrazine	3.50	07/12/88
1	0045-04	Barking Sands	IRR	Simazine	0.20	07/12/88
2	5530-03	Lawai Well 1	DW	TCP	0.04	01/29/04
3	5631-01	Kalaheo Deep Well 1	DW	Isophorone	0.70	9/17/01*
4	5822-02	Grammar School Well	DW	Isophorone	0.60	07/08/98
5	5823-01	Garlinghouse Tunnel	DW	Atrazine	0.06	05/25/04
5	5823-01	Garlinghouse Tunnel	DW	Desethyl Atrazine	NQ<0.05	11/17/03
6	5824-06	Puhi Well 4	DW	DBCP	NQ<0.04	11/24/03
6	5824-06	Puhi Well 4	DW	EDB	NQ<0.04	11/24/03
6	5824-06	Puhi Well 4	DW	TCE	NQ<0.5	10/31/02
6	5824-06	Puhi Well 4	DW	TCP	0.08	11/03/04
7	5921-01	Kalepa	DW	Isophorone	0.50	9/17/01*
8	5923-02	Kilohana B	DW	Isophorone	1.60	9/4/01*
9	5923-03	Kilohana C	DW	Atrazine	0.08	11/24/03
9	5923-03	Kilohana C	DW	Bromacil	0.20	11/17/03
						*Montgomery Lab


ISLAND OF O`AHU
2004 NITRATES
Concentration (mg/l)
0.3 (No detection)
0.31-4.90
5.0-10.0
Aquifer Systems
KO`OLAULOA
KAWAILOA
WAIALUA
MOKULE`IA
KEA`AU
WAHIAWA
KAHANA
MAKAHA
WAI`ANAE
WAIPAHU-
WAI`AWA
KO`OLAUPOKO
LUALUALEI
WAIMALU
NANAKULI
MOANALUA
WAIMANALO
MAKA`IWA
KALIHI
EWA-KUNIA
NU`UANU
WAI`ALAE-EAST
PALOLO
WAI`ALAE-WEST
0 1.5 3 6 9 12 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006


ISLAND OF O`AHU
2005 NITRATES
Concentration (mg/l)
0.3 (No detection)
0.31-4.90
5.0
Aquifer Systems
KO`OLAULOA
KAWAILOA
WAIALUA
MOKULE`IA
KEA`AU
WAHIAWA
KAHANA
MAKAHA
WAI`ANAE
WAIPAHU-
WAI`AWA
KO`OLAUPOKO
LUALUALEI
WAIMALU
NANAKULI
MOANALUA
WAIMANALO
MAKA`IWA
KALIHI
EWA-KUNIA
NU`UANU
WAI`ALAE-EAST
PALOLO
WAI`ALAE-WEST
0 1.5 3 6 9 12 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006


ISLAND OF HAWAI`I
2004 NITRATES
Concentration (mg/l)
0.3 (No detection)
0.31-4.90
5.0-10.0
Aquifer Systems
HAWI
WAIMANU
MAHUKONA
HONOKA`A
PA`AUILO
WAIMEA
HAKALAU
KIHOLO
ONOMEA
HILO
`ANAEHO`OMALU
KEAUHOU
KEA`AU
KEALAKEKUA
`OLA`A
PAHOA
KAPAPALA
KALAPANA
KA`APUNA
HILINA
NA`ALEHU
KEAIWA
KA LAE
MANUKA
0 3 6 12 18 24 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006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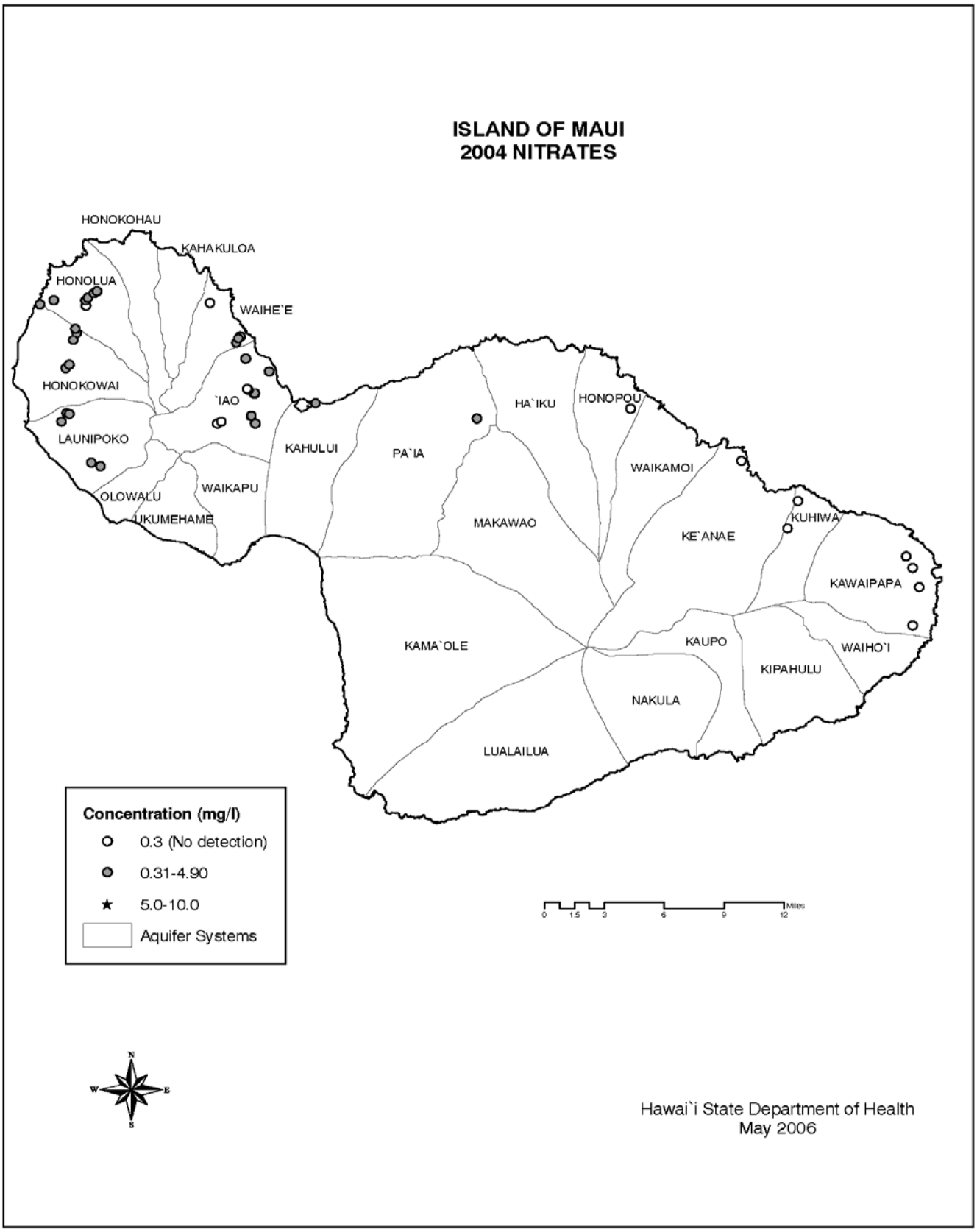
Hawai`i State Department of Health
May 2006


ISLAND OF MAUI
2004 NITRATES
HONOKOHAU
KAHAKULOA
HONOLUA
WAIHE`E
HONOKOWAI
`IAO
LAUNIPOKO
KAHULUI
PA`IA
HA`IKU
HONOPOU
WAIKAMOI
OLOWALU
WAIKAPU
UKUMEHAME
MAKAWAO
KE`ANAE
KUHIWA
KAWAIPAPA
KAMA`OLE
KAUPO
WAIHO`I
KIPAHULU
NAKULA
LUALAILUA
Concentration (mg/l)
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0.31-4.90
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Aquifer Systems
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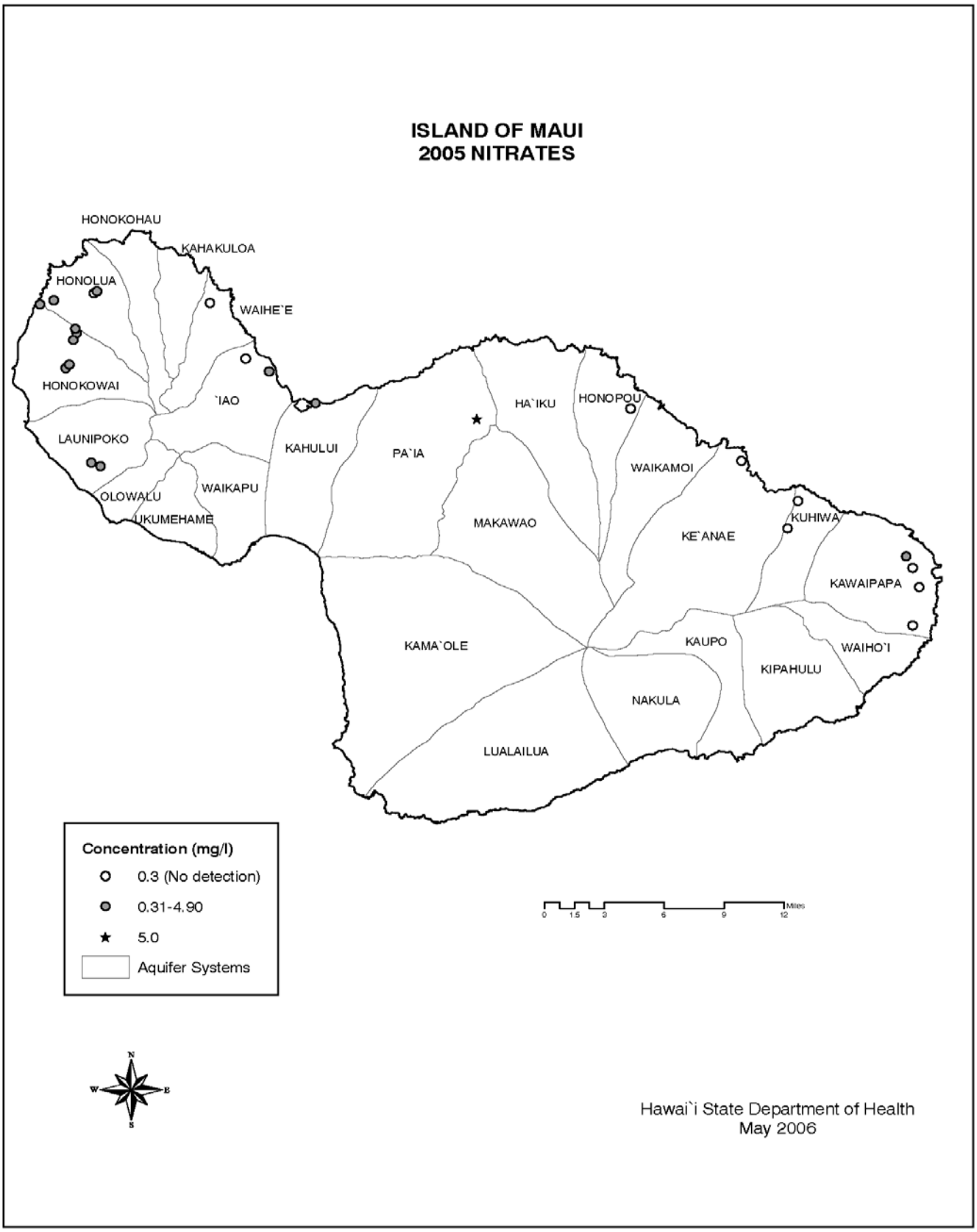
Hawai`i State Department of Health
May 2006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KAHAKULOA
HONOLUA
WAIHE`E
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Hawai`i State Department of Health
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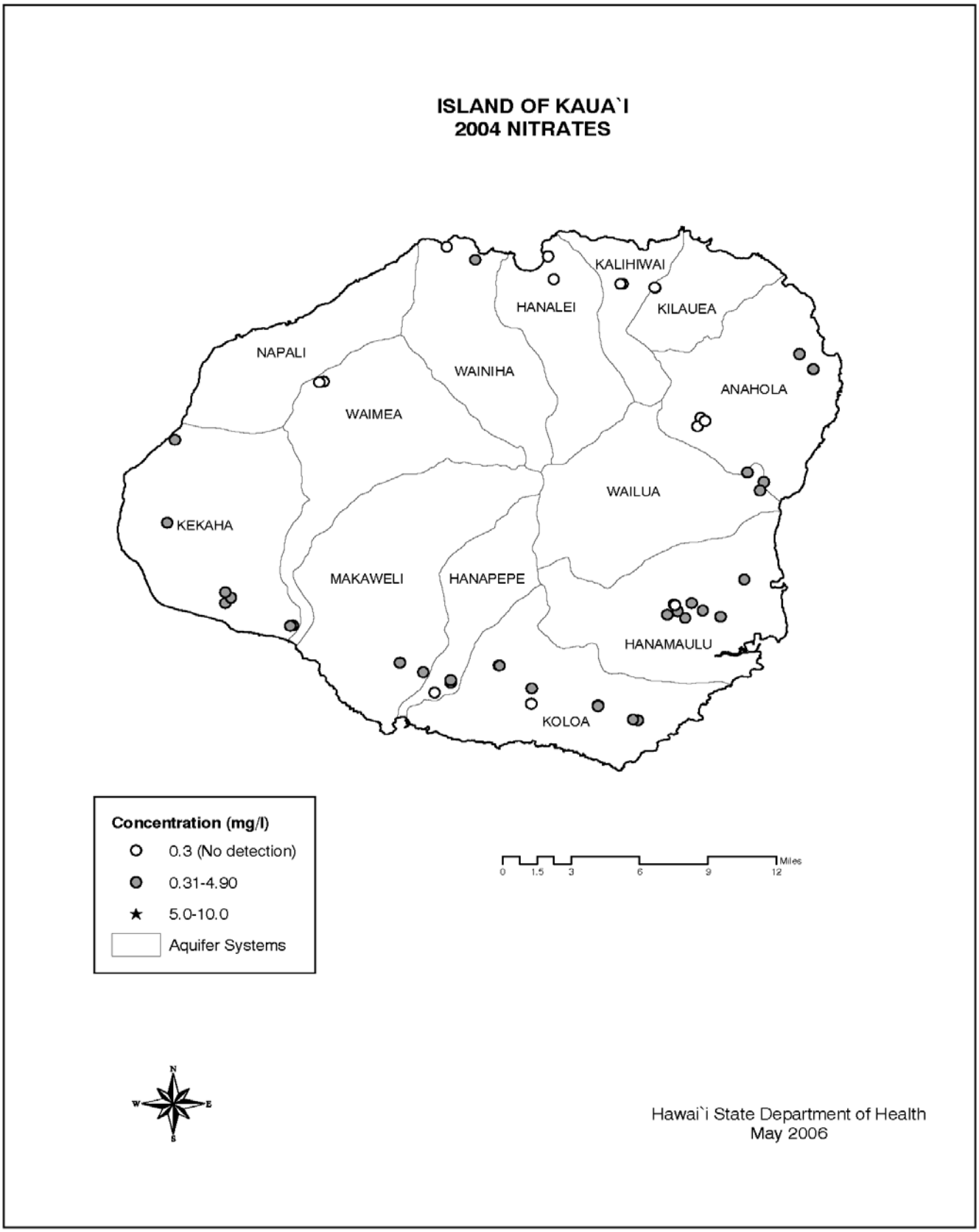
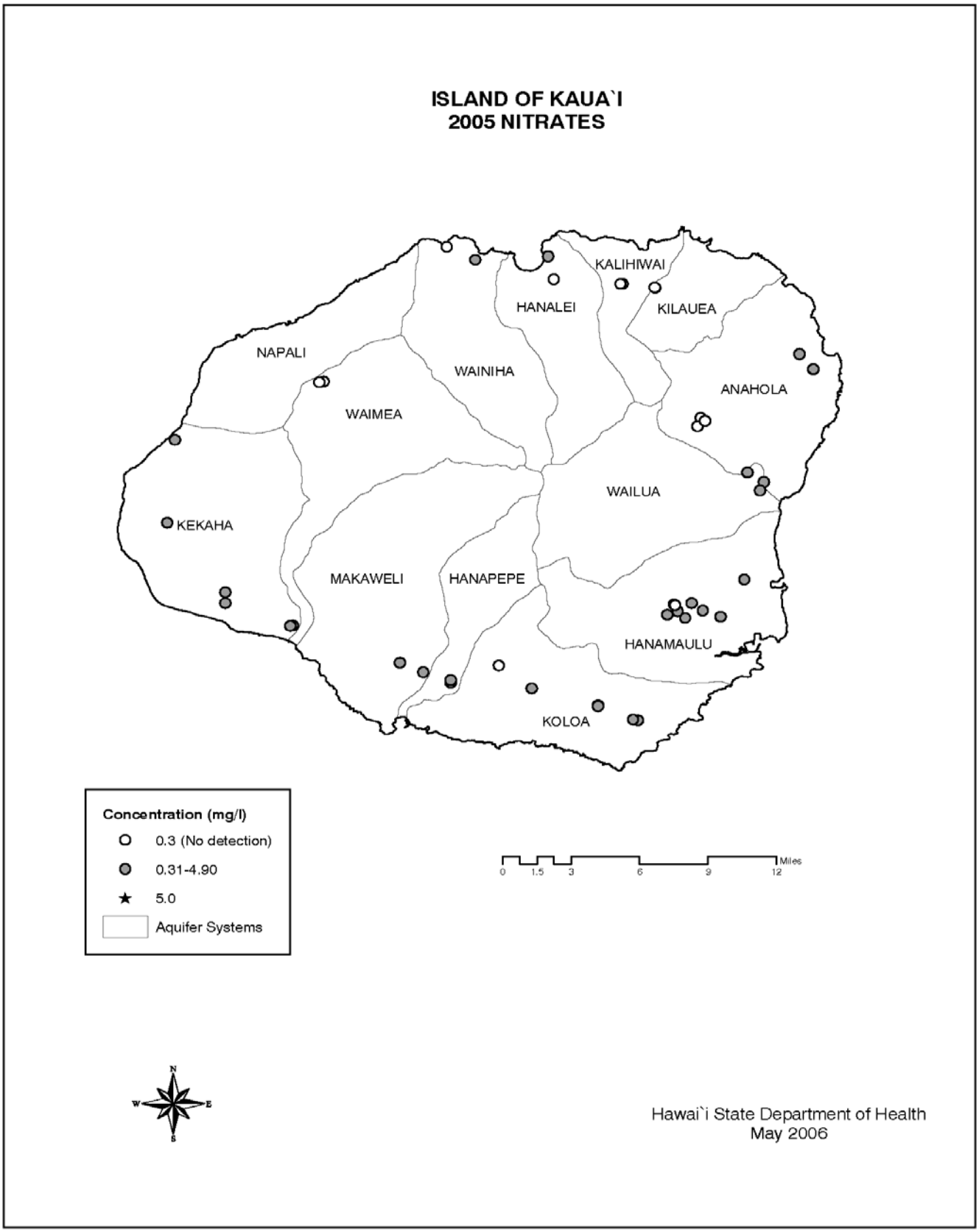

ISLAND OF KAUA`I
2004 NITRATES
KALIHIWAI
HANALEI
KILAUEA
NAPALI
WAINIHA
ANAHOLA
WAIMEA
WAILUA
KEKAHA
MAKAWELI
HANAPEPE
HANAMAULU
KOLOA
Concentration (mg/l)
0.3 (No detection)
0.31-4.90
5.0-10.0
Aquifer Systems
0 1.5 3 6 9 12 Miles
N
W
E
S
Hawai`i State Department of Health
May 2006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