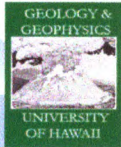


Maui County Department of Water Supply

Wellhead Protection Through Zoning in Maui County

County Council Water Resources Committee
September 30, 2015

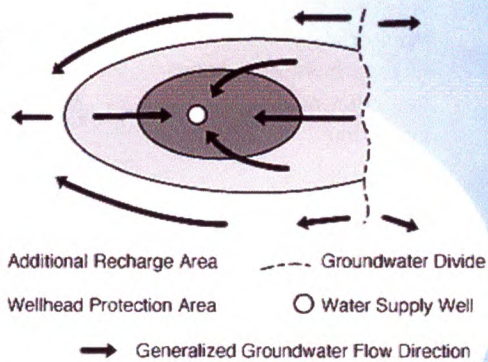


What is the Wellhead Protection Program?

Developed through collaborative process to protect County's potable wells from contamination and prevent the need for expensive treatment

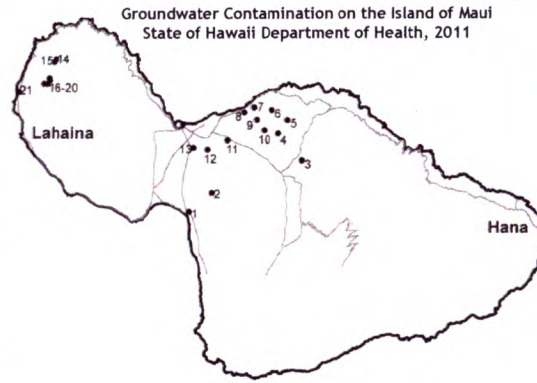
Wellhead Protection Area:
The surface and subsurface area surrounding a well, through which contaminants are reasonably likely to reach the well

- Common sources of contamination:**
- Leaks & spills from chemical storage
 - Industrial processes
 - Pesticide and fertilizer applications
 - Cesspools



Why Wellhead Protection?

- 70% of Maui's drinking water supply is groundwater
- Years between contaminating event and detection
- Aquifers ranked as vulnerable to contamination
- Organic compounds detected in 73% of Oahu public supply wells
- Current practices and regulations of many potential contaminating activities are not sufficient to prevent contamination
- Gaps in regulations put our drinking water wells at risk!



Maui Island Plan:
 "Complete and implement DWS wellhead protection program to protect the water quality of public and private wells"

Community Plans:
 "Promote and implement programs for groundwater and wellhead protection"

3

Prevention or Treatment?

- Contamination :
- Treatment
 - Monitoring
 - Alternate water supplies
 - Remediation
 - Litigation
- Prevention:
- Simpler
 - Less expensive
 - More reliable over long term

GAC or Air Stripping at 32 Sites	32 Sites Median	32 Sites Average
Average volume of groundwater treated per year (1,000 gal)	30,000	120,000
Total capital cost	\$2,000,000	\$4,900,000
Average operating cost/year	\$260,000	\$770,000
Capital cost per volume of treated groundwater/ year (\$/1,000 gal)	\$78	\$280
Average annual operating cost per volume of treated groundwater/year (\$/1,000 gal)	\$16	\$32

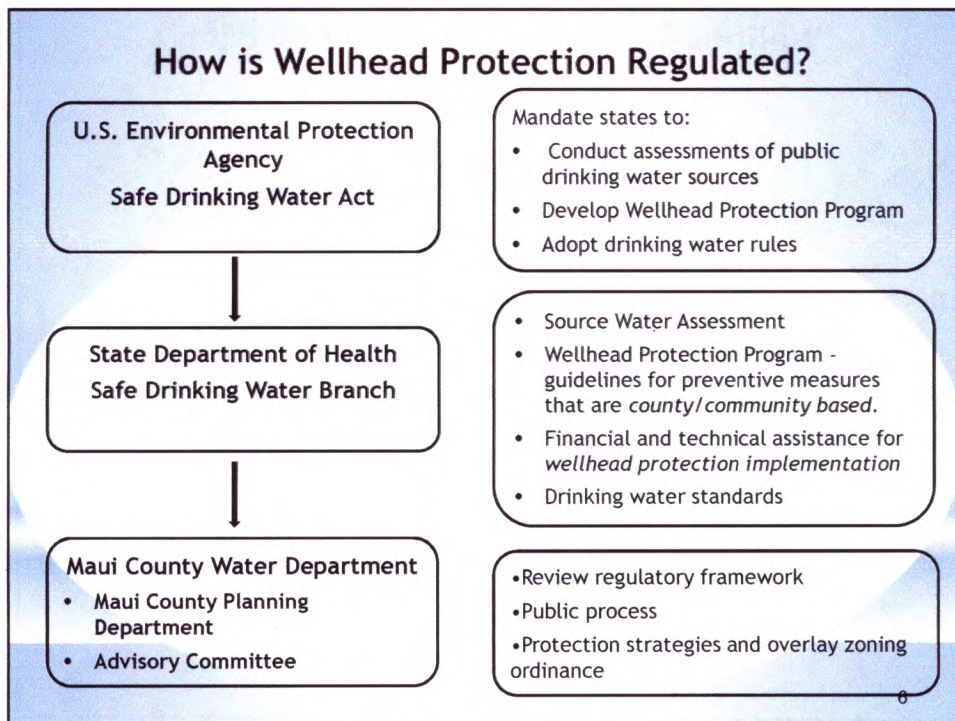
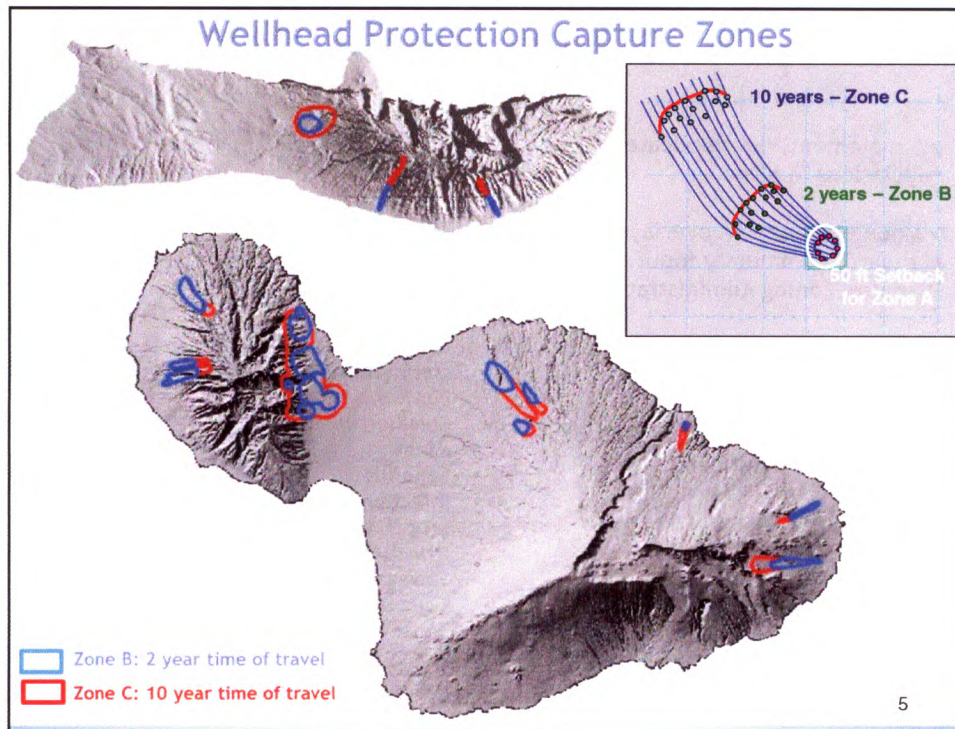
(Cost Analyses for Selected Groundwater Cleanup Projects: Pump and Treat Systems and Permeable Reactive Barriers, EPA)



1. Delineate wellhead protection areas
2. Inventory potential contaminating activities
3. Develop wellhead protection strategy with public participation

Cost to clean up groundwater exceeds prevention cost at a 3:1 ratio

4



Wellhead Protection Overlay District

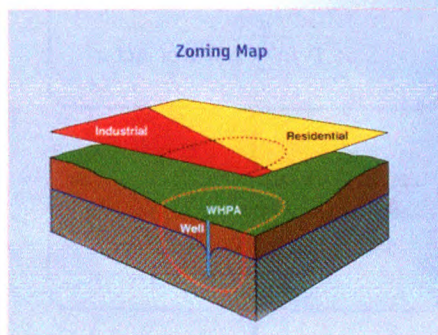
- ✓ Supplement, not duplicate regulations in place
- ✓ Modeled upon EPA overlay zoning standard, community input, Dept of Planning/Zoning Administration
- ✓ Zoning - restrict NEW high risk uses
- ✓ Administrative permit with best management practices
- ✓ Existing uses grandfathered in

PROHIBITED NEW HIGH RISK USES:

- Cesspools
- Commercial electrical/electronic manufacturing facilities
- Commercial chemical processing/storage facilities
- Mortuaries/graveyards
- Golf courses
- Commercial metal plating/finishing/fabricating facilities
- Plastics/synthetic production facilities
- Commercial junk/scrap/salvage yards
- Mines
- Landfills
- Injection wells on non residential properties
- Irrigation with R2/R3 reclaimed water
- Sewage sludge land applications
- Commercial slaughterhouses
- Wastewater percolation ponds

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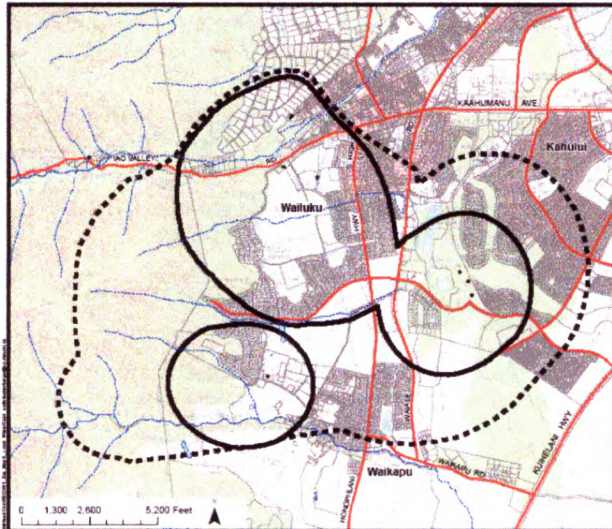
Wellhead Protection Overlay District



- New plastic production facility - NO
- New landfill - NO
- New agricultural supply storage: YES - with best management practices

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Wellhead Protection Overlay District - Central Maui



- LEGEND**
- WPOD ZONE A
 - WPOD ZONE B - 2 year
 - ⋯ WPOD ZONE C - 10 year
 - 2013 PARCEL



NOTE:
 WPOD zones were delineated by the University of Hawaii Department of Geology & Geophysics utilizing head distance for the ZONE A and Time of Travel (TOT) criteria for Zones B and C using the USGS 3-dimensional numerical groundwater model, MODFLOW, followed by the particle tracking program, MODPATH.

ZONE A - Direct chemical contamination zone
 A 50-foot radius around each well to provide protection from vandalism, tampering, or other threats to each well site.

ZONE B - Indirect microbial contamination zone
 Consists of the surface area overlying the portion of the aquifer that contributes water to the well within a 2-year time-of-travel distance.

ZONE C - Indirect chemical contamination zone
 Consists of the surface area overlying the portion of an aquifer that contributes water to the well within a 10-year time-of-travel distance.

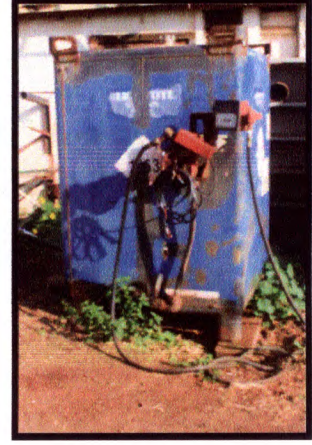
OFFICE OF THE COUNTY CLERK
 200 SO. HIGH ST., WAILUKU, MAUI, HAWAII 96793

WELLHEAD PROTECTION OVERLAY DISTRICT
MAP No. 5
IAO STREAM TO WAIKAPU, MAUI

APPROVED:	PUBLIC HEARING:
COUNTY CLERK:	DATE:
APPROVED:	ADOPTED BY:
PLANNING DIRECTOR:	DATE:
	BILL NO./YEAR:
	ORDINANCE NO.:

WPOD Map 5

Best Management Practices



Permit operations with mitigating measures:

- Store potentially contaminating substances on an impervious surface with a *secondary containment*
- Reduce pesticide applications through *integrated pest management*

Incentives for Business Owner:

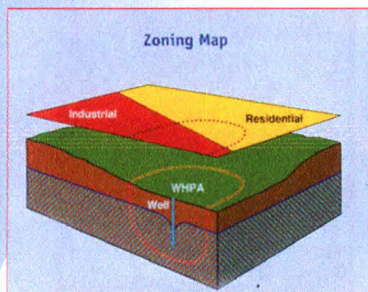
- Reduce potential spill clean up costs
- Reduce environmental liability
- Increase employee safety

Community and Board of Water Supply Concerns

- | | |
|---|---|
| 1. Delineation/groundwater model not acceptable level/single peer review | 1. USGS modeling codes, among the most widely reviewed codes available to simulate groundwater flow and define well capture zones. EPA contracted peer review |
| 2. Impact on property values | 2. Programs not shown to deflate property values or interfere with business and economic development in a community |
| 3. Legal challenges/Takings | 3. Overlay zoning to protect groundwater a well accepted method. Delineation defensible |
| 4. Cost to community/customers | 4. Grant funded program development. Existing staff absorb permit administration |
| 5. No justifiable need/no historical examples showing failures of current regulations | 5. "More groundwater specific protection is needed to address gaps" - <i>State Director of Health</i>
- Kunia, Superfund site (10's of \$M)
- Red Hill
- Sand Island |
| 6. What about new wells? | 6. This bill will not impact siting of new wells |

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Comprehensive Wellhead Protection Strategy



Wellhead Protection Overlay Zoning:
Restrict new high risk uses in wellhead protection areas



Best Management Practices
Public education
Well siting

- 70% of Maui's drinking water supply is groundwater
- Current laws and regulations leave gaps in protecting wells
- Prevention always less expensive than treatment

By Water All Things Find Life

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