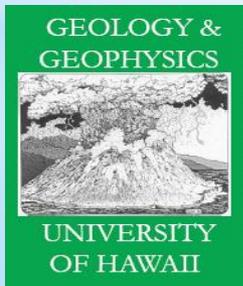


# Maui County Department of Water Supply

## Wellhead Protection Through Zoning in Maui County

4<sup>th</sup> Joint Government Water Conference  
August 7, 2018

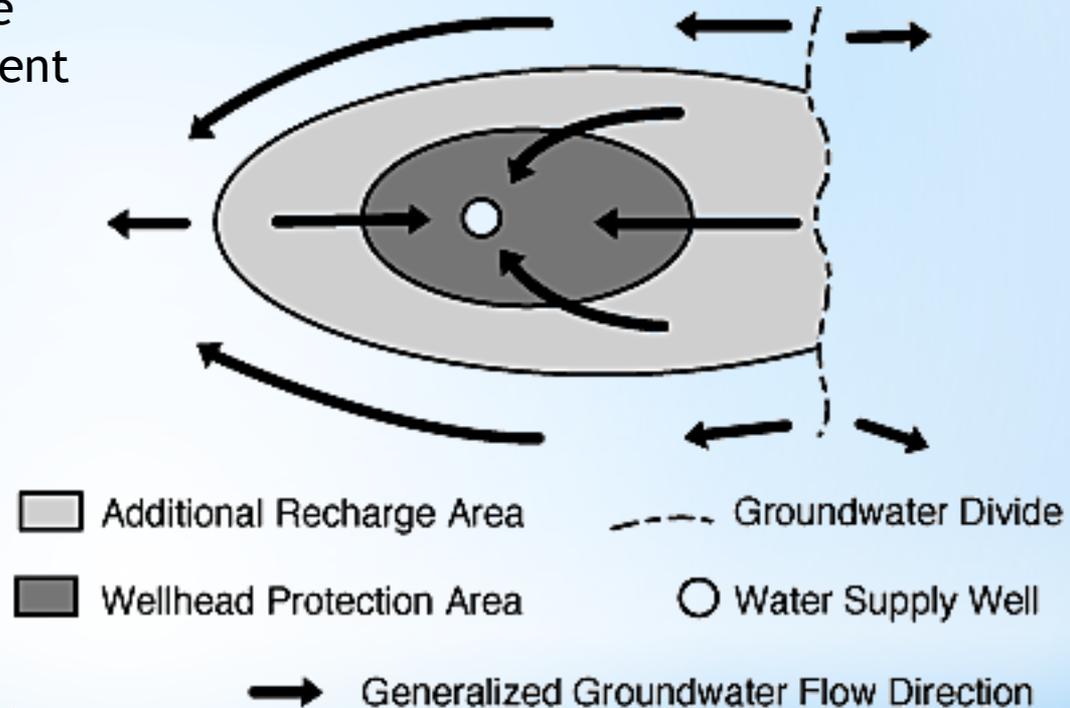


# What is the Wellhead Protection Program?

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

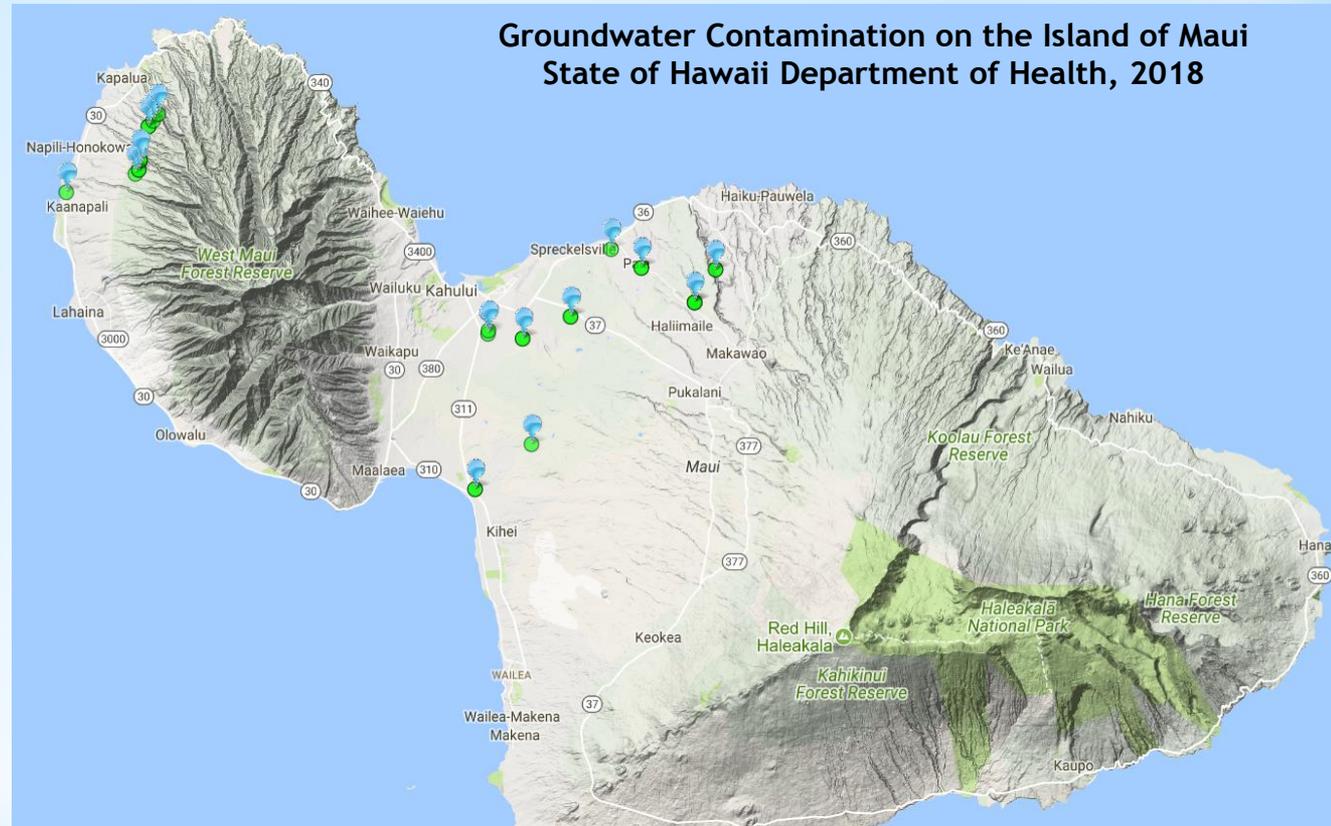


## Common sources of contamination:

- 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
- 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”*

# Prevention or Treatment?

Contamination :

Treatment

Monitoring

Alternate water supplies

Remediation

Litigation

Treatment Technology	Estimated Unit Cost \$/1,000 gallons treated)
Granular Activated Carbon (VOCs)	\$0.32 - \$1.47*
Reverse Osmosis (Nitrate)	\$1.19 - \$2.1

\*Carollo Engineers, 2007 City of Fresno Metropolitan Water Resources Management Plan Update, Technical Memorandum 1.4 Groundwater Contaminants and Treatment Alternatives

Honolulu BWS annual O&M costs for GAC: \$2.5M

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



Prevention:

Simpler

Less expensive

More reliable over long term

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

# How is Wellhead Protection Regulated?

U.S. EPA  
Safe Drinking Water Act



State Department of Health  
Safe Drinking Water Branch



Maui County Water Department  
Maui County Planning Department  
Advisory Committee

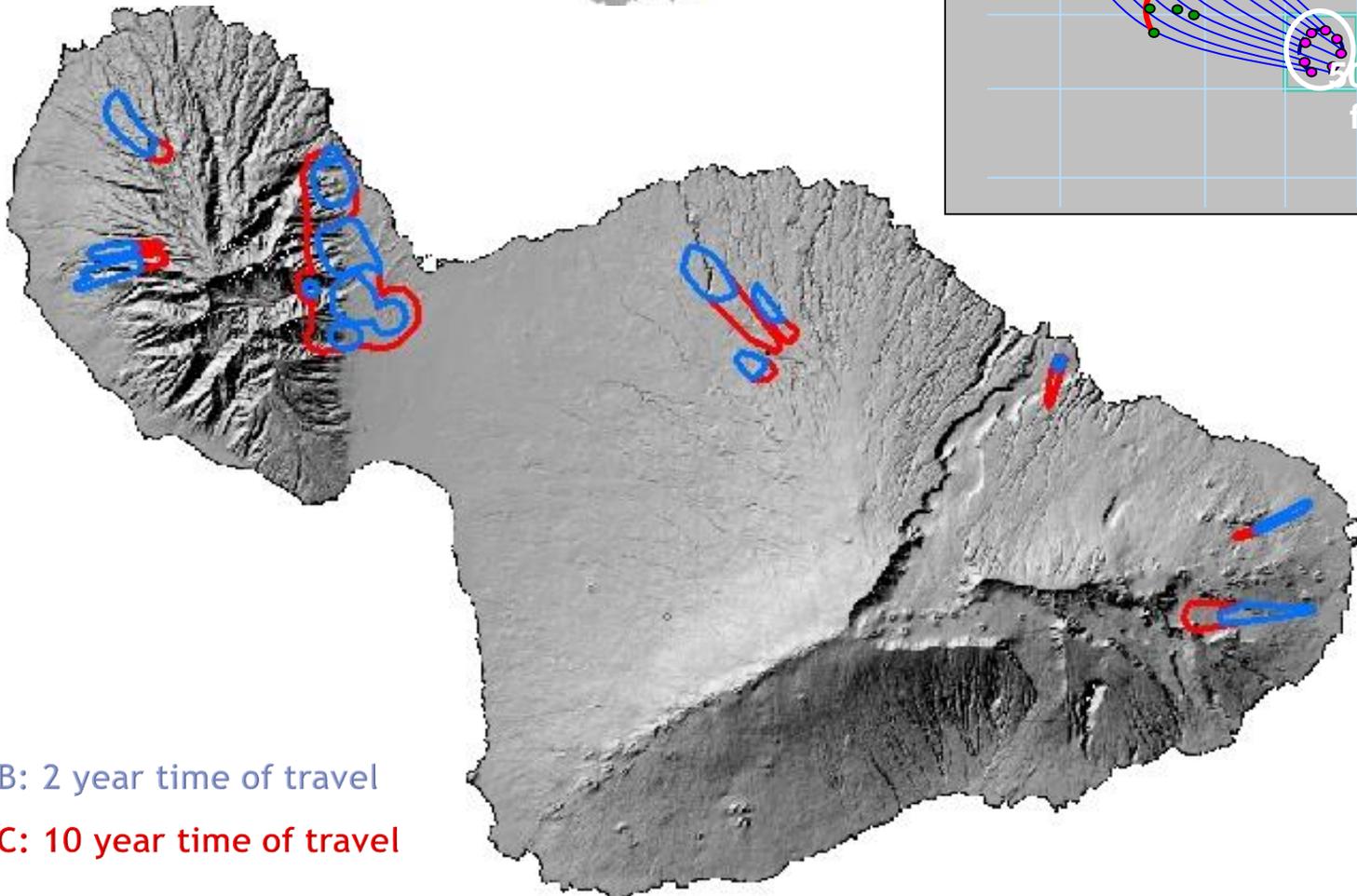
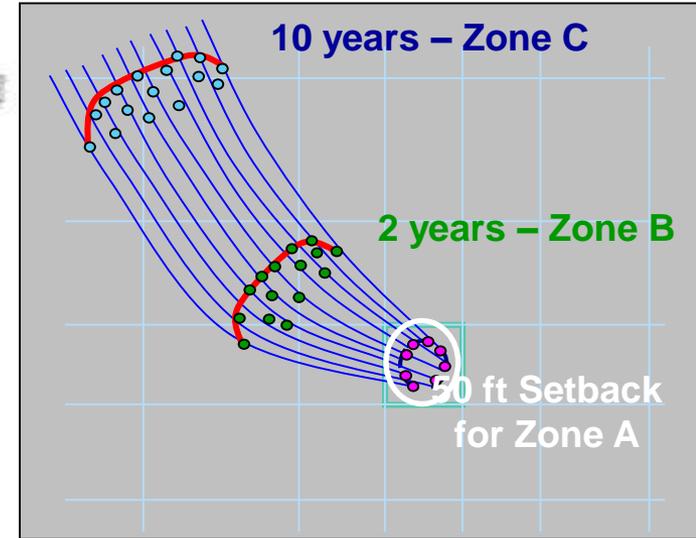
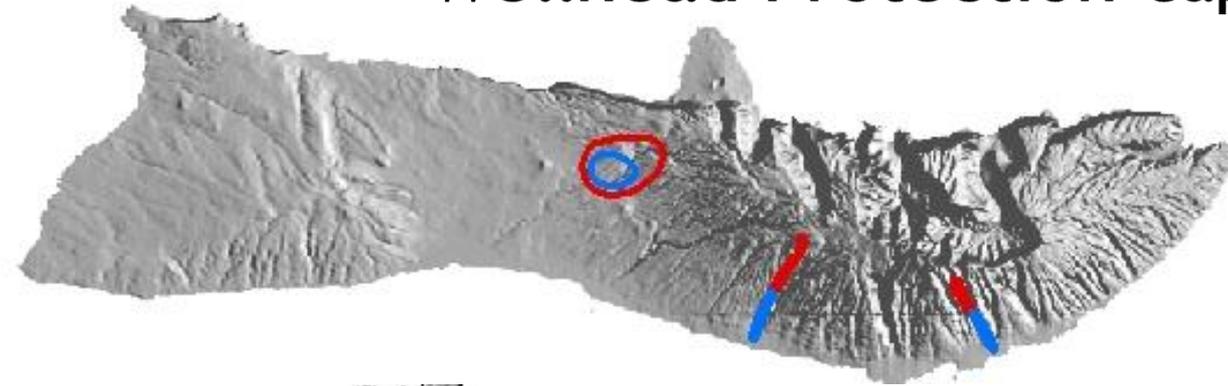
## Mandate states to:

- Conduct assessments of public drinking water sources
- Develop Wellhead Protection Program
- Adopt drinking water rules

- Source Water Assessment
- Wellhead Protection Program - guidelines for *county/community based* measures
- Financial and technical assistance for *wellhead protection implementation*
- Drinking water rules

- Review regulatory framework
- Public process
- Protection strategies and ordinance

# Wellhead Protection Capture Zones



-  Zone B: 2 year time of travel
-  Zone C: 10 year time of travel

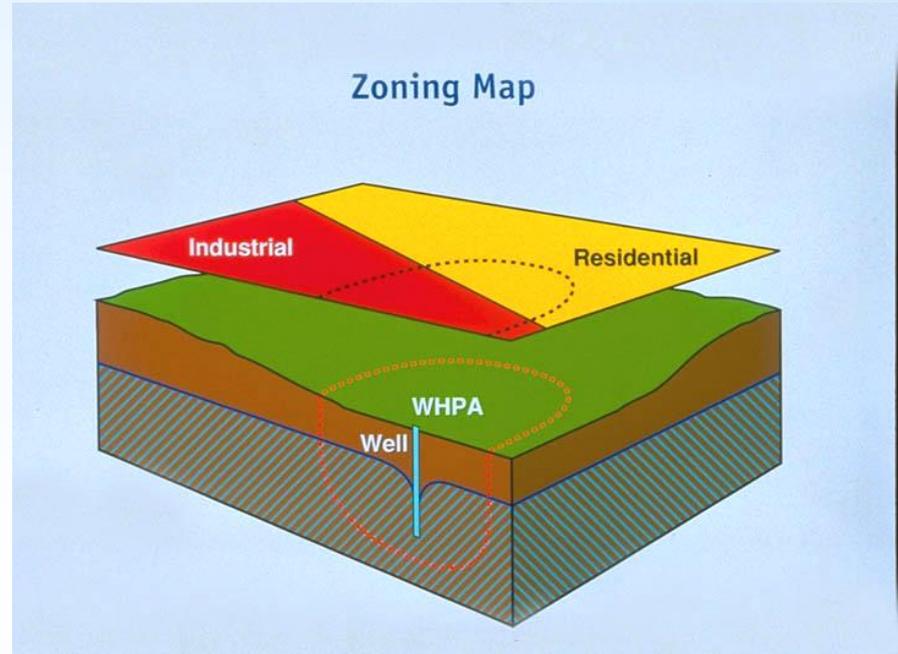
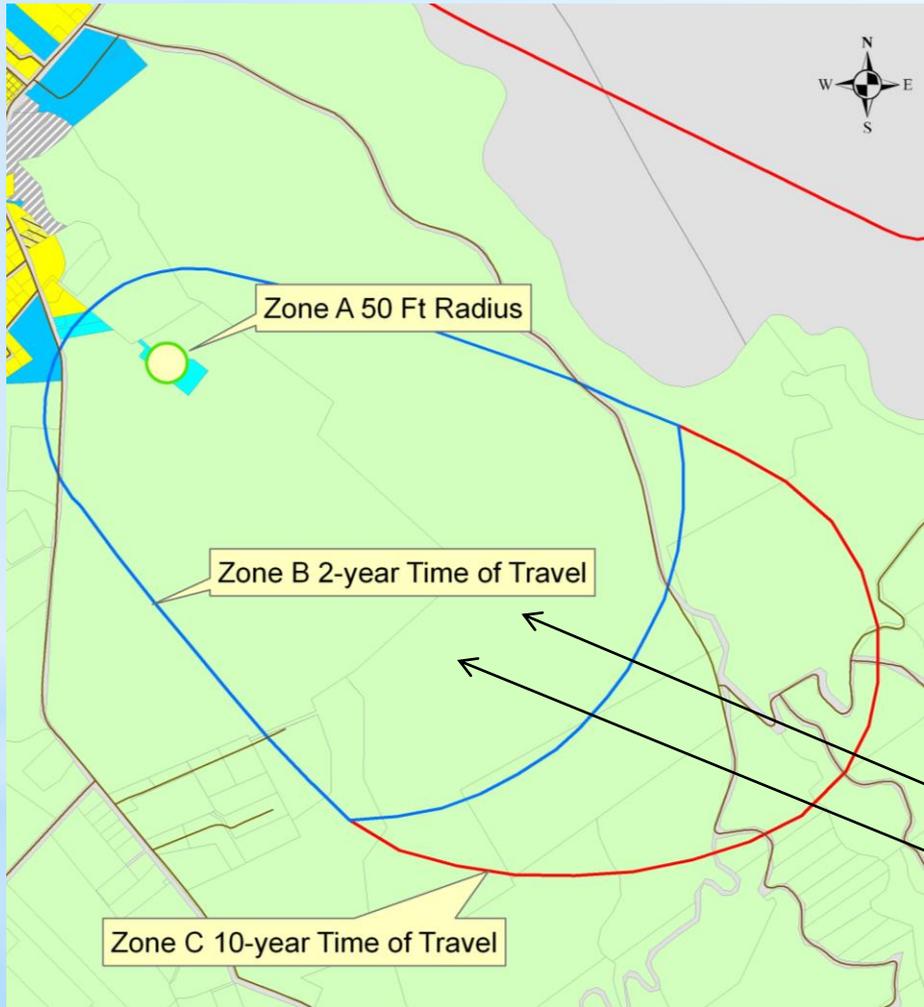
# Wellhead Protection Overlay District

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

## PROHIBITED NEW HIGH RISK USES:

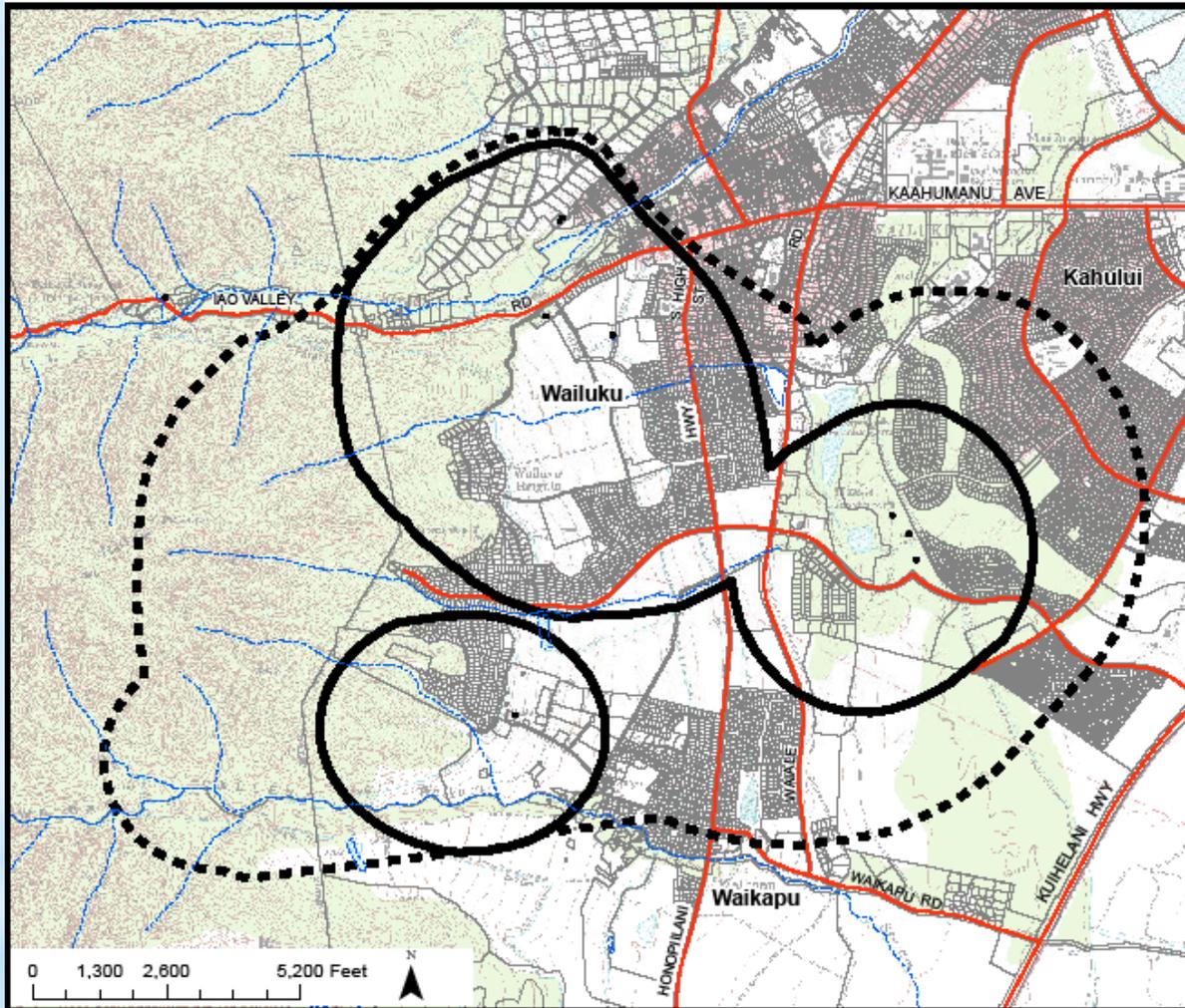
- Cesspools
- Commercial electrical/electronic manufacturing facilities
- Commercial chemical processing/ storage facilities
- Mortuaries/graveyards
- Golf courses
- Commercial metal plating/finishing/fabricating facilities
- Plastics/synthetic production facilities
- Commercial junk/scrap/salvage yards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

# Wellhead Protection Overlay District



- New landfill - **NO**
- New agricultural supply storage: **YES** - with best management practices

# 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 fixed distance for the ZONE A nearest the well 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	ADOPTED BY COUNCIL: _____
DATE	ADOPTED BY MAYOR: _____
APPROVED:	BILL No./YEAR _____
PLANNING DIRECTOR	ORDINANCE No. _____
DATE	

**DRAFT 04** WPOD Map **5**

- No impact on Residential development in sewerred areas (4 lots or more: Design Guidelines)
- <1% land zoned Light Industrial

# Community and Board of Water Supply Concerns

1. Delineation/Model acceptable level/peer review?
  1. USGS modeling codes, among the most widely reviewed codes available to simulate groundwater flow, define well capture zones. EPA contracted peer review. 3D numerical GW model MODFLOW & particle tracking program MODPATH
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. Justifiable need? No historical examples showing failures of current regulations
  5. “More groundwater specific protection is needed to address gaps” - *State Director of Health*
    - Kunia, Superfund site (10’s of \$M)
    - Red Hill
    - Sand Island

# Best Management Practices

Permit operations with mitigating measures



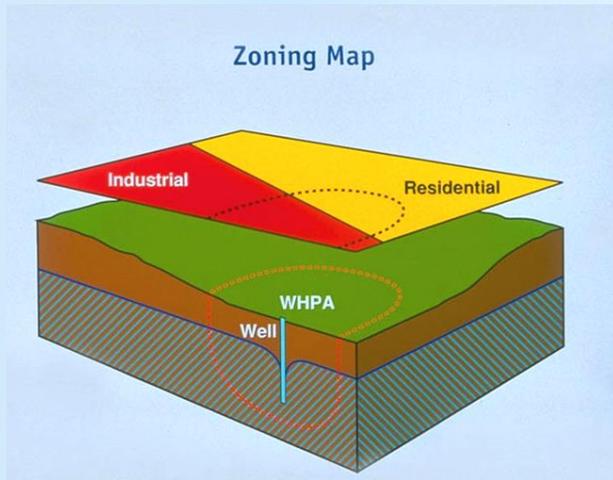
- Impervious surface with a *secondary containment*

Incentives for Business Owner:

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



# Comprehensive Wellhead Protection Strategy



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

Best Management Practices  
*Public education*

Well siting

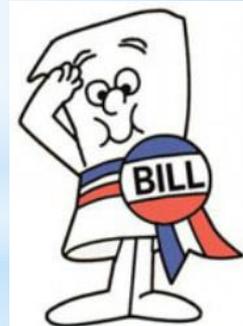
- *Assessment preceding site selection*
- *Preference to sites of low vulnerability*

- 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*

# Review Process for County of Maui Adoption

- County of Maui (CoM) DWS develops draft WPOD ordinance with input from CoM Planning Department and Corp. Counsel, HDOH, HDOA, UH, Public Outreach
- CoM Board of Water (BWS) Supply initial review
- Maui County Council Water Resources Committee (WRC) initial review
- CoM Planning Commissions + BWS 2<sup>nd</sup> review
- Maui County Council WRC 2<sup>nd</sup> review
- Maui County Council 1<sup>st</sup> Reading
- Maui County Council 2<sup>nd</sup> Reading



→ WPOD Ordinance to be adopted as part of Title 19 County Code

# Referenced Laws and Regulations

- Relevant definitions under Maui County Code
  - Title 19, Title 14.
- *Pesticides of Concern* identified by State of Hawaii under US EPA Pesticides of Interest Tracking System (POINTS) as posing significant risk of contamination in geographically sensitive areas.
  - Pesticides of concern identified from State Issues Research and Evaluation Group (SFIREG) under Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)
  - Pesticides of concern identified as specific causes of water quality impairments under U.S. EPA Clean Water Act (CWA) § 303(d).

# Referenced Laws and Regulations (Cont.)

- *Irrigation of crops:*
  - USDA NRCS Conservation Practice Standards on Integrated Pest Management Code 595 and on Irrigation Water Management Code 449, as may be amended.
- *Regulated Substances:*
  - US EPA National Primary Drinking Water Regulations
  - Rules Relating to Public Water Systems pursuant to Hawaii Administrative Rules Title 11, Chapter 20.