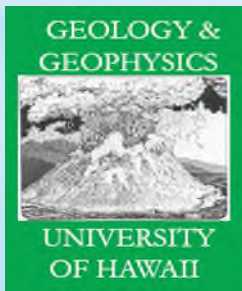


# Maui County Department of Water Supply

## Wellhead Protection Through Zoning in Maui County

Housing and Land Use Committee  
June 7, 2023





# What is the Wellhead Protection Program?

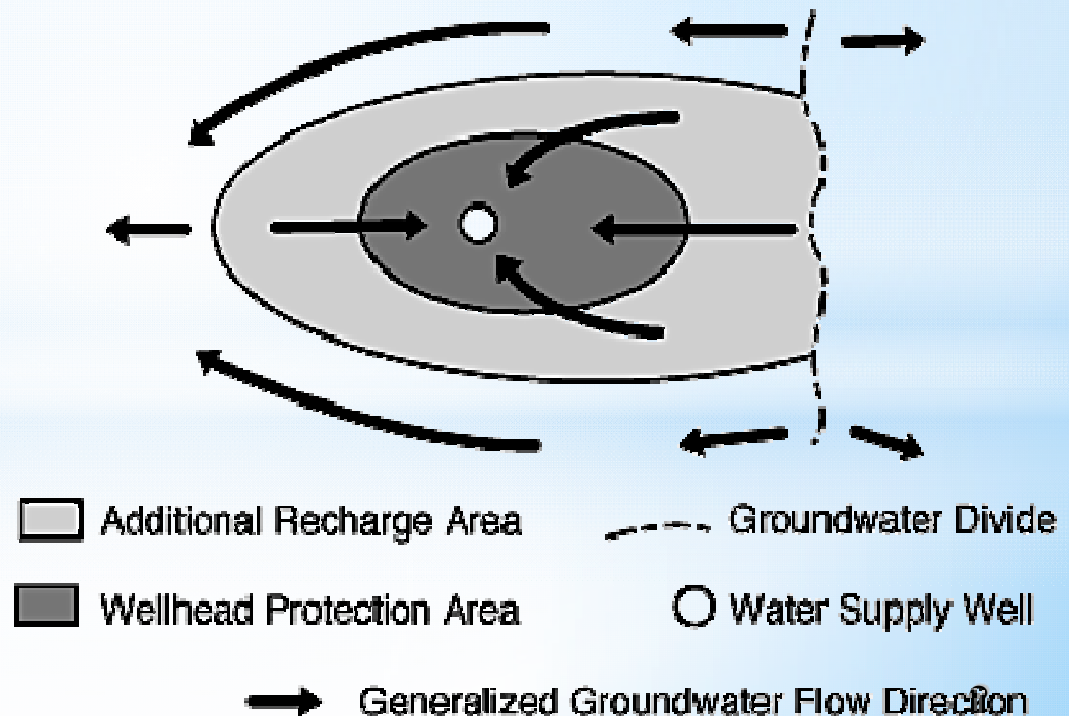
Protect the County's potable wells from contamination and prevent the need for expensive treatment

## Common sources of contamination:

- Leaks & spills from chemical storage
- Industrial processes
- Pesticide applications

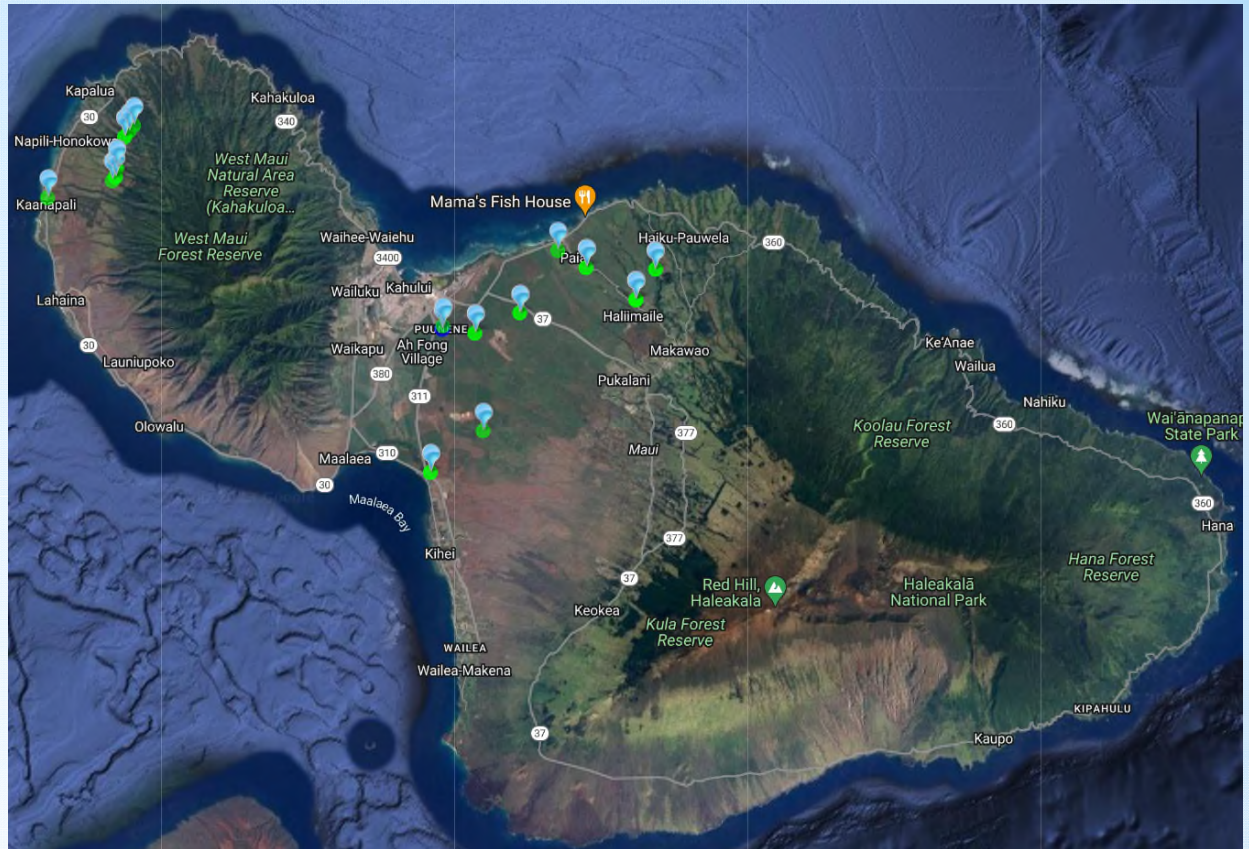
## Wellhead Protection Area:

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





# Why Wellhead Protection?



Groundwater Contamination on the Island of Maui  
State of Hawaii Department of Health, 2022

- 70% of Maui's drinking water supply is groundwater
- Years between contaminating event and detection
- Aquifers ranked as vulnerable to contamination
- Gaps in regulations put our drinking water wells at risk



# Prevention or Treatment?

## Contamination

- Monitoring
- Treatment
- Alternate water supplies
- Remediation
- Litigation

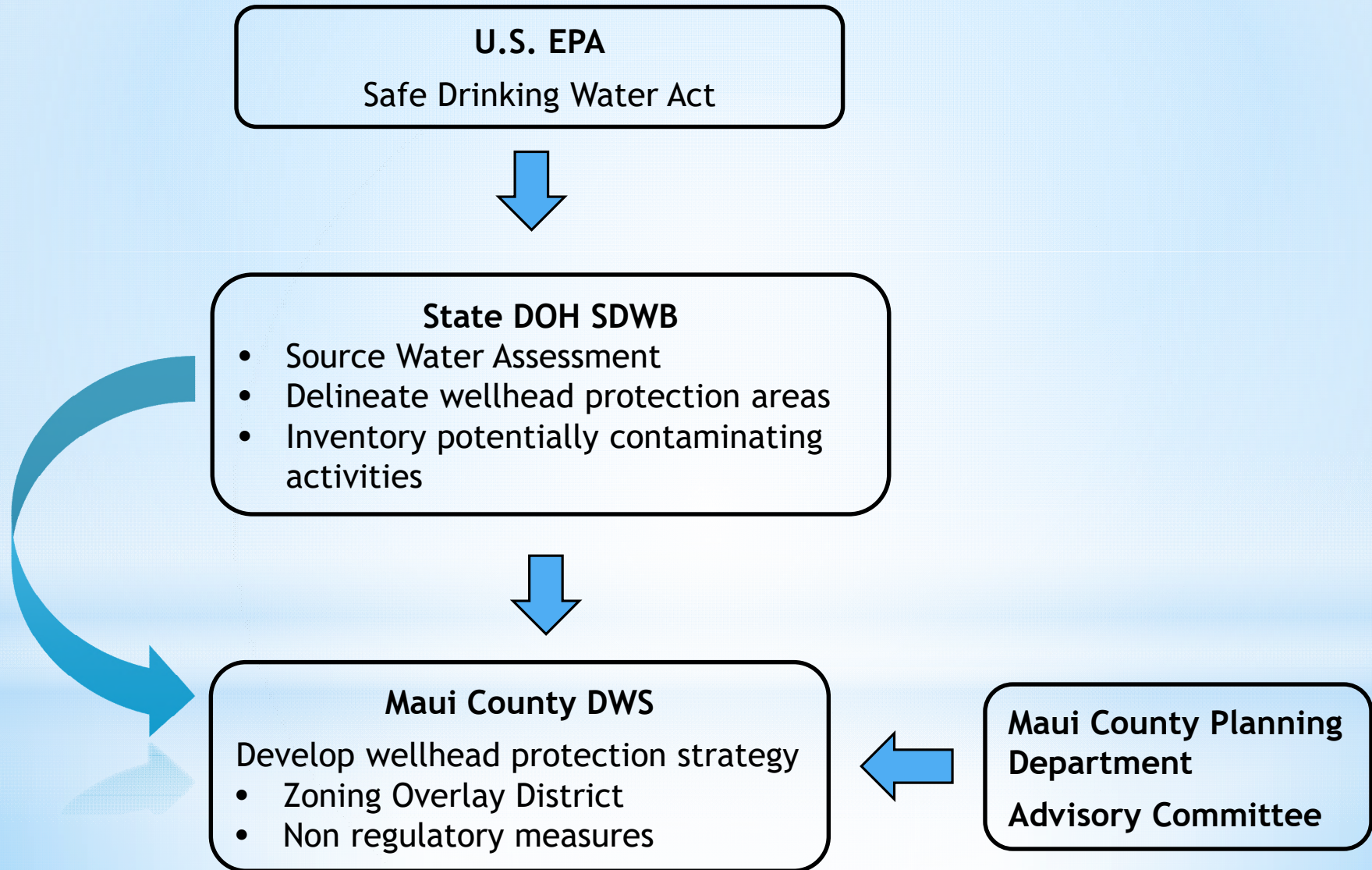
## Prevention

- Simpler
- Less expensive
- More reliable over long term

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

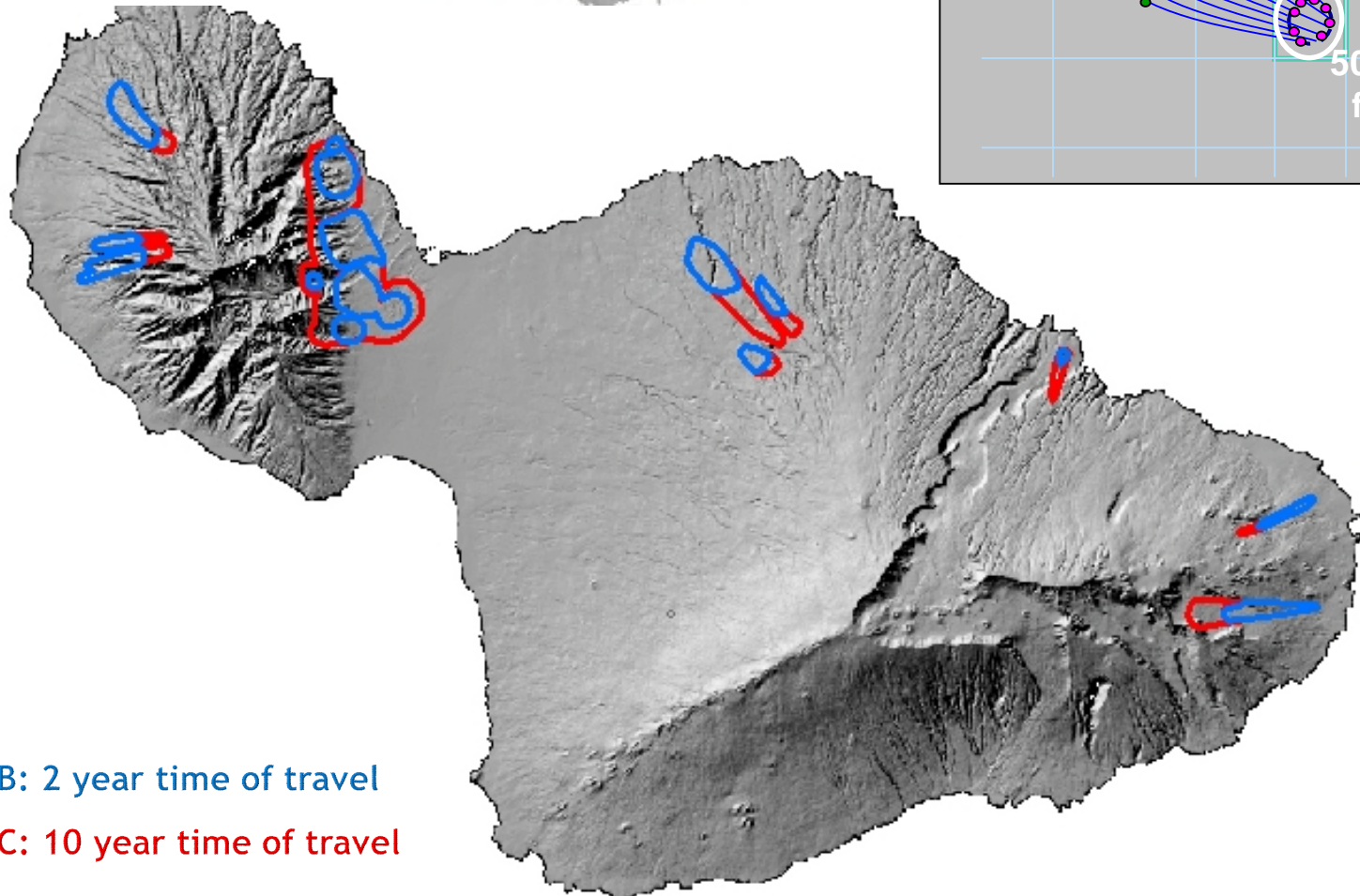
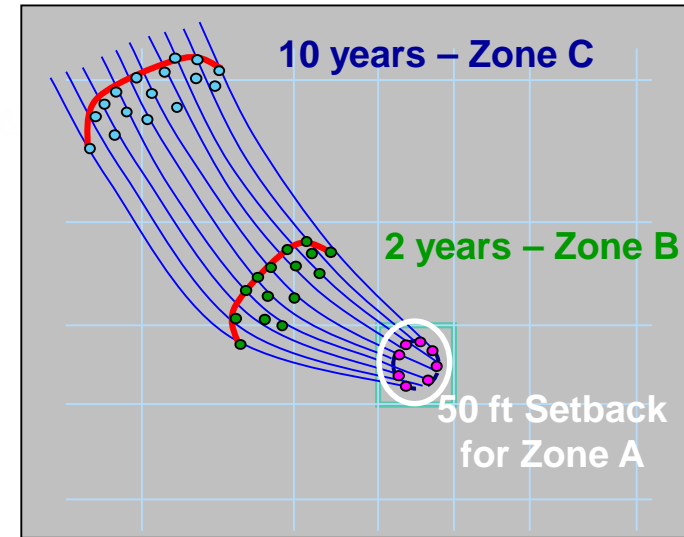
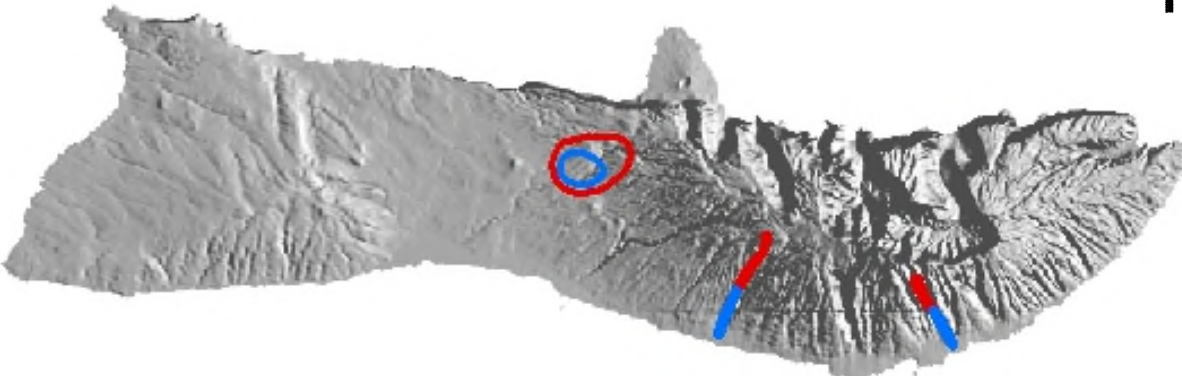


# How is Wellhead Protection Regulated?





# 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
- Existing non conforming uses are grandfathered in
- Wellhead protection permit with best management practices
- Permit administered by the Department of Water Supply
- No impact on residential development in sewered areas (3 lots or more: Design Guidelines)
- <1% land in overlay district is zoned Light Industrial

## PROHIBITED HIGH RISK USES:

- 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

## WELLHEAD PROTECTION PERMIT REQUIRES BEST MANAGEMENT PRACTICES

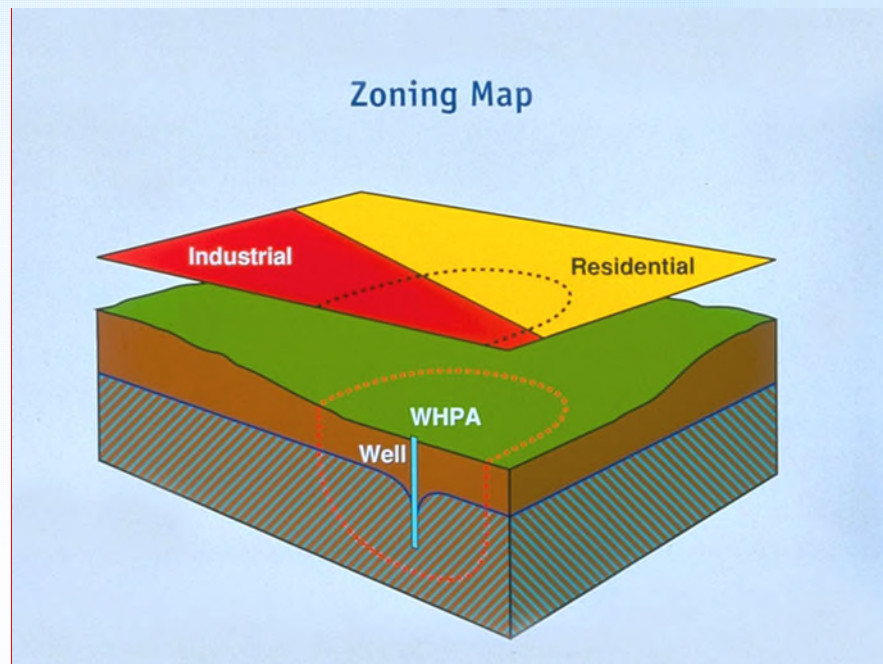
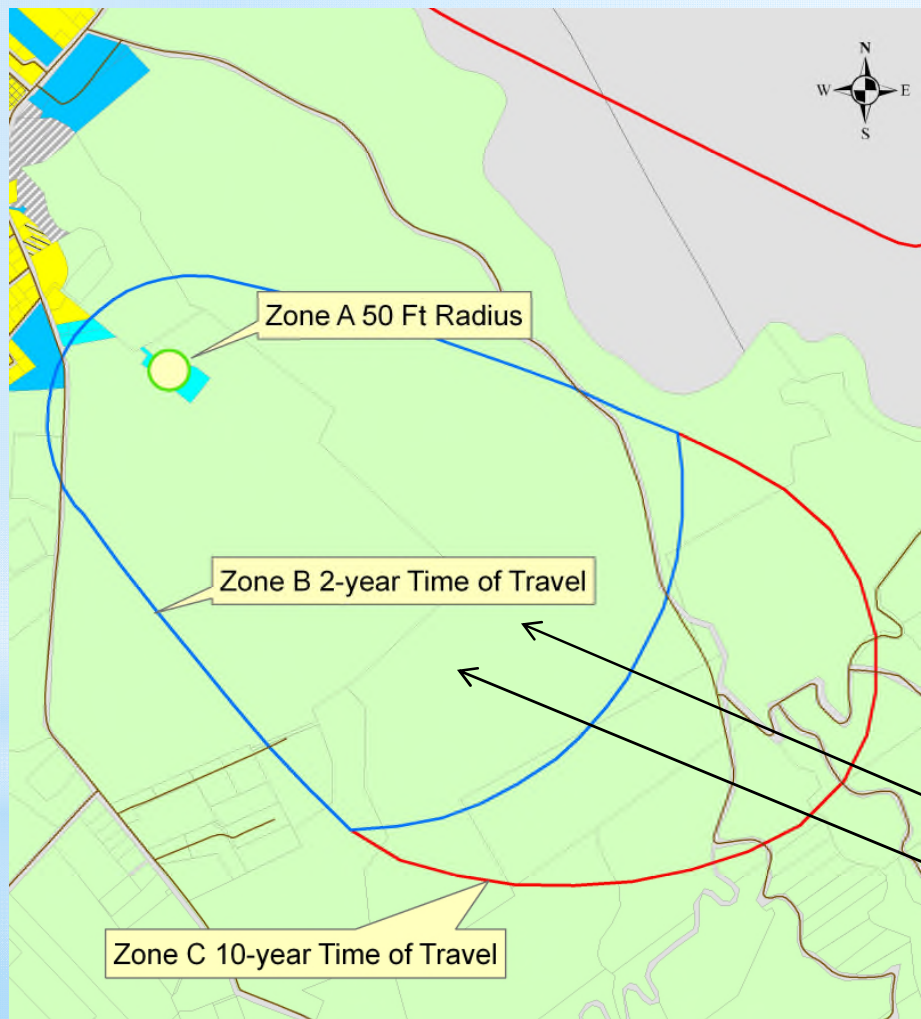
- Commercial automobile body/repair shops
- Car washes
- Cement/concrete plants
- Petroleum/mixed-biofuel fueling stations
- Fleet/trucking/bus terminals
- Dry cleaners
- Use of pesticides determined to be of groundwater concerns
- Commercial machine shops
- Commercial wood preserving/treatment facilities
- Animal feeding operations
- Commercial equipment maintenance/fueling areas
- Hospitals
- Parking lots with > 20 parking spaces
- Waste transfer/recycling stations
- Collection/handling/manufacture/use/storage/transfer/disposal of > 55 gallons petroleum or >10 gallons regulated substances
- Subdivisions that create 4 or more developable lots
- Construction of 3 or more dwelling units



Impervious surface with a  
*secondary containment*



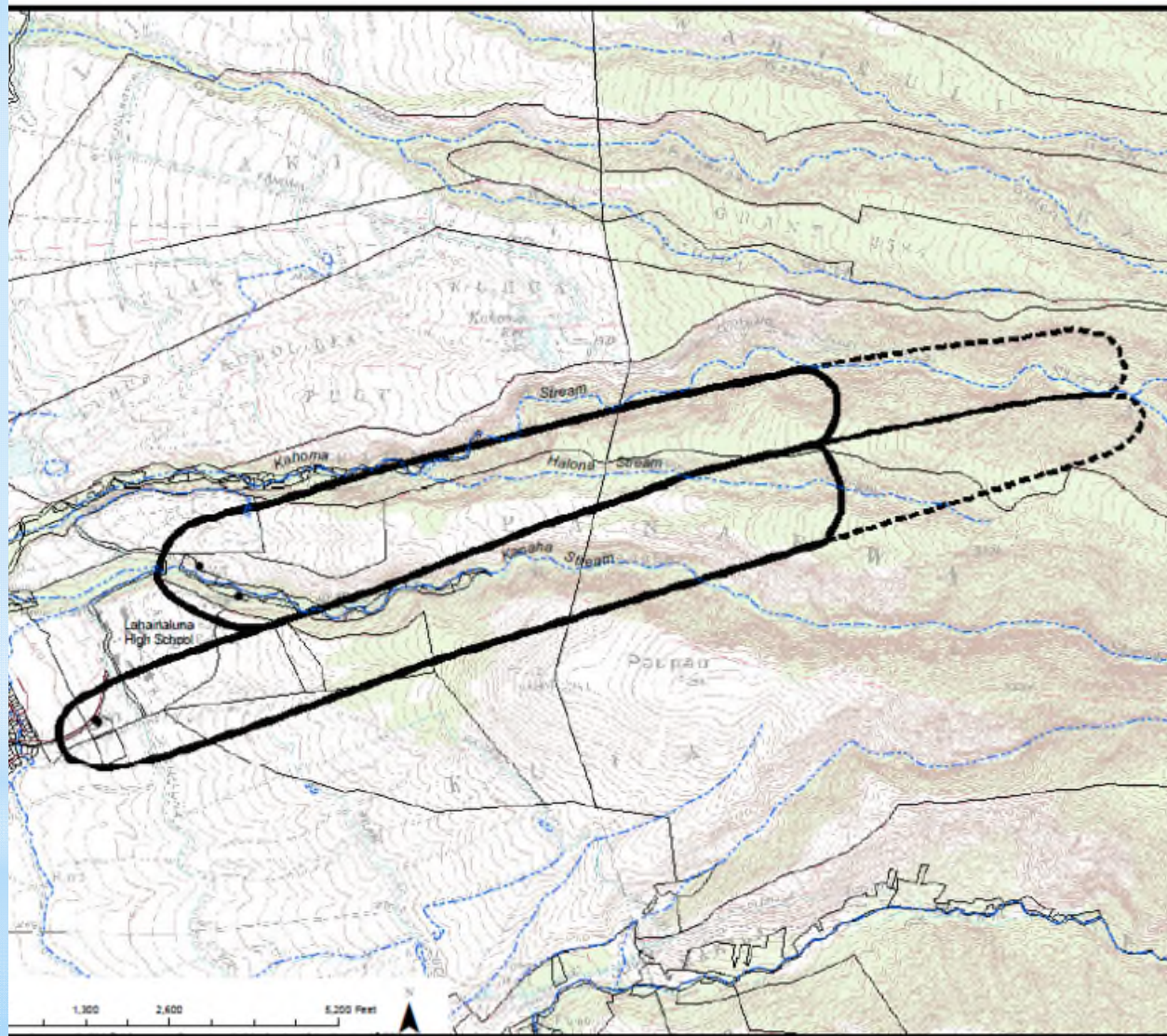
# Wellhead Protection Overlay District



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



# Wellhead Protection Overlay District - West 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. 2 AREA NORTH-EAST OF LAHAINA TOWN, MAUI

APPROVED:

PUBLIC HEARING: \_\_\_\_\_

COUNTY CLERK DATE

ADOPTED BY  
COUNCIL: \_\_\_\_\_

APPROVED:

ADOPTED BY  
MAYOR: \_\_\_\_\_

PLANNING DIRECTOR DATE

BILL No./YEAR

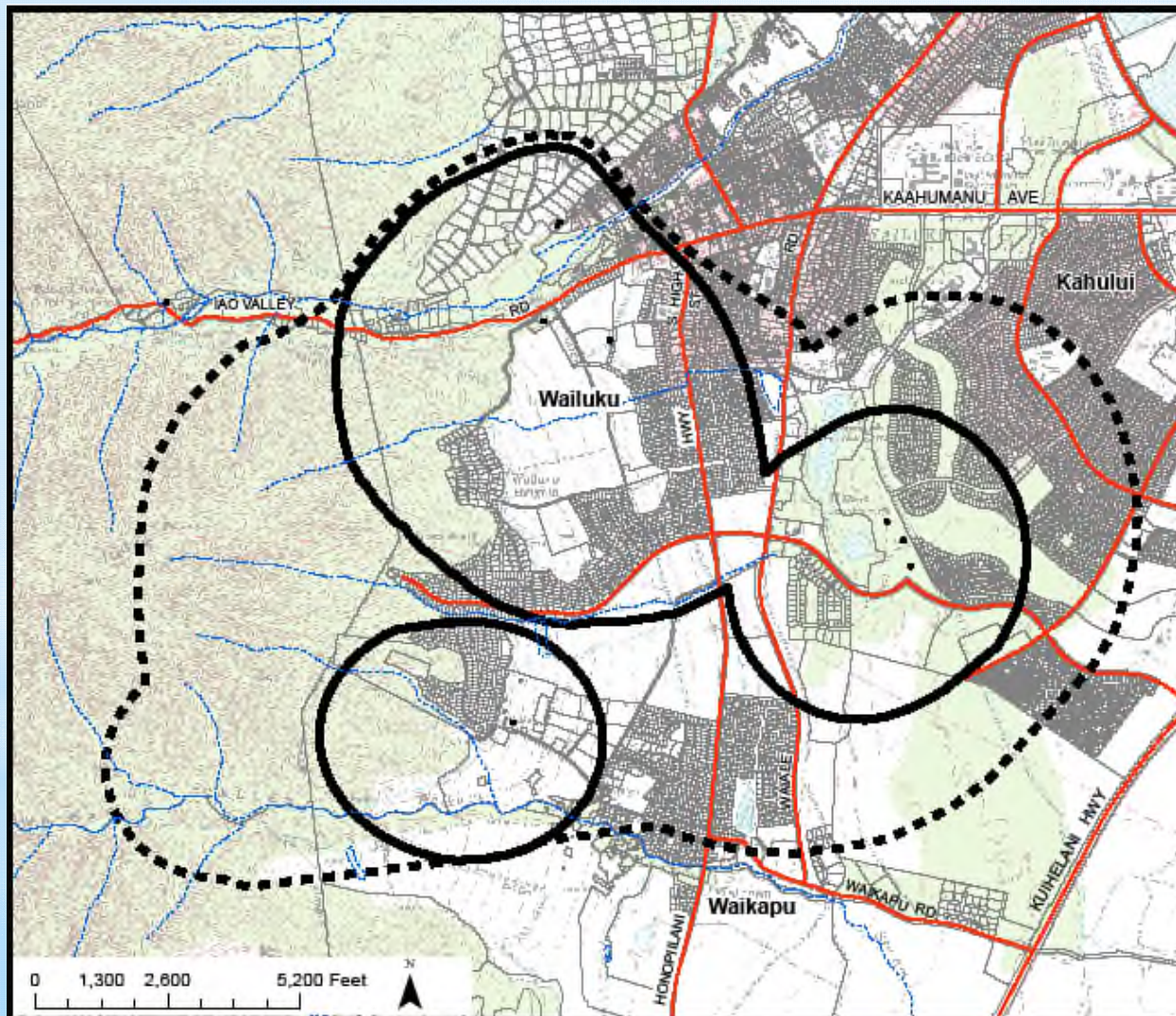
ORDINANCE No. \_\_\_\_\_

DRAFT 04

WPOD Map 2



# 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.

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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.

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

APPROVED:	PUBLIC HEARING: _____
COUNTY CLERK _____ DATE _____	ADOPTED BY COUNCIL: _____
APPROVED:	ADOPTED BY MAYOR: _____
PLANNING DIRECTOR _____ DATE _____	BILL No./YEAR _____
	ORDINANCE No. _____

DRAFT 04

WPOD Map 5



# 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 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

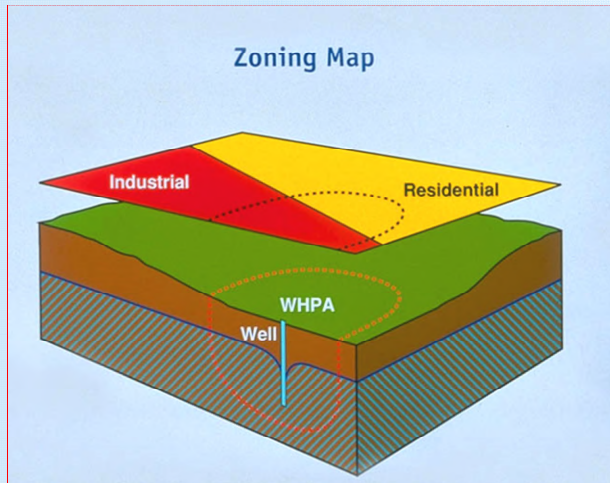
5. Justifiable need? No historical examples showing failures of current regulations

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



# 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*



## HLU Committee

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**From:** Eva Blumenstein <Eva.Blumenstein@co.maui.hi.us>  
**Sent:** Monday, June 5, 2023 9:45 AM  
**To:** HLU Committee  
**Cc:** John Stufflebean; Linda Kimura; Ana L. Lillis  
**Subject:** HLU-10  
**Attachments:** WPOD HLU 060723.ppt

You don't often get email from eva.blumenstein@co.maui.hi.us. [Learn why this is important](#)

Aloha Chair Kama,

Please find attached the Department of Water Supply's presentation on the proposed bill establishing a Wellhead Protection Overlay District.

Mahalo,

Eva

=====  
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Wailuku, Hawaii 96793-2155  
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