

# Rainwater Harvesting Design

Clair Klock – Resource Conservationist

Patti & Paul Jarrett - Board Member

Jim White – Ewing Irrigation

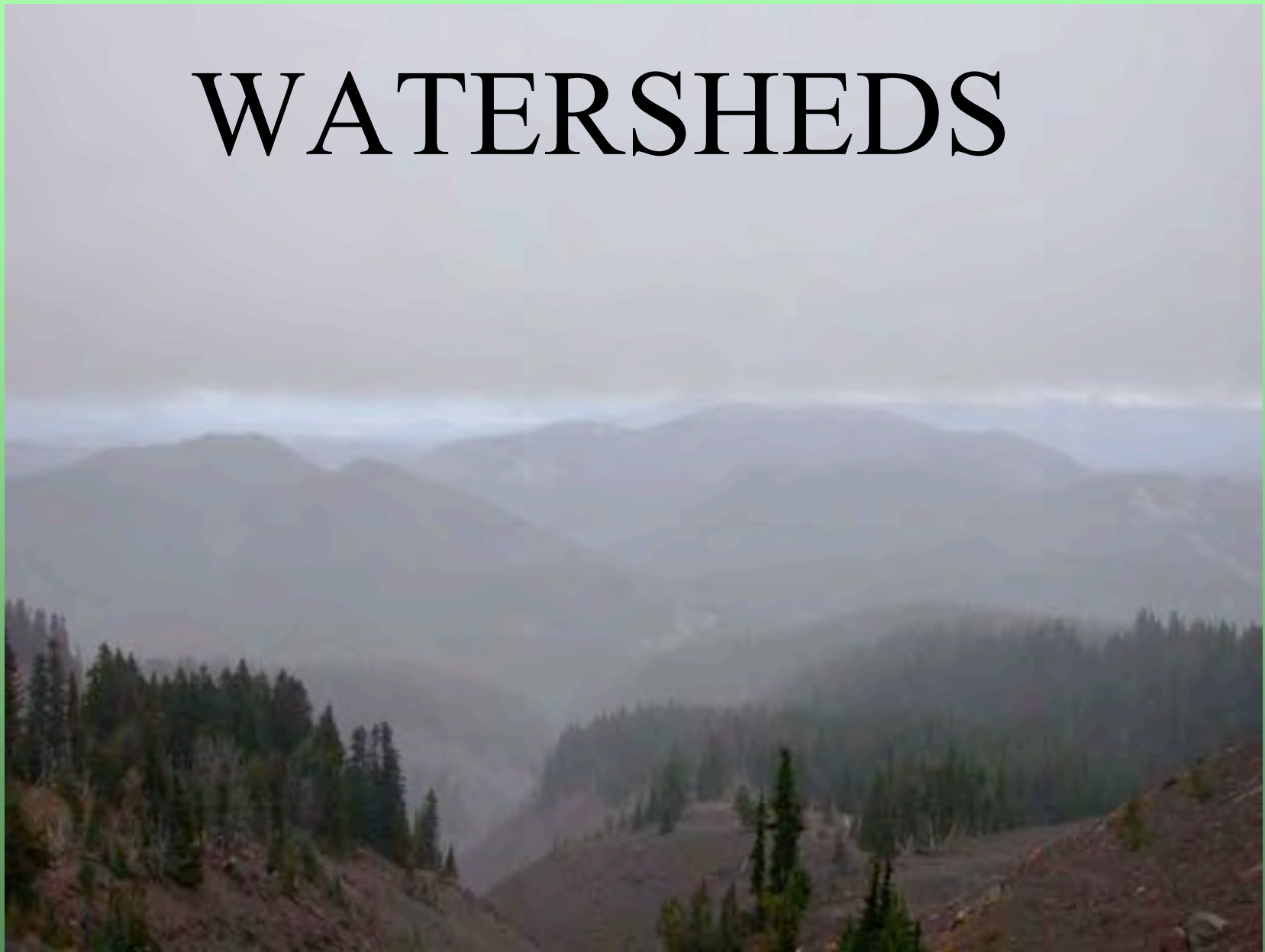


CLACKAMAS COUNTY

**Soil and Water Conservation District**

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# WATERSHEDS





# Why

Lack of water quantity

Lack of water rights

Cost of establishing water rights

3. 5. 2000

# Why

Water bill reduction (Areas served by water districts)

Groundwater Conservation



Stormwater reduction (help those folks downstream)

# When

# Now!!

Economically feasible

Lack of the water quantity

Groundwater critical areas



# Why

Insure water purity

Conservation goals



# Where

**Anywhere – Urban or rural**

**Groundwater critical areas**

**Arid – Rainfall around Portland area**



# Calculating Water Quantities

## Figuring Capacity

Sq. Ft. = 0.6 gallons, 100 sq. ft = 60 gallons

Area(ft<sup>2</sup>) x Average rainfall(inches) x 600

1000 sq. ft



Example:

$$33 \times 33 \text{ ft} = 999 \text{ sq ft} = 1,000 \text{ sq. ft.}$$

36 inches rainfall

600 gallons per inch of rain

$$(1000 \times .6 = 600)$$

$$1,000 \times 36 \times 600 / 1000 = 21,600 \text{ gallons}$$

Fudge factor is 2X

Design with additional tanks in the plan

## Figuring Needs –

*Indoor Needs*

**Amount of water needed**

**Calculate daily usage –**

**see Home Use Analysis Chart**

**75(gal/day) per person**

**Calculate longest known dry spell - 90 days**

**75 gal x 90days =**

**6750 gallons needed per person**



## *Outdoor Needs*

1,000 sq ft. garden

Weekly usage = 1 inch

$12 \text{ inches} \times 1000 / 12 = 1000 \text{ cu. ft}$

$1000 \text{ cu ft} \times 7.48 = 7,480 \text{ gallons}$

Good Idea - 10 – 15,000 gallon tank to start



**Paul & Patti Jarrett –  
12,000 gallon tank: Sept 2003.**

**Tank = \$6,500**

**Installation/Siting = \$2,000**

**Distribution System = \$1,000**

16 10 2003

$\$9,500/20\text{yrs} = \$475 \text{ per year}$

Cost of City water  
on 6750 gallons  
= ???????

**New Well -**

**Sandy area landowner spent  
\$22,000 to go 600+ feet.**

16 10 2003

# Water Quality

Water sources

Willamette – Clackamas - Molalla– Sandy

Shallow wells and aquifers

Municipal system

Bottled water

2000. 3. 24

# THE WORKS!

**Catchment Area (Roof)**

**Gutters & Downspouts**

**Roof Washers & Leave Screens**

12.19.2001

# THE WORKS!

**Storage Containers (tanks)**

**Conveyance**

**Filtration**



# Catchment Area (Roof)

Uncoated Stainless Steel or factory enameled galvanized steel

(Certified lead free)

Galvanized Steel – check for lead

Composition (asphalt) shingles

Wood shingles

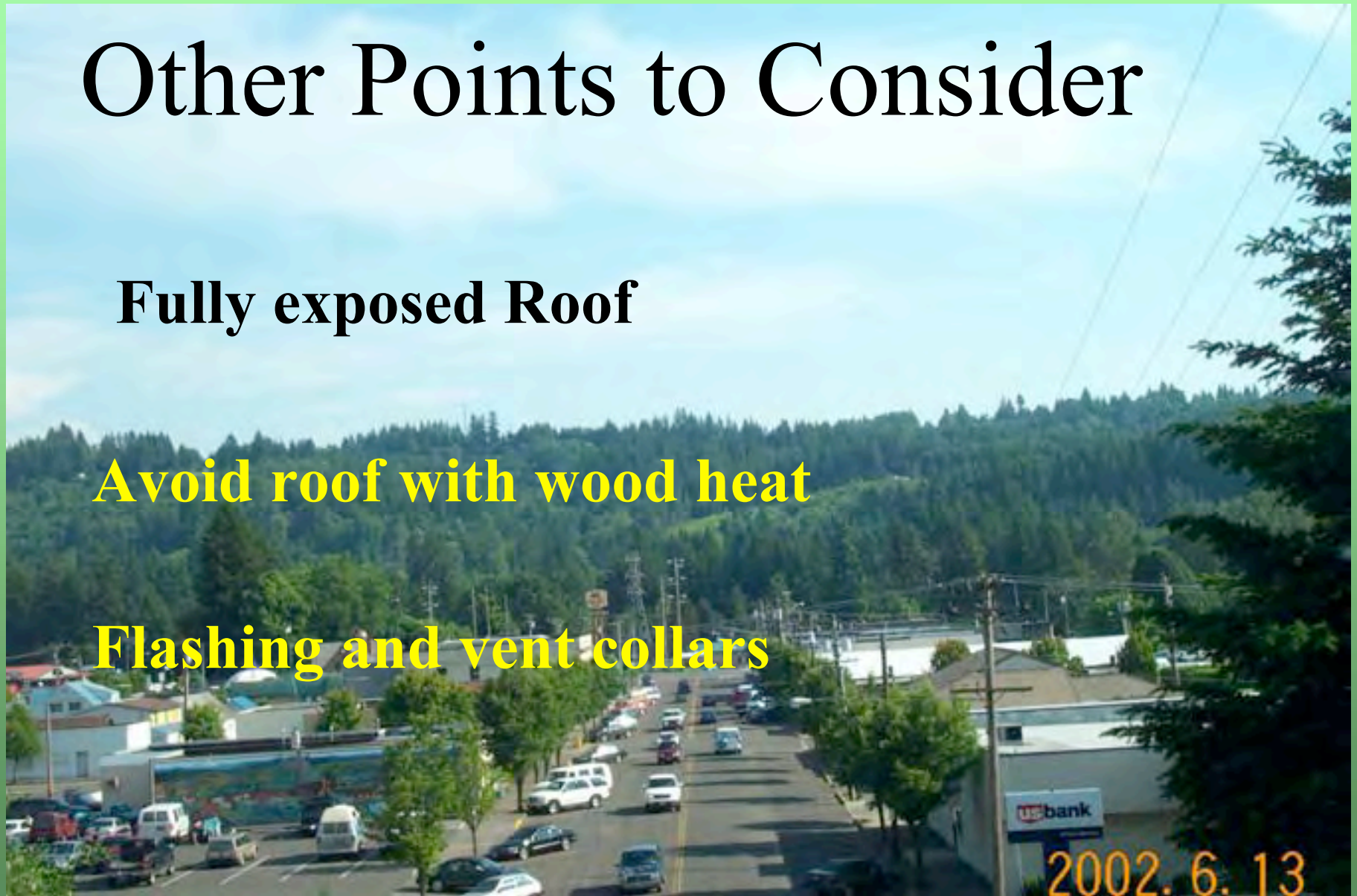


# Other Points to Consider

**Fully exposed Roof**

**Avoid roof with wood heat**

**Flashing and vent collars**



# Gutters and Downspouts

Seamless Aluminum

PVC, Polyethelene, galvanized steel

5-6 inch standard extrusion in 50' lengths

3" downspout for 5" gutter

& 4" downspout for 6" gutter

1 downspout for each 50' gutter

# Roof Washer

Discard first 10 gallons – “first flush”

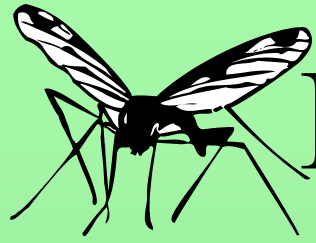
(removes most contaminants)



# Leaf Screen

One quarter inch wire mesh installed entire length of the gutter

One quarter inch wire mesh at downspout



# Mosquito Control

Dunks – BT – amount to use???

Netting

Gambusia



Swallows

Bats



# Distribution System



The image shows two large, cylindrical, green-painted metal storage tanks standing side-by-side in a grassy area with trees in the background. The tanks have ladders on their sides and various pipes and valves at the base. The text is overlaid on the image in a yellow, bold, serif font.

# Storage Containers

Whiskey and wine barrels

55 gallons barrel – know the origin

Tanks

- Above ground
- Buried

Ponds and open Pools – Requires water rights

# Tanks

Stone

Concrete

Metal

Polypropylene

Fiberglass





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# Overflow



**Pipe to direct excess water to proper area.**

# Clean Tanks

Point of origin and use

FDA approved tanks

American Waterworks

approved epoxy-based sealer



# Maintenance Factors

Closed

- Evaporation
- Algae

Yearly cleaning – Flush

Sun damage - Tank and gutters

Cleaning leaf screen and downspouts - regularly

# Conveyance

Tanks to point of use

Garden, Field, Orchard, House

Pump

Pressure tank



Automated Systems – timers

# Filtration

**NonPotable**

Filter as it enters irrigation tubes



**Potable**

Filter - 25micron + 5 micron

+ Hi Intensity UV light units + 5 micron carbon filter



# Filtration

Other cleaning options

Reverse osmosis

Ozone

Chlorine



# Other Rainwater Catchment reasons



# Resources

*“Rainwater Collection for the Mechanically Challenged”*

*Banks & Heinichen*

*“Texas Guide To Rainwater Harvesting”*

*[www.twdb.state.tx.us](http://www.twdb.state.tx.us)*

# Natural Resource and Small Farm Partners



OACD

Oregon Association of  
Conservation Districts



OREGON STATE UNIVERSITY  
EXTENSION SERVICE  
CLACKAMAS COUNTY



 **NRCS** Natural Resources  
Conservation Service



**Agriculture**

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# Thank You

Patti Jarrett & Clair Klock

Clackamas Soil and Water Conservation District

256 Warner-Milne Rd

Oregon City, OR 97045

503.656.3499

[clair-klock@or.nacdnet.org](mailto:clair-klock@or.nacdnet.org)

