

Increasing Rain & Gray Water Use in the Southeast



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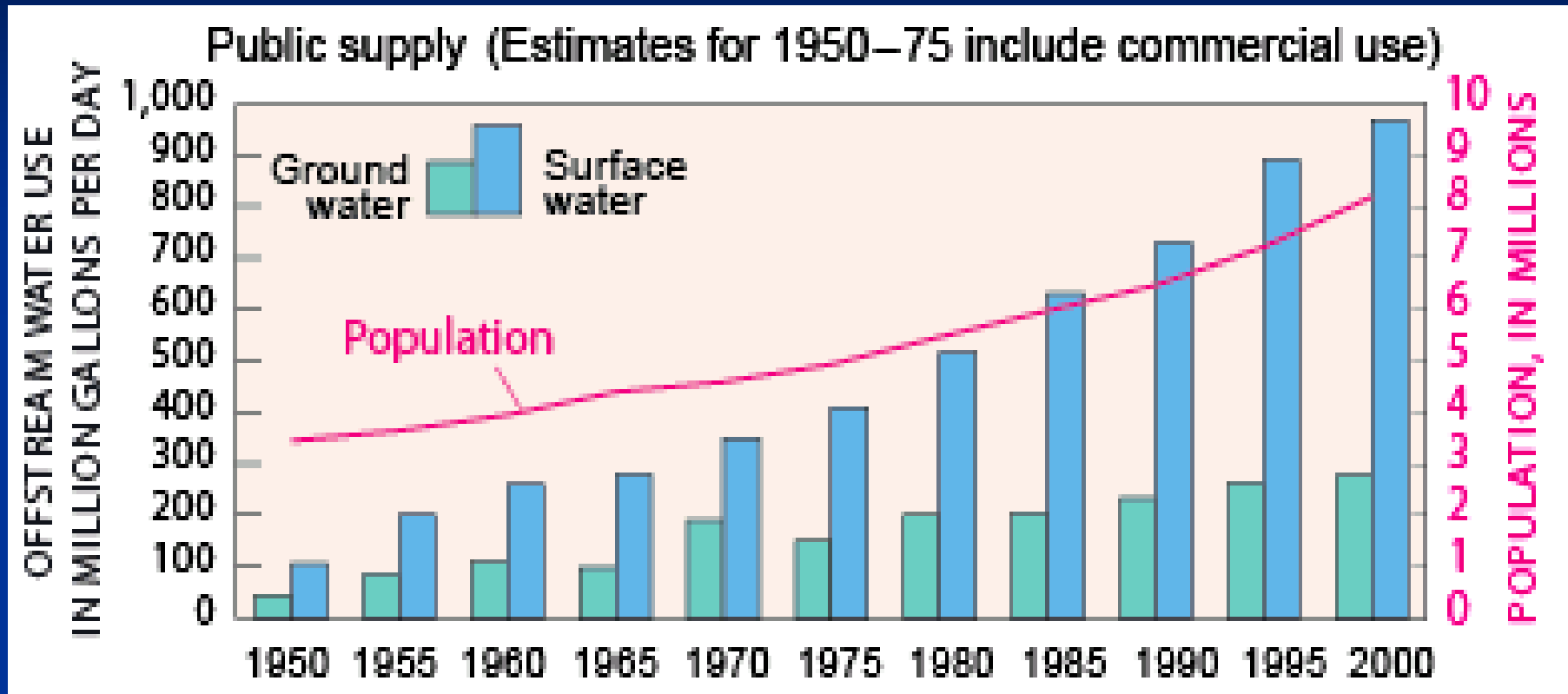


Water Smart Landscapes

- Reduce sources of pollution
- Increase infiltration
- Enhance treatment
- Reduce consumption
- Improve stream habitat



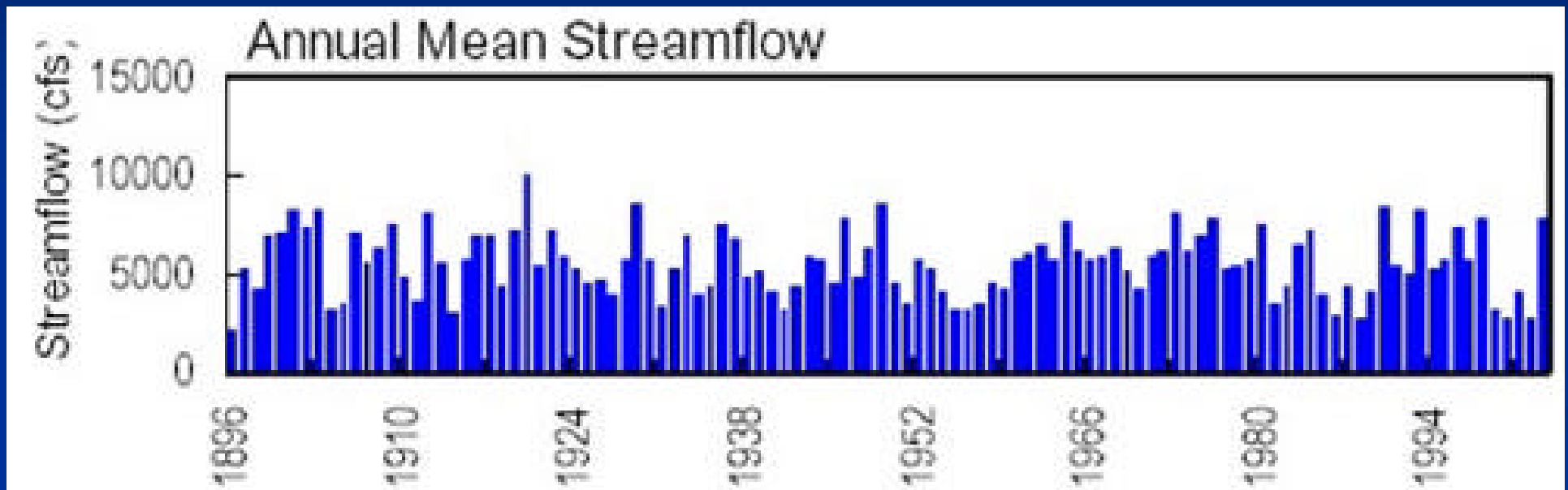
Georgia Growth and Water Use Trends



Source: US Geological Survey 2003

More people = More demand

Chattahoochee River Flows



Atlanta population growth

~100,000 → 4.5 M



Supply and Demand

drought planning
INSIGHT & IDEAS • D2

FLORIDA, VANDY WINS TIGHTEN EAST
SPORTS • SECTION C, PAGE 1

at the
bus stop

ATHENS BANNER-HERALD

SUNDAY, OCTOBER 21, 2007

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Drought emergency declared

Perdue asks Bush for aid

By Amy Brantner
Associated Press

CUMMING — With water supplies rapidly shrinking due to a drought of historic proportions, Gov. Sonny Perdue declared a state of emergency Sunday for the northern half of Georgia and asked President Bush to declare it a major disaster.

Georgia officials state that Lake Lanier, a 36,000-acre reservoir that supplies more than 7 million residents with water, is less than three months from depletion.

See PERDUE on A1

UGA examines its own water use

By Lee Thomas
In Athens for the Athens Banner-Herald

The University of Georgia, which uses more water than many other public universities, has begun an audit by NCS. It is among the schools that reduce its water use by 25 percent.

With 47,000 students and 10,000 faculty and staff, the University of Georgia uses more than 100 million gallons of water a year.

Creating water use audits is among the leading efforts to take climate change, but generally officials are not waiting on the

See UGA on A1

DAR SENIOR SURPRISES EVERYONE WITH RECOVERY AFTER NEAR-FATAL ACCIDENT

PROPERTY ASSESSMENTS
Tax beefs

opinions

D3
Athens Banner-Herald
SUNDAY, OCTOBER 21, 2007

Water crisis is a failure of state's leadership

By Lee Thomas
In Athens for the Athens Banner-Herald

It is a failure of leadership, not a failure of nature, that has led Georgia to the brink of a water crisis, says Lee Thomas, a senior advisor to the state's water supply task force.

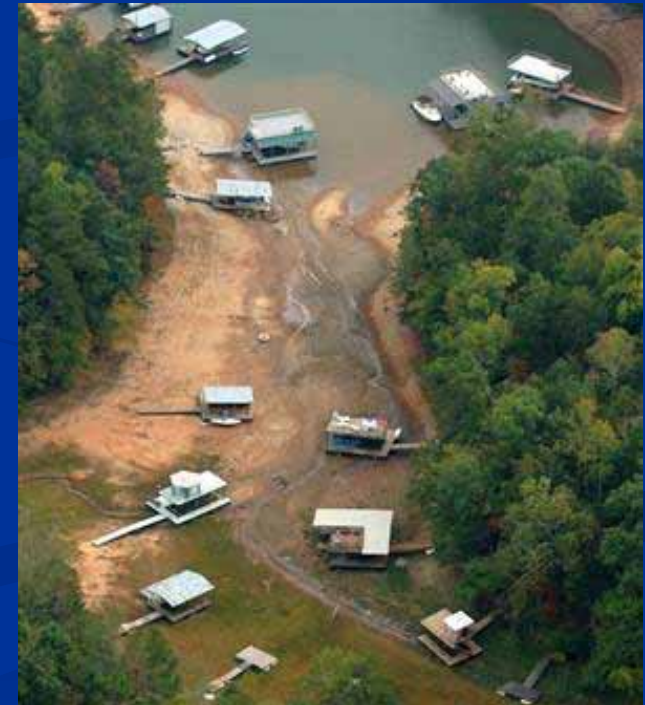
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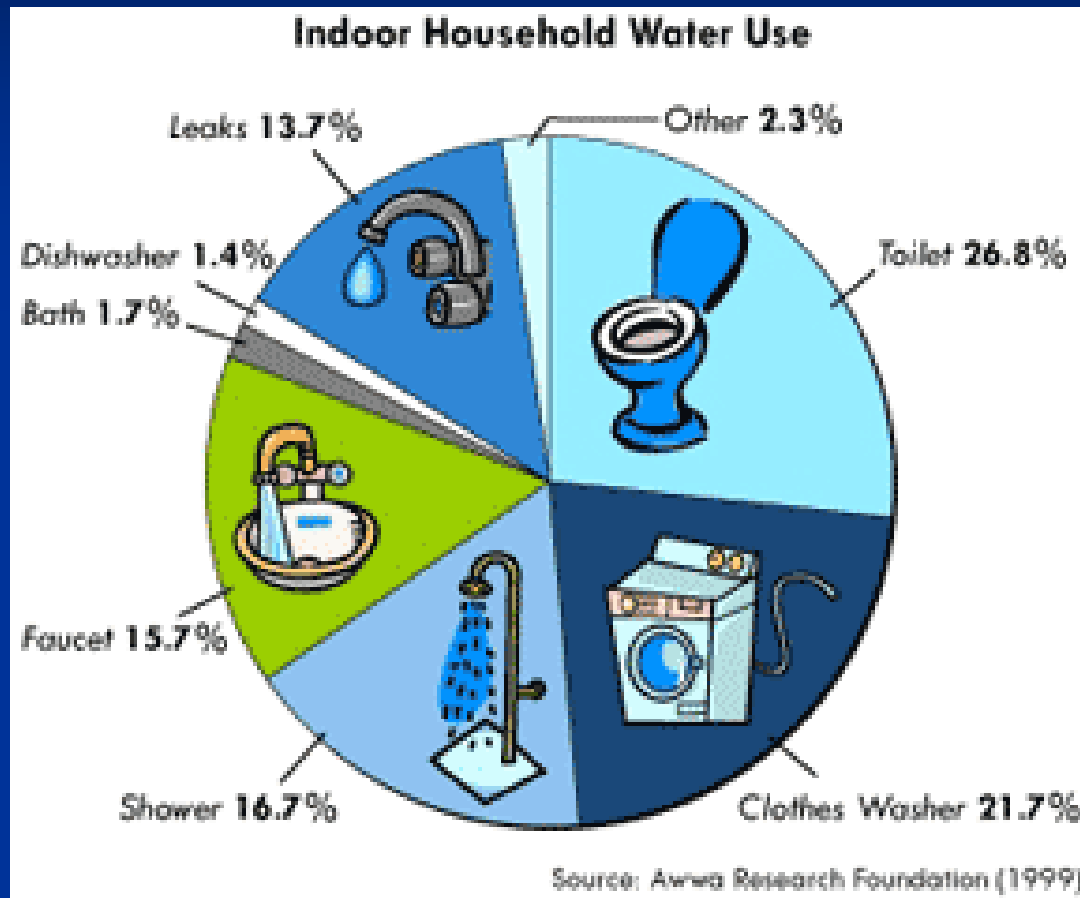
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The Metropolitan North Georgia Water Planning District's Water Supply Plan

- Propose building **six reservoirs** through 2035
 - > Glades Reservoir in Hall County, a 733-ac, 6.4 MGD
 - > Bear Creek Reservoir in Fulton County, 15 MGD
 - > Richland Creek Reservoir in Paulding County, 305 AC, 35 MGD
 - > Etowah Reservoir, Fulton County, 30 MGD
 - > Ocmulgee Reservoir, Henry County, 13 MGD
 - > Cedar Creek Reservoir, Hall County, 9 MGD
- Estimated Cost to Implement Districts Plan
through 2035: **\$5.8 billion**
- **Are there other costs?**
- **Are there other options?**



Non-potable Water




+Outdoor Uses
~80% domestic use (EPA, Kloss 2008)

Gray Water

Supplementing Domestic Supplies

Household water use	Amount (GPD)
Toilet	18.5
Clothes Washer	15.0
Shower, Bath	12.8
Sinks, Faucets	10.9
Leaks	9.5
Dishwasher	1.0
Other Sources	1.6
Total Indoor Water Use	69.3
Total Outdoor Water Use	30 – 40



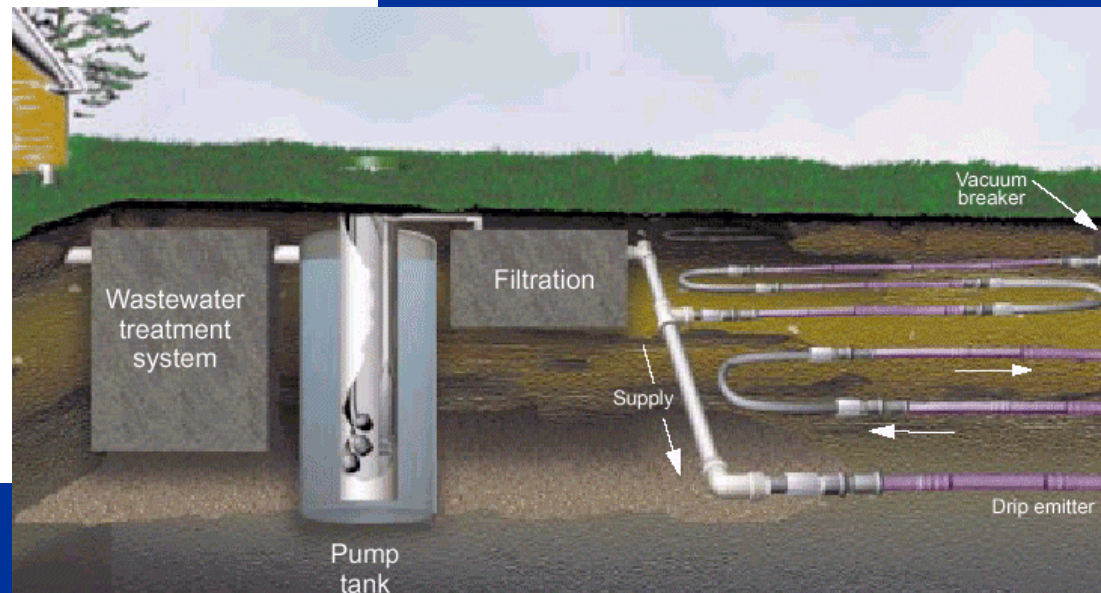
*Averages per day; source AWWA Research Foundation

Department of Human Resources
Division of Public Health

Manual
For
On-Site Sewage
Management Systems

Gray Water Drip Irrigation

Revised January 2006

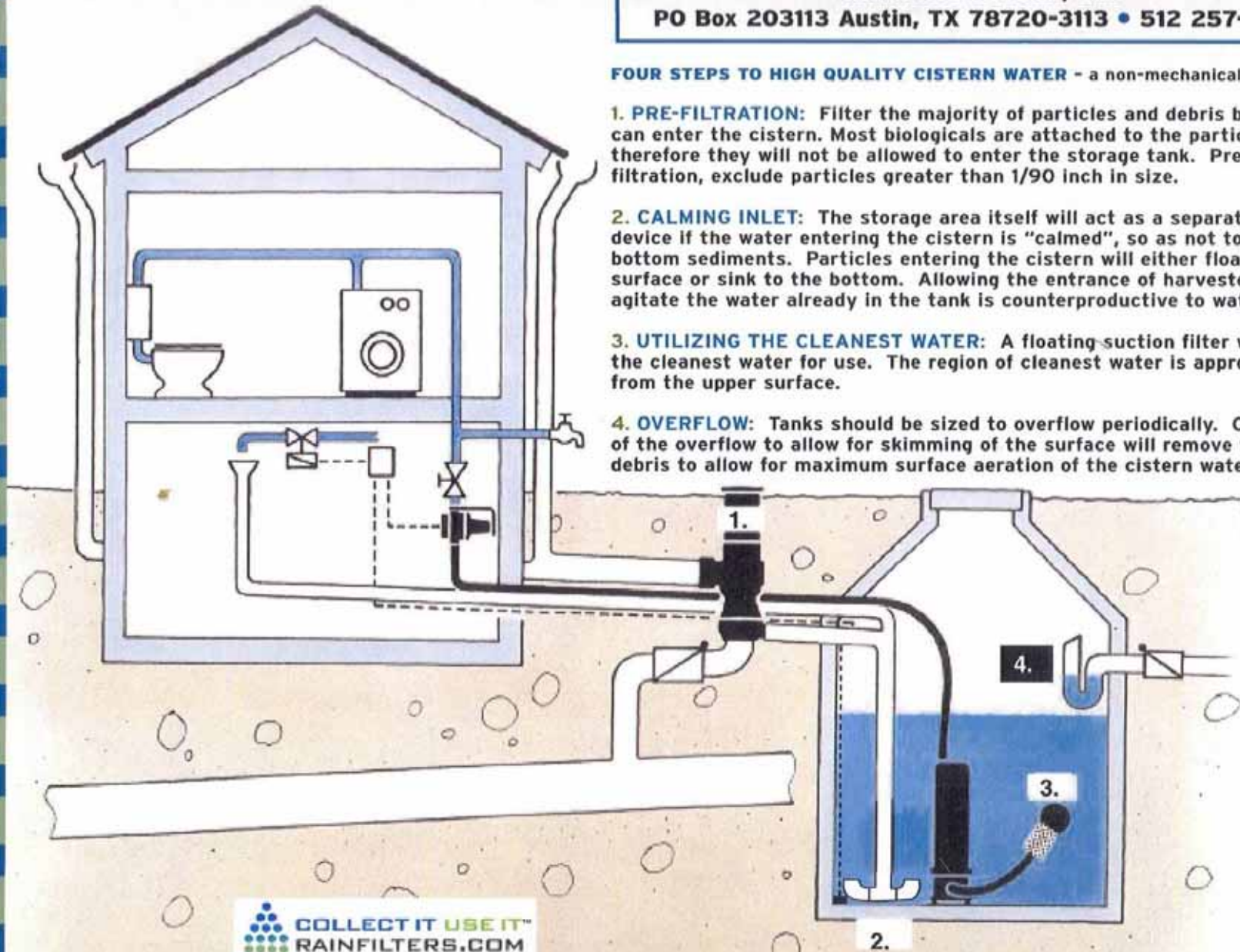


Rainwater

Rainfilters of Texas, LLC
PO Box 203113 Austin, TX 78720-3113 • 512 257-7986

FOUR STEPS TO HIGH QUALITY CISTERN WATER - a non-mechanical process

- 1. PRE-FILTRATION:** Filter the majority of particles and debris before they can enter the cistern. Most biologicals are attached to the particles and therefore they will not be allowed to enter the storage tank. Preferable filtration, exclude particles greater than 1/90 inch in size.
- 2. CALMING INLET:** The storage area itself will act as a separation filtration device if the water entering the cistern is "calmed", so as not to disturb bottom sediments. Particles entering the cistern will either float to the surface or sink to the bottom. Allowing the entrance of harvested water to agitate the water already in the tank is counterproductive to water quality.
- 3. UTILIZING THE CLEANEST WATER:** A floating-suction filter will remove the cleanest water for use. The region of cleanest water is approximately 6" from the upper surface.
- 4. OVERFLOW:** Tanks should be sized to overflow periodically. Construction of the overflow to allow for skimming of the surface will remove floating debris to allow for maximum surface aeration of the cistern water.



Non-potable Uses

Supplementing domestic supplies with Rainwater

Household water use	Amount (GPD)	
Toilet	18.5	6,753 g/yr <u>5,475 g/yr</u> 12,278 g/yr
Clothes Washer	15.0	
Shower, Bath	12.8	
Sinks, Faucets	10.9	
Leaks	9.5	
Dishwasher	1.0	
Other Sources	1.6	
Total Indoor Water Use	69.3	
Total Outdoor Water Use	30 – 40	

*Averages per day; source AWWA Research Foundation



Rainwater Harvesting

How Much Water Do We Use?

Toilets ~ 6,753 g/yr

Laundry ~ 5,475 g/yr

Non-potable indoor ~ 12,278 g/yr/person

Household of four ~ **50,000 g/yr**

+ Irrigation ???

***Can we supply or supplement
with harvested rainwater?**

Harvestable Rainwater

NOAA Average Precipitation: 1971 - 2000

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
5.02	4.68	5.38	3.62	3.95	3.63	5.12	3.67	4.09	3.11	4.1	3.82	50.2

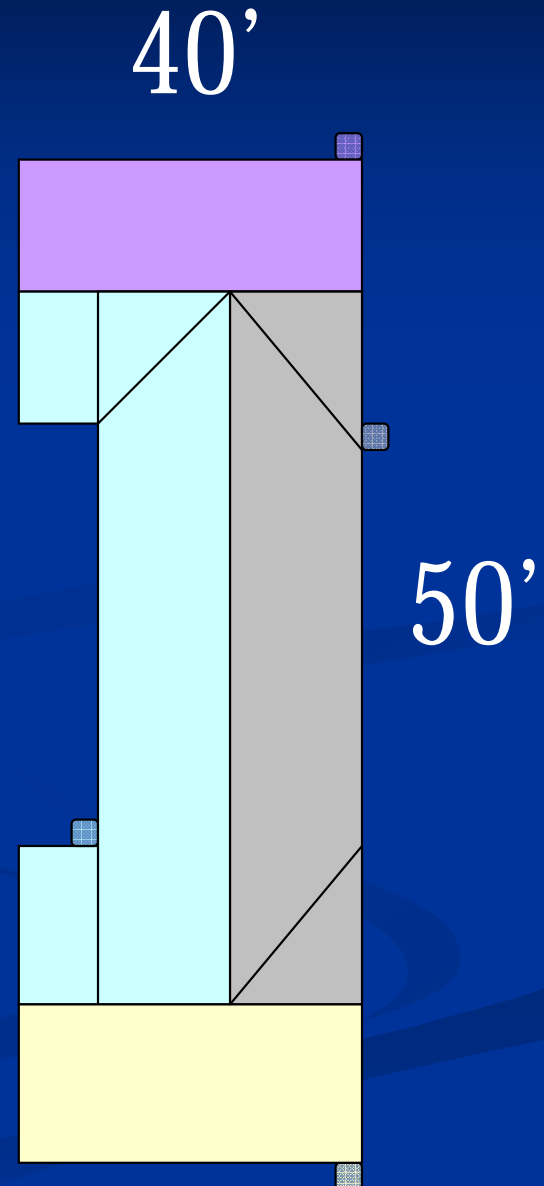
<http://www.weather.gov>

~50 inches/year
~3 – 5 inches/month



How Much Water is Available

- 623 gal/1,000 sq. ft. /inch of rain
- 40'x50' = **2,000 sq ft.**
- **60,000 gal/yr**
- **Toilet + Laundry + >10,000 gal**



Other Catchment Areas

The screenshot displays the ArcMap interface for a project named 'RockEagle.mxd'. The map shows an aerial view of a residential area with a blue line representing a stream or road. A 'Measure' dialog box is open, displaying the following information:

Measurement Type	Value
Area measurement	19,585.432521 Square Feet
Segment	21.937652 Feet
Perimeter	629.20933 Feet

A large blue arrow points from the 'Area measurement' value in the dialog box to a polygon on the map, indicating the area being measured.

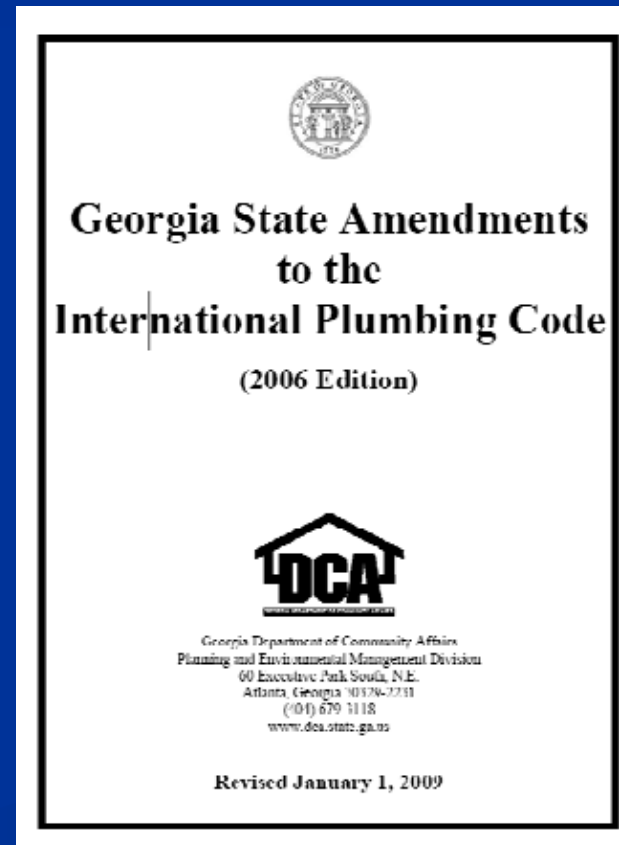
The 'Layers' panel on the left lists the following layers:

- ortho_1-1_1n_s_ga237_2007_1.sid
- Rain Garden Waypoints.dxf Point
- Rain Garden Waypoints-tracks.dxf Polyline
- river237
- lake237
- ptgr237rd.e00 arc
- putnamcontour arc
- r3383d4.tif
- ned237.img
- Value
- High : 211
- Low : 102
- ga_statsgo_1 tic
- ga_statsgo_1 label
- ga_statsgo_1 arc
- putcobndry polygon
- huc12
- ga_statsgo_1 polygon

Gray Water & Rainwater Workgroup

Can we use gray water and rainwater supplement potable supplies in SE?

UGA
State Gov.
Local Gov's
Private Co's



2008 Legislature: Gray Water for Hand Watering

Grey Water Do's

- Only apply by hand watering using watering cans or containers
- Only apply enough water that can be absorbed
- Only use waste water from baths, wash sinks, showers, washing machines
- Wash your hands following watering with gray water
- Stop using gray water if odors are generated or plants appear to be unhealthy
- Use gray water only during prolonged warm dry periods, and use only what you need to meet the plants needs

Gray Water Don'ts

- Don't water a vegetable garden with gray water
- Don't disconnect plumbing or pipes from sewer or septic systems.
- Don't allow gray water to flow from your property or enter storm drains.
- Don't use gray water from washing clothes soiled by feces or vomit, for example laundering diapers or illness in the home.
- Don't collect and store gray water
- Don't allow children or pets to drink or play with gray water

FOR MORE INFORMATION

Georgia Division of Public Health
Environmental Health
(404) 657-6534

www.health.state.ga.us/programs/envservices

O.C.G.A. 31-3-5.2

Gray Water Regulations “Hand Watering”



Environmental Health Section

DIVISION OF PUBLIC HEALTH

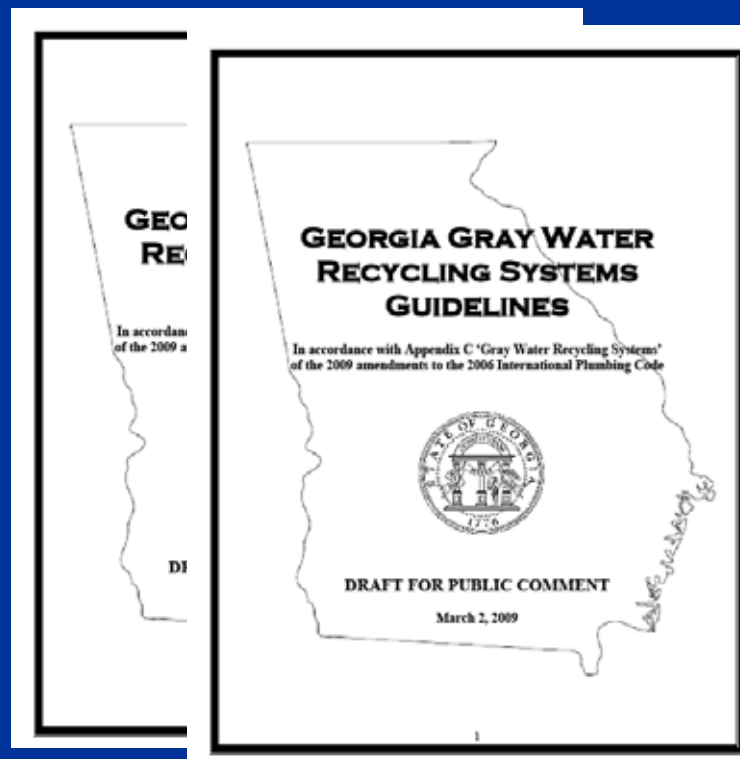


Gray Water/Rainwater Guidelines Taskforce

2/20/09 – final draft review

3/2/09 – 5/1/09 – Gray water guidance issued

60 days public comment (DHR)



Educational Efforts



Rain Harvesting Workshop

A Professional Rain Catchment System Training

Featuring UGA Scientists & Billy Kniffen, Texas A&M Water Resource Specialist



May, 2008



ARCOSA

(Amer. Rainwater Catchment Systems Assoc.)

www.arcsa.org

National Conference

Decatur, GA

September 12-16



Advanced Concepts in Water Smart Landscape Design



Collection

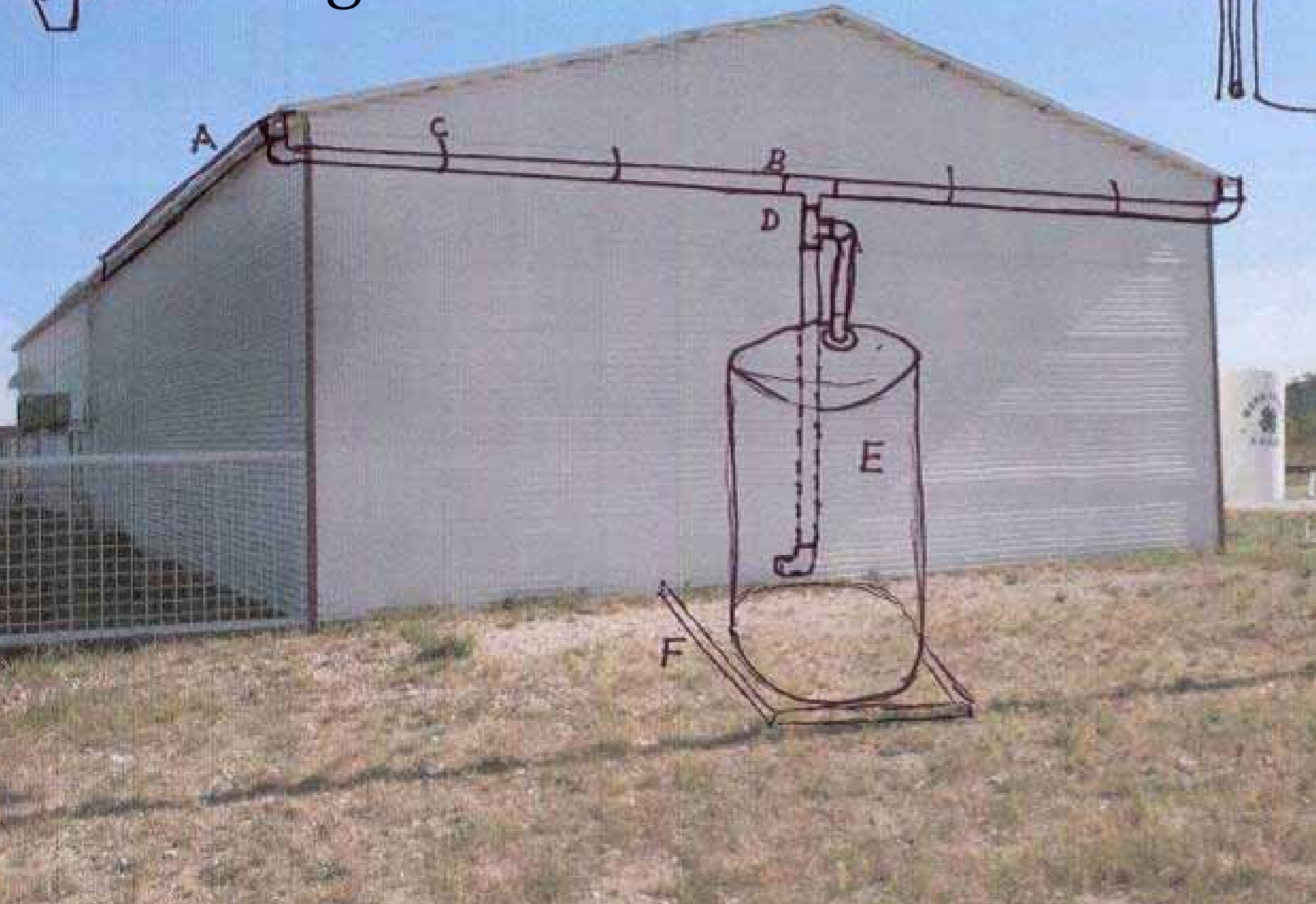


Screen/Pre-Filter Inlets



Sight Selection for Tanks

SS TRAP ↓



Storage



Hiding Tanks



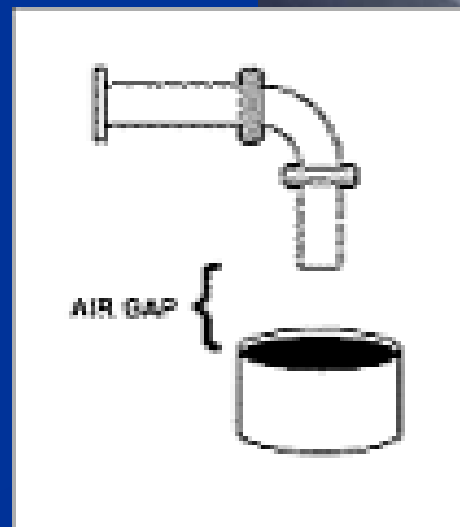
Pumps & Controls



Makeup Water Reduced-Pressure Back Flow Assembly (RPBA)



Public water Systems
May Require air gap,
Require RPBA or both



Filtration and Disinfection



Labeling & Plumbing



UNTREATED RAINWATER
DO NOT DRINK

Irrigation Systems



Minimum Maintenance

- Maintain pre-filters & filters
- Maintain disinfection system
- Wash and clean out above ground tanks yearly
- Keep roof gutters clean to minimize trash in storage



Additional WaterSmart Benefits

- Reduce sources of pollution
- Increase infiltration
- Enhance treatment/filtration
- Reduce consumption



Questions?

