

December 1980

FRD-14



Easy ways to **SAVE WATER MONEY & ENERGY** at home



NOTE

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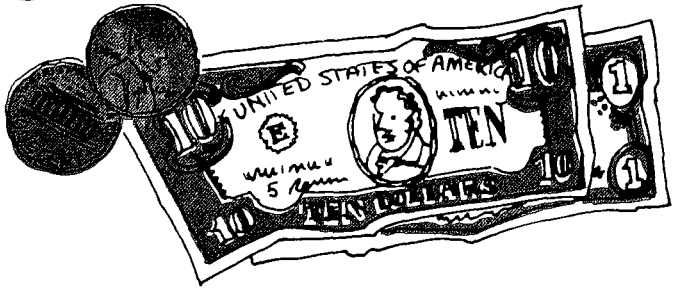
Easy ways to **SAVE WATER MONEY & ENERGY** at home



"Motorists who drive blocks out of their way to save 4¢ a gallon at a cut-rate gas station never dream they may be wasting 4¢ a minute in the shower"



"By investing in five simple, water-conserving devices, I've been saving \$11 a month on water and energy bills—for just one person!"



written by Edwin F. Wesely, Jr.

illustrated by Billie Sturgeon
Julie Flaherty
Suzie Potter

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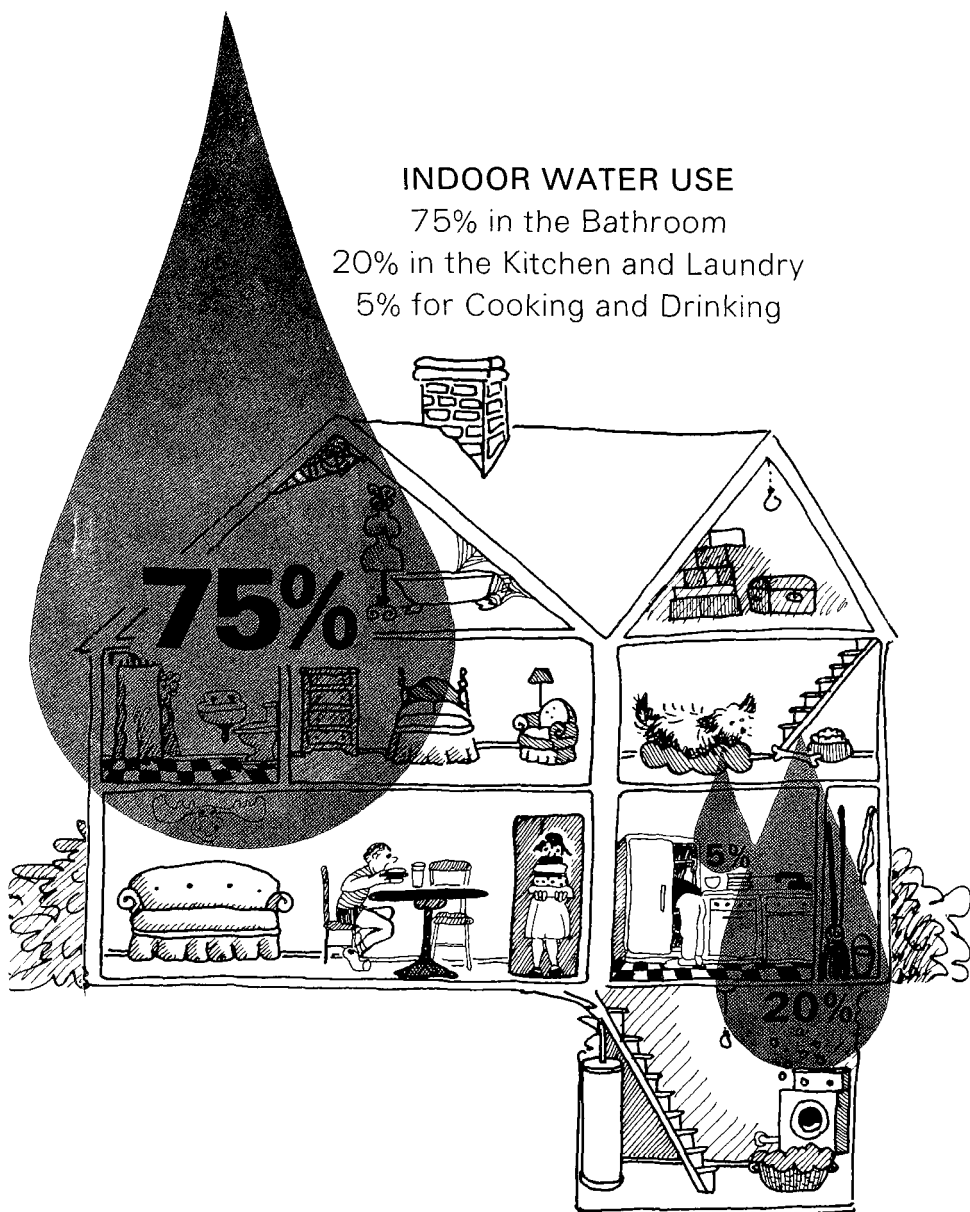
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INDOOR WATER USE

75% in the Bathroom

20% in the Kitchen and Laundry

5% for Cooking and Drinking



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ACKNOWLEDGEMENTS:

Special thanks to Louise Chesnut, Arlington, Va., and to David Wilborn, Metropolitan Water Saving Co., Inc., 4701 Sangamore Road, Washington, D.C. 20016. Their wide knowledge and interest in the subject of water saving were especially helpful to the author. Thanks also to staff members at the U.S. Environmental Protection Agency and the U.S. Department of Energy for reading and commenting on the text.

WHY SAVE WATER

Saving water saves energy, but a lot of us miss the connection. Motorists who drive blocks out of their way to save 4¢ a gallon at a cut-rate gas station never dream they may be wasting 4¢ a minute in the shower.

By conserving *hot* water many households could save 50¢-60¢ of energy a day—almost what they'd save on gasoline by switching to a fuel efficient car.

Before I set out to test water-saving ideas in my home, I hardly knew a "spray tap" from the dog's flea collar.

But I soon learned that the "gas-guzzling" car had its counterpart in my bathroom—in the *water-guzzling* plumbing fixtures I'd been using for years and still considered "normal"

Like many of us I was stuck with "high-flow" plumbing appliances designed for

an era of cheap, and seemingly endless water and energy.

I discovered, too, how easy it was to purchase and install efficient water-saving devices that fit the existing plumbing.

Weeks of exploring faucets and toilet tanks at home and around the neighborhood—many of them wasting tons of water—has me eager to report my findings

- 💧 By investing in five simple, water-conserving devices, I've been saving \$11 a month on water and energy bills—for just *one* person!
- 💧 The devices—that work *more* effectively than the original plumbing—took me 20 minutes to install, and will save about 13,000 gallons of water over the next year.
- 💧 Applied nationally, household water-conservation programs would save billions of gallons of water a day, and reduce the need to build high-priced dams and sewage plants on America's last free-flowing rivers.
- 💧 More fresh water—and less treated sewage—in our streams mean improved water quality for the people and wildlife who depend on it.



WHERE THE WATER COMES FROM

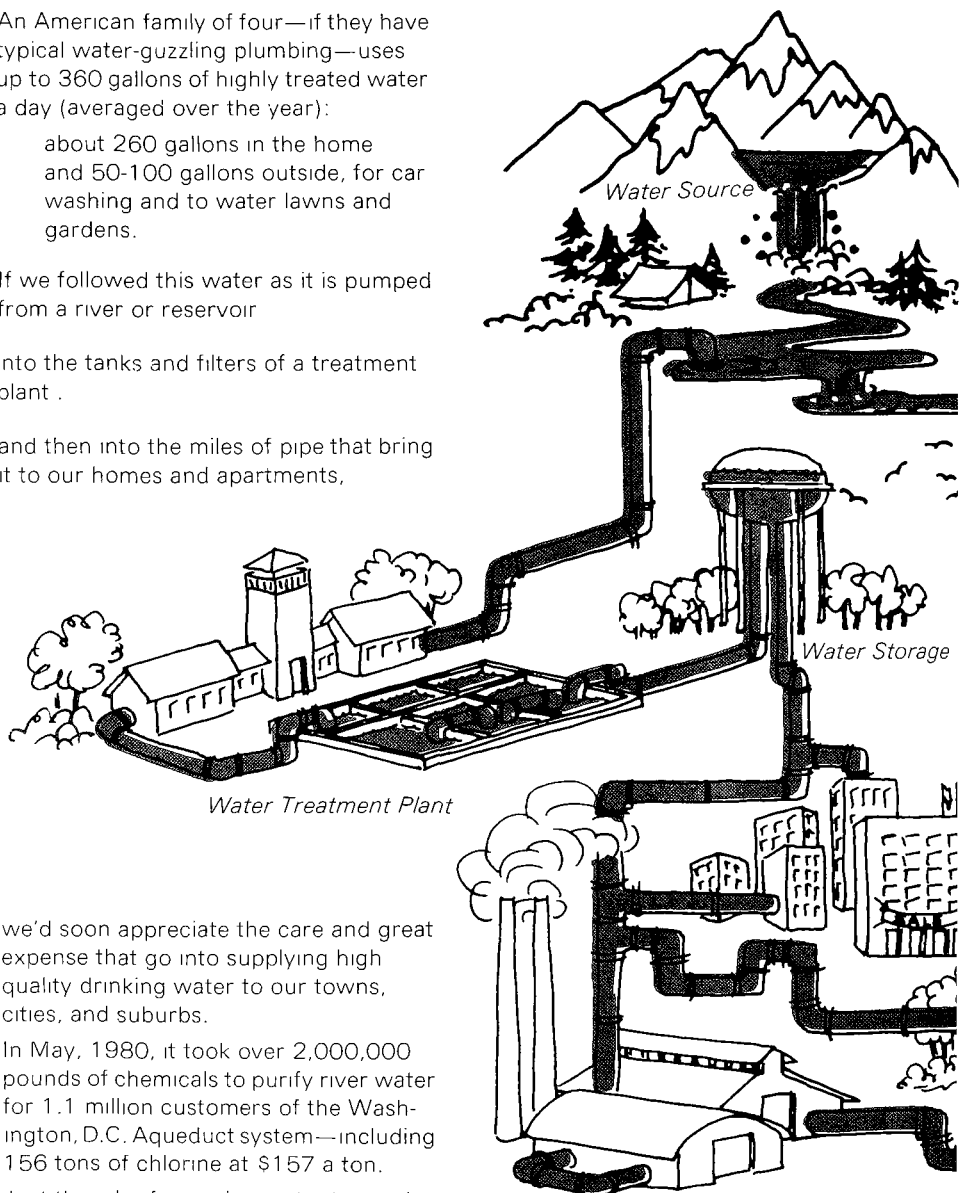
An American family of four—if they have typical water-guzzling plumbing—uses up to 360 gallons of highly treated water a day (averaged over the year):

about 260 gallons in the home and 50-100 gallons outside, for car washing and to water lawns and gardens.

If we followed this water as it is pumped from a river or reservoir

into the tanks and filters of a treatment plant .

and then into the miles of pipe that bring it to our homes and apartments,



we'd soon appreciate the care and great expense that go into supplying high quality drinking water to our towns, cities, and suburbs.

In May, 1980, it took over 2,000,000 pounds of chemicals to purify river water for 1.1 million customers of the Washington, D.C. Aqueduct system—including 156 tons of chlorine at \$157 a ton.

Just the job of pumping water to municipal customers in the United States comes to 40,000 barrels of fuel oil a day—worth \$1.2 million a day at 1980 OPEC prices.

WHERE IT GOES

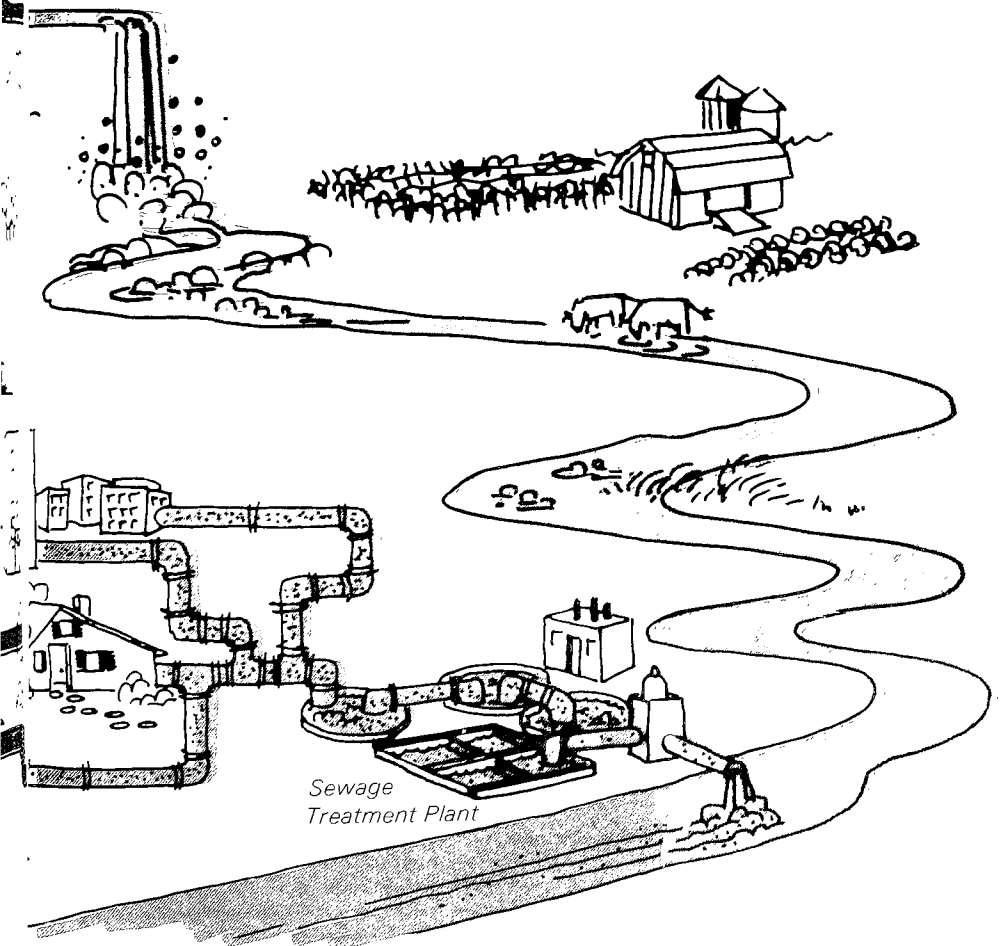
Once used and flushed down a sink or toilet (sometimes to carry a single tissue)

our household wastewater travels through endless pipes to the complex system of pumps, tanks, and chlorination chambers of a sewage-treatment plant . . .

where it is cleansed of most (though not all) pollutants and released back into a river

Since 1972, when the Clean Water Act made it national policy to clean up our rivers, we've been spending about \$4 billion a year to renovate old sewage plants and build new ones.

Operating costs of all U.S. sewage plants — paid by local ratepayers — ran close to \$13 million a day in 1980.



HOW WE USE IT

To pinpoint the ways we use household water we've taken the family of four on our cover, the Fred Longshowers, whose home was built with typical "high-flow" plumbing fixtures.

FIGURE HOW MANY GALLONS THEY (AND WE) USE TO

(circle the correct answers)

(1) flush a toilet one time	1-3	5-7	7-9
(2) run the tap two minutes while "Dripper" Longshower brushes his teeth	1	3-5	7-9
(3) take a ten minute shower	5-15	20-40	40-70
(4) wash the dishes in an automatic machine	5-10	10-20	20-30
(5) do a full load of clothes in a top-loading machine	15-25	30-55	45-70
(6) wash the car for 20 minutes (nozzle off, hose running the whole time)	30	60	90
(7) the Longshowers ignore a leaky faucet that drips slowly for a month	200	300	400
(8) the toilet leaks for 6 months	7,500	25,000	45,000



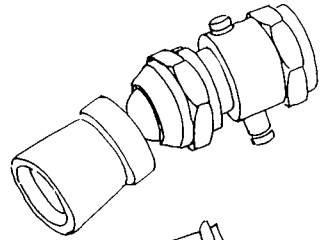
QUIZ ANSWERS

(1) 5-7 GALLONS (2) 3-5 GALLONS (3) 40-70 GALLONS (4) 10-20 GALLONS (5) 30-55 GALLONS (6) 90 GALLONS (7) 300 GALLONS (8) 45,000 GALLONS

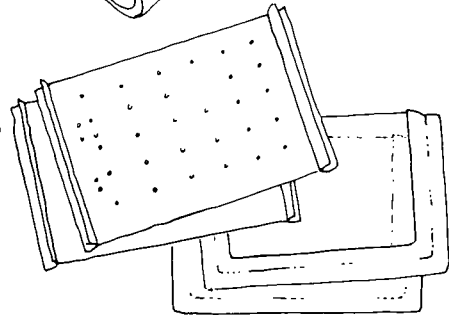
EASY WAYS TO SAVE

To beat inflation, and their town's soaring water, sewer, and energy costs, the Longshowers decided to set up their own water-saving program. This required three investments at a local hardware store.

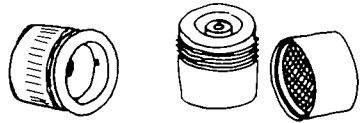
\$12.95 for an effective water-saving shower head



\$11.00 for two sets of plastic toilet inserts (called "dams") which they installed in each of two toilet tanks

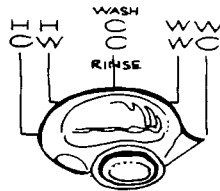


\$6.00 for three faucet aerators

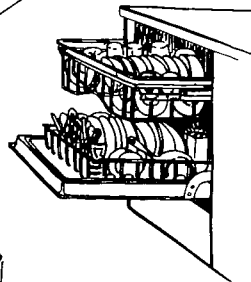


They also changed the way they used two appliances:

the washing machine—normally set for HOT WASH-WARM RINSE—was reset to WARM WASH-COLD RINSE.



they ran the dishwasher only when it had a full load (which saved two loads/week).



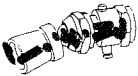
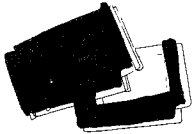




By changing their toothbrushing habits the Longshowers saved another 14 gallons of water a day (about 21 tons a year). Instead of running the tapwater for two or three minutes, everyone used a cup, and ran the tap just to rinse the toothbrush.



WATER & MONEY—SAVED BY A FAMILY OF FOUR

RESULTS OF THE LONGSHOWERS' EASY-TO-DO WATER-SAVING PROGRAM:

(gallons used in one day by a family of four)

	TOTAL WATER		HOT WATER	
	before	after	before	after
 SHOWERS (4 showers, 25 minute total)	125	55	62.5	27.5
 TOILET (20 flushes)	110	80	—0—	—0—
 FAUCETS	26	16	16	10
 WASHING MACHINE (1 load—34 gallons)	34	34	25	8
 DISHWASHER (1 load—17 gallons)	17	17	17	17
 TOOTH BRUSHING (8 times—not counted in faucet total)	16	2	—0—	—0—
TOTAL				
GALLONS USED IN ONE DAY	328	204	120	62
	<i>before</i>	<i>after</i>	<i>before</i>	<i>after</i>
	TOTAL WATER		HOT WATER	

HOT WATER IS EXPENSIVE

SAVINGS IN WATER, ENERGY, MONEY

At average water and energy rates in the Washington, D. C. suburbs (June 1980) the Longshowers saved:

 TOTAL WATER SAVED IN ONE YEAR (including the dishwasher)	47,028 gallons
--	-----------------------

MONEY SAVED ON WATER/SEWER BILLS

WATER (at 90¢ per 1,000 gallons)	\$42.33
SEWER (at \$1.10 per 1,000 gallons)	\$51.73

TOTAL MONEY SAVED ON WATER/SEWER IN ONE YEAR	\$94.06
---	----------------

 HOT WATER SAVED IN ONE YEAR (including the dishwasher)	22,938 gallons
--	-----------------------

MONEY EARNED IN ONE YEAR BY SAVING HOT WATER

—with an electric water heater (electricity at 6¢ a kilowatt hour)	\$285.52*
—with a gas water heater (gas at 38¢ a therm)	\$102.86*
—with an oil water heater (oil at \$1.00 a gallon)	\$205.06*

HOT WATER

The water heater, which may be gathering cobwebs in a dark corner, will quietly pick our pockets, if we let it. As we fret about furnace and air-conditioning bills, we should remember that the water heater burns *twenty percent* of the energy we use at home.

Conserving hot water saved the Longshowers about 1.25¢ a gallon, which came to 72¢ of electricity a day. Gas rates in the summer of 1980 were about 60% less, so savings with a gas heater

would have been 26¢ a day (about 1/2¢ a gallon).

But the Natural Gas Policy Act of 1978 will bring rate increases to gas users. By 1985, when the phased "deregulation" of natural gas prices is accomplished, homeowners may be paying 90¢ a therm—well over twice what most communities are paying in 1980.

You can easily figure your own hot water costs by applying the simple formulas on page 24.

*To figure your own energy costs see the formulas on page 24.

APARTMENTS & CONDOMINIUMS

When we aren't billed individually for water and energy there's usually less incentive to conserve. But these are such big budget items to the building owner, they're passed on in rents or as charges for condominium maintenance.

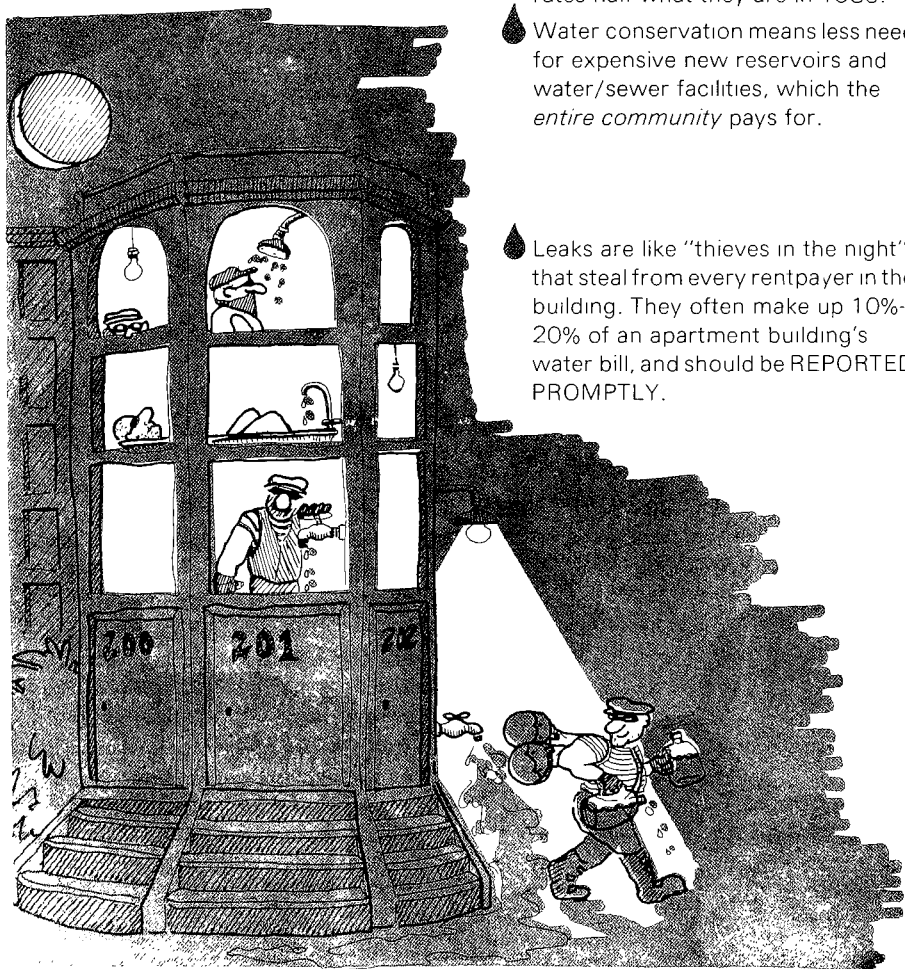
And for the first time, many water utilities are starting to charge *higher* rates to *big* users, which will put apartment and condominium residents even more under the gun.

Savings to landlords—and tenants—who conserve can be considerable.

💧 A few years ago a 151 unit high-rise apartment installed low-flow devices on showers and kitchen faucets at a cost of \$1,094. Within two months the fixtures had paid for themselves; and the building realized a net saving of \$9,570 in the first year. For ten years they projected a return of \$147,818—at water and energy rates half what they are in 1980.

💧 Water conservation means less need for expensive new reservoirs and water/sewer facilities, which the *entire community* pays for.

💧 Leaks are like "thieves in the night" that steal from every rentpayer in the building. They often make up 10%-20% of an apartment building's water bill, and should be **REPORTED PROMPTLY**.



WHAT ABOUT WELLS AND SEPTIC SYSTEMS?

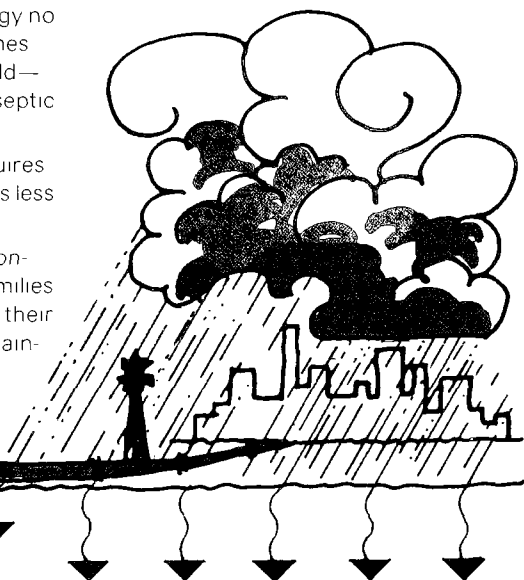
Conserving hot water will save energy no matter where the water supply comes from. And saving water—hot or cold—has additional benefits for well and septic system users

- Since well water generally requires pumping, less water used means less energy burned at the pump
- By saving just half the water conserved by the Longshowers, families would make life a lot easier for their septic systems. And prevent drain-field overloads

In some parts of the sunbelt

rainfall is replacing
5-10 inches of
groundwater
a year—

but groundwater
is being withdrawn
from wells
at the rate of
24 to 36 inches
a year.



● Parts of the United States are already running low on groundwater

On Long Island, New York—which normally gets 40 inches of rainfall a year—new developments have drawn away so much groundwater that ponds and streams have dried up, and salt water from the ocean has been seeping into groundwater systems drained dry by community wells.

In some parts of the sunbelt, groundwater that took centuries to accumulate is being withdrawn from wells at the rate of 24 to 36 inches a year

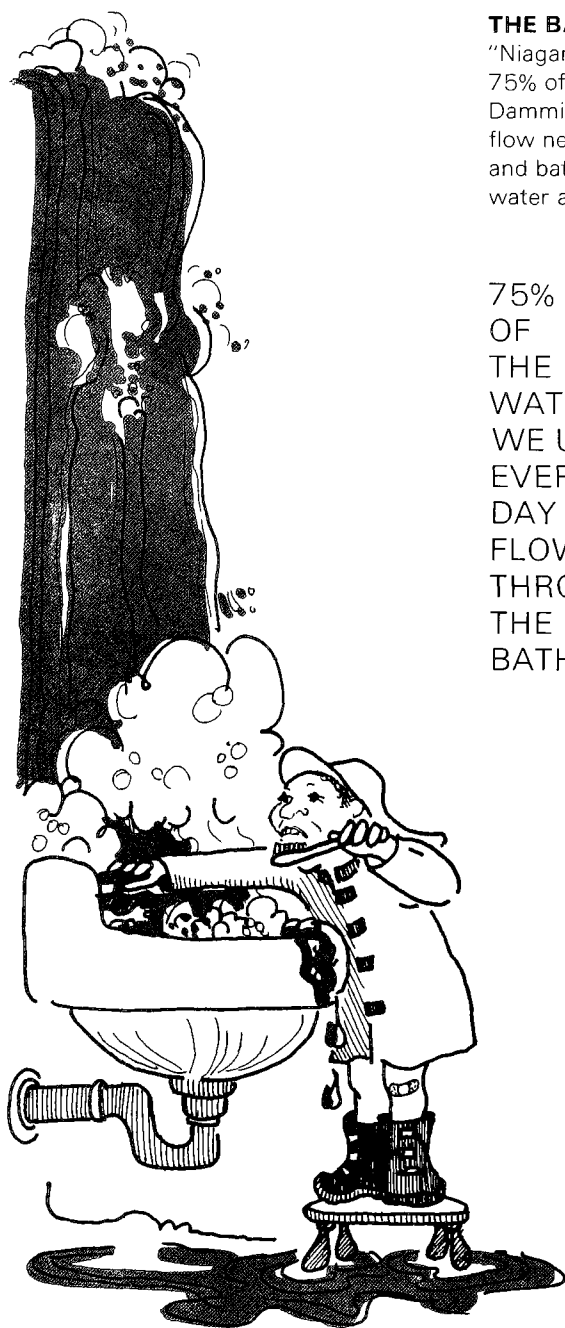
Nature, through rainfall, is replacing just 5-10 inches a year—and less than an *inch* in parts of Texas and Oklahoma

In communities such as these, water conservation is clearly an *urgent necessity*.

HOW TO SAVE WATER

THE BATHROOM is like an indoor "Niagara Falls", that consumes about 75% of the water we use in the house. Damming back the tons of water that flow needlessly from showers, toilets, and bathroom faucets is the key to big water and energy savings.

75%
OF
THE
WATER
WE USE
EVERY
DAY
FLOWS
THROUGH
THE
BATHROOM



THE SHOWER. Changing to a low-flow shower head saved the Longshower family 14¢ of water a day, and 44¢ of electricity. Flow-control inserts and shorter showers also save water.

💧 **Water-saving shower heads—**
Some new homes and apartments already have low-flow shower heads, and some plumbing codes require them. But most of us have "high-flow" fixtures that gush water at 5-10 gallons a minute

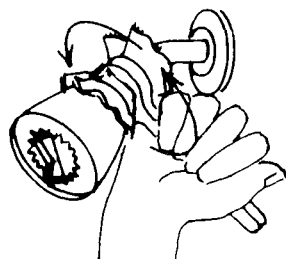
In testing shower heads, I found the one I'd been using for years (and considered "normal") produced 5-6 gallons a minute. After a few experiments I settled on a low-flow head—*more* effective and comfortable than the original—that delivered just 2.1 gallons a minute at full force. It cost \$12.95, but had paid for itself within two months.

Friends with two young teen-agers bought the same model—fearing the worst—but reported: "Good lord—we're saving \$15 a month with this shower head, and we really enjoy the shower."

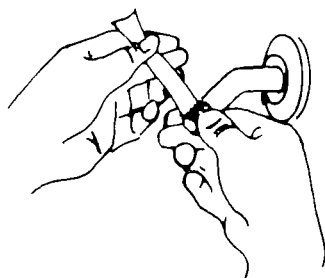
💧 In shopping for a conservation shower head make sure to check the advertised flow rate—the flow should be *under* three gallons a minute if you want substantial savings.

To calculate flow rates, use the water meter (see page 18), or put a gallon container under the shower head and measure the time it takes to fill the container (at your typical shower setting). If it fills in *less* than 20 seconds, the flow is greater than 3 gallons/minute.

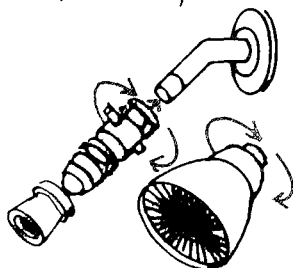
TO CHANGE SHOWER HEADS:



① Remove old "High Flow" shower head...turn counter-clockwise

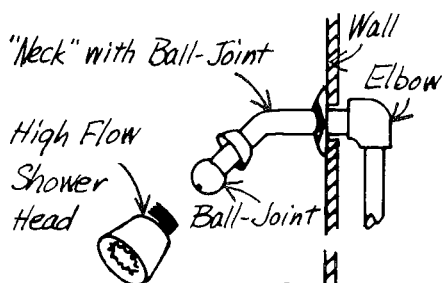


② To insure a tight seal, cover exposed threads of "neck" with pipe joint compound or Teflon tape.



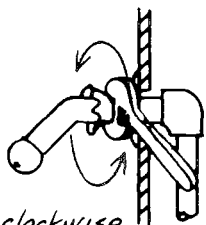
③ "Low Flow" shower heads. To install...screw onto "neck" clockwise.

IN THE SHOWER

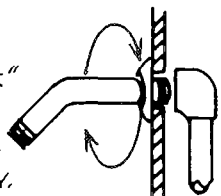


① To Remove
"Neck"...

Turn counter-clockwise.



② New "Neck"
screws
clockwise
into elbow.



In a few cases you may find the new shower head won't fit onto the existing pipe (called an "arm" or "neck"), especially if the "neck" ends in a ball-joint. But you can unscrew most necks and replace them. Replacements are readily available in plumbing stores and most hardware stores.

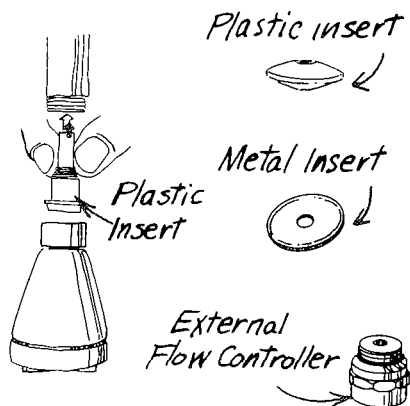
💧 Be sure to put some teflon tape (about 75¢ for a small roll) or pipe joint compound (50¢ for a small tube) on exposed threads of the new neck. Either one will seal the joints and provide a leak-proof connection.

💧 If you have a ball joint that has been on the shower a few years, and the neck proves too "stiff" to unscrew with moderate pressure, consider having a plumber replace it.

💧 **Flow-control inserts**—Small inserts, like the ones in the drawing, sell for about a dollar or two, and when fit into standard shower heads reduce the flow to 3 gallons a minute or less.

I tried several brands in my old "high-flow" shower head and found they cut the flow to about 2.75 gallons a minute; but in areas that have low water pressure the results may not be as good.

I prefer my water-saving shower head to the various inserts I tested (it saves more water, for one thing), but if you don't want to invest in a new shower head by all means try an insert.



IN THE BATHTUB

💧 **Shorter showers**—I find that running the water about 4 minutes is plenty of time for a comfortable shower. Measured against my former habit of 7-8 minute showers (at 5 gallons or more a minute) I'll save about 10,000 gallons of shower water this year—and up to \$100 in water and energy.

And here, my low-flow shower head has another advantage: a valve in the head lets me cut off the water for soaping and shampooing—and start it again at the same flow rate.

THE BATHTUB. Using a gallon container, fill the bottom of the bathtub until the water is an inch high. Using the formulas on page 24, you can then calculate what an inch of tubwater costs you.

An inch equals about 4.5 gallons in my tub, and for a "normal" bath I use about 5.5 inches (25 gallons)—at 4¢ an inch.

Since my "normal" shower now takes 8 gallons of water, I save 13¢ every time I boycott the bathtub—which has become standard practice.

When a warm bath is irresistible, I try to do the following

- **Close the drain before starting the faucet**—The first gallon or two may be cold, but it warms by mixing with hot water that follows.
- **Make sure the stopper is water-tight**—An inch of hot water leaked under a badly seated stopper is worth about 4¢.
- **Don't spill water through the overflow pipe**—I displace about 2 inches of water when I sit in the tub. If the tub is so full when I get in that an inch or two of water spills over into the pipe, I've wasted 4¢-8¢.
- **Bathe with less water**—And save 4¢ an inch.



TOILETS

TOILETS. Even now, many “standard” toilets are made with tanks that hold 5-7 gallons of water; and all of it spills into the toilet bowl when the toilet flushes.

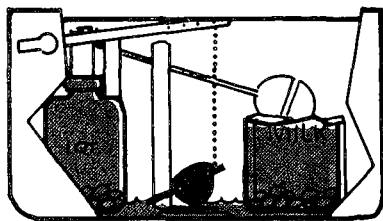
But it isn't just the *volume* of water that produces a “good” flush. I was surprised to learn that flushing action depends on the *height* from which the water falls. This creates a “head pressure”—or force—that gives sufficient “kick” to flush the toilet. (This is why old-fashioned water closets flushed the toilet with just 2 or 3 gallons of water)

An inexpensive pair of panels, called “dams”, can be set in the bottom half of a toilet tank to hold back about 1.5 gallons—without reducing the “head pressure”

Another trick is to displace water in the tank with plastic bottles, milk cartons, etc.

💧 **Plastic bottles**—The idea is to fill a couple of quart plastic bottles with water and set them in the toilet tank where they won't interfere with the flushing mechanism. Put a few clean stones in the bottom to hold them down.

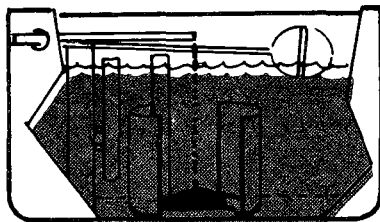
Two bottles displace and save about half a gallon of water—or more, if larger bottles are used (some people adapt gallon plastic milk bottles by cutting off the tops).



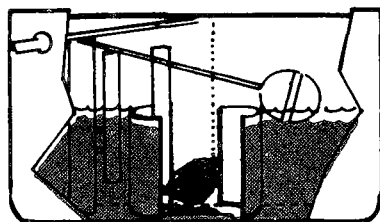
Bottles in place

Water utilities ask us *not* to use the once popular brick, which displaces water but may deteriorate in the toilet tank.

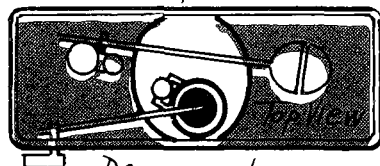
💧 **Toilet “dams”**—Those on the market are plastic, or made with rubber-coated pieces of metal that you can flex and fit between the front and back walls of a toilet tank. Once in place they make a barrier that holds back a gallon and a half of water during each flush.



Before Flush



During Flush



Dams in place

Dams are easy to adjust, and don't interfere with working parts in the toilet. Mine are set on either side of the flush valve, and about as close to the valve as I can get them. Other toilets may require other alignments, even to using only one dam.

The aim is to find an adjustment that combines adequate flushing action with maximum water saving—while insuring that the toilet doesn't have to be flushed twice.

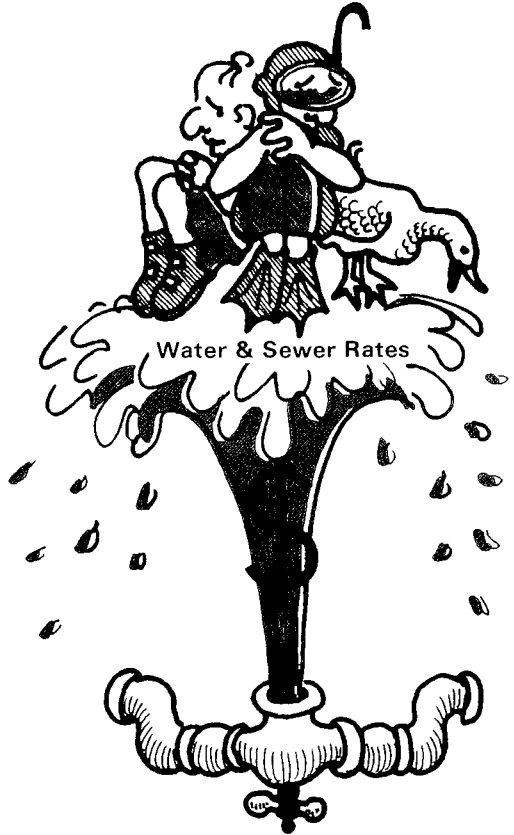
WATER & SEWER RATES

Having experimented with bottles, bricks, milk cartons, and toilet dams, I'm sold on the plastic dams I bought at \$5.00 a pair. They not only save more water, but create a central channel for water flushed from the toilet tank—which aids in efficient flushing.

💧 **Water saving toilets**—Toilets that were “standard” when water supplies were assumed to be limitless (and water/sewer rates were “dirt cheap”) are still being manufactured—and commonly require 5-7 gallons of water to flush properly.

But the 1980's have also brought more efficient models that flush with 3.5 gallons of water—and some local plumbing codes require them in new construction.

If, and when, you need to replace a toilet, make sure to install an up-to-date “water-saving” model.



Water & Sewer Rates

As this is written, water/sewer rates in my own sanitary district have jumped to an all-time high—in line with the rising costs of the chemicals and energy needed to process household water.

For a family like the Longshowers, water rates have risen from 90¢ to 97¢ per 1,000 gallons; but sewer rates have jumped 50¢, to \$1.60 per 1,000 gallons of sewage.

Given the usage figures on page 6, toilet dams will save the Longshowers 7.7¢ a day at the new rates—and pay for themselves (2 pair) in less than 5 months. While 8¢ a day may not keep the wolf

from the door in 1980, it's when I consider the huge construction and operating budgets of my local water/sewer district that I become even more fanatical about toilet dams.

If each resident of my district conserved 7.5 gallons of toilet water a day, we'd save 9 million gallons a day from expensive treatment at the water-filtration plant, and reduce flows to the regional sewage plant by the same amount.

For just \$10 a household, this would save nearly half the capacity of a new sewage plant my sanitary district plans to build in 1982 (cost estimate is over \$100 million!).

FAUCETS

FAUCETS. Although many plumbing codes now require 2.75 gallon/minute faucets, most of us can expect to run 4 gallons of water a minute with the faucet wide open—and more if we live in a zone of high water pressure.

Three inexpensive devices sold at most hardware stores will save gallons of water in the bathroom and kitchen.

💧 **Spray taps**—These spray the water like a miniature shower, and make washing and rinsing operations handier and more efficient. Most have adapters that let you screw them onto faucet spouts that have internal or external threads.

If you have an *unthreaded* faucet spout ask at a plumbing store for a “universal” faucet adapter.

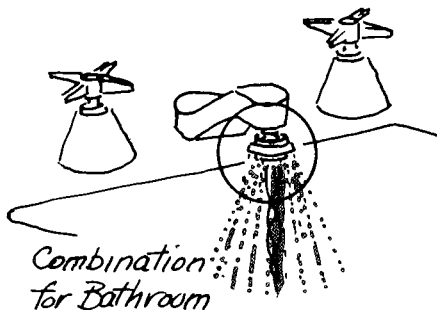
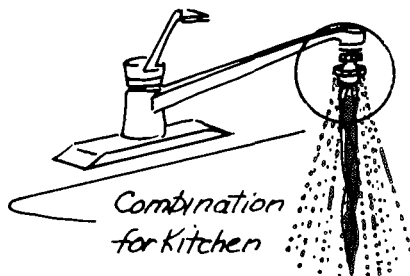
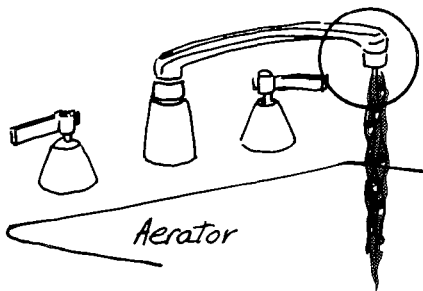
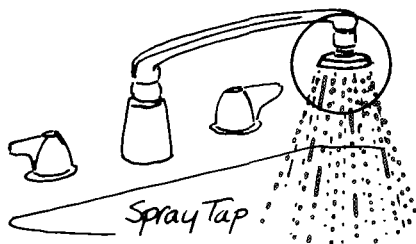
💧 **Aerators**—Like spray taps, most come with screw-on adapters. Aerators mix air with faucet water to reduce the flow

My own taps poured-out 5 gallons a minute under full pressure, but a \$2.00 aerator cut this to 2.5 gallons, about the same rate as the spray tap.

💧 **Combined spray tap-aerators**—Inexpensive fixtures that combine both features and let the user select the one he wants for a given job.

I have them on all faucets in the house: the spray is ideal for washing dishes, hands and vegetables, and the aerated flow just right for rinsing a razor or filling a glass.

I bought the spray-aerators to save water, but have found them so effective and such a pleasure to use that I wouldn't be without them. Mine have swivel necks that direct water to all parts of the sink



KITCHEN & LAUNDRY

THE KITCHEN AND LAUNDRY

Automatic dishwashers and washing machines are too expensive to replace just to save water. But good, water-saving models that use just half the water of older models are sold in many appliance stores. Look for one if you need to replace a worn-out machine



DISHWASHER. All the water in wash-rinse and pre-soak cycles is hot, since it comes directly from the water heater. My machine uses 17 gallons, about 21¢ of hot water a load.

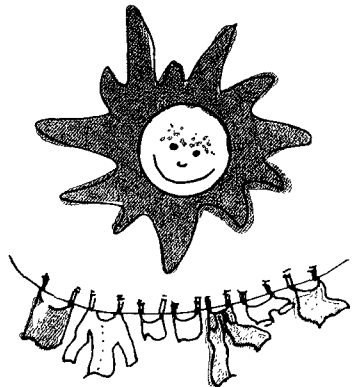
- So I never run the dishwasher with less than a full load.
- Rinsing the dishes in a stoppered sink (with cold water) lets me bypass the pre-soak cycle, and saves 10¢ a load.
- If you have a pre-soak cycle and like to use it, don't waste time and water rinsing dishes in the sink—the machine is equipped to do this for you. Scraping the dishes is good enough.
- When there are just a few breakfast or lunch dishes, do them by hand and save 10 or 12 gallons of hot water.

Instead of rinsing the dishes under a tap, fill a second basin or bowl with rinsewater.

- However you do the dishes, it's less work and uses less water to wash (or at least rinse) them soon after meals, before the food has dried.

WASHING MACHINE. For many years I set the dial for hot wash-warm rinse, thinking it would produce the "sparkling" clothes I saw on TV ads. Changing to warm wash-cold rinse has been saving 21¢ a wash (on a 34 gallon machine)—and the clothes are just as clean.

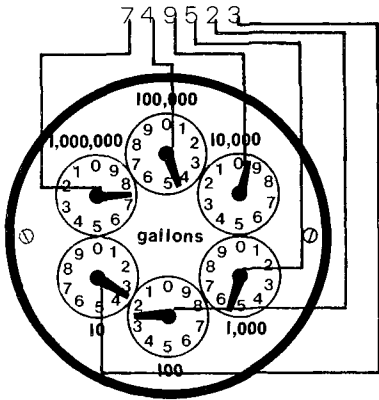
- Use the warm wash-cold rinse cycle unless the laundry is exceptionally dirty, or even a cold wash with cold water detergent if it gets the clothes clean.
- If there's less than a FULL load, don't run the washing machine.
On my machine, even the so-called "low-load" cycle uses 24 gallons of water, so it's a lot more cost-effective to wait until I have a full load.
- If convenient, set up a clothesline and let the sun dry your wash



WATER METERS

If the house has a water meter, you can check the entire plumbing system in five easy steps:

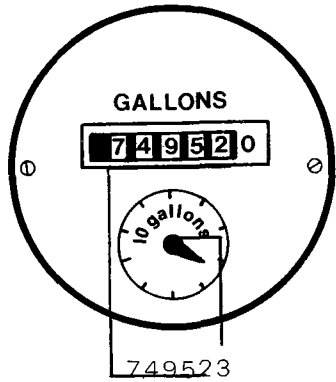
1. find the water meter. (It may be outdoors or hidden in a dark corner of the basement).
2. make sure no water is running.
3. read the dial (or dials) and record the reading.
4. after 15 or 20 minutes re-check the meter.
5. if the reading has changed you have a leak. Divide the number of gallons by the elapsed time and you'll know the rate: gallons per minute, per hour, etc.



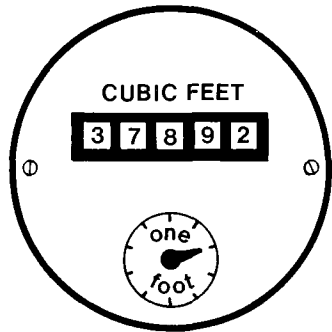
Some water meters read like electric meters: they have a set of dials that must be read in series, starting with the dial that records thousands or millions of gallons (or cubic feet).

You'll find the hands move counter-clockwise on one dial, then clockwise on the next, and continue to alternate this way.

To get the total gallons, read each dial in turn as shown in the drawing—if the hand is between two numbers, read the lower one.



If your meter looks like a car odometer, just read it as you would the car mileage. But note that the last number on the right is a zero, and never changes. It is for tens of gallons, which are recorded by the hand on the small dial.



Should the meter record cubic feet, multiply by 7.5 to convert to gallons of water.

Example: 3 cubic feet x 7.5 = 22.5 gallons

You now have a tool to check any appliance in the house by taking "before" and "after" readings. Find out how many gallons you use in the shower; to flush the toilet; for running the automatic dishwasher, etc. Just make sure to run only one appliance at a time.

Leaks—This was never *my* problem, until I checked one day and found two hidden leaks that were wasting almost 10 tons of water a week—at 48¢ a ton!

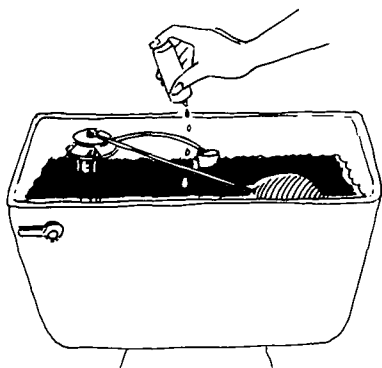
According to water utilities, leaks can easily account for 10% of our water bill, and waste 50¢ a day or more if the source is a *hot* water tap.

Toilet leaks—When a toilet leaks, water escapes from the tank into the bowl and washes away into a sewer. Toilets are notorious for hidden leaks, because unless the toilet “runs” after each flush (which can waste 4-5 gallons a minute) we seldom notice them.

At home, a silent leak caused by a corroded flush valve was wasting about 10.5 gallons of water an hour—costing me a ton of water and 50¢ a day for a plumbing failure I couldn’t see or hear.

The best way to find a toilet leak is one recommended by water utilities. For 83¢ I bought a small food coloring set at a local grocery store and put about a dozen drops of red dye into the toilet tank.

When red showed up in the toilet bowl soon after, I knew I had a problem. No dye in the bowl after 10 or 15 minutes means a leak-proof toilet.

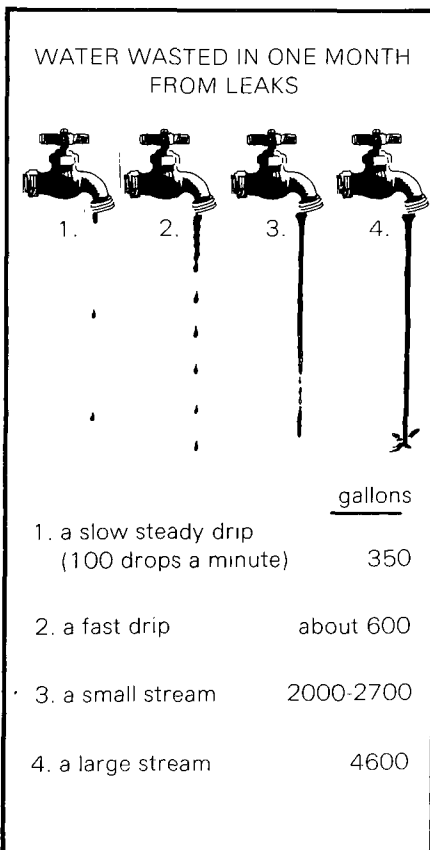


Faucet Leaks—Faucet leaks are obvious, but make sure to check seldom used taps in the basement or outside the house

On checking the basement, I found I was losing 65 gallons a day from a leaking faucet I rarely used

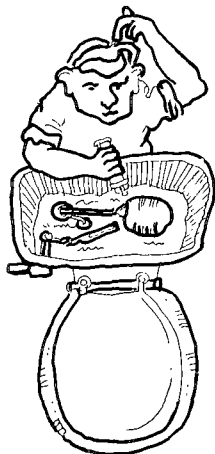
It was adding \$4 a month to the water/sewer bill, and had it been *hot* water would have added another \$24 a month to my electric bill.

To show how insidious faucet leaks are, we’ve drawn a few of them at rates I’ve measured in my own home.



FIXING LEAKS

A word of caution: most leaks are easy to repair, but if you're not handy with tools better buy or borrow a basic plumbing book or call your plumber.



Faucets

The majority of faucet leaks are caused by worn-out washers, inexpensive parts that are easily replaced. But there are so many kinds of faucets in use you'd better consult a plumbing book—or plumber—unless you know exactly how to take apart your faucet.



Toilets

The best way to see how a toilet works is to remove the lid, pull the handle, and watch what happens.

When water stands too high in a toilet tank it can spill out the overflow tube. A line on the back of the tank usually marks the right level, about 1/2 inch below the top of the tube.

If the water is too high (or too low) bend the float arm (very gently) until the toilet fills to a point about 1/2 inch below the top of the overflow tube. If the water is too low you may get a poor flush.

A worn flush-valve ball can leak 10-12 gallons an hour, but so secretly you'll need food coloring to spot it. It's a part you can easily remove and replace.

It may also happen that the flush-valve ball isn't seating properly. Check the valve seat for scale or corrosion and clean it if necessary. This may also be the problem if the toilet "runs"

If the ball still won't seat, the guide-wire may be bent or catching in the guide. Straighten the wire or clean the guide until the ball seats properly.

In newer toilets, the guide-wire assembly has been replaced by a chain, and the flush-valve ball by a streamlined "flapper-ball". If you have these parts you won't have problems with a balky guide-wire.

If you have to jiggle the handle to keep the toilet from "running", it may be a sticking guide-wire, or the handle itself may be loose. If the handle is loose, tighten the nut that secures it in the toilet tank.

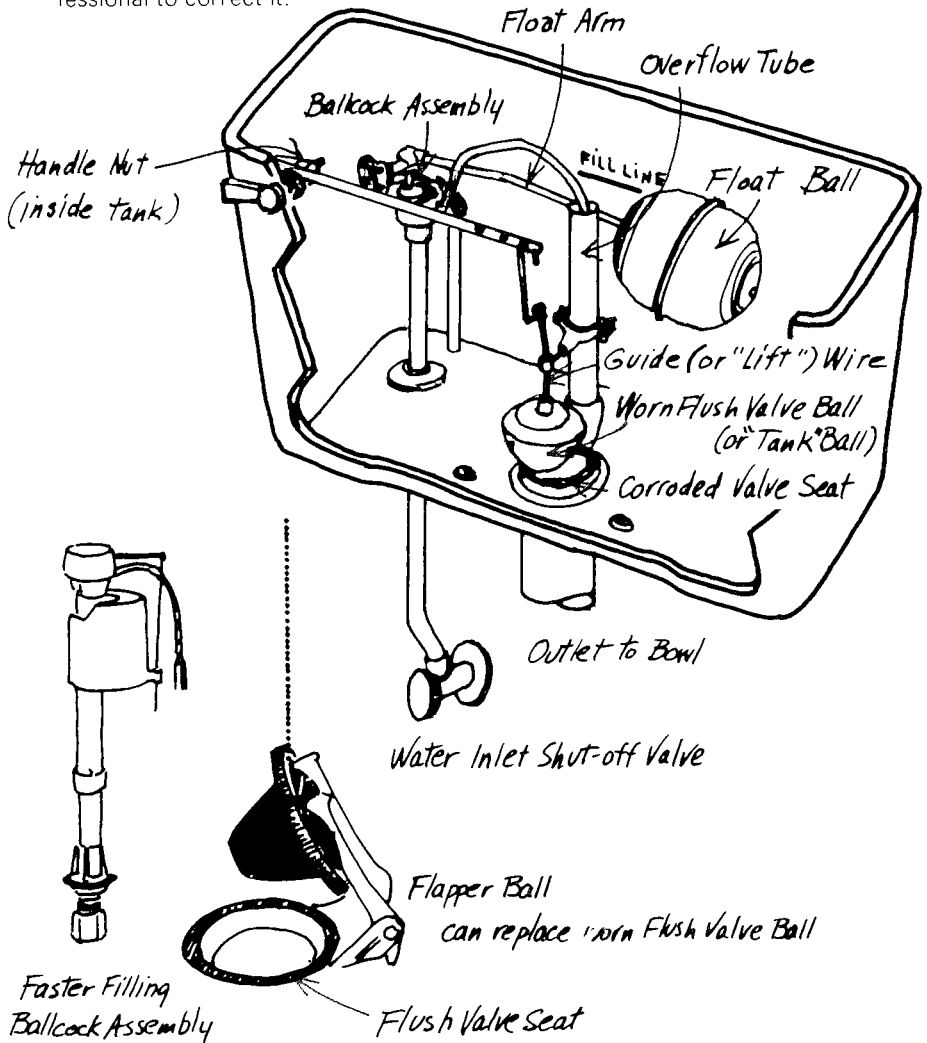
FIXING LEAKS

💧 If the water that refills the tank won't shut off, you probably have a defective shut-off valve in the ballcock assembly. You'll find that water continues to run and spill into the overflow-tube, eventually wasting tons of water and a lot of money.

Unless you're a good household plumber, you'll want to call a professional to correct it.

In replacing a ballcock assembly, consider getting a new, efficient model like the one below.

💧 To empty the tank for toilet repairs, turn off the water inlet under the toilet. Empty the tank by flushing it, and sponge up the leftover water.



MORE TIPS

Inside the House

Don't use the toilet as an ashtray (or wastebasket). Flushing away six gallons of water is an expensive way to dispose of a cigarette.

To save hot water, turn off the shower while soaping or shampooing. Many low-flow shower heads have built-in controls that make this easy.

Half-fill the sink while shaving so you don't have to run the hot water continuously.

A lower thermostat setting on the water heater will save energy. If you haven't adjusted it, the setting on your water heater is probably between 140-160 degrees, but in some cases could be lowered 10 or 15 degrees without affecting the operation of a dishwasher or washing machine.

I suggest you call the local gas or electric company to see what they recommend.

Insulating the water heater and hot-water pipes will save energy. But be sure to get advice on the proper way to do it.

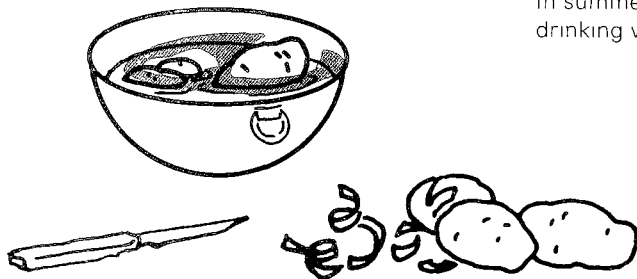


Low sudsing detergents require less water for rinsing (the amount of foam has no effect on cleansing power).

The garbage disposal eats *water*, too. Throw bones, rinds, eggshells, etc. into the trash—or even build a compost pile.

Use a bowl of water or stopper the sink when washing vegetables. In one experiment I used 3 gallons of water to scrub a dozen potatoes under the tap. Washing them in a bowl used 2 quarts.

In summer, keep a bottle of cold drinking water in the ice box.



Outside water use

Water washed or sprinkled onto streets and sidewalks means energy and chemicals wasted at a water purification plant—plus the cost of pumping the water through miles of pipe.

A few experiments with garden hoses taught me the following

💧 Washing my car for 20 minutes with a 5/8" diameter garden hose (nozzle off, hose running the whole time) used 97 gallons of water.

💧 A 3/4" hose nearly doubled the flow.

💧 With a pistol-grip nozzle on the hose—that I shut off except to wet and rinse the car—I used just 15 gallons of water.

💧 Watering lawns, gardens, and cars during the summer nearly doubles household water consumption. But at just the time of year when streams *are beginning to run dry*, this water is *not* returned to the river.

Low summer stream flows put heavy stress on fish and other stream wildlife. Their survival in drought summers may well depend on how carefully we manage the garden hose.



To conserve outside water:

💧 Plant native vegetation, especially in dry climates. Communities in the Southwest, for example, are rediscovering the beauty of native, desert plants that survive hot, dry summers on little water.

💧 To wash the car: hose it down, then shut off the hose until you're ready to rinse. Do the washing with a pail of soapy water.

💧 Instead of hosing driveways and sidewalks, use a rake or broom—and save 50-60 gallons of water.

💧 For lawns and gardens water utilities recommend the following.

—water the grass *only* when it needs water. If it springs up after you walk on it, the grass is OK and doesn't need watering.

—soak grass long enough for water to reach the roots. This kind of watering, once a week, is better than several light sprinklings. The formula is: WATER SLOWLY, DEEPLY, INFREQUENTLY.

—water during the cool of the day, early in the morning or at dusk, to minimize water loss by evaporation. Don't water on windy days

—in summer, keep the grass about 2" high. This shades the root system and holds soil moisture better than closely clipped lawns.

—conserve soil moisture around trees and garden plants (and discourage weeds) by mulching with leaves, lawn clippings, or even strips of plastic.

—don't water the street! Adjust the hose or sprinkler until it's on target

—Sprinklers that produce a fine mist waste a lot of water through evaporation.

—If water is rationed in a drought, give priority to trees and shrubs, which are more expensive and harder to replace than grass and annual plants.

—In a real emergency, water plants with "gray water" saved from bathing and dishwashing.

FIGURING THE COST OF HOT WATER

In figuring the cost of energy for bath and shower water, I've assumed that 50% of the water is hot; so if I use 20 gallons of water for a shower, I take half, or 10 gallons, in working out the energy costs.

To figure how much gas, oil, or electricity it takes to heat household water, use the following formulas:

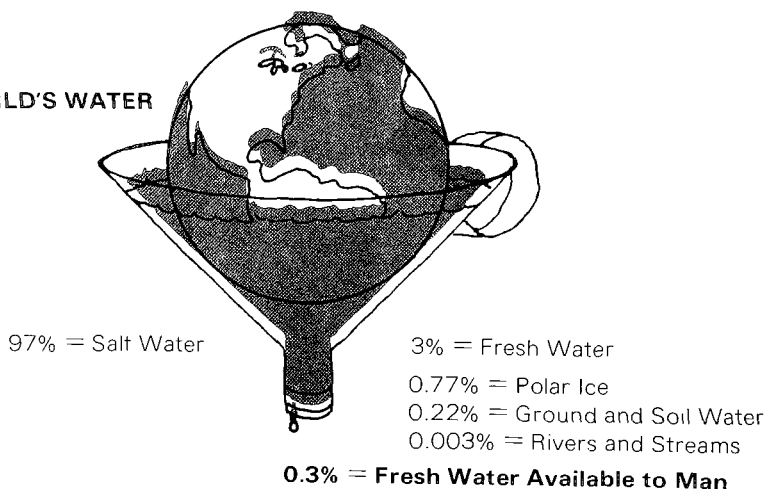
$$\frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^*}{3413} = \text{kilowatt hours (of electricity)}$$

$$\frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^*}{100,000} = \text{therms (of gas)}$$

$$\frac{\text{gallons of water} \times 8.33 \times \text{change in water temperature}^*}{132,000} = \text{gallons (of oil)}$$

Multiply your answer by the rate on a current energy bill to determine how much you pay for hot water.

THE WORLD'S WATER



FIGURING THE COST OF HOT WATER

Example: the cost of running a load of dishes through my 17 gallon dishwasher (all 17 gallons are hot water)—

$$17 \text{ gals.} \times 8.33 \times 85^{\circ} = \frac{12,036.85}{3413} = 3.53 \text{ kilowatt hrs.}$$

$$3.53 \text{ kilowatt hours} \times 6\text{¢/ kilowatt hour} = 21\text{¢ per load}^{**}$$

*Average year-round temperature of water coming into the home is about 60° F. Subtracting 60°F from the setting on your water heater gives the "change in temperature" referred to in the formula. In the example, 145°F. (heater setting) minus 60° F = 85°

**Water Heater Efficiency: I've assumed an electric heater is 100% efficient; gas and oil are about 60% (0.60) efficient. So the cost of gas for the same load of dishes would be:

$$17 \times 8.33 \times 85^{\circ} = \frac{12,036.85}{100,000} = 0.12 \text{ therms}$$

$$0.12 \text{ therms} \times 38\text{¢/therm} = \frac{4.6\text{¢}}{0.60 \text{ efficiency}} = 7.6\text{¢ per load}$$

CONVERSION TABLE

1 gallon = 8.33 pounds

1 cubic foot = 7.48 gallons

1 ton = 240 gallons

1 acre-foot = 325,851 gallons

1 million gallons a day (mgd) = 694.4 gallons/minute
= 1.55 cubic feet/second

1 billion gallons a day (bgd) = 1.12 million acre-feet/year

BUYING WATER SAVING DEVICES

There is more variety to low-flow plumbing than I had thought, and it was easy enough, living near a big city, to find exactly what I needed. Like the standard "high-flow" plumbing most of us already have, some spray-taps, water-saving showerheads, etc., will suit us better than others.

Readers who worry about switching showerheads, or taking time to buy a set of toilet dams, will find the money they save is well worth a shopping trip or two.

Here are some tips for finding low-flow devices:

- If the neighbors have faucet aerators, low-flow shower heads, etc., find out how they like them, and ask to try one.

- Call several plumbing or hardware stores to find out what they have. Visit one or two stores to examine the devices.

- To be sure the devices suit *your* plumbing, try to find items that are returnable.

- *Consumers Report* magazine has rated a number of water-saving devices. Look up the following articles in the library:

Consumers Report, May 1978, (pages 294-302): rates water-saving devices for toilets and showers. (I disagree with their appraisal of toilet "dams".)

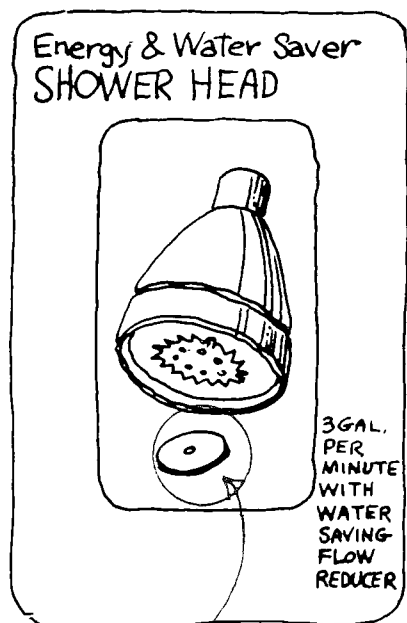
Consumers Report, October 1978, (pages 572-577): rates washing machines, including water-saving models.

- A book I found very helpful in describing water-saving devices, and which has an extensive listing of manufacturers, is: *North Marin's Little Compendium of Water Saving Ideas*. Written in 1977 by John Olaf Nelson, General Manager of the North Marin County Water District, the *Little Compendium* is 273 pages of information on water-saving methods, devices, and where the devices can be obtained. It is available for about \$7.00 from:

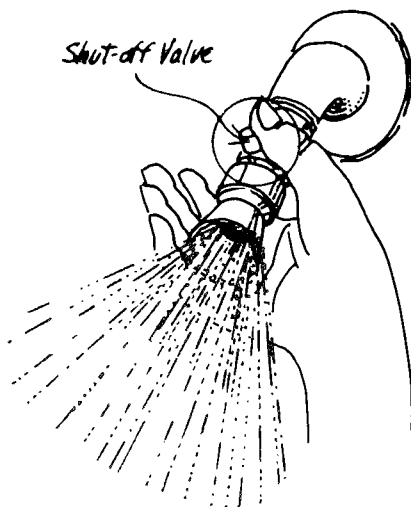
John Olaf Nelson
North Marin County Water District
P.O. Box 146
Novato, California 94947
(415) 897-4133

- The U.S. Department of Housing and Urban Development will publish in late 1980 an extensive handbook on residential water saving. It is called "Saving Water Makes Cents," and will be for sale for about \$2 from.

The Superintendent of Documents
Government Printing Office
Washington, D.C. 20402



Only the plastic
insert makes
this shower head
"Low Flow"



"Low Flow" shower head,
engineered to work
well without inserts,
or "add-ons."

A word of caution

Some shower heads, advertised as "low-flow" on the package, are *standard* designs—but come with a plastic disk or washer the buyer must insert to reduce the normal flow.

You can get a similar effect with your current shower head by using an inexpensive flow-control "insert"

Don't spend money on a "low-flow" shower head that requires "add-ons" to make it work. Good low-flow heads are engineered to save water (and give a pleasant shower) *without* additional gimmicks.

If you can't find low-flow devices .

In doing a retail survey in the city of Frederick, Md. (pop. 30,000) and several outlying towns, I found that very few stores carried all, or even most of the water-saving devices I have recommended.

To assist readers who have similar problems in obtaining toilet "dams," low-flow shower heads, etc., I have listed the names of a few equipment manufacturers and distributors of products I like or which are recommended in publications of the following agencies:

- Institute for Research on Land & Water Resources
Penn State University, University Park, PA 16802
- California Dept. of Water Resources
P.O. Box 388, Sacramento, CA 95802
- Oregon Water Resources Department
555 13th St., N.E., Salem, OR 97310

LOW-FLOW SHOWER HEADS, TOILET DAMS, & AERATORS:

Metropolitan Water Saving Inc
4701 Sangamore Rd
Washington, D C 20016

Ny-Del Corp
740 E Alosta Ave
P O Box 155
Glendora, CA 91740

Con-Serv Inc
7745 Reinhold Dr
Cincinnati, OH 45237

LOW-FLOW SHOWER HEADS & AERATORS

Whedon Products Inc
20 Hurlbut Street
West Hartford CT 06110

Moen
Elyria, OH 44035

LOVO Products Div
Vanderburgh Enterprises, Inc
P O Box 138
Southport, CT 06490

SPRAY TAPS/AERATORS:

Delta Faucet Co
55 E 111 St
Indianapolis, IN 46280

Speakman Co.
Wilmington, DE 19899

Kirkhill Inc
12021 Woodruff Ave
Downey, CA 90241

UNIVERSAL FAUCET ADAPTORS & SHOWER FLOW-RESTRICTORS ("INSERTS"):

Wrightway Manufacturing Co
1050 Central Ave
Park Forest South, IL 64086

For a more complete list of low-flow devices write to Potomac River & Trails Council, 12 S Market St., Frederick, Md. 21701. **Be sure to enclose a stamped self-addressed envelope.**



This booklet has been reviewed by the Environmental Protection Agency and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Environmental Protection Agency, nor do mention of trade names or commercial products constitute endorsement or recommendation for use