



**U. S. Postal Service  
Water Conservation  
Program**

*Reducing Operating Costs  
Through Water Conservation*



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August 20, 2003





# ***Presentation Overview***

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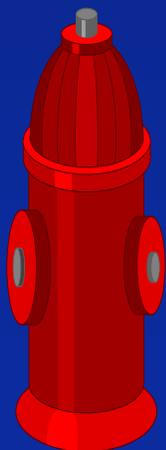
- 1. Why The Postal Service Has A Water Conservation Program.**
- 2. What Is The Current Program.**
- 3. Which Type Of Facilities Participate.**
- 4. What Savings Are Expected.**
- 5. What Steps Are Needed To Establish A Similar Program.**



# Why a Water Conservation Program

## Water Consumption

- Personal uses - drinking, personal hygiene, toilet flushing
- Facility uses - equipment cleaning, vehicle washing, facility cleaning
- Operational uses - irrigation, cooling water supply
- Emergency uses - fire protection





# Why a Water Conservation Program

## Water Consumption

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- **38,000 Facilities**
- **800,000 Employees**
- **250,000 Vehicles**
- **Need data to focus management related responsibilities**
- **Billions of gallons of water are used a year at a cost of 19 plus million dollars**



## Why a Water Conservation Program Doing the Right Thing

“To meet the needs of existing and future populations and ensure that habitats and ecosystems are protected, the nation's water must be sustainable and renewable. Sound water resource management, which emphasizes careful, efficient use of water, is essential in order to achieve these objectives.”

**[USEPA, Office of Water, Web-site]**



# Why a Water Conservation Program

There are 4 reasons to have a water conservation program

1. Regulations
2. Local water restriction
3. Preparing for the future
4. Financial





# **Why a Water Conservation Program Laws and Policies Reasons**

## ***USPS adheres to:***

- Laws**
  - Energy Policy Act of 1992 – Annual Reporting
  - State and local Water Restrictions
- Regulations**
  - Executive Order 13123 “Greening the Government Through Efficient Energy Management”
  - Presidential Memorandum “Environmentally and Economically Beneficial Practices on Federal Landscaped Grounds”
- USPS Policies and Procedures**
  - Handbook AS-554-A: Water Management Guide for Facility Managers
  - Handbook AS-554-B: Water Conservation Guide



## Why have a Water Conservation Program? *Financial Reasons*

### **USPS Can Save O&M Dollars**

**– Total Annual Water Expenses  
Are Over \$19.4 M**

- Includes over Four Billion  
Gallons of water each year**



# Why a Water Conservation Program

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## Financial Reasons



Hold it right  
there!  
Don't get too  
excited!



# Why a Water Conservation Program

## Financial Reasons

### USPS's water costs are:

- 4% of total utility costs (approximately \$490 Million)
- 0.01% utility percentage of total operating costs (\$66 Billion)

### \$850,000 water savings represent (4%)

- Less than \$2 per employee
- Less than \$40 per facility involved



# Why a Water Conservation Program

## Financial Reasons

### ***Good for the Bottom Line***

**Every dollar counts** toward reducing the overall operating budget.

**Savings** are useful, but not the only critical factor -they **must be balanced with operational concerns.**

Consider **non-financial** benefits as well.

USPS must

- comply with laws and policies
- should be “Doing the Right Thing”
- should prepare itself to operate better during drought or water restrictions



# Why a Water Conservation Program Doing the Right Thing

## *USPS Should “Do the Right Thing”*

- We are in a *Leadership Position*
- We have *Responsibilities to our Communities*
- By implementing a Water Conservation Program, *We can:*
  - Be a Role Model
  - Lead by Example
  - Be a “Good Neighbor”
  - Help Sustain our Natural Resources



## ***Why have a Water Conservation Program? Droughts and Water Restrictions***

**U. S. Postal Service  
should take measures to  
ensure that we can  
operate even during  
water restrictions.**



# ***Presentation Overview***

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- 1. Why The Postal Service Has A Water Conservation Program.**
- 2. What Is The Current Program.**
- 3. Which Type Of Facilities Participate.**
- 4. What Savings Are Expected.**
- 5. What Steps Are Needed To Establish A Similar Program.**



# USPS Water Conservation Program

## Current Activities

- **Analyzed water usage patterns on a facility-cluster basis, nationwide**
- **Set water conservation targets for Postal Service facilities**
- **Developed a Water Conservation Guide (Handbook AS-554-B, November 2000)**
- **Stressed the need for water conservation plans**
- **Implemented water conservation measures at various facilities**



# USPS Water Conservation Program Estimating USPS Water Consumption

## **Two Known Data Sources:**

**1. Facility Square Footage**

**2. Total Facility Water Cost**



# USPS Water Conservation Program

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## FY02 & 03 Goals and Indicators

Target of:

- **22 gallons of water consumed per employee per day** Source: FEMP

Or

- **25 gallons/net interior square footage of facilities/year** Source: USPS Policy



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# What Type of Facilities to Target? Highest Water Using Clusters

**FY  
2000**



<b>Selection of Highest 15% of Water Use</b> <i>(as measured in gal/sq.ft./yr.)</i>		
Water Use Upper Limit <i>(gal/sq. ft./yr)</i>	Cluster-Types using at or less than limit	Cumulative %
0	7	<i>excluded</i>
5	27	11.9%
10	43	31.0%
15	56	55.8%
20	46	76.1%
<b>25</b>	24	86.7%
30	6	89.4%
40	17	96.9%
50	5	99.1%
60	1	99.6%
	1	100.0%
Total including Zeroes	233	
Total excluding Zeroes	226	
Total above Target Level	30	

↑  
**Meets  
target**

*Water use rates derived from USPS Financial Report, FY2000.  
Target level selected on basis of analysis.*



# What Type of Facilities to Target ? Highest Water Using Clusters

**FY  
2001**



Water Efficiency Limit (gal/sq.ft./yr)	Cluster-Types in Range Between This and Preceding Limit		Cumulative %
0	37		<i>excluded</i>
5	97		23.5%
10	79		42.6%
15	95		65.6%
20	59		79.9%
25	42		90.1%
30	9		92.3%
40	14		95.6%
50	5		96.9%
60	3		97.6%
Over 60	10		100.0%
Total Including Zeroes	450		
Total Excluding Zeroes	413		
Total Above Target Level	41		

↑  
**Meets  
target**

*Water use rates derived from USPS Financial Report, FY2001.  
Target level selected on basis of analysis.*



UNITED STATES  
POSTAL SERVICE

# Area Water Expenditures – FY01- FY02

Area	FY01 Exp. (\$/KSF)	FY02 Exp. (\$/KSF)	Percent Change
NY Metro	71.8	90.4	26.0
Capital Metro	62.6	71.0	13.6
Pacific	81.5	87.0	6.8
Eastern	61.1	64.8	6.0
Northeast	51.9	54.4	4.7
Southeast	58.9	58.6	-0.5
Southwest	71.6	70.4	-1.6
Western	61.6	63.7	-7.1
Great Lakes	48.2	44.7	-7.4
<b>Total USPS</b>	<b>61.6</b>	<b>63.7</b>	<b>3.4</b>
National Average			4.1

KSF = thousands of square feet



# Inefficient Clusters

## Clusters to Target for Inefficient Water Use (>25 gal/sq. ft/year)

### Efficiency by Type of Facility

(Bolded and boxed entries exceed efficiency target)

Area	PFC Cluster	ADMIN /HQ	AMF	BMC	CSF	DDC	P&DC	PARK	VMF
Capital Metro	Capital		5.9	<b>28.0</b>	<b>25.7</b>	12.3	19.5	18.3	12.8
Eastern	Erie				22.7		11.3		<b>35.8</b>
Eastern	Philadelphia		13.0	<b>41.5</b>	4.5		11.6	0.7	1.1
Great Lakes	Central Illinois	7.7			<b>26.9</b>	9.3	13.0		0.0
Great Lakes	Chicago		6.9	<b>34.1</b>	<b>49.3</b>	<b>50.8</b>	1.1	<b>50.8</b>	0.0
Great Lakes	Detroit	<b>93.9</b>	1.4	7.5	18.2	1.4	4.3	<b>35,173.3</b>	<b>25.2</b>
Great Lakes	Greater Indiana		12.1	<b>35.9</b>	14.0	4.6	9.9		0.9
Great Lakes	Royal Oak	24.4			<b>27.7</b>	0.0	17.8		24.8
New York Metro	Caribbean		3.4		<b>136.9</b>		<b>34.5</b>		<b>37.1</b>
Northeast	Albany		4.7	0.0	8.5		4.5	20.5	<b>73.8</b>
Pacific	Los Angeles	22.6	<b>123.7</b>	9.0	18.2	22.6	16.1	22.6	22.6
Pacific	Sacramento	4.6	0.0	22.2	12.6	<b>37.4</b>	8.5		10.5
Southeast	South Florida	22.3	<b>756.3</b>		14.6		<b>26.4</b>		15.7
Southwest	Arkansas		8.9	<b>36.8</b>	22.3		11.1		0.8
Southwest	Dallas	<b>35.5</b>	<b>38.0</b>	21.2	24.9		0.0	21.7	<b>30.2</b>
Southwest	Louisiana	<b>36.7</b>	1.5		14.7		14.3	21.2	17.1
Southwest	Oklahoma	14.7	15.6	<b>26.8</b>	13.3		9.7	14.7	14.4
Western	Albuquerque		2.0		<b>28.1</b>		10.3		10.3
Western	Arizona		<b>49.8</b>	9.1	14.6	7.8	<b>54.4</b>		20.2
Western	Colorado/Wyoming	9.0	2.9	11.1	19.3		13.5	<b>828.3</b>	<b>31.2</b>
Western	Dakotas	0.0			16.5		3.7	<b>31.7</b>	
Western	Las Vegas		0.0		<b>27.5</b>		11.6		
Western	Portland	<b>313.6</b>	0.8		7.3	<b>103.5</b>	4.3	6.7	2.4

FY  
2000



# What Type of Facilities to Target? Water Expenditures

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- Water expenditures are reported separately in USPS financial system that are tracked and available
- USPS spent \$20M in FY02 for water/wastewater
- Consumption is not tracked and is not input into a database – only the dollars are inputted
- Many of the 37,000 have combined water bills



## What Type of Facilities to Target? Estimating Total Usage (gallons)

In absence of consumption data, gallons are estimated for FY2002 by dividing total water expenditures by a national average water/wastewater cost

**FY02: \$20M / national average cost =  
4,844,000 gallons**



# **What Type of Facilities to Target? Estimating Total Usage (gallons)**

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- **National average cost is published every 2 years in the Raftelis Water and Wastewater Survey**
- **LMI was contracted to research and calculate facility water usage**



## **What Type of Facilities to Target? Estimating Total Usage (gallons)**

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- **Estimates of consumption broken down by Area and District levels are not 100% reliable**
- **Water expenditure data are available, but average costs of water for regions cannot be developed accurately from Raftelis survey**
- **Bottom line: Use of Raftelis survey is best limited to determining national average cost.**



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# What are the Projected Savings? Pilot Projects Evaluated

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- **DPRAs researched and evaluated water conservations projects**
- **Pilot Projects Evaluated**
  1. Plumbing fixture retrofits and replacements
  2. Cooling and heating systems
  3. Vehicle washing
  4. Reclaimed water for non-potable applications
  5. Rainwater harvest systems



# What are the Projected Savings?

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## Plumbing Fixtures

- **Major water use is associated with plumbing fixtures**
- **Projects might involve:**
  1. **Retrofit faucets with water saving aerators**
  2. **Retrofit existing toilets and urinals with low consumption valve replacement kits**
  3. **Replace existing high consumption faucets with more energy efficient models**
  4. **Replace existing high consumption toilets and urinals with more energy efficient models**



# What are the Projected Savings?

## Estimated Water Savings - Toilets

- Replace 3.5 gallons per flush (gpf) toilets with 1.6 gpf toilets
- **Average water savings**
  - **5.7 gallons per day for females or 1,482 gallons per year**
  - **1.9 gallons per day for males or 494 gallons per year**
- Savings is greater if existing toilets are more than 3.5 gallons per flush

*Source: Handbook of Water Use and Conservation, Amy Vickers, May 2001, p. 27*



## What are the Projected Savings? Case Study - Toilets

- Case study of commercial properties in two California communities
  - Replaced over 200 high flush toilets with 1.6 gpf toilets
  - **Average savings per day of 26 gallons**

*Source: Handbook of Water Use and Conservation, Amy Vickers, May 2001, p. 37*



# What are the Projected Savings?

## Estimated Water Savings - Urinals

- Install waterless urinals with average water savings:
  - 2 to 10 gallons per day
  - 520 to 2,600 gallons per year
- Install 1 gallon urinals with average water savings:
  - 1 to 8 gallons per day
  - 260 to 2,080 gallons per year
- Savings depends on efficiency of the existing urinals

*Source: Handbook of Water Use and Conservation, Amy Vickers, May 2001, p. 77*



# What are the Projected Savings? Cooling and Heating Systems

- **Consume 20 to 30 percent of water usage**
- **Systems evaluated**
  - Cooling Towers
  - Evaporative Coolers
  - Boilers





# What are the Projected Savings?

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## Cooling Towers

### Typical water savings measures include:

- Operational measures
- Water treatment measures
- Replace older, less efficient cooling towers



# What are the Projected Savings? Cooling Towers



**USPS Cooling Tower**

## **Water Treatment Measures**

- Adjust pH with sulfuric acid
- Install side stream filtration
- Treat water with ozone
- Recycle and reuse



# What are the Projected Savings?

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## Case Study - Cooling Towers

- **Sandia National Laboratory (SNL), New Mexico**
  - Over 8,000 employees, and 765 buildings
  - 5.4 million square feet
- **SNL projects annual savings potential of \$415,000 with water conservation measures**
- **Five water conservation projects**
  - 15 to 25% water use reduction
  - Annual savings of \$250,000
- **Future water measures**
  - Additional 6 to 18% water use reduction
  - Additional annual savings of \$215,000 measures

*Source: FEMP Focus Newsletter, July/August 1998*



# What are the Projected Savings? Case Study - Cooling Towers

## **Sandia National Laboratory (SNL), New Mexico**

- 23 cooling towers
- Use 78 million gallons per year
- Water conservation:
  - Monitored water hardness with conductivity meters
  - Reduced blowdown
  - Savings of 5 to 15 million gallons per year or 6.4 to 19%

*Source: A Water Conservation Guide for Commercial, Institutional and Industrial Users, New Mexico Office of the State Engineer, July 1999*



# What are the Projected Savings?

## Case Study - Cooling Towers

### Ozone Treatment for Cooling Towers—Digital Equipment Corporation, Littleton, Massachusetts

- 500,000 square-foot complex
- Ozonation
  - Superior to previous chemical treatments
  - Reduced blowdown
  - Eliminated handling of chemicals
  - Operating cost savings of \$90,000 per year
  - Payback period of 2 years



**Typical Cooling Tower Ozone Generation System**

*Source: Ozone Treatment for Cooling Towers, Federal Technology Alerts, U.S. Dept of Energy; [http://www.pnl.gov/FTA/6\\_ozone.htm](http://www.pnl.gov/FTA/6_ozone.htm)*



# What are the Projected Savings? Case Study - Cooling Towers

## **Environmentalist/Zero-Bleed 2000—Fresno, CA**

- Water is processed through a series of systems to condition water
- On average \$24,000 per year on chemicals to clean the water
- One-time cost of \$32,000
- No chemicals
- Payback period of 18 months



# What are the Projected Savings? Boilers

- **Water consumption depends on**
  - **Boiler size**
  - **Amount of steam generated**
  - **Amount of condensate return**
- **Water added to boiler to make up for water lost as steam and to replace blowdown**



**Fire Tube Boilers**



# What are the Projected Savings? Boilers

## Water Conservation Measures

- Identify and repair leaks
- Install a steam condensate return line
- Install an automatic blowdown control
- Install an automatic control to turn off the unit when not in use
- Replace or upgrade older boilers





# What are the Projected Savings? Boilers

## Water Conservation Benefit

Recovering and returning steam condensate may cut operating costs by up to 70%

*Source: New Mexico Office of the State Engineer*





# What are the Projected Savings? Case Study - Boilers

## Food Processing Company

- 22 boilers at locations throughout the U.S.
- Demonstration pilot project:
  - Repairs
  - Automatic blowdown controls and equipment to reduce blowdown
- Estimated water use and sewer discharge reduction of 31 million gallons per year
- Implementation costs \$45,000
- Projected annual cost savings of \$186,000

*Source: Handbook of Water Use and Conservation, Amy Vickers, May 2001, p. 312*



# What are the Projected Savings?

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## Vehicle Washing

- Postal Service operates a fleet of over 200,000 vehicles
- Most postal facilities wash vehicles about twice a month
- Approximately 100 million gallons of water are used each year for vehicle washing



*Source: Postal Service Handbook AS 554 C,  
Vehicle Washing Technologies, March 1998*



## What are the Projected Savings? Vehicle Washing



### Three major vehicle washing technologies at Postal Service vehicle maintenance facilities (VMFs)

1. Permanent facility washing equipment
2. Mobile washing equipment
3. Off-site washing

*Source: Postal Service Handbook AS 554 C,  
Vehicle Washing Technologies , March 1998*



## What are the Projected Savings? Vehicle Washing



- Mobile washing equipment by postal employees or contractor
  - High-Pressure Spray
  - Brush
  - Dry washing
  - Manual washing
- Off-site washing at commercial washing facilities



# **What are the Projected Savings? Vehicle Washing**

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## **Water Conservation Measures Evaluated**

- **Implementing recycling systems at VMFs**
  - **Closed-loop system**
  - **Partial water recycling**
  - **Water reclamation**
- **Implementing waterless cleaning systems**



# What are the Projected Savings? Case Study – Vehicle Washing

## Seattle Car Wash

- Installed reclaimed wash and rinse water system
- Reduced water use for washing buses from 350 gallons per vehicle to 25 gallons
- System cost \$85,000
- Rebate \$42,400
- Annual water/sewer cost savings of \$53,000
- Payback less than one year

*Source: Handbook of Water Use and Conservation, Amy Vickers, May 2001, p. 255-56*



# What are the Projected Savings?

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## Case Study – Vehicle Washing

### Waterless Cleaning—USPS VMF, Hawaii

- Contractor applied dry wash to fleet of 100 vehicles
- Cleaned each vehicle once per month
- Wash and polish are applied in one step
- Employee response: Finishes looked shinier than following the water wash system



# What are the Projected Savings? Case Study – Vehicle Washing

## **Waterless Cleaning—Naval Environmental Leadership Program, San Diego, CA**

- Dry wash and finishing restoration
- Liquid, clay-based nonabrasive emulsifiers remove oxidized paint, road film, acid rain blemishes, scuffs, and fills in minor scratches
- Provides protection from the elements and new areas of corrosion
- Dry wash/finishing took 3 to 4 times longer than traditional waxing
- Protective coating lasts 2 years, waxing last 2 months



# What are the Projected Savings?

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## Case Study – Vehicle Washing

### Waterless Cleaning—Torrance Post Office

- Contractor applied similar waterless wash process used in the Naval Environmental Leadership Program
- Since the case study, this technology has been implemented at @ 20 post offices and on over 2,000 vehicles in the Long Beach District
- Torrance facility: 10-year old vehicles looked new or freshly repainted



# What are the Projected Savings? Reclaimed Water

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- **Non-potable water uses**
  - Operational uses (irrigation and cooling and heating)
  - Facility uses (equipment and facility cleaning and vehicle washing)



# What are the Projected Savings? Other Measures

- Perform on-site analyses of water use
- Metering/Submetering/Flow Meters
- Water Pressure Adjustments
- Employee Education



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# Steps Needed To Establish a Similar Program

## Establish Goals

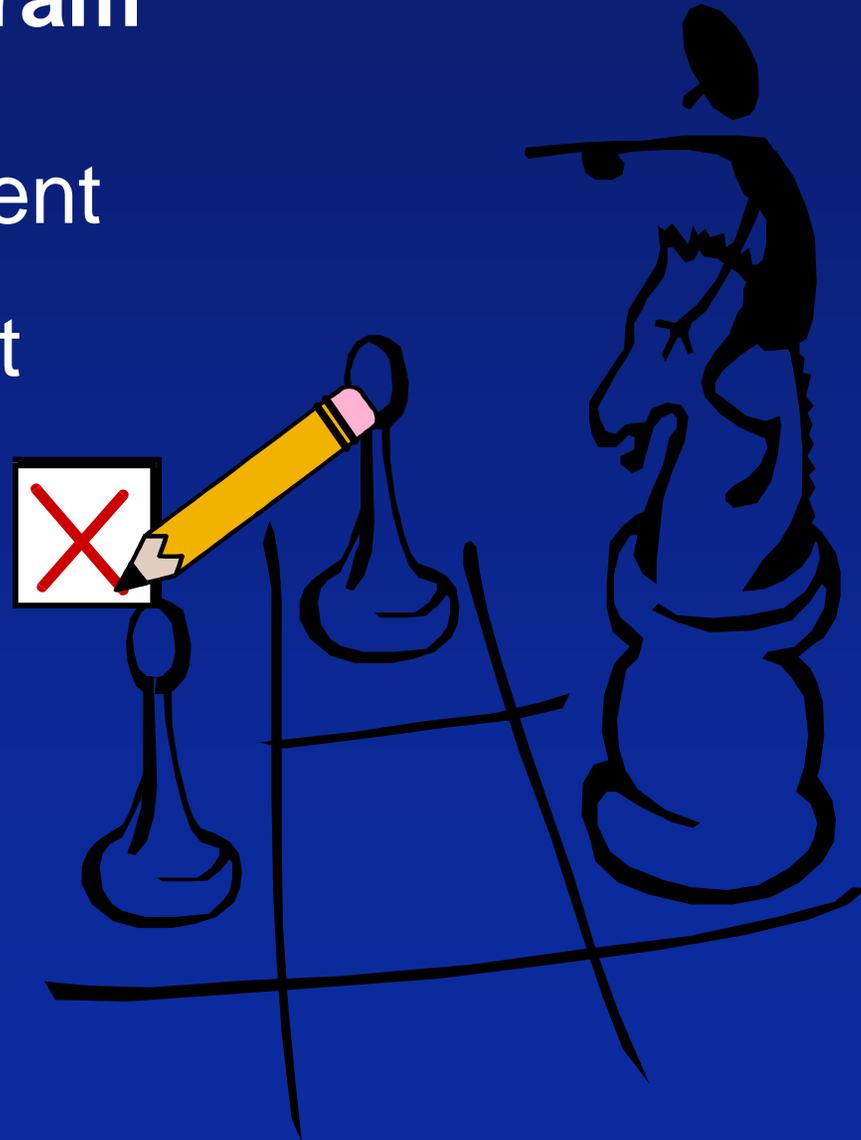
1. Assist facilities in meeting state water restriction requirements
2. Reduce long-term water expenditures
3. Conserve water



# Steps Needed To Establish a Similar Program

1. Establishment
2. Deployment

3. Implementation
4. Evaluation





# Steps Needed To Establish a Similar Program

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## Three Steps

1. Identify facilities with significant water usage (Target High-Users)
2. Survey facilities to gather data regarding their water usage and operations
3. Evaluate possible pilot projects, processes, and monitor water usage



# Steps Needed To Establish a Similar Program

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## Pilot Programs

1. Establish goals for percent water savings
2. Perform on-site analysis of water use
3. Design and select pilot projects
  - Perform detailed cost analysis
  - Estimate payback period
4. Implement and monitor pilot projects to document water and money savings



# Steps Needed To Establish a Similar Program

## EMPLOYEE AWARENESS CAMPAIGN

Educate employees

- Report leaks
- Turn water off completely
- Contact Maintenance





# Conservation is an ongoing effort

The Postal Service must and will  
continually improve.

