

Humboldt State Fall 2010 Water Audit

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Issues and History

Clean drinking water is indeed rare in many areas of the globe and is beginning to become scarce in numerous growing urban centers within the United States. We on the North Coast of California are blessed with ample amounts of rain and water resources from the numerous rivers and water bodies that surround us but are we currently paying the total environmental cost for our drinking water. The current water supplied to the HSU Campus comes from the City of Arcata, but the real supply chain starts with Humboldt Bay Municipal Water District (HBMWD) which was formed in 1956 and supplies wholesale water to 60% of the residents of Humboldt County. HBMWD operates 5 pumping stations located in the Mad River. These pump stations draw water from 60 to 90 feet below the river bed tapping into the aquifer that is continually replenished by the river system. The water in the Mad River originates at Ruth Lake Reservoir, in Trinity County which is 90 miles upstream from the pumping stations. The water shed around the reservoir has an annual rain fall of 40"-110" per year enabling a constant and reliable source even during drought years. The reservoir has a storage capacity of approximately 48,800 acre-feet which is approximately 8% of the total watershed runoff. This yields 75 million gallons per day and insures a higher on average regulated flow year round for the Mad River and a continuous supply of drinking water for HBMWD's customers.

The water is pumped from the Mad River to the HBMWD initial treatment facility on Essex road and then pumped uphill to the storage tanks on West End Road. The elevation of the tanks allows the use of gravity to move the water through 35 miles of distribution pipes to the municipalities it serves. The City of Arcata takes the water into its treatment and distribution system that contains 12 water booster pump stations and 16 water storage tanks, located throughout 5 interconnected elevation zones and contains over 200 miles of supply pipelines to

the roughly 5000 metered Arcata businesses and residences of which HSU is one. Recently on September 28, 2010 the Evergreen Pulp Mill closed for good. This closure has caused a loss of \$1,187,000.00 revenue per year or 28% of total revenue for HBMWD and 46% of revenue from retail water sales.

This loss of revenue will need to be partially recouped by HBMWD by increasing fees to its wholesale customers including the City of Arcata. Since 1999 water rates have increased by 110% for the City of Arcata (Driscoll-Times standard 2010) and facing large increases in the wholesale price estimates for near future increases are as high as a tripling of current rates. The last water audit of the campus was conducted in 1999 with a goal to reducing water usage. Considering the current and future cost increases facing the university and the increase in fees faced by the student body we were interested in seeing where campus water use currently stands and where changes can again be made to reduce the use and cost of water for all interested parties.

Goals and Objectives

As sustainability is a campus wide goal we must find new ways to conserve water consumption, and mitigate waste.

- Ascertain if 1999 Campus Water Audit's goals were met.
- If goals were not met, determine areas of continued waste.
- Reduce water usage 5% per year as per the 1999 Campus Water Audit
- Increase campus awareness of water issues on campus.

Alternatives

- Timers on showers. 5 minuet shower max, no frolicking in the shower.
- Installation of more rain catchment to use for watering campus landscaping.

- Motion sensors on sinks to shut off when no one is present, can't leave water running if not present.
- Form water conservation and technology club (or work with existing club) to keep up on current water saving ideas and advances water conservation technology. Work with university staff to figure out cost/benefit ratios for implementation of ideas.
- Hold water education rally to educate student body about current water use costs and uses. Teach the students conservation techniques that can be used every day.
- Hold a competition between campus housing dorms to see who can reduce water usage reward would be based on the gallons of water saved by the dorms.
- Install new toilet fixtures in all buildings
- Institute Xeriscaping(use of native plants) across campus with exceptions for academic purposes
- Institute Pay as you go showers
- Public database for campus water use
- Students living on campus pay for all utilities including water use
- Use of grey water for toilets

Implementation, Monitoring and Evaluation

The implementation of our chosen alternatives will be the responsibility of Take Back the Tap which has generously agreed to help us achieve our goals. Take Back the Tap will help us by increasing Humboldt State University's awareness of water issues on campus. Its first goal will be in helping Plant Operations in the creation of a water use database which will be updated monthly as new water bills arrive. This information will be published on the club website, as well as its own page on the campus's energy and water efficiency page. At the end of every school year this data will be analyzed to determine if our goal of 5% per year reduction in water use is met. The interface will be crafted to allow easy updating, in the hope that it could become a standard part of HSU's water use. In other words, whenever the bills come in for water, the information will be automatically added to the website in real time. The site will also display long term trends, and comparisons from the same month in different years. Using this information over a longer period of time, Take Back the Tap can identify any changes made in water policy and see the effects those policies have had. One of the biggest problems we had in

determining areas of waste was ten years of changes made to campus policy, with only two data points to compare. A larger sample size will help to identify changes in water use due to increases or decreases in rainfall or other natural variables, and help to focus on changes made by the campus administration or community. Take back the tap will also be responsible for creating and maintaining a forum for open discussion of campus water issues, and discussions for their solutions.

Take Back the Tap will also be the monitoring and enforcing group for the other alternatives chosen to implement our goals. These jobs will mainly updating Plant Operations as to the location and condition of old or broken toilet fixtures. While we were unable to obtain a firm commitment from any of the three campus plumbing organizations to replace these fixtures with newer, more efficient models, keeping these organizations up to date on broken fixtures will reduce water loss to leaks or overflows.

Interviews and Email Correspondence

Interview with Mike Cline: Campus Plummer, Plant Operations: Karl Ensminger

I interviewed Mike to get the answers to some questions about fixture compliance and the current status of replacing old high water use fixtures, if they had implemented any other water savings practices besides full replacement of fixtures. He informed me that a majority of the fixtures in the older campus buildings are still several years old in some cases back to the fifties. With in current budgetary constraints the maintenance department does not have enough funds to replace fixtures simply to update them, the current operating procedure is to replace only those that beyond repair. All new buildings and renovated building do have updated low use fixtures

though, as per state law. All new fixtures must meet state mandates of 1.6 GPF for toilets and 1.0 GPF for Urinals.

Interview with Kylee Singh: Take back the Tap President: Karl Ensminger

My conversation with Kylee was focused on the idea of using the “Take Back the Tap” web page to be a store house for the results of our water audit and for future water audits. She felt that it would be a good match and the information would prove useful for the club in the future. Kylee felt the club could in the future work on further education of the student body beyond just the issues of drinking water use. She suggested I talk to COS to find out where to have the data up loaded once compiled and how to set up an easy to use data base for future information.

Interview with Paul Mann: Senior News & Information Officer and Jarad Petroske / Campus Writer: Karl Ensminger

My discussion with Paul and Jarrad were at separate times. I contacted Jarrad first because Paul was out of the area. I was looking to gather a greater amount of information on how water use was distributed between the buildings on campus to create a better idea of where water was being saved and where improvements were needed. Jarrod had some ideas where he could get the information but didn't follow up in a timely manner. So, I went back to the offices and talked to Paul who same day contacted the Tim Moxon the Director of Plant Ops. He was able to inform me that the information we were seeking is no longer available.

Email/Interview with James Robinson: Student Aide to Plant Operations: Karl Ensminger

James was my original contact to get information on current water use and the current water bills. Our initial conversation was excellent he informed me he could that information to me in 2 days. A week later I sent him another email concerning the information, he responded and apologized for the delay. A couple of days later he sent the raw data on a spread sheet with no figures, so the information was worthless. Again I sent him an email regarding the information I asked if I could get copies of the bills as well as a request for any other water use information, he apologized again for the lack of figures on the spreadsheet saying he would send another updated version soon. He did a week later and again there were issues with the units used for the data that Bill and I solved after a good deal of consternation.

Email/Interview with Seth Vidana: Coordinator Office of Sustainability for Western Washington University

Seth was a disappointment, he was really gun ho in his email and was very excited about the idea of the project when we discussed it but never came through on his end of the data collection information for WWU water use. Over the Semester we conversed 3 times by phone and I sent him 6 emails in regard to the information requested he responded to three of the emails. Once I began impressing upon the need to hurry he stopped communications.

I tried to contact other sustainability Clubs at Portland State University and Western Oregon University but received no responses in return.

**Interview with City of Arcata Michael McDowall and Diana Cooper:
Environmental Services Department: Karl Ensminger and William Dineen**

Bill and I interviewed Mike and Diana to get the actual water bill for HSU they had to confer with the accounting department if that information could be released to us after around 20 minutes of talking and waiting we were informed that the information we were looking for could not be obtained through the city as HSU is a customer and they legally would not be able to release the information to us.

On a follow up visit to the city of Arcata I was able to get copies of the Cities current water bills from HBMWD. From this we should be able to determine the portion of the city's water is supplied to the HSU campus and what the cost of that water is. The employees at the City were very helpful and did their best to assist any way they could.

Interview with Doug Kokesh: Manager, Grounds & Landscape Services: William Dineen

In our interview with Doug Kokesh, grounds manager of Humboldt State University, we learned a lot about the policies concerning plant choice on campus. Our goal in the interview was to determine current policies relating to choice of native or non-native species, and to determine the road blocks to implementing a xeriscaping program on campus. Kokesh has been the grounds manager for over ten years, during that time he has seen his water usage drop 7% per year. The current policy, enacted by Kokesh, is to use approximately 70%-80% native species. The remaining species are chosen for educational purposes for use in the forestry or botany departments, or by the administration as ornamental plants to improve the look of the campus. Kokesh gave an example of how his polices have changed the use of ornamental plants on campus by detailing his plan for the new dormitories. Currently the new dorms have about 75% ornamental plants, in 4-5 years this will be reduced to about 60% and in 10 years about 50%. While not sweeping changes, this will have the new dorms at the campus average of 30%

ornamental in just 20 years. Kokesh is a huge supporter of xeriscaping, and is currently doing his best to ensure the largest population of native plants on campus.

Interview with T. C. Comet: Sustainability Coordinator: William Dineen and Karl Ensminger

In order to determine the likelihood, and administrative channels, of installing new toilet fixtures around campus we talked to Tall Chief. In this interview we discussed several programs operating on campus. TC explained that while Plant Operations runs the plumbing and maintenance for all the educational buildings on campus, two other organizations which do similar work exist in other places. Campus Housing and Dining has their own plumbers which maintain fixtures in the dormitories and in the “J”, and the University Center maintains its own plumbing for the UC Center, Depot and nearby administrative buildings. TC also explained that while many fixtures were wasteful or in need of repairs, the cost of repairs is lower in the short term than replacing them completely. TC stated that the budget of Plant Operations does not allow for the replacement of fixtures on any regular basis, even the 1-2 new fixtures per semester we were requesting. The good news is that TC, and many groups on campus are working on making information, such as the water usage bills we collected, more public and is implementing a new website dedicated to showing monthly and yearly power and water usage. This information will be available online to all students, faculty, and staff who are interested. While this will occur over the next few semesters, we offered the data we collected as well as help in establishing this database for the public.

Conclusions

Since 1999 there has been a reduction in the amount of water used on campus. The goals of the 1999 Water audit have been reached with an overall reduction exceeding the 5% per year goal. What is not known is how these reductions were achieved, if it due to greater diversion of storm water or updated water systems. Unfortunately data was not kept as to upgrades to campus water systems to help in determining areas where conservation efforts have not yet been focused. Though the reduction is good news water use issues currently facing the campus are become more relevant as cost for water continues to rise.

Humboldt State Water Use 1999 vs. 2010

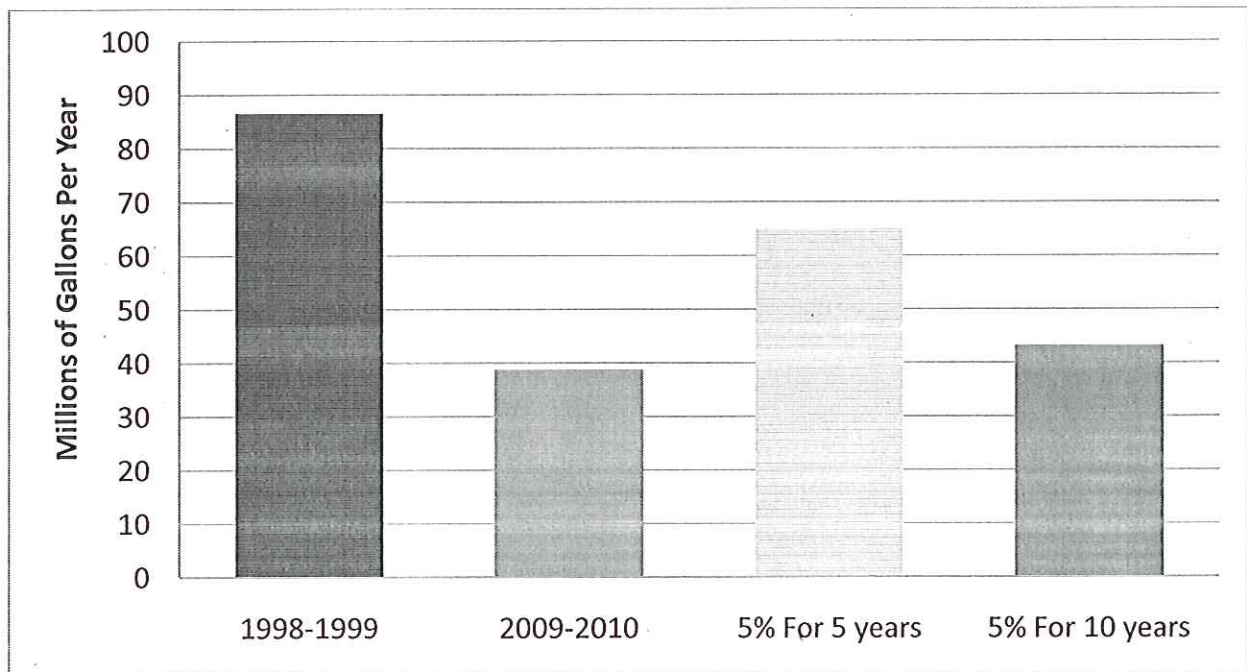


Table 1: Humboldt State Water Use 1999 vs 2010

There are new reasons to look at further efforts to conserve water. One such place that has yet to be exercised is the replacement of old toilets with low flow models. The limited fixture

survey that was completed re-enforced the current view of campus administrators that budgetary constraints do not warrant updating to more efficient fixtures. The result is that all the fixtures surveyed in 1999 remain on campus in 2010 using superfluous amounts of water. These results show that areas of waste continue to exist on campus.

While we were unable to obtain firm commitments from any of the maintenance departments on campus, we were able to help establish a community information program which is currently being set up by T.C. Comet. This system will allow the community of Humboldt State to share information on energy and water issues. New ideas and technologies can be discussed and implemented to reduce water usage further. Perhaps with more community involvement the immutability of campus gardening policies can be changed to fully implement xeriscaping. In any event, the future of Humboldt State's water usage is not as grim as we had feared when we started this project, but much remains to be done to ensure that the campus does not have to face budget problems from rising water prices.

Humboldt State 2010 Water Audit Survey Results

The survey was conducted using nearly the same survey as the last Water Audit in 1999 so that the results could be easily compared such as changes in water use habits and peoples dispositions to water conservation. This choice gave some interesting results as far as bottle water use, time reduction for personal showers, and feelings toward water conservation on campus. The survey also clearly shows the need to increase student awareness on how to handle plumbing issues. These are all illuminated by the Results and Graphs below:

Total Surveys:	500		
Total surveys received:	<table border="1"><tr><td>334</td></tr></table>	334	66.8%
334			

1) Do you believe drinking water is abundant in Humboldt County?

Yes		No		Blank	
269	82.0%	59	17.7%	2	0.6%

2) What is the source of the drinking water for your residence?

1. HSU Dorms		2. City of Arcata		3. City of Eureka	
41	12.3%	175	52.4%	56	16.8%
4. Well Water		5. Don't Know		6. Other Source	
9	2.7%	11	3.3%	42	12.6%

3A) Do you purchase bottled water?

Yes		No		Blank	
40	12.0%	292	88.0%	2	0.006

3B) If 'Yes', how much do you spend on average each month on bottled water?

\$5 or less		\$6-10		\$11-25		\$26-50	
37	11.1%	10	3.0%	4	1.2%	0	0.0%
\$51 or more							
0	0.0%						

4A) On Average do you more often take a

Shower:		Bath:	
334	100.0%	0	0.0%

4B) If you shower how long is your shower on average?

2-5 minutes		5-10 minutes		10-15 minutes		more than 15 minutes	
44	13.2%	172	51.5%	112	33.5%	6	1.8%

5) There is a lack of water conservation on Campus.

Strongly agree								Strongly disagree	
1		2		3		4		5	
80	24.0%	42	12.6%	124	37.1%	57	17.1%	31	9.3%

6) When you see a plumbing problem on campus, do you.

1. Ignore it		2. Report it to the secretary of the building	
38	11.4%	125	37.4%

3. Don't know where to report it.

171	51.2%
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**Humboldt State 1999
Water Survey Results**

Total Surveys: 556
Total surveys received:

310

 55.8%

1) Do you believe drinking water is abundant in Humboldt County?

Yes		No		Blank	
219	70.6%	76	24.5%	15	4.8%

2) What is the source of the drinking water for your residence?

1. HSU Dorms		2. City of Arcata		3. City of Eureka	
61	20.0%	132	43.0%	24	8.0%
4. Well Water		5. Don't Know		6. Other Source	
8	3.0%	0	0.0%	141	45.0%

3A) Do you purchase bottled water?

Yes		No		Blank	
163	53.0%	143	46.0%	4	1.0%

3B) If 'Yes', how much do you spend on average each month on bottled water?

\$5 or less		\$6-10		\$11-25		\$26-50	
71	23.0%	59	19.0%	31	10.0%	8	3.0%
\$51 or more		Blank					
0	0.0%	141	45%				

4A) On Average do you more often take a

Shower:		Bath:		Blank	
301	97.0%	6	2.0%	3	1%

4B) If you shower how long is your shower on average?

2-5 minutes		5-10 minutes		10-15 minutes		more than 15 minutes	
26	8.0%	137	44.0%	99	32.0%	40	13.0%

5) There is a lack of water conservation on Campus.

Strongly agree

Strongly disagree

1		2		3		4		5	
25	8.0%	67	22.0%	132	42.0%	49	15.0%	21	7.0%

6) When you see a plumbing problem on campus, do you.

1. Ignore it

2. Report it to the secretary of the building

69	22.0%
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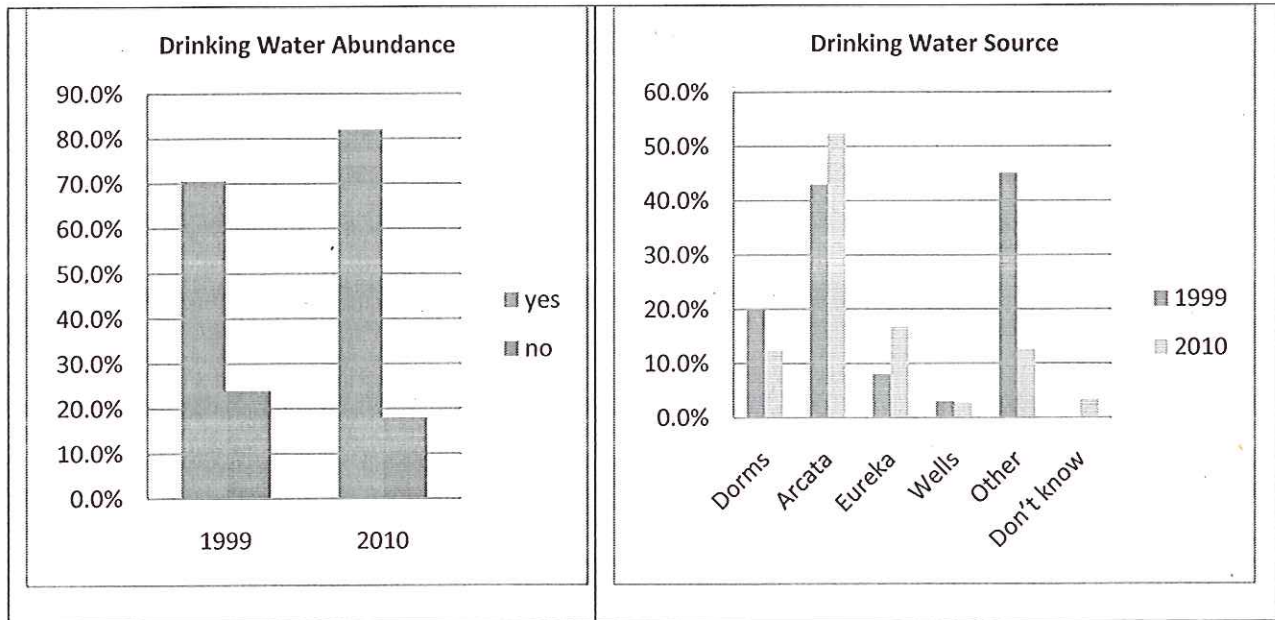
84	27.0%
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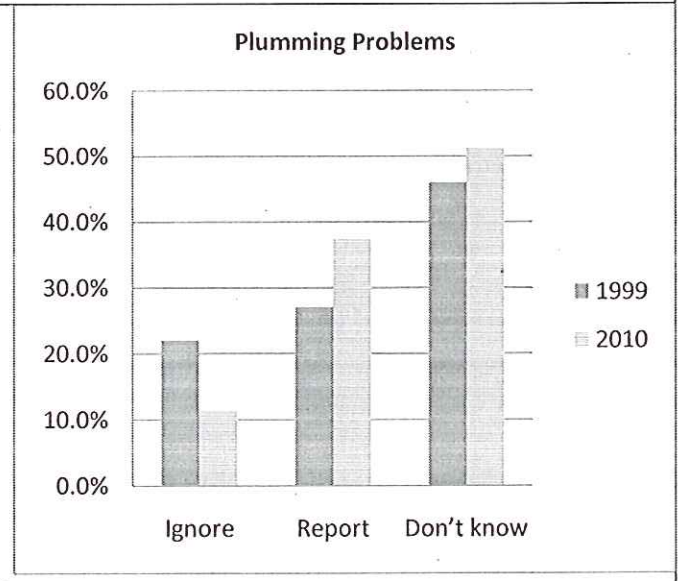
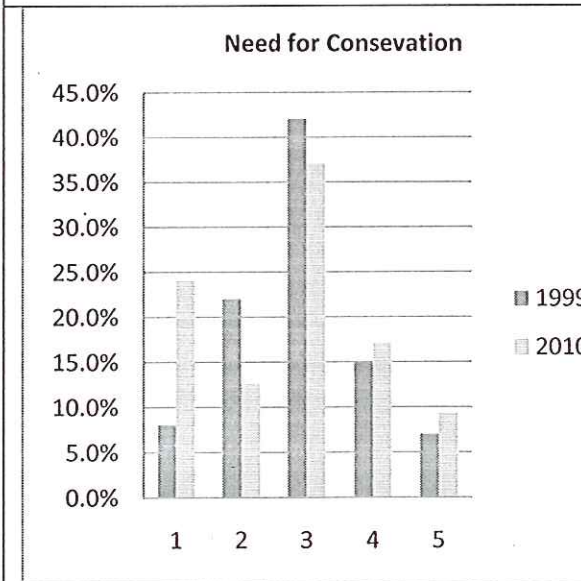
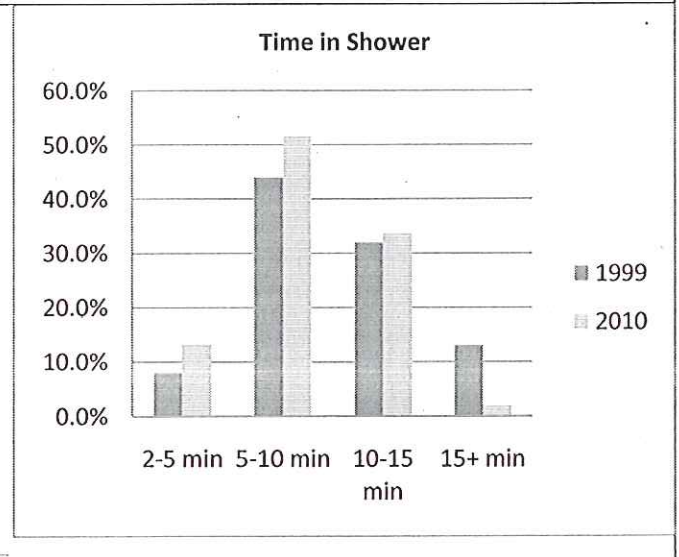
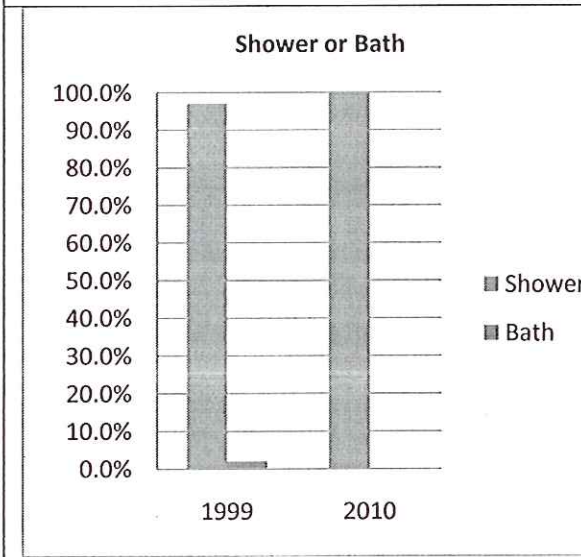
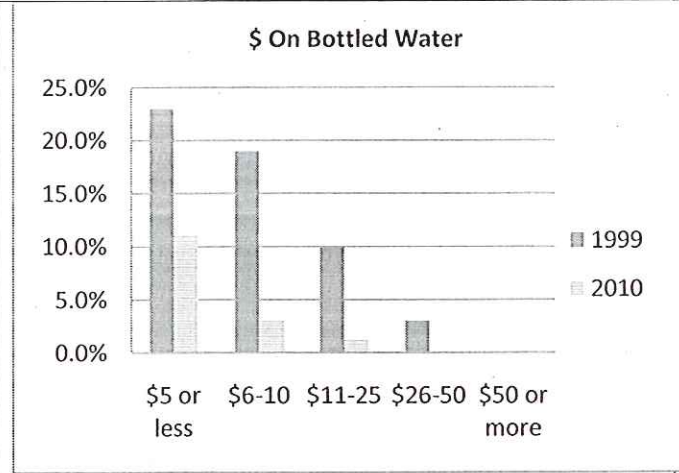
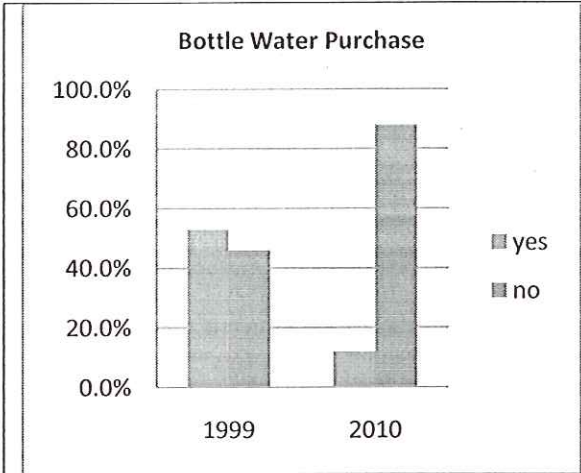
3. Don't know where to report it.

Blanks

140	46.0%
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17	5%
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Though these findings are interesting their major flaw is that they really have nothing to do with water conservation on campus. The focus to use the old survey and use similar survey methods just to have the comparison was a mistake. The focus of the project was water use on the campus and the focus of the questions should have been directed as such. There should have been greater effort to get surveys out to all students living in the dorms. The questions should have focused on larger campus water issues. Such as how many times do you flush a toilet on campus per day or week? Do you leave the water running while brushing your teeth? Do you use a rise water sink or bucket when doing dishes, or rinse them with running water? Have you seen over watering of campus landscaping? Where? More questions regarding people's views of conservation would be more beneficial in highlighting areas for further education.

Fixture Survey Results

The purpose of the survey was to determine if there had been any change in the makeup of the fixtures that were in place 10 years ago. I completed the process for Founders Hall, Van Matre Hall, The Depot, and the Library. I then took these results and compared them to the prior audit and found that as far as these buildings were concerned there were no changes in the fixtures from the last audit. This prompted a call to the Campus plumber who informed me that there indeed have been no changes in the fixtures for many years. There is currently no interest in replacing current fixtures as they will have to be replaced when each building is remodeled. The only location that had fixtures in disrepair was the men's restroom in the Depot. Current State mandates for fixtures are: Toilets and associated flushometer valves that use no more than 1.6 gallons per flush; Urinals and associated flushometer valves that use no more than 1.0 gallon

per flush; Showerheads that use no more than 2.5 GPM; and bathroom faucets that use no more than 2.2 GPM.

The results for the buildings completed:

Founders Hall: 22 Toilet fixtures with Sloan/Royal @ best 3.5GPF

7 Urinal fixtures with Sloan/ Royal fixtures 1.0GPF

2 Drinking fountains found Haws fixtures

10 Sinks various old American standard faucets

Van Matre Hall: 3 Toilet fixtures with Sloan/ Royal @ best 3.5GPF

2 Urinal fixtures with Sloan/ Royal fixtures 1.0GPF

3 Sinks various old Standard Faucet Co. faucets

Library not complete basement level not accounted for:

18 Toilet fixtures with Sloan/ Royal @ best 3.5GPF

8 Urinal fixtures with Sloan/ Royal fixtures 1.0GPF

2 Urinal fixtures unidentified floor valves unknown brand most likely Sloan

11 Moen faucets

7 Unidentified faucets

Depot: Men's Bathroom (only)

1 Toilet fixture with Sloan /Royal @ best 3.5GPF

2 Urinals 1 with Sloan/ Royal one old and unknown

2 Sinks old unknown brand

Sample Water Survey Form

Do you believe drinking water is abundant in Humboldt County?

- Yes No

What is the source of the drinking water for your residence?

1. HSU Dorms 2. City of Arcata 3. City of Eureka 4. Well Water
5. Don't Know 6. Other Source _____

Do you purchase bottled water?

- Yes No

If 'Yes,' how much do you spend on average each month on bottled water?

1. \$5 or less 2. \$6-10 3. \$11-25 4. \$26- 50 5. \$51 or more

On average do you more often take a shower or bath?

If you shower how long is your shower on average?

1. 2-5 minutes 2. 5-10 minutes 3. 10-15 minutes 4. more than 15 minutes

There is a lack of water conservation on campus.

- 1 Strongly agree 2 3 4 5 Strongly disagree

When you see a plumbing problem on campus, do you.

1. Ignore it 2. Report it to the secretary of the building 3. Don't know where to report it.

Thank you for taking our survey, the check is in the mail.

Sample Fixture Survey Form

Building Name or Location _____

Fixture Type:	Total/ counted	Flow rate	Condition*
Faucets:			
Bathroom:	_____	_____	_____
Class/Lab:	_____	_____	_____
Toilet:			
Urinals:	_____	_____	_____
Sit -Down:	_____	_____	_____
Shower Heads:	_____	_____	_____
Drinking Fountains:	_____	_____	_____


*Visual inspection used to determine condition / damaged fixtures have greater chance of leaks and need of replacement.

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Other Materials

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Future flow: Shifting needs prompt plans to protect the region's water supply

For some 50 years, the water supply for the Arcata, Eureka and McKinleyville areas was tied to two pulp mills on the Samoa Peninsula.

The founders of the Humboldt Bay Municipal Water District were looking to build a water supply system for the region, and to attract pulp mills that would consume lots of water and more cleanly use sawmills' wood waste, which was burned at the time in teepee burners that clouded the air.

The district's plan had strong support from the community, and two pulp mills promised to build on the peninsula and buy water. For decades, the cost of the system -- including Matthews Dam and Ranney wells on the Mad River, and a distribution network -- was subsidized by the pulp mills.

The mills used some 75 percent of the capacity of the available 75 million gallons per day. But in the 1990s, a pollution suit prompted the Simpson mill to close, and the Louisiana-Pacific mill to switch to a chlorine-free system. Over the years, that mill began to use less water, and in October, it folded -- probably for good.

This has led to dramatic rate hikes for the district's 80,000 municipal water users, spiking bills from 69 percent in McKinleyville to 135 percent in Eureka between 1999 and 2008. Those rates will go higher with the closure of the last pulp mill, and significant capital projects to improve the aged system will cost millions on top of that.

That is not an agreeable situation. But beyond that, California's use-it-or-lose-it water laws mean that the water district stands to lose its rights to much of the water the system can provide.

"At the end of the day we will lose our water rights," district General Manager Carol Rische said of one likely option.

Rische said that the district could otherwise try to sell its excess water within the region, though the district acknowledges it would be difficult to find a water user that would need the up to 60 million gallons of water per day that the industrial system produces.

Another option: Release more water for salmon and steelhead in the Mad River. Rische said that strategy could potentially protect rights to the water, but it may not be deemed a reasonable use of the water if it's challenged by another potential user like a municipality or a business.

The water could also be sold out of the area. One such proposal to buy surplus industrial water became infamous in 2002. An Alaska-based company called Aqueous Corp. wanted to buy millions of gallons of Mad River water and pump it into giant bags that could be towed south on the ocean by barge. Its owner promised jobs and income for the water district.

But that bid failed after it sparked public outrage over the possibility of the district losing control of some of its water. Still, it wasn't the first pitch for ocean-going water delivery to thirsty southern cities, and it may not be the last. All it takes is for such an operation to pencil out.

"People do amazing things to get oil, and water is more valuable than oil, really," said district Director Kaitlin Sopoci-Belknap.

The district in 2004 already had to give up rights to about 60,000 acre feet of water per year, an acre foot being enough water to cover an acre to a depth of a foot. But to have actually used that much water would have required Matthews Dam to be raised. Today, it has rights to about 85,000 acre feet

annually.

With only municipal customers, the district now uses only about 10,000 acre feet per year, and when its permit is up again in 2029, the state will no doubt look closely at whether the district should retain rights to the full 85,000 acre feet.

Between now and 2029, however, if another user were to challenge the water district's right to the excess water, the State Water Resources Control Board would ask the district to provide a statement of need for the water.

"If they want to keep the right ... we would expect them to have a plan that explained where that water would go," said State Water Resources Control Board spokesman Dave Clegern.

And by 2029, depending on population growth and climate change in California, much of the state will likely be facing a more dire water supply problem than it does now. While water use per person has fallen some in recent years, it's not enough to offset growth, said Michael Hanemann, director of the Climate and Energy Policy Institute at the University of California at Berkeley.

With climate change reducing storage in the form of snow, Hanemann said, more storage would be needed to capture runoff in wet months for use during the dry months. Hanemann said that California will also need more infrastructure to connect watersheds in order to move water from place to place. Water management also needs to be far more proactive and nimble in the future, he said.

The Mad River's geographical location, its size and its disconnectedness to other rivers could prevent significant diversions. Hanemann said that water is easy to store but expensive to transport -- whether by pipelines or by shipping.

The uncertainty of California's water future makes planning now a smart thing to do, Hanemann said.

"Planning 25 years out is not too early to start," Hanemann said.

Which is why the Humboldt Bay Water District has embarked on a major planning effort. In early September, the district convened a group of 30 stakeholders and about 20 Humboldt County residents to begin to gather ideas on how the district might safeguard its water.

The district is now developing a larger forum to educate the public on the district's water rights and rates with the loss of its industrial customers. Sopoci-Belknap said that the more people willing to participate, the better the ideas and possible solutions will be.

PLANNING FOR THE FUTURE:

What: "Frank Language about Our Water" meetings

When: - Oct. 13 at Azalea Hall in McKinleyville

- Oct. 14 at D Street Neighborhood Center in Arcata

- Oct. 22 at Wharfinger Building in Eureka

All meetings are from 6 p.m. to 8:30 p.m.

John Driscoll covers natural resources/industry. He can be reached at 441-0504 or jdriscoll@times-standard.com

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NATURAL RESOURCES DEFENSE COUNCIL
THE EARTH'S BEST DEFENSE



GREENING ADVISOR

LOW-FLOW FIXTURES AND WATER-EFFICIENT APPLIANCES

Installing low-flow fixtures and aerators saves water and money. Aerators for faucets and showers require an initial capital investment, but they often pay back the investment in less than a year, especially when they are used often. Many utilities and city governments offer incentives to purchase and install low-flow fixtures. Contact your utility to learn more about these programs. For information on water use efficiency, see [New Mexico's Water Conservation Guide for Commercial, Institutional and Industrial Users](#).

[Sample Contract Language](#)

For a database of environmentally intelligent products that can help reduce water use, visit the following:

- [Oikos Green Product Database](#)
- [EPA: Environmentally Preferable Purchasing Database](#)
- [EPA: Comprehensive Procurement Guidelines: Suppliers Database](#)

LOW-FLOW FIXTURES SAVE MONEY: CORPORATE EXAMPLES

The Port Authority of New York and New Jersey upgraded restroom facilities at LaGuardia Airport to increase the efficiency of toilets, faucets, and showers. It installed a leak detection system, ultralow-flow toilets, high-efficiency aerators for faucets, and flow restrictors on showerheads. These improvements yield annual water savings of almost \$160,000, after an initial capital cost of only \$90,000. [Case Study](#)

The Veterans Affairs Hospital in Portland, Oregon, performed a water audit and implemented a variety of water-saving measures, including low-flow toilets, faucets, and showers. Savings from these low-flow fixtures amounted to more than \$50,000 per year. [Case Study](#)

PRODUCT SPECIFICATIONS

Toilets: 1.28 gpf or 1.6/0.8 gpf dual flush

Urinals: 0.125 gpf or waterless

Faucets: 1.5 gpm

Shower heads: 1.5 gpm

Service sinks 2.0 gpm

ADDITIONAL RESOURCES

- [EPA: WaterSense: Efficiency Made Easy](#)
- [EPA: Using Water Efficiently: Ideas for Commercial Businesses](#)
- [EPA: Water efficiency programs by state](#)

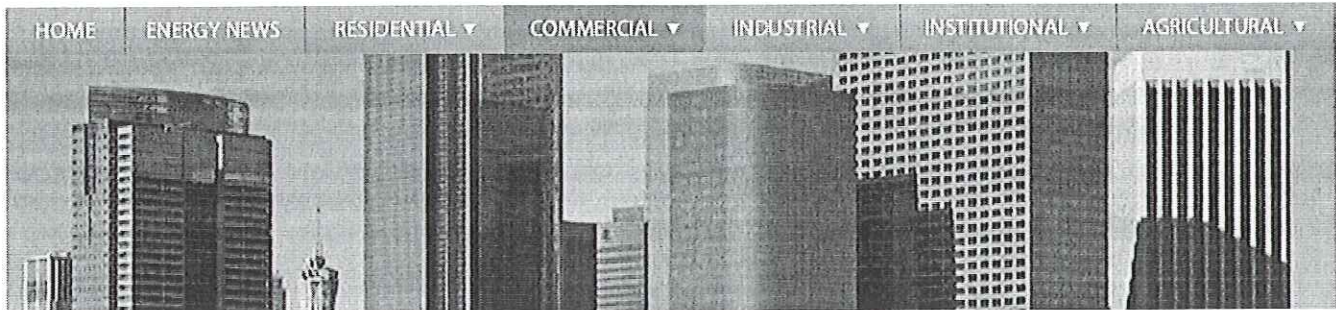
Installing low-flow fixtures and aerators saves water and money. Aerators for faucets and showers require an initial capital investment, but they often pay back the investment in less than a year.

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Introduction

The United States uses about 5.8 billion gallons of water every day to flush waste. Since toilets and urinals account for nearly one-third of building water consumption, there is a significant potential for savings. Ultra-low-flush (ULF) toilets use no more than 1.6 gallons per flush (gpf) rather than 3.5 to 7 gallons of water used by other designs.

Technology Options

Current Federal law requires that residential toilets manufactured after Jan. 1, 1994, must use no more than 1.6 gallons per flush (gpf). Commercial toilets manufactured after Jan. 1, 1997, must use no more than 1.6 gpf; urinals must use no more than 1 gpf. ULF toilets are required in all new construction in California as of January 1, 1992. This statewide requirement was passed to promote water conservation.

ULF toilets use an efficient bowl design and increased flushing velocities to remove waste, rather than simply using a large amount of water for flushing. There are two main varieties of low-flush toilets: gravity flow and pressurized tank systems. The gravity flow technology is also used for conventional toilets. When flushing an ULF toilet, however, the rim wash can come through an open slot rather than through little holes. The bowl may have steep sides and a narrower trapway. These changes to the design of the toilet bowl cause a quick release of water, creating a siphon action to pull the waste out. The pressurized flush is a new design developed for 1.6 gpf residential toilets. It uses the house water line pressure to increase the velocity of the water going into the bowl. Within the toilet tank incoming water presses against a rubber diaphragm that compresses a pocket of air. The water is released by pushing the flush valve.

For institutions like prisons or hospitals, non-ceramic, metal toilets are available. They have straight drain lines and a flush rate of 0.5 gallons per flush (gpf). Replacing 3.5 gpf with 0.5 gpf toilets can lead to lifetime water savings even larger than those shown below in the Benefits section.

Installation and User Tips for Commercial Facilities

For initial installation of a low-flush toilet, "snake" drain lines and replace the entire fixture. After a low-flush gravity tank unit is in operation, only the valve and ballcock need be replaced if the rest of the fixture still functions.

With flush-valve toilets, make sure valves are properly adjusted. Leaky valves are a source of enormous water loss in both flush-valve and tank toilets, and are especially common in hard-water areas. These leaks are often invisible and inaudible. Semi-annual dye tablet

In This Guide

[Introduction](#)
[Technology Options](#)
[Efficiency Benefits](#)
[Manufacturers](#)
[Purchasing Tips](#)
[Emerging Technology](#)
**Get Rebates,
Incentives &
Services**
California Zipcode:

Sector:

Cost-Effectiveness Example			
Performance	Typical Existing Unit	New Standard Unit	Best Available Unit
Gallons per flush (gpf)	3.5 gpf	1.6 gpf	1.0 gpf
Annual Water Use	27,300	12,500	7,800
Annual Water Cost	\$110	\$50	\$30
Lifetime Water Cost	\$880	\$400	\$250
Lifetime Water Cost Savings (for replacing existing unit 10 years early)	-	\$480	\$630

Metric Conversion: 1 gallon = 3.8 liters Cost Effectiveness Assumptions: Savings estimates are based on an existing flush rate of 3.5 gpf. Usage assumption: 30 flushes per day, and 260 days per year. Assumed combined water and wastewater price: \$4.00/1000 gallons.

Source: DOE, FEMP, FYP

Manufacturers

Toto, Niagara, and Mansfield are some top-rated manufacturers of high-efficiency toilets. Additionally, the NAHB Research Center (NAHBRC), in cooperation with Seattle Public Utilities in Washington, and the East Bay Municipal Utility District in Oakland, Calif., has released a water closet fixture performance study (PDF, 16K) that took place in 2002. The report details the results of extensive performance testing on 49 of the most popular ultra-low-flush (ULF) toilets in the United States.

California Urban Water Conservation Council (CUWCC) compiled a side-by-side comparison of Consumer Reports and the NAHBRC's performance ranking of all ULF toilet models. CUWCC also offers a full report on the Maximum Performance testing of over 840 toilet models.

Purchasing Tips

Ultra-low-flow toilets come in a range of prices. Many models are available for about \$100 and can run as high as \$400 or more for the decorator models. ULF toilets can be purchased in the same spectrum of decorator colors as conventional toilets. Various styles are available in plain rim, elongated rim and high handicapped models. ULF toilets install just like conventional toilets, making them ideal for remodeling and new construction. No special hook-ups or tools are needed.

- When buying from a commercial source (retailer or distributor), select or specify models with flush rates that meet the recommended level. Start with this list of water-efficient toilet units, rated one to five by Consumer Reports.
- Evaluate new performance standards and testing criteria released by the American National Standards Institute (ANSI) in December 1990. All ULF toilets have to meet these standards to be listed by the International Association of Plumbing and Mechanical Officials (IAPMO).

Emerging Technology

A proposal to amend the current national standard for dual-flush toilet fixtures is currently being considered by the Standards Committee. The water industry supports this proposal. The primary purpose of the dual-flush water closet is to achieve water conservation benefits over and above those yielded by the conventional 1.6-gallons per flush water closet. This is accomplished by providing the user with a reduced flush mode for liquid- (urine) only flushes.

Dual-flush water closets are currently being sold in the United States and Canada by two manufacturers, Kohler and Caroma U.S.A. Wash-down bowls are non-siphonic and use the weight and volume of water to "push" the waste from the bowl, while siphonic bowls are designed to "pull" the waste from the bowl. The wash-down design is typical of dual-flush water closets sold elsewhere in the world with a reduced flush volume of approximately 0.8 gallons (3 liters). A number of these wash-down type closets have been installed in the United States and Canada.

William Dineen

Karl Ensminger

NR 221 Water Audit Fixture Survey Sheet

Building Name or Location Founders Hall

Fixture Type:

Total/ counted

Flow rate

Condition*

Faucets:

N/S | S/S

American Standard

N/S Sloan Royal
600 series

Bathroom:

||||| | |||

Toilets
N/S Sloan Royal
V/500AA

Class/Lab:

Toilet:

Urinals:

|||| | ||

1.0

All SS/ V/500 AA
Sloan Royal

Sit-Down:

||||| ||| | |||

3.5 or more

Shower Heads:

No info
on webpage

Drinking Fountains:

| |

Hand

Sinks All American
Standard

*Visual inspection used to determine condition / damaged fixtures have greater chance of leaks and need of replacement.

Notes:

Depot Sloan Royal 600

Landscape

Landscapes are essential to the quality of life in California...."

"Landscape design, installation, and maintenance can and should be water efficient" (Excerpts from: Title 7, Div. 1, Ch. 3, Article 10.8 (d) and (e) of the Government Code)

The California State Legislature recognizes the importance of landscaping for recreation, fire protection, erosion control, enhancing environmental conditions and replacing ecosystems in areas of development. However, California faces a real challenge to meet the water needs of a growing population with a limited supply of water. To meet this challenge, water use in landscapes must become more efficient. There are many ways to accomplish this goal and even modest improvements can have a cumulative effect in saving a great deal of water.

LANDSCAPE WATER USE CONSERVATION METHODS

There are many methods that can reduce the amount of water used in a landscape and still maintain the health, appearance and function of the landscape. Here are just a few:

- Water-efficient landscape designs using low water-use plants
- Efficient irrigation systems
- Minimized turf areas
- Soil improvements and mulch
- Regular maintenance of irrigation systems
- Regular adjustment of irrigation controllers
- Scheduling irrigation during early or late hours
- Water budgeting using evapotranspiration data from CIMIS and crop coefficients from "WUCOLS" -Water Use Classification of Landscape Species
- Dedicated landscape water meters for monitoring of water budget and leak detection
- Conformance to local or the State Water Efficient Landscape Ordinance
- Education of residents, customers and employees regarding the importance of efficient water use.
- Coordinate efforts with local water agency for incentives, rebates and planning programs.

LANDSCAPE WATER USE CONSERVATION TECHNOLOGY

ET Irrigation Controllers

There are several new types of irrigation controllers that base the irrigation schedule on evapotranspiration data. Some of the controllers use historical data only. Others use a combination of historical data and real-time data feeds from on-site temperature sensors, sunlight intensity indicators or from complete weather stations. These "ET" controllers represent a new frontier in scheduling irrigation by enabling the irrigator to apply the amount of water actually required by the landscape plants. This is a great improvement over irrigating an arbitrary "run time" when the amount of water needed and the amount of water applied is usually not matched. The advantages of using an ET controller include: reduced run-off, less damage to pavement, fences and buildings; increased health of plants from fewer diseases and insect pests and better air circulation in the soil, fewer "soggy" or dry areas, lower water bills, and reduced energy costs. ET based controllers have been used in large turf areas such as golf courses and parks for some time. Newer models are being used and tested for use by residential customers throughout the state.

LANDSCAPE WATER USE FREQUENTLY ASKED QUESTIONS

What is WUCOLS?

Answer: WUCOLS stands for **Water Use Classifications of Landscape Species**. It is a University of California Cooperative Extension Publication. The project was developed by the San Francisco and San Mateo County Office in cooperation with 32 landscape professionals. This project was initiated and funded by DWR. The purpose and intended use is to provide guidance to landscape professionals when selecting plant material, while taking into consideration water needs. It also serves as a guide to assist in developing irrigation schedules for existing landscapes. A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California.

Which water laws affect landscape water use in California?

Answer: The California Constitution (Article X, Section 2) and the Water Code (Sections 100 & 101) prohibit "waste or unreasonable use" of water.

Is there a specific law governing the landscape water in California?

Answer: Yes. Assembly Bill 325 required all local jurisdictions to adopt a landscape water conservation ordinance by 1993. DWR's Model Water Efficient Landscape Ordinance reflects the State policy of promoting the conservation and efficient use of water in landscape.

What are the objectives of DWR's Water Efficient Landscape Ordinance?

Answer: The objectives, consistent with AB 235 are:

- To promote the values and benefits of landscapes while recognizing the need to invest water and other resources as efficiently as possible.
- To establish a structure for designing, installing and maintaining water efficient landscapes in new projects.
- To establish provisions for water management practices and wastewater prevention for established landscapes.

How can I get help with landscape water use calculations when submitting a landscape project to the city or county?

Answer: DWR's Model Water Efficient Landscape Ordinance has examples of specific calculations, including:

- Calculation of the Maximum Applied Water Allowance (MAWA)
- Calculation of the Estimated Applied Water Use
- Calculation of the estimated Total Water Use

Where can I get information to calculate the Maximum Applied Water Allowance (MAWA)?

Answer: MAWA calculation requires using DWR's CIMIS Reference Evapotranspiration (ET_o) in inches per year. CIMIS ET_o data is available for many locations in California.

Or for any special request you can call, (800) 922-4647, Monday through Friday from 8 AM to 5 PM.

What does CIMIS ET_o mean?

Answer: CIMIS stands for California Irrigation Management Information System. ET_o stands for reference evapotranspiration. ET_o is an estimate of the amount of water used by water evaporated from both the soil and the amount used by well-irrigated grass (transpiration). It is calculated based on weather data measured on site, at DWR's CIMIS weather station and retrieved daily by a central computer in Sacramento.

See also the DWR White Paper: Evapotranspiration Adjustment Factor, January 25, 2008
I'm in landscaping and I need CIMIS ET_o information. What is the cost of obtaining it?

Answer: The CIMIS information is free.

What are landscape coefficients?

Answer: Landscape coefficients are a reasonable approach to determine how much water is used by a landscape planting in relation to CIMIS ETo. The landscape coefficient method is explained in A Guide to Estimating Irrigation Water Needs of Landscape Plantings in California, **The Landscape Coefficient Method and WUCOLS III**.

Should I rely solely on CIMIS ETo data, landscape coefficients, and the available water holding capacity of soils to schedule my irrigations?

Answer: No. Irrigation scheduling will rely heavily on the experience of the person responsible for the landscape design and/or maintenance. It also relies on estimates for water use, such as CIMIS ETo data, as well as soil moisture monitoring devices (rainfall sensors), which all contribute to accurate and efficient irrigation scheduling.

How many acres of irrigated landscape do we have in California?

Answer: We are working very hard in cooperation with local agencies to find a good answer to this question. Approximations can be made based on past surveys of land use by counties conducted in different years by DWR, which have values for urban acres. Assuming that the growth in urban acres correlates to the trend in increased county populations, we can come up with conservation ratios between landscape and urban acres. By 1995, the range of landscape acres was between 1.2 and 1.4 million acres, including mainly urban irrigated landscape.

My client would like a long term comparison between a high water use landscape project, (including large turf areas and high water-use plants) and a landscape project using limited amounts of water (based on recreational needs and lower water-use plants). What technical and economical parameters should I consider for my analysis?

Answer: Assume that both projects would provide the same long term recreational, aesthetic and economical benefits to the client. A study during the lifetime of two similar landscape projects concluded the following:

- Both operational and maintenance costs (such as energy, water, fertilizers, pesticides, labor, fuel etc.) represented over 80% of the total cost, while the design and construction represented less than 20%.
- Both annual operational and maintenance costs were less than half in the low water-use landscape project compared to the higher water-use landscape project.
- The money saved each year as net savings in operational/maintenance costs in the low water-use landscape project generated financial cost savings.

How can I attend a landscape water audit class?

Answer: DWR is no longer directly sponsoring landscape water audit classes. However, the Irrigation Training and Research Center (ITRC) is still providing this type of training for a fee in different California Regions. To find out the current schedule please call Cal Poly, San Luis Obispo, at ITRC (805) 756-2434.

Has the California Building Standards Commission approved the revised California Graywater Standards?

Answer: Yes, on March 18, 1997. The most significant change in the standards that graywater systems can now be used in commercial, industrial, single-family, and multi-family projects. DWR retains copies of the revised Standards which are available upon request. [Click here to view the Graywater Standards in PDF format.](#)

Is there information available regarding the use of gray water for residential landscape in California?

Answer: Yes. DWR has a publication called Using Graywater in your Home Landscape - Graywater Guide.

Where can I find technical information about the use of recycled water for landscape purposes in California?

Answer: Please visit the Recycling and Desalination Web Page.

LANDSCAPE WATER USE PHOTO GALLERY

WATER SERVICE CHARGES (2010-2011)

Meter Rental Charges:	Monthly	Monthly	
Meter Size	Inside City Rate	Outside City Rate	Deposit
5/8"	\$6.24	\$12.01	\$150.00
3/4"	6.24	12.01	150.00
1"	13.65	21.11	292.00
1 1/2"	18.79	26.95	578.00
2"	23.45	35.46	1139.00
3"	135.30	201.55	2792.00
4"	170.88	240.57	2792.00
6"	240.57	373.83	2792.00
8"	336.15	500.04	2792.00
10"	403.22	625.54	2792.00

Consumption Charges:

Single Family Residential Dwelling Units:

Quantity	Inside City Rate	Outside City Rate
0-300 cubic feet	\$1.60 per 100 cubic feet	\$1.77 per 100 cubic feet
300-400 cubic feet	1.72 per 100 cubic feet	1.91 per 100 cubic feet
401 cubic feet & up	3.36 per 100 cubic feet	4.61 per 100 cubic feet

All Customers except Single Family Residential Dwelling Units:

Quantity	Inside City Rate	Outside City Rate
1 & up	\$3.36 per 100 cubic feet	\$4.61 per 100 cubic feet

Service charge for turn-on, reconnection, or other service calls	\$ 33.00
Service charge to reinstall water meter	132.00
Water meter testing	70.00
Tampering fee (unauthorized operation of City owned meter, valves etc.)	187.00
After hours fee (evenings, weekends and holidays)	180.00

WASTEWATER CHARGES

Customer Type	Base Charge	Allowance	Charge per 100 cubic feet over allowance
Residential	\$25.52	450 cubic feet	\$3.89
Low Strength Commercial	26.29	550 cubic feet	3.63
Medium Strength Commercial	26.29	400 cubic feet	4.24
High Strength Commercial	26.29	250 cubic feet	7.02
Universities and Schools	13.65	0	3.51

All customers receive a 10% sewer consumption allowance for irrigation. Residential customers receive a 30% allowance for irrigation during the summer months. Residential Customers who believe that their irrigation use exceeds the 30% adjustment may request a manual adjustment of their July to October bills based on their winter consumption. Request may be made by contacting the cashier's window at 707-822-5951.

CITY OF ARCATA
Water/Sewer Service Rate and Fact Sheet
2010/2011 Fiscal Year

Service Charges:

Water or Water/Sewer\$33.00
Sewer only account.....\$9.06
Reconnection charges.....\$33.00

Security Deposit:

Deposits are required on all Water and/or Sewer accounts. Deposits for meters 1” and smaller are held for one year or are applied to the closing bill if service is less than a year. Deposits for meters of 1 ½ “ or greater will be held until service is disconnected. The deposit for meter 1 ½” and larger will earn simple interest of 4% per year after the first year, payable upon disconnection.

Returned Check Fee:

Checks returned by the payer’s bank (for insufficient funds, closed accounts, stop payments, etc.) must be redeemed in cash, money order, or cashier’s check for the full amount of the check, plus a \$25.00 service fee.

Monthly Billing:

Utility accounts are billed 30 days after the end of service period and are due upon presentation. The bill becomes delinquent 30 days after the billing date and will be assessed a 10% penalty on any past due balance.

- If payment is not received within 15 days after the due date a final notice will be mailed indicating a shutoff date for non payment.

- If payment is not received within 30 days after the due date **service will be disconnected**.

- If service is disconnected, reconnection will only be made after all past due charges, current charges, and a reconnection fee of \$25.00 are paid. Service will then be restored within 24 hours from the time payment is received (excluding weekends and holidays).

Payments:

Utility payments may be mailed to: City Hall, 736 F St. Arcata, CA 95521-6284. Payments are accepted at the Cashier’s Window in City Hall, Monday - Friday, 9am to 5pm, except Holidays. Visa or MasterCard payments are accepted by call 707-822-5951 during business hours. Payment drop boxes are located in front of City Hall next to the mail box and in the parking lot at the end of the center parking row nearest the Library.

Leak Adjustments:

Customers may request an adjustment for excessive water/sewer charges due to a water leak **once** during a 12-month period. Any adjustment will be made only after repairs have been made and verified by a city water technician. Adjustments will be based on average annual water consumption. Only month may be adjusted during any 12-month period.

Closing an Account:

Please call the Finance Department at **822-5951 to DISCONTINUE SERVICE**.

Have the following information ready:

1. Customer name and account numbers
2. Date service is to be discontinued.
3. Forwarding address and phone number for final bill or deposit refund.

It is the account holder’s responsibility to notify the City when you wish service to be discontinued. If you fail to discontinue service you will be responsible for charges after you move out! Requests to discontinue service retroactively will not be honored!

- Sewer Repair Fee:** In October 1996 the City Council approved a bond to pay for capital improvements in wastewater collections system. This bond is being repaid by the collection of a "Sewer Repair Fee" collected monthly on each sewer connection billed by the City. The initial payment was \$1 per month starting in February 1997. The fee increased by \$1 each year until the fee reached \$5 per month in February 2001. The fee will continue at \$5 per month for 20 years until the bond is paid.
- Tampering Fee:** A tampering fee of \$187 shall be charged for the unauthorized operation of any of City owned curb cocks, main cocks, gates on valves; or any interference with meters, their connections, or other parts of the City's water system
- Call out fee:** A service charge of \$180.00 will be charged for turn-on, reconnection, or other service calls related to water accounts performed outside of the City's usual business hours (evenings, weekends and holidays).
- Backflow Prevention Devices:** Residents with backflow prevention devices are charged \$5.00 per month for backflow device rental and annual inspection.
- Jacoby Creek Assessment District:** Residents who live in the Jacoby Creek Water District are assessed \$6.50 per month on their City of Arcata Water Bills. This money is used by the Jacoby Creek Water District to pay a bond debt for construction of the water lines and water tank that services the district. The bond is scheduled to be paid off in 2033. The address for the Jacoby Creek Water District is PO Box 122, Bayside CA 95524-0122.
- Utility tax:** All utility services within the city limit are taxed at a rate of 3%. For the purposes of City billed utilities, this applies to water and sewer charges.

Other Utilities:

Garbage services:	Arcata Garbage Company	707-822-0304
Electric and Gas	PG&E	800-743-5000
Telephone	AT&T	800-310-2355
Television Cable	Suddenlink	877-443-3127



FACTS ABOUT

Ultra Low Flush Toilets

A MASSACHUSETTS WATER RESOURCES AUTHORITY PUBLICATION

In recent years, the perception that water is plentiful has been replaced by the realization that a good water supply is a valuable asset, worth conserving and protecting. Consumers are also discovering that more efficient water use can alleviate the strain on their water supplies and their wallets. 1.6 gallon per flush Ultra Low Flush Toilets, also called *Low Consumption* and *Low Flow* Toilets, have played a big part in making water efficiency at home possible.

In 1989, revisions to the plumbing code made Massachusetts the first state in the United States to require the installation of Ultra Low Flush Toilets and other water efficient plumbing fixtures for all new construction, remodeling and replacement projects. Several other states soon followed Massachusetts' lead.

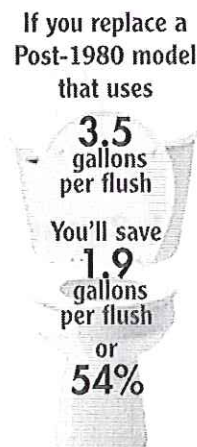
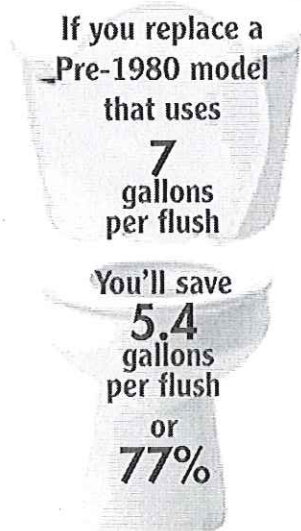
In January 1994, federal standards for plumbing products went into effect. They prohibit the manufacture of wasteful plumbing fixtures and ensure that only 1.6 gallon-per-flush toilets are sold.

- **WHY REPLACE A TOILET:** Toilets account for over a third of the water used in most homes. Installing an ultra low flow toilet will save thousands of gallons each year and can automatically and permanently reduce your bathroom water use by more than half.
- **WHEN TO REPLACE A TOILET:** A good time to replace your toilet is during renovations or repairs. You should consider replacement anytime a toilet is leaking – a leaking toilet can waste up to 18,000 gallons of water in a year!
- **HOW TO CHECK FOR LEAKS:** Here's an easy way to test for leaks: Put 2 dye tablets, or a few drops of food coloring, or a couple of tablespoons of instant coffee or powdered fruit drink mix (grape or cherry) in the tank. Wait 10-15 minutes. If dyed water seeps into the bowl, you have a leak. This could mean your flush valve or refill valve needs replacing.

HOW TO USE THIS FACT SHEET

This fact sheet was prepared to help you make informed purchase and replacement decisions. The information presented here is not intended to serve as a substitute for the judgement of a plumber, engineer, retailer or contractor. However, we hope that it will help you to have informed discussions with these professionals.

HOW MUCH WATER DOES INSTALLING A 1.6 GALLON TOILET SAVE?



Whether you replace one toilet in a single bathroom or several hundred toilets in a large commercial or residential complex, you can expect to see significant savings. For example, replacing a typical 3.5 gallon toilet with a 1.6 gallon model will save a family of four 11,096 gallons per year. That's a 54% reduction in toilet water use. The more water the toilet you're replacing uses, the more you'll save.

WATER

HOW MUCH MONEY CAN YOU SAVE?

Water savings can be converted into dollar savings. The charts on this fact sheet present examples of the amount of money an average family of four can save, and the calculation for determining the 'payback' from your investment.

YEARLY SAVINGS FOR A FAMILY OF FOUR FROM SWITCHING TO AN ULTRA LOW FLUSH TOILET

Gallons per flush	X	Daily Flushes	X	People in household	X	Days in a year	X	Average cost of 1,000 gallons water and sewer	÷	1,000 gallons	=	Cost per year
3.5 gallon (old model)*	X	4	X	4	X	365	X	\$7.00	÷	1,000	=	\$143.00
1.6 gallon (Ultra Low Flush Model)	X	4	X	4	X	365	X	\$7.00	÷	1,000	=	\$65.00

*without a toilet dam

**Yearly Savings with
the Ultra Low Flush Toilet: = \$ 78.00**

CALCULATE YOUR PAYBACK TIME

Your payback time is the time it will take for you to recover the cost of buying and installing an ultra low flush toilet.

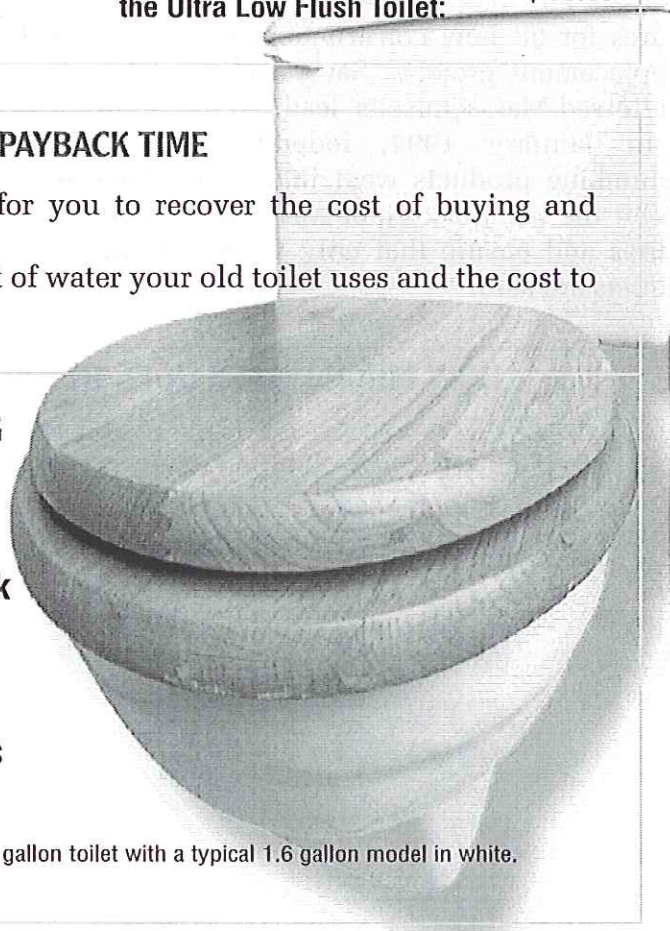
Your payback time will depend on the amount of water your old toilet uses and the cost to purchase and install a 1.6 gallon model.

SAMPLE PAYBACK TIME FOR SWITCHING TO AN ULTRA LOW FLUSH TOILET

$$\text{Approximate Installation Cost} \div \text{Yearly Savings} = \text{Payback Time}$$

$$\text{\$260.00} \div \text{\$78.00} = \text{3.3 years}$$

Installation cost includes labor and materials for replacing a 3.5 gallon toilet with a typical 1.6 gallon model in white.



HOW TO CHOOSE A TOILET

Not all Ultra Low Flush Toilets are the same. Customer satisfaction varies among different types, models and manufacturers. There is also a wide range in price. Before you buy, consider which type of toilet is best for your home or building. These checklists can guide you in your search.

WHICH TYPE OF TOILET IS RIGHT FOR YOU?

Consider which of the residential ultra low flush toilet types is best for your home:

- **GRAVITY TOILETS** are the most common. Water is stored in a tank and when flushed, the water is released through a flapper valve and driven by gravity to clear out the bowl. These toilets require approximately 10-15 pounds per square inch (psi) of pressure at the connection to function properly. Gravity toilets are relatively inexpensive, ranging from \$75 to \$150.
- **PRESSURE ASSISTED TOILETS** are hybrids of gravity and flush valve toilets. A pressurized tank placed inside the porcelain tank compresses a pocket of air and releases pressurized water into the bowl and out the trapway at high velocity. The flushing action of these toilets is noisier than the gravity types', and they require a minimum water pressure of 25 psi to operate properly. Prices for these toilets are usually over \$150.
- **FLUSHOMETER TOILETS** are found in most commercial buildings. They have no tank but rely instead on a pressure-operated valve directly connected to the building's water supply. They require a large supply pipe and a minimum water pressure of 23-40 psi to operate well. These toilets are priced at about \$250.

PERFORMANCE

Customer satisfaction surveys show that newer 1.6 gallon toilets perform as well, if not better than, the 3.5 gallon water-wasters they replace. Customer concerns about clogging and double-flushing of earlier Ultra Low Flush models have been addressed by manufacturers, and today's toilets have been redesigned to improve performance. Several design and plumbing features factor into how well an Ultra Low Flush Toilet works:

- **WATER SEAL:** The surface area of the water standing in the bowl, which correlates with bowl staining. A small water seal can produce more staining and require more frequent cleanings.
- **WASTE REMOVAL:** How well the toilet evacuates bulk and waste from the bowl. Insufficient waste removal is the main cause of double-flushing.
- **DILUTION:** The completeness of water change in the bowl.
- **DRAIN LINE CARRY:** How far the toilet transports solid waste down a sewer line.
- **NOISE:** What you hear when you flush.

FACTORS THAT AFFECT COST

- **COLOR:** 'Natural' and other non-white finishes may cost more.
- **BOWL SHAPE:** Elongated or round bowls can differ in price.
- **DESIGN:** One-piece or two-piece models are available. One-piece models are usually more expensive.
- **ROUGH IN:** The distance from the wall to the flange bolts that hold the toilet down. Standard is 12 inches, but 10-inch and 14-inch models are also available. Make sure you buy the right size.

YOU SHOULD ALSO CONSIDER...

- **GLAZED TRAPWAYS:** Most models have this feature, which improves waste removal and reduces staining.
- **NOISE LEVELS:** Pressure-assisted toilets tend to be louder than gravity models. Ask about toilet noise levels before you buy.
- **THE FOOTPRINT:** Check the footprint of your new toilet to determine if any floor patching will need to be done around the base.
- **WARRANTIES:** Look for manufacturer warranties that guarantee the toilet components for many years.
- **EXPERTISE:** We recommend that you consult a licensed plumber before installing any toilet.

FIND YOUR YEARLY DOLLAR SAVINGS FROM INSTALLING AN ULTRA LOW FLUSH TOILET*

Use the number in the left hand column that's closest to your home's average number of flushes per day and the dollar amount that's closest to your community's water rate to find your yearly dollar savings. Check with your local water/sewer utility, or visit MWRA's website: WWW.MWRA.STATE.MA.US/ORG/HTML/RATES_HOUSE_CHARGES.HTM for your current rate.

CITY/TOWN COMBINED WATER AND SEWER RATES IN COST PER 100 CUBIC FEET**

	\$4	\$5	\$6	\$7	\$8	\$9	\$10	\$11
AVERAGE YEARLY SAVINGS	\$8	\$11	\$51	\$14	\$17	\$19	\$21	\$23
	\$13	\$16	\$19	\$22	\$25	\$28	\$32	\$35
	\$17	\$21	\$25	\$30	\$33	\$38	\$41	\$46
	\$21	\$26	\$32	\$37	\$41	\$47	\$52	\$56
	\$25	\$32	\$38	\$44	\$50	\$56	\$62	\$69
	\$29	\$37	\$44	\$51	\$59	\$65	\$73	\$80
	\$33	\$41	\$50	\$59	\$67	\$75	\$83	\$92
	\$38	\$47	\$56	\$65	\$75	\$84	\$94	\$103
	\$41	\$52	\$63	\$73	\$83	\$94	\$104	\$115

* Assumes that one 3.5 gallon per flush toilet, in a model installed after 1980, is being replaced. Earlier models may use up to 7.0 gallons per flush, in which case your savings would be even greater.

** 100 cubic feet = 750 gallons

A WORD ABOUT FLAPPERS.

Water savings from an Ultra Low Flush Toilet can be significantly reduced if the flush valve closure device called a flapper doesn't work properly. Flappers have an average life span of five years before they begin to fail, creating water leaks. Replacing a worn out flapper with one that is compatible is essential for maintaining your Ultra Low Flush Toilet's water savings. Replacement flappers for some Ultra Low Flush Toilets can be hard to find. Try contacting the toilet's manufacturer, or call MWRA at 617-242-7283 (SAVE) for suggestions.

REFERENCES AND PERFORMANCE TESTS

The American National Standards Institute (ANSI) designs minimum performance tests and standards for Ultra Low Flush Toilets. Make sure you choose a model that meets these standards. Several excellent studies have been conducted. Here is a list of resources for more information.

- **THE WATER EFFICIENCY CLEARINGHOUSE (WATER WISER):** 6666 West Quincy Avenue, Denver, CO 80235-9913. Tel: 1-(800) 559-9855, website: WWW.WATERWISER.ORG. See "Water Conservation Tips for the Home" under the books heading.
- **CONSUMER REPORTS:** "Low Flush Toilets, In search of a Better Toilet". Vol. 63, No. 5, pages 44-46, May 1998.
- **SEATTLE PUBLIC UTILITIES:** Owner's guide on Purchasing Low Consumption Toilets: WWW.CITYOFSEATTLE.NET/UTIL/EFFICIENTTOILETS
- **TERRY LOVE'S CONSUMER TOILET REPORTS:** A Plumber's Report on Low Flow Water Efficient Toilets: WWW.TERRYLOVE.COM/CRTOILET.COM
- **RELATED WEBSITE:** WWW.TOILETOLOGY.COM

REMEMBER...

- **NEVER** use your toilet as a waste basket. Synthetic fibers such as dental floss or plastic wrappers can clog drains and cause backups.
- **ALWAYS** hold down the handle until the tank fully empties (some models don't have a quick flush).
- **NEVER** use toilet bowl cleaners inside the tank. They're corrosive, causing parts to disintegrate, resulting in leaks.

MWRA offers a variety of informational materials on the region's water and wastewater systems and the natural environment. To find out what's available:

CALL US:

MWRA Public Info Line: 617-788-1170
 MWRA Water Conservation Line: 617-242-7283 (SAVE)

VISIT OUR WEB SITE: WWW.MWRA.COM

WRITE TO US:

MWRA
 Public Information Unit
 Charlestown Navy Yard
 100 First Avenue
 Boston, MA 02129





Exposed, Manually Operated Water Closet Flushometers

Our motto and goal: "Under-promise...Over-perform."

PlumbingSupply.com is the web's leading and most popular Internet plumbing supplier since 1995
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Find other plumbing supplies starting with the letter: **A B C D E F G H I J K L M N O P Q R S T U V W X Y Z**

Customers who have purchased **exposed flushometers** have also been:
 to [quality Sloan products](#) - to [manual to sensor flushometer kits](#) - to [restroom hygiene products](#)
 to [Sloan valve replacement parts](#) - to [battery powered toilet flushometers](#) - to [exposed urinal flushometers](#)
 to [top quality stainless steel urinals](#) - to [restroom products](#) - to [grab bars](#)
 to [ADA compliant products](#) - to [stainless steel toilets](#)

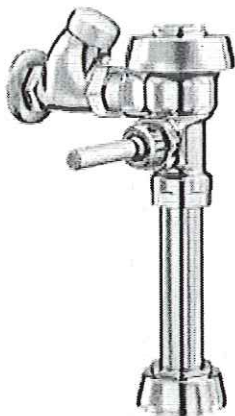
Low rates and easiest to calculate/understand [shipping](#) for exposed, manually operated flushometers

Sloan Flushometers are offered in a variety of models, and there's one for every toilet - from exposed-style [top spud](#) flushometers to exposed-style [back spud](#) flushometers, you'll find them here on PlumbingSupply.com! Looking for other Sloan products? Click [here](#).

Exposed Water Closet Flushometers - Royal® 100 Series

- Designed for floor mounted 1-1/2" top spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- [Click here for dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
100-1.6	top spud	1.6 GPF water closet flushometer for floor water closets/toilet	\$146.80 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
100	top spud	3.5 GPF water closet flushometer for floor water closets/toilet	\$146.78 <input type="text"/>
100-H	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - handle on front of valve	\$158.76 <input type="text"/>
100-HL3	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - 3" oscillating push button on front of valve	\$172.47 <input type="text"/>

100-XD	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - less supply stop	\$172.70
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ADD TO CART

- Or -

VIEW CART

Exposed Water Closet Flushometers - Royal® 110/111 Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 11-1/2" tailpiece: [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.28 GPF <i>ultra low water consumption</i> exposed toilet/water closet flushometers			
111-1.28	top spud	1.28 GPF water closet flushometer for floor/wall hung toilets	\$125.89
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
111-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets	\$146.53
111-H	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - handle on front of valve	\$158.68
111-HL3	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - 3" oscillating push button on front of valve	\$173.30
111-HL3-YO	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - 3" oscillating push button on front of valve - bumper on angle stop	\$172.78
111-SG	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - <u>Saniguard</u> antimicrobial coated handle	\$176.08
111-SG-TP	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - Saniguard handle - tap primer	\$220.04
111-YG	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - extended bumper on angle stop (for seat with cover)	\$153.20
111-YO	top spud	1.6 GPF water closet flushometer for floor water closets/toilet - bumper on angle stop (for open front seat without cover)	\$147.39
↓ 3.5 GPF exposed toilet/water closet flushometers			
110	top spud	3.5 GPF water closet flushometer for floor water closets/toilet	\$159.50
110-H	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - handle on front of valve	\$158.59
110-HL3	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - 3" oscillating push button on front of valve	\$172.10

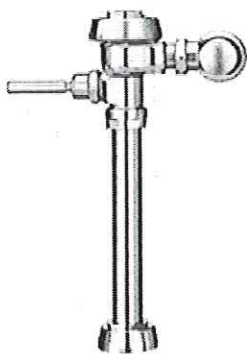
110-HL3-YO	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - 3" oscillating push button on front of valve - bumper on angle stop (for open front seat without cover)	\$173.37
110-SG	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - Saniguard handle	\$174.81
110-YG	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - extended bumper on angle stop (for seat with cover)	\$154.03
110-YO	top spud	3.5 GPF water closet flushometer for floor water closets/toilet - bumper on angle stop (for open front seat without cover)	\$146.76

ADD TO CART - Or - **VIEW CART**

Exposed Water Closet Flushometers - Royal® 113 Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

This water closet flushometer features:



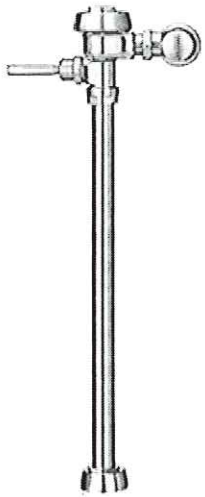
- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 16" tailpiece: [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.28 GPF <i>ultra low water consumption</i> exposed toilet/water closet flushometers			
113-1.28	top spud	1.28 GPF water closet flushometer for floor/wall hung toilets	\$149.70
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
113-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets	\$150.79
↓ 3.5 GPF exposed toilet/water closet flushometers			
113	top spud	3.5 GPF water closet flushometer for floor water closets/toilet	\$150.21

ADD TO CART - Or - **VIEW CART**

Exposed Water Closet Flushometers - Royal® 114 Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls



This water closet flushometer features:

- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 34-3/8" tailpiece: [Click here for detailed dimensions](#)

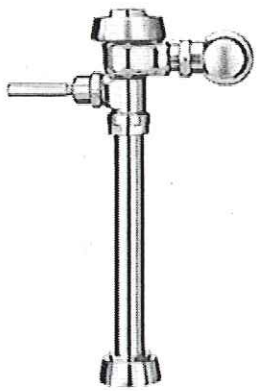
Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
114-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets	\$165.53 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
114	top spud	3.5 GPF water closet flushometer for floor water closets/toilet	\$166.41 <input type="text"/>

ADD TO CART - Or - **VIEW CART**

Exposed Water Closet Flushometers - Royal® 115 Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 24" tailpiece: [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.28 GPF <i>ultra low water consumption</i> exposed toilet/water closet flushometers			
115-1.28	top spud	1.28 GPF water closet flushometer for floor/wall hung toilets	\$158.03 <input type="text"/>
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
115-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets	\$158.70 <input type="text"/>
115-1.6-SG	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - <u>Saniguard</u> antimicrobial coated handle	\$185.93 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
115	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets	\$158.14 <input type="text"/>

115-HL3	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 3" oscillating pus button on front of valve	\$182.67
115-SG	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - Saniguard handle	\$186.35

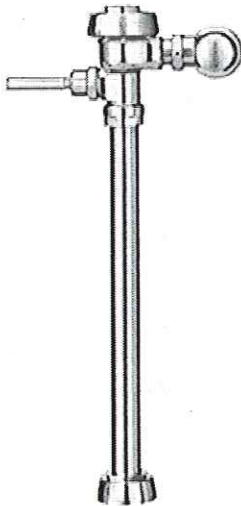
ADD TO CART

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VIEW CART

Exposed Water Closet Flushometers - Royal® 116 Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls



This water closet flushometer features:

- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 27" tailpiece: [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.6 GPF low water consumption exposed toilet/water closet flushometers			
116-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets	\$159.96
↓ 3.5 GPF exposed toilet/water closet flushometers			
116	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets	\$158.61

ADD TO CART

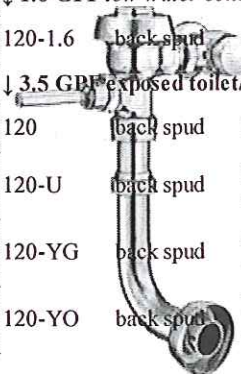
- Or -

VIEW CART

Exposed Water Closet Flushometers - Royal® 120 Series

- Designed for floor mounted 1-1/2" back spud bowls

Model	Type	This water closet flushometer features:	Price & Quantity
↓ 1.6 GPF low water consumption exposed toilet/water closet flushometers			
120-1.6	back spud	1.6 GPF water closet flushometer for floor mounted toilets	\$158.28
↓ 3.5 GPF exposed toilet/water closet flushometers			
120	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$158.55
120-U	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$158.55
120-YG	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$166.20
120-YO	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$159.52



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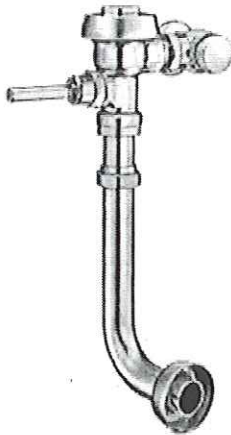
- Or -

VIEW CART

Exposed Water Closet Flushometers - Royal® 121 Series

- Designed for floor mounted 1-1/2" back spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" back spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 16" tailpiece
- [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 3.5 GPF exposed toilet/water closet flushometers			
121	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$163.99

ADD TO CART

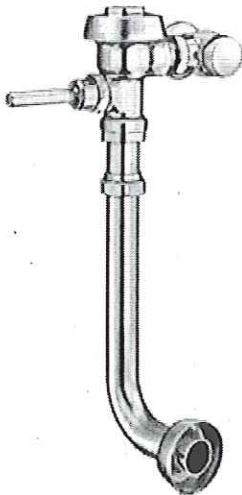
- Or -

VIEW CART

Exposed Water Closet Flushometers - Royal® 122 Series

- Designed for floor mounted 1-1/2" back spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" back spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant
- 24" tailpiece
- [Click here for detailed dimensions](#)

Model	Type	Description	Price & Quantity
↓ 1.6 GPF low water consumption exposed toilet/water closet flushometers			
122-1.6	back spud	1.6 GPF water closet flushometer for floor mounted toilets	\$169.93
↓ 3.5 GPF exposed toilet/water closet flushometers			
122	back spud	3.5 GPF water closet flushometer for floor mounted toilets	\$170.57

ADD TO CART

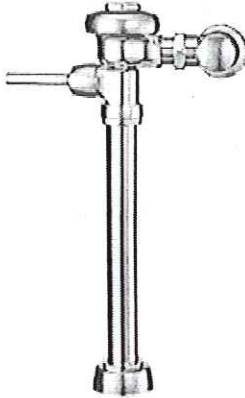
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Exposed Water Closet Flushometers - Royal II® Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Sleek contoured cover, handle socket, and flanges for an aesthetically pleasing look
- One-piece bottom hex coupling nut
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
111-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$186.05 <input type="text"/>
113-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 16" tailpiece - click here for detailed dimensions	\$189.35 <input type="text"/>
115-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$198.74 <input type="text"/>
116-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$200.21 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
110	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$186.29 <input type="text"/>
113	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 16" tailpiece - click here for detailed dimensions	\$190.80 <input type="text"/>
115	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$197.47 <input type="text"/>
116	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$198.16 <input type="text"/>

ADD TO CART

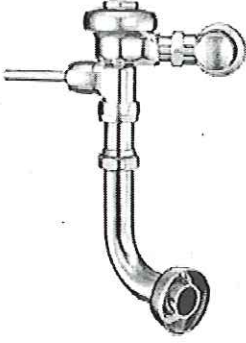
- Or -

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Exposed Water Closet Flushometers - Royal II® Series

- Designed for floor mounted 1-1/2" back spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- Dual filtered diaphragm reduces debris from entering the flushometer and ensures maximum performance in demanding environments
- 1" IPS screwdriver straight stop
- Sleek contoured cover, handle socket, and flanges for an aesthetically pleasing look
- One-piece bottom hex coupling nut
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" back spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
120-1.6	back spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$201.46 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
120	back spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$198.78 <input type="text"/>

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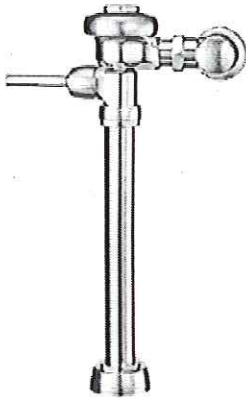
- Or -

VIEW CART

Exposed Water Closet Flushometers - Continental® Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

This water closet flushometer features:



- Permex™ molded rubber diaphragm, handle packing, stop seat, & vacuum breaker provides chloramine corrosion resistance
- 1" IPS screwdriver straight stop
- Continental style cover for an elegant look
- One-piece bottom hex coupling nut
- Chrome plated handle, tailpiece, and body for an attractive look
- Vandal resistant free-spinning stop cap
- Spud coupling & flange for 1-1/2" top spuds
- Sweat solder adapter & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- Non-hold open handle to ensure maximum water conservation
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low water consumption</i> exposed toilet/water closet flushometers			
111	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$177.22 <input type="text"/>
111-YC	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - cast wall flange w/ set screw - 11-1/2" tailpiece - click here for detailed dimensions	\$178.26 <input type="text"/>

115-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$188.51 <input type="text"/>
116-1.6	top spud	1.6 GPF water closet flushometer for floor/wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$191.00 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
110	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$177.13 <input type="text"/>
110-YC-YA	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - cast wall flange w/ set screw - nickel silver handle - 11-1/2" tailpiece - Click here for detailed dimensions	\$193.98 <input type="text"/>
115	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$189.34 <input type="text"/>
116	top spud	3.5 GPF water closet flushometer for floor/wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$190.73 <input type="text"/>

ADD TO CART

- Or -

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Exposed Toilet/Water Closet Flushometers - Regal® Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

These toilet flushometers feature:



Model #110/111 shown

- 1" IPS screwdriver angle stop
- Vacuum breaker flush connection
- Spud coupling, wall and spud flanges for 1-1/2" top spud
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- Optional XL packages available - includes ADA handle, vandal resistant stop cap, and sweat solder adapter kit
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF low consumption exposed toilet/water closet flushometers			
111	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$121.82 <input type="text"/>
111-YB	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$123.99 <input type="text"/>
111-XL	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$126.20 <input type="text"/>
113-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions	\$126.03 <input type="text"/>
113-1.6-YB	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$126.92 <input type="text"/>
113-1.6-XL	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$129.69 <input type="text"/>
115-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$131.06 <input type="text"/>

115-1.6-YB	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$132.85 <input type="checkbox"/>
115-1.6-XL	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$133.90 <input type="checkbox"/>
116-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$133.34 <input type="checkbox"/>
116-1.6-XL	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$136.12 <input type="checkbox"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
110	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$89.58 <input type="checkbox"/>
110-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$124.60 <input type="checkbox"/>
110-XL	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$124.82 <input type="checkbox"/>
113	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions	\$125.56 <input type="checkbox"/>
113-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$127.45 <input type="checkbox"/>
113-XL	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 16" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$129.05 <input type="checkbox"/>
115	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$131.02 <input type="checkbox"/>
115-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$132.92 <input type="checkbox"/>
115-XL	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$133.49 <input type="checkbox"/>
116	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$133.72 <input type="checkbox"/>
116-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$135.25 <input type="checkbox"/>
116-XL	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$137.32 <input type="checkbox"/>

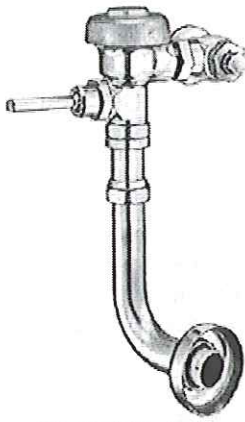
ADD TO CART

- Or -

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Exposed Toilet/Water Closet Flushometers - Regal® Series

- Designed for floor mounted 1-1/2" back spud bowls



Model #120 shown

These toilet flushometers feature:

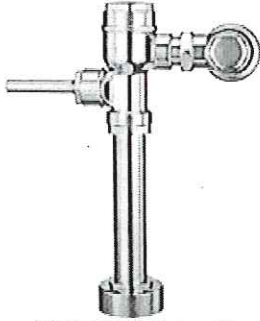
- 1" IPS screwdriver angle stop
- Vacuum breaker flush connection
- Spud coupling, wall and spud flanges for 1-1/2" back spud
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- Optional XL packages available - includes ADA handle, vandal resistant stop cap, and sweat solder adapter kit
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF low consumption exposed toilet/water closet flushometers			
120-1.6-YB	back spud	1.6 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for dimensions - with sweat solder adapter kit & stamped flange	\$135.63 <input type="text"/>
120-1.6-XL	back spud	1.6 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$137.27 <input type="text"/>
121-1.6-YB	back spud	1.6 GPF water closet flushometer for floor mounted toilets - 16" tailpiece - click here for dimensions - with sweat solder adapter kit & stamped flange	\$138.19 <input type="text"/>
↓ 3.5 GPF exposed toilet/water closet flushometers			
120	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for dimensions	\$133.24 <input type="text"/>
120-YB	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for dimensions - with sweat solder adapter kit & stamped flange	\$134.01 <input type="text"/>
120-XL	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$137.87 <input type="text"/>
121-YB	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 16" tailpiece - click here for dimensions - with sweat solder adapter kit & stamped flange	\$138.33 <input type="text"/>
121-XL	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 16" tailpiece - click here for dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$140.17 <input type="text"/>
122-YB	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 24" tailpiece - click here for detailed dimensions - with sweat solder adapter kit & stamped flange	\$142.89 <input type="text"/>
122-XL	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 24" tailpiece - click here for detailed dimensions - with ADA handle, vandal resistant stopcap/set screw, & sweat solder adapter	\$145.66 <input type="text"/>

ADD TO CART - Or - **VIEW CART**

Exposed Toilet/Water Closet Flushometers - Crown® Series
- Designed for floor mounted or wall hung 1-1/2" top spud bowls

These toilet flushometers feature:



Model #111 Crown II

- Optional polished brass cover & handle accent ring
- Fixed volume piston with filtered o-ring bypass
- Non-hold open handle to ensure consistent water saving flushes
- Contoured cover, handle socket, & flanges give it an attractive look
- 1" IPS screwdriver angle stop
- Vandal resistant stop cap
- One-piece bottom hex coupling nut
- Spud coupling, wall and spud flanges for 1-1/2" top spud bowls
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity with polished brass cover/handle accent rings	Price & Quantity without polished brass cover/handle accent rings
↓ 1.28 GPF ultra low consumption exposed toilet/water closet flushometers				
111-1.28	top spud	1.28 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$201.02 <input type="checkbox"/>	\$145.77 <input type="checkbox"/>
↓ 1.6 GPF low consumption exposed toilet/water closet flushometers				
111	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$203.55 <input type="checkbox"/>	\$146.28 <input type="checkbox"/>
115-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$214.52 <input type="checkbox"/>	\$156.91 <input type="checkbox"/>
116-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 27" tailpiece - click here for detailed dimensions	\$217.47 <input type="checkbox"/>	\$158.34 <input type="checkbox"/>

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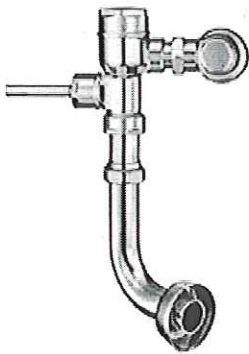
- Or -

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Exposed Toilet/Water Closet Flushometers - Crown II® Series

- Designed for floor mounted 1-1/2" back spud bowls

These toilet flushometers feature:



Model #120 Crown

- Optional polished brass cover & handle accent ring
- Fixed volume piston with filtered o-ring bypass
- Non-hold open handle to ensure consistent water saving flushes
- Contoured cover, handle socket, & flanges give it an attractive look
- 1" IPS screwdriver angle stop
- Vandal resistant stop cap
- One-piece bottom hex coupling nut
- Spud coupling, wall and spud flanges for 1-1/2" back spud bowls
- Sweat solder adapter with cover tube & cast set screw wall flange
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity	Price & Quantity
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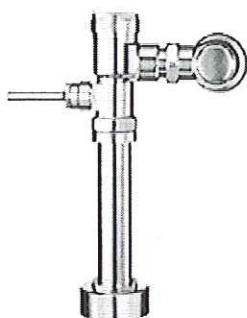
			<u>with polished brass cover/handle accent rings</u>	<u>without polished brass cover/handle accent rings</u>
↓ 1.6 GPF <i>low consumption</i> exposed toilet/water closet flushometers				
120-1.6	back spud	1.6 GPF water closet flushometer for floor toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$215.83	\$159.10

ADD TO CART - Or - **VIEW CART**

Exposed Toilet/Water Closet Flushometers - Gem•2® Series

- Designed for floor mounted or wall hung 1-1/2" top spud bowls

These toilet flushometers feature:



Model #110 shown

- Fixed volume piston with filtered o-ring bypass
- Non-hold open handle to ensure consistent water saving flushes
- Contoured cover, handle socket, & flanges give it an attractive look
- 1" IPS screwdriver angle stop
- Vandal resistant stop cap
- One-piece bottom hex coupling nut
- Spud coupling, wall and spud flanges for 1-1/2" top spud bowls
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF <i>low consumption</i> exposed toilet/water closet flushometers			
111	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$140.11
111-YB	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$145.40
111-YB-YG	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - extended bumper on angle stop (for seat with cover) - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$146.89
111-YB-YC	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - cast wall flange with set screw - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$145.95
111-YB-YC-YO	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - cast wall flange with set screw - bumper on angle stop (for open front seat without cover) - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$146.92
115-1.6	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$150.72
115-1.6-XYV	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - less vacuum breaker - 24" tailpiece - click here for detailed dimensions	\$145.06
115-1.6-YB	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - sweat solder adapter kit & stamped flange - 24" tailpiece - click here for detailed dimensions	\$157.64

115-1.6-YB-0	top spud	1.6 GPF water closet flushometer for floor or wall hung toilets - 2" offset vacuum breaker - sweat solder adapter kit & stamped flange - 24" tailpiece - click here for detailed dimensions	\$181.47
↓ 3.5 GPF exposed toilet/water closet flushometers			
110	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$139.84
110-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - sweat solder adapter & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$146.19
110-YB-YG	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - extended bumper on angle stop (for seat with cover) - sweat solder adapter & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$147.00
110-YB-YC-YO	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - cast wall flange with set screw - bumper on angle stop (for open front seat without cover) - sweat solder adapter & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$146.54
115	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - 24" tailpiece - click here for detailed dimensions	\$150.44
115-YB	top spud	3.5 GPF water closet flushometer for floor or wall hung toilets - sweat solder adapter kit & stamped flange - 24" tailpiece - click here for detailed dimensions	\$156.75

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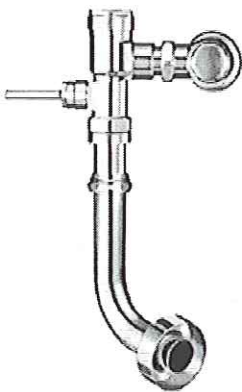
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Exposed Toilet/Water Closet Flushometers - Gem•2® Series

- Designed for floor mounted 1-1/2" back spud bowls

These toilet flushometers feature:



Model #120 shown

- Fixed volume piston with filtered o-ring bypass
- Non-hold open handle to ensure consistent water saving flushes
- Contoured cover, handle socket, & flanges give it an attractive look
- 1" IPS screwdriver angle stop
- Vandal resistant stop cap
- One-piece bottom hex coupling nut
- Spud coupling, wall and spud flanges for 1-1/2" back spud bowls
- High copper, low zinc brass casting for dezincification resistance
- No external volume adjustment to ensure maximum water conservation
- Low flow models available help keep water costs down
- Stylish chrome finish
- Chloramine resistant handle packing, stop seat, & vacuum breaker
- ASSE 1037, ANSI/ASME 112.19.6, & military spec V-29193 compliant

Model	Type	Description	Price & Quantity
↓ 1.6 GPF low consumption exposed toilet/water closet flushometers			
120-1.6	back spud	1.6 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$153.26
120-1.6-YB	back spud	1.6 GPF water closet flushometer for floor mounted toilets - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$158.63
120-1.6-YB-YG	back spud	1.6 GPF water closet flushometer for floor mounted toilets - extended bumper on angle stop (for seat with cover) - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$167.32

↓ 3.5 GPF exposed toilet/water closet flushometers			
120	back spud	3.5 GPF water closet flushometer for floor mounted toilets - 11-1/2" tailpiece - click here for detailed dimensions	\$152.94 <input type="text"/>
120-YB	back spud	3.5 GPF water closet flushometer for floor mounted toilets - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$158.91 <input type="text"/>
120-YB-YG	back spud	3.5 GPF water closet flushometer for floor mounted toilets - extended bumper on angle stop (for seat with cover) - sweat solder adapter kit & stamped flange - 11-1/2" tailpiece - click here for detailed dimensions	\$167.81 <input type="text"/>

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Frequently Asked Questions

Q. "What is Permex™?"

A. Permex is a patented rubber compound that is formulated to withstand the deteriorating effects of ammonia and chloramine which are often used in water treatment facilities and cleaners.

Q. "What is Chloramine?"

A. Chloramine is commonly used in low concentrations as a disinfectant in municipal water systems as an alternative to chlorination.

Q. "What is a Saniguard antimicrobial coated handle?"

A. Antimicrobial coatings protect against a broad array of potentially harmful bacteria, fungi, yeast, mold, and mildew. The antimicrobial coating can withstand salt spray, water soak, high humidity, corrosion, and still protect effectively even with light scratches and abrasions.

We hope that we have helped you on this page with manually operated flushometers, and thank you for helping to make PlumbingSupply.com the most famous Internet plumbing supplier.

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*"Age imprints more wrinkles in the mind than it does on the face."
- Michel de Montaigne*

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INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

City of Arcata
736 F Street
Arcata, Ca 95521

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

Billing Period: July 1 - 31, 2009

Meter Readings:

Ending 715,689,000
Beginning 651,912,000

63,777,000

Simpson 0
Flakeboard 62,832

Total Usage 63,839,832 gallons

Date: 31-Jul-09

Terms: Net 15 days

=====

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$7,038.00
Price Factor 4 - Additions to Reserves	\$1,625.28

Total Charges This Invoice: \$57,314.27

* Less PF-2 Credit from FY 2008-09: \$0.00

Plus Charge due to McKinleyville CSD meter adjustment \$ 2,948.03
Credited over 6 months (Final charge)

Net Charges Due: \$60,262.30
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

City of Arcata
736 F Street
Arcata, Ca 95521

Billing Period: August 1 - 31, 2009

Meter Readings:

Ending 780,022,000
Beginning 715,689,000

64,333,000

Simpson 0
Flakeboard 32,912

Total Usage 64,365,912 gallons

Date: 31-Aug-09

Terms: Net 15 days

=====
Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$7,654.62
Price Factor 4 - Additions to Reserves	\$ 1,625.28

Total Charges This Invoice: \$57,930.89

* Less PF-2 Credit from FY 2008-09: \$0.00

Net Charges Due:

=====
\$57,930.89
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

City of Arcata
736 F Street
Arcata, Ca 95521

Billing Period: September 1 - 30, 2009

Meter Readings:

Ending 842,199,000

Beginning 780,022,000

62,177,000

Simpson 0

Flakeboard 46,376

Total Usage 62,223,376 gallons

Date: 30-Sep-09

Terms: Net 15 days

=====

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service \$9,844.61

Price Factor 2 - O&M/Capital Cost \$38,806.39

Price Factor 3 - Electrical Power for Pumping **\$8,967.15**

Price Factor 4 - Additions to Reserves \$ 1,625.28

Total Charges This Invoice: \$59,243.42

* Less PF-2 Credit from FY 2008-09: \$0.00

Net Charges Due:

=====
\$59,243.42
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

City of Arcata
736 F Street
Arcata, Ca 95521

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

Billing Period: Oct 1 - 30, 2009

Meter Readings:

Ending	896,132,000
Beginning	842,199,000

	53,933,000
Simpson	0
Flakeboard	37,400

Total Usage 53,970,400 gallons

Date: 30-Oct-09

Terms: Net 15 days

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$8,494.89
Price Factor 4 - Additions to Reserves	\$ 1,625.28
Total Charges This Invoice:	<u>\$58,771.16</u>
* Less PF-2 Credit from FY 2008-09:	\$0.00

Net Charges Due:

=====
\$58,771.16
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

City of Arcata
736 F Street
Arcata, Ca 95521

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

Billing Period: October 31 - November 30, 2009

Meter Readings:

Ending	942,852,000
Beginning	896,132,000

	46,720,000
Simpson	0
Flakeboard	40,392
Total Usage	<u>46,760,392</u> gallons

Date: 30-Nov-09

Terms: Net 15 days

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$8,517.86
Price Factor 4 - Additions to Reserves	\$ 1,625.28
Total Charges This Invoice:	<u>\$58,794.13</u>
* Less PF-2 Credit from FY 2008-09:	\$0.00

Net Charges Due:

=====
\$58,794.13
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

City of Arcata
736 F Street
Arcata, Ca 95521

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

Billing Period: December 1 - 31, 2009

Meter Readings:

Ending 987,062,000
Beginning 942,852,000

44,210,000
Simpson 0
Flakeboard 17,952

Total Usage 44,227,952 gallons

Date: 31-Dec-09

Terms: Net 15 days

=====

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$5,131.60
Price Factor 4 - Additions to Reserves	\$ 1,625.28
Total Charges This Invoice:	<u>\$55,407.87</u>
* Less PF-2 Credit from FY 2008-09:	\$0.00

Net Charges Due:

=====

\$55,407.87

=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

HUMBOLDT BAY MUNICIPAL WATER DISTRICT

City of Arcata
736 F Street
Arcata, Ca 95521

828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

Billing Period: January 1 - 29, 2010

Meter Readings:

Ending 1,027,654,000
Beginning 987,062,000

40,592,000
Simpson 0
Flakeboard 37,400

Total Usage 40,629,400 gallons

Date: 29-Jan-10

Terms: Net 15 days

=====

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service \$9,844.61
Price Factor 2 - O&M/Capital Cost \$38,806.39
Price Factor 3 - Electrical Power for Pumping \$5,037.13
Price Factor 4 - Additions to Reserves \$1,625.28

Total Charges This Invoice: \$55,313.40

* Less PF-2 Credit from FY 2008-09: \$0.00

Net Charges Due: \$55,313.40

=====
\$55,313.40
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

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828 7th Street — P. O. Box 95
EUREKA, CALIFORNIA 95502
(707) 443-5018

City of Arcata
736 F Street
Arcata, Ca 95521

Billing Period: January 30 - February 26, 2010

Meter Readings:

Ending	69,733,000
Beginning	27,654,000

	42,079,000
Simpson	0
Flakeboard	33,660

Total Usage 42,112,660 gallons

Date: 26-Feb-10

Terms: Net 15 days

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$5,014.06
Price Factor 4 - Additions to Reserves	\$1,625.28

Total Charges This Invoice: \$55,290.33

* Less PF-2 Credit from FY 2008-09: \$0.00

Net Charges Due:

=====
\$55,290.33
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

INVOICE

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City of Arcata
736 F Street
Arcata, Ca 95521

Billing Period: February 27 - March 31, 2010

Meter Readings:

Ending	118,153,000
Beginning	69,733,000

	48,420,000
Simpson	0
Flakeboard	20,196
Total Usage	<u>48,440,196</u> gallons

Date: 31-Mar-10

Terms: Net 15 days

=====
Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$4,898.29
Price Factor 4 - Additions to Reserves	\$1,625.28
Total Charges This Invoice:	<u>\$55,174.56</u>
* Less PF-2 Credit from FY 2008-09:	\$0.00

Net Charges Due:

=====
\$55,174.56
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

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City of Arcata
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Arcata, Ca 95521

Billing Period: May 1 - 28, 2010

Meter Readings:

Ending	205,798,000
Beginning	163,740,000

	42,058,000
Simpson	0
Flakeboard	26,928
Total Usage	<u>42,084,928</u> gallons

Date: 28-May-10

Terms: Net 15 days

=====
Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service	\$9,844.61
Price Factor 2 - O&M/Capital Cost	\$38,806.39
Price Factor 3 - Electrical Power for Pumping	\$5,171.60
Price Factor 4 - Additions to Reserves	\$1,625.28
Total Charges This Invoice:	<u>\$55,447.87</u>
* Less PF-2 Credit from FY 2008-09:	\$0.00

Net Charges Due:

=====
\$55,447.87
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.

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City of Arcata
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Arcata, Ca 95521

Billing Period: May 29 - June 30, 2010

Meter Readings:

Ending 251,777,000

Beginning 205,798,000

45,979,000

Simpson 0

Flakeboard 41,140

Total Usage 46,020,140 gallons

Date: 30-Jun-10

Terms: Net 15 days

=====

Ordinance 16 Price Factor Charges:

Price Factor 1 - DWFP Debt Service \$9,844.61

Price Factor 2 - O&M/Capital Cost \$38,806.39

Price Factor 3 - Electrical Power for Pumping \$5,219.08

Price Factor 4 - Additions to Reserves \$1,625.28

Total Charges This Invoice: \$55,495.35

* Less PF-2 Credit from FY 2008-09: \$0.00

Net Charges Due:

=====
\$55,495.35
=====

* Note: PF-2 credits from FY 2008-09 were used to establish the Municipal Supplemental Reserve Account (MSRA) as provided in Contract for Supply of Municipal Water, Amendment #3. The MSRA consists solely of excess Price Factor 2 charges accumulated during Fiscal Year 08/09 that would otherwise be subject of refund credits in Fiscal Year 09/10 under Paragraph 7.2.4. of Ordinance 16.