Water group proposals (in no partcular order)

1. Tap into existing programs to the max extent possible
2. Use water bill to encourage conservation
3. Enable use of greywater for non-potable purposes
4. Build up city water conservation team and midset
5. Make Mountain View Beautiful: Incent water-wise landscaping
6. Pavers not pavement: Incent permeable surfaces for driveways (to start)
7. Strengthen ordinance with incentives, hotline and conservation advocates
8. Save the Rain: Incent rainwater capture and storage
9. Close the feedback loop: Install CIMIS weather station and other feedback mechanisms

Marn-Yee Lee
Steve Bishop
Elizabeth Sarmiento

Recommendation #1

Title: Tap into existing conservation programs to the max extent possible.

Working Group: Water

Statement of Issue

According to CA.Gov, climate change is expected to cause increasing freshwater shortage.[1] The City of Mountain View is dependent on the Hetch Hetchy Reservoir, San Francisco and Santa Clara water districts for 99% of its water supply. Furthermore, this water is distributed over aging pipeline (150 years old). As result, water will become increasingly more expensive. Unfortunately the city does not have much control over the supply side.

However, it does have control over the demand side. According to SCVWD, water conservation is the most cost and energy-effective way of reducing water consumption.[2] In addition, other cities have shown that efficiency in water usage is possible while retaining or even increasing service level. For example, the Metropolitan Water District of Southern California decreased water use by 16% from1990 to 2003, despite a 14% increase in service area population.[3]

A number of organizations currently fund water conservation incentive programs for city residents and businesses, including BAWSCA and SCVWD – at no cost to the city. For example, SCVWD, currently the city's main water conservation partner, provides free audit, free outreach materials, and free irrigation technical assistance to both residents and businesses. Although the city lists these programs on its website and in its annual Water Quality report, during this Working Group tenure, we found that a significant number of residents who are concerned about water conservation and sustainability did not even realize that these incentives exist. This anecdotal evidence is especially concerning.

Today in Mountain View, we have an 80% of one staff person to coordinate water conservation efforts (i.e. Tom Ford, Water Conservation Technician). In addition, all five of our conservation-oriented water ordinances are only enforced on complaint-basis, unless in severe water shortage scenarios.

Recommendation

Conservation does not have to mean sacrifice – water use efficiency means using less resources to achieve the same goals.

We recommend that the city taps into existing conservation programs to the max extent possible. This provides a significant opportunity for the city to implement water conservation to the maximum extent possible without incurring much additional cost.

This is a short term (1-12 mos.) solution. Refer to the appendix for the URL to the sample of incentive programs that are available to city residents[4]. Also, refer to the appendix for the SCVWD Baseline Study: Survey of Commercial, Inst, Industrial Users that shows what priorities such users give to conservation preferences[5].

Conservation outreach should focus on the city's biggest water usage area, that is, landscaping. Lndscaping consumes 60% of our water. In addition to the website and Water Quality report, the

city should actively use the media such as The Voice, The View, KMTV, etc to promote and signup residents for these county-organized programs. Also, please refer to the Water Bill Improvement proposal, whereby we propose that water conservation tips be printed on white spaces in the bill. Lastly, we propose the concept of a network of Neighborhood Conservation Advocate. These volunteer advocates are local neighborhood experts with their own personal network. They should be trained on basic water conservation tips, water usage ordinances, and conservation incentives available to residents. Through their personal network, they can spread the word and encourage their neighbors to take advantage of water efficiency programs/technology, in addition to being the city's eyes and ears on water conservation opportunities within their neighborhood.

Environmental Impact

Mountain View is located in a semi-arid climate region. Water is a scarce resource. Regardless of whether we are in a drought emergency, water conservation reduces the demand side of the water equation – the only lever our city has to manage its freshwater budget.

Water conservation will reduce our city's GHG footprint, since every gallon of cold water takes 7.1 watt-hour of electricity to process (this does not include water conveyance from the Sierras).

If we start now with making water conservation a priority throughout Mountain View, we are effectively building a bigger cushion to deal with water shortage scenarios.

Fiscal Impact

This is the most low hanging fruit in our suite of proposals for the Water WG, as it costs the city nothing except for coordination effort, since regional water agencies have numerous programs in place to incent water conservation. It will require the City Water Conservation Coordinator to modify and extent its modus operandi – however, we estimate this is mostly a shift in the nature of the job rather than additional manpower. Nevertheless, it would be ideal if the City Water Conservation Coordinator can be increased to at least 100% of one person's time.

Water conservation allows us to postpone further into the future our need for more expensive freshwater sources, such as desalination, reverse osmosis, or graywater processing. It allows the city to avoid having to make drastic rate increases due to rising water processing costs.

Our Neighborhood Conservation Advocates will serve as additional volunteer forces to augment the city's conservation team. While additional staff time will be needed to setup and coordinate the program, the multiplier effect of havaing a network of volunteers is akin to hiring several full-time staff to achieve the same goal.

Obstacles

For local residents and businesses to adopt water conservation mindset, it requires some upfront time investment, in addition to cost investment where changes are not fully covered by incentive programs. Our "Incentive Program Cost Matching" proposal provides a way to work around this obstacle.

Partnerships

Newly formed Neighborhood Conservation Advocate neighborhood network.

Santa Clara Valley Water District (SCVWD): http://www.valleywater.org/

Bay Area Water Supply and Conservation Agency (BAWSCA): http://www.bawsca.org/

Appendix

Citations

1. California Climate Change Portal, FAQ: What Are The Potential Impacts For California's Water? http://www.climatechange.ca.gov/publications/faqs.html

2. From Watts to Water, June 2007 (Santa Clara Valley Water District)

3. Improving Water Conservation: Opportunities for San Francisco Bay Area Water Supply Agencies, June 2007 (Sierra Club Loma Prieta Chapter's Water Sustainability Campaign report)

4. List of water conservation programs available to Mountain View Residents. http://www.ci.mtnview.ca.us/news/displaynews.asp?NewsID=154&TargetID=1#10%%20reduction

5. SCVWD Baseline Study, Survey of Commercial, Inst, Industrial Users, Feb 2008

Contact Information

Please contact the water agencies listed in Partnership section for more information on existing conservation programs.

Author: Marn-Yee Lee

Recommendation #2

Title: Use the water bill to encourage conservation.

Working Group: Water

Statement of Issue

The Mountain View water bill today is included in the utility bill issued by the Finance Department every two months. In its current configuration, conservation opportunities are missed because water usage is billed at a macro level (per "unit" of 748 gallons), only includes current and past period usage, does not make tiered water rate visible, and is billed every other months. In addition, the water rate table is only 3 tier.

Research at University of Delaware showed that, "beyond making monthly payment, customers most often use their utility bills to check for unusual consumption or to evaluate the effect of conservation measures."[1]

Recommendation

Leverage the existing utility bill to incent water conservation behaviors for both residential and commercial users. For illustration, please refer to the Appendix for sample bills from other cities.

The following recommendations are short-term (1-12 mos.). These low-hanging fruits are identified as such because they require only a one-time redesign of the billing template.

1. **Include a rate table** in the bill itself, by showing usage and cost at each billing tier. This encourages users to reduce demand at higher rate tiers.

2. **Compare** user's current month usage to user's **past year historical usage**, in chart format. The chart format is easier to read and has a more compact design than table. BetterBills.org believes that "comparison taps into people's competitive desire to do better. Comparison may also help people recognize abnormal usage due to water leaks or energy efficiency problems."[1]

3. **Compare** user's current and past year historical actual **to a "water budget",** in chart format. "Water budget" is the recommended water use per account type, or a method for allocating water among competing uses. The city could work with m the Santa Clara Water Valley District to identify and develop such a measure. Alternatively, the city could work with EPA Energy Star Billing program.[7]

4. Alternatively, compare user's current and past year historical actual to average usage in the city (residential or commercial depending on account type). Studies in Norway and Finland found that when customers received neighborhood comparisons, together with frequent electric bills and meter readings, they reduced their energy use by 5%-10%.[7]

With both #3 and #4, we think that that there is a potential for users who are below average to increase their usage to the average level. To encourage such water-wise users to stay below

average, the chart should include positive reinforcement for good behaviors (e.g. a friendly smiley face for below-average user, a "sad" face for above-average user).

5. Change the terminology "Sewer" to "Wastewater/Sewer" to educate users that this category includes all indoor wastewater generated.

6. Include water conservation tips on the bill. There are three approaches:

a) According to city staff, electronic version of the bill will be available in 2009. The online bill should prominently easy-to-read conservation tips, in addition to links to conservation incentives.
b) Print water conservation tip-of-the-month on the bill. E.g. remind users in the Fall to turn of their sprinklers once the first winter rain begins. This approach utilizes white space on the existing paper bill.
c) Include paper inserts of existing SCVWD conservation outreach brochure. This could possibly be planned so that total mailing weight does not exceed the 1oz stamp rate to manage cost.

The following recommendations are medium-term (1-3 yrs.), because it requires putting the procedure and system in place to collect emissions information related to water and sewage processing.

7. Include total emissions generated due to water processing as it relates to the total amount of water used. Our preliminary calculation shows that cold water requires 7 wh/gallon to process in MOC and the Palo Alto Regional Water Quality plant. This number should be verified by professionals and updated once a year.

8. The city should also revise its 3-tier billing rate to 5-tier to increase water conservation incentives for large users.

Environmental Impact

1) Water conservation will reduce GHG emissions, since for every gallon of unheated water processed, the city spends 7.1 watt-hour of electrical energy. Energy usage will further increase for heated water. Encouraging conservation through billing will reduce both cold and hot water use.
2) Every drop of water saved reduces the demand side on the city's backup water supply. This will increase our city's resiliency against future water shortage events.

Fiscal Impact

We estimate that the low-hanging fruits proposals will require 1-2 months of a Finance Department staff time, primarily to redesign and implement the changes with the city's water bill provider. The proposed changes could be staggered. Items #1, #5, and #6c could be implemented immediately. Items #2, #3, #4, and #6b should be studied together as they involve more system changes. Item #6a should be included in the project of moving to electronic billing.

Additional computation logic may need to be programmed for showing historical usage and water budget graph. However, once redesigned, there should be little additional overhead needed to maintain the changes, except for the "conservation tip of the month". We believe that such an investment is worth the conservation impact it will have on the city water usage.

Obstacles

We encourage City Council and the City Manager to require that the Finance Dept, which manages the bill, to adopt a water conservation mindset since the billing department holds a significant and cost-effective lever to encourage responsible water usage in the city.

Partnerships

- Vendor that creates the template for the city's utility bill.
- Mountain View Finance Department
- Mountain View Municipal Operations, which reads the meter, manages city's water conservation efforts, and meters the electrical components that processes and distributes water.
- Palo Alto Regional Water Quality plant, which meters the electrical components that processes our wastewater.

Appendix

Citations

1. "Can Better Utility Bills Save Money?", Kevin Bengtson, Home Energy Magazine Online 1997
http://www.homeenergy.org/archive/hem.dis.anl.gov/eehem/97/970510.html

2. Better Bills: Promoting Conservation Through Bill Design
http://www.betterbills.org/

3. Sample Boulder, Colorado water bill:
http://one.valeski.org/2007/06/efficient-water-use.html

4. Sample Kauai, Hawaii water bill:
http://www.kauaiwater.org/waterbill.jpg

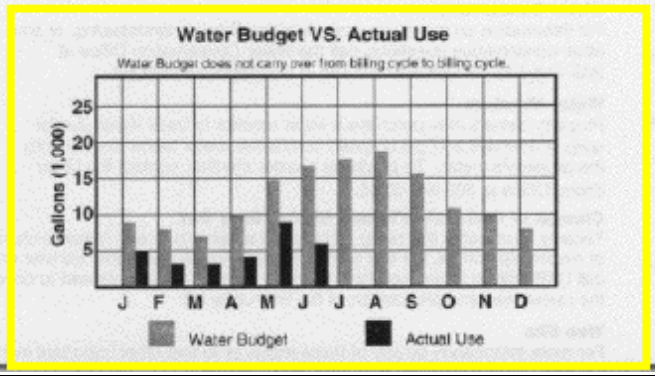
5. Mountain View rate table
http://www.mountainview.gov/city_hall/admin_services/utility_billing/utility.asp

6. NRDC Water Glossary
http://www.nrdc.org/water/conservation/draw/glossary.asp

7. EPA Energy Star Billing
http://www.acca-ncc.org/enrgystr.htm

Sample Water Bill from Boulder, CO

Water	Rate/ 1,000 gal	Used 1,000 gal	Cost
Service Charge			8.55
0 - 11,000 gal	1.88	6	11.28
11,001 - 17,000 gal			
17,001 - 26,000 gal			
26,001 - 34,000 gal			
34,001 +			
Total Water		6	$19.83
Wastewater Service Charge			0.74
Wastewater Quantity		4	14.00
Stormwater/Flood Management			6.75
Total Current Charges			**$41.32**
Please Pay This Amount			**$41.32**



Account Summary

(1,000 Gallons)
Current use: 6
udget this bill cycle: 17

Use last year: 15

t next bill cycle: 18

Avg. monthly winter usage (Dec.-Mar.): 4

Please Note:

PLEASE DO NOT PAY
TOTAL AMOUNT DUE WILL BE TRANSFERRED AUTOMATICALLY ON OR AFTER 07/02/07

Check For Leaks

Leaks or poorly maintained systems can cause very high water bills. Check for leaks especially in your irrigation systems where significant amounts of water can be lost. It will save you money! For more water saving tips go to boulderwater.net or call Water Conservation at 303 413-7407.

** THANK YOU FOR YOUR PROMPT PAYMENT **

Contact Information

Author: Marn-Yee Lee, marn.sustain@gmail.com

Title: Enable use of graywater for non-potable purposes

Working Group: Water

Statement of Issue

Greywater is any wastewater that doesn't contain human or organic waste. In practice, it is the water that comes from your tubs, showers, non-kitchen sinks and laundry machine. It does not include toilets, dishwasher and kitchen sinks waste water.

Greywater reuse is one strategy to reduce water demand. Greywater reuse can cut a family's water bill by one third; reduce septic tank groundwater pollution; protect aquifers; and direct nutrients to the soil where they become plant nutrients rather than water pollutants.

California's greywater code is prohibitively restrictive and complicated and thus most residents are unable to obtain permitted greywater systems. We believe that ultimately the Califiornia greywater code needs to be changed to encourage and support greywater use. In the meantime while policy makers work on redesigning California's greywater code we believe that there could be experimental systems that follow a "friendly" interpretation of the CA gray water code, or are modeled after Arizona's greywater code[1]. These systems can address the immediate need for reduction of water use, and be used to test and monitor for future policy change.

Recommendation

We strongly encourage the city to support a **residential** greywater demonstration project and devote some staff time to investigate the feasibility of such a project.

Short Term: To design and install simple, low tech, permitted greywater systems that can be easily replicated by other residents. The city and health department can analyze these systems and if approved allow other residents to model their systems after the permitted one, thus greatly decreasing cost, while maintaining the level of design needed to meet health and safety requirements.

Medium Term: Once a few systems have been tested, these can be used as prototypes and other residents can follow the guidelines of the system for themselves. If they follow the guidelines their system should be considered "permitted" with out them having to go through the whole process. Greywater permitting code should be revised to make the process more streamlined and quicker. This would expedite the time and money involved for residents to install such systems.

Long term: All houses plumbed for greywater stub-outs. City or water district offers rebates for residents who install greywater systems.

For **commercial users** with large landscaping areas, we strongly encourage the city to maximize the use of recycled water that will be made available via the purple pie project slated to complete by the end of 2008.

[1] Layperson interpretation of the Arizona greywater code: http://watercasa.org/graywaterguidelines.php

Environmental Impact

Typically water is used half inside the house and half outside. Greywater can reduce from 15-50% of outdoor irrigation need. This affects the health of rivers, health of receiving waters for sewer plant effluent, as well as health of residents. When residents begin to use greywater they typically analyze the products and cleaners they are using and chose more environmentally friendly products since it will end up in their own back yards.

Greywater reuse will also lower green house gas emissions as lower water use lowers water treatment plant energy uses both for drinking water and sewer treatment.

Fiscal Impact

Costs to homeowners. Cost for education and creating simple brochures/pamphlets for people.

Savings: Water- savings to homeowners. Savings to water district. Saving in cost for sewer treatment.

Obstacles

The major obstacle is the rigid state plumbing code. This obstacle could be greatly diminished if a city was enthusiastic about supporting greywater reuse, the planning department was educated on a safe and effective code, and then the code was interpreted in a friendly, flexible, fashion.

In addition, other common barriers to graywater systems are:

1. Confusion within city staff as to whether such systems are even allowed by code
2. Concerns about health hazard
3. Lengthy permitting process is a major deterrent for homeowners
4. The CA plumbing code drives up the cost of systems and makes it cost prohibitive for most home owners.
5. Education of inspectors and building department: Most people with in the establishment are unfamiliar with greywater systems. With proper education they could help residents build safe and effective systems that are not costly.
6. Public Education: Because of the code issues with greywater, and the vast amounts of misinformation, many people lack education on how to safely and efficiently reuse their greywater.
7. Differentiation and separation of graywater from regular water pipes
8. Concern about over fertilization with nitrate residue from soap

Partnerships

1. Graywater Guerrilas. greywaterguerrillas.com
2. Water District
3. Building permitting department
4. Health Department
5. Greywater Alliance (a group of East Bay greywater groups)

Resources:

1. Introduction to Graywater
http://www.lowimpactliving.com/blog/2007/11/13/graywater-recycling-systems/

2. For specific code recommendations see Art Ludwig's greywater policy center or his testimony to New Mexico before they changed their code. Oasis Design consulting services to help define ordinances
http://oasisdesign.net/greywater/law/index.htm
http://oasisdesign.net/greywater/law/improve/nmtestimony.htm

Web Sites

- greywater.net
- watercasa.org (Arizona's water conservation group)
- http://www.friendsoftheriver.org/

Contact Information

Author: Laura Allen, laura@greywaterguerrillas.com

Recommendation #4

Title: Build up city staff water conservation team and mindset

Working Group: Water

Statement of Issue

Currently the city has an 80% staff with the title of "Water Conservation Coordinator". This staff member has a water technician background and is in charge of outreach and ordinance enforcement. We believe water conservation should be viewed strategically, not just technically or tactically within the city organization structure.

Recommendation

We recommend that the city has at least two full-time water conservation staff who are trained in community outreach approaches, and water conservation science. We also recommend that at least one of these staff member possess strategic management skills so as to coordinate a long-term strategic plan for water conservation.

During our tenure, we encountered both first hand and anecdotal evidence of resistance towards water conservation efforts in certain city departments. We would like City Council and the City Manager to require that all city departments adopt the water conservation mindset. For example, landscaping department should use drought-tolerant and native plants. The water billing department should investigate how they can leverage their function to encourage water conservation. By leveraging the innovation of individual employees and departments, we believe that innovative solutions to water conservation and water consumption will arise. We urge the City Council to not underestimate the contribution that city staff can have on influencing over the direction of water usage in the city. The successful implementation of many of our proposals will depend on how much city staff believes in the importance of water conservation.

This is a short term (1-12 mos.) to medium term (1-3 yrs.) solution.

Environmental Impact

The environmental impact of adopting a water conservation mindset and increasing water conservation staffing is very similar to that of increase water conservation. Please refer to our "Adopt Water Conservation Measures" proposal for details.

Fiscal Impact

Between $50K-$120K for each additional staff member.

Requiring water conservation mindset will cost the city nothing. In fact, it may even result in cost savings and GHG inventory reduction, as innovative approaches are percolated up the ranks of city employees, and implemented.

Obstacles

We are well aware of budget constraints making creating additional staff position a challenge.

To change the mindset means changing status quo. Cultural change is frequently resisted, unless there is mandate or leadership by example from top down.

Senior managers must first adopt a water conservation mindset in order to empower lower level employees to do the same.

Partnerships

City Council along with City Manager and senior management of key departments.

Appendix

Contact Information

Author: Marn-Yee Lee

Recommendation #5

Title: Make Mountain View Beautiful: Incent Water Wise Landscaping

Working Group: Water Group

Statement of Issue

60% of the residential water consumed in Mountain View is used to irrigate yards (2.74 *billion* gallons annually). Many yards feature grass lawns and non-native plants for aesthetically purposes, but negatively impact the environment in several ways:

1) Lawns and some non-native plants are water intensive, particularly in the summer months. The average lawn uses up to 10,000 gallons of water over a summer.
2) Lawns are not particularly good at absorbing precipitation during rainy months, sending 20% (twice as much water as natural ground cover) of precipitation that would otherwise recharge local water tables out to the bay.
3) Lawns are a monoculture and do not support a biologically diverse ecosystem

Lawns are a cultural norm. However, residents can achieve the same aesthetic standards with any number of native plants this area has to offer. Because many residents are unfamiliar with native species, they are not widely adopted in landscaping.

Recommendation

We propose a "Make Mountain View Beautiful" program to enlist residents in water-wise landscaping. This proposal focuses on making native-plants a desirable part of any yard or garden. The program would consist of the following components:

a) Lead by example: Get residents familiar with California natives and drought tolerant landscaping by establishing native-plant demonstration gardens throughout the city.

b) Educate: Provide information for residents and landscaping professionals online, over a hotline and in booklets that might be handed out at public events such as local farmers markets, etc. A landscaping book of tips may include information on plant profiles, starter tips, and drip irrigation strategies. Also coordinate water-wise landscaping continuing education courses with other groups.

c) Incent: Provide incentives for residents, HOAs and small businesses to replace lawns with drought-tolerant natives. Leverage existing incentives from the Santa Clara Valley Water District that encourage lawn replacement by increasing outreach on the program and matching the incentives already provided by the county to make water-wise landscaping conversion more cost-effective.

Incent landscapers and gardeners with "Make Mountain View Beautiful" certification programs. Certification may enable them to increase business and offer new expert services.

d) Reward: Celebrate the most successful yard transformations with public recognition and a place in a "Make Mountain View Beautiful" home garden tours.

This is a short term (1-12 mos.) to medium term (1-3 yrs.) solution.

Environmental Impact

"Make Mountain View Beautiful" could transform our city into a water-wise, yet aesthetically attractive destination. More specifically, it could positively impact:

Water use - Potential to save 2.74 billion gallons of water used annually from conservation on residential irrigation.
Water table - For every square foot of lawn converted to drought tolerant plant landscaping, twice as much rain water is returned to the water table and is not pumped out to the bay,
Carbon emissions - Potential to prevent 7515 tons of CO2 emitted annually to irrigate yards[2].
Biodiversity - Less monoculture and more diverse landscapes to support a wide range of wildlife.

Fiscal Impact

Residents could save up to $7.1 million annually (an average of $101.30 per resident).[3]
In energy costs alone, the city has the potential to save $70,400.00 annually.[4]
The city may also save additional money in water and energy costs by converting it's own facilities to lawn-free California native gardens.
Some savings may also be seen in reducing the amount waste water needed to be pumped to the bay.

Obstacles

Water wise landscaping doesn't have to mean cactus and rocks. Many California native plants are lush and beautiful. With educational outreach, we think that the city can change this perception by promoting such gardens by example, through images, and how to kits.

Converting to water-wise landscaping requires more involvement from the homeowner/businesses or similarly knowledgeable gardeners. There is a steep learning curve towards implementing native gardens compared to maintaining a lawn. It is imperative to provide training programs to bridge the gap.

Partnerships

- California Native Plant Society, CNPS: http://www.cnps.org/
- Santa Clara Valley Chapter: www.gardeningwithnatives.com/

Synergy

Please refer to the Biodiversity and Suburban Forest Working Group proposal #1 to learn more about why biodiversity is a key component of sustainability.

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[2] Potential Carbon emissions savings = (2.74B gal * .012 kwh per gal * .459 lbs CO2 per kwh) / 2000 lbs per ton
[3] Potential Savings per resident = {(2.74B gal / 748 gallons per unit) * $1.94 per unit of water (tier 1)} / 70090 residents
[4] Potential Energy Savings for city = 2.74B gal * .012 kwh per gal * $.14 per kwh

Appendix

Citations

1. Protect Water Resources with Higher Density Development (EPA)

2. From Watts to Water, June 2007 (Santa Clara Valley Water District)

3. California Climate Change Portal, FAQ: What Are The Potential Impacts For California's Water? http://www.climatechange.ca.gov/publications/faqs.html

4. Cities Offer Incentives For "Rip Up The Lawn" Movement
http://www.mnplan.state.mn.us/issues/resource.html?Id=806

Recommendation #6

Title: Pavers not Pavement: Incent permeable surfaces for driveways

Working Group: Water Group

Statement of Issue

Storm drain water is often more toxic than sewage. And unlike sewage, which is extensively treated before being retuned to the bay, urban surface runoff entering the storm drain receives no treatment before being pumped directly to the bay. Storm drains carry more than rain. Water from over irrigation, car washing, and power washing are all sources of storm drain water.

Storm drain water carries significant amounts of toxins such as copper, nickel, mercury, pesticides, PCBs, and dioxins. All of these pollutants enter the bay through urban surface runoff. The city also spends close to $200,000 annually on energy required to pump water to the bay.

The large volumes of urban surface runoff are a result of extensively paved urban areas. Impermeable surfaces such as concrete and asphalt cover up to 40-80% of residential areas. Impermeable surfaces divert up to 55% of water to storm drains. Only 15% reaches soil levels. The rest evaporates. As a comparison, natural ground cover surfaces divert only 10% of water to storm drains.

Santa Clara Vallay has been addressing runoff toxicity at a municipal scale through the Urban Runoff Pollution Prevention Program. This proposal intends to support those efforts with a residential program aimed at preventing the amount of runoff.

Recommendation

To reduce toxins and protect our bay, we propose a "Pavers not Pavement" program as a *beginning* to prevent urban runoff. This proposal recommends incentives to residents and contractors to use paving stones or pavers for residential driveways. Paving stones allow water to pass through to soil level and prevent a significant portion of urban water runoff.

Pavers have other benefits. They are easy to maintain and allow for easy disassembly and reassembly should the need arise. Concrete and asphalt require demo and replacement, which costs money, time, and resources.

Converting driveways to pavers is only a first step that residents can act on today. *Green roofs* are a more popular recommendation to achieve similar goals, and the technology is quickly developing. We position "Pavers not Pavement" as a first step that may lead to more significant actions such as installing a green roof.

The "Pavers no Pavement" program would consist of the following components:

a) Lead by example: Use paving stones instead of concrete or asphalt on public pedestrian pathways,

b) Educate: Provide information for residents and contractors online, over a hotline and in booklets that might be handed out at public events such as local farmers markets, etc. A landscaping book of

tips may include information on the benefits of paving stones, starter tips, and a list of certified contractors.

c) Incent: Provide rebate incentives for residents, HOAs and small businesses to replace driveways with paving stones or permeable surfaces. Incent contractors with "Pavers not Pavement" certification programs. Certification may enable them to increase business and offer new expert services.

This is a short term (1-12 mos.) to medium term (1-3 yrs.) solution.

Environmental Impact

"Pavers not Pavement" could transform our city into a water-wise, yet aesthetically attractive destination. More specifically, it could positively impact:

Water table - For every square foot of concrete or asphalt converted to pavers, two to four times as much rain water is returned to the water table, filtered naturally, and not pumped out to the bay.
Carbon emissions - Potential to prevent 322 tons of CO2 emitted annually to pump water[5].
Health of the bay – Fewer toxins reach the bay, preventing further eutrification and other forms of environmental damage.

Fiscal Impact

Residents could save in maintenance of their driveways and additionally add value to their homes.

In energy costs alone, the city has the potential to save $180,000 annually.[6]

The city may also save additional money in maintenance costs and increase revenue by converting pedestrian pathways to pavers.

Obstacles

There have been several concerns with regards to pavers, all of which are addressed below:

Pavers would be hard for people with disabilities to navigate. Several kinds of interlocking pavers offer a smooth surface that is no different than that offered by other forms of paving.

Because water gets through, weeds will grow through the cracks. When installed correctly with sand, aggregate, and permeable linings, plant growth is prevented while water is allowed to pass through. This does underscore the importance of proper installation

Pavers cost a lot more than concrete. Pavers are maintainable. Should the driveway need repair, pavers can be removed and reassembled. Concrete slabs, on the other hand, require demo and reinstallation. While paver installations can be 10-20% more expensive, we hope incentives offered by the city will offset some of that difference.

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[5] Potential Carbon emissions savings = 1.4M kwh * .459 lbs CO2 per kwh
[6] Potential Energy Savings for city = 1.4M kwh * $.14 kwh – 10% min

Is it better to divert storm water or allow it into the soil? Out initial impression is that the earth acts as a natural filter. Microorganisms in the soil are able to breakdown compounds in small amounts. However, we recommend more input from environmental scientists to flesh out a complete strategy for this proposal.

Partnerships

- Santa Clara Valley Urban Runoff Pollution Prevention Program: http://www.scvurppp-w2k.com/Default.htm
- Santa Clara Valley Water District: http://www.valleywater.org/

Synergy

Citations

2. Protect Water Resources with Higher Density Development (EPA)

2. Preliminary Toxicity Identification Evaluation (TIE) of Dry-Weather Urban Discharge

3. California Climate Change Portal, FAQ: What Are The Potential Impacts For California's Water? http://www.climatechange.ca.gov/publications/faqs.html

Recommendation #7

Title: Strengthen ordinances with incentives, hotline, and conversation advocates.

Working Group: Water Group

Statement of Issue

The city has several water ordinances that are acted on by complaint basis only. They include:

1.Hose must have auto-shutoff valve
2.Prevent wasteful potable water runoff
3.Fix leaks and prevent over-watering
4.Serve water in restaurants only by request
5.Install single-pass cooling systems on new construction

Many people do not know these ordinances exist, and may unintentionally be in violation of them. And people in the community who see infractions against these ordinances do not know what to do, have no constructive advice to provide, and in worst cases, do not know who to call to complain.

Should they reach the proper person, that person has only 80% of their time to spend on water conversation issues – a true bottleneck in the system.

Recommendation

We propose a three part recommendation to strengthen water ordinances.

1) Supplement ordinances with incentives to use water properly. Rather than solely policing water use, we recommend incentivizing proper use of water. This may be as simple as providing a baseline in the water bill and measuring bill payer's usage against that baseline (see water bill proposal for more details)

2) Promote the Water-Wise Hotline. Several hotlines exist to report water pollution (1-888-510-5151) or to reach a team of experts for conservation tips. otlines for water to support water conservation efforts and in the worst case, report and infraction
Community outreach to educate people about water conservation and when necessary, have the authority to write tickets

Help people help eachother. To make use of this underutilized resource, we propose a "Save the Rain" program that would make residents and contractors aware of rain capture strategies and the permitting requirements to act on them. This proposal also recommends financial incentives to homeowners who incorporate rain capture strategies on their property.

The "Save the Rain" program would consist of the following components:

a) Lead by example: Demonstrate rain capture techniques at city owned facilities.

b) Educate: Provide information for residents and contractors online, over a hotline and in booklets that might be handed out at public events such as local farmers markets, etc. A landscaping book of

tips may include information on the benefits of rainwater capture, starter tips, and a list of certified contractors.

c) Incent: Provide financial incentives for residents, HOAs and small businesses to install rainwater capture systems. Incent contractors with "Save the Rain" certification programs. Certification may enable them to increase business and offer new expert services.

This is a medium term (1-3 yrs.) to long term solution.

Environmental Impact

Only 2% of the water we use is actually consumed. There are many uses for rainwater, including irrigation, toilet flushing, dishwashing, and laundry that would positively impact the environment.

Water resources – reduces demand on water conveyance from Hetch Hetchy.
Carbon emissions – Has potential to prevent 10646 tons of CO2 emitted annually to deliver water[7].
More CO2 savings could be found in less storm water to pump to the bay.
Health of the bay – Less urban storm water runoff means fewer toxins reaching the bay.
Health of the ecosystem – Continued support of an ecosystem in a water constrained world.

Fiscal Impact

"Save the Rain" has several benefits to both residents and the city. Residents could potentially save up to $140 per household (over $10 million total) annually on water in today's prices. Installing rain capture systems could also increase the value of a home.

The city would save energy and resources in delivering water. *In energy costs alone,* the city has the potential to save $100,000 annually.

Because rainwater typically ends up in the storm drain, the city might reduce urban runoff and save some of the nearly $200,000[8] it spends on energy annually to pump water to the bay.

Obstacles

Cost. Building a 10,000 gal cistern is very expensive. Providing residents with a smaller, more affordable in addition to financial incentives for larger efforts will be needed for this program to succeed.

Education. Not many people know they can capture rainwater. For those who do, they are not sure what the permitting requirements are or where to begin. Education will also be key.

Partnerships

- Santa Clara Valley Water District: http://www.valleywater.org/

[7] Potential carbon emissions savings = (3.88B gal * .012kwh * .459 lbs CO2 per kwh) / 2000 lb per ton
[8] Potential savings from pumping water to bay = 1.4M kwh * $.14 kwh

Recommendation #8

Title: Save the Rain: Incent rainwater capture and storage

Working Group: Water Group

Statement of Issue

The Sierra snowpack is below average. State officials said April and May were the driest spring on record. And Roseville has issued a drought alert – the first since 1994. While the snowpack is dwindling, the population of cities that depend that snowpack or the water it provides is growing. What's more, as global warming continues and temperatures rise, demand for water too will rise. To meet future water needs, Mountain View residents will need to think about other water resources.

Rainwater is one such resource that is underutilized in Mountain View. Even though the average annual rainfall is only 14-16", a 1000 square foot roof could capture enough water during the rainy season to irrigate an average lawn for the entire summer.

Up to 85% of residential water consumed never comes in contact with people who use it. Irrigation, flushing toilets, dishwashing, laundry, and washing dishes are all applications where rainwater can be used and to mitigate growing demand on water resources.

And from initial research, there seems to be significant interest in rainwater capture. The trouble is that people are unclear on how to do it. Should I build a cistern? What are the permitting requirements? Where do I start? These questions are hard to answer and often lead to inaction.

Recommendation

To make use of this underutilized resource, we propose a "Save the Rain" program that would make residents and contractors aware of rain capture strategies and the permitting requirements to act on them. This proposal also recommends financial incentives to homeowners who incorporate rain capture strategies on their property.

The "Save the Rain" program would consist of the following components:

a) Lead by example: Demonstrate rain capture techniques at city owned facilities.

b) Educate: Provide information for residents and contractors online, over a hotline and in booklets that might be handed out at public events such as local farmers markets, etc. A landscaping book of tips may include information on the benefits of rainwater capture, starter tips, and a list of certified contractors.

c) Incent: Provide financial incentives for residents, HOAs and small businesses to install rainwater capture systems. Incent contractors with "Save the Rain" certification programs. Certification may enable them to increase business and offer new expert services.

This is a medium term (1-3 yrs.) to long term solution.

Environmental Impact

Only 2% of the water we use is actually consumed. There are many uses for rainwater, including irrigation, toilet flushing, dishwashing, and laundry that would positively impact the environment.

Water resources – reduces demand on water conveyance from Hetch Hetchy.
Carbon emissions – Has potential to prevent 10646 tons of CO2 emitted annually to deliver water[9]. More CO2 savings could be found in less storm water to pump to the bay.
Health of the bay – Less urban storm water runoff means fewer toxins reaching the bay.
Health of the ecosystem – Continued support of an ecosystem in a water constrained world.

Fiscal Impact

"Save the Rain" has several benefits to both residents and the city. Residents could potentially save up to $140 per household (over $10 million total) annually on water in today's prices. Installing rain capture systems could also increase the value of a home.

The city would save energy and resources in delivering water. *In energy costs alone,* the city has the potential to save $100,000 annually.

Because rainwater typically ends up in the storm drain, the city might reduce urban runoff and save some of the nearly $200,000[10] it spends on energy annually to pump water to the bay.

Obstacles

There have been several concerns with regards to pavers, all of which are addressed below:

Cost. Building a 10,000 gal cistern is very expensive. Providing residents with a smaller, more affordable in addition to financial incentives for larger efforts will be needed for this program to succeed.

Education. Not many people know they can capture rainwater. For those who do, they are not sure what the permitting requirements are or where to begin. Education will also be key.

Partnerships

- Santa Clara Valley Water District: http://www.valleywater.org/

Synergy

Citations

[9] Potential carbon emissions savings = (3.88B gal * .012kwh * .459 lbs CO2 per kwh) / 2000 lb per ton
[10] Potential savings from pumping water to bay = 1.4M kwh * $.14 kwh

Recommendation #9

Title: Close the feedback loop: Install CIMIS weather station and other feedback mechanisms.

Working Group: Water

Statement of Issue

Residents simply do not know how much water they are using or if they are using too much. The only feedback they are provided is a bill once every two months, at which point, it is too late to make any changes. Leaks are undetectable, even though people drink the same amount of water that is lost through leaks every year. More timely feedback on water usage would help many residents spot leaks and other wasteful activities and be more efficient with their water usage.

Irrigation is another task that lacks the proper feedback. Residents unaware of how much water they need to keep their gardens healthy frequently overwater. The City of Mountain View and Mountain View School District oversee large pieces of property that require irrigation and rely on the intuition of groundskeepers. Because of this, overwatering is common and water is simply wasted.

Recommendation

This proposal focuses on getting residents and city departments the feedback they need to use water in the most efficient way possible. We recommend a two-prong approach:

1) Work with the SCVWD to install a CIMIS weather station on city property.

The California Irrigation Management Information System (CIMIS) is a program in the Office of Water Use Efficiency (OWUE), California Department of Water Resources (DWR) that manages a network of over 120 automated weather stations in the state of California. CIMIS was developed in 1982 by the California Department of Water Resource and the University of California at Davis to assist California's irrigators in manage their water resources efficiently. The City of Mountain View, unlike other neighboring cities, has no such station. However, the SCVWD has offered to provide such a station at no expense.

The climate gradient suggests that 2 stations would be appropriate: one for the marine-influenced Bay area, and one in the vicinity of Cuesta Park for the western part of the city. SCVWD would gladly supply and maintain these stations, as well as supply soil moisture monitoring equipment and irrigation system testing.

The stations provide feedback and forecasting data to devices used to make irrigation decisions. Parks Department officials and resident would both have access to this data. Enabling irrigation devices would read data and irrigate appropriate to the weather, soil moisture, temperature, and other data.

The SCVWD's provision and maintenance of weather stations and soil moisture monitoring equipment are a long term solution, over five years. The technology may -- for example, it is assumed that a satellite remote sensing will be employed at some time in the near future -- but the weather stations will always be needed to supply reference data. Water and energy will continue as long as the technology is used by the City of Mountain View.

2) Replace the 16,200 water meters in Mountain view with networked enabled meters. When installed, provide each household with a simple device that provides realtime feedback on water consumption.

Studies have shown that by simply closing the feedback loop on daily water use, residents conserve an average of 10% of their typical water usage.

Environmental Impact

There will be no negative environmental impacts resulting from the installation CIMIS stations.

Fiscal Impact

This Technology and service will be free of charge to the City of Mountain View.

Obstacles

Although some sites for the installation of the stations have been identified, one obstacle could be that if the sites are not appropriate for the collection of data, relocating the station would require some flexibility by the City.

Partnerships

The City of Mountain View and the Santa Clara Valley Water District will work in partnership.
The California Irrigation Management Information System (CIMIS):
http://wwwcimis.water.ca.gov/cimis/welcome.jsp

Reference:

http://www.valleywater.org/
http://www.valleywater.org/Water/Water_in_agriculture/index.shtm
http://wwwcimis.water.ca.gov/cimis/welcome.jsp

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