Collecting Today, Saving For Tomorrow: A Proposal for Rainwater Cisterns

Created by: Regina Fletcher, Colin Campbell and Kyle Clifford
Climate Change Impacts

- Temperature increase
- Earlier snowpack melt = Less summer flow
- Less summer flow = Local watershed stress
- More stress = high costs and less irrigation water

Aerial View of Lake Whatcom Watershed
Problem

• Large impact on Whatcom County’s natural resources and local utilities
• Increase in water costs

Solution

• Build two 5,100 gal. cisterns to collect rainwater from the roof of Carver Gym
• Conserve water sustainably/lessen dependency on Lake Whatcom
Quick Knowledge

Potential Non-Potable Water Uses

- Non consumable
- Flushing toilets
- Wash equipment
- Irrigation
## Why is Rainwater Better?

<table>
<thead>
<tr>
<th>Potable Water</th>
<th>V. Rainwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requires energy to disinfect, treat, and transport water</td>
<td>Currently available natural resource</td>
</tr>
<tr>
<td>Water utility rate is increasing</td>
<td>Can be sustainably used on campus</td>
</tr>
<tr>
<td>Availability of local water sources decreasing</td>
<td>Reduces stormwater runoff</td>
</tr>
<tr>
<td></td>
<td>Saves money on water bill!!</td>
</tr>
</tbody>
</table>
Rules and Regulations

RCW 90.03

- “The on-site storage and/or beneficial use of rooftop or guzzler collected rainwater is not subject to the permit process.”

- Rainwater collection is **not** illegal in WA State

- State actively encourages rainwater collection
Case Study

Georgia Tech

- 6,000 gallon tank
- 30% irrigation cost reduction
Local Case Studies

Seattle Public Library

- Includes a 40,000 gallon underground tank with drip system

Seattle City Hall

- Includes a 210,000 gallon underground tank
- 88% water reduction
Rainwater Cistern Pilot Project
Educational Value

- Water Gauge
- Electronic Meter
- Information Plaque
- Class Involvement

1,000 gallon tank near Biology greenhouse
Location

Green square = 3,800 Sq. Ft. of bed space

Roof size = 4,900 Sq. Ft.
How Much We Use Right Now

Total Campus Irrigation in Cubic Feet
Jul. '12 - Jun. '13

- Smate: 10%
- Campus Fields - S: 23%
- Chemistry: 18%
- Campus Fields - N: 3%
- Buchanon Towers: 2%
- Biology: 6%
- Archives Building: 2%
- Archives Parking Lot: 1%
- Biology: 0%
- All Weather Field: 7%
- Public Safety: 7%
- PARCEL: 0%
- Vikings Commons: 1%
- Student Rec Center: 9%
- Miller Hall Irrigation: 2%
- Buchanon Irrigation: 0%

Campus Drive: 7%
Current Water Usage

Yearly SMATE Irrigation Costs

Yearly Cost in CCF

Year

'08  '09  '10  '11  '12  '13  '14  '15  '16  '17  '18
Actual vs. Desired Total Monthly Water Use for Irrigation via Rain Catchment (Based on WA State Irrigation Guide)

- **Desired Monthly Rainwater for Irrigation Use (gallons)**
- **Actual Enabled Rainwater for Irrigation Use (gallons)**
Assumed Water Meter Area

Blue Line = Assumed Perimeter for SMATE Water Meter
## Budget

<table>
<thead>
<tr>
<th>Materials</th>
<th>Estimate for One Cistern</th>
<th>Estimate for Two Cisterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>5,100 gallon corrugated metal tank and accessories</td>
<td>$9,395</td>
<td>$18,790</td>
</tr>
<tr>
<td>Passive Filtration System</td>
<td>$30</td>
<td>$60</td>
</tr>
<tr>
<td>Labor</td>
<td>$4,700</td>
<td>$9,395</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$14,125</strong></td>
<td><strong>$28,245</strong></td>
</tr>
</tbody>
</table>
How Much Does All This Cost?

- Western will spend $122,640 over 30 years
- Total savings = $94,455 in 30 years
- Return on Investment = 7 years
Potential Funding

- Green Energy Fee
- State funding for LEED certified remodel
Future Works

• 9,060 ccf collected rainwater left over after irrigation

• Carver Gym uses 450 ccf for toilet flushing per year
Conclusion

- Washington’s climate is currently changing
- Rainfall is abundant in Bellingham
- Rain cisterns will save money in the long run
- The time to collect rainwater is now!
Thank You To All!!
Special Thanks to...

- Anitra Accetturo
- David Willett
- Steve Morrow
- Sherrie Montgomery
- Greg Hough
- Seth Vidaña
Any Questions?
Works Cited


- Dazzling Places. Photograph. Retrieved from dazzlingplaces.com

