

# Student Perceptions on Water Resources and Reuse at a Large University in Ohio

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# Introduction

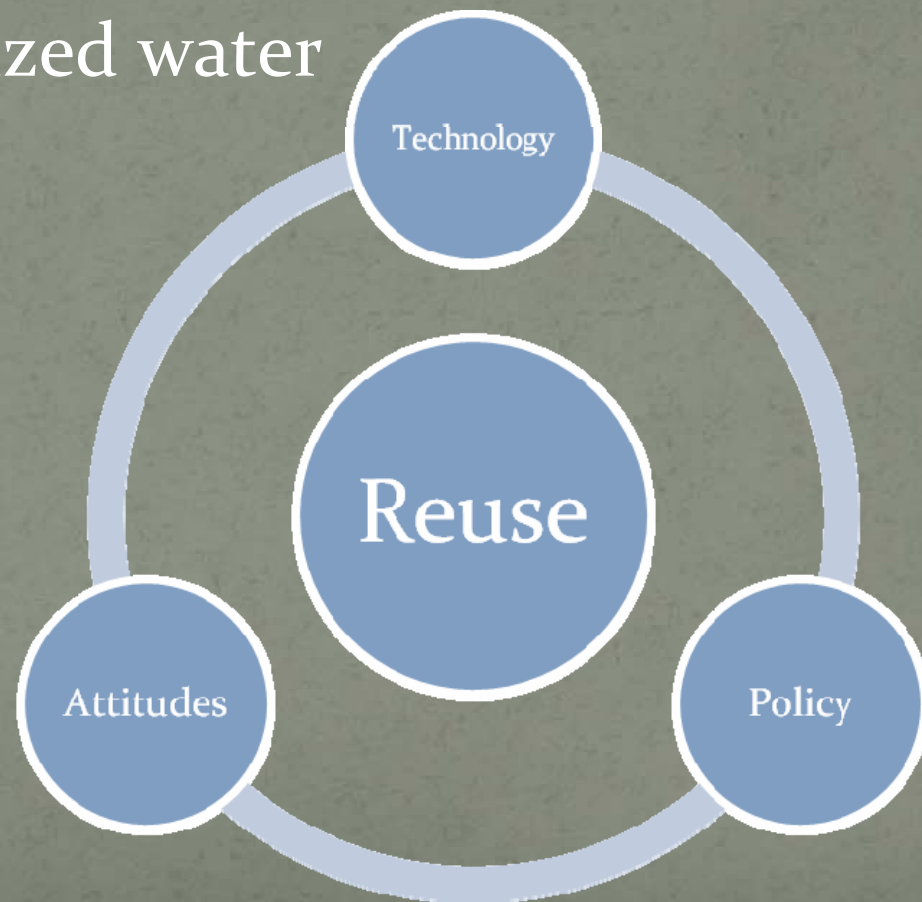
- Wastewater
  - Any adversely affected water
- Reuse
  - Using wastewater from one application to another
  - Practiced in the Minoan civilization in ancient Greece (20<sup>th</sup> century B.C.)

# Introduction

- Renewed interest in water reuse
  - Arid and semi-arid parts of the world
  - China and India
  - United States
    - Arizona, California, Colorado, Texas
    - Florida and Georgia
  - Singapore\*
- Motivation
  - Human consumption beyond sustainable levels
  - Guidelines for safe use by WHO and USEPA
  - Reuse in irrigation

# Limitations

- Lack of infrastructure
- Lack of awareness/policy options
- Availability of subsidized water
- Public perceptions



# Public Perceptions

- Technology available to generate potable-standard water
- Public opposition has the potential to cause failure of reuse projects
- Resource use behavior integral to policy-making
  - Local ownership ensures success
- Assessing attitudes and perceptions
  - Regional context

**Telegraph**.co.uk

**NASA astronauts to drink their own urine**

Published: 9:53PM GMT 14 Nov 2008

# Media Discourse

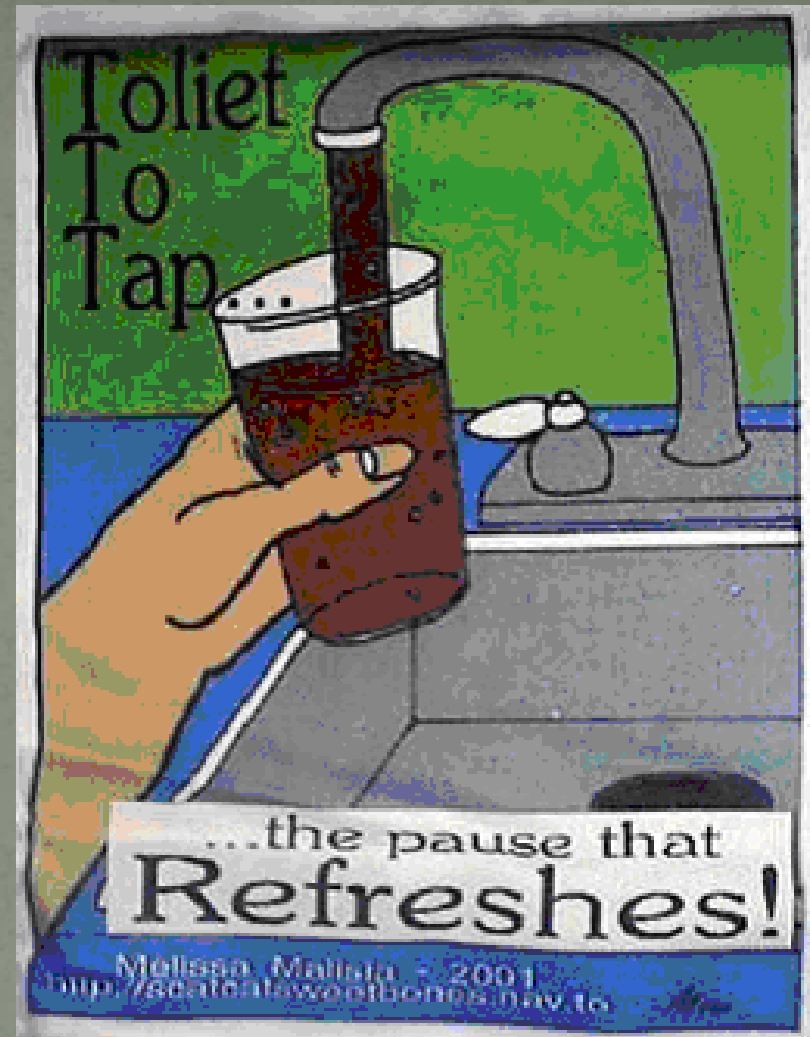
- Opposing forces

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"Water? Bottled, on tap or from the toilet?"



# Media Discourse

- Changed stance

**Los Angeles Times**

## Revisiting 'toilet to tap'

This time around, Los Angeles can't afford to let recycled water slip through its fingers.

By Marc B. Haefele and Anna Sklar

*August 26, 2007*

**Slate**

**HOME** / **GREEN ROOM** : NEWS AND COMMENTARY ABOUT ENVIRONMENTAL ISSUES.

## It's Time To Drink Toilet Water

Recycling sewage is safe and efficient, so why aren't we doing it?

*By Eilene Zimmerman*

Posted Friday, Jan. 25, 2008, at 7:33 AM ET

# Role of Universities

- Institutions of higher learning advance the cause of sustainable efforts
- Worldwide
  - University of British Columbia, Canada
  - Loyola College, Chennai, India
  - Jordan University of Science and Technology, Jordan

# Role of Universities

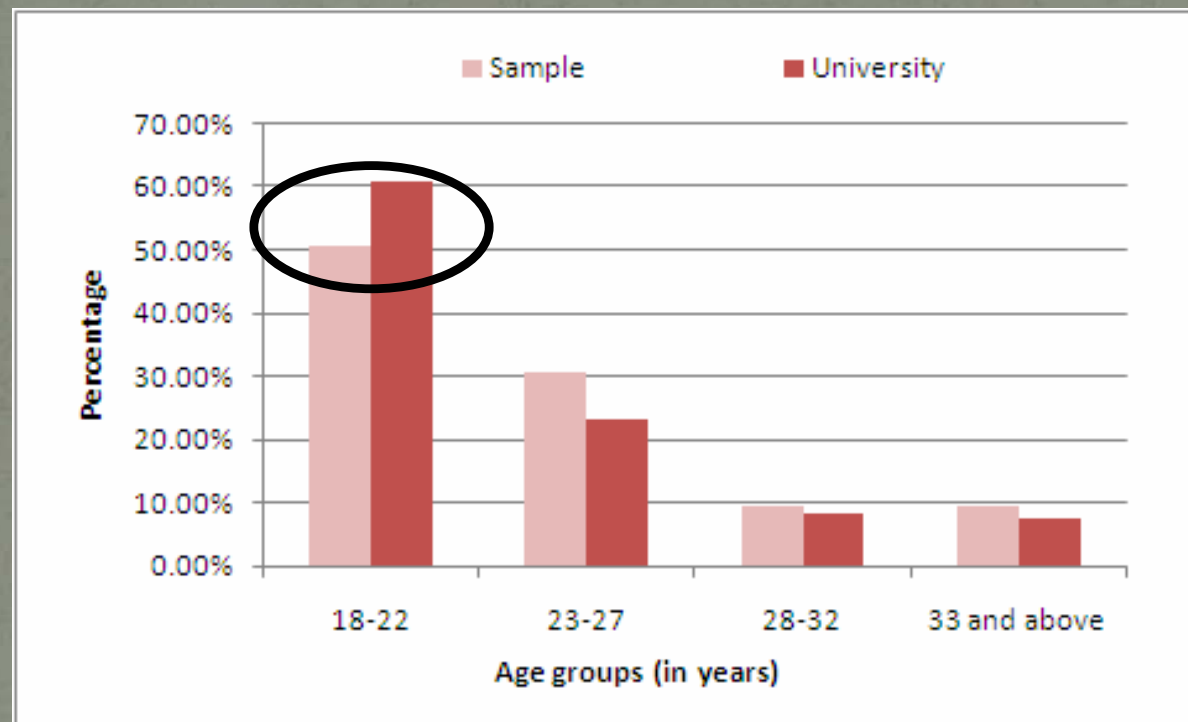
- U.S.
  - **University of Florida**
    - Wastewater treatment plant since 1948
    - Reclaims 3 MGD
  - **University of North Carolina**
    - Reclaims 660,000 gallons per day
    - 2009 Institution of the Year (WaterReuse Association)
  - **Penn State University**
    - 'Living Filter' used on a pilot-scale since 1963
    - Converted to full-scale in 1984
    - Reclaims 3 MGD
  - **The Ohio State University**
    - Experimental reuse system in London, OH.

# Survey

- Assessment of public perceptions towards resource of concern
- Random sample of Columbus students
  - Important stakeholders in the campus experience
- 819 students participated
  - 601 complete responses (95% C.I., 4% error)
  - Low response rate
  - Representative of population

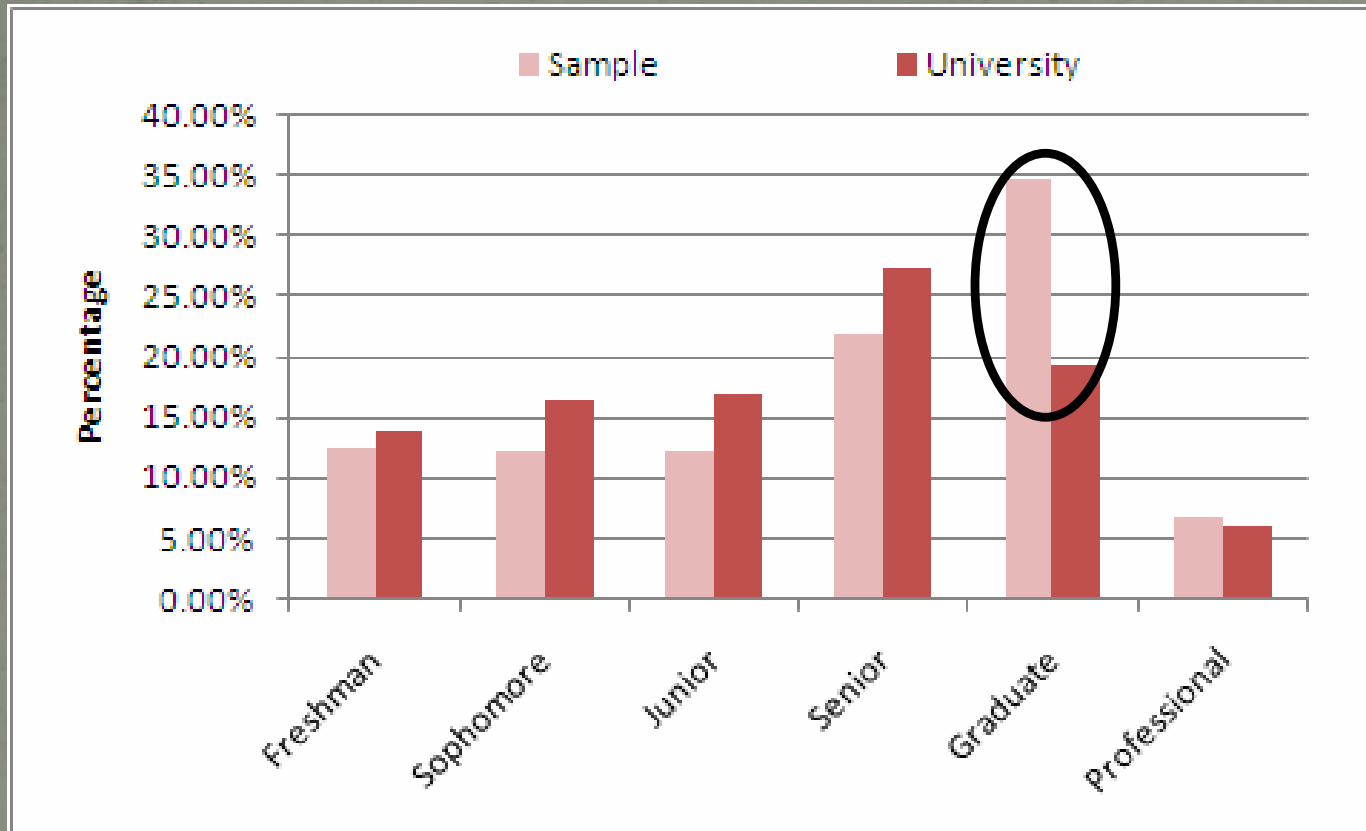
# Demography

- Marginally higher female representation (56.9%) than the population (48.1%)



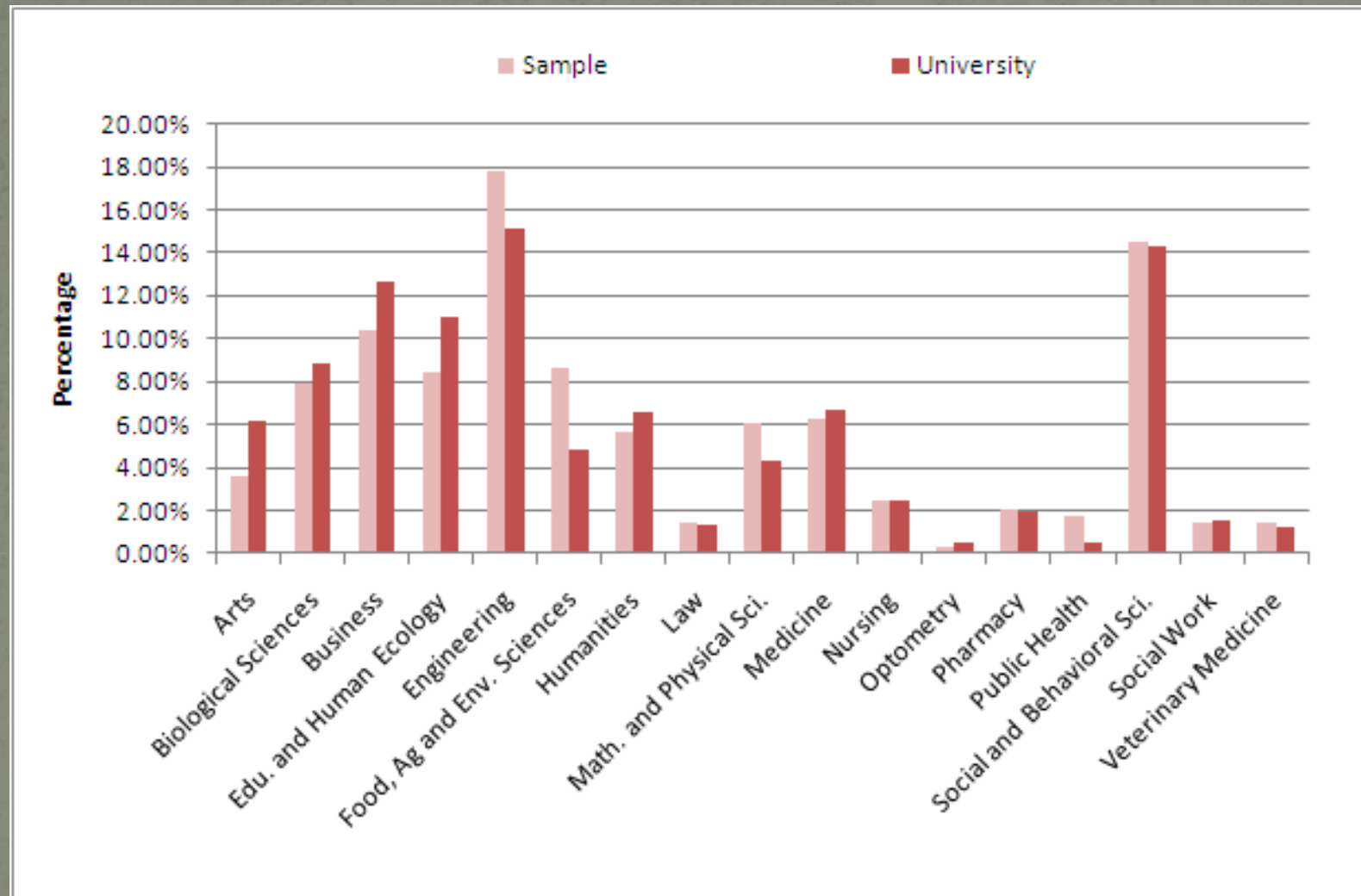
Distribution of students according to age

# Demography



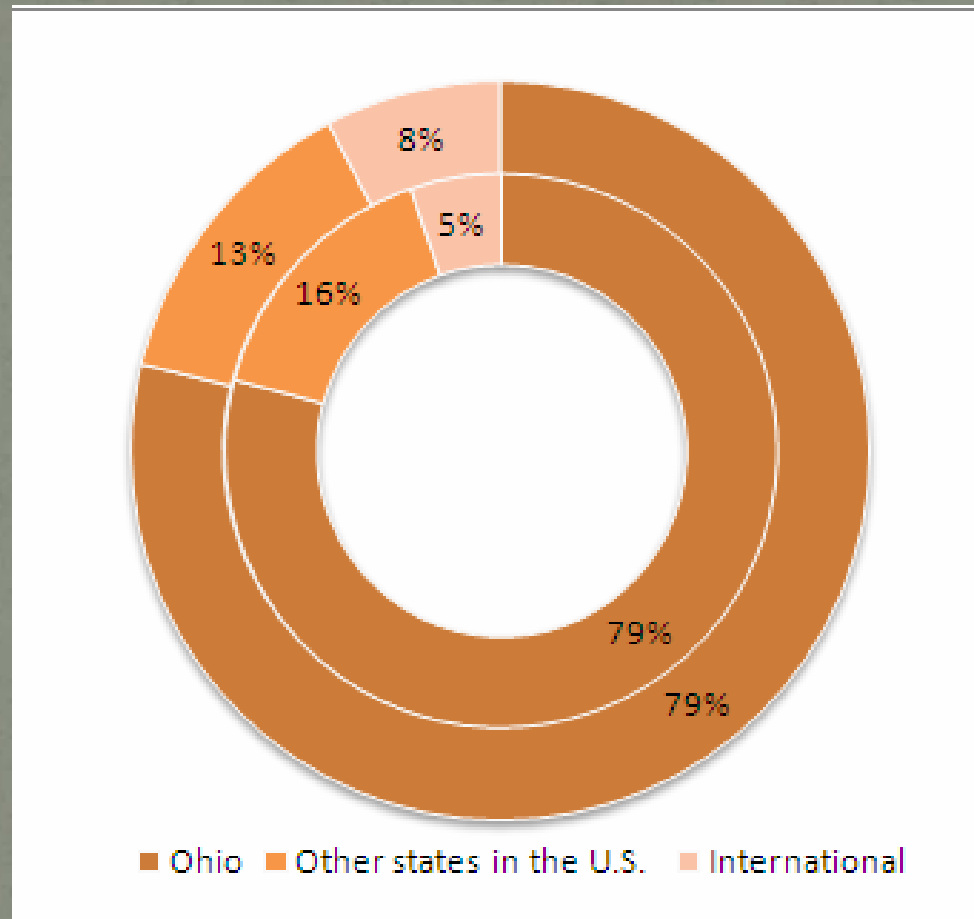
Distribution of students according to academic status

# Demography



Distribution of students according to academic major

# Demography



Distribution of students according to hometown.

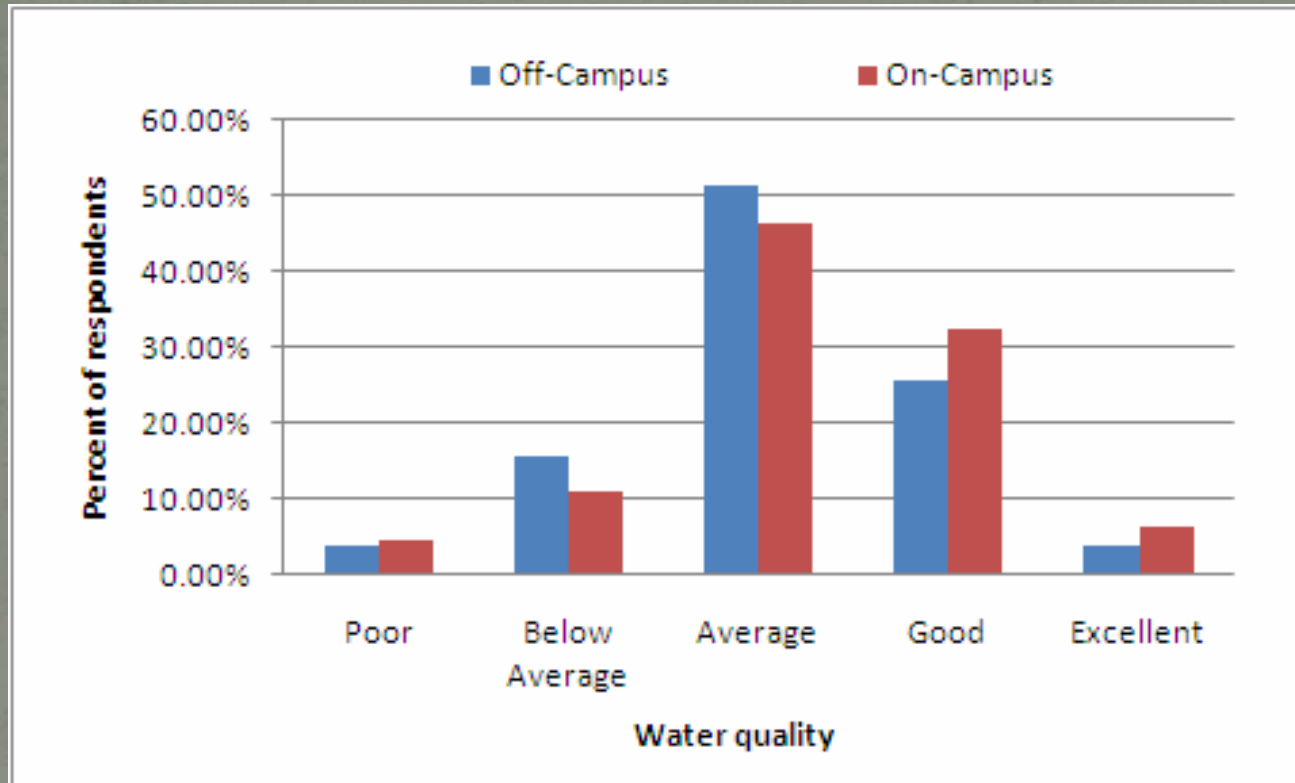
# Water Consumption and Practices

- In an average American home, where is the max. amount of water consumed?
  - a. Shower b. Toilet c. Faucet d. Washing machine e. Leaks
- 50% selected showers
  - Focus from organizations/blogs?
- Groups more likely to select toilets
  - Renters and owners > Dorm residents
  - Payment of water bill > Those not paying

# Water Consumption and Practices

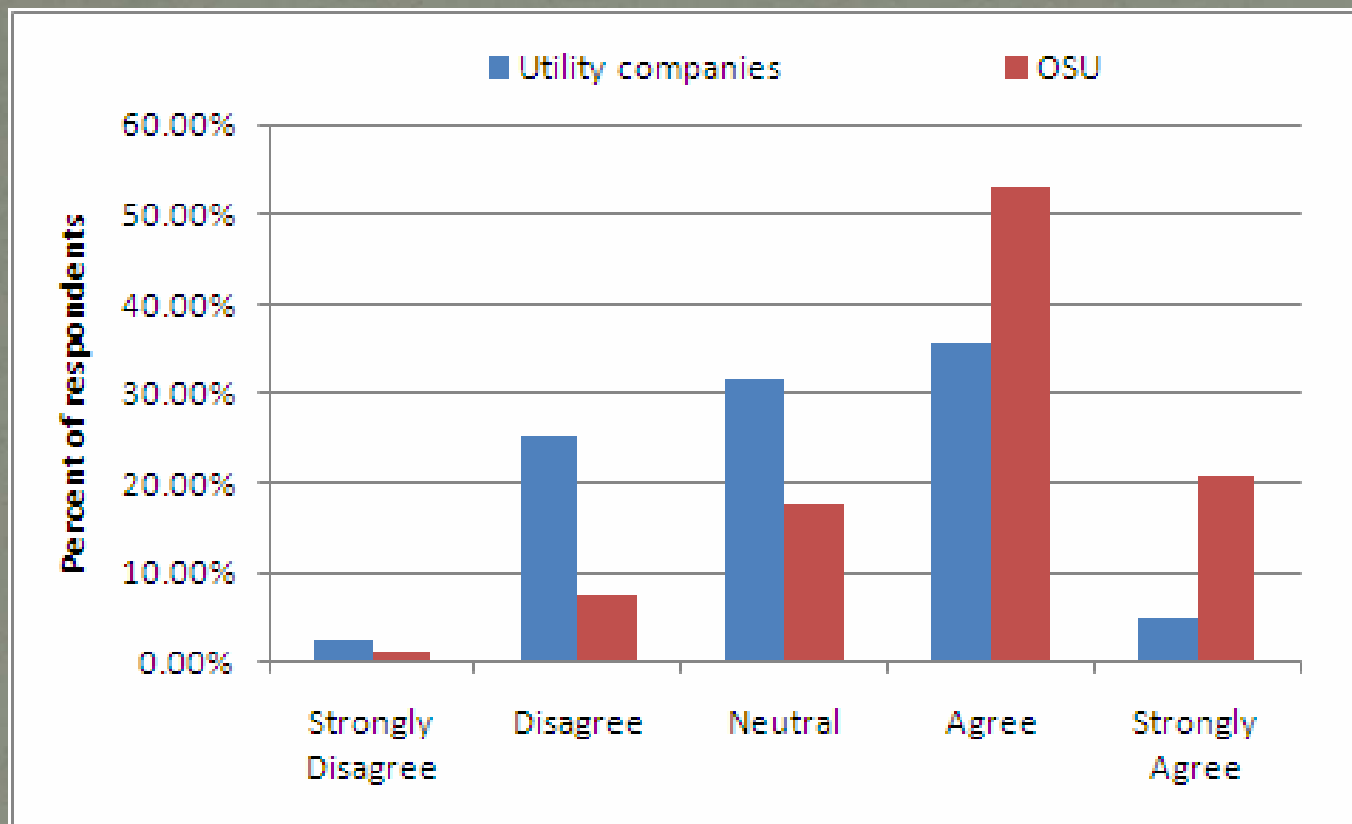
- Which of the following options most accurately describes what happens to the wastewater that is generated in the stadium during a season game?
  - The wastewater is treated within the stadium and
    - (a) drains into the Olentangy River, and (b) reused for watering the plants around the twin towers (Lincoln and Morrill).
  - No treatment is carried out within the stadium.
    - (c) The wastewater drains into the Olentangy River. (d) The wastewater is sent to the city's treatment plant.
- Results
  - 18% think raw sewage is dumped in the river
  - More international students (47%) think the water is recycled

# Campus Water Quality



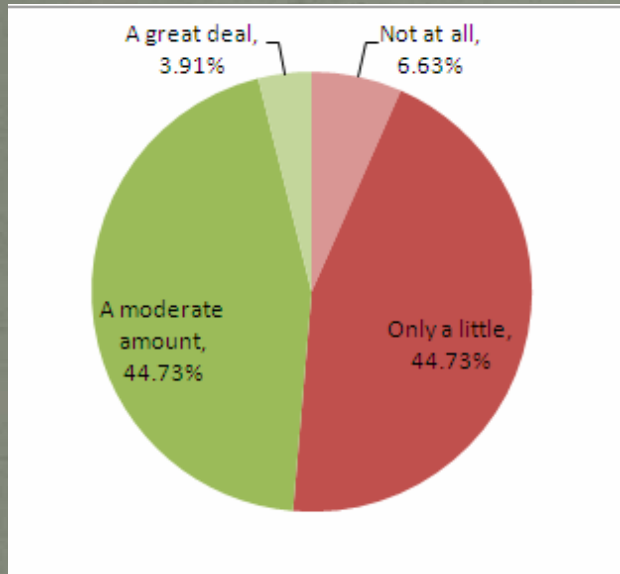
Perceptions on quality of water

# Campus Water Quality

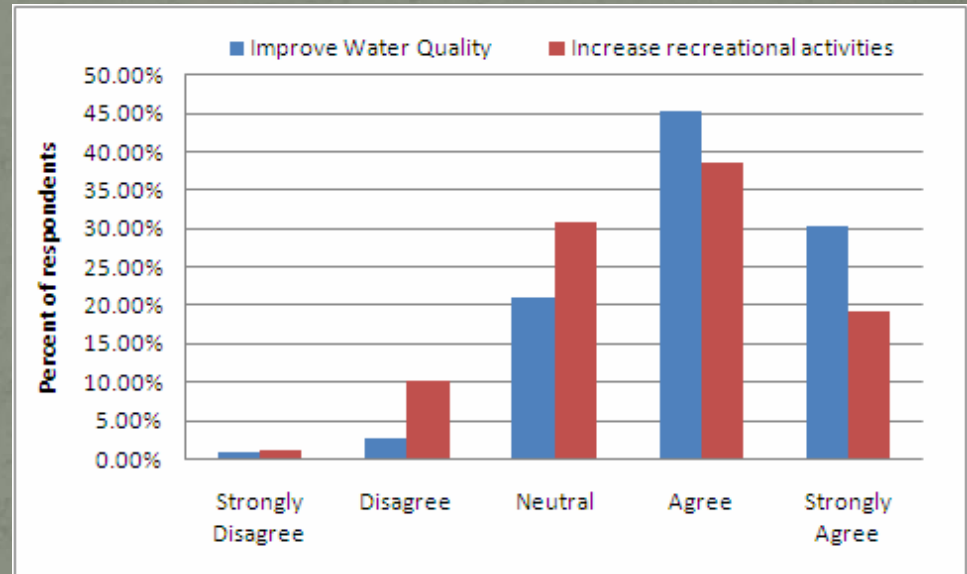


Perceptions on trustworthiness of the service providers

# Campus Water Quality



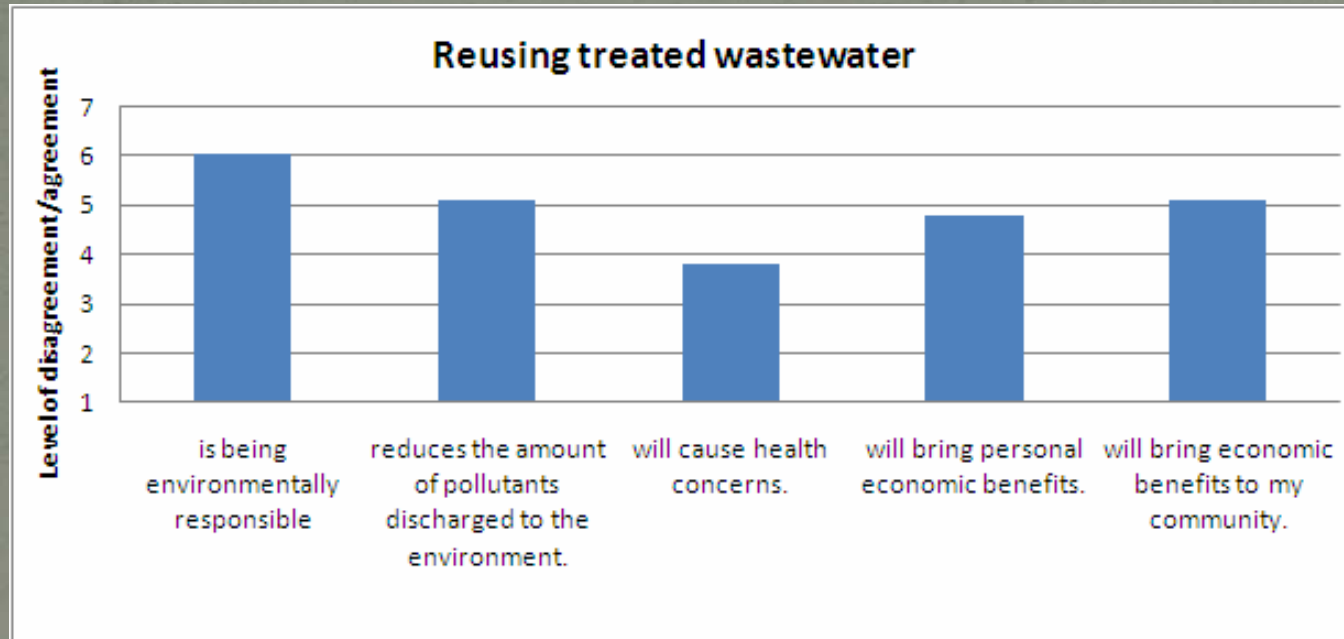
(a)



(b)

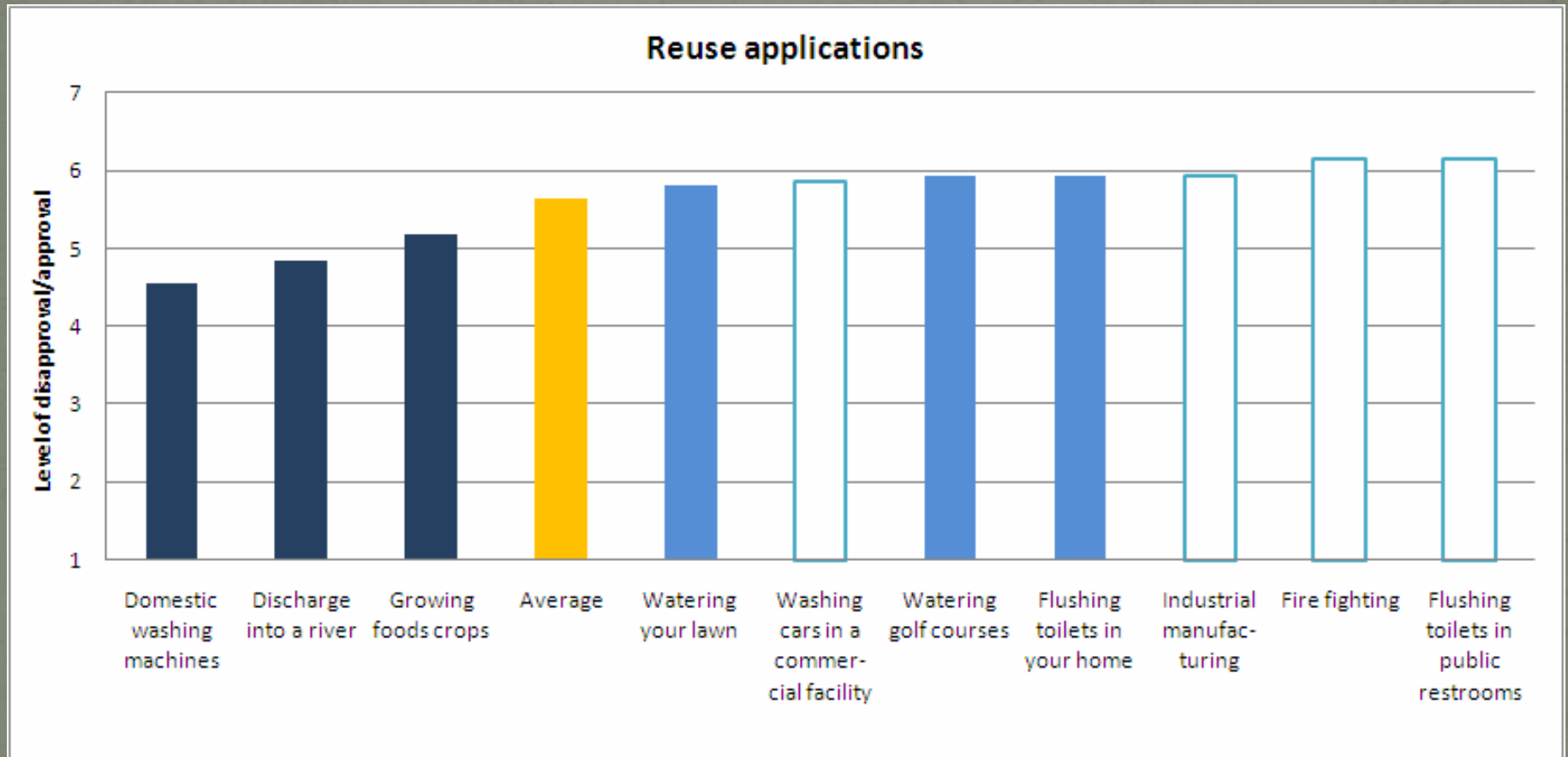
Student responses on (a) university's current level of involvement , and (b) university's future involvement

# Perceptions about Wastewater Reuse



Student responses on statements regarding wastewater reuse in general

# Specific Reuse Applications



Student responses on ten wastewater reuse applications

# Conclusions

- Less informed on certain facts and practices
- University water is better?
  - However, the university is more trustworthy
- Information results in action
  - Critical demographic
- Strong support
  - Reuse efforts on campus
  - One University Framework

# Next Actions

- Work with the university administration
- Involve student groups/representatives
- Pilot effort can be initiated to improve acceptability in Ohio
- Viability of stormwater reuse

Thank You and Questions