



# Clean River Design Challenge: Going Beyond Talking Trash

Student Teams Compete to Build  
the Best Trash Removal Device

The Water Connection/The Greenway Foundation

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# The Greenway Foundation & The Water Connection



The Greenway Foundation (TGF) is a Denver-based 501(c)(3) nonprofit organization that has led efforts, since 1974, to reclaim the South Platte River and its tributaries from a virtual cesspool to a place of environmental and recreational pride.



The Water Connection (TWC) is the water resources and policy initiative of TGF, fostering civic action and technological innovation for resilient Colorado watersheds.

# Trash in Denver

- Over 100,000 people have moved to Denver since 2010
- Over 30 million visitors in 2016 alone
- City and County of Denver spends \$1.5 million on trash removal annually

## How TWC/TGF is tackling this issue

- Volunteer programs
- Partnering with Frog Creek Partners on a 12 Gutter Bin pilot
- Clean River Design Challenge



# 2015-2016 Clean River Design Challenge (CRDC)

- Raise awareness & find innovative solutions
- Metropolitan State University of Denver through their One World One Water Center, Rose Community Foundation, CH2M, Flood Control District
- 2 rounds; focused on the Confluence
  - Fall Semester: Research and Design
  - Spring Semester: Full Scale Prototype
- Eight teams registered > Five teams invited to Round 2 > Two teams completed and presented a device to a judging panel



# 2016-2017 Evaluation of the Competition

- Reasonable scope for a two-semester competition
- Get students access to professional development opportunities
- How to get more students involved?
- How to retain student teams for Round 2?
- How to engage more of the community in this competition?

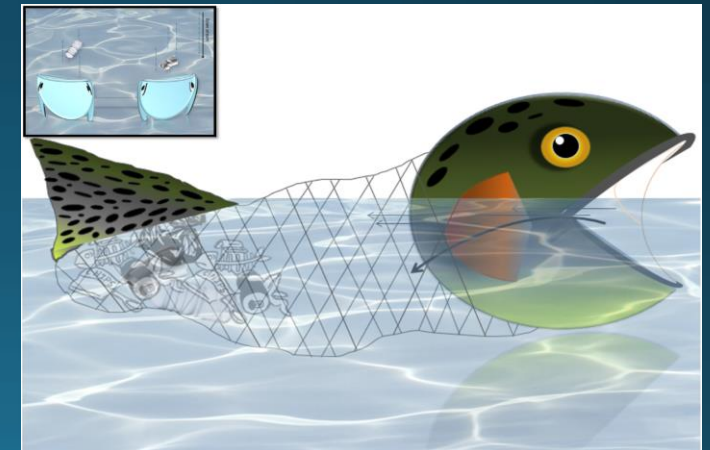
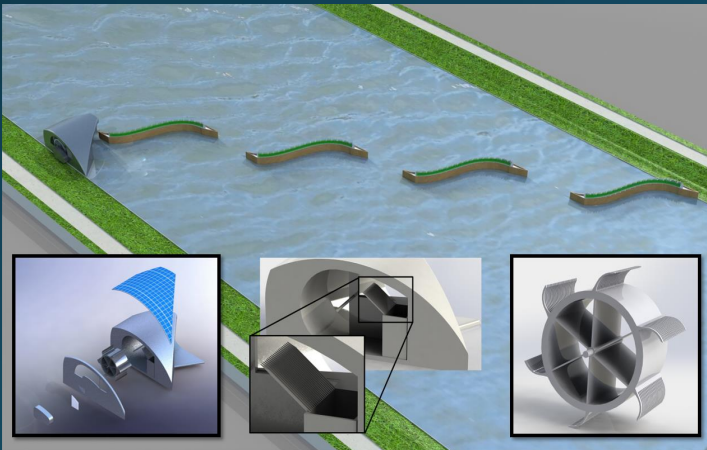
# 2017-2018 Clean River Design Challenge

- Engage and Retain Student Teams
  - Contacted schools that have Senior Capstone programs and leveraged our success from the first year to generate interest
  - Made the pitch personally to students
  - Top three teams received modest cash awards and invitations to our Reception on the River
- Nine teams from three institutions
  - Metropolitan State University of Denver
  - University of Colorado Denver
  - Colorado School of Mines
- New Partners
  - U.S. Bureau of Reclamation Hydraulics Lab
  - Engineers from other projects

# 2017-2018 Clean River Design Challenge

## Round 1: Concept and Design

- Given a specific stretch of the Cherry Creek
- Most teams received credit for their participation
- Mid-semester check-in with engineering professional
- Judging panel represented key stakeholders: TWC, recreational sports, flood and safety concerns, engineering expertise



# 2017-2018 Clean River Design Challenge

## Round 2: Scaled Model

- All teams who presented a design were invited to participate in Round 2
- 2-hour practice block at the U.S. Bureau of Reclamation Hydraulics Lab with an engineering professional
- Judging panel returned to represent key stakeholders
- Testing Day Experience
  - Every team tested their model in a specialized flume, participants could watch on cameras
  - Over 80 people attended
  - Tour of the facility





# Where We Are Now & Next Steps

- A 3-foot diameter Nautilus prototype has been built!
- TWC is working with the City of Denver on installation and a pilot program
  - Student club interested in helping with the monitoring and emptying
- The winning design from the 2017-18 CRDC is in the prototype design phase
- 2018-19 CRDC: Five teams competing from Metropolitan State University of Denver, Colorado School of Mines, and University of Denver



# Takeaways from the last three years



- Build on existing relationships
- It's ok to start small
- Word of mouth.... But, don't forget to brag!
- Create a tangible project with different ways to get involved
  - Students compete
  - Professionals donate their time
  - Organizations donate financially
  - Student club will collect data on the prototype pilot



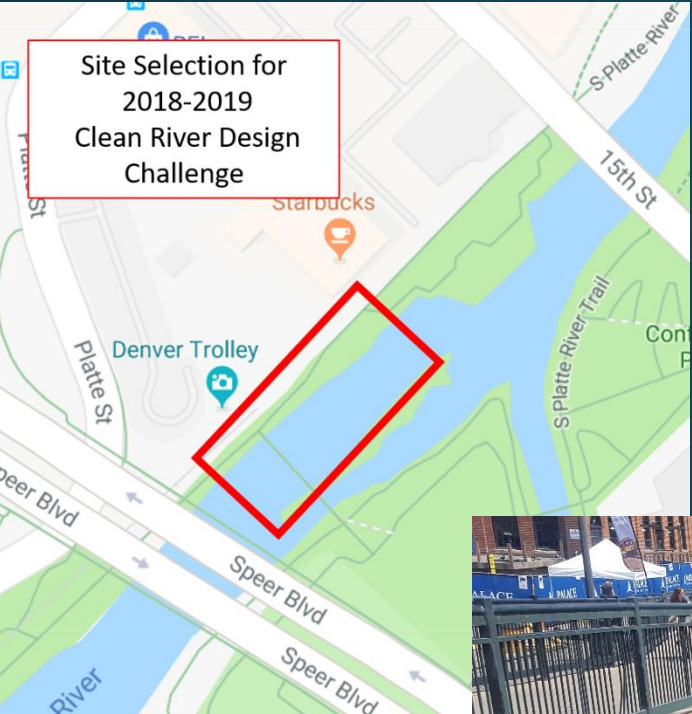
# Questions?



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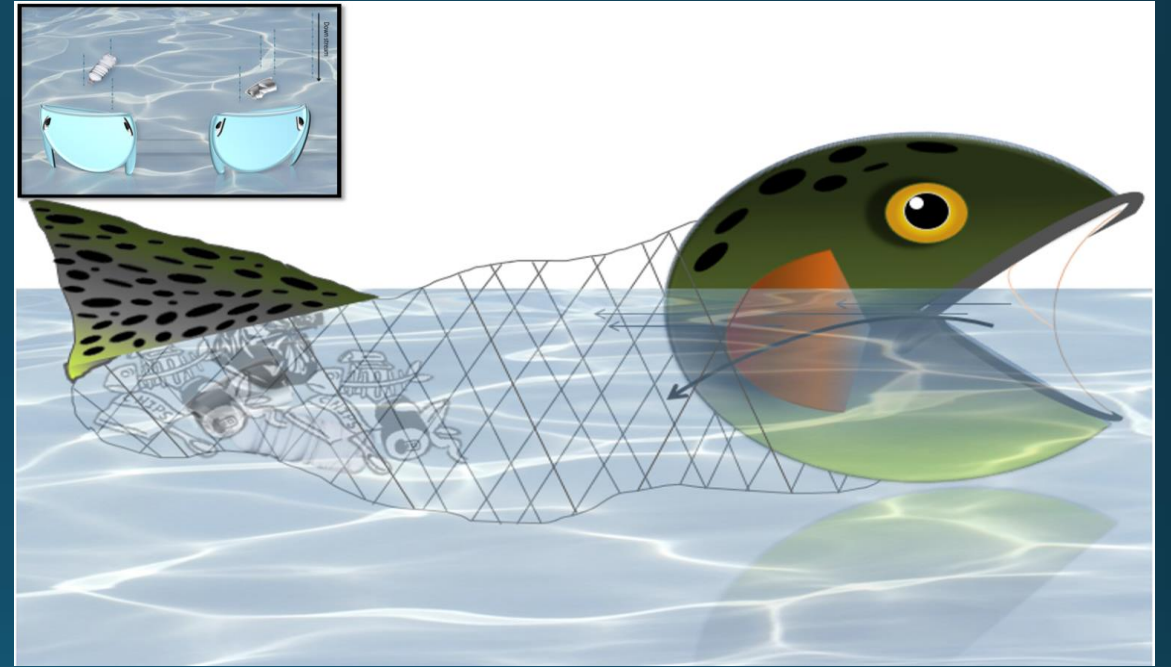
# 2017-18 CRDC Site



# Round 1 Design Winners

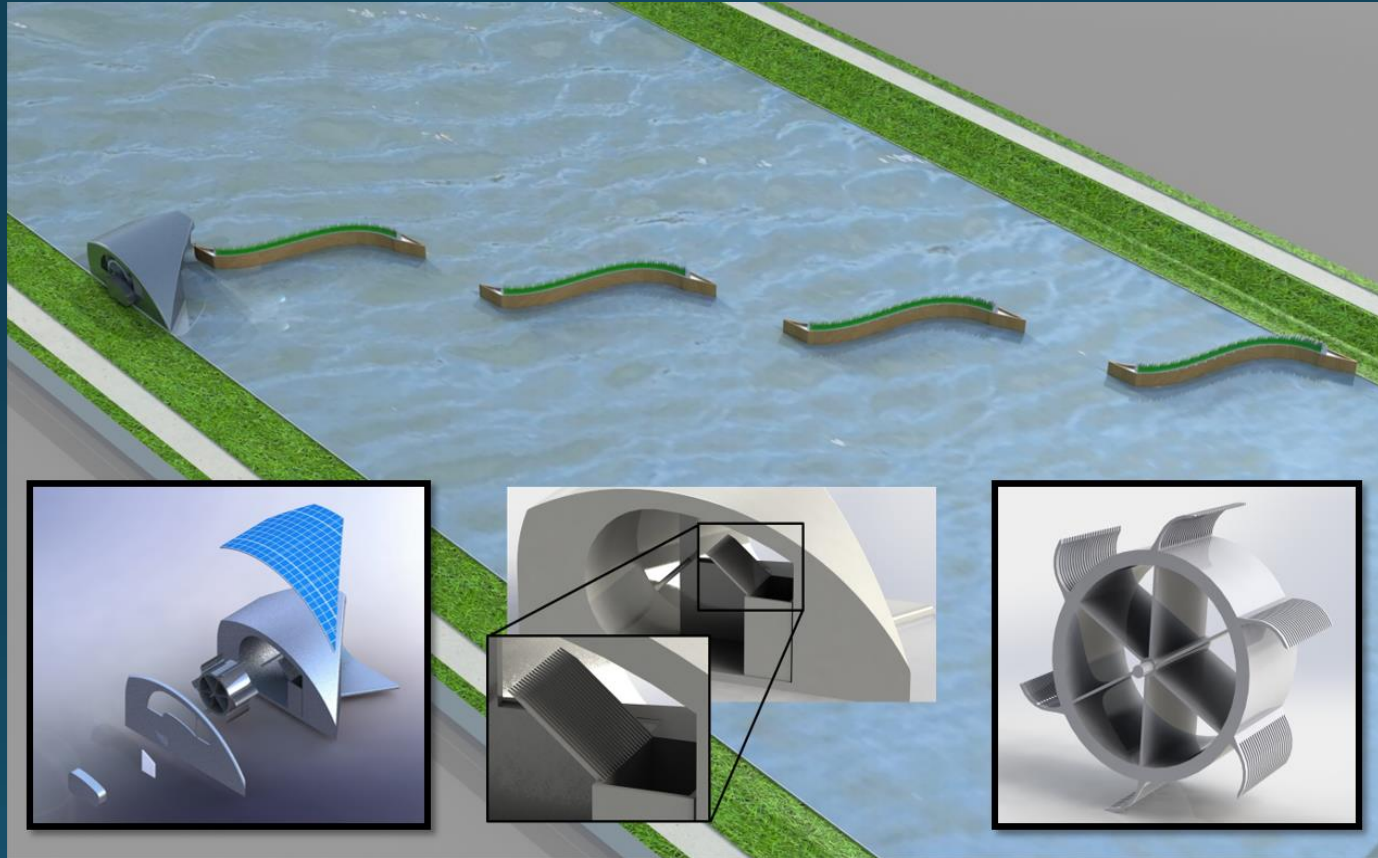


Third Place from  
Colorado School of Mines



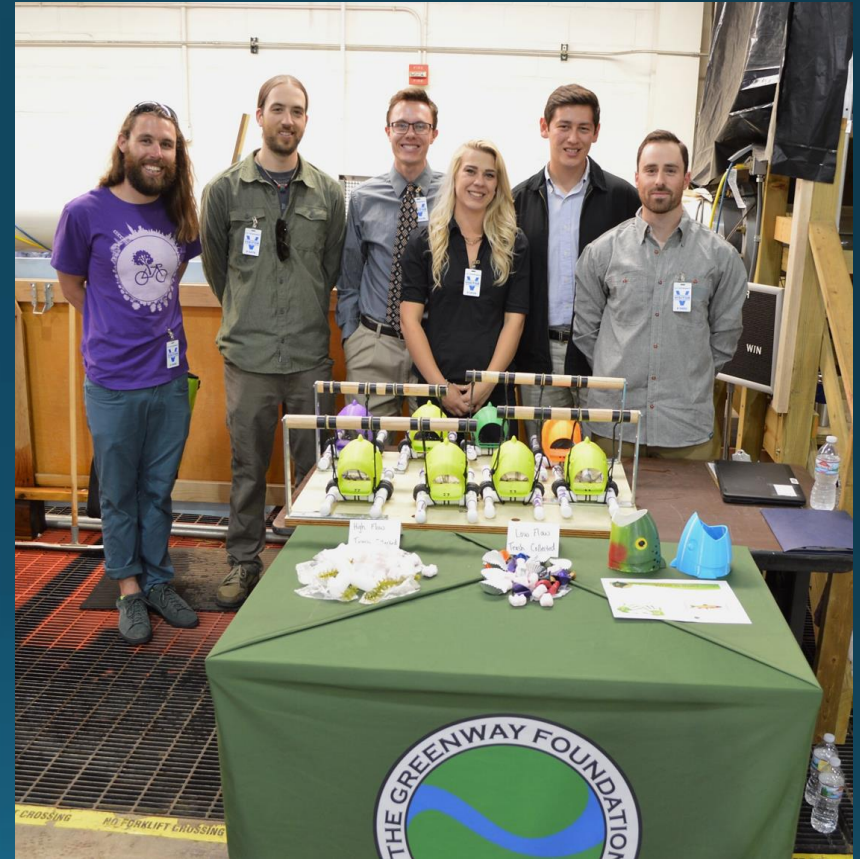
Second Place from  
Metropolitan State University of Denver

# Round 1 Design Winners



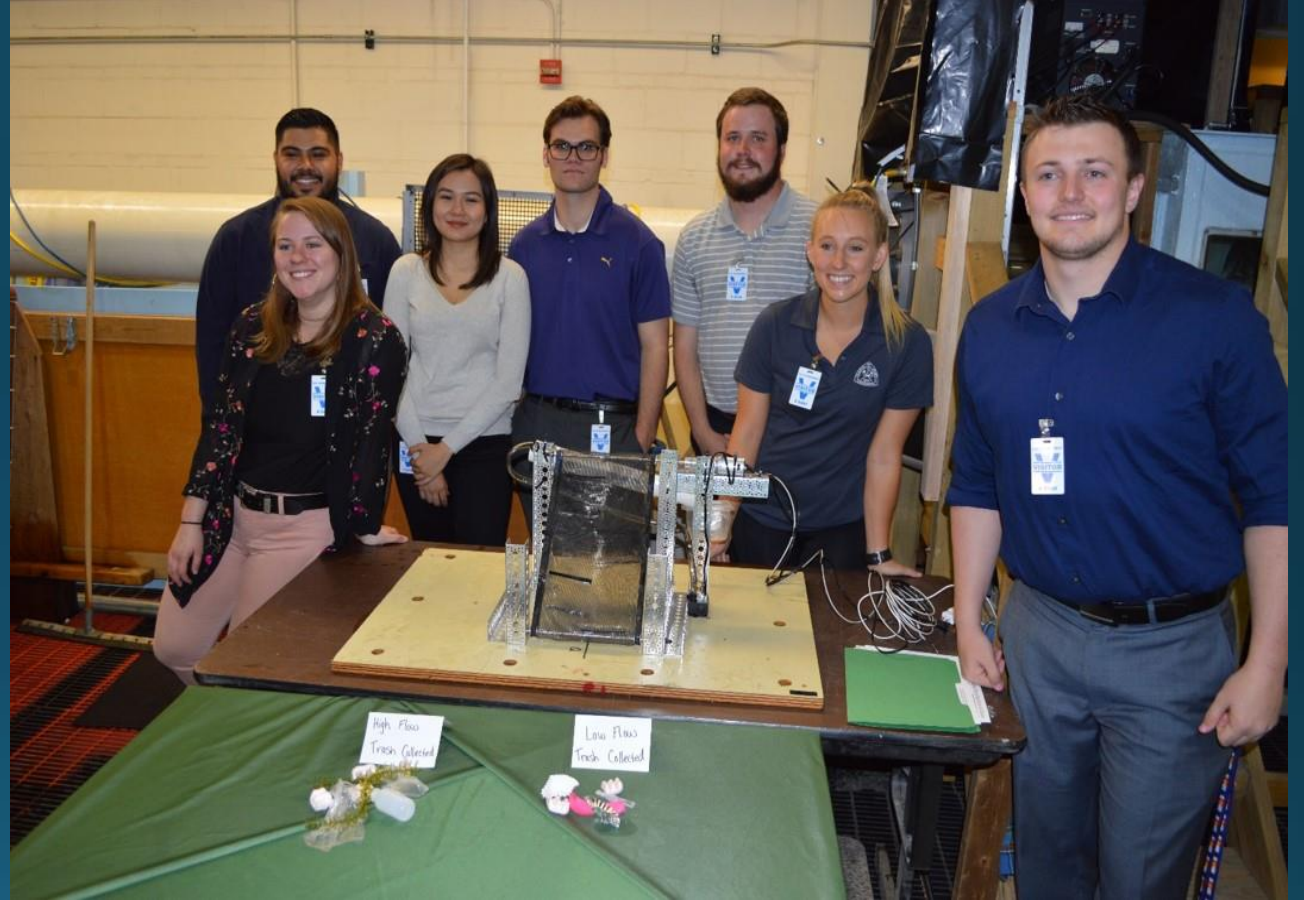
First Place from Colorado School of Mines

# Round 2 Model Winners



Third Place from  
Metropolitan State University of Denver

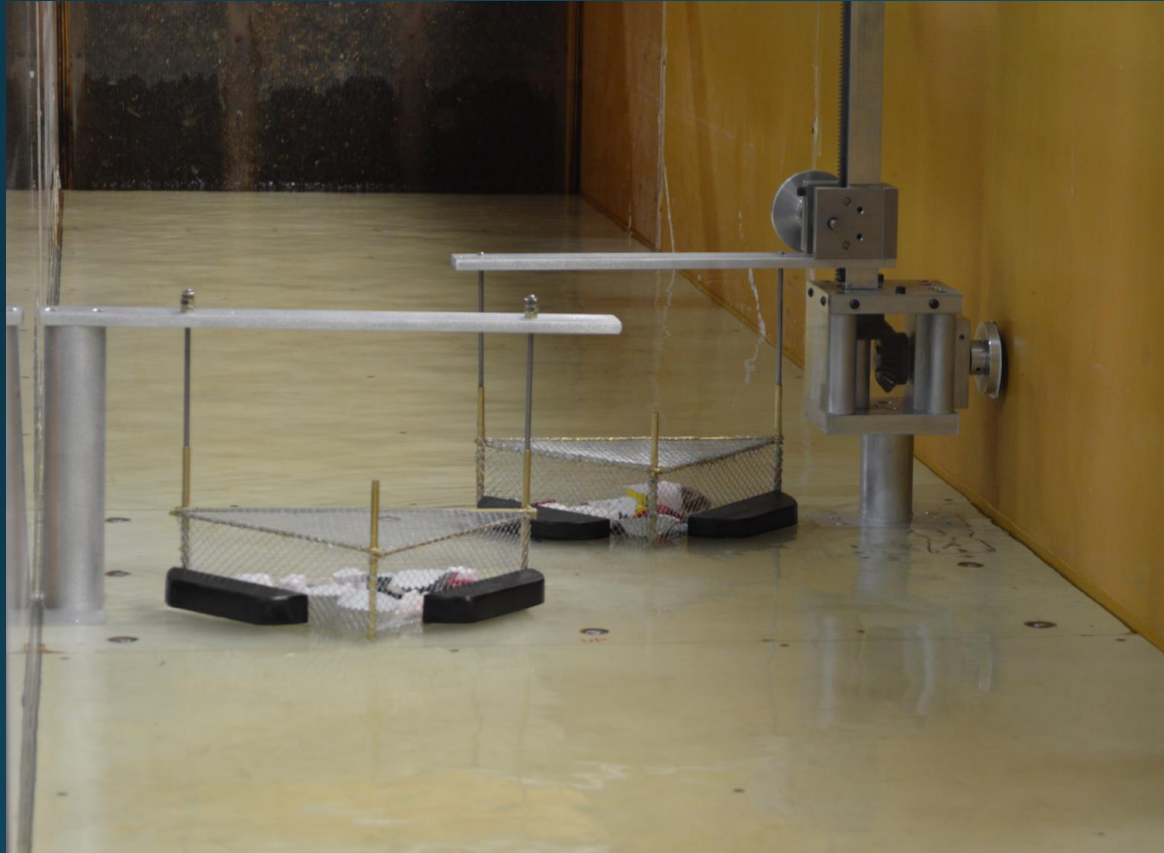
# Round 2 Model Winners



Second Place from  
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# Round 2 Model Winners



First Place from  
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