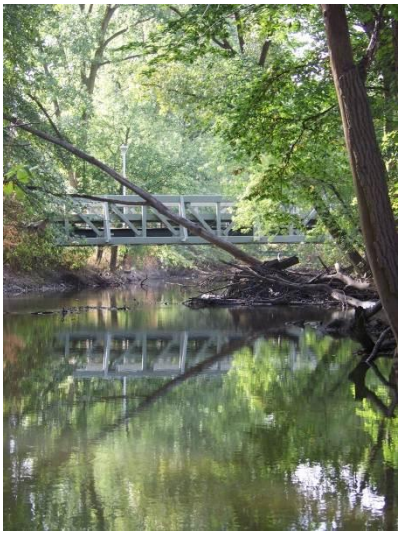
2013 Annual Report President's Commission on the River

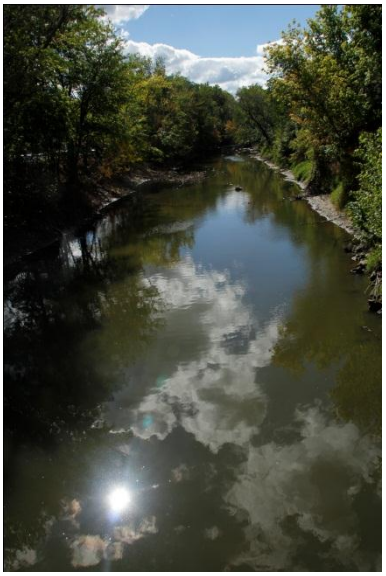
PRESIDENT'S COMMISSION *on the River*

2013 Student River Photography Contest winners



Bridge Reflections
By Anthony Dixon
1st Place

Ripples of Time
By Jacob Cameron
2nd Place



Cloudy
By Yanran Han
3rd Place

Prepared by
Dr. Patrick L. Lawrence, Chair
President's Commission on the River
patrick.lawrence@utoledo.edu

December 2013

Introduction

During 2013 the Commission oversaw the final completion of the river restoration project on the main campus with the installation of in-stream habitat structures along the 3,700 feet of the Ottawa River – a project in planning and design since 2009. With funding support from USFWS and OEPA, this project resulted in improvements to bank vegetation and aquatic conditions for fish and other aquatic species, and a legacy of improved conditions and awareness of the importance and value of the river to our campus.

The project also included numerous events and activities for community engagement, public outreach, and education at the university and the Toledo area. The project was a great success and represented the largest activity undertaken to date by the Commission in partnership with the funding agencies and other partners including TMACOG, U.S. Army Corps of Engineers, Partners for Clean Streams Inc., EnviroScience, and the lead constructor – Ecological Restoration Inc. We are greatly appreciative of all their support and efforts on this project.

This annual report also provides a summary of many other activities of the Commission over the past year including Celebrate Our River week and Clean Your Streams, work with faculty and students from Civil Engineering on proposed storm water improvements, and ongoing fund raising and education activities to students, faculty, staff and our community.

On behalf of the Commission, I am pleased to present our 2013 Annual Report and to continue our commitment to address environmental, beautification, education, public access, and community engagement for the Ottawa River here on the main camps of the University of Toledo in 2014 and beyond!

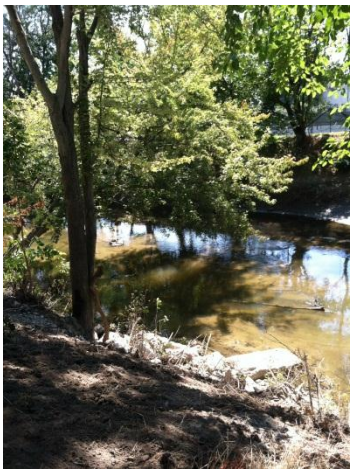
Sincerely,

Dr. Patrick L. Lawrence, Commission Chair

Table of Contents

River Restoration Project

In planning and design since 2009, the final construction phase of the in-stream restoration for the 3,700 feet of the Ottawa River on the UT main campus was undertaken during 2013, the next series of slides provide an overview of the work and project now complete



Timeline 2013

Early 2013: Submission of Applications for federal and state permits

(secured May 2013; OEPA NPDES storm water permit + USACOE Nationwide permit)

Spring 2013: UT issues call for construction bids

(completed May/June 2013; RFP sent to 8 pre-qualified bidders, contractor selected

Spring/early Summer 2013: Site preparation/monitoring

(July 2013: signage, materials, media, pre construction in-stream assessment, bank clearing of invasives and access/staging areas)

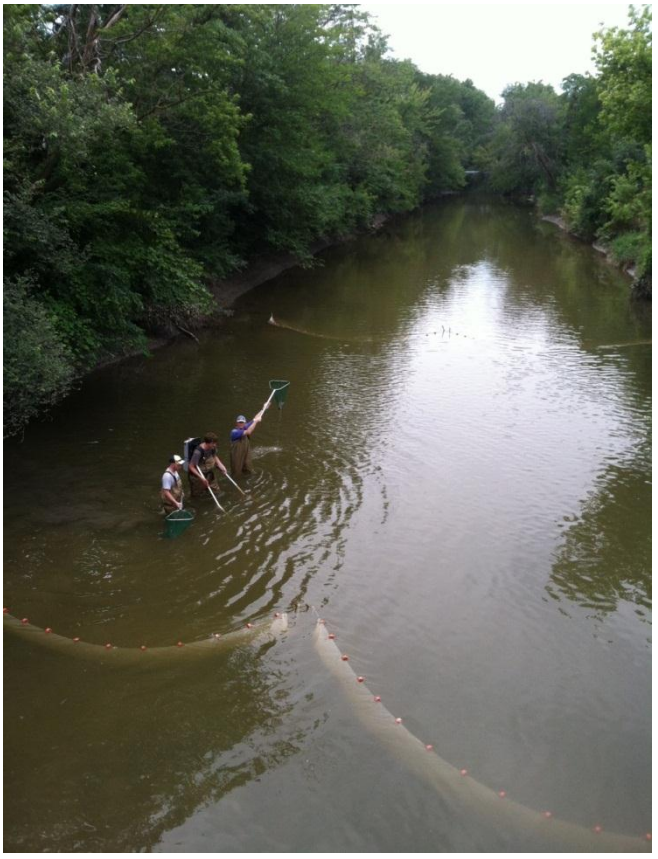
August 2013: Construction of In-stream restoration features construction

(completed July 29-August 14, 2013)

Fall 2013: Additional bank and in-stream native plantings

(completed September/October)

2014: Post project monitoring + install permanent information signage



Additional grant from USFWS and Lake Erie Commission (both to Dr. H. Gottgens, UT DES) funds pre and post construction monitoring of fish populations and habitat conditions

Install of information signs on site pre-construction (July 2013)

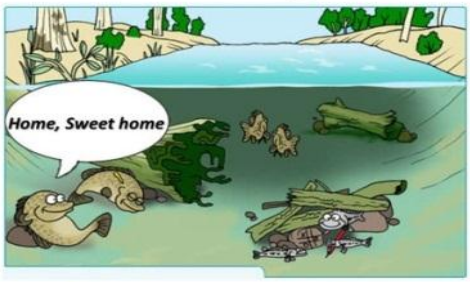
River Habitat Restoration in Progress

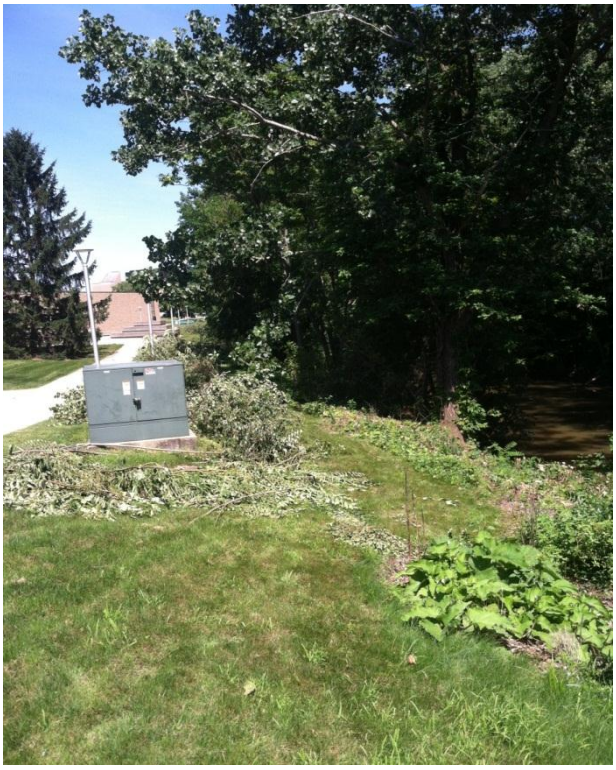
THE UNIVERSITY OF TOLEDO 1872

Work is currently underway along the 3,700 feet of the Ottawa River on the main campus of UT with the installation of several in-stream structures to improve aquatic habitat.

These various features use stone, wood and native plantings to provide enhanced sites for the feeding, spawning, and shelter for fish and many other natural organisms found within the river. In addition, along the river banks non-native exotic plants will be removed and replaced with native species

For more information on this project refer to:
www.utoledo.edu/commissions/river
or contact:
Dr Patrick Lawrence
UT Presidents Commission on the River
patrick.lawrence@utoledo.edu





NOAA GLRI grant to Partners for Cleans Streams Inc. for establishment of Maumee Corp – Eight student workers were hired by PCS to assist with local restoration projects, including removal of invasive species at UT project site (June-July 2013)

Buckthorn, Honeysuckle, Tree of Heaven removal

Pre-construction media attention

Final phase of Ottawa River restoration to begin July 29

By Meghan Cunningham

The restoration of the portion of the Ottawa River flowing through The University of Toledo Main Campus soon will be complete with the final phase of in-stream work to begin this month.

Student workers of the Maumee Conservation Corps from Partners for Clean Streams already have begun some clearing of the riverbanks to prepare for the major in-stream construction work that is scheduled to begin Monday, July 29. The clearing will remove non-native invasive plants along the riverbank with no extensive removal of trees planned, and replanting of native species will take place later this summer.

"This phase will focus on aquatic improvements, including adding large rocks and logs to mimic natural water flow and get a ripple effect in the water," said Dr. Patrick Lawrence, professor and chair of the Department of Geography and Planning, and chair of the President's Commission on the River. "Right now the river is essentially uniform with very limited ripples or turbulence. Adding these natural materials will make for more diversity to the aquatic habitat giving fish and other aquatic organisms more places for nesting, spawning, food and shelter."

The President's Commission on the River in 2009 started the habitat restoration efforts for the 3,700 feet of the waterway that runs through Main Campus. This current work is funded with a $235,000 grant from the Ohio Environmental Protection Agency and a $151,000 grant from the U.S. Fish and Wildlife Service and represents the largest project undertaken to date by the commission. The restoration project also involves the assistance of Toledo Metropolitan Area Council of Governments, EnviroScience, Partners for Clean Streams, Ohio EPA and the U.S. Army Corps of Engineers.

Ecological Restoration Inc. has been hired for the final in-stream restoration phase, which is scheduled to be complete Aug. 16. Signs will be placed along the river to inform the community of the work being done; however, no bridges or roads will be closed during the restoration, and disruptions to the University community will be kept to a minimum, Lawrence said. A workshop and public tour about the project are being planned for early August.

Summer is the best time to complete the project because there are fewer people on campus, the river water is at its lowest levels, and it is after the fish-spawning season during the spring, reducing impacts to the natural habitats, Lawrence said.

The in-stream work is the final phase of the project that has included adding more than 300 native plants and trees along the banks of the river and creating a cut bank area near the Law Center last summer that will allow for more water storage during higher river levels.

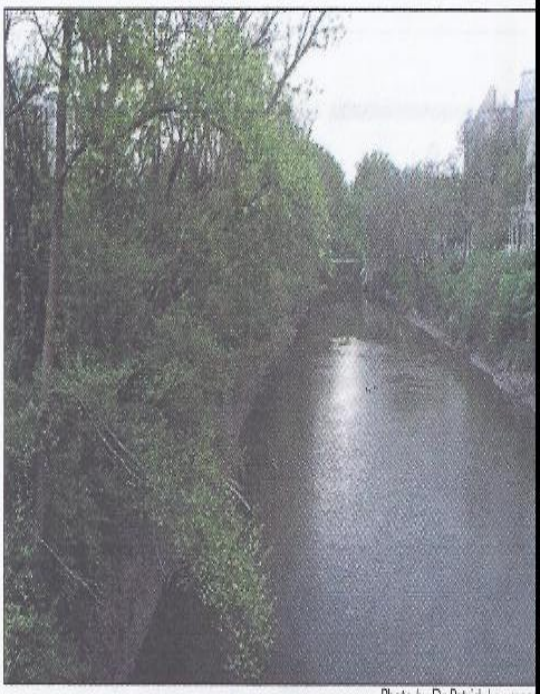


Photo by Dr. Patrick Lawrence

DOWN BY THE RIVER: Restoration work on the Ottawa River started last week as non-native plants were cleared from the river bank. Major in-stream construction work is scheduled to begin Monday, July 29.

Another related milestone for the Ottawa River on Main Campus was achieved in February 2012 when the fish consumption advisory, with the exception of carp, was lifted for the river by the Ohio Department of Health and the Toledo-Lucas County Health Department. The advisory had dated back to 1991 when it was issued by the Ohio Department of Health as a result of the decades of manufacturing activity and improper waste disposal of hazardous substances in the Ottawa River and its watershed.

"We have more than 40 fish species in the river, and we've noticed additional wildlife such as small mammals, birds, turtles, frogs, mallard ducks and Canada geese," Lawrence said. "We look forward to the completion of the restoration that will further enhance the river and add more wildlife diversity."

4

THE BLADE
One of America's Great Newspapers

UT summer interns fighting against nature's leafy invaders

BY KELLY McLENDON
BLADE STAFF WRITER

Removing invasive plants from the University of Toledo campus has its challenges.

Just ask the four seasonal interns who spent this week there, working to remove aggressive, meddlesome plants such as the invasive form of honeysuckle and buckthorn. Mike Griswold, a graduate student at the university, said the interns have also all encountered another common intrusive plant — poison ivy.

"We've all suffered a little bit," he said.

The work the interns will complete this summer is part of a grant that was secured by Partners for Clean Streams, a nonprofit organization that strives to improve water quality in northwest Ohio.

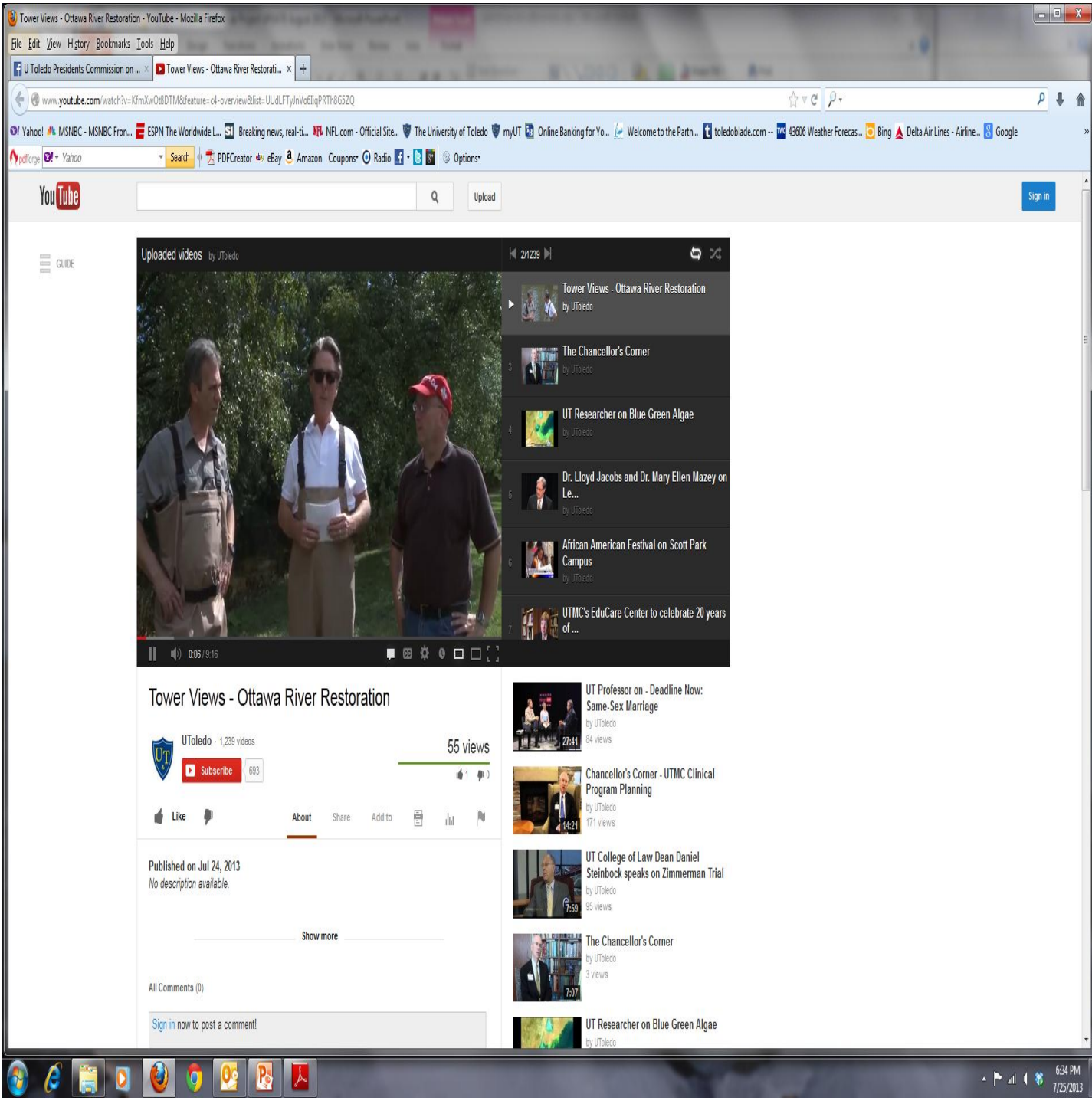
Awarded an $800,000 grant from the National Oceanic and Atmospheric Administration to focus on habitat restoration, the nonprofit hired eight Maumee Corps interns this summer to clean up an estimated 1,000 acres of habitat along the Ottawa River and Swan Creek watersheds.

University of Toledo graduate student Mike Griswold removes invasive species on campus, along the Ottawa River. It's part of a summer internship to clean up an estimated 1,000 acres of habitat. *THE BLADE/JEFFREY SMITH*

Enlarge | Buy This Photo

The interns will also help with existing projects in the community through partnerships with other organizations, including Boy Scouts of America, The Nature Conservancy, Metroparks of the Toledo Area, and The Olander Park System. The other organizations have hired more employees, utilizing the grant funding.

UT media office films feature on project before construction on UT Tower Views (July 2013)



http://www.youtube.com/watch?v=KfmXwOt8DTM&feature=c4-overview&list=UUdLFTyJnVo6IiqPRTh8G5ZQ

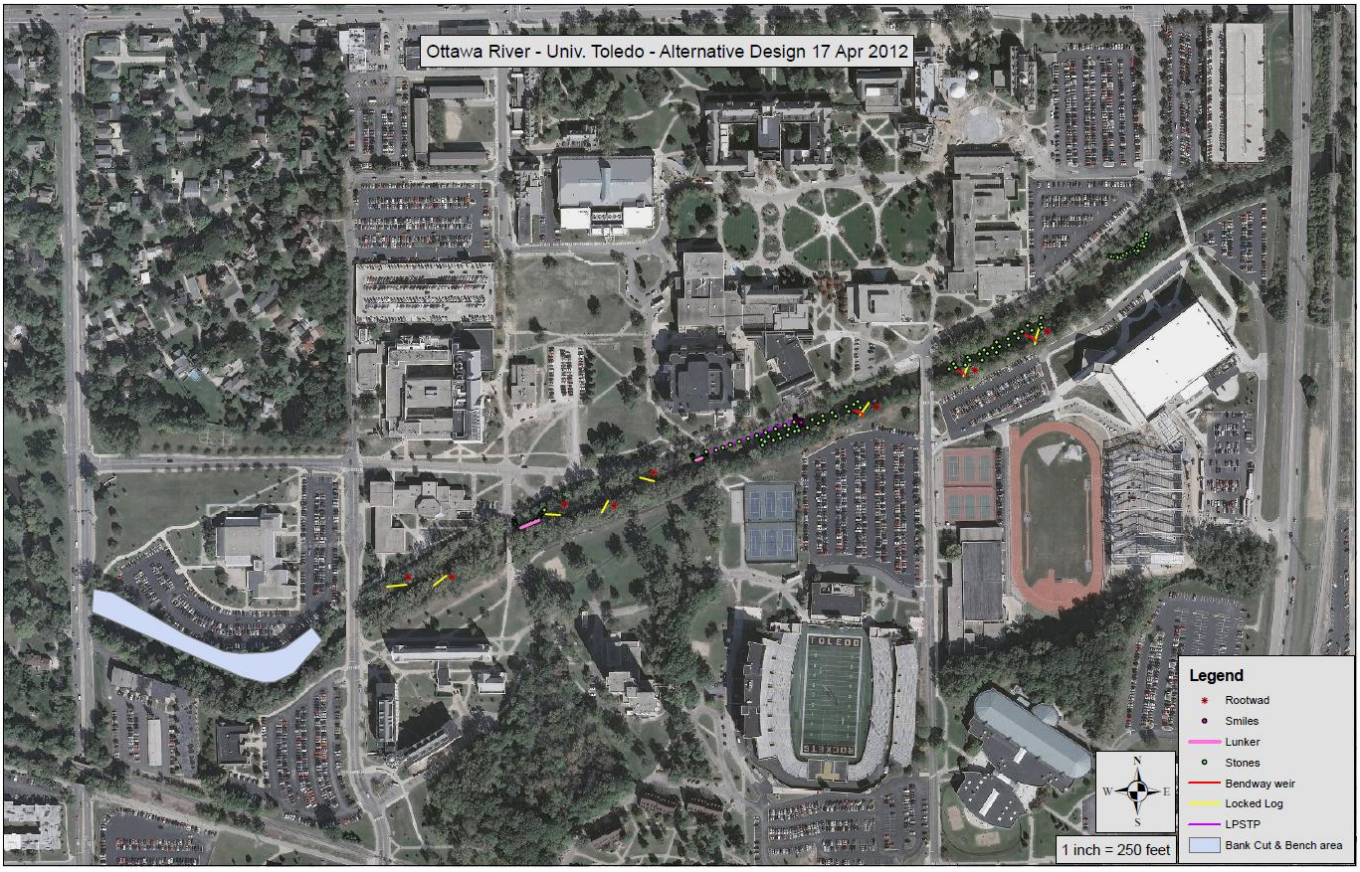
Construction (July 29th – August 13, 2013)

Funded by Ohio EPA 319 Program and USFWS (GLRI)

Design by ACOE Buffalo and Dave Derrick (ACOE)

Project Management: Patrick Lawrence (University of Toledo)
Matt Horvat (TMACOG)

Contractor: Dave Hails (Ecological Restoration Inc.)



Mobilization (4 days)

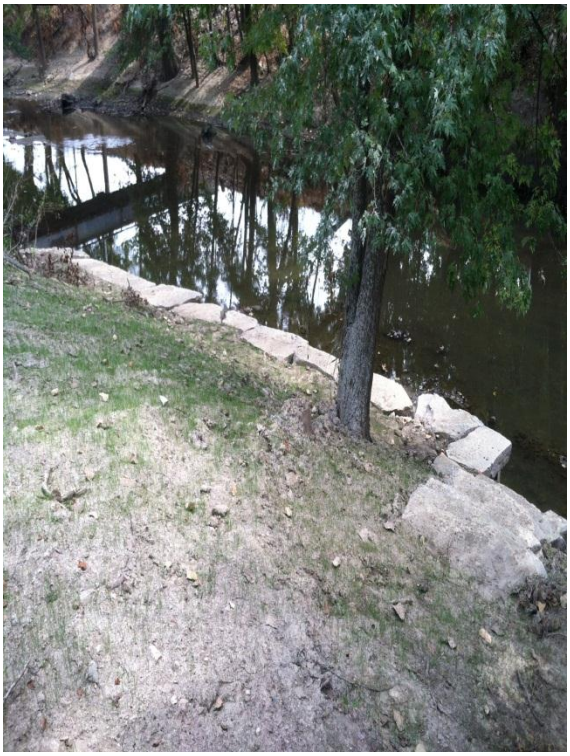
Construction

Locked Logs (Reach 2)

LUNKERS #1 (Reach 3)

Locked Log #1 (Reach 3)

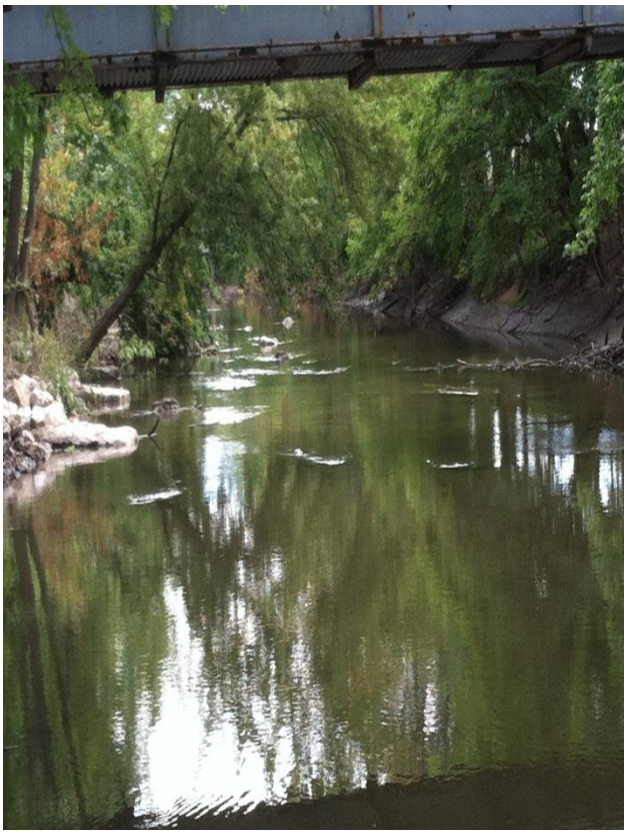
LUNKERS #2 (Reach 3)



Locked Log with Hydraulic Cover Stones (Reach 3)

Longitudinal Peaked Toe Protection (LPTP) with single stone bendway weirs (Reach 4)

Hydraulic Cover Stones (Reach 4)



Bendway Weir with locked log (Reach 4)

Bendway Weir with locked log #1 (Reach 5)

Bendway Weir with locked log #2 (Reach 5)

Hydraulic Cover Stones (Reach 5)

Mini Bendway Weir and stepping Stones (Reach 5)

Access Path (Reach 5)

River Restoration Workshop (August 6-9th, 2013)

- Hosted by the UT President's Commission on the River and Partners for Clean Streams Inc.
- Included presentations and daily site visits to local recent restoration projects and to UT site under construction
- 40+ attendees including professionals, federal/state agency staff, citizens and students
- Each attendee left with a flashdrive containing all presentations and project handouts

Project Media Day (August 9th)

Conducted interviews with media from University, student newspaper, local ABC news, and Toledo Blade (local paper)

LET IT FLOW: Under the close supervision of Dave Derrick from the U.S. Army Corps of Engineers, Dave Hails of Ecological Restoration Inc. carefully placed cover stone for the fish habitat structures installed as part of the recently completed river restoration along the Ottawa River on Main Campus. "This phase focused on aquatic improvements, including adding large rocks and logs to mimic natural water flow and get a ripple effect in the water," said Dr. Patrick Lawrence, professor and chair of the Department of Geography and Planning, and chair of the President's Commission on the River. "Adding these natural materials will also make for more diversity to the aquatic habitat, giving fish and other aquatic organisms more places for nesting, spawning, food and shelter." The restoration work for the 2,700 feet of the waterway that runs through Main Campus was funded with a $235,000 grant from the Ohio Environmental Protection Agency and a $151,000 grant from the U.S. Fish and Wildlife Service. The project also involved the assistance of Toledo Metropolitan Area Council of Governments, EnviroScience and Partners for Clean Streams.

Photo by Daniel Miller

THE BLADE
One of America's Great Newspapers

COMMENTARY

UT proud of new look, new life for Ottawa River

8/18/2013

BY MATT MARKEY
OUTDOORS

Ecological restoration continues to the Ottawa River at the University of Toledo. It has worked to restore all 3,700 feet of the river that runs through campus.

Cross the bridge over the Ottawa River in the heart of the University of Toledo campus less than a decade ago, and you were more likely to see a discarded shopping cart than a smallmouth bass.

Take that same stroll today, and there's no more societal debris littering the waterway, and what you see looks very much like the makings of a good fishing stream.

The short stretch of the Ottawa that makes a diagonal cut across the school's main grounds has had an extreme makeover, habitat edition. Gone are the flotsam and jetsam that were so visually distasteful, and a good share of the invisible trash — industrial pollutants, sewage overflows and excess sediment — that have tainted the river for so long.

The campus waterway is undergoing the final phase of a restoration effort that began back in 2005 with the formation of a university president's commission to address the many concerns associated with river.

"We had a river that, from a lot of people's perception, was just dirty and ugly," said Patrick Lawrence, a UT professor who heads the group that has been restoring the campus stretch of river.

"What they see now is something very different."

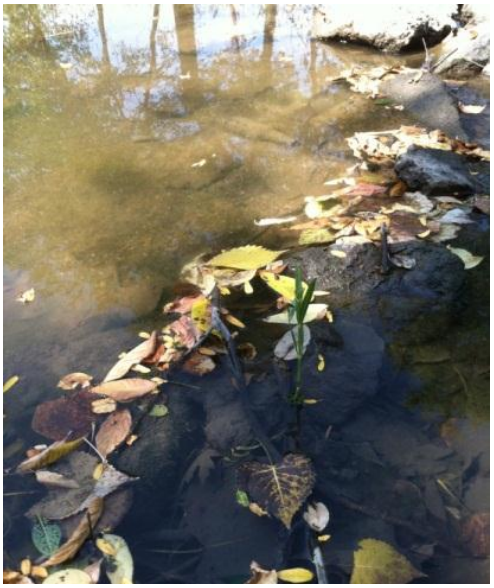
The latest phase of the project called for the placement of logs, large rocks, and other materials in the waterway to bring back some of the character of its original path through campus. Helped by the removal of a dam further upstream, long, flat, shallow stretches are being replaced with minor bends and diversions in the flow that are intended to create a more natural combination of riffles and pools.

De-Mobilization (3 days)

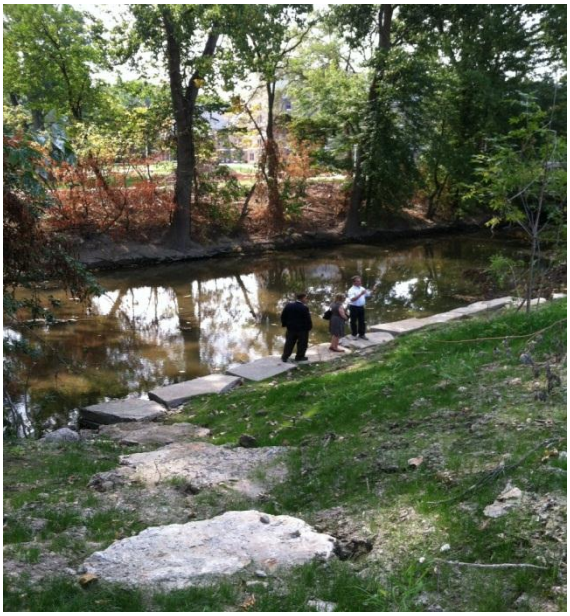
Replanting (September-October 2013)

- 400 water willows in river bed

- 325 native plants along the bank, 25 species including Burt Oak, Dogwood, Indigo Bush, Black Chokeberry, Hazelnut, Black Walnut, Tulip Poplar, Hornbeam, Ninebark, Sycamore, Black Cherry, Sumac

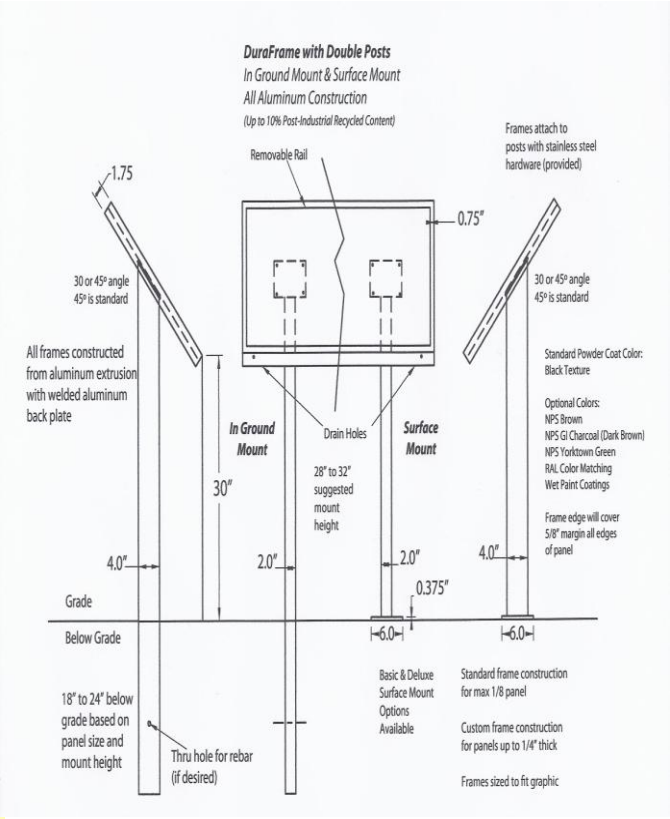


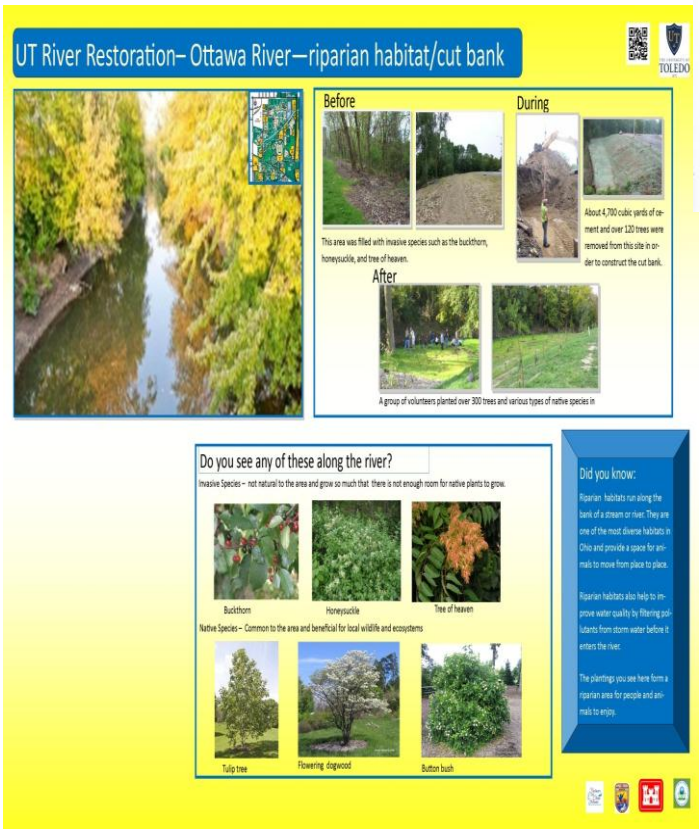
Dedication event (September 20th, 2013)



Information Signs

- 6 signs to be installed along the river at bridge crossings and key sites to educate students and visitors about the river and in-stream restoration structures installed (Spring 2014)





On the Web….

- **UT Tower Views: Ottawa River Restoration Follow-up (October 2013)**
  http://www.youtube.com/watch?v=iFN157nXPk4

- **Series of Construction Time Lapse Videos Found on YouTube Channel "U Toledo Presidents Commission on the River"**

http://www.youtube.com/channel/UCEJ907DppXDYqrfmie4Nn9A

- **Archive of all project reports and presentations can also be found at:**

http://www.utoledo.edu/commissions/river

Project Outcomes: Restoration efforts

- Clearing of non-native invasive plants from approximately 5,600 linear feet of river bank (both banks), followed by re-planting of over 320 native species on the banks

- Planting of 400+ aquatic native plants (water willows)

- Installation of 12 in-stream restoration structures + 80 hydrologic cover stones along 2,800 liner feet of river (River Reaches 2-5):

  - 6 locked logs
  - 2 sets of LUNKERS (total length 88ft)
  - 1 Longitudinal Peaked Toe Protection (200 liner feet) with 5 single stone bendway weirs + stone smile structure
  - 3 Bendway Weirs

- Addition of 400 feet of access path along river bank

- 900 foot long cutbank feature for flood storage, included removal of 4,000 cubic yards of construction debris and planting of 325 native plants on river bank feature (plus improvements of two storm water outfalls)

Public Education and Outreach: Deliverables

- 3 project public meetings/workshops
- 3 press events, numerous media stories including
  in local papers and T.V. news stations
- Presentations to University community (leadership and students) and at professional conferences, workshops
  and meetings
- Numerous field tours and site visits
- 2 featured project stories on
  UT Tower Views
- Project website and Facebook page
- YouTube channel (with project videos)
- 8 Project Grant funding and information signs
- 6 Permanent Project Information Signs (installed 2014)

River Restoration Project
Future and Ongoing Work

- Treatment and/or removal of any regrowth or re-establishment of non-native invasive plant species

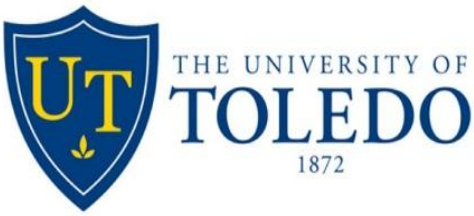
- Maintenance of native plantings, working with Partners for Clean Streams Inc. for future river bank plantings in Summer 2014 at no cost to this grant

- Monitoring of fish populations and aquatic habitat conditions (under USFWS funding provided to Dr. Hans Gottgens, University of Toledo and by OEPA 319 program and LEPF)

- Observation and assessment of stability and function of in-stream restoration

- Extension of river restoration work by the UT Presidents Commission on the River under future projects and other funding sources, including storm water mitigation public access

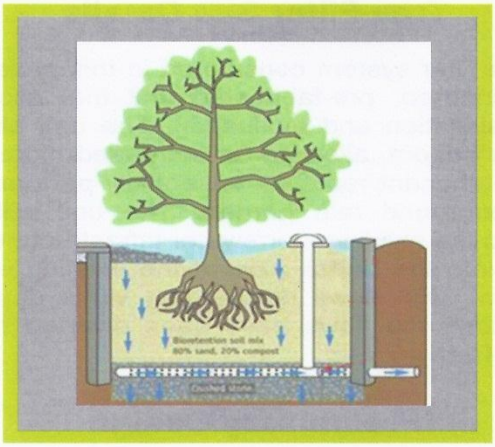
Appreciation is extended to all the project partners and funders:



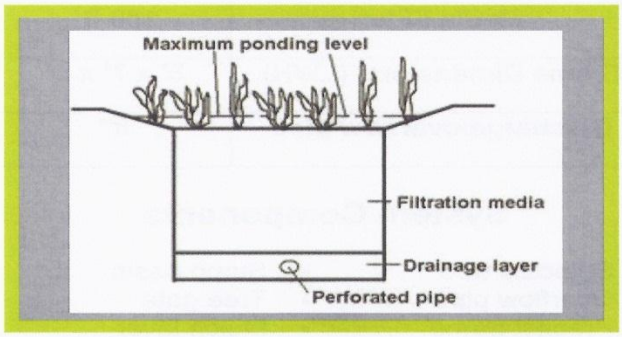
Ohio EPA SWIF Funded Storm water Projects

In 2013 Dr. Cyndee Gruden (Civil Engineering) secured grants from the Ohio EPA SWIF program that will be used to install storm water treatment systems at two parking lot project sites on main campus adjacent to the Ottawa River (construction Spring 2014)

UT Green Stormwater Infrastructure



Treefilters are engineered bioretention systems designed relative to the volume of the first flush of stormwater runoff from impermeable drainage areas. In normal rain events, these systems provide preliminary treatment and volume control before discharging to receiving water bodies.



Bioretention basins are vegetated ditches that are designed to capture and control the first flush of polluted surface runoff from impermeable drainage areas before discharging to surface water bodies.

Project Description

Stormwater discharge sampling at UT has indicated that levels of various contaminants including nutrients and suspended solids can be high and have significant temporal variation. As part of an ongoing effort to improve the condition of the Ottawa River, UT has received GLRI funding through the Ohio EPA to design and implement two stormwater demonstration sites on campus. These projects will incorporate low impact design (LID) principles through the installation of a tree filter and a bioretention basin addressing flows from parking lots 12W and Area 3, respectively.

Low Impact Design Background

Related to stormwater infrastructure, LID attempts to incorporate natural systems in a built environment to replicate natural hydrologic cycles and reduce reliance on municipal and traditional grey stormwater systems.

Bioretention Systems Background

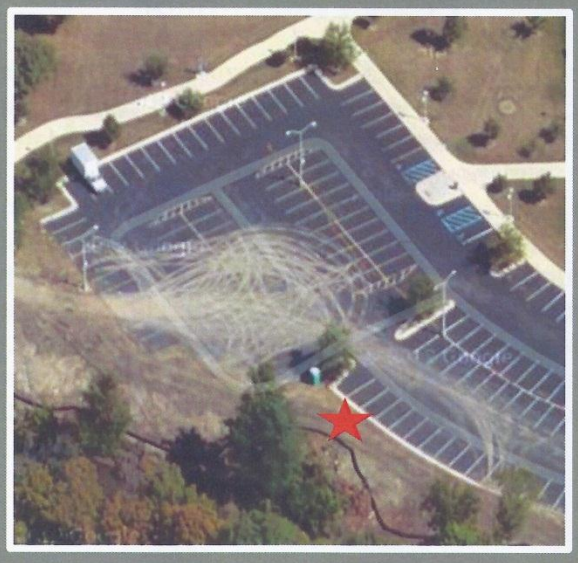
These systems are designed to retain (and treat) the first flush from contributing impermeable drainage areas. The first flush can contain suspended solids, nutrients, bacteria, and petroleum hydrocarbons, among other pollutants. The first flush can be calculated as a half inch of rainfall over the impermeable surface area.

Developing Project Goals

- Native species/plant selection (trees and low-lying vegetation/grasses).
- Engineered media composition.
- Flow dissipation.
- Maintenance scheduling.
- Performance monitoring.
- Educational signage/outreach.

UT
COLLEGE OF ENGINEERING
THE UNIVERSITY OF TOLEDO

Proposed Tree Filter Details



Tree Filter Location

The proposed tree filter will be located in the southwest corner of parking lot 12W of the UT law center. The existing 18" stormwater outfall is buried under construction debris and decaying vegetation.

Example Retrofit

The proposed tree filter will be integrated with the existing curb and stormwater infrastructure. The system will slow discharge velocities to the river, provide preliminary treatment and relieve peak flow events.

Tree Filter Site Details

The tree filter system considered in this project is a pre-engineered, pre-fabricated unit that allows for easy installation and evaluation. The unit also has an open bottom, allowing for increased bioretention and contaminant removal, essentially performing as an underground rain garden. The unit will be a retrofit to the existing stormwater infrastructure, tying directly into the outfall pipe at the existing edge of pavement, with flows discharging via a daylighted outfall, after the flows have been diverted through the tree filter.

Preliminary Design

Impermeable Drainage Area	**0.7 acres**
First Flush	**1,270 ft^3**
10-yr Storm Flow	**1.78 cfs**
Media Filter	**100 ft^2**
Frame Dimensions (LWH)	**5' x 7' x 5'**
Discharge/overflow pipe	**8"**

System Components

- Selected tree
- Overflow pipe
- Precast frame
- Engineered media
- Discharge pipe
- Sump basin
- Tree gate
- Mulch layer
- Gravel
- Rip-rap

Expected Benefits

- 95% reduction in total suspended solids
- 70-90% reduction of metals and petroleum hydrocarbons
- 40% reduction in dissolved inorganic nitrogen
- Elimination of coliform bacteria

Proposed Bioretention Basin Details

Bioretention Basin Details

The proposed bioretention basin is an 85' vegetated rectangular channel that conveys stormwater to the existing inlet catch basin in the northeast corner of Parking Area 3. The depth of the bioretention basin is 3', which provides sufficient retention time for infiltration, biological conversion and vegetative uptake to occur.

Preliminary Design

Impermeable Drainage Area	**0.85 acres**
First Flush	**1,500 ft^3**
10-yr Storm Flow	**2.9 cfs**
Basin Dimensions (LWD)	**85' x 8' x 3'**
Basin Surface Area	**680 ft^2**
Area Ratio (%)	**2%**

System Components

- Native plant species
- 15"-18" eng. media
- 3"- 6" pea gravel
- 12" gravel
- 8" underdrain pipe @ 1.5% Slope
- Media composition
  - Organic soil
  - Sand
  - Clay
- Protective rock channel

Contact Information

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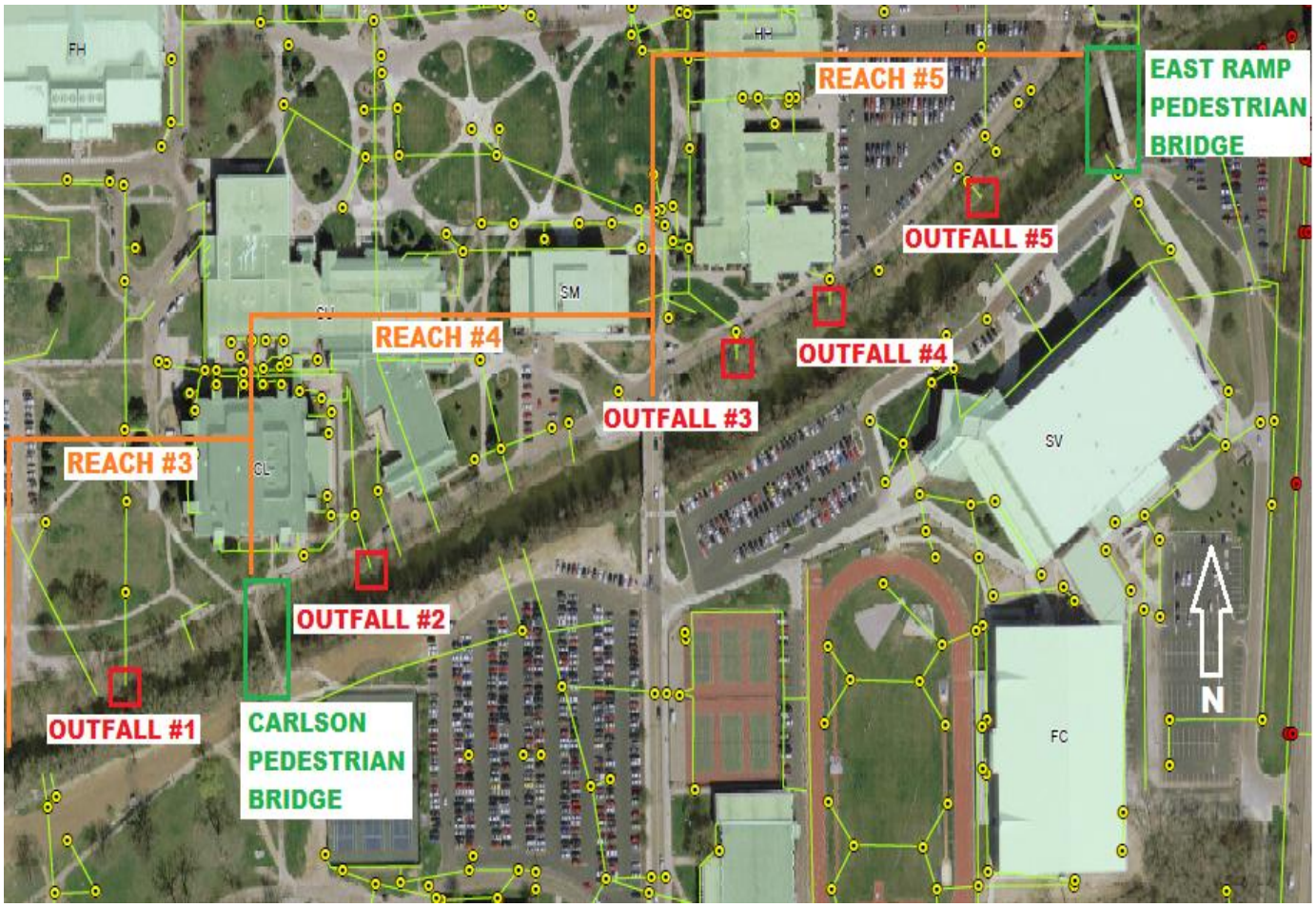
Jaryd Motsinger, jaryd.motsinger@rockets.utoledo.edu
Kyler Lucas, kyler.lucas@rockets.utoledo.edu
David Buchman, david.buchman@rockets.utoledo.edu
Robert Phillips, rphilli5@rockets.utoledo.edu

Bioretention Basin Location

The proposed bioretention basin will be located in the grassy area along the north edge of Parking Area 3, near Savage Arena. An existing portion of the gutter pan will be removed to create additional space. The proposed location is denoted by the blue rectangle in the picture above.

Existing Site Conditions

Fall 2013
Civil Engineering Senior Design Project: Storm water outfalls and bridges



- Project focused on proposals to repair five storm water outfalls and channels, and address erosion under two bridges

Repair Headwall at Outfall #1

Preparation

- Remove broken splash pad
- Remove loose soil and obstructions around headwall

Repairs

- Shore headwall with compacted rip-rap
- Pour new concrete splash pad

  (82” wide, 24” deep, and 6” thick)

Material Needed

- 0.253 cubic yards of concrete

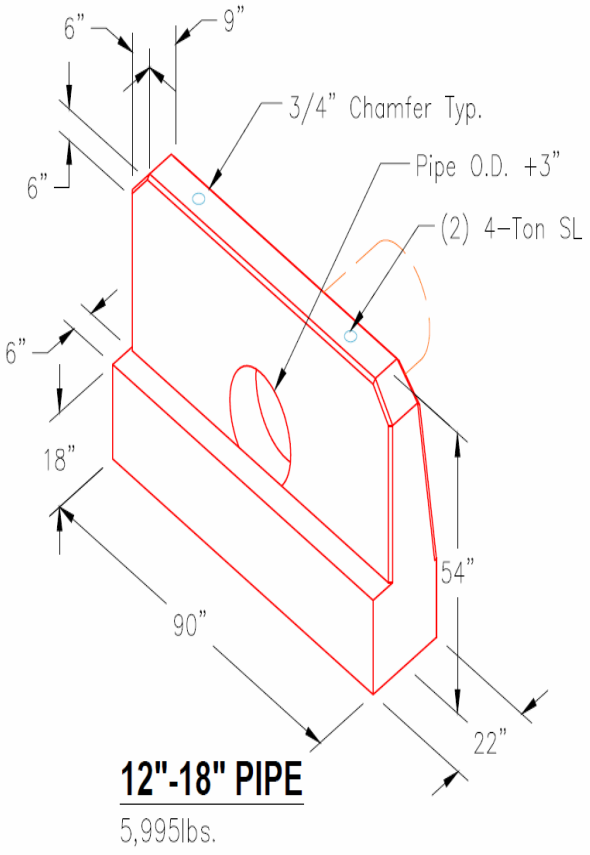
Remove and Replace Headwall at Outfall #1

Precast Concrete Headwall

- Remove current headwall
- Replace with precast concrete headwall
- 14” diameter pipe

Material Cost

- Oldcastle Precast Headwalls
- $495.00



Overlook Addition
At Outfall #1

- Provide place for fishing or enjoying view
- 12’ x 18’ Composite wood/treated wood platform
- 25 psf dead load, 20 psf snow load, and 100 psf for people capacity
- Factored design ultimate load of 222 psf
- Railing will provide fall protection
- Ramp will allow easy access
- Estimated materials and labor is $10,000 to $12,000

Outfall #2

Location

North bank, in Reach 4 of the Ottawa River, near the Carlson Library.

Current Condition

- Damage to corrugated pipe
- Outfall channel erosion issues
- Large elevation difference from outfall to water level

Repairs to Outfall

- Cut pipe flush to headwall
- No modifications to headwall

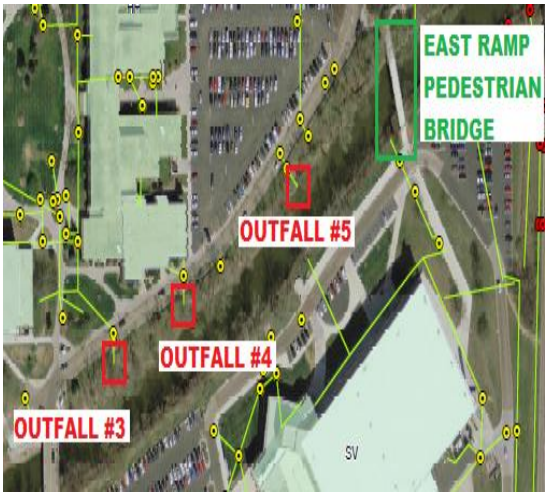
Overlook Addition
At Outfall #2

- Ties into Student Garden Plaza
- Concrete Cantilever based design
- A 12’ x 20’ area will be required for this addition
- 150 psf dead load, 20 psf snow load, and 100 psf for people capacity
- Factored design ultimate load of 372 psf
- Railing for safety
- Bench seating

Outfall #3

Location

North bank, in Reach 5 of the Ottawa River, near the Health and Human Resource Building



Current Condition

- Oversized headwall
- Headwall forward tilt
- Outfall channel needs protection

Alternatives to Outfall

- Repair Headwall
- Remove and Replace Headwall

Repair Headwall at Outfall #3

Repairs

- Saw headwall down to size
- Backfill to level out erosion issues

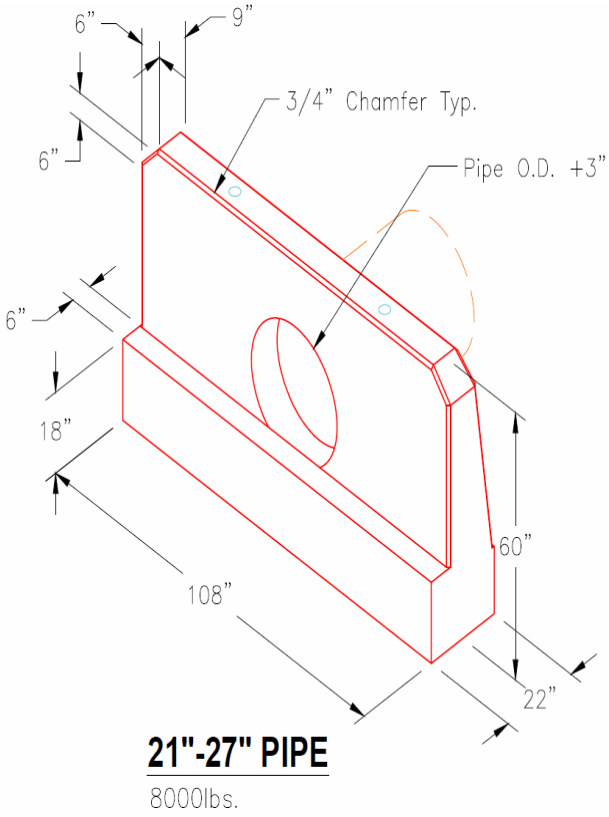
Costs

- Sawing concrete is $35.00/ linear foot
- Total cost is $233.33

Remove and Replace Headwall at Outfall #3

Precast Concrete Headwall

- Remove and replace with precast conc headwall
- Smaller headwall required than the original
- Eliminates forwai lean of original headwall
- 21” diameter pipe



Material Cost

- Oldcastle Precast Headwalls
- $605.00

Outfall #4

Location

North bank, in Reach 5 of the Ottawa River, South of the Health and Human Service Building

Current Condition

- Pipe has broken off inside the Headwall
- Soil erosion issues
- Outfall channel protection

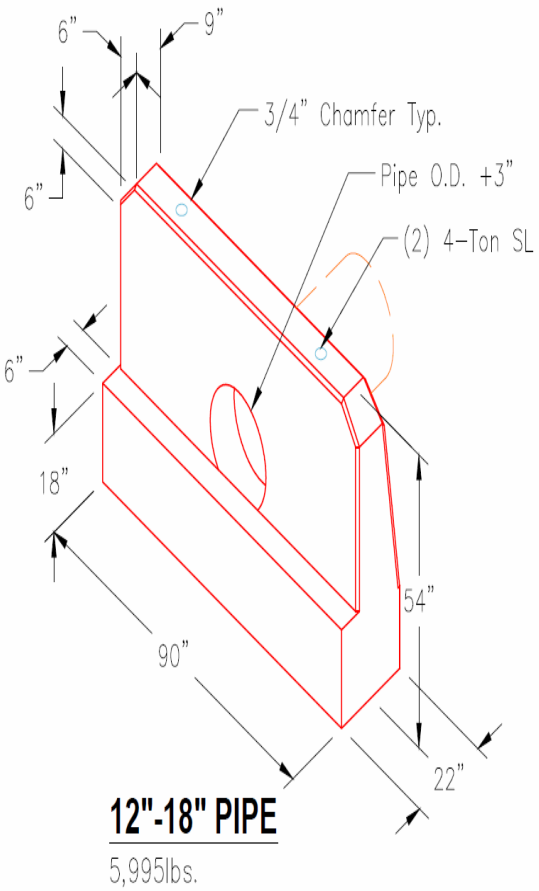
Repair to Outfall

- Remove and Replace Headwall

Remove and Replace Headwall at Outfall #4

Precast Concrete Headwall

- Remove and replace damaged headwall and pipe
- Guardrail may need to be removed to access pipe
- 12” diameter pipe



Material Cost

- Oldcastle Precast Headwalls
- $495.00

Outfall #5

Location

North bank, in Reach 5 of the Ottawa River, underneath the new stone pathway

Current Condition

- Headwall and splash pad are in good condition
- Erosion issues
- Outfall channel protection needed

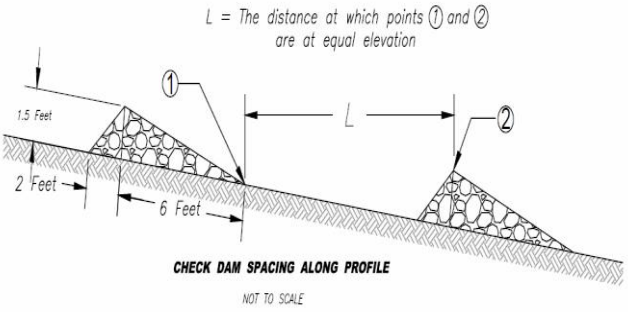
Alternatives to Outfall

- No alternatives due to good condition of structure, pipe, and splash pad

Channel Protection Alternative Design

Rock Check Dams

- Slow flow with a series of rock dams constructed perpendicular to flow
- Creates ponding, allows soil particles to settle



Outfalls

- #3 – One Check Dam
- #4 – Two Check Dams

Rip Rap

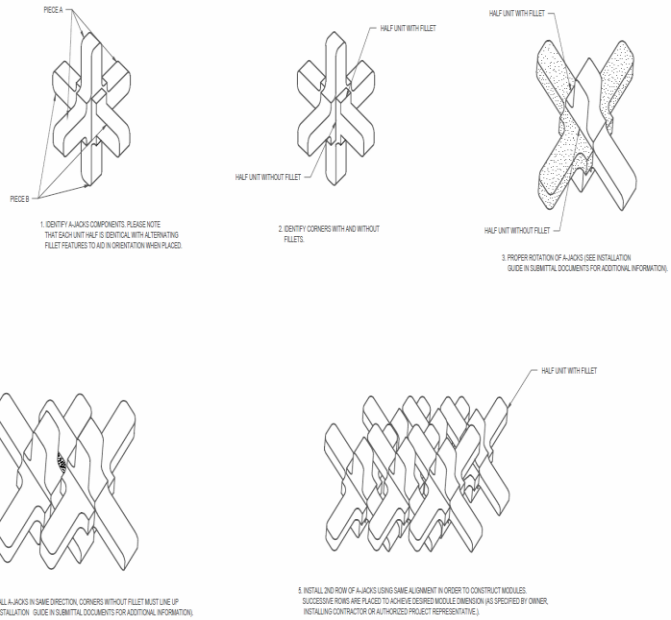
- Using outlet velocity
  - Outfall 3 velocity = 9.316 fps
  - Outfall 4 velocity = 6.405 fps
- Type C rip rap
- Cross sectional area for volume

Rock Check Dam/ Channel Rip Rap Alternative								
	Channel Rip Rap	Check Dam Rip Rap	Total	Total	Price/ Ton	Geo-textile	Geo-textile Price	Total Price
Channel	(yd^3)	(yd^3)	(yd^3)	(Tons)	($/Ton)	(Price/ sq ft)	($)	($)
#3	3.70	0.89	4.59	8.03	18.00	0.20	20.00	164.59
#4	4.30	1.78	6.08	10.64	18.00	0.20	23.20	214.72
							Total =	379.31

Channel Protection Alternative Design

Concrete A-Jacks

- Concrete armor units that interlock into a flexible, permeable matrix
- Dissipate the energy of water flow, preventing erosion
- Voids in the jacks provide habitat for aquatic life, or may be backfilled with soil for plant life



Outfalls

- #1, #2, and #5

Sizing

- Four different sizes
- Various river parameters
- Factor of safety
- Shear stress and velocity that the river impels on the A-jacks

A-Jacks Concrete Units Alternative						
	Length	Width	Rows	Total	Price/A-Jack	Total Price
Channel	(ft)	(ft)		(A-Jacks)	($/A-Jack)	($)
#1	13.00	9.00	11.00	143.00	30.00	4290.00
#2	15.00	6.00	13.00	153.00	30.00	4290.00
#3	20.00	6.00	9.00	126.00	30.00	3780.00
					Total =	12660.00

Channel Protection Alternative Design

Articulating Concrete Block Mats

- An interlocking matrix of concrete blocks held together with steel cable
- Blocks come in different sizes and shapes for protection at different flows

Outfalls

- #3, #4, and #5

Sizing

- Various hydraulic conditions
- Target factor of safety
- Total area for each channel

Articulating Concrete Block Mats								
	Mat Length	Mat Width	Mat Area	Block Mat	Block Mat Price	Geotextile	Geotextile Price	Total Price
Channel	(ft.)	(ft.)	(ft^2)	Price / sq. ft.	($)	Price / sq. ft.	($)	($)
#3	25	16	400	4.00	1600.00	0.20	80.00	1680.00
#4	29	16	464	4.00	1856.00	0.20	92.80	1948.80
#5	20	18	360	4.00	1440.00	0.20	72.00	1512.00
							Total =	5140.80

Outfall and Channel Conclusions

- Outfall #1: Replace splash pad and install A-Jacks
  - Estimated $4,315.30 in material costs
- Outfall #2: Cut off the damaged pipe flush with the headwall and install A-Jacks
  - Estimated $4,590.00 in material costs
- Outfall #3: Cut down the headwall and install rock check dam in channel
  - Estimated $397.92 in material costs and concrete cutting
- Outfall #4: Replace headwall and install two check dams
  - Estimated $709.72 in material costs
- Outfall #5: Install articulating concrete blocks in the channel
  - Estimated $1512.00 in material costs

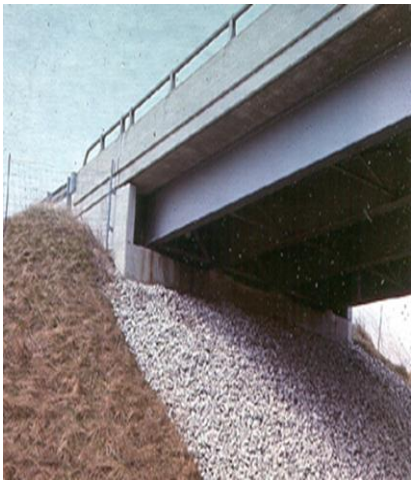
Total Cost = $11524.94

Alternative Bridge Erosion Designs

Rip Rap

- Commonly used and cost effective
- Rocks size based on river conditions
- Easy to install and maintain
- Aesthetically pleasing to most

Application of Rip Rap



Design

- Rip rap sizing based on river flow velocity (HEC-RAS)
- Type C rip rap
- Volume of rip rap was determined by using the area under the bridges placed one foot thick

Under Bridge Rip Rap Alternative						
Bridge	Under Bridge Rip Rap (yd^3)	Geotextile (Price/ sq ft)	Geotextile Price ($)	Total (Tons)	Price/ Ton ($/Ton)	Total Price ($)
East Ramp Pedestrian Bridge	22.10	0.20	155.97	38.68	18.00	852.12
Carlson Pedestrian Bridge	17.00	0.20	119.98	29.75	18.00	655.48
					Total =	1507.60

Articulating Concrete Block

- Concrete blocks attached to grid cables
- Solid and open block designs
- Allow for vegetation growth around blocks
- Cost effective (less effective than rip rap)

Design

- Same design process as outfall alternatives
- Based on river parameters and block design
- Factor of safety target is 1.4
- Select block to meet factor of safety (SD-400 OC block from SHORETEC)
- Open-celled blocks were chosen to promote plant growth

Articulating Concrete Block with Holes

Articulating Concrete Block Mats								
	Mat Length	Mat Width	Mat Area	Block Mat	Block Mat Price	Geotextile	Geotextile Price	Total Price
Bridge	(ft.)	(ft.)	(ft^2)	Price / sq. ft.	($)	Price / sq. ft.	($)	($)
Savage	60	72	2160	4	8640	0.2	432	9072
Carlson	60	60	1800	4	7200	0.2	360	7560
							Total =	$16,632

Geo-mat

- Variety of types and styles
- Installation by staking or installing anchors
- Allows growth of vegetation
- Aesthetically pleasing
- Cost dependant on selected variety

Installation of Geo-Mat

Design

- Based on bank slope and fill material properties
- EGA 30 geo-mat was selected from Geo Products, LLC
- Mat must be anchored to the river bank
- Area under each bridge determine mat area
- #57 Stone used to fill the cells within the mat

Alternative Bridge Erosion Designs

Geo-mat / Geo-grid								
	Number of Panels	Price/	Panel cost	Tendon Cost	Total Number	Price/	Stake Cost	Total Price
Bridge	(27.4' x 8.4')	Panels	($)	($)	of Stakes	Stake	($)	($)
Savage	10	168.02	1680.20	250.00	300	0.80	240.00	2170.20
Carlson	8	168.02	1344.16	250.00	240	0.80	192.00	1786.16
							Total =	3956.36

#57 Stone for Geo-mat								
	Panel Area	Stone Depth	Stone Volume	Number of	Total Volume	Total Tons	Price / Ton	Total Price
Channel	(yd^2)	(yd)	(yd^3)	Panels	(yd^3)		($)	($)
Savage	25.57	0.17	4.27	10.00	42.70	85.4	11.50	982.14
Carlson	25.57	0.17	4.27	8.00	34.16	68.3	11.50	785.71
							Total =	1767.86

East Ramp Pedestrian Bridge

Install Geo-matting under the bridge on both banks

Estimated material cost: $3,152.35

Carlson Pedestrian Bridge

Install Geo-matting under the bridge on both banks

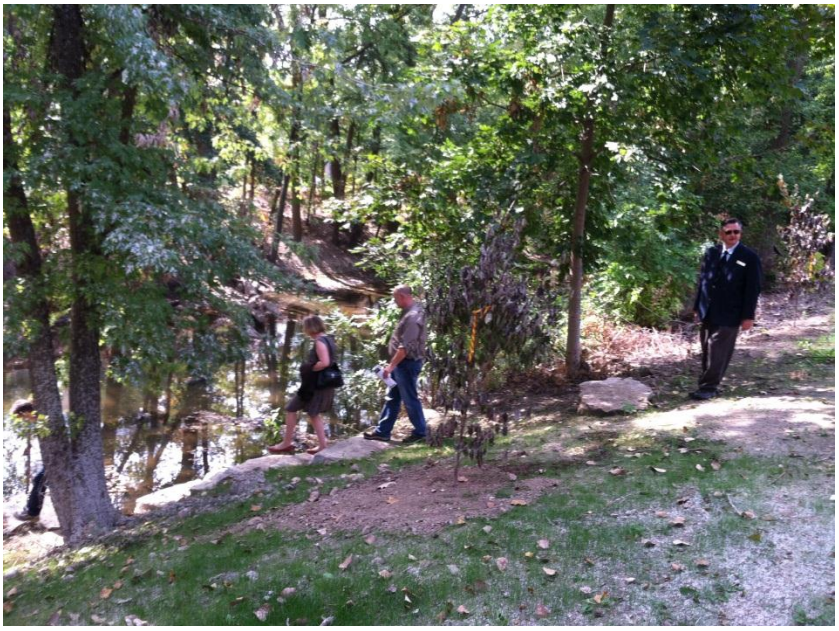
Estimated material cost: $2,571.87

Total bridge cost = $5724.22

2013 Celebrate Our River Week September 18th to 21st

Again this year the Commission hosted events and activities that focused on the Ottawa River and the work of the Commission.

- This year the week included:
  - Video and poster board displays in the Carlson Library
  - 2nd Annual Student river photography contest
  - Ribbon Cutting dedication for river restoration project
  - And UT involvement in the 17h Annual Clean Your Streams community event.



- Appreciation is given to the various members of the Commission and others from the UT Community for their assistance with these events.

17th Annual Clean Your Streams event September 21st, 2013

Over 290 UT and community volunteers participated in the annual CYS event in 2012, working at twenty five sites located at:

- Main Campus
- Health Sciences Campus
- Scott Park Campus
- Village of Ottawa Hills
- River east of main campus
- Camp Miakonda

- Over 100 large bags of trash weighing more than 1,500 pounds were collected and removed.

- Most peculiar items included bikes, balls, and a light saber!

- Appreciation is extended to the Office of the President for their continued support of this event as a community partner.

Financial Reports

- **River Restoration Project (total funding 2011-2013)**
  - OEPA 319 program grant = $235,000
    - Spending = $235,000
    - Balance (12/31/2013) = $0
  - USFWS GLRI grant = $161,132
    - Spending = $161, 132
    - Balance (12/31/2013) = $0
  - Stranahan Foundation grant Year 3 (2012)
    - FY 12 carry forward into FY13 = $1,210
    - Spending (2012) = $1, 210
    - Balance (12/310/2012) = $0

  Note: Stranahan Foundation grant closed 12/31/2012; OEPA and USFWS project grants closed 12/31/13 as river restoration is complete

- **Friends of the River Fund (UT Foundation account)**

  (July 1, 2012- December 31st, 2013)
  - FY12 balance forward = $ 1,181
  - Income (donations*) = $1,252
  - Expenses = $2106

  Balance = $327

  * includes $627 reimbursement by US ACOE of unspent funds

Outreach and Education

- News articles on the work of the Commission appeared in the UT News, Independent Collegian, Toledo Blade and feature reports on local news media, UT Tower Views and the Relevant University

- New Commission logo created

UT
PRESIDENT'S COMMISSION
on the River

- Work of the Commission was highlighted in various University classes.

- The Commission co-hosted a three day workshop on river restoration in August 2013

- Displays of River Restoration Project were placed in the Carlson Library during Celebrate Our River week.

- Presentations on the work of the Commission and the river restoration project were given to UT Board of Trustees, Faculty Senate and Student Government

- The activities and work of the Commission were presented at community meetings, including the Maumee RAP Summits.

Art on the River

Recent efforts by the UT Campus Beautification Committee have introduced two river themed art pieces to main campus

"Pescados #III"
by
Michael Sohikian
(2013 UT Campus Sculpture Show)

"Current Forces"
By
Judith Greauv

(Ohio Arts Council and University of Toledo One Percent for the Arts Project: Bowman Otty Building

http://utnews.utoledo.edu/index.php/11_01_2013/new-sculpture-flows-on-main-campus

Commission Priorities for 2014

- Continue to call for upgrades or replacements to the East Parking Garage pedestrian bridge, David Root traffic bridge, and Carlson Library pedestrian bridge

- Support ongoing and future storm water improvements to reduce impacts from runoff from roads, building and parking lots directly into the Ottawa River on main campus

- Develop concept plans for river walking trail to include overlooks. signage, and access points

- Launch a fund raising effort to alumni, public and UT community in support of the work of the Commission through the UT Foundation and our Friends of the River account

- Further native replanting along the river in association with Partners for Clean Streams Inc. and the Maumee Corp NOAA grant opportunity

- Remain an advocate for consideration of the Ottawa River in main campus planning

- Continue student engagement, education and public awareness of the river, planning needs and issues, and future projects and activities of the Commission

Commission Members (2013)

- Dr. Patrick Lawrence, UT faculty (chair)
- Mike Cassidy, Community
- Doug Collins, UT staff
- Don Curtis, UT staff
- Dick Eastop, UT retired
- Kurt Erichsen, TMACOG
- Dr. Hans Gottgens, UT faculty
- Dr. Steve LeBlanc, UT faculty
- Dick Meyers, Toledo Design Center
- Dr. Carol Stepien, UT faculty
- Jay Brewster, Blanchard Tree and Lawn
- Katie Swartz, American Rivers
- Karen Gallagher, UT student
- Mike Young, Community
- Aaron Svoboda, UT student
- Matt Horvat, TMACOG
- Linda Solarek, UT staff
- William Sodeman, UT staff
- Augusta Askari, UT retired
- Cyndee Gurden, UT faculty

Acknowledgements

The Commission would like to recognize the following individuals and groups for their assistance and in support of our projects and activities during 2013:

- President's Office, University of Toledo
- Chuck Lehnert, Vice President Administration
- Vern Snyder, Vice President Institutional Advancement
- Doug Collins, Manager, Parking and Grounds
- UT Facilities & Construction; UT Grounds
- UT Safety and Health
- UT Foundation and Institutional Advancement
- UT Department of Geography & Planning
- UT Department of Environmental Sciences
- UT Library
- UT Honors College
- Dr. Cyndee Gruden, Civil Engineering
- Senior design class students, UT Civil Engineering program
- Todd Crail
- UT Campus Environs & Beautification Committee
- Ecological Restoration Inc.
- Blanchard Tree and Lawn
- Ohio EPA
- US Fish and Wildlife Service
- US Army Corps of Engineers
- TMACOG
- EnviroScience
- Partners for Clean Streams Inc. and Maumee RAP
- With funding support provided by:
  - Ohio EPA 319 grant program
  - US Fish & Wildlife Service
  - US Army Corps of Engineers
  - UT Foundation Friends of the River
  - UT Presidents Office

For more information on the Commission please go to our Facebook page or website at: www.utoledo.edu/commissions/river