

Dry Run Creek Watershed Improvement Project Black Hawk Soil and Water Conservation District Final Report

Project Timeframe: March 1, 2006 – January 31, 2009
Submission Date of Final Report: December 1, 2010
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Introduction

The Dry Run Creek Watershed Improvement Project was begun in 2006 to treat the biological impairment designated for Dry Run Creek in 2002. Primary stressors identified by the Department of Natural Resources (DNR) included hydrologic alteration of both urban and rural areas of the stream, increased urban stormwater inputs, and excessive sedimentation stemming from bank erosion, agricultural field runoff, and construction site erosion. In order to mitigate these influences the Dry Run Creek project was established to provide information and education to the local stakeholders in the form of educational workshops, newsletters, events, and the establishment of structural best management practices (BMP) throughout the watershed. The attitudes of the stakeholders within the watershed were also assessed through the use of surveys coordinated in cooperation with the University of Northern Iowa. Information regarding the condition of the creek water as well as the pollutants contained in urban runoff was also gathered through the projects monitoring program.

Information and Education

Several components were included in the information and education portion of the Dry Run Creek Project. Among these were classroom education projects conducted with the assistance of the Hartman Reserve Nature Center (HRNC) staff, newsletters and direct mailings sent out by the district, educational signage placed at BMP sites, and annual workshops held to educate local developers, contractors, and officials on stormwater and erosion control.

The classroom education program held in cooperation with HRNC staff held two camps on the Hartman State Preserve, as well as 19 school programs held at Southdale and North Cedar Elementary Schools. All together, there were 286 children involved in the programs. HRNC continues to be a partner in the promotion of watershed management, helping promote Dry Run Creek monitoring programs and the implementation of raingardens throughout the City of Cedar Falls.

During the timeline of the WIRB sponsorship of the Dry Run Creek Project there were numerous publications helping to draw attention to the project and the practices it promoted. Seven newspaper articles were published about Dry Run Creek in local newspapers including the Waterloo-Cedar Falls Courier and the Cedar Falls Times. The project also drew national attention when a piece about the streambank stabilization and habitat enhancement project with the University of Northern Iowa was published in Stormwater Magazine. In addition, the Black Hawk Soil and Water Conservation District releases an annual newsletter in which articles about the project were written and published by Watershed Coordinator Rebecca Kauten, in total four newsletters were released over the course of the grant period.

Three annual workshops were held from 2006 through present day using numerous funding sources including WIRB, local sponsors, door fees, and vendor presentation fees. During the grant period of 2006 – 2009 a total of 146 people attended the workshops to see the various speakers from state and local organizations as well as professionals in the field of stormwater management and erosion control. The topics shifted from year to year but focused primarily on the policies, technical processes, and

programs associated with stormwater management and low impact development (LID). The Dry Run Creek's partnership with the University of Northern Iowa allowed these workshops to be held without building rental fees, while other contributing partners such as the City of Cedar Falls and Lockard Companies donated funding to help support parking fees, catering costs, and the cost of promotion.

Educational signage was placed at the most visible practice sites of the Dry Run Creek Project, some of this signage was funded through WIRB and 319 funding while other were paid for entirely through sponsor (UNI) funds. Recently, bridge crossing signs have also been put up around town to help increase awareness of the creek by local stakeholders.

Monitoring and Assessment

The monitoring portion of the Dry Run Creek Project was a collaborative effort that included the efforts of many different groups. Among these were volunteer monitors, student monitoring from both Hawkeye Community College and the University of Northern Iowa, Iowa Department of Natural Resources monitoring, and independent monitoring efforts conducted by the Black Hawk Soil and Water Conservation District.

Volunteer monitoring came in the form of IOWATER volunteers and participants in the Dry Run SNAPSHOT program, which held bi-annual, watershed-wide SNAPSHOTS twice a year during the grant period. Some of these volunteers were students who would participate once or twice during their college career and others were certified IOWATER volunteer monitors who would participate on a more regular basis. This effort allowed us to collect valuable data, but also to get the local community involved and to educate many of them on the issues facing the creek.

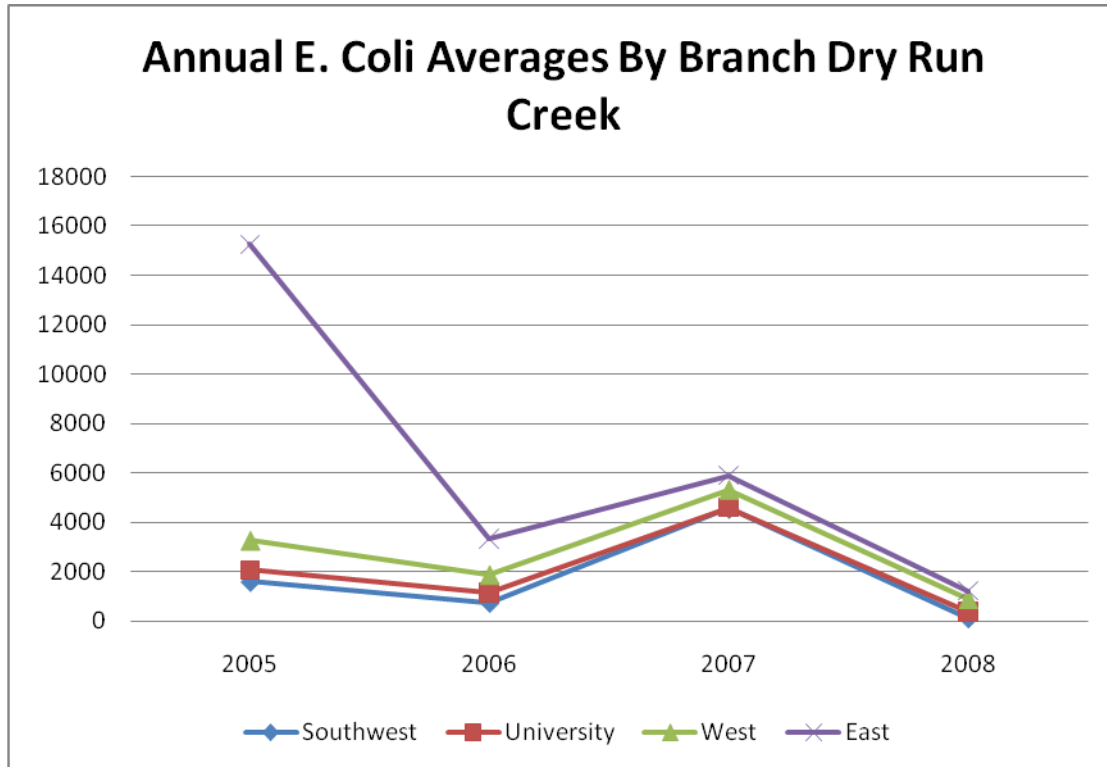
During the timeframe of the WIRB grant, student monitoring was coordinated with the Natural Resource Management Class at Hawkeye Community College. This class, under the supervision of instructor Terri Rogers, conducted weekly sampling throughout the watershed for several months in 2007 sampling for IOWATER parameters and visual watershed assessment (water color, bank stability, evidence of land use).

This type of partnership has continued in recent years with student monitoring projects conducted by University of Northern Iowa students using funds provided by the University and the Community Foundation of Northeast Iowa. Also, a \$500 grant was received from the Waterloo Exchange Club to fund the training of local school teachers in the use of IOWATER equipment and technique. It is the intent of the grant that these teachers will then use this knowledge to develop monitoring projects with their students.

The Iowa Department of Natural Resources monitoring efforts are especially important as it is this data that determines the status of the impairment designation on the creek. DNR monitoring assigned the original impairment for Dry Run Creek in 2002 citing a deficiency in the diversity and abundance of aquatic life. This original impairment was assigned to the urban reach of the creek's Southwest Branch. Since then, the urban areas of all branches have been designated with a second impairment for high bacteria levels in accordance with DNR findings.

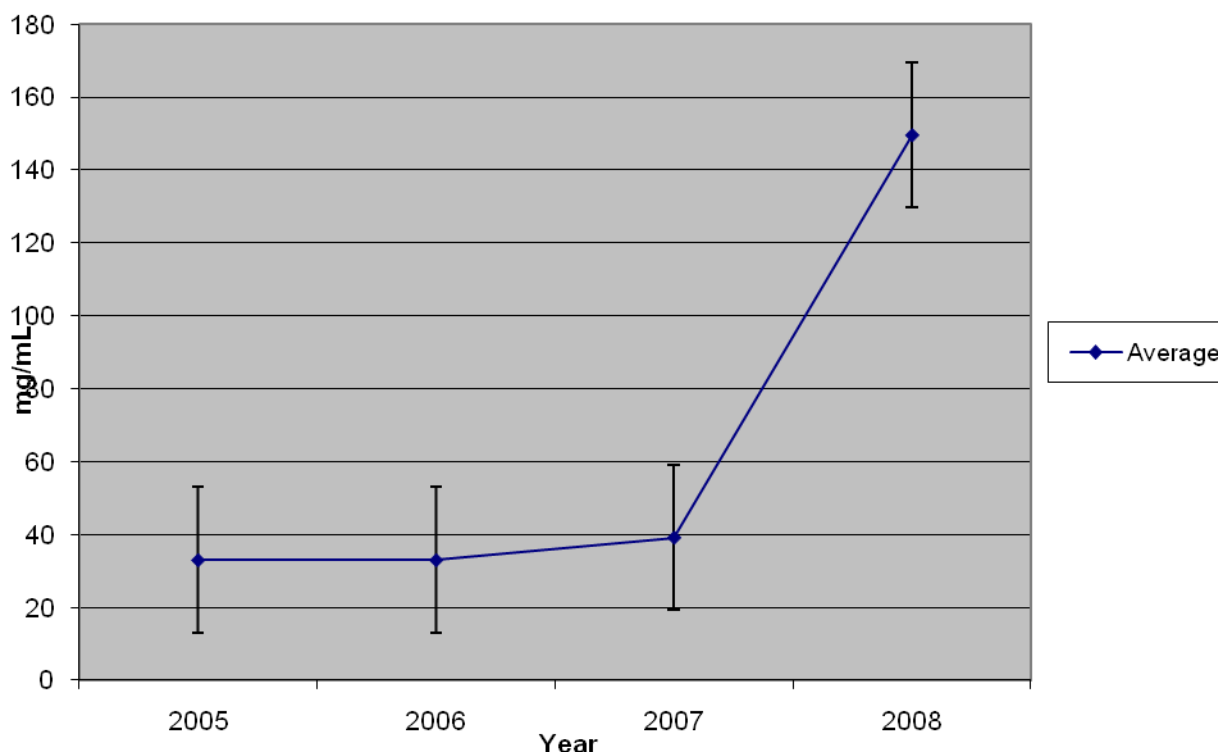
The district continues to its monitoring efforts through ongoing partnerships with the University of Northern Iowa and the Iowa Department of Natural Resources. The results from the monitoring conducted during the WIRB grant and in the years leading up

to it has been combined into an aggregate spreadsheet and the results have been analyzed. Due to the relatively short timeframe and the extreme conditions, most notably the floods of 2008, these results do little to show significant trends in the progress of the variables measured; this issue is illustrated in the graphs below for e. coli and chlorine.



The above graph shows the annual averages for e. coli throughout the watershed. The state standard for a stream with the designated uses assigned to Dry Run Creek is 126 colonies/100 mL sample, all of these branch averages exceed that standard and reinforce the Department of Natural Resources Bacteriological Impairment findings on Dry Run Creek. While the data was collected throughout the year and in different locations, large fluctuations were seen making it impossible to draw any statistically significant conclusions from the data. In the case of the e. coli data, the fluctuations seem to have no observable connections with annual weather patterns.

Dry Run Creek Annual Average Cl Concentrations



This graph shows the yearly chloride averages collected in the Dry Run Creek watershed. Note the major gap between the values seen in 2008 and those seen in previous years. It is believed that this difference is caused by the high levels of precipitation seen in 2008. As with the e. coli data, no statistically significant conclusions can be drawn due to the high levels of variability within the data and the limited amount of data collected.

In addition to the water quality monitoring, a series of public surveys were conducted in coordination with Kathleen Scholl of the University of Northern Iowa's Department of Leisure Services. Surveys were sent to 348 randomly selected stakeholders within the watershed. The same landowners were surveyed in 2005 and in 2008, in total the survey had a response rate of 56%, though only 44.7% of individuals surveyed responded in both 2005 and 2008. Public knowledge of water quality-related issues was assessed as well as values assessments and general opinion about who is responsible for helping to fix watershed related problems in urban and rural areas. Since part of the goal of the project is to change the public perception and educate the local stakeholders about water quality, the assessment of public attitude and awareness of the local watershed problems is essential to the assessment of the success of the watershed project.

The differences between the answers given in the 2008 survey and the 2005 survey were varied and were likely impacted by any number of external influences. Most notably, the percentage of respondents who stated that they were aware of the issues facing Dry Run Creek increased by 27% from 2005 to 2008, moving from 25.9% to 52.8. More specifically, there was an increase in the number of respondents who believed that

runoff from impervious surfaces effects water quality. However, there was a decrease seen in the percentage of landowners expressing interest in specific practices on their land and an increase in the percentage of landowners who believed that it is the responsibility of taxpayers to resolve the issues facing Dry Run Creek. There was also an increase in the percentage of landowners who felt that regulations protecting local water bodies limited their personal freedoms. Much of this is likely a negative reaction to the recent implementation of storm-water utility fees which were added onto the utility bills of all Cedar Falls residents as part of the city's NPDES program. In addition, the economic conditions of 2008 likely had an impact on the willingness of landowners to contribute personal funds to stormwater practices on their property, or it could be an indication that landowners who had previously expressed interest had done further research on the practices and deemed them inappropriate for their particular parcel.

Financial Accountability

Budget Line Item	Total Allocated	Amended Allocation	Total Expended	Remaining Balance
Information/education	\$18,000.00	\$18,000.00	\$13,982.66	\$4,017.34
Guest Speaker	\$2,000.00	\$2,000.00	\$1,851.55	\$148.45
Salary/Benefits	\$75,000.00	\$75,000.00	\$77,254.29	(-\$2254.29)
Supplies	\$15,000.00	\$15,000.00	\$3,888.79	\$11,111.21
WQ Monitoring	\$70,000.00	\$70,000.00	\$60,775.79	\$9,224.21
Permeable Pavement	\$28,000.00	\$28,000.00	\$28,500.00	(-\$500.00)
Infiltration Cell	\$41,400.00	\$23,078.19	\$16,210.00	\$6,868.19
Streambank Stabilization	\$46,875.00	\$96,875.00	\$96,875.00	\$0.00
Rain Garden – Com.	\$5,000.00	\$0.00	\$0.00	\$0.00
Stormwater Ponds	\$10,000.00	\$10,000.00	\$10,000.00	\$0.00
Pool/Riffle	\$11,000.00	\$11,000.00	\$6,252.75	\$4,747.25
Urban Erosion Control	\$78,000.00	\$28,000.00	\$26,020.19	\$1,979.81
Bio-Retention Cell	\$51,750.00	\$51,750.00	\$53,435.00	(-\$1,685.00)
Asphalt, Porous	\$45,402.00	\$45,402.00	\$47,625.00	(-\$2,223.00)
Streetscape BMPs	\$0.00	\$23,321.81	\$8,400	\$14,921.81
Totals	\$497,427.00	\$497,427.00	\$451,071.02	\$46,355.98

Funding Sources	Cost-Share Contributions		Project Contributions		Total	
	Approved Application Budget	Actual Expenditures	Approved Application Budget	Actual Expenditures	Approved Application Budget	Actual Expenditures
WIRB	\$497,427.00	\$451,071.02	\$0.00	\$0.00	\$497,427.00	\$451,071.02
City of Cedar Falls	\$521,000.00	\$2,050,000.00	\$0.00	\$2,400.00	\$521,000.00	\$2,052,400.00
Meadows Homeowners Association	\$0.00	\$340.06	\$0.00	\$0.00	\$0.00	\$340.06
UNI	\$26,625.00	\$75,625.00	\$0.00	\$35,650.00	\$26,625.00	\$107,703.00
Weicher's Construction	\$20,000.00	\$208,270.92	\$0.00	\$0.00	\$20,000.00	\$208,270.92
Prairie Lakes Church	\$40,848.00	\$4,620.00	\$0.00	\$0.00	\$40,848.00	\$4,620.00
Community Foundation	\$0.00	\$0.00	\$5,000.00	\$5,000.00	\$5,000.00	\$5,000.00
319 Grant	\$0.00	\$13,125.00	\$0.00	\$0.00	\$0.00	\$13,125.00
Total	\$1,105,900.00	\$2,278,479.90	\$5,000.00	\$43,050.00	\$1,110,900.00	\$2,842,529.90

WIRB Funding Contribution

Actual: 15.8%
 Approved: 45.0%

Further Explanation

Funding by Line Item

Administrative Funds

The original allocation of \$20,000 provided for Information and Education (hereinafter referred to as I&E) proved to be excessive due to the abundance of sponsors who chose to partner with the district on these projects. The city of Cedar Falls chose to sponsor the district's annual workshops in order to complete the information/education portion of their National Pollutant Discharge Elimination System (*hereinafter referred to as NPDES*) requirements. The University of Northern Iowa also agreed to provide facilities for the workshops at no cost to the district. In addition, corporate sponsorships were received in exchange for the sponsor's opportunity to present information regarding their services or products to the attendees. Additional funding for the annual workshops was provided through attendance fees charged to attendees to cover such expenses as catering and parking. The funding provided for I&E was also used to partner with the people at Hartman reserve to fund a classroom outreach program with local elementary schools. Further information about this partnership will be presented in the proceeding sections of this report.

Funds allocated to the Guest Speaker line item was not fully utilized as a result of many of the speakers volunteering their time free of charge through cooperative partnerships, many of these speakers were employees of state and local government agencies. Much of the funding expended in this line item was used to cover transportation and lodging of out-of-town speakers. As was true of the information/education line item the funding for these speakers was supplemented with moneys from sponsorships, contributing partners and attendance fees.

Practice Funds

The original allocation of \$70,000 for urban erosion control was reallocated when the proposed prairie lakes church project was cancelled by the landowner. The funding was originally reallocated for the stormwater detention pond structure as part of the Hudson Rd. and 18th street wetland project. It was later reallocated again to the streambank stabilization line item to be used for the streambank stabilization projects on the University Branch in partnership with the University of Northern Iowa.

All proposed structures were completed for the wetland project, however the total area of land included in this project was significantly overestimated. The majority of the funding for this project was provided by the City of Cedar Falls with WIRB funding being allocated to specific practices within the wetland structure including riffle structures and seeding.

The College Hill Streetscape project had an allotted total of \$18,321 for the streetscape best management practices while only \$8,400.00 was requested by the partner upon completion of the project. An additional \$5,000 was dedicated to the construction of a neighborhood raingarden in partnership with the College Hill Neighborhood Association, this project was not completed, however, as the partner was unable to begin construction before the end of the grant term.

Funding by Source:

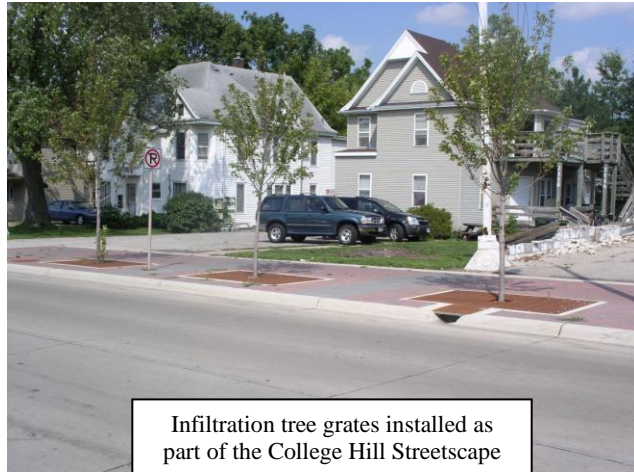
The purpose of this section is to discuss the partner contributions to the project within the timeframe of the grant period.

Weicher's Construction Wildhorse Ridge

The total incurred cost for raw materials used to install the BMP's on this land was \$63,409, of which the WIRB grant funded \$60,000. However, as part of the proposed BMP's the developer installed an extensive stormwater and erosion management system. This includes the tiling and storm sewer system that allows the development to drain into the sediment control basin, the installation of erosion control stones along the banks of the basin, seeding and mulching, and silt fencing during construction. The developer also provided the designs and labor as part of its contribution. The total cost of the BMP's and the further stormwater and erosion management system, not including labor, was \$262,999. This leaves the Weichers contribution at over \$200,000.

City of Cedar Falls:

The city of Cedar Falls has invested a great deal of money installing stormwater management practices. The total cost of the Hudson Rd. & 18th St. wetland project exceeded \$730,000, to which \$16,252.75 in WIRB funding was applied, leaving the city's contribution for this project at approximately \$713,000. Another project coordinated with the city is the College Hill Streetscape project. The total city budget for this project exceeded \$1,050,000. This project is dual purpose: it is first designed to improve stormwater management and reduce pollution and runoff from the College Hill area. However, the project is also designed to create an appealing area for public use. Due to the dual purpose of the project it is very difficult to delineate between expenses incurred for stormwater management and those incurred for commercial benefit. For example, the infiltration tree grates installed along the sidewalk serve to beautify the area and also to infiltrate stormwater, the paving on the sidewalks serves as a walking space, but is also essential to stormwater management as special grading was installed to ensure it's proper drainage into the installed BMP's. Contributions from the WIRB grant to this project totaled \$8,400.



University of Northern Iowa:

The partnership with UNI has been extensive and we have worked with them on a great many projects. Some of these projects, including the pervious pavement project, and the streambank stabilizations were not included as part of the original grant application. In addition to their \$72,053 matching contributions they have contributed over \$35,000 in in-kind contributions to enhance and extend the WIRB funded projects.

Aside from their financial contributions the university has partnered with the project in many other ways. Numerous university staff have given their time to consult with the District on various projects, both on and off of the UNI campus. UNI students also regularly participate in monitoring activities (greater detail given in proceeding sections), and the university has donated use of their facilities to store and mount monitoring equipment, as well as housing our annual Stormwater workshops.

Prairie Lakes Church:

As mentioned in the preceding section of the report the Prairie Lakes Church project was cancelled by the landowner. Some of the practices that were to be installed on this site including soil amendments and native seeding, as well as an erosion control rock chute. The cost of these practices, estimated at \$4,620, was paid entirely by the land owner. The WIRB funding intended for this site was reallocated to different line items

and ultimately was used for the streambank stabilization projects on the university campus.

319 Grant:

A grant agreement was entered into by the District and EPA Sec. 319/Watershed Protection Fund (*hereinafter referred to as WSPF*) to conduct watershed improvements in the Dry Run Creek Watershed. Funding from the streambank stabilization line item of this grant was used to stabilize a section of streambank directly adjoining the 18th St. and Hudson Rd. Wetland.

A 25% match was also contributed by the University of Northern Iowa to this extension, these funds were included as part of their in-kind contributions in the preceding section.

Environmental Accountability

Practice	Units	Proposed Amount	Implemented Amount	Impact	Percentage
Permeable Pavement* ₁	Ft ²	12,240	5516 ft ² McLoed 2500 ft ² WRC	62,524.8 gallons/day	66%
Bio-Retention Cell* ₁	Acres	As-needed surrounding Prairie Lakes Church	1.5 acres	50,965 gallons/day	NA
Bio-Detention and Erosion Control	Acres	80* ₄	40 acres	9,360 gallons/day	50%
Infiltration Cell	Ft ²	2180	1,605 ft ²	12,519 gallons/day	74%
Streambank Stabilization	Ft	500	1800ft ² * ₂	92 tons/year	360%
Raingarden – Commercial	Count	1	1	5,850 gallons/day	100%
Retention Basin* ₃	Acres	100	23	Flood prevention/habitat	23%
Riffle Pool	Count	6	9	Habitat	150%
Landscape/Erosion Control Site* ₁	Count	1	0	N/A	0%
Kwik Star Skimmer Box	Count	0	1	Filtration of runoff from parking lot	NA
<p>*1 – Implementation reduced due to cancellation of Prairie Lakes Church Project, funding reallocated to other projects/line items *2 – 700 ft. of the 1800 ft. listed was stabilized on an as needed basis *3 – smaller total area used for project, funding reduced and reallocated to streambank stabilization *4 – initial estimate was square footage for entire development, all practices completed, half the development drains to BMPs</p>					

Further Explanation by Line Item

Permeable Pavement, Bio-retention cell and Landscape/Erosion Control:

Initial estimates of these line items were based on the proposed Prairie Lakes Church project. As mentioned in the preceding section this project was cancelled by the landowner. Prairie lakes church feared that the implementation of these practices would interfere with various other land use activities they were planning. Most notably, the pervious paving that was proposed as part of the original project was perceived as being incompatible with the heat pump that the facility was installing under the parking lot.



Pervious Paving at UNI's McLeod Center

The funding that was originally allocated for this project was shifted into others. The funding allotted for the pervious paving line item was put to use on the pervious paving project installed in the parking lot at UNI's McLeod Center and UNI's Wellness and Recreation Center parking lots (See Map 1, point 4, adjacent lots were plotted as a single practice), an area of about 5,516 ft² for the McLeod lot and 2,500 ft² for the Wellness and Recreation Center Parking lot.

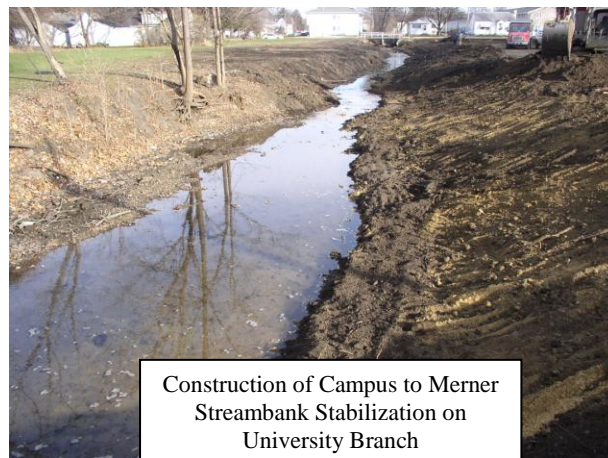
\$50,000 originally designated for use on this project through the urban erosion control line item was originally reallocated into the stormwater detention ponds line item, and then the grant agreement was again amended to transfer the funds from stormwater detention ponds into streambank stabilization. This streambank stabilization funding was used to install the first of the three streambank stabilization projects on Dry Run Creek (See Map 1, point 3).

Bio-Detention and Erosion Control:

Initial estimates for the breadth of this project were based on the total size of the development. However, the size of the development was scaled back by the developer due to a sagging housing market. In addition to the reduced size of the project, the topography of the area does not allow for the entire development to drain into the funded BMP's. These factors yield a total area of treatment of roughly 40 acres (See Map 1, point 8).

Streambank Stabilization:

The total linear footage of streambank stabilization performed far exceeds that which was proposed for a number of reasons. First and foremost, additional funding was dedicated to this line item from 319 grant contributions,



Construction of Campus to Merner Streambank Stabilization on University Branch

additional in-kind contributions from UNI, and from other line items within the WIRB grant as previously described.

One additional reason for the increase in project size was the method used to perform the stabilizations. In the initial streambank stabilization (Map 1, point 8) the practice was not installed in a continuous stretch; instead the stabilization occurred as needed along a 700 ft reach of stream along the University Branch. This method allowed us to achieve the desired water quality results while maximizing the area of treatment, removing . In total, streambank stabilization projects successfully removed 92 tons of sediment from the stream annually, and created or preserved habitat in key areas of the University Branch. Campus to Merner stretch of the University Branch (See Map 1, point 5) and the extension west of the 18th St. Wetland (Map 1, point 1) added a considerable amount of lineal footage to the project total.

Retention Basin:

The estimated area of this project was based on the 28-E land use agreement



between the City of Cedar Falls and the University of Northern Iowa. The agreement allows the city to perform development functions on an area of land owned by the university; the proposed area consisted of roughly 100 acres. However, much of this land was developed for other public and university purposes including athletic fields. All together, an area of roughly 23 acres was used to create the wetland park area (Map 1, point 2).

Riffle Pool:

In addition to the 6 riffle pools proposed as part of the Hudson Rd. & 18th St. wetland project (Map 1, point 2), an additional 3 riffle pools were installed along the initial stretch of streambank stabilization on the university branch (Map 1, point 3). These were installed along with fish hides to create habitat along the stabilized reach of stream. The stones were provided and installed by the university.

Kwik Star Skimmer Box:

The Kwik Star parking lot was the original proposed site for the pervious paving to be installed as part of the College Hill Streetscape project. The Kwik Star corporation expressed interest in the project but eventually rejected the idea because they were uncomfortable allowing hydrocarbons (namely oil and gas) to infiltrate the soil for fear of groundwater contamination.

The pervious paving was moved to a different location as part of the College Hill Streetscape Project (Map 1, point 6) and the runoff from the Kwik Star was treated using a skimmer box (Map 1, point 7). This box was installed at the storm sewer inlet and serves to filter out contaminants from stormwater before the runoff is allowed to enter the storm sewer.

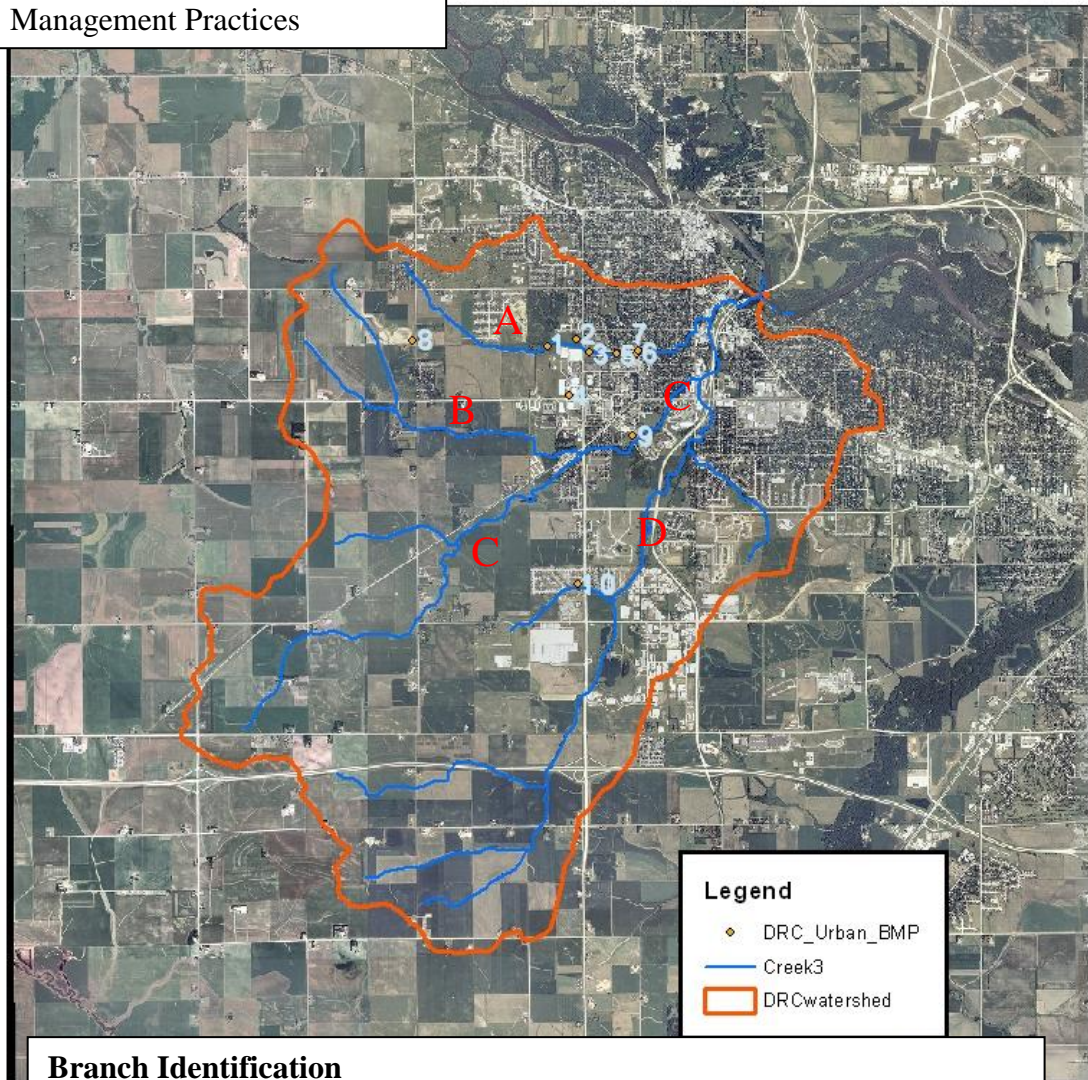
Bioretention Cell

Originally, bioretention cells were meant to be installed around the Prairie Lakes Church build. However, because of the cancellation of this project and the reallocation of the funding, this line item was largely eliminated from the project except for the addition of a biocell treating approximately 1.5 acres of impervious surface at the University of Northern Iowa's Business Communications Center (Map 1, point 9).



Dry Run Creek Urban Best Management Practices

Map 1: Urban Best Management Practices



Branch Identification

- A – University Branch
- B – West Branch
- C – Southwest Branch
- D – East Branch

Practices

- 1 – Streambank Stabilization West of 18th St. Wetland
- 2 – 18th St. Wetland
- 3 – Tennis Court Streambank Stabilization
- 4 – McLeod Center and Wellness and Recreation Center Permeable Paving
- 5 – Campus to Merner Streambank Stabilization
- 6 – College Hill Streetscape
- 7 – Kwik Star Skimmer Box
- 8 – Wild Horse Ridge
- 9 – BCS Biocell
- 10 – Meadows Homeowners Association