Loess Hills Development and Conservation Authority
712 S. Hwy. 6 & 59
Oakland, Iowa 51560-0189
Phone (712) 482-3029
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December 22, 2022

Holly Lyons, Division Director
Legislative Fiscal Services
1007 E Grand Avenue, Ste G01
Des Moines, IA 50319

Dear Ms. Lyons,

This report is being submitted pursuant to Iowa Code Section 161D.8.

The Loess Hills Development & Conservation Authority passes state funds appropriated from the Environment First and General Funds to the Hungry Canyons Alliance (HCA) and the Loess Hills Alliance (LHA). A copy of the HCA's report is enclosed for your review; the LHA will send theirs separately this year.

The Hungry Canyons Alliance is concerned with stream stabilization projects in 19 western Iowa counties. Stream stabilization projects protect bridges and other infrastructure including roadways, utilities and pipelines. The focus of the Loess Hills Alliance is to protect special natural and cultural resources in the seven counties of deep loess bordering the Missouri River while ensuring the economic viability and private property rights of the region.

If you need further information, please contact myself or Cara Morgan at Golden Hills RC&D, 712-482-3029 or cara.morgan@goldenhillsrcd.org.

Sincerely,

Bernie Bolton

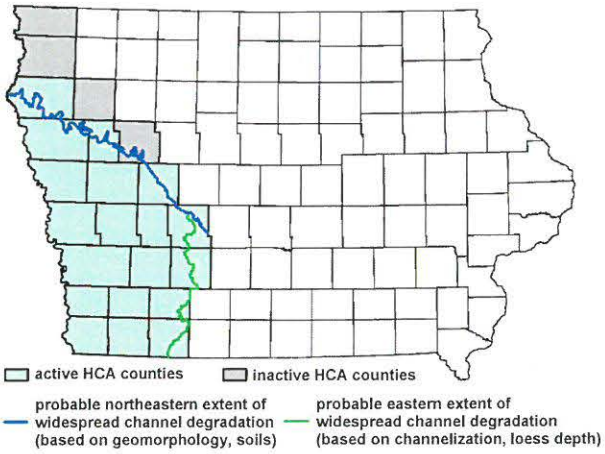
Bernie Bolton
Chairman
Loess Hills Development and Conservation Authority

Enc.

HUNGRY CANYONS ALLIANCE – Dec 2022 Update

The Problem

The Hungry Canyons Alliance (HCA) was formed locally to research and implement solutions to the problem of stream channel erosion and degradation in a 19 county area of the deep loess soils region of western Iowa. Channelization of streams and land use changes during the first half of the 1900's caused stream channels to erode, causing an estimated $1.1 billion in damages to public and private infrastructure (bridges, culverts, utility lines, etc.), loss of farmland, and increased sediment loads. A 2013 survey of county infrastructure in western Iowa revealed that a total of 415 bridges, culverts, and flumes were still endangered due to stream channel degradation. Golden Hills RC&D in Oakland, Iowa helped to form and currently provides office space and administrative assistance to the HCA.



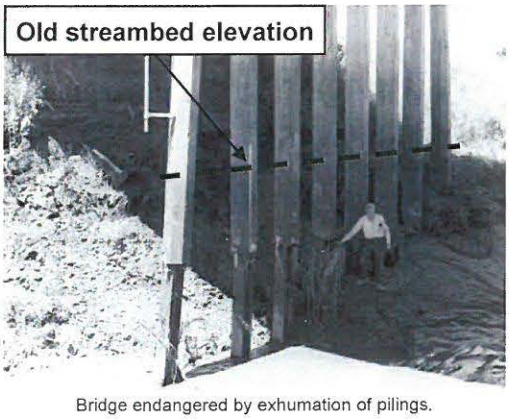
Straightened versus meandering stream.
(Walnut Creek, Pottawattamie County).

The Solution

A proven, affordable solution to this problem is to build grade control structures in streams. Grade control structures (GCS) at regular intervals help streams stabilize by changing their longitudinal profile from an erosive steep incline to a stable stair-step pattern. Streambed stabilization is the key to preventing further erosion and protecting infrastructure. GCS design is largely dependent on drainage area. Small drainage areas can often be controlled with reinforced concrete box (RCB) or corrugated metal pipe (CMP) culverts with drop inlets and/or flume outlets. Large drainage areas are often controlled with weirs constructed with steel sheet pile driven into the streambed, with a riprap and concrete grout slope immediately downstream, a loose riprap stilling basin downstream of the weir slope, and loose riprap covered banks. Both RCB/CMP and weir designs allow the stream elevation to drop in a controlled setting, restore lost stream grade, prevent further degradation, and reduce streambed slope upstream. This creates a calm backwater condition where silt can settle out, decreasing sediment loads and turbidity and increasing water quality. Sediment re-deposited upstream then helps support formerly exposed bridge pilings and stabilize eroded streambanks.

The Savings

The HCA provides state and federal money available to the 19 counties through a cost share program for grade control structures (GCS). County governments provide a minimum of 20% match for each GCS. Since 1992, the program has provided $27 million in state and federal appropriations and the technical assistance needed to complete 421 GCS in 19 counties in western Iowa. Another 11 GCS are in progress. These GCS will protect an estimated $100.8 million in property value. It is estimated that 827.5 acres of land, equivalent to 24.6 million tons of sediment, will be protected from erosion by construction of the 432 GCS. HCA grade control structures, with an average cost of $66,182,



Bridge endangered by exhumation of pilings.

protect approximately $233,346 in property per GCS. **For every $1 invested in HCA grade control structures, on average more than $4.26 of property value and 0.91 tons of sediment are protected from streambed degradation.** During FY 2022, the HCA completed construction on eight GCS, and obligated cost share to six new projects.

A second HCA program provides funding to landowners where grade control is necessary to stabilize active gully erosion. This program is funded with the interest earned from state appropriations. This program has built 131 structures, and approved another one, with cost share totaling $901,426.

The HCA has quarterly meetings at which issues concerning stream erosion and streambed stabilization are discussed. Tours show firsthand which aspects of past GCS designs have worked and which haven't while also highlighting new techniques which can be used to enhance future GCS performance. Regular attendees include county engineers and supervisors, NRCS & DNR employees, SWCD commissioners, consultants, contractors, and landowners.

Top: 4 foot high sheet pile weir with a 1:20 grouted riprap slope in Crawford County. Bottom: RCB flume with 25 feet of fall in Fremont County.

Over 1,500 GCS of all types have been constructed in 19 western Iowa counties by county governments, the HCA, NRCS, NRCS-EWP, SWCD, Iowa DOT, cities, utility (water, gas, telephone, electric, etc.) companies, railroad companies, Army Corps of Engineers, Iowa DNR, and landowners. This is the greatest concentration of GCS anywhere in the world due to the loess soils, highly altered unstable stream system, high drainage density, and high road density. With so many GCS located in one area, western Iowa has been referred to as a "laboratory" for GCS design. And because western Iowa is still experiencing streambed degradation, the HCA is one of the unheralded leaders in innovative GCS research, design, and construction.

Matching Federal Funding for Flood Recovery

Heavy precipitation in May 2007 and June 2008, and again in March and June of 2019, resulted in widespread stream channel damage and destroyed county road infrastructure. However, in the investigations that followed, FEMA, NRCS, and county road departments all reported that GCS directly reduced infrastructure and channel damage costs and the number of FEMA program claims, and infrastructure protected by GCS suffered no damage. Although some GCS suffered minor damage, these damages were minimal compared to the potential total loss of infrastructure that could have resulted without the GCS.

Federal NRCS-EWP funding became available after the disaster declarations; so in order to complete as many projects as possible and reduce the counties' burden to 15% match, the HCA provided 10% match (using state cost share) for all EWP projects which provided grade control or were directly associated with existing GCS projects. Between September 2008 and January 2011, **72 GCS projects were completed at a cost of $12.84 million. The HCA provided $1.28 million in cost share**, the EWP program $9.50 million, and the sponsor counties $2.05 million. In 2020-2021, **69 GCS projects were completed at a cost of $10.66 million. The HCA provided $1.07 million in cost share**, the EWP program $8.05 million, and the sponsor counties $1.55 million.

HCA Research

Completed HCA research projects include design of GCS to provide fish passage, use of scrap tires in GCS, aerial stream video and classification of western Iowa streams, factors controlling knickpoint migration, and the use of directional drilling in small watershed GCS projects. Ongoing research projects include experimenting with new bank stabilization techniques and measuring nutrient loads from eroding streambanks to quantify the impact of channel stabilization projects. Partners in these projects include: NRCS, Iowa DOT Highway Research Board, IIHR–Hydroscience and Engineering at the University of Iowa, Natural Resource Ecology and Management Department at Iowa State University, Civil Engineering Department at Iowa State University, Iowa DNR, US Geological Survey, and US Fish and Wildlife Service.

For further information, please contact: John Thomas, Project Director, Hungry Canyons Alliance, Golden Hills RC&D Office, 712 S. Hwy. 6 & 59, P.O. Box 189, Oakland, IA 51560-0189 Ph: 712-482-3029 Fax: 712-482-5590 Cell: 402-250-3293 Email: john.t.thomas@goldenhillsrcd.org

Hungry Canyons Alliance

I. Project Overview

A. Purpose:

- Focus attention on the problems of, and develop solutions related to, stream channel degradation in the deep loess region of western Iowa.

B. Needs:

- 415 bridges, flumes, and major culverts susceptible to significant damage from stream degradation in 2013 (from correspondence with county engineers).

C. Goals:

- Provide financial and technical assistance to construct grade control structures (GCS) in 19 counties in western Iowa.
- Conduct research and provide demonstration for members.

II. Progress Report (1992-2022)

A. HCA Structures as of 12-22-22:

1.	GCS approved:	432
2.	GCS completed:	421
3.	GCS in progress:	11

B. HCA Costs as of 12-22-22:

1.	Total costs:	$ 28,590,480
2.	Total HCA cost share spent:	$ 20,312,608
3.	Total HCA cost share obligated:	$ 329,521
4.	Cost share per structure:	$ 47,782
5.	Counties share of total cost spent:	$ 7,858,170
6.	Counties share of total cost obligated:	$ 90,182

C. HCA Benefits as of 12-22-22:

1.	Total property protected:	$100,805,361
2.	Property protected per structure:	$ 233,346

For every $1 invested in Hungry Canyons Alliance grade control structures (GCS), an average of more than $4.26 in property value and 0.91 tons of sediment are protected.

Match for EWP Program:
Occasionally, western Iowa counties will be declared eligible for federal disaster assistance due to severe rains which cause flooding and stream channel damage, endangering or destroying county infrastructure. The NRCS-EWP program will provide cost share for new GCS and repairs to existing GCS. In order to complete as many EWP projects as possible while the federal money is available to western Iowa, the HCA will provide 10% of the match, reducing the counties match to 15%, for any EWP projects which provided grade control or were directly associated with existing GCS projects. In FY10, the state appropriated $100,000 to the HCA specifically for this purpose.

D. EWP Structures and Costs as of 12-22-22:

1.	GCS completed:	145
2.	GCS in progress:	0
3.	Total costs spent	$ 23,796,881
4.	Total HCA cost share spent:	$ 2,380,151
5.	Total HCA cost share obligated:	$ 0
6.	Total NRCS cost share spent:	$ 17,780,019
7.	Total counties share spent:	$ 3,636,711

III. Funding Summary (1992-2022)

A. Total Appropriations:

1. Federal:	$ 11,944,394
2. State:	$ 15,101,334
3. Total:	$ 27,045,728
4. County share:	$ 9,514,852

B. Funds Needed:

Total needed to reach goal of protecting 182 bridges, flumes, and major culverts: $10.01 million

- Annual appropriations of $0.9 million ($0.5 million in state funds, $0.4 million in federal funds) for 11.2 more years (assuming no disastrous floods)

IV. Accomplishments of the Past Year

A. Approved cost share for eight county GCS and one small GCS for a landowner.

B. Completed construction of one EWP project, eleven county GCS, and one small GCS for a landowner.

C. Held four successful quarterly meetings which included two tours.

D. Continued technical assistance to the NRCS and local sponsors for EWP projects damaged in the 2019 spring and summer flooding.

E. Continued inventory of scanned PL-566, PL-534, pilot, and RC&D watershed structure documents through an agreement with the NRCS.

F. Gave free advice to numerous landowners, cities, county conservation boards, and county road departments on cost-effective methods of streambank stabilization.

G. Helped organize the Partnership for River Restoration and Science in the Upper Midwest's (PRRSUM) February 2022 Upper Midwest Stream Restoration Symposium (UMSRS) held virtually.

H. Continued serving as a vocal stakeholder in the ongoing process to setup an in-lieu fee program to deal with compensatory mitigation requirements in Iowa stemming from changes in the way the Rock Island USACE office interprets federal rules. Coupled with the creation of the new Iowa Stream Mitigation Method (ISMM), a tool designed to help standardize mitigation decisions during the USACE permit process, permits requiring mitigation have increased. This has put the USACE in direct conflict with other federal and state programs aimed at flood control and conservation.

I. Continued a research project led by Iowa State University to measure nutrient loads from eroding streambanks in western Iowa with the goal to make a case for funding stream bed and bank stabilization due to the current emphasis on the state's nutrient reduction strategy.

V. Strategy for the Coming Year

A. Continue to protect infrastructure and prevent soil loss by providing state cost share to county governments and private landowners for streambed erosion control projects.

B. Continue providing education to students and the public about the fragility of loess soils and river channel stability and processes.

C. Continue cooperation with Iowa DNR Fisheries Division and US Fish and Wildlife Service to modify existing grade control structures to allow fish migration.

D. Continue work with the NRCS to inventory PL-566, PL-534, pilot, and RC&D watershed structure documents statewide.

E. Continue work with Iowa DNR River Programs Team to identify stream reaches in western Iowa that would be good for recreation and avoid those with hazardous grade control structures.

F. Continue monitoring and building bored headcut basins in the Loess Hills in conjunction with the USDA-NRCS and IDALS. Despite being experimental, the bored headcut basin design was recognized in 2015 by the NRCS as an approved, viable, cost-effective method of controlling deep gully headcuts with small drainage areas in the Loess Hills.

G. Continue to provide technical assistance for bank stabilization projects.

Hungry Canyons Projects in Progress as of 12-22-22

County Grade Control Projects - Uses State Funds

Project #	County (or sponsor)	Stream	Total Cost	HCA Share	Sponsor Share
21-1	Crawford	Beaver Crk. Trib.	$ 45,000.00	$ 36,000.00	$ 9,000.00
21-4	Adams	Kemp Crk. Trib.	$ 30,477.75	$ 24,382.20	$ 6,095.55
21-6	Adams	E. Nodaway R. Trib.	$ 21,756.68	$ 17,405.34	$ 4,351.34
21-7	Montgomery	Lit. Tarkio Crk.	$ 38,049.00	$ 30,439.20	$ 7,609.80
22-2	Crawford	E. Soldier R. Trib.	$ 31,013.00	$ 24,810.00	$ 24,810.00
22-3	Crawford	Paradise Crk. Trib.	$ 22,334.00	$ 17,867.00	$ 17,867.00
22-4	Plymouth	W. Fk. Lit. Sioux R. Trib.	$ 10,861.00	$ 8,688.00	$ 2,173.00
22-5	Plymouth	Whiskey Crk. Trib.	$ 9,141.00	$ 7,313.00	$ 1,828.00
22-6	Plymouth	Plymouth Crk. Trib.	$ 8,196.00	$ 6,557.00	$ 1,639.00
23-1	Monona	Rock Crk.	$ 182,800.00	$ 140,000.00	$ 42,800.00
23-2	Taylor	Buchanan Crk. Trib.	$ 20,074.00	$ 16,059.00	$ 4,015.00
Total			$ 419,702.43	$ 329,520.74	$ 122,188.69

Small Structure Projects - Uses Interest Funds

Project #	County	Location	Name	Total Cost	HCA Share	Landowner + Government Share
22-156	Mills	Waubonsie Crk. Trib.	Rick Walker	$ 39,500.00	$ 8,500.00	$ 31,000.00
Totals				$ 39,500.00	$ 8,500.00	$ 31,000.00

Total obligated: $ 338,020.74

9/7/2022

Hungry Canyons Alliance
Approved FY2023 Budget
July 1, 2022 to June 30, 2023

I. Available or expected funds		State	Interest	County	Contract	Federal
A. New appropriations		$ 500,000				$ -
B. Unobligated state appropriations (pre-FY23)	(6/30/22)	$ 541,817			Contract	
C. Unobligated interest	(6/30/22)		$ 56,267		income	
D. Differed salary already paid to GH	(6/30/22)			$ (3,667)	will be	
E. Unobligated county fees & interest	(6/30/22)			$ 41,484	reimbursed	
F. County dues received for FY23	(6/30/22)			$ 42,750	to salary	
G. County dues expected for FY23	(6/30/22)			$ 52,250		
I. PL-534/566 project expected for FY23	(6/30/22)				$ 13,000	
Total available funds		$ 1,041,817	$ 56,267	$ 132,817	$ 13,000	$ -

II. Expenses from state and federal appropriations					
A. Available for projects					
1. HCA county structures (estimated)	$ 959,817				$ -
B. HCA administration					
1. LHDCA administrative expenses from state appropriations (1.75%)	$ 8,750				
2. GHRC&D administrative expenses (office space, bookkeeper, vehicle, utilities etc.) (5% of FY2022 approp., but not < $35,000)	$ 35,000		$ -		
3. Staff (salary, benefits)	$ 6,250	$ 10,700	$ 96,300	$ 13,000	
4. Operational reserve (6-month 1/2 time)		$ 34,000	$ 30,000		
C. Research and education					
1. Research, education, & development (GIS, special projects, stream table, other)	$ -				
2. Stage-discharge / crest-stage gages	$ -				
3. Aerial video reconnaissance - misc.	$ -				
4. Aerial video development	$ -				
5. Bank erosion & nutrients research project	$ -				
6. Road signs	$ -				
7. Stream profile surveys	$ 15,000				
8. Experimental bored headcut basins	$ 17,000				
9. Experimental scrap tire structures	$ -				
III. Expenses from interest fund					
A. Available for projects					
1. HCA small structures		$ 17,000			
IV. Expenses from county fees					
A. Administration					
1. Insurance			$ 700		
2. Supplies/equipment (computer, camera, cell phone, etc.)			$ 1,700		
3. Postage			$ 200		
4. Office / field assistants			$ -		
5. Meeting expenses & travel			$ 2,500		
6. Conferences/training			$ 1,200		
7. Subscriptions, books, media			$ 100		
8. Miscellaneous (cards, awards, etc.)			$ 100		
9. HCA shirts			$ 250		
10. Services (web page, maps, etc.)			$ -		
B. Lobbying					
1. State lobbyist			$ 7,500		
2. Lobbying trips (DC trip, Des Moines trip)			$ -		
Subtotal of expenses (no county structures)	$ 82,000	$ 61,700	$ 140,550	$ 13,000	$ -
Total budgeted expenses	$ 1,041,817	$ 61,700	$ 140,550	$ 13,000	$ -
potential interest earned by FY24:		$ 5,490	$ 421		
estimated balance in FY24 if operational reserve unused:		$ 34,057	$ 30,022		
estimated balance in FY24 if operational reserve used:		$ 57	$ 22		

Hungry Canyons Alliance Funding