
Yellow River Headwaters

Watershed Improvement Review Board Final Report

Project # WIRB 1012-007: December 15, 2010 – June 30 2014.

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Project Background

The Yellow River Headwaters Watershed Project (YRHW) was developed in 2008 in response to the Iowa DNR placing the stream on Iowa's 303(d) List of Impaired Waters due to excessive bacteria levels; alongside nutrient and sediment loading (a TMDL was completed in 2012 and a Watershed Management Plan in 2012). The Winneshiek Soil and Water Conservation District (SWCD) and Allamakee SWCD were fortunate enough to receive a Watershed Protection Funds (WSPF) grant from the Iowa Department of Agriculture & Land Stewardship (IDALS) to support our efforts in 2009 and an Iowa DNR EPA-319 grant was awarded in 2013. WIRB has committed funding in support of the project with investments of grants in 2010 and 2014. The SWCD committed to peruse WIRB grants to increase the available cost share dollars to effectively leverage partners' funds through implementation of crucial Best Management Practices (BMPs) in the targeted areas in the watershed.

The YRHW encompasses approximately 26,119 acres or 16.8% of the overall area of the greater Yellow River Watershed (YRW). Locally, there are two identified stream stretches in the YRHW, the North Fork of the Yellow River and the Yellow River main. As its name implies, the YRHW is the headwaters of the Yellow River and as such plays an important role in the water quality of the Yellow River and the eco-tourism of the region (southeastern Winneshiek and southern Allamakee Counties). The geology, ecology, topography and land use in the YRHW are vastly different from the rest of the YRW. Agriculture (72% of the watershed) rather than forests dominate the YRHW and highly fertile uplands tend to comprise more tile drainages than cold-water springs that replenish the river.

The award #1012-007 by the WIRB was dovetailed at the time to the ongoing watershed project and stated objectives and goals of the project. Keystone goals were accepted as:

- Goal 1: Decrease sediment delivery to the YRHW by 50% over the next 4 years.
- Goal 2: Decrease bacteria loading to the YRHW by 35% over the life of the project.
- Goal 3: Reduce livestock access to the stream by 75% over the life of the project.
- Goal 4: Increase the culture of conservation among landowners in the YRHW.

Principally the practices of Grade Stabilization, Livestock Manure Storage and Terraces were chosen to be further endowed with WIRB funds because general shortfall at the time to budgets in state and federal funds. Acceptance and enactment of these practices by producers and landowners was anticipated to be high allowing for timely education and construction of practices.

Project partners have operated closely with producers and landowners to market and promote BMPs, adhering to the objectives of the project using guidance from stewardship partners and fiscal agents with outlined data and pertinent information from documents such as the TMDL and WMP. These collaborations have exhibited producer enthusiasm towards the implementation of practices that focus on goals set forth from the watershed advisory board to emphasize the removal of the YRHW from the impaired waters list. This expired WIRB funding agreement was a mechanism spanning a 3.5 year (December 2010-June 2014) period, it is a part of a larger engine that is driving the gears of water quality enhancement that has targeted goal load reductions of bacteria (7.67E+14CFU daily delivery reductions), sediment (17,450 t/y)



and excess nutrients to accomplish the stated project goals for the entirety of water quality project. The Yellow River is also designated as a *High Quality Resource Water* by the State of Iowa but is even more known as the largest cold water trout stream in the state.

Financial Accountability

Grant Agreement Budget Line Item	Total Funds Approved (\$)	Total Funds Approved—Amended (\$)	Total Funds Expended (\$)	Available Funds (\$)
Waste Storage Structure	66,664.00	66,664.00	28,088.37	(46,759.21)
Terraces	66,664.00	66,664.00	56,524.45	(10,140.51)
Grade Stabilization Structures	66,672.00	66,672.00	19,904.62	(38,583.83)
Totals	200,000.00	200,000.00	104,516.44	(95,483.55)
Difference				(95,483.55)*

* \$.01 difference that is caught in rounding

This WIRB award was sought after by the SWCD to ensure the limited project dollars that were already on hand would be available to extend the opportunity to more producers to get the most bang for the financial assistance available. By complementing funds from different sources (WSPF/IFIPS-IDALS, EQIP-USDA/NRCS, 319-EPA/IA DNR, CRP-USDA/FSA) the likelihood of a successful project could be weighed against bacteria, sediment and nutrients with the achievement of measurable reductions. Up to 75% cost-share was allowed for producer cost-share to build structural practices to allow enticement of the producers to complete BMPs yet allow them investment of their personal funds advocating complete buy-in towards accomplishing stewardship. Management Practices (such as Summer Construction, Cover Crops, Use Exclusion...) paid rates of 100% to generate excitement for practices that could be timely applied to the landscape with the scope of reducing impacts of pollutants or enticement to build BMPs in specific locales, with lessor degrees of technical layout/design in a proficient manner.

The influence of partners' funds throughout the project was highlighted by the 29% investment of total funds expended by landowners. The resolve by the producers that participated in the watershed project illustrated the need and desire to implement practices that were practical yet met needs of their farming operation.

Execution of the planned goals of the project, financial culpability (funds invested) and technical development of practices were hindered by eradicate weather that was experienced during the life of the project. The fall of 2012 was categorized as moderate drought year by NOAA for this region of Iowa. This excessive dryness halted construction of practices because soil moisture was diminished to the point that compaction of soil to USDA-NRCS Engineering Standards could not be met. Magnification of failing to implement practices was synthesized by the federal government shutdown for 16 days in the fall of 2013 that direly shortened the construction season and was followed by a record setting wet spring of 2014 that also hampered construction of BMPs. Detrimental construction techniques would have allowed inferior stewardship practices to be built that may have failed thus discouraging future producer



participation and most importantly the risk of squandering publicly-dispensed funds on practices destined to fail.

Funding Source	Approved Application Budget (\$)	Actual (\$) Invested	Investment Towards Partnership
WIRB	\$200,000.00	\$104,517.44	7%
WSPF/WPF	\$603,600.00	\$451,721.29	33%
EQIP	\$272,000.00	\$259,584.61	18%
319	-	\$59,336.96	4%
NRCS	\$20,000.00	\$20,500.00	1%
Landowners	\$255,000.00	\$432,225.95	31%
IFIP	-	\$14,088.40	1%
REAP	-	\$600.00	1%
CRP	\$53,200.00	\$62,416.75	4%
Totals	\$1,403,800.00	\$1,404,991.40	100%

Watershed Improvement Fund contribution: Approved application budget: 14 %
Actual: 7 %

Disbursement of WIRB-awarded funds to qualifying BMPs were built in a measured pace within the constraints of construction seasons delivered upon the watershed with conditions that were less than favorable. During the first half of the project the watershed advisory board designated a calculated conservative delivery of WIRB funds approach was taken to ensure enough funds were available through the entirety of the project. As the project progressed a coordinated hastened pace was taken towards investing WIRB funds; in retrospect formulated dispersal caused the project to miss some set goals, yet it generated loftier collaboration by partners.

Generation of excitement and commitment to the project can be appreciated to the 31% total project resources invested into BMPs which is almost double the anticipated buy-in by landowners and producers as set forth in the WIRB Award application. This persistent enthusiasm towards the project can be measured back to the original landowner survey that showed 94% of the landowners/producers were willing to invest their own funds towards improved water quality and land treatments. In summation, the other project partners invested over \$1 million to either meet or exceed the original goals set forth in the WIRB Award application to improve water quality, intensify the culture of conservation and infuse the local economy from services rendered. BMPs that were built within watershed project area were built to USDA-NRCS Engineering Standards to ensure longevity and integrity. Maintenance agreements have been signed for every practice installed to ensure reliability and producer dedicated upkeep of stewardship practices.

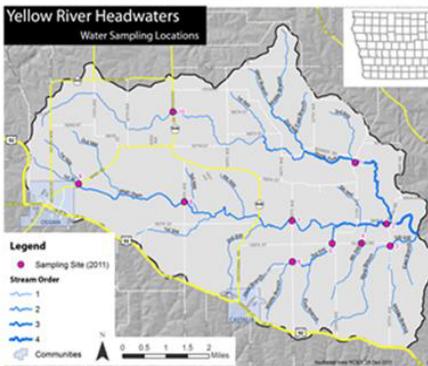
Environmental Accountability

Water monitoring has been a competent tool to quantitate the effectiveness of the BMPs that have been targeted to the watershed's priority areas. Sampling by the district has focused on the following parameters: bacteria (E.coli), water temperature, dissolved oxygen, turbidity,



chloride, pH, nitrate-N, nitrite-N, phosphate and ammonia. Our sampling data has over 40 sampling dates tied to our efforts, this complements four years of downstream water sampling by the Allamakee SWCD. Water sampling will continue through the EPA-Iowa DNR 319 funding through federal FY2015 or further depending on available funding. So far sampling has confirmed that our loading issues of bacteria, sediment and nutrients are in correlation to runoff events; this has been exhibited by monitoring summaries from Iowa DNR Watershed Monitoring and Assessment Section.

Goal 2 of the project devised that a 35% reduction in bacteria was needed to enhance the long-term water quality of the Yellow River. In the priority tributaries that the WIRB Award has helped fund along with partners' obligations, we have seen a cumulative reduction of 29% (calculated average of reduction per targeted sub-tributaries in measured bacteria) of bacteria loading. Main branch sampling site #2 along with tributaries sampling sites (YRHW 4, 6, 7 and 8) have shown reductions of (13%-46%) in loading of bacteria. Tumultuous weather patterns during the award period within the watershed drainage has increased stormwater runoff and linking the measured runoff has been documented as increased bacteria loading in the 5 sampling sites. The illustration of successful implementation of practices can be presented even with amplified loading of bacteria sums measured reductions in bacteria were documented because of BMPs such as livestock corridor exclusion, riparian buffers and livestock waste systems.



Water sampling was tasked as a tool to measure the progression of meeting water quality goals tied directly to priority areas of the Yellow River Headwaters. Water sampling has been conducted on a weekly basis (April-Nov.) starting in 2011, 2012 (was skipped due to lack of funding), 2013 and again in 2014. Anticipation of desirable results in reduction of bacteria loading was tied to BMP placement within the priority areas with emphasis on practices that reduced access of livestock to stream corridor and livestock manure storage facilities that either eliminated open lots or contained manure from open lots until it could be land applied to croplands under optimal conditions to ensure limited runoff of land applied nutrients or bacteria sourced from manure. Producers that received cost-share for livestock facilities from WIRB or partners were required to enact a Certified Nutrient Management Plan to safeguard water quality by highlighting nutrient timing.

Site	Median 2013	Median 2011
YRHW1	10000	7350
YRHW2	1500	2300
YRHW3	580	370
YRHW4	900	1200
YRHW5	1100	705
YRHW6	560	770
YRHW7	340	625
YRHW8	430	490
YRHW9	2250	1100
YRHW10	4100	1500



The reduction of bacteria loading overall at site #2 which is a pivotal point below the aforementioned targeted focus tributaries by the watershed project; demonstrates as an indicator what can be done throughout the remainder of the YRHW with financial incentives, marketing and acceptance by producers to improve overall water quality.

Goal 3 (Culture of Conservation) assigned the task of marketing and educating the need of stewardship practices within the set priority areas of the watershed that resulted in 23 different producers having participated in the installation of BMPs resulting in bacteria, sediment and nutrient loading declines during the WIRB Award timeframe of the YRHW project. This timeframe of accelerated stewardship enactment has reduced sediment loading by 5,449 t/y and 7,059 lbs. of phosphorus, respectively. In the entirety of the YRHW project to date, BMPs by producers have enhanced water quality supported by reductions of 7,490 t/y sediment and 9,086 lbs. of phosphorus from being transported to the Yellow River.



Terraces and Grade Stabilization Structures were sediment stewardship focus BMPs for the WIRB Award listing of practices to be constructed within the timeline and to the completion of Goal 1 (reduce sediment delivery by 50%). 6.4 miles of terraces now are sentinels of corn and soybean studded hills that were carefully arranged according to our highest sediment delivery capable fields (>5 t/y) from pre-watershed analysis as designated priority areas of the application.

Four Grade Stabilization Structures were strategically linked with the landscape of the watershed that capture and diminish upstream of the dam, 1,416 acres of stormwater water runoff, wayward nutrients, and sediment delivery that is calculated reductions of 2,864 t/y according to pollution delivery calculator. The culmination of these practices from the WIRB Award and the associated funded practices from partners funds have achieved 34% total reduction of sediment delivery for this timeline and 43% of the entirety of the project towards the goal of 17,450 t/y.



Four Livestock Manure Systems have been built with partners' funding from the WIRB Award after it was adapted into the project. These BMPs now regulate runoff manure (bacteria/nutrients) from 5 open lots, eliminated 3 open feedlots and 1 dairy day pasture that was heavily grazed to the point of denudation of all grasses and legumes. These facilities have long-term storage for over 950 head of livestock for manure storage and consist of manure stacking pads, settlings basins, complete confinement of manure and liquid

manure storage tank that now can be can be land-applied in appropriate weather conditions that reduce the conveyance of manure or associated nutrients, yet giving the producer the flexibility

to coordinate this into their farming strategies. Four Certified Nutrient Management Plans were also enacted along with the livestock waste systems to safeguard producers from over applying nutrients to meet cropland needs for commodity production. This in-depth report analyzes the soil health of available cropland for nutrient incorporation along with associated farming techniques that determine runoff and incorporation of storm waters.



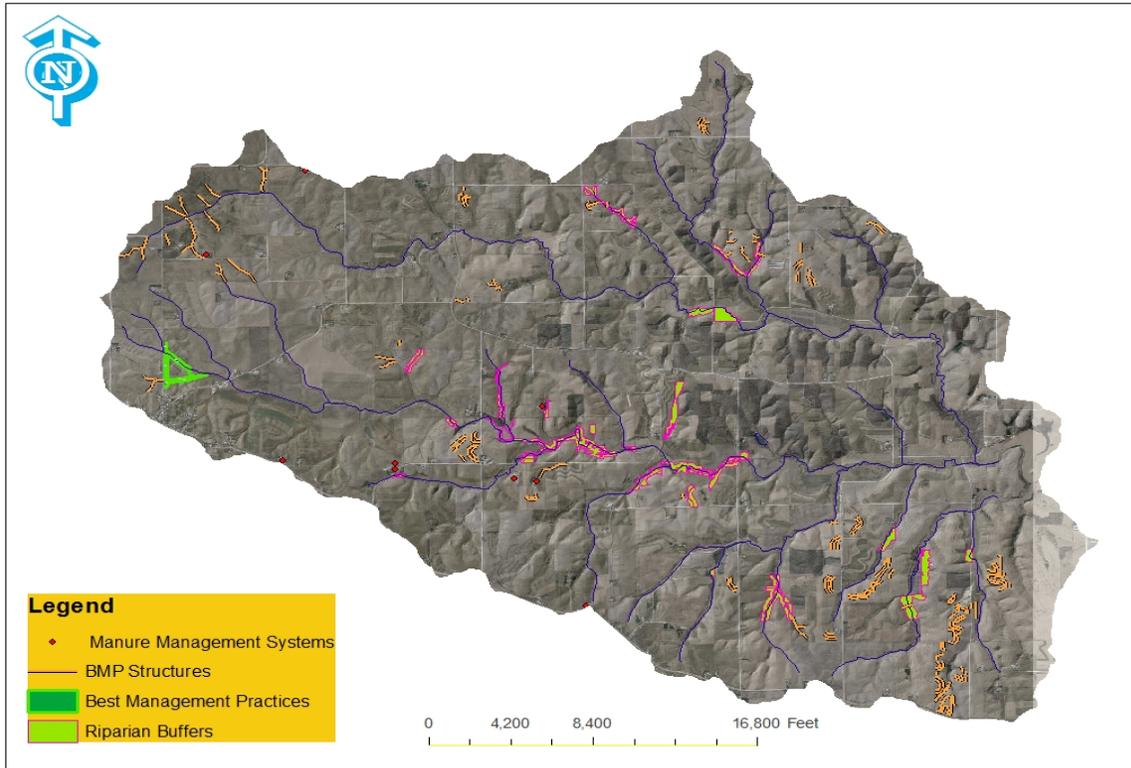
To accomplish further achievement of desired goals, project partners concentrated on executing Goal 3 of the project (removal of livestock from the stream corridor) by emphasizing the implementation of riparian buffers within the stream corridor. 5.9 miles (31,152 ft.) of stream (21% of the corridor that was previously grazed) is now in stewardship practices that enhance water quality from the WIRB Award period; this commitment plus 39,807 ft. of additional riparian buffers installed prior to the WIRB Award add up to 47% (13.4 miles) of the corridor enhanced by reducing direct conveyance of nutrients, sediments and bacteria. There will be another 1.7 miles of stream corridor within the designated high priority target area that will be planted to native trees or prairie and the perimeter of that area will be fenced to allow rotational grazing of the remainder of flood plain in the fall of 2014. This will be a unique demonstration of stream corridor stewardship and utilization for livestock pasturing because the following featured BMPs will be deployed: Fencing for Livestock, Livestock Watering System, Stream Crossings, Heavy Use Protection, Pipeline, Prescribed Grazing Plan, Pasture Plantings and Livestock Exclusion. By using formulas from Table 16-8 of the WMP for consideration towards washoff bacteria from the pasture, we estimate reduced bacteria from the Yellow River by 1.10e+13 orgs per day.



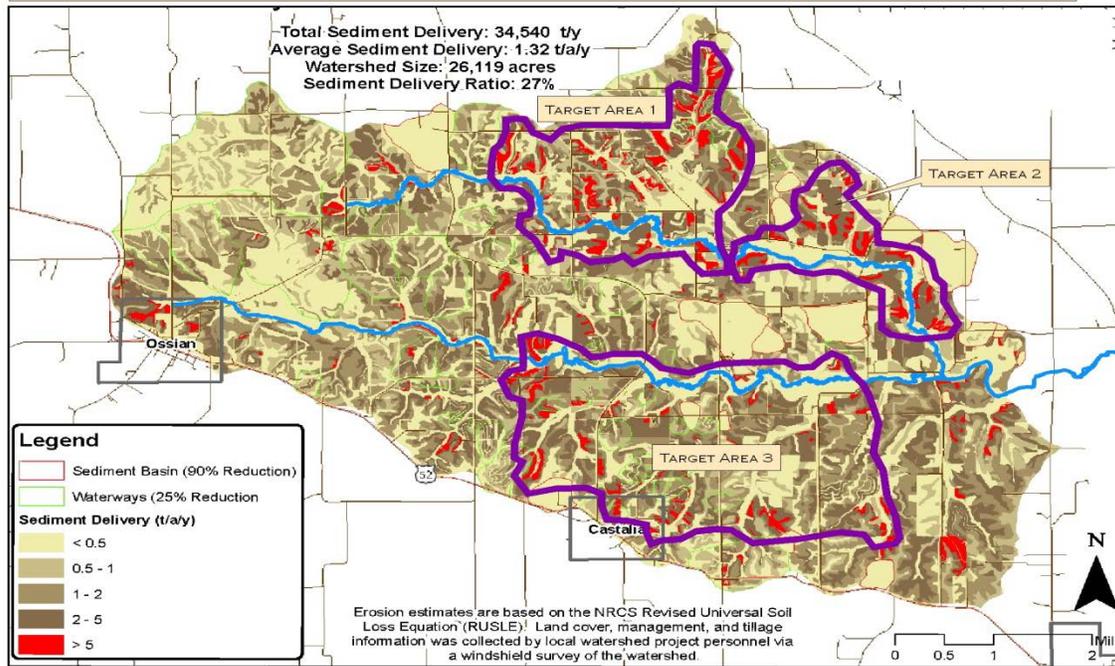
Practice	Unit	Approved Goals	Goals Accomplishments	Percent Completion
Terraces	Ft.	40,000	33,887	85%
Sediment Basin	No.	20	0	0
Grassed Waterways	Ac.	15	27	100%+
Grade Stabilization Structures	No.	12	4	33%
Cover Crops (Ac)	No.	812	186	23%
Filter Strip / Buffers (Ac)	Ac.	268	123.2	46%
Summer Construction	No. Ac.	100	109	100%+
Waste Storage Systems	No.	8	4	50%
Nutrient Management Plans	No.	8	3	3%
Diversions	No.	12	0	0
Livestock Exclusion (Ft)	Ft.	4000	2594	65%
Tank or Trough (NBR)	No.	8	3	38%
Use Exclusion (Ac)	Ac.	100	85.5	86%
Filter Strip / Buffers (Ac)	Ac.	80	57.4	72%

* Denotes WIRB Funded BMPs





AREAS OF TARGETED CONSERVATION IN YELLOW RIVER HEADWATERS



Program Accountability

Anticipated outcomes of the project for the timeline of this WIRB Award were moderate to exceptional depending on the numerical percentages of BMPs completed. In summation it was unfortunate that all the goals that were originally set were not reached or exceeded at a 100% rate. Unfortunate weather in timing to the construction seasons and a government shut down severely hindered the measured meeting of goals, which is inopportune but does not signify the end to a project's felt impact or innovation. For instance now that weather has faded and summer construction has been able to progress, practices are being implemented that were originally going to be funded from this WIRB Award are being funded from partners' funds (\$28,500); though this is exceptional news it is causing hardships to the point other practices that were slated to be completed this year will have to be put on hold until other funding is available. Ultimately fortuitous timing to support producer investment in BMP construction windows will be the vast deciding factor in structural practice success of YRHW Water Quality Project. Significant gains in the culture of conservation, stewardship practice implementation and overall strides in appreciation for the resources have been made. Continued collaboration by producers and the partners' awarded funds have enduring potential to influence the enhancement of one of Iowa's ecological gems and eco-recreational destinations.

Knowledgeable discussion by the advisory board and partners concluded through calculated discussions that the project has been a success and to keep the momentum established further funding should be initiated from funding partners to keep the project moving forward. Through the timeline of the WIRB Award the project expanded upon funding to expedite managing bacteria loading with a grant from EPA-Iowa DNR 319 funding and supplementary WIRB awarding was sought to utilize the foresight from the Iowa Nutrient Reduction Strategy's wealth of management practices, as they coincided with many of the currently utilized stewardship practices in the watershed project and will also be thoroughly referred to in implementing innovative science based practices that may be fresh to producers in the targeted watershed. Practices that are being marketed for stewardship application YRHW include *Cover Crops*, *N-Inhibitors*, *Contour Strips*, *Filter Strips*, and *Tile Outlet Wetlands*. These practices are easy to emulate for producers and peer enactment collaboratively will increase conservation awareness.

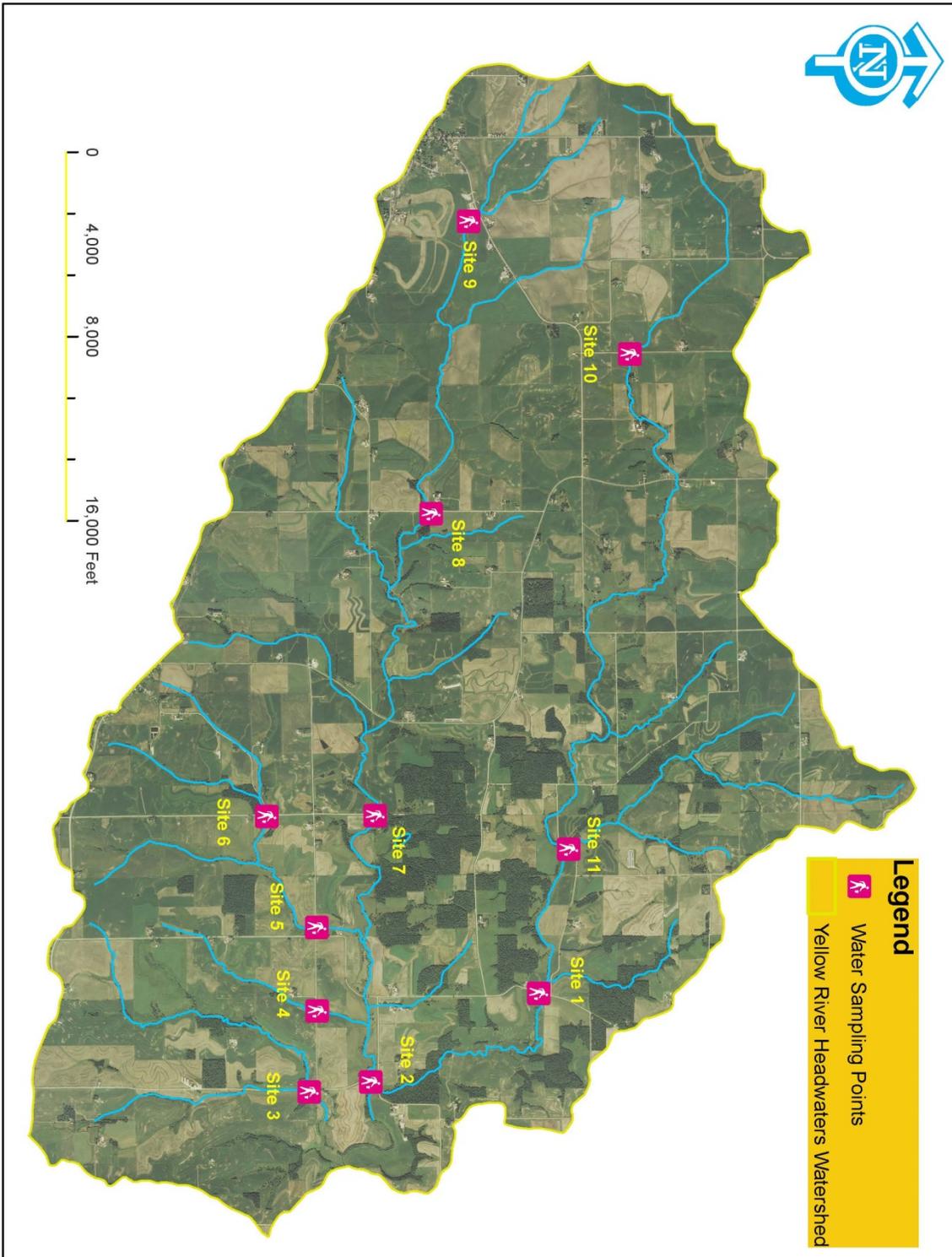
Reporting and funding allocations were administered by the project coordinator, including plans of operation, supplemental funding/budget reconciliation, project spreadsheet with updated balances and the annual district report. The project coordinator led the aggressive marketing of the watershed effort and worked diligently to inform the public on the importance of water quantity/quality to residents in and out of the water quality focus area. The project coordinator worked on valued partnerships such as with Iowa DNR Fisheries personnel to intensively enrich the aquatic habitats within the stream corridor and oversee the installation of thermographs. The project coordinator managed the collection, analysis and proper documentation of water sampling efforts to ensure the continued logging of data that pertains to the removal of the YRHW from the Impaired Waters List. The project coordinator operated tools such as the IDALS-DSC/IA DNR pollutant delivery calculator as a measurement tool to calculate the reduction of sediment and nutrient delivery to the priority waterbody. Also, these tools assisted in selecting one conservation practice over another in the case of getting more "bang for the buck" when estimating BMP placement. BMPs were designed to stringent USDA-NRCS engineering specifications to meet their strict and precise engineering standards. Monthly reports were presented to Winneshiek SWCD commissioners to ensure district and quarterly/annual reports would be submitted to IDALS-DSC, WIRB and IA DNR. The YRHW



advisory board met twice annually and an annual meeting with all project partners reviewed or modified plans of conservation practices to reach goals originally set upon the watershed project. Further project accountability was safeguarded through the ongoing use of the maintenance agreements that are used for all WIRB, IDALS-DSC, Iowa DNR funded conservation practices to ensure long-term longevity of BMPs and cost effectiveness. Programs such as the Continuous CRP were utilized for its programs (when eligible) with administration be provided by the Farm Service Agency. Finally, BMPs implemented for landowners/producers at a rate not to exceed 75% for all structural practices using the funding sources of WIRB, WSPF, EQIP and/or 319 in any combination according to available funds. Management practices stood at set fair market rates to ensure they enticed cooperation without exceeding prudent distribution of taxpayer funds.

One common barrier that became apparent throughout the project was how to reach the “human-shed” as it was called in the awareness campaign plan prepared for the watershed project. Winneshiek SWCD Commissioners, YRHW watershed coordinator and team partners suggested that Calmar and Postville be included in the watershed marketing campaign, even though these communities are geographically located outside the YRHW. Many watershed residents travel outside the watershed to Calmar or Postville for social, athletic events and education (elementary through high school), including post-secondary education at Northeast Iowa Community College. To overcome this the SWCD made a concerted effort to market the project through methods such as being sponsors for school athletic booster clubs, sponsor field days, sponsor BMPs , featured articles in annual reports, radio show interviews, sent newsletters and quick information post cards encouraging participation in the effort.





Yellow River Headwaters

Estimated Sheet & Rill Erosion, 2011

Total Sheet & Rill Erosion: 120,731 tons/year
Average Sheet & Rill Erosion: 4.62 tons/acre/year
Watershed Size: 26,118 acres

Sediment delivery estimates are based upon NRCS Erosion and Sediment Delivery Worksheet (1996), RUSLE C and P factor information were gathered by local watershed personnel.

