

MISSOURI CONSERVATION HERITAGE FOUNDATION  
STREAM STEWARDSHIP TRUST FUND – GRANT PROGRAM  
REQUEST FOR MITIGATION PLAN APPROVAL

**The Stream Stewardship Trust Fund is available to restore, enhance, and/or protect stream systems and associated riparian habitats.** Proposed projects will be prioritized and funded by the Foundation based on regional stream needs, maximum return on expended monies, level of threat to the stream system, and overall anticipated benefits to stream resources. Proposed projects should be located within the ecological drainage unit (EDU) where participating stream impacts occurred. Approval will be limited to projects that restore, enhance, or preserve Missouri's diverse stream systems.

This request form will be used by MCHF Board members assigned to the Stream Stewardship Trust Fund – Grant Program Action Team. Proposals submitted for funding consideration need to clearly explain elements of stream-based projects listed below which warrant consideration during the approval process. Spaces provided in the elements below are not to be considered limiting, and the attachment of additional pages of explanation is encouraged in order to provide full details.

*The Goal of the MCHF's Stream Stewardship Trust Fund is to provide an innovative tool for the restoration, enhancement, and protection of Missouri's streams and aquatic resources.*

- 1) Project Title – **Koeller bank stabilization and riparian protection** Landowner Name **Richard Koeller and Lynn Lambert**
- 2) County **Christian** MDC region **Southwest**
- 3) Project objectives – **We are proposing this mitigation project in an effort to directly address the resource threats identified in a comprehensive characterization of the Bull Creek Priority Watershed. The objectives of this project are to mitigate the unnatural rate of stream bank erosion occurring on approximately 315 feet at the site, improve channel stability by reinforcing one stream crossing, augment and protect approximately 11 acres of bottomland forest to maintain a healthy riparian corridor and establish a perpetual easement to protect over 2,100 linear feet of high quality perennial Ozark stream, 1,030 feet of intermittent stream and associated riparian corridors. These objectives will all address specific areas of concern discussed in the Compensation Planning Framework for the White River EDU such as minimizing sources of eroding soils, restoring, expanding and maintaining well vegetated riparian areas (especially in areas at risk of urbanization), and restoration of instream habitats that benefit sportfish, non-game fish and aquatic invertebrate populations. The East Fork of**

**Bull Creek on US Forest Service land upstream of the project site will be used as a reference reach to help establish achievement of the defined objectives.**

- 4) The project submitted for consideration is in the Bull Creek sub-basin of the White River EDU watershed and is considered a priority by MDC for the following reasons (include how project achieves watershed objectives and describe the rationale for site selection).

**This project will restore approximately 315 feet of eroding stream bank, restore channel stability by reinforcing one stream crossing and protect 11 acres of riparian corridor with a perpetual easement. The planned bendway weirs and longitudinal stone toe protection will reduce the sediment load entering Bull Creek by protecting the toe of the stream bank and pushing erosive currents away from the bank. In addition, limiting channel migration at this site will restore channel stability within this reach. The bank stabilization project will add habitat diversity by creating in-stream substrate and depth diversity. In-channel hydraulics will be restored by reducing excessive lateral movement of the stream channel. The restoration and enhancement of the riparian corridor will be an additional component to improving and stabilizing the site.**

**The project site is located on Bull Creek in the headwaters of the Bull Creek Priority Watershed immediately downstream of the Kipfer SSTF project site and waters from these sites flow into the Woods Fork Aquatic Conservation Opportunity Area (ACOA). The Woods Fork ACOA, which includes Camp Creek, and portions of Woods Fork and Bull Creek, was designated by MDC to target Williams' crayfish (Rank S2), three mussel species including Ouachita kidneyshell (Rank S3), Neosho mucket (S2), and purple lilliput (S2), and White River EDU fish species including southern brook lamprey (Rank S2S3). Multiple agencies have also designated aquatic priority areas within the Bull Creek watershed. The Missouri Department of Natural Resources has also designated 8 miles of Bull Creek as an Outstanding State Resource Water. Terrestrial priority areas are also within the watershed, including Busiek terrestrial COA and the Bull Creek Dolomite Glade/Oak Woodland Breaks LTA. The Bull Creek watershed has 45 recorded fish species, six recorded mussel species, and five recorded crayfish species.**

**Based on comprehensive background work, current threats in the Bull Creek watershed include inadequate riparian corridor and stream bank erosion in headwater reaches and bottom pasturelands, extensive residential development that can lead to the well-known effects of urban runoff and nutrient introduction from residential yards, a high gravel bed load resulting from past and current land management activities, and numerous aquatic organism passage barriers. The proposed project is located in the headwaters of Bull Creek and would address stream bank erosion and sediment issues that have been identified as serious threats to watershed health. In addition, the establishment of a perpetual easement along approximately 3,400 feet of Bull Creek and its tributaries will help protect this high priority watershed from the impacts that can result from encroaching suburban development.**

- 5) Site protection instrument (circle):

Acquisition

**Perpetual easement**

Special management agreement

- 6) Describe the details of the site protection instrument (ownership, legal arrangements, how the instrument assures the long-term protection of the proposed mitigation site): The landowner specified on the deed will be verified in addition to verification of any rights granted on the property. The perpetual easement will be written into the deed of the property to stay in trees and vegetation even in the instance of land transferring hands. If any management activities are conducted in the protected area, a professionally trained forester, engineer, fisheries biologist and/or hydrologist will need to approve those alterations.
- 7) Baseline information
- Describe the ecological characteristics of the proposed project site:  
The main project site is located on a 4<sup>th</sup> order stretch of Bull Creek approximately 2.5 miles upstream of the confluence with Woods Fork. The proposed bank stabilization project is located on the left descending bank. Much of the reach of Bull Creek on the Koeller property has well established riparian corridor, but some areas within the proposed easement will need additional riparian plantings. The stream bank has eroded over 80 feet since 1995, with approximately 75% of that erosion occurring since 2008. In its current condition, the site of bank erosion is approximately 315 feet in length with bank heights averaging four to six feet. The average channel width is approximately 115 feet, channel depth is approximately 6 feet and the substrate is predominately unconsolidated coarse gravel. The right descending bank is on the inside bend of a meander and is stable with a maturing riparian corridor.
  - Historic and existing plant communities, hydrology and soils of the proposed project site:  
Historic plant community consisted of bottomland hardwood forest. The existing plant community in the riparian areas is bottomland hardwood forest with areas of inadequate riparian buffer consisting of mixed grass pasture/hay land. Soils in the project site are within the Cedargap- Razort Complex with 0-2 percent slope and is frequently flooded.
  - Project application must include maps identifying the proposed project boundary with lat/long boundaries in decimal degrees and a GIS shape file with metadata of the delineated boundary. See attached
  - Describe existing hydro-system connectivity between the stream project site and any wetlands or other waters including tributaries connecting to receiving waters:  
At the main project site, Bull Creek is a 4<sup>th</sup> order stream. One 1<sup>st</sup> order unnamed tributary enters Bull Creek approximately 650 feet upstream of the project site. A 1st order unnamed tributary enters Bull Creek approximately 400 feet downstream of the project site. The National Wetlands Inventory map illustrates riverine wetland within the site. The Corps of Engineers has not made a determination regarding the extent of jurisdictional wetlands within the site. However, if

jurisdictional wetlands do exist, the project should not result in a loss of wetlands or wetland function.

- 8) Determination of credits as determined by the Missouri Mitigation Method (attach credit calculation worksheet or other detailed information to demonstrate the specific approach for credit calculation for this project) – see separate attachment:

- a. Number of stream channel credits 804
- b. Number of riparian credits 3,839.35
- c. Stream type (circle): Ephemeral                      Intermittent                      Perennial

9) Mitigation work plan

- a. Specifications of the project (geographic boundaries, construction methods, timing, sequence): The rock stabilization project will employ three bend-way weirs, 200 feet of longitudinal stone toe protection keyed into the existing bank, and a rock vein at the downstream end. For the size and amount of rock, please see the attached engineering design. Willow and sycamore poles will be used as a biotechnical component within the rock project area. One stream crossing will be reinforced using a rock blanket on the approaches. The riparian corridor will be established through the installation of bare-root seedlings. The proposed planting method will be hand planting or the use of a mechanical tree planter. The plantings will be done once rock placement is completed and will include species recommended by a local MDC Private Lands Conservationist (see attached). Plantings will be maintained throughout the monitoring period.
- b. Methods for establishing desired plant community (species composition and type, control of undesirable species, size of plants used, control of wildlife damage): An MDC approved tree and shrub planting plan will be given to the landowner for guidance in restoring and enhancing the riparian corridor.
- c. Grading plan and elevations of constructed features (describe or attach engineering design plans): See design in Appendix 1
- d. Describe or attach drawings showing existing stream channel cross sections, proposed alterations to the stream channel and/or banks, a description of in-stream structures including materials used for improvements, dimensions and elevations, and riparian plantings: See design in Appendix 1 and maps

10) Maintenance plan:

- a. Description and schedule of maintenance following initial construction: Depending on initial construction time of year, trees will be planted in the spring following construction. A tree planting plan will be used for guidance and the maintenance guidelines will be followed for a successful riparian corridor establishment. Planting sites will be prepared by using an approved herbicide in the fall and also in the spring to kill fescue and other vegetation. In the spring, a pre-emergent herbicide will be applied to help control unwanted vegetation through the summer. In accordance with Missouri state law, the riparian corridor restoration area shall be

kept free of weeds listed as noxious (see attached). In addition to state-listed noxious weeds, callery pear (*Pyrus calleryana*) and Japanese hops (*Humulus japonicus*) shall also be eradicated within the site.

- b. Mowing frequency and timing: Mowing of weeds between rows of newly planted trees will be beneficial in aiding in tree survival and growth. This will be done as needed until the newly planted trees are taller than any potential weed growth.

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- c. Herbicide applications (chemical used, method, timing, frequency): The fall before the trees are to be planted spray the entire planting area to obtain bare soil. Any type of herbicide with an active ingredient that contains glyphosate can be applied (ex. Roundup, Roundup Ultra, ClearOut, Eraser, Buccaneer, Gly-4(plus)) in the fall and also in the spring to kill fescue and other vegetation. In the spring before tree seedlings break dormancy a pre-emergent herbicide will be used to help control unwanted vegetation through the summer. Stomp, Prowl, Goal, Oust, Squadron or Princep 4L are several types of pre-emergent herbicides that can be used. To control annual and perennial grasses (fescue, foxtail, and Johnson grass) during the growing season use Poast, Fusilade, or Select herbicides.
- d. Irrigation plan (include source of water): Irrigation is not recommended.
- e. Passive water control and instream structure description and required maintenance (type and frequency): The rock stabilization structures will employ approximately 200 feet of longitudinal stone to protection keyed into the existing bank. The project will also include three bend-way weirs upstream and one rock vein at the downstream end of the longitudinal stone toe protection. The total amount of rock used for the project will be approximately 710 tons (Appendix 1). Upon completion, the project should not require maintenance except in the case of catastrophic failure. See adaptive management section for instream structure failures.

#### 11) Performance standards

- a. Description of the performance standards used (include metrics for determining project success):

Riparian: Monitoring will take place for five years to ensure survivorship of 300 stems/acre after the second growing season including natural recruitment of native desirable species. Monitoring, for purposes of the easement, will continue in perpetuity. No more than 20 percent of the woody vegetation within the restored corridor may be naturally-recruited species, unless otherwise approved by the Corps. The site will be free of noxious weeds and other invasive species as described in Section 10(a) above.

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Stream Channel: Georeferenced aerial photography will be used to monitor lateral bank movement. Periodic site inspections will be made to ensure that the structures are working as designed and remain in place. After several high flow events, we

would expect to see the thalweg of the stream shift away from the eroding bank and the bank begin to stabilize as erosive forces are diverted and riparian growth becomes established.

Reference stream(s) used (if any): The East Fork of Bull Creek located on US Forest Service land upstream of the project site

- b. Describe how the performance standards relate to the objectives of the mitigation site (include description of the desired resource type, expected functions or services being measured, or any other applicable metrics): One primary objective of the mitigation site is to reduce bank erosion and lateral channel migration within a 315 LF reach of the site. The performance standards directly measure whether this objective has been accomplished. If the performance standards are met, we expect to accomplish secondary objectives, which are beyond the scope of the monitoring to measure. For example, by inhibiting lateral bank movement, the project will reduce sediment loads into the stream, and improve the quality and diversity of aquatic habitat. A second objective of the mitigation site is to reestablish and preserve forested riparian corridor. The use of minimum tree survivorship within the specified acreages directly measures this objective. As with the in-stream objectives, if the performance standards are met, we expect to accomplish secondary objectives, which are also beyond the scope of the monitoring to measure. The establishment and preservation of forested riparian corridor will contribute to water quality by filtering herbicides, pesticides, nutrients, and other contaminants associated with agricultural runoff. The forested corridor will also contribute to the improvement of habitat, both within the stream and the corridor. The forested corridor will provide shading for the stream, lowering water temperatures. Additionally, the corridor will provide a source of organic detritus and large woody debris, which provide food and habitat for benthic macroinvertebrates and other aquatic organisms. Terrestrial and avian species, including passerines, will benefit from increased habitat availability, including forage and nesting. The restored area will also provide increased habitat contiguity with other riparian and upland habitat areas near the site.
- 12) Describe the method and frequency of project monitoring to determine when performance standards are being met (project site must be monitored for an appropriate period not less than 5 years after initial construction/planting), who will be conducting the monitoring, and the frequency monitoring reports will be submitted: Monitoring will take place annually for a minimum of five years to ensure that performance standards and Corps criteria for minimum planted tree survivorship are met. Due to the number of trees proposed for planting within the site, total stem inventory is not practicable. Therefore, monitoring of trees will be performed using a random sample. Sampling methodology will incorporate the use of either fixed random transects or plots, as determined appropriate by the MCHF/MDC to estimate percent survival. The monitoring reports will document general trends in the health and vigor of the planted forested riparian corridor; such as subjective evaluation of growth, signs of disease, or species-specific mortality. If naturally-recruited tree species are required to meet minimum survivorship requirements,



the reports will document the relative percentages of planted vs. naturally-recruited species, as well as species composition. Any occurrences of noxious and/or invasive species will be documented, with recommendations on control and management. Monitoring will include reconnaissance within the preserved riparian corridor, to determine whether the preserved corridor has been affected by clearing, dumping, or other prohibited disturbances. MCHF/MDC staff will photo document changes in stream channel morphology and will also photo document rock stabilization structures and riparian corridor restoration/enhancement. Annual site visits will include visual inspection of the longitudinal peak stone and weir, to determine if they are working as designed and remain in place; and document evidence of bank stability, such as establishment of bank vegetation. Lateral channel migration will be measured using georeferenced aerial photography and on-sight measurements along the project site and newly restored/enhanced riparian corridor every year for five years. If instances of bank instability or continued erosion are observed, the monitoring report will provide recommendations on repair or modification to meet performance standards. If, after five years of annual monitoring, the Corps determines that the performance standards have been met; no further monitoring will be required. If the performance standards have not been met and/or a reasonable assurance of long-term success can't be demonstrated; then the Corps may, at its discretion, require additional monitoring and/or corrective measures. After the Corps releases the site from annual monitoring, the site will be visited periodically to observe whether the site continues to function as designed; and determine whether the site is in compliance with the provisions of the conservation easement. Monitoring for purposes of the easement will continue in perpetuity.

13) Long-term management plan:

- a. Describe how the project site will be managed after performance standards have been met: The project site will be protected by a perpetual easement and monitored routinely. Continuing evaluations and coordination will take place with the USACOE. If any adverse effects occur they will be addressed on a case-by-case basis with Best Management Practices (BMPs) that have been approved throughout Missouri for use on stream, livestock, and riparian corridors.
- b. Annual cost estimate for management: \$ 60-100 per acre
- c. Funding mechanisms will be used to finance long term management (including responsible party: If required SSTF funds will be used to make sure the newly established riparian corridor is successfully established and maintained.
- d. Long term management responsibilities transferred to (include description of their long-term management plan and a written stewardship commitment that includes a financing plan): The landowner will assume responsibility for long-term management of the project. Through MDC technical assistance, the landowner will follow those guidelines to ensure a successful project. A perpetual easement will ensure that the project will stay protected into perpetuity.

14) Adaptive management plan (due to inability to construct project in accordance with approved plans, monitoring revealing that the project is not meeting performance standards, remedial measures resulting in project modifications, design changes, revisions to maintenance requirements, revised monitoring, etc):

- a. Description of strategy to address unforeseen changes in the project: If rock stabilization fails, SSTF will reevaluate and reconstruct rock work to specifications for a

successful design. If riparian corridor does not meet requirements set forth by the NRCS, then the landowner will be required to re-plant. If riparian corridor fails due to an act of God then SSTF funds will be used to assist with a new planting.

- b. Party (ies) responsible for implementing adaptive management: If failure in the project is due to an act of God then the agencies will assist with adaptive management. If failure is due to landowner negligence, then the landowner will be responsible for adaptive management.
- c. Inability or unwillingness of the landowner to implement remedial measures and bring the riparian corridor into compliance will result in a reduction of available credit for the mitigation project. The amount of reduction will take into account the percentage of the riparian corridor area that does not meet minimum performance requirements; and the extent to which this area falls below the performance standards. The Corps has the final authority to determine the available credits for the project.

15) Financial Assurances:

The MCHF has previously demonstrated its ability to fund good stream projects and is committed to the installation, monitoring, and long-term management of its compensatory mitigation projects. Since an important basis for project selection is a project's fit into MDC's statewide stream management plan, a commitment of the biological, engineering, and legal resources of MDC also accompanies each project. In addition to MDC's support, the MCHF has incorporated financial assurances into its cost-per-credit and will retain financial assurances not to exceed 10% of each project's estimated completion cost to establish a continuous contingency fund balance of \$250,000.00.

16) Total cost of the project is estimated at \$ 99,000.00. SSTF Resources are requested in the amount of \$ 99,000.00.

17) Partner funds in the amount of NA are being contributed by: (if applicable):\_\_\_\_\_

18) Total stream length of the project approximately 3,400 linear feet. Total Riparian corridor acreage approximately 11 acres

19) Total cost per credit (including all costs) estimated at \$ \$ 21.32

20) If the project is leveraged with contributions from others, SSTF Resources are requested to fund which practices/products/costs activities? NA

21) Schedule for project completion and/or installation: Rock stabilization to begin late winter 2021; Riparian Corridor Restoration/Enhancement fall 2020/spring 2021

Note: Proposal must include appropriate on-site photographs, county maps locating the proposed project, related topographic, soils, or other maps, drawings and materials necessary to describe planned activities. In order to reproduce color photographs and maps, a complete electronic file is requested with project proposals.



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MDC Region: **Southwest** \_\_\_\_\_ Date: **7/29/2019** \_\_\_\_\_

Name of project leader, and Division: **Dave Woods, Fisheries** \_\_\_\_\_

Lead Unit Chief Approval: Sherry Fischer

Sign: Sherry Fischer \_\_\_\_\_ Date 9-20-19

Lead Division Administrator Approval: \_\_\_\_\_ Date: \_\_\_\_\_

MDC Director Approval: approval by email \_\_\_\_\_ Date: 9-19-19

Please return to the Executive Director of the Missouri Conservation Heritage Foundation.

MCHF Approval: Kevin Pope \_\_\_\_\_ Date: 8-27-2019

Figure 1. Location of project site in the White River EDU.

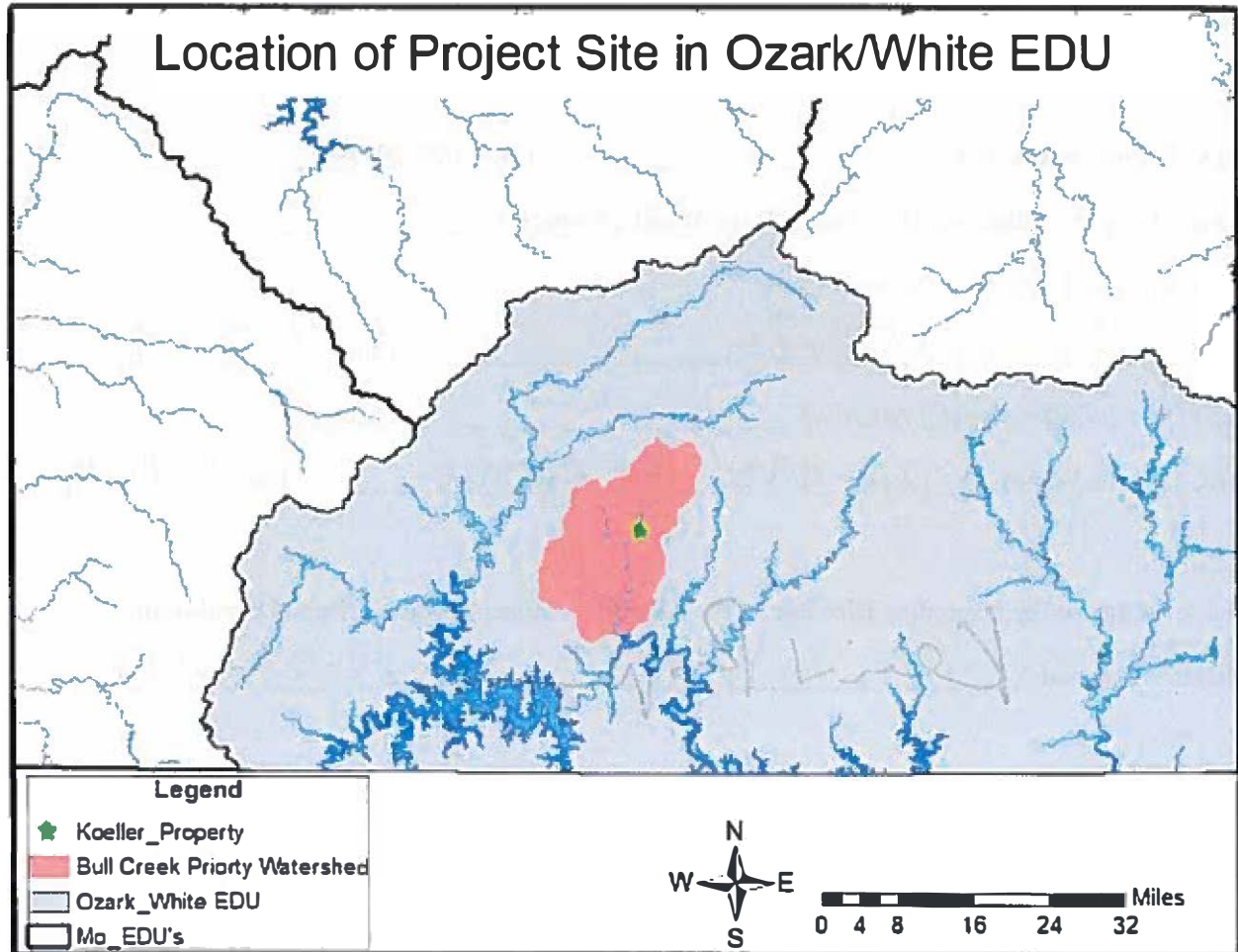




Figure 2. Location of Koeller Property in southwest Missouri.

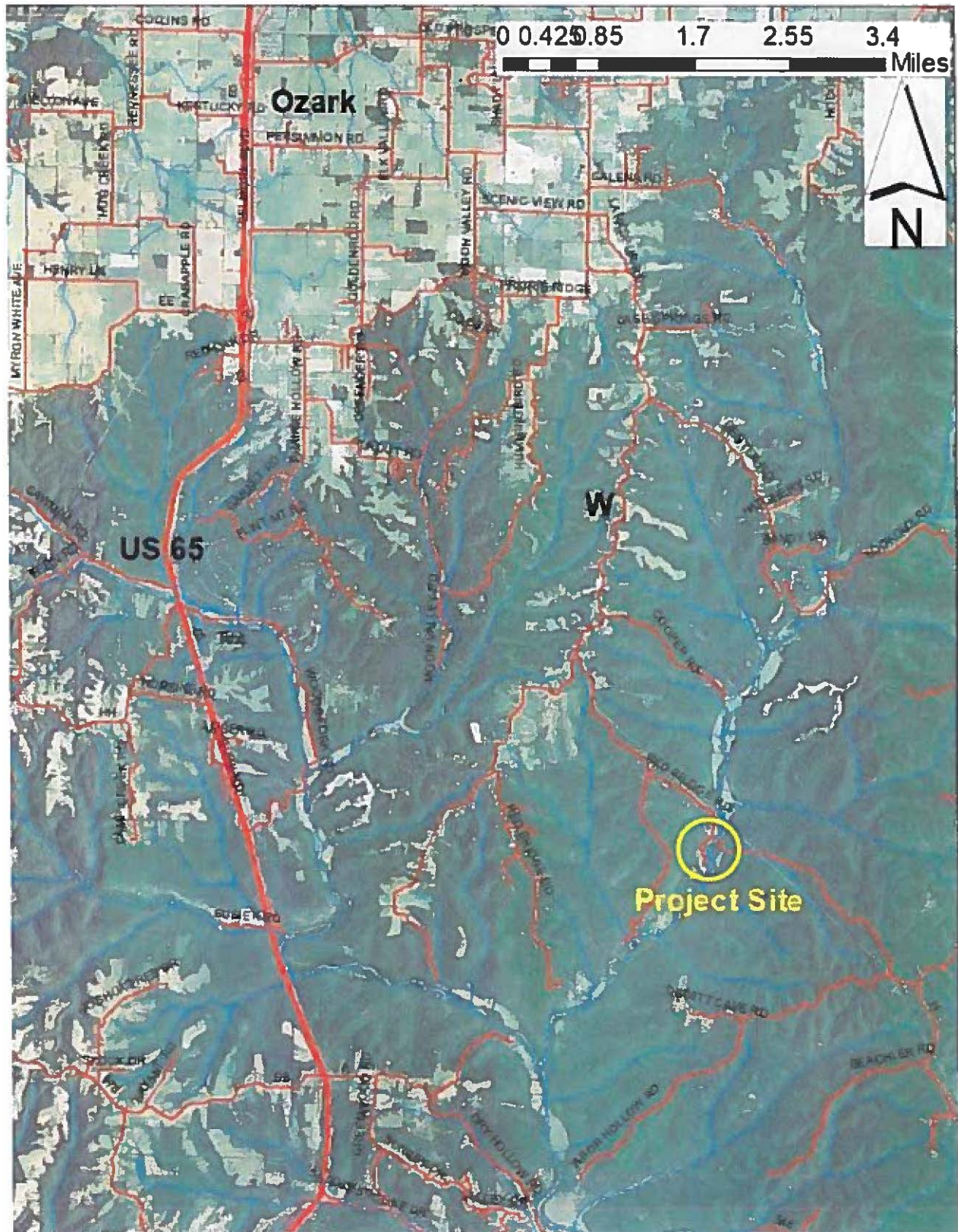




Figure 3. Progression of stream bank erosion since 1995.

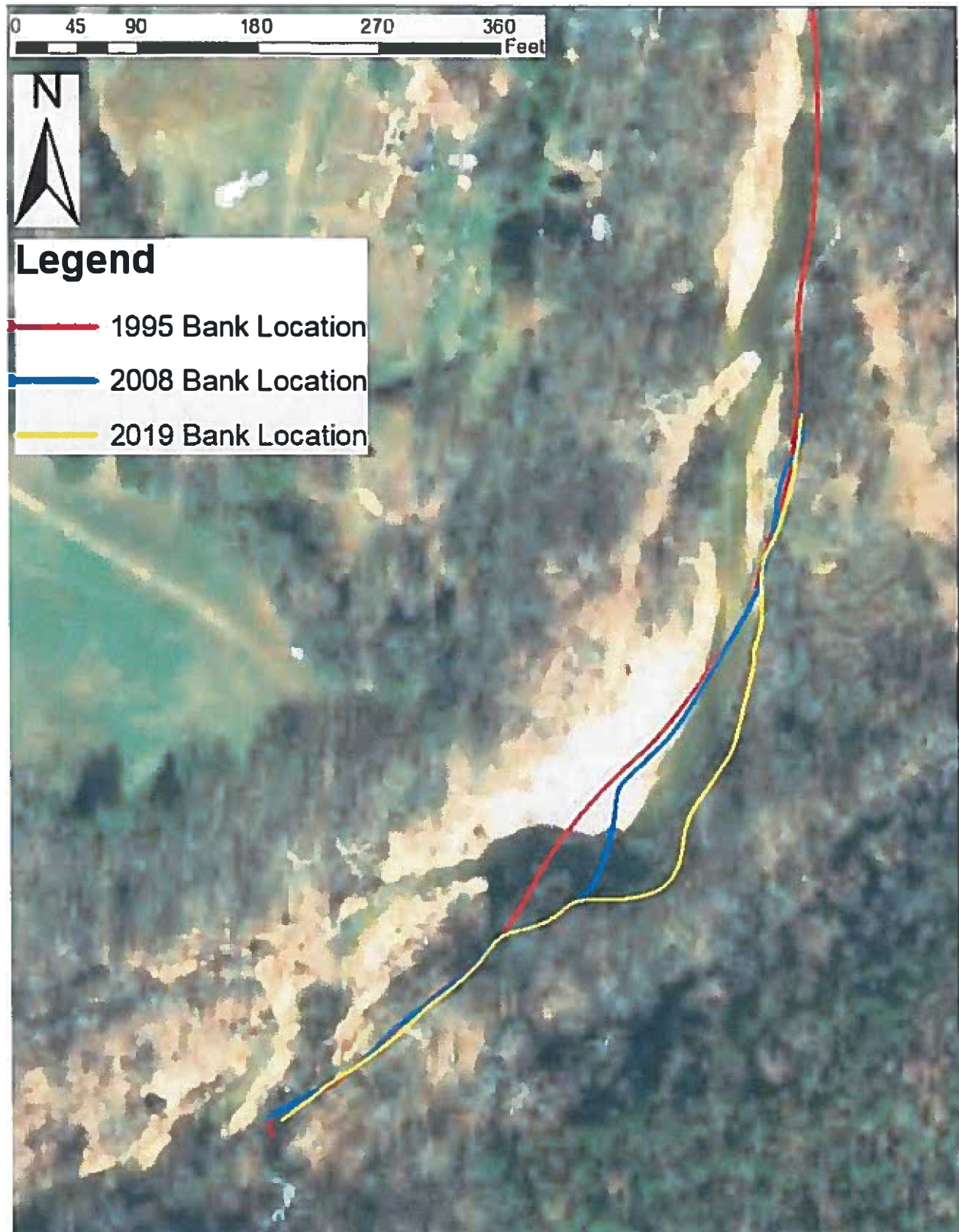




Figure 4. Proposed project components for the Koeller project.

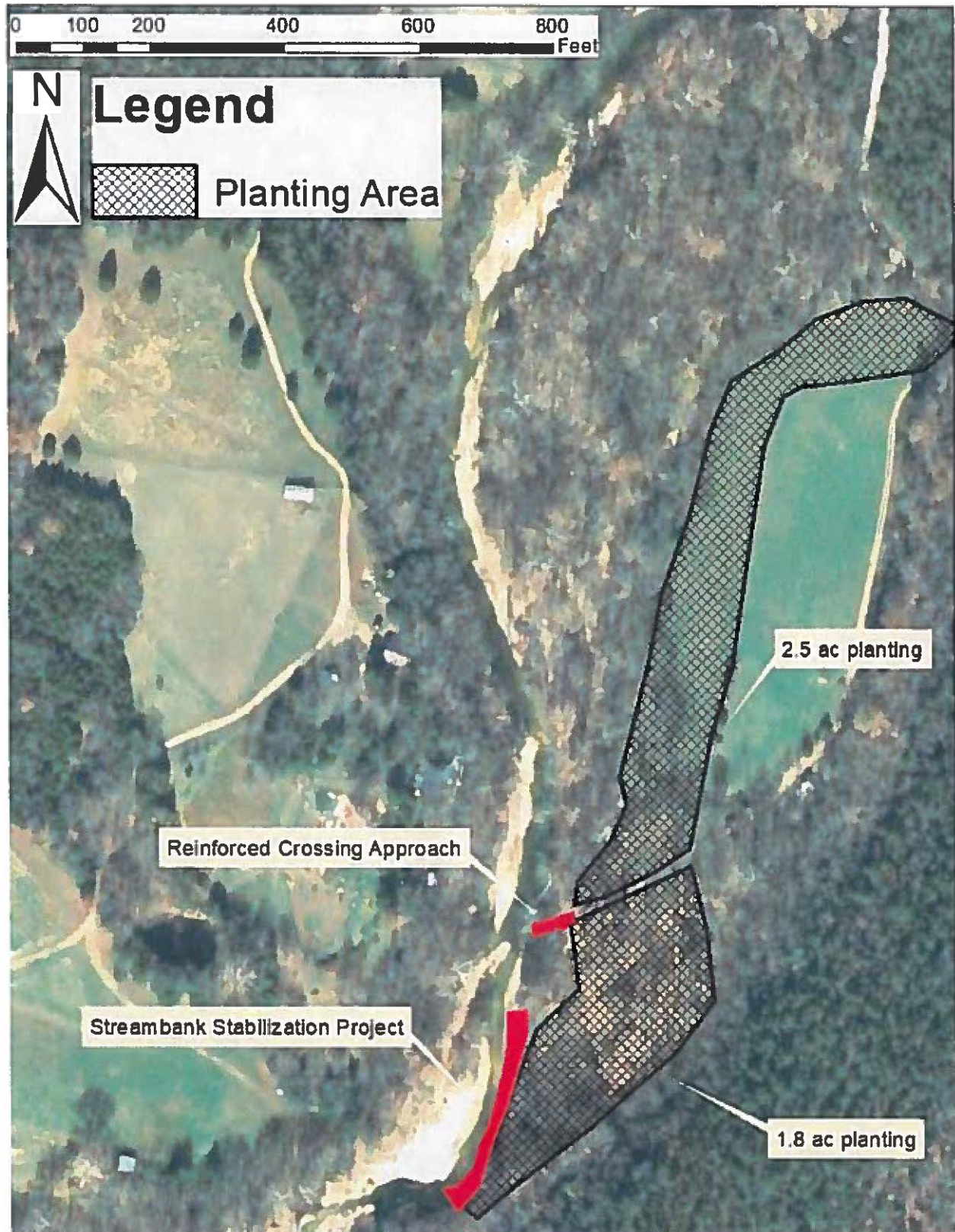




Figure 5. Proposed perpetual easement on Koeller Property. Easement area will encompass approximately 11 acres.

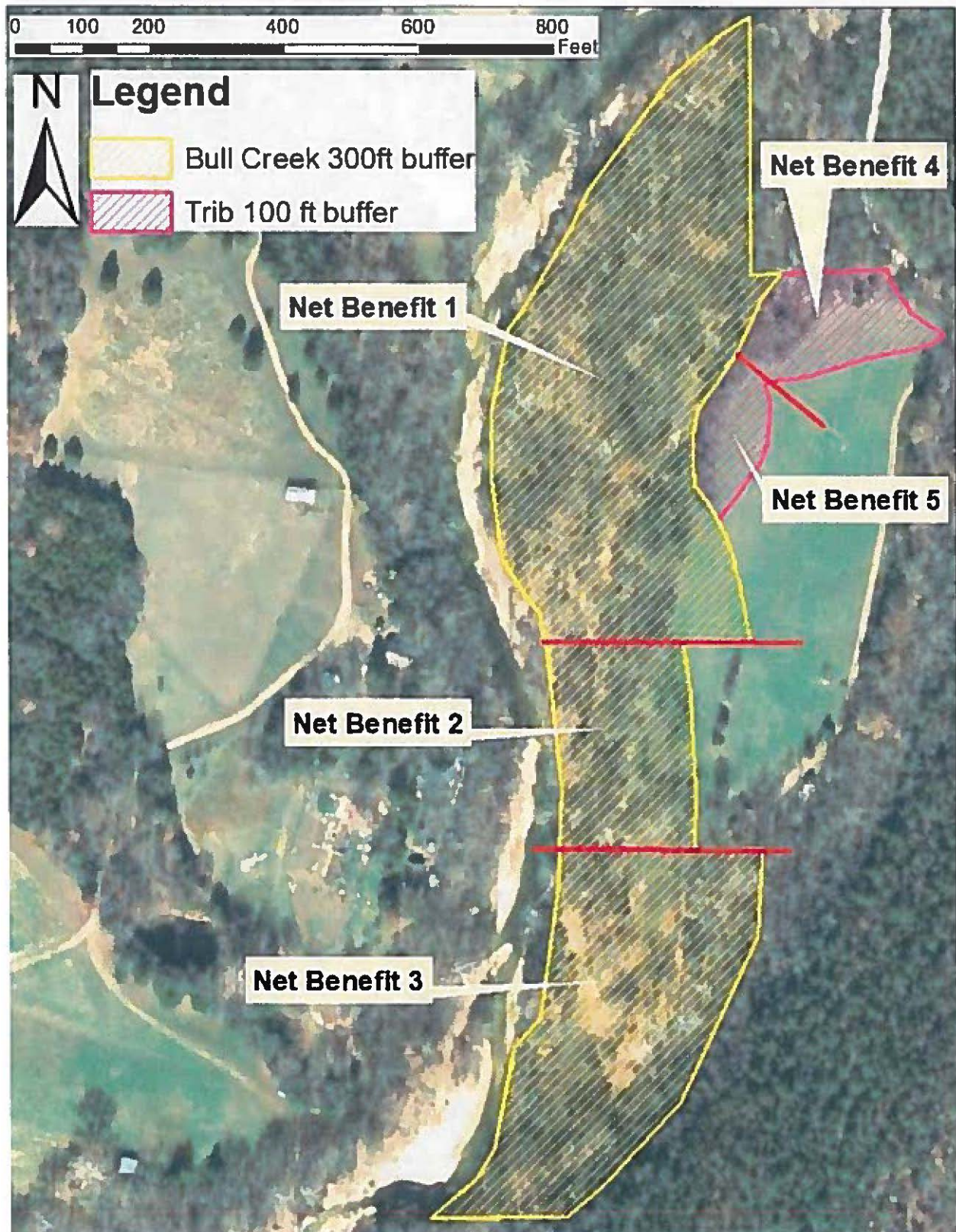




Figure 6. Heritage database records of species of conservation concern and section of Outstanding State Resource Water in the Bull Creek watershed.

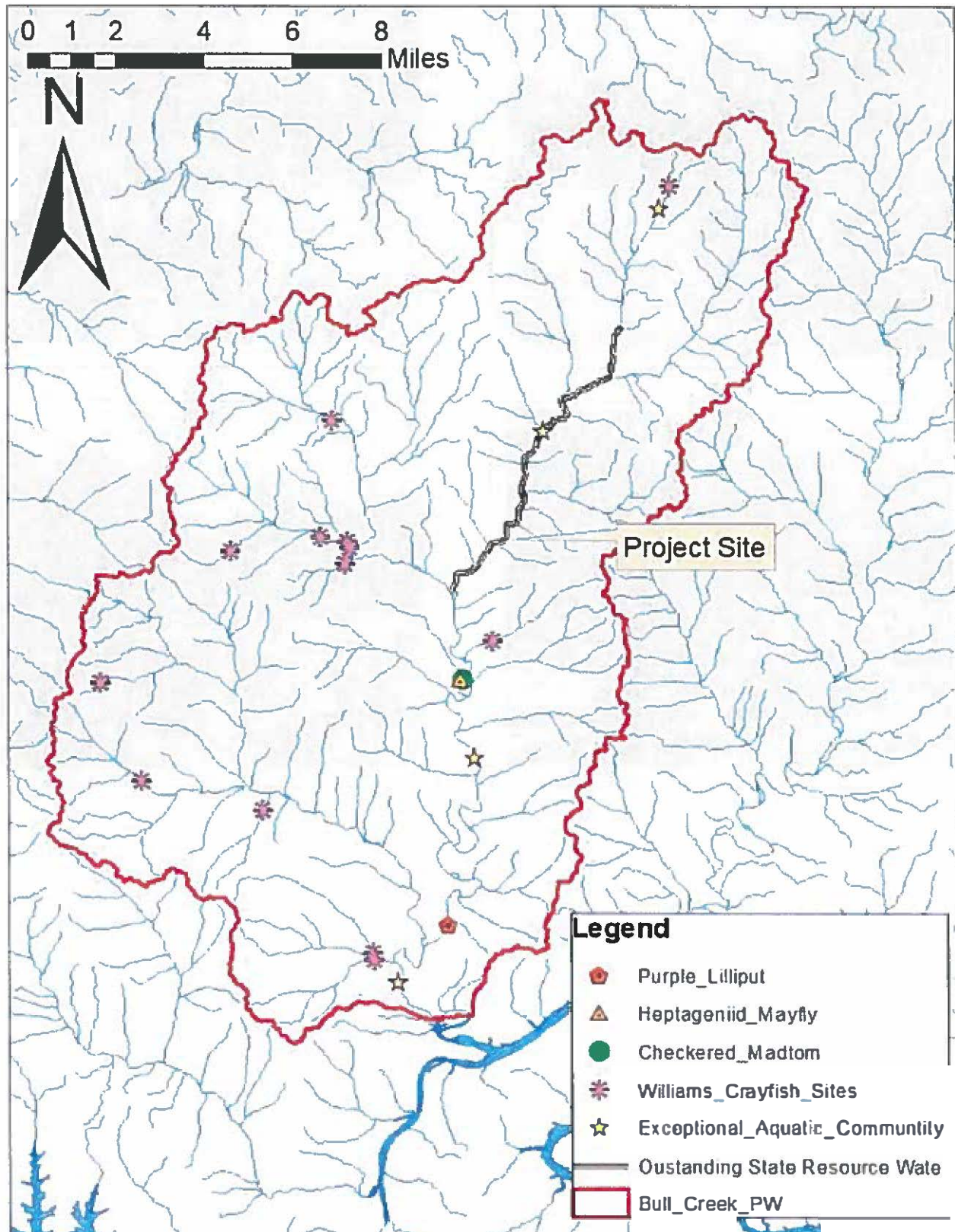
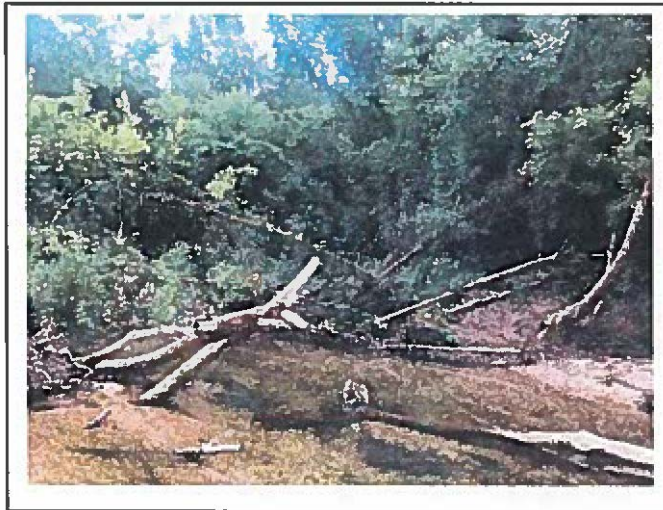




Figure 7. Photographs of bank erosion at the proposed project site on the Koeller property.



## Appendix 1. Conceptual design for bank stabilization project.

### Koeller Passive Restoration – July 2019 Conceptual Design



#### Problem:

Impinging flow is eroding a weak bank-toe resulting in accelerated lateral and longitudinal meander movement. Substantial bank loss will continue based on bend configuration and no riparian corridor.

#### Solution:

Install the following passive restoration measures as highlighted in the figure:

1. 3 Bendway Weirs (256-tons) to control conveyance of flow energy
2. Longitudinal Stone Toe Protection (400-tons) to convey flow through a sharp bend
3. Rock Vane (54-tons) to control exit conveyance

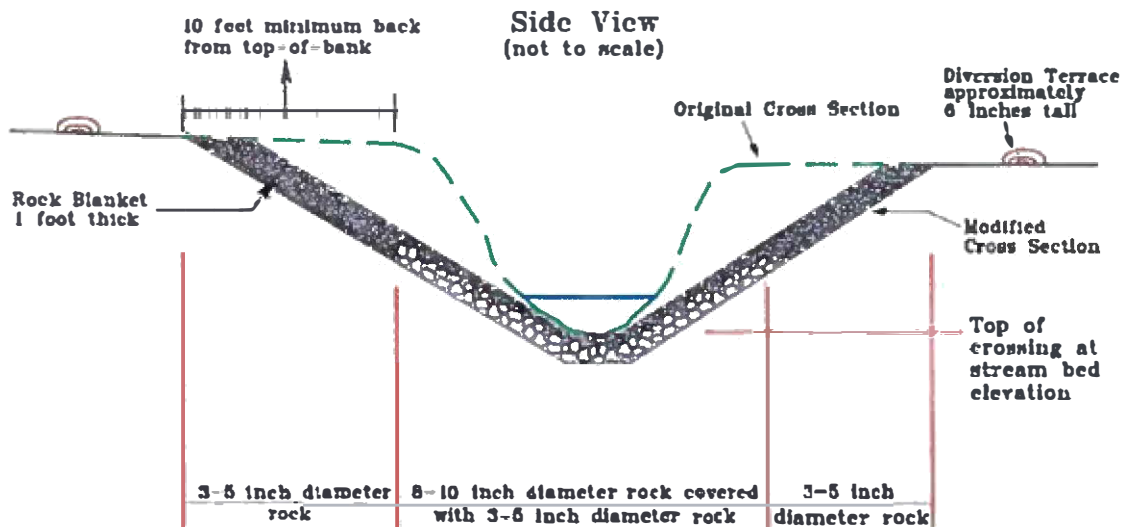
In total, an estimated 710-tons of rock would be conservatively required to provide passive restoration system. This conceptual design includes an increase of bank erosion up to 42-ft longitudinally until system installation.



## Appendix 2. Preliminary design for reinforced stream crossing approach

### Livestock and Light Equipment Crossing

- Stream bed must be vertically stable. The channel should not be downcutting (no head cuts downstream) or rapidly filling with sediment.
- Stream banks in the vicinity must be stable.
- Landowner should be prepared for sedimentation in the crossing where bank slope has been altered. Frequent clearing of sediment and debris will be necessary.
- Landowner should build 6 inch tall diversions around the crossing to prevent overland flow from eroding the approaches.



**NOTE:** 6:1 slope for light equipment, 4:1 slope for livestock and ATV's

Mark Mathewson and Brian Todd  
Forest Pest Reduction Division  
Oregon Department of Conservation  
July 22, 2013



## IN-STREAM WORKSHEET

Stream Type	Ephemeral 0.15	Intermittent 0.2	Perennial Stream 0.4		
Priority Waters	Tertiary 0.05		Secondary 0.2	Primary 0.4	
Net Benefit	Stream Relocation to Accommodate Authorized Project 0.5		Moderate 1.2	Good 2.4	Excellent 3.5
Site Protection	Corps approved site protection without third party grantee 0.1		Corps approved site protection recorded with third party grantee, or transfer of title to a conservancy 0.4		
Credit Schedule	Schedule 1 0.3		Schedule 2 0.1	Schedule 3 0	

## Stabilization Crossing

Factors	Net Benefit 1	Net Benefit 2	Net Benefit 3	Net Benefit 4	Net Benefit 5	Net Benefit 6
Stream Type	0.4	0.4				
Priority Waters	0.4	0.4				
Net Benefit	1.2	1.2				
Site Protection	0.4	0.4				
Credit Schedule	0	0				
Sum Factors (M)=	2.4	2.4				
Stream Length Benefited (do not count each bank separately or count same channel reach twice) (LF)=	315	20				
Credits (C) = M X LF	756	48				
Total Instream Credits Generated C X LK Factor* =						

Total Instream Credits Generated from all Columns = 804

\* Location and Kind (LK) Factor only applies to permittee-responsible mitigation projects  
(see page 18 of document) .

## RIPARIAN BUFFER WORKSHEET

Stream Type	Ephemeral 0.15	Intermittent 0.2	Perennial 0.4
Priority Waters	Tertiary 0.05	Secondary 0.2	Primary 0.4
Net Benefit (for each side of stream)	Riparian Restoration/Establishment, Enhancement, and Preservation Factors (select values from Table 1) (also see Minimum Buffer Width (MBW) page 15)		
Supplemental Buffer Credit	Condition: Buffer established, enhanced or preserved on both streambanks To calculate: (Net Benefit Stream Side A + Net Benefit Stream Side B) / 2		
Site Protection	Corps approved site protection without third party grantee 0.05	Corps approved site protection recorded with third party grantee, or transfer of title to a conservancy 0.2	
Credit Schedule	Schedule 1 0.15	Schedule 2 0.05	Schedule 3 0
Temporal Lag (Years)	Over 20 -0.3	10 to 20 -0.2	5 to 10 -0.1
			0 to 5 0

Factors	Net Benefit 1	Net Benefit 2	Net Benefit 3	Net Benefit 4	Net Benefit 5	Net Benefit 6
Stream Type	0.4	0.4	0.4	0.2	0.2	
Priority Waters	0.4	0.4	0.4	0.4	0.4	
Net Benefit	Stream Side A	.27	.9	1.10	.7	.7
	Stream Side B			.13		
Supplemental Buffer Credit (Buffer on both sides)				.415		
Site Protection	0.2	0.2	0.2	0.2	0.2	
Credit Schedule	Stream Side A	0	0	0	0	
	Stream Side B					
Temporal Lag	0	-0.2	-0.2	-0.2	-0.2	
Sum Factors (M)=	1.27	1.7	1.9	1.845	1.3	
Linear Feet of Stream Buffered (LF)= (do not count each bank separately or count same channel segment twice)	1130	320	620	250	170	
Credits (C) = M X LF	1,435.1	544	1,178	461.25	221	
Total Credits Generated C X LK Factor * =						

Total Riparian Credits Generated from all Columns = 3,839.35

\* Location and Kind (LK) Factor only applies to permittee-responsible mitigation projects (see page 18 of document).