

**AGREEMENT TO ESTABLISH AN  
IN-LIEU-FEE AQUATIC RESOURCE MITIGATION  
PROGRAM  
FOR THE STATE OF KANSAS**



Submitted to:



U.S. Army Corps of Engineers, Northwestern Division  
Kansas City District, Regulatory Program  
700 Federal Building  
Kansas City, MO 64106

Submitted by:



1200 S.W. Executive Drive  
Topeka, KS 66615

April 6, 2006

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## 1.0 INTRODUCTION

This document (the Agreement) establishes an in-lieu-fee (ILF) mitigation agreement between the Watershed Institute, Inc. (TWI) and the Kansas City District of the U.S. Army Corps of Engineers (USACE). This Agreement establishes the mechanism to compensate for adverse impacts to wetlands, streams, and riparian areas (aquatic resources) throughout Kansas. TWI will cooperate with the USACE, U.S. Fish and Wildlife Service (USFWS), U.S. Environmental Protection Agency (USEPA), Kansas Department of Wildlife and Parks (KDWP), Kansas Department of Health and Environment (KDHE), Kansas State Conservation Commission (SCC), Kansas Alliance for Wetlands and Streams (KAWS), and other appropriate organizations to manage an ILF mitigation program designed to replace aquatic resource functions and values that are adversely impacted under the Clean Water Act Section 404 and Rivers and Harbors Act Section 10 regulatory programs. TWI will establish the Kansas Aquatic Resources Trust Fund (KARTF) for receipt and disbursement of mitigation in-lieu-fees collected from USACE permittees.

## 2.0 BACKGROUND AND PURPOSE

The Clean Water Act (33 USC 1251 et seq.) establishes the basic regulatory structure to restore and maintain the chemical, physical, and biological integrity of the nation's waters so that they can support "the protection and propagation of fish, shellfish, and wildlife and recreation in and on the water." Additionally, Section 10 of the Rivers and Harbors Act prohibits the unauthorized obstruction or alteration of any navigable water of the United States. The USACE administers a permit program for both the discharge of dredge and fill materials into waters and wetlands of the United States under Section 404 of the CWA and for activities in navigable waters under Section 10 of the Rivers and Harbors Act. The Section 404 permit program relies on the use of compensatory mitigation to offset unavoidable aquatic resource impacts by replacing functions and values lost to authorized activities.

ILF agreements may be used to compensate for impacts authorized by USACE permits if the agreement is developed, reviewed, and approved using the process established for mitigation banks in the *Federal Guidance for the Establishment, Use and Operation of Mitigation Banks* (Federal Register, November 28, 1995). ILF monies must be used for replacing aquatic resource functions and values consistent with existing regulations and associated permit conditions. The purpose of this Agreement is to:

- Identify and assess ecologically appropriate wetland, stream, and riparian restoration opportunities in Kansas;
- Implement practical plans to protect, purchase, enhance, restore, and monitor as many aquatic resources as possible with the funds available;
- Establish financial, technical, and legal mechanisms to ensure long-term success of compensatory mitigation sites authorized by USACE permit.

### **3.0 SPONSOR QUALIFICATIONS**

The Watershed Institute, Inc. (TWI) is a not-for-profit Kansas corporation founded in 2003 and incorporated in 2004 to advance the science of natural resource conservation, holistic watershed management, and habitat restoration. The TWI team provides a multidisciplinary approach with staff skilled in self-sustaining stream design, fluvial geomorphology, stream ecology, wildlife biology, endangered species conservation, and environmental and water rights law. TWI staff has over 100 years cumulative experience in streambank stabilization, wetland, stream and riparian restoration, aquatic and terrestrial ecological assessments, threatened and endangered species surveys and management plans, critical habitat identification, habitat mitigation and restoration, ecological monitoring, environmental permit compliance, environmental law, and water rights law.

Aquatic habitat rehabilitation is the primary focus of TWI. The TWI approach integrates stream stability and natural channel design concepts into stream, riverine wetland, and floodplain and watershed management services. TWI objectives are to create or rehabilitate wetlands, stabilize stream banks, improve habitat for native aquatic species, and restore the appropriate vegetative community at degraded stream and wetland sites. TWI staff has provided field survey, structure design, and environmental permitting services on over 160 small stream and wetland projects in Kansas (Appendix A). TWI staff has also provided these services for projects on numerous small Kansas fluvial systems and major waterways including the Kansas, Republican, Delaware, Smoky Hill, Big Blue, Little Blue, Neosho, Cottonwood, and South Fork Ninnescah rivers.

#### **4.0 PROGRAM OPERATION/ADMINISTRATION**

TWI will establish a restricted account—KARTF—to handle and manage all fees received from USACE permittees and other entities. Funds shall be used solely for activities directly related to physical aquatic habitat and resource establishment, stabilization, restoration, enhancement, and protection to include the following: development and implementation of physical mitigation and monitoring, long-term management of mitigation parcels, administrative costs, overhead costs, purchase of permanent easements, and land acquisition.

At the time funds are deposited in the KARTF, TWI Executive Director shall receive an overhead reimbursement equal to 10% of the funds. The overhead reimbursement will be used for expenses directly related to the day-to-day management of the ILF program and the KARTF. Sole authority and responsibility for decisions related to the use of deposited overhead reimbursement funds and administrative costs and expenditures shall be with TWI Executive Director. It is the intent of TWI to maximize the amount of funds that will be directly applied to the establishment, restoration, enhancement, and protection of aquatic resources.

After USACE determination that a proposed activity is eligible for ILF payment, the eligible applicant may contact TWI to determine payment amount to offset impacts on aquatic resources, and determine costs associated with long-term maintenance, monitoring, and management. If accepted by the applicant, TWI will identify a potential mitigation site(s), and develop and implement a compensatory mitigation plan. Per USACE request, TWI may accrue mitigation payments from multiple permitted projects and apply to one large mitigation action. Additionally, TWI will ensure that all required federal, state, tribal, and local permits are obtained prior to implementation of projects carried out under the Agreement. The legal responsibility ensuring mitigation terms are satisfied fully will lie solely with TWI. TWI will provide an annual report to the USACE and the Mitigation Bank Review Team (MBRT) documenting funds received, approved ILF projects, fund disbursement, habitat types created or enhanced, and the success of projects conducted under the Agreement.

#### **5.0 WATERSHED PLANNING**

Through partnership with KAWS and the SCC, TWI will identify and prioritize aquatic resource mitigation projects that serve the purposes of this Agreement. TWI will use a variety of available

resources—see Table 1—to prioritize projects and focus expenditure of ILF funds within a watershed that is biologically-similar and hydrologically-related to the area generating the funds. Project recommendations will be based on priority criteria, proximity to the permitted activity, similarity of habitat types, number of required mitigation credits, and availability of perpetual protection.

**TABLE 1.  
AQUATIC MITIGATION PROJECT  
PRIORITIZATION RESOURCES**

ENTITY	RESOURCE
Kansas Dept. Health & Environment	TMDL-High Priority Watersheds
Kansas Dept. Health & Environment	Unified Watershed Assessment (UWA)
Kansas Dept. Health & Environment	Exceptional State Waters
Kansas WRAPS Work Group	WRAPS Priority Areas
Kansas Dept. Wildlife & Parks	T/E Critical Aquatic Habitats
Kansas State University	Aquatic Gap
University of Missouri-MoRAP	Ecological Drainage Units
Kansas Alliance for Wetlands and Streams	Biological Priority Areas
U.S. Environmental Protection Agency	HUC 8 Wetland Loss Maps

## 6.0 MITIGATION REVIEW TEAM

With implementation of the Agreement, USACE will establish and chair a MBRT to include representatives of the following entities:

- U.S. Army Corps of Engineers – Kansas Regulatory Office
- U.S. Environmental Protection Agency – Watershed Planning and Implementation Branch
- U.S. Fish and Wildlife Service – Kansas Ecological Services Office
- Kansas Department of Wildlife and Parks – Environmental Services Section
- Kansas Department of Health and Environment – Watershed Management Section
- TWI/KAWS

The MBRT will provide recommendations and general guidance in development of the ILF document. Additionally, the MBRT will meet biannually to field review planned and implemented mitigation projects. TWI will provide an annual accounting of ILF fund

expenditures to the MBRT. MBRT recommendations will ensure a careful consideration of the ecological suitability of compensatory mitigation sites, the technical feasibility for proposed mitigation techniques, and the long-term protection and maintenance of restoration sites funded under the Agreement.

## **7.0 MITIGATION REQUIREMENTS**

The evaluation of aquatic resource impacts and determination of compensatory mitigation requirements lie solely with the USACE. When applicable, the USACE will provide TWI contact information to eligible permittees. Upon request, TWI will submit a cost estimate to the permittee for development and implementation of restoration actions that comply with USACE-determined mitigation requirements. Acceptance or rejection of the cost estimate lies solely with the eligible permittee.

## **8.0 SITE SELECTION**

It is recognized by all parties that the Agreement will only be used in situations where compliance with the mitigation sequence of the Section 404(b)(1) Guidelines has occurred. The Guidelines require that compensatory mitigation occurs after all appropriate and practicable steps have been taken to first avoid and then minimize aquatic resource impacts. Compensatory mitigation will be habitat-based and focus on the Clean Water Act goals to restore and maintain the chemical, physical, and biological integrity of the nation's waters. Specific emphasis will be on the restoration and enhancement of aquatic resources to offset impacts and losses from USACE permitted activities. Other relevant information on comprehensive watershed function will be evaluated as available and incorporated into site selection and mitigation planning. Compensatory mitigation projects selected and funded under this Agreement should:

- Be located in the State of Kansas
- Be in-kind replacement of aquatic resources (e.g. occur in streams of similar order, classification, size, and drainage area; occur in wetlands with similar vegetation characteristics—bottomland hardwood, emergent, etc.)
- Provide, to the extent possible, replacement of the amount, type, and function of aquatic resources impacted or lost by permitted activity

- Be designed for long term geomorphic stability and self-sustaining function
- Have provisions for long-term permanent management and protection by a responsible state agency, federal agency, or nonprofit corporation

Using the resources in Table 1 as a guide, TWI will select sites based on the following priority:

1<sup>st</sup> – Within the HUC 11 of the authorized activity.

2<sup>nd</sup> – Within the HUC 8 of the authorized activity.

3<sup>rd</sup> – Within the HUC 4 of the authorized activity.

4<sup>th</sup> – Outside the HUC 4 of authorized activity. (Will require prior approval of the USACE and MBRT).

## 9.0 MITIGATION PLANS

Compensatory mitigation plans will be developed by TWI for each ILF eligible site. Through Public Notice No. 200400295 (July 30, 2004), the USACE, Kansas City District (KCD) established Mitigation Guidelines and a Compensatory Mitigation Checklist for use in developing compensatory mitigation plans. TWI will use this Checklist (see Appendix C) and follow KCD Guidelines for all ILF projects. Although habitat preservation will be one mitigation option, to ensure compliance with *Federal Guidance*, TWI will emphasize restoration, enhancement, or creation over preservation. Each plan will contain the following:

- Assessment and quantification of aquatic resource functions and values impacted or lost to a permitted activity.
- Location and baseline habitat condition of proposed mitigation site.
- Goals and objectives of the mitigation plan to include the techniques proposed and anticipated gain in habitat quality and quantity.
- Work plan to include the boundaries of mitigation area; timing and sequence for survey, design, and construction; operation and maintenance schedule; vegetation planting schedule and weed control; erosion control; and additional management considerations.
- State and federal permit requirements.

- Water Quality Project Plan to ensure protection of receiving stream, including best management practices to prevent accidental introduction of exotic or invasive species to the mitigation site.
- Estimated cost to accomplish the mitigation work, including administrative fees.
- Performance standards to determine ecological success and/or identify remedial actions necessary to successfully establish the site.
- Long term management plan to include responsibility for remedial actions, reporting schedule, monitoring protocols, financial, technical, and legal protections.

Over the first five years of all mitigation projects, TWI will provide an annual status report to the USACE and MBRT.

## **10.0 MITIGATION FEES**

TWI will determine appropriate fees to meet compensatory mitigation requirements for each ILF project approved by the USACE. Upon receipt of the mitigation fee from a permitted entity, TWI will assume the responsibility of mitigation planning, implementation, monitoring, and long-term maintenance and management. Acceptance of a mitigation fee by TWI is an acknowledgement by TWI that it, and not the contributing party, is responsible for satisfying the mitigation requirements of the Section 10 or Section 404 permit, Section 401 Certification, or settled enforcement action. TWI reserves the right to reject any fee.

The fee structure for individual ILF projects will be habitat-based and include all reasonable costs for implementing ILF projects including:

- Impact evaluation
- Mitigation planning and design
- Construction
- Acquisition and permanent protection of the site
- Long-term maintenance, monitoring, and management
- Administrative, accounting, and legal costs
- Obtain necessary permits and clearances
- Contractor oversight
- TWI overhead (10%)

The fee structure will be categorized by mitigation treatment (e.g. riparian buffer restoration, stream bank stabilization, aquatic habitat creation) with fee for projects involving more than one treatment as the sum of each treatment cost. The fee structure will provide a breakdown to include salaries and benefits, equipment, materials, subcontractors, other direct costs—mileage, meals, lodging, telephone, postage—and administrative overhead for each mitigation technique.

Due to variability in project size and location, geomorphic setting, habitat conditions, and level of impact, it is difficult to standardize mitigation fees on a linear foot, per acre, or per credit basis. However, to provide a timely cost estimate for eligible projects TWI will seek to standardize mitigation costs to the extent practicable. Project costs will be influenced by, but not limited to the following factors:

- Length and/or acreage of mitigation area.
- Type of mitigation technique used: streambank stabilization, riparian restoration, stream restoration, aquatic habitat creation, etc.
- Location of, and access to, the mitigation site.
- Design time.
- Local material cost.
- Local hourly cost of equipment.
- Local labor cost.
- Access to, amount needed, and price of native grass seed, bare-root tree seedlings, and other vegetation.
- Local real estate market.

## **11.0 ACCOUNTING**

TWI agrees to receive and expend fees in the manner and with the limitations described in this Agreement. Mitigation fees will be delivered to TWI by cash, certified check, or money order and held in a separate, federally-insured interest-bearing account (KARTF) to earn interest while maximizing the safety and preservation of the principal fees. TWI will account for the funds in accordance with generally accepted accounting principles. TWI will establish and maintain a written record of funds received to document date received, source of funds, USACE permit number, permit applicant, mitigation credits purchased, cost per credit, and disbursement for

mitigation plan implementation. TWI will provide an annual accounting statement to the USACE and the MBRT. With reasonable notice, the KARTF and TWI accounting practices will be subject to audit when requested by the USACE or the MBRT. Interest earned through the established banking instrument, donations from non-permitted entities, and assets left over from mitigation projects will remain in the KARTF for long-term maintenance and monitoring, future mitigation projects, and administrative costs.

## **12.0 PROTECTION OF MITIGATION SITES**

TWI will ensure that all compensatory mitigation sites are permanently protected. With approval by the USACE and MBRT, TWI may transfer interest in land to appropriate state or federal agencies, nonprofit corporations, local governments, or qualified land trusts. In all cases, TWI will procure appropriate legal agreements—conservation easements, deed transfer, deed restrictions, restrictive covenants, Memorandum of Agreement of Operation, signed assurances, or other legally binding agreement—to ensure that both publicly-owned and other properties are protected in perpetuity as viable aquatic habitats and resources serving the functions and values required by the USACE permit conditions. The protection agreements will prohibit physical alterations including, but not limited to agriculture, logging, mining, mowing—unless approved by the MBRT—and land development. Long-term funding, monitoring and management responsibility for each compensatory mitigation site will remain with TWI.

## **13.0 TIME FRAME FOR MITIGATION IMPLEMENTATION**

TWI is committed to developing compensatory mitigation projects that fully offset stream, wetland, and riparian impacts within a reasonable time of permit action. To reduce the time between permitted impact and compensatory mitigation, and ensure compliance with *Federal Guidance*, TWI will initiate a project within 12 months of receipt of sufficient ILF funds for that project. For purposes of this Agreement, the term “initiate” means that a site has been identified and mitigation plan is being developed. The completion of physical habitat improvements should not exceed two years from the receipt of sufficient funds from the permittee. If unforeseen circumstances prevent compliance with this timeframe, TWI will submit an amended implementation schedule and work plan to the USACE for approval. In recognition of initial funding and planning challenges, the Corps approves in advance that compensatory mitigation fees collected in the first and second year of KARTF establishment shall be obligated and initial

physical and biological improvements shall be completed no later than the third full growing season of the KARTF existence.

#### **14.0 GOOD FAITH**

The signatory parties agree that all will exercise their rights and obligations contained in this Agreement in good faith. The parties also agree that it is their desire to facilitate the process set forth in this Agreement by open and timely communication and cooperation.

#### **15.0 AMENDMENT AND TERMINATION**

This Agreement may be amended by written approval of the USACE and TWI. While the USACE will consult with the MBRT on proposed amendments, final approval authority lies with the USACE. Termination of this Agreement will require ninety (90) days written notice to the other signatory party and the MBRT. Within sixty (60) days of written notice of termination, the signatory parties and the MBRT shall meet to discuss the reasons for notice and any actions that may address the concerns leading to a desire to terminate the Agreement.

Prior to termination, TWI will provide a complete accounting of ILF funds received and disbursed along with uncompleted projects and associated remaining funds. Where feasible, all outstanding projects having available funds will be completed, with perpetual protection insured, prior to termination of this Agreement. Upon termination, the USACE and MBRT will direct remaining funds as appropriate.

#### **16.0 FORCE MAJEURE**

Nothing contained in this Agreement shall be construed to impose upon the parties any liability arising from circumstances beyond the parties' control, including unauthorized actions by third parties, natural disasters such as drought, fire, storm, climate change, and earth movement, or from any prudent action taken in good faith by the parties under emergency conditions to prevent, abate, or mitigate significant injury to protected property resulting from such causes. The USACE shall make the final determination as to whether or not any corrective action by the ILF Administrator is required.

**17.0 EXECUTION**

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District., Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**UNITED STATES ARMY, CORPS OF ENGINEERS**

By:  Date: 26 Jun 06  
**Michael A. Rossi, Colonel, District Commander**

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District., Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**Concur:**

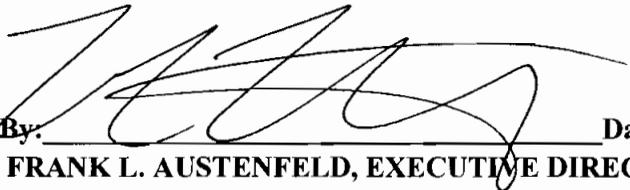
**U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION SEVEN**

By:  Date: 4-21-06  
Margaret E. Stockdale, Chief, Watershed Planning and Implementation Branch

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District, Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**Concur:**

**WATERSHED INSTITUTE, INC.**

By:  Date: 4/10/06  
**FRANK L. AUSTENFELD, EXECUTIVE DIRECTOR**

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District, Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**Concur:**

**U.S FISH & WILDLIFE SERVICE, KANSAS ECOLOGICAL SERVICES OFFICE**

By:  Date: 4/13/16  
MICHAEL LEVALLEY, PROJECT LEADER

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District, Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**Concur:**

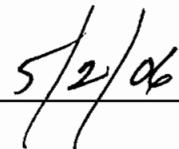
**KANSAS DEPARTMENT OF HEALTH & ENVIRONMENT**

By: Donald Snethen Date: May 30, 2006  
DONALD D. SNETHEN, CHIEF, WATERSHED MANAGEMENT SECTION

Execution of this In-lieu Fee Compensatory Mitigation Agreement by the Kansas City District, Corps of Engineers, in consultation with the sponsor, The Watershed Institute, Inc., the U.S. Environmental Protection Agency, the U.S. Fish and Wildlife Service, the Kansas Department of Wildlife and Parks and the Kansas Department of Health and Environment and the implementation of its terms evidences that the Kansas City District., Corps of Engineers has afforded all cooperating parties (Review Team) an opportunity to comment on the undertaking and its effects on the aquatic resources in the State of Kansas and that the Kansas City District, Corps of Engineers has taken into account the comments provided by the Review Team on the identified aquatic resources in order to complete this agreement.

**Concur:**

**KANSAS DEPARTMENT OF WILDLIFE & PARKS**

By:  Date:   
J. MICHAEL HAYDEN  
SECRETARY

**APPENDIX A**

**STREAM REHABILITATION PROJECTS**

**TWI Staff Stream Rehabilitation Experience**

<b>County</b>	<b>Name</b>	<b>Stream</b>	<b>Feet</b>
Allen	Geffert	Neosho	2,300
Brown	Heinen	Craig Creek	600
	Finney	Wolf River	400
Butler	Sturbenz		300
	McLaren	W. Walnut	500
	Seibel	Hickory	550
Chase	Barett	Cottonwood River	500
	Sauble	Cedar Creek	900
Clay	Cotts	Republican River	4,300
	Mugler	Republican River	2,200
	KDWP	Republican River	1,650
	Koch	Republican River	1,320
	Long	Republican River	700
Cloud	Drainage	Republican River	1,100
	Dorman	Republican River	1,200
	Lynch	Solomon River	400
Cowley	Toma	Grouse Creek	240
	Stewart	Grouse Creek	200
	Stewart	Timber Creek	600
	Barber	Timber Creek	600
	Sunflower	Stewart Creek	650
Dickinson	Mills 1	Smoky Hill River	900
	Mills 2	Smoky Hill River	2,350
Douglas	Leslie	Kansas River	2,225
Ellsworth	Pflughoeft	Smoky Hill River	1,110
Geary	Stewart	McDowell Creek	440
Greenwood	KDWP	Otter Creek	500
	Ed	Bachelor Creek	400
Harvey	Schroll	unnamed	150
Jackson	Dickinson	Straight Creek	650
	Reed	Soldier	600
	Pottawattomi	Soldier	650
	Sudbeck	Soldier	500
	Douglas	Muddy Creek	650
	Banner		250
Jefferson	Ewert 1	Nine Mile Creek	350
	Ewert 2		530
	Swaney	Delaware	750
	Jeff Farms	Delaware	600
	Dorthy	Slough Creek	200
	Robb	Kansas River	800
Jewell	Leece	Republican River	850
	Leece	Republican River	750
	Rathman	Republican River	900
	Hansen	Republican River	1,500
	Ely	Republican River	1,200
Johnson	Overland Park	Deer Creek	250
	Overland Park	Tomahawk	200
	Johnson County	Antioch Park	500

TWI Staff Stream Rehabilitation Experience			
Johnson	Lenexa	Manchester Park	1,200
Kearny	Bob Price 1	Arkansas River	400
	Bob Price 2		320
	Bob Price 3		750
Kingman	Pace	S. F. Ninnescah	2,500
Leavenworth	Linwood	Stranger Creek	1,150
	Norman	Stranger Creek	850
Lincoln	Hoffman 1	Spring Creek	440
	Hoffman 2	Spring Creek	160
	Hoffman 3	Spring Creek	160
Linn	Highway	Big Sugar	600
Lyon	Stanford	Elm Creek	800
Marion	Johnson	N. F. Cottonwood	450
	County	N. F. Cottonwood	850
	Peabody	Spring Creek	200
Marshall	Petr 1	Elm Creek	680
	Petr 2	Elm Creek	550
	Petr 3	Elm Creek	400
	Nietfeld	Big Blue River	1,700
	Wilson	Walnut Creek	105
	Rudolph 1	Big Blue River	1,900
	Rudolph 2	Big Blue River	1,700
	Bigalow Twensp	Black Vermillion	645
	Pishney	Little Blue River	800
	Holle	Horseshoe Creek	750
	McPherson	Shogren	Sharps Creek
Dalhsten		Smoky Hill River	1,050
Shogren		Smoky Hill River	400
Ade		Smoky Hill River	800
Johnson		Smoky Hill River	950
Mitchell	Campbell	Salt Creek	350
Morris	Amos	Elm Creek	1,000
	Collier	Munkers Creek	800
Nemaha	Schmidtz	Clear Creek	930
	Rettle	Clear Creek	750
	Becker	Harris Creek	300
	Becker	Dutch Branch	200
	Koester	Nemaha	1,100
	Haverkamp	Nemaha	1,100
	Feldkamp	Nemaha	1,200
	Sudbeck 1	Nemaha	800
	Sudbeck 2	Nemaha	1,000
	Sextro	Nemaha	1,100
Neosho	Fairfield	Clear Creek	500
	Kepley	Neosho	1,150
	King	Neosho	1,000
	Cutoff	Neosho	800
Pottawattomie	Criser	Little Canville Crk.	300
	Reece	Rock Creek	300
Riley	Sump	Otter Creek	150
	Richter	Fancy Creek	650

**TWI Staff Stream Rehabilitation Experience**

Riley	Stumpff	Deep Creek	475
	SBC	Wildcat Creek	600
	?	Wildcat Creek	200
	Mitchell	Wildcat Creek	300
	COE	File Creek	650
	Wienk	Swede Creek	150
Saline County	Land Institute	Smoky Hill River	1,000
	Ryan Brothers	Smoky Hill River	1,600
	Lynch	Mulberry Creek	275
Sedgwick	Schuster	Ninnescah River	1,700
	Pauly	Ninnescah River	1,200
	Mitchell	Little Arkansas	1,400
Shawnee	Bilou	Trib to Wetstone	1,200
	Garrett	Wakarusa River	460
	Eakes	Stinson	200
	Faith	Wetstone Creek	100
		Soldier	300
		Baxter	Wakarusa River
Sumner	Gilliam	Ninnescah River	2,000
Wabaunsee	Schmidt	Spring Creek	600
	Peters	Trib to Mill Creek	75
	Miller	Kansas River	1,000
Washington	Hennerberg	Little Blue River	2,100
	Brenneis	Little Blue River	2,500
	Stapulous	Little Blue River	1,250
	Martin	Little Blue River	1,150
	Martin - Jueneman	Little Blue River	1,240
	Jueneman	Little Blue River	1,400
	Neumann	Little Blue River	1,200
	Hynek	Little Blue River	1,500
	Callendar	Little Blue River	1,180
	Travelute	Little Blue River	1,500
	Callendar	Little Blue River	1,050
	Mueller	Little Blue River	1,400
	Goeckel	Little Blue River	1,500
	Goeckel	Little Blue River	336
	Imming	Little Blue River	2,016
	Bruna	Little Blue River	882
	Bruna	Little Blue River	900
	Bruna	Little Blue River	1,360
	Turk	Little Blue River	950
	Bruna	Little Blue River	1,375
	Jueneman	Little Blue River	1,140
	Clark	Little Blue River	2,500
	Jueneman	Little Blue River	950
Krainbill	Little Blue River	1,200	
Krainbill	Little Blue River	800	
Krainbill	Little Blue River	2,000	
Hynek	Little Blue River	1,150	
Hynek	Little Blue River	1,150	
Jandera	Little Blue River	1,800	

TWI Staff Stream Rehabilitation Experience			
Washington	Bruna	Little Blue River	1,800
	Wilkinson	Little Blue River	1,950
	Kennedy	Little Blue River	1,200
	Yungeberg	Little Blue River	1,200
	Hatesohl	Trib to Coon Crk.	150
	Schwartz	Mill Creek	500
	Rogge	Peats Creek	500
	County	Mill Creek	475
	Meyer	Horseshoe Creek	500
Wilson	Kenny		300
			<b>145,194 feet</b>
			<b>27.50 miles</b>

TWI Wetland Project Experience			
County	Name		
Brown	Iowa Tribe	Wetland	1
Butler	Fry	Wetland	1
	Blankenship	Wetland	1
Jefferson	Mellard	Wetland	1
Lyon	Peterson	Wetland	1
Neosho		Wetland	1
		Wetland	1
Shawnee	Balch	Wetland	2
Jackson Co. Mo.	County	Wetland	1
<b>TOTAL</b>			<b>10</b>

**APPENDIX B**  
**MITIGATION GUIDELINES/TECHNIQUES**

## ***MITIGATION GUIDELINES***

While the following mitigation practices are often considered “restoration,” TWI believes that true restoration (the return of an aquatic system to a pre-settlement state) is not possible given the present climate, land use patterns, and anthropogenic conditions. Therefore, as part of the ILF program, TWI proposes to assess and rehabilitate altered or degraded streams, wetlands and riparian areas to the best function and value the particular system is capable of supporting under present conditions. Therefore, compensatory mitigation projects will aim to establish the maximum physical, chemical, and biological functions and values possible within the existing environmental context. No poured concrete or concrete rubble will be used in any mitigation effort. When feasible, plantings will use material from within a 200-mile radius of the mitigation site to protect local genotypes.

Stream mitigation plans will be designed to offset the impacts of a proposed project through the establishment of riparian corridors; stabilization of eroding banks and channel grade; enhancement of in-stream habitat; reconstruction of channelized reaches; removal of dams, culverts, or other barriers to fish passage; and “daylighting” buried streams. Mitigation opportunities may be found on stream sites having:

- Channelized or impounded reaches
- Concrete or rip rap lined reaches
- Sections of eroding bank
- Areas with little or no riparian vegetation
- Sites with poorly construction road crossings
- Urban streams with minimal in-stream habitat
- Rural streams having degraded riparian or in-stream habitat

Stream sites with potentially greater ecological benefits will receive higher priority for mitigation. Specific techniques and credit ratios will be determined on the basis of the functions and values of the impacted habitat. The primary categories of mitigation treatments and specific techniques are provided below.

## **RIPARIAN BUFFER RESTORATION**

If the mitigation stream does not have an established riparian buffer, the mitigation plan will include the re-establishment of such. Buffer width should typically extend landward from bankfull elevation for 100 feet on both banks or for two times the width of the stream, whichever is greater. For large waterways where two times the width is not feasible, a minimum buffer of 150 feet landward from the bankfull elevation will be established. TWI reserves the right to adjust buffer widths to account for site specific factors such as steep slopes, highly erodible soils, or land uses that may contribute to high sediment yields. Mitigation credit may be given for increasing the buffer width on streams with minimal vegetation, improvement of the species mix or structural diversity at a site, and for livestock exclusion.

### **Specific Techniques**

**Live Staking** is a practice where short (2 feet long) sections of tree and shrub branches are driven into moist ground where they establish roots systems and sprout leaves. Willows are most commonly used in this practice, although other species are acceptable. When correctly situated, these systems will provide dense cover suitable for avian species.

**Live Fascines** are bundles of tree or shrub branches placed in long trenches and covered with soil. The bundles of material develop roots, branches, and leaves providing a linear row of vegetation to prevent erosion and provide terrestrial habitat. Fascines can also be used to drain wet slopes. This vegetative method breaks slopes into shorter slopes separated by benches created by the fascines.

**Brush Mattresses** are dense layers of small tree and shrub limbs placed directly on the soil surface and fastened in place with live or dead stakes and covered with soil. This practice provides immediate surface protection and erosion control over a large surface area. Brush mattresses are resistant to high water velocities and create dense stands of vegetation.

**Native Grass Planting** involves planting an area with a suitable mixture of native grasses. Species combination and seed mixture will vary depending on the local climate and soils.

**Bare-root Tree and Shrub Planting** requires planting various species of trees and shrubs with established root systems. This style of planting allows a greater diversity of species to be planted within the riparian corridor.

**Nut Planting** is suitable for mast producing trees such as oaks, walnuts, and hickories along with seed bearing tree species such as maples, ash, redbud, and box elder.

**Live Pole Planting** places large, long trees or limbs in deep holes in the ground. Larger trees establish quickly stabilizing slopes having geotechnical soil failures. This practice can be used to create instant shade.

**Branchpacking** involves placing alternate layers of un-rooted cuttings and soil. It is useful in establishing vegetation in conjunction with bank shaping. Vegetation establishes quickly along the streambank or slope filtering pollutants from moving water. Branchpacking is also used for gully repair.

**Brush Layering** is similar to branchpacking and provides immediate soil reinforcement via developing root systems and is suitable for large slopes.

**Willow Curtains** requires placing larger willow trunks and limbs in shallow trenches on low banks, perpendicular to streamflow. Vegetation rows establish quickly providing roughness to slow water velocities and creating terrestrial habitat.

## **BANK STABILIZATION**

Bank stabilization will incorporate flow redirection and bioengineering techniques that slow near-bank velocities and protect actively eroding areas. Re-sloping actively eroding banks and restoring an appropriate riparian community will be included in most stabilization projects.

### **Specific Techniques**

**Root Wads** are a combination of tree trunks, with roots attached, and rocks placed along the outside bend to slow water velocities. Properly placed, root wads stabilize streambanks while providing scour holes and overhanging fish cover.

**Vanes** are a re-directive streambank stabilization method composed of rock and/or logs. Vanes are sharply angled into the stream flow and taper from the streambed elevation to a given design height near the streambank. These structures protect a vertical distance equal to 2X their height and are suitable for use on narrow streams or streams with a low width/depth ratio. Vanes can be enhanced with locked limbs, willow curtains, and instant shade.

**Bendway Weirs** are another re-directive method of streambank stabilization. These structures are low, level-crested rows of rock constructed in the stream channel. Weirs are designed at a slight angle into the stream flow. Water passing over the weir is redirected away from the streambank reducing water velocities in the near bank region and resulting in sediment deposition along the streambank. Weirs are normally used in streams with high a width/depth ratio due to their ability to reduce the w/d ratio and induce the stream toward a naturally stable type. On sand and gravel bed streams, weirs create scour holes on the streamward end. On many streams, scour holes provide immediate aquatic habitat which can be enhanced with locked limbs and in some cases, instant shade.

**Live Cribwalls** are a rectangular framework of logs layered with alternating soil and live cuttings. They also provide overhanging cover while protecting streambanks from erosion. Properly constructed cribwalls provide excellent habitat for a variety of avian and terrestrial species.

**Log Deflectors** may function alone or in conjunction with another deflector or rootwad to direct

flow away from unstable bank conditions. The effect will mimic a fallen tree within the channel, redirect flow toward the channel center, and create a scour pool on the downstream side.

**Lunker Boxes** act as an undercut bank but provide solid structure preventing bank slump. Lunkers may be constructed of wood or plastic and are buried along the stream bank just below the water line.

**Cross Vanes** are a row of rock that span the stream channel and function similar to a natural riffle. Cross vanes can be used to stabilize a degrading stream bed. A properly designed series of cross vanes can restore a stable streambed elevation in an incising stream channel or restore a natural riffle sequence to a channelized stream. Cross vanes should only be used in a pattern compatible with a natural stream riffle/pool sequence.

**W-Weirs** are normally constructed with rock to stabilize streambed gradients. They are also used in conjunction with bridges to reduce build up of large woody debris on bridge pilings. W-weirs will create multiple scour pools diversifying aquatic habitat.

**J-Hook Vanes** are similar to simple rock vanes, but create scour pools diversifying aquatic habitat.

**Live Siltation** involves rows of un-rooted cuttings planted perpendicular to stream flow. The result is a row of vegetation that slows water velocities, induces sediment deposition, reduces bank erosion, and increases terrestrial habitat.

**Branchpacking** (see previous section)

**Brush Layering** (see previous section)

**Tree Revetments** are a series of trees anchored along the toe of an eroding bank. They are designed to reduce water velocity, increase sediment deposition within the branches, and reduce bank slumping. Finely branched trees—typically eastern red cedar—are used to increase sediment deposition and bank protection.

**Longitudinal Peaked Stone-Toe Protection (LPSTP)** is a continuous streambank protection method utilizing rock to protect the toe, or lower portion of a streambank. This practice is often used in conjunction with rock vanes or bendway weirs on meanders with a low radius of curvature or on the lower 1/3 of large, unstable meander bends. This stabilization method can be combined with live staking to provide improved aquatic and terrestrial habitat by creating overhanging cover.

## **AQUATIC HABITAT CREATION**

Aquatic habitat creation will consist of structures that offset limiting factors and enhance fish and macroinvertebrate habitat within the mitigation reach. Specific objectives of these mitigation techniques are to increase the physical habitat diversity of the stream and create cover. These structures provide stable rock and wood features that increase habitat for a variety of organisms, including benthic invertebrates and several species of native fish. Except for the rock riffle, each

structure allows an option to slope the bank and incorporate plantings to enhance the terrestrial habitat of the reach. Installed structures will match the natural, stable characteristics of the mitigation stream.

### **Specific Techniques**

**Boulder Clusters** are groups of large boulders placed into stream channels to create fisheries habitat by disrupting and varying water velocities. Surface turbulence from boulder clusters may enhance dissolved oxygen levels.

**Hydraulic Cover Stones** are similar to boulder clusters, but employ single boulders rather than groups of stones.

**Locked Limbs** consists of combining small trees and other woody debris with bendway weirs. Tree limbs protrude into scour areas to provide overhanging cover for aquatic species.

**Rock Riffles** A rock riffle acts as grade control and increases substrate heterogeneity, providing habitat for benthic invertebrates and small fish. In most wadeable streams, riffles are the habitat type supporting the richest community of benthic organisms that in turn provide a food base for the fish community. Riffle height can be constructed to either increase backwater pool habitat or in a manner that minimizes backwater effects. Riffles may be constructed with a step-pool pattern allowing up- and down-stream fish passage through culverted systems.

**Cross Vanes** are similar to riffles but configured to create a downstream scour pool for aquatic habitat.

**Newbury Riffles** are a type of riffle designed and tested by Dr. Robert Newbury, British Columbia, Canada. The design of Newbury riffles will vary depending on stream type and fish community.

**Converging Roller Eddy (CRE)** works similarly to the rock riffle but creates more diversity in channel pattern, water velocities and backwater areas. They also increase substrate heterogeneity, providing habitat for invertebrates and small fish. The roller eddy can be used as an alternative to, or in combination with the rock riffle.

**Log Deflectors** mimic a fallen tree within the channel, redirect flow toward the channel center, and create a scour pool on the downstream side. This structure will increase habitat complexity by providing a variety of depths and current velocities. The log is also an excellent substrate for aquatic macroinvertebrates

**Lunker Boxes** act as an undercut bank but provide solid structure to prevent bank slump. Lunkers may be constructed of wood or plastic and are buried along the stream bank just below the water line. An open end faces the stream such that fish can swim in for shelter and protection. These structures provide excellent cover for larger predatory fish species. Locked limbs within the lunker provide habitat for various size fish. The lunker boxes may be placed on the opposite bank and slightly downstream of the log deflector. This ensures sufficient flow through the lunker preventing sedimentation within the structure.

**Root Wads** diversify habitat complexity by varying current speeds among the roots, providing in-stream and overhead cover for fish, as well as an ideal substrate for other aquatic macroinvertebrates.

**Large Woody Debris (LWD)** provides a suitable substrate for invertebrates which are the basis of the aquatic food chain. In sand bed streams such as the Republican, Little Blue, South and North Fork Ninnescah, and Arkansas River, LWD is responsible for the bulk of scour holes, over hanging cover and invertebrate habitat.

**Submerged Cover Logs** provide overhead cover with varying depths and velocities. The log also provides excellent substrate for aquatic macroinvertebrates.

**Instant Shade** can be created by selectively half cutting trees along a streambank or by transplanting large willows or cottonwood trees in a manner so they provide over hanging cover on the water surface.

**J-Hook Vanes** create scour pools similar to cross vanes, but extend from one streambank rather than completely across a stream channel.

## **DAYLIGHTING**

Daylighting deliberately exposes some, or all, of the flow of a previously buried river, creek, or stormwater drainage. Daylighting may re-establish a waterway in its old channel where feasible, or require construction of a new channel through excavation and grading. This method may have particular application in urban mitigation settings.

## **DAM REMOVAL**

Dam removal is an accepted approach to deal with unwanted, unsafe, or obsolete dams. Though dams provide a variety of social benefits, they also cause negative impacts to stream systems and native fauna. Removal may be an appropriate mitigation tool to restore an altered ecosystem in both the rural and urban context.

## **WETLAND ENHANCEMENT, RESTORATION, CREATION**

Previously drained wetlands can often be restored by blocking a drainage system in order to restore the natural hydrology. Enhancement can be accomplished through establishing filter strips, improving hydrology, or by vegetative plantings. Wetland creation establishes a wetland in a suitable area, but one where wetlands did not occur naturally. Filter strips—native grass

planting—will be incorporated to provide cover habitat around existing or created wetlands and prevent sediment from filling the wetlands.

Seasonal Wetlands: Suitable for creation throughout the state.

**Playa Lakes/Depressional Wetlands** occur in the western 1/3 of Kansas. Playa lakes are seasonal wetlands created when rainfall fills shallow depressions in the landscape.

**Diked Terrace Wetlands** are created by diking gradient terraces on cropland or previously cropped land. The resulting linear band of wetlands provides excellent habitat for amphibians such as chorus frogs, narrowmouth toads, cricket frogs, and aquatic plants such as spike rush and arrowhead.

Perennial Wetlands: Suitable for the eastern 1/2 of Kansas.

**Bottomland Hardwood Forest** habitats are predominately found along the eastern edge and southeast corner of Kansas. Bottomland hardwood forests are normally established—by tree planting—on active floodplains.

**Floodplain Wetlands** can be created in an active floodplain by excavation of a pool or series of pools, or by building low dikes.

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**APPENDIX C**

**MULTI-AGENCY COMPENSATORY MITIGATION PLAN CHECKLIST**

## ***CHECKLIST: COMPENSATORY MITIGATION PLAN***

### **1. Mitigation Goals and Objectives**

- Describe functions lost at impact site
- Describe functions to be gained at mitigation site
- Describe overall watershed improvements to be gained

### **2. Baseline Information for Impact and Proposed Mitigation Sites**

- Provide data on physical attributes of sites (soils, vegetation, hydrology)
- Describe historic and existing land uses and resources impacted
- Describe reference site attributes if available

### **3. Mitigation Site Selection and Justification**

- Describe process of selecting proposed site
- Likelihood of success, future land use compatibility, etc.

### **4. Mitigation Work Plan**

- Location
- Construction Plan
- Describe planned hydrology, vegetation, soils, buffers, etc.

### **5. Performance Standards**

- Identify success criteria
- Compare functions lost and gained at impact and mitigation sites
- Describe soils, vegetation and hydrology parameter changes

### **6. Site Protection and Maintenance**

- List parties and responsibilities
- Provide evidence of legal protective measures
- Maintenance plan and schedule

### **7. Monitoring Plan**

- Provide monitoring schedule, identify party(ies) and responsibilities
- Specify data to be collected, including assessment tools and methodologies

### **8. Adaptive Management Plan**

- Identify party(ies) and responsibilities
- Remedial measures (financial assurances, management plan, etc.)

### **9. Financial Assurances**

- Identify party(ies) responsible for assurances
- Specify type of assurance, contents and schedule