EGIS NWA MITIGATION BANK

ILLINOIS RIVER WATERSHED

BENTON COUNTY, ARKANSAS

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EGIS, Inc.
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Bentonville, Arkansas 72712

TABLE OF CONTENTS

FIGURES

I. INTRODUCTION

The following is a Mitigation Bank Prospectus Plan provided to the Little Rock District, U.S. Army Corps of Engineers (USACE) concerning the EGIS Northwest Arkansas (NWA) Mitigation Bank near the City of Siloam Springs, Benton County, Arkansas. This plan is prepared by EGIS, Inc. (EGIS).

The EGIS NWA Mitigation Bank is situated within an approximate 280± acre farm located along the Illinois River's south bank. One hundred (100) acres comprise the EGIS NWA Mitigation Bank which borders the Illinois River. The EGIS NWA Mitigation Bank is contiguous to an area identified as "Completed Conservation Lands" which is a 35-acre area where 7 projects have already been successfully mitigated over the previous two decades. No credits are claimed for this completed conservation area.

The EGIS NWA Mitigation Bank is located in southwestern Benton County, Arkansas, along the Illinois River. The Adjacent EGIS Mitigation lands have been utilized as a viable option for unavoidable impacts to offsite development projects within the local Ozark Mountain Highlands region since Circa 2000.

A site location map is provided as Appendix A. A conceptual environmental plan with preliminary mitigation features and vegetative composition is provided in Appendix B. Appendix C contains a geographic service area map and professional credentials of the Primary EGIS Professional Wetland Scientist involved with the design and management of this Bank is provided in Appendix D.

A. Purpose

The purpose of the Prospectus is to describe and create guidelines for the establishment, use, operation and maintenance of compensatory work performed on the EGIS NWA Mitigation Bank.

The EGIS NWA Mitigation Bank is publicly available for use as compensatory mitigation for offsite development project impacts to palustrine forested, scrub-shrub, lacustrine emergent, or riverine wetlands (Cowardin *et al*. 1979) as well as stream buffers which result from activities authorized under Section 404 of the Clean Water Act.

EGIS has performed wetlands and stream permitting including mitigation design and construction over the last 28 years throughout the United States (45 states) and Puerto Rico. Projects have ranged from small to large with documented success meeting stated goals and permit conditions. Mr. Manuel Barnes, will serve as Project Manager/Administrator/Co-owner of the EGIS NWA Mitigation Bank, is a certified Professional Wetland Scientist (Certification # 1094) with experience as a Corps Research Scientist, Corps Planner, Corps Regulator and a graduate of the USACE Water Resource Fellowship Program completing graduate degrees at Colorado State University in 1988 and previously at the University of Arkansas Masters program in the sciences in 1977. He also served as Commissioner with the Arkansas Natural Heritage Commission from 2004 to 2013. Mr. Barnes is President and CEO of EGIS Environmental Consulting conducting thousands of environmental studies from 1990 to the present. His work as a conservationist is known throughout the region.

Mr. Barnes is a partner of MPV, LLC which owns the 66-acre eastern portion of the 100-acre EGIS NWA Mitigation Bank along with Mr. Paul Mahan who is an equal partner in MPV, LLC. EGIS ND owns the 34-acre western area and Mr. Barnes is the sole owner of EGIS ND. EGIS ND is an Arkansas-licensed general contractor specializing in Environmental Restoration and Conservation work throughout the USA since 1999. Together Mr. Barnes and Mr. Mahan own 100 percent of the EGIS NWA Mitigation Bank 100-acre Property in fee title with over 25 years of economic stability in NWA which is verifiable with their financial institution, Arvest Bank.

B. EGIS NWA Mitigation Bank Location and General Description

The EGIS Mitigation Bank is located in southwestern Benton County, Arkansas. More specifically, the site is described as a part of the SW ¼ of Section 5 and a part of the SE ¼ of Section 6 and a part of the NW ¼ of Section 8, all in Township 17 North, Range 32 West, Benton County, Arkansas containing approximately 100 plus acres. The Illinois River bounds the property to the west and north. US Highway 412 is about a ¼ mile south of the mitigation bank. The Ozark National Forest is located less than one mile south of the mitigation site. There is potential to expand on lands to the south.

The EGIS NWA Mitigation Bank is comprised of agricultural land, remnant river scars, riparian buffer, contiguous mitigated wetlands, as well as the Illinois River channel and Pedro Creek riparian land and creek channel. Forested land and riparian areas comprise the majority of the surrounding lands

C. The EGIS NWA Mitigation Bank Physical Environment

1. Vegetation

The historical vegetation on the EGIS NWA Mitigation Bank would have been bottomland hardwoods along the low-lying and flat areas of the Illinois River, including the ox-bows scars with upland oak-hickory forest on knolls and slopes. Today, the project site has been cleared for cattle ranging except for a thin riparian strand along the top of bank of the Illinois River. Common vegetation over the majority of the land is herbaceous comprised of fescue (*Festuca arundinacea*), Johnsongrass (*Sorghum halepense*) and bahiagrass (*Paspalum notatum*). The riparian strand contains woody species such as green ash (*Fraxinus pennsylvanica*), white oak (*Quecus alba*), sycamore (*Platanus occidentalis*), boxelder (*Acer negundo*) and persimmon (*Dlospyros virginiana*). Three historic river scars exist within the southern portion of the EGIS NWA Mitigation Bank and include wet herbaceous and low growth shrubs such as common rush (*Juncus effusus*), bulrush (*Scirpus validus*), smartweed (*Polygonum pensylvanicum*) and buttonbush (*Cephalanthus occidentalis*).

2. Soils

The Soil Survey of Benton County indicates that the project site occurs within the Secesh-Britwater-Captina soil associations. In general, the soils of this association consist of well drained and moderately well drained, level to moderately sloping, deep, loamy soils on floodplains and terraces. The soils included within these associations include Secesh, Britwater, Captina, Fatima, Healing, Elsa, Peridge, and Waben. Specifically, the project site has been mapped by the NRCS as possibly containing Healing silt loam (occasionally flooded) and Healing silt loam (0 to 2 percent). Healing series consists of well drained, level to nearly level soils on flood plains and low terraces. The soils formed in local sediment washed from soils predominantly of limestone and cherty limestone uplands. The native vegetation was bottomland hardwoods. Both soils are listed on the 2006 Benton County hydric soils list as either being hydric or having hydric inclusions.

3. Hydrology

The main influence of hydrology in the locale of the EGIS NWA Mitigation Bank is the Illinois River. The river bounds the EGIS Mitigation Bank along its north and west boundaries. In addition, the site is subject to direct precipitation and overland storm water from adjacent agricultural lands as well as storm runoff from U.S. Highway 412. The entire site is located within the 100-year floodplain. The Illinois River floods the site on a regular basis, in recent history about every 1-2 years to a depth of over 5 feet and occasionally over 15 feet deep.

D. Geographic Service Area

The EGIS Mitigation Bank would be eligible for providing compensatory mitigation for construction or maintenance projects that are considered the least environmentally damaging practical alternatives associated with dredge or fill activities occurring in waters of the United States. Specific to Arkansas, the

geographic service area would encompass parts of 11 counties (Benton, Washington, Newton, Johnson, Franklin, Crawford, Sebastian, Scott, Logan, Yell and Pope counties) and include the Illinois River watershed as well as portions of the Ozark Mountains and Arkansas Valley of the Arkansas Wetland Planning Region as defined by the Arkansas Multi-Agency Wetland Planning Team (MAWPT). For accounting purposes Table 1 on the following page provides a listing of Unites States Geologic Service (USGS) hydrologic unit codes (HUC) for the Primary and Secondary Service Locations. The Service area is limited to the Arkansas portions of these watersheds and excludes the portions of the watersheds within Oklahoma and Missouri.

E. Credit Requirement

Credits would be used by EGIS as compensatory mitigation for development activities permitted by the USACE.

Table 1.

USGS Hydrologic Unit Codes

Sub Basin Name (Primary Service Area)	**HUC**
Illinois River	11110103
Elk (Little Sugar) Watershed	11070208
Lower Neosho (Spavinaw) Watershed	11070209
Lake O The Cherokees	11070206
Sub Basin Name (Secondary Service Area)	
Frog Mulberry	11110201
Robert S. Kerr	11110104

II. MITIGIATON PLAN

A. Management Goal

The management goal for the EGIS NWA Mitigation Bank is successful establishment, restoration, enhancement, and protection of a sustaining

ecologically sensitive ecosystem. This would include enhancement, restoration, and creation of streams, riparian buffer, wetlands, and associated uplands. The main objectives include, stream bank improvements and reclamation, riparian buffer enhancements, wildlife habitat improvements, creation of wetlands and reforestation of wetlands and uplands. These objectives would be achieved on an individual basis.

B. Mitigation Objectives

1. Stream Bank Improvements and Reclamation

There is a total of 24,050 linear feet of stream channel habitat in the 100-acre EGIS NWA Mitigation Bank (existing stream channel, and restoration of historic river scars). Improvements and reclamation activities would occur on an individual basis. Activities would include both preservation and enhancement of existing channel and riparian buffers. Channel reclamation would be conducted within the river scars to re-establish stream channel during moderate to high flow events. The reclamation activities would include channel restoration, bank stabilization and riparian zone establishment. In the existing Illinois River channel, areas of erosion would be reclaimed by stabilization activities such as bank sloping, rock armor and herbaceous and woody bank stabilization plantings.

2. Riparian Buffer Enhancements

Riparian buffers will parallel the Illinois River as well as restored riverlets. Dedicated widths of riparian buffer will vary from a minimum of 25 feet to 100 feet. Areas void of woody stock would be planted with riparian trees. All other areas would be evaluated and support plantings (herbaceous and woody) installed as appropriate.

3. Wildlife Habitat Improvements

The EGIS Mitigation Bank will provide a wildlife resting area within the region that has been experiencing exponential commercial and residential

growth. The site will provide a variety of habitats including marsh, wet woods, streams and uplands forest. The EGIS NWA Mitigation Bank will provide a connected wildlife corridor beneath U.S. Highway 412 through existing dedicated EGIS Mitigation lands which have been maturing for approximately 20 years. Songbird and waterfowl nesting structures (self-standing and hanging) will be installed throughout the riparian buffer areas. Bat nesting structures could also be employed within the riparian buffers.

4. Wetland Creation/Enhancement

Approximately 30 acres of land is available for wetlands creation/enhancement in the EGIS NWA Mitigation Bank. The areas designated for creation/enhancement would be excavated to an elevation to attain wetlands hydrologic regime (saturated or inundated for at least two consecutive weeks during the growing season). The created areas would be covered with a layer of topsoil (hydric, as available) and re-vegetated with native or endemic wetland plant stock (woody and herbaceous). Enhancement areas would already meet hydric soils and hydrological conditions and would thereby be planted with native or endemic wetlands plant stock (woody and herbaceous).

5. Reforestation

Locations to be reforested (wetland and/or riparian buffers) would be planted with woody seedlings within areas of appropriate hydrologic regimes. Appropriate species would be determined via the use of the USFWS National Plant List.

a. Woody Plant Selection[1]

[1] Facultative wetland plants, FACW, have a probability of 67-99% of occurring in wetlands. Facultative plants, FAC, have an estimated probability of 33-67% of occurring in both wetlands and non-wetlands. Facultative upland plants, FACU, occur more often in non-wetlands, while obligate upland plants, UPL, rarely occur in wetlands. The addition of a plus (+) or minus (-) to the indicator status further differentiates the likelihood of a plant occurring in a wetland or non-wetland. If a species does not occur in wetlands in any region, it is

The reforestation process would utilize only native or endemic species to the State of Arkansas. Additionally, species specific to Benton County would be sought as the first priority for plantings. Replacement of species being impacted would be considered in the reforestation activities where practicable.

In addition to the use of native species, the seedlings would be planted in hydrologic zones conducive to the flood tolerance of each species.

The type and number of individual species will be dependent on availability of the plant material as well as the hydrology patterns during the actual planting season. The following Table 2 provides a partial list of woody species that will be used.

Table 2.
Woody Species List

Common Name	Scientific Name	Indicator Status
Buttonbush	*Cephalanthus occidentalis*	OBL
Baldcypress	*Taxodium distichum*	OBL
American elm	*Ulmus americana*	FACW
Green Ash	*Fraxinus pennsylvanica*	FACW
Willow Oak	*Quercus phellos*	FACW
Boxelder	*Acer negundo*	FACW
Red Maple	*Acer rubrum*	FAC
Persimmon	*Diospyros virginiana*	FAC
Red Mulberry	*Morus rubra*	FAC
Water Oak	*Quercus nigra*	FAC
White Oak	*Quercus alba*	FACU

not on the USFWS National *List of Plant Species That Occur in Wetlands*, p. 8-9.

Eastern redcedar	*Juniperus virginiana*	FACU

b. Planting Methods

The seedlings would be hand-planted on a minimum spacing of 15 feet by 15 feet (194 trees per acre). The initial plantings would consist of (1) bare-root seedlings, (2) 1- to 3-gallon containerized trees and/or, (3) seedling plugs, if available.

c. Timing

The seedlings would be planted during the appropriate planting seasons for the size individuals as well as availability. Bare root seedlings would be primarily planted between December 1 and March 15. Containerized trees would be primarily planted between March 15 and May 31.

6. Additional Activities

In addition to the above improvements, other considerations regarding enhancement to the mitigation site will be given.

a. Deed Restriction

The mitigation lands will be set aside from future development activities via recordation of a deed restriction/covenant with the County. The deed restriction will indicate the mitigation locations as restricted areas (with minimal disturbances allowed) in perpetuity. Along with the recordation, the site will be delineated in the field with identification signs which demarcate the protected areas.

b. Erosion Control

Erosion control will be a priority during all mitigation construction activities. Careful attention regarding work around the stream areas will be ensured. Erosion control measures will be implemented to assist in reducing potential downstream sedimentation. Erosion control methods will most likely include silt fence, staked hay bales, staked silt barriers, seeding with rye grass (*Lolium perenne*), fescue (*Festuca arundinacea*), white clover (*Trifolium repens*) and red clover (*Trifolium pratense*), straw or hay mulching, rip-rap with geo-textile material and possibly erosion control matting. Specific erosion control methods will be addressed in the erosion control section of the construction documents as they are developed.

c. Routine maintenance

Maintenance mowing will be allowed only in designated areas of the mitigation sites. It is the intent of the proposed mitigation concepts to limit maintenance, or disturbance within the riparian buffer areas. The selected vegetative species should be allowed to propagate and grow uninhibited. Should maintenance mowing within the riparian areas of the mitigation site be necessary, the USACE will be notified prior to mowing. Along the Illinois River occasional specific excluded 50 to 100-foot-wide gaps will be set aside for access to the River and will not be included in credit calculations as these areas will not be included in the Mitigation Bank restricted area.

III. OPERATION OF THE EGIS Mitigation Bank

A. Crediting and Debiting

1. Wetlands

Wetlands (impacted and mitigated) will be assessed via the 2002 Charleston District Standard Operating Procedure (SOP) with SWL addendum or any succeeding version or method adopted by the USACE. Wetland debits or credits would be based on the results of the Charleston Method. Review of the Charleston Method indicates that approximately 67.59 wetland credits are available on the 100-acre EGIS NWA Mitigation Bank.

2. Streams

Streams (impacted and mitigated) would be assessed via the 2011 Little Rock District Stream Method or any subsequent adaptation or method adopted by the USACE. Stream debits or credits would be based on the results of the Little Rock District Stream Method. Review of the Little Rock Stream Method indicates that approximately 13,621.75 stream credits are available on the west 34-acre portion of the EGIS Mitigation Bank.

Table 4

Stream Credits for West 34-acre area

Area	Length	Credit
Preservation	1,820	4844.25
Restoration	4,230	8777.5
Total	6,050	13,621.75

Riparian Buffer

Area	Length	Credit
Preservation	1,820	3358
Restoration	4,230	19,386
Total	6,050	22,744

Grand Total Stream Credits West 34-acre area 36,365.75

EGIS calculates that the East 66-acre area will provide an additional 106,156.3 stream credits. Therefore, the total available credits with the combined 34-acre area and the 66-acre area results in 142,672.8 stream credits considering total use of the entire 100-acre EGIS NWA Mitigation Bank.

B. Credit/Debit Accounting Procedures

EGIS will be responsible for maintaining an up-to-date record of all transactions on the EGIS Mitigation Bank. EGIS shall submit a copy of these records to the USACE by December 31 of each year following the initial planting and will update RIBITS with all transactions.

C. Performance Standards

The monitoring period is normally a five-year requirement. Therefore, the following criteria would be used to assess the EGIS Mitigation Bank success:

1. Woody Species Survival

Following the initial installation of planted stock and conducted within the local growing season, an annual tree tally will be conducted on the planted woody stock. An approximate 70 percent survival rate for the planted stock will be required for success each of first two years following initial plantings. Assuming the minimum total of 194 trees per acre (15 feet on center), the EGIS Mitigation Bank must maintain 136 trees per acre planted. For each subsequent year, the EGIS Mitigation Bank must maintain a 50 percent survival rate for the planted woody stock (97 trees per acre planted).

2. Herbaceous Species Survival

An approximate 70 percent survival rate for the herbaceous planted stock will be required for success each year following initial plantings. Over the monitoring period, planted herbaceous plant communities in wetlands of

the EGIS Mitigation Bank must also exhibit a predominance of hydrophytic vegetation composition (greater than 50 percent).

3. Success Determination

Successful establishment of the planted stock will be determined by a professional biologist. Species will be inventoried via percent plot tally techniques.

D. Monitoring Reports

Annual monitoring reports would be submitted to the USACE for five years and then for subsequent years as required by the USACE. Monitoring would begin the first growing season following the completion of the initial plantings. The reports will indicate at a minimum the following:

1. Wetland Monitoring

At a minimum, wetland monitoring will include a narrative description and photographs of the wetland mitigation area. Emphasis will include vegetative diversity and hydrophytic characteristics, hydric soils, hydrology and tree survival.

2. Stream /Riparian Buffer Monitoring

At a minimum, stream monitoring will include a narrative description and photographs of: the full length of stream bank restoration, stream bank features (i.e. in-stream improvements, riparian buffer conditions, tree plantings and herbaceous plantings) and problematic erosion areas.

E. Remedial Actions

The USACE will determine the success of the mitigation areas. In the event that monitoring reveals that the success criteria have not been met, remedial actions will be considered and implemented as appropriate.

IV. OTHER PROVISIONS

A. Access to the EGIS NWA Mitigation Bank

EGIS will allow, or otherwise provide for, access to the site to the USACE as necessary for the purpose of inspection and compliance monitoring. Inspecting parties shall provide reasonable notice to the EGIS prior to inspection of the EGIS Mitigation Bank.

B. Provisions for the Uses of the EGIS NWA Mitigation Bank

EGIS shall not:

1. Easements

Grant of additional easements, rights-of-ways or any other property interest in or to the project areas will require and consultation with and approval by the USACE.

2. Uses

Convert the property to another use, including but not limited to: clearing, logging, bushogging, mowing, spraying with herbicides, filling, leveling, draining, dumping, construction of any structure, or any other activity that would adversely impact the natural state of the area must be authorized first by the USACE. Natural resource management or wildlife enhancement activities involving alteration of the EGIS NWA Mitigation Bank would require written consent of the USACE. Recreational and educational activities will be permissible under the supervision of EGIS.

C. Force Majeure

The management or mitigation potential may be adjusted, or corrective actions required on the EGIS NWA Mitigation Bank at any time should an Act of God or uncontrollable human-induced activity adversely affect its functions and values.

Any required adjustments or corrective responsibilities to the EGIS NWA Mitigation Bank under any uncontrollable situation would be determined by the USACE, on a case-by-case basis.

D. Validity and Modification

The EGIS NWA Mitigation Bank mitigation plans may be amended or modified with the written approval of the USACE.

V. CONCLUSIONS

The final mitigation area will be designed in such a way that the restored stream channels and created wetlands will become quality natural resource areas which provide, among other things, fish and wildlife habitat, nature observations, educational benefits, and positive aesthetics. The riparian buffers will provide an additional level of protection to the restored stream channels. The buffers will also serve as wildlife corridors which will assist in the perpetuation of local fauna.

More detailed mitigation plans will be developed and will be provided to the USACE as the EGIS NWA Mitigation Bank is utilized. Project scheduling will be enhanced when the USACE is able to provide approval of this EGIS NWA Mitigation Bank Prospectus.

REFERENCES

Brinson, M. M. (1993). "A hydrogeomorphic classification for wetlands," Technical Report WRP-DE-4, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A270 053.

Compensatory Mitigation, Department of the Army, Little Rock District, Regulatory Branch, Corps of Engineers, Standard Operating Procedure.

Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U. S. Department of the Interior, Fish and Wildlife Service, Washington, D.C. 131pp.

Department of the Army, Charleston District, Corps of Engineers, *Standard Operating Procedure, Compensatory Mitigation*.

Department of the Army, Little Rock District, Corps of Engineers, 2011. *Stream Method*.

Dunne, Thomas and Luna B. Leopold. 1978. *Water in Environmental Planning*. W.H. Freeman and Company. San Francisco, California. 818 pages.

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual,* Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station. Vicksburg, Mississippi.

Harper, M. Dean, et al. January 1977. *Soil Survey of Benton County, Arkansas.* United States Department of Agriculture. Soil Conservation Service and Forest Service, in cooperation with the Missouri Agricultural Experiment Station. 94 pages.

Harrington, H.D. 1977. *How to Identify Grasses and Grasslike Plants*. Swallow Press, Ohio University Press. Athens, Ohio. 142 pages.

Hitchcock, A.S. 1971. *Manual of the Grasses of the United States*. 2nd ed. Dover Publications, Inc. New York. 1051 pages.

Knobel, Edward. 1980. *Field Guide to the Grasses, Sedges and Rushes of the United States*. 2nd ed. Dover Publications, Inc. New York. 1051 pages.

Kollmorgen Instrument Corporation. 1992. *Munsell Soil Color Charts*. Rev. MacBeth Division of Kollmorgen Instruments Corporation. Newburgh, New York.

Mitsch, William J. and James G. Gosselink. 1993. *Wetlands*. 2nd ed. Van Nostrand Reinhold. New York. 722 pages.

Radford, Albert E., et al. 1968. *Manual of the Vascular Flora of the Carolinas*. The University of North Carolina Press. Chapel Hill, North Carolina. 1183 pages.

Reed, P.B., Jr. 1988. *National List of Plant Species that Occur in Wetlands: National Summary*. U.S. Fish and Wildlife Service Biological Report 88(24). 244 pages.

Smith, D. R., Ammann, A., Bartoldus, C., and Brinson, M. M. (1995). "An approach for assessing wetland functions using hydrogeomorphic classification, reference wetlands, and functional indices," Technical Report WRP-DE-9, U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS. NTIS No. AD A307 121.

Smith, Edwin. 1994. *Keys to the Flora of Arkansas*. The University of Arkansas Press. Fayetteville, Arkansas. 363 pages.

U.S. Department of Agriculture, Soil Management Support Services, Soil Survey Staff. 1988. *Keys to Soil Taxonomy*. 4th Printing. Cornell University. Ithaca, New York. 280 pages.

WEB SITES

Arkansas Multi-Agency Wetland Planning Team - http://www.mawpt.org/products.asp

EPA - http://cfpub.epa.gov/surf/state.cfm?statepostal=AR

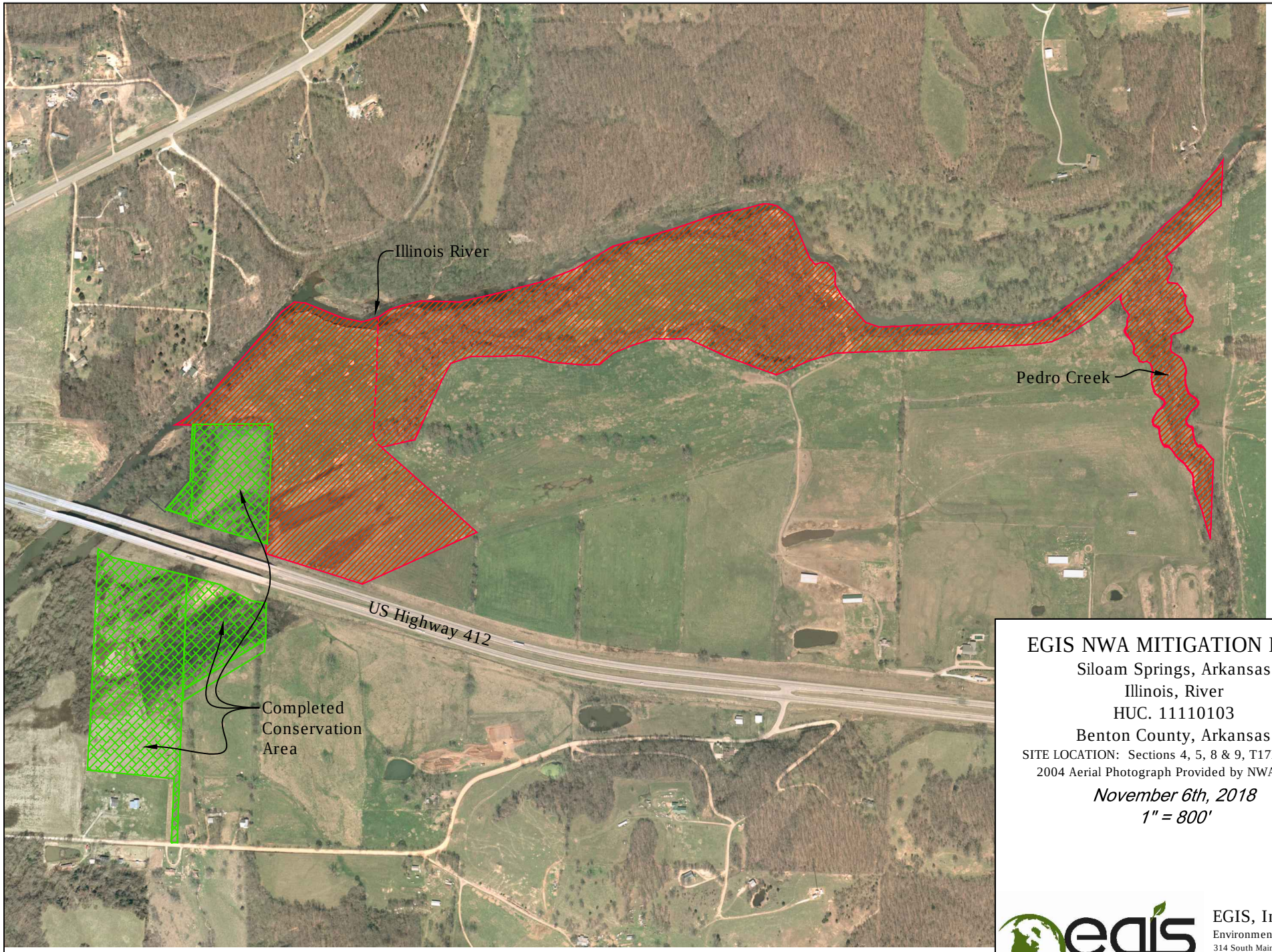
USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

U.S. Geological Survey - http://nationalatlas.gov/natlas/Natlasstart.asp

APPENDICES

APPENDIX A

EGIS NWA MITIGATION BANK LOCATION



EGIS NWA MITIGATION BANK

Siloam Springs, Arkansas
Illinois, River
HUC. 11110103
Benton County, Arkansas

SITE LOCATION: Sections 4, 5, 8 & 9, T17N, R32W
2004 Aerial Photograph Provided by NWA Topo

November 6th, 2018
1" = 800'

EGIS, Inc.
Environmental Consulting
314 South Main Street
Bentonville, AR 72712
(479) 271-9252

APPENDIX B

CONCEPTUAL MITIGATION PLAN

with

PRELIMINARY ENVIRONMENTAL FEATURES LISTING

Conceptual Mitigation Plan

Preliminary Environmental Features Listings
(The environmental features could include, but not be limited to the following)

Erosion Control

Staked Hay bales
Regular and Reinforced Silt Fence
Rip-rap (with geo-textile fabric)
Erosion Control Matting

Vegetation

#	Feature	Species	Method
TBD[1]	rye grass	*Lolium perenne*	seeded
TBD	white clover	*Trifolium repens*	seeded
TBD	red clover	*Trifolium pratense*	seeded
TBD	black willow	*Salix nigra*	>18", spriggings

Stream Reclamation

Feature		Method
Sinusoidal low flow channel creation		2ft - 60ft wide by 1ft to 4ft deep
Shoal creation		gravel lining
TBD		
Stream substrate placement		6"-12" deep clay/gravel lining
TBD	Pools	2ft – 10ft long; 2ft – 4ft deep
TBD	Riffles	6ft – 30ft long; 0.2ft – 0.5ft deep; contain varying sized substrate

In-stream feature placement

TBD	Deflectors
TBD	Plunge logs
TBD	Boulders
TBD	Other

Stream bank stabilization — willow sprigs, rip-rap, other

Riparian Buffers

Woody — Nursery Stock Trees — varying aged and sized trees (bare root, containerized and/or plugs)

#	Feature	Species
TBD	Red Maple	*Acer rubrum*
TBD	Persimmon	*Diospyros virginiana*
TBD	Red Mulberry	*Morus rubra*
TBD	Water Oak	*Quercus nigra*
TBD	White Oak	*Quercus alba*
TBD	Sycamore	*Platanus occidentalis*
TBD	Boxelder	*Acer negundo*

TBD	Green Ash	*Fraxinus pennsylvanica*
TBD	Eastern redcedar	*Juniperus virginiana*

Herbaceous

#	Feature	Species	Method
TBD	rye grass	*Lolium perenne*	seeded
TBD	white clover	*Trifolium repens*	seeded
TBD	red clover	*Trifolium pratense*	seeded

Wetland Creation

Woody Nursery Stock Trees — varying aged and sized trees (bare root, containerized and/or plugs)

#	Feature	Species
TBD	Buttonbush	*Cephalanthus occidentalis*
TBD	Baldcypress	*Taxodium distichum*
TBD	American elm	*Ulmus americana*
TBD	Green Ash	*Fraxinus pennsylvanica*
TBD	Willow Oak	*Quercus phellos*
TBD	Red Maple	*Acer rubrum*
TBD	Boxelder	*Acer negundo*

Herbaceous

#	Feature	Species	Method
TBD	soft rush	*Juncus effusus*	seeded and/or plugs
TBD	millet	*Echinochloa crus-galli*	seeded
TBD	bulrush	*Scirpus fluviatilis*	seeded and/or plugs
TBD	sweetflag	*Acorus calamus*	seeded and/or plugs
TBD	porcupine sedge	*Carex hystericina*	seeded
TBD	shallow sedge	*Carex lurida*	seeded

Other Enhancements and/or Features

#	Feature		Species	Method
TBD	Informative signs			
TBD	Nesting structures			
	TBD	songbirds	bluebirds, wrens, nuthatches	Self standing and hanging
	TBD	bats		Self standing and hanging
	TBD	waterfowl	wood duck	Self standing and hanging

Deed Restriction

[1]TBD - To Be Determined

APPENDIX C

GEOGRAPHIC SERVICE AREA MAP


Primary Service Area
Secondary Service Area
Lake O' The Cherokees
11070206
Elk
11070208
Lower Neosho
11070209
Illinois
11110103
Robert S. Kerr Reservoir
11110104
Frog-Mulberry
11110201
Dardanelle Reservoir
11110202

APPENDIX D

PROFESSIONAL CREDENTIALS

NAME: James Manuel Barnes, PWS

TITLE: Principal Scientist

FIRM ASSOCIATIONS: EGIS, Inc., President and CEO

PROJECT ASSIGNMENT: Environmental Planner, Senior Environmental Scientist, Professional Wetland Scientist

YEARS EXPERIENCE: With This Firm – 28
With Other Firms – 13

EDUCATION: BS/1974/Zoology/minor in Chemistry/University of Arkansas
MS/1977/Zoology/University of Arkansas
MS/1987/Water and Land Resource Planning, Rec. Resources Dept., Colorado State University
PH.D. Draft Dissertation/Fishery and Wildlife Biology, Colorado State University

PROFESSIONAL AFFILIATIONS:

- Commissioner, Arkansas Natural Heritage Commission
- Certified Asbestos Inspector, EPA TSCA Title II accreditation
- Certified Asbestos Management Planner
- Certified Professional Wetland Scientist, Society of Wetlands Scientists
- Certified SCUBA
- American Indoor Air Quality Council
- Certified Indoor Environmental Consultant
- Licensed General Contractor
- Board Member, Fellowship of Christian Athletes
- American Society of Civil Engineers
- American Fisheries Society, Member #107395
- Arkansas Trout Unlimited, Member #408002102, Chapter 514
- The Association of State Wetland Managers, Certificate #1577
- Arkansas Wetland Technical Committee
- 1983 National Corps of Engineers Wetland Functional Value Committee
- Arkansas Interagency Protection Planning Committee, 1990 Chairman
- National GIS Ad Hoc Committee – U.S. Army Corps of Engineers
- Sigma XI, Scientific Research Society of North America
- Arkansas Chapter of American Fisheries Society
- National Groundwater Association
- Aircraft Owners and Pilots Association (Licensed Co-Pilot, single engine)

OTHER EXPERIENCE AND QUALIFICATIONS:

Mr. Barnes conducts environmental assessments and impact statements coast to coast.

Representative studies include:

- Wetland Delineations, Assessments, Evaluations, Mitigation in 40 states, and Steam Relocation Projects in Iowa, Tennessee, Alabama and Arkansas
- Environmental Site Assessments, Planning, Studies and Seminars
- Mold Inspections, Mold Sampling, Mold Remediation
- Expert Witness Regarding Wetlands Aquatic Ecology
- Water and Land Resource Evaluation Studies
- Fish Impingement and Entrainment Studies for FERC Hydropower Licensing
- Photogrammetric Remote Sensing of Earth Resources
- Phase I, II, and III Environmental Site Assessments

As a senior environmental specialist and GIS Manager with U.S. Army Corps of Engineers (USACE) for 13 years, Mr. Barnes managed stream, lake and wetland studies for the USACE while at the Environmental Laboratory, Waterways Experiment Station and two Districts. Other duties with the USACE included Evaluation of 404 Permits and Environmental Planning of major civil works projects.

Mr. Barnes has performed environmental studies and assessments for the Arkansas Water Resource Center, U.S. Fish and Wildlife Service, the National Park Service and municipalities, and wetland training seminars for developers, engineers and scientists throughout the United States and Puerto Rico. He has presented numerous scientific reports, publications, and lectures concerning the environment.

From 1989 to 1990, Mr. Barnes chaired the Arkansas Environmental Protection Planning Committee, a 20-member interagency group which Governor Clinton initiated. He was appointed in 2004 by Governor Huckabee to the Arkansas Natural Heritage Commission, a 10-year appointment.

From 2006-2007 Mr. Barnes participated as environmental scientist in biological surveys of a +/- 245-mile linear project from north-central Arkansas to central Mississippi. He was responsible for delineating waters of the U.S., including wetlands waters of the U.S. Project also involved identifying threatened or endangered species habitat. Field work was collected and provided on a daily basis.

From 2007-2008 Mr. Barnes participated as principle scientist in biological surveys of multiple segments of linear projects in parts of Iowa, Nebraska, Minnesota, and Wisconsin. Responsible for delineating waters of the U.S., including wetlands as well as non-404 regulated watercourses. Project also involved identifying threatened or endangered species habitat. Field work was collected and provided to client on a daily basis. In addition, a report of findings was developed and Section 404 permitting was coordinated with the U.S. Army Corps of Engineers Rock Island, Omaha, and St. Paul Districts.

From 2008 – 2012 Mr. Barnes was the Senior Environmental Scientist regarding Environmental Investigations regarding over 200 miles of the Fayetteville Shale Natural Gas Pipeline Project through North Central Arkansas into Western Mississippi. Mr. Barnes was also project manager overseeing over 100 miles of the Marcellus Shale Natural Gas Projects in Southwest Pennsylvania performing earth science evaluations and mapping. This project involved identifying soils, plants and hydrological parameters for use in determining presence of wetlands and stream habitats recorded via GPS mapping. Various habitats as well as Threatened or Endangered Species evaluations were involved in this 1.5-year project.

2012 – 2018 Mr. Barnes has conducted a variety of Environmental Assessments regarding wetlands, streams, contamination, Clean Water Act Permits design and construction of required mitigation on large scale projects. Mr. Barnes has designed and coordinated the development of a Wetlands Mitigation Bank in the Memphis District Corps of Engineers. He has conducted numerous Phase I and II ESA's regarding environmental damage and served as an expert witness on several occasions. He frequently gives public presentations regarding environmental matters to private and public groups throughout the region and occasionally on a national basis. Mr. Barnes conducts specialized soils and hydrological investigations regarding development and natural resources. Mr. Barnes is a certified Indoor Environmental Consultant and holds Asbestos Certifications regarding Inspection and Management Planning.