Appendix A:
Geomorphic Assessment Field Forms

A1. Channel-stability Ranking Scheme field form (CSRS)

CHANNEL-STABILITY RANKING SCHEME*

Station # _____ **Sheet #:** _____

Date: _____ **Crew:**_____ **Site Coordinates:**_____

Pictures: ❑ U/S ❑ D/S ❑ X-section ❑ LB ❑ RB **Samples:**_____

Pattern: ❑ Meandering ❑ Straight ❑ Braided ❑ Drainage Ditch**

Field Measurements: Reach length:_____ Est. Reach Slope:_____

Avg channel widths: (top)_____(bottom)_____ Avg/Max channel depth:_____/_____

LB angle (avg):_____ RB angle (avg):_____

Primary bank material:_____ Primary bed material: *(See #1)*

BHS Note # (GP=gravel; SP=sand; ML=silt; CL=clay; BR=bedrock)

1. Primary bed material

Bedrock	*Boulder/Cobble*	*Gravel*	*Sand*	*Silt/Clay*	
0	1	2	3	4	

2. Bed Protection

a) *Yes* 0

OR

b) *No* 1 *(with)* *#Banks Protection* *One (L or R)* 2 *Both* 3

3. Degree of floodplain separation/incision** (Relative elevation of "normal" low water; floodplain/terrace @100%)

0-10%	*11-25%*	*26-50%*	*51-75%*	*76-100%*	
4	3	2	1	0	

4. Degree of constriction (Relative decrease in top-bank width from up to downstream)

0-10%	*11-25%*	*26-50%*	*51-75%*	*76-100%*	
0	1	2	3	4	

5. Streambank erosion (Each bank over reach length)

	None	*Fluvial*	*Mass wasting (failures)*	
Left	0	1	2	
Right	0	1	2	

6. Stream bank instability (Percent of each bank failing over reach length)

	0-10%	*11-25%*	*26-50%*	*51-75%*	*76-100%*	
Left	0	0.5	1	1.5	2	
Right	0	0.5	1	1.5	2	

7. Established woody vegetative cover (Percent of each bank face over reach length)

	0-10%	*11-25%*	*26-50%*	*51-75%*	*76-100%*	
Left	2	1.5	1	0.5	0	
Right	2	1.5	1	0.5	0	

8. Occurrence of bank/bar accretion (Percent of each bank with fluvial deposition over reach length)

	0-10%	*11-25%*	*26-50%*	*51-75%*	*76-100%*	
Left	2	1.5	1	0.5	0	
Right	2	1.5	1	0.5	0	

9. Stage of Channel Evolution (If applicable)

I	*II*	*III*	*IV*	*V*	*VI*	
0	1	2	4	3	1.5	

OTHER OBSERVATIONS:

Total Score:

* Adapted from Kuhnle and Simon (2000)

A2a. Biological/Habitat Ranking Scheme (low gradient) form (BHRS-low)

BIOLOGICAL/HABITAT RANKING SCHEME (low gradient streams)*

Station # _____ Station Description: _____
Date: _____ Crew:_____ Samples Taken: _____

Pictures: ❑ U/S: ❑ LB ❑ RB ❑ Channel Bed ❑ _____
❑ D/S: ❑ LB ❑ RB ❑ LB Riparian Zone ❑ _____
❑ RB Riparian Zone ❑ _____

1. Availability of favorable habitat *(snags, submerged logs undercut banks; average of LWD and detritus)*

>50%	*30-50%*	*10-30%*	*<10%*	
4	3	2	1	

2. Pool-substrate composition

GP & firm SP	*Soft SP & ML-CL*	*All ML-CL or All SP*	*Hardpan/ Bedrock*	
4	3	2	1	

3. Pool-variability character

Mix large/small & deep/shallow	*Majority large-deep pools*	*Shallow pools more prevalent*	*Majority small-shallow or absent*	
4	3	2	1	

4. Active streambed/bar deposition

0-20%	*21-50%*	*51-80%*	*81-100%*	
4	3	2	1	

5. Streambed exposure

0-5%	*5-25%*	*25-75%*	*75-100%*	
4	3	2	1	

6. Degree of "hard" channel alteration (channelization, dredging, embankments/shoring structures, gabion/cement)

Channelization/dredging absent	*Minor or historic*	*40-80% reach disrupted*	*>80% Disrupted/ habitat altered*	
4	3	2	1	

7 (low). Sinuosity

3-4	*2-3*	*1-2*	*Straight*	
4	3	2	1	

7 (high). Pool-riffle sequence (% Pool + % Riffle)

>80%	*51-80%*	*20-50%*	*<20%*	
4	3	2	1	

8. Bank Instability (Percent each bank failing)

	0-5%	*6-30%*	*31-60%*	*61-100%*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

9. Vegetative Bank Protection (Bank face):

	>90% covered w/mix of veg.	*70-90% cover*	*50-70% cover; disruption obvious; bare patches*	*<50% veg disruption high*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

10. Riparian-zone width (out from edge of water)

	>20m	*10-20 m*	*5-10 m*	*<5m*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

Total Score: ☐

A2b. Biological/Habitat Ranking Scheme (high gradient) form (BHRS-high)

BIOLOGICAL/HABITAT RANKING SCHEME (high gradient streams)*

Station # _____ Station Description: _____

Date: _____ Crew:_____ Samples Taken: _____

Pictures: ❑ U/S: ❑ LB ❑ RB ❑ Channel Bed ❑ _____

❑ D/S: ❑ LB ❑ RB ❑ LB Riparian Zone ❑ _____

❑ RB Riparian Zone ❑ _____

1. Availability of favorable habitat *(snags, submerged logs undercut banks; average of LWD and detritus)*

>70%	*70-40%*	*40-20%*	*<20%*	
4	3	2	1	

2. Embeddedness: Gravel, cobble, boulder % surrounded by fine sediment

0-25%	*25-50%*	*50-75%*	*>75%*	
4	3	2	1	

3. Velocity/Depth Regime: a) slow-deep, b) slow-shallow, c) fast-deep, d) fast shallow; (slow is <0.3 m/s, deep is >0.5 m)

All 4 regimes present	*3 of 4 regimes(if 'd' is missing,score lower*	*2 of 4 regimes (if 'd' and 'b' missing, score lower*	*Dominated by 1 regime (usually 'a')*	
4	3	2	1	

4. Active streambed/bar deposition

<5%	*5-30%*	*30-50%*	*>50%*	
4	3	2	1	

5. Streambed exposure

0-5%	*5-25%*	*25-75%*	*75-100%*	
4	3	2	1	

6. Degree of "hard" channel alteration (channelization, dredging, embankments/shoring structures, gabion/cement)

Channelization/dredging absent	*Minor or historic*	*40-80% reach disrupted*	*>80% Disrupted/ habitat altered*	
4	3	2	1	

7 (high). Pool-riffle sequence (% Pool + % Riffle)

>80%	*51-80%*	*20-50%*	*<20%*	
4	3	2	1	

8. Bank Instability (Percent each bank failing)

	0-5%	*6-30%*	*31-60%*	*61-100%*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

9. Vegetative Bank Protection (Bank face):

	>90% covered w/mix of veg.	*70-90% cover*	*50-70% cover; disruption obvious; bare patches*	*<50% veg disruption high*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

10. Riparian-zone width (out from edge of water)

	>20m	*10-20 m*	*5-10 m*	*<5m*	
Left	2	1.5	1	0.5	
Right	2	1.5	1	0.5	

Total Score: _____

A3. Bank Height/Slope Measurement Notes form (BHS), page 1

BANK HEIGHT/SLOPE (BHS) MEASUREMENT NOTES

NOTE #:	**DATE:**	**CREW:**	**UNITS:** Metric / English
STREAM:	**TIME:**	**REACH LOCATION:**	
CROSS-SECTION # **of**		**DISTANCE FROM U/S REACH:**	

Measurement instruments:

Distance method: tape / laser rangefinder / acoustic device / pace / other

Inclination method: Abney level / Brunton / clinometer / hypsometer / rod & tape / other level

Cross-section sketch for instrument and shot locations (see examples)**:**

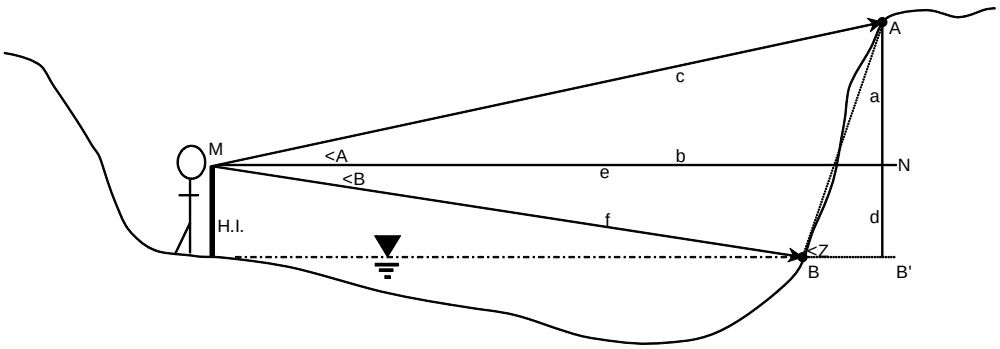
LB RB

STANDING ON BANK (Left/Right)	Shot ID	Location of Target on Bank*	Location of Instrument *	Height of Instrument	Distance (indicate units)	Angle (degrees)	Height from Level (M-N)
	A						
	B						
	<D						
	3						
	4						
	5						
	6						

	Scenario #1 (A, B)	Scenario #2 (A, B, <D)	1	2	3	4
Ht of Opposite Bank:						
Angle of Opposite Bank:						
Ht of Near Bank:						
Angle of Near Bank:						
Channel Width @ TOB:						

* TOB/VF=top of bank/vertical face; UB=upper bank; SL=slough line; DS=deposition surface; EOW=edge of water; CB=cutbank; CS/Bar=channel shelf

A3. Bank Height/Slope Measurement Notes form (BHS), page 2

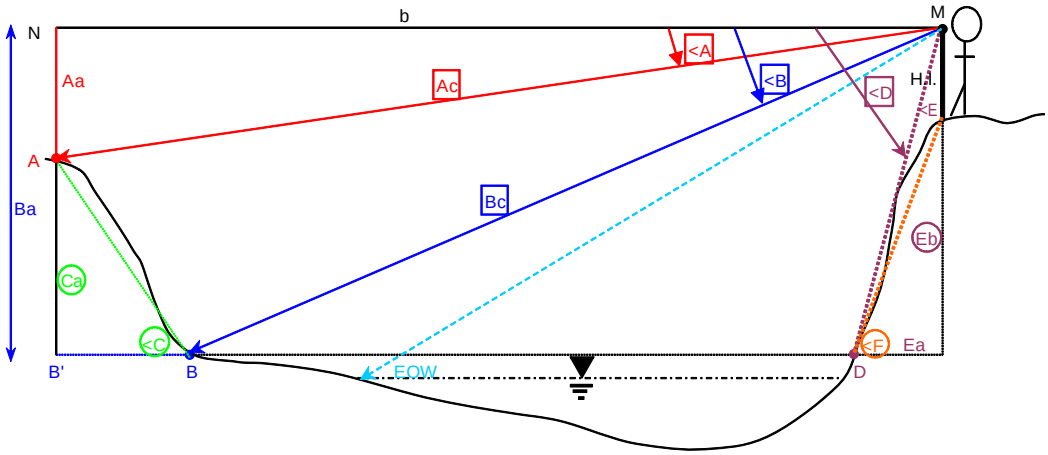


Measure:

1) Shoot points A and B with rangefinder to get lengths c and f.
2) Measure <A and <B with level to get inclination in degrees.

Height of Bank (Distance AB'): $a + d = (c * \sin<A) + (f * \sin<B)$

Average Slope of Bank (in degrees): $\tan<Z = \frac{a + d}{A - B}$



Measure:

1) Shoot points A and B with rangefinder to get lengths Ac and Bc.
2) Measure <A, <B, and <D with level to get inclination in degrees.

Height of Opposite Bank (Distance AB'=Ca):

Ba = Bc * sin<B

Aa = Ac * sin<A

Ca = Ba-Aa

Average Slope of Opposite Bank (in degrees):

<C = 90-(tan-1 [Ca / (A-B)])

Height of Near Bank (Eb):

Eb = Ba - H.I.

Average Slope of Near Bank (in degrees):

<E = 90 - <D

Ea = Ba * tan<E

<F = 90-(tan-1 [Eb/Ea])

Channel Width at TOB (b):

$$b = \sqrt{(Ac^2 - Aa^2)}$$

Drawings adapted and modified from Compton (1962).

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 1

Geomorphic Assessment Stream-Evaluation Data Sheet

Adapted from Kuhnle and Simon (2000), Rhoads (2003) and Thorne (1998) ❑ Metric ❑ English

SITE INFORMATION

STATION#:	DATE:	CREW:	EVALUATION SHEET #:
SITE NUMBER:	STREAM NAME:		MAJOR WATERSHED:
NEAREST GAGING STATION:	DRAINAGE AREA:		COUNTY:
QUAD SHEET:	COORDINATES (Lat/Long or TRS):		
WEATHER (current):		WEATHER (past 24 hours):	

GENERAL STREAMFLOW CONDITIONS

FLOW TYPE: (none, smooth, pool/riffle, run, rapid-tumbling)	*FLOW WIDTH:*	FLOW DEPTH: (@ center)
APPEARANCE OF WATER:	*AVG SURFACE VELOCITY:*	FLOW (cfs): (if available or [high, medium, low])
HIGH FLOW PLANFORM: (straight, mildly sinuous, meandering, tortuous, braided, anabranching)		SINUOSITY: (channel length/valley length)
LOW FLOW PLANFORM: (straight, mildly sinuous, meandering, tortuous, braided, anabranching)		*SINUOSITY:* (channel length/valley length)

GENERAL CHANNEL DESCRIPTION

REACH LENGTH:	TOP-BANK WIDTH: *Mid Reach:*		*U/S end:* *D/S end:*	
MAXIMUM CHANNELWIDTH (for entire reach):		and *CORRESPONDING CHANNEL DEPTH:*		
MAXIMUM CHANNEL DEPTH (for entire reach):		and CORRESPONDING CHANNEL WIDTH:		
GRADIENT:	STRUCTURES: (none, bridge, grade control, culverts, bank)		*%DETRITUS:*	*% LWD:*
% POOL:	*% RIFFLE:*	% RUN:	CROSS SECTION TAKEN (yes / no)?	
[If applicable] (Pool + Riffle + Run = 100%)			Location of Record:	
BED WIDTH: Method:		BERM WIDTH: Method:	*CEM:*	
(Method: T=tape; R=rangefinder (type); A=acoustic device; P=pace)			(I, II, III, IV, V, VI)	

BANKFULL INDICATORS (circle any): none-incised / active floodplain / berm / woody veg / bar tops

% RELATIVE ELEVATION AT BANKFULL:	*% RELATIVE ELEVATION AT LOW WATER:*
(Assume top height = 100%, N/A if appropriate)	
WIDTH OF RIPARIAN ZONE (Top of Left Bank):	*WIDTH OF RIPARIAN ZONE (Top of Right Bank):*

FLOODPLAIN LANDUSE (urban, forest, pasture, row crop/riparian buffer-width):

Left:_____/_____/_____ Right: _____/_____/_____

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 2

CHANNEL BED DESCRIPTION

BED MORPHOLOGY: (flat, uniform; scour holes; pool-riffle sequence)		*BED CONTROLS:* (none; bedrock; cohesive materials; armoured; structure; rip-rap)	
PRIMARY BED-MATERIAL TYPE:		*SECONDARY BED-MATERIAL TYPE:*	
(GP=gravel; SP=sand; ML=silt; CL=clay; BR=bedrock)			
POOL SUBSTRATE: (GP with firm SP; Soft SP with ML-CL; All ML-CL; All SP; Hard Pan CL; Rock)		*ACTIVE BED DEPOSITION (Type and % area) :* (GP-SP, SP, ML, CL)	
BED EXPOSED: (% Area out of water)	EXPOSED BED FORMS: (attached point bar, mid channel, alternate)		COHESION (kg/cm^2): (shear testing device; 14.2258)
KNICKPOINT PRESENT? (Yes / No)	HEIGHT:	MATERIAL: (GP, SP, ML, CL, BR)	

Planform Sketch:

Map Symbols

Study Reach Limits	u/s limit d/s limit	North Point	N	Cut Bank		Photo Point	P1
Cross-section	A—A′	Flow Direction		Exposed Island/Bar		Sediment Sampling Point	SS
Bank Profile	BS	Impinging Flow		Structure		Significant Vegetation	

SEDIMENT SAMPLES:	CH_____	CH_____	CH_____	CH_____

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 3

LEFT BANK DESCRIPTION

REACH TYPE: (I=inside; O=outside; S=straight	BANK HEIGHT: (average or range)	*BANK ANGLE (degrees):* (average; degrees from horizontal)
% WOODY COVER:	*% HERBACEOUS COVER:*	% OTHER:

DENDROGEOMORPHIC INDICATORS [corrasion scars/tilt sprouts/tree age/tree ring anomalies] (circle):

BANK SURFACES (yes, no):

VF_____ UB_____ SL_____ *DS*_____ CB_____ *CS/Bar*_____

(VF=vertical face; UB=upper bank; SL=slough line; DS=depositional surface; CB=cutbank; CS/Bar=channel shelf)

HEIGHT OF CB:	HEIGHT OF VF:	DIST. OF TENSION CRACK FROM VF:	SHEAR STRENGTH (kg/cm^2): (shear testing device; 14.2258)

SURFICIAL MATERIAL (Origin / Type):

VF____/____ UB____/____ SL____/____ DS____/____ CB____/____ CS/Bar___/___

(I=insitu [M=modern; PM=pre-modern], D=deposited, F=failed) / (CL=clay, ML=silt, SP=sand, GP=gravel, BR=bedrock)

TYPE OF ACCRETED SEDIMENT: (**N=none,** CL=clay, ML=silt, SP=sand, GP=gravel)	*% BANK WITH FLUVIAL DEPOSITION:*	*% BANK FAILING:*

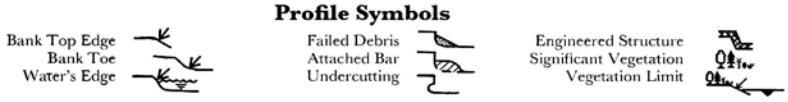
DOMINANT TYPE OF EROSION PROCESS ON:

VF_____ UB_____ SL_____ DS_____ CB_____ CS/Bar_____

(N=none-stable, MW=mass wasting, F=fluvial erosion, S=sapping, D=deposition)

Bank Sketch:

Profile Symbols



SEDIMENT SAMPLES:	LB_____	LB_____	LB_____	LB_____

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 4

RIGHT BANK DESCRIPTION

REACH TYPE: (I=inside; O=outside; S=straight	BANK HEIGHT: (average or range)	*BANK ANGLE (degrees):* (average; degrees from horizontal)
% WOODY COVER:	*% HERBACEOUS COVER:*	% OTHER:

DENDROGEOMORPHIC INDICATORS [corrasion scars/tilt sprouts/tree age/tree ring anomalies] (circle):

BANK SURFACES (yes, no):

VF_____ UB_____ SL_____ *DS*_____ CB_____ *CS/Bar* _____

(VF=vertical face; UB=upper bank; SL=slough line; DS=depositional surface; CB=cutbank; CS/Bar=channel shelf)

HEIGHT OF CB:	HEIGHT OF VF:	DIST. OF TENSION CRACK FROM VF:	SHEAR STRENGTH (kg/cm^2): (shear testing device; 14.2258)

SURFICIAL MATERIAL (Origin / Type) :

VF_____/_____ UB_____/_____ SL_____/_____ DS_____/_____ CB_____/_____ CS/Bar___/____

(I=insitu [M=modern; PM=pre-modern], D=deposited, F=failed) / (CL=clay, ML=silt, SP=sand, GP=gravel, BR=bedrock)

TYPE OF ACCRETED SEDIMENT: (**N=none,** CL=clay, ML=silt, SP=sand, GP=gravel)	*% BANK WITH FLUVIAL DEPOSITION:*	*% BANK FAILING:*

DOMINANT TYPE OF EROSION PROCESS ON:

VF_____ UB_____ SL_____ DS_____ CB_____ CS/Bar_____

(N=none-stable, MW=mass wasting, F=fluvial erosion, S=sapping, D=deposition)

Bank Sketch:

Profile Symbols

Bank Top Edge
Bank Toe
Water's Edge

Failed Debris
Attached Bar
Undercutting

Engineered Structure
Significant Vegetation
Vegetation Limit

SEDIMENT SAMPLES:	RB_____	RB_____	RB_____	RB_____

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 5

PHOTOGRAPHIC RECORD

DATE:	CAMERA TYPE:	PHOTOGRAPHER:
PHOTO CHECKLIST:		
STATION #:	❑ U/S ❑ Mid-reach ❑ D/S ❑ Channel Bed ❑ Left Bank ❑ Right Bank ❑ Structures ❑ LB Riparian ❑ RB Riparian	*Remember: add a recognizable scale in all pictures; record photo number; and time of day (shadows)*
PHOTO #	DESCRIPTION	

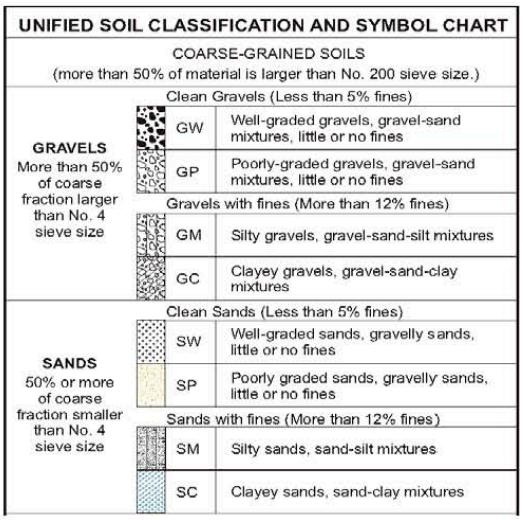
MISCELLANEOUS OBSERVATIONS

A4. Geomorphic Assessment Stream-Evaluation Data Sheet, page 6

FIELD CHECKLIST

- ❑ Binoculars
- ❑ Bottled water
- ❑ Calculator
- ❑ Camera (preferrably digital)
- ❑ Cell phone
- ❑ Clipboard (field sheets)
- ❑ Compass (Silva/Brunton)
- ❑ Field backpack
- ❑ Field book
- ❑ Field Sheets
- ❑ First-aid kit (small)
- ❑ Geologic hammer
- ❑ Grain size chart
- ❑ Gravelometer
- ❑ Handheld GPS
- ❑ Increment borer
- ❑ Insect repellent
- ❑ Laser rangefinder / Hypsometer
- ❑ Level (Abney level/clinometer)
- ❑ Map: Air Photos
- ❑ Map: Bedrock
- ❑ Map: Plat (landowner info)
- ❑ Map: Road atlas
- ❑ Map: Surficial materials
- ❑ Map: Topographic
- ❑ Measuring tape/stakes/pins
- ❑ Pocket Rod/Surveying Rod/Range Pole/Staff
- ❑ Probe rod (tile probe, etc.)
- ❑ Raingear
- ❑ Soil Probe (bank sampling)
- ❑ Trenching tool/plastic bags/permanent marker
- ❑ Wading boots
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____
- ❑ _____

Material Size Classification:

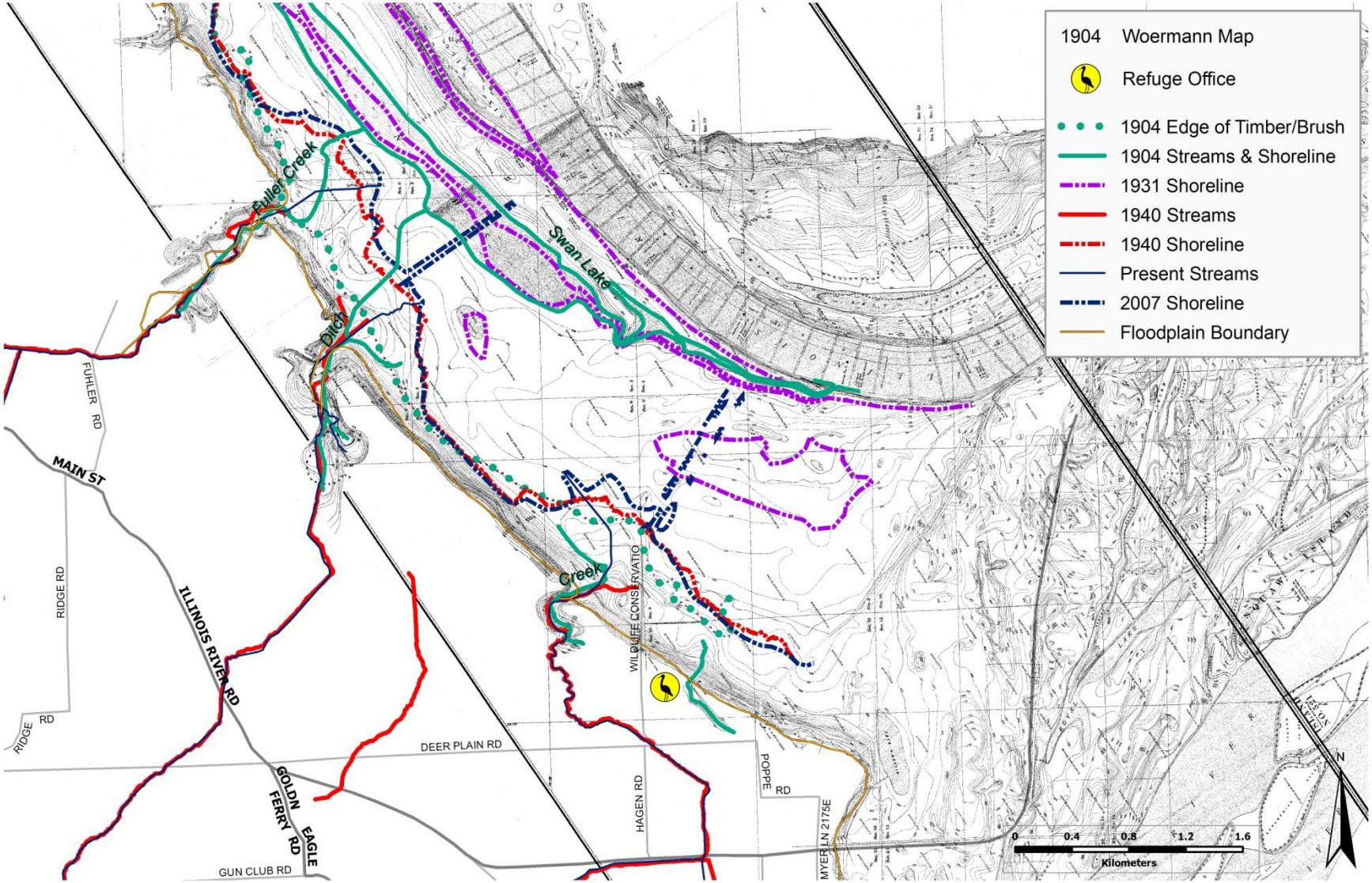


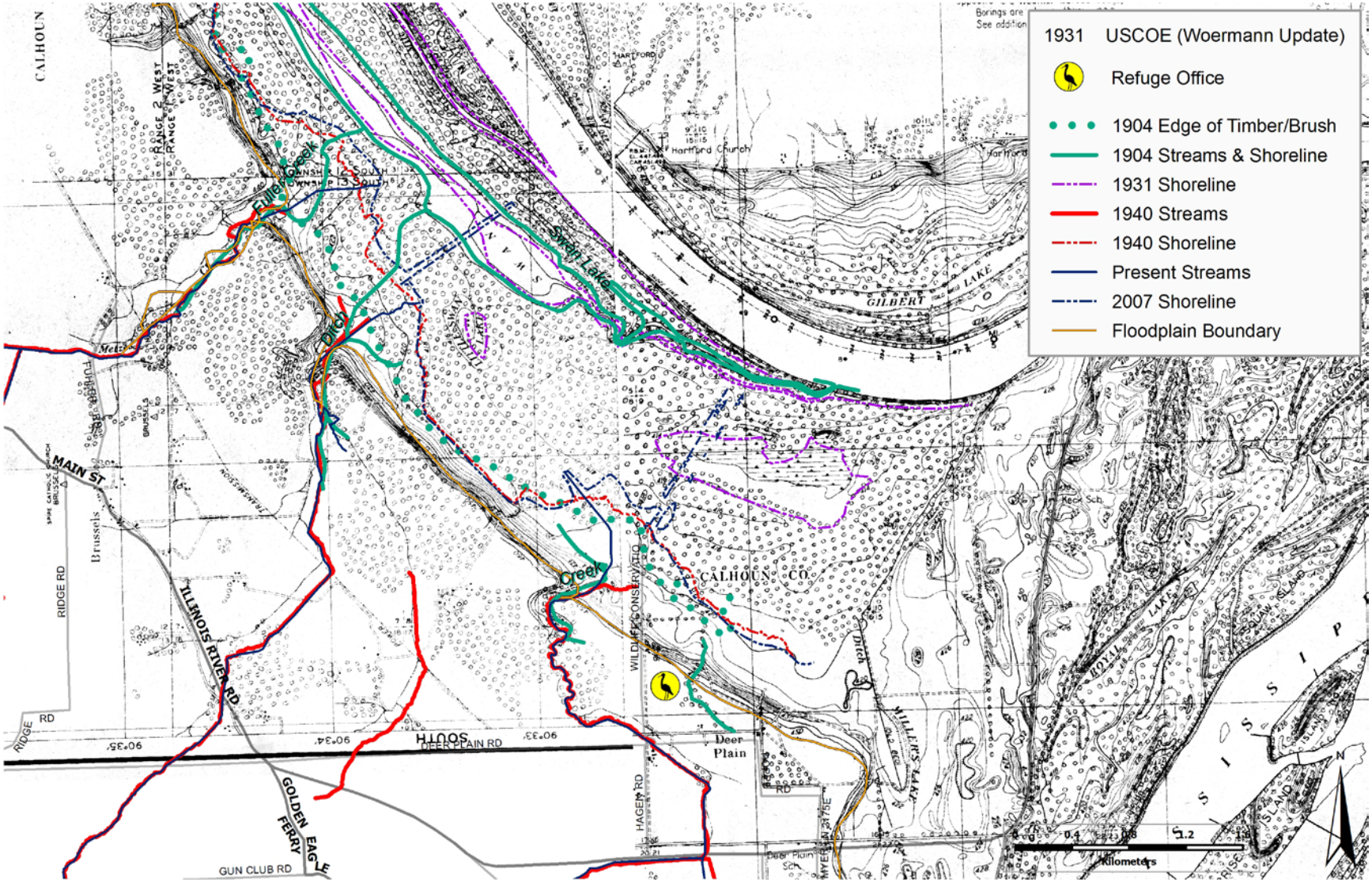
UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART			
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures

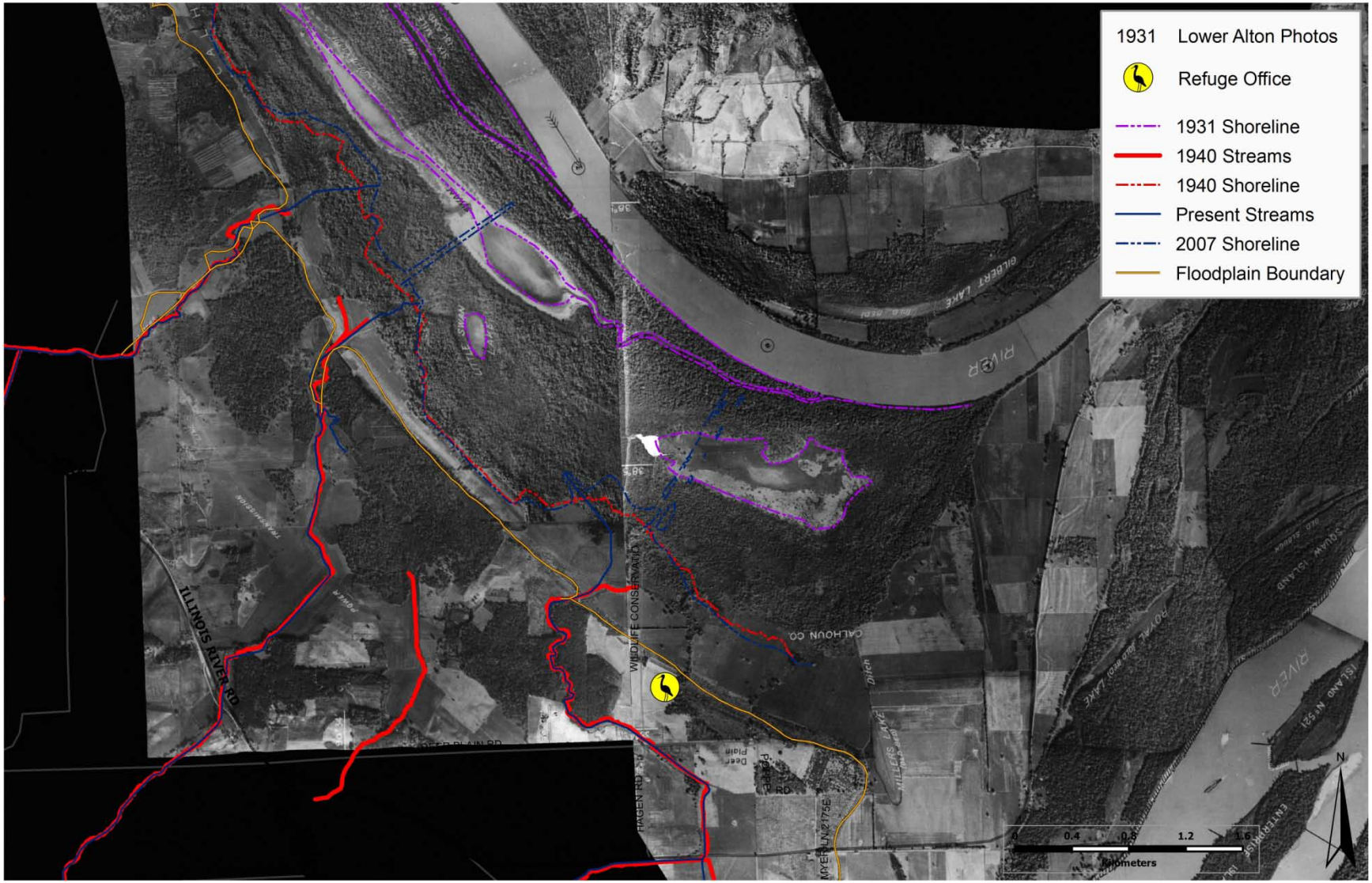
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

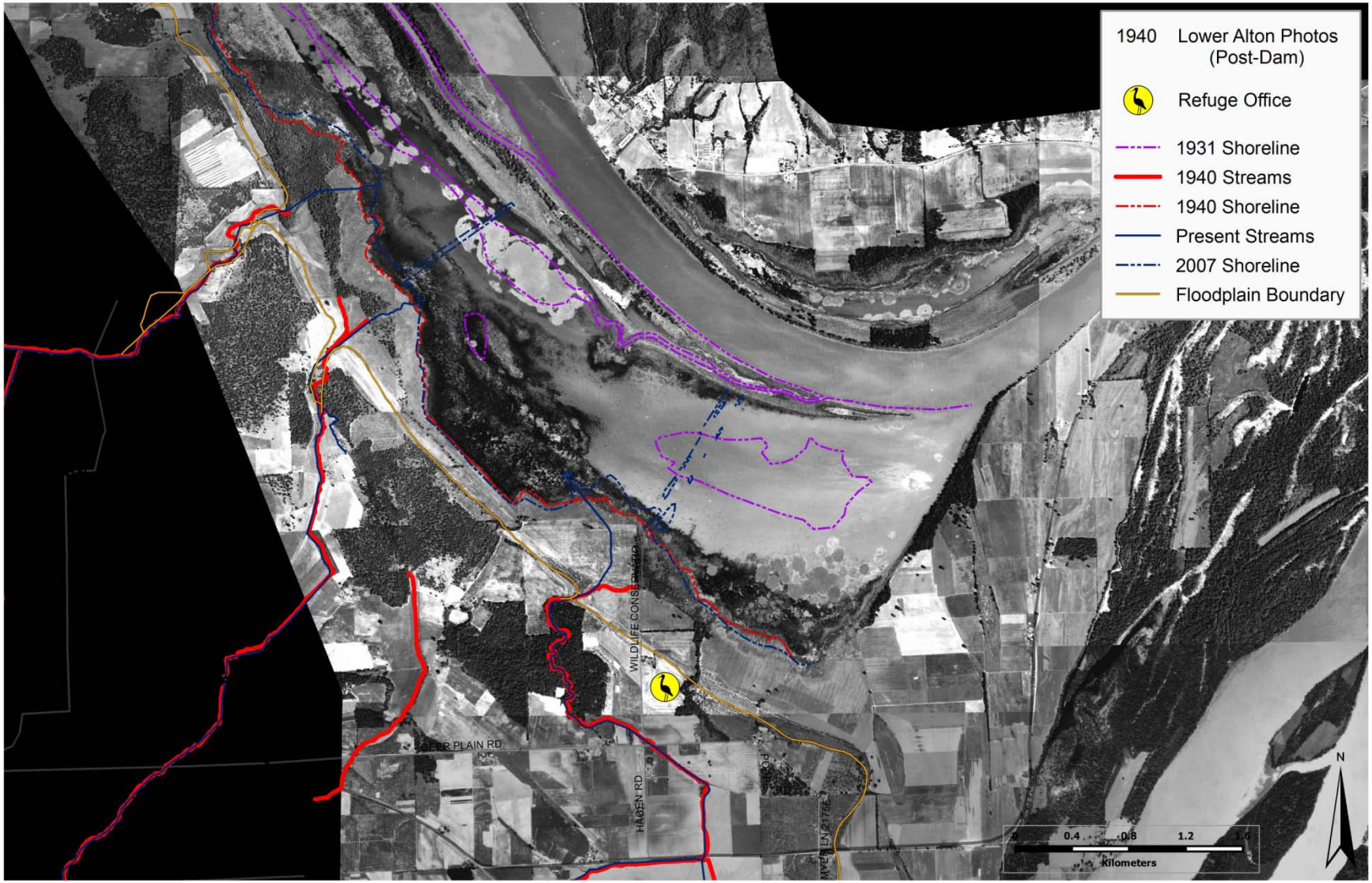
Appendix B:
Historical Aerial Imagery of Swan Lake

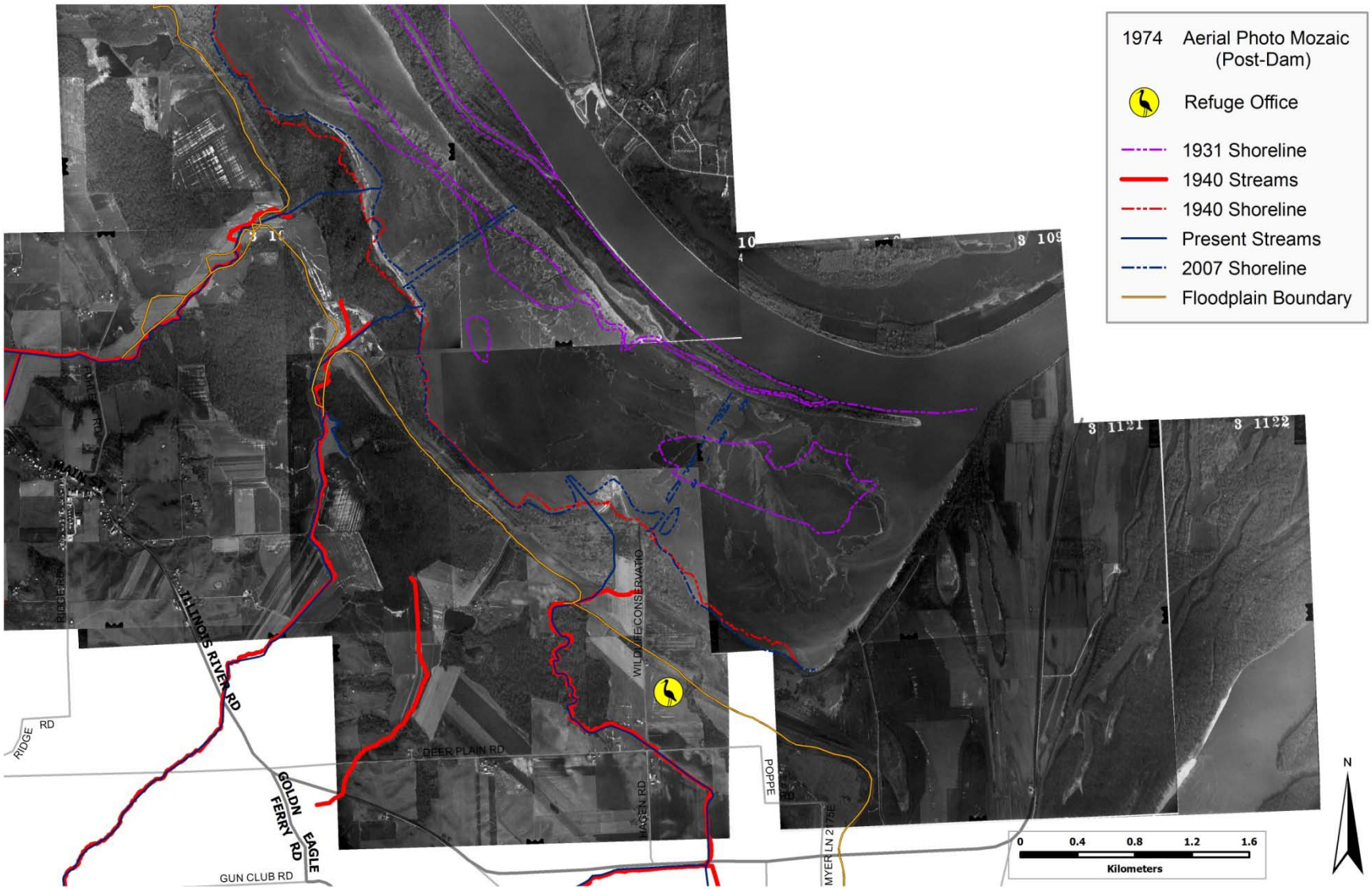
Year (Date)	Source Agency/Program	Type Media
1902-1904	Woermann - USCOE	Drawn maps
1931 (Oct. 25)	USCOE (Woermann update)	Drawn maps (updated with 1931 aerial photography)
1931 (Oct. 25)	Upper Midwest Environmental Science Center, Wisconsin; Lower Alton Pool	Aerial photography
1940 (Jun. 19)	Upper Midwest Environmental Science Center, Wisconsin; Lower Alton Pool	Aerial Photography
1974 (Dec. 9)	Aerial Photo Mozaic	Aerial Photography
1999 (Mar. 25)	USGS	Digital Ortho Quads
2004, 2005, 2006, 2007, and 2009 (Agricultural growing season)	USDA – National Agricultural Imagery Program (NAIP)	Digital Ortho Quarter Quads

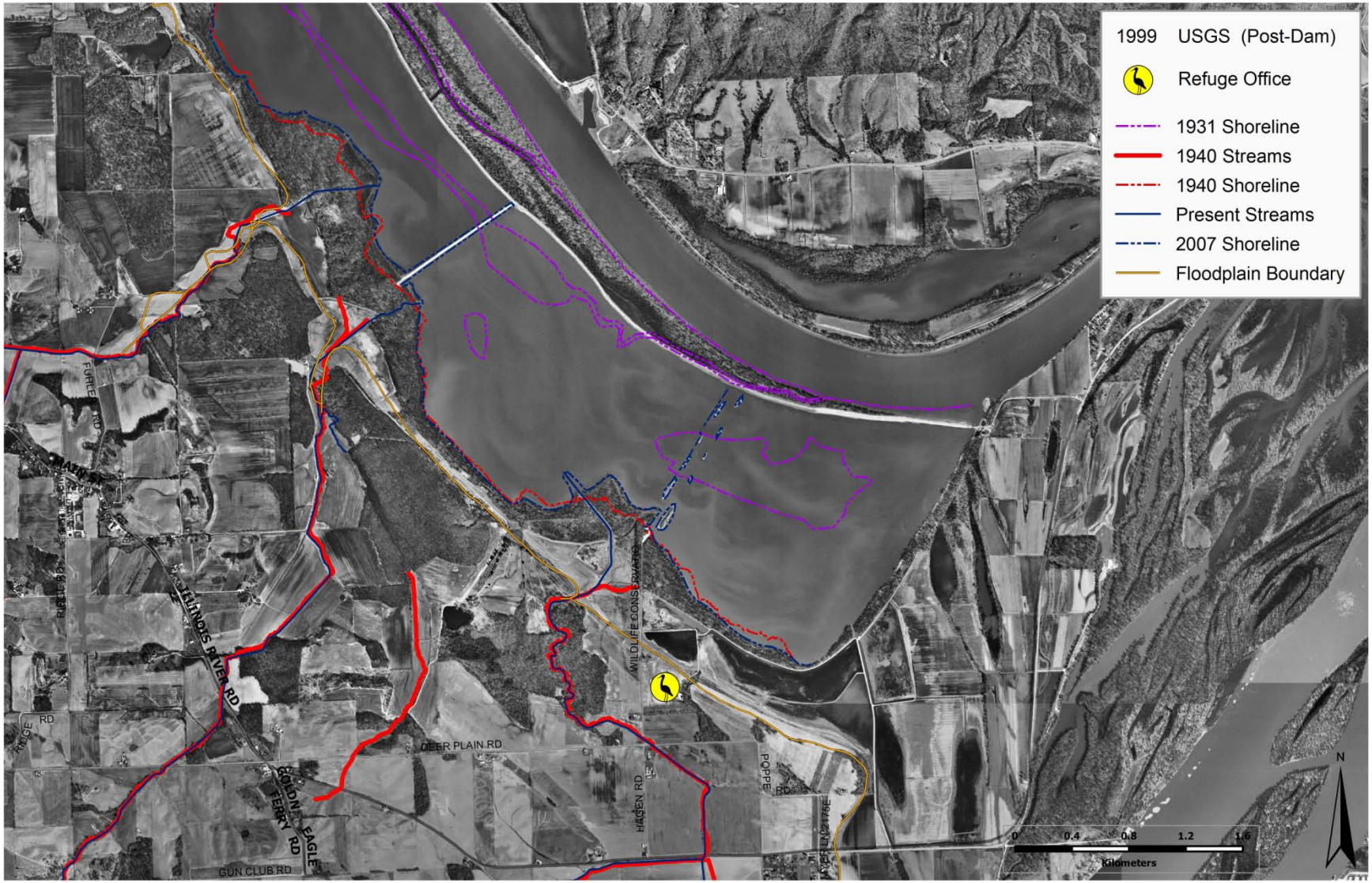

1904 Woermann Map
Refuge Office
1904 Edge of Timber/Brush
1904 Streams & Shoreline
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
Fuller Creek
Swan Lake
Ditch
Creek
FUHLER RD
MAIN ST
RIDGE RD
RIDGE RD
ILLINOIS RIVER RD
DEER PLAIN RD
GOLDN FERRY RD
EAGLE
GUN CLUB RD
HAGEN RD
POPPE RD
MYER LN 2175E
WILDLIFE CONSERVATIO
0 0.4 0.8 1.2 1.6
Kilometers
N

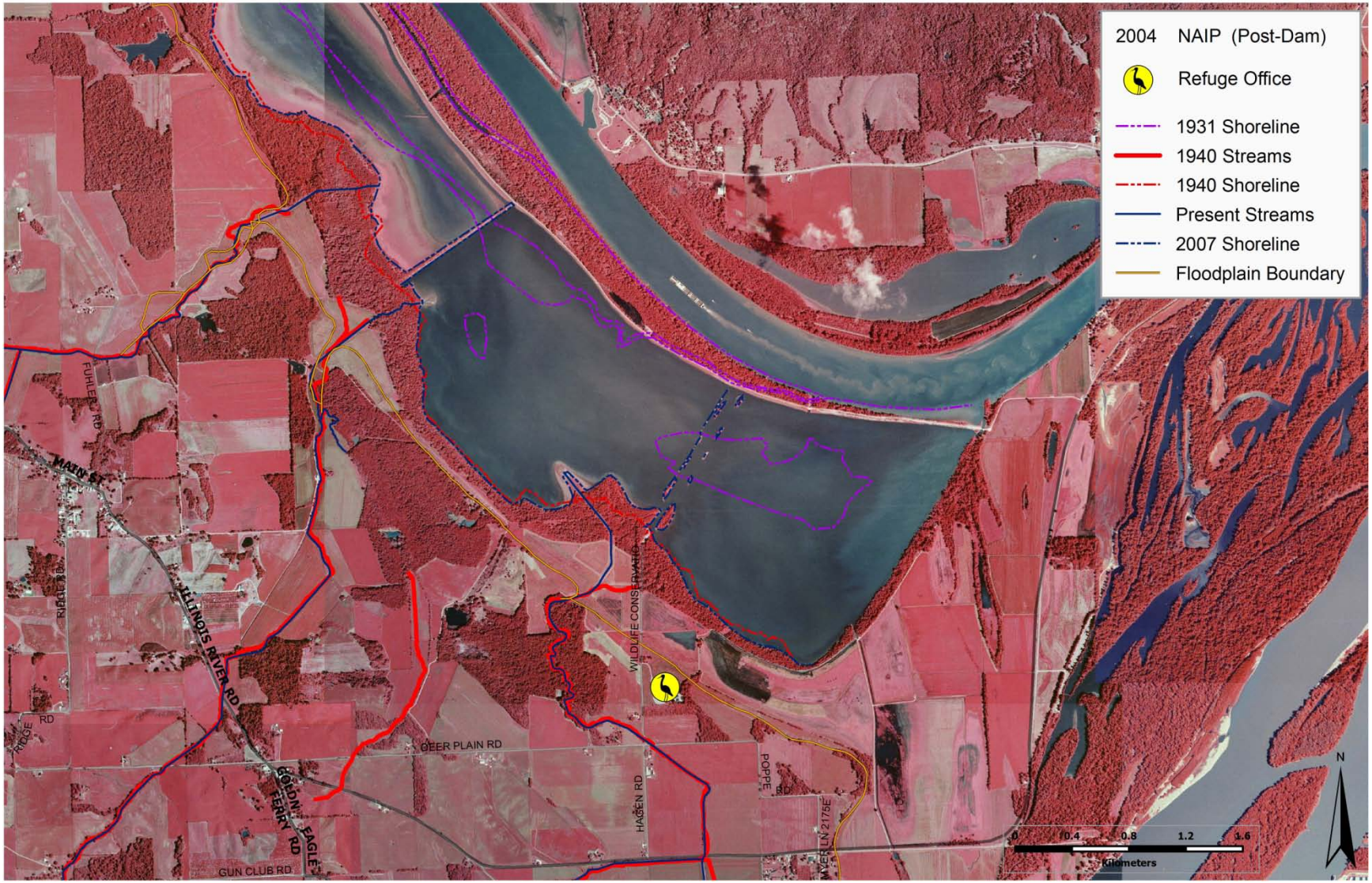

1931 USCOE (Woermann Update)
Refuge Office
1904 Edge of Timber/Brush
1904 Streams & Shoreline
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
CALHOUN
Sweet Lake
Ditch
Creek
MAIN ST
Brussels
RIDGE RD
ILLINOIS RIVER RD
DEER PLAIN RD
SOUTH
GOLDEN EAGLE FERRY
GUN CLUB RD
HAGEN RD
Deer Plain
CALHOUN CO.
GILBERT LAKE
Hartford Church
Kilometers

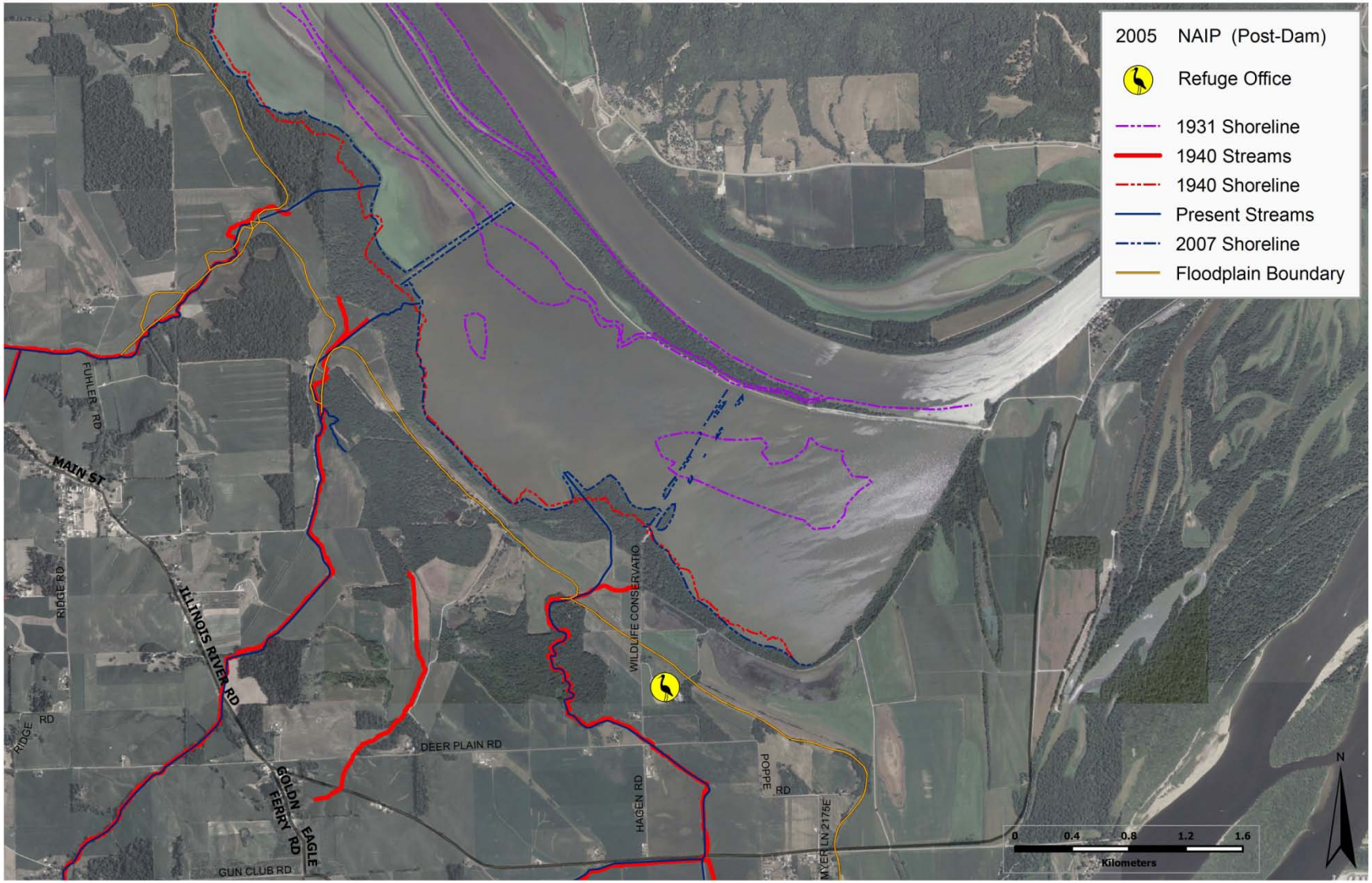

1931 Lower Alton Photos
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
ILLINOIS RIVER RD
WILDLIFE CONSERVATION
CALHOUN CO
RIVER
N
0 0.4 0.8 1.2 1.6
Kilometers

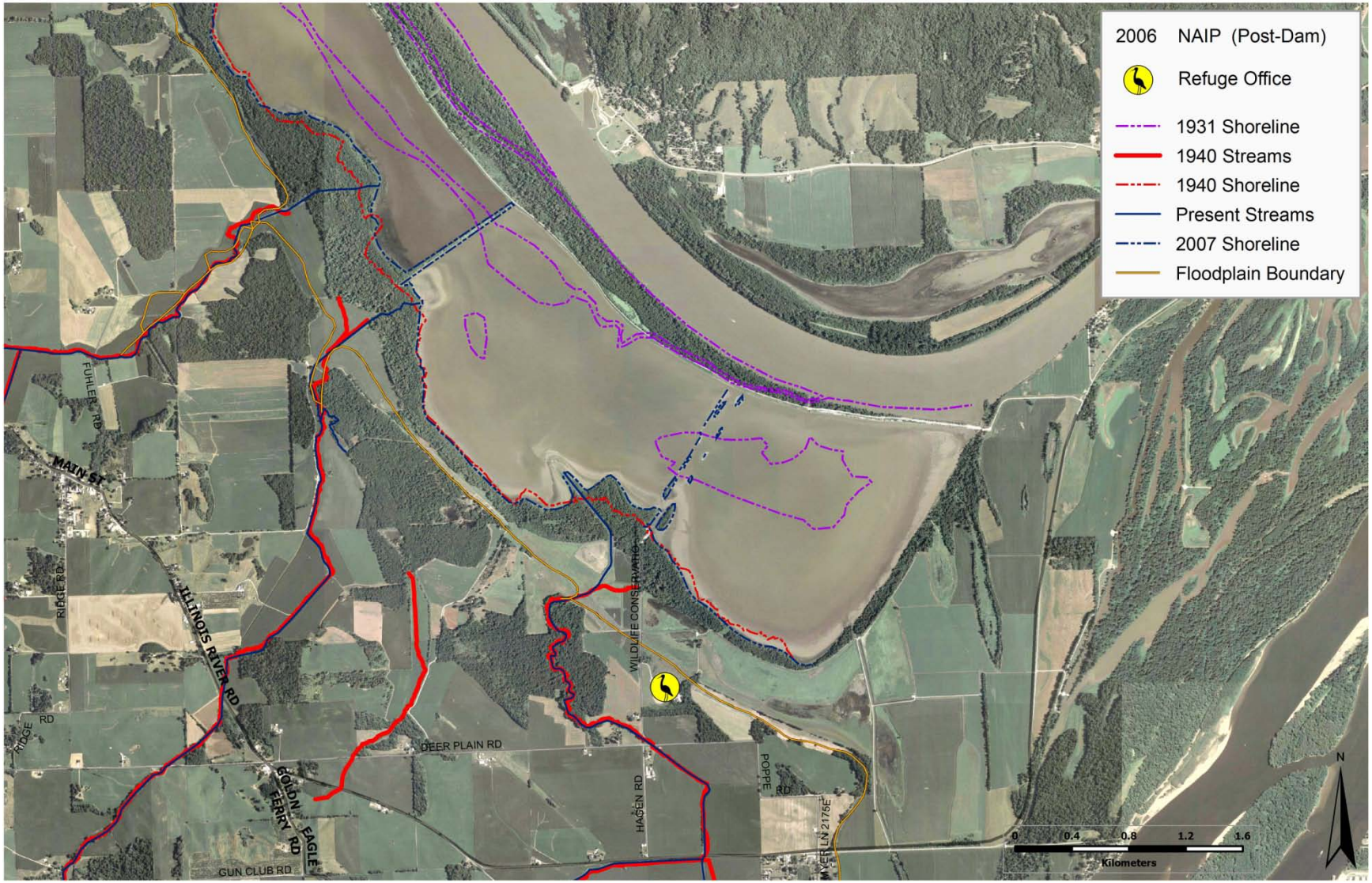

1940 Lower Alton Photos
(Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
WILDLIFE CONSERVATION
HAGEN RD
0.4
0.8
1.2
1.6
Kilometers
N

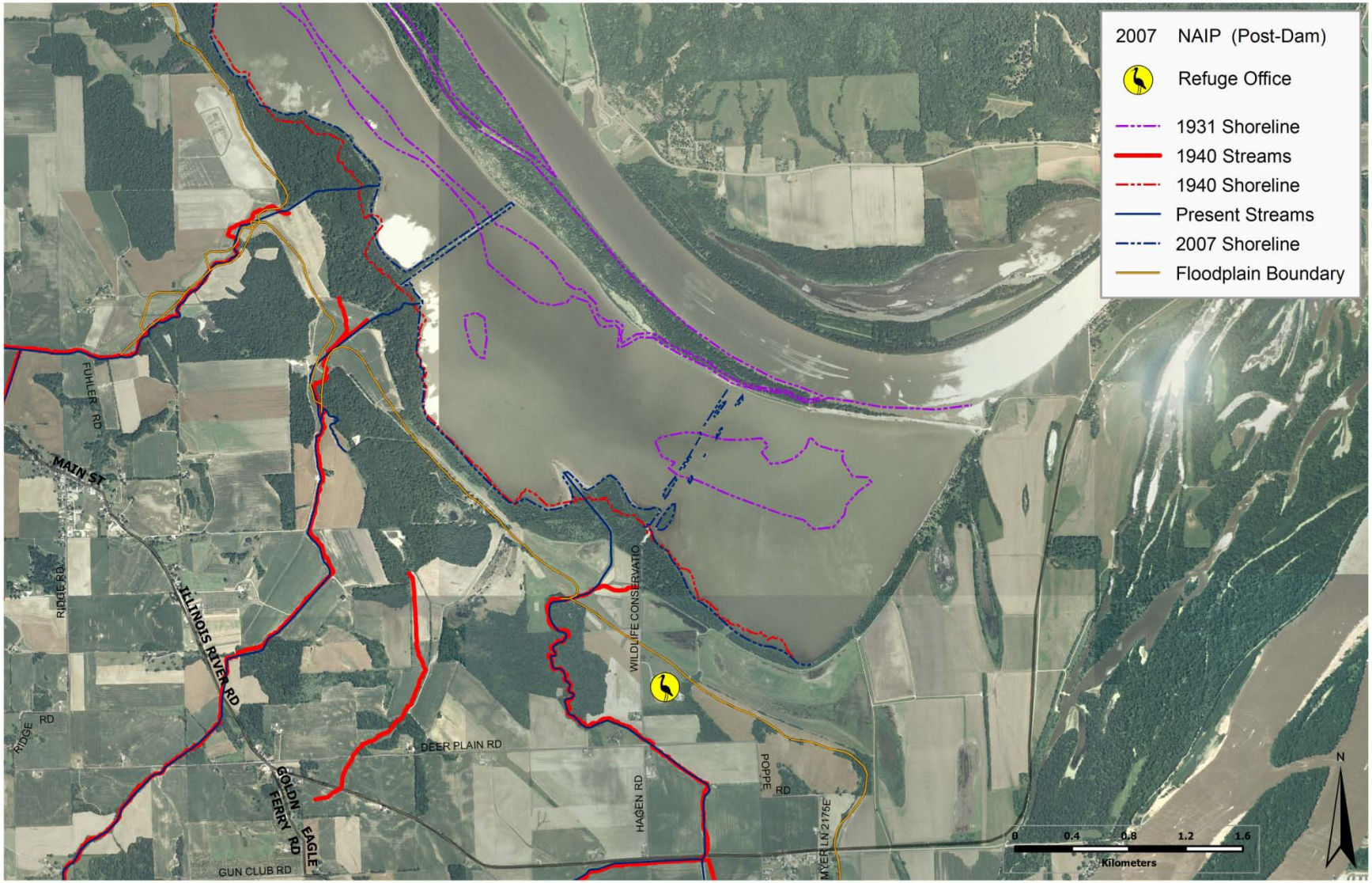

1974 Aerial Photo Mozaic (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
ILLINOIS RIVER RD
GOLDN EAGLE FERRY RD
GUN CLUB RD
RIDGE RD
DEER PLAIN RD
HAGEN RD
POPPE RD
MYER LN
0 0.4 0.8 1.2 1.6
Kilometers
N

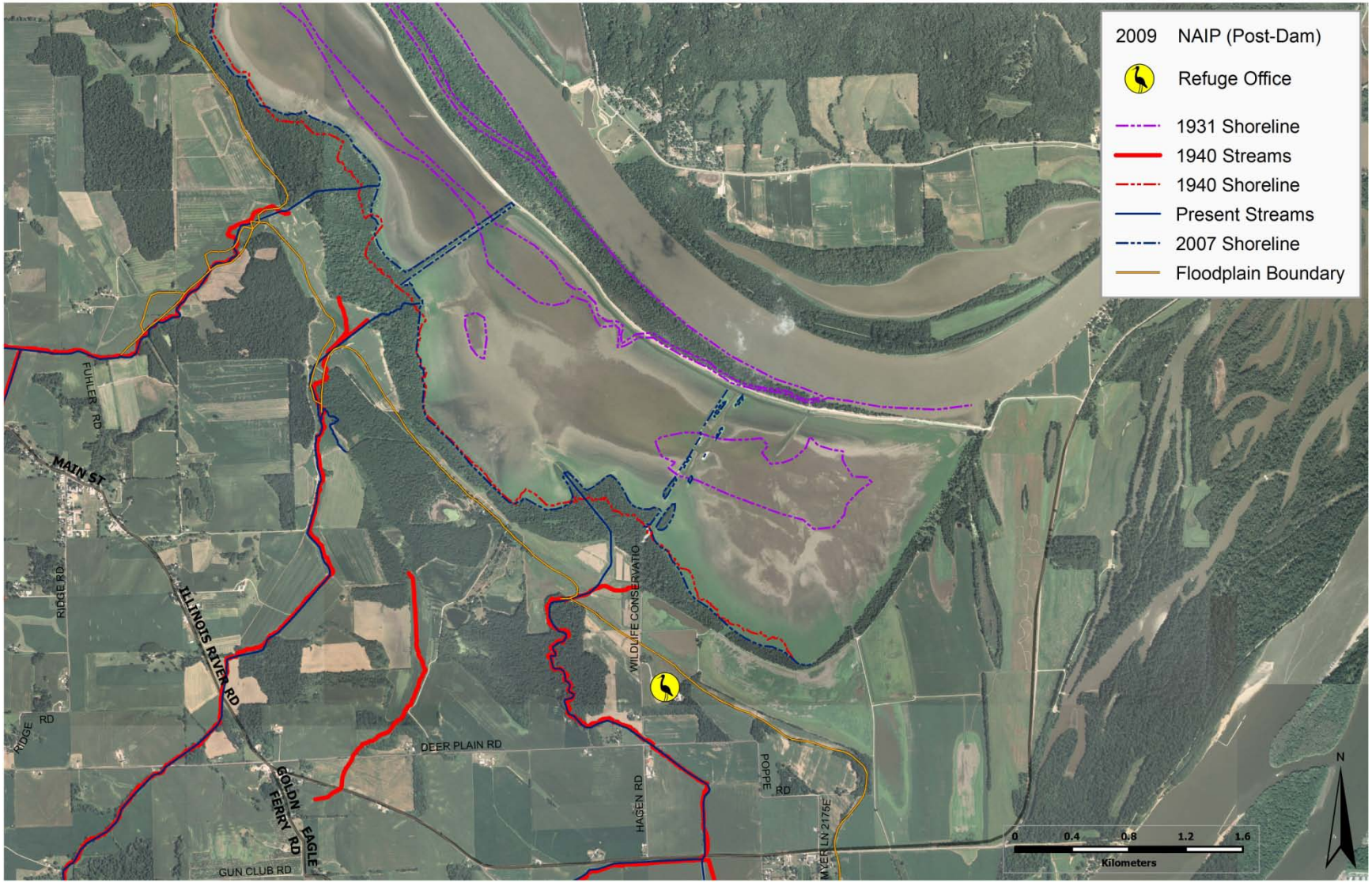

1999 USGS (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
ILLINOIS RIVER RD
DEER PLAIN RD
GOLDEN EAGLE FERRY RD
GUN CLUB RD
HAGEN RD
POPPE RD
WILDLIFE DOWNS DRIVE
FUHLER RD
MAIN ST
RIDGE RD
0 0.4 0.8 1.2 1.6
Kilometers
N


2004 NAIP (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
FUHLER RD
MAIN ST
RIDGE RD
ILLINOIS RIVER RD
BEER PLAIN RD
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN 2175E
GORDON FERRY RD
EAGLE
GUN CLUB RD
0 0.4 0.8 1.2 1.6
Kilometers
N


2005 NAIP (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
FUHLER RD
MAIN ST
RIDGE RD
ILLINOIS RIVER RD
WILDLIFE CONSERVATIO
RIDGE RD
DEER PLAIN RD
GOLDN EAGLE FERRY RD
HAGEN RD
POPPE RD
MYER LN 2178E
GUN CLUB RD
0 0.4 0.8 1.2 1.6
Kilometers
N


2006 NAIP (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
FUHLER RD
MAIN ST
RIDGE RD
ILLINOIS RIVER RD
WILDLIFE CONSERVATIO
DEER PLAIN RD
HAGEN RD
POPPE RD
GOLDEN EAGLE FERRY RD
GUN CLUB RD
N
0 0.4 0.8 1.2 1.6
Kilometers


2007 NAIP (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
FUHLER RD
MAIN ST
RIDGE RD
ILLINOIS RIVER RD
RIDGE RD
WILDLIFE CONSERVATIO
DEER PLAIN RD
GOLDN FERRY RD
EAGLE
GUN CLUB RD
HAGEN RD
POPPE RD
MYER LN 2176E
0 0.4 0.8 1.2 1.6
Kilometers
N


2009 NAIP (Post-Dam)
Refuge Office
1931 Shoreline
1940 Streams
1940 Shoreline
Present Streams
2007 Shoreline
Floodplain Boundary
FUHLER RD
MAIN ST
RIDGE RD
ILLINOIS RIVER RD
RIDGE RD
WILDLIFE CONSERVATIO
DEER PLAIN RD
GOLDN EAGLE FERRY RD
GUN CLUB RD
HAGEN RD
POPPE RD
MYER LN 2176E
0 0.4 0.8 1.2 1.6
Kilometers
N

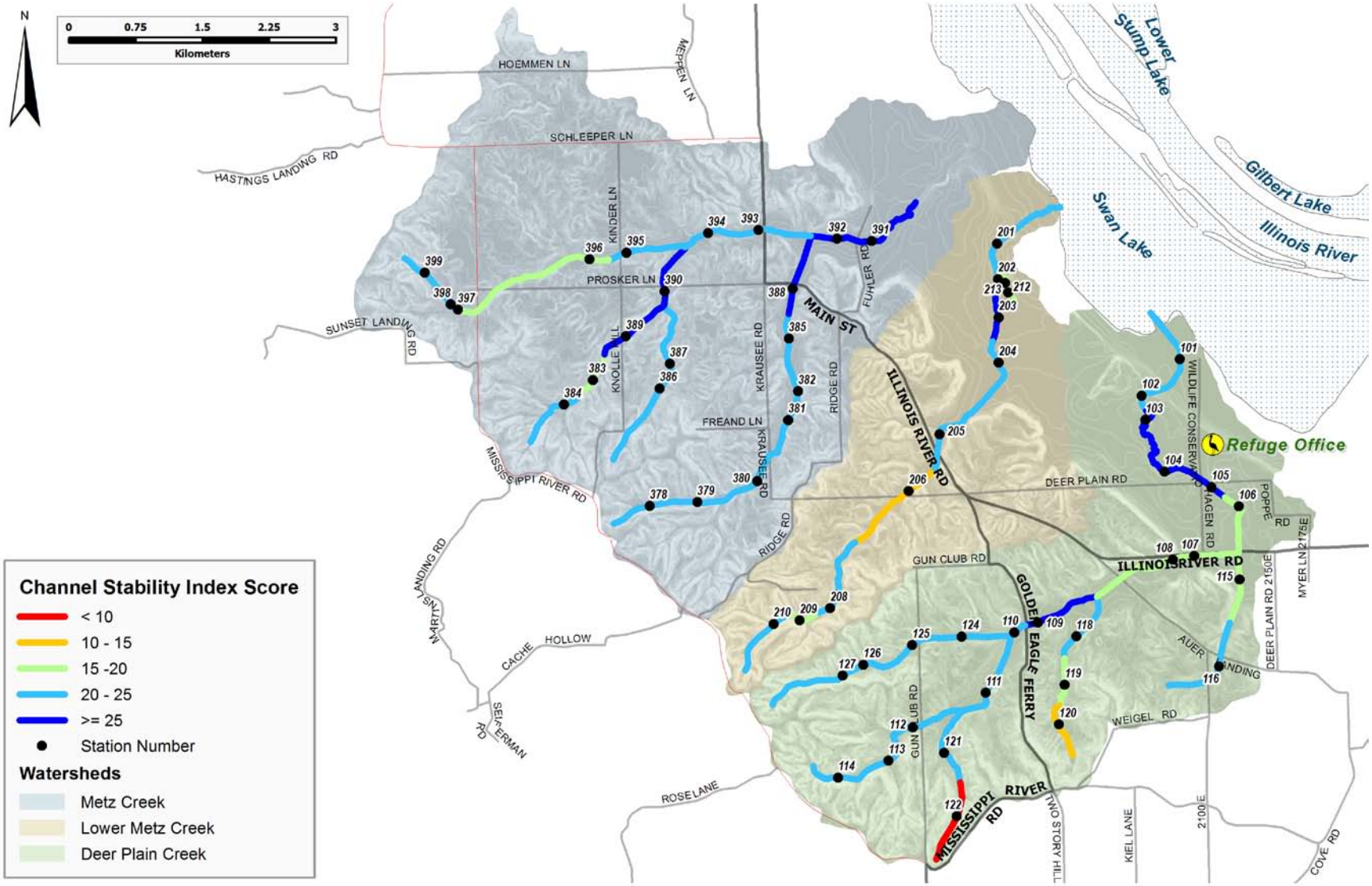
Appendix C:
Channel-Stability Ranking Scheme
Tables and Maps

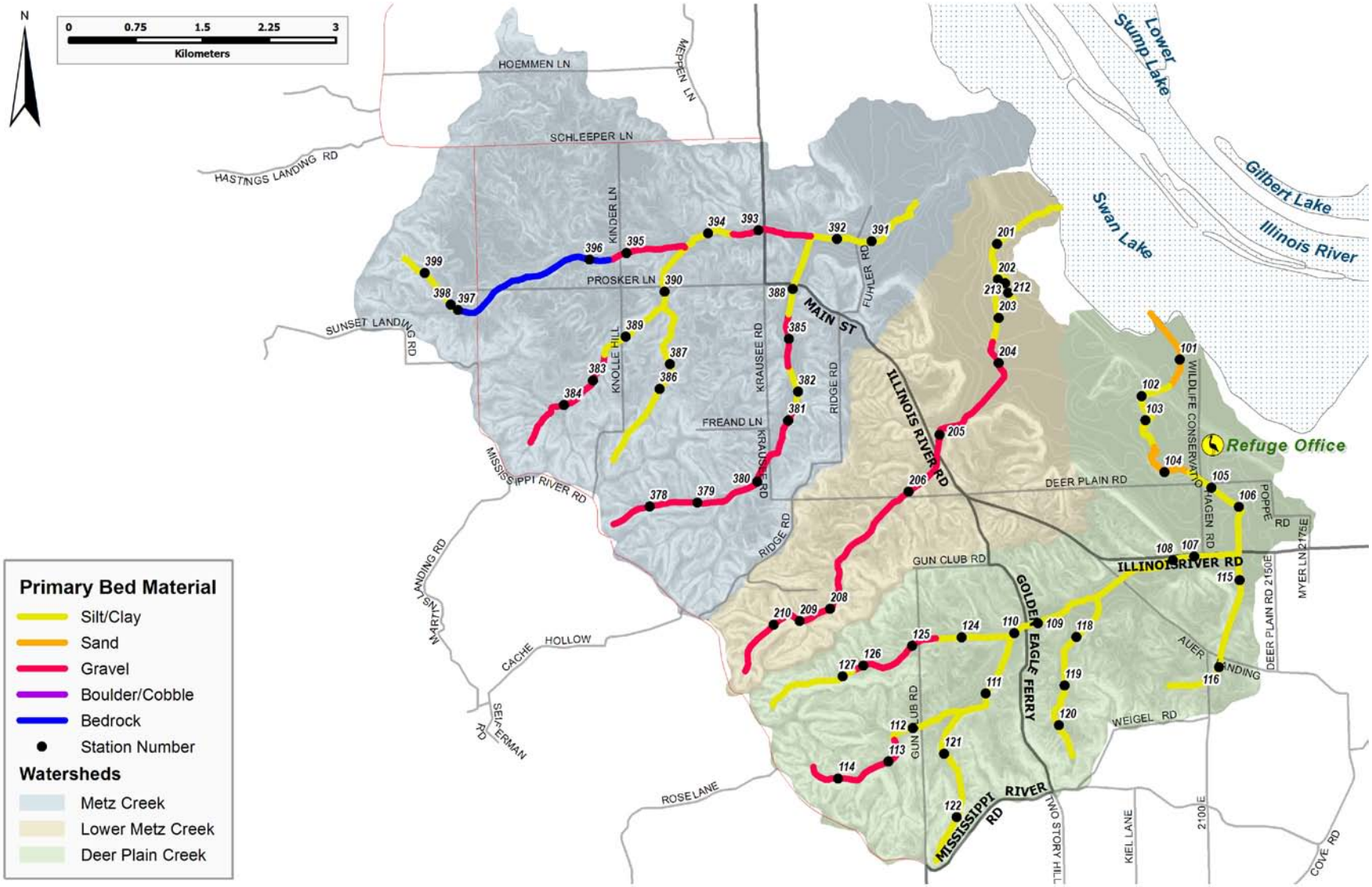
Channel-Stability Ranking Scheme (by station number)

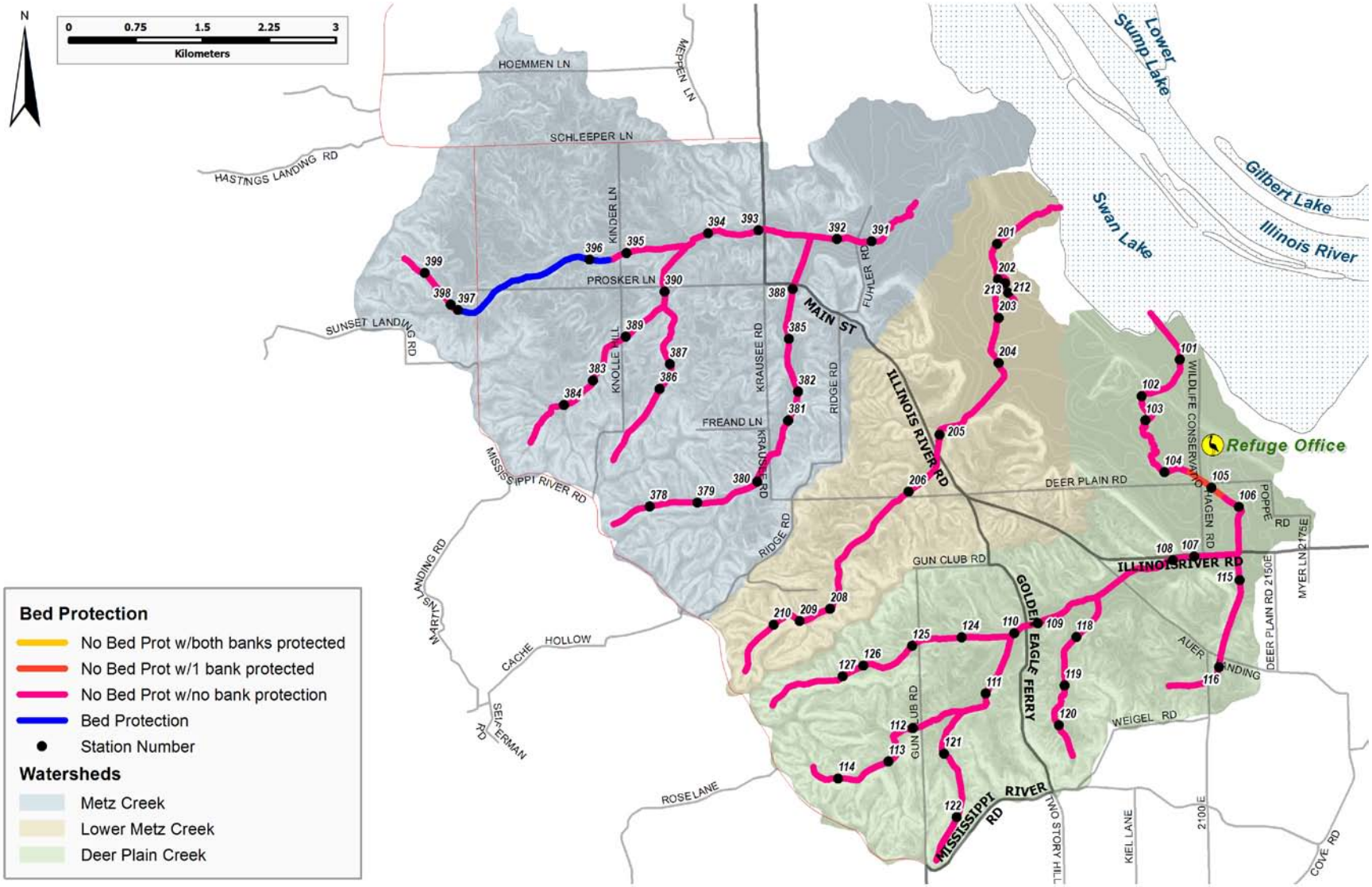
Station	Primary Bed Material	Bed Protection	Floodplain Separation	Degree of Constriction	Type of Bank Erosion LEFT	Type of Bank Erosion RIGHT	Percent Bank Instability (Active) LEFT	Percent Bank Instability (Active) RIGHT	Percent Established Woody Cover LEFT	Percent Established Woody Cover RIGHT	Percent Bank/Bar Accretion LEFT	Percent Bank/Bar Accretion RIGHT	CEM Stage	Channel-Stability Index (CSI)
101	3	1	2	0	2	2	2	2	2	2	2	1	IV	25
102	3.25	1	1	0	1	2	2	2	1.5	1.5	2	1.5	IV-V	22.25
103	4	1	3	0	2	2	2	2	2	2	2	2	IV	28
104	2.5	1	4	0	2	2	2	2	2	2	1.5	1.5	IV	26.5
105	4	2	3	0	1	1	2	2	1.5	1.5	2	2	IV	26
106	4	1	3	0	0	1	0	0	2	2	2	2	III	19
107	4	1	3	0	1	1	0	0	2	2	2	2	III	20
108	4	1	3	0	0	1	0	0	2	2	2	2	III	19
109	4	1	4	0	1	1	2	2	2	2	2	2	IV	27
110	4	1	3	0	1	1	0	0	2	2	2	2	IV	22
111	4	1	4	0	2	2	1	1	1	1	0.5	0.5	V	21
112	4	1	4	0	2	2	1	1	2	2	1	1	V	24
113	2	1	4	0	0	2	0	1	1.5	2	2	2	V	20.5
114	2	1	2	0	2	2	1	1	2	2	2	2	IV	23
115	4	1	2	0	1	1	0	0	2	2	2	2	II-III	18.5
116	4	1	4	0	1	1	0	0.5	2	2	2	2	II-III	21
118	4	1	3	0	1	1	1	1.5	2	2	2	2	I	21.5
119	4	1	3	0	1	1	0.5	0.5	1	1	2	2	I	17
120	4	1	3	0	1	1	1	1	0	0	1.5	1.5	I	15
121	4	1	3	0	2	1	2	1	2	0.5	2	2	III	22.5
122	4	1	0	0	0	0	0	0	0	0	0	0	I	5
124	4	1	4	0	2	2	0.5	1.5	1	0.5	2	1	V	22.5
125	2	1	4	0	2	2	1	1	1	1	2	2	IV	23
126	2	1	3	0	2	2	2	1.5	2	1.5	2	2	IV	25
127	4	1	3	0	1	1	1.5	1.5	2	2	2	2	III	23
201	4	1	3	1	1	1	2	2	2	2	2	2	I	24
202	4	1	4	0	1	1	2	2	1.5	2	2	2	IV	26.5
203	4	1	3	0	1	1	2	2	2	2	2	2	IV	26
204	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
205	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
206	2	1	4	0	1	1	0.5	0.5	1	0.5	1	1	II-III	15
208	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
209	2	1	3	0	1	1	0	0	2	0	2	2	III	16
210	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
212	4	1	3	0	1	1	0	0	1.5	2	2	2	II-III	19
213	4	1	3	0	1	1	0	0	2	2	2	2	II-III	19.5
378	2	1	4	0	1	1	2	2	2	1.5	1.5	2	V	23
379	2	1	4	0	1	1	2	2	0.5	2	1	1.5	V	21
380	2	1	4	0	1	1	2	2	1.5	2	1.5	2	V	23
381	2	1	4	0	2	2	1	0.5	2	1	1.5	1.5	V	21.5
382	4	1	4	0	2	2	1	1	2	2	1	1	V	24
383	2	1	4	0	1	1	2	2	1.5	1.5	1	1.5	II-III	20
384	2	1	4	0	2	1	2	2	1	0.5	1.5	1.5	V	21.5
385	2	1	4	0	2	2	2	1.5	2	1.5	1.5	1.5	V	24
386	4	1	4	0	1	1	1.5	1	0.5	1	2	2	V	22
387	4	1	4	0	1	1	2	1	0	1	2	2	IV	23
388	4	1	4	0	1	1	2	2	2	0.5	2	2	IV	25.5
389	4	1	4	0	1	1	2	2	1	1.5	2	2	IV	25.5
390	4	1	4	0	1	1	2	2	1.5	1.5	2	2	IV	26
391	4	1	4	0	1	1	2	2	1.5	2	2	2	IV	26.5
392	4	1	4	0	2	2	2	2	2	2	2	2	V	28
393	2	1	4	0	0	1	0	2	2	2	2	2	IV	22
394	3.5	1	3	0	1	1	2	2	2	2	2	2	IV-V	25
395	2	1	4	0	1	1	2	2	1.5	2	2	2	V	23.5
396	0	0	4	0	1	2	1.5	2	1.5	1	2	2	I	17
397	0	0	4	0	1	1	2	2	1	0.5	1.5	1.5	V	17.5
398	4	1	4	0	1	1	2	2	2	2	2	2	III	25
399	3.75	1	4	0	1	1	2	2	2	2	2	2	III	24.75

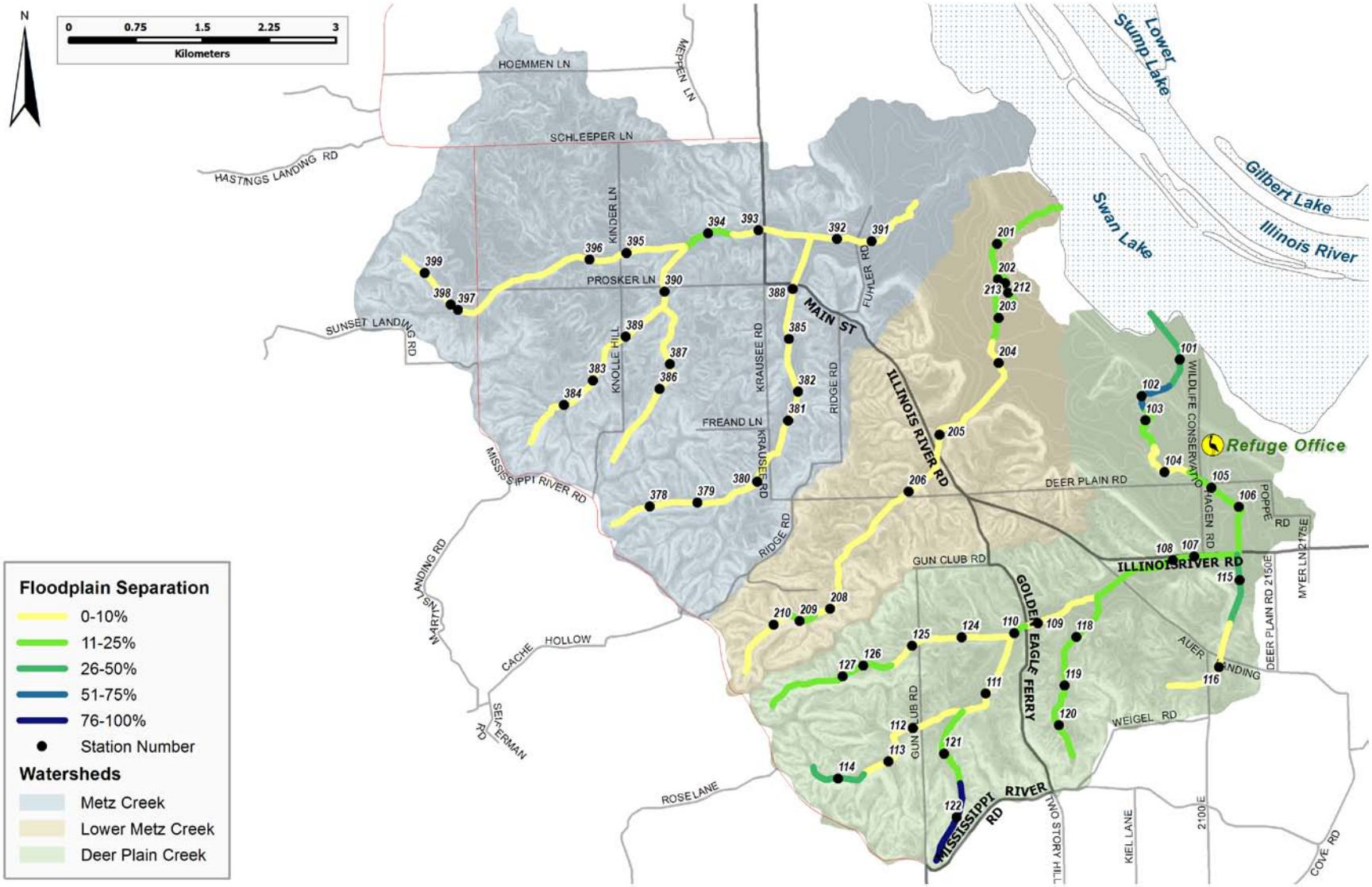
Channel-Stability Ranking Scheme (by CSI score)

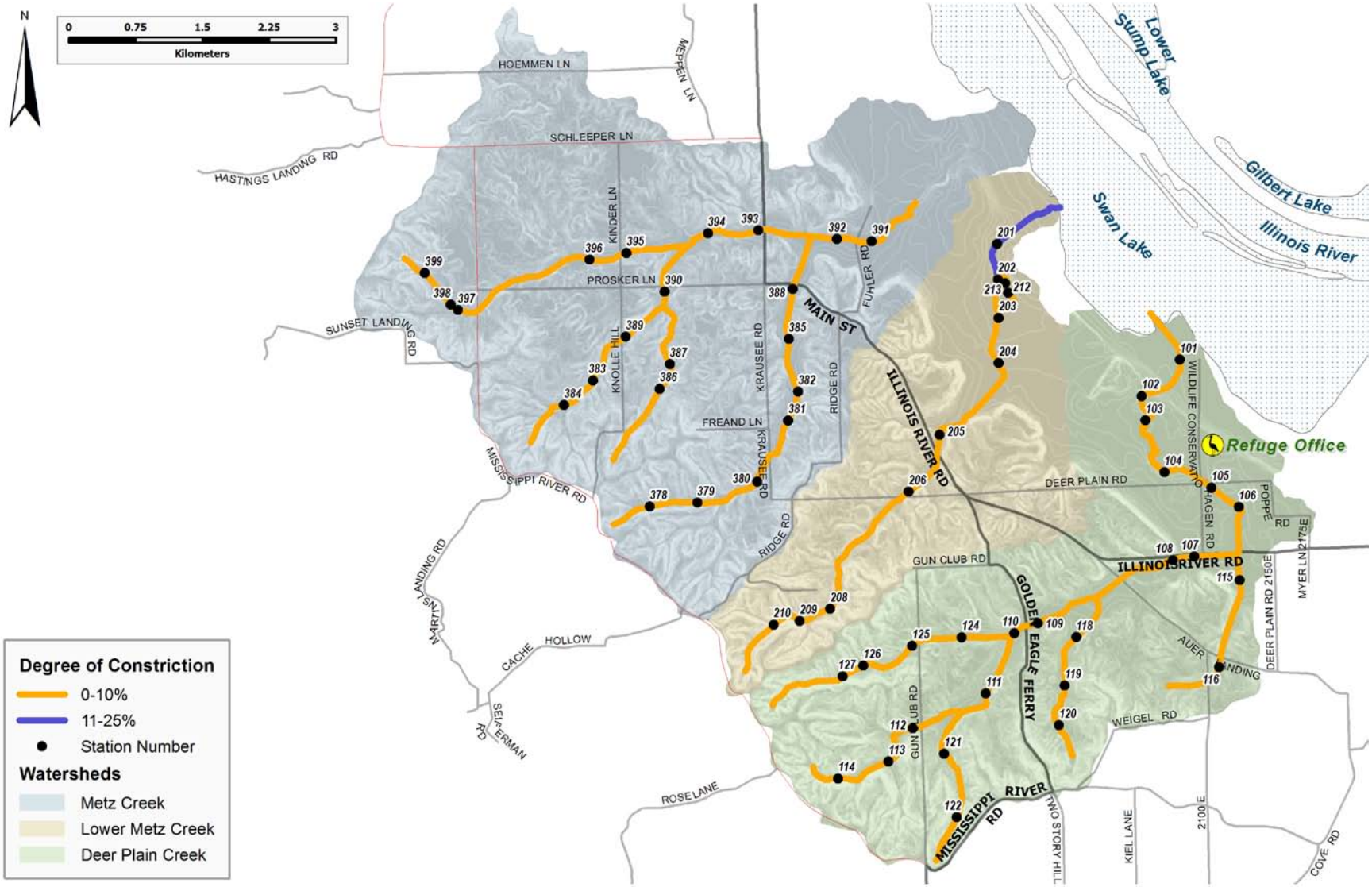
Station	Primary Bed Material	Bed Protection	Floodplain Separation	Degree of Constriction	Type of Bank Erosion LEFT	Type of Bank Erosion RIGHT	Percent Bank Instability (Active) LEFT	Percent Bank Instability (Active) RIGHT	Percent Established Woody Cover LEFT	Percent Established Woody Cover RIGHT	Percent Bank/Bar Accretion LEFT	Percent Bank/Bar Accretion RIGHT	CEM Stage	Channel-Stability Index (CSI)
103	4	1	3	0	2	2	2	2	2	2	2	2	IV	28
109	4	1	4	0	1	1	2	2	2	2	2	2	IV	27
104	2.5	1	4	0	2	2	2	2	2	2	1.5	1.5	IV	26.5
105	4	2	3	0	1	1	2	2	1.5	1.5	2	2	IV	26
101	3	1	2	0	2	2	2	2	2	2	2	1	IV	25
126	2	1	3	0	2	2	2	1.5	2	1.5	2	2	IV	25
112	4	1	4	0	2	2	1	1	2	2	1	1	V	24
114	2	1	2	0	2	2	1	1	2	2	2	2	IV	23
125	2	1	4	0	2	2	1	1	1	1	2	2	IV	23
127	4	1	3	0	1	1	1.5	1.5	2	2	2	2	III	23
121	4	1	3	0	2	1	2	1	2	0.5	2	2	III	22.5
124	4	1	4	0	2	2	0.5	1.5	1	0.5	2	1	V	22.5
102	3.25	1	1	0	1	2	2	2	1.5	1.5	2	1.5	IV-V	22.25
110	4	1	3	0	1	1	0	0	2	2	2	2	IV	22
118	4	1	3	0	1	1	1	1.5	2	2	2	2	I	21.5
111	4	1	4	0	2	2	1	1	1	1	0.5	0.5	V	21
116	4	1	4	0	1	1	0	0.5	2	2	2	2	II-III	21
113	2	1	4	0	0	2	0	1	1.5	2	2	2	V	20.5
107	4	1	3	0	1	1	0	0	2	2	2	2	III	20
106	4	1	3	0	0	1	0	0	2	2	2	2	III	19
108	4	1	3	0	0	1	0	0	2	2	2	2	III	19
115	4	1	2	0	1	1	0	0	2	2	2	2	II-III	18.5
119	4	1	3	0	1	1	0.5	0.5	1	1	2	2	I	17
120	4	1	3	0	1	1	1	1	0	0	1.5	1.5	I	15
122	4	1	0	0	0	0	0	0	0	0	0	0	I	5
202	4	1	4	0	1	1	2	2	1.5	2	2	2	IV	26.5
203	4	1	3	0	1	1	2	2	2	2	2	2	IV	26
204	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
205	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
208	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
210	2	1	4	0	1	1	2	2	2	2	2	2	IV	25
201	4	1	3	1	1	1	2	2	2	2	2	2	I	24
213	4	1	3	0	1	1	0	0	2	2	2	2	II-III	19.5
212	4	1	3	0	1	1	0	0	1.5	2	2	2	II-III	19
209	2	1	3	0	1	1	0	0	2	0	2	2	III	16
206	2	1	4	0	1	1	0.5	0.5	1	0.5	1	1	II-III	15
392	4	1	4	0	2	2	2	2	2	2	2	2	V	28
391	4	1	4	0	1	1	2	2	1.5	2	2	2	IV	26.5
390	4	1	4	0	1	1	2	2	1.5	1.5	2	2	IV	26
388	4	1	4	0	1	1	2	2	2	0.5	2	2	IV	25.5
389	4	1	4	0	1	1	2	2	1	1.5	2	2	IV	25.5
394	3.5	1	3	0	1	1	2	2	2	2	2	2	IV-V	25
398	4	1	4	0	1	1	2	2	2	2	2	2	III	25
399	3.75	1	4	0	1	1	2	2	2	2	2	2	III	24.75
382	4	1	4	0	2	2	1	1	2	2	1	1	V	24
385	2	1	4	0	2	2	2	1.5	2	1.5	1.5	1.5	V	24
395	2	1	4	0	1	1	2	2	1.5	2	2	2	V	23.5
378	2	1	4	0	1	1	2	2	2	1.5	1.5	2	V	23
380	2	1	4	0	1	1	2	2	1.5	2	1.5	2	V	23
387	4	1	4	0	1	1	2	1	0	1	2	2	IV	23
386	4	1	4	0	1	1	1.5	1	0.5	1	2	2	V	22
393	2	1	4	0	0	1	0	2	2	2	2	2	IV	22
381	2	1	4	0	2	2	1	0.5	2	1	1.5	1.5	V	21.5
384	2	1	4	0	2	1	2	2	1	0.5	1.5	1.5	V	21.5
379	2	1	4	0	1	1	2	2	0.5	2	1	1.5	V	21
383	2	1	4	0	1	1	2	2	1.5	1.5	1	1.5	II-III	20
397	0	0	4	0	1	1	2	2	1	0.5	1.5	1.5	V	17.5
396	0	0	4	0	1	2	1.5	2	1.5	1	2	2	I	17

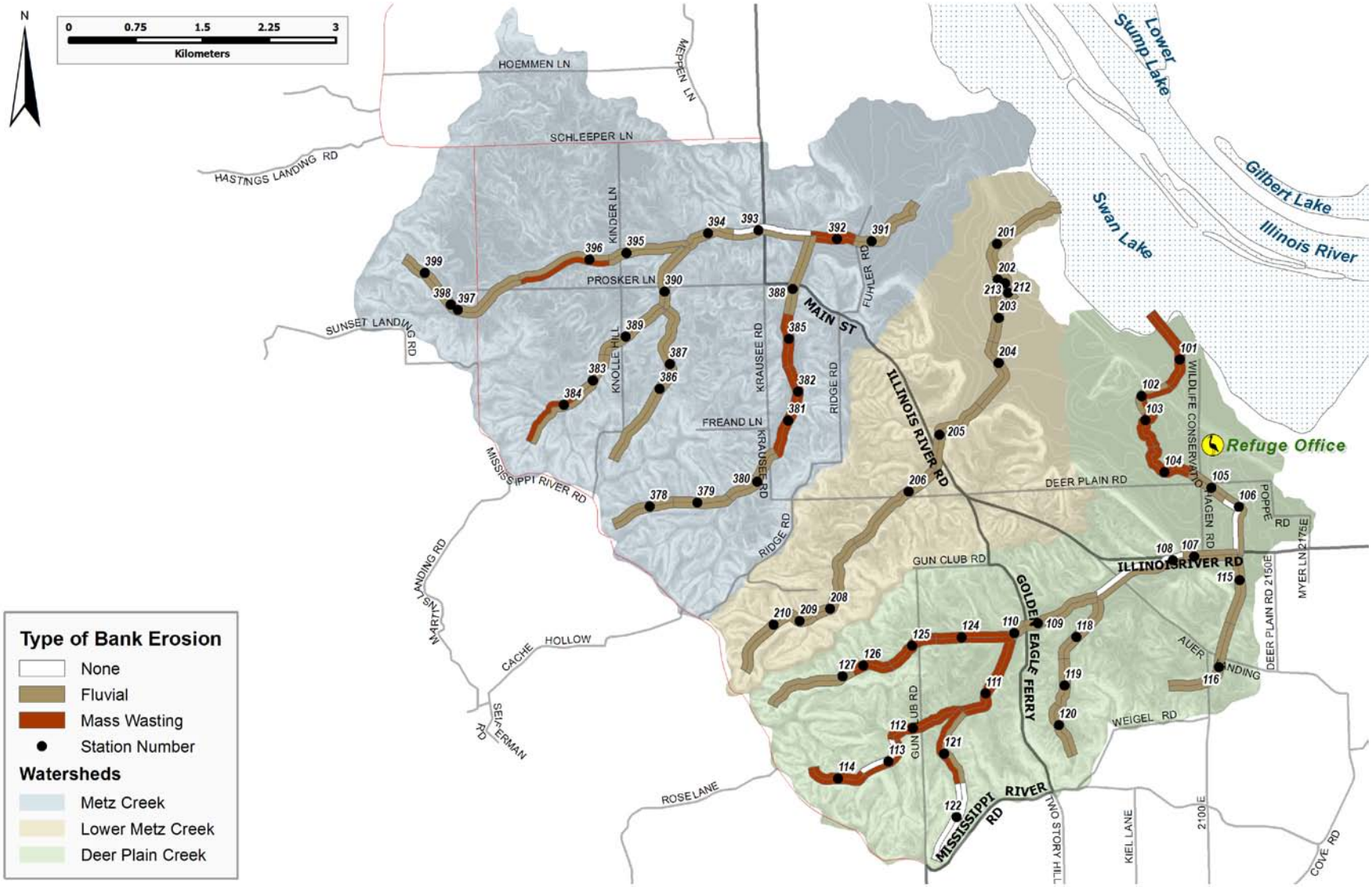

N
0
0.75
1.5
2.25
3
Kilometers
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE LL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
MISSISSIPPI RIVER RD
CACHE HOLLOW
SELVERMAN RD
MARY LN
LANDING RD
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
AUER LANDING
KIEL LANE
TWO STORY HILL
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office
Channel Stability Index Score
< 10
10 - 15
15 -20
20 - 25
>= 25
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek

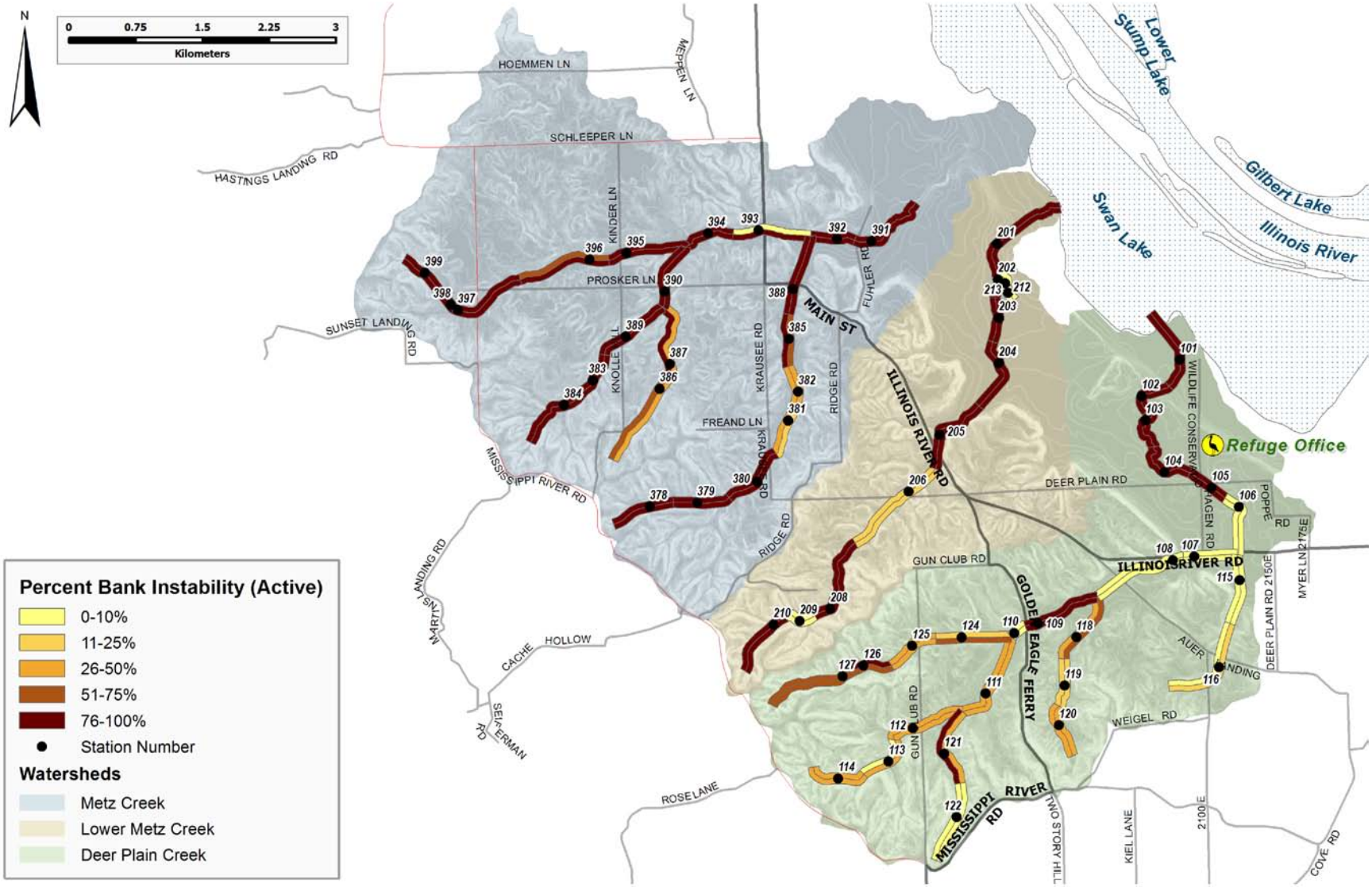

N
0
0.75
1.5
2.25
3
Kilometers
Primary Bed Material
Silt/Clay
Sand
Gravel
Boulder/Cobble
Bedrock
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
FUHLER RD
MAIN ST
RIDGE RD
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
KIEL LANE
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office

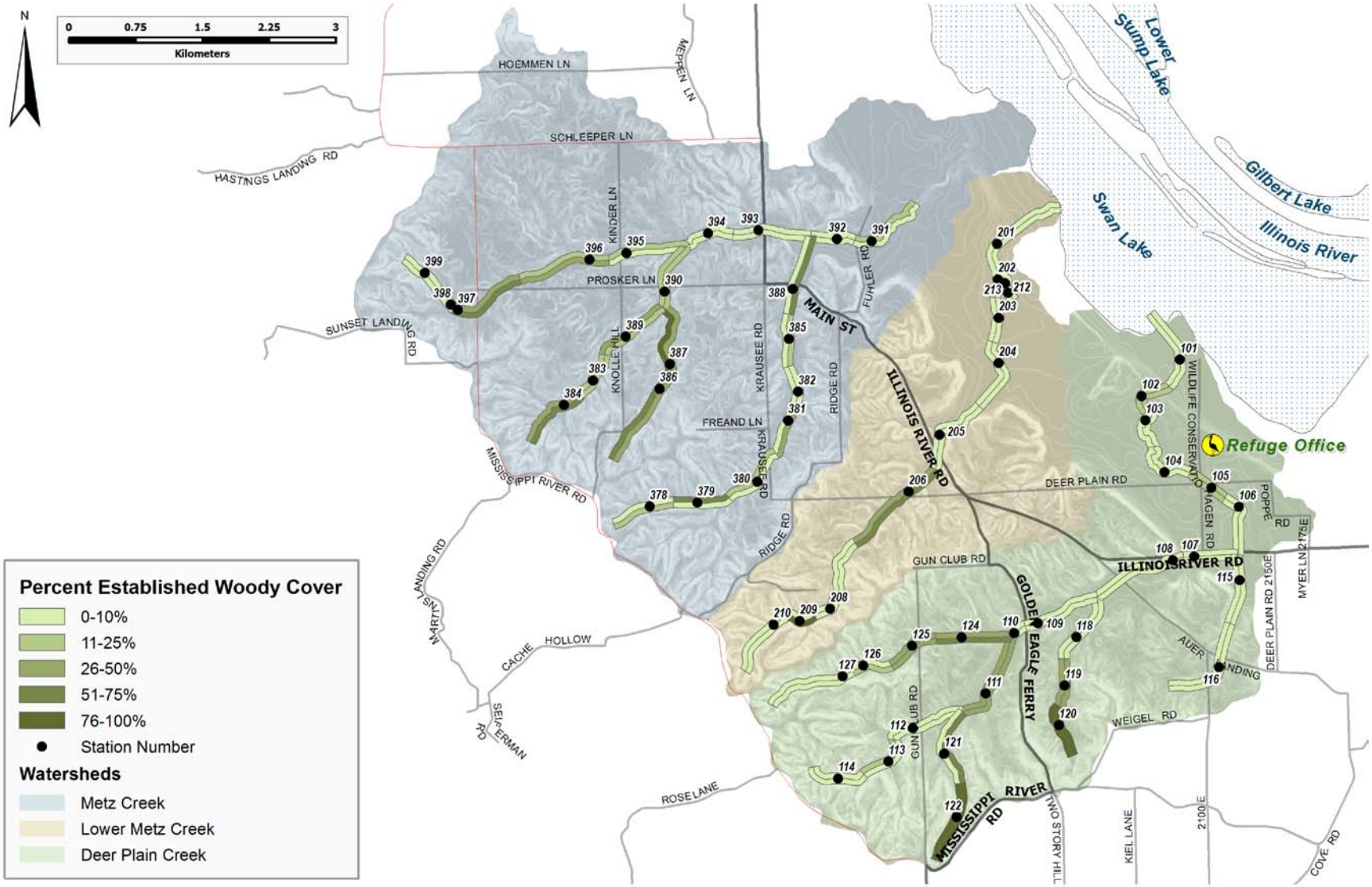

N
0
0.75
1.5
2.25
3
Kilometers
Bed Protection
No Bed Prot w/both banks protected
No Bed Prot w/1 bank protected
No Bed Prot w/no bank protection
Bed Protection
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
PROSKER LN
SUNSET LANDING RD
KINDER LN
KNOLLE HILL
KRAUSEE RD
FUHLER RD
RIDGE RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
ILLINOISRIVER RD
AUER
WEIGEL RD
MISSISSIPPI RIVER RD
TWO STORY HILL
KIEL LANE
COVE RD
ROSELANE
CACHE HOLLOW
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River

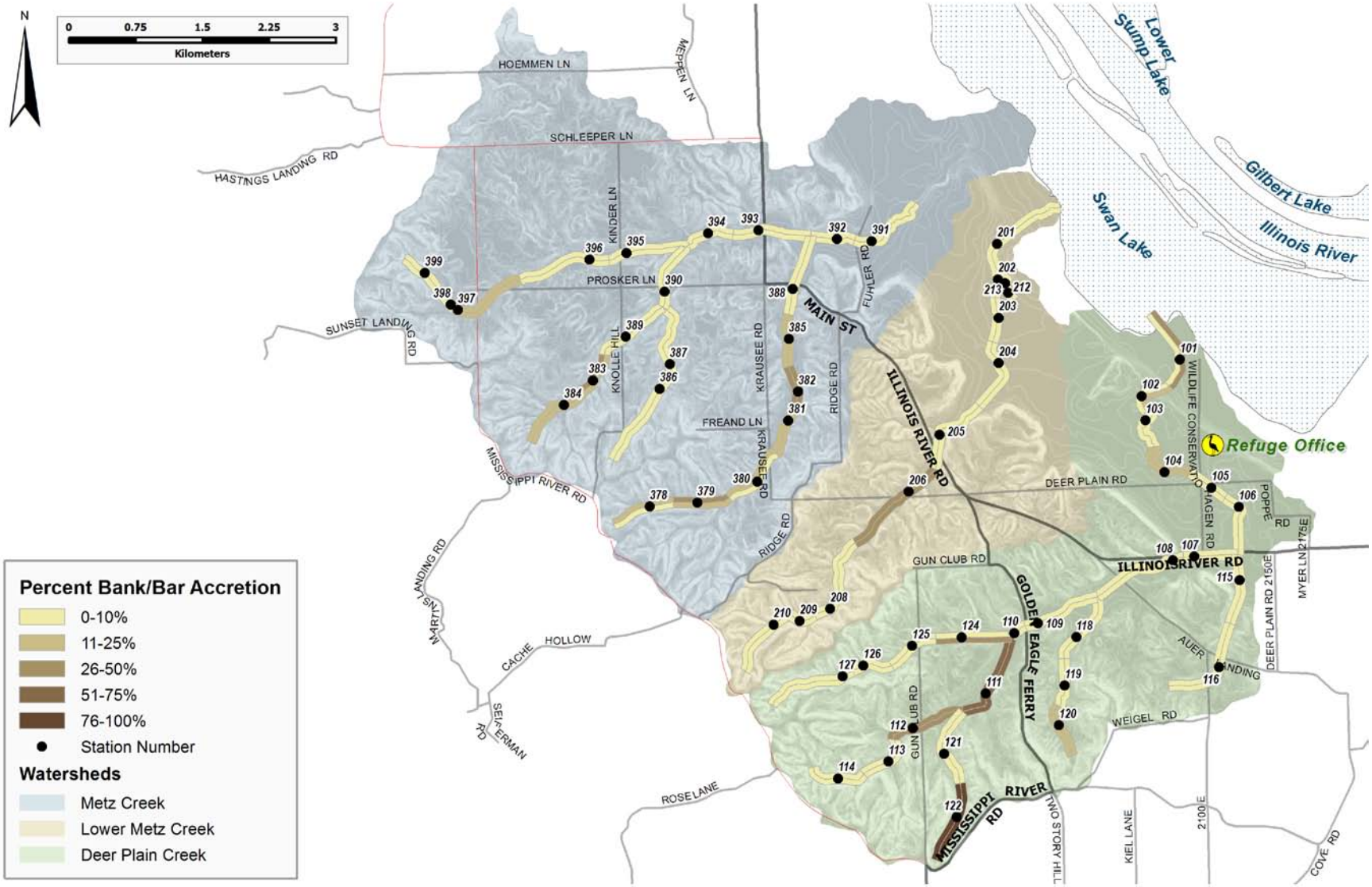

N
0
0.75
1.5
2.25
3
Kilometers
Floodplain Separation
0-10%
11-25%
26-50%
51-75%
76-100%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
PROSKER LN
SUNSET LANDING RD
MISSISSIPPI RIVER RD
FREAND LN
MAIN ST
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
MISSISSIPPI RIVER RD
WEIGEL RD
ROSELANE
CACHE HOLLOW
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
KINDER LN
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
KIEL LANE
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office

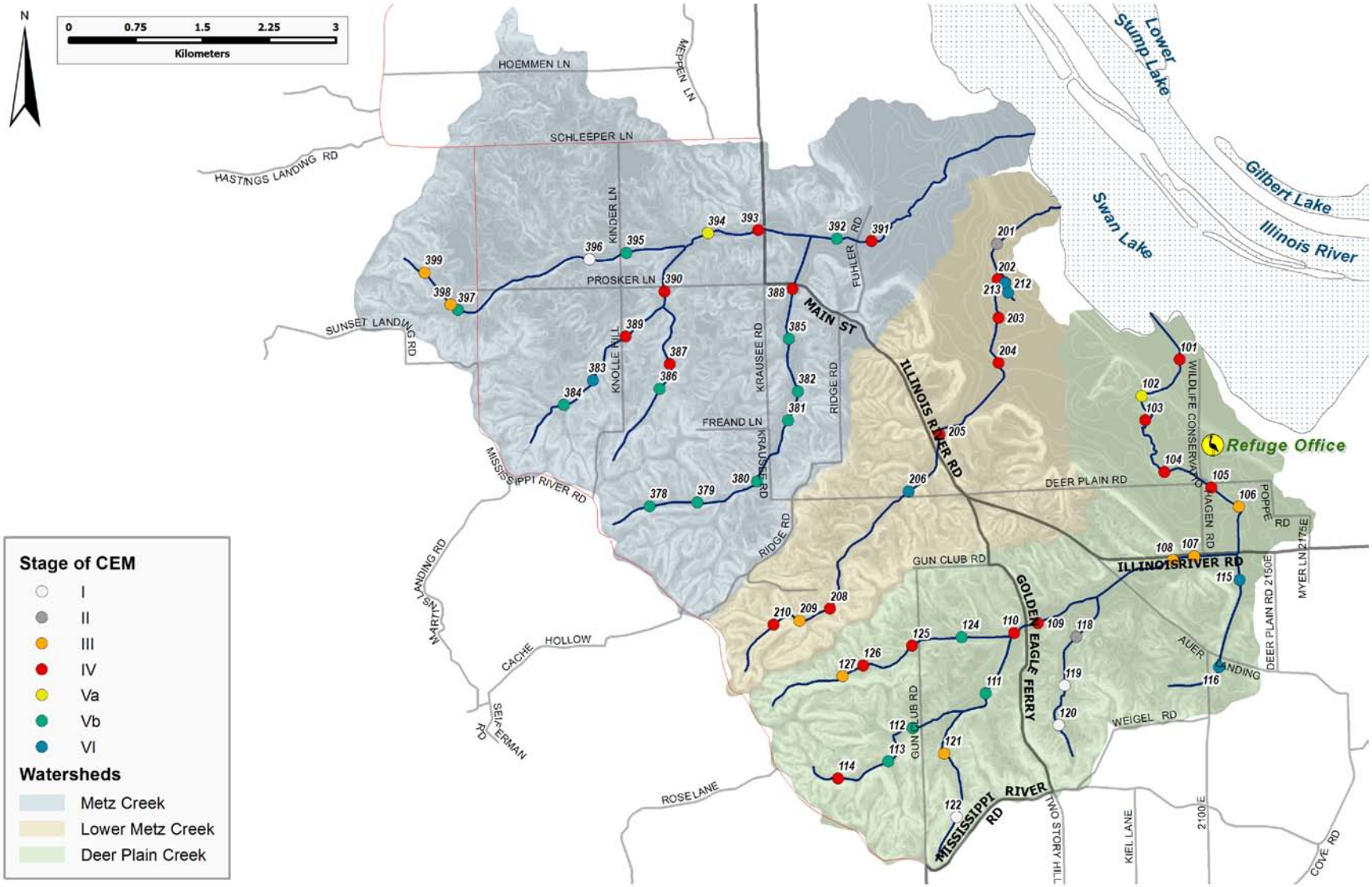

N
0
0.75
1.5
2.25
3
Kilometers
Degree of Constriction
0-10%
11-25%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
KINDER LN
PROSKER LN
SUNSET LANDING RD
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
MARTY LANDING RD
CACHE HOLLOW
SELVERMAN RD
ROSELANE
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
MISSISSIPPI RIVER RD
TWO STORY HILL
KIEL LANE
2100E
COVE RD
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
MYER LN 2175E
DEER PLAIN RD 2150E
AUER
LANDING
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office

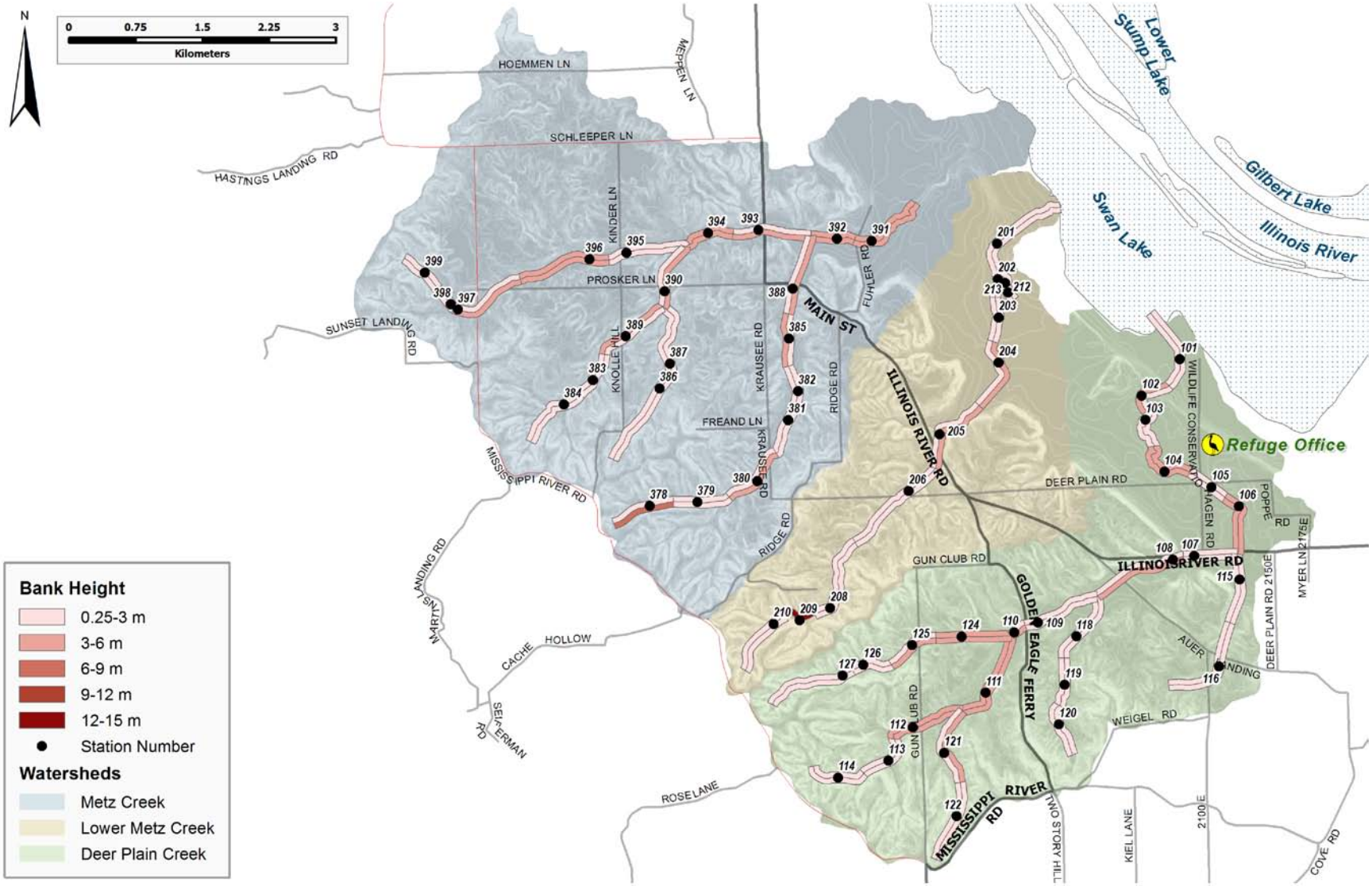

N
0
0.75
1.5
2.25
3
Kilometers
Type of Bank Erosion
None
Fluvial
Mass Wasting
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
MARTY'S LANDING RD
CACHE HOLLOW
SELVERMAN RD
ROSELANE
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
AUER LANDING
DEER PLAIN RD 2150E
MYER LN 2175E
TWO STORY HILL
KIEL LANE
2100E
COVE RD
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River

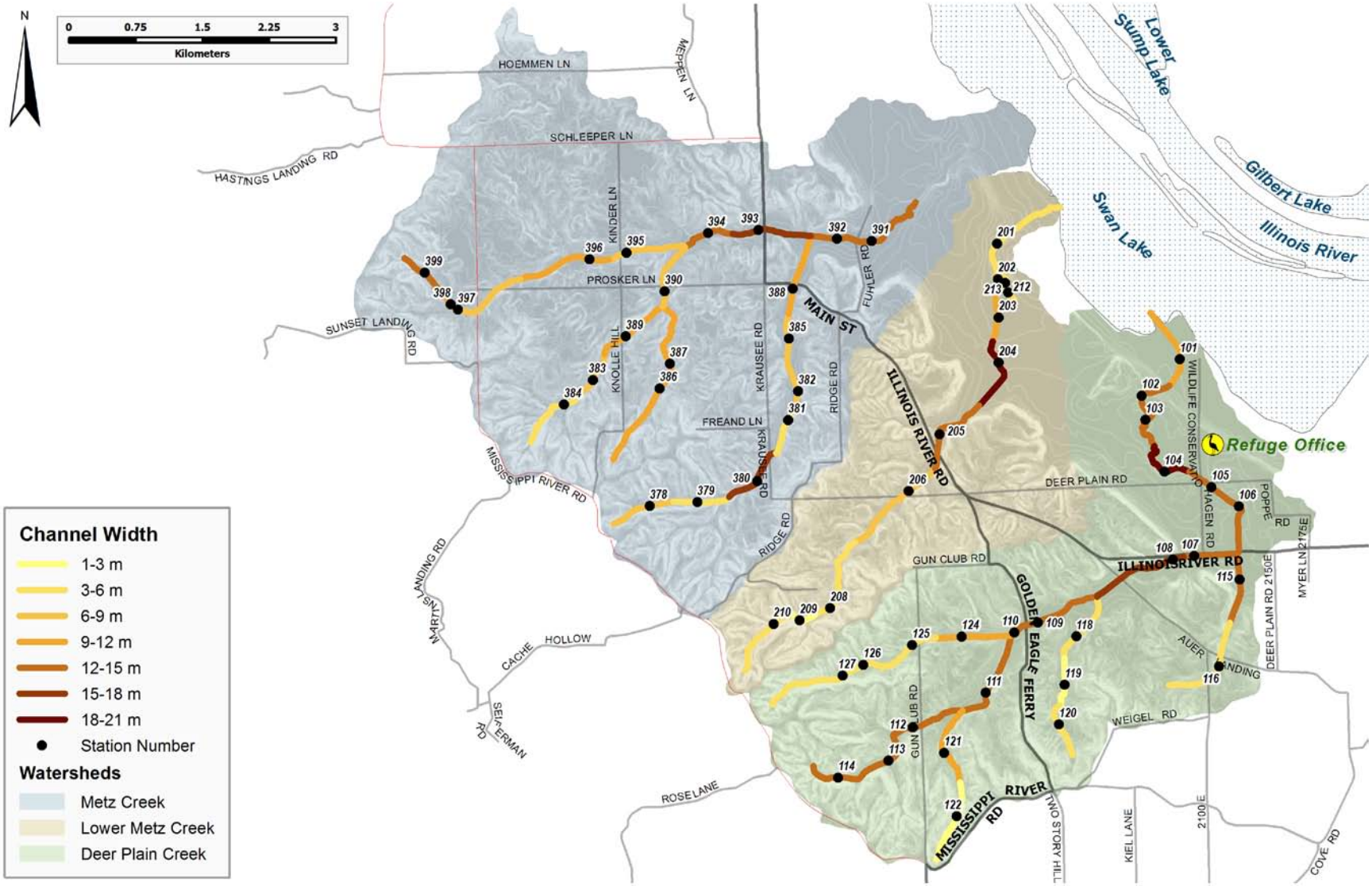

N
0
0.75
1.5
2.25
3
Kilometers
HOEMMEN LN
WEPPEN LN
SCHLEEPER LN
HASTINGS LANDING RD
KINDER LN
PROSKER LN
SUNSET LANDING RD
KNOLLE LN
KRAUSEE RD
FUHLER RD
MAIN ST
RIDGE RD
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
MARTY'S LANDING RD
SELVERMAN RD
WILDLIFE CONSERVATION
POPPE RD
MYER LN
2175E
DEER PLAIN RD
2150E
AUER LANDING
TWO STORY HILL
KIEL LANE
2100E
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office
Percent Bank Instability (Active)
0-10%
11-25%
26-50%
51-75%
76-100%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek

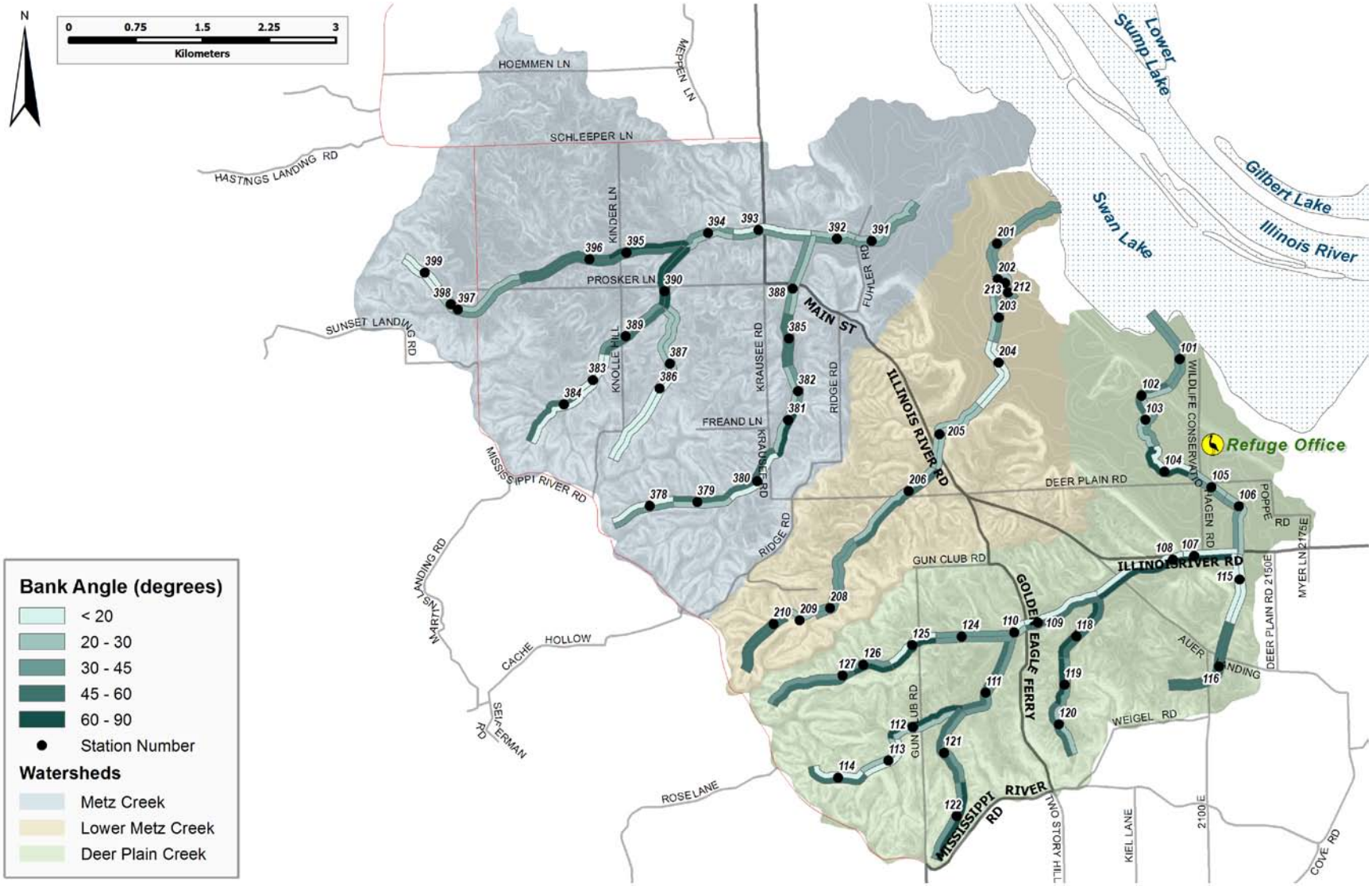

N
0
0.75
1.5
2.25
3
Kilometers
Percent Established Woody Cover
0-10%
11-25%
26-50%
51-75%
76-100%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
FUHLER RD
RIDGE RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
WILDLIFE CONSERVATION
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River


N
0
0.75
1.5
2.25
3
Kilometers
Percent Bank/Bar Accretion
0-10%
11-25%
26-50%
51-75%
76-100%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
AUER
KIEL LANE
COVE RD
TWO STORY HILL


N
0
0.75
1.5
2.25
3
Kilometers
Stage of CEM
I
II
III
IV
Va
Vb
VI
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
FREAND LN
MISSISSIPPI RIVER RD
MARTY LANDING RD
CACHE HOLLOW
SELVERMAN RD
ROSELANE
KINDER LN
KNOLLE HILL
KRAUSEE RD
KRAUSSER RD
RIDGE RD
FUHLER RD
MAIN ST
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
AUER LANDING
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN 2175E
DEER PLAIN RD 2150E
TWO STORY HILL
KIEL LANE
2100E
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office


N
0
0.75
1.5
2.25
3
Kilometers
Bank Height
0.25-3 m
3-6 m
6-9 m
9-12 m
12-15 m
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WILDLIFE CONSERVATION
Refuge Office
POPPE RD
MYER LN
DEER PLAIN RD
AUER LANDING
WEIGEL RD
CACHE HOLLOW
SELVERMAN RD
ROSELANE
KIEL LANE
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River


N
0
0.75
1.5
2.25
3
Kilometers
Channel Width
1-3 m
3-6 m
6-9 m
9-12 m
12-15 m
15-18 m
18-21 m
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD 2150E
AUER LANDING
WEIGEL RD
MARTY LN
CACHE HOLLOW
SELVERMAN RD
ROSELANE
TWO STORY HILL
KIEL LANE
2100E
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office


N
0
0.75
1.5
2.25
3
Kilometers
Bank Angle (degrees)
< 20
20 - 30
30 - 45
45 - 60
60 - 90
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
MARTY LANDING RD
SELVERMAN RD
WILDLIFE CONSERVATION
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River

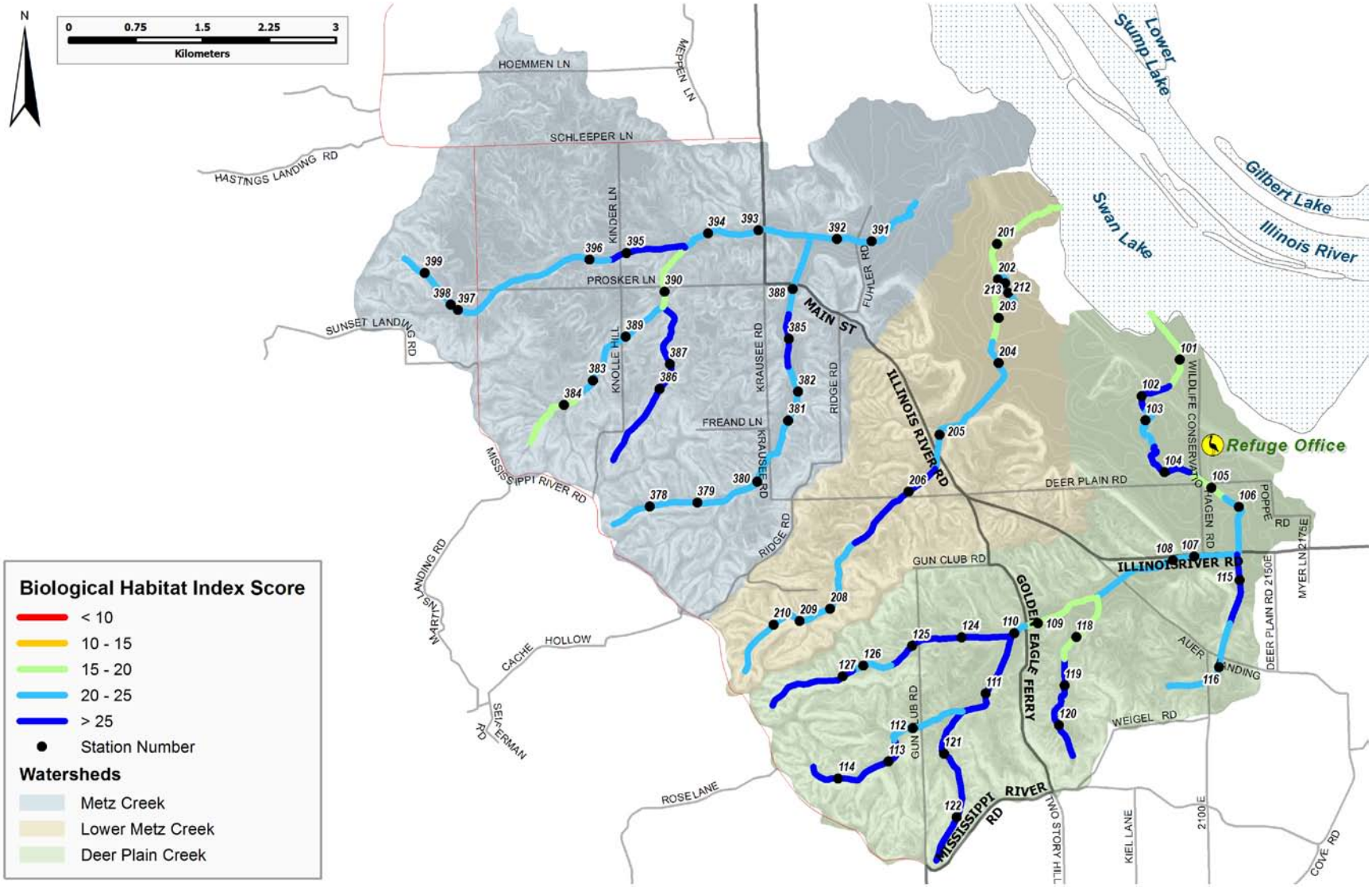
Appendix D:
Biological/Habitat Ranking Scheme
Tables and Maps

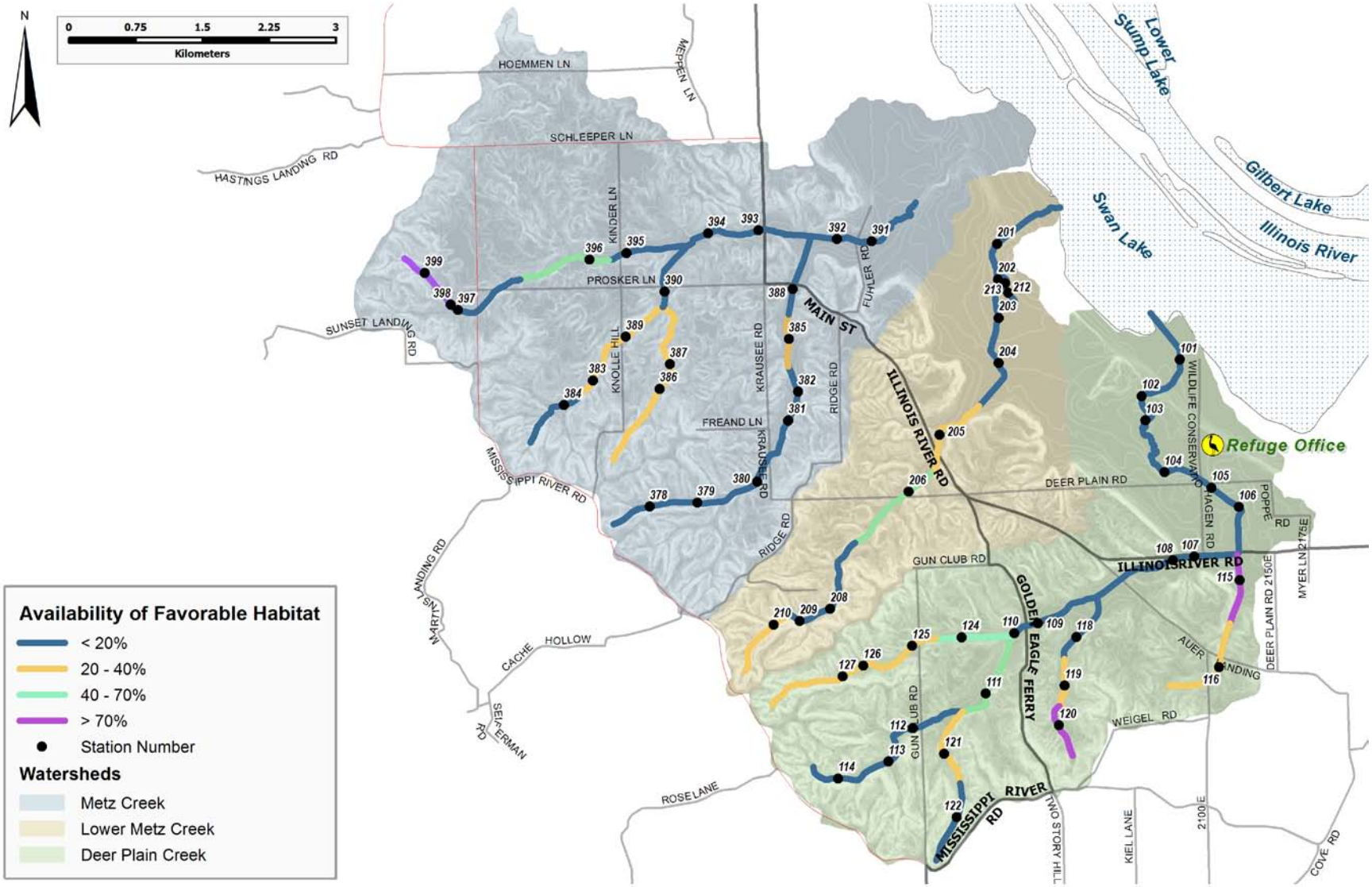
Biological/Habitat Ranking Scheme (by station number)

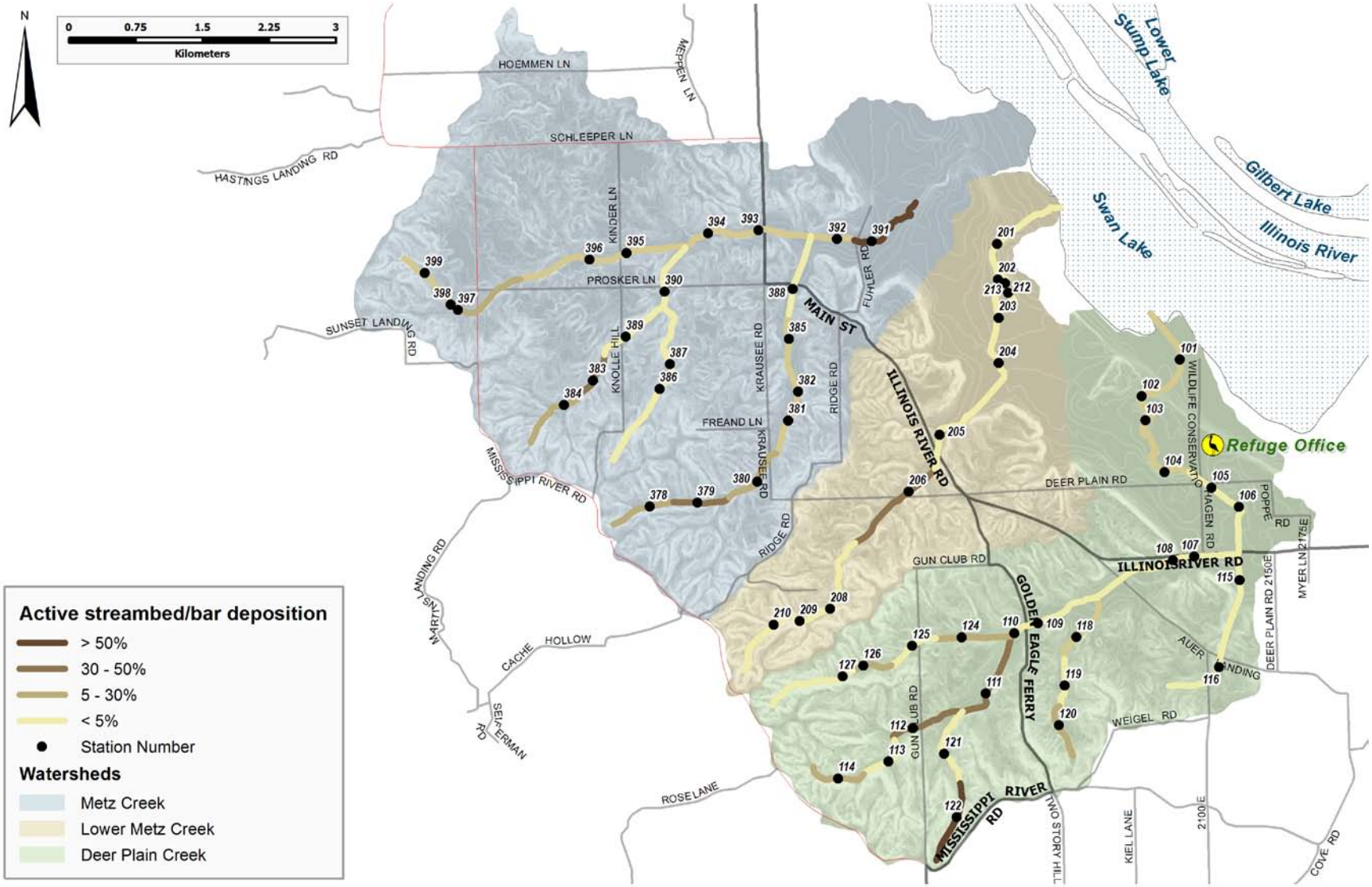
Station	Availability of Favorable Habitat	Active streambed/bar deposition	Percent Streambed Exposure	Degree of "Hard" Channel Alteration	Percent Bank Instability LEFT	Percent Bank Instability RIGHT	Vegetative Bank Protection(Bank Face) LEFT	Vegetative Bank Protection(Bank Face) RIGHT	Riparian-zone Width (out from edge of water) LEFT	Riparian-zone Width (out from edge of water) RIGHT	Biological/Habitat Index (BHI)
101	1	4	4	1	0.5	0.5	0.5	0.5	0.5	0.5	17
102	1	4	4	4	0.5	0.5	0.5	0.5	1.5	2	26
103	1	4	4	4	0.5	0.5	0.5	0.5	2	2	23
104	1	4	4	4	0.5	0.5	0.5	0.5	1	0.5	27
105	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
106	1	4	4	3	2	2	2	2	0.5	0.5	24
107	1	4	4	2	2	2	1.5	0.5	0.5	0.5	22
108	1	4	4	3	2	2	2	0.5	0.5	0.5	22.5
109	1	4	4	4	0.5	0.5	1	1	0.5	0.5	20
110	1	4	4	4	2	2	1	1.5	0.5	0.5	23.5
111	3	3	3	4	1	1	1	1	0.5	0.5	27
112	1	3	4	3	1	1	1	1	0.5	0.5	22.5
113	1	4	4	4	2	1.5	2	1	0.5	0.5	26.5
114	1	3	4	4	1	1	1	1	0.5	0.5	28
115	4	4	4	4	2	2	2	2	0.5	0.5	28
116	2	4	4	3	1.5	1.5	1	1	0.5	0.5	22
118	1	4	4	1	1	0.5	0.5	0.5	0.5	0.5	17.5
119	2	4	4	3	2	1.5	1.5	1.5	0.5	0.5	28.5
120	4	3	3	4	1	1	2	2	0.5	0.5	29
121	2	4	4	4	0.5	1	0.5	2	0.5	0.5	27
122	1	1	3	4	2	2	2	2	2	2	29
124	3	3	3	3	1.5	1	1	1	0.5	0.5	27.5
125	2	4	2	4	1	1	1	1	0.5	0.5	27
126	2	3	2	4	0.5	0.5	0.5	0.5	2	1	25
127	2	4	4	4	1	1	0.5	0.5	0.5	2	25.5
201	1	4	4	1	0.5	0.5	0.5	0.5	0.5	0.5	16
202	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
203	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
204	1	4	4	4	0.5	0.5	0.5	1	0.5	0.5	20.5
205	2	4	4	4	0.5	0.5	1.5	1	0.5	0.5	21.5
206	3	3	4	3	1.5	1.5	1.5	2	0.5	0.5	28.5
208	1	4	4	4	0.5	0.5	0.5	0.5	1	2	21
209	1	4	4	4	2	1.5	0.5	0.5	0.5	0.5	22.5
210	2	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	22
212	1	4	4	4	1.5	1.5	0.5	0.5	0.5	0.5	21
213	1	4	4	4	1.5	2	0.5	0.5	0.5	0.5	21.5
378	1	3	4	4	0.5	0.5	0.5	0.5	2	1	22
379	1	2	4	4	0.5	0.5	1	0.5	1	0.5	21
380	1	3	4	4	0.5	0.5	0.5	0.5	2	2	23
381	1	4	4	4	2	1	1	1.5	0.5	1	25
382	1	4	4	3	1	1	1.5	1.5	0.5	0.5	22
383	2	2	4	4	0.5	0.5	1	0.5	0.5	0.5	20.5
384	1	3	4	4	0.5	0.5	0.5	0.5	0.5	0.5	20
385	2	4	4	4	0.5	1	0.5	0.5	0.5	0.5	26
386	2	4	4	3	1.5	1.5	1	1	0.5	0.5	27
387	2	4	4	3	0.5	2	1	1	0.5	0.5	26.5
388	1	4	4	3	0.5	0.5	0.5	1	0.5	0.5	23.5
389	2	4	4	3	0.5	0.5	1	0.5	0.5	0.5	22.5
390	1	4	4	3	0.5	0.5	0.5	0.5	0.5	0.5	20
391	1	1	4	3	0.5	0.5	1	0.5	0.5	0.5	21.5
392	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	21
393	1	4	4	4	2	0.5	2	0.5	0.5	0.5	24.5
394	1	4	4	4	0.5	0.5	1	0.5	1	0.5	24.5
395	1	4	4	4	0.5	0.5	1	0.5	0.5	0.5	27
396	3	4	2	4	1	0.5	1	0.5	1	0.5	24
397	1	3	2	3	0.5	0.5	0.5	1	0.5	0.5	20.5
398	3.5	4	4	4	0.5	0.5	0.5	0.5	1	0.5	23.5
399	3.5	4	2	4	0.5	0.5	0.5	0.5	1.75	1	23.75

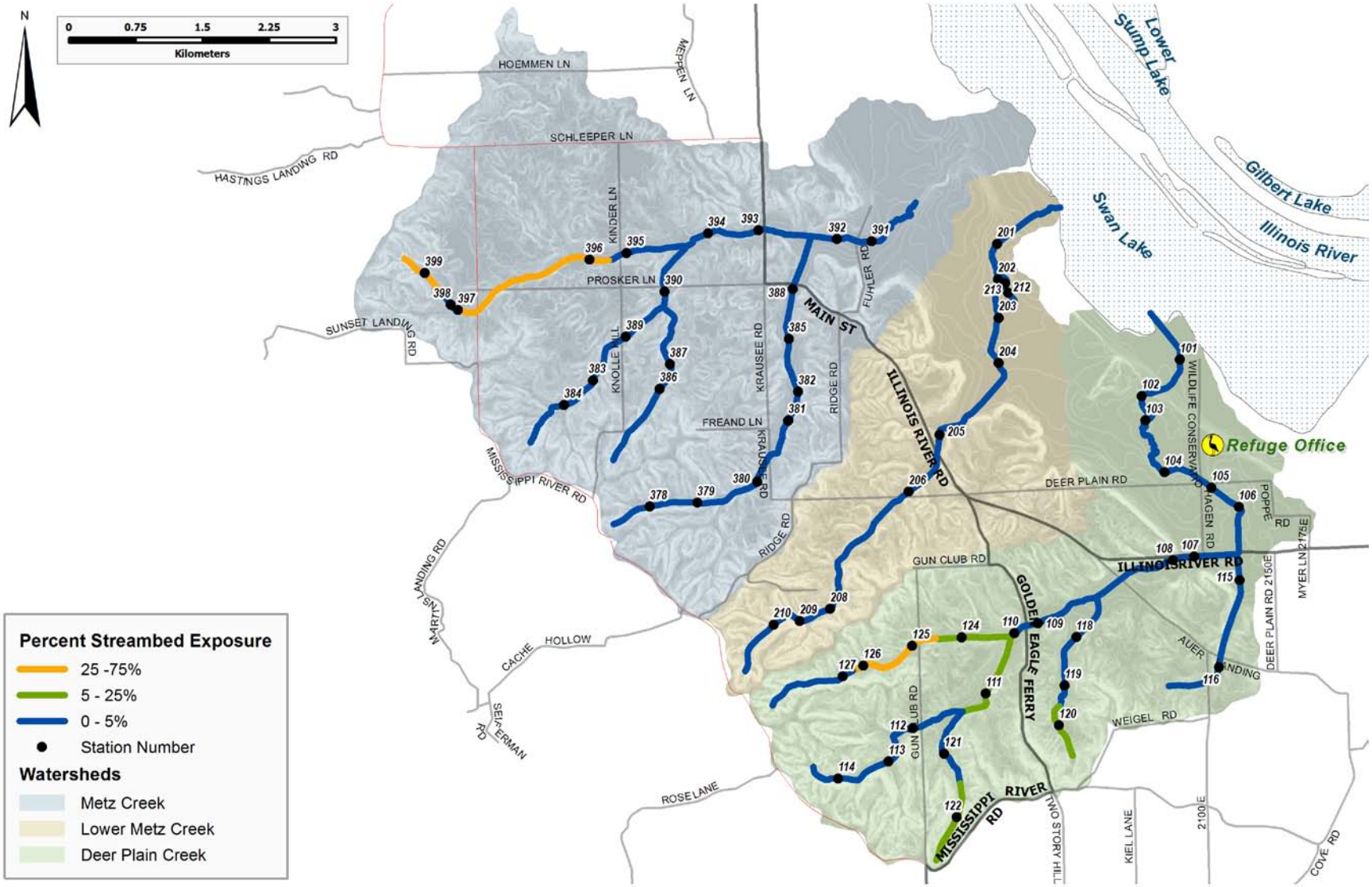
Biological/Habitat Ranking Scheme (by BHI score)

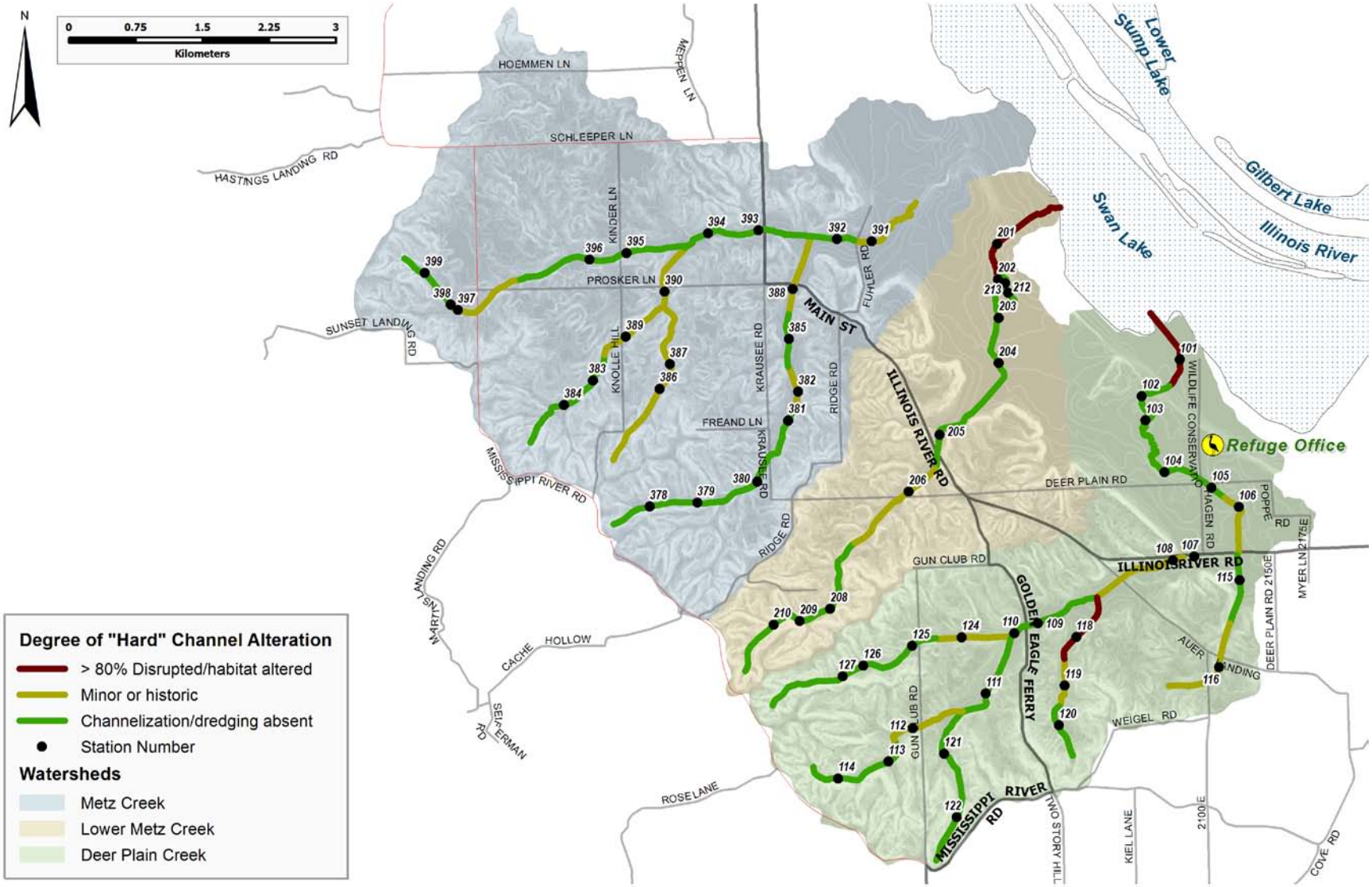
Station	Availability of Favorable Habitat	Active streambed/bar deposition	Percent Streambed Exposure	Degree of "Hard" Channel Alteration	Percent Bank Instability LEFT	Percent Bank Instability RIGHT	Vegetative Bank Protection(Bank Face) LEFT	Vegetative Bank Protection(Bank Face) RIGHT	Riparian-zone Width (out from edge of water) LEFT	Riparian-zone Width (out from edge of water) RIGHT	Biological/Habitat Index (BHI)
120	4	3	3	4	1	1	2	2	0.5	0.5	29
122	1	1	3	4	2	2	2	2	2	2	29
119	2	4	4	3	2	1.5	1.5	1.5	0.5	0.5	28.5
114	1	3	4	4	1	1	1	1	0.5	0.5	28
115	4	4	4	4	2	2	2	2	0.5	0.5	28
124	3	3	3	3	1.5	1	1	1	0.5	0.5	27.5
104	1	4	4	4	0.5	0.5	0.5	0.5	1	0.5	27
111	3	3	3	4	1	1	1	1	0.5	0.5	27
121	2	4	4	4	0.5	1	0.5	2	0.5	0.5	27
125	2	4	2	4	1	1	1	1	0.5	0.5	27
113	1	4	4	4	2	1.5	2	1	0.5	0.5	26.5
102	1	4	4	4	0.5	0.5	0.5	0.5	1.5	2	26
127	2	4	4	4	1	1	0.5	0.5	0.5	2	25.5
126	2	3	2	4	0.5	0.5	0.5	0.5	2	1	25
106	1	4	4	3	2	2	2	2	0.5	0.5	24
110	1	4	4	4	2	2	1	1.5	0.5	0.5	23.5
103	1	4	4	4	0.5	0.5	0.5	0.5	2	2	23
108	1	4	4	3	2	2	2	0.5	0.5	0.5	22.5
112	1	3	4	3	1	1	1	1	0.5	0.5	22.5
107	1	4	4	2	2	2	1.5	0.5	0.5	0.5	22
116	2	4	4	3	1.5	1.5	1	1	0.5	0.5	22
109	1	4	4	4	0.5	0.5	1	1	0.5	0.5	20
105	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
118	1	4	4	1	1	0.5	0.5	0.5	0.5	0.5	17.5
101	1	4	4	1	0.5	0.5	0.5	0.5	0.5	0.5	17
206	3	3	4	3	1.5	1.5	1.5	2	0.5	0.5	28.5
209	1	4	4	4	2	1.5	0.5	0.5	0.5	0.5	22.5
210	2	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	22
205	2	4	4	4	0.5	0.5	1.5	1	0.5	0.5	21.5
213	1	4	4	4	1.5	2	0.5	0.5	0.5	0.5	21.5
208	1	4	4	4	0.5	0.5	0.5	0.5	1	2	21
212	1	4	4	4	1.5	1.5	0.5	0.5	0.5	0.5	21
204	1	4	4	4	0.5	0.5	0.5	1	0.5	0.5	20.5
202	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
203	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	19
201	1	4	4	1	0.5	0.5	0.5	0.5	0.5	0.5	16
386	2	4	4	3	1.5	1.5	1	1	0.5	0.5	27
395	1	4	4	4	0.5	0.5	1	0.5	0.5	0.5	27
387	2	4	4	3	0.5	2	1	1	0.5	0.5	26.5
385	2	4	4	4	0.5	1	0.5	0.5	0.5	0.5	26
381	1	4	4	4	2	1	1	1.5	0.5	1	25
393	1	4	4	4	2	0.5	2	0.5	0.5	0.5	24.5
394	1	4	4	4	0.5	0.5	1	0.5	1	0.5	24.5
396	3	4	2	4	1	0.5	1	0.5	1	0.5	24
399	3.5	4	2	4	0.5	0.5	0.5	0.5	1.75	1	23.75
388	1	4	4	3	0.5	0.5	0.5	1	0.5	0.5	23.5
398	3.5	4	4	4	0.5	0.5	0.5	0.5	1	0.5	23.5
380	1	3	4	4	0.5	0.5	0.5	0.5	2	2	23
389	2	4	4	3	0.5	0.5	1	0.5	0.5	0.5	22.5
378	1	3	4	4	0.5	0.5	0.5	0.5	2	1	22
382	1	4	4	3	1	1	1.5	1.5	0.5	0.5	22
391	1	1	4	3	0.5	0.5	1	0.5	0.5	0.5	21.5
379	1	2	4	4	0.5	0.5	1	0.5	1	0.5	21
392	1	4	4	4	0.5	0.5	0.5	0.5	0.5	0.5	21
383	2	2	4	4	0.5	0.5	1	0.5	0.5	0.5	20.5
397	1	3	2	3	0.5	0.5	0.5	1	0.5	0.5	20.5
384	1	3	4	4	0.5	0.5	0.5	0.5	0.5	0.5	20
390	1	4	4	3	0.5	0.5	0.5	0.5	0.5	0.5	20

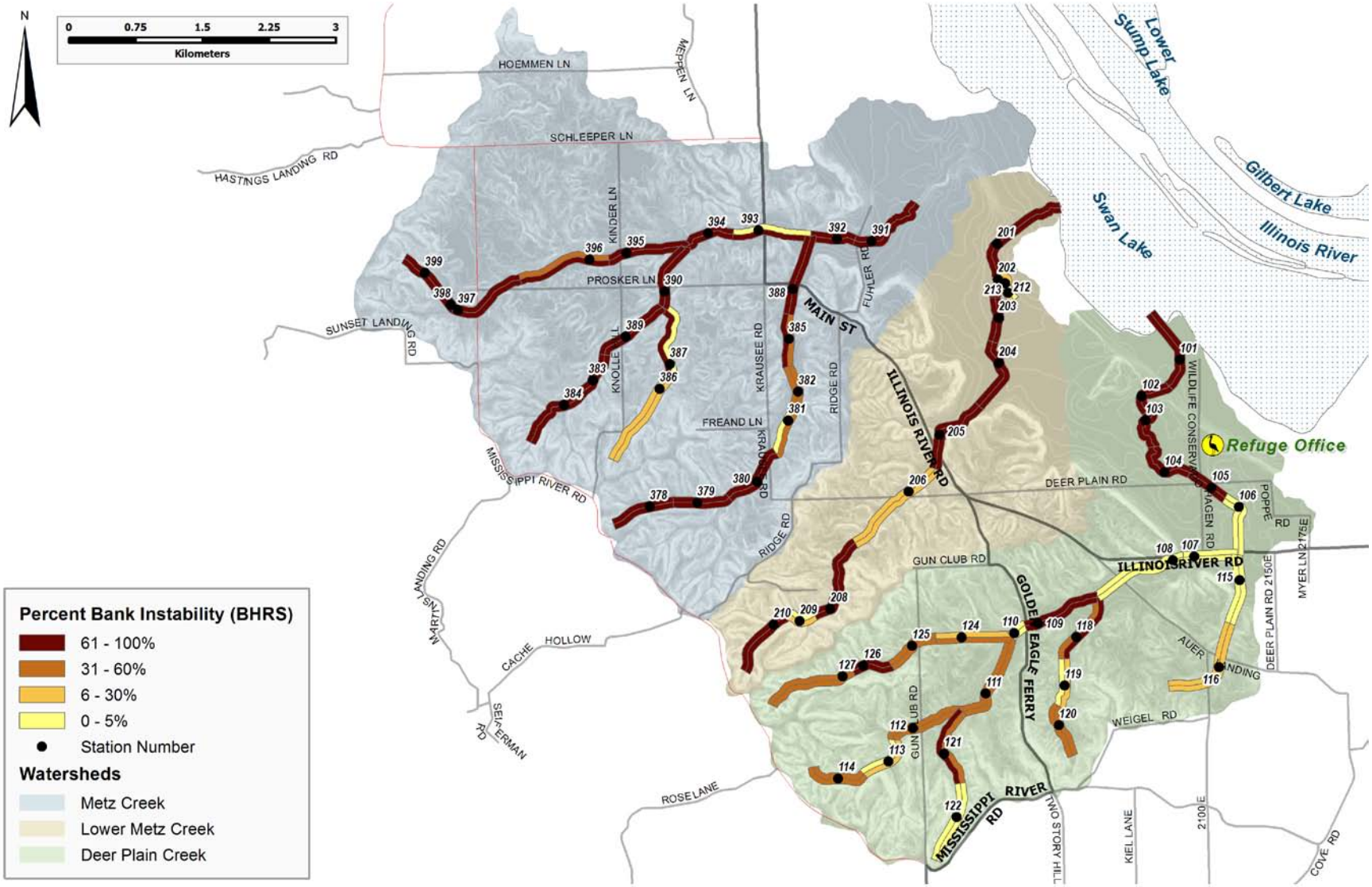

N
0
0.75
1.5
2.25
3
Kilometers
Biological Habitat Index Score
< 10
10 - 15
15 - 20
20 - 25
> 25
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
WILDLIFE CONSERVATO
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
AUER
LANDING
CACHE HOLLOW
ROSELANE
KIEL LANE
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office

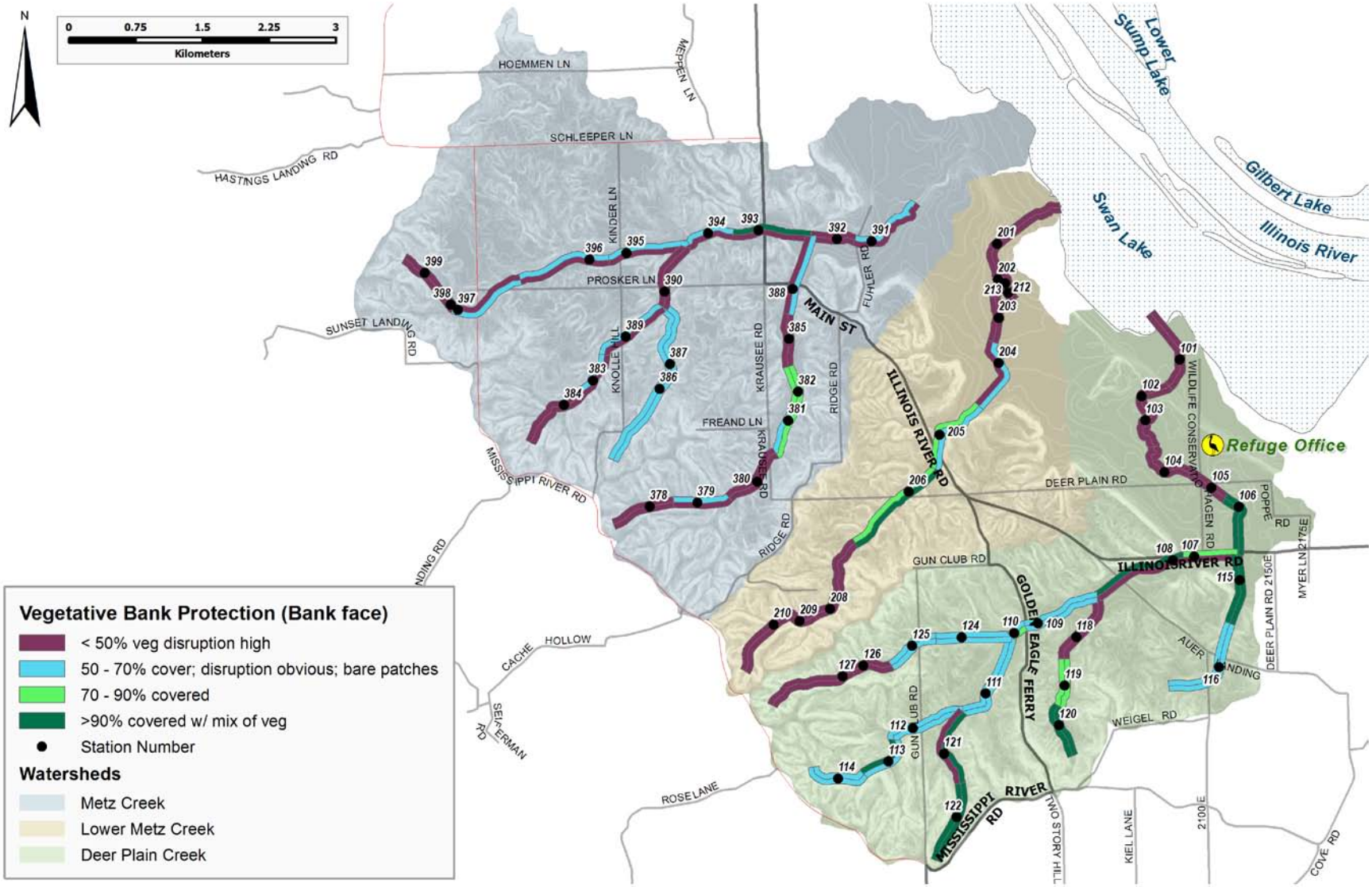

N
0
0.75
1.5
2.25
3
Kilometers
Availability of Favorable Habitat
< 20%
20 - 40%
40 - 70%
> 70%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
Lower Sump Lake
Gilbert Lake
Swan Lake
Illinois River
Refuge Office
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
PROSKER LN
SUNSET LANDING RD
MISSISSIPPI RIVER RD
FREAND LN
MAIN ST
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN
2175E
2150E
2100E
KIEL LANE
COVE RD
TWO STORY HILL

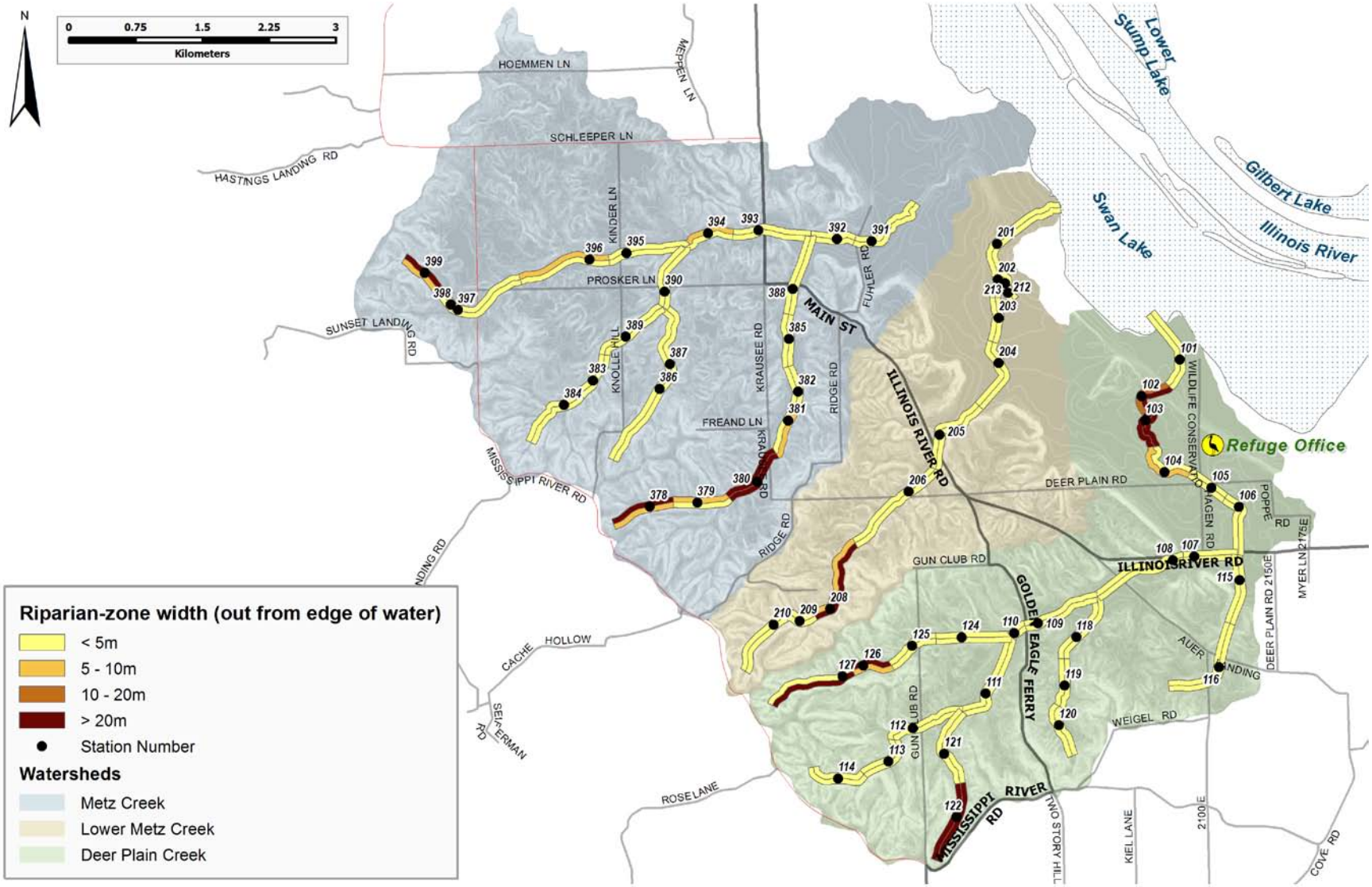

N
0
0.75
1.5
2.25
3
Kilometers
Active streambed/bar deposition
> 50%
30 - 50%
5 - 30%
< 5%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
AUER LANDING
WILDLIFE CONSERVATIO
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD 2150E
GUN CLUB RD
MISSISSIPPI RIVER RD
ROSELANE
KIEL LANE
2100E
COVE RD
TWO STORY HILL
MARTY LANDING RD
CACHE HOLLOW
SELVERMAN RD
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River


N
0
0.75
1.5
2.25
3
Kilometers
Percent Streambed Exposure
25 -75%
5 - 5%
0 - 5%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
FUHLER RD
MAIN ST
RIDGE RD
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
MARTY'S LANDING RD
SELVERMAN RD
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
DEER PLAIN RD 2150E
MYER LN 2175E
KIEL LANE
2100E
COVE RD
TWO STORY HILL
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office


N
0 0.75 1.5 2.25 3
Kilometers
Degree of "Hard" Channel Alteration
> 80% Disrupted/habitat altered
Minor or historic
Channelization/dredging absent
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
FUHLER RD
RIDGE RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
WILDLIFE CONSERVATION
HAGEN RD
POPPE RD
MYER LN
DEER PLAIN RD
AUER LANDING
MARTY LANDING RD
CACHE HOLLOW
SELVERMAN RD
ROSELANE
TWO STORY HILL
KIEL LANE
COVE RD
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Refuge Office


N
0
0.75
1.5
2.25
3
Kilometers
Percent Bank Instability (BHRS)
61 - 100%
31 - 60%
6 - 30%
0 - 5%
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE LN
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
MARTY'S LANDING RD
SELVERMAN RD
TWO STORY HILL
KIEL LANE
COVE RD
WILDLIFE CONSERVATION
POPPE RD
MYER LN
2175E
2150E
2100E
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River


N
0 0.75 1.5 2.25 3
Kilometers
Vegetative Bank Protection (Bank face)
< 50% veg disruption high
50 - 70% cover; disruption obvious; bare patches
70 - 90% covered
>90% covered w/ mix of veg
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
SUNSET LANDING RD
PROSKER LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
FREAND LN
MISSISSIPPI RIVER RD
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
WEIGEL RD
ROSELANE
CACHE HOLLOW
WILDLIFE CONSERVATION
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River


N
0
0.75
1.5
2.25
3
Kilometers
HOEMMEN LN
SCHLEEPER LN
HASTINGS LANDING RD
PROSKER LN
SUNSET LANDING RD
MISSISSIPPI RIVER RD
FREAND LN
KINDER LN
KNOLLE HILL
KRAUSEE RD
RIDGE RD
FUHLER RD
MAIN ST
ILLINOIS RIVER RD
DEER PLAIN RD
GUN CLUB RD
GOLDEN EAGLE FERRY
CACHE HOLLOW
ROSELANE
WEIGEL RD
AUER LANDING
WILDLIFE CONSERVATION
Refuge Office
Lower Sump Lake
Swan Lake
Gilbert Lake
Illinois River
Riparian-zone width (out from edge of water)
< 5m
5 - 10m
10 - 20m
> 20m
Station Number
Watersheds
Metz Creek
Lower Metz Creek
Deer Plain Creek