ATTACHMENT E-3

STREAM ASSESSMENT REPORTS

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STREAM ASSESSMENT REPORTS:

PROPOSED UNIT 3 COOLING TOWERS

UNIFIED STREAM METHODOLOGY STREAM ASSESSMENT FOR THE PROPOSED UNIT 3 COOLING TOWERS

Dominion North Anna Power Station

Prepared for:

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July 2009

1.0 INTRODUCTION

The North Anna Power Station (NAPS) is a nuclear power plant with the capacity to generate electricity from two units (Unit 1 and Unit 2). NAPS is located in Louisa County, near the town of Mineral, on a peninsula on the southern shore of Lake Anna, approximately 5 miles upstream of the North Anna Dam (Figure 1). Virginia Electric and Power Company D/B/A Dominion Virginia Power (Dominion), operates the existing nuclear units on the NAPS site. Dominion owns the land above and below the lake surface and around the lake up to the expected high-water mark.

Dominion proposes to construct a new nuclear unit (Unit 3) at the NAPS site to provide additional electric service to meet the growing demand. One component of the proposed project includes the construction of cooling towers for the proposed Unit 3. The proposed cooling towers will be located to the west of existing Units 1 and 2. The footprint of the proposed cooling tower complex is approximately 1,672,772 square feet (38.4 acres).

1.1 STREAM ASSESSMENT STUDY

EA Engineering, Science, and Technology (EA) conducted a stream assessment during 2 October 2007 to 3 October 2007 within the proposed cooling towers location. The streams that were assessed were located within the project area for the proposed cooling towers complex. This report provides the results of the stream evaluations using the Unified Stream Methodology (USM).

1.2 PURPOSE OF THE STREAM ASSESSMENT

The proposed construction of cooling towers will affect streams within the design footprint. The USM was used for the Stream Assessment Study to characterize existing stream resources throughout the design footprint for the construction of the proposed cooling towers. This information will be used to determine compensatory stream mitigation requirements to support the joint permit application for the proposed project.

2.0 UNIFIED STREAM METHODOLOGY

The US Army Corps of Engineers - Norfolk District (USACE) and the Virginia Department of Environmental Quality (VDEQ) proposed a protocol in January 2007 entitled "Unified Stream Methodology" (USM) (USACE et al. 2007). This method replaces both the USACE's Stream Attribute Assessment Methodology (SAAM) and VDEQ's Stream Impact and Compensation Assessment Methodology (SICAM). The purpose of the method is to rapidly assess the stream compensation requirements that would be required for permitted stream impacts and the amount of "credits" obtainable through implementation of various stream compensation practices.

There are four processes that are described within the USM. These include 1) assign a Reach Condition Index (RCI) to the stream to be impacted; 2) assess the type or severity of impact; 3) determine the compensation requirement; and 4) determine what types of and the amount of the various compensation practices that will satisfy the compensation requirement.

There are six basic types of analysis that are performed using this methodology: 1) assessing existing conditions, 2) characterizing proposed impacts, 3) determining compensation requirements, 4) evaluating pre-compensation conditions, 5) determining compensation credit, and 6) evaluating total compensation credit. This study includes the first three analysis types.

2.1 FIELD DATA FORMS

A field data form (Form 1) was created by the USACE and VDEQ for the Stream Assessment Study. Data related to the four variables included in the USM were collected in the field and recorded via the electronic notebook. Copies of the data forms resulting from the Stream Assessment Study have been exported from the electronic notebook and are included in Appendix A.

2.2 SITE PHOTOGRAPHS

Photographs of the streams assessed during the Stream Assessment Study are located within Appendix B.

2.3 GLOBAL POSITIONING SYSTEM

A global positioning system (GPS) was used during the Stream Assessment Study to collect coordinates for the stream assessment. Reach lengths were determined in the field using a tape measure. The data collected by the GPS unit during the study were exported and incorporated into the CAD/GIS project files. The GPS data were used to define reach lengths for application to the analysis presented in this report.

3.0 RESULTS

A field survey was conducted on 2-3 October 2007 at NAPS for three tributary streams of Harris Creek. The tributaries were assessed to collect the information required by the USACE and VDEQ USM methodology. Appendix A contains the field data sheets and associated worksheets that were used to calculate the stream condition index (CI), the reach condition index (RCIs), and the compensation requirement (CRs) for each of the stream assessment reaches (SAR).

The three tributaries to Harris Creek were classified as headwater streams. At the time of the assessment, the stream assessment reaches did not contain water. The width of the channels varied from 0.5 feet to 8 feet and the depth of the channels ranged from 1 inch to 5 feet. The substrate was characterized as silty sand with gravel located throughout each SAR.

The streams were divided into multiple stream assessment reaches that were determined by significant changes in one or more of the four variables: channel condition, riparian buffer, instream habitat, and channel alteration. In Stream A, four stream assessment reaches were characterized; in Stream B, six stream assessment reaches were characterized; and in Stream C, four stream assessment reaches were characterized. For each stream assessment reach, a condition index was given for each variable and an impact factor (IF) was assigned based on the expected impairment of the stream. For each of the stream assessment reaches, an impact factor of 1.0 was assigned, representing an activity that is presumed to have a complete or near-complete loss of all beneficial stream functions due to the proposed activity. The stream assessment reaches were recorded on the data form using the letter to determine the stream (A, B, or C) followed by the sequence of the stream assessment reach (i.e., the first assessment reach in Stream A of the proposed project was recorded on the data form as A-1).

As defined by the USM the reach condition indexes can vary from 0.5 to 1.5. The reach condition index values ranged from 0.98-1.29 for the stream assessment reaches evaluated at the proposed cooling towers site.

The compensation requirement was determined based on the length of impact multiplied by the reach condition index and the impact factor. Table 1 provides a summary of compensation requirement values for each stream assessment reach evaluated.

As a result, approximately 2,668 linear feet of stream channel will be permanently impacted by the proposed project. The data calculations from the stream assessment resulted in a total Compensation Requirement of 3,084 stream credits. This represents the total number of stream compensation credits required for the proposed cooling towers.

The USM includes forms for evaluation of mitigation potential on streams proposed for preservation and/or enhancement. These forms are not included in this report because Dominion proposes to mitigate permanent impacts to streams by purchasing stream credits at an approved stream mitigation bank and preserving streams within the NAPS site.

Stream Name	Reach ID	Length of Impact (L ₁) (feet)	Reach Condition Index (RCI)	Impact Factor (IF)	Compensation Requirement (CR) (L _I × RCI × IF)
Alpha	A-4	217	1.18	1.00	256
Bravo	B-1	205	1.29	1.00	264
	B-4	244	1.04	1.00	254
	B-5	528	1.16	1.00	612
	B-6	253	1.20	1.00	304
Charlie	C-1	191	0.98	1.00	187
	C-2	174	1.11	1.00	193
	C-3	661	1.18	1.00	780
	C-4	195	1.20	1.00	234
	Total L _I	2,668		Total CR	3,084

Table 1. Values that Determine the Compensation Requirements for the StreamAssessment Reaches Evaluated

4.0 CONCLUSION

The USM protocol developed by the USACE – Norfolk District and VDEQ was applied to three headwater streams located within the footprint of the proposed cooling towers site. The Stream Assessment Survey was conducted on 3-4 October 2007. Based on the USM, the total compensation requirement is 3,084.

5.0 **REFERENCES**

U.S. Army Corps of Engineers, Norfolk District (USACE) and Virginia Department of Environmental Quality (VDEQ). 2007. Unified Stream Methodology for Use in Virginia. January



Figure 1. General Location Map



PHOTOGRAPHIC RECORD



Photographic Record

North Anna Power Station Mineral, Virginia



Stream Assessment Reach A-1



Stream Assessment Reach A-3



Stream Assessment Reach A-2



Stream Assessment Reach A-4



Photographic Record

North Anna Power Station Mineral, Virginia



Stream Assessment Reach B-1



Stream Assessment Reach B-2



Stream Assessment Reach B-3, Riparian Area



Stream Assessment Reach B-5



Stream Assessment Reach B-4



Photographic Record

North Anna Power Station Mineral, Virginia



Stream Assessment Reach C-1



Stream Assessment Reach C-2



Stream Assessment Reach C-3



Stream Assessment Reach C-4

USM DATA SHEETS

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	Riparian Buffers Condition Scores Delemine squ B. Enter the % R Right Bank Left Bank B. INSTREAM banks; root mats Instream Habitat/ Available Cover	Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are are are footage for ea Riparian Area and S % Riparian Area Score > % Riparian Area Score >	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as. 5 ach stream bank i ach by measuring Corre for each ripa 100% 1.5 100% 1.5 ind substrate size complexes, stable imal ach stream bank i over the reach.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% the canopy cover and containing both herbaceous and understory. High 1.2 into Condition Cat or estimating leng arian category in tt conserved to the second	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width. Cale the blocks below. Conditiona ptimal ments are typically of the reach and are maintenance of alions	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid culators are provid	measurements o	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e blocks e b	Ay be acceptable) por Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, now crops, active feed lots, trails, or other comparable conditions. Low 0.5 tiparian qual 100 100% 100% is shade; undercut por sitisted above are nstable. Habitat ally present in less tipare are stable. Habitat	NOTES>> CI= (Sum % RA * Sr Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.50 1.50

	St	tream Ir	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
 CHANNEL spoil piles, constr 	ALTERATION: Stream crossin	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelization	embankments,	NOTES>>		
	Nealiaible	Mi	Conditiona	al Category Mod	erate	Sev	ere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of by any of the chanr in the parameter g 80% of banks sh riprap, or	f reach is disrupted lel alterations listed uidelines AND/OR ored with gabion, cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0.	5			1.50
	REACH (INDEX and S	TREAM CO	NDITION UNI	ITS FOR THIS	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	e CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>	1.24
							RCI	= (Sum of all C	l's)/5	0
							COMPENSAT	X LF X IF	WENT (CR) >>	U
Notes:										
 Describe ex maintained, lav 100 percent mature common greenbrier, What is the 	cisting riparian buffer (i.e., ma wns, impervious surfaces, etc deciduous forest with thin understory. Sp , nepalse browntop, and virginia creeper. estimated bankfull width?	ture forested, f .). Provide the peices within ripariar	Approximately 8 ft	I shrub layers centage of the t cherry, american ho	oresent in unde total riparian ar	erstory, utility ea ea comprised o poplar, poison ivy, gra	asments presei f each cover ty ppe fern species,	nt, understory pe.		
3. What is the	estimated bank height?		Approximately 1 ft 8	3 in						
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the ch	nannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has be	en altered?		Natural sinuosity		
6. Does the ch	nannel appear to be aggrading	j, degrading, oi	r stable?		Stable					
7. Describe th	e sediment supply (i.e., extrer	ne, very high, ł	nigh, etc.).		Low sediment suppl	ly				
8. Are the stre	ambanks eroding? Over wha	t percentage o	f the reach?		30 percent of strear	nbanks eroding				
9. Are headcu	ts present within the reach?		No headcuts presen	ıt						
10. Explain the	e composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.).	25 % cobble, 25% g	ravel, 25% sand, and	d 25% silt.		
Additional No	otes:									
	75 percent st	ream was dry, I	not flowing. St	ream originate	s from two CMI	Ps at side of rai	Iroad tracks.			

Channel Optimal Locality Council or and an analysis of the second of			Stre		SSESS fied Stream M	sment Iethodology f	Form	(Forr	n 1)		
1413101 Stream Assessment Louisa Co. 10/2/07 A.2 128 0 Name(s) of Evaluators) Steam Name and Information T.U., CW, MH Alpha - Tributory to Lake Anna Channel Condition: Assess the cace-weaters of the stream of the stre	Project #	F	Project Name	For use i	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
Name(s) of Evaluation(s) Bitem Name and Information TJL, CWL, MLH Apply a Tributary to Lake Anna Channel Condition: Assess the cross-sectors of the sitema and set has the main a	1439101	Stre	am Assessm	ent	Louisa Co.			10/2/07	A-2	128	0
<form> Tel CPUIC UP Carbon C</form>	Name	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion		1		I	
Channel Condition: Access the orace-access of the data and providing operating under agrigation (Condition)	т	JL, CWL, MLH	ł	Alpha - Tribu	tary to Lake A	Anna					
Optimal Outgoinal Marginal Poor Severe Channel Juine Channel	. Channel C	ondition: Asses	s the cross-secti	on of the stream a	nd prevailing cond	dition (erosion, ag	gradation)				
Optimal Suboptimal Marginal Poor Severe Channel Image: Suboptimal Image: Suboptimal <td< td=""><td></td><td></td><td></td><td></td><td>(</td><td>Conditional Categor</td><td>ry</td><td></td><td></td><td></td><td></td></td<>					(Conditional Categor	ry				
Image: Note: Image: Note: Image: Note: Image: Note: Score 3 2.4 2 1.6 1 NOTES>> Image: Note: Image: N	Channel Condition	Very little incision or 100% stable banks. protection or natura (80-100%). AND/ bars/bankfull benc, Access to their orig fully developed wide Mid-channel bars, an few. Transient sed covers less than	active erosion; 80- Vegetative surface I rock, prominent OR Stable point hes are present. jinal floodplain or bankfull benches. nd transverse bars iment deposition 10% of bottom.	Slightly incised, fr erosion or unprotec of banks are st Vegetative protect prominent (60- Depositional feat stability. The bar channels are well dk has access to bai newly developed portions of the r sediment covers 10 bott	ew areas of active ted banks. Majority table (60-80%). tion or natural rock 80%) AND/OR ures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along each. Transient 0-40% of the stream tom.	Often incised, but I Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegetai 60% of banks. S bevertical or under instabil contribute instabil contribute instabil channels have vege > 40% of the bank	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 tireambanks may rout. AND/OR 40- overed by sediment. emporary/transient, ity. Deposition that tability, may be AND/OR V-shaped attive protection on s and depositional	Overwider Overwider Vertically/laterally widen further. Maj are near vertical. El 80% of banks. Ve present on 20-40° insufficient to preve 60-80% of the str sediment. 3 temporary/transi contributing to inst shaped channels protection is prese banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60- getative protection % of banks, and is nt erosion. AND/OR aem is covered by Sediment is ant in nature, and ability. AND/OR V- have vegetative nt on > 40% of the diment deposition is or	Deeply incised vertical/lateral ins incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%, ANIC channel. Greater th bed is covered contributing to ins thread channels ar for	(or excavated), stability. Severe tained within the d below average giority of banks egetative protection n 20% of banks, is giority of banks egetative protection n 20% of banks, is protection. Obvious bank Erosion. Obvious bank Erosion. Obvious bank Erosion. Obvious bank Brook of stream by deposition, stability. Multiple d/or subterranean
Score 3 2.4 2 1.6 1 NOTES>> Riparian Free shalon (bh > 3 inches) parater, with 9 (bh to cancy or our with any be acceptable) NOTES>> NOTES>> Riparian Tree shalon (bh > 3 inches) parater, with 9 (bh to cancy or our with any be acceptable) Ios Poor NoTES>> NOTES>> Riparian Tree shalon (bh > 3 inches) parater, with 9 (bh to cancy or our with any be acceptable) Ios Poor NoTES>> Ios Poor Buffers Tree shalon (bh > 3 inches) parater, with 9 (bh to cancy or our with any be acceptable) Ios Poor Ios Poor Suboptimal Ios Poor Buffers Tree shalon (bh > 3 inches) parater, with 9 (bh to cancy or our with any be acceptable) Ios Poor Ios Poor Suboptimal Ios Poor Scores 1.5 1.2 1.1 0.85 0.75 0.6 0.5 Delenset riparian Areas along seach stream bank into Condition Categories and Condition Scores using the descriptors. Ensure the sums of % Rapation Biocks equal to 0 Ios % Rapation Biocks equal to 0 Io						teatures which col	ntribute to stability.	abs	ent.	TIO	w.
NOTES> RIPARIAN BUFFERS: Assess both bank's 100 foot inparian areas along the entire SAR. (rough measurements of length & wind may be acceptable) NOTES> NOTES> Optimal Suboptimal Registion areas with registin registion areas with registion areas with registion ar	-	3		2	.4		2	1	.6	1	
Image: Note of the symplectic state symplectic state of the symplectic state symplectic state of the symplectic state symplectic state of the s	Score NOTES>> . RIPARIAN	BUFFERS: As	sess both bank's mal	: 100 foot riparian Con Subo	areas along the en aditional Cate	ntire SAR. (rough gory Mary	measurements o ginal	f length & width ma	ay be acceptable)	NOTES>>	
Condition Scores 1.5 1.2 1.1 0.85 0.75 0.6 0.5 Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. Ensure the sums of % Riparian Enter the % Riparian Area and Score for each riparian category in the blocks below. Blocks equal 100 Image: Score S	Score NOTES>> RIPARIAN Riparian Buffers	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located w area	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is.	High Suboptimal: Riparian areas with tree stratum (dbh 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the end ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Ay be acceptable) OF Low Poor: Impervious surfaces, mine sopoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Concest Image: Concest in gradient and server the sums in the condition Categories and Condition Scores using the descriptors. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. Ensure the sums of % Riparian Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. of % Riparian Right Bank	Score NOTES>> RIPARIAN Riparian Buffers	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High	Areas along the end ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, if present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Ay be acceptable) The second	NOTES>>	
Cl= (Sum % RA * Scores*0.01)/2 Left Bank % Riparian Area> 100% Rt Bank Cl> 0.60 Score > 0.6 0.6 0.60 0.60 0.60 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut nks; root mats; SAV; riffle poole complexes, stable features. NOTES>> Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat elements are typically present in 30-50% of the reach and are in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in less than 10% of the reach. Habitat	Score NOTES>> RIPARIAN Riparian Buffers	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is.	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy course and a maintained understory. Recent cutover (dense vegetation). Low 1.1	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with ~30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries: no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	Ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5	NOTES>>	
Left Bank % Riparian Area> 100% Rt Bank Cl> 0.60 Score> 0.6 Image: Construction of the reach of the reach. 0.60 It Bank Cl> 0.60 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embeddeness; shade; undercut restruction of the reach of the reach. NOTES>> Instream Habitat/ Available Cover Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in less the reach. Habitat elements are typically present in less the reach.	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delineate ripar Delermine squ Enter the % Right Bank	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.	sess both bank's mai 3 inches) present, canopy cover. vithin the riparian is. 5 5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale the blocks below.	htire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements o ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, prods, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	Ay be acceptable)	NOTES>>	
Score > 0.6 Lt Bank Cl > 0.60 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut nks; root mats; SAV; riffle poole complexes, stable features. NOTES>> Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat / Available Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in less than 10% of the reach. Habitat of the reach.	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delineate ripar Determine squ Enter the % Right Bank	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.	sess both bank's mal 3 inches) present, canopy cover. within the riparian is. 5 5 5 5 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in th	Areas along the enditional Caterers along the enditional Caterers and the suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	htire SAR. (rough gory High Marginal: Non-maintained, ense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-tili cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	Ay be acceptable)	NOTES>>	200res*0.01)/2_
INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut nks; root mats; SAV; riffle poole complexes, stable features. NOTES>> Instream Habitat/ Mating the tements are typically present in 30-50% of the reach and are in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in 10-30% of the reach. NOTES>>	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delineate ripar Determine squ Enter the % R Right Bank	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area Lare footage for ear iparian Area and So % Riparian Area> Score >	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is. 5 5 ch stream bank i ch stream bank i core for each ripa 100% 0.6	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% the canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale the blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using sulators are provid	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>> CI= (Sum % RA * Sc Rt Bank CI >	cores*0.01)/2 0.60
Conditional Category Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat/ Available Habitat elements are typically present in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations. Habitat elements listed above are lacking or are unstable. Optimal 0.50% 0.00% 0.00%	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delemente ripar Determine squ Enter the % Ri Right Bank Left Bank	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area Lare footage for each iparian Area and Sc % Riparian Area> Score >	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is. 5 5 5 5 5 5 6 6 by measuring core for each ripa 100% 0.6 100% 0.6	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	htire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, cow row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>> CI= (Sum % RA * Sc Rt Bank CI > Lt Bank CI >	cores*0.01)/2 0.60 0.60
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populations. than 10% of the reach.	Score NOTES>> RIPARIAN Riparian Buffers Condition Condition Condition Delineate ripar Determine squ Enter the % R Right Bank Left Bank I.Left Bank I.INSTREAM	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area Used for the strategy of the strategy 1.1.1 rian areas along ea uare footage for eac uare footage for eac score > % Riparian Area> Score > % Riparian Area> Score > 1 HABITAT: Varn SAV; riffle poole co	sess both bank's mal 3 inches) present, canopy cover. within the riparian is. 5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in tr a	areas along the en ditional Cater ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. and depths; woody Conditiona	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-tili cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently area,	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% shade; undercut	NOTES>> Cl= (Sum % RA * Sc Rt Bank Cl > Lt Bank Cl > NOTES>>	cores*0.01)/2 0.60 0.60
	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delineate ripar Determine squ Enter the % R Right Bank Left Bank Left Bank INSTREAM anks; root mats; Instream Habitat/ Available Cover	BUFFERS: As Option Tree stratum (dbh > with > 60% tree Wetlands located v area 1.1 Trian areas along ea uare footage for eact iparian Areas and Su % Riparian Areas Score > % Riparian Areas Score >	sess both bank's mal 3 inches) present, canopy cover. vithin the riparian is. 5 5 5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Con Subop High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in th ses, water velocity a features. Subop Stable habitat eleg present in 30-50%	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid culators are provid c	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 stratum (dbh >3 st	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seded and tabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e blocks	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, conditions. conditions. Low 0.5 he sums tiparian qual 100 100% 100% ishade; undercut or ilisted above are stable. Habitat ally present in less fibe noadi	NOTES>> CI= (Sum % RA * Sc Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 0.60 0.60

	S	tream Ir	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL	LALTERATION: Stream crossi	ngs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chan	nel, channelizatio	n, embankments,	NOTES>>		
spoil piles, const	rictions, livestock		Conditiona	al Category						
	Negligible	Mi	nor	Mod	lerate	Se	vere			
				40 - 60% of reach is disrupted by any	60 - 80% of reach is disrupted by any					
Channel		Less than 20% of	20-40% of the	of the channel alterations listed in	of the channel alterations listed in	Greater than 80%	of roach is disrupted			
Alteration	Channelization, dredging, alteration, or	disrupted by any of	disrupted by any of	the parameter guidelines. If	the parameter guidelines. If	by any of the char	inel alterations listed			
	unaltered pattern or has naturalized.	alterations listed in	alterations listed in	stream has been channelized,	stream has been channelized,	80% of banks sl	nored with gabion,			
		guidelines.	guidelines.	normal stable stream meander	normal stable stream meander	npiap, c				
				pattern has not recovered.	pattern has not recovered.					
SCORE	1.5	1.3	1.1	0.9	0.7	().5			1.10
	REACH	CONDITION	INDEX and S	TREAM CO	NDITION UN	ITS FOR TH	S REACH			
NOTE: The CIs and R	RCI should be rounded to 2 decimal places. T	he CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	0.84
							RCI	= (Sum of all C	l's)/5	
							COMPENSAT	ION REQUIRE	MENT (CR) >>	0
							CR = RCI	X LF X IF		l
Notes:	viating vinarian huffar (i.a. ma	ture ferented k				notomi utilitu i	acmente nueco	nt understem.		
1. Describe ex maintained, la	xisting riparian butter (i.e., ma iwns. impervious surfaces. etc	ture forested, r c.). Provide the	estimated perc	centage of the	present in unde total riparian ar	erstory, utility e	easments prese of each cover ty	nt, understory /pe.		
100 percent herbac	ceous, few tree saplings.	,		.	••••	• • •				
2. What is the	e estimated bankfull width?		Approximately 1 ft							
3 What is the	estimated bank beight?		Approximately 1 ft	5 in						
o. What is the	commuted bank height:		, pproximatory i ne							
4. Is the chan	nel high gradient or low gradi	ient?	High gradient							
5. Does the cl	hannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has be	en altered?				
Charmer has been h	mounted by power lines.									
6. Does the cl	hannel appear to be aggrading	g, degrading, o	r stable?		Stable					
7. Describe th	ne sediment supply (i.e., extre	me, very high, h	nigh, etc.).		Low sediment supp	ly				
						-				
8. Are the stre	eambanks eroding? Over what	at percentage o	f the reach?		10 percent of strear	nbanks eroding				
	Ū									
9. Are headcu	its present within the reach?		No headcuts preser	nt						
o. Ale neudoc										
10 Evolain th	e composition of the existing	stream hed (ne	arcent cobble r	ock sand etc	`	50% gravel 50% s	and			
	le composition of the existing	Stream bed (pe		ook, sand, etc.	<i>)</i> •	6676 grafol, 6676 6				
Additional N	otes:									
		D								
		Powerline rov	v-mowed with r	rıp-rap. Decidu	ious woodland	on either side.				

		Stre		SSESS fied Stream M	Sment Methodology f	Form or use in Virg	i (Forr	n 1)		
Project #	F	Project Name	For use I	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	am Assessm	ent	Louisa Co.			10/2/07	A-3	968	0
Name	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion	1				
1	IL, CWL, MLH	1	Alpha - Tribu	tary to Lake A	Anna					
. Channel C	ondition: Asses	s the cross-secti	on of the stream a	nd prevailing cond	dition (erosion, aq	gradation)				
	Onti		Cuba		Conditional Categor	ry nim el	D-		C	
Channel Condition	Very little incision or 100% stable banks. protection or natura (80-100%). AND/ bars/bankfull benc Access to their orig fully developed wide Mid-channel bars, ai few. Transient sed covers less than	active erosion; 80- Vegetative surface I rock, prominent OR Stable point thes are present. jinal floodplain or bankfull benches. nd transverse bars iment deposition 10% of bottom.	Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The bar channels are well di has access to ba newly developed portions of the r sediment covers 10 bot	ew areas of active ted banks. Majority table (60-80%). tion or natural rock 80%) AND/OR ures contribute to hkfull and low flow efined. Stream likely hkfull benches, or floodplains along each. Transient 0-40% of the stream tom.	Often incised, but I Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegetal 60% of banks. S bevertical or unde 60% of stream is co Sediment may be t contribute instabili contribute to s forming/present. A channels have vege > 40% of the bank	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 tireambanks may rout. AND/OR 40- overed by sediment. emporary/transient, ity. Deposition that tability, may be AND/OR V-shaped attive protection on s and depositional	Overwiden Overwiden Vertically/laterally widen further. Maj are near vertical. Er 80% of banks. Ve present on 20-40° insufficient to preve 60-80% of the str sediment. 3 temporary/transi contributing to inst shaped channels protection is prese banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60- getative protection & of banks, and is nt erosion. AND/OR pediment is ant in nature, and ability. AND/OR V- have vegetative nt on > 40% of the diment deposition is cet	Deeply incised vertical/lateral in incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%, ANI channel. Greater th bed is covered contributing to in thread channels ar a	(or excavated), stability. Severe tained within the d below average ajority of banks, egetative protectic n 20% of banks, is ion. Obvious bank Erosion/raw banks /0/CR Aggradus ana 80% of stream by deposition, stability. Multiple d/or subterranean
				_	features which cor	ntribute to stability.	abs	ent.	flo	w.
Score	3		2	.4		2	1.	6	1	
NOTES>>	BUFFERS: As	sess both bank's	100 foot riparian Con Subo	areas along the en aditional Cate	ntire SAR. (rough gory Maru	measurements o ginal	f length & width ma	y be acceptable)	NOTES>>	
NOTES>> 2. RIPARIAN Riparian Buffers	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	asess both bank's mal 3 inches) present, canopy cover. within the riparian as.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the er ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Development Devel	NOTES>>	
NOTES>> 2. RIPARIAN Riparian Buffers	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	3 inches) present, canopy cover. within the riparian as.	100 foot riparian Cor Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High	measurements o ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	v be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
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Condition Scores Riparian Buffers Condition Scores Delineate ripa Delineate ripa	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area Wetlands located v area 1.1 Trian areas along ea uare footage for eau iparian Area and S % Riparian Area Score >	asess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 ch stream bank i core for each ripa 100% 1.2 100%	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy course and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhb > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, ourspiras; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % R Blocks e	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums iparian qual 100 100%	NOTES>> Cl= (Sum % RA * St Rt Bank Cl >	cores*0.01)/2 1.20
Condition Riparian Buffers Condition Scores Determine squ Benter the % R Right Bank Left Bank	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area Wetlands located v area 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	asess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 5 5 5 6 6 by measuring core for each ripa 100% 1.2 100% 1.2	100 foot riparian Cor Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng	areas along the enditional Categories and constrained by the second seco	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % R Blocks e	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums iparian qual 100 100%	NOTES>> CI= (Sum % RA * Su Rt Bank CI > Lt Bank CI >	pores*0.01)/2 1.20 1.20
NOTES>> 2. RIPARIAN Riparian Buffers Condition Scores . Delineate ripa 2. Determine square 3. Enter the % R Right Bank Left Bank 3. INSTREAN	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area 1.1 rian areas along ea uare footage for ear uare footage for ear uare footage for ear uare footage for ear score > % Riparian Area> Score > % Riparian Area> Score >	asess both bank's mal 3 inches) present, canopy cover. within the riparian is. 5 5 5 5 6 6 by measuring core for each ripa 100% 1.2 100% 1.2 ied substrate size omplexes. stable	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th and the category in the category in the category in th and t	areas along the en ditional Cates ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (abh > 3 inches) present, with <30% tree canopy cover. High 0.85 Ition Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open waterstartum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % R Blocks e Locks e L	y be acceptable)	NOTES>> Cl= (Sum % RA * Sr Rt Bank Cl > Lt Bank Cl > NOTES>>	cores*0.01)/2 1.20 1.20
Condition Scores Condition Scores Determine squ Enter the % R Right Bank Left Bank S. INSTREAM	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v arec Wetlands located v arec 1.1.1 rian areas along ea uare footage for ear uare footage for ear uare footage for ear score > % Riparian Area> Score > % Riparian Area> Score > % Riparian Area> Score >	asess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th con estimating leng se, water velocity a features.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and depths; woody Conditional	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhb > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaccous areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, oropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % R Blocks e low embededness	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums iparian qual 100 100% 100% shade; undercut	NOTES>> CI= (Sum % RA * St Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
NOTES>> 2. RIPARIAN 2. RIPARIAN 2. RIPARIAN 2. RIPARIAN Condition Cover Cove	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area 1.1 rian areas along ea uare footage for ear uare footage for ear uare footage for ear score > % Riparian Area> and S % Riparian Area> Score > % Riparian Area> % Riparian % Riparian Area> % Riparian % Riparian Area> % Riparian %	asess both bank's mal 3 inches) present, canopy cover. within the riparian is. 5 5 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7	100 foot riparian Cor Subo High Suboptimal: Riparian areas with Iree stratum (dbv herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th features. Subo Stable habitat ele present in 30-5% (adequate for prost	areas along the en ditional Cates ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width. Cale th and width. Cale blocks below. Conditiona ptimal ments are typically of the reach and are naintenance of ations.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provid culators are provi	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water, if present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate; ginal ments are typically of the reach and are naintenance of ations.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t Blocks e Blocks e Condition No ensure t Blocks e Condition No ensure t Condition	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums iparian qual 100 100% 100% shade; undercut isted above are istable. Habitat ally present in less	NOTES>> Cl= (Sum % RA * So Rt Bank Cl > Lt Bank Cl > NOTES>>	cores*0.01)/2 1.20 1.20

	St	tream In	npact A	ssessm	ent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL	ALTERATION: Stream crossin	ngs, riprap, concret	te, gabions, or cor	ncrete blocks, stra	ightening of chani	nel, channelization	, embankments,	NOTES>>		
			Conditiona	al Category						
	Negligible	Mir	ıor	Mod 40 - 60% of reach	erate 60 - 80% of reach	Sev	vere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of by any of the chanr in the parameter g 80% of banks sh riprap, or	of reach is disrupted hel alterations listed uidelines AND/OR ored with gabion, r cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5			1.50
	REACH (CONDITION I	NDEX and S	TREAM CO	NDITION UN	ITS FOR THIS	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>	1.24
							RCI	= (Sum of all C	l's)/5	
							COMPENSAT		MENT (CR) >>	0
Mataa							CK = RCI	ΛLF Λ IF		l
 Describe of maintained, la 100 percent mature What is the 	wns, impervious surfaces, etc deciduous forest	:.). Provide the	Approximately 3 ft	centage of the t	otal riparian ar	ea comprised c	of each cover ty	pe.		
3. What is the	estimated bank height?		Approximately 2 ft							
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the cl Natural sinuoisty	hannel appear to have natural	sinuosity or do	es it appear th	at the channel	pattern has be	en altered?				
6. Does the cl	hannel appear to be aggrading	g, degrading, or	stable?		Stable					
7. Describe th	ne sediment supply (i.e., extrer	me, very high, h	igh, etc.).		Low to medium sed	iment supply				
8. Are the stre	eambanks eroding? Over wha	it percentage of	the reach?		40 percent of strear	nbanks eroding				
9. Are headcu	its present within the reach?		No headcuts presen	t						
10. Explain th	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	50% cobble, 25% sa	and, 25% gravel/rock			
Additional M	atacı								-	
			Channe	l dry, no flowir	ıg water.					

		Stre		SSESS	sment lethodology f	Form or use in Virg	(Forr	n 1)		
Project #		Project Name	For use i	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	nent	Louisa Co.			10/2/07	A-4	730	1
Nam	e(s) of Evaluat	tor(s)	Steam Name	and Informat	ion		1		I	
٦	TJL, CWL, MLI	н	Alpha - Tribu	itary to Lake A	Anna					
. Channel C	Condition: Asse	ss the cross-section	on of the stream a	and prevailing cond	dition (erosion, ag	gradation)				
				(Conditional Catego	ry				
Channel Condition	Very little incision or 100% stable banks. protection or natur (80-100%). AND bars/bankfull ben Access to their ori fully developed wid Mid-channel bars. a few. Transient sec covers less than	r active erosion; 80- Vegetative surface al rock, prominent (NR Stable point ches are present. ginal floodplain or e bankful benches. and transverse bars diment deposition 10% of bottom.	Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The bar channels are well di has access to ba newly developed portions of the ri sediment covers 10 bott	ew areas of active ted banks. Majority table (60-80%). tion or natural rock -80%) AND/OR urres contribute to nkfull and low flow efined. Stream likely nkfull and lows, or floodplains along reach. Transient -040% of the stream tom.	Often incised, but Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of theam is co Sediment may be t contribute instabil contribute to s forming/present. J channels have vege > 40% of the bank	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 tireambanks may rout. AND/OR 40- byoered by sediment. emporary/transient, ity. Deposition that tability, may be AND/OR V-shaped ataive protection on s and depositional	Overwider Vertically/laterally widen further. Maj are near vertical. El 80% of banks. Ve present on 20-40° insufficient to preve 60-80% of the str sediment. 3: temporary/transis contributing to inst shaped channels protection is preses banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection % of banks, and is nt erosion. AND/or bediment is and is overned by Sediment is and in nature, and ability. AND/OR V- have vegetative nt on > 40% of the diment deposition is	Deeply incised vertical/lateral ins incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANIC channel. Greater th bed is covered contributing to ins thread channels ar	(or excavated), tability. Severe tained within the d below average ajority of banks egetative protectio n. Obvious bank Erosion/raw banks D/OR Aggrading D/OR Aggrading by deposition, tability. Multiple d/or subterranean
					features which co	ntribute to stability.	abs	ent.	flo	w.
Score	3	3	2	.4		2	1	.6	1	
	Opti	imal	: 100 foot riparian Con Subo	areas along the en Iditional Cate Inditional Cate	ntire SAR. (rough gory Mary	measurements o	f length & width ma	ay be acceptable)	NOTES>>	
Riparian Buffers	Opti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, a canopy cover. within the riparian ras.	tion toot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh ≥ 3 inches) present, with 30% to 60% thre 3 anopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the enditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhb > 3 inches) present, with <30% tree canopy cover.	terministic of the second seco	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries, no-till coropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers	Opti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, a canopy cover. within the riparian vas.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh ≥ 3 inches) (dbh > 3 inches) (dbh > 3 inches) (dbh > 4 inches) (dbh > 1 inches) (dbh >	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and tabilized, or other comparable condition. High	tor Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers Condition Scores	Opti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, canopy cover. within the riparian has.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	Areas along the enditional Cates ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy coordinationed understory. Recent cutover (dense vegetation). Low 1.1	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	terminiation of the second sec	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are 1. arian areas along ex- uare footage for ea Riparian Area and S % Riparian Area? Score >	 seess bour banks imal > 3 inches) present, e canopy cover. within the riparian pass. .5 ach stream bank i ach by measuring Score for each ripa 100% 1.2 	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale ne blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lackout nav production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	Av be acceptable) toor Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>>	
Riparian Buffers Condition Scores Delineate ripa Delineate ripa Determine sq Enter the % R Right Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Metlands located are 1. arian area\$ along ex uare footage for ea siparian Area and S % Riparian Area> Score >	 seess bour bank s imal > 3 inches) present, e canopy cover. within the riparian las. .5 ach stream bank i ach by measuring Score for each ripa 100% 1.2 	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cate or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhb > 3 inches) present, with <30% tree canopy cover. High 0.85	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparial and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	A be acceptable) The sum of the	NOTES>>	zores*0.01)/2
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are 1. arian areas along et uare footage for ea Riparian Area and S % Riparian Area? Score > % Riparian Area?	 seess bour bank s imal > 3 inches) present, e canopy cover. within the riparian ras. .5 ach stream bank in ach by measuring Score for each riparian 100% 1.2 	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Catt or estimating leng arian category in tt	areas along the en ditional Cate, ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) rosent, with 30% to 60% the anopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	the descriptors. the d	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till coropland; actively grazed pasture, sparsely vegetated non-maintained area; recently seeded and stabilized, or other comparable condition. High 0.6 Blocks e	A be acceptable) The sum of the	NOTES>> CI= (Sum % RA * Sc Rt Bank CI >	cores*0.01)/2 1.20
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank Left Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are Metlands located are Netlands located are Netlands located are Netlands located are Netlands located are Netlands located Area Netlands located Netlands located Area Netlands located Area Area Netlands located Area	imal > 3 inches) present, canopy cover. within the riparian as. 5 ach stream bank i ach stream bank i ach by measuring Score for each ripa 100% 1.2 100% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Catt or estimating leng arian category in t	areas along the en ditional Cate, ptimal Low Suboptimal: Riparian areas with b 3 inches) resent, with 30% to 60% the canpy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid	descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, orropiand; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	A be acceptable) NOT Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>>	cores*0.01//2 1.20 1.20
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank Left Bank 3. INSTREAN	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. Arian areas along ex- uare footage for ea Riparian Area and S % Riparian Area? Score > % Riparian Area? Score > % Riparian Area? Score > % Riparian Area? Score >	 seess bour banks imal > 3 inches) present, e canopy cover. within the riparian pass. .5 ach stream bank i ach by measuring Score for each ripar 100% 1.2 100% 1.2 ried substrate size 	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale the blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (back) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provid	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e blocks e	A be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100%	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank Left Bank 3. INSTREAM	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. arian areas along ex- uare footage for ear ware footage footage for ear ware footage for ear ware footage footage footage footage ware footage footage footage ware footage footage footage ware footage footage ware footage footage ware footage footage ware footage ware footage footage ware footage war	 seess bour bank s imal > 3 inches) present, e canopy cover. within the riparian ias. .5 ach stream bank i ach by measuring Score for each ripa 100% 1.2 100% 1.2 ried substrate size complexes, stable 	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Catt or estimating leng arian category in tt	areas along the en ditional Cate, ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width. Cale blocks below. and depths; woody Conditional	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using sulators are provid	stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e low embededness	A be acceptable) The sum of the	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine sq 3. Enter the % R Right Bank Left Bank 3. INSTREAN Danks; root mats Instream Habitat/ Available Cover	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. arian areas along ex- uare footage for ea vare footage for ea Score > % Riparian Area> Score > % Riparian Area> % Ripa	imal > 3 inches) present, e canopy cover. within the riparian as. 5 ach stream bank i ach by measuring Score for each ripa 100% 1.2 100% 1.2 ried substrate size complexes, stable imal re typically present 0% of the reach.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in th arian category in th ss, water velocity a features. Subo Stable habitat elle present in 30-50% or adequate for andequate for areated the state of the sta	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width. Cale th and width. Cale blocks below. Conditiona ptimal ments are typically of the reach and are maintenance of ations	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid culators are provid c		f length & width ma	A be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100% is shade; undercut stable. Habitat ally present in less stable. Habitat ally present in less	NOTES>> CI= (Sum % RA * Sc Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20

	S	tream Ir	npact A	ssessm	nent For	m Page	e 2			
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL spoil piles, constr	ALTERATION: Stream crossir rictions, livestock	ngs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chan	nel, channelizatio	n, embankments,	NOTES>>		
, , , , , , , , , , , , , , , , , , , ,	bi		Conditiona	al Category						
	Negligible	MI	nor	40 - 60% of reach	60 - 80% of reach	Se	vere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the char in the parameter 80% of banks s riprap, o	of reach is disrupted nel alterations listed guidelines AND/OR hored with gabion, or cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	().5			1.50
	REACH	CONDITION	INDEX and S	TREAM CO	NDITION UN	ITS FOR TH	S REACH			
NOTE: The CIs and R	RCI should be rounded to 2 decimal places. The should be rounded to 2 decimal places.	he CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	1.18
							COMPENSAT		MENT (CR) >>	861
						·	CR = RCI	X LF X IF	. ,	
Notes:										
 Describe ex maintained, la 100 percent mature 	xisting riparian buffer (i.e., ma wns, impervious surfaces, etc deciduous forest	ture forested, h c.). Provide the	erbaceous and estimated perc	I shrub layers centage of the t	oresent in unde total riparian ar	erstory, utility e rea comprised	easments prese	nt, understory /pe.		
2. What is the	estimated bankfull width?		Approximately 3 ft							
3. What is the	e estimated bank height?		Approximately 2-3 f	t						
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the cl Natural sinuoisty	hannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has be	en altered?				
6. Does the cl	hannel appear to be aggrading	g, degrading, or	r stable?		Stable					
7. Describe th	ne sediment supply (i.e., extrei	me, very high, ł	nigh, etc.).		medium sediment	supply				
8. Are the stre	eambanks eroding? Over wha	at percentage of	f the reach?		40 percent of stream	mbanks eroding				
9. Are headcu	uts present within the reach?		No headcuts presen	nt						
10. Explain th	ne composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.).	40% cobble, 25% s	and, 20% gravel, 15%	% large rocks		
Additional N	otes:									I

		Stre		SSESS	sment	Form or use in Virg	(Forr	n 1)		
Project #		Project Name	For use I	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	ent	Louisa Co.			10/2/07	B-2	632	1
Nam	l e(s) of Evaluat	tor(s)	Steam Name	and Informat	ion					
٦	IJL, CWL, MLI	н	Bravo - Tribu	Itary to Lake	Anna					
Channel C	ondition: Asse	ss the cross-secti	on of the stream a	and prevailing con	dition (erosion, an	aradation)				
				(Conditional Catego	ry			-	
Channel Condition	Very little incision or 100% stable banks. protection or natur (80-100%). AND bars/bankfull bem Access to their ori fully developed wid Mid-channel bars, a few. Transient sec covers less than	r active erosion; 80- Vegetative surface al rock, prominent //OR Stable point ches are present. ginal floodplain or e bankfull benches. and transverse bars diment deposition : 10% of bottom.	Subo Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60) Depositional feat stability. The bar channels are well d has access to ba newly developed portions of the r sediment covers 1(ptimal ewareas of active cted banks. Majority table (60-80%). tion or natural rock -80%) AND/OR tures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along reach. Transient 0-40% of the stream tom.	Often incised, but Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of stream is co Sediment may be 1 contribute to s forming/present. <i>A</i> channels have veg	Iess than Severe or stable than Severe wer bank slopes. esent on 40-60% of threambanks may rout. AND/OR 40- overed by sediment. emporary/transient, tty. Deposition that tability, may be ND/OR V-shaped etative protection on and thoseitions!	Overwider Overwider Vertically/laterally widen further. Maj are near vertical. Ef 80% of banks. Ve present on 20-400 insufficient to preve 60-80% of the str sediment. 2 temporary/transi contributing to inst shaped channels protection is press backe and table co	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection % of banks, and is getative protection % of banks, and is getative protection her erosion. AND/OR baility. AND/OR V- have vegetative nt on > 40% of the diment dorection is	Deeply incised vertical/lateral in incision, flow con- banks. Streambe rooting depth, n vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANI channel. Greater ti bed is covered contributing to in the de is covered	fere (or excavated), stability. Severe tained within the db elow average ajority of banks, is ion. Obvious bank rosion/raw banks by deposition, stability. Multiple dor cubroreana
					features which co	ntribute to stability.	abs	ent.	flo	w.
Score	3	3	2	.4	:	2	1	.6	1	
. Riparian	I BUFFERS: A	ssess both bank's imal	: 100 foot riparian Con Subo	areas along the en nditional Cate ptimal	ntire SAR. (rough gory Mary	measurements o	f length & width ma	ay be acceptable)	NOTES>>	
2. RIPARIAN Riparian Buffers	Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, canopy cover. within the riparian as.	100 foot riparian Cor Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the er aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	htire SAR. (rough gory High Marginal: Non-maintained, dense herbaccous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover.	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries, no-till coropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition.	A be acceptable)	NOTES>>	
2. RIPARIAN Riparian Buffers	Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, c canopy cover. within the riparian as.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, oropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	bor Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers	Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, o canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1	htire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries: no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	Ay be acceptable)	NOTES>>	
2. RIPARIAN Riparian Buffers	Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, canopy cover. within the riparian as.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	Areas along the er aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements o ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pcc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till coropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	A be acceptable)	NOTES>>	
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Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R Right Bank	I BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are Interpret of the strategy Interpret of the strategy Interpret of the strategy Riparian Area and S % Riparian Area Score > % Riparian Area>	ssess both bank's imal 3 inches) present, e canopy cover. within the riparian as. 5 ach stream bank in ach by measuring Score for each ripa 100% 1.2 100%	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > sinches) resent, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th	areas along the en aditional Cates ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provice	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pcc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till coropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	ay be acceptable)	NOTES>> CI= (Sum % RA * S; Rt Bank CI >	cores*0.01)/2 1.20
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2. RIPARIAN Riparian Buffers Condition Scores . Delineate ripa . Determine sq . Enter the % R Right Bank Left Bank 3. INSTREAM	I BUFFERS: An Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are In trian areas along ex- uare footage for ear tiparian Area and S % Riparian Area Score > % Riparian Area> Score > % Riparian Area> Score >	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as. 5 ach stream bank in ach stream bank in ach by measuring Score for each rips 100% 1.2 100% 1.2 100% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh ≥ 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th	areas along the en aditional Cates ptimal Low Suboptimal: Riparian areas with tree stratum (dbs) to 60% tree canop cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Calo he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh s 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, poropland; actively grazed pasture, sparsely vegretated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active denudes surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100%	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
 RIPARIAN Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R Right Bank Left Bank B. INSTREAN anks; root mats 	I BUFFERS: An Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are I I I I I I I I I I I I I	ssess both bank's imal 3 inches) present, a canopy cover, within the riparian as. 5 ach stream bank in ach stream bank in ach by measuring Score for each ripa 100% 1.2 100% 1.2 ried substrate size complexes, stable	100 foot riparian Cor Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in tf arian category in tf features.	areas along the er aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy course and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. and depths; woody Conditiona	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e low embededness	ay be acceptable) toor Low Poor: Impervious surfaces, nine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100%	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
RIPARIAN Riparian Buffers Condition Scores Delineate ripa Determine sq Determine sq Enter the % R Right Bank Left Bank Left Bank S. INSTREAM	I BUFFERS: An Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are I I I I I I I I I I I I I	ssess both bank's imal 3 inches) present, e canopy cover. within the riparian as. 5 ach stream bank in ach by measuring Score for each ripa 100% 1.2 100% 1.2 ried substrate size complexes, stable imal	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > Sinches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Catt or estimating leng arian category in th con estimating	areas along the er aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. and depths; woody Conditiona ptimal	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh s 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provid	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate; ginal	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e low embededness	ay be acceptable)	NOTES>> CI= (Sum % RA * Sr Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
Riparian Buffers Condition Scores Delineate ripa Determine sq Determine sq Determine sq Determine sq Determine sq Enter the % R Right Bank Left Bank Left Bank Left Bank Instream Habitat/ Available Cover	Image: Second	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as. 5 ach stream bank i ach by measuring Score for each ripa 100% 1.2 100% 1.2 ried substrate size complexes, stable imal re typically present 0% of the reach.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Catt or estimating leng arian category in th se, water velocity a features. Subo Stable habitat ele present in 30-50% of adequate for r popula	areas along the en aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbs) - 3 inches) to 60% tree canop cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. blocks below. Conditiona ptimal ments are typically of the reach and are maintenance of ations.	Intire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provice culators are provice al Category Mar Stable habitat ele present in 10-30% adequate for r popul	measurements o ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate; ginal ments are typically of the reach and are naintenance of ations.	f length & width ma Pcc High Poor: Lawns, mowed, and maintained areas, parsely expected non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e blocks e blo	ay be acceptable) Por Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100% 100% 100%	NOTES>> CI= (Sum % RA * Sr Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20

	St	tream Ir	npact A	ssessm	ent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
 CHANNEL spoil piles, constri 	. ALTERATION: Stream crossin ictions, livestock	gs, riprap, concre	te, gabions, or cor	icrete blocks, stra	ightening of chanr	el, channelization,	embankments,	NOTES>>		
	Negligible	Mi	Conditiona	al Category	erate	Sou	ere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% o by any of the chann in the parameter g 80% of banks sh riprap, or	f reach is disrupted lei alterations listed uidelines AND/OR ored with gabion, cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0.	5			1.50
	REACH (CONDITION	NDEX and S	TREAM CON	NDITION UNI	TS FOR THIS	6 REACH			
NOTE: The CIs and RO	CI should be rounded to 2 decimal places. Th	e CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	1.18
							RCI	= (Sum of all C	's)/5	740
							COMPENSAT	X LF X IF	MENT (CR) >>	/40
Notes:							0.1. 1101	/		I
1. Describe ex maintained, lav 100 percent mature	xisting riparian buffer (i.e., ma wns, impervious surfaces, etc deciduous forest	ture forested, h .). Provide the	erbaceous and estimated perc	l shrub layers p eentage of the t	oresent in unde otal riparian ar	rstory, utility ea ea comprised o	asments preser f each cover ty	nt, understory pe.		
2. What is the	estimated bankfull width?		Approximately 2-4 f	t						
3. What is the	estimated bank height?		Last 50 ft of SAR ba	ink height was appro	ximately 4-5 ft, rema	aining bank height wa	is approximately 1-2	ft		
4. Is the chanr	nel high gradient or low gradio	ent?	High gradient							
5. Does the ch	annel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has bee	en altered?		Natural sinuosity		
6. Does the ch	annel appear to be aggrading	ı, degrading, oı	stable?		Stable					
7. Describe the	e sediment supply (i.e., extrer	ne, very high, ł	nigh, etc.).		Medium sediment s	upply				
8. Are the stre	ambanks eroding? Over wha	t percentage o	f the reach?		30 percent of stream	nbanks eroding				
9. Are headcut	ts present within the reach?		Yes, one headcut of	oserved						
10. Explain the	e composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.)		20% gravel, 20% co	bble, 30% sand, 30%	6 silt/mud		
Additional No	otes:									İ
Minnows, fr	rogs, crayfish castle observed	I. Water within	channel at SA	R B-1 and SAR	B-2-approxima	tely 1-2 in., flov	ving. Deer and	raccoon track	s observed.	

		Stre		SSESS	sment	Form or use in Virg	i (Forr	n 1)		
Project #		Project Name	e e e e e e e e e e e e e e e e e e e	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	nent	Louisa Co.			10/2/07	B-3	106	1
Nam	e(s) of Evaluat	tor(s)	Steam Name	and Informat	ion	I	l			
Т	TJL, CWL, MLI	н	Bravo - Tribu	Itary to Lake	Anna					
l. Channel C	Condition: Asse	ess the cross-secti	on of the stream a	and prevailing con	dition (erosion, ag	gradation)				
				(Conditional Categor	ry				
Channel Condition	Very little incision or 100% stable banks. protection or nature (80-100%). AND bars/bankfull been Access to their ori fully developed wid Mid-channel bars. a few. Transient sec covers less than	r active erosion; 80- Vegetative surface al rock, prominent V/OR Stable point tobes are present. iginal floodplain or le bankfull benches. and transverse bars diment deposition n 10% of bottom.	Slightly incised, fr erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The bar channels are well d has access to ba newly developed portions of the r sediment covers 10 bott	ew areas of active cted banks. Majority table (60-80%). tion or natural rock -80%) AND/OR tures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along reach. Transient 0-40% of the stream tom.	Often incised, but Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of tream is co Sediment may be 1 contribute instabil contribute to s forming/present. J channels have vege > 40% of the banh	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 streambanks may grout. AND/OR 40- byte adment. temporary/transient, ity. Deposition that tability, may be AND/OR V-shaped AND/OR V-shaped Control to the tability.	Overwider Vertically/laterally widen further. Ma are near vertical. E 80% of banks. Ve present on 20-400 insufficient to preve 60-80% of the str sediment. temporary/transi contributing to inst shaped channels protection is prese banks and stable se	ied/incised. unstable. Likely to jority of both banks osion present on 60 getative protection % of banks, and is nt erosion. AND/OR Sediment is ant in nature, and ability. AND/OR V- have vegetative nt on > 40% of the diment deposition is diment deposition is	Deeply incised vertical/lateral in: incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANI channel. Greater ti bed is covered contributing to in thread channels ar	(or excavated), stability. Severe tained within the dbelow average egetative protection n 20% of banks, is egetative protection banks, is egetative prot
					features which co	ntribute to stability.	abs	ent.	flo	w.
Score	3	3	2	.4		2	1	.6	1	
	Opti	imal	Con Subo	nditional Cate <mark>ptimal</mark>	gory Mar	ginal	Pc	oor	NOTES>>	
Riparian Buffers	Cpti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, e canopy cover. within the riparian pas.	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	tee canopy cover and intervention of the second base of the second of the second base of the second of the second tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover.	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum, hay production, ponds, open water, If present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory.	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers	Opti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, e canopy cover. within the riparian aas.	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers Condition Scores	Opti Tree stratum (dbh > with > 60% tree Wetlands located are	imal > 3 inches) present, e canopy cover. within the riparian eas.	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	Provide a standard and a stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are 1. arian areas along ex- quare footage for ea Riparian Area and S % Riparian Area? Score >	imal 3 inches) present, c canopy cover, within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 100% 0.6	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in th	Aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors.	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure I of % F Blocks e	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 tiparian qual 100	NOTES>>	
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Vetlands located are 1. arian areas along ex uare footage for ea Siparian Area and S % Riparian Area>	imal 3 inches) present, e canopy cover. within the riparian pass. 5 ach stream bank ach by measuring Score for each ripa 100% 0.6	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cate or estimating leng arian category in th	Aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-til cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure of % F Blocks e	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, denuded surfaces, now crops, active feed lots, trails, or other comparable conditions. Low 0.5 the sums tiparian qual 100	NOTES>>	corres*0.01)/2_
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Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank Left Bank	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Vetlands located are 1. arian areas along ea uare footage for ea Riparian Area and S % Riparian Area Score > % Riparian Area> Score >	imal > 3 inches) present, e canopy cover. within the riparian as. .5 ach stream bank ach by measuring Score for each ripa 100% 0.6 100% 0.6	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in th	hditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provice	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. ted for you below.	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure 1 of % F Blocks e	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 the sums tiparian qual 100 100%	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI >	cores*0.01)/2 0.60 0.60
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank Left Bank 3. INSTREAN	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are I. I. arian areas along ex- guare footage for ea Riparian Area and S % Riparian Area Score > % Riparian Area? Score > M HABITAT: Vaa S SAV: riffe poole of	imal > 3 inches) present, c canopy cover, within the riparian as. .5 ach stream bank ach by measuring Score for each ripa 100% 0.6 100% 0.6 ried substrate sizz complexes, stable	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in the set of the strategy of the strategy of the arian category in the set of the strategy of the strategy of the features	Additional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Call he blocks below.	y and leafy debris;	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. ted for you below. stable substrate;	Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-til cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure I of % F Blocks e	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 tiparian qual 100 100% 100%	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 0.60 0.60
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank Left Bank 3. INSTREAN panks; root mats	Opti Tree stratum (dbh > with > 60% tree Wetlands located are Jarian areas along ex Quare footage for ear Riparian Area and S % Riparian Area> Score > % Riparian Area> Score > WHABITAT: Varias; SAV; riffle poole of	imal 3 inches) present, a canopy cover. within the riparian ass. .5 .5 .5 .5 .5 .5 .5 .5 .5	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Cat or estimating leng arian category in the sea water velocity a features.	Aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy code and a maintend understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Call he blocks below. Condition:	gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhh > 3 inches) present, with <30% tree canopy cover. High 0.85 Ition Scores using culators are provice ulators are provice al Category	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	Proved, and a moved, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure 1 of % F Blocks e	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, now crops, active feed lots, trails, or other comparable conditions. Low 0.5 the sums tiparian qual 100 100% ; shade; undercut	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	corres*0.01)/2 0.60 0.60
Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank Right Bank Left Bank 3. INSTREAN panks; root mats Instream Habitat/ Available Cover	Opti Tree stratum (dbh > with > 60% tree Wetlands located are User In arian areas along ex Quare footage for ea Riparian Area and S % Riparian Area? Score > % Riparian Area? Score > % Riparian Area? Score > M HABITAT: Van ;; SAV; riffle poole of Opti Habitat elements a in greater than 5	imal > 3 inches) present, c canopy cover, within the riparian ras. 5 ach stream bank ach by measuring Coore for each ripr 100% 0.6 100% 0.6 ried substrate size complexes, stable imal are typically present 0% of the reach.	Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 into Condition Catt or estimating leng arian category in the set of the strategy of the strate habitat elector present in 30-50% of adequate for r adequate for r	Aditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. Conditiona ptimal ments are typically of the rate of adiance of ations	degree present in 0.30% dealey debris; and leafy debris; and leafy debris; astable habitat ele present in 0.30%	ginal Low Marginal: Non-maintained, dense herbaceous vegetation, ripariar areas lacking shrut and tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. ted for you below. stable substrate; ginal ments are typically of the reach and are maintenance of ations	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated and area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure I of % F Blocks e Blocks e Image: State of the state	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 the sums tiparian qual 100 100% 100% s shade; undercut	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 0.60 0.60

	St	tream In	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL spoil piles, constr	ALTERATION: Stream crossin rictions, livestock	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelization	, embankments,	NOTES>>		
	Neelisihle		Conditiona	al Category	orato		(OFO			
	Negligible	IVII	nor	40 - 60% of reach	60 - 80% of reach	Sev	vere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of by any of the chann in the parameter g 80% of banks sh riprap, or	f reach is disrupted lel alterations listed uidelines AND/OR ored with gabion, cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5			1.10
	REACH (CONDITION I	NDEX and S	TREAM CO	NDITION UNI	ITS FOR THI	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH		DEX (RCI) >>	0.84
								ION REQUIRE	(S)/5 MENT (CR) >>	89
							CR = RCI	X LF X IF	(-)	
Notes:										
1. Describe ex	xisting riparian buffer (i.e., ma	ture forested, h	erbaceous and	shrub layers	present in unde	erstory, utility e	asments prese	nt, understory		
maintained, la 100 percent herbac	wns, impervious surfaces, etc eous area	.). Provide the	estimated perc	centage of the t	otal riparian ar	ea comprised c	of each cover ty	vpe.		
2. What is the	estimated bankfull width?		Approximately 1-2 f	t						
3. What is the	estimated bank height?		Approximately 1 ft							
	-									
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the cl Channel altered by	hannel appear to have natural power line.	sinuosity or do	oes it appear th	at the channel	pattern has bee	en altered?				
6. Does the cl	hannel appear to be aggrading	, degrading, or	stable?		Stable					
7. Describe th	ne sediment supply (i.e., extrer	ne, very high, h	nigh, etc.).		Low sediment suppl	ly				
8. Are the stre	eambanks eroding? Over wha	t percentage of	f the reach?		10 percent of stream	nbanks eroding				
9. Are headcu	its present within the reach?		No headucts observ	ved						
10. Explain th	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	50% sand, 50% gra	vel			
								-		
Additional No	otes:									
	Strea	m channel with	iin transmissio	n line right of v	vay. No water o	observed in cha	annel.			

		Stre		SSESS	sment	Form or use in Virg	i (Forr	n 1)		
Project #		Project Name	Por use i	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	am Assessm	ent	Louisa Co.			10/2/07	B-4	380	1
Name	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion					
т	IJL, CWL, MLH	4	Bravo - Tribu	utary to Lake /	Anna					
. Channel C	ondition: Asses	s the cross-section	on of the stream a	and prevailing cond	dition (erosion, ag	gradation)				
				(Conditional Categor	ry				
Channel Condition	TJL, CWL, MLH Bravo - nel Condition: Assess the cross-section of the str Image: Condition: Condite: Condition: Condite: Condit		Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60) Depositional feat stability. The bar channels are well di has access to ba newly developed portions of the r sediment covers 11 bot	ew areas of active cted banks. Majority table (60-60%). tion or natural rock -80%) AND/OR tures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along reach. Transient 0-40% of the stream tom.	Often incised, but I Poor. Banks more or Poor due to lo Erosion may be pn both banks. Vegetal 60% of banks. S bevertical or unde 60% of stream is co Sediment may be t contribute instabil contribute to s forming/present. A channels have vege > 40% of the bank features which poor	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tire erotection on 40 tireambanks may ircut. AND/OR 40- overed by sediment. emporary/transient, tty. Deposition that tability, may be AND/OR V-shaped stative protection on ss and depositional	Overwiden Overwiden Vertically/laterally widen further. Maj are near vertical. Er 80% of banks. Ve present on 20-400 insufficient to preve 60-80% of the strr sediment. 3 temporary/transi contributing to inst shaped channels protection is prese banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection & of banks, and is nt erosion. AND/OR am is covered by sediment is nt in nature, and ubility. AND/OR V- have vegetative t on > 40% of the diment deposition is ant	Severe Deeply incised (or excavated), vertical/lateral instability. Severe incision, flow contained within the banks. Streambed below average vertical/ndercut. Vegetative protecting vertical/ndercut. Vegetative protecting present on less than 20% of banks, if not preventing erosion. Otvious ban sloughing present. Erosion/raw bank on 80-100%. AND/OR Aggrading channel. Creater than 80% of streat bed is covered by deposition, there is one of the streat of the stre	
					reatures which con	nindule lo sladility.	abs	ent.	110	w.
Score	3		2	4		2	1.	6	1	
NOTES>>	Very little incision or active erosion; 80- 100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%). AND/OR Stable point bars/bankful benches are present. Access to their original floodplain or fully developed wide bankful benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom. 3 N BUFFERS: Assess both bank's Optimal Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.		100 foot riparian	areas along the en	ntire SAR. (rough	measurements of	f length & width ma	y be acceptable)	NOTES>> do	minate
NOTES>> 2. RIPARIAN Riparian Buffers	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area	3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	trie SAR. (rough gory Marg High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>> do species withi area are muse white oak.	minate n riparian clewood and
Riparian Buffers	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located area	asess both bank's mal 3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	tire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with ~30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>> do species withi area are muse white oak.	minate n riparian clewood and
Riparian Buffers	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area	3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>> do species withi area are muse white oak.	minate n riparian clewood and
NOTES>> 2. RIPARIAN 2. RIPARIAN Riparian Buffers Condition Scores 1. Delineate ripa 2. Determine squ 3. Enter the % R Right Bank	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located \ area area area 1.	ssess both bank's mal 3 inches) present, canopy cover, within the riparian as. 5 5 5 ch by measuring core for each ripa 100% 1.2	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	tire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provid	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seded and stabilized, or other comparable condition. High 0.6 Ensure t of % R Blocks e	y be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums iparian qual 100	NOTES>> do species withi area are muso white oak.	minate n riparian clewood and
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	S	tream In	npact A	ssessm	ent For	m Page	e 2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
4. 01141111								500	1	
4. CHANNEL spoil piles, const	ALTERATION: Stream crossir rictions, livestock	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelizatio	n, embankments,	NUTES		
	Negligible	Mi	Conditiona nor	al Category Mod	erate	Se	vere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chan in the parameter 80% of banks s riprap, r	of reach is disrupted nnel alterations listed guidelines AND/OR nored with gabion, or cement.			
SCORE	1.5	1.3	1.1	0.9	0.7).5			1.50
	REACH	CONDITION I	NDEX and S	TREAM CO	NDITION UNI	TS FOR TH	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH RCI	CONDITION IN = (Sum of all C	IDEX (RCI) >> il's)/5	1.04
							COMPENSAT	ION REQUIRE	MENT (CR) >>	395
Notes							CR = RCI	X LF X IF		I
1. Describe e: maintained, la 100 percent mature	xisting riparian buffer (i.e., ma wns, impervious surfaces, etc e deciduous forest	ture forested, h	erbaceous and estimated perc	I shrub layers centage of the f	oresent in unde otal riparian ar	erstory, utility o ea comprised	easments prese of each cover ty	nt, understory /pe.		
2. What is the	estimated bankfull width?		Approximately 4-6 f	t						
3. What is the	estimated bank height?		Approximately 3-5 f	t						
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the cl Natural sinuosity	hannel appear to have natural	sinuosity or do	es it appear th	at the channel	pattern has bee	en altered?				
6. Does the cl	hannel appear to be aggrading	ı, degrading, or	stable?		Stable					
7. Describe th	ne sediment supply (i.e., extre	ne, very high, h	iigh, etc.).		Medium to high sed	liment supply				
8. Are the stre	eambanks eroding? Over wha	t percentage of	f the reach?		80 percent of stream	nbanks eroding				
9. Are headcu	its present within the reach?		No headucts observ	red						
10. Explain th	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	20% boulder/rock,	25% cobble, 25% gra	vel, 30% silt		
Additional N	otes:									

		Stre		SSESS fied Stream M	sment	Form	I (Forr	n 1)		
Project #	F	Project Name	For use i	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	am Assessm	ent	Louisa Co.			10/2/07	B-5	507	1
Nam	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion					
٦	IL, CWL, MLH	1	Bravo - Tribu	itary to Lake	Anna					
. Channel C	ondition: Asses	s the cross-section	on of the stream a	nd prevailing cond	dition (erosion, ag	gradation)				
			.	(Conditional Categor	ry				
Channel Condition	Very little incision or 100% stable banks. protection or natura (80-100%). AND/ bars/bankfull benc Access to their orig fully developed wide Mid-channel bars, ar few. Transient sed covers less than	active erosion; 80- Vegetative surface Il rock, prominent OR Stable point thes are present. jinal floodplain or bankfull benches. nd transverse bars iment deposition 10% of bottom.	Slightly incised, f erosion or unprotec of banks are si Vegetative protec prominent (60) Depositional feat stability. The bar channels are well d has access to ba newly developed portions of the r sediment covers 10 bott	ew areas of active ted banks. Majority labe (60-80%). tion or natural rock. 80%) AND/OR ures contribute to hkfull and low flow fined. Stream likely nkfull benches, or floodplains along each. Transient)-40% of the stream tom.	Often incised, but I Poor. Banks more or Poor due to lo Erosion may be pr both banks. Vegetal 60% of banks. S bevertical or unde 60% of stream is cc Sediment may be t contribute to s forming/present. / channels have vege > 40% of the bank features which co	less than Severe or stable than Severe over bank slopes. esent on 40-60% of tive protection on 40 tireambanks may rout. AND/OR 40- povered by sediment. emporary/transient, tty. Deposition that tability, may be AND/OR V-shaped etative protection on ss and depositional	Overwider Vertically/laterally widen further. Mej are near vertical. El 80% of banks. Ve present on 20-400 insufficient to preve 60-80% of the strn sediment. 2 temporary/transi contributing to inst shaped channels protection is prese banks and stable se banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection k of banks, and is getative protection k of banks, and is getative protection k of banks, and is petative protection h crosion. AND/OR warm is covered by Sediment is nature, and ability. AND/OR V- have vegetative int on > 40% of the diment deposition is ent.	Deeply incised vertical/tateral in incision, flow con banks. Streamler rooting deepth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANI channel. Greater ti bed is covered contributing to in thread channels ar flo	(or excavated), stability. Severe tained within the d below average ajority of banks, egetative protectic n 20% of banks, is ion. Obvious banl Erosion/raw banks, ion. Obvious banl Erosion/raw banks, by deposition, stability. Multiple d/or subteranean w.
Seere	2			4		. ,	4	c		
Score	3		2	.4	· · · ·	2	I	0		
NOTES>> . RIPARIAN	Very little incision or active erosion; 80 100% stable banks. Vegetative surface protection or natural rock, prominent (80-100%), AND/OR Stable point bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom. 3 BUFFERS: Assess both bankful Optimal Tree stratum (dbh > 3 inches) present, with > 60% tree canopy cover. Wetlands located within the riparian areas.		100 foot riparian	areas along the en	ntire SAR. (rough gory	measurements of	f length & width ma	y be acceptable)	NOTES>> co	-dominate
NOTES>>	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	asess both bank's mal 3 inches) present, canopy cover. within the riparian as.	100 foot riparian Corr Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh ≥ 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>> co- species withi area include pine, muscle hickory, and	-dominate in riparian Virginia wood, red cedar.
NOTES>>	BUFFERS: As Optin Tree stratum (dbh > with > 60% tree Wetlands located v area	asess both bank's mal 3 inches) present, canopy cover. within the riparian as.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the er ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. prods, open water. inches) present, tree stratum (dbh > 3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seded and stabilized, or other comparable condition. High	by be acceptable) or Impervious surfaces, mine spoil lands, denuded surfaces, active feed lots, trails, or other comparable conditions.	NOTES>> co- species withi area include pine, muscle hickory, and	-dominate in riparian Virginia wood, red cedar.
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	St	tream In	npact A	ssessm	nent For	m Page	e 2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL	ALTERATION: Stream crossin	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chan	nel, channelizatior	n, embankments,	NOTES>>		
spoil plies, constr			Conditiona	al Category						
	Negligible	Mir	ıor	Mod	erate	Se	vere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chan in the parameter 80% of banks sh riprap, o	of reach is disrupted nel alterations listed juidelines AND/OR nored with gabion, r cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5			1.50
	REACH (CONDITION I	NDEX and S	TREAM CO	NDITION UN	ITS FOR THI	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>	1.16
							RCI	= (Sum of all C	l's)/5	1
							COMPENSAT		MENT (CR) >>	588
							CR = RCI	X LF X lF		I
maintained, la 100 percent mature 2. What is the 3. What is the	wns, Impervious surfaces, etc deciduous/coniferous forest estimated bankfull width? estimated bank height?	.). Provide the	estimated perc Approximately 5-6 fi Approximately 3-6 fi	centage of the t	total riparian a	rea comprised (of each cover ty	rpe.		
4. Is the chan	nel high gradient or low gradio	ent?	High gradient							
5. Does the ch Natural sinuosity	nannel appear to have natural	sinuosity or do	es it appear th	at the channel	pattern has be	en altered?				
6. Does the ch	nannel appear to be aggrading	g, degrading, or	stable?		Stable					
7. Describe th	e sediment supply (i.e., extrer	ne, very high, h	igh, etc.).		Medium to high sec	liment supply				
8. Are the stre	eambanks eroding? Over wha	t percentage of	the reach?		60 percent of stream	mbanks eroding				
9. Are headcu	ts present within the reach?		No headucts observ	ed						
10. Explain th	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	10% rock/cobble, 3	0% silt, 60% sand			
Additional M	ntes:									l
	SAR ends at CMP alo	ong railroad tra	ks. Ferns grow	ving inside of t	bank. Salaman	der observed w	vithin stream ch	annel.		

Channel Optimal Locality Council of the same base assessment Locality Project 3 Impact SAR # Impact SAR			Stre		SSESS	sment Methodology f	Form	(Forr	n 1)		
1413101 Stream Assessment Louisa Co. 10/2/07 B-6 262 1 Nume(s) of Evaluator(s) Steam Name and Information Information Information T.U., CW, MLH Brave - Thiotopy Lake Annu Provo - Thiotopy Lake Annu Information Channel Optimal Suboptimal Marginal Poor Severe Order Suboptimal Marginal Poor Severe Optimal Suboptimal Marginal Poor Severe Steam Name and Information Suboptimal Marginal Poor Severe Steam Name and Information Steam Name and Information Severe Severe Steam Name and Information Severe Severe Severe Severe Severe Severe	Project #		Project Name	For use I	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
Name(s) of Evaluation(s) Bits an Name and Information TJL, CWL, MLH Brave - Tributary to Lake Anna Channel Condition: Optimal Secure Tributary to Lake Anna Optimal Support (base) Performance (base) Performance (base) Optimal Support (base)	1439101	Stre	am Assessm	ent	Louisa Co.			10/2/07	B-6	262	1
<form> Tel Credit Biological State /form>	Name	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion		1		I	
Channel Condition: Aucos the output-action of proving upput ingramments of length 2 with the pro	т	JL, CWL, MLH	4	Bravo - Tribu	utary to Lake /	Anna					
Optimal Suboptimal Marginal Poor Severe Channel Juiper Internet Caregory Severe	. Channel C	ondition: Asses	s the cross-section	on of the stream a	and prevailing cond	dition (erosion, ag	gradation)				
Optimal Suboptimal Marginal Poor Survey Channel Junction Suboptimal Junction Juncti					(Conditional Categor	ry				
Image: source Image: s	Channel Condition	Very little incision or 100% stable banks. protection or nature (80-100%). AND/ bars/bankfull benc Access to their orig fully developed wide Mid-channel bars, a few. Transient sed covers less than	active erosion; 80- Vegetative surface al rock, prominent OR Stable point ches are present. jinal floodplain or bankful benches. nd transverse bars liment deposition 10% of bottom.	Slightly incised, fi erosion or unprotec of banks are sl Vegetative protec prominent (60- Depositional feat stability. The bar channels are well di has access to ba newly developed portions of the ri sediment covers 10 bott	ew areas of active cted banks. Majority table (60-80%). tion or natura rock -80%) AND/OR tures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along reach. Transient 0-40% of the stream tom.	Often incised, but I Poor. Banks more or Poor due to la Erosion may be pr both banks. Vegetal 60% of banks. S bevertical or unde 60% of theram is co Sediment may be t contribute instabili contribute to si forming/present. A channels have vege > 40% of the bank	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 tireambanks may rrcut. AND/OR 40- byoered by sediment. emporary/transient, ity. Deposition that tability, may be AND/OR V-shaped etative protection on	Overwider Vertically/laterally widen further. Maj are near vertical. El 80% of banks. Ve present on 20-40' insufficient to preve 60-80% of the str sediment. 1 temporary/transis contributing to inst shaped channels protection is prese banks and stable se	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection % of banks, and is nt erosion. AND/OR % of banks, and is nt erosion. AND/OR Sediment is am is covered by Sediment is and in nature, and ability. AND/OR V- have vegetative nt on > 40% of the diment deposition is	Deeply incised vertical/latersd in incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANI channel. Greater th bed is covered thread channels ar	(or excavated), stability. Severe tained within the d below average egicitiv of banks egicitiv of banks egicitiv of banks, is gegetative protectio n 20% of banks, is gegetative protection. Ovor Aggrading na 80% of stream by deposition, stability. Multiple d/or subterranean
Score 3 2.4 2 1.6 1 NOTES> Image: state of the state						features which cor	ntribute to stability.	abs	ent.	flo	w.
NOTES>> RipARIAN BUFFERS: Assess both bank's 100 foot nigarian areas with the SAR: (rough measurements of length & with may be acceptable) NOTES>> RipARIAN BUFFERS: Assess both bank's 100 foot nigarian areas with the SAR: (rough measurements of length & with may be acceptable) NOTES>> Riparian areas with the Suboptimal Reparator areas with the Suboptimal Reparator areas with Reparator areas with Reparator areas with Reparator areas with the Suboptimal Reparator areas with th	-	3		2	.4		2	1	.6	1	
High Low High Low High Low Condition Scores 1.5 1.2 1.1 0.85 0.75 0.6 0.5 Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. Ensure the sums of % Riparian Enter the % Riparian Area and Score for each riparian category in the blocks below. Blocks equal 100 Blocks equal 100 Right Bank % Riparian Areaa 100% Score > 1.2 Cl= (Sum % RA * Scores*0.01)/2 Left Bank % Riparian Areaa 100% Rt Bank Cl > 1.20 Lt Bank Cl > 1.20 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut nks; root mats; SAV; riffle poole complexes, stable features. NOTES>> Instream Habitat/ Cover Stable habitat elements are typically in greater than 50% of the reach. and are adequate for maintenance of populations. Stable habitat elements are typically present in 10.30% of the reach. Stable habitat elements are typically present in 10.30% of the reach.	Score NOTES>>	BUFFERS: As	ssess both bank's	100 foot riparian	areas along the en aditional Cate	ntire SAR. (rough	measurements o	f length & width ma	ay be acceptable)	NOTES>>	
Condition Scores 1.5 1.2 1.1 0.85 0.75 0.6 0.5 Delineate riparian areas along each stream bank into Condition Categories and Condition Scores using the descriptors. Determine square footage for each by measuring or estimating length and width. Calculators are provided for you below. Ensure the sums of % Riparian Enter the % Riparian Area and Score for each riparian category in the blocks below. Blocks equal 100 Right Bank % Riparian Area> 100% Score > 1.2 0 0 100% Score > 1.2 0 0 100% Score > 1.2 0 0 0 0 Left Bank % Riparian Area> 100% Rt Bank C1> 1.20 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercot riks; root mats; SAV; riffle poole complexes, stable features. NOTES>> Instream Habitat Optimal Stable habitat elements are typically present in 90-0% of the reach, and are projection of the reach and are stream bark of the reach and are streamed are stre typically present in 30-5% of the reach and are stream	Score NOTES>> RIPARIAN Riparian Buffers	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area	3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
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Left Bank % Riparian Area> 100% Rt Bank Cl> 1.20 Score > 1.2 Instream It Bank Cl> 1.20 It Bank Cl> 1.20 INSTREAM HABITAT: Varied substrate sizes, water velocity and depths; woody and leafy debris; stable substrate; low embededness; shade; undercut nks; root mats; SAV; rifle poole complexes, stable features. NOTES>> Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat elements are typically present in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in less than 10% of the reach.	Score NOTES>> 2. RIPARIAN Riparian Buffers 0. Delineate ripar 2. Delineate ripar 2. Delineate ripar 2. Delineate ripar 2. Delineate ripar 2. Delineate ripar	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	seess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 ach stream bank i ch by measuring core for each ripa 100% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th	areas along the en nditional Categ ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements or ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pativne, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	Ay be acceptable)	NOTES>>	
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Conditional Category Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat/ Available Habitat elements are typically present in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations. Habitat elements listed above are lacking or are unstable. 0 10 0 0 0	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Deleret ripar Determine squ Enter the % Ri Right Bank Left Bank	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area Wetlands located v area 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	ssess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 5 6 6 by measuring core for each ripa 100% 1.2 100% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>> CI= (Sum % RA * Sc Rt Bank CI > Lt Bank CI >	pores*0.01)/2 1.20 1.20
Instream Habitat/ Available Cover Optimal Suboptimal Marginal Poor Habitat/ Available cover Habitat elements are typically present in greater than 50% of the reach. Stable habitat elements are typically present in 30-50% of the reach and are adequate for maintenance of populations. Stable habitat elements are typically present in 10-30% of the reach and are adequate for maintenance of populations. Habitat elements isted above are lacking or are unstable. Habitat elements are typically present in less than 10% of the reach.	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delineate ripar Determine squ Enter the % RI Right Bank Left Bank ILeft Bank	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	3 inches) present, canopy cover. within the riparian as. 5 5 5 6 6 by measuring core for each ripa 100% 1.2 100% 1.2 ied substrate size	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th arian category in t	areas along the en ditional Cate; ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 tition Scores using culators are provid	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate;	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and tabilized, or other comparable condition. High 0.6 Ensure t Blocks e Low embededness	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100%	NOTES>> CI= (Sum % RA * Sc Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01)/2 1.20 1.20
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	Score NOTES>> RIPARIAN Riparian Buffers Condition Scores Delemente ripar Determine squ Enter the % R Right Bank Left Bank Left Bank I.INSTREAM anks; root mats; Instream Habitat/ Available Cover	BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located v area user footage for eau parian Area and S % Riparian Area Score > N Riparian Area> Score > HABITAT: Var SAV; riffle poole c Opti Habitat elements ar in greater than 50	ssess both bank's mal 3 inches) present, canopy cover. within the riparian as. 5 5 5 6 6 by measuring core for each ripa 100% 1.2 100% 1.2 ied substrate size omplexes, stable mal	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 Ito Condition Cate or estimating leng arian category in tf features. Subo Stable habitat ele present in 30-50% o adequate for	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below. blocks below. Conditiona ptimal ments are typically of the reach and are maintenance of	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid culators are provid	measurements or ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate; ginal ments are typically of the reach and are naintenance of	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure 1 of % F Blocks e low embededness Pc Habitat elements lacking or are u elements are typic	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% ishade; undercut stable. Habitat ally present in less	NOTES>> CI= (Sum % RA * So Rt Bank CI > Lt Bank CI > NOTES>>	cores*0.01/2 1.20 1.20

	Si	tream In	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
 CHANNEL spoil piles, constr 	ALTERATION: Stream crossir	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelization	, embankments,	NOTES>>		
	Nealigible	Mi	Conditiona	al Category Mod	erate	Sev	/ere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has ben channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of by any of the chann in the parameter g 80% of banks sh riprap, or	of reach is disrupted nel alterations listed juidelines AND/OR ored with gabion, r cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5			1.50
	REACH	CONDITION I	NDEX and S	TREAM CO	NDITION UNI	ITS FOR THI	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. The	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	1.20
								= (Sum of all C	l's)/5	314
							COMPENSAT	X LF X IF	WENT (CR) >>	314
Notes:										l
1. Describe ex maintained, lav 100 percent mature	xisting riparian buffer (i.e., ma wns, impervious surfaces, etc deciduous forest. Virginia pine intermixe	ture forested, h :.). Provide the ad, but not dominate	erbaceous and estimated perc	I shrub layers centage of the f	present in unde total riparian ar	erstory, utility e	asments presen of each cover ty	nt, understory pe.		
2. What is the	estimated bankfull width?		Approximately 2-3 f	t						
3. What is the	estimated bank height?		Approximately 1-2 f	t						
4. Is the chani	nel high gradient or low gradi	ent?	High gradient							
5. Does the ch Natural sinuosity	nannel appear to have natural	sinuosity or do	es it appear th	at the channel	pattern has bee	en altered?				
6. Does the ch	nannel appear to be aggrading	g, degrading, or	stable?		Stable					
7. Describe th	e sediment supply (i.e., extre	ne, very high, h	nigh, etc.).		Low sediment supp	ly				
8. Are the stre	eambanks eroding? Over wha	t percentage of	f the reach?		20 percent of strear	nbanks eroding				
9. Are headcu	its present within the reach?		No headucts observ	ed						
10. Explain th	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	100% silt/sand				
Additional N	otes:								-	l
		SAR be	gins at railroad	tracks and en	ds at remnants	of road.				

		Stre		SSESS	sment	Form	(Forr	n 1)		
			For use i	n wadeable chan	inels classified a	s intermittent or	perennial			
Project #		Project Name	•	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	nent	Louisa Co.			10/3/07	C-1	287	1
Nam	e(s) of Evaluat	tor(s)	Steam Name	and Informat	ion	1	I	1		
1	TJL, CWL, MLI	н	Charlie - Trib	outary to Lake	Anna					
Channel	ondition: Asso	as the prope posti	on of the stream of	and provailing con-	dition (oronion, or	arodation)				
. Channel C	Jonunion. Asses	ss the cross-section	on of the stream a	ind prevailing con	Conditional Catego	gradation) ry				
	Opti	imal	Subo	ptimal	Mar	ginal	Po	oor	Sev	ere
Channel Condition	Very little incision on 100% stable banks. protection or natur: (80-100%). AND bars/bankfull bem Access to their ori fully developed wid Mid-channel bars, a few. Transient see	r active erosion; 80- Vegetative surface al rock, prominent (/OR Stable point ches are present. ginal floodplain or e bankfull benches. and transverse bars diment deposition	Slightly incised, fr erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The bar channels are well du has access to ba newly developed portions of the r	ew areas of active ted banks. Majority table (60-80%). tion or natural rock -80%) AND/OR urres contribute to nkfull and low flow pfindu. Stream likely nkfull benches, or floodplains along reach. Transient	Often incised, but Poor. Banks more or Poor due to le Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of banks s bevertical or unde contribute instabil contribute instabil	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 streambanks may prout. AND/OR 40- overed by sediment. temporary/transient, ity. Deposition that tability. may be	Overwider Vertically/laterally widen further. Ma are near vertical. E 80% of banks. Ve present on 20-40 insufficient to preve 60-80% of the str sediment. temporary/transi contributing to inst	ned/incised. unstable. Likely to jority of both banks rosion present on 60 getative protection % of banks, and is ant erosion. AND/OR Bediment is ent in nature, and ability. AND/OR V-	Deeply incised vertical/lateral in incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%, ANIC channel. Greater th	(or excavated), stability. Severe tained within the d below average ajority of banks egetative protection n 20% of banks is ion. Obvious bank Erosion/raw banks O/OR Aggrading han 80% of stream
	covers less than	tection or natural rock, prominent 30-100%). AND/OR Stable point ars/bankfull benches are present. cess to their original floodplain or developed wide bankfull benches. -channel bars, and transverse bars w. Transient sediment deposition zovers less than 10% of bottom.			channels have vegu > 40% of the bank features which con	etative protection on ks and depositional ntribute to stability.	protection is prese banks and stable se abs	ent on > 40% of the ediment deposition is sent.	contributing to ins thread channels an flo	stability. Multiple nd/or subterranean w.
Score	3	3	2	.4	:	2	1	.6	1	
Riparian Buffers	Tree stratum (dbh > with > 60% tree Wetlands located are	 3 inches) present, canopy cover. within the riparian as. 	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dhb > 3 inches) present, with <30% tree canopy cover.	Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegure, sparsely veguted non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.		
			High	Low	High	Low	High	Low		
Condition	1.	.5	1.2	1.1	0.85	0.75	0.6	0.5		
ocores									1	
. Delineate ripa . Determine squ . Enter the % R	arian areas along ea uare footage for ea Riparian Area and S	ach stream bank i ach by measuring Score for each ring	into Condition Cat or estimating leng arian category in th	egories and Cond th and width. Cal ne blocks below.	ition Scores using culators are provic	the descriptors. led for you below.	Ensure of % F Blocks e	the sums Riparian equal 100		
	% Riparian Area>	20%	80%					100%	-	
Right Bank	Score >	1.2	0.5					10070		
	·								CI= (Sum % RA * So	cores*0.01)/2
Left Bank	% Riparian Area>	100%						100%	Rt Bank Cl >	0.64
	Score >	1.2							Lt Bank CI >	1.20
B. INSTREAM	I HABITAT: Va	ried substrate size	es, water velocity a	and depths; woody	y and leafy debris;	stable substrate;	low embededness	; shade; undercut	NOTES>>stre	eam not
	; SAV; riffle poole o	complexes, stable	features.	Conditio	al Catana				unstable	
oanks; root mats				LONGITION	al Category				1	
anks; root mats	Opti	imal	Suba	ptimal	Man	ginal	D,	oor		
Instream Habitat/ Available Cover	Opti Habitat elements a in greater than 5	imal re typically present 0% of the reach.	Stable habitat eler present in 30-50% (adequate for r popula	ptimal ments are typically of the reach and are maintenance of ations.	Mary Stable habitat ele present in 10-30% adequate for r popul	ginal ments are typically of the reach and are naintenance of ations.	Habitat elements lacking or are u elements are typic than 10% of	s listed above are instable. Habitat cally present in less of the reach.		
Instream Habitat/ Available Cover	Opti Habitat elements a in greater than 5	imal re typically present 0% of the reach.	Stable habitat eler present in 30-50% adequate for r popul	ptimal ments are typically of the reach and are naintenance of ations.	Mar Stable habitat ele present in 10-30% adequate for r popul	ginal ments are typically of the reach and are naintenance of ations.	Po Habitat elements lacking or are u elements are typic than 10% o	s listed above are instable. Habitat cally present in less of the reach.		

	St	tream In	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL spoil piles, constri	ALTERATION: Stream crossin	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelization,	embankments,	NOTES>>		
spon piloo, consu			Conditiona	al Category						
	Negligible	Mi	nor	40 - 60% of reach	erate	Sev	ere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% o by any of the chann in the parameter g 80% of banks sh riprap, or	f reach is disrupted lel alterations listed uidelines AND/OR red with gabion, cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0.	5			1.50
	REACH (CONDITION I	NDEX and S	TREAM CO	NDITION UNI	ITS FOR THIS	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	0.98
							RCI	= (Sum of all C	l's)/5	
							COMPENSAT		MENI (CR) >>	281
Neteri										I
maintained, lav Left Bank - 100 perc Right Bank - 20 perc 2. What is the	wns, impervious surfaces, etc zent mature deciduous forest with some r zent mature deciduous forest and 80 perc estimated bankfull width?	:.). Provide the ed cedars present cent disturbed area.	estimated perc	to 1 ft	iotal riparian ar	ea comprised o	f each cover ty	pe.		
3. What is the	estimated bank height?		Approximately 1-2 i	n						
4. Is the chann	nel high gradient or low gradio	ent?	High gradient							
5. Does the ch Natural sinuosity	nannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has be	en altered?				
6. Does the ch	nannel appear to be aggrading	g, degrading, or	stable?		Stable					
7. Describe th	e sediment supply (i.e., extrer	ne, very high, h	nigh, etc.).		None					
8. Are the stre	ambanks eroding? Over wha	t percentage of	f the reach?		0 percent of stream	banks eroding- no str	eambank			
9. Are headcu	ts present within the reach?		No headucts observ	red						
10. Explain the	e composition of the existing	stream bed (pe	rcent cobble, r	ock, sand, etc.).	50% sand, 50% grav	rel			
Additional No	otes:								-	l
	No d	efined channel,	, defined pathw	vay where wate	r flows. SAR e	nded at beaver	dam.			

		Stre	eam A		sment	Form	(Forr	n 1)		
			For use i	n wadeable chan	nels classified a	s intermittent or	perennial			
Project #		Project Name	,	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	ent	Louisa Co.			10/3/07	C-2		1
Nam	le(s) of Evaluat	tor(s)	Steam Name	and Informat	ion	I				
٦	TJL, CWL, MLI	н	Charlie - Trib	utary to Lake	Anna					
Channel C	Condition: Asso	ss the cross socti	on of the stream a	nd provailing con	dition (orosion, ag	aradation)				
. onamici o	, and the second s	33 116 61033-3661		(Conditional Catego	ry				
	Opti	imal	Subo	ptimal	Mar	ginal	Po	or	Sev	ere
Channel Condition	Very little incision or 100% stable banks. protection or natur (80-100%). AND bars/bankfull ben Access to their ori fully developed wid Mid-channel bars, a few. Transient see covers less than	r active erosion; 80- Vegetative surface al rock, prominent VOR Stable point ches are present. ginal floodplain or e bankfull benches. and transverse bars diment deposition 10% of bottom.	Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The bar channels are well d has access to ba newly developed portions of the r sediment covers 10	ew areas of active ted banks. Majority table (60-80%). tion or natural rock. 80%) AND/OR ures contribute to hkfull banches, or floodplains along each. Transient J-40% of the stream	Often incised, but Poor. Banks more or Poor due to la Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of stream is co Sediment may be t contribute instabili contribute to s forming/present.	less than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 tireambanks may prout. AND/OR 40- boyered by sediment. temporary/transient, ity. Deposition that tability. may be AND/OR V-shaped	Overwider Vertically/laterally widen further. Ma are near vertical. E 80% of banks. Ve present on 20-40' insufficient to preve 60-80% of the str sediment. : temporary/transi contributing to inst shaped channels	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection % of banks, and is nt erosion. AND/OR ami is covered by Sediment is ami scovered by Sediment is and in nature, and ability. AND/OR V- have vegetative to an 240% of the	Deeply incised vertical/lateral in incision, flow con banks. Streambe rooting depth, m vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANII channel. Greater ti bed is covered contributing than	(or excavated), stability. Severe laioned within the d below average egletaive protection n 20% of banks, is gegetaive protection n 20% of banks, is ion. Obvious banks D/OR Aggrading D/OR Aggrading by deposition, etability. Muticalo
			bot	tom.	> 40% of the bank features which co	And depositional ntribute to stability.	banks and stable se abs	diment deposition is ent.	thread channels ar flo	nd/or subterranean w.
Saara	-	>	2	4		ว	1	6	-	1
Score		•	2	.4	· ·	2	1	.0		
NOTES>>	bars/bankfull benches are present. Access to their original floodplain or fully developed wide bankfull benches. Mid-channel bars, and transverse bars few. Transient sediment deposition covers less than 10% of bottom. 3 BUFFERS: Assess both bank's Optimal Tree stratum (dbh > 3 inches) present, with > 50% tree encompared		: 100 foot riparian Con Subo	areas along the en aditional Cate ptimal	ntire SAR. (rough gory Mar	measurements of ginal	f length & width ma	ay be acceptable) P or	NOTES>>	
Riparian Buffers	N BUFFERS: A: Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the enditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understoy.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till coropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Ay be acceptable) OC Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers	N BUFFERS: Au Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the end ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low	f length & width ma Pro- High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>>	
Riparian Buffers	N BUFFERS: Ar Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	Areas along the end ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1 1	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries, no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0 6	ay be acceptable) or Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5	NOTES>>	
Riparian Buffers	N BUFFERS: A: Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, e canopy cover. within the riparian as.	High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2	Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6	Ay be acceptable)	NOTES>>	
Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R	N BUFFERS: As Opti Tree stratum (dbh > with > 60% tree Wetlands located are Uetlands located are 1.	ssess both bank's imal a 3 inches) present, e canopy cover. within the riparian as. 5 ach stream bank ach by measuring Score for each ripa	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cate or estimating leng arian category in t	areas along the en ditional Categorial ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh > 3 inches) present, with ~30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure I of % F Blocks e	tor Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100	NOTES>>	
Riparian Buffers Condition Scores Delineate ripa Enter the % R	N BUFFERS: A: Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. arian areas along ex uare footage for ea siparian Area and S % Riparian Area	ssess both bank's imal 3 inches) present, e canopy cover. within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 70%	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (db > 3 inches) present, with 30% to 60% tree canopy cover and containing by 60% tree canopy cover and containing voice and containing voice and containing voice and containing voice shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th 30%	areas along the en ditional Categorial ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-til cropland; actively grazed pasture, sparsely vegetated area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure I of % F Blocks e	Ay be acceptable)	NOTES>>	
Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R Right Bank	N BUFFERS: Ar Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. 1. arian areas along er uare footage for ea Riparian Area and S % Riparian Area? Score >	ssess both bank's imal 3 inches) present, canopy cover. within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 70% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th 30% 0.75	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% the anopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale the blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provice	measurements of ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-til coropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure t of % F Blocks e	Ay be acceptable) FOR Low Poor: Impervious Surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100%	NOTES>>	
Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R Right Bank	N BUFFERS: An Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. 1. arian areas along ex uare footage for ea Riparian Area and S % Riparian Area and S	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 70% 1.2	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Catt or estimating leng arian category in th 30% 0.75	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale the blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense hetraceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 titon Scores using culators are provice	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. ted for you below.	f length & width ma Pc High Poor: Lawns, mowed, and cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure of % F Blocks e	ay be acceptable) The sums tiparian qual 100	NOTES>>	cores*0.01)/2
Riparian Buffers Condition Scores Delineate ripa Determine sq Enter the % R Right Bank	N BUFFERS: Ar Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. 1. arian areas along er uare footage for ea Riparian Area and S % Riparian Area> Score >	ssess both bank's imal 3 inches) present, a canopy cover. within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 70% 1.2 100%	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Cat or estimating leng arian category in th 30% 0.75	areas along the er ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale he blocks below.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provid	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed patture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition. High 0.6 Ensure 1 of % F Blocks e	ay be acceptable) The sums Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, mine spoil lands, denuded surfaces, active feed lots, trails, or other comparable conditions. Low 0.5 he sums tiparian qual 100 100% 100%	NOTES>>	cores*0.01)/2 1.07
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Riparian Buffers Condition Scores Delineate ripa Determine squeet Enter the % R Right Bank Left Bank Left Bank B. INSTREAN Habitat/ Available Cover	N BUFFERS: A: Opti Tree stratum (dbh > with > 60% tree Wetlands located are Wetlands located are 1. Arian areas along en uare footage for ea Grarian Area and S % Riparian Area and S Score > % Riparian Area> Score > % Riparian Area> Score > % Riparian Area> Score > % ABJTAT: Vala s; SAV; riffle poole of Opti Habitat elements a in greater than 5	ssess both bank's imal a 3 inches) present, a canopy cover, within the riparian as. 5 ach stream bank ach by measuring Score for each ripa 70% 1.2 100% 1.2 ried substrate size complexes, stable imal re typically present 0% of the reach.	100 foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory. High 1.2 nto Condition Catt or estimating leng arian category in th 30% 0.75 stable habitat ele present in 30-50%, adequate for r popula	areas along the en ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation). Low 1.1 egories and Cond th and width. Cale th and width. Cale th and width. Cale th and width. Cale the blocks below. Conditional ptimal ments are typically of the reach and are maintenance of ations.	ntire SAR. (rough gory High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dh > 3 inches) present, with <30% tree canopy cover. High 0.85 ition Scores using culators are provice culators are provice	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory. Low 0.75 the descriptors. led for you below. stable substrate; ginal ments are typically of the reach and are maintenance of ations.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries: no-till cropland; actively grazed pasture, sparsely vegetated area, recently stabilized, or other comparable condition. High 0.6 Ensure 1 of % F Blocks e blocks e blo	ay be acceptable) The sums tiparian qual 100 100% tiparian qual 100% tiparian qual 100% tiparian tipari tiparian tiparian tiparian tiparian tiparian tiparian t	NOTES>> CI= (Sum % RA * SA Rt Bank CI > Lt Bank CI > NOTES>stre unstable	cores*0.01)/2 1.07 1.20 eam not

	Si	tream Ir	npact A	ssessm	nent For	m Page	e 2			
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL	ALTERATION: Stream crossir	ngs, riprap, concre	ete, gabions, or co	ncrete blocks, stra	ightening of chanr	nel, channelizatior	n, embankments,	NOTES>>		
	Neulinikle		Condition	al Category		6.				
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander	Greater than 80% by any of the char in the parameter 80% of banks sl riprap, c	of reach is disrupted anel alterations listed guidelines AND/OR hored with gabion, or cement.			
				pattern has not recovered.	pattern has not recovered.					
SCORE	1.5	1.3	1.1	0.9	0.7	C).5			
	REACH	CONDITION	INDEX and S	STREAM CO	NDITION UNI	TS FOR THI	S REACH			
NOTE: The CIs and R	CI should be rounded to 2 decimal places. Th	he CR should be round	led to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	
							COMPENSAT		MENT (CR) >>	
							CR = RCI	I X LF X IF		1
Notes:	dada a da a da a da da	4		d alam to to						ł
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2. What is the	estimated bankfull width?									
3. What is the	estimated bank height?									
4. Is the chani	nel high gradient or low gradi	ent?								
5. Does the ch	nannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has bee	en altered?				
6. Does the ch	nannel appear to be aggrading	g, degrading, o	r stable?							
7. Describe th	e sediment supply (i.e., extre	me, very high, I	high, etc.).							
8. Are the stre	eambanks eroding? Over wha	it percentage o	f the reach?							
9. Are headcu	ts present within the reach?									
10. Explain the	e composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.)).					
Additional No	otes:									l
	Wetland area/beaver	^r pond. Small a	amount of wate	r in beaver pon	d, but otherwis	e dry. Beaver o	damage throug	n area.		
		Stre		SSESS	Sment Nethodology f	or use in Virg	ı (Forr _{jinia}	n 1)		
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			For use i	n wadeable chan	nels classified a	s intermittent or	perennial			
Project #		Project Name	•	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
1439101	Stre	eam Assessm	nent	Louisa Co.			10/3/07	C-3	592	1
Nam	e(s) of Evaluat	tor(s)	Steam Name	and Informat	ion	l	l			
-	TJL, CWL, MLI	н	Charlie - Trib	outary to Lake	Anna					
Channel C	Condition: Acces	se the cross as -t	on of the stream -	and proveiling and	dition (orceion	aradation)				
- onamiei C	Sonution. Asse	aa me cross-secti	on or the stream a	and prevailing con	Conditional Categor	ry				
	Opti	imal	Subo	ptimal	Mar	ginal	Po	or	Sev	rere
Channel Condition	Very little incision or 100% stable banks. protection or natur (80-100%). AND bars/bankfull ben Access to their ori fully developed wid Mid-channel bars, a few. Transient sec covers less than	r active erosion; 80- Vegetative surface al rock, prominent (NR Stable point ches are present. iginal floodplain or be bankful benches. and transverse bars diment deposition 10% of bottom.	Slightly incised, fi erosion or unprotec of banks are si Vegetative protec prominent (60- Depositional feat stability. The ban channels are well di has access to ba newly developed portions of the r sediment covers 10	ew areas of active cted banks. Majority table (60-80%). table (60-80%). 80%) AND/OR tures contribute to nkfull and low flow efined. Stream likely nkfull benches, or floodplains along reach. Transient 0.40% of the stream	Often incised, but Poor. Banks more or Poor due to lc Erosion may be pr both banks. Vegeta 60% of banks. S bevertical or unde 60% of tream is co Sediment may be 1 contribute instabil contribute to s forming/present.1	less than Severe or stable than Severe or stable than Severe wer bank slopes. esent on 40-60% of tive protection on 40 threambanks may rrout. AND/OR 40- byoered by sediment. emporary/transient, ity. Deposition that tability, may be AND/OR V-shaped stative protection on	Overwider Vertically/laterally widen further. Ma are near vertical. E 80% of banks. Ve present on 20-40' insufficient to preve 60-80% of the str sediment. temporary/transi contributing to inst shaped channels protection is preser	ed/incised. unstable. Likely to ority of both banks osion present on 60 getative protection % of banks, and is nt erosion. AND/OR getative protection am is covered by Sediment is ent in nature, and ability. AND/OR V- have vegetative nt on > 40% of the	Deeply incised vertical/lateral in incision, flow cor banks. Streambe rooting depth, rr vertical/undercut. V present on less tha not preventing eros sloughing present. on 80-100%. ANI channel. Greater t bed is covered contributina to in	(or excavated), stability. Severe tained within the d below average algority of banks, segetative protectior n 20% of banks, is con Obvious bank Erosion/raw banks D/OR Aggrading han 80% of stream by deposition, stability. Multiole
			boti	tom.	> 40% of the bank features which co	s and depositional ntribute to stability.	banks and stable se abs	diment deposition is ent.	thread channels ar flo	nd/or subterranean w.
Score		2	2	4		2	1	6		1
00010	, , , , , , , , , , , , , , , , , , ,	<u> </u>			· · · ·	-			1	
. RIPARIAN	N BUFFERS: A	ssess both bank's imal	: 100 foot riparian Con Subo	areas along the e nditional Cate ptimal	ntire SAR. (rough gory Mar	measurements of ginal	f length & width ma	ay be acceptable)	NOTES>> no riparian area,	wetlands in but
Riparian Buffers	N BUFFERS: Ar Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, e canopy cover. within the riparian tas.	te 100 foot riparian Cor Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the e ditional Cate ptimal Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaccous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with ~30% tree canopy cover with maintained	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, cow crops, active feed lots, trails, or other comparable conditions.	NOTES>> no riparian area, otherwise op riparian buffe	wetlands in but timal er.
RIPARIAN Riparian Buffers	N BUFFERS: An Opti Tree stratum (dbh > with > 60% tree Wetlands located are	ssess both bank's imal > 3 inches) present, e canopy cover. within the riparian ias.	tion foot riparian Con Subo High Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and containing both herbaceous and shrub layers or a non-maintained understory.	areas along the e ditional Cate ptimal Low Suboptimal: Riparian areas with tree stratum (dbh > 3 inches) present, with 30% to 60% tree canopy cover and a maintained understory. Recent cutover (dense vegetation).	High Marginal: Non-maintained, dense herbaceous vegetation with either a shrub layer or a tree layer (dbh > 3 inches) present, with <30% tree canopy cover.	measurements of ginal Low Marginal: Non-maintained, dense herbaceous vegetation, riparian areas lacking shrub and tree stratum, hay production, ponds, open water. If present, tree stratum (dbh >3 inches) present, with <30% tree canopy cover with maintained understory.	f length & width ma Pc High Poor: Lawns, mowed, and maintained areas, nurseries; no-till cropland; actively grazed pasture, sparsely vegetated non-maintained area, recently seeded and stabilized, or other comparable condition.	Ay be acceptable) NOT Low Poor: Impervious surfaces, mine spoil lands, denuded surfaces, row crops, active feed lots, trails, or other comparable conditions.	NOTES>> no riparian area, otherwise op riparian buffe	wetlands in but timal er.
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	S	tream Ir	npact A	ssessm	nent For	<u>m Pag</u> e	2			
Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor	
								500	1	
 CHANNEL spoil piles, constr 	ALTERATION: Stream crossir rictions, livestock	ngs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chan	nel, channelization	, embankments,	NOTES>>		
	Negligible	Mi	Conditiona	al Category	erate	Seu	/ere			
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% c by any of the chanr in the parameter g 80% of banks sh riprap, or	of reach is disrupted rel alterations listed uidelines AND/OR ored with gabion, r cement.			
SCORE	1.5	1.3		0.9			.5			1.50
	REACH	CONDITION	INDEX and S	TREAM CO	NDITION UN	TS FOR THIS	S REACH			4.40
NOTE: The CIS and R	CI snould be rounded to 2 decimal places. I	ne CR snould be round	ed to a whole number.				RCI	= (Sum of all C	l's)/5	1.18
							COMPENSAT	ION REQUIRE	MENT (CR) >>	699
							CR = RCI	X LF X IF		
Notes:	victing ringrian huff /: -	turo foresta d'	orbaccour -	l chrub lasser		roton:tillt.	ocmorte	at		
 Describe ex maintained, la 100 percent mature 	Kisting riparian buffer (i.e., ma wns, impervious surfaces, etc deciduous forest	ture forested, r :.). Provide the	estimated pero	i shrub layers j centage of the i	present in unde total riparian ar	erstory, utility ea	asments presen of each cover ty	nt, understory pe.		
2. What is the	estimated bankfull width?		Approximately 6 ft							
3. What is the	estimated bank height?		Approximately 2 ft							
4. Is the chan	nel high gradient or low gradi	ent?	High gradient							
5. Does the ch	nannel appear to have natural	sinuosity or do	oes it appear th	at the channel	pattern has be	en altered?		Natural sinuosity		
6. Does the ch	nannel appear to be aggrading	g, degrading, or	r stable?		Stable					
7. Describe th	e sediment supply (i.e., extre	me, very high, ł	nigh, etc.).		Moderate sediment	supply				
8. Are the stre	eambanks eroding? Over wha	t percentage of	f the reach?		60 percen streamba	ank erosion				
9. Are headcu	ts present within the reach?		Yes, headcuts were	observed						
10. Explain th	e composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.).	10% rock, 15% grav	rel, 60% sand, 15% s	ilt		
Additional No	otes:									
	SAR	ends at headcu	ut. Above grad	ient is drainage	e channel that o	cuts through we	oods.			

Channel Project # Project Amount Locality Cover, ILS HUC Date SAR # Impact/SR Impact/SR<			Stre		SSESS	sment lethodology f	FORM or use in Virg	i (Forr	n 1)			
Project Name Locality Covarian HUC Date SAR # Imagin (h) Project Name 1133101 Stream Assessment Louisa Co. 10/307 C-4 178 1 1133101 Stream Assessment Date is CPUILLADOR (h) Stream Assessment C-4 178 1 1133101 Stream Assessment Cate - Tribulary to Lob Armite Stream Assessment C-4 178 1 Channel Vinction of the stream Assessment				For use i	n wadeable chan I	nels classified as	s intermittent or	perennial				
1439101Stream AusesLouis ALouis A10/10/0C.4161Network of Extentance:Stream Ause:Stream Ause: <td <="" rowspan="4" th=""><th>Project #</th><th></th><th>Project Name</th><th>,</th><th>Locality</th><th>Cowardin Class.</th><th>HUC</th><th>Date</th><th>SAR #</th><th>Impact/SAR length (ft)</th><th>Impact Factor</th></td>	<th>Project #</th> <th></th> <th>Project Name</th> <th>,</th> <th>Locality</th> <th>Cowardin Class.</th> <th>HUC</th> <th>Date</th> <th>SAR #</th> <th>Impact/SAR length (ft)</th> <th>Impact Factor</th>	Project #		Project Name	,	Locality	Cowardin Class.	HUC	Date	SAR #	Impact/SAR length (ft)	Impact Factor
Number (a) Descent (b) Descent (b) <thdescent (b)<="" th=""> <thdescent (b)<="" th=""></thdescent></thdescent>		1439101	Stre	am Assessm	ent	Louisa Co.			10/3/07	C-4	176	1
		Nam	e(s) of Evaluat	or(s)	Steam Name	and Informat	ion		I			
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Channel Optimal Subortical Marginal Por Subortical Control Subortical S	Channel C	ondition: Assos	s the cross socti	on of the stream a	and provailing con	dition (orosion, ag	aradation)					
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Score 3 2.4 2 1.6 1 NOTES>>				DOL	ioni.	> 40% of the bank features which cor	s and depositional tribute to stability.	banks and stable se abs	diment deposition is ent.	thread channels ar flo	nd/or subterranean w.	
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	S	tream Ir	npact A	ssessm	nent For	m Page	2			
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor	
								500	1	
4. CHANNEL	L ALTERATION: Stream crossir	ngs, riprap, concre	ete, gabions, or cor	ncrete blocks, stra	ightening of chani	nel, channelizatior	n, embankments,	NOTES>>		
opon piles, consti			Conditiona	al Category						
	Negligible	Mi	nor 	40 - 60% of reach	erate	Se	vere			
			00.40% - 64	is disrupted by any of the channel	is disrupted by any of the channel					
Channel	Channelization dradging alteration or	Less than 20% of the stream reach is disrupted by any of	20-40% of the stream reach is	alterations listed in the parameter	alterations listed in the parameter	Greater than 80%	of reach is disrupted			
Alteration	hardening absent. Stream has an unaltered pattern or has naturalized.	the channel alterations listed in	the channel alterations listed in	guidelines. If stream has been	guidelines. If stream has been	in the parameter	guidelines AND/OR			
		the parameter guidelines.	the parameter guidelines.	channelized, normal stable	channelized, normal stable	riprap, c	or cement.			
				pattern has not	pattern has not					
SCORE	1.5	1.3	1.1	0.9	0.7	C	.5			1.50
	REACH		INDEX and S			TS FOR THI	S REACH			
NOTE: The CIs and R	RCI should be rounded to 2 decimal places. T	he CR should be round	led to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>	1.20
							RCI	= (Sum of all C	l's)/5	
							COMPENSAT		MENT (CR) >>	211
Notes:							UN - KUI			I
1. Describe ex	xisting riparian buffer (i.e., ma	ture forested, h	nerbaceous and	d shrub layers	present in unde	erstory, utility e	asments prese	nt, understory		
maintained, la	wns, impervious surfaces, etc	c.). Provide the	estimated perc	centage of the t	otal riparian ar	ea comprised	of each cover ty	pe.		
100 percent mature	e deciduous forest									
2. What is the	e estimated bankfull width?		Approximately 1.5-2	2.5 ft						
3 What is the	actimated bank beight?		Approximately 1 ft							
5. What is the	e estimated bank height?		Approximately							
4 1 4			LP-LP							
4. Is the chan	inel high gradient or low gradi	ent?	High gradient							
5 Deep the ol	hannal annear ta have notural		aaa it annaar th	of the channel	nattarn hao ha	an altarad2		Net al since it.		
5. Does the ci	nannel appear to have hatural	sinuosity or ad	bes it appear th	at the channel	pattern has be	en altered?		Natural sinuosity		
6. Does the cl	hannel appear to be aggrading	g, degrading, oi	r stable?		Stable					
7. Describe th	he sediment supply (i.e., extre	me, very high, ł	high, etc.).		Low sediment supp	ly				
8 Are the stre	aambanks arading? Over wha	t percentado o	f the reach?		20 percen streamb	ank erosion				
. Are une sure	cambaines erounig? Over Wild	a percentage 0			_s portion du camba					
9. Are headcu	uts present within the reach?		Yes, headcut obser	ved at head of strear	n					
10. Explain th	ne composition of the existing	stream bed (pe	ercent cobble, r	ock, sand, etc.).	100% silt and sand				
Additional N	otes:									l
]
	SAR henine a	at headcut C-4	is a drainage o	channel that ru	ns through fore	st. Drv. no wa	ter in channel			
			.e a aramage t		in ough fore		in onamiel.			

ATTACHMENT E-3

STREAM ASSESSMENT REPORTS:

ROUTE 700 PARCELS

UNIFIED STREAM METHODOLOGY STREAM ASSESSMENT WITHIN THE ROUTE 700 PARCELS

Dominion North Anna Power Station

Prepared for:

Dominion Virginia Power 5000 Dominion Boulevard Glen Allen, Virginia 23060-3308

Prepared by:

EA Engineering, Science, and Technology, Inc. 15 Loveton Circle Sparks, Maryland 21152 (410) 771-4950

June 2009

1.0 INTRODUCTION

The North Anna Power Station (NAPS) is a nuclear power plant with the capacity to generate electricity from two units (Unit 1 and Unit 2). NAPS is located in Louisa County, near the town of Mineral, on a peninsula on the southern shore of Lake Anna, approximately 5 miles upstream of the North Anna Dam (Figure 1). Virginia Electric and Power Company D/B/A Dominion Virginia Power (Dominion), operates the existing nuclear units on the NAPS site. Dominion owns the land above and below the lake surface and around the lake up to the expected high-water mark.

Dominion proposes to construct a new nuclear unit (Unit 3) at the NAPS site to provide additional electric service to meet the growing demand. In order to prepare the site for the proposed expansion, a haul road and laydown areas are proposed in the Route 700 parcels to support near-term construction projects within the NAPS site. The preparation and construction activities within the Route 700 parcels will cause direct permanent impacts to stream resources on-site. As part of the planning process for the Route 700 parcels, steps were taken in the alternatives analysis to ensure avoidance and minimization to the maximum extent practicable. Due to numerous specific safety, operational, and engineering siting requirements, it was determined that the proposed alternatives would result in unavoidable impacts to stream resources. Dominion is committed to avoiding stream impacts where practicable, and minimizing potential impacts to streams where no practicable alternative exists.

1.1 STREAM ASSESSMENT STUDY

EA Engineering, Science, and Technology, Inc. (EA) performed a stream assessment on March 24 and 25, 2009 within four parcels known as the Route 700 parcels, southwest of NAPS. The quality of stream reaches was assessed using the Unified Stream Methodology (USM) developed by the U.S. Army Corps of Engineers, Norfolk District (USACE) and the Virginia Department of Environmental Quality (VDEQ).

1.2 PURPOSE OF THE STREAM ASSESSMENT

The proposed project will affect streams within the design footprint. The USM was used for the Stream Assessment Study to characterize existing stream resources throughout the design footprint. This information will be used to determine compensatory stream mitigation requirements to support the joint permit application for the proposed project.

2.0 UNIFIED STREAM METHODOLOGY

The US Army Corps of Engineers - Norfolk District (USACE) and the Virginia Department of Environmental Quality (VDEQ) proposed a protocol in January 2007 entitled "Unified Stream Methodology" (USM) (USACE et al. 2007). This method replaces both the USACE's Stream Attribute Assessment Methodology (SAAM) and VDEQ's Stream Impact and Compensation Assessment Methodology (SICAM). In May 2008, the methodology was revised to include an additional data form for ephemeral streams. The purpose of the method is to rapidly assess the stream compensation requirements that would be required for permitted stream impacts and the amount of "credits" obtainable through implementation of various stream compensation practices.

There are four processes that are described within the USM. These include 1) assign a Reach Condition Index (RCI) to the stream to be impacted; 2) assess the type or severity of impact; 3) determine the compensation requirement; and 4) determine what types of and the amount of the various compensation practices that will satisfy the compensation requirement.

There are six basic types of analysis that are performed using this methodology: 1) assessing existing conditions, 2) characterizing proposed impacts, 3) determining compensation requirements, 4) evaluating pre-compensation conditions, 5) determining compensation credit, and 6) evaluating total compensation credit. This study includes the first three analysis types.

2.1 FIELD DATA FORMS

A field data form (Form 1) was created by the USACE and VDEQ for the Stream Assessment Study. Data related to the four variables included in the USM were collected in the field and recorded via the electronic notebook. Copies of the data forms resulting from the Stream Assessment Study have been exported from the electronic notebook and are included in Appendix A. Photographs of the site are included within the data forms.

2.2 GLOBAL POSITIONING SYSTEM

A global positioning system (GPS) was used during the Stream Assessment Study to collect coordinates for the stream assessment. Reach lengths were determined in the field using a tape measure. The data collected by the GPS unit during the study were exported and incorporated into the CAD/GIS project files. The GPS data were used to define reach lengths for application to the analysis presented in this report.

3.0 RESULTS

A field survey was conducted on 24-25 March 2009 at NAPS for four tributary streams of Harris Creek. The tributary streams were labeled as Stream 2, 6, 7/8, and 9. The tributaries were assessed to collect the information required by the USACE and VDEQ USM methodology. Appendix A contains the field data sheets and associated worksheets that were used to calculate the stream condition index (CI), the reach condition index (RCIs), and the compensation requirement (CRs) for each of the stream assessment reaches (SAR).

The four tributaries to Harris Creek were classified as headwater streams. The width of the channels varied from 0.5 inches to 3 feet with bank heights that varied from 1 inch to 3 feet, and the depth of the channels ranged from 0 to 8 inches.

The streams were divided into multiple stream assessment reaches that were determined by significant changes in one or more of the four variables: channel condition, riparian buffer, instream habitat, and channel alteration. In Stream 2, eight SARs were characterized; in Stream 6, two SARs were characterized; in Stream 7/8, two SARs were characterized as SAR 7 and four SARs were characterized as SAR 8; and in Stream 9, three SARs were characterized (Figure 2). The stream assessment reaches were recorded on the data form using a number to determine the stream (2, 6, 7, 8, or 9) followed by the sequence of the stream assessment reach (i.e., the first assessment reach in Stream 2 of the proposed project was recorded on the data form as 2-1). For each stream assessment reach, a condition index was given for each variable and an impact factor (IF) was assigned based on the expected impairment of the stream. For each of the stream assessment reaches, an impact factor of 1.0 was assigned, representing an activity that is presumed to have a complete or near-complete loss of all beneficial stream functions due to the proposed activity.

As defined by the USM the reach condition indexes can vary from 0.5 to 1.5. The reach condition index values ranged from 1.04 to 1.50 for the stream assessment reaches evaluated at the proposed cooling towers site.

The compensation requirement was determined based on the length of impact multiplied by the reach condition index and the impact factor. Table 1 provides a summary of compensation requirement values for each stream assessment reach evaluated.

SAR	Length of Impact (L _I)	Reach Condition Index	Impact Factor	Compensation Requirement (CR)
	(feet)	(RCI)	(IF)	$(L_I \times RCI \times IF)$
2-1	172	1.15	1.00	198
2-2	240	1.05	1.00	252
2-3	175	1.13	1.00	198
2-4	150	1.04	1.00	156
2-5	316	1.12	1.00	354
2-6	450	1.16	1.00	522
2-7	27	1.10	1.00	30
6-1	236	1.22	1.00	288
6-2	303	1.26	1.00	382
7-1	321	1.35	1.00	433
7-2	53	1.35	1.00	72
8-1	16	1.27	1.00	20
8-2	436	1.36	1.00	593
8-3	71	1.41	1.00	100
8-4	75	1.30	1.00	98
8-5	222	1.43	1.00	317
9-1	243	1.50	1.00	365
9-2	138	1.38	1.00	190
Total L _I	3,644		Total CR	4,568

Table 1. Values that Determine the Compensation Requirements for the StreamAssessment Reaches Evaluated

As a result, approximately 3,644 linear feet of stream channel will be permanently impacted within the Route 700 Parcels by the proposed project. The data calculations from the stream assessment resulted in a total Compensation Requirement of 4,568 stream credits. This represents the total number of stream compensation credits required for the proposed impacts to streams on the Route 700 Parcels.

The USM includes forms for evaluation of mitigation potential on streams proposed for preservation and/or enhancement. These forms are not included in this report because Dominion proposes to mitigate permanent impacts to streams by purchasing stream credits at an approved stream mitigation bank and preserving streams within the NAPS site.

4.0 CONCLUSION

The USM protocol developed by the USACE – Norfolk District and VDEQ was applied to four headwater streams that are located within the Route 700 Parcels. The Stream Assessment

Survey was conducted on 24-25 March 2009. Based on the USM, the total compensation requirement is 4,568.

5.0 **REFERENCES**

U.S. Army Corps of Engineers, Norfolk District (USACE) and Virginia Department of Environmental Quality (VDEQ). 2007. Unified Stream Methodology for Use in Virginia. January



Figure 1. General Location Map



APPENDIX A



Project #	Applicant					III F aye	; Z		
CHANNEL			Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
CHANNEL								500	1
il piles, constri	ALTERATION: Stream crossin ctions, livestock	igs, riprap, concret	te, gabions, or cor	ncrete blocks, strai	ightening of chanr	nel, channelization	, embankments,	NOTES>>	
<u> </u>			Conditiona	al Category				1	
	Negligible	Mir	nor	Mod	erate	Sev	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% 6 by any of the chan in the parameter 80% of banks sh riprap, o	of reach is disrupted nel alterations listed juidelines AND/OR ored with gabion, r cement.		
CORE	1.5	1.3	1.1	0.9	0.7	0	.5		
	REACH (CONDITION I	NDEX and S		NDITION UNI	TS FOR THI	S REACH		
E: The CIs and RC	I should be rounded to 2 decimal places. Th	e CR should be rounde	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>
							RC	= (Sum of all C	's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
							CR = RCI	X LF X IF	

INSERT PHOTOS:



Looking north at drop in bank



Looking toward right bank



Looking north at channel

Right Bank Riparian



						age	-		
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL piles, const	ALTERATION: Stream crossin rictions, livestock	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelizatior	, embankments,	NOTES>>	
			Conditiona	al Category				1	
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chan in the parameter 80% of banks sh riprap, o	of reach is disrupted nel alterations listed juidelines AND/OR iored with gabion, r cement.		
CORE	1.5	1.3	1.1	0.9	0.7	0	.5		
	REACH (CONDITION	NDEX and S	TREAM CON	NDITION UNI	TS FOR THI	S REACH		
TE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>
							RC	= (Sum of all C	l's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
							CR = RCI	X LF X IF	

INSERT PHOTOS:



Looking north at channel



Left bank riparian area



Right bank riparian area



Due is at #	Annelisent		Lasality	Couverdin Class	11110	Data	Dete Deint	CAD longeth	
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL	ALTERATION: Stream crossin ictions, livestock	igs, riprap, concre	te, gabions, or cor	ncrete blocks, strai	ightening of chanr	nel, channelizatior	, embankments,	NOTES>>	
• •			Conditiona	al Category					
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% of by any of the chan in the parameter g80% of banks sh riprap, o	of reach is disrupted nel alterations listed uidelines AND/OR ored with gabion, r cement.		
CORE	1.5	1.3	1.1	0.9	0.7	0	.5		
	REACH (NDEX and S	TREAM CON	IDITION UNI	TS FOR THI	S REACH		
TE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>
							RC	= (Sum of all C	l's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
							CR = RCI	X LF X IF	



Looking north at channel



Left bank riparian area



Right bank riparian area



Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL	L ALTERATION: Stream crossin rictions, livestock	igs, riprap, concre	e, gabions, or cor	ncrete blocks, stra	ightening of chanr	iel, channelizatio	n, embankments,	NOTES>>	
			Conditiona	al Category				1	
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chai in the parameter 80% of banks s riprap, r	of reach is disrupted nnel alterations listed guidelines AND/OR hored with gabion, or cement.		
CORE	1.5	1.3	1.1	0.9	0.7		0.5		
	REACH (CONDITION I	NDEX and S	TREAM CO	NDITION UNI	TS FOR TH	IS REACH		
E: The CIs and R	RCI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	NDEX (RCI) >>
							RC	= (Sum of all C	il's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
							CR = RC	XIEXIE	





Looking north downstrea





Right bank riparian area



Project #	Applicant		Locality	Cowardin Class.	нис	Date	Data Point	SAR length	Impact Factor
								500	1
HANNEL	ALTERATION: Stream crossin rictions, livestock	gs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	iel, channelizatio	n, embankments,	NOTES>>	
1			Conditiona	al Category					
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chai in the parameter 80% of banks s riprap, r	of reach is disrupted nnel alterations listed guidelines AND/OR hored with gabion, or cement.		
ORE	1.5	1.3	1.1	0.9	0.7		0.5		
	REACH (NDEX and S		NDITION UNI	TS FOR TH	IS REACH		
E: The CIs and R	CI should be rounded to 2 decimal places. Th	e CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>
							RC	= (Sum of all C	l's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>



Looking north at channel



Left bank riparian area





Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL	ALTERATION: Stream crossin	gs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	el, channelizatio	n, embankments,	NOTES>>	
1,			Conditiona	al Category					
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Iteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the char in the parameter 80% of banks s riprap, o	of reach is disrupted nel alterations listed guidelines AND/OR hored with gabion, or cement.		
CORE	1.5	1.3	1.1	0.9	0.7	().5		
	REACH (NDEX and S		NDITION UNI	TS FOR TH	S REACH		
E: The CIs and R	CI should be rounded to 2 decimal places. Th	e CR should be round	ed to a whole number.				THE REACH	CONDITION IN	DEX (RCI) >>
							RC	= (Sum of all C	l's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
								VIEVIE	



Looking north downstream



Left bank riparian area



Right bank riparian area



Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL piles, const	ALTERATION: Stream crossin rictions, livestock	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	el, channelizatio	n, embankments,	NOTES>>	
			Conditiona	al Category					
	Negligible	Mi	nor	Mod	erate	Se	vere		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of Peach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 60% of Peach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the char in the parameter 80% of banks s riprap, o	of reach is disrupted anel alterations listed guidelines AND/OR hored with gabion, or cement.		
SCORE	1.5	1.3	1.1	0.9	0.7	().5		
	REACH (NDEX and S		NDITION UNI	TS FOR TH	IS REACH		-
DTE: The CIs and R	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>
							RCI	= (Sum of all C	l's)/5
							COMPENSAT	ION REQUIRE	MENT (CR) >>
							CR = RCI	X LF X IF	



Looking north downstream



Left bank riparian area



Right bank riparian area







Looking upstream at channel.



Left Bank Riparian ARea



Right Bank Riparian Area



	St	tream Ir	npact A	ssessm	ent For	m Page	2		
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
CHANNEL	ALTERATION: Stream crossin ctions, livestock	ıgs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelizatior	n, embankments,	NOTES>>	
			Conditiona	al Category				1	
	Negligible Mi		nor Moderate		erate	Severe		1	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the char in the parameter 80% of banks st riprap, c	of reach is disrupted nel alterations listed guidelines AND/OR nored with gabion, r cement.		
SCORE	1.5	1.3	1.1	0.9	0.7	C	.5		
	REACH (INDEX and S	STREAM CO	NDITION UNI	TS FOR THI	S REACH		-
TE: The CIs and RC	CI should be rounded to 2 decimal places. Th	ne CR should be round	ed to a whole number.				THE REACH	CONDITION IN	IDEX (RCI) >>
							RC	I= (Sum of all C	l's)/5
							COMPENSA	TION REQUIRE	MENT (CR) >>
							CR = RC	I X LF X IF	
	TOS								





Looking south, upstream

Left Bank Riparian Area



Right Bank Riparian Area







Looking South, Upstream





Right Bank Riparian Area







Looking Upstream





Right Bank Riparian Area






	St	tream Ir	npact A	ssessm	ent For	m Page	2		
Project #	Applicant		Locality	Cowardin Class.	HUC	Date	Data Point	SAR length	Impact Factor
								500	1
. CHANNEL	ALTERATION: Stream crossin	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	el, channelizatior	n, embankments,	NOTES>>	
			Conditiona	al Category				1	
	Negligible	Negligible Mi		inor Moder		Severe]	
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has ben channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has ben channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chan in the parameter 80% of banks sh riprap, c	of reach is disrupted nel alterations listed juidelines AND/OR nored with gabion, r cement.		
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5		
	REACH (NDEX and S	TREAM CO	NDITION UNI	TS FOR THI	S REACH		
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number. THE REACH CONDITION INDEX (RC							NDEX (RCI) >>		
RCI= (Sum of all CI's)/5									
COMPENSATION REQUIREMENT (CR) >>									
CR = RCI X LF X IF									
NSERT PHO	TOS:								



Looking Upstream



Left Bank Riparian Area



Right Bank Riparian Area







Looking Upstream



Left Bank Riparian Area



Right Bank Riparian Area







Looking Upstream



Right Bank Riparian Area





DESCRIBE PROPOSED IMPACT:







Looking Downstream



Markey at the state

Right Bank Riparian Area



Stream Impact Assessment Form Page 2										
Project #	Applicant		Locality Cowardin Class		нис	Date Da	Data Point	SAR length	Impact Factor	
								500	1	
. CHANNEL	ALTERATION: Stream crossin	igs, riprap, concre	te, gabions, or cor	ncrete blocks, stra	ightening of chanr	nel, channelizatior	ı, embankments,	NOTES>>		
Conditional Category										
	Negligible Mi		inor Modera		erate	Severe]		
Channel Alteration	Channelization, dredging, alteration, or hardening absent. Stream has an unaltered pattern or has naturalized.	Less than 20% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	20-40% of the stream reach is disrupted by any of the channel alterations listed in the parameter guidelines.	40 - 60% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	60 - 80% of reach is disrupted by any of the channel alterations listed in the parameter guidelines. If stream has been channelized, normal stable stream meander pattern has not recovered.	Greater than 80% by any of the chan in the parameter 80% of banks sh riprap, o	of reach is disrupted nel alterations listed juidelines AND/OR lored with gabion, r cement.			
SCORE	1.5	1.3	1.1	0.9	0.7	0	.5			
	REACH (CONDITION	INDEX and S	TREAM CON	DITION UNI	TS FOR THI	S REACH			
NOTE: The CIs and RCI should be rounded to 2 decimal places. The CR should be rounded to a whole number.							THE REACH CONDITION INDEX (RCI) >>			
RCI= (Sum of all Cl's)/5										
COMPENSATION REQUIREMENT (CR) >>										
CR = RCI X LF X IF										
NSERT PHO	TOS:									



Looking Downstream





Right Bank Riparian Area







Looking Downstream



Left Bank Riparian Area



Right Bank Riparian Area

Stream Assessment Summary Form (Form 2)

Unified Stream Methodology

for use in Virginia

Project #	Applicant		Date
1439102	Dominion	4/17/2009	
Evalu	HUC	Locality	
Leasure, Hard	2080106.00	Louisa County	

Stream Name	Reach ID	Length of Impact (L ₁) (feet)	Reach Condition Index (RCI)	Impact Factor (IF)	Compensation Requirement (CR) (L ₁ × RCI × IF)	
System 2	2-1	172	1.15	1.00	198	
	2-2	240	1.05	1.00	252	
	2-3	175	1.13	1.00	198	
	2-4	150	1.04	1.00	156	
	2-5	316	1.12	1.00	354	
	2-6	450	1.16	1.00	522	
	2-7	27	1.10	1.00	30	
System 6	6-1	236	1.22	1.00	288	
	6-2	303	1.26	1.00	382	
System 7	7-1	321	1.35	1.00	433	
	7-2	53	1.35	1.00	72	
System 8	8-1	16	1.27	1.00	20	
	8-2	436	1.36	1.00	593	
	8-3	71	1.41	1.00	100	
	8-4	75	1.30	1.00	98	
	8-5	222	1.43	1.00	317	
System 9	9-1	243	1.50	1.00	365	
	9-2	138	1.38	1.00	190	
	Total L _I	3,644		Total CR	4,568	

Note: Round all feet & CR's to the nearest whole number.