FOREST LAWN MEMORIAL-PARK, HOLLYWOOD HILLS - CALIFORNIA RAPID ASSESSMENT METHOD EXECUTIVE SUMMARY - AUGUST 2010

PURPOSE

In early consultations with U.S. Army Corps of Engineers ("Corps") Regulatory Branch staff, Aaron O. Allen, PhD, North Coast Section Chief, of the Corps Los Angeles Regulatory District, recommended that TERACOR Resource Management ("TERACOR") conduct a California Rapid Assessment Method ("CRAM") Functional Analysis on Forest Lawn Memorial-Park, Hollywood Hills ("Forest Lawn Property"). Dr. Allen made this recommendation for purposes of determining the relative functional values of the four (4) largest stream segments on the Forest Lawn Property.

TERACOR conducted the initial CRAM Analysis in January 2007. TERACOR performed an updated CRAM Analysis on 28 and 29 June 2010 of Sennett Creek and three (3) of its tributaries on the Forest Lawn Property. These tributary drainages were identified as Drainages D, F, and H in TERACOR's *Preliminary Determination of U.S. Army Corps of Engineers "Waters of the U.S." and Wetlands Jurisdiction and Impact Analysis*, dated 02 September 2010. This CRAM functional analysis was based on the *California Rapid Assessment Method (CRAM) for Wetlands User's Manual (Version 5.0.2)* dated September 2008, and is meant to supplement TERACOR's preliminary jurisdictional determination, and assist in assessment of Forest Lawn's proposed Master Plan Project and Alternatives.

CRAM ANALYSIS DESCRIPTION

The CRAM is a functional analysis which provides specific guidelines in assessing any wetland or riparian area located in the state of California. It provides a consistent method to monitor present and future conditions of wetlands and riparian areas in California. The CRAM classifies six (6) wetland types (Riverine, Depressional, Playas, Estuarine, Lacustrine, and Slope). Riverine, Depressional, Estuarine, and Slope types are broken down further into sub-types (i.e., Confined or Non-confined Riverine Wetlands; Individual Vernal Pools, Vernal Pool Systems, or Other Depressional Wetlands; Perennial Saline, Perennial Non-saline, or Seasonal Estuarine Wetlands; and Seeps and Springs or Wet Meadows for Slope Wetlands).

CRAM develops Assessment Areas within the wetland or comprising the entire wetland in which four (4) attributes are evaluated to determine an overall functional value (i.e., how well the area functions as a wetland to provide ecological values and habitat) for the wetland. These four (4) attributes are assessed within the Assessment Area or areas immediately surrounding the Assessment Area and are:

1) Buffer and Landscape Context;
2) Hydrology;
3) Physical Structure; and
4) Biotic Structure

Each attribute is then further broken down into metrics, which are measurable components of an attribute.

Buffer and Landscape Context

A buffer is a zone of transition between the immediate margins of a wetland or riparian area and its surrounding environment that is likely to help protect the wetland from anthropogenic stress. CRAM includes four (4) metrics to assess the buffer and landscape context of wetlands. These metrics are 1) landscape connectivity, 2) percentage of the Assessment Area perimeter that has a buffer, 3) the average buffer width, and 4) the condition or quality of the buffer.

Hydrology

Hydrology includes the sources, quantities, and movements of water, plus the quantities, transport, and fates of water-borne materials, particularly sediment as bed load and suspended load. The hydrology attribute consists of the following metrics: 1) water source, 2) hydroperiod or channel stability, and 3) hydrologic connectivity.

Physical Structure

Physical structure is the local physical, chemical, or biological features that provide or support habitat for biota. Physical structure is comprised of two (2) metrics: structural patch richness and topographic complexity.

Biotic Structure

The biotic structure of a wetland includes all of its organic matter that contributes to its material construct or architecture. Biotic structure is characterized by the following three (3) metrics: 1) plant community, 2) horizontal interspersion and zonation, and 3) vertical biotic structure. The plant community metric is composed of four (4) sub-metrics: 1) number of plant layers present, 2) number of co-dominant species, 3) percent invasion, and 4) native plant species richness.

Each metric is then given a specific rating based on current field conditions. Each attribute is then given a score based on each metric rating or if applicable sub-metric ratings. After a score has been assigned for all four (4) attributes, an overall CRAM score for each Assessment Area is then calculated by finding the average of the four (4) attribute scores. CRAM scores can be used to compare sites within a single wetland class, but not between different wetland classes. CRAM scores for similar wetland classes can be compared to determine which wetland has a higher functional value. For example, a CRAM score of 90% indicates a higher functional value for a particular wetland as compared to another wetland of the same class with a CRAM score of 78%.

CRAM METHODOLOGY

The general procedure for conducting the CRAM analysis consists of eight (8) steps, as defined in the CRAM User's Manual:

1.) Assemble Background Information

TERACOR analyzed topographic maps, aerial photography, and other map sources of the Assessment Areas and general area, prior to the field assessment. TERACOR also queried the California Natural Diversity Database ("CNDDB") for the *Burbank, California United States Geological Survey 7.5 minute Quadrangle* to determine the recorded sightings of sensitive species.

2.) Classify the Wetland and Riparian Areas

TERACOR determined that the areas assessed within the Forest Lawn Property fall into one (1) wetland class: Confined Riverine.

3.) Verify the Appropriate Assessment Window

The Assessment Window is the period of time each year when assessments of wetland condition based on CRAM should be conducted. The CRAM User's Manual states that Riverine wetlands should be conducted late in the growing season. TERACOR conducted the updated CRAM Analysis on 28 and 29 June 2010, in compliance with this recommendation.

4.) Establish the Assessment Area

TERACOR mapped the four (4) Assessment Areas (described below) within the Forest Lawn Property. The size of each Assessment Area was then calculated utilizing GIS. TERACOR based the size of each AA on this calculation.

5.) Conduct Initial Office Assessment of Condition Metrics and Stressors

TERACOR acquired site imagery, planned logistics for the site visit, and assembled information about the management of the Assessment Areas within the Forest Lawn Property and their possible stressors based on topographic mapping, aerial photography, and TERACOR's knowledge of the Forest Lawn Property and surrounding areas.

6.) Conduct Field Assessment of Condition Metrics and Stressors

TERACOR field personnel conducted a field analysis and recorded the field conditions of the four (4) Assessment Areas within the Forest Lawn Property.

7.) Complete CRAM Scores and Basic QA/QC Procedures

Following the field assessment of each Assessment Area within the Forest Lawn Property, TERACOR then calculated an overall CRAM score for each Assessment Area based on scores achieved from the field analysis. Initial quality assurance/quality control procedures (QA/QC) were followed.

8.) Upload Assessment Data and Results

TERACOR will electronically submit data collected and CRAM scores for each Assessment Area within the Forest Lawn Property into the CRAM database. The submission will occur at the appropriate time during the Corps' preparation of the Corps' Environmental Assessment.

CRAM ASSESSMENT AREAS

TERACOR field personnel I. Swift and J. Reed performed a CRAM Confined Riverine Analysis on four (4) Assessment Areas on the Forest Lawn Property. The attached *Exhibit 1 - Assessment Area Locations - March 2010 Aerial Photograph* depicts the mapped Assessment Areas within the Forest Lawn Property. Details of the CRAM Assessment Areas are presented below.

Assessment Area No. 1 is located within the upstream portion of Sennett Creek, just west of the former crossing. The attached *Exhibit 2 - Assessment Area No. 1 Photographs (Sennett Creek)* depicts the field conditions of Assessment Area No. 1.

Assessment Area No. 2 is located within the upper midstream portion of Drainage D. The attached *Exhibit 3 - Assessment Area No. 2 Photographs (Drainage D)* depicts the field conditions of Assessment Area No. 2.

Assessment Area No. 3 is located within the midstream portion of Drainage F. The attached *Exhibit 4 - Assessment Area No. 3 Photographs (Drainage F)* depicts the field conditions of Assessment Area No. 3.

Assessment Area No. 4 is located within the midstream portion of Drainage H. The attached *Exhibit 5 - Assessment Area No. 4 Photographs (Drainage H)* depicts the field conditions of Assessment Area No. 4.

Field Assessment forms for each Assessment Area are included in Appendix A - Field CRAM Assessment Forms. The results of the CRAM Analysis for each Assessment Area are discussed below.

RESULTS OF CRAM ANALYSIS

The following table depicts the overall and four (4) attribute scores for each Assessment Area.

Table 1 - Assessment Area CRAM Scores

	Size (hectares)	Buffer and Landscape Context Score	Hydrology	Physical Structure	Biotic Structure	CRAM Score Overall
Assessment Area No. 1	0.43	93	100	88	100	95
Assessment Area No. 2	0.33	100	100	75	83	90
Assessment Area No. 3	0.35	100	100	88	67	89
Assessment Area No. 4	0.25	100	100	50	67	79

CONCLUSION

Assessment Area No. 1 (Sennett Creek) had the highest overall CRAM score of 95. The functional value, therefore, of Assessment Area No. 1 was determined to be the highest of the four (4) Assessment Areas. Assessment Area Nos. 2 (Drainage D) and No. 3 (Drainage F) had CRAM scores of 90 and 89, respectively. Assessment Area No. 4 (Drainage H) had the lowest overall CRAM score of 79, indicating this Assessment Area has the relatively lowest functional value of the four (4) Assessment Areas.

Enclosures:

Exhibit 1 - Assessment Area Locations - March 2010 Aerial Photograph
Exhibit 2 - Assessment Area No. 1 Photographs
Exhibit 3 - Assessment Area No. 2 Photographs
Exhibit 4 - Assessment Area No. 3 Photographs
Exhibit 5 - Assessment Area No. 4 Photographs
Appendix A - Field CRAM Assessment Forms

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0 300 m

Scale

↑

N

TERACOR
RESOURCE MANAGEMENT
27555 YNEZ ROAD SUITE 207
TEMECULA, CA 92591

EXHIBIT 1
ASSESSMENT AREA LOCATIONS
MARCH 2010 AERIAL PHOTOGRAPH

Photo 1 - This southern view of AA No. 1 depicts the California sycamore-coast live oak riparian canopy associated with this portion of Sennett Creek.

Photo 2 - This northern view from the unimproved access road south of AA No. 1 shows the southern perimeter of AA No. 1.

Photo 3 - The understory within the eastern portion of AA No. 1 is dominated by poison oak (*Toxicodendron diversilobum*) and California rose (*Rosa californica*).

Photo 4 - The western portion of AA No. 1 is shown in this photograph.

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Exhibit 2
Assessment Area No. 1 Photographs
(Sennett Creek)

Photo 1 - The northern extent of AA No. 2 is shown. Coast live oak (*Quercus agrifolia*) is dominant within AA No. 2.

Photo 2 - The understory within AA No. 2 is dominated by catweed (*Ageratina adenophora*), a non-native/invasive species, and poison oak.

Photo 3 - This western view depicts the California sycamore-coast live oak habitat associated with AA No. 2.

Photo 4 - The western perimeter of AA No. 2 is shown. The understory in this area is dominated by Torrey's melica (*Melica torreyana*).

Exhibit 3
Assessment Area No. 2 Photographs
(Drainage D)

Photo 1 - The northern extent of AA No. 3 is shown. Toyon (*Heteromeles arbutifolia*) overhangs the drainage at this location.

Photo 2 - The southern extent of AA No. 3 is shown. Poison oak is abundant throughout the understory of this AA.

Photo 3 - Coast live oaks are depicted in this western view of AA No. 3.

Photo 4 - Toyon is present on the west bank of AA No. 3.

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FOREST LAWN MEMORIAL - PARK, HOLLYWOOD HILLS
REPORT DATE: AUGUST 2010

Exhibit 4
Assessment Area No. 3 Photographs
(Drainage F)

Photo 1 - The southern extent of AA No. 4 is shown. AA No. 4 comprises a mixed woodland/scrub habitat.

Photo 2 - The northern extent of AA No. 4 is shown. Coast live oak comprises the overstory in this area.

Photo 3 - This eastern view depicts the dense vegetation within AA No. 4.

Photo 4 - The western perimeter of AA No. 4 is shown.

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FOREST LAWN MEMORIAL - PARK, HOLLYWOOD HILLS
REPORT DATE: AUGUST 2010

Exhibit 5
Assessment Area No. 4 Photographs
(Drainage H)

Basic Information Sheet: Riverine Wetlands

Your Name: IAN SWIFT

CRAM Site ID: DRAINAGE "SENNETT"

Assessment Area Name: AA NO. 1

Date (m/d/y): 6/28/2010

Assessment Team Members for This AA

I. SWIFT, J. REED

Average Bankfull Width: 16'

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100 m

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☐ Mitigation ☑ Impacted ☐ Other

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ ephemeral ☑ intermittent

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		North	34.14191	118.31251	NAD
2		South	34.1414	118.31259	↓
3		East	34.14172	118.31236	
4		West	34.1417	118.31367	
5					
6					

Comments: AA is 0.432 ha

Scoring Sheet: Riverine Wetlands

AA Name: AA No. 1			(m/d/y)	6 28 2010
Attributes and Metrics		**Scores**		**Comments**
Buffer and Landscape Context				
Landscape Connectivity (D)		A		
Buffer submetric A: Percent of AA with Buffer	A			
Buffer submetric B: Average Buffer Width	A			
Buffer submetric C: Buffer Condition	B			
$D + [\,C \times (A \times B)^{\frac{1}{2}}\,]^{\frac{1}{2}}$ = **Attribute Score**		Raw 22.4	Final 93	Final Attribute Score = (Raw Score/24)100
Hydrology				
Water Source		A		
Hydroperiod or Channel Stability		A		
Hydrologic Connectivity		A		
Attribute Score		Raw 36	Final 100	Final Attribute Score = (Raw Score/36)100
Physical Structure				
Structural Patch Richness		B		
Topographic Complexity		A		
Attribute Score		Raw 21	Final 88	Final Attribute Score = (Raw Score/24)100
Biotic Structure				
Plant Community submetric A: Number of Plant Layers	A			
Plant Community submetric B: Number of Co-dominant species	A			
Plant Community submetric C: Percent Invasion	B			
Plant Community Metric (*average of submetrics A-C*)		A		
Horizontal Interspersion and Zonation		A		
Vertical Biotic Structure		A		
Attribute Score		Raw 36	Final 100	Final Attribute Score = (Raw Score/36)100
Overall AA Score		95		**Average of Final Attribute Scores**

Worksheet 1: Landscape Connectivity Metric for Riverine Wetlands.

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1 —	0	1 —	0
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	0

Worksheet 2: Calculating average buffer width of AA.

Line	Buffer Width (m)
A	230
B	105
C	230
D	250
E	250
F	250
G	250
H	250
Average Buffer Width	227

Worksheet 3: Assessing Hydroperiod for Riverine Wetlands.

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools. ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☑ There are no mid-channel bars and/or point bars densely vegetated with perennial vegetation. ☑ Channel bars consist of well-sorted bed material. ☑ There are channel pools, the bed is not planar, and the spacing between pools tends to be regular. ☑ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps, or the lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more nick points indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.

Worksheet 4: Entrenchment Ratio Calculation for Riverine Wetlands.

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate mid-points along straight riffles or glides, away from deep pools or meander bends.

Steps	**Replicate Cross-sections** ⟶	**1**	**2**	**3**
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	25	12	10
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	5	2	2
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	10	4	4
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	173	45	41
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	6.92	3.75	4.1
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections.			4.92

Worksheet 5a: Structural Patch Type for Non-confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	**Check for presence**
Secondary channels on floodplains or along shorelines	
Swales on floodplain or along shoreline	
Pannes or pools on floodplain	
Vegetated islands (mostly above high-water)	
Pools or depressions in channels (wet or dry channels)	
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	
Debris jams	
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	
Submerged vegetation	
Total Possible	**16**
No. Observed Patch Types	

Worksheet 5b: Structural Patch Type for Confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Pools or depressions in channels (wet or dry channels)	✓
Riffles or rapids (wet channel) or planar bed (dry channel)	✓
Point bars and in-channel bars	
Debris jams	✓
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	✓
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	✓
Cobble and/or Boulders	✓
Total Possible	**11**
No. Observed Patch Types	6

Worksheet 6a: Plant Community Metric –

Co-dominant Species Richness for Non-confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

N/A

Floating or Canopy-forming	**Invasive?**	**Short**	**Invasive?**
Medium	**Invasive?**	**Tall**	**Invasive?**
Very Tall	**Invasive?**		
		Total number of co-dominant species for all layers combined	
		Percent Invasion	

Worksheet 6b: Plant Community Metric –

Co-dominant Species Richness for Confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

Short	**Invasive?**	**Medium**	**Invasive?**
POLYPOGON MONSPELIENSIS	Y	CYPERUS SP.	N
GALIUM APARINE	Y		
Tall	**Invasive?**	**Very Tall**	**Invasive?**
ROSA CALIFORNICA	N	Q. AGRIFOLIA	N
TOXICODENDRON	N	P. RACEMOSA	N
RUBUS URSINUS	N		
RIBES AUREUM	N		
SAMBUCUS NIGRA	N	**Total number of co-dominants for all layers combined**	11
HETEROMELES ARBUTIFOLIA	N		
		Percent Invasion	18%

Worksheet 7: Wetland disturbances and conversions.

Has a major disturbance occurred at this wetland?	Yes	[✓ No]		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type? NO	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Worksheet 8: Stressor Checklist.

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)	✓	
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)	✓	
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		

Comments OLD STREAM CROSSING ABOVE AA MAY BE SOURCE FOR DISCHARGES

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		

Comments NONE

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	✓	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer	✓	
Comments THE AA LIKELY HAS VIRGINIA OPOSSUM; THE INVASIVE FLORA HAS NOT BEEN TREATED W/I THE AA		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments CEMETARY LAWNS & PARKING AREAS W/I 500M BUFFER		

Basic Information Sheet: Riverine Wetlands

Your Name: IAN SWIFT
CRAM Site ID: DRAINAGE "D"
Assessment Area Name: AA NO. 2
Date (m/d/y): 6/28/2010

Assessment Team Members for This AA

I. SWIFT, J. REED

Average Bankfull Width:

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☐ Mitigation ☑ Impacted ☐ Other

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ ephemeral ☑ intermittent

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		North	34.14055	118.31357	NAD
2		South	34.14029	118.31345	↓
3		East	34.14039	118.31323	
4		West	34.14043	118.31372	
5					
6					

Comments: AA is 0.334 ha.

Scoring Sheet: Riverine Wetlands

AA Name: AA No. 2 (m/d/y) 6 28 2010

Attributes and Metrics		Scores		Comments
Buffer and Landscape Context				
Landscape Connectivity (D)		A		
Buffer submetric A: *Percent of AA with Buffer*	A			
Buffer submetric B: *Average Buffer Width*	A			
Buffer submetric C: *Buffer Condition*	A			
$D + [C \times (A \times B)^{1/2}]^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100
		24	100	
Hydrology				
Water Source		A		
Hydroperiod or Channel Stability		A		
Hydrologic Connectivity		A		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		36	100	
Physical Structure				
Structural Patch Richness		B		
Topographic Complexity		B		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100
		18	75	
Biotic Structure				
Plant Community submetric A: *Number of Plant Layers*	A			
Plant Community submetric B: *Number of Co-dominant species*	B			
Plant Community submetric C: *Percent Invasion*	A			
Plant Community Metric (*average of submetrics A-C*)		A		
Horizontal Interspersion and Zonation		B		
Vertical Biotic Structure		B		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		30	83	
Overall AA Score		90		**Average of Final Attribute Scores**

Worksheet 1: Landscape Connectivity Metric for Riverine Wetlands.

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1 —	0	1 —	0
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	0

Worksheet 2: Calculating average buffer width of AA.

Line	Buffer Width (m)
A	250
B	250
C	250
D	250
E	250
F	250
G	250
H	250
Average Buffer Width	250

Worksheet 3: Assessing Hydroperiod for Riverine Wetlands.

Condition	**Field Indicators** **(check all existing conditions)**
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools. ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☑ There are no mid-channel bars and/or point bars densely vegetated with perennial vegetation. ☑ Channel bars consist of well-sorted bed material. ☑ There are channel pools, the bed is not planar, and the spacing between pools tends to be regular. ☑ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps, or the lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more nick points indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.

Worksheet 4: Entrenchment Ratio Calculation for Riverine Wetlands.

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate mid-points along straight riffles or glides, away from deep pools or meander bends.

Steps	**Replicate Cross-sections** →	**1**	**2**	**3**
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	17	14	27 (FEET)
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	4	4	4
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	8	8	8
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	36	36	42
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	2.11	2.57	1.55
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections.			2.08

Worksheet 5a: Structural Patch Type for Non-confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	**Check for presence**
Secondary channels on floodplains or along shorelines	
Swales on floodplain or along shoreline	
Pannes or pools on floodplain	
Vegetated islands (mostly above high-water)	
Pools or depressions in channels (wet or dry channels)	
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	
Debris jams	
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	
Submerged vegetation	
Total Possible	**16**
No. Observed Patch Types	

Worksheet 5b: Structural Patch Type for Confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Pools or depressions in channels (wet or dry channels)	✓
Riffles or rapids (wet channel) or planar bed (dry channel)	✓
Point bars and in-channel bars	
Debris jams	✓
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	✓
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	✓
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	✓
Cobble and/or Boulders	✓
Total Possible	**11**
No. Observed Patch Types	7

Worksheet 6a: Plant Community Metric –

Co-dominant Species Richness for Non-confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

N/A

Floating or Canopy-forming	**Invasive?**	**Short**	**Invasive?**
Medium	**Invasive?**	**Tall**	**Invasive?**
Very Tall	**Invasive?**		
		Total number of co-dominant species for all layers combined	
		Percent Invasion	

Worksheet 6b: Plant Community Metric –

Co-dominant Species Richness for Confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

Short	**Invasive?**	**Medium**	**Invasive?**
MELICA TORREYANA	N	SYMPHORICARPOS MOLLIS	N
		TOXICODENDRON	N
		AGERATINA ADENOPHORA	Y
		RIBES AUREUM	N
		LEYMUS CONDENSATUS	N
Tall	**Invasive?**	**Very Tall**	**Invasive?**
SAMBUCUS NIGRA	N	Q. AGRIFOLIA	N
HETEROMELES ARBUTIFOLIA	N	P. RACEMOSA	N
		Total number of co-dominants for all layers combined	10
		Percent Invasion	10%

Worksheet 7: Wetland disturbances and conversions.

Has a major disturbance occurred at this wetland?	Yes	[✓ No]		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type? NO	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Worksheet 8: Stressor Checklist.

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		

Comments

NONE

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		

Comments

NONE

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		
Comments		

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		

Comments CEMETARY LAWNS & PARKING AREAS W/I THE 500m BUFFER AREA

Your Name: IAN SWIFT

CRAM Site ID: DRAINAGE "F"

Assessment Area Name: AA No. 3

Date (m/d/y): 10/29/2010

Assessment Team Members for This AA

I. SWIFT, J. REED

Average Bankfull Width: 6.5'

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☐ Mitigation ☑ Impacted ☐ Other

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ ephemeral ☑ intermittent

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude	Longitude	Datum
1		North	34.141161	118.315797	NAD
2		South	34.140575	118.315954	↓
3		East	34.140892	118.315600	
4		West	34.141122	118.315942	
5					
6					

Comments: AA is 0.35 ha

Scoring Sheet: Riverine Wetlands

AA Name: AA No. 3				**(m/d/y)** 6 / 29 / 2010
Attributes and Metrics		**Scores**		**Comments**
Buffer and Landscape Context				
Landscape Connectivity (D)		A		
Buffer submetric A: *Percent of AA with Buffer*	A			
Buffer submetric B: *Average Buffer Width*	A			
Buffer submetric C: *Buffer Condition*	A			
$D + [C \times (A \times B)^{\frac{1}{2}}]^{\frac{1}{2}}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100
		24	100	
Hydrology				
Water Source		A		
Hydroperiod or Channel Stability		A		
Hydrologic Connectivity		A		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		36	100	
Physical Structure				
Structural Patch Richness		B		
Topographic Complexity		A		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100
		21	88	
Biotic Structure				
Plant Community submetric A: *Number of Plant Layers*	A			
Plant Community submetric B: *Number of Co-dominant species*	C			
Plant Community submetric C: *Percent Invasion*	A			
Plant Community Metric (*average of submetrics A-C*)		B		
Horizontal Interspersion and Zonation		C		
Vertical Biotic Structure		B		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		24	67	
Overall AA Score		89		**Average of Final Attribute Scores**

Worksheet 1: Landscape Connectivity Metric for Riverine Wetlands.

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1 —	0	1 —	0
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	0

Worksheet 2: Calculating average buffer width of AA.

Line	Buffer Width (m)
A	250
B	250
C	250
D	140
E	250
F	250
G	250
H	250
Average Buffer Width	235

Worksheet 3: Assessing Hydroperiod for Riverine Wetlands.

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA. ☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it. ☑ There is leaf litter, thatch, or wrack in most pools. ☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area. ☑ There is little or no active undercutting or burial of riparian vegetation. ☑ There are no mid-channel bars and/or point bars densely vegetated with perennial vegetation. ☑ Channel bars consist of well-sorted bed material. ☑ There are channel pools, the bed is not planar, and the spacing between pools tends to be regular. ☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs. ☐ There are abundant bank slides or slumps, or the lower banks are uniformly scoured and not vegetated. ☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel. ☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation. ☐ The channel bed appears scoured to bedrock or dense clay. ☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided). ☐ The channel has one or more nick points indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment. ☐ There are partially buried living tree trunks or shrubs along the banks. ☐ The bed is planar overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced. ☐ There are partially buried, or sediment-choked, culverts. ☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour. ☐ There are avulsion channels on the floodplain or adjacent valley floor.

Worksheet 4: Entrenchment Ratio Calculation for Riverine Wetlands.

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate mid-points along straight riffles or glides, away from deep pools or meander bends.

Steps	**Replicate Cross-sections** →	**1**	**2**	**3**
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	6	7	6
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	2	1.5	2.5
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	4	3	5
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	13	12	18
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	2.17	1.71	3
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections.			2.29

Worksheet 5a: Structural Patch Type for Non-confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Secondary channels on floodplains or along shorelines	
Swales on floodplain or along shoreline	
Pannes or pools on floodplain	
Vegetated islands (mostly above high-water)	
Pools or depressions in channels (wet or dry channels)	
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	
Debris jams	
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	
Submerged vegetation	
Total Possible	**16**
No. Observed Patch Types	

Worksheet 5b: Structural Patch Type for Confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Pools or depressions in channels (wet or dry channels)	✓
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	✓
Debris jams	✓
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	✓
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	✓
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	✓
Total Possible	**11**
No. Observed Patch Types	6

Worksheet 6a: Plant Community Metric –

Co-dominant Species Richness for Non-confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

N/A

Floating or Canopy-forming	**Invasive?**	**Short**	**Invasive?**
Medium	**Invasive?**	**Tall**	**Invasive?**
Very Tall	**Invasive?**		
		Total number of co-dominant species for all layers combined	
		Percent Invasion	

Worksheet 6b: Plant Community Metric –

Co-dominant Species Richness for Confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

Short	**Invasive?**	**Medium**	**Invasive?**
Melica torreyana	N	TOXICODENDRON	N
		CARDUUS PYCNOCEPHALUS	Y
Tall	**Invasive?**	**Very Tall**	**Invasive?**
HETEROMELES ARBUTIFOLIA	N	Q. AGRIFOLIA	N
SAMBUCUS NIGRA	N	P. RACEMOSA	N
		Total number of co-dominants for all layers combined	7
		Percent Invasion	14%

Worksheet 7: Wetland disturbances and conversions.

Has a major disturbance occurred at this wetland?	Yes	[✓ No]		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type? NO	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Worksheet 8: Stressor Checklist.

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		

Comments

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**	✓	
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		

Comments SOME GRADING W/I 50m OF AA, HOWEVER, THIS AREA
DOES NOT FLOW INTO THE AA, AND NO NEGATIVE EFFECTS ARE
LIKELY

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer		

Comments

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		

Comments CEMETARY LAWNS & PARKING LOTS W/I THE 500m BUFFER.

Your Name: IAN SWIFT

CRAM Site ID: DRAINAGE "H"

Assessment Area Name: AA # 4

Date (m/d/y): 6/29/2010

Assessment Team Members for This AA

I. SWIFT, J. REED

Average Bankfull Width: 7'

Approximate Length of AA (10 times bankfull width, min 100 m, max 200 m): 100m

Wetland Sub-type:

☑ Confined ☐ Non-confined

AA Category:

☐ Restoration ☐ Mitigation ☑ Impacted ☐ Other

Did the river/stream have flowing water at the time of the assessment? ☐ yes ☑ no

What is the apparent hydrologic flow regime of the reach you are assessing?

The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

☐ perennial ☐ ephemeral ☑ intermittent

Photo Identification Numbers and Description:

	Photo ID No.	Description	Latitude N	Longitude W	Datum
1	1	North	34.140572°	118.316059°	NAD
2	2	South	34.140609°	118.317884°	↓
3	3	East	34.141064°	118.316965°	
4	4	West	34.141055°	118.317546°	
5					
6					

Comments: TOTAL AREA OF THE AA IS 0.25 ha.

Scoring Sheet: Riverine Wetlands

AA Name: # 4				(m/d/y) 6 29 2010
Attributes and Metrics		**Scores**		**Comments**
Buffer and Landscape Context				
Landscape Connectivity (D)		A		
Buffer submetric A: Percent of AA with Buffer	A			
Buffer submetric B: Average Buffer Width	A			
Buffer submetric C: Buffer Condition	A			
$D + [\,C \times (A \times B)^{1/2}\,]^{1/2}$ = **Attribute Score**		Raw	Final	Final Attribute Score = (Raw Score/24)100
		24	100	
Hydrology				
Water Source		A		
Hydroperiod or Channel Stability		A		
Hydrologic Connectivity		A		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		36	100	
Physical Structure				
Structural Patch Richness		C		
Topographic Complexity		C		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/24)100
		12	50	
Biotic Structure				
Plant Community submetric A: Number of Plant Layers	A			
Plant Community submetric B: Number of Co-dominant species	A			
Plant Community submetric C: Percent Invasion	A			
Plant Community Metric (*average of submetrics A-C*)		A		
Horizontal Interspersion and Zonation		C		
Vertical Biotic Structure		C		
Attribute Score		Raw	Final	Final Attribute Score = (Raw Score/36)100
		24	67	
Overall AA Score		79		**Average of Final Attribute Scores**

Worksheet 1: Landscape Connectivity Metric for Riverine Wetlands.

Lengths of Non-buffer Segments For Distance of 500 m Upstream of AA		Lengths of Non-buffer Segments For Distance of 500 m Downstream of AA	
Segment No.	Length (m)	Segment No.	Length (m)
1 —	—	1 —	—
2		2	
3		3	
4		4	
5		5	
Upstream Total Length	0	Downstream Total Length	0

Worksheet 2: Calculating average buffer width of AA.

Line	Buffer Width (m)
A	200
B	140
C	105
D	70
E	250
F	250
G	250
H	250
Average Buffer Width	190 m

Worksheet 3: Assessing Hydroperiod for Riverine Wetlands.

Condition	Field Indicators (check all existing conditions)
Indicators of Channel Equilibrium	☑ The channel (or multiple channels in braided systems) has a well-defined bankfull contour that clearly demarcates an obvious active floodplain in the cross-sectional profile of the channel throughout most of the AA.
	☑ Perennial riparian vegetation is abundant and well established along the bankfull contour, but not below it.
	☑ There is leaf litter, thatch, or wrack in most pools.
	☑ The channel contains embedded woody debris of the size and amount consistent with what is naturally available in the riparian area.
	☑ There is little or no active undercutting or burial of riparian vegetation.
	☑ There are no mid-channel bars and/or point bars densely vegetated with perennial vegetation.
	☑ Channel bars consist of well-sorted bed material.
	☑ There are channel pools, the bed is not planar, and the spacing between pools tends to be regular.
	☐ The larger bed material supports abundant mosses or periphyton.
Indicators of Active Degradation	☐ The channel is characterized by deeply undercut banks with exposed living roots of trees or shrubs.
	☐ There are abundant bank slides or slumps, or the lower banks are uniformly scoured and not vegetated.
	☐ Riparian vegetation is declining in stature or vigor, or many riparian trees and shrubs along the banks are leaning or falling into the channel.
	☐ An obvious historical floodplain has recently been abandoned, as indicated by the age structure of its riparian vegetation.
	☐ The channel bed appears scoured to bedrock or dense clay.
	☐ Recently active flow pathways appear to have coalesced into one channel (i.e. a previously braided system is no longer braided).
	☐ The channel has one or more nick points indicating headward erosion of the bed.
Indicators of Active Aggradation	☐ There is an active floodplain with fresh splays of coarse sediment.
	☐ There are partially buried living tree trunks or shrubs along the banks.
	☐ The bed is planar overall; it lacks well-defined channel pools, or they are uncommon and irregularly spaced.
	☐ There are partially buried, or sediment-choked, culverts.
	☑ Perennial terrestrial or riparian vegetation is encroaching into the channel or onto channel bars below the bankfull contour.
	☐ There are avulsion channels on the floodplain or adjacent valley floor.

Worksheet 4: Entrenchment Ratio Calculation for Riverine Wetlands.

The following 5 steps should be conducted for each of 3 cross-sections located in the AA at the approximate mid-points along straight riffles or glides, away from deep pools or meander bends.

Steps	Replicate Cross-sections →	1	2	3
1 Estimate bankfull width.	This is a critical step requiring familiarity with field indicators of the bankfull contour. Estimate or measure the distance between the right and left bankfull contours.	8	5	9
2: Estimate max. bankfull depth.	Imagine a level line between the right and left bankfull contours; estimate or measure the height of the line above the thalweg (the deepest part of the channel).	3	1	1
3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2.	6	2	2
4: Estimate flood prone width.	Imagine a level line having a height equal to the flood prone depth from Step 3; note where the line intercepts the right and left banks; estimate or measure the length of this line.	16	24	14
5: Calculate entrenchment ratio.	Divide the flood prone width (Step 4) by the bankfull width (Step 1).	2	4.8	1.56
6: Calculate average entrenchment ratio.	Calculate the average results for Step 5 for all 3 replicate cross-sections.			2.79

(FEET)

Worksheet 5a: Structural Patch Type for Non-confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Secondary channels on floodplains or along shorelines	
Swales on floodplain or along shoreline	
Pannes or pools on floodplain	
Vegetated islands (mostly above high-water)	
Pools or depressions in channels (wet or dry channels)	
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	
Debris jams	
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	
Submerged vegetation	
Total Possible	**16**
No. Observed Patch Types	

Worksheet 5b: Structural Patch Type for Confined Riverine Wetlands.

Identify each type of patch that is observed in the AA.

Structural Patch Type	Check for presence
Pools or depressions in channels (wet or dry channels)	✓
Riffles or rapids (wet channel) or planar bed (dry channel)	
Point bars and in-channel bars	
Debris jams	✓
Abundant wrackline or organic debris in channel, on floodplain, or across depressional wetland plain	✓
Plant hummocks and/or sediment mounds	
Bank slumps or undercut banks in channels or along shoreline	
Variegated, convoluted, or crenulated foreshore (instead of broadly arcuate or mostly straight)	
Standing snags (at least 3 m tall)	
Filamentous macroalgae or algal mats	
Cobble and/or Boulders	✓
Total Possible	**11**
No. Observed Patch Types	4

Worksheet 6a: Plant Community Metric –

Co-dominant Species Richness for Non-confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

N/A

Floating or Canopy-forming	**Invasive?**	**Short**	**Invasive?**
Medium	**Invasive?**	**Tall**	**Invasive?**
Very Tall	**Invasive?**		
		Total number of co-dominant species for all layers combined	
		Percent Invasion	

Worksheet 6b: Plant Community Metric –

Co-dominant Species Richness for Confined Riverine Wetlands.

Note: A dominant species represents ≥10% *relative* cover. Count species only once when calculating any Plant Community sub-metric.

Short	**Invasive?**	**Medium**	**Invasive?**
BROMUS DIANDRUS	Y	RUBUS URSINUS	N
		RIBES AUREUM	N
		ARTEMISIA DOUGLASIANA	N
		TOXICODENDRON	N
		SYMPHORICARPOS MOLLIS	N
Tall	**Invasive?**	**Very Tall**	**Invasive?**
BACCHARIS SALICIFOLIA	N	Q. AGRIFOLIA	N
SAMBUCUS NIGRA	N		
CEANOTHUS OLIGANTHUS	N		
Q-BERBRIDIFOLIA	N		
		Total number of co-dominants for all layers combined	11
		Percent Invasion	9%

Worksheet 7: Wetland disturbances and conversions.

Has a major disturbance occurred at this wetland?	Yes	[✓ No]		
If yes, was it a flood, fire, landslide, or other?	flood	fire	landslide	other
If yes, then how severe is the disturbance?	likely to affect site next 5 or more years	likely to affect site next 3-5 years	likely to affect site next 1-2 years	
Has this wetland been converted from another type? If yes, then what was the previous type? NO	depressional	vernal pool	vernal pool system	
	non-confined riverine	confined riverine	seasonal estuarine	
	perennial saline estuarine	perennial non-saline estuarine	wet meadow	
	lacustrine	seep or spring	playa	

Worksheet 8: Stressor Checklist.

HYDROLOGY ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Point Source (PS) discharges (POTW, other non-stormwater discharge)	✓	
Non-point Source (Non-PS) discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)	✓	
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		

Comments OLD PAVED ROAD ON WEST FLANK OF DRAINAGE MAY SERVE AS A POINT SOURCE. IT ALSO MAY DIVERT FLOW AWAY FROM DRAINAGE

PHYSICAL STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**	✓	
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		

Comments SEE ABOVE, ROAD ON WEST FLANK OF DRAINAGE MAY ALTER FLOW PATTERNS.

BIOTIC STRUCTURE ATTRIBUTE (WITHIN 50 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)	✓	
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of treatment of invasive plants adjacent to AA or buffer	✓	

Comments VIRGINIA OPOSSUM IS LIKELY PRESENT IN THE AA, BUT WAS NOT OBSERVED.
NO CURRENT TREATMENT IS UNDERWAY FOR INFESTATIONS OF AGERATINA ADENOPHORA & CARDUUS PYCNOCEPHALUS.

BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE (WITHIN 500 M OF AA)	Present and likely to have negative effect on AA	Significant negative effect on AA
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dams (or other major flow regulation or disruption)		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)	✓	
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		

Comments CEMETARY LAWNS & PAVED PARKING AREAS WITHIN 500m.