Appendix 1: Modified Environmental Protection Agency Rapid Bioassessment Habitat Assessment Field Data Sheet (High Gradient Ephemeral/Intermittent Streams)

Station ID/ Stream Name				Date					SLOPE (%	%)				(CHA	NNE	L TYP	E
Reach Length (m)				LAT	(DD)				LONG (D	D)						-Poo		(Circle one
HABITAT				_				ATEGO	DV						Grad	lual		
PARAMETER	Op	timal			Sub-	optim		AIEGO	T	largi	inal					Poor	•	
1. SUBSTRATE DIVERSITY/ AVAILABLE BENTHIC, SALAMANDER, CRAYFISH, AND LAND SNAIL COVER SCORE:	consisting of slabs, bould or other state cover for state aquatic or the LWD in mostage of dechannel; Sicapable of	Iders, cobbleable habitatealamanders terrestrial in oderate to a ecay and wi ubstrate rou trapping loo	oulder e, snags, providing s and overtebrates. dvanced thin- active ughness ts of organic ed, rate high.	stable h LWD); v potentia mainten presend form of roughne organic	pabitat well su al; ade ance se of a new fa ess stil matte	(bould lited fo quate I of popul ddition all. Sub II capal	ler, co r full c habita ulatior val LW ostrate ble of	over t for ns; (D in the trapping	20 to 40% habitat ave desirable; disturbed density an early deca suitable for low.	ailabil subst or ren d/or r ny stat r trap lers a	ity less trate fr noved. may be ge. So ping o re abs	s than equentl LWD lo new fa me area rganic r ent, sco	y ow in all or in as matter. ore	cove is ob unsta areas	r; lad viou able s sui	ck of l s; sub or lac		t e
	20 19	18 17	16	15	14	13	12	11	10	9	8	7 6		5	4	3	2 1	0
2. EMBEDDED- NESS Examine at least 10 particles (e.g., 5 particles from 2 different steps) SCORE:	Lg. cobble, particles ar 25% surrou sediment; I boulders pr niche space	re between unded by fir layering of d rovides a di	ne cobble or	particles	s are b rround	betwee ded by	n 25 a fine se	or wood and ediment.	Lg.cobble, particles a surrounded	re be	tween	50 and	75%	wood over	d pai 75%	rticles	boulde are ounde	•
	20 19	18 17	16	15	14	13	12	11	10	9	8 7	6		5	4	3	2 1	0
3. CHANNEL ALTERATION SCORE:		; stream wit o crossings	nce absent h normal	Minor co usually or bridg past che dredging past 20 no evide disturba	in area e abut annel (g, or re years, ence c	as of co tments disturb ealignr)may b	ulverts; evide ance, ment (pe pres	s, fords, ence of i.e. > than sent, but	Channeliza Embankme structures and 40% to reach chan	ents, prese o 80%	berms ent on 6 of the	or sho both ba strear	ring nks; n ed.	or ce the s chan disru habit entire chan	emer etreal ineliz ipted tat gi ely re	nt; ove m rea zed ar d. Inst reatly emove may b	er 80% ch is nd tream altere ed. St	ed or ream d as a
	20 19	18 17	16	15	14	13	12	11	10	9	8 7	6		5	4	3	2 1	0
4. FINE SEDIMENT DEPOSITION Consider non- natural sources of sediment SCORE:	bottom is a	el bars or pand less that affected by the leposition (see). Pool rockt layering; le	oint bars an 5% of the fine silt, sand, ks with eafpacks	mostly t 5 to 30% is affect fines in covered	from fil % of th fed; so pools. I in silt	nd grav ne botto ome de Leafp t.	vel, sa om positio acks r	moderately	sand or fin new bars; affected; s	ne sed 30-50 redimins, co position leafp red.	diment 0% of l ent dep enstrict on of fi acks n	on old a pottom in cosits a posits a posits a posits are nes in posits and positive and	and is it ind pools	mate deve 50% chan pools	erial; elopn of b eging s aln ebsta	increa nent; i ottom i frequ nost a nntial s		bar than es and with flow; due
			Kate		001	15 0		Сроз	11101101									

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RAPID HABITA	AT ASSES			P Ephe	emera	I/Inte	rmitten	t >>>>>	>>>>	>>>>	>>>>	>>>>	>>>>	>>>
Reviewers Initials	i	Station ID Stream Na							0	Date				
HABITAT							CATE	GORY						
PARAMETER	Optin	nal		Sı	ub-opti	mal		Ma	argina	ıl			Poor	
5. BANK STABILITY** (score each bank) determine left/ right by facing downstream	erosion or ba or minimal; l	e; evidence of ank failure ab ittle potential ems (<5% of b	sent are for 5-3	eas of ero		stly hea	nt, small nled over; areas of	Moderately bank in reac high potenti	ch has a	areas of e		areas; frequence section obviou 60-100	ole; many "raw" are nt along s ns and be s bank sl 1% of bar nal scars.	eas straight ends; loughing; nk has
LEFT:	10	9		8	7	6		5	4	3		2	1	0
RIGHT:	10	9		8	7	6		5	4	3		2	1	0
6. BANK** VEGETATIVE PROTECTION (rate from bottom of bank to crest- over at top of bank – large roots count) **In very steep constrained	bank surface riparian zone covered by v including tre shrubs, and plants (herbs mosses); ve disruption the other encroad or not evider plants allowe	es, understory non-woody s, ferns, getative rough grazing achment minir nt; almost all ed to grow	liate are) cla rep / no to on rei or pla	e covered ass of pla presented at affecting any grea ae-half of	In the ca	etation, I t well tion evid rowth po more th ntial plai	but one dent, but otential an nt stubble	50-70% of the are covered obvious; particles than on plant stubble the case of score low.	by veg tches of ped veg ne-half o e heigh	etation; of bare so getation of the pot tremaining tremaining the tremaining the second secon	disruption il or common; ential ng. In	stream are con vegeta stream very hi been re	bank veg gh; vege emoved i in avera	faces uption of
channels with continuous bank- riparian zone (no distinct crest) score bank from toe to ~2 m.	naturally. Bri overhanging important.		If as:		d in wi	inter (or early	spring lo	ook fo	or rem	nants	of her	bs, an	d
LEFT:	10	9		8	7	6		5	4	3		2	1	0
RIGHT:	10	9		8	7	6		5	4	3		2	1	0
7. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. is trees, shrubs, and non- woody herbs)	tative zone human activ clearcuts, m	listurbed vege is >18 meters ities (roadbed ining, pasture pacted this zoo rub layers	; me ls, mi) se ne. no	Zone width is between 12 and 18 meters; human activities have only minimally impacted this zone. Some selective logging may be present but not clearcuts. Tree and shrub layers still present.				Zone width meters; hun impacted the Trees or shi	ivities ha a great o	Width of zone is less than 6 meters; little or no undisturbed vegetation due to man-induced activities. Trees typically absent or in narrow row at top of bank.				
LEFT:	10	9		8	7	6		5	4	3		2	1	0
RIGHT:	10	9		8	7	6		5	4	3		2	1	0
TOTAL:	Max Pool D	epth (if water	is pres	ent; othe	erwise "l	NA")	cm	Total from	n front	+	· Total fr	om bac	:k	_=
(max=140)	Average Ch	annel Width	(Toe of	Banks) _		m		Score Per	centa	ge= Tot	al Score	/140 X	100	%
Average Width In	tact Rip Veg	etative Zon	e (m)	Left		m			Right			m		
→ What is the do	_						•	of forest: ta (e.g, cano			25-50 yrs shrub, h		-	<5 yrs
Stream Surface S (average of lower		per reach)	Indica	te % ba	sed on	cloudl	ess day	in summer	at noo	n. Fill	in squar	e that a	pplies.	
☐ Fully exposed ((0-25%)		□ Part	tly shad	led (25-	50%)		☐ Partly exp	osed	(50-75%	6)	Fully	shaded	(75-100%)
% Canopy (Densi	ometer)		Comp	ass Bea	aring (fa	cing d	lownstre	am) (0-360°)					

Appendix 1: Modified Environmental Protection Agency Rapid Bioassessment Protocol (EPA RBP)
Habitat Assessment Field Data Sheet (Low Gradient Ephemeral/Intermittent Streams)

DADID HADI		Data Sheet (Low Gradient Eph		· · · · · · · · · · · · · · · · · · ·
Station ID/	IAI ASSESSMENT: LOW	GRADIENT Ephemeral/Into		>>>>>>>
Stream Name			LAT (DD)	
Reach Length (m)		Date	LONG (DD)	
HABITAT		CATEGOR	RY	
PARAMETER	Optimal	Sub-optimal	Marginal	Poor
1. SUBSTRATE/ DIVERSITY AVAILBLE COVER FOR AMPHIBIANS CRAYFISH	Greater than 50% of substrate consisting of mix of snags, tree roots or other stable habitat providing cover for amphibians and aquatic or terrestrial invertebrates. LWD in moderate to advanced stage of decay and within- active channel; Substrate roughness capable of trapping lots of organic matter. If moss covered, rate high.	30 to 50% cover and mix of diverse stable habitat; well suited for full cover potential; adequate habitat for maintenance of populations; presence of additional LWD in the form of new fall. Substrate roughness still capable of trapping organic matter.	10 to 30% mix of stable cover; habitat availability less than desirable; substrate frequently disturbed or removed. LWD low in density and/or may be new fall or in early decay stage. Some areas suitable for trapping organic matter. If Ig. wood is absent, score low.	Less than 10% stable cover; lack of habitat is obvious; substrate unstable or lacking. Few areas suitable for trapping organic matter.
SCORE:	kate in G	nannel and Toe	of Banks	
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. POOL SUBSTRATE CHARACTER- IZATION In dry channels, pool areas should still be observable	Mixture of substrate materials, with gravel and firm sand prevalent; root mats and submerged (or remnant) aquatic vegetation are common.	Mixture of soft sand, mud, or clay; mud may be dominant; some root mats and submerged (or remnant) vegetation are present.	All mud or clay or sand bottom; little or no root mat; no submerged (or remnant) vegetation.	Hard-pan clay or bedrock; no root mat or vegetation.
SCORE:	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. CHANNEL ALTERATION SCORE:	Channelization or dredging absent of minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging (>than past 20 years) may be present, but no evidence of recent channelization.	Channelization may be extensive; embankments or shoring structures present on both banks; 40 to 80% of the stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. SEDIMENT DEPOSITION SCORE:	Little or no enlargement of "islands" or point bars and less than 20% of the bottom affected by fine sediment deposition. Leaf packs and woody debris with minimal silt covering.	Some new increase in bar formation, mostly from sand, or fine sediment; 20 to 50% of the bottom is affected; slight deposition in pools. Leaf packs with moderate silt covering.	Moderate deposition of new sand, or fine sediment on old and new bars; 50 to 80% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent. Leaf packs with heavier silt covering.	Heavy deposits of fine material, increased bar development; more than 80% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. CHANNEL SINUOSITY SCORE:	The bends in the stream increase the stream length 3 to 4 times longer than if it was in a straight line.	The bends in the stream increase the stream length 2 to 3 times longer than if it was in a straight line.	the bends in the stream increase the stream length up to 2 times longer than if it was in a straight line.	Channel is straight; waterway has been channelized for a long distance.
	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Appendix 1: Modified Environmental Protection Agency Rapid Bioassessment Protocol (EPA RBP) Habitat Assessment Field Data Sheet (Low Gradient Ephemeral/Intermittent Streams)

RAPID HABITA	AT ASSESSN	<i>IENT</i> : LOW	'GRA	DIENT	² >>>>	>>>>>>>>>>	>>>>>>>>	»≽ Re	viewers Initi	als		
	Optim	al		Su	b-optin	nal	Mar	ginal			Poor	
6. BANK STABILITY (score each bank) *determine left/ right by facing downstream	Banks stable; e erosion or bank or minimal; little future problems affected).	t failure absent e potential for	area 5-30	as of ero	sion mos	frequent, small tly healed over; ch has areas of	Moderately ur bank in reach high potential	has are	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.			
LEFT:	10	9		8	7	6	5	4	3	2	1	0
RIGHT:	10	9		8	7	6	5	4	3	2	1	0
7. BANK VEGETATIVE PROTECTION SCORE:	More than 90% bank surfaces a riparian zones of vegetation incluunderstory shruwoody plants (herns, mosses); disruption throumowing minima almost all plants to grow naturall	and immediate covered by uding trees, ubs, and non-nerbs, grasses, vegetative uph grazing or all or not eviden s allowed	are class reprint not exter pote rem	covered as of plar resented affecting ent; more ential pla aining.	by vegeta this is not a distribution of plant group than one ant stubble	on evident, but bwth potential to e-half of the	are covered b obvious; patch closely croppe less that one- plant stubble l	y vegeta nes of ba ed veget half of the neight re	tation common; ne potential emaining.	streaml are cov vegetat streaml very hig been re or less height.	bank veg gh; vege emoved t in avera	ruption of getation station has to 2 inches ge stubble
LEFT:	10	9		8	7	6	5	4	3	2	1	0
1												
RIGHT:	10	9		8	7	6	5	4	3	2	1	0
RIGHT: 8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes)	Width of undistrative zone is > human activitier roadbeds, clear crops) have not zone.	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or	met min	e width i	is betwee	n 12 and 18 ties have only	Zone width is meters; huma impacted the	betweei	n 6 and 12 ies have	Width of 6 mete	of zone is rs; little c	s less than or no un- tation due d activities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro-	Width of undistretative zone is human activities roadbeds, clear crops) have not	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or	met min	e width i	is betwee	n 12 and 18 ties have only	Zone width is meters; huma	betweei	n 6 and 12 ies have	Width of 6 mete	of zone is rs; little c	s less than or no un- tation due
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes)	Width of undistrative zone is > human activities roadbeds, clear crops) have not zone.	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or t impacted this	met min	e width i ers; hum imally im	is betwee nan activit npacted th	n 12 and 18 ies have only iis zone.	Zone width is meters; huma impacted the	betweei n activit zone a (n 6 and 12 ies have great deal.	Width of the disturbent of the man-	of zone is rs; little c ed veget -induced	s less than or no un- tation due d activities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes) LEFT:	Width of undistrative zone is > human activitier roadbeds, clear crops) have not zone.	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or t impacted this	met min	e width i ers; hum imally im	is betwee nan activit npacted th	n 12 and 18 ties have only his zone. 6 6	Zone width is meters; huma impacted the s	between activitizone a c	n 6 and 12 ies have great deal.	Width of 6 meter disturber to many	of zone is rs; little ded veget induced	s less than or no untation due diactivities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes) LEFT:	Width of undistrative zone is > human activities roadbeds, clear crops) have not zone.	urbed vege- 18 meters; s (parking lots, routs, lawns, or t impacted this 9 9 9	met min	e width i ers; hum imally im	is betwee nan activit npacted the	n 12 and 18 ties have only his zone. 6 6 6	Zone width is meters; huma impacted the s	between activit zone a c	n 6 and 12 ies have great deal.	Width of 6 meter disturber to many	of zone is rs; little ded veget induced	s less than or no untation due diactivities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes) LEFT: RIGHT:	Width of undistrative zone is > human activities roadbeds, clear crops) have not zone.	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or t impacted this 9 9 th (if water is	met min	e width i ers; hum imally im	is betwee nan activit npacted the	n 12 and 18 ties have only his zone. 6 6 6	Zone width is meters; huma impacted the :	between activit zone a c	n 6 and 12 ies have great deal. 3 3 4 Total	Width of 6 meter disturber to many	of zone is rs; little ded veget induced	s less than or no untation due di activities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non- woody macro- phytes) LEFT: RIGHT: TOTAL: (max=160)	Width of undistrative zone is > human activities roadbeds, clear crops) have not zone. 10 10 Max Pool Dep Average Chan Intact Rip Veg	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or t impacted this 9 9 th (if water is anel Width (To getative Zone	preser	e width i ers; hum imally im	is betwee nan activiting acted the second of	n 12 and 18 ies have only is zone. 6 6 7'')cm m Estimated age	Zone width is meters; huma impacted the state of forest:	between activit zone a contact activity zone a contact activity zone a contact activity zone zone zone zone zone zone zone zone	n 6 and 12 ies have great deal. 3 3 + Total	Width of 6 meter disturber to many to	of zone is rs; little ded veget induced in 1 ck	s less than or no untation due diactivities.
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non-woody macrophytes) LEFT: RIGHT: TOTAL: (max=160) Average Width → What is the	Width of undistrictative zone is > human activities roadbeds, clear crops) have not zone. 10 10 Max Pool Dep Average Chan Intact Rip Veg dominant vege Coniferous (pine Shading (%)	urbed vege- 18 meters; s (parking lots, rcuts, lawns, or t impacted this 9 9 th (if water is anel Width (To getative Zone etation type	preser pe of Bare (m)	e width i ers; hurrimally im 8 8 nt; other anks) Left reach?	is betwee nan activit npacted the 7 7 7 rwise "NA	n 12 and 18 ies have only is zone. 6 6 7'')cm m Estimated age	Zone width is meters; huma impacted the state of forest:	between activit zone a contact activity.	an 6 and 12 ies have great deal. 3 3 4 Total free Total Scores25-50 yr.	Width of 6 meter disturber to many to	of zone is rs; little ded veget induced in 1 ck	s less than or no untation due di activities. 0 0
8. WIDTH OF UNDISTURBED VEG. ZONE (undisturbed veg. Is trees, shrubs, and non-woody macro-phytes) LEFT: RIGHT: TOTAL: (max=160) Average Width → What is the Condition of the	Width of undistrative zone is > human activities roadbeds, clear crops) have not zone. 10 10 Max Pool Dep Average Chan Intact Rip Veg Coniferous (pine e Shading (%) er, middle, up	urbed vege- 18 meters; s (parking lots, routs, lawns, or it impacted this 9 9 9 th (if water is anel Width (Togetative Zone etation type etation type etation type per reach)	preser pe of Ba in the flixed (i	e width i ers; hum imally im 8 8 nt; other anks) Left reach? >10%)	is betwee nan activit npacted the 7 7 7 rwise "NA	n 12 and 18 ies have only iis zone. 6 6 6 A")cm m m Estimated age Number of str	Zone width is meters; huma impacted the state of forest:	between activity acti	an 6 and 12 ies have great deal. 3 3 4 Total free Total Scores25-50 yearnopy, shrub,	Width of 6 meter disturber to many to	of zone is rs; little ded veget enduced from the condition of the conditio	s less than or no untation due di activities. 0 0