

Cumberland HCP Science Advisory Committee Meeting, 15 September 2009

Group Activity Results

One of the challenges for Habitat Conservation Plans (HCPs) is to design efficient and effective monitoring programs. The Northern Cumberlands Forest Resources HCP is currently in the process of designing monitoring programs for the six communities of species covered under the HCP. We would like the Scientific Advisory Committee's ideas and feedback on how to design a monitoring program that monitors the key effects of the covered activities on the habitats of the covered species or the species themselves.

To address this need, small groups were formed to record potential metrics for monitoring and design of monitoring programs in the watersheds affected by HCP-covered activities on the North Cumberlands, Catoosa, Mt. Roosevelt, and Luper Wildlife Management Areas (WMAs). These activities include timber harvests, prescribed burns, and road construction and maintenance. Each small group addressed the covered species within a specific community grouping all the WMAs together.

The following are the results from the group activity. The Core Team will utilize these results to complete the monitoring program for the HCP.

Forest Interior (*Boves, Saunders, Pelren, Welton, Gumbert, Turrentine, and Wyss*)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: *Eastern Small-footed Bat, Allegheny Woodrat*

Also covers: Indiana Bat, Masked Shrew, Smoky Shrew, Southeastern Shrew, Green Salamander, Timber Rattlesnake

North Cumberland WMA

Umbrella Species: *Indiana Bat, Cerulean Warbler*

Also covers: Green Salamander, Rafinesque's Big-eared Bat, Eastern Small-footed Bat, Woodland Jumping Mouse, Allegheny Woodrat, Masked Shrew, Smoky Shrew, Southeastern Shrew, Timber Rattlesnake

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
Cerulean Warbler	<u>Density</u> -Point Counts -Spot Mapping -Line Transect	*	Annual - early May to early June	Covered activity sites or randomly covered sites	*
	<u>Productivity</u> Nest Search and Monitoring	*	Annual	Stratified subset	High

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
Cerulean Warbler	<u>Changes in Forest Interior and Quality/Quantity</u> GIS	*	Annual	Entire HCP Region	Low
Bats	<u>Presence/ Absence</u> -Mist Netting - ANABAT - Winter roost surveys	Consulting company or TWRA	Annual - Summer Biannual - Winter	Number of net nights per 250 acres of covered activity - selected caves	\$1,000 - \$2,200 per Site
	Species Diversity	*	*	*	*
	Rough Density Trends	*	*	*	*
	Changes in quality and quantity of habitat	*	*	*	*
Rattlesnakes	ID birthing racks	*	Before and after activity	Activity site	*
	<u>Presence/Absence</u> -Snake stick -Habitat survey	*	Before and after activity	Activity site	*
Rattlesnakes	<u>Density</u> Road application surveys	*	*	*	*
Salamanders	Density	*	*	*	*
	Quality and Quantity of Habitat	*	*	*	*
Small Mammals	Density (population)	*	*	*	*
	Quality and Quantity of Habitat	*	*	*	*
	Presence/Absence	*	*	*	*

* Missing information

Early Successional (Buehler, Hawkins, Percy, Warr, Thurman, and Johnson)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: Northern Pinesnake

Also covers: Eastern Slender Glass Lizard, Timber Rattlesnake

North Cumberland WMA

Umbrella Species: Golden-winged Warbler

Also covers: Timber Rattlesnake

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
C, N	Remote sensing Acres of potential habitat	TWRA GIS lab	Every other year	All	\$5,000 per year
C	Agency Records/Monitoring Site	TWRA Savanna Manager	1 month/year	each site	*
C	GIS layer of burn history	TWRA GIS lab	every 5 years	Burn sites	*
N	Monitor burn sites	TWRA	1 month/year	Burn sites	\$1,300 per year
N	Call-back surveys (golden-winged warbler)	Buehler Lab	Once every 5 years	10 sites previously identified	\$5,000/ 5 year period
C, N	Drift fence/ trapping box array	TWRA	Twice every 5 years	*	\$48,000/ 5 year period
C, N	Vegetation (plot data)	TWRA, Buehler Lab	Do when you do Call-back surveys, drift fence/ trapping box array, productivity		
N	Measure of productivity (golden-winged warbler)	Buehler Lab	Once every 5 years	10 sites previously identified	\$20,000 / 5 year period
C, N	Data analysis	TWRA intern or graduate student	Twice every 5 years	*	\$25,000/ 5 year period

* Missing information

C = Catoosa, etc.

N = North Cumberland

Isolated Wetlands (Wyatt, Bishop, Call, Miles, and Tisinger)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: Four-toed Salamander

Also covers: White Fringeless Orchid, Indiana Bat, Eastern Small-footed Bat

North Cumberland WMA

Umbrella Species: Four-toed Salamander

Also covers: Indiana Bat, Rafinesque's Big-eared Bat, Eastern Small-footed Bat, Canada Lily

Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
<u>Habitat Availability</u> -Size, pH, depth, exfoliating bark, sphagnum, type of wetland -Vernal pool vs. permanent wetland -Spatial connectivity	TWRA	Biannual - spring and summer	Rotation of six sites/year	12 man days - \$2,400
<u>Habitat Structure</u> -Condition of canopy -Species composition	TWRA	Every 5 years absent of disturbance	Done with habitat availability	6 man days - \$1,200
Distance of wetland to mine portal, cave, rock outcropping with GPS/GIS	TWRA, TNC (GIS)	As wetlands are mapped	Area-wide	12 man days - \$2,400
<u>Species presence</u> VES Dipnets ANABAT Stationary mist n09	TWRA, TDEC, TTU, UTK, contractors, LMU, TVA	Done with habitat availability / ANABAT at night on summer visit		ANABAT - \$15-\$45 / The rest included in Habitat Availability cost
Seasonal flowering of plants	TDEC	Done with Habitat Availability - summer visit		6 man days - \$1,200
Frog logger	TWRA	Done with habitat availability- at night on spring visit		ANABAT - \$15-\$45 / The rest included in Habitat Availability cost

Intermittent Headwater Aquatic and Forested Riparian Systems

(Kirk, Baker, Smith, M. Davis, and Wisby)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: Black Mountain Salamander

Also covers: Cumberland Dusky Salamander

North Cumberland WMA

Umbrella Species: Black Mountain Salamander

Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
<u>Canopy cover</u> Measure % densiometer Habitat assessment field data sheet	TWRA	Annual	All treatments and 3-5 control pre and post impact	\$5,000 - \$6,000 (2-3 people over 9 days)
measure % canopy cover - GIS	TWRA GIS lab	Annual	Whole WMAs	\$500
<u>Sedimentation</u> Measure embeddedness - habitat assessment sheet Measure embeddedness - <i>Aquatic Habitat Assessment</i> . M.B. Bain and N.J. Stevenson. AFS	To be done along with Canopy Cover Measurements			
<u>Dominant Substrate</u> Assessment of Composition: Frequency of Size Classes (<i>Aquatic Habitat Assessment</i> . M.B. Bain and N.J. Stevenson. AFS)	To be done along with Canopy Cover Measurements			
<u>Water quality</u> pH, conductivity, temperature, DO, turbidity	To be done along with Canopy Cover Measurements			
<u>Hydrology</u> Modify the NC Stream Classification sheet to score only hydrology	To be done along with Canopy Cover Measurements			
<u>Species Density</u> CPUE (for 1 hour)	To be done along with Canopy Cover Measurements			

Perennial Headwater Aquatic and Forested Riparian Systems

(Henry, Hughes, Candlish, Mattingly, and Medlock)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: Swainson’s Warbler and Black Mountain Salamander

Also covers: Eastern Small-footed Bat, Indiana Bat, Allegheny Woodrat, Masked Shrew, Smoky Shrew, Southeastern Shrew, Timber Rattlesnake, Green Salamander, Cumberland Dusky Salamander, Olive Darter, Sickle Darter, Obed Crayfish, Emory River Crayfish, Large-flowered Barbara’s Buttons, White Fringeless Orchid, Tennessee Pondweed

North Cumberland WMA

Umbrella Species: Swainson’s Warbler, Cumberland Elktoe, Emerald Darter, Blackside Dace, Arrow Darter, and Black Mountain Salamander

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
Black Mountain Salamander, Swainson’s Warbler	<u>Habitat</u> Remote sensing of riparian stand widths	TWRA - GAP Data	5 years	Whole WMA	No cost at this frequency? (already happening)
Swainson’s Warbler	<u>Biology</u> -Nesting success -Number breeding pairs or Number territories	TWRA	3 years	Catoosa	\$40,000 - nesting success; breeding pairs or territories - \$20,000
Salamanders, darters, dace, and elktoe	<u>Turbidity/ conductivity</u> Water quality checks	*	Monthly	*	*
	<u>Sedimentation</u> Pebble counts	*	Annually (winter-prior to spring spawning)	*	*
	Temperature data loggers	*	6 months	Each 12 digit HUC or each population	\$2,000
Salamanders, darters, dace, elktoe	Stream flow: establish a stream gage station	USGS	Daily	Watershed above the gage	Expensive - USGS is getting money for climate change - could be opportunity also could add on temperature

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost and turbidity for extra cost
Blackside dace, arrow darter, emerald darter	CPUE with electrofishing	*	Annually	*	*
Cumberland elktoe	CPUE with quadrats	*	2 years	*	*
Indiana bat	ANABAT (if cliffs/bluffs are present in riparian areas)	*	*	*	*

* Missing information

Perennial Mainstem Aquatic and Forested Riparian Systems

(Ayers, Bakaletz, Rakes, Scott, Harvey, J. Davis, Fiss, Hart, and Kingsbury)

Catoosa, Luper Mountain, and Mt. Roosevelt WMAs

Umbrella Species: Swainson’s Warbler, Purple Bean, Ashy Darter, Spotfin Chub, Tangerine Darter

Also covers: Eastern Small-footed Bat, Indiana Bat, Allegheny Woodrat, Masked Shrew, Smoky Shrew, Southeastern Shrew, Timber Rattlesnake, Green Salamander, Olive Darter, Sickle Darter, Obed Crayfish, Emory River Crayfish, Hellbender, Cumberland Sandgrass, Cumberland Rosemary, Large-flowered Barbara’s Buttons, White Fringeless Orchid, Tennessee Pondweed, Virginia Spiraea

North Cumberland WMA

Umbrella Species: Swainson’s Warbler and Ashy Darter

Also covers: Rafinesque’s Big-eared Bat, Eastern Small-footed Bat, Indiana Bat, Woodland Jumping Mouse, Allegheny Woodrat, Masked Shrew, Smoky Shrew, Southeastern Shrew, Timber Rattlesnake, Green Salamander, Sickle Darter, Canada Lily

	Metric Description	Group Doing the Monitoring	Frequency	Spatial Extent	Cost
Spotfin chub, Ashy darter, Tangerine darter, Purple bean	CPUE - needs to be repeatable	Collaboration of Agencies	Annual or semi-annual	Downstream or near covered activities; 8-10 sites within range of species; 1-2 sites in each 4th order stream	1 week/ year - \$30,000/ year
	Monitoring suspended sediment	Collaboration of Agencies	During events; spawning season	At established USGS gauges	\$240,000/year
	<u>General water parameters</u> -Chemistry -Physical -Temperature -Conductivity	Graduate students/ local watershed groups	Monthly (or weekly during harvest) need base data pre-harvest	Downstream or near covered activities; use installed USGS gauges	\$2,000/ year per activity site
	Embeddedness/ habitat estimates (EPA method) Visual underwater video mapping (Ayers)	Consultants or graduate students	Before, during, and after activities	At sites of covered activities	\$2,000/ year per activity site
	Macro-invertebrate surveys (Rapid Assessment)	Consultants or graduate students, TVA	Annual	Control, above, and below activity	\$2,000/ year per activity site
	Buffer monitoring (remote sensing)	Consultant, graduate students, watershed groups	Annual	*	*