

South Mountains State Park Trout Conservation Effort

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**North Carolina State Parks
Rocky River Trout Unlimited**

And Supported by

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Trout Enhancement and Restoration is a joint multi-year (2013-2018) partnering program to enhance the preservation, protection and management of the wild and native trout in the unique, stand-alone South Mountains of North Carolina.

South Mountains State Park Trout Effort

As North Carolinians we are extremely fortunate to have a large portion of the South Mountains as a state park. This very unique, stand-alone mountain range with several cold water mountain streams contains healthy populations of wild and native trout. South Mountain State Park preserves, protects and manages over 18,000 acres in and around the central mountain peaks which include the pristine headwaters of Jacob Fork which flows to the East, Henry Fork which flows to the North and Clear Creek which flows to the West. The headwaters which flow to the South are entirely in the South Mountain Game Lands which borders the Park and not within the Park boundary.

The Trout Enhancement and Restoration (TER) initiative at South Mountains State Park is a cooperative project established by The Rocky River Chapter of Trout Unlimited (RRTU) and South Mountains State Park. Other organizations with vital participation in the initiative include but are not limited to the North Carolina Wildlife Resources Commission (NCWRC), North Carolina Trout Unlimited (NCTU) and other Trout Unlimited (TU) chapters as well as regional TU national conservation staff.

The planning group for TER initiative includes but is not limited to the following leaders:

Tom Adams, RRTU Pres. (Charlotte)	f64rrtu@gmail.com
Alen Baker, RRTU, NCTU Vice-Chair	alenandscottie@aol.com
Doug Besler, NCWRC	doug.besler@ncwildlife.org
Jason Costner, NC State Parks	jason.costner@ncparks.gov
Marshall Ellis, NC State Parks	marshall.ellis@ncparks.gov
David Goodfred, NCWRC	david.goodfred@ncwildlife.org
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Dave McHenry, NCWRC	david.mchenry@ncwildlife.org
Damon Hearne, TU (SE Region Staff)	dhearne@tu.org
Jimmy Lacey, Foothills TU (704) 477 9856	mcielly.jimmy@yahoo.com
Amanda Lasley, NC State Parks	amanda.lasley@ncparks.gov
Jim Mabrey, RRTU, NCTU Chair	rrtujim@gmail.com
Tim Ramsey, RRTU	tramsey@wardtank.com
Jacob (Jake) Rash, NCWRC (828) 659-3324x225	jacob.rash@ncwildlife.org
Allan Reinhardt, Tablerock TU	dareinhardt1@aol.com
Allen Rogers, Superintendent NCDPR (828) 433-4772	allen.roger@ncparks.gov
Chris Wood, NCWRC	chris.wood@ncwildlife.org
Eric Woodard, Foothills TU	ericw@bellsouth.net

The above list may change from time to time to include others involved in the planning and direction of the initiative. In addition, NCTU has established a Conservation

Committee that will encourage various chapters to lead projects or encourage member volunteers to participate:

Alen Baker, NCTU Conservation Committee Chair (704) 507-6191	
Dick Everhart, Stone Mountain TU (336) 874-3114	jreverhart@triad.rr.com
Carley Guy, Dogwood TU	
Damon Hearne, TU	
Edward Jones, Triangle TU	emt.trout@gmail.com
Nick Mermigas, At-Large TU	nmermigas@bbandt.com
Tim Ramsey, RRTU	
John Rich, Pisgah TU (803) 767-9006	cosw@netzero.net
Allan Reinhardt, Tablerock TU	
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Eric Woodard, Foothills TU	
?, Land O'Sky TU	
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?, Tuckasegee TU	
?, Northwestern TU	

The planning group has established four (4) objectives to complete within a 3-5 year timeframe. Actual restoration of a stream to native trout depends on a confidence level that the appropriate strain of brook trout exists, can be transplanted without harm to the source stream and that there is an appropriate habitat available within the park that can successfully sustain a native trout population.

Note: Appropriate habitat criteria include locating a natural barrier that can effectively protect a restored native trout population. Also, a higher altitude and the presence of trout will contribute to a higher priority for eventual stream selection.

TER Initiative Objectives:

1. Identify, prioritize and complete coldwater conservation projects within South Mountains State Park that are defined while executing the Trout Enhancement and Restoration initiative.
2. Develop a comprehensive profile of wild and native trout populations within South Mountains State Park.
3. Provide a general education to anglers and the general public in regards to wild and native trout populations within the South Mountains.

4. Restore one or more selected headwater tributaries within South Mountains State Park to native trout if deemed appropriate by state-of-the-art scientific methods.

The organizations involved will accomplish the objectives with a simple three (3) phase approach. Any project identified during the Preparation Phase that is given a high priority and can be fully defined will be scheduled and coordinated as soon as feasible. This means the Project Phase timeline will overlap the Preparation Phase with ongoing project efforts occurring even while still working to fully complete the Preparation Phase. Likewise, any completed project will move into the Follow-up Phase such that an appropriate evaluation of the results can occur on a timely basis.

TER Initiative Phases:

Preparation Phase

- ✓ *As an ongoing effort during this phase, SMSP, TU, and NCWRC will jointly develop a prioritized list of collateral projects; then as each are fully defined the projects are launched (see Collateral Projects Appendix).*
- ✓ RRTU drafts and Planning Group establishes the TER initiative plan and schedules future meetings (second meeting draft, third meeting working document)
- ✓ NCWRC provides data gathering equipment specifications, creel card and native trout genetic studies materials
- ✓ TU provides Embrace-A-Stream and other grant materials
- ✓ Planning Group develops communications, PR and education materials/plans
- ✓ TU pursues grants or performs fundraising for data gathering equipment and for other estimated costs not covered as part of SMSP operations
- ✓ Each organization promotes and communicates the TER initiative
- ✓ Planning Group identifies potential conservation/habitat improvement projects that enhance and support wild and native trout. Given the Parks location and the low elevation of its waters, this will be the primary focus of conservation activities, and restoration opportunities will arise if appropriate.
- ✓ Planning Group develops list of candidate streams for potential conservation efforts
- ✓ SMSP operates a check-out/check-in for data gathering equipment and collection of creel cards from TU volunteers
- ✓ SMSP volunteer coordinator provides data gathering training for TU volunteers
- ✓ TU volunteers visits candidate streams and gather preliminary data such as GPS locations of natural barriers and temperature data.
- ✓ Planning Group refines a prioritized shortlist of streams for conservation/habitat improvement projects
- ✓ Planning Group refines a prioritized shortlist of headwater streams for restoration
- ✓ NCWRC completes genetic studies (est. 2 year timeline remaining)
- ✓ NCWRC finalizes data for shortlist

- ✓ NCWRC and SMSP determine appropriateness of brook trout restoration activities for waters within SMSP
- ✓ If restoration efforts are appropriate, Planning Group makes the “go/no-go” for one or more restoration projects
- ✓ Planning Group develops detail plans for brook trout restorations if appropriate
- ✓ Each organization makes final preparations according to detail plans

Projects Phase

- *TU volunteers completes each collateral project*
- For any restoration or enhancement project, the Planning Group will select the stream, plan the logistics, acquire needed resources and schedule the joint efforts of NCWRC, SMSP and TU volunteers
- Each organization promotes and communicates the progress of the TER initiative as appropriate
- For any restoration, NCWRC, SMSP and TU volunteers completes the field work
- Each organization promotes and communicates the each project completion of the TER initiative as appropriate

Follow-up Phase

- ❖ *TU volunteers performs follow-up efforts as defined with each completed project*
- ❖ For any restoration, NCWRC, SMSP and TU volunteers will perform planned follow-ups as defined in the project.
- ❖ Planning Group reviews and documents lessons learned and noteworthy conclusions of the TER initiative for use in comparable future projects
- ❖ Each organization promotes and communicates the results of the TER initiative as appropriate

The above overview of the TER initiative presented in phases gives a summary approach of the key actions that will be performed by the joint efforts of NCWRC, SMSP and TU volunteers. A more detailed plan is presented as an appendix. The detail plan will be the working document that is used to plan, manage, adjust and re-plan the TER initiative.



The Rocky River Chapter of Trout Unlimited is a non-profit, conservation sub-organization of Trout Unlimited. Established in 1982, the chapter earned the Gold Chapter Award in 1986, the highest honor that is bestowed to a chapter for fulfilling the mission of Trout Unlimited which is to Conserve, Protect and Restore Coldwater Resource. **Other chapters near and around the park may join in the effort including but not limited to Foothills, Tablerock, Northwestern and Dogwood chapters.**



<need brief description>

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“The North Carolina Wildlife Resources Commission (NCWRC) is the state government agency created by the General Assembly in 1947 to conserve and sustain the state’s fish and wildlife resources through research, scientific management, wise use, and public input. The NCWRC is responsible for the management of the State’s freshwater fishery resources, including all non-game aquatic fauna and their habitats.”



The North Carolina Council of Trout Unlimited is a non-profit, conservation sub-organization of Trout Unlimited. The state council is an assembly of representatives of each chapter within the state which operates various committees to coordinate statewide joint efforts by the chapters. <Jim to review and edit>



Trout Unlimited is a non-profit, national conservation organization whose mission is to Conserve, Protect and Restore Coldwater Resources. <Damon to review and edit>

Appendix A – Brook Trout Restoration Initiative Detail Plan (working document)

TER Initiative Preparation Phase

	Task	Status	Timeframe	Lead	Remarks
A	<i>As an ongoing effort during this phase, SMSP and TU will jointly develop a prioritized list of collateral projects; then as each are fully defined the projects are launched (see Collateral Projects Appendix).</i>	Ongoing	2012-2018	SMSP/RRTU	RRTU Adopt-A-Park
B	TU drafts and Planning Group establishes the TER initiative plan and schedules future meetings	Underway	2012-2018	SMSP/RRTU	
B1	1 st Meeting – Planning Group Formation	Completed	Nov 6, 2012	SMSP	
B2	Draft BTR Initiative Plan	Completed	Nov 2012	Alen Baker	
B3	Circulate Plan for edits and more details	Underway	Nov-Dec 2012	Planning Group	Email Alen Baker
B4	2 nd Meeting – Draft Review/Refinement	Planned	Jan 2013	SMSP/RRTU	
B5	3 rd Meeting – Working, Document/Plan		Feb-Mar 2013	SMSP/RRTU	
Bn	(quarterly meetings)		Feb,May,Aug,Nov	Planning Group	Suggested
C1	NCWRC provides data gathering equipment specifications	Planned	Dec-Jan	NCWRC	Garman Etrex 10 ECO Testr pH2
C2	NCWRC provides data gathering Angler's Diary card	Assigned	Jan 2013	Jacob Rash	Used SMB/MK
C4	Edit Card for TER initiative Use	Planned	Jan 2013	Planning Group	3 revisions
C5	NCWRC provides native trout genetic studies materials	Planned	Jan 2013	NCWRC	90s pop. "like" Pisgah Hat. stock
D1	TU provides Embrace-A-Stream grant materials	Assigned	Jan 2013	Damon Hearne	
D2	TU provides other grant materials	Assigned		Damon Hearne	
E1	Planning Group develops communications materials/plans				
E2	Planning Group develops PR materials/plans			NC Parks PR Dept	
E3	Planning Group develops education materials/plans				
E3a	Kiosk updates				
E3b	Pamphlets/brochures				
E3c	TU Chapter meetings/newsletters/websites		Feb 2013		
E4	SMSP/RRTU develops TU Volunteer Training materials/plans		Mar 2013	Amanda Lasley	
F	TU pursues grants or performs fundraising for data gathering equipment and for other estimated costs not covered as part of SMSP operations	Planned		Damon Hearne Alen Baker	
G	Each organization promotes and communicates the TER initiative		2012-2013		
G1	RRTU, NCTU, TU communications			Alen Baker Jim Mabrey Damon Hearne	
	SMSP communications			Allen Rogers	
	NCWRC communications			Jacob Rash	
H	Planning Group identifies potential conservation/habitat improvement projects that enhance and support wild				Siphon for Henry River Reservoir?

	and native trout				
I	Planning Group develops list of candidate headwater streams for potential restoration <i>Note: Criteria include locating a natural barrier that can effectively protect a restored native trout population. A higher altitude and the presence of trout will contribute to a higher priority for eventual stream selection.</i>	Planned	2013	SMSP	Appendix D (draft list)
J	SMSP operates a check-out/check-in for data gathering equipment and collection of Angler's Diary cards from TU volunteers	Planned	Apr 2013 desired Mid-Jun 2013 latest	SMSP	
J1	Acquire data gathering equipment		Mar 2013		Two (2) sets \$350
J2	Print Inventory of Angler's Diary cards		Early-Mar 2013		
J3	Setup check-out/check-in "station"		Late-Mar 2013		
J4	Review and adjust processes/data gathering		Jul, Aug, Sep 2013		
K1	TU volunteers recruited for training		Jan-Mar 2013	RRTU/NCTU	"Treasure Hunt"
K2	SMSP volunteer coordinator provides data gathering training for TU volunteers		Early-Apr 2013		Qualified for data accurate collection
L	TU volunteers visits candidate streams and gather preliminary data		From Apr 2013 forward	TU volunteers	Continues as a follow-up task
L1	Temperature monitoring				?pH? later if needed
L2	Barrier mapping (first cut GPS locations with basic data)				Detail survey based on need
L3	SMSP Angler's Diary card				
L4	Angler reporting/diary				
M	Planning Group refines a prioritized shortlist of headwater streams for restoration		2014-2015	SMSP	
N	NCWRC completes genetic studies (est. 2 year timeline remaining)		2015	NCWRC	Est. 2 year timeline remaining as of 11/6/12
O	NCWRC finalizes data for shortlist		2015		
P	Planning Group makes the "go/no-go" for one or more restoration projects		2015		DECISION POINT
Q	Planning Group develops detail plans for one or more brook trout restorations		2015		Optimistic timeline
R	Each organization makes final preparations according to detail plans		2015		Detail TER planning
R1	SMSP plans/prepares stream access route			SMSP	
R2	NCWRC and SMSP arranges for equipment and staff			SMSP NCWRC	
R3	RRTU arranges for individual equipment			RRTU	
R4	NCWRC/SMSP/RRTU sets date(s) and rain date(s)			NCWRC/SMSP/RRTU	
R5	NCWRC/RRTU/NCTU communicates project date(s) and rain date(s)			NCWRC RRTU NCTU	
R6	Arrange onsite refreshments				
R7	Arrange onsite first aid/emergency			SMSP	

	plans				
R8	RRTU coordinates travel/stream access			RRTU	
R9	SMSP/TU Volunteers prepares route to move existing, nonnative trout			SMSP staff TU Volunteers	
R10	NCWRC/TU Volunteers prepares route from native trout source stream			NCWRC staff TU Volunteers	
	(other preparation tasks)				
	(repeat for any additional streams planned for brook trout restoration)				

TER Initiative Project Phase

	Task	Status	Timeframe	Lead	Remarks
	<i>TU volunteers completes each collateral project</i>				
	Walk-Bridge/Debris Clean-up Project		2013		
	Creel Study and Analysis Project		2013		
			2014		
			2014		
			2015		
			2015		
	For any restoration, the Planning Group will select the stream, plan the logistics, acquire needed resources and schedule the joint efforts of NCWRC, SMSP and TU volunteers		2016		
	Each organization promotes and communicates the progress of the TER initiative as appropriate		2016		
	For any restoration, NCWRC, SMSP and TU volunteers completes field work (both the removal of wild, nonnative trout and the restoration of native trout)		2016		
	Each organization promotes and communicates the each project completion of the TER initiative as appropriate		2016		

TER Initiative Follow-up Phase

	Task	Status	Timeframe	Lead	Remarks
	<i>TU volunteers performs follow-up efforts as defined with each completed project</i>				
	Walk-Bridge/Debris Clean-up Project		2014		
	Gamefish (Trout) Study and Analysis Project		2014		
			2015		
			2015		
			2016		
			2016		
	For any restoration, NCWRC, SMSP and TU volunteers will perform planned follow-ups as defined in the project.		2017, 2018		
	NCWRC follow-up		2017, 2018		
	SMSP follow-up		2017, 2018		
	RRTU follow-up		2017, 2018		
	Planning Group reviews and documents lessons learned and noteworthy conclusions of the TER initiative for use in comparable future projects		2017		
	Each organization promotes and communicates the results of the TER initiative as appropriate		2017		
	SMSP promotion and communications				
	RRTU/NCTU/TU promotion and communications				
	NCWRC promotion and communications				

Appendix B – Collateral Projects

Unique stream jam project with a high priority: Stream debris jams clean-up and removal of primarily man-made objects and/or natural materials that obstruct flows or decays to a level that robs oxygen from the stream (the input of woody debris is a natural process that can diversify aquatic habitats, so removal of such materials should be done with ample consideration and under the supervision of certified stream hydrologists. Any alterations to in-stream habitats will require the proper permitting and care to protect and enhance natural hydrologic processes)

	Task	Status	Timeframe	Lead	Remarks
	Walk-Bridge/Debris Clean-up Project				
1	Plan workday with SMSP				
2	Develop equipment list				
3	Schedule date and rain date with SMSP				
4	Document, announce, communicate and promote for TU volunteer turn-out				
5	Secure and move equipment above High Shoals Falls				
6	Acquire removal plan approval				Stream Permit
7	Remove unnatural, man-made debris jam from stream				
8	Dispose of debris per SMSP direction				
9	Clean-up and restore riparian zone				
10	Account for and return equipment				
11	Communicate project completion				

Projects oriented toward riparian zone stabilization:

- Erosion control via bank reinforcement using willow shoots, willow weaving and natural materials such as rocks, logs and bio degradable matting
- Canopy and stream bank native vegetation plantings
- Tributary silt and sediment source reduction/elimination

	Task	Status	Timeframe	Lead	Remarks
	Stream Bank Erosion Abatement Project				
Site	(sites where erosion impacts the stream)				
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					
K					
	(Plan a separate project for each site)				
1	Determine Eco-Safe Source of Rocks				
2	Secure tools based on expected number of volunteers: shovels,racks,wheelbarrows,etc.				
3	Coordinate work dates, rain dates w/ SMSP				
4	Communicate project/dates across NCTU				
5	Pre-cut Willow chutes and keep in water				
6	Arrange for refreshments/lunch or BYOF				
7	Place worksite signage on each workday				
8	Execute workdays until work completed				
9	SMSP completion sign-off				
10	Communicate project completion				

Projects oriented toward trail stabilization to curtail run-off:

- Run-off re-direction and management
- Improving horse trail and park vehicle stream crossings

	Task	Status	Timeframe	Lead	Remarks
	Trail Repair or Re-Route Project				
	(sites where run-off impacts the stream)				
Site					
A					
B					
C					
D					
E					
F					
G					
H					
I					
J					
K					
	(Plan a separate project for each site)				
1	Determine Eco-Safe Source of Rocks				
2	Secure tools based on expected number of volunteers: shovels,racks,wheelbarrows,etc.				
3	Coordinate work dates, rain dates w/ SMSP				
4	Communicate project/dates across NCTU				
5	Secure materials for trail construction/repair				
6	Arrange for refreshments/lunch or BYOF				
7	Place worksite signage on each workday				
8	Execute workdays until work completed				
9	SMSP completion sign-off				
10	Communicate project completion				

“Kids dam” removal in high use sites on Jacob Fork:

	Task	Status	Timeframe	Lead	Remarks
	Annual Rock Dam Removal Project				
1	Coordinate work date, rain date w/ SMSP				
2	Schedule annual Streamside on Jacob Fork				
3	Communicate project/dates to TU Chapter				
4	Arrange for refreshments/lunch or BYOF				
5	Execute workdays until work completed				
6	SMSP completion sign-off				
7	Communicate project completion				
8	Allow time for volunteers to fish!				

Assist NCWRC with stocking and other projects in need of volunteer labor

	Monthly Stocking Assistance Project				
1	(Mar, Apr, May, Jul, Oct and Nov)				
2	Coordinate dates w/ NCWRC hatchery				
3	Communicate each date/time to TU Chapter				
4	Arrange for refreshments/lunch or BYOF				
5	Allow time for volunteers to fish!				

At the January 2013 planning meeting the NCWRC provided a preliminary update from recent stream sampling at nine (9) sites. No brook trout were encountered in the unnamed tributary of Henry Fork where brook were found in the 1990s. Past genetic samples were processed and it appears that the brook trout in the headwaters of Henry Fork are comparable to prior Pisgah Hatchery stock. Thus, to date no true native brook trout have been confirmed in the South Mountains range.

The discussion moved to the need to protect the existing wild brown trout population in Henry Fork both above and below the Henry Fork Reservoir. Recent samples indicate the presence of wild brown trout in low numbers. The concern is both the sedimentation load coming from the old unmaintained logging roads and high water temperatures below the reservoir due to the topwater spillover design of the dam. A means to discharge cold water from the bottom of the reservoir is a potential solution given that the discharge may be well aerated in some manner as well. The following is a preliminary project for Henry Fork:

	Task	Status	Timeframe	Lead	Remarks
	Lower Henry Fork Enhancement Project				
1	Research siphon and aeration technology				
2	Target upper Henry Fork headwaters for systematic Angler's Diary activity				
3	Target upper Henry Fork for turbidity monitoring and measurement				
4	Target lower Henry Fork for temperature and pH monitoring and measurement				
5	NCWRC temperature monitoring				
6	NCWRC spring-summer sampling				
7	Develop a project plan and cost estimate to enhance the water temperature and DO for lower Henry Fork.				
8	Pursue funding options				
9	<project plan>				
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Appendix C – Sub-Projects

This section details portions of the TER Initiative Project. First and foremost is a complete survey of the streams within the South Mountains Range and specifically within South Mountain State Park and within South Mountains Game Lands which has public access. Surveying a stream on private property required the permission of the landowner prior to crossing the property boundary and accessing the stream.

Gamefish (Trout) Population Study and Analysis Project

A comprehensive sampling of all “fishable tributary” headwaters in the South Mountains Range by volunteer TU members and friends is designed to discover any brook trout populations as well as confirm any non-native wild trout populations in all the streams. Although specific streams have been assigned to specific chapters by general agreement, any volunteer may fish any stream in the South Mountains Range and complete an Angler’s Diary Card and contributes to the study of South Mountains gamefish (trout) populations.

In addition to completing a trout species/catch summary, the study includes measuring pH and obtaining a GPS coordinate for each natural barrier greater than 3 feet high on the stream along with the height of the barrier. During the months of June, July, August and September temperature readings at 10am, Noon, 2pm and 4pm are expected if on the stream at any of these times. A GPS coordinate or identifiable landmark description may be used to denote the following: Any bank erosion is to be reported. Any trash is to be carried out if possible or reported. Any stream jams that impede the natural movement of trout upstream and downstream are to be reported. Finally, note each “fishable tributary” encountered on the stream separately whether named or un-named on maps.

A GPS Unit, a ECOTESTR PH1 or 2 pH/thermometer Unit, Ruler, Angler’s Diary Cards and Pen are to be carried during the trek to the stream. The South Mountains State Park office will have this “study kit” available for check-out/check-in during park hours. TU members of the NCTU Conservation Committee are encouraged to acquire the (NCWRC specified) items and create one or more “creel study kits” for their chapter’s convenient use as well. Angler’s Diary Cards are to be turned-in at the SMSP office or mailed to the SMSP office when necessary. An angler’s diary is encouraged for capturing anecdotal information about the streams visited and any observations to be shared.

The information gathered by volunteers will be analyzed by NCWRC for species follow-up work and by the TER Planning Group for future conservation projects. The Gamefish (Trout) Population Study and Analysis Project is intended to fun for the volunteer. The data and information collected will provide a comprehensive view of the coldwater conservation profile of the South Mountain Range and fundamental for future projects.

The following is a (working document) project task list to guide the progress the survey of all potential trout streams in the South Mountains Range followed by the Angler’s Diary Card with instructions:

	Task	Status	Timeframe	Lead	Remarks
	Gamefish (Trout) Study and Analysis Project				
	Pre-Requisite Tasks				
J	SMSP operates a check-out/check-in for data gathering equipment and collection of creel cards from TU volunteers	Planned	Apr 2013 desired Mid-Jun 2013 latest	SMSP	
J1	Acquire data gathering equipment		Mar 2013		At least two set
J2	Print Inventory of creel cards		Early-Mar 2013		
J3	Setup check-out/check-in "station"		Late-Mar 2013		
J4	Review and adjust processes/data gathering		Jul, Aug, Sep 2013		
	Trout Study of South Mtn Range			NCTU (examples)	
1	Complete Angler's Diary Cards				
	Catawba River Headwaters			RRTU	
	Henry Fork (SMSP)			Northwestern TU	
	He Creek (SMSP)				
	Hipp Creek (SMGL)				
	Ivy Creek (SMSP)				
	Jerry Branch (SMSP)				
	Laurel Creek (SMGL)				
	Stacy Creek				
	Jacob Fork (SMSP)			RRTU	
	Little River (SMSP)				
	Nettle Branch (SMSP)				
	Murray Branch (SMSP)				
	Shinny Creek (SMSP)				
	White Oak Creek				
	Silver Creek			Tablerock TU	
	Clear Creek (SMSP)				
	Bailey Fork				
	Double Branch				
	Sutterwhite Creek				
	Shoal Creek				
	Chestnut Flat Branch				
	Hall Creek				
	Hunting Creek (SMGL)				
	Laurel Branch				
	First Broad River Headwaters			Foothills TU	
	Beaverdam Creek (SMGL)			Foothills TU	
	Brier Creek (SMGL)			Foothills TU	
	Pheasant Creek (SMGL)				
	Pot Branch (SMGL)				
	Little First Broad River			Pisgah TU	
	Grayson Creek				
	Smalley Creek				
	Somey Creek (SMGL)				
	N Fork First Broad River (SMGL)			RRTU	
	Negro Creek (SMGL)				
	Roper Creek (SMGL)				
	Johanna Branch				
	Sally Queen Creek (SMGL)				
	Wards Creek			Dogwood TU	
	Beechnut Creek (SMGL)				
	Cox Creek (SMGL)				
	Knob Creek (SMGL)				
	Tim Creek				
	Second Broad River Headwaters			Pisgah TU	
	Cane Creek			Pisgah TU	
	Shoal Creek			Pisgah TU	
2	Analysis			NCWRC	
3	Creek Follow-up and Re-Direction				
4	Draft Report			NCWRC	
5	Final Report			NCWRC	
6	Report Communications				
7	Project Review and Follow-up				
8	Communicate Project Completion				

Stream health monitoring and analysis during drought periods (these activities to improve stream health are critical and will be a focal point of this effort.). This project is seasonally most likely during the “dog days” of summer and possibly into the fall. Volunteers may find little conflict between project work and fishing as very clear, low-water on hot days are most challenging for trout fishing anyway. However, during a drought, the more days with temperature measurements the more complete the analysis of the affects of drought.

	Task	Status	Timeframe	Lead	Remarks
	Drought Monitoring and Analysis				
	(take reading at 10am, Noon, 2pm and 4pm)				
	Temperature Measurements on Henry Fork				
	Temperature Measurements on Jacob Fork				
	Temperature Measurements on Clear Creek				
	Add tributary sites that have sections of open canopy and southern exposures				
	Add a measurement site upstream if temperatures reach 80 degrees				
	Add a measurement site downstream if temperatures remain below 75 degrees				
	Record Hi, Avg. and Low Temperatures				
1	Correlate Stream Temp vs. Air Temp(s)				
2	Complete an Annual Report				
3	Communicate results w/ SMSP, NCWRC				

Stream health monitoring and analysis during flooding periods (these activities to improve stream health are critical and will be a focal point of this effort.). This project is not scheduled but rather “on-demand”. Volunteers must monitor the weather reports for heavy rains and predicted flooding in the South Mountains and be prepared to execute the task upon short notice.

	Task	Status	Timeframe	Lead	Remarks
	Flooding Monitoring and Analysis				
	(use a turbidity disc instrument for accuracy)				
	Check Henry Fork for Trubidity				
	Check Jacob Fork for Turbidity				
	Check Clear Creek for Turbidity				
	Add tributary sites that have turbidity				
	Narrow-down and pin-point run-off sources				
	Record South Mountains Rainfall for each set of turbidity measurements				
1	Correlate Stream Turbidity vs. Rainfall				
2	Complete an Annual Report				
3	Communicate results w/ SMSP, NCWRC				

NCTU
Angler's Diary, Stream Temp/pH and Turbidity
Instructions

1. Fill out a different card each time you go fishing. It is important that you fill out a card even on days when no fish were caught.
2. Fill in the TU Chapter, date of the fishing trip (mm/dd/yyyy), your name, e-Mail address and phone number.
3. Record the stream or "fishable tributary" name (Body of Water) where you fished (Jacob Fork DH, Shiny Creek, etc.) and information about put-in and take-out points (list times and locations for each). If you do not know the name enter the GPS coordinate or describe how to locate and access the stream or "fishable tributary".
4. Record the number of anglers in your party fishing.
5. Record the total number of hours (to the nearest 1/4 hours) that were fished.
6. Please fill in the appropriate data within the table for all fish caught (enter length to the nearest 1/4 inch). **If no fish were caught, enter o (zero) in the table for each species sought that was not caught.**
7. Continue recording information for your trip on an additional card if you fill all the data boxes on your original form. Write **Continuation of DATE Trip** in the Body of Water section on the next form. For example: Body of Water Continuation of 10/31/2013 Trip.
8. Use the Fish Notes column to note disease, deformities, etc. The Angler's Remarks/Observation section is a place for information of interest to you or the biologist. In addition, use this section to record the number of fish caught on days when the catch is high and it is not feasible to measure each individual fish.
9. If more than one diary keeper are fishing together, each of you fill out a card as if you were fishing alone (enter "1" for number fishing and record only the fish that you caught). Do not record the same fish in more than one diary.
10. While fishing, measure the height (from the lower pool surface water level to the upper pool surface level in inches) of any natural barriers encountered. Record the GPS coordinate and height of the natural barrier if 36 inches or greater in height.
11. While fishing, measure and record the stream temperature morning (ideally 10am), afternoon (ideally 1pm) and evening (ideally 4pm). This is most important from **June through September**.
12. While fishing, at any opportunity measure and record the stream pH with the GPS point.
13. During or immediately following rain measure and record the stream turbidity with the GPS point. Turbidity is judged in degrees by observation as **Clear (0), Tinged (1), Dingy (2), Milky (3) or Muddy (4)**. If time permits, seek out the source of Milky or Muddy water and note the point of erosion run-off.
14. A GPS coordinate or identifiable landmark description may be used to denote the following:
 - a. Any bank erosion is to be reported.
 - b. Any trash is to be carried out if possible or reported.
 - c. Any stream jams that impede the natural movement of trout upstream-downstream are to be reported.
 - d. Any point source of milky or muddy erosion run-off.

Note each "fishable tributary" encountered on the stream separately whether named or un-named on maps.

Check-in equipment check-out and turn-in your completed Angler's Diary card(s) at the South Mountain State Park office. If you are using chapter equipment, return as instructed and (either turn-in or) mail your Angler's Diary card(s) to:

South Mountains State Park
Attn: SMSP TER Initiative
3001 South Mountain Park Ave.
Connelly Springs, NC 28612
Phone: (828) 433-4772

Note: Instructions numbers are designated for many of the entries

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NCTU

Stream Temp/pH
Stream Turbidity

² TU Chapter _____ Date _____
Angler _____ Phone _____
e-Mail _____
Body of Water _____

3

Measurement Sites (GPS coordinates in decimal degrees, Measurements) 11,12,13

Morning

Afternoon

Evening

_____	____.____ pH _____	____.____ pH _____	____.____ pH _____
(GPS coord.)	____.____ degrees _____	____.____ degrees _____	____.____ degrees _____
	____.____ turbidity _____	____.____ turbidity _____	____.____ turbidity _____
_____	____.____ pH _____	____.____ pH _____	____.____ pH _____
	____.____ degrees _____	____.____ degrees _____	____.____ degrees _____
	____.____ turbidity _____	____.____ turbidity _____	____.____ turbidity _____
_____	____.____ pH _____	____.____ pH _____	____.____ pH _____
	____.____ degrees _____	____.____ degrees _____	____.____ degrees _____
	____.____ turbidity _____	____.____ turbidity _____	____.____ turbidity _____
_____	____.____ pH _____	____.____ pH _____	____.____ pH _____
	____.____ degrees _____	____.____ degrees _____	____.____ degrees _____
	____.____ turbidity _____	____.____ turbidity _____	____.____ turbidity _____
14	____.____ pH _____	____.____ pH _____	____.____ pH _____
	____.____ degrees _____	____.____ degrees _____	____.____ degrees _____
	____.____ turbidity _____	____.____ turbidity _____	____.____ turbidity _____

Bank Erosion _____

Trash/Jams _____

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Appendix D - Potential Conservation Projects for RRTU/NCTU Chapters

Sedimentation Abatement Projects

- Erosion control via bank reinforcement using willow shoots, willow weaving and natural materials such as rocks, logs and bio degradable matting
- Tributary silt and sediment source reduction/elimination
- Run-off re-direction and management
- Re-establishing riparian zones from livestock overgrazing
- Developing alternate livestock watering capabilities with landowners
- Improving livestock and vehicle stream crossings
- Stream health monitoring and analysis during flooding and drought periods (these activities to improve stream health are critical and will be the focal point of this effort.)

Habitat Restoration Projects

- Stream debris jams clean-up and removal of primarily man-made objects and/or natural materials that obstruct flows or decays to a level that robs oxygen from the stream (the input of woody debris is a natural process that can diversify aquatic habitats, so removal of such materials should be done with ample consideration and under the supervision of certified stream hydrologists. Any alterations to in-stream habitats will require the proper permitting and care to protect and enhance natural hydrologic processes)
- Canopy and stream bank native vegetation plantings
- Marking and monitoring stream protection zones
- “Kids dam” removal in high use sites on trout streams
- Small irrigation dam removal and replacement with rock sills
- Irrigation canals, culverts and water intake screening to block unwanted fish movement
- Engineered structures and de-channelization
- Structural mitigation of shallow, wide stream channels with total channel width-to-depth greater than 10 (Careful consideration should be given to stream habitat manipulation. This field has advanced in recent years; thus, technical experts will be consulted and employed)
- Invasive aquatic and riparian plant setback/elimination via multi-pass eco-approved treatments
- Culvert replacements that provide stream-beds and free movement of trout
- Stream habitat mapping and analysis for improvement projects planning

Species Protection Projects

- Southern Appalachian Brook Trout restoration via multi-pass electroshock removal and relocation of an existing, nonnative trout population (NCWRC Aquatic Wildlife Diversity staff would be the lead for any effort associated with non-game fishes in public waters. If a true “invasive” was present NCWRC would work to control or eliminate the aquatic nuisance species - elimination by eco-approved treatments)

- Private tributary “owner voluntary closures to fishing” for limited periods of time (not a regulatory change)
- Stream Adoption with member monitoring and reporting
- Establishing Species Conservation Area(s)
- Distribution work in the park – collect data on all trout, focus sampling on brook trout - line sampling via TU and shocking survey via SMSP/NCWRC; TU assist
- Mapping of stream resources – identify priorities and problem areas

Stream Access Projects

- Trail maintenance with trash and debris clean-up
- Parking maintenance with trash and debris clean-up
- Replace fencing with angler/wildlife friendly riparian fencing
- Private access via permission process agreements and signage
- Assist NCWRC with stocking and other projects in need of volunteer labor

**Appendix E – List of Coldwater Tributaries in the South Mountains Range
(with approximate elevation ranges)**

Jacob Fork (eastern watershed)

White Oak Creek (¼ mile borders, mostly outside SMSP)	1340-2480
<no name> first Dogwood Stamp Mountain tributary (upper ½ mile inside SMSP)	1580-2360
<no name> second Dogwood Stamp Mountain tributary (outside SMSP)	1590-2000
<no name> third North tributary (outside SMSP)	1755-2160
North Prong White Oak Creek (outside SMSP)	1915-2360
South Prong White Oak Creek (outside SMSP)	1915-2480

Nettle Branch 2030-2640

Murray Branch 2030-2150

South Prong Murray Branch 2150-2400

North Prong Murray Branch 2150-2400

Jacob Fork (headwaters) 1880-2290

Shinny Creek 1390-1850

Lower South Prong Shinny Creek 1410-2000

Upper South Prong Shinny Creek 1850-2120

Upper North Prong Shinny Creek 1850-2200

Lower North Prong Shinny Creek 1390-2050

Little River (tiny, ½ miles within SMSP) 1410-1810

<no name> second West tributary
(mostly outside SMSP) 1410-1760

<no name> first West tributary
(¼ mile inside SMSP) 1300-1680

Lower Fork Little River 1300-2035

Henry Fork (northern watershed) 1550-1910

Ivy Creek (outside SMSP) 1310-1355

East Prong Ivy Creek (outside SMSP) 1355-1880

Ivy Creek (headwaters) 1355-1950

West Prong Ivy Creek (primarily outside SMSP) 1345-1880

He Creek 1680-2700

<no name> first East tributary 1790-2240

<no name> second East tributary 1910-2180

Coldwater Impoundment 1710

South Prong Henry Fork 1710-1910

East Fork of the South Prong Henry Fork 1910-2600

West Fork of the South Prong Henry Fork 1910-2500

Henry Fork (headwaters) 1910-2755

North Prong Henry Fork (less than ¾ mile) 1810-2300

Jerry Branch 1700-2500

Upper North Prong Jerry Branch (less than ½ mile) 1955-2560

Lower North Prong Jerry Branch (less than ¾ mile) 1830-2360

Hipp Creek (outside SMSP)	1410-2320
<no name> Cedar Mountain tributary (outside SMSP)	1355-1800
Stacy Creek (outside SMSP)	1210-1525
<no name> Black Fox Ridge tributary (outside SMSP)	1100-1390
North Prong <no name> headwaters (SMGL, outside SMSP)	1350-1560
South Prong <no name> headwaters (SMGL, outside SMSP)	1390-1600
West Prong Hunting Creek (SMGL, outside SMSP)	1100-1750
Laurel Creek (SMGL, outside SMSP)	1100-1300

Silver Creek (western watershed)

Clear Creek (above impoundment)	1100-1220
Bailey Fork (tiny, less than ¾ mile)	1800
Double Branch (outside SMSP)	1150-1190
East Prong Double Branch (less than ½ mile)	1190-2050
West Prong Double Branch	1190-2100
Warmwater Impoundment	1220
East Prong Clear Creek	1220-2520
West Prong Clear Creek	1220-2160
Sutterwhite Creek (primarily outside SMSP)	1100-1510
Shoal Creek (outside SMSP)	1120-1640
<no name> Bollinger Loop tributary (outside SMSP)	1155-1240
?Coldwater? Impoundment	1640
East Prong Shoal Creek	1640-2300
West Prong Shoal Creek (less than ¾ mile)	1700-2150
Chestnut Flat Branch (primarily outside SMSP)	1195-1900
Hall Creek (outside SMSP)	1100-2120
East Prong Hall Creek (primarily outside SMSP)	
Lane Branch (outside SMSP)	1330-2500
<no name> Roper Hollow Road tributary (outside SMSP)	1440-2100
West Prong Hall Creek (outside SMSP)	1410-1900
<no name> West tributary	1560-1920
Silver Creek (headwaters) (outside SMSP)	1320-1720

First Broad River (southern watershed) (outside SMSP)

Brier Creek (outside SMSP)	1100-1350
Pheasant Creek (outside SMSP)	1150-2320
North Prong Pheasant Creek (outside SMSP)	1200-2200
East Prong Brier Creek (outside SMSP)	1300-2440
Brier Creek (headwaters) (outside SMSP)	1350-2650
West Prong Brier Creek (outside SMSP)	1350-2350
Pot Branch (outside SMSP)	1100-2030

West Prong Pot Branch (outside SMSP)	1410-1610
Beaverdam Creek	1100-1300
Sally Queen Creek (outside SMSP)	1100-1650
East Prong Sally Queen Creek (outside SMSP)	1790-2240
Sally Queen Creek (headwaters) (outside SMSP)	1650-2440
West Prong Sally Queen Creek (outside SMSP)	1830-2240
North Fork First Broad River (headwaters) (outside SMSP)	1800-2510
East Prong North Fork Broad River (outside SMSP)	1860-2280
Roper Creek (outside SMSP)	1500-2530
Johanna Branch (outside SMSP)	2170-2540
<no name> East tributary (outside SMSP)	2280-2540
<no name> West tributary (outside SMSP)	2100-2440
Negro Creek (outside SMSP)	2000-2420
Grayson Creek (outside SMSP)	1900-2300
Somey Creek (SMGL, outside SMSP)	1920-2360
Little First Broad River (outside SMSP)	1920-2380
Smalley Creek (outside SMSP)	1850-2200
Wards Creek (outside SMSP)	1200-1800
Beechnut Creek (SMGL, outside SMSP)	1300-2000
Cox Creek (SMGL, outside SMSP)	1400-1900
Knob Creek (SMGL, outside SMSP)	1450-2000
Tim Creek (outside SMSP)	1350-1500

Second Broad River (southern watershed) (outside SMSP)

Cane Creek (outside SMSP)	1200-1400
Shoal Creek (outside SMSP)	1300-1500

We have been fortunate to have long-standing relationships with South Mountains State Park and Trout Unlimited. Thus, we are appreciative of the efforts to conserve the coldwater habitats and organisms of South Mountains State Park and the opportunity to continue to work with our partners to achieve common goals.

It was noted in our comments above and at our 6 November 2012 meeting, but actual restoration of brook trout populations may not be an outcome via the Park's natural resources (i.e., low elevation, limited habitats, etc.). However, those same features likely highlight the need for other conservation measures (i.e., sediment control, riparian restoration, etc.) to provide direct impacts in relatively short temporal scales. Projects of this ilk should be abundant and diverse in the Park (and across western NC).

We should keep "restoration" on the table, but again, we should continue to approach it with the pragmatism that has been discussed.