REPORT ON 2009 WORK IN COMPARTMENT 84 OF SUMTER NATIONAL FOREST
November 2009

Background: Per contract from John Richardson, Forest Ranger, Enoree District, the Kudzu Coalition began kudzu removal on September 18, 2009.

Location and size: 19 acres within Compartment 84 and on the Ridge Road about 7 miles east of Whitmire at Compartment 84 in Sumter National Forest, Enoree Ranger District

Site History: Treated 3 times with Transline (r). 2006, 2007, and 2008; Controlled burn: Year unknown

Purpose: Avoid a fourth and fifth application of herbicides by using manual methods instead.
Learn what the problems/challenges would be.
Find solutions to those challenges.
Improve the manual methods.
The objective was not: Cost reduction or speed of completion.

Advance check out: Ranger Richardson walked the site with Paul Savko and Newt Hardie on Monday, July 20. At that time, the current year vines had not rooted. Several hundred vines extended out into the road about three to five feet. The boundary was very well marked with pink flags. No large dense areas of kudzu were apparent. Scattered kudzu remained. The property across the road, apparently privately owned, had considerable kudzu which was up into the pine trees.

Bush hogging: Because of the large number of vines growing out onto the road on July 20, I asked if bush hogging might be done along the shoulder of the road. The purpose was two fold: Remove the bio-mass so that it is easier to see the kudzu crowns and prevent this year's vines from rooting before the team began to work. Ranger Richardson kindly checked with persons involved in managing the on-going bush hog contracts and the contractor did bush hog -- probably mid-August.

Work plan: The master plan was to work from west to east, first covering the entire west “wing”, the entire east “wing”, and then address the deep, middle section. We started with the wings because the kudzu density was highest along the road where it was open to full sun most of the day. The team worked in line abreast. Upon completing each section, we planned to work it a second time by moving perpendicular to the original line of attack.

Disposal: We hung the excised **c**rowns and vines on nearby tree and bush limbs in order to keep them off the ground where we might perceive them to be unworked when we returned for mop up.

Summary of all work activities: We traveled to the site seven times – four more than expected. A short recap of dates, total number of workers, number of volunteers included, hours traveled, hours worked, total hours worked, and crowns removed:

				Time in hours			
Session	Date	Workers	Volunteers	Travel	Work	Man Hours	Crowns removed (approx)
1.	Sept 18	8	3	Two	7	56	1800
2.	Oct 9	11	3	Two	7	77	2000
3.	Oct 21	6	2	Two	7	42	840
4.	Oct 23	5	3	Two	6	30	1025
5.	Oct 30	8	3	Two	7	56	1440
6.	Nov 3	5	1	Two	8	40	750
7.	Nov 13	6	2	Two	8	48	1820
	Totals	49	17	14	50	349	9,670

Volunteers provided 35% of the total effort. Travel time consumed about 22 % of total time. Total cost of contract workers was $3,057. Contract payment $2,299.

Productivity (**Crowns removed):** We averaged approximately 27.7 crowns per worker per hour. The workers varied in productivity -- approximately 15 per hour to 45 per hour.

Factors affecting productivity:
1. The soil was moist due to **recent rains**. Generally, this made removal easier. However, it also made the **"kudzu chop**" ineffective several days due to softness of the soil,
2. The **briars** make manual removal very difficult. The briars were concentrated in several areas but were a major factor in the open one acre area on the knoll in the center of the site. Locating the crown was much more difficult in briars. The vines were at the top surface of the briars and had gone from stem to stem to stem. To find the spot where the vine goes to the ground often required wading through ten to twenty feet of briars and five minutes or more tracking the vine. The time required for manual removal in the briar patch was often five to ten times the amount of time required when briars were not involved. We did not complete the 90 degree cross sweep or mop up in some of the big briar patch.
Note: Foliar spraying would be much easier and quicker since the worker does not need to go fully into the briar patch. If requested to repeat this project in 2010, we propose – see below -- to bush hog or string trim the briar patch before manual removal of the kudzu and institute quality assurance measurements.
3. **Fallen trees** which had previously been encircled by kudzu were a challenge. Since the kudzu was wrapped around, no matter how the tree fell, there were kudzu vines under the tree. By coming in contact with the soil, these tended to root. Since the rooted nodes were under the fallen tree, removal was difficult.
4 We encountered one nest of **yellow jackets** on the first day and in the west "wing". This was not a problem later in the season.

Factors affecting quality of removal effort (as measured by percent removed): Many kudzu plants were visible when we worked areas the second time -- especially weeks later. Some of the factors which impact our quality of performance are outlined below.

Deer: Deer had eaten the leaves off many vines. This made it difficult to spot the kudzu vines. We surmise that foliar herbicide application would not have worked effectively in those portions of the site.

Delayed emergence: Many, many large (lemon to baseball size) crowns had only one single, thin vine. Crowns of this size would normally have many large vines in September, October, and November. On November 5, we talked to Mr. Bill Kline of Dow AgroSciences about what we were seeing. He immediately pointed out that if the herbicide dose is sub-lethal, the kudzu crown has "delayed emergence". This was very helpful in explaining the small, thin vines which we observed. It may also explain why we were seeing only one vine (80 to 90% of the time) instead of the normal three or four vines from crowns of these sizes. This is a current year result of the same dormancy result we observed while working the Sedalia Site during 2007 and 2008. We saw there, and Dr. Jim Miller confirmed, that surviving crowns may remain dormant for one and two years – perhaps more.

Shortcomings in Kudzu Coalition methods:
1. Workers **failed to see** many of the kudzu plants. The deer and small leaves were only a part of the reason. We learned that some workers are much better than others in spotting kudzu leaves and vines. We believe that some workers spot 90 to 95% of all the kudzu in their line of march. Others, we believe, recognize only 60 to 70% of what is there. This pinpointed a weak area in our training.
2. Workers have a **desire to move** on after spending a long time – say, 30 minutes or more -- in one spot. They have a tendency to stand up and move on, leaving a large number of crowns still intact.
3. Poor technique using the **"Chop" approach** sometimes leaves the bottom half of the crown attached to the root. We now inspect – on a sampling basis - crowns removed by this method.

4. Using the forked end of the tiller to **leverage up the crown** sometimes leaves the bottom part of the crown intact. We have incorporated this info into our training.
5. **Same day** mop up in any direction and sweeping through the previously worked area in a 90 degree cross hatch pass or is not as effective as doing this two weeks later when surviving kudzu is more easily seen.

Miscellaneous observations:
A. By far the heaviest concentration of kudzu was along the dirt road where it gets the most sun.
B. We found a few large crowns (softball size) but not nearly as high a proportion as we had found the last two years at the Sedalia Hunt Club site. This experience leads us to believe that the Sedalia Hunt Club kudzu was older.
C. Damage to the crowns was visible by a rust-orange color. The color of damaged crowns at the Sedalia site was black. The difference in color may be the result of different herbicides used.
D. We marked the boundaries of our sweeps with yellow tape
E. We noticed that kudzu is on the property adjacent to the east side of this Compartment and pointed it out to Ranger Richardson.

Timing:
Working in mid-July, although hotter, might make the briar patch work easier because they would be less well developed.
Delayed emergence of vines from crowns which survive the herbicide application confirms the wisdom of attacking the kudzu late in the season even though nodes begin to root in late July. Not only is the weather cooler but there are fewer bugs and yellow jackets, etc.
While deer hunters were not encountered on this site, it is better to schedule the work before the season opens.

Recommendations for 2010:
Involve the Youth Conservation Corps in a quality assurance measurement of effectiveness.
A. Count the kudzu vines on the road bed.
B. Count the vertical kudzu which is visible from the road.
C. Measure remaining crowns through sampling of different spots in each wing and in the center.
D. Measure with GPS the footprint of the area where kudzu still exists.
E. Resample after the kudzu removal and the following year.
Note: If the YCC is not to be used, the Kudzu Coalition could include this testing as a part of the contract.

If the Kudzu Coalition is engaged again next year, we propose to bush hog or string trim the major briar patch – about two acres in the open area on top of the knoll -- in July to knock back the briars and permit easier access to the kudzu. The Kudzu Coalition is prepared to perform this if the National Forest permits.
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We appreciate the opportunity to remove the kudzu, learn more, improve our methods, and identify new questions to be answered. Special appreciation is due Dr. Charlie Covert and Paul Savko for their many hours of volunteer service on this project as well as for providing transportation for others.

Respectfully submitted, Newt Hardie, Kudzu Coalition