



**National Park Service  
Fire Ecology Annual Report  
Calendar Year 2005**

**Summary**

In March of 2005, NATR welcomed two new fire effects monitors- Brad Weisshaupt and Ed Hentzelt. These folks came to NATR with a combination of experience and education that has turned out to be a real benefit to the program. Unfortunately, lead fire effects monitor Andrew Ruth left NATR to pursue a doctoral degree in Alaska. Since May, the NATR crew has been functioning with no lead monitor.

During 2005, the biggest accomplishment for the NATR Fire Ecology program was the conversion of FMH to FEATDesktop. All parks have been converted to the new software program, and the fire effects monitors and fire ecologist alike spent much time learning to enter, sort, and summarize data in FEAT.

Another big accomplishment for the fire ecology folks included the creation of a fuels map for the Parkway. This map is needed not only for the Parkway but also for Fire Program Analysis (FPA). Many weeks were spent digitizing polygons in ArcGIS!

Two new parks came online for NATR in 2005- Stones River National Battlefield and Russell Cave National Monument. A 30-acre prairie restoration burn was conducted at STRI, and NATR personnel were involved in the burning as well as the monitoring.

In 2005, each park in which the NATR fire effects crew works was provided with a report summarizing the fire effects data to date. These reports were subsequently posted to the fire ecology intranet site. By facilitating communication between the ecologist, the park and the operational employees, it is possible to begin the iterative process of adaptive management. Other steps toward adaptive management included increased collaboration during the prescribed burn planning process. In 2006, it is hoped that this process will be extended to include formal presentation of the monitoring data to the respective parks.

This report does not include Table 1, Monitoring Results, at this time. An updated version including the results will be available by mid-February.

**Table 1. Management Objectives and Monitoring Results 2005**

All results shown are 80% confidence intervals of the mean unless otherwise noted. Fuel reduction objectives/results are mean percent reduction from preburn to immediate postburn, unless otherwise stated. An underlined number of plots denote that minimum sample sizes have been achieved.

| Monitoring Unit                                                                                  | Management Objective (Restoration)                                                      | Monitoring Results (80% confidence interval) | Objective Achieved? (minimum plots achieved/needed) |
|--------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| <b>GUIS<sup>1</sup></b><br><b>FPICL1D07</b><br>Sand pine-scrub oak forest<br><i>Pinus clausa</i> | 20-40% litter and duff reduction <sup>2</sup> immediate postburn <sup>3</sup>           |                                              |                                                     |
|                                                                                                  | 40-60% reduction of sand pine poles by 2 <sup>nd</sup> year after 3 <sup>rd</sup> burn  |                                              |                                                     |
|                                                                                                  | 50-90% hardwood pole reduction by Year 1                                                |                                              |                                                     |
|                                                                                                  | 20-40% increase in herbaceous cover by 2 <sup>nd</sup> year after 3 <sup>rd</sup> burn  |                                              |                                                     |
| <b>GUIS</b><br><b>FPIPA1D07</b><br>Longleaf-slash pine forest<br><i>Pinus palustris</i>          | 50-90% hardwood pole reduction by Year 1                                                |                                              |                                                     |
|                                                                                                  | 20-40% litter and duff reduction immediate postburn (Year 1 data presented)             |                                              |                                                     |
|                                                                                                  | 20-40% increase of herbaceous cover by 2 <sup>nd</sup> year after 3 <sup>rd</sup> burn. |                                              |                                                     |
| <b>GUIS</b><br><b>FSAAL1D07</b><br>Pitcher plant forest<br><i>Sarracenia alata</i>               | 40-90% pole density reduction by Year 1                                                 |                                              |                                                     |

<sup>1</sup> No new installations were performed at GUIS due to uncertainty regarding burning, therefore many minimum plot calculations are the same as last year.

<sup>2</sup> Year 1 and Year 2 postburn fuels data was averaged across plot data taken 12-19 months postburn (for Year 1) and 24-33 months postburn (for Year 2; see GUIS monitoring schedule for details).

<sup>3</sup> Year 2 data presented as no 01 Post data is available.

| Monitoring Unit                                                                                  | Management Objective (Restoration)                                                     | Monitoring Results (80% confidence interval) | Objective Achieved? (minimum plots achieved/needed) |
|--------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| <b>GUIS</b><br><b>FSAAL1D07, cont.</b><br><b>Pitcher plant forest</b><br><i>Sarracenia alata</i> | 20-40% increase of herbaceous cover by 2 <sup>nd</sup> year after 3 <sup>rd</sup> burn |                                              |                                                     |
|                                                                                                  | 20-40% decrease in litter and duff loading immediately postburn                        |                                              |                                                     |
| <b>LIRI</b><br><b>FPIEC1DG09</b><br><b>Shortleaf pine forest</b><br><i>Pinus echinata</i>        | 25-80% reduction in pole-sized trees by 3 <sup>rd</sup> burn                           |                                              |                                                     |
|                                                                                                  | 25-50% increase native grass and forb cover                                            |                                              |                                                     |
|                                                                                                  | 25-50% reduction in downed woody fuel and litter/duff by 3 <sup>rd</sup> burn          |                                              |                                                     |

| Monitoring Unit                                                                                | Management Objective (Restoration)                                                  | Monitoring Results (80% confidence interval) | Objective Achieved? (minimum plots achieved/needed) |
|------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| <b>LIRI FSAOR1G10<sup>4</sup></b><br>Green pitcher plant forest<br><i>Sarracenia oreophila</i> | 30-90% decrease in pole-sized trees by second year after 3rd burn.                  |                                              |                                                     |
|                                                                                                | 40-90% decrease in shrub cover by second year after 3rd burn                        |                                              |                                                     |
|                                                                                                | 20% increase cover of <i>S. oreophila</i> by second year after 3 <sup>rd</sup> burn |                                              |                                                     |
|                                                                                                | 25% reduction in litter and duff fuel load                                          |                                              |                                                     |
| <b>LIRI FQUMO1G10</b><br>Chestnut oak-dominated forests<br><i>Quercus montana</i>              | 20-60% reduction in pole-sized trees                                                |                                              |                                                     |
|                                                                                                | 25-50% increase native grass and forb cover                                         |                                              |                                                     |
|                                                                                                | 25-50% reduction in total fuel load                                                 |                                              |                                                     |

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<sup>4</sup> Plots within the SAOR monitoring type are not randomly distributed; plots were installed to encompass existing *Sarracenia* populations.

| Monitoring Unit                                                                         | Management Objective (Restoration)                                                                     | Monitoring Results (80% confidence interval) | Objective Achieved? (minimum plots achieved/needed) |
|-----------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| MACA<br>BSONU1T02<br>Indian grass grassland<br><i>Sorghastrum nutans</i>                | Reduce density of shade tolerant seedlings 30% to 60% one year after second fire.                      |                                              |                                                     |
|                                                                                         | Reduce density of shrubs 30% to 60% one year after second fire.                                        |                                              |                                                     |
|                                                                                         | Cause no net gain in percent cover of exotic plants (Japanese honeysuckle) after five years of burning |                                              |                                                     |
|                                                                                         | Increase relative cover of <i>Sorghastrum nutans</i> 15% after five years of burning                   |                                              |                                                     |
| MACA<br>FQUMO1D09<br>Chestnut oak forest<br><i>Quercus montana</i>                      | Decrease density of shade tolerant pole trees by 30-90%                                                |                                              |                                                     |
|                                                                                         | Limit mortality of overstory trees to less than 20%                                                    |                                              |                                                     |
| MACA<br>FJUVI1D09<br>Red cedar glade forest<br><i>Juniperus virginiana</i> <sup>5</sup> | Reduce litter/duff and downed woody fuel load by 25-50%                                                |                                              |                                                     |

<sup>5</sup> Pole density reduction and overstory mortality objectives for the red cedar monitoring type cannot be examined until Year 1 data has been collected. Data from the *Andropogon gerardii* monitoring type (woody species density, fuel load and exotic cover) cannot be analyzed on the monitoring type until Year 1 data has been collected. (2005)

| Monitoring Unit                                                                      | Management Objective (Restoration)                                                                                                    | Monitoring Results (80% confidence interval) | Objective Achieved? (minimum plots achieved/needed) |
|--------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------|
| <b>NATR<br/>FPITA1D09</b><br><b>Loblolly pine forest</b><br><i>Pinus taeda</i>       | Reduce total fuel load by 20-40% immediate postburn                                                                                   |                                              |                                                     |
|                                                                                      | Reduce conifer poles (2.5-15.0 cm dbh) >25% one year post burn                                                                        |                                              |                                                     |
|                                                                                      | Cause no net gain in percent cover of exotic plants (e.g. kudzu, Chinese privet, Japanese honeysuckle, etc.) after 5 years of burning |                                              |                                                     |
| <b>NATR<br/>BJUVI1D06</b><br><b>Blackbelt prairie</b><br><i>Juniperus virginiana</i> | 25-50% reduction of <i>Juniperus virginiana</i> density after 5 years of burning                                                      |                                              |                                                     |

**Table 2. Fire Effects Plot Workload 2005**

| <b>Park</b>  | <b>Monitoring Unit</b>                                                              | <b>Type of Plot<br/>(FMH, photo<br/>point, other)</b> | <b>Pre-<br/>burn</b> | <b>Immed.<br/>Post</b> | <b>Postburn<br/>(1-20 yrs)</b> | <b>Total<br/>Plots</b> |
|--------------|-------------------------------------------------------------------------------------|-------------------------------------------------------|----------------------|------------------------|--------------------------------|------------------------|
| <b>NATR</b>  | Loblolly Pine<br>( <i>Pinus taeda</i> ) (PITA)                                      | FMH Forest<br>Plot                                    | 2                    | 2                      | 6                              | <b>10</b>              |
| <b>NATR</b>  | Eastern Red Cedar<br>( <i>Juniperus virginiana</i> ) (JUVI)                         | FMH Brush<br>Plot                                     | 0                    | 4                      | 0                              | <b>4</b>               |
| <b>LIRI</b>  | Shortleaf Pine<br>( <i>Pinus echinata</i> ) (PIEC)                                  | FMH Forest<br>Plot                                    | 0                    | 2                      | 6                              | <b>8</b>               |
| <b>LIRI</b>  | Chestnut Oak<br>( <i>Quercus montana</i> ) (QUMO)                                   | FMH Forest<br>Plot                                    | 0                    | 0                      | 2                              | <b>2</b>               |
| <b>LIRI</b>  | Green Pitcher Plant<br>( <i>Sarracenia oreophila</i> ) (SAOR)                       | FMH Forest<br>Plot                                    | 0                    | 2                      | 3                              | <b>5</b>               |
| <b>MACA</b>  | Big Bluestem<br>( <i>Andropogon gerardii</i> ) (ANGE)                               | FMH Grass<br>Plot                                     | 0                    | 0                      | 3                              | <b>3</b>               |
| <b>MACA</b>  | Eastern Red Cedar<br>( <i>Juniperus virginiana</i> ) (JUVI)                         | FMH Forest<br>Plot                                    | 1                    | 0                      | 5                              | <b>6</b>               |
| <b>MACA</b>  | Chestnut Oak<br>( <i>Quercus montana</i> ) (QUMO)                                   | FMH Forest<br>Plot                                    | 0                    | 0                      | 1                              | <b>1</b>               |
| <b>MACA</b>  | Indiangrass<br>( <i>Sorghastrum nutans</i> ) (SONU)                                 | FMH Brush<br>Plot                                     | 0                    | 0                      | 3                              | <b>3</b>               |
| <b>MACA</b>  | Oak Forest<br>( <i>Quercus</i> spp). (QUSP)                                         | FMH Forest<br>Plot                                    | 1                    | 1                      | 0                              | <b>2</b>               |
| <b>MACA</b>  | Oak-Hickory Forest<br>( <i>Quercus-Carya</i> spp). (OAHI)                           | FMH Forest<br>Plot                                    | 1                    | 0                      | 0                              | <b>1</b>               |
| <b>GUIS</b>  | Longleaf and Slash Pine<br>( <i>Pinus palustris</i> and <i>P. elliotii</i> ) (PIPA) | FMH Forest<br>Plot                                    | 0                    | 0                      | 9                              | <b>9</b>               |
| <b>GUIS</b>  | Sand Pine<br>( <i>Pinus clausa</i> ) (PICL)                                         | FMH Forest<br>Plot                                    | 0                    | 0                      | 2                              | <b>2</b>               |
| <b>GUIS</b>  | Yellow Trumpets<br>( <i>Sarracenia alata</i> ) (SAAL)                               | FMH Forest<br>Plot                                    | 0                    | 0                      | 1<br>(modified)                | <b>1</b>               |
| <b>STRI</b>  | Little Bluestem<br>( <i>Schizachyrium scoparium</i><br>(SCSC)                       | FMH Grass<br>Plot                                     | 3                    | 6                      | 0                              | <b>9</b>               |
| <b>STRI</b>  | Splitbeard Bluestem<br>( <i>Andropogon ternarius</i> ) (ANTE)                       | FMH Grass<br>Plot                                     | 1                    | 0                      | 0                              | <b>1</b>               |
| <b>STRI</b>  | Broomsedge<br><i>Andropogon virginicus</i> (ANVI)                                   | FMH Grass<br>Plot                                     | 7                    | 0                      | 0                              | <b>7</b>               |
| <b>HOBE</b>  | Longleaf Pine<br>( <i>Pinus palustris</i> ) (PIPA)                                  | FMH Forest<br>Plot                                    | 2                    | 0                      | 0                              | <b>2</b>               |
| <b>Total</b> |                                                                                     |                                                       | <b>18</b>            | <b>17</b>              | <b>41</b>                      | <b>76</b>              |

**Table 3. Fire Ecology Staffing 2005**

| <b>Monitor</b>          | <b>Starting Date</b> | <b>Ending Date</b> | <b># of Pay Periods</b> | <b>Training and Development</b>                                                                                                               |
|-------------------------|----------------------|--------------------|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Lisa McInnis, ecologist | 1/3/05               | 12/31/05           | 26                      | S-212, PMS 419, First Aid/CPR, Firefigher Refresher, initiated FEMO taskbook.                                                                 |
| Andrew Ruth             | 1/3/05               | 5/13/05            | 10                      | ESRI online GIS training.                                                                                                                     |
| Ed Hentcelt             | 3/7/05               | 12/31/05           | 21                      | S-131, L-180, PMS 419, First Aid/CPR, Firefigher Refresher, Saws Refresher, completed FEMO taskbook, HECM and Squad Boss taskbooks initiated. |
| Brad Weisshaupt         | 3/7/05               | 12/31/05           | 21                      | L-180, ESRI online GIS training, S-212, PMS 419, First Aid/CPR, Firefigher Refresher, initiated FEMO taskbook.                                |

**Table 4. Fire Ecologist Accomplishments/Focus Area**

| Category                            | Percent Time | Accomplishments/Focus Areas                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------------------------------|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| General Planning                    | 10%          | <ul style="list-style-type: none"> <li>• Crew task planning</li> <li>• Monitoring schedule planning</li> <li>• Prescribed burn planning at NATR, MACA and HOBE/objective development</li> <li>• FMP review for GUIS, HOBE</li> </ul>                                                                                                                                                                                                                |
| Monitoring Plans                    | 5%           | <ul style="list-style-type: none"> <li>• Draft of NATR FMP forwarded to regional ecologist; update approximately 85% done. Lit review for other park's mon plans begun</li> </ul>                                                                                                                                                                                                                                                                   |
| Presentations                       | 5%           | <ul style="list-style-type: none"> <li>• Prescribed burn success stories submitted to InsideNPS: 1 for STRI, 1 for RUCA</li> <li>• Fire ecology PowerPoint program presented to Daughters of the American Revolution</li> <li>• Fire effects PowerPoint program presented to fire management students at MSU.</li> <li>• Fire effects data reports to each park</li> <li>• Interdivisional meeting at MACA to discuss objectives of fire</li> </ul> |
| NPS Meetings/ Task Groups           | 15%          | <ul style="list-style-type: none"> <li>• Fire Ecology Steering Committee- Adaptive Management Task Group, Ch 11 Rewrite Task group</li> <li>• FEAT Conversion Group- during midyear</li> <li>• FEAT/Statistics workshop in Fort Collins</li> </ul>                                                                                                                                                                                                  |
| Interagency Work                    | 5%           | <ul style="list-style-type: none"> <li>• FRCC Reference Conditions Modeling workshop</li> <li>• FPA Weighting Factors workshop</li> <li>• Train the Trainer Workshop for Fire and Fuels Management (FCCS, Consume, and Photoseries)</li> <li>• Interagency prescribed burns with FWS and USFS.</li> <li>• Digitized fuels map for FPA</li> </ul>                                                                                                    |
| Fire Assignments and Fuels Projects | <5%          | <ul style="list-style-type: none"> <li>• FEMO on 4 prescribed fires</li> <li>• COTR on 2 WUI mechanical fuel reduction projects</li> <li>• Short detail to Katrina to evaluate mortality</li> </ul>                                                                                                                                                                                                                                                 |
| Research                            | <5%          | <ul style="list-style-type: none"> <li>• Literature reviews</li> <li>• Federal cooperator on JFSP proposal</li> <li>• Review of manuscript for GWS conference</li> </ul>                                                                                                                                                                                                                                                                            |
| Monitoring Field Work               | 30%          | <ul style="list-style-type: none"> <li>• Assisted monitoring crew with FMH plots at NATR, GUIS, STRI, LIRI, and MACA.</li> </ul>                                                                                                                                                                                                                                                                                                                    |
| Data Entry                          | 0%           | <ul style="list-style-type: none"> <li>• Monitors completed data entry</li> </ul>                                                                                                                                                                                                                                                                                                                                                                   |
| Data Management and Conversion      | 5%           | <ul style="list-style-type: none"> <li>• After first park, monitor completed most data conversion</li> <li>• Troubleshooting conversion</li> </ul>                                                                                                                                                                                                                                                                                                  |
| Data Analysis                       | 5%           | <ul style="list-style-type: none"> <li>• Data analysis primarily for annual report</li> </ul>                                                                                                                                                                                                                                                                                                                                                       |
| Training & Professional Development | 5%           | <ul style="list-style-type: none"> <li>• FEAT Training</li> <li>• Firefighter refresher, Wildland Fire Saws, Engine Operator, Driving for the Fire Service, First Aid/CPR</li> <li>• PT (approximately 3 hrs per week)</li> </ul>                                                                                                                                                                                                                   |
| Miscellaneous                       | <5%          | <ul style="list-style-type: none"> <li>• GIS work- tutorials, consulting outside resources for help, etc.</li> <li>• Responses to emails asking for input or data</li> </ul>                                                                                                                                                                                                                                                                        |

**Table 5. Fire Effect Crew Accomplishments**

| <b>Category</b>                     | <b>Percent Time</b> | <b>Notes</b>                                                                                                                                                            |
|-------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| FMH plots                           | 30                  | Estimated amount of time spent collecting plot data; includes any preparation time.                                                                                     |
| Mechanical Treatment plots          | 0                   | Estimated amount of time spent collecting plot data; includes any preparation time.                                                                                     |
| CBI plots                           | 0                   | Estimated amount of time spent collecting plot data; includes any preparation time.                                                                                     |
| Other plot work                     | 0                   |                                                                                                                                                                         |
| Fire Assignments and Fuels Projects | 5                   | Prescribed fires in SER, short detail to Katrina.                                                                                                                       |
| Data Entry                          | 33                  | Estimated amount of time spent entering data from paper to PC                                                                                                           |
| Data Management and Conversion      | 20                  | Estimated amount of time to convert FMH data to FEAT and to manage monitoring data; includes preparing species lists, error checking, learning conversion program, etc. |
| Data Analysis                       | 0                   |                                                                                                                                                                         |
| Supervision/Admin                   | 5                   | Travel, payroll, etc.                                                                                                                                                   |
| Training & Professional Development | 5                   | Training,, PT, etc.                                                                                                                                                     |
| Miscellaneous                       | 2                   | FPA digitizing, GIS work                                                                                                                                                |

**Optional.** Attach additional material not already covered: Describe in narrative form alternative monitoring activities, unique solutions to problems, and challenges facing monitoring program. Include any collaboration with natural resource managers, other federal agencies, or research institutions. Provide graphics and/or tables of data analysis results presentations, photographs of monitoring and fire activities.

### **Collaboration with Resource Managers**

During 2005, a rare *Schizachyrium scoparium* - *Sorghastrum nutans* - *Dalea candida* - *Liatris squarrosa* - (*Silphium terebinthinaceum*) Black Belt chalky prairie community was identified along the Parkway by Naturserve. Due to fire suppression, the area is heavily encroached with eastern red cedar. In cooperation with resource management at NATR, funds to mechanically thin and burn were approved through NFPORS, and the area is scheduled for treatment in FY06. This will be the first inter-divisional thinning and burning restoration project for NATR in recent history.



Figure 1. Preburn photograph of chalky prairie restoration site. Note *Silphium* species in flower and significant cedar encroachment.

**Optional question for the fire ecologist.** Over the next 6 to 12 months what do you anticipate to be your primary areas of focus? Provide a rough break out of how much time you anticipate to spend in these areas and a short description of what you will be doing.

Broadly speaking, over the next 6-12 months, I hope to hire a lead monitor. If so:

- 40% attention on monitoring plans for each park (NATR, MACA, LIRI, HOBE, STRI, and VICK)
- 20% attention on data management in FEAT and data analysis/statistics work (including learning how to use MS Access, and NATR pilot data finalization).
- 20% I hope to devote to plant taxonomy, fieldwork/plot location, GIS skill development,
- 10% on communication and adaptive management (website updating, educating locals and park neighbors about fire ecology and dumping of exotics on parkway, making presentations to each park about their fire effects data, planning with operational fire folks and resource management, etc).
- 10% on administrative and general planning (in a perfect world...)

