



**National Park Service
Fire Ecology Annual Report
Calendar Year 2009**



Quartz Ridge Fire – North Fork area within 1988 Red Bench Burn (08-09-2009)

A. Summary

The summer proved to be a light fire season, although fire indices were very high from late August until late September. The park had 14 wildland fires, none of which exceeded a tenth of an acre. One wildfire was monitored for resource benefits for a week.

Fourteen FMH plots in the Ponderosa pine monitoring type were re-read at 10 years after burning. The last four plots in the monitoring type will be read in 2010. Over 60 photopoints plots in fuel reduction areas were photographed again, and the sites inspected. Burn spots and work areas were monitored for any weed introduction and small incursions were pulled; larger areas were reported to IPM. Five longterm monitoring plots were revisited and read. A new trial post fire composition monitoring protocol was tested in the Robert Fire area. It is a quick read plot to identify the tree and shrub layers that are presently dominating the new forest stands. The plots run along trails and roads within the burn to get an idea of the diversity and density of the initial vegetation complex. We eventually hope to run transects of these plots cross country, from trail to trail, and in time have a good idea of the tree species and shrub layer within much of the burn. If, after preliminary analysis we decide that it is worthwhile project to pursue, we hope to expand this to other burns as time allows.

The GNP Fire Atlas Geodatabase work continues, and all of the fire start location correcting has been completed back to 1910 where the database begins. This has been a major effort begun by Nate Benson in the late 1980's, and with the help of volunteers from The National Center for Landscape Fire Analysis was completed by the fire ecology staff. It was discovered that almost a 1,000 start locations were erroneous to one degree or another. Errors were probably introduced when the park first entered the paper report data into the initial DOS database system and then additional errors were made when the database was converted from Township and Range or Lat/Long to UTM locations in the late 1970's. Some fires were displaced up to 300-500 miles from the correct location, which were easy to identify, but others were displaced 1-25 miles, but still fell within the park boundary, and in most cases were not obviously erroneous. Each individual fire report had to be studied and each start location compared to site data and then relocated when warranted. Such location data as fire name, cause, aspect, elevation, slope, access, and tree species information were used to dial in the location. As an example, many railroad fires were located many miles away from the tracks. Many starts were moved up to 5-20 miles, only about 15% did not have to be moved either due to proper location, or more often, the lack of any good information to correctly locate the start. The emphasis now is to get the best historical polygons incorporated into the atlas.

McClellan continued the work begun by Mitch Burgard on the parks Wind Wizard data files that could be used in FARSITE, FLAMMAP, and possibly FSPRO and WFDSS by Fire Behavior Analysts and Long Term Fire Analyst to better model fire behavior and direction of spread. This work will require hundreds of hours of computation time to make 552 separate runs for the various wind speeds (5, 10 and 20 mph) and directions (initially S, SW, W, and NW, but eventually, all eight cardinal directions) data massaging (boundary clipping), and proper storage of the huge files.

We still discover some issues with the FMH\FEAT\FFI database conversions, and we try to repair them as they arise. McClellan has done excellent work in FFI database maintenance and with protocol writing for our home grown monitoring efforts.

McClellan converted our GOES fire weather data download from the obsolete GOES Data Collection System Automatic Processing System (DAPS) to Local Readout Ground Station

(LRGS). No simple task; it took many hours/days to learn a new software (DECODES) and configure the LRGS software to communicate and automatically load the data into the Weather Pro3 software that the park uses for both NFDRS and Canadian Fire Indices.

With the 100th anniversary of the historic 1910 Fires, we made a significant effort to get the best 1910 fire shapefiles by using various historical maps and the parks standage maps. A poster was produced for the Fort Missoula Historical Museum for a long term display documenting the 1910 fires in the region.

Divoky was a Plans, Logistics, and GIS Tech member of a park ICT3 Team created for the Blackfoot Confederation Conference at St Mary, Montana in June. The conference had a large encampment within the park and attracted over 300 tribal members that held meetings and ceremonies at the camp. The conference lasted 5 days with 4-5 additional planning meetings.

Lang and monitor crew collected bimonthly fuel moisture samples throughout the park and maintained a database and produced reports and charts, which were emailed to all of our local interagency partners. We plan to include all of our recent data into the national database, National Fuel Moisture Database (NFMD) in the near future.

Scott Lang worked for Carl Key, USGS researcher, for two payperiods this winter (2009) producing CBI posters and data checking.

Table 1. Fire Effects Plot Workload 2009

Complete the following table. In the “Pre-“ and “Postburn” columns, fill in the number of plots visited this year only. In the “Total Plots” column, fill in the total number of plots installed in the Monitoring Unit to date. Denote any pilot sampling plots with a symbol, such as an asterisk. Northern Great Plains parks are used as a fictitious example in the table.

2009						
Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-	Immed. Post	Postburn (1-20 yrs)	Total Plots
Glacier	Ponderosa Pine Forest	FMH			14	14
Glacier	Long Term Fire Monitoring	LTM			5	5
Glacier	Post Fire Composition	PFC			56	56
Glacier	Fuel Reduction Parkwide	Photo points			62	62
Glacier	Fuel Reduction Parkwide	Brown's Transects			16	16
Total					153	153

Table 2. Fire Ecology Staffing 2009

Complete the staffing and personnel development table for fire ecologist and monitors. Include fire training (e.g. S-290, RX-310), distance learning or on-campus college credit, technology training, NWCG taskbooks initiated or completed, conferences attended, etc.

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Dennis Divoky	1/1/2009	12/31/2009	26	Yes	Safety for Supervisors Training, online WFDSS training (various), Zion NP 5 Year Program Review, East Glacier Firewise Workshop, Bear Training; various FFI training; Annual 24 hour Structural Fire Refresher and monthly Brigade Training, Amtrak Disaster Training, HAZWOPER, Operational Leadership
Mike McClellan	4/26/2009	12/31/2009	17	Yes	Co-Lead on S-244 Field Observer Course, Instructor and Field Certifier for S-212/GNP Chainsaw Safety Course, Basic Fire School
Scott Lang	5/10/2009	11/05/2009	13.5	Yes	HAZWOPER; RX-300; Monthly Structural Fire Training ; Structural Live Fire Refresher; Annual Fire Refresher; Worked 2 PP's for Carl Key during winter; RXB2 taskbook work.
Jason Stoffer	6/08/2009	9/03/2009	6.5	No	HAZWOPER; Annual Fire Refresher.
Carrie Gibadlo	6/01/2009	10/01/2009	9.0	No	S-290; S-212; S-244 Annual Fire Refresher

Table 3. Management Objectives and Monitoring Results 2009

All results shown are XX% confidence intervals of the mean. Fuel reduction objectives/results are mean percent reduction from preburn to immediate postburn. Stand density objectives/results are for five-year postburn mean stand density. An underlined number of plots indicates that the minimum sample size has been attained for that variable.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?
Ponderosa pine	Limit overstory Ponderosa pine mortality to $\leq 20\%$ at year 05.	Mortality = 36% ($n=\underline{18}$ plots, 4 unique fires*)	No

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?
	Reduce ladder fuels (pole and seedling conifers other than P-pine) $\geq 40\%$ at year 5	Mortality = 35% ($n=18$ plots, 4 unique fires*)	Yes
	Maintain 95% relative cover by native herbaceous species 5 years postburn.	Non-native species = 3.9%	Yes

Initial analysis resulted in a 36% reduction for overstory (dbh > 15.1cm) Ponderosa pine across all 18 of the plots in the monitoring type. The fire management objective was to limit mortality to 20%. The 20% target was an agreed upon desired condition made among the Vegetation Ecologist (Carolyn), Fire Ecologist (Divoky), Fire Management Officer (Vanhorn) and the Regional FMO at the time (Dan O'Brien). It was a sociological limit rather than a science based limit. Various burn units in this pine monitoring type were burned wholly and partially by prescribed fire, wildfire, and fire use with a wide gamut of fire severities.

After the 5 year post fire plot read, the prescribed burned plots did meet the < 20% mortality. Not surprisingly, the wildfire and fire use did not, skewing the overall results. Poles (2.5 – 15.0cm dbh) were reduced by 35% with the fire management objective looking for a reduction of 30-80%. The almost 4% increase in non-natives would be alarming if not for the fact that all of the species were exclusively naturalized non-natives such as dandelion, timothy, and the various clovers. None of the non-natives were noxious weeds. In 2010 the rest of the 10 year post fire plots will be read and we will relook at the analysis.

*There is a significant challenge in analyzing and presenting this five year data. Two plots were burned only by prescribed fire, 6 plots burned in a WFU, 2 plots burned in a prescribed fire and subsequently reburned in a WFU, and finally 4 were burned entirely in a wildfire. This does provide a unique opportunity to compare and contrast the various fire entries, but it also eliminates any solid statistical analysis due to limited plot numbers in any one fire type.

B. Fire ecologist accomplishments and areas of focus

This section deals with roles and functions of the ecologist. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas (see table format and example below). This includes planning documents produced or reviewed (e.g. fire management plans, monitoring plans, prescribed fire or mechanical treatment plans, etc.), presentations given and audience, meetings and task groups attended, contracts reviewed, interagency collaboration efforts, volunteer hours managed, and scientific or research publications produced.

Table 4. Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	5	• Blackfoot Confederacy Conference Encampment held at St Mary in June ; Type 3 Team; 5 planning meetings. • IA FMP Annual Review • East Glacier Fire Safe Council
Presentations and Training provided	10	• Zone Coordinator and Lead instructor for S-244 FOBS/FEMO Course • GNP all park Interpretation Staff Training – 8 hours (4 hrs prep, 1 hr, travel) presentation on Fire Ecology and Management • Provided fire ecology training to West Lakes Interpretive staff for a half day Rocky Point Fire Nature walk. 5 hours - (2 hours prep, 3 hrs on the trail) • Provided fire ecology training to St Mary Interpretive staff for a half day Red Eagle Fire Nature walk. (2 hours prep, 4 hrs on the trail, travel to eastside) • Taught a one hour fire ecology session to an undergraduate /graduate level class from the University of Montana. (3 hour field trip and 3 hours travel) • Taught one 8 hr fire refresher; assisted with 3 others • FIREWISE Conference at East Glacier – Climate Change and Changing Fire Regimes • Lake McDonald Horse Concessions Fire Mgmt. and Ecology Training
NPS Meetings/ task groups	5	• Member of GNP Type III All Risk ICS Team – Situation Unit Leader, GIS Tech, and Logistics. June – 1 week Blackfoot Confederacy Conference • Weekly supervisors meetings, Division meetings, Daily, monthly and quarterly Safety Meetings • East Glacier FIREWISE Group – roadside display design planning
Interagency work	3	• Managed contract with USGS for Early Warning System for flooding on Divide Creek (Red Eagle Fire) • East Glacier Fire Safe Council Group member • Fire Atlas geodatabase manager – provide data and assistance to researchers
Fire & SAR Assignments	5	• Duty Officer, 2 days a week throughout summer • Assisted with pile burning
Research	3	• Assisted Jason Sibold with three separate research funding processes • Assisted Akira Mori with research funding proposal • Assisted David A. McKenzie with grant proposal
Data entry and management	5	• GNP (3 stations) COOP, WIMS (4 stations), and Weather Pro 3 database manager
Data Conversion	3	• Data checking FFI conversion
Data analysis	10	• Additional work on PIPO and gaining familiarity with FFI
Supervision/Admin	10	• Directly supervise two permanent employees and indirectly two seasonal • Managed project accounts and acquired supplies and materials for fire monitoring.
Training	15	• GNP Bear Refresher • West Lakes Fire Brigade, monthly meetings and a 24 hour Level 2 live fire annual refresher • Assorted NPS and National WFDSS Online Training • Operational Leadership, 2 days • HAZWOPER, 1 day • AMTRAK Response, 4 hours • Assorted online FFI training • IS-800.b National Response Framework • M3 - Aviation Management for Supervisors, B3 – refresher • Park Supervisors Safety Training • Multitude of mandatory training; Safety, Federal Information Systems

		Security Awareness, Quicktime, Approving Official, Discrimination and Whistleblowing in the Workplace, Records Management Awareness, IT Security Awareness, NPS Responsibilities for Computer Use, Travel/Purchase Business Lines, DOI Diversity Training, Orientation to the Privacy Act, DOI Integrated Charge Card Holder
Miscellaneous	25	• Produced two significant climate change ArcMap projects. One delineated all older forest stands and older multiyear forest compositions within the park. The second project included the habitats of species of concern (Bull trout, Bald eagle nest sites, rare plant locations, Whitebark and Limber pine plantings, and exotic plant infestations) to aid in discussion of resource/fire management in light of climate change. • Managed four NFDRS RAWS stations • Managed Red Eagle BAER Funds – final year • Park Co-coordinator for Adopt a Highway Roadside cleanup - twice annually • GIS Map products for fire management and other divisions • In conjunction with the Lead Lookout and the GNP Sign Shop produced an ArcMap project for all active Northern Region Fire Lookouts that will be mounted and used in 16 lookouts throughout GNP, Flathead NF, Lolo NF, Lewis and Clark NF, and Montana DNRC. Finalized project in 2009. • Error checking and managing GNP Fire Atlas Geodatabase; 150+ hours. • Wrote fire and weather summaries for annual park summary reports for Concessions, Backcountry, North Fork Subdistrict, and Re-vegetation monitoring reports.

C. Fire effects crew accomplishments and areas of focus

This section deals with roles and functions of the fire effects crew. Identify accomplishments and/or focus areas along with a rough estimate of the amount of time spent in these areas (see table format and example below).

Table 5. Fire Effects Crew Accomplishments/Focus Areas

2009

Category	Percent Time	Notes
FMH plots	20%	• 14 FMH PIPO plots read in 2009.
WUI plots	10%	• Photo point re-takes of plots in West Glacier, Logging Ranger Station, Many Glacier, and Two Medicine Fuel Reduction Projects. • Completed 16 Brown's transects at Many Glacier Fuel Reduction Project.
CBI plots	0%	• None read in 2009
Other plot work	7%	• 56 GLAC-Post Fire Composition (PFC) plots read / photo's. • 5 Long Term Monitoring protocol plots (Red Eagle)
Fuel Moisture Sampling	5%	• Bimonthly fuel moisture sampling, data management, and sent out an interagency email.
Fire Assignments	10%	• Assisted with Fire Suppression on two fires in and around Glacier National Park with multiple assignments.
Fuels Project work	5%	• Lang and McClellan assisted with burning piles.
Data entry	10%	• Completed 100% of data entry/error checking from 2009 field season.

Data conversion	10%	Completed some error checking of data and species list.
Data analysis	2%	Some minor analysis of Long Term, FMH, and Red Bench Plots.
Supervision/Admin	10%	- McClellan hired two seasonal monitors - Lang supervised seasonal employees
Training	3%	- McClellan instructed S-212 and assisted with Basic Fire School. - Lang assisted with instructing Basic Fire School and Refreshers. Attended RX-300, HAZWOPER; Structural Live-Fire Refresher; Monthly Fire Refreshers. - Gibadlo attended S-290; S-212 - Stoffer attended Fire Refresher; HAZWOPER - Orientation, Bear, All Employee, etc.
Miscellaneous	8%	- Performed maintenance and repair of the park's three NFDRS RAWs stations. - Fire History work - Assisted other park divisions in clearing roads and trails. - Office maintenance work. - Assisted with numerous Search and Rescue missions in Park.

D. Complete Annual Report Supplement (“2009 Annual Report Supplement.xls”)

E. Annual Report Supplement Additional Information

1. *Identify types of fire effects monitoring databases or spreadsheets being used (e.g., FFI, Access, Excel).*

1. We use FFI exclusively for all databases; FMH, Long Term Monitoring, Non-native, Post Fire Composition, and Red Bench are all converted to the FFI format. We do have some additional cleanup work with the latter two.

2. *Annual Meetings - Provide a brief description of the 2009 meeting(s) where fire ecologists present and discuss monitoring results with fire and non-fire park staff, and others have informal discussions.*

In April of 2009 Resource and Fire Management met for 4 hours to discuss how, as managers, we could begin to address climate change. Although specific plot data was not part of the discussion, it was an excellent exchange between the divisions. There is a two day Crown of the Continent Climate Change Scenario Planning Workshop to be held March of 2010. I would like to think that this workshop, in a small part, evolved from this meeting. This CCCC workshop will involve 11 webinars to prepare for it.

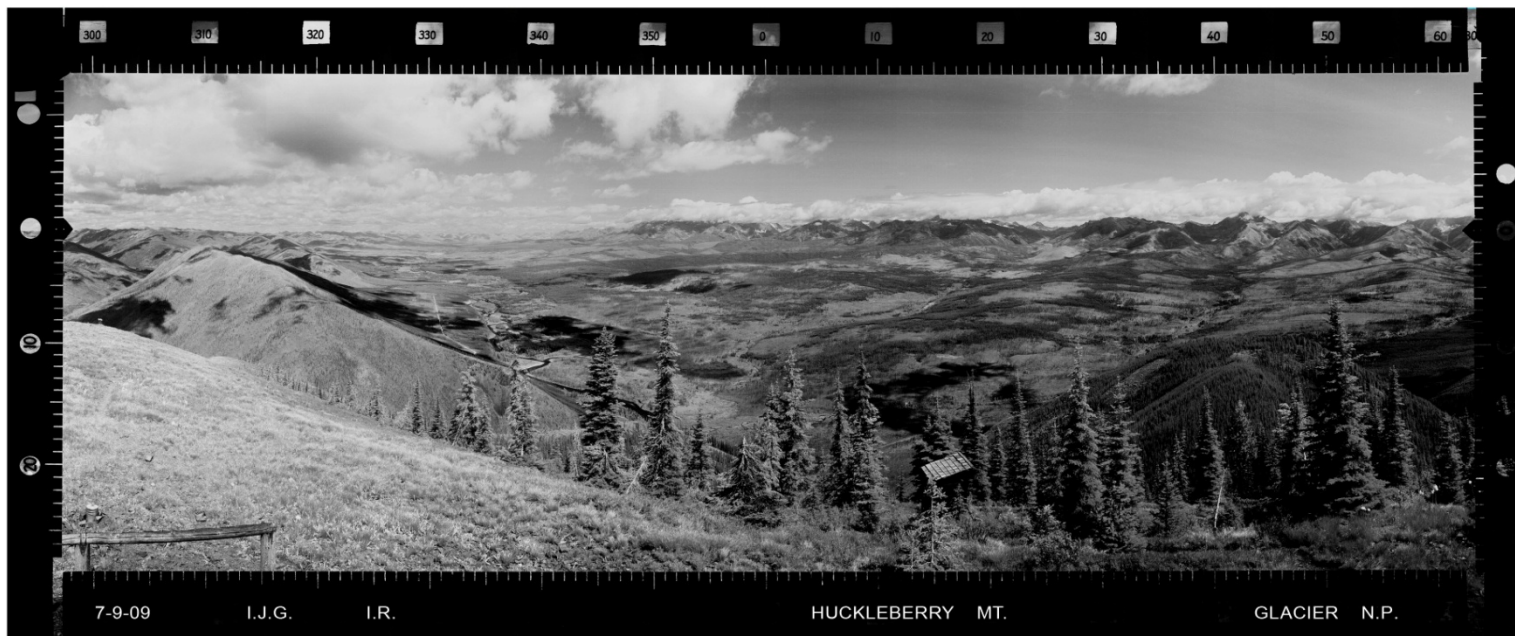
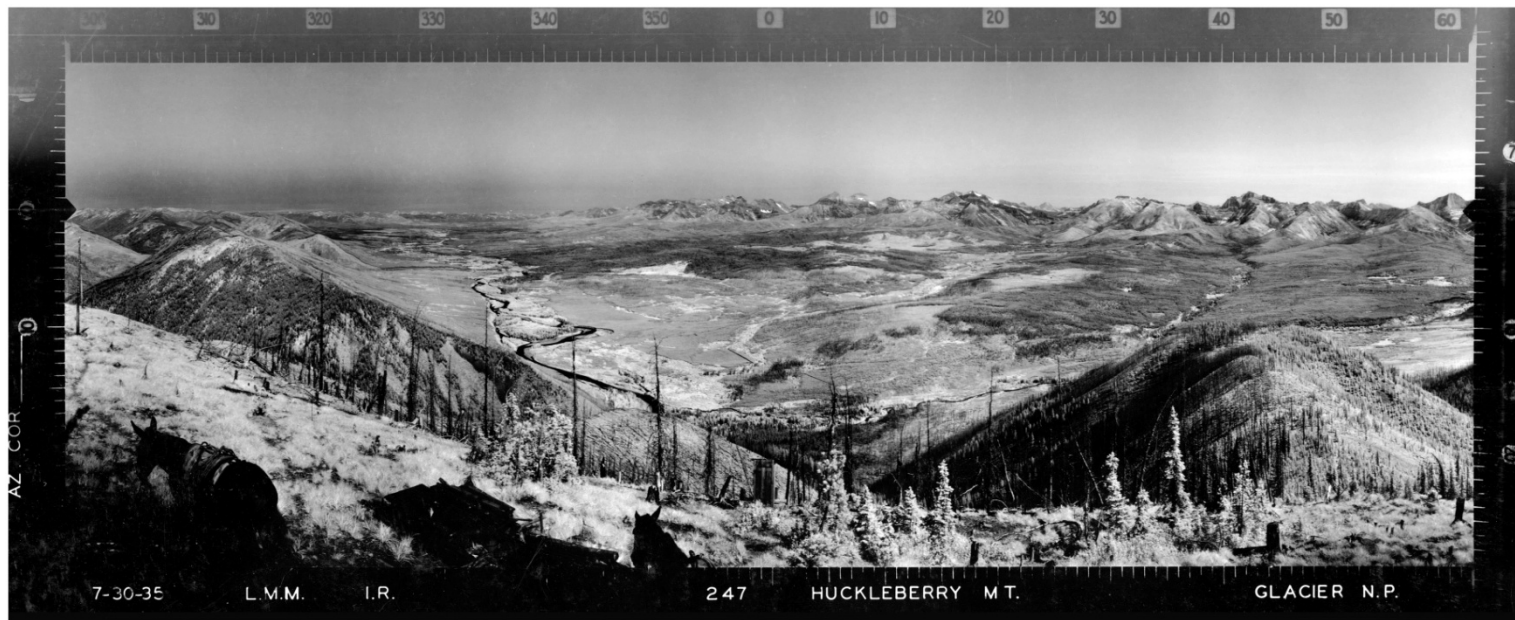
3. *If further explanation for the Annual Report Supplement information is needed, please provide it here as well as any other information relating to the spreadsheet that you would like to include.*

F. 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.

2010 Direction

- Complete 10YR plot reads in PIPO and analyze data for report.
- Keep engaged with Crown of the Continent Climate Change Workshop.
- Attend RX-510 Advanced Fire Effects.
- Continue with gathering fire atlas geodatabase historic fire perimeter polygons.
- Provide all plot photos to LANDFIRE with time and georeference.
- Continue collecting Long Term Monitoring and Post Fire Forest Composition plot reads.
- Continue working with funded research projects – Sibold, Robichaud, McKensie, etc.
- Continue producing Glacier Wind Wizard data files.
- Continue training and preparing background data for WFDSS use.
- Work towards digitizing and georeferencing 1945 and 1968 aerial photographs sets.
- Work with new Fuels Specialist, helping to orient then to park and fire management.



Repeat photography done with the original Osborne photo-recording transit. This example is from Huckleberry Lookout, the view is north, up the North Fork of the Flathead River. Notice recent burn evidence in both photos. Monitors and firefighters assisted USGS with project by helping to Sherpa loads to lookouts. See <http://nrmcs.usgs.gov/research/panphoto.htm> for numerous additional photos.