



**National Park Service
Fire Ecology Annual Report
Calendar Year 2013**



(Prescribed Fire Big Prairie Unit #8 – April 23, 2013)

A. Summary

This past summer initially appeared that the fire season would be significant. June was under average by almost .7" and July was very dry, with only .43" of rainfall. The West Glacier RAWS rapidly climbed to the 97th percentile in ERC by July 25th and the trend was in a steep rise. Just as we were putting together a Severity Request, it rained for 14 out of the next 16 days for a total of 2.67" significantly dropping the indices. Although that amount represents one good thunderstorm in the southwest, that amount of rainfall, in this fuel type, and spread over that many days, is a game changer. August continued moist and was above average with 1.8". The ERC's did reach the 90% level again, for about a week at the end of August, but then again in early September, a weather change produced considerable rainfall and reduced it for the rest of the year.

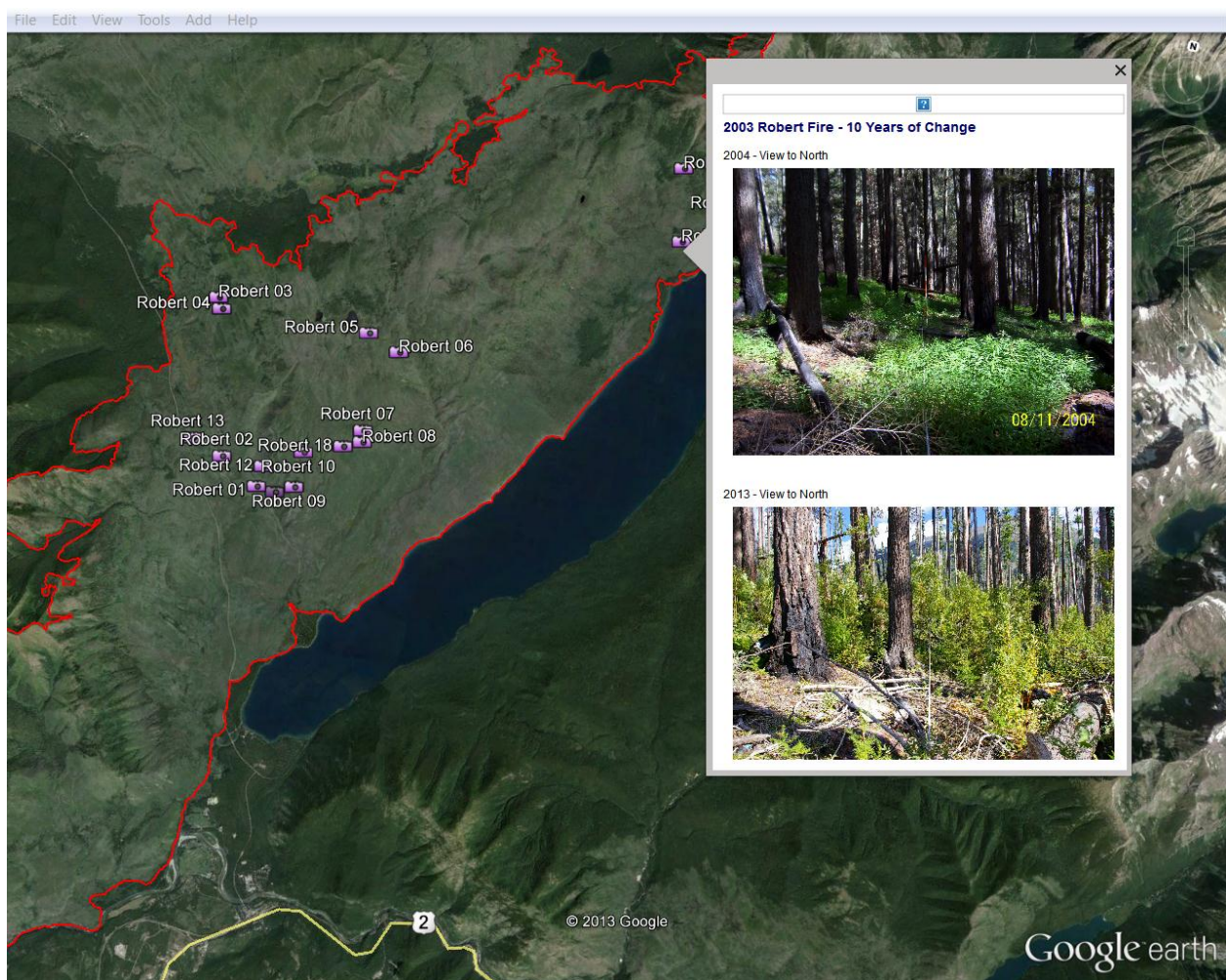
Not surprisingly, the fire season was well under average with only four wildfires, all lightning starts that were suppressed at less than one tenth of an acre. Our land management neighbors also had a slow fire season, which limited opportunities to get out on fires locally. Divoky and McClellan, both got one out of park assignment. Divoky assisted ROMO as a Resource Advisor on the Big Meadow Fire and McClellan had a 16 day assignment as a Field Observer on the West Fork Complex in Colorado in early July. Ryan Lima had one dispatch as part of a twenty person crew with the Flathead National Forest. Ryan also helped out with staffing the park Engine when a Glacier firefighter left earlier than expected.

Fire management burned two units in late April in the Big Prairie area for 141 acres with significant help from the USFS. At this time of the year, no seasonal park fire staff is on duty. These were re-entry burns, and the first ever attempted in the spring. We had previously always tried to burn in the fall, with the logic that natural burns would normally occur from lightning ignitions in mid-summer to early and mid-fall. There is no evidence at this time that Native Americans burned in this valley, although they travelled through it annually to get to the buffalo plains. We have had numerous missed opportunities to burn over the years due to exceptionally dry Summers with either very high indices, and/or other ongoing wildfires, or conversely, it gets too wet too soon after the first of September, and we get a re-greening of the perennial grasses. Spring is not an easy burn window to hit either. The snow generally comes off late (mid-March to early April), and then if it is followed soon by rains, and it will almost immediately initiate green up. Roughly, one out of two or three years has a proper spring window, but they are short duration and hard to predict. Unfortunately, this year we had a very wet four inch snow (.33" of precipitation), five days prior to the scheduled burn. Fortunately, it did dry out enough to burn the open grasses, but remained too moist in the shaded areas where we needed the heat to reduce the lodgepole pine poles and overstory. Seedlings invading the grassland were successfully removed. It was a worthwhile attempt, but we learned we need a drier and warmer window to succeed with spring burns.

We were reduced to one fire effects monitor this fire season (in the recent past we have had 2 or 3 seasonal monitors), and luckily the plot load was lower this past year due to how the FMH plot schedule fell. We continued with the Long Term monitoring plots, reading 29. Two of the Long Term plots in the Middle Fork Complex were retired due to the enormous amount of downfall encountered and the cost/benefit was not in our favor in regards to employee safety. Some of

these burns have sizeable areas that force you to travel 3-5' above the ground on top of the downfall in and amongst the 6 foot and taller Regen. The risk of falling and catching a broken branch or wrenching a knee is too great. There were the immediate post reads (7 plots) in the two Spring burn units in Big Prairie. The crew continues to collect bi-weekly fuels moisture samples and enter the data in the National Fuel Moisture Data Base. All of the Fire Ecology staff helped with much of the pile burning this past year in both the frontcountry and the backcountry.

Mike has worked on a project linking plot data and photos up with Google Earth. Initially, we would like to make this available to all park staff with access to the park intranet, but eventually the goal is to have it available to researchers and the public. After the .kmz file is loaded, icons for each plot will populate GE, and it is as simple as clicking on the icon to bring up photos and data for that plot.



Graphic 1. Screen capture of Google Earth with a plot photo opened. In a side note, the post burn overstory mortality you see here is typical. We have witnessed this phenomenon throughout much of the 1994 - 2003 burns.

We had hoped to burn in Big Hole National Battlefield for grassland and cultural scene maintenance, and for Lemhi penstemon (*Penstemon lemhiensis*) this past Fall, but the late Fall

the fuels project money did not exist. We are hopeful project money will be available in 2014. The project is in conjunction with Tom Rodhouse, an Ecologist with the NPS Upper Columbia Basin Inventory and Monitoring Network. See the 2012 report for additional background on this project.

Mike again helped with instructing and certifying S-212 Chainsaw/Project Saw training in late May.

We will attempt to burn up to three units in Big Prairie and two units in the Ponderosa pine this next Spring/Fall.

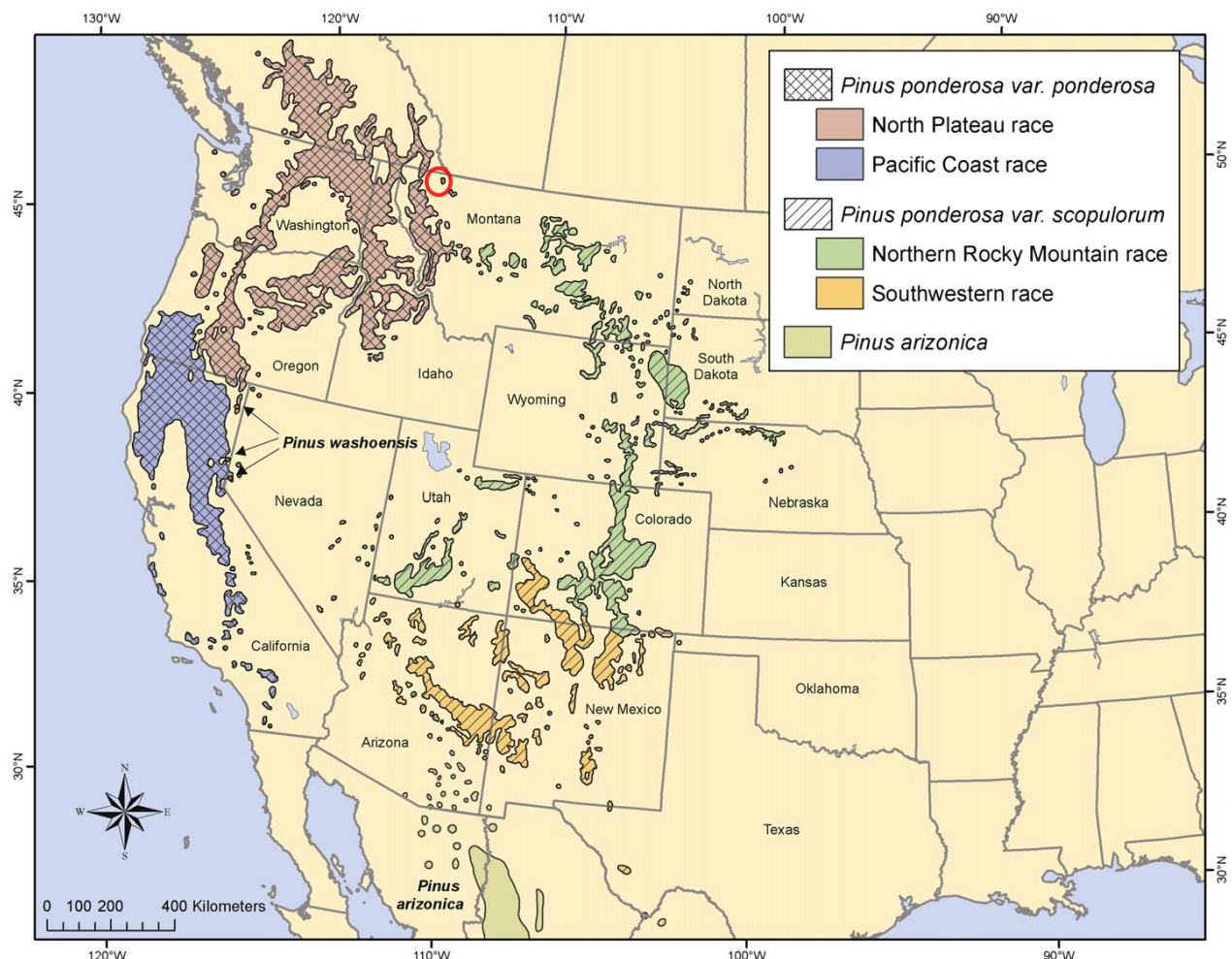
Divoky worked with Sibold, Rodhouse, Naficy, and Harvey to help facilitate their research projects with logistics and navigating the park's compliance permit process.

An update on the cambium scorched propane trees: it was mentioned in the 2012 Annual Report that we are trying various methods to reach mortality objectives in lodgepole pine regeneration areas in the previously burned Big Prairie units. We have found it difficult to find a burn window that is warm, dry, and breezy enough, but also safe enough to meet the mortality objectives. Glaciers forest's with their large amount of live shrub, forb, and grass component tend to either burn exceedingly well, smolder around, or not at all, depending on previous summers rainfall. We continually have had difficulty getting any prescribed fire to run through these thick, green, and shady stands. Our hope is that by opening up these thickets, the fuels will become dry enough that we can run a ground fire through them. It is not our intent to clearcut with any of the methods. The main issue is finding an acceptable method of mechanically reducing the larger poles and overstory trees in proposed wilderness. Chainsaws and brushers are not a full option at this time, although we were given approval for their use in some small test plots (~40' x 40') with various degrees of slashing; low, moderate, and high levels. The rationale was to allow fire management a one-time intrusion to see if our strategy of partially opening the stand would actually be successful or not. Our options include mechanical hand girdling with a draw knife, girdling with heat, hand sawing, and brush clippers for the smaller diameter trees. Whatever option that is chosen, it needs to be viable over 20-30 acres of thickets.

The method we tried this past winter (2012/2013) was heating/scorching the cambium approximately 3-4 feet from the base of the trees with propane torches. We had gone out on cold (15-20 degree) clear days and the torches "froze" up in less than twenty minutes. Continually running propane does not work properly for long under those air temperatures. As the propane fuel is being burned it also gets very cold as it expands, and in mid-20 degree air temperature or less, the torches do not burn properly for very long. It is the same reason that backpack stoves do not use straight propane and have additives for cold and higher elevation. It also appears that the time (5-10 minutes a tree) it takes to scorch a larger pole or overstory lodgepole pine tree, does not appear to be efficient over the size of the area that we need to treat. We will need to monitor another two to three years to fully evaluate mortality, but initially the method does not appear to be very successful except on the small poles. Although, I have since lost the citation, I had recently read where trees that had been physically girdled, had not completely succumbed for 2-3 years. In addition, it is possible that injuring the cambium might allow for insects or disease to finish the job. Consequently, there still is a possibility of good results. I would also

like to try additional plots when the air temperature is much warmer. This will allow the torches work hotter and we might get better results.

We received the results of the genetic testing on the parks ponderosa pine. It can be found in Mitochondrial DNA Haplotype Distribution Patterns in *Pinus ponderosa* (Pinaceae): Range-wide Evolutionary History and Implications for Conservation, Kevin M. Potter , Valerie D. Hipkins, Mary F. Mahalovich, and Robert E. Means. American Journal of Botany 100(8): 000–000. 2013. The results were that the parks Ponderosa pine (*Pinus ponderosa*, var. *ponderosa*) belong in the North Plateau race. This is what one could probably expect, although we are well separated from the nearest stand in Flathead Valley. There is another variety found as nearby as the Helena, MT area. It is the Northern Rocky Mountain race (*Pinus ponderosa*, var. *scopulorum*), that is the variety found in central and eastern Montana, the Black Hills, Nebraska, Wyoming, Colorado, and into Utah.



Graphic 2. Ponderosa pine variety map from document cited above.

Table 1. Fire Effects Plot Workload (2013) and Total Plots Installed

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Pre-burn 2013	Immed. Post 2013	Postburn (1-20 yrs) 2013	Annual Total (2013)	Total Plots
GLAC	North Fork Grasslands (Forest)	FMH		7			13
GLAC	North Fork Ponderosa (Forest)	FMH					18
GLAC	Long Term Monitoring Parkwide	LTM			29	29	54
GLAC	Post Fire Composition	PFC					380
GLAC	North Fork Grasslands	Non-native grassland Daubenmire					24
GLAC	Fuel Reduction North Fork Grasslands	Modified Tree Belt					3*
GLAC	Fuel Reduction Parkwide	Photo Points					86
GLAC	Fuel Moisture Plots Parkwide	Fuel Moisture Collection				4	4
Total				7	29	36	582

* Pilot sampling plots

Table 2. Fire Ecology Staffing 2013

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Dennis Divoky	1/1/13	12/31/13	26	Yes	Annual Fire Refresher Avalanche Rescue READ/BAER Webinars Numerous NPS CC, JFSP webinars
Mike McClellan	4/22/13	12/26/13	18	Yes	Annual Fire Refresher RXB2 taskbook work GIS Training and Development
Scott Lang	5/6/13	11/15/13	13.5	Yes	Monthly Structural Fire Training Annual Wildland Fire Refresher RXB2 taskbook work GIS Training and Development Supervisory training Live Fire Structural Refresher
Ryan Lima	5/28/13	9/30/13	9	No	Annual Fire Refresher Intro to GIS training S-271 and completed HECM Taskbook

Table 3. 2013 Management Objectives and Monitoring Results

All results shown are 80% confidence intervals of the mean.

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (90% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Ponderosa pine	Limit overstory ponderosa pine mortality to $\leq 20\%$ at year 05.	Mortality = 36% (<i>n=18 plots, 4 unique fires*</i>)	No Two units burned under a hot wildfire condition	2010
	Reduce ladder fuels (pole and seedling conifers other than P-pine) $\geq 40\%$ at year 5	Mortality = 35% (<i>n=18 plots, 4 unique fires*</i>)	Yes	2010
	Maintain 95% relative cover by native herbaceous species 5 years postburn.	Non-native species = 3.9% (<i>n=18 plots, 4 unique fires*</i>)	Yes	2010

*This monitoring type was burned under prescribed fires (2 burn units), a wildfire, (1 unit), and a wildfire with resource benefits (1 unit), and all with greatly varying fire severities.

B. Fire Ecologist accomplishments and areas of focus

Table 4. Fire Ecologist 2013 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	10	- Reviewed Fuels and Burn Plans and NFPORS requests - FMP Annual Review - Zone NFDRS Plan review
Presentations and Training provided	5	- Taught two hours of fire ecology/ history to the entire Interpretation staff - Taught a 4 hour Fire Ecology session to CCLC Biology Teacher Seminar - Taught and assisted with 3- 8 hr fire refreshers
NPS Meetings/ Task groups	10	- Weekly V&RP supervisors meetings (monthly; June – September), 1-2 hrs - Chairman of the Board of Review Committee – monthly meetings - Bi-annual Division meetings - Safety Committee; bi-monthly - Ranger/Warden Meeting – 1 day
Interagency work	3	- Park representative on the Interagency Northwest Montana Zone NFDRS Plan writing team - Updated LANDFIRE data
Fire & SAR Assignments	5	- READ on the ROMO Big Meadows Fire in June - Duty Officer; rotated a week at a time throughout summer - READ updates for park - Assisted with planning and initiating cambium burn plots in Big Prairie - Assisted with front and backcountry pile burning
RX and Fuels	5	- FEMO on Spring Big Prairie Burn - Assisted with Burn Prep (installing and removing hoselays) - Reviewed Burn and Fuel reduction plans - Assisted with propane girdling project - Helped with pile burning
Research	7	- Worked closely with Harvey with GMW Climate Change Research funding process with planning, compliance, and logistics support. <u>Wildfire burn severity patterns and forest transitions under a warming climate in national parks of the northern Rockies.</u> - Sibold and Assal – <u>Fire regimes and fire-climate relationships of forest ecosystems in Glacier National Park: Assessing the potential ecological consequences of fire suppression and climate change.</u> - Naficy - <u>Cross-scale assessment of spatiotemporal patterns and drivers of fire effects in mixed-severity fire regime forests of Larix occidentalis, Glacier National Park.</u>
Data entry and management	5	GNP COOP (3 stations), WIMS (4 stations), and Weather Pro 3 database manager
Data analysis	5	Additional work on FESC, PIPO and LTM
Supervision/Admin	15	- Directly supervise two permanent employees and indirectly one seasonal - Managed project accounts and acquired supplies and materials for fire monitoring.
Training and Career Development	15	- Future Forest ; NPS Climate Change, JFSP, and WFLLC Webinar series - IAT M-3, B-3, and A-200 - Park Supervisors Safety Training - Annual Wildland Fire Refresher - Avalanche Rescue Training - Multitude of mandatory training; OSHA Safety, Federal Information Systems Hiring Reform for Supervisors, Managers and HR Professionals, Uniformed Services Employment and Re-employment Rights Act (USERRA),

		Security Awareness, Quicktime, Credit Card 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	15	• Produced GIS map products (lightning, fire, LE, Interp. and SAR maps) for fire management and other divisions • Liaison with GNP RM GIS Specialist • Error checking and managing GNP Fire Atlas Geodatabase and WFMI database. • Coordinating with the Skip Edel to convert the GNP Fire Atlas to NPSMap • Wrote fire and weather summaries for annual park summary reports for Concessions, Backcountry, North Fork Subdistrict, and Re-vegetation monitoring reports. • Park coordinator for Parks “Adopt a Highway” Roadside cleanup - twice annually • GNP Fire Atlas geodatabase manager – provide data and assistance to researchers and national staff converting it to NPSMap

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew 2013 Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	4%	Read 7 FMH FESC plots
WUI plots	1%	Photo point plots taken at fuel reduction projects
CBI plots	0%	None read in 2013
Other plot work	38%	29 GLAC-Long Term Monitoring plots read / photos. Fuel Moisture sampling at 4 sites in the Park. Monitored 6 fuel reduction/ thinning monitoring plots created in North Fork Grasslands.
Wildfire assignments	12%	Assisted with Fire Suppression and Fire Monitoring in Glacier National Park. Also, 1 monitor completed a two week handcrew assignment out of state. Mike McClellan had a full 14 day FOBS assignment in Colorado. Provided parkwide initial attack (for a 1 million acre Park) two days a week during the fire season. Provided backup support parkwide the rest of the week.
Prescribed fire projects	4%	Assisted with RX fire monitoring pre-planning for BIHO which is linked to a possible RX burn in 2014. Completed Prescribed fire project on two burn units in Big Prairie (GLAC). Lang and McClellan worked on RXB2 taskbooks.
Non-fire fuels projects	14%	Lang and McClellan assisted with piling and burning piles. Crew assisted with Fuel reduction around Park facilities in numerous locations. READ activities during fuel reduction projects at GLAC.
Travel for plot or project work	0%	
Data entry	8%	Completed 100% of data entry/error checking from 2013 field season.
Data analysis	2%	Some minor analysis/GIS work of GLAC- Long Term Monitoring plots.
Supervision/Admin	10%	Lang supervised (Directed; trained; time management; career development; mentored; evaluated; and counseled) one seasonal monitor.
Training	2%	• McClellan instructed S-212 and assisted with Fire Refreshers. • Lang assisted with Fire Refreshers. • Lang attended monthly Structural Fire Refreshers and Structural Fire “Live Fire” Refresher.. • All attended Basic Fire Refresher. • All attended Orientation, Bear, Safety, All Employee, etc.
Miscellaneous	5%	• Performed maintenance and repair of the park’s three NFDRS RAWs stations and three COOP stations. • Assisted other park divisions in clearing roads and trails. • Office maintenance work. • Assisted with Search and Rescue missions in Park.

D. Additional Program Information

Table 6. Planning - 2013

Park	Does Park have written DFCs? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2013)	Assisted with how many BAER plans in 2013?
Glacier National Park	no	2010	0	0
Big Hole Nat'l Battlefield	no	-	0	0

Table 7. Monitoring - 2013

Park	% 2013 Data Entered	% 2013 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Glacier National Park	100%	100%	2	0	0	0
Big Hole Nat'l Battlefield	-	-	0	0	0	0

* Number of treatment units with treatment effects monitoring conducted. Include pre-burn and post-burn monitoring but not burn-day monitoring.

Table 8. Communicating Results - 2013

Park	# of Project Monitoring Reports completed in 2013	# of Annual meeting(s) with Park staff	# of Formal presentations of results	Do you use Minitab?*
Glacier National Park	1	2	0	No

* This information will help to assess Minitab multi-user license needs.

Table 9. Research - 2013

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2013	# of Proposals Funded in 2013	# of Research Projects Supported in 2013*	Additional Comments
Glacier National Park	yes	1	1	4	
Big Hole Nat'l Battlefield	yes	1	0	1	Tom Rodhouse, UCB I and M Network, Lemhi penstemon research burn

*Number of funded research projects, new or ongoing, supported by the fire ecology program including logistical info or support, staffing, etc.

Reserve Fund Research:

Jason Sibold and staff have until March 31 to provide their report on, Mountain pine beetle altered forest fuel influences on wildfire in Glacier National Park.

E. 2014 Direction

Glacier has requested two seasonal fire monitors bases on preliminary budget levels provided by Intermountain Regional Office, and hopeful the one funded seasonal from 2013 will return for a second season. Fourteen FMH Ponderosa 15 year plot rereads are on tap to be reread. Five Big Prairie and Ponderosa burns are scheduled if the budget and fire indices allow. The Big Hole burn is also on tap, which involves procuring soil temperature sensors from the Missoula Fire Lab, installing the sensors, helping to prep the unit, burn and monitor the unit, and retrieve the temperature sensors data, and return them the Missoula Lab.

The Northern Rocky Mountain Science Center has offered the use of their Gigapan camera. No solid plans as yet, but we are thinking of duplicating some Lester Moe's 1930's 360 degree panoramics that were taken from all the fire lookouts in and around the park. NOROCK has done numerous comparisons with park glaciers, and started with duplicating the lookouts, but did not complete the project. It would be an excellent way to compare forest changes over 80 years. See http://www.nrmssc.usgs.gov/repeatphoto/repeatphoto_map.htm . The advent of the Gigapan camera has greatly simplified re-taking the photos. The original Osborne camera itself weighed 80 .lbs.

G. Metadata and FFI Database Update on NPS Data Store

Updated the Glacier FFI data on 1/22/14.