



**Glacier National Park
National Park Service
Fire Ecology Annual Report
Calendar Year 2010**



Redhorn Wildfire – Goat Haunt Subdistrict of Glacier National Park (08-06-2010)

A. Summary

The summer of 2010 proved to be a very minimal fire season in the Northern Rockies and throughout the Lower 48. Glacier recorded only four < .1 of an acre fires, which is less than 30% of the average. Fire Indices were well under the 15 year average throughout the summer. Many live fuels did not cure out all summer. Notice the cover photo taken during the height of fire season, and the greenness of the surrounding vegetation. This allowed the fire monitor crew to stay home and read many Post Fire Composition plots. The crew did get to cross train with a crew working for fire researcher, Alexandra Urza, who was working under Jason Sibold from Colorado State University. Hiring proved to be a challenge as many candidates on the Certificate declined after having accepted positions elsewhere. We were able to make a short term student hire with significant effort. Divoky participated in a Crown of the Continent Climate Change Scenario Planning exercise that involved numerous webinars and a two day conference with numerous park partners from Canada and the US.

Table 1. Fire Effects Plot Workload 2010

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-	Immed. Post	Postburn (1-20 yrs)	Total Plots
Glacier	North Fork Grasslands (Forest)	FMH			4	4
Glacier	Post Fire Composition	PFC			219	219
Glacier	Fuel Reduction Parkwide	Photo points			5	5
Total					228	228

Table 2. Fire Ecology Staffing 2010

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	1/1/2010	12/31/2010	26	Yes	RX-510 Advanced Fire Ecology, 3rd Fire Behavior and Fuels Conference, Crown of the Continent Climate Change Scenario Planning Workshop, I-400 Advanced Incident Command System, Annual Fire Refresher
Mike McClellan	4/26/2010	12/31/2010	18	Yes	Instructor and Field Certifier for S-212/GNP Chainsaw Safety Course, Instructor for Basic Fire School, Annual Fire Refresher
Scott Lang	4/26/2010	10/28/2010	13.5	Yes	HAZWOPER; , Instructor for Basic Fire School , L-380; Monthly Structural Fire Training ; Annual Fire Refresher; Instructor for Basic Fire School; Supervisor Training; Worked 4 PP's for Carl Key during winter; RXB2 taskbook work.
Alison Lay	6/7/2010	9/30/2010	8.5	No	Annual Fire Refresher
Scott Gavin	6/21/2010	8/19/2010	4.5	No	Annual Fire Refresher

Table 3. Management Objectives and Monitoring Results

Complete the following Summary table for each monitoring units for which analysis is available. Monitoring results should include time frame, confidence interval, and sample size.

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% ($n=18$ plots, 4 unique fires*)	No Two units burned under a hot wildfire condition	2005
	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	2005
	Maintain 95% relative cover by native herbaceous species 5 years postburn.	Non-native species = 3.9% ($n=18$ plots, 4 unique fires*)	Yes	2005

*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 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	5	• Reviewed Heavens Peak Lookout EA • Sibold, Urza, and Assalt research planning – 4 day site visit in May and significant time taken to aid Assalt help track down data, maps, and aerial photo's on the 1970's beetle kill event for IMR funded research. • IA FMP Annual Review
Presentations and Training provided	10	• Presented 1910 Fire Season talk in Columbia Falls as part of the 100th park anniversary celebration events • Presented a fire history and ecology talk to the Society of Environmental Journalists park field trip with Director Jarvis in attendance. • Taught a two hour fire ecology and history to the entire Interpretation staff • Taught a fire ecology session to an undergraduate /graduate level class from the University of Montana. (1.5 hour presentation, 3 hour field trip and 3 hours travel) • Taught one 8 hr fire refresher; assisted with 3 others • Taught Hazmat for S-130 • Lake McDonald Horse Concessions Fire Mgmt. and Ecology Training
NPS Meetings/ task groups	5	• Met with RM and FMO on addressing Climate Change in regards to fire management • Weekly RM/VP supervisors meetings (Monthly; June –September), 1-2 hrs • Bi-annual Division meetings • Monthly Park Safety Committee Meetings; 2 hours • Worked with Interpretation Education Techs with designing a high school curriculum – 5 days of meetings and field trips, map production, provided FFI data • Ranger/Warden Meeting – 2 days • Bowman Lake Ranger Meeting – 1 day
Interagency work	3	• Climate Change Scenario Planning – 6 webinars and 2 day conference • Represented GNP at Tony Prato's <u>Assessing and Adaptively Managing Wildfire Risk in the Wildland-Urban Interface for Future Climate and Land Use Changes</u> at Glacier National Park and Flathead Valley, Montana – 1 day and provided requested data. • Park representative on the Interagency Northwest Montana Zone NFDRS Plan writing team
Fire & SAR Assignments	5	• Duty Officer, 2 days a week throughout summer • Assisted with pile burning • SOPL detail to CAVE, 1 week • Mt Brown SAR-successful winter search for party stranded overnight • Mt Shield's SAR-winter avalanche fatality
Research	5	• Worked closely with Jason Sibold with three separate research funding processes and with planning the projects • Coordinated with Alexandra Urza with research logistics and planning for her two month field season • Assisted David A. McKenzie with grant proposal • Fire Atlas geodatabase manager – provide data and assistance to researchers • Greeted and met with 4 researchers from Portugal/Portland for one day
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 training – 2 hours per month • Assorted NPS and National WFDSS Online Webinar Training • Operational Leadership, 1 day • RX-510, 5 days • I-300 and I-400, 4 days • HAZWOPER, 1 day • AMTRAK Response, 4 hours • M3 - Aviation Management for Supervisors, B3 – refresher • Park Supervisors Safety Training • Multitude of mandatory training; 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	25	• Worked (phone calls, email, meetings, field trip) with Christopher White, a professional writer and naturalist, on an article intended for Nature or Smithsonian on fire occurrence and ENSO/PDO and the Robert Fire. • Hiked with Superintendent to Huckleberry LO – 1 day • Managed and helped to maintain four NFDRS RAWs and two park COOP stations • Park Co-coordinator for Adopt a Highway Roadside cleanup - twice annually • GIS Map products for fire management and other divisions • Error checking and managing GNP Fire Atlas Geodatabase; 50+ hours. • Wrote fire and weather summaries for annual park summary reports for Concessions, Backcountry, North Fork Subdistrict, and Re-vegetation monitoring reports. • Reviewed IMNR Climate Change Draft

C. Fire effects crew accomplishments and areas of focus

Table 5. Fire Effects Crew Accomplishments/Focus Areas

2010

Category	Percent Time	Notes
FMH plots	5%	4 FMH PIPO plots read in 2010.
WUI plots	1%	Photo point re-takes of plots in Logging Ranger Station Fuel Reduction Project.
CBI plots	0%	None read in 2010
Other plot work	42%	219 GLAC-Post Fire Composition (PFC) plots read / photos.
Fuel Moisture Sampling	10%	Bimonthly fuel moisture sampling, data management, and sent out an interagency email to local partners. Entered data and previous years data into NFMD.
Fire Assignments	6%	Assisted with Fire Suppression and Fire Monitoring on two fires in and around Glacier National Park with multiple assignments.
Fuels Project work	3%	Lang and McClellan assisted with burning piles.
Data entry	6%	Completed 100% of data entry/error checking from 2010 field season.
Data conversion	2%	Completed some error checking of data and species list.
Data analysis	3%	Some minor analysis/GIS work of GLAC- Post Fire composition plots (PFC).
Supervision/Admin	10%	- McClellan hired two seasonal monitors with one being a STEP or student hire. - Lang supervised (time management, career development; mentored; evaluated, and counseled) two seasonal monitors.
Training	3%	- McClellan instructed S-212 and assisted with Basic Fire School. - Lang assisted with instructing Basic Fire School and Refreshers. Attended L-380, HAZWOPER; CPR/First Aid; Supervisors Training; Monthly Structural Fire Refreshers. - Lay attended Basic Fire Refresher - Gavin attended Basic Fire Refresher; CPR/First Aid - Orientation, Bear, Safety, All Employee, etc.
Miscellaneous	10%	- Performed maintenance and repair of the park's three NFDRS RAWS stations and three COOP stations. - Removed Divide Creek Flood Warning Station equipment. - Provided all geo-referenced plot photos to LANDFIRE with spreadsheet - Corrected errors in Fire Atlas Geodatabase - Assisted other park divisions in clearing roads and trails. - Office maintenance work. - Assisted with numerous Search and Rescue missions in Park. - McClellan completed Wind Wizard analysis and mapping for the complete park, represents 100+ hours. - McClellan mapped and digitized dozer lines from 1967 Huckleberry Fire.

D. Additional Information

Table 6. Data Entry and Projects Monitored

Park	% 2010 Data Entered	% 2010 Data Quality Checked	# Prescribed Fires Monitored*	# Non-fire Fuels Treatments Monitored*	# Wildfires Monitored*	# BAER Treatments Monitored*
Glacier National Park	100%	100%	0	2	0	0

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

E. Optional Information

In March, Jack Potter (Division Chief of Resource Management), Soleim, and Divoky met to discuss how, as managers, we could begin to address climate change and how it influences fire management today. It was an excellent exchange of ideas and will provide direction for a FMP update. Divoky worked with Interpretation Education Techs that were producing a High School curriculum based on fire monitoring. They ideally would like to have the students read the plots, enter data, analyze the data and write reports. We worked together using some of our current FMH data. Not surprisingly, they felt FFI software was too complex for students to learn quickly, so the data will be entered and manipulated in Excel, which most students are already familiar with.

We are pleased that the Sibold/Urza research project was begun this past summer. Titled the Direct and indirect influences of climate change on post-fire forest establishment in Glacier National Park, the 4 person crew read 150+ plots in areas of the burns that our monitoring crew does not get to due to remoteness and extreme access difficulty. Some of her initial observations indicate that forest regeneration is abundant in most locations with little species shift. Ponderosa pine is regenerating in significant numbers where it was previously present. Post 1988 Red Bench initial reports indicated the opposite was occurring. Englemann spruce is often a very strong colonizer within one to two years postfire.

Sibold/Assalt have begun the Mountain pine beetle altered forest fuel influences on wildfire in Glacier National Park study. We have assisted with procuring archive data, reports, and aerial photographs from the local USFS from the height of the 1977-1982 event in the North Fork area of the park.

The Post Fire Composition Project evolved from concern by many that the park was converting to lodgepole pine and was losing diversity as a result of all the large landscape fires that have occurred since 1988. The project was designed to quickly record the present tree and shrub species along trails, but eventually we would like to run transects across trail less ridges and valleys. It takes 10-12 minutes to read a plot. The plots are a 15 meter circle placed every quarter mile along, and about 20-50 meters off of the trail in the burns. Shrub and tree species are identified and given a cover code. Basic site data is recorded, plot center is GPS'd, photos are taken, the fuel model is recorded, fire severity is estimated, and if present, live trees are age classed. A database was created in FFI

and all of the 2010 data has been entered. The challenge now is to present the data in an easily understandable and visual format. Various ideas are to use Google Earth with pop up windows or icons that display what tree and shrub species are present and in what cover class, or an ArcMAP project that uses icons to easily present the data visually. My expectation is that this project results in an interactive product that could eventually be placed on the park internet site for visitors and the public to review.

Newspaper article about the Fire Ecology Monitoring Program

The Fire Ecology program had a front page spread in the local weekly, the Hungry Horse News in September. It was titled "From the ashes, life" and had a large photo of monitors at work.



Chris Peterson photos

Scott Lang, left, and Alison Lay take measurements and photos of a plot in the post-fire Moose burn in Glacier National Park.

From the ashes, life

Scientists learn how woods grow after forest fires

By CHRIS PETERSON
Hungry Horse News

On a hard hot day in August, Scott Lang, Alison Lay and Mike McClellan are standing in a young forest in Glacier National Park, taking note of the trees.

The forest doesn't look like much. The trees are short and sort of scruffy, most are no taller than five or six feet.

In 2001 the Moose Fire burned through this area. Moose was a massive blaze that started in the Flathead National Forest on Moose Peak up the North Fork. High winds blew it into Glacier, scorching tens of thousands of acres.

Today a new forest is growing here, albeit in an ugly duckling fashion.

"We're trying to get some idea of where these stands are headed," Lang explained.

For example, a fast-growing lodgepole might grow a foot or more in a year. While a spruce, the same exact age, might

grow an inch.

At first glance, the spruce looks like it just sprouted, while the lodgepole looks much older.

"But we've taken cuttings back to the lab and looked at them under a scope and counted their growth rings," explained McClellan. "They're both the same age."



Pearly everlasting is an important post-fire plant, fixing nitrogen in the soil.

One popular misconception Lang notes is that the forests after fire are reduced to monocultures — mostly lodgepole, little else.

"That's not true," he said. "There's quite a bit of diversity."

See Growth on Page A3

Growth

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In one plot, for example, they count spruce, lodgepole, aspens, Douglas fir and a host of other plant species, including mosses and a flower known as pearly everlasting. The flower is important because it's a nitrogen fixer — it takes nitrogen from the air and puts it into the soil where it becomes fertilizer for other plants. Other flowers, like lupine, for example, complete the same process.

A MATURE forest can burn in completely in a matter of minutes. Growing that same forest back takes decades. In fact, researchers will long be dead before this particular patch of woods takes on the look it before it burned.

The researchers aren't just looking at the regeneration in the post-fire world of Glacier's Moose Fire. They're examining blazes across the Park. Since 1988, when the Red Bench Fire burned through the North

Fork, fires have impacted nearly 240,000 acres in Glacier, or 373 square miles.

Researchers knew the landscapes would be significantly changed after the fires, explained Park Fire ecologist Dennis Divoky, who is overseeing the effort.

In order to measure that change, and to see what's growing back, the "effects crew" — as they're called — hikes a quarter-mile, takes a plot sample, records the major plants growing in the plot and then they hike another quarter-mile and take another plot sample.

So far, they've completed more than 500 plots — mostly fairly close to trails. But eventually the plan is to also complete transects away from trails as well.

"I'm hoping to (eventually) produce a visual of what trees are growing where," he said.

ONE BENEFIT of the fires has manifested in

Glacier's aspens stands. The iconic tree relies on fire for regeneration. Most aspens stands are created by cloning. An old tree sends out shoots from its roots and creates a new grove.

But aspens also have feathery, light and delicate seeds. In Glacier's post fire landscape, new aspen stands are sprouting up where they weren't before.

"I think aspens are definitely winners," in the post-fire world, Divoky noted.

Aspens are a valuable wildlife tree. The young shoots are a favorite food for deer, elk and moose and old trees have nooks, crannies and cavities that provide nesting sites for a host of bird species.

Glacier is seeing other interesting effects as well. Along Lake McDonald where low intensity ground fire burned through stands of mature hemlock, new seedlings are sprouting up by the thousands. There are

so many seedlings, in some places they take on the appearance of grass.

The bottom line, Divoky notes, is that Glacier is a landscape that has adapted to disturbance for tens of thousands of years.

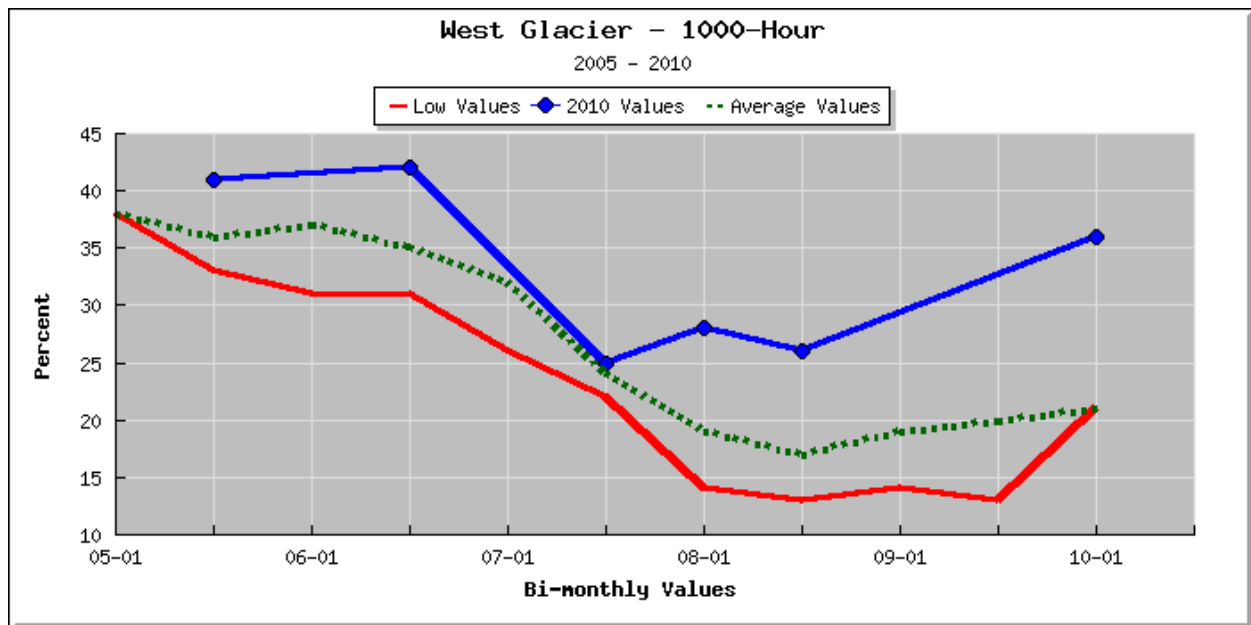
"These are the same processes that happened for eons," he said.

**LOW PRE
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Readers note: Pearly everlasting (*Anaphalis margaritacea*) is not a nitrogen fixer, it is in the sunflower family. We did not provide that information to the author. Although pearly everlasting was used as a substitute for smoking tobacco by some native american's, among many other medicinal uses.

Fuel Moisture Sampling

Screen capture of 1000 hour NFMD graph that represents 6 years of consistent fuel moisture data gathering. Other fuels sampled are lodgepole pine needles, pinegrass, and serviceberry leaves. Sampling is done every two weeks at the West Glacier site and other sites (eastside of park and in the North Fork) are sampled when time allows. It was obvious when looking at the 1000 hour fuels in 2010, it was not to be a significant fire season.



West Glacier - 1000-Hour

	05-01	05-15	06-01	06-15	07-01	07-15	08-01	08-15	09-01	09-15	10-01	10-15
2010		41		42		25	28	26			36	
Avg	38	36	37	35	32	24	19	17	19	20	21	
Low	38	33	31	31	26	22	14	13	14	13	21	

F. 2011 Direction

- Complete 10YR plot reads in PIPO and analyze data for report.
- Attend S-482, Advanced Fire Management Applications.
- Continue with gathering fire atlas geodatabase historic fire perimeter polygons.
- Continue with reading Post Fire Composition plots and devise presentation method.
- Continue collecting Long Term Monitoring and Post Fire Forest Composition plot reads.
- Continue working with funded research projects – Sibold, Urza, Assalt, McKensie, etc.
- SOPL assignments for Divoky.
- Continue training and preparing background data for use in WFDSS.
- Work towards digitizing and georeferencing the 1945 and 1968 aerial photograph sets.
- Continue to seek out pertinent research to aid fire planning.