



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

A. Summary

The Everglades fire effects monitoring crew continued to read FMH plots and refine methodologies in both Everglades National Park and Cape Canaveral National Seashore. Fire effects monitor Lyndi Kirkman came on in early January and the fire effects crew was fully staffed for nearly the entire year.

In 2010 monitoring efforts were started to investigate the effects of fire on two exotic plant species in Everglades National Park. The crew implemented *Lygodium microphyllum* monitoring in Coastal Prairie FMH plots and installed plots in the East Everglades Expansion area to monitor the effects of fuel reduction and prescribed fire treatments on *Melaluca quinquenervia*. Additional plots were installed in Canaveral National Seashore scrub jay (*Aphelocoma coerulescens coerulescens*) habitat and in the Pine Rocklands, monitoring of imperiled butterfly host plants continued.

Table 1. Fire Effects Plot Workload (2010) and Total Plots Installed

Park	Monitoring Unit	Type of Plot (FMH, photo point, other)	Pre-burn	Immed. Post	Postburn (1-20 yrs)	Total Plots
Everglades	Pine Rockland	FMH Forest plot	0	0	6	27
	Short Hydro-period Prairie	FMH grass plot	0	0	13	28
	Long Hydro-period	FMH grass plot	0	0	1	11

	Prairie					
	Coastal Prairie	FMH grass plot	0	0	11	18
	Butterfly Host plant Monitoring	Host-plant monitoring	N/A	0	24	2
	Melaleuca Monitoring*		23	0	0	23
	Phenology Monitoring	Phenology monitoring	N/A	0	0	8
	Shrub Monitoring	Tagged individual shrub monitoring plot	0	0	0	6
	Insect Monitoring	Insect Monitoring plot	N/A	0	0	6
	1970's photo-point relocation plots	Photo Point	N/A	0	0	225 (26 relocated)
Canaveral	Slash Pine Flatwoods (<i>Pinus elliottii</i>)	FMH Forest plot	0	0	7	10
	Coastal Scrub	Photo Point	0	7	0	18
	Scrub Oak*	Photo Point, cover line	2	0	0	9
Total			18	11	51	161

* Pilot sampling plots

In 2010, the Everglades fire effects crew monitored 31 FMH plots and conducted 24 butterfly host plant plot visits in Everglades National Park. In Cape Canaveral National Seashore, 7 Coastal Scrub photopoints and 7 Pine Flatwood plots were revisited and 2 new plots were installed in Scrub Oak habitat. The crew also monitored 2 University of Vermont pine forest plots.

Table 2. Fire Ecology Staffing 2010

Ecologist and	Starting	Ending	# of	Training and Development
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Monitors	Date	Date	Pay Periods	
Maya Tupaj	1/1/10	12/31/10	26	RT-130, GIS Workshop, Wilderness Workshop, Pine Rockland Working Group conference, S-130/190 Instructor, National Geographic Bioblitz, WFDSS Seminar, Cape Sable Seaside Sparrow (<i>Ammodramus maritimus mirabilis</i>) Symposium, EEO Diversity training
Aerin Land	1/1/10	12/31/10	26	RT-130, GIS Workshop, Wilderness Workshop, Planning Section Chief on Gulf Oil Spill, JFSP Peer Review Panel, S-130/190 Instructor, Pine Rockland Working Group conference, Water Ditching Training, Native Plant Society Meeting, National Geographic Bioblitz, Cape Sable Seaside Sparrow (<i>Ammodramus maritimus mirabilis</i>) Symposium, Entomological Society of America meeting, Imperiled Butterfly Working Group meeting
Colleen Holland	01/01/10	12/31/10	26	RT-130, S-390, S-215, GIS Workshop, S-130/190 Instructor, Cape Sable Seaside Sparrow (<i>Ammodramus maritimus mirabilis</i>) Symposium, Wilderness Workshop, South Florida Prescribed Fire Council meeting, Water Ditching Training, National Geographic Bioblitz, Documentation Unit Leader on Gulf Oil Spill, Helicopter Crew Member on Mesa Verde Helitack
Matthew Smith	01/01/10	12/31/10	17	RT-130, S-215, RX-310, GIS Workshop, S-130/190 Instructor, Pine Rockland Working Group meeting, Prescribed fire detail to Savannah River NWR, National Geographic Bioblitz, Fire Effects monitor detail to Shenandoah for 4 months, Severity detail for two weeks, WFDSS Seminar, Cape Sable Seaside Sparrow (<i>Ammodramus maritimus mirabilis</i>) Symposium
Lyndi Kirkman	01/04/10	9/24/10	18	S-130/190, S-271, RX-310, GIS Workshop, Wilderness workshop, Water Ditching Training, National Geographic Bioblitz, Prescribed fire

				detail in SE region, Sea grass survey detail to the Key Largo district at ENP.
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The fire effects crew was fully staffed for most of 2010. In late December Lyndi Kirkman left to take a research position with Florida International University.

Table 3. Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Slash Pine Savanna	<u>Canaveral-</u> Limit mortality of <i>Pinus elliottii</i> overstory trees (>15cm BDH) to less than 30% as measured two years post burn.	Overstory pine mortality = 31% Figure 1	No	2010
	Promote 20% recruitment of seedling and pole sized PIEL >15cm in DBH five years post burn.	Pole and Seedling recruitment = 22% Seedling recruitment = 390% Pole recruitment = - 84% Figure 2	Yes – combined Yes – seedlings No - poles	2010
	Increase cover of bare ground/open space to 25% bare ground / 75% litter cover 5 years post burn.	Bare ground = 18% Litter cover = 82% (Bare ground = <50% litter cover Litter cover = >50% litter cover) Figure 3	No	2010

Slash Pine Savanna	Everglades- To maintain fire frequency return interval 1-5 yrs while maintaining up to 33% of the pinelands in a three year rough condition.	Pineland FMH plots: <1yrFRI – 0% 1yr FRI – 0% 2yr FRI – 0% 3yr FRI - 26% 4yr FRI - 11% 5yr FRI - 22% 6yr FRI – 0% 7yr FRI - 41% Pineland acres: <1yrFRI – <1% 1yr FRI – 0% 2yr FRI – 2% 3yr FRI - 31% 4yr FRI - 16% 5yr FRI - 18% 6yr FRI – 9% 7yr FRI - 36% Figure 5 and 6	No Fire Frequency maintained at 1-5 yrs for only 59% of pineland FMH plots and ~67% of pineland acres Yes- 31% of pineland acres are in a three year rough condition	
Short Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Based on visual analysis of photomonitoring data 99% of shrubs were topkilled immediately post burn Figure 7	Yes	
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed	
Coastal Prairie	Treat up to 100% of Old World climbing fern (<i>Lygodium microphyllum</i>) and/or Brazilian pepper (<i>Schinus terebinthifolius</i>) populations that have been identified by the Exotic Plant Management staff for fire treatment annually	<i>Lygodium microphyllum</i> : 45% exotic plant populations were treated <i>Schinus terebinthifolius</i> : No populations were identified for treatment	Yes	

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Last Analysis Completed
Long Hydroperiod Prairie	Topkill >50% of encroaching woody species immediately post-burn	Based on visual analysis of photomonitoring data 51% of shrubs were topkilled immediately post burn Figure 8	Yes	
	Reduce fine fuels >70% immediately post-burn	Did not complete cover transects	No data * Photomonitoring data not analyzed	

B. Fire ecologist accomplishments and areas of focus

In 2010 the draft Fire Management Plan (FMP) was revised to include a multi-year fuels plan, resource description section and conform to the new interagency template. The bulk of time in 2010 was spent working on completing the 2010 draft Fire Management Plan and developing a multi-year fuels treatment plan. Fire ecology research, vegetation assessments and fire spread models were used to determine the desired fire return interval in Wildland Urban Interface (WUI) designated prescribed fire units and hazardous fuel reduction units. Fire effects fuel loading, time since fire and natural resource data was synthesized to determine unit treatment priorities and schedule treatment implementation in the WUI and Hazardous fuel reduction units throughout the park.

NEPA and Endangered Species compliance work was ongoing for the FMP and annual project specific proposals. Maya Vaidya participated in several planning meetings and worked on the Environmental Assessment NEPA analysis and Endangered Species Act consultation with the USFWS. A categorical exclusion for NEPA analysis and consultation with the US Fish and Wildlife Service (USFWS) and the State Historic Presentation Office (SHPO) was completed for the 2010 prescribed fire projects NEPA, section 7 and section 106 compliance for WUI treatments and Hazardous fuel/exotic plant reduction projects.

The fire ecologist continued to serve on several working groups and committees including the Everglades Wilderness Committee, Pine Rockland Working Group, Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) Working Group. Development and methodology of the multi-year fuels plan was presented at the 2010 Cape Sable Seaside Sparrow symposium.

The fire ecologist assisted with 1 prescribed fire in the Park and one off Park prescribed fire assignment and spent time developing and implementing and inquiry based fire ecology learning program with Everglades Environmental Education and Miami-Dade College.

Table 4. Fire Ecologist Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	35%	Annual NEPA compliance, Sec 7 endangered species consultation, Sec 106 cultural resources consultation, Cape Sable Seaside Sparrow Fire Management Strategy, FMP revision, Multi-Year fuels plan Environmental Assessment research and planning
Presentations	<5%	Fire effects data summary presentation, Multi-year fuels plan development and methodology presentation
NPS Meetings/ task groups	10%	Work with SFNRC, I&M, Panther National Wildlife Refuge, Pine Rockland Working Group, Wilderness Committee, Cape Sable Seaside Sparrow Working Group
Interagency work	<5%	Work with Panther National Wildlife Refuge, SFNRC, I&M, USFWS
Fire Assignments	<5%	FFT2 – HID prescribed fire, S244 prescribed fire
Research	5%	Support and consultation for research in Everglades National Park conducted by USGS, UVM, FIU and UF researchers and students, working with SFNRC to develop exotics monitoring protocols, background research for planning and consultation
Data Management	<5%	Data entry, quality checking and analysis
Outreach, education programs	10%	Development and presentation of a fire ecology based inquiry learning project with Environmental education department
Monitoring Field Work	<5%	Assisted crew in monitoring fire effects plots in EVER and butterfly host plant plots in EVER
Supervision/Admin	20%	Supervised fire effects monitors, Hiring: recruited and hired GS 5 fire effects monitor, completed EPAP evaluations for fire effects crew
Training	<5%	RT-130
Miscellaneous	5%	Staffing, assistance with other Fire Management projects, Wilderness committee, burn plan and project proposal reviews

C. Fire effects crew accomplishments and areas of focus

In 2010, the Everglades fire effects crew monitored 38 FMH plots in Everglades and Canaveral National Seashore. All FMH data was entered into FFI and quality checked by the fall of 2010. Fire effects monitoring of the butterfly host plant, *Croton linearis*, continued to be conducted monthly in the pine rocklands. Additional plots were installed to determine success of chemical treatments of hazardous fuel/exotic plants followed by prescribed fire in the East Everglades WUI. In Cape Canaveral National Seashore, 7 Coastal Scrub photopoints were revisited

immediately post burn and 2 new plots were installed in Scrub Oak habitat. The crew also assisted the University of Vermont with a long-term fire effects study in the pine rocklands by monitoring 2 of their plots. Crew members continued to scan and digitally store FMH photo slides, using the external hard drive archiving system. Fire effects monitoring data was synthesized to determine unit treatment priorities and schedule treatment implementation in the WUI and Hazardous fuel reduction units throughout the park for the multi-year fuels plan and annual project specific proposals and compliance.

Collaboration efforts:

Everglades fire ecology and fire effects staff continued to assist and collaborate with other departments in ENP, as well as with other outside organizations. The staff continued to provide technical assistance to the University of Vermont, collecting data in pine rockland research plots. The fire effects staff provided input and expertise to Panther Wildlife Refuge biologist and field technicians. The staff continued to serve on several committees and working groups including the Everglades Wilderness Committee, the Imperiled Butterfly Working Group, the Cape Sable Seaside Sparrow (*Ammodramus maritimus mirabilis*) Working Group and the Pine Rockland Working Group. Aerin Land assisted with the planning and organization of the 2010 Pine Rockland Working Group Conference and the Cape Sable Seaside Sparrow Working Group Symposium. Aerin Land also served as a peer reviewer on the Joint Fire Science Program funding proposal review board.

Outreach:

The Everglades fire effects staff participated in a number of outreach events and projects in 2010. Everglades staffed an education station at the Biscayne National Park Bioblitz, teaching over 300 students about insect identification. Aerin Land presented several talks to the public at Fairchild Tropical Garden and to the North American Butterfly Association regarding candidate butterfly species fire effects and prescribed fire management practices.

Presentations:

Fire effects crew members gave presentations at various venues in 2010. Colleen Holland presented a talk at the South Florida Prescribed Fire Council meeting and presented a poster at the 2010 Pine Rockland Working Group conference on monitoring fire effects on exotic plant populations. Aerin Land presented at the 2010 Entomological Society of America conference regarding candidate butterfly species fire effects and prescribed fire management practices.

Mechanical fuels treatments:

The fire effects crew assisted with hazardous fuel/exotic plant fuels reduction and pre-burn prep treatment projects removing exotic *Melaleuca quinquenervia* in the WUI, and *Schinus terebinthifolius* in the pine rocklands of Everglades National Park. In the WUI, approximately 20,200 acres were treated in 2010 that are now available for prescribed fire treatment in 2011. Exotic plant treatments in the pine rocklands are ongoing.

Fire Management:

The fire ecology and fire effects staff was involved in diverse wildland fire operational activities in 2010. The staff worked on 4 prescribed fires and 1 wildfire within ENP and went on 5 out of park assignments for prescribed fire, severity and helicopter details. The staff assisted with

staffing engines and dispatch locally. Aerin Land served as Deputy Planning Section Chief and Colleen Holland served as Documentation Unit Leader on the Deepwater Oil Spill Incident Management Team. Matt Smith completed a detail with Shenandoah National Park fire effects crew and Lyndi Kirkman detailed with Park marine biology staff in Key Largo. Matt Smith was signed off on his FEMO task book. Aerin Land was signed off on her FEMO and RADO taskbooks.

Table 5. Fire Effects Crew Accomplishments/Focus Areas

Category	Percent Time	Notes
FMH plots	10%	6 pine plots, 13 MUFI, 11 COPR, 1 CLJA, 7 CANA
WUI plots	N/A	
CBI plots	N/A	
Other plot work	10%	Melaleuca (<i>Melaleuca quinquenervia</i>), Croton (<i>croton linearis</i>), Scrubjay (<i>Aphelocoma coerulescens</i>), University of Vermont, Prep time
Fire Assignments	5%	National Key Deer Refuge, Mesa Verde Helitack, Savannah River, RX Shenandoah, Mississippi Severity, Key Largo marine research, RX burning in SE Region
Fuels Projects	5%	Assisted the fire/fuels crew with exotics treatment.
Prescribed Fire Projects	5%	Savannah River NWR assist, Key Deer NWR assist, SE Regional assist, 4 prescribed fire at Everglades NP as FEMO's/FFT1/FFT2
Data entry	10%	Plots, EVER, CANA, MEQU, Plot folder management, Library entry, Photo management/ slide scanning
Data analysis	<5%	MEQU plot distribution, Comparing post frost reads to normal reads (Spp diversity)
Supervision/Admin	<5%	Travel, payroll and purchasing, paperwork, etc. - Lead monitor- training new personnel, crediting plan,
Training	5%	GIS, Wilderness workshop, water ditching, S-390, S-215, S- 310, S- 271, S-130/190,
Presentations/Conferences	<5%	JFSP, Butterfly @ Fairchild, ESA Butterfly, NABA, IBWG, South Florida RX Council, PRWG
Public Outreach	<5%	Crew ran an education station at the Biscayne National Park Bio-Blitz
NPS meetings/task groups	5%	ENP Wilderness Meetings, Environmental Assessment Meetings, Prescribed Fire Meeting, ENP Hurricane Incident Management Team Meetings
Interagency Meetings	<5%	Imperiled Butterfly Working Group, Cape Sable Seaside Sparrow (<i>Ammodramus maritimus mirabilis</i>) Symposium, Fire and Invasive Learning Network meetings
Gulf Oil Spill	15%	Lead and Assistant on incident management team for 1

		month full time, 1-4 months part time
Miscellaneous	15%	staffing dispatch, fire engines and helitack, hurricane incident management, new protocol/expanded project development, incorporating exotics monitoring, assisting fire program, Rx fires at EVER, Tiling, Meetings: Pine Rocklands, Cape Sable Seaside Sparrow, RX Fire Council, assist with teaching classes, Panther SCA/Biologist consultation and meeting

D. Additional Information

****Note that the entire Annual Report Supplement (Excel spreadsheet) will not need to be completed this year. We will only request a completed supplement as part of the annual report every other year, as many of the requested pieces of information do not change on an annual basis.**

Please complete the new table below which contains the information from the supplement that we feel is valuable to compile on an annual basis to help assess the fire ecology program workload. Everglades National Park is used as a fictitious example in the table.

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*
Everglades National Park	100%	100%	14	3	1	0
Canveral National Seashore	100%	100%	7	0	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

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.

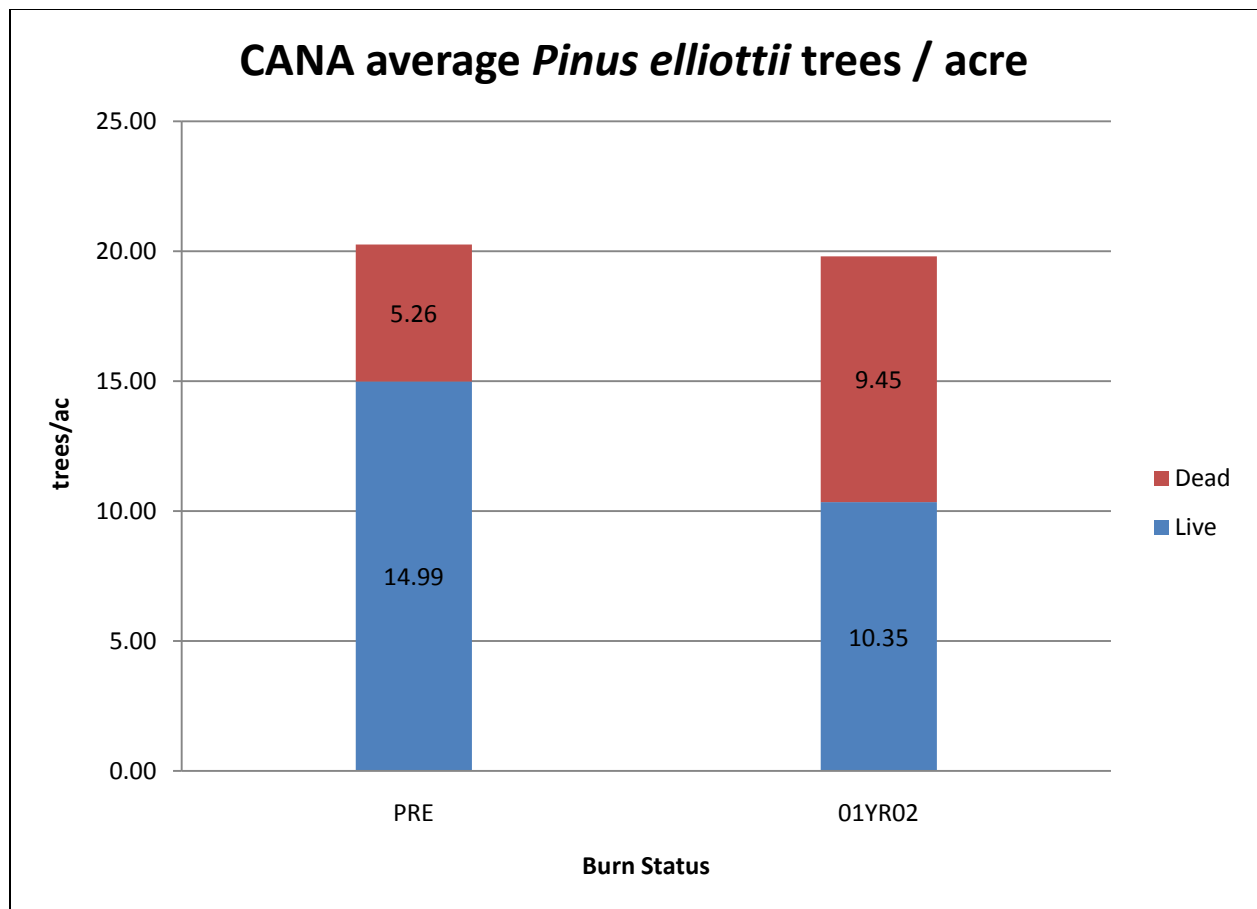


Figure 1: Average mortality of overstory *Pinus elliottii* in the pine flatwoods of Cape Canaveral National Seashore.

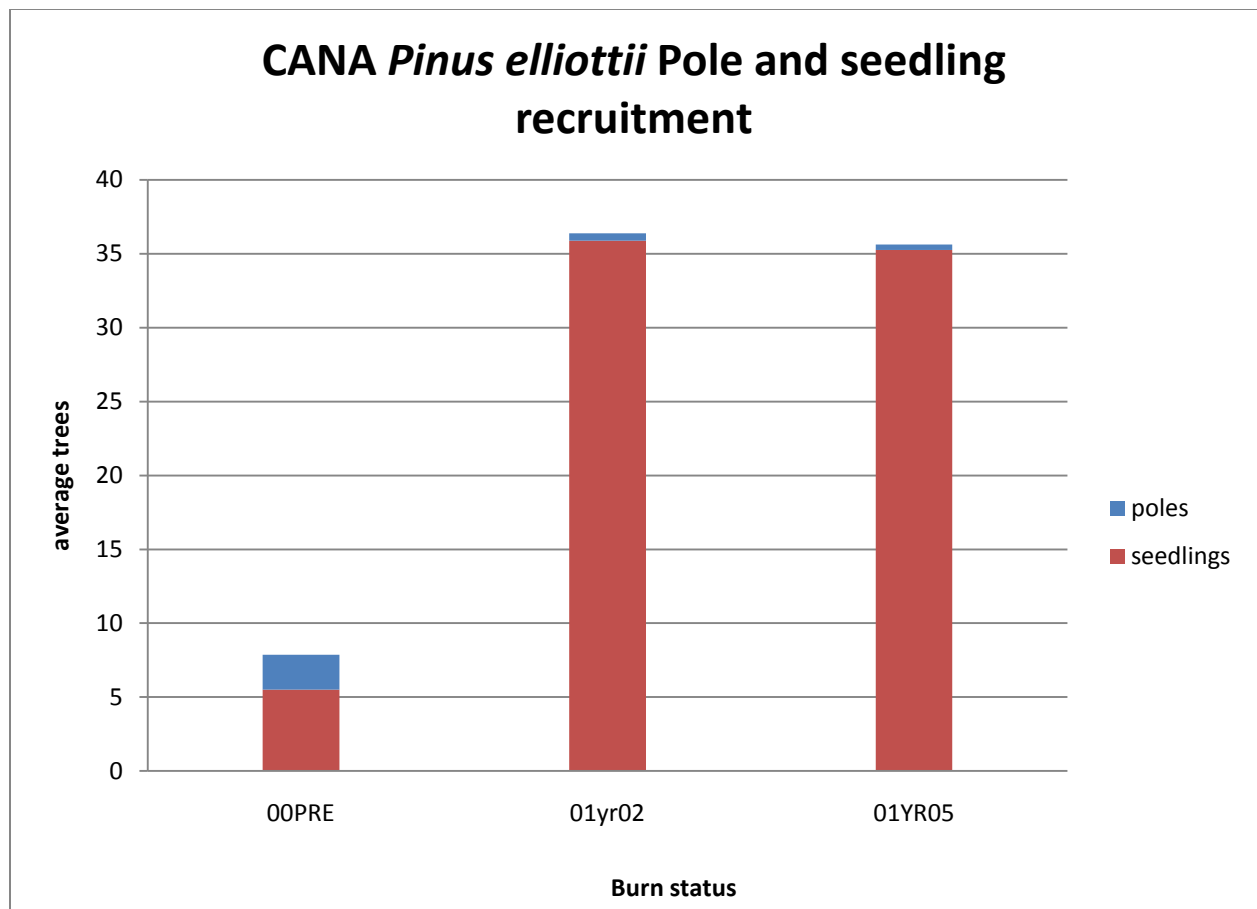


Figure 2: Average *Pinus elliotii* seedling and pole recruitment in the pine flatwoods of Cape Canaveral National Seashore.

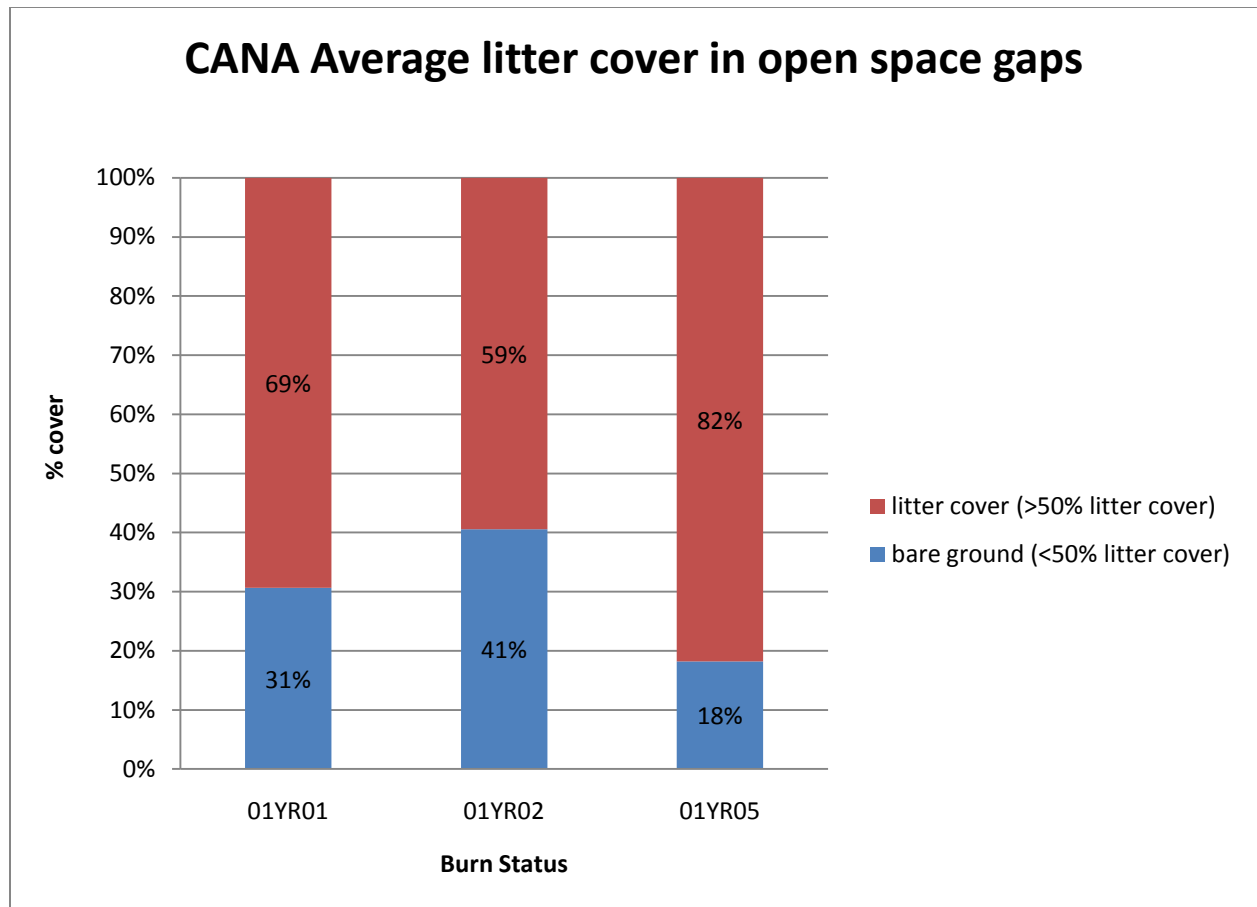


Figure 3: Average litter cover in open gaps between understory vegetation in the pine flatwoods of Cape Canaveral National Seashore. Open space and litter cover assessed to determine habitat conditions for the gopher tortoise (*Gopherus polyphemus*) and indigo snake (*Drymarchon coraisi couperi*).

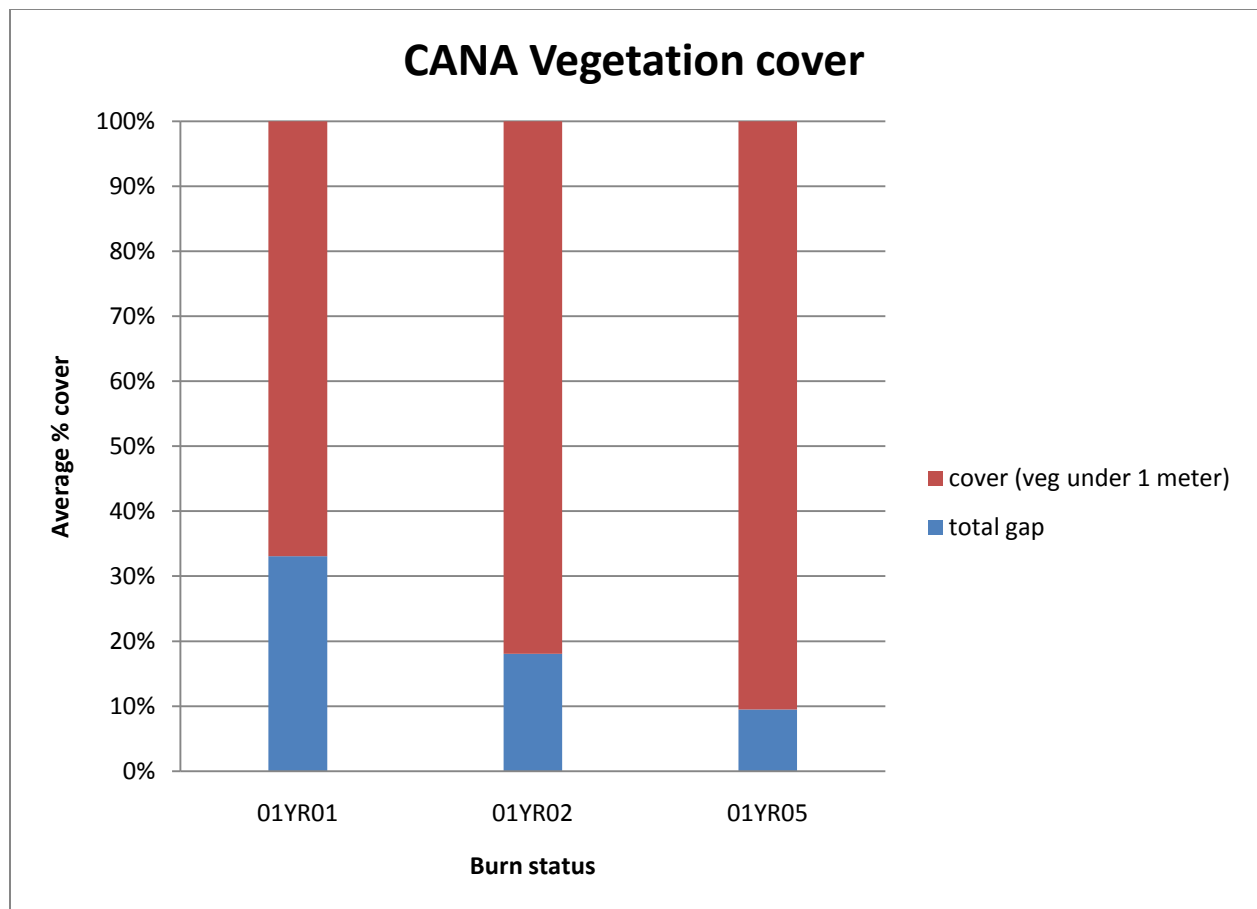


Figure 4: Average understory vegetation cover vs. open space (gap) in the pinelands of Cape Canaveral National Seashore. Open space and litter cover assessed to determine habitat conditions for the gopher tortoise (*Gopherus polyphemus*) and indigo snake (*Drymarchon coraisi couperi*).

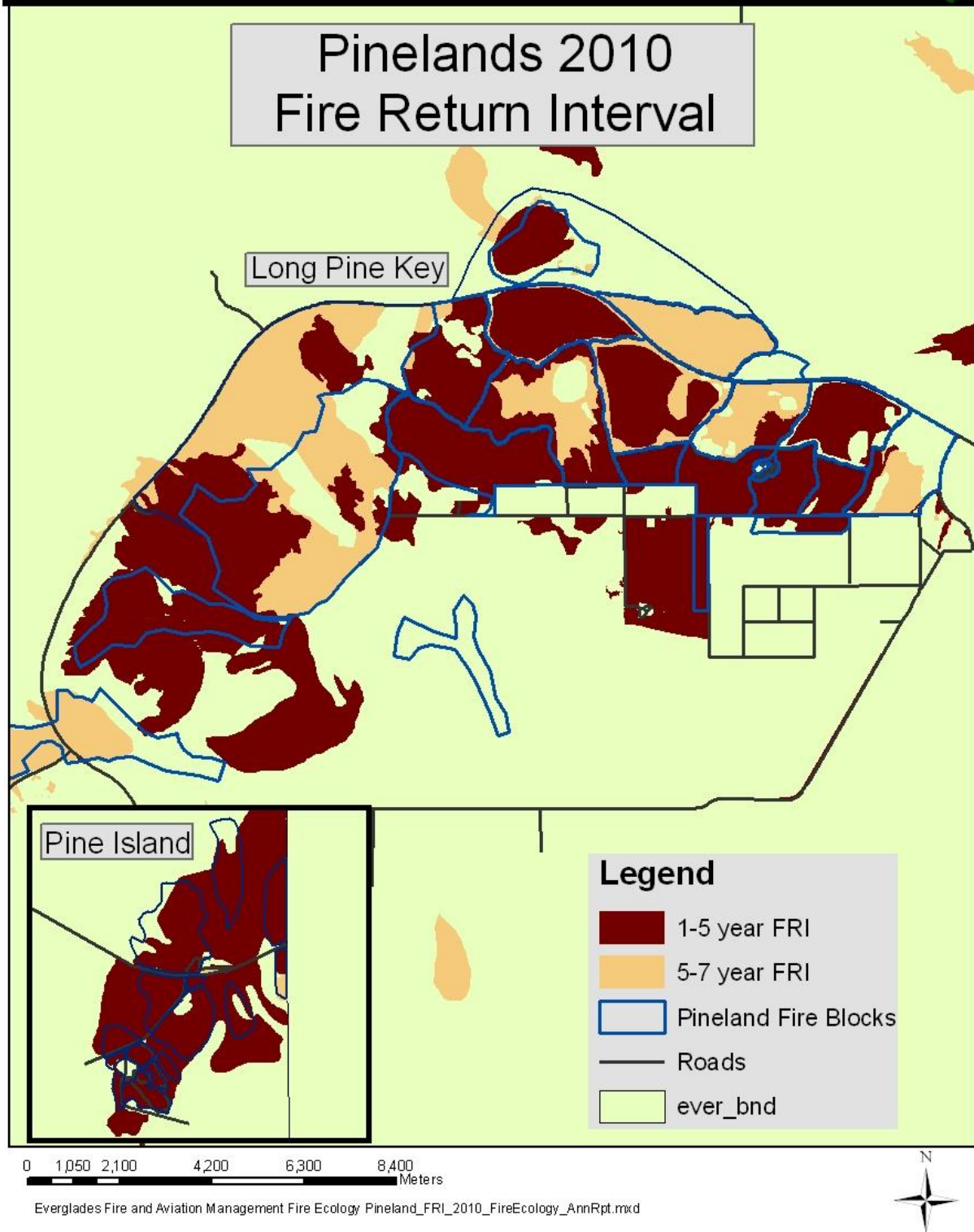


Figure 5: Fire Return Interval of Everglades National Park Pine Rocklands.

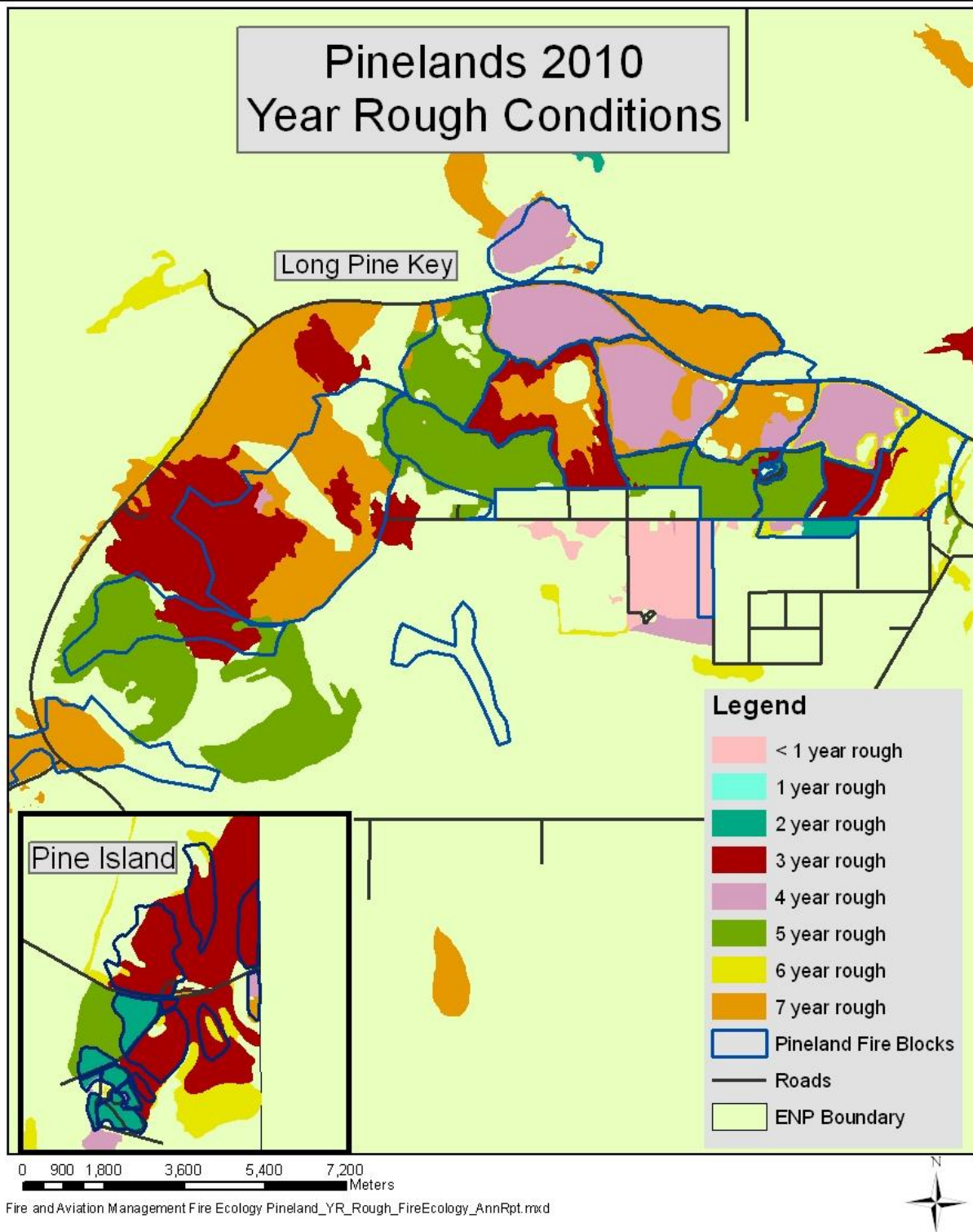


Figure 6: Time since fire – year rough of Everglades Pine Rocklands.

Everglades National Park: Short Hydroperiod Prairie



BMUFI1G0302 Pre burn 2003 (30P)



BMUFI1G0302 Post burn 2003 (30P)



BMUFI1G0307 Pre burn 2003 (0P)



BMUFI1G0307 Post burn 2005 (0P)



BMUFI1G0307 Pre burn 2003 (30P)



BMUFI1G0307 Post burn 2005 (30P)



BMUF11G0309 Pre burn 2003 (30P)



BMUF11G0309 Post burn 2005 (30P)



BMUF11G0319 Pre burn 2003 (30P)



BMUF11G0319 Post burn 2003 (30P)



BMUF11G0327 Pre burn 2008 (OP)



BMUF11G0327 Post burn 2008 (OP)

Figure 7: Everglades National Park Short Hydroperiod Prairie shrub topkill photo monitoring

Everglades National Park: Long Hydroperiod Prairie



BCLJA1G0309 Pre burn 2003 (OP)



BCLJA1G0309 Post burn 2007 (OP)



BCLJA1G0309 Pre burn 2003 (30P)



BCLJA1G0309 Post burn 2007 (30P)

Figure 8: Everglades National Park Long Hydroperiod Prairie shrub topkill photo monitoring

To help in the ongoing effort to improve FFI, please include any feedback or suggestions here based on your experiences using FFI.

INSTRUCTIONS FOR UPLOADING 2010 ANNUAL REPORT

1. Save your report as a PDF file using the following file naming convention “2010 *Park/Network Name* Annual Report.pdf”.
2. Go to the NPS Fire Ecology Sharepoint site (<http://npsfamshare.nps.doi.net/wildlandfire/firescience/fireecology/default.aspx>). In Fire Ecology Documents, upload your report to the 2010 Park and Network Fire Ecology Program Annual Reports folder.
3. Please e-mail your regional ecologist, Nate Benson, and MaryBeth Keifer to let us know when you get your report uploaded.

Call MaryBeth Keifer (603-795-2333) or Nate Benson (208-387-5219) if you have any questions or problems.