



National Park Service South Florida Fire and Aviation Big Cypress National Preserve Canaveral National Seashore Everglades National Park Fire Ecology Annual Report Calendar Year 2025

Maya Tupaj, Fire Ecologist



Isabel Marzullo and Kendall Hastings conducting post burn ground truthing points for burn severity mosaic maps following prescribed fire in Everglades National Park (NPS Photo by Maya Tupaj)

The National Park Service (NPS) Division of Fire and Aviation Management relies on science and long-term monitoring to inform an adaptive management approach for assessing and improving fire management programs and activities at park units. Adaptive management, along with policies, standards, and responsibilities for monitoring are described in Chapter 8 of [Reference Manual 18](#). The NPS Fire Ecology Program is responsible for the collection, analysis, and interpretation of fire effects monitoring data for park managers to use for program evaluation and decision making. This annual report is intended to partially fulfill reporting requirements for the Fire Ecology Program and does not constitute a complete analysis of any NPS fire management program or activity. Additional interpretation and reporting can be found in previous annual reports at [NPS DataStore](#) or by contacting the author(s) of this report.

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A. Summary

The South Florida Fire and Aviation (SFFA) fire ecology program supports the southeast fire management zone and the southwest fire management zone encompassing all south Florida and Caribbean NPS units as well as provides support to Canaveral National Seashore in the Atlantic Zone. Primary fire effects monitoring work occurs in Big Cypress National Preserve (BICY), Canaveral National Seashore (CANA), and Everglades National Park (EVER). In 2025, the SFFA fire ecology staff contributed to a wide variety of projects that support the SFFA fire management program by participating locally in 8 wildland fires across BICY and EVER as FEMO, FFT2 and roles supporting operations.

The Fire Ecology program experienced significant staffing changes in recent years. The SFFA program hired an intern, Kendall Hastings, for the 2024 field season to work with the assistant lead fire effects monitor, Isabel Marzullo. In August of 2025 Isabel Marzullo left for a new career opportunity. The previous year 3 people, Aerin Land, Denise Gazawie, and Hannah Evergreen, left and additional hiring has not occurred. Maya Tupaj, Fire Ecologist, remained with the program throughout 2025.

In 2025 the fire ecology staff completed traditional fire effects monitoring while continuing integration in wildfire operations and began to explore remote sensing applications for fire effects monitoring to increase efficiency of field data collection. Post burn severity mosaic mapping was completed for prescribed fires in BICY and EVER. A burn severity FEMO summary was completed for one fire to test utility as a quick reference for burn bosses and managers.

On site FEMO positions were filled for prescribed fires and refinement of the FEMO report template was completed to increase integration and use of weather, fire behavior and post fire effects information in decision making in prescribed fire implementation and planning.

The SFFA fire effects monitoring program plans to further explore the use of remote sensing and new technologies to help answer questions related to effects of wildfires and prescribed fire impacts at the landscape scale as well as informing best management practices for managing wildfires and implementing landscape scale prescribed fire in habitat for federally threatened and endangered species. Information may be used to support wildfire decision making and be used in prescribed fire planning and prioritization.

Table 1. Fire Effects Plot Workload (2025)

Park	Monitoring Unit	Plot Type (FMH Forest/Brush/Grass plot, photo point, Rapid Assessment, CBI, etc.)	Years Data Collected (start-end)	Annual Total (2025)	Total Plots
Big Cypress National Preserve (BICY)	Slash Pine	Photo point	1992-2025	0	37
		Photo series		-	-
	Prairie	Photo point	1992-2025	0	32
		Photo series		-	-
	Cypress Savannah	Photo point	1992-2024	0	14
				-	-
	Hammock	Photo point	2001-2021	0	1
				-	-
	Teufel Unit	Photo point	2025	4	4
Canaveral National Seashore (CANA)	Slash Pine Flatwoods	FMH Forest Plot	2001-2022	0	7
	Coastal Scrub	Modified FMH Brush Plot	2009-2022	0	4
	Scrub Oak	Modified FMH Brush Plot	2013-2023	0	10
Everglades National Park (EVER)	Pine Rockland	FMH Forest Plot	1999-2025	3	29
	Short Hydro-period prairie	FMH Grass Plot	1999-2025	13	25
	Long Hydro-period prairie	FMH Grass Plot	1999-2025	1	20
	Coastal Prairie	FMH Grass Plot	1999-2024		16
Total				21	199

B. Monitoring Results and Recommendations

The 2025 fire effects monitoring efforts were focused on burn severity mapping and FEMO monitoring during prescribed fires. Spatial data analysis only was updated in 2025. Table 2 below summarizes long term and ongoing management objectives and when past data analysis was completed.

Table 2. 2025 Management Objectives and Monitoring Results

Monitoring Unit	Management Objective	Monitoring Results (w/level of certainty)	Progress Towards Meeting Objectives
<i>BICY Slash Pine</i>	Treat >70% of pinelands in BICY at least once within 7 years	82% of pinelands treated with wildland fire within 7 years (2019-2025) <i>GIS fire perimeter analysis</i>	Objective achieved
	Reduce woody shrub height >50% one year post burn (when compared to pre-treatment) in pinelands	Objective not analyzed in 2025	N/A
<i>BICY Prairies</i>	Treat >70% of pinelands in BICY at least once within 7 years	67% of prairies treated with wildland fire within 7 years (2019-2025) <i>GIS fire perimeter analysis</i>	Objective not met
	Reduce woody shrub height >50% one year post burn (when compared to pre-treatment) in prairies	Objective not analyzed in 2025	N/A
<i>BICY Slash Pine and Prairies</i>	Top-kill at least >75% of woody shrubs during each treatment	Objective not analyzed in 2025	N/A
<i>CANA Slash Pine Savannah</i>	Limit mortality of overstory Longleaf and Slash pine to 40% -50% as measured two years post burn.	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2019
	Promote 20% recruitment of seedling and pole sized PIEL <15cm in DBH five years post burn.	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2022
	Increase cover of bare ground/open space to 25% bare ground/open space and 75% vegetation cover 5 years post burn.	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2022
<i>CANA Scrub Oak and Coastal Scrub</i>	Reduce cover of saw palmetto by 50-80% immediately post burn	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2021
	Reduce cover of live oak species by 40-60% immediately post burn.	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2021
	Reduce number of scrub oak trees, taller than 2 meters, by 50-80%, as measured three years from the second application of fire (02YR02).	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2023

	Increase relative cover of non-woody species by 50-70%, as measured three years from the second application of fire (02YR02).	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2023
<i>EVER Slash Pine Rocklands</i>	To maintain fire frequency return interval 1-5 yrs while maintaining up to 33% of the pinelands in a three year rough condition	<i>78% of pineland within 1-5 year fire frequency return interval 22% of pinelands outside 1-5 year fire frequency return interval 16% of pineland in a 3 year rough condition GIS perimeter analysis</i>	Objective not met
	Reduce shrub density by $\geq 50\%$ immediately post-burn	<i>Objective not analyzed in 2025</i>	N/A
	Reduce average shrub height by $\geq 25\%$, as measured two years from application of fire (XXYR02)	<i>Objective not analyzed in 2025</i>	N/A
	Maintain average species richness within 90% or greater of baseline 00PRE average	<i>Objective not analyzed in 2025</i>	Objective last analyzed in 2023
<i>EVER Short Hydroperiod and Long Hydroperiod Prairie</i>	Topkill $>50\%$ of encroaching woody species immediately post-burn	<i>Objective not analyzed in 2025</i>	N/A
	Reduce fine fuels $>70\%$ immediately post-burn	<i>Objective not analyzed in 2025</i>	N/A

C. Research, Planning, and Communication

- NPS SFFA Fire Ecology subject matter expertise and/or monitoring data supported the below listed research projects.
 - Malone, S.L., McLeod, G., Chen, A. et al. Contemporary Fire Regimes of the Subtropical Everglades. *Sci Data* 12, 1622 (2025)
 - Nocentini, A., Alarcon, C., Gue, M. et al. High-resolution burn prioritization models enhance fire management decisions in heterogeneous landscapes. *fire ecol* 21, 66 (2025)
- Monitoring plans for all 3 Parks/Preserve are currently under review and updates are ongoing.

- Fire Ecology staff participated in several planning meetings with BICY and EVER resource management staff and the USFWS preparing programs to complete new consultation under the Endangered Species Act for updated Fire Management Plans and program updates.
- Fire Ecology staff assisted in communication and planning with the USFWS for wildfire emergency consultation procedures and reports.

D. Future Direction

Provide information related to future plans for the fire ecology program including:

- The South Florida Fire and Aviation Fire Ecology program will continue to implement and refine fire effects monitoring protocols.
- SFFA fire ecology staff will continue to develop burn severity mapping products to detect mosaic fire spread within burn units in EVER and BICY.
- SFFA fire ecology staff will investigate using UAS and fixed wing aerial flights for monitoring of post fire impacts to pine canopy in BICY and EVER.

E. References, Links, and Additional Reading

- Monitoring methods for BICY, CANA, and EVER are stored on local NPS shared drive and available on request.
- IRMA Data Store record for BICY FFI database:
 - Land A and Tupaj M. 2025. 2024 Big Cypress National Preserve FFI Database. National Park Service <https://irma.nps.gov/DataStore/Reference/Profile/2316165>
- IRMA Data Store record for CANA FFI database:
 - Tupaj M and Land A. 2025. Canaveral National Seashore FFI Fire Effects Monitoring 2024 Data. National Park Service <https://irma.nps.gov/DataStore/Reference/Profile/2316164>
- IRMA Data Store record for EVER FFI database:
 - Tupaj M and Land A. 2025. Everglades National Park FFI Fire Effects Monitoring Data. National Park Service <https://irma.nps.gov/DataStore/Reference/Profile/2316163>

Appendices

Appendix A (Staffing and Accomplishments) and Appendix B (History of Fire Effects Plots) are required. If all existing plots (not just those visited in the current year) are included in [Table 1](#) in the Summary section, then Appendix B is not required.

Appendix C (Fire/Fuels Treatments and Associated Monitoring) and Appendix D (Individual Park Annual Reports) are optional. Add other Appendices for any additional information to include in the annual report as needed.

Appendix A. Staffing and Accomplishments

Table A-1. Fire Ecology Staffing 2025

Ecologist and Monitors	Position	Appointment Length	Training and Development
Maya Tupaj	Fire Ecologist	PFT	RT-130
Isabel Marzullo	Assistant Lead Monitor	15 pay periods (PFT position)	HEMC long line training, S-270, RT-130

Table A-2. Fire Ecologist 2025 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Planning	10%	FMP update reviews, edits and planning meetings Multi-year fuels planning Project level prescribed fire planning ESA Sec 7 planning and analysis Wilderness Stewardship Plan Park Planning and Compliance Meetings
Presentations	<1%	Scientific meetings, park staff, public, etc.
Meetings/task groups	10%	USFWS – South Florida Parks and Preserve meetings Tribal coordination and information sharing meetings Wilderness Stewardship Planning Workshops NEPA and Environmental Compliance Planning Meetings
Wildfire assignments	10%	Plans/WFDSS for local wildfires, local READ assistant, BAER/BAR coordination
Prescribed fire/fuels treatment projects	<5%	Prescribed fire unit recon
Research	5%	Fire regime paper review and collaboration, burn prioritization model manuscript review; coordinated with researchers and provided fire history and GIS data and subject matter expertise
Field work/data collection	20%	Estimated amount of time spent in the field collecting data; include time spent preparing for field work and travel time to plot locations
Data management	5%	Estimated amount of time spent entering data from paper to FFI database, managing data in FFI, preparing and/or archiving data, and/or conducting quality control activities
Data analysis	<5%	Estimated amount of time spent performing analyses, including data summaries and statistical tests
Supervision/admin tasks	20%	Hiring, supervision, payroll, travel authorization/vouchers, purchasing, etc.
Training	<5%	GIS, UAS, Spatial analysis
Miscellaneous	15%	Spatial burn severity analysis

Table A-3. Fire Effects Crew 2025 Accomplishments/Focus Areas

Category	Percent Time	Notes
Data collection	35%	Estimated amount of time spent collecting plot data; includes any preparation time and travel time to local plot locations
Wildfire assignments	5%	FFT2, PIO
Prescribed fire/fuels treatment projects	10%	FEMO, FFT2, Fuels Reduction
Travel out-of-park for plot or project work	0%	
Data entry/management	15%	Estimated amount of time spent entering data from paper to FFI database, managing data in FFI, preparing or archiving data, and/or conducting quality control activities
Data analysis	<1%	Time spent assisting Fire Ecologist in data analysis tasks
Administrative activities	5%	Payroll, travel authorization/voucher, etc., crew lead tasks
Training	10%	S-270, HECM, GIS training
Miscellaneous	10%	Severity staffing, working groups

Appendix B. History of Fire Effects Monitoring Plots

See [Table 1](#)

Appendix C. Fire/Fuels Treatments and Associated Monitoring (OPTIONAL)

Table C-1. Summary of 2025 Fire/Fuels Treatments and Associated Monitoring

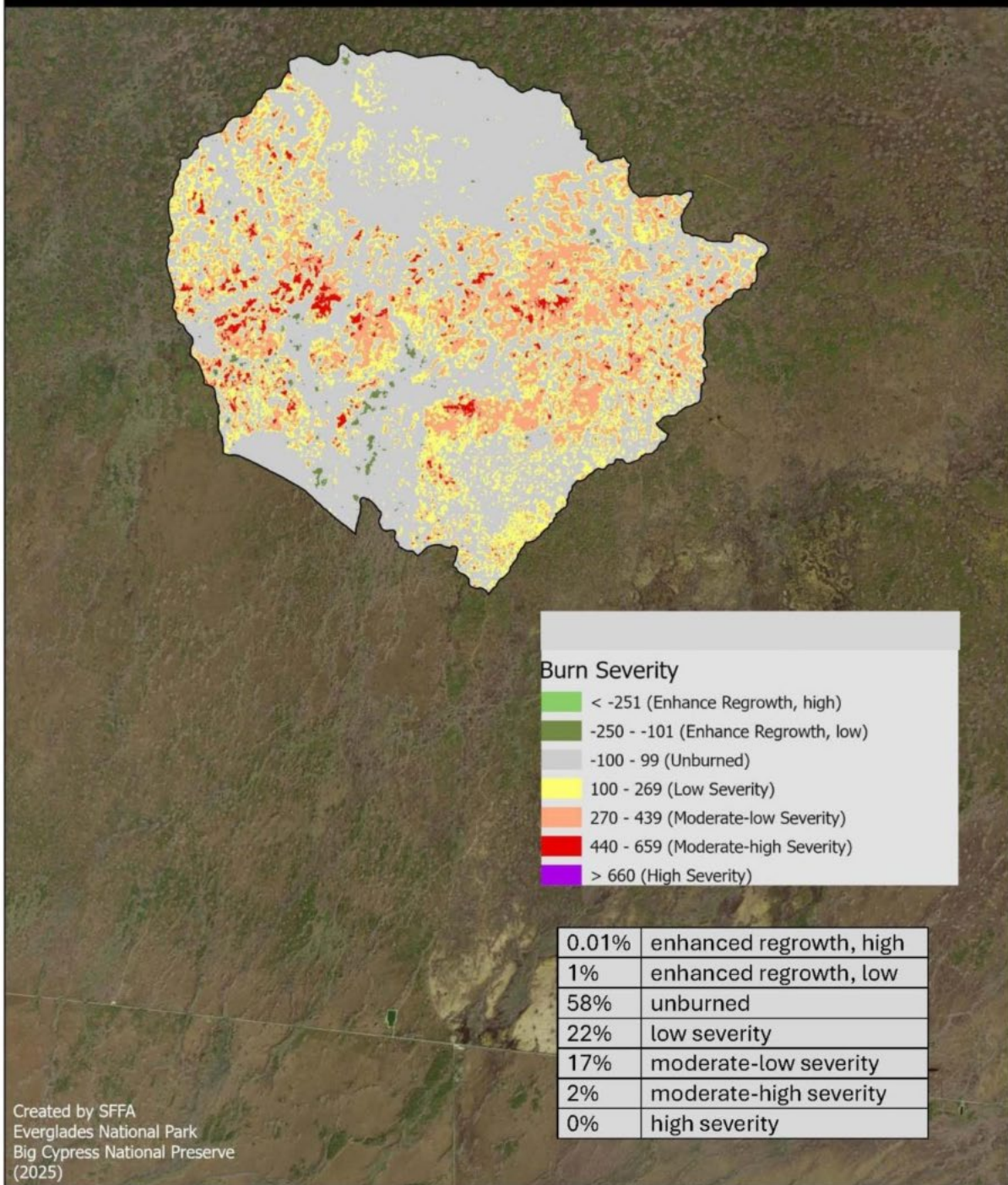
Park	Fire/Treatment Name	Monitoring Conducted	Acres (GIS acres)
<i>Big Cypress National Preserve (BICY)</i>	Boothill Rx	Yes (FEMO, burn severity mapping)	24,529
	Mullet Rx	Yes (FEMO, burn severity mapping)	23,158
	Teufel mechanical fuels treatment	Yes (photo points)	452
	Preserve wide mastication	No	199
<i>Everglades National Park (EVER)</i>	Coastal Prairie Exotics Rx	No	13,443
	Block F Rx	Yes (FEMO, croton recovery, burn severity mapping, ground truthing points)	48
	Block I1 Rx	Yes (FEMO, FMH, croton recovery, burn severity mapping, ground truthing points)	425
	HID East Rx	Yes (FEMO, burn severity mapping, ground truthing points)	1,503
	HID Buffer Rx	Yes (FEMO, burn severity mapping, ground truthing points)	3,370
	Nike Missile Base	Yes (FEMO)	17
	Park wide mastication	No	27
Total	11	8	67,171

C-2. Summary of 2025 Fire Treatments Burn Severity Mapping

In 2025 the South Florida Fire and Aviation Program continued to develop and refine the process for post burn severity mapping. The program utilized sentinel-2 satellite imagery and a Differenced Normalized Burn Ratio (dNBR) analysis to create post burn severity maps for areas treated with prescribed fire in 2025. Based on initial review and preliminary ground truthing results, dNBR works well for burn severity and burned and unburned mosaic mapping in forested and wooded areas, however additional refinement may be needed for post burn assessments in prairie areas. Burn severity mosaic mapping will be used in the SFFA prescribed fire program to help assess if goals and objectives are being met such as those related to mosaic pattern at a landscape scale, maintaining areas of unburned refugia within burn units and achieving low to mixed severity fire effects with prescribed fires reducing potential for severe fire effects from unplanned wildfires.

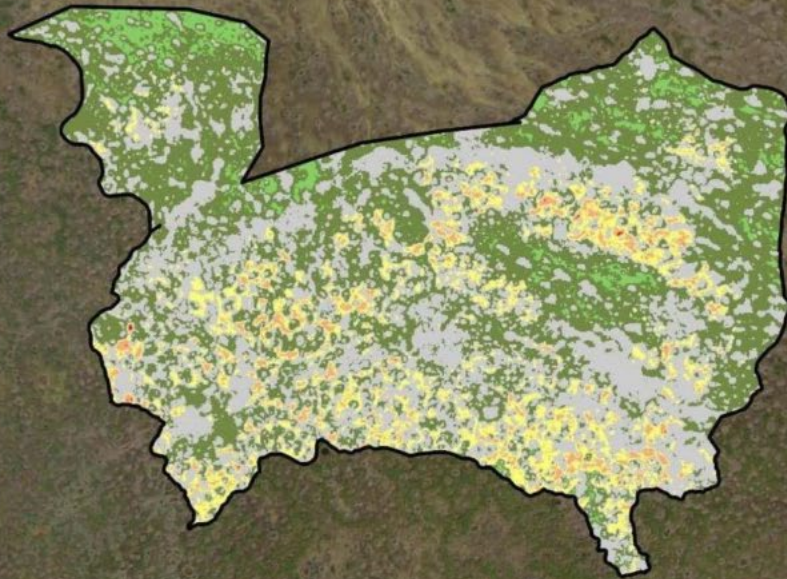
Boothill Prescribed Fire 2025

National Park Service
U.S Department of Interior
South Florida Fire and Aviation



Mullet Prescribed Fire 2025

National Park Service
U.S Department of Interior
South Florida Fire and Aviation



Burn Severity

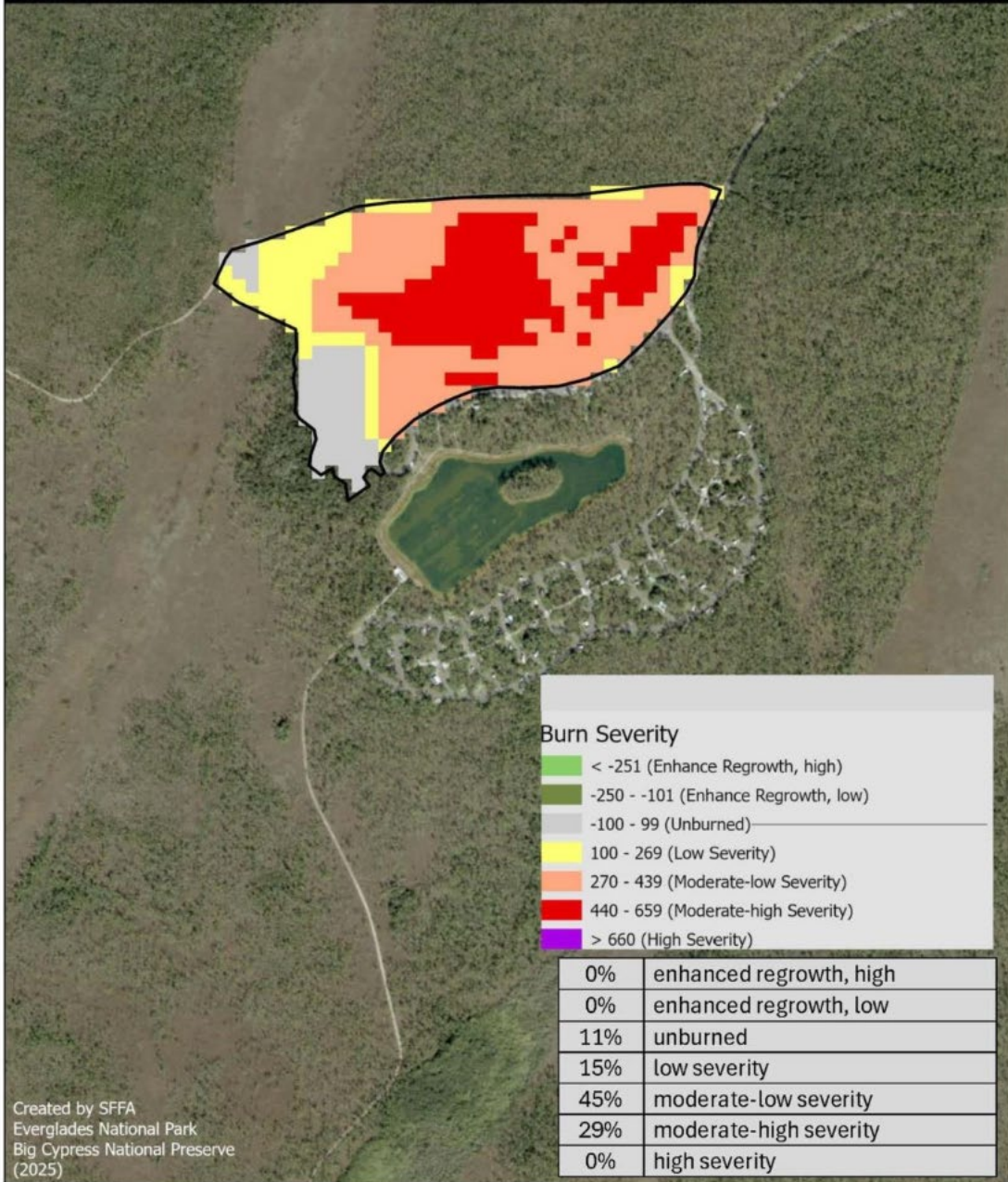
- < -251 (Enhance Regrowth, high)
- 250 - -101 (Enhance Regrowth, low)
- 100 - 99 (Unburned)
- 100 - 269 (Low Severity)
- 270 - 439 (Moderate-low Severity)
- 440 - 659 (Moderate-high Severity)
- > 660 (High Severity)

4%	enhanced regrowth, high
40%	enhanced regrowth, low
43%	unburned
10%	low severity
3%	moderate-low severity
0.02%	moderate-high severity
0%	high severity

Created by SFFA
Everglades National Park
Big Cypress National Preserve
(2025)

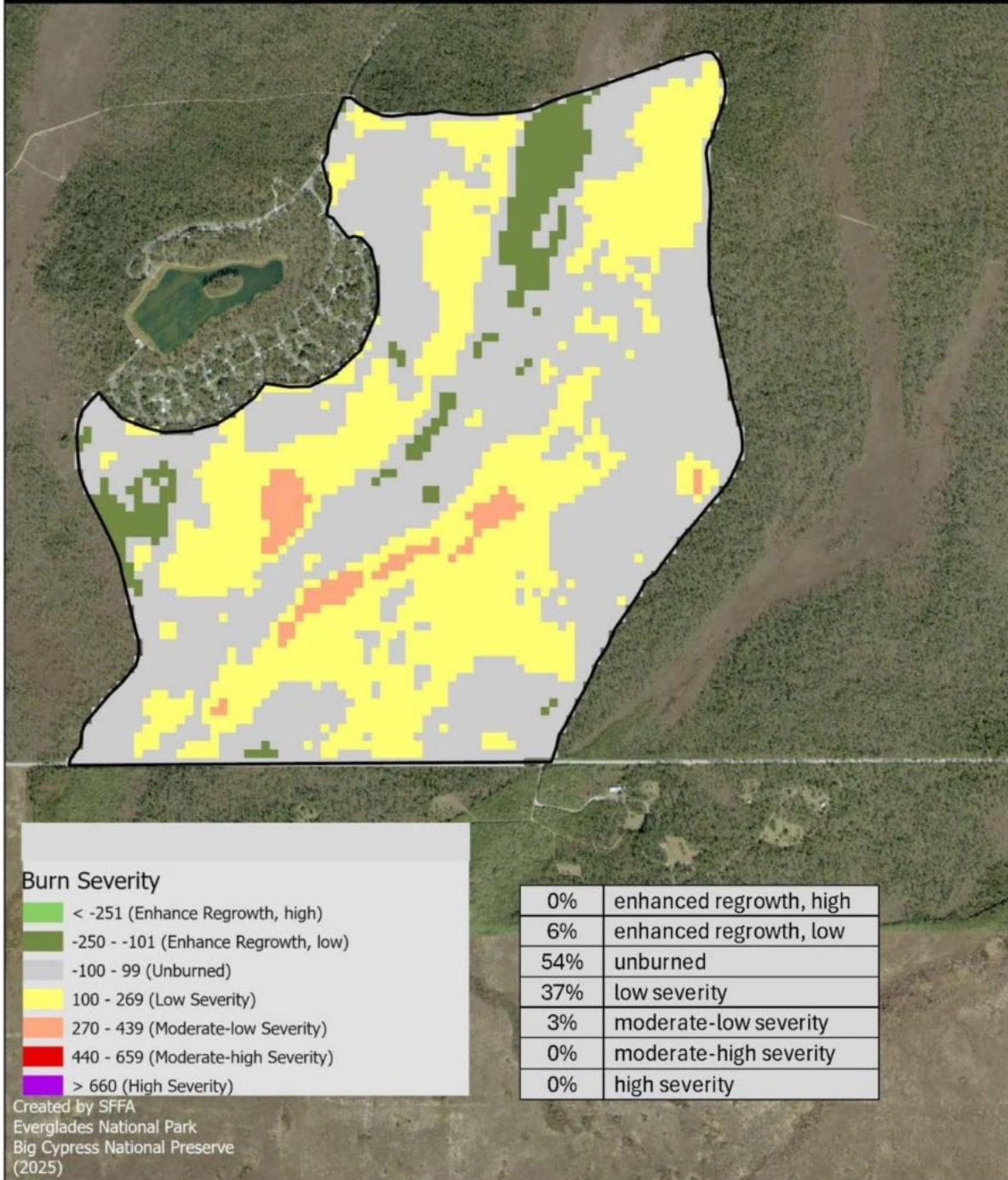
Block F Prescribed Fire 2025

National Park Service
U.S Department of Interior
South Florida Fire and Aviation



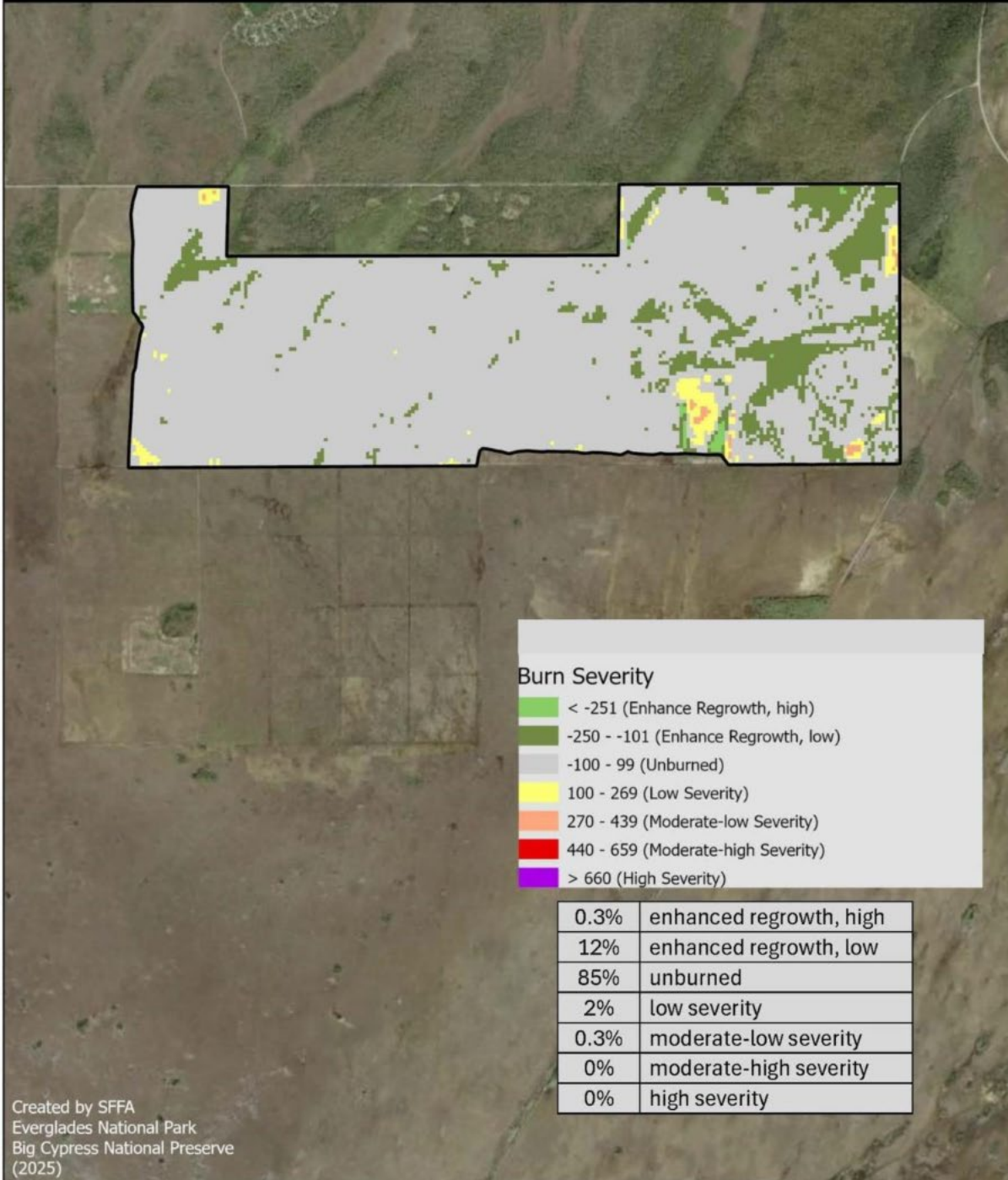
Block I1 Prescribed Fire 2025

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HID East Prescribed Fire 2025

National Park Service
U.S Department of Interior
South Florida Fire and Aviation



HID Buffer Prescribed Fire 2025

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