



National Park Service Big Cypress National Preserve Fire Ecology Annual Report Calendar Year 2020

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A. Summary

The Fire Effects crew a Big Cypress National Preserve (BICY) had a challenging year as all prescribed fire treatments were at stalled due to implementation of new compliance protocols and the COVID-19 pandemic. This resulted in nearly zero acres burned in prescribed fire. However, throughout the 2020 calendar year the crew participated in numerous wildfires and completed a wide variety of fuels and non- fuels projects.

Prescribed Fire/Ecology Program Accomplishments:

- A total of 29,225 acres were treated with fire this year. 31 wildfires (29,225 ac) and one attempted prescribed fires treatment (.25 ac).
- Mechanical treatments and prescribed fires were used to protect 80 private structures, 104 NPS structures, over 82 miles of roadways and 105 Red Cockaded woodpecker trees from potential wildfire impacts.
- Crew assisted in 13 off-unit prescribed fires.
- \$100,000 of Burned Area Rehabilitation (BAR) funds were acquired in addition to \$73,032 funded by Big Cypress National Preserve. Funds were used to treat 4,173 acres of Lygodium within the Cowbell Wildfire area.
- Collaboration with I&M to acquire new standard vegetation data layer and assess post fire vegetative effects
- Released social media fire ecology series for promoting public education
- Conversion of all preserve geospatial data into two geospatial databases
- Uploaded all preserve geospatial data to NIFC AGOL
- Maintained functionality of AGOL for users during wildfire incidents
- Submitted proposals FY21 BAR funding for the Moonfish and Silver king Wildfire
- Edit weather data errors and completed new NFDRS pocket cards for Big Cypress Fire
- Began FFI data conversion process for fire effects data

- Successfully input all 2020 project data to FFI. Regional Office support has also contributed to the conversion of all historical photopoint effects data from Excel to FFI. This project will be completed in FY21.

Throughout the year, the crew worked with Education and Resource management staff and cooperators on projects and outreach such as:

- Assisted USGS with the installation of Melaleuca seedling plots
- Assisted education staff with swamp walks and the development of a fire Jr. Ranger workbook
- Participated in the South Florida National Parks Trust community outreach
- Promote the understanding of prescribed fire objectives by cross-train education rangers on local fire ecology, monitoring techniques and protocols
- Assisted in teaching S130/190 at the University of Central Florida

Table 1. Fire Effects Plot Workload (2020) and Total Plots Installed

Park	Monitoring Unit	Plot Type	Pre-burn	Immed Post	Postburn* (1-20 yrs)	Annual Total	Total Plots
Big Cypress	Slash Pine	Photopoint	1	-	11	12	12
		Photoseries	-	-	2	2	2
	Prairie	Photopoint	4	-	15	19	19
		Photoseries	-	-	3	3	3
	Cypress Savannah	Photopoint	-	-	1	1	1
		Photoseries	-	-	-	-	-
	Hammock	Photopoint	-	-	-	-	-
		Photoseries	-	-	-	-	-
Total			5	0	32	37	32**

* Pre-burn site visits only occur if a plot hasn't been burned within 6 years or it has been over three years since the last site visit. These plots are included in the Post Burn (1-20years) site visit statistics.

**Grand total includes only photopoint plot types because the photoseries data collection protocols occur at already established photopoint locations.

Table 2. Fire Ecology Staffing 2020

Ecologist and Monitors	Starting Date	Ending Date	# of Pay Periods	READ Qualified (Yes or No)	Training and Development
Jill Waisley (Fire Ecologist)	1/1/20	12/31/20	26	No	- Maintained SEMG qualification - Attended: Annual fire refresher
Megan Hurrell (Lead Fire Effects Monitor)	1/1/20	12/31/20	26	No (Working on for FY 21)	- Worked toward: IC4 (t), FIRB (t), - Hired as GS 7 fuels technician - Completed: FIRB taskbook, CDL Class A Combination - Attended: Fundamentals, annual fire refresher
Josh Moore (Career Seasonal Monitor)	1/1/20 10/26/20	4/23/20 12/31/20	13	No	- Worked toward: FFT1, IC5 (t), FEMO (t), ENOP (t), Technical specialist (t) Completed: FFT1 and IC5 - Attended: Annual fire refresher
Seth Williams (Seasonal Monitor)	1/1/20	2/28/20	4	No	- Worked toward: FEMO and Technical specialist task books
John Raney (Seasonal Monitor)	10/26/20	12/31/20	5	No	- Working on: IC5 (t) Opened: FEMO, Technical specialist task books - Attended: Annual fire refresher

Table 3. 2020 Management Objectives and Monitoring Results

Monitoring Unit	Management Objective (Restoration)	Monitoring Results (XX% confidence interval)	Objective Achieved?	Year Analysis Completed (Range of Data [Yrs] Included in Analysis)
Slash Pine	Treat >70% of pinelands in BICY at least once within 7 years	Fuel reduction treatments for the last 7 years occurred in 80.5% of pinelands in BICY at least once <i>77,324 of hydric and mesic pineland flatwoods were treated during 177 fires within last 7 years (105,167 total acres of pinelands). With 27,955 acres treated multiple times.</i>	YES	2020 (2014-2020)
	Reduce woody shrub height >50% one year post burn (when compared to pre-treatment) in pinelands	Ocular Estimation at photopoint sites determined that >50% reduction in shrub height occurred 1 year post at 100% of the plots. <i>n=2. Two site visits were analyzed via ocular estimation.</i>	YES	2020 (2019-2020)
Prairies	Treat >70% of prairies in BICY at least once within 7 years.	Fuel reduction treatments for the last 7 years occurred in 59% of prairies in BICY at least once <i>110,934 acres of wet prairie were treated during 177 within last 7 years (144,989 total acres of prairie). With 34,185 acres treated multiple times.)</i>	NO	2020 (2014-2020)
	Reduce woody shrub height >50% one year post burn (when compared to pre-treatment) in prairies	Ocular Estimation at photopoint sites indicate that >50% reduction in shrub height occurred 1 year post at 80% of the plots <i>n=5. Five site visits were calculated via ocular estimation.</i>	YES	2020 (2019)
Slash Pine & Prairies	Top-kill at least >75% of woody shrubs during each treatment	Ocular Estimation at photopoint sites indicate that at least >75% of woody shrubs were top killed at 89% of the plots. <i>n=0. Zero immediate post site visits were visited.</i>	N/A	2020 (2020)

B. Program Information

Table 4. Planning - 2020

Park	Does Park have written Desired Future Conditions? (yes or no)	Date Park-level Monitoring Plan completed (or revised)	Total # of Project- or Community-level Monitoring Plans (not just 2020)	Assisted with how many BAER/BAR plans/updates in 2020?
Big Cypress National Preserve	NO	2013	0	4

Table 5. Monitoring - 2020

Park	% 2020 Data Entered	% 2020 Data Quality Checked	# Prescribed Fires Monitored	# Non-fire Fuels Treatments Monitored	# Wildfires Monitored	# BAER/BAR Treatments Monitored
Big Cypress National Preserve	100%	100%	0	1	5*	1

**Number of treatment units with burn-day observations and post treatment first order fire effects only*

Table 6. Communicating Results - 2020

Park	# of Project Monitoring Reports completed in 2020	# of Annual meeting(s) with Park staff	# of Formal presentations of results*	Do you use Minitab?
Big Cypress National Preserve	1	3	10	No

**# of formal presentations include field based educational presentations.*

Table 7. Research - 2020

Park	Are research needs identified in FMP or Monitoring Plan? (yes or no)	# of Proposals Submitted in 2020	# of Proposals Funded in 2020	# of Research Projects Supported in 2020*	Additional Comments
Big Cypress National Preserve	Yes*	0	0	3	RCW monitoring, Florida panther research, and black rail

** Additional research needs are being considered and will be included in the next Monitoring Plan update.*

C. Fire ecologist accomplishments and areas of focus

Several developments have occurred in the Big Cypress National Preserve organization, including a reorganization and merger with Everglades National Park to create South Florida National Parks. During this transition, the Ecologist worked to hire a GS 7 Fuels Tech and career seasonal GS 5 Forestry Tech position.

The Fire Ecologist lead led the ArcGIS to ArcPro transition for the Fire Program and has worked with the Regional Office to convert all Preserve GIS data from hundreds of individual shapefiles into three geodatabases (Fire, Resource Management and Preserve data). Appropriate information was also published on NIFC AGOL for use on prescribed fires, wildfires and some Resource Management based monitoring (ie. RCW tracking and invasive species treatment locations). Ready-made maps were developed to facilitate data collection.

Currently, a complete revamp of the structure dataset is in progress and will continue through 2021. The Regional GIS, Ecologist, and Resource Management Staff have coordinated and developed a single mechanism in NIFC AGOL to edit, track and update the National Risk Assessment, Resource Management Survey and Preserve Structure datasets.

Support from Resource Management and local cooperators have enabled the BICY Ecology Program to explore additional monitoring strategies. Modifications to sampling protocols will be implemented in 2021 based on adaptive management strategies and the best possible science. In coordination with Resource Management changes to monitoring objectives and prescribed fire objectives will better align with resource management goals. Progress has continued to convert historical monitoring data into FFI and with the Lead taking point on this project it will be completed in 2021.

The Ecologist acquired a new vegetation layer from South Florida/Caribbean I&M Network (I&M) and the data has been incorporated into many aspects of the fire planning process. This data layer will assist with the development of landscape level monitoring protocols.

The Fire Ecologist worked with Resource Management to track and report the completion of one BAR project, one is currently in progress and two new BAR project requests were submitted for funding.

We hope to provide additional education and operationally based experiences to our partners and cooperators in order ensure a comprehensive understanding of fire on the landscape. The Fire Ecologist created a social media outreach series. The series released information biweekly throughout the prescribed fire season. Monitoring photographs and educationally information were released to help the public better understand fire effects across the landscape.

Table 8. Fire Ecologist 2020 Accomplishments/Focus Areas

Category	Percent Time	Accomplishments and/or areas of activities
Prescribed Burning planning and prep	42%	<i>Planning for prescribed fire treatments Work with Resource Management and cooperators to capture/update geospatial values-at-risk and reevaluate previous structure assessments. Convert data files types, create new databases, upload information into AGOL.</i>

Category	Percent Time	Accomplishments and/or areas of activities
Training/Conferences	0%	<i>Training limited to the fire refresher due to the pandemic.</i>
Data Collection	3%	<i>Plot work</i>
Data Entry	15%	<i>Enter plot data into FFI. Identify data entry protocol issues and communicate with Regional/National Office and contractor for historical database conversion. NFPORS</i>
Admin / Supervisory / Misc.	20%	<i>Complete seasonal on-boarding/refresher, DOI Talent training, QuickTime certifier, EPAPs were completed for two seasonals and one FTE On-boarding and tracking of four monitoring volunteers General administration/meeting Got approval to fill vacant position and completed new hiring packet for the GS7 FTE position which will start in 2020. By-weekly leadership meetings Tracking RAWs station maintenance and repair schedule Update roles and responsibilities within the Ecology Program PT</i>
Data Analysis	10%	<i>Minimal data analysis was completed. Photopoint plots were visually examined and cross compared with historical fire treatment areas to explore the effects of recent fire treatments. Tracking of ground observations of where treatments are needed in the future and when. GIS data analysis of fires and values-at-risk</i>
Wildfires	3%	<i>Fire assignment to CA</i>
BAR	7%	<i>Work with Resource Management to track funds and complete BAR reports</i>

D. Fire effects crew accomplishments and areas of focus

The 2020 fire effects crew comprised of permanent and seasonal staff, education staff and volunteers. Coordination between educators, volunteers, resource managers, and operational personnel is essential to the Big Cypress Fire Ecology Program. In addition to the hiring of the Lead and Career seasonal position, one additional seasonal position was also hired.

In addition to the 13 off unit prescribed fires, the crew worked on numerous task books on wildfires and held operational leadership roles. During this time the Lead completed Firing Boss and continued ICT4; the senior completed FFT1 and ICT5. The crew continues to develop operationally and will continue working closely with suppression.

2020 is the first year all data has been entered only into FFI and not into the historical database. This transition has been challenging as the ecology program continues to navigate FFI and develop custom protocols better aligned with Resource Management priorities. A contractor has been hired to assist with the data conversion from our historical database the Ecologist and Lead have been providing feedback. Data continues to be written and filed with hard copies as the BICY FFI database continues to develop. We expect the final transfer into FFI to be completed by the June of 2021 and look forward to using the FFI remote app.

Due to a multitude of events (wildfires, hurricanes, exponential invasive growth, etc.) both resource management and fire overhead have expressed concern and interest for capturing

overstory recruitment and age class dynamics. Monitors have begun implementing quadrant overstory counts at every photopoint. This has become a standard and will continue to help managers and crew understand how the overstory responds to treatments as well as track the impacts of wildfires on overstory species.

Throughout the prescribed fire season we worked closely with BICY education staff to cross train and streamline information sharing. We have continued to develop our working relationship with the University of Central Florida with the lead assisting in teaching university students and Florida state parks staff S-130 and S-190.

Table 9. Fire Effects Crew 2020 Accomplishments/Focus Areas

Category	Percent Time	Notes
Data Collection	10%	<i>This includes both photopoints and fuel loading photoseries plots.</i>
Wildfire Assignments (Off-unit)	3%	<i>The crew responded to 4 wildfires off BICY.</i>
Wildfire response (in BICY)	10%	<i>The crew responded to 15 wildfires within BICY.</i>
Prescribed fire projects	15%	<i>Crew lead and assisted in preparation that included Red Cockaded Woodpecker tree clearing, power poll and line clearing, removing hazardous trees and prepping around private properties, mixing fuel and preparing equipment, as well as, scouting burn locations and fuel conditions. Crew assisted as ENGB, FFT1, FFT2 on 13 prescribed fires off-unit.</i>
- Operations	5%	
- Prep / Planning	10%	
Data entry	20%	<i>Completed data entry and quality checked for 2019 into FFI.</i>
Data analysis	1%	<i>Data analysis limited in FFI and for end of year monitoring report.</i>
Supervision / Admin / Meetings	20%	<i>Payroll, travel authorization/voucher, division meetings, hiring process, transition into telework, etc.</i>
Training / Conferences	5%*	<i>Each crew member completed refresher training, python handling, and terra torch operations. Seasonals completed S-200 and WFR refresher. Lead monitor completed S-200 and attended the AFE Conference.</i>
Miscellaneous / Outreach / Research Cooperation	6%	<i>Crew members assisted other divisions with education outreach swamp walks, overview of Fire Jr. Ranger book, and presented at the Wine and Wildlife.</i>
Physical Training	10%	<i>Each crew member is expected to PT for at least an hour every day.</i>

E. 2021 Direction

In the future the BICY Fire Effects program will work toward utilizing field FFI entry for easy data sharing and the utilization of Minitab for data analysis.

Burn objectives within Fire Management Plan are under review, and monitoring techniques will work toward reflecting those changes. With the implementation of quadrant overstory counts we are confident the changes will be streamline and should not interrupt the 2021 monitoring season.

Photoseries data analyses remain incomplete due to higher priority tasks. This project will improve ocular estimates and to provide a detailed picture of fuels throughout BICY. Although not landscape based, the data may be used to validate aerial observations and assessments. This project will continue into FY21.

A Photo Load series will begin in FY21 to improve our data assessment procedures for our primary fuel types. This is a work in progress and will likely take several years to complete. The crew continues to explore Photo Load sampling techniques and look forward to incorporating this into the program. This protocol has potential to decrease in the amount of time at each plot and an increase in the consistency and accuracy of cover estimates. During the 2021 monitoring season the crew will begin to sample species of high importance and create a base line for the BICY photo loading series.

The FFI historical database will continue to be reviewed and edited. Protocols are being fine-tuned and bugs are being fixed. 2020 data will continue to be entered into FFI and will ultimately be merged into the historical database.

F. Overall Data Entry Status and FFI suggestions

Program Data - In an effort to ensure the longevity of NPS fire effects monitoring data, please provide the following:

- List FFI databases for which no new data were collected this year.
 - None
- Estimate of the percentage of your park/network **total** monitoring program data (including past and present data) that has been entered into FFI, or another application, and quality checked (e.g. Are there any non-digital, hard copies of data still floating around out there?)
 - 100% of photoseries project data
 - 100% of 2020 photopoint data
 - 70% of historical photopoint data
- Do you have a need for migration of any data to FFI?
 - Historical data is being entered into FFI via National Office for 2018 and prior.

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

The BICY Fire ecology and fire effects monitoring crew have no FFI feedback at this time.

G. Optional Information

Challenges facing monitoring program:

- Historically the fire effects crew was minimal, 1-2 staff; within the last few years the staff has grown to 2-4 people. However, staff retention has been challenging due to living expenses, and housing concerns.
- Are the current monitoring objectives addressing resource management concerns?
 - o Discussed during meetings with RM.
 - o Objectives are being reviewed and edited.
 - o Additional support options have been identified with South Florida/Caribbean I&M Network.

Additional Monitoring Information:

Zero prescribed fires were completed in FY20. The following are observations made at plots from past treatments and post major wildfire events. Each plot can only be compared to itself using ocular and limited numerical data as significant historical data calculations are unavailable at this time.

LIDE 1 / LIDE2 – Pine Seedlings

This monitoring season we began counting pine seedlings within the 30.5 m radius. One of the more interesting areas has been the Little Deer (LIDE) 1 and LIDE 2 plots. Less than 300 ft apart one another, LIDE 2 had over 80 pine seedlings and zero at LIDE 1. These areas have been on almost the same burn rotation (one exception) for over 25 years. Both plots have very similar age classes of overstory pine trees, however, one of the main differences is LIDE 1's plant community; though a pineland, it is on an ecotone of a cypress strand. This small change in elevation, surface water longevity or other competing plants may have contributed to the lack of pine seedlings.



PINE 3 – Lack of fire / long fire return

This plot has shown significant fuel load accumulation and plant community changes within the last 6-8 years. With the last two fire treatments being in 2000 and 2009 numerous hard wood species and shrubs (red bay and wax myrtle) are growing to overstory heights with a very dense cabbage palm understory. The photos below indicate these changes with a majority of the plot no longer visible and cannot be accurately measured using ocular estimates. With an average of a 10-year fire return interval (FY00 to FY20), the amount of accumulated biomass both horizontally and vertically gives potential for a high severity fire.



Pine 3 2010 – 1-year post treatment

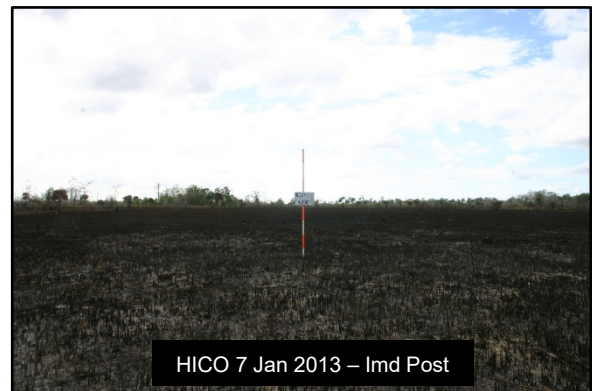
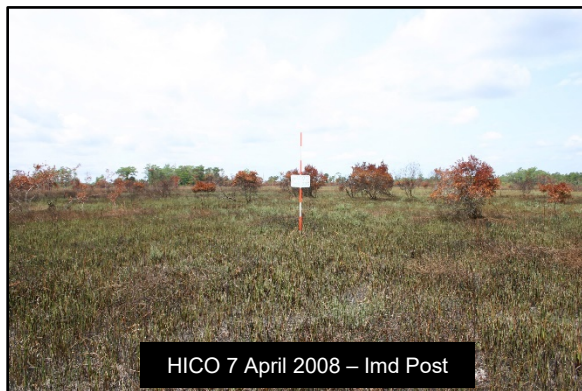


Pine 3 2020 – 11 years post

The monitoring crew will continue to observe and document ecological effects of both wildfires and prescribed fires. New tools are currently being explored to better extrapolate estimates and monitor changes over time. Increased communication with Resource Management and cooperators will allow monitors to explore the effects of these fires on the ecosystem, and its relationship to threatened and endangered species.

HICO 7 – Shrub management with short fire return intervals

Three reoccurring fire treatments 4-5 years apart for the last 12 years have been able to maintain wax myrtle shrub encroachment in this area. April '08 treatment had a significant impact on the regeneration of wax myrtle, with little to no regeneration; the counter can be seen during the January '13 treatment, with numerous shrubs present 4 years later. In the spring of 2020, no wax myrtle seedlings or re-sprouts were counted within the plot area. This has suggested repeated treatments along with burning just before or during the growing season has a strong ability to regulate shrub growth within prairies.



COW 4 – Ongoing effects of Irma

In 2019; COW4 was within the Perrochi Rx, however most of the plot did not burn, believed to be related to low herbaceous fuels and low winds. Pre prescribed fire this plot did not have any fire history for 17 years which caused a drastic change from open prairie to thick wax myrtle shrubland. After hurricane Irma numerous large wax myrtles were blown over, opening the shrub canopy. In 2020 the understory herbaceous cover increased by 20%, and live shrub cover reduced by over 30%. It is unclear how this change will affect future fire treatments, though the higher herbaceous cover may assist in carrying fire through this plot.



COW 4 – April 2017 Pre Irma



COW 4 – March 2020 2.5 yr post Irma

HICO 10 – Missed plot

Comparative photos from 2018 to 2020 make evident this area burned between monitoring events likely during the Avian Complex (May 2018). It is unclear as to why HICO 10 was missed immediately post and 1 year post the wildfire. It is possible due to the proximity of the plot to the fires edge initial GPS fire perimeter tracks did not capture the plot within the fire perimeter. Almost 50% of the pine overstory, with a majority being saplings dead when monitored in Feb 2020.



HICO 10 – March 2018



HICO 10 – Feb 2020

The background pine stand suggests a high severity fire; however, this is outside our plot perimeter therefore trees were not previously quantified. Interestingly this area did burn during the Parliament wildfire in 2017, but the cumulative stress of a wildfire, long duration standing water, hurricane winds, and another wildfire may have contributed to the drastic overstory loss in

the background. Without significant monitoring it is unclear if the overstory severity was caused by the Avian Complex or had delayed post-hurricane effects. What most likely occurred was a cascade of physiological stresses through root damage from both fire and long duration water events that caused high pine mortality.

HICO2 – Wx and water levels between treatments

Understory fuel regulation is an integral part of our burn objectives and this plot shows the variability of our three-year post that is heavily influenced by water levels. The first series is a winter Rx (North 41), where water levels stayed below the surface for five months post fire. After three years the density and height of the shrub understory had returned to levels similar to pre burn conditions.



Below is the same location with an early spring burn treatment (New River Rx). Water levels stay below the surface for 2 months post burn. Additionally, the following 3 years water trend had longer duration and unseasonably wet 2016 winter with the onset of a Super El Niño. Shrub regeneration has been slower to respond, with potentially due to wetter conditions the second treatment experienced.



In 2017 this plot did burn in the Parliament wildfire, unfortunately the immediately post photos were missed. Water levels stayed below the surface for 2 months post fire, with very heavy summer June rains and hurricane Irma shortly after. Feb 2020 (pictured to the right) is three years post, has shrub heights and densities similar to Feb 2016. Short fire return intervals (3-4 years) coupled with historic seasonality has allowed us to meet our burn objectives concerning shrub / understory height and density. Below are the cumulative water levels graph (Fig 1) with these treatments and time between monitoring events.



HICO 2 – Feb 2020 3 yr post

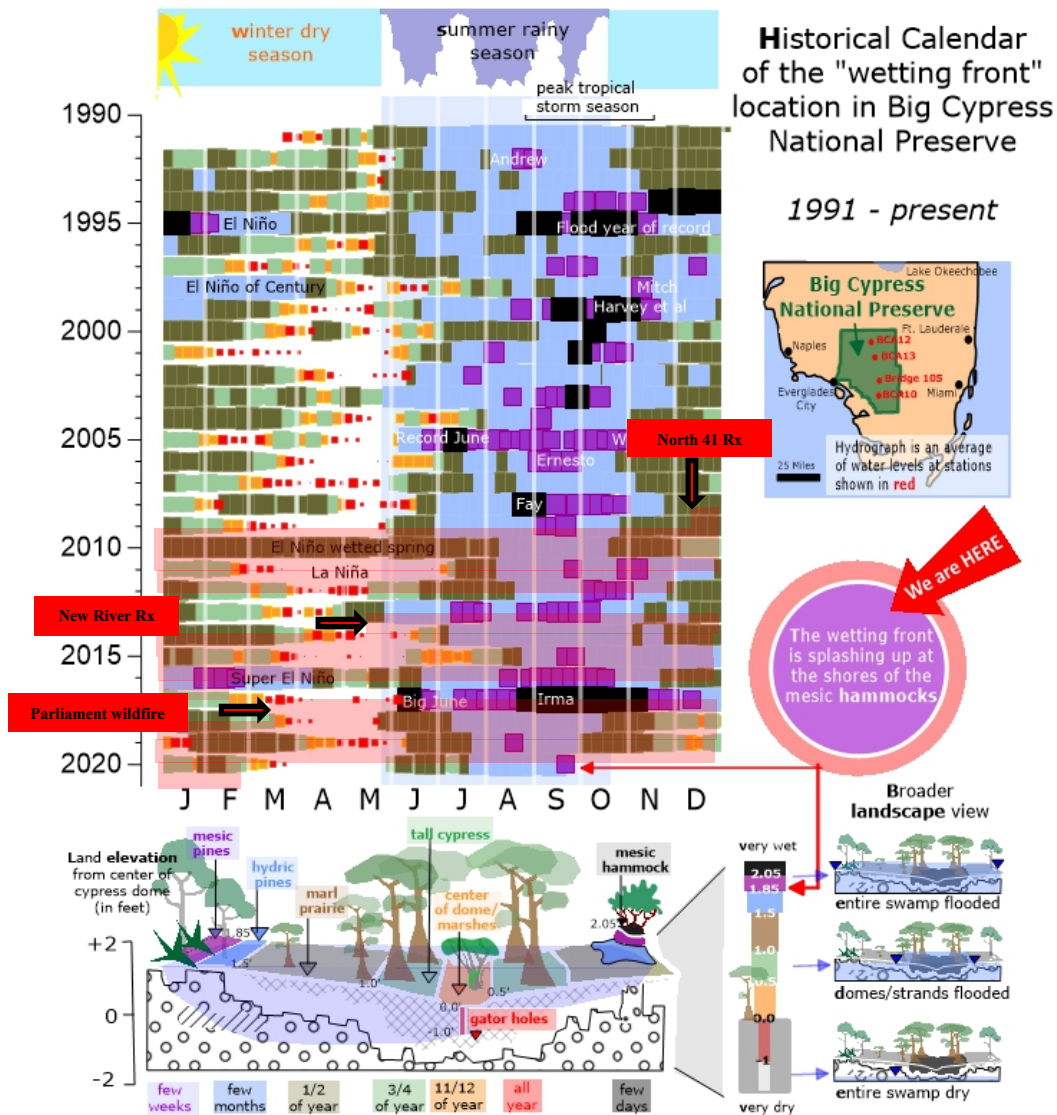


Figure 1: BICY Hydrological Historical Calendar

SKIL 3 – Terra torch effects

This plot has allowed us to compare the effects on a hedge row using hand ignition vs a terra torch. Hand ignition was able to top kill most of the hedge row, leaving the center of larger shrubs untouched. One-year post, a majority of the shrubs have survived or have re-sprouted. The terra torch has top killed the entire hedge row, with a significant reduction in height and density one-year post. With the terra torch's longer duration heat resonance time this has produced more desirable effects along this hedge row.



2020 Fire Season

19 wildfires occurred within Big Cypress, ranging from less than an acre to 25,000 acres. A majority of the small fires (less than 1 acre) occurred during the dormant season. These consisted of low fire behavior and were all human caused. It wasn't until the growing season large active fires took precedent and were primarily human caused. Late growing season (June and July) fires were for a majority managed and maintained low to moderate fire behavior and were lighting caused. The following are highlights from the 2020 season.

The Silver King Fire (620 acres)

This fire started late in the day on April 10, 2020 by a power box being struck by lightning. Initial fire behavior was moderate with 15-20ft flame lengths, burning in primarily pine and the herbaceous / shrub understory of cypress (Image 1). Due to the fire's proximity to inholders and a slough with threatened and endangered plant species it was fully suppressed. Portions of this area had two past treatments within 5 years, however there were areas with over 30 years of no fire history.

Pine crowns were 50-95% scorched, as wind and low RH heavily influenced fire behavior causing single tree torching. No crowning was observed. As extended attack continued the fire moved through cypress domes with ease as water levels were well below the center of the domes. This allowed for the heavy duff and litter component within domes to continue to burn (Image 2). Within days of the fire consuming these layers numerous cypress was observed falling down within the domes. Duff and litter continued to smolder within the fire well into May. The southern portion of the fire crept toward Mullet slough (which rarely sees fire as it historically always contains water), without suppression actions it is possible fire could have continued to move through the slough.



Image 1: Silver King Fire Southern flank



Image 2: Silver King Fire Cypress

10 Mile Corner – Moon Fish (25,000 acres) and Guava Fires (28,000 acres)



Image 3: Moon Fish Initial Attack

The Moon Fish fire started May 7th in the early afternoon, burning in marl prairie and dwarf cypress with active fire behavior (Image 3). Water levels were at unprecedented lows, with the location primarily accessible by aircraft only most of the year if not year-round. RH values were regularly below 30% for days before and during the fire. On the day of ignition RH values reached a dramatic low of 18% with wind gusts at 15 mph. Fire behavior increased significantly on May 8th with continued low RH values and wind gusts reaching 20+ mph. Herbaceous fuels, dwarf cypress, and small hardwood hammocks were completely consumed (Image 5). Interestingly portions of the dried periphyton did burn but a solid layer of unburned dry periphyton remained within most of the fire area.

Large hammocks had significant fire damage to the edges but maintained unburned or low severity centers. Due to the high grass component Landsat imagery showed low to moderate severity across the burned area (Image 4).

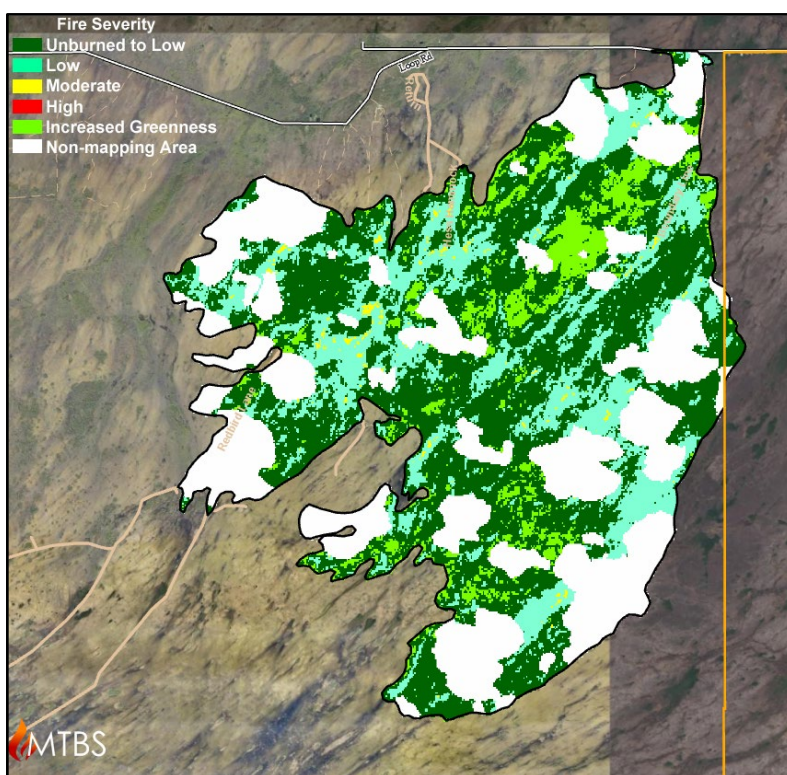


Image 4: Moon Fish Landsat Severity

By May 25th cumulative precipitation within the fire area was over 9 inches. The fire area quickly flooded, and an algae bloom was observed throughout the fire scar (Image 6). This is assumed to be the “increased greening” on the Landsat imagery.



Image 4: Moon Fish Aerial View May 12, 2020

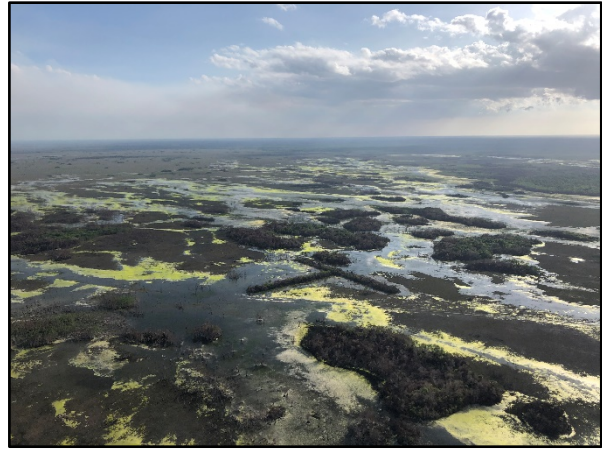


Image 5: Moon Fish Aerial View May 30, 2020

The Guava fire was started on May 27th by lightning in the Everglades National Park and was due south of the Moon Fish scar. Only a small portion of this fire burned within the Big Cypress boundary, running into the Moon Fish fire scar. This fire showed similar fire behavior as the Moon Fish and burned in similar fuels. However, this fire maintained movement through grass islands surrounded by water on the southernmost edge (Image 6), and was largely fuel and wind driven.

The two fires combined burned over 53,000 acres. Water levels within the fire scars were at historical lows. Using the Everglades Depth Estimation Network (EDEN) for Support of Biological and Ecological Assessments we can emphasize the rarity of this fire event. The Ten Mile Corner water station on the day of ignition (May 7th) for the Moon Fish was -0.21 feet below the surface (Figure 2.), with the lowest value at -0.52 feet on May 14th. This station is not within the Moon Fish burn area but is within the Guava wildfire, on the boundary of Big cypress and Everglades in a sawgrass prairie. Water levels were so low crew members were able to drive the entire length of the Moon Fish fire to the southern end. The BCA20 water site (on the western boundary of the Moon Fish) is within the Tiger Hammock; water levels here were the lowest on record (0.68 feet) for the history of this site (in 30 years, Figure 3.). This was reflected in the fires ability to actively burn through and maintain heat in most of the hardwood hammocks within the fire area.



Image 6: Guava Southern Edge May 30, 2020

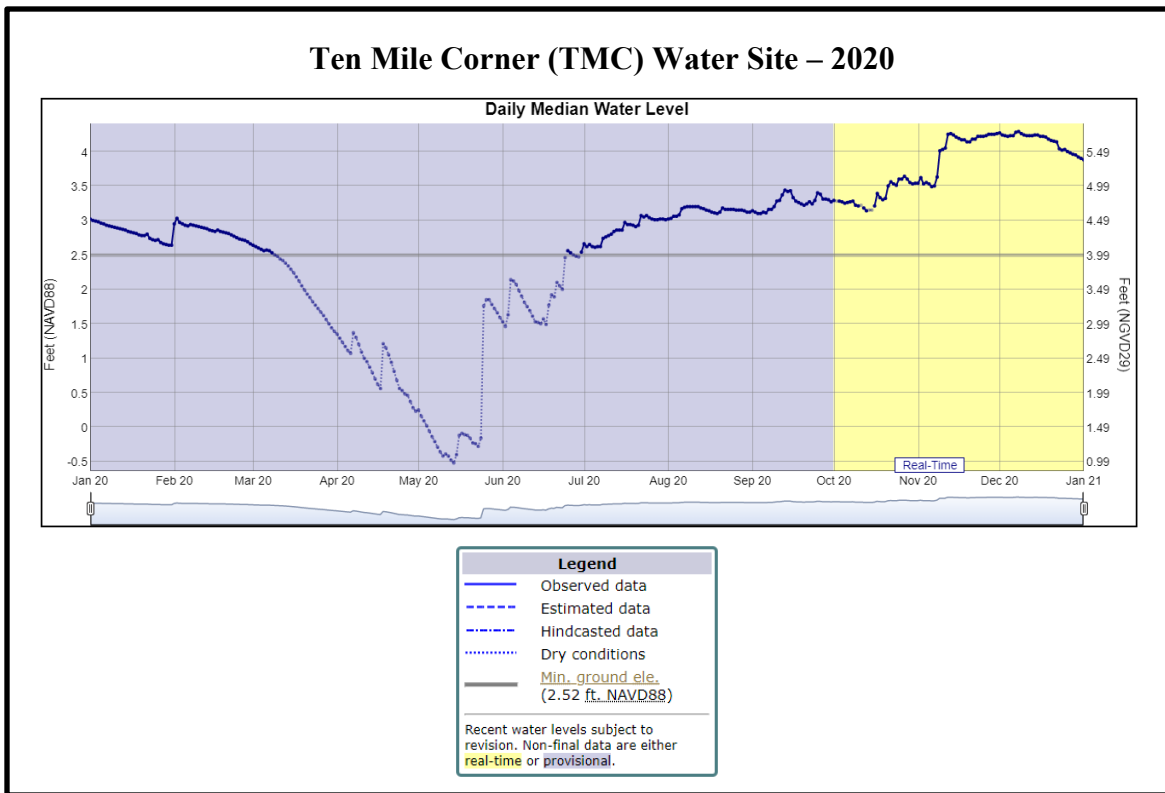


Figure 2. TMC water site 1990-2020

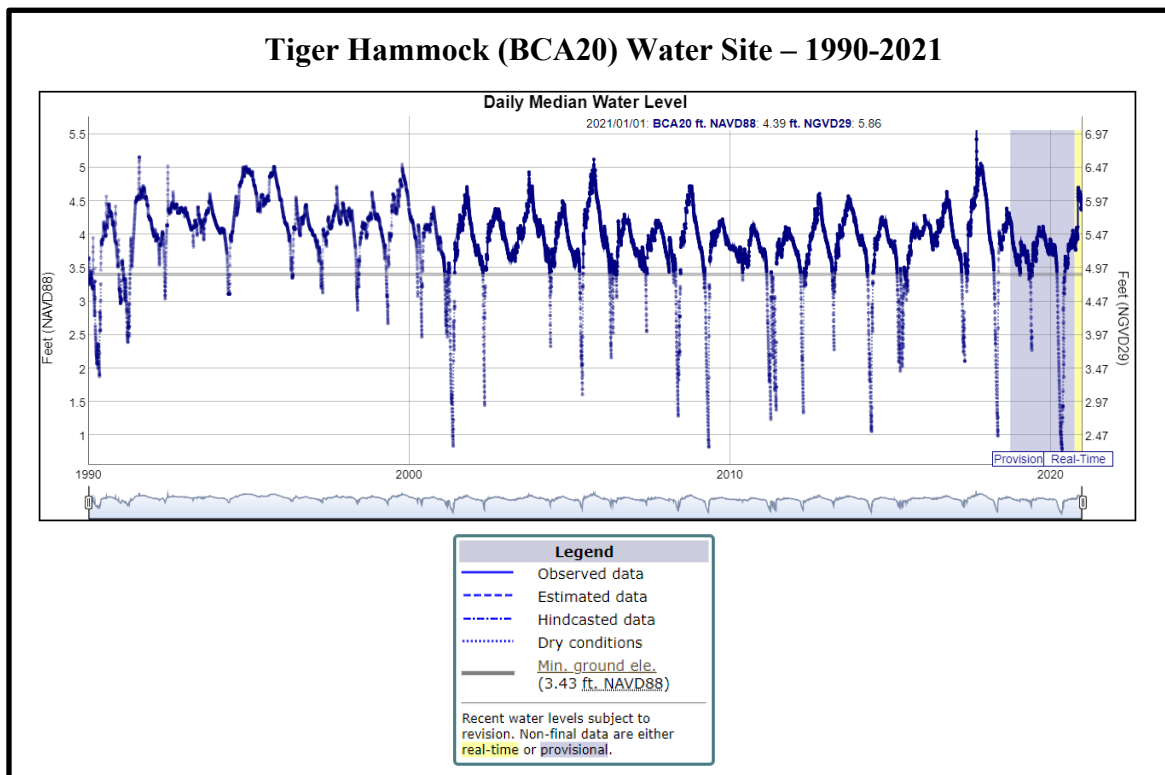


Figure 3. BCA20 water site 1990-2021

Within the boundary of Big Cypress both the Moon Fish and Guava fire burned in areas with no documented fire history since 1978. Fire history within this area (represented in green) was a mix of both prescribed and wildfires. Since 1978 over 68% of the 2020 burned areas have not seen a fire treatment (represented in blue and purple). It is assumed this area has burned in the past, yet the frequency and size are undocumented. Both the seasonal low water levels within the prairie and historical low levels within the hammocks reflect the fires ability to move quickly and spread across the land scape.

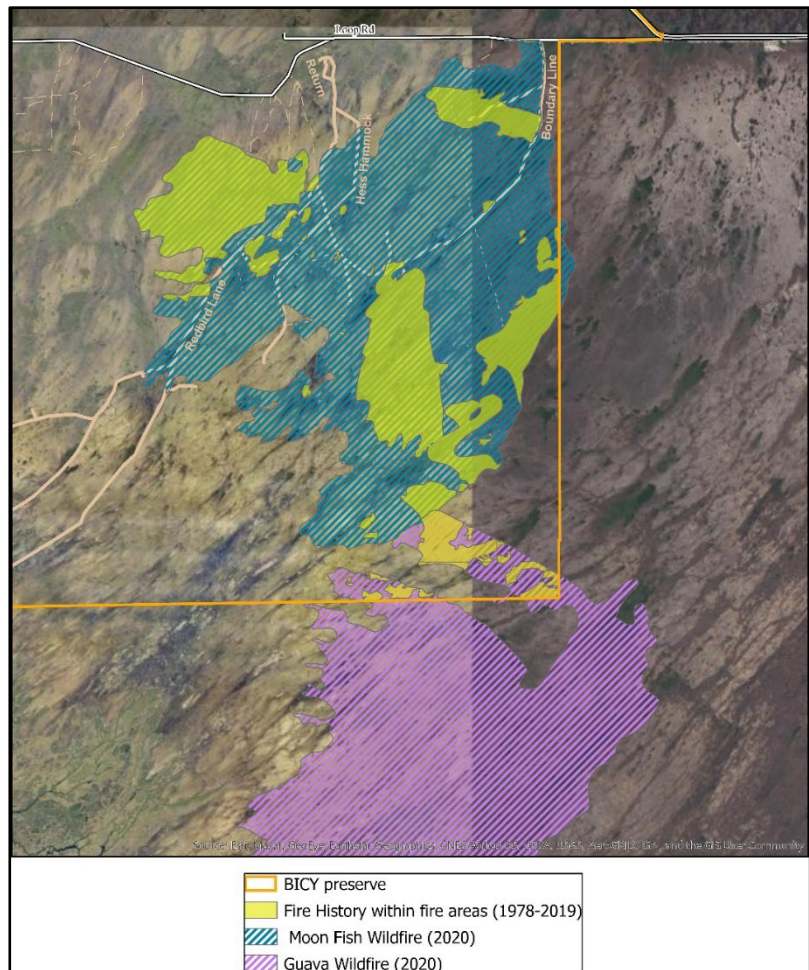


Figure 4. Fire history within BICY at the 10 mile corner

Late Growing Season Fires – June - August

11 wildfires were detected during the late growing season. Ranging from less than an acre to 163 acres, all but one of these fires was managed and light to no suppression actions were taken. Fire behavior was low, with low overstory scorch heights over a majority of the fire areas. Smoldering did continue days after ignition and continued to do so until the late summer rains.



Image 7. Cobia Fire June 2020