2018 SANTA CRUZ ISLAND FIRE FACILITATED LEARNING ANALYSIS

Channel Islands National Park

National Park Service, Pacific West Region

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Executive Summary

In March 2018, Channel Islands National Park (CHIS) initiated mechanical tree removal and pile burning operations. The work is part of a long-standing project with the goal of removing eucalyptus trees to reduce hazardous fuels and restore ecological and hydrologic processes in several areas on Santa Cruz Island. With favorable conditions, including several inches of rain, a number of piles were burned successfully for two days. Burn piles were monitored, patrolled and mopped up twice daily for the subsequent five days. On the morning of March 27, 2018, patrol and mop up actions continued until about noon, then at approximately 14:00, fire was detected outside the piles and actively moving. A wildfire was declared and suppression efforts initiated. Command of the wildfire transitioned to an on-site Type 3 incident commander and then subsequently to a local Type 3 incident management team. The weather changed to conditions more favorable for suppression efforts and containment of the fire was quickly gained. The wildfire area totaled approximately 258 acres.

Project History

Channel Islands National Park was established to preserve the outstanding natural and cultural resources on San Miguel, Santa Rosa, Santa Cruz, Anacapa and Santa Barbara Islands, including the rocks islets, submerged lands, and waters within one nautical mile of each island. Santa Cruz Island, the largest island in the park, supports a rich assemblage of rare and endemic species. The island is approximately 20 miles offshore from Ventura, California and supports biological diversity and archeological resources of international significance. The island is managed cooperatively under separate parcel ownership by The Nature Conservancy (TNC) and National Park Service (NPS) as a single ecological unit.

A joint TNC/NPS project was developed to remove eucalyptus trees in several groves on Santa Cruz Island to reduce hazardous fuels, which posed a fire risk to highly valuable resources and assets, and to restore ecological and hydrologic connectivity between stream channels, the floodplain and coastal wetlands.

"Ecologically speaking, this is one of the most successful projects ever." -Ecologist

The long-term, phased project consists of felling eucalyptus trees, piling the logs and wood material by hand and heavy equipment into piles and burning the piles to both remove biomass and create cleared areas for additional felling. This project was well underway with more than 10 years of successful implementation.

Description of Events

Pre-planning and coordination for the continuation of work on the project began in early fall 2017. Work was postponed due to significant incident response needs in other parts of California and the United States for wildfire, flooding, debris flows and hurricane response, as well as logistical challenges and lack of available personnel.

"We were burnt out by January, but we're hard chargers and going to try and get stuff done" -Park fire management

> "In the pre-planning process we'd get lined up good, but the compliance or logistics or incident response or scheduling conflicts kept popping up. We really had to work to drum folks up."
> -Park fire management

In January 2018, coordination for implementation began again. Fire management ran into additional challenges due to availability, logistics, and incident response to flooding events in southern California.

Eventually, coordination issues were resolved and implementation was scheduled to begin. Discussions were on-going with the resource project leader, fire management officer (FMO), agency administrators, TNC staff, resource and compliance specialists, and operational personnel. The FMO, acting superintendent and superintendent engaged in a thorough discussion about implementation plans and reviewed the Agency Administrator Go/No-Go Pre-Ignition Authorization Checklist. The acting superintendent signed the checklist after conversation with the superintendent who was away from the park.

Personnel arrived at CHIS for transportation to Santa Cruz Island on March 18, 2018. The priority was additional tree felling with the expectation that some pile burning would be needed to provide enough clearance for continuation of safe tree felling operations. The plan was to conduct operations at both the Bosque de Cabrillo (Bosque) and La Selva groves. March 19 and 21 provided an adequate window of opportunity for burning piles with rain forecasted for several days.

Piles were burned at the Bosque grove March 19 with some issues of spotting into sloughing bark and fire creeping into adjacent piles. Resources were able to adequately address these issues. The piles were 'chunked and mopped up' with few additional issues.

Figure 1: Bosque grove, notice fire in bark slough and creeping ground fire at base of tree.

Figure 2: Bosque grove, notice water in roadway

With significant rain predicted for the next several days, the decision was made to move operations to the La Selva grove. Previous heavy rains had damaged the road along the Bosque grove. Managers wanted to minimize possible damage from heavy equipment and fire vehicles to the roadway accessing the Bosque grove during this predicted rain. Also, additional productivity could be gained at La Selva grove given the greater number of trees and easier travel access to that site. A patrol and mop-up plan was devised and executed for the Bosque grove. Later in the day on March 20, some personnel began transitioning to the La Selva grove.

Figure 3: Le Selva grove, notice flatter terrain and easier access.

Pile burning continued on March 21 at La Selva under steady rain. From March 22-26, personnel split into two groups, one to focus on cutting and one to focus on patrol/mop-up of burn piles. The burn boss assisted as part of the burn pile patrol group. Burn piles were worked twice daily, pushing material in, securing the edges and chunking piles. Each morning, the piles were worked for several hours and then again in later afternoon for another several hours. On the night of March 22, there was a small amount of creep out of one pile in some of the grass thatch, but there was no smoke in the morning of March 24 and the burned area was found to be cold. As would be expected, each day seemed to show consumption of material, a decrease in heat and generally less activity of the burn piles.

"My mindset was we needed to get production done."(In reference to splitting into 2 groups) -Burn boss

"Everything went well. We could have burned every pile out there during the shift, but we were thinking ahead. We knew we'd need to chunk and patrols these and also needed to get stuff cut. We only wanted what we could reasonably deal with."
-Burn boss

Figure 3: La Selva grove pile burning near ranch. Notice rain in roadway.

Figure 4: La Selva grove piles burning 3/21. Notice no movement in grass thatch and good consumption of pile material.

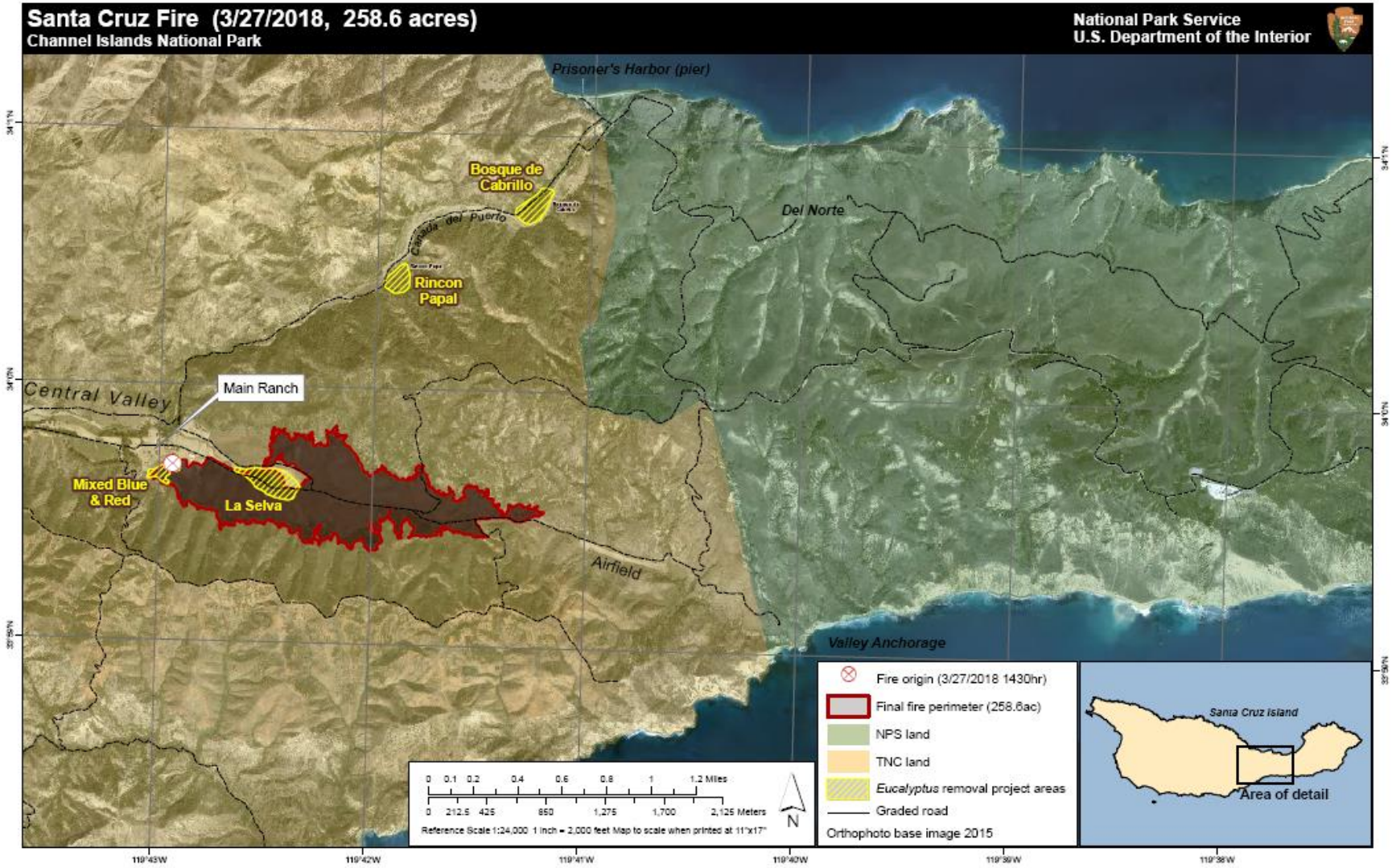
On March 27, personnel began their normal workday with a thorough briefing including priorities, assignments, weather, intent and end state, medical extraction, equipment logistics, transportation plan. Personnel again split into two groups, one to focus on cutting, the other to focus on burn piles. That morning, the piles were patrolled until about noon with no concerns indicated. All personnel were now at the cutting site. At approximately 14:20, smoke was observed at the burn pile site from the cutting site and personnel quickly responded. Upon arrival, several acres of active moving fire was observed. The burn boss quickly assumed the role of incident commander. Prioritized values at risk were quickly identified, organizational assignments were made, and suppression action was taken to protect priority assets and resources. Resources began 'point protection' of values and assets with direct line construction and use of the type 6 engine. At approximately 14:50, a wildfire was declared with notification to dispatch and the FMO. Additional resources ordered included aviation and ground resources. Additional required notifications were made.

"We had already identified values at risk and were on the same page. That was key to fast response"
-Operations Chief

On March 28, incident command transferred from the burn boss to a qualified incident commander type 3. In the subsequent days, command transferred to a local type 3 team. Weather conditions became more favorable for reaching incident containment. In the end, the fire grew to approximately 258 acres. There were no major injuries or significant loss of structures or infrastructure. The initial damage assessment indicated the fire had impacted a storage shed and 3inoperable vehicles. No fire investigator (INVF) was ordered to complete a thorough cause and origin investigation of the wildfire. There are no known witnesses

to positively establish fire movement from a burn pile to surrounding vegetation. There was an attempt to protect the suspected origin but the area was disturbed during suppression actions.

Figure 5: Time lapse photos of burn piles at La Selva grove near Main Ranch, March 21-22.


Santa Cruz Fire (3/27/2018, 258.6 acres)
Channel Islands National Park
National Park Service
U.S. Department of the Interior
Prisoner's Harbor (pier)
Bosque de Cabrillo
Cañada del Puerto
Rincon Papal
Del Norte
Central Valley
Main Ranch
Mixed Blue & Red
La Selva
Airfield
Valley Anchorage
Fire origin (3/27/2018 1430hr)
Final fire perimeter (258.6ac)
NPS land
TNC land
Eucalyptus removal project areas
Graded road
Orthophoto base image 2015
0 0.1 0.2 0.4 0.6 0.8 1 1.2 Miles
0 212.5 425 850 1,275 1,700 2,125 Meters
Reference Scale 1:24,000 1 inch = 2,000 feet Map to scale when printed at 11"x17"
N
Santa Cruz Island
Area of detail
34°1'N
34°0'N
33°59'N
119°43'W
119°42'W
119°41'W
119°40'W
119°39'W
119°38'W

Chronology of Events (edited and condensed)

Oct-17	
	Discussion of project implementation pre-planning and scheduling. Implementation delayed due to fire activity and hurricane response.
Nov-17	
	Discussion of project implementation pre-planning and scheduling. Implementation delayed due to fire activity and hurricane response.
Dec-17	
	Discussion of project implementation pre-planning and scheduling. Implementation delayed due to fire activity in southern California (Thomas Fire).
Jan-18	
	Discussion of project implementation pre-planning and scheduling. Implementation delayed due to response activity in southern California flooding and debris flows.
Feb-18	
	Discussion of project implementation pre-planning and scheduling. Implementation delayed due to training, logistical challenges, lack of available personnel.
Mar-18	
	Discussions of project implementation and scheduling. Personnel available, logistical considerations worked out.
March 18, 2018 (2.73 inches of precipitation in the previous 7 days)	
	Seven personnel boat transport to Santa Cruz Island with equipment, conduct site assessment, plan of work, make assignments and conduct thorough briefing. No piles burned, work only on machine access. Submit spot weather forecast request in after12:00. Contact dispatch center for notifications and establish communication. Talk with the FMO regarding smoke, burn day status, expected accomplishments next shift, review of burn plan and the Agency Administrator Go/No Go Checklist.
March 19, 2018 – Burn Day – Bosque site – 6 piles (Cool dry day)	

	07:00 Briefing, main ranch, cover weather, emergency procedures, transport, and strategy for the shift. Plan to evaluate weather conditions for pile burning at Bosque, target piles closest to eucalyptus stand in order to open future lay for felled trees. Weather is favorable, conduct burning of a few piles (begin 09:15, complete ignitions 10:00). Burn boss and T6 engine with personnel monitor piles with several personnel proceed to tree cutting.
	11:00 Spot fire is 50 plus feet up in crotch of a large eucalyptus tree in some bark slough that caught in a limb crotch. Burning material had fallen to the ground creating several small spots in the ground fuel adjacent to the involved eucalyptus tree.
	11:30 Saw crews called back to assist with spots as well as excavator. Execute some handline, wet line, easily contained no additional movement.
	12:30 Ground fire extinguished and fire in the eucalyptus burns out.
	15:00 Conditions calm, all burned piles look good, no issues.
	17:30 Return to main ranch for saw refurbish, submit spot forecast, contact FMO with accomplishments, plan to burn no piles next shift, "chunk what we've got and fell additional trees."
March 20, 2018 (.07 inches of precipitation for the day)	
	07:00 Brief at main ranch, weather, emergency procedures, transport, and strategy for shift.
	Plan to "chunk" piles by hand and with equipment at Bosque from day before; main focus is securing piles. No piles to be lit this shift based on extended forecast of heavy rains, which could possibly limit or shut equipment operations down due road damage.
	No issues with piles through shift, all slops hand felt, cold.
	17:00 Based on forecasted rain event, need for equipment at La Selva for planned ignitions next shift. Submit spot forecast for next shift. Contact FMO, plan for La Selva, burn piles with rain, no equipment access to project during rainy weather.
March 21, 2018 – Burn day – La Selva – 21 machine and 15 hand piles (1.49 inches of precipitation for the day)	
	07:00 Brief main ranch, weather, emergency procedures, transport and strategy for shift. Based on active rain overnight into the morning, plan to burn piles at La Selva, supported by heavy excavator. Areas of focus behind main ranch buildings, La Selva grove eucalyptus removal piles.
	08:30 Test fire is initiated and ignitions begin on handpiles above main ranch on ridge. Approximately 15 piles ignited. No creep, no scorch, active rain, wind is not a factor.

	09:00 Test fire successful. Handpiles move past initial pulse and flare up with no issues.
	09:45 Group moves to ignite machine piles behind main ranch. Two piles ignited initially with same outcome, no issues. Machine piles burn down 20 minutes.
	11:00 All personnel move to La Selva on foot, based on poor road conditions. Total of 16 piles ignited at La Selva. Focus on east end of unit, piles that are independent of others, with good spacing and machine berms.
	12:00 Ignitions complete.
	18:00 Excavator finishes shift working to clean up downed and un-piled material from 2017 felling operations. All ground personnel are assigned to monitor burning piles.
	19:00 Spot weather forecast request submitted for following shift, contact unit FMO to inform him of total pile accomplishment and that we were not planning on igniting additional pile during the project duration for this year; we would be in a holding pattern, patrolling and chunking.
March 22, 2018 (.56 inches of precipitation for the day)	
	07:00 Brief main ranch, weather, emergency procedures, transport and strategy for shift. Main objective chunk all piles, by hand and/or with excavator throughout shift, secure piles by end of shift utilizing wet weather and rainfall.
	08:00 Excavator engages at La Selva piles, chunking yesterday's burn piles. Ground personnel to hand chunking piles and utilize the machine where possible – areas of focus behind main ranch, La Selva piles.
	Equipment is very effective re-piling large material. Active rain, no creep issues, continued burn down throughout this shift.
	Ground personnel actively chunking, securing edges of piles, assisting equipment with access and priorities.
	18:30 Return to main ranch for tool refurbish, request spot weather forecast for following day.
March 23, 2018 (cool dry day)	
	Brief 07:00 main ranch, weather, emergency evacuation, transport, logistics, and strategy for the shift. Weather forecast favorable for moving crew and excavator back to Bosque unit. Remaining smoldering piles to be patrolled and mopped up twice a day – morning, and after 12:00 with engine and two personnel.
	08:00 Saw teams with an archeologist move down to Bosque to begin project work.

	08:00 Two personnel to main ranch, La Selva, to chunk and mop up the machine and hand piles with engine. Personnel mop up all perimeters, cut and chunk large material where possible into center of pile footprints. Majority of the pile edges secured via equipment activity – deep, hot ash piles remain in most piles. Utilize several tanks of water from engine on mop up.
	17:00 Engine with two mop and secure Bosque piles, up to La Selva/ main ranch piles to secure, mop and patrol piles. No control issues observed; continue to hand chunk interior material, secure pile edges, and spreading material where applicable.
	18:30 Return all personnel to the main ranch. Request spot weather for next shift.
March 24, 2018 (cool dry day)	
	07:00 Brief personnel on weather, emergency evacuations, logistics, transportation, strategy for shift, and equipment operations. Plan is for saw teams to work at Bosque all shift. Based on high winds overnight, engine with two to mop La Selva and main ranch piles in AM, engine down to Bosque piles near lunch to mop piles.
	08:00 Engine with two to La Selva and main ranch piles. Observed creep overnight from furthest east pile in La Selva. Creep pushed by high wind overnight, located in "thatch" of grass crop, one large stump adjacent to original piles, one-half acre total. Patrolled and mopped up overnight creep – no perimeter movement, no control issues. Continue to mop, turn over, and spread out remaining ash piles. No further chunking done, all heat on heavy woody materials sprayed out. Both La Selva and main ranch piles looking very good no smoke showing on any piles. Hot interior ash piles remain, will require continued engine support. Six tanks from engine expended.
	13:00 Engine moved to Bosque. Bosque personnel work with equipment to clear creek and pile previous material. Sawyer continues to fell trees for piles. Engine with two mop up and secure Bosque piles; looking very good, no smoke showing, some heat found in ash piles, root pit, and buck one heavy log.
	18:00 Engine returns to ranch to patrol La Selva. Personnel walk main ranch piles. No water utilized, no bucking needed, no smoke showing.
	19:00 Return to main ranch. Request spot weather forecast for next shift.
March 25, 2018 (Cool breezy day)	

	07:00 Briefing weather, emergency evacuations, logistics, transportation, and strategy for shift, equipment operations, and boat schedule. High winds overnight, continued warming and drying. Mop up focus on the piles at Bosque to allow piling via incoming saw teams on burnt pile footprints. Additional personnel to arrive via boat at 12:00 as planned.
	08:00 Engine assigned to patrol and mop at La Selva and the main ranch. Piles look very good. Largest ash piles still being turned over and sprayed. No bone piling of large unburnt material, mop up only.
	11:00 Engine and remaining personnel en route to Bosque for equipment operations, check piles, and continue felling project.
	13:00 Boat lands with additional planned personnel. Nine personnel inserted. Total of 13 now assigned to project.
	16:00 Additional personnel return to Bosque to view project.
	17:30 Return to ranch. Engine with two personnel patrol La Selva, main ranch piles. No mop up, no smoke showing.
	19:00 Engine returns to the main ranch, request spot weather forecast for next shift.
March 26, 2018 (Hot, dry and windy day)	
	07:30 Briefing bunkhouse, weather, hazards, medivac plan, transportation, logistics, equipment, strategy for shift. Split felling project into two groups, medic on site. Engine with two patrol and mop up piles La Selva/ main ranch. One tank expended. Piles looking good. No smoke shown, hot interior ash pits, pile edges secured.
	10:00 Engine 75 travels to Bosque.
	17:00 PM patrol of piles with engine with two personnel. No issues, patrol only, no smoke or hot edges.
	18:00 Personnel return to the main ranch. Order updated spot weather forecast.
March 27, 2018 ESCAPE DAY (Hot, dry and windy day)	
	07:30 Briefing bunkhouse, operations, medical extraction, equipment logistics, transportation plan, boat schedule, and strategy for the project. No projected changes to previous shift with exception of personnel on engine.
	08:00 Engine with two personnel patrol La Selva, main ranch – work heat in La Selva, main ranch indicates no smoke and showing no concerns.
	12:00 All personnel at Bosque grove.

	14:20 – Smoke observed over south ridge, immediate departure from project to La Selva. Engine with three personnel, pickup with three personnel en route to main ranch. Radio traffic received regarding fire at main ranch. SEKI Dispatch requesting update and response needs.
	14:45 Arrive main ranch – Observed: Approximately 5 acres, very active fire behavior, and very close proximity to main ranch structure complex. Update to SEKI – continue response from Santa Barbara, request aviation support (rotor wing). All project personnel en route to main ranch. Begin handline construction to secure threatened structures, scout east toward head for containment options.
	14:50 Contact FMO to inform of escape. Declare a wildfire – Santa Cruz Island Fire – ICT4 – 10-20 acres.
	Switch over to Los Padres Interagency dispatch (LP) and order: air attack, three fixed wing air tankers (retardant), request rotor wing, and request two T1/T2 initial attack crews.
	15:00 Indirect line established to protect structures/infrastructures. Make contact and implement evacuation of campgrounds, research sites and cooperator sites.
	16:00 Update FMO and dispatch: 40 acres, active fire spread, moving to the east, and the structures threatened. Repositioning some assets out of path of fire (vehicles, aircraft, etc.).
	16:37 Air attack on scene and size up 100 acres. Retardant dropped at heel and main ranch. Air Attack 210 orders load and return on aircraft. Place an order with LP for two additional fixed wing from San Diego. Informs IC that it is a no-go on rotor wing due to no dip sites on the island and tanked helicopters will not utilize the saltwater.
	17:00 – Update to FMO, update to dispatch, update to National Park Service island manager for park superintendent and chief ranger briefing. Issues with aircraft availability. 2 crew orders filled. Handline checks western spread, securing the structures. Ground personnel remain focused at heel and structure defense. Additional fixed wing drops – heel, head.
	18:00 Update FMO and LP - 120 acres and fire status. Set aviation order next shift for air attack, 3 tankers committed, 3 rotors on order.
	22:00 Release all but three personnel to bed down, fire dying down.
	24:00 Return to bunkhouse. Plan for brief 06:00.
March 28, 2018 (Hot, dry and breezy day)	
	06:00 Transition from ICT4 to ICT3. Type 3 ad hoc team order filled and en route. Fire size estimated at 100 acres.

Analysis of Prescribed Fire Conversion to Wildfire

Adequacy of Prescribed Fire Plan Compliance with Policy and Guidance

The review team for the 2018 Santa Cruz Island Fire found the prescribed fire plan did not fully meet current policy and guidance. However, the shortcomings the review identified were not determined to be contributing factors to the resultant conversion to wildfire.

The Santa Cruz Island Hazardous Fuels Burn Pile Plan was signed October 2013 and was approved for 2013-2018. In December 2013, the NPS issued a memo requiring all new prescribed fire plans to follow the 2014 Interagency Prescribed Fire Planning and Implementation Procedures Guide (2014 RX Guide), PMS 484 (released 11/2013). In April 2017, the NPS issued a memo requiring all burn plans use the 2014 RX Guide by October 1, 2017. The Santa Cruz Island Hazardous Fuels Burn Pile Plan was not updated and followed the 2008 guidance.

The complexity analysis provided to the review team did not have the signatures of the FMO, burn boss or agency administrator; all three individuals were articulate in their knowledge and understanding of the content of the analysis during discussions. The review team recognizes that, due to fire management personnel changes, these documents may have been signed and simply not transferred to new personnel. This highlights the importance of project file retention, record transfer, and review.

The Santa Cruz Island Hazardous Fuels Burn Pile Plan maps do not meet the requirements for map standards such as preparer name, cardinal direction, scale, etc. Additional project maps, meeting those standards, were available and used by personnel as supplemental products but were not included in the prescribed fire plan.

Several prescribed fire plan elements including Element 7: Prescription, Element 16: Holding Plan, Element 17: Contingency Plan, have inconsistencies and do not fully address require information or do not adequately address all phases of prescribed fire operations. Their prescription states “the project will take place when the surrounding vegetation’s fuel moisture is above the moisture of extinction”, the Hot or Optimum prescription would not put adjacent fuels within moisture of extinction. Some parameters also do not correlate with calculations, such as temperature and relative humidity parameters do not correlate to fuel moisture prescriptions. There is a lack of adequate foresight into conditions, actions, and procedures for the mop-up and patrol phases. Element 16 does not list critical holding points or activities, it simply states to “confine burning to piles.” It does not refer to critical structures or infrastructure nearby. Element 4C: Description of Unique Features addresses unique cultural and natural resource portions but does not address structures or infrastructure either. Element 16 also does not address requirements for patrol or mop up phases. Element 17 sets only one trigger point of “Multiple spots from embers would trigger a need to modify plan. If spot fire cannot be extinguished with resources on hand declare a wildfire,” and does not identify additional resources required.

Following Prescribed Fire Plan Prescription, Actions and Procedures

The review team found that the prescribed fire plan prescription, actions and procedures were followed as set forth in the plan. The personnel took very prudent actions during the planning, ignition, mop-up and patrol phases, and wildfire declaration, demonstrating a high level of thought and competency beyond the prescribed fire plan requirements.

A burn plan should be written so an individual unfamiliar with the area could take the plan and successfully complete the project. The burn plan was thoroughly reviewed, post fire, to develop suggestions for improvement and examine possible contributing factors. As with nearly all burn plans, especially those using the older template, there are numerous suggestions that could improve the plan, however, the review team found no factors in the plan that contributed directly to the wildfire declaration.

Environmental and Fire Behavior prescriptive elements were found to be in conflict with each other and the narrative prescription. For example, the "Hot" prescription is in conflict with "the surround vegetation's fuels moisture is above moisture of extinction." In addition, a fuel model is not identified in Fire Behavior Prescription. No empirical data or fire behavior model runs were provided to demonstrate validity of prescription to meet objectives, controllability or necessary personnel. Prescriptive parameters also do not correlate with other plan element requirements. The plan requires specific contact and use of individuals rather than positions. Since the plan is several years old, a number of the individuals are no longer in the positions identified in the plan. The plan does not fully address and lacks specificity of current smoke management and air quality compliance requirements. The medical response information and direction is inadequate. The plan lacks clear identification of critical areas, values of concern or actions to be taken to protect highly valuable resources and assets. There is a lack of adequate procedure or direction for mop-up or patrol.

It is important to note the piles were ignited at the low end of the prescription when adjacent fuels were above the moisture of extinction. At the time of ignition, spot weather forecasts also indicated conditions would stay within prescription for several days. The plan has some references to patrolling and early detection, but does not include a patrol and mop up plan.

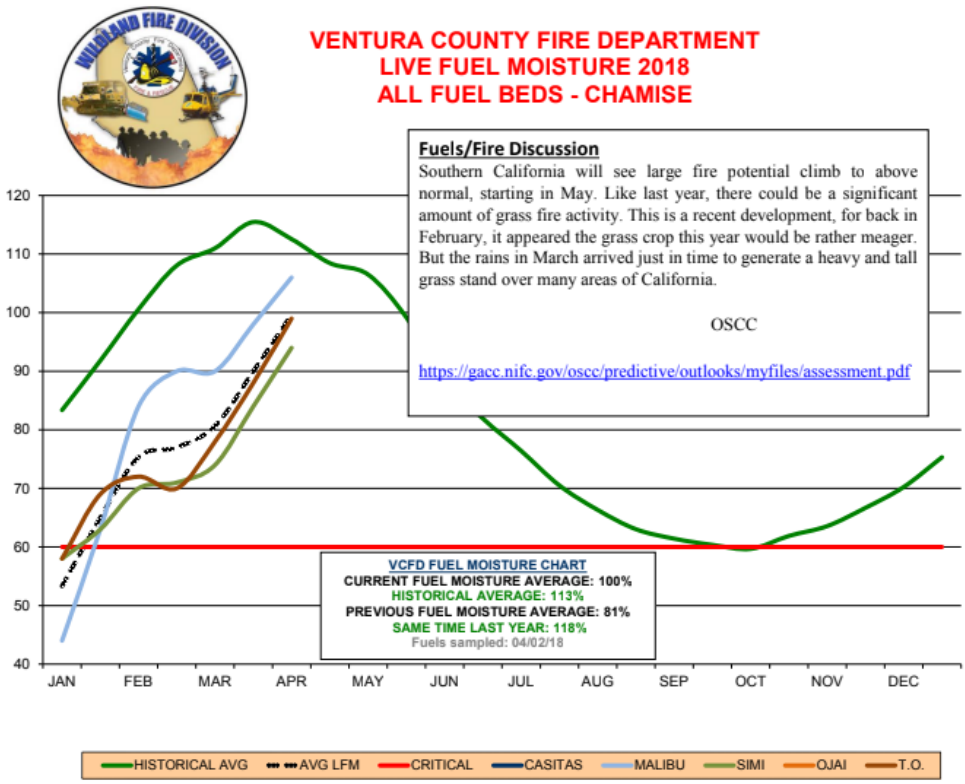
In general, considering the areas lacking in the plan, the burn boss and associated overhead performed above and beyond the minimum requirements of the plan.

Key actions taken by personnel during the course of the prescribed burn and noted by review team were beyond the prescribed fire plan requirements:

- Daily spot weather forecast for the entire duration (plan only required prior to and day of ignition),
- Additional fuels condition assessment and fire behavior evaluation (used on-site RAWS and local predictive services products),
- Preparation of a more detailed, site specific medical and evacuation plan,
- Additional notification and communication carried out with cooperators and stakeholders,
- Additional personnel beyond minimum requirements with a substantially higher skillset than minimally required in prescribed fire plan,
- More frequent and thorough mop-up and patrol were conducted than required in plan,
- More in-depth identification of highly-valuable resources and assets (HVRAs),
- Additional documentation and monitoring of project (time-lapse, videos, daily project log, etc.), and
- Clarified coordination and communication procedure with dispatch centers

Analysis of Seasonal Severity, Weather and On-site Conditions Leading Up to Wildfire Declaration

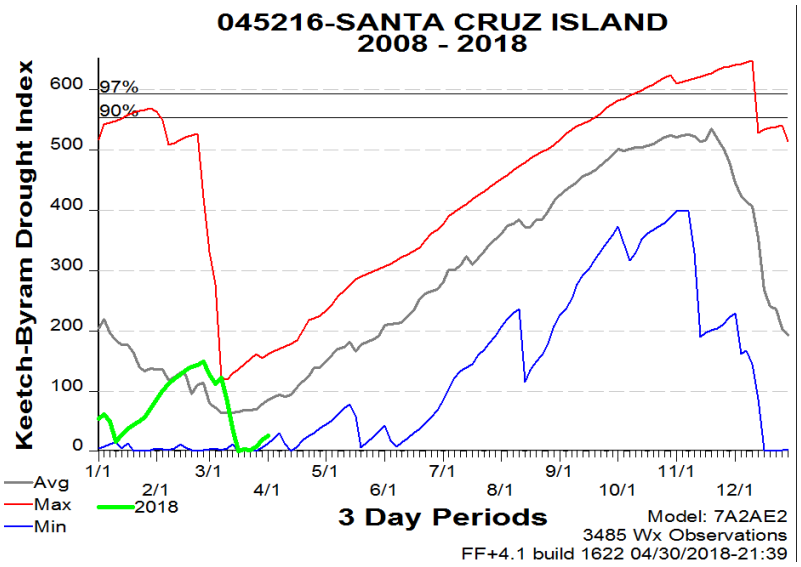
Both the Energy Release Component (ERC) value and Burning Index (BI) value for the prescribed fire area, as represented by the Santa Cruz Island RAWS station, for the period of the pile burn were well within acceptable levels for March 19-24. The BI climbed above the 90th percentile after March 25. Live fuel moistures were well below historical average but significantly above critical thresholds. Spot weather forecasts for the area on March 18 indicated approaching subtropical moisture with chances for moisture starting March 20 increasing to heavy rains into March 22. March 19 forecasts again predicted incoming moisture. Twenty-foot winds were also predicted to increase to 10 to 20 mph with gusts up to 27. Eye level winds were expected at 3-6 mph. Forecasts largely turned out to be correct with a little more than two inches of rainfall recorded at the RAWS station during March 19-23. Much of the project area was sheltered from the winds and National Weather Service forecasted a lower confidence in how strong gusts would be onsite. Winds were predicted to be fairly gusty from March 23-25, but eye level winds were predicted at 5-7 mph with gusts of 11-16 mph, and decreasing somewhat thereafter. Winds largely did not materialize at the project area. However, they did materialize at higher ridgetop areas. Due to the sheltered location of the project, it is unlikely that wind played a significant causal factor in a wildfire being declared. The spot weather forecasts for the burn days indicated that prescription weather parameters would be met for the time of ignition.

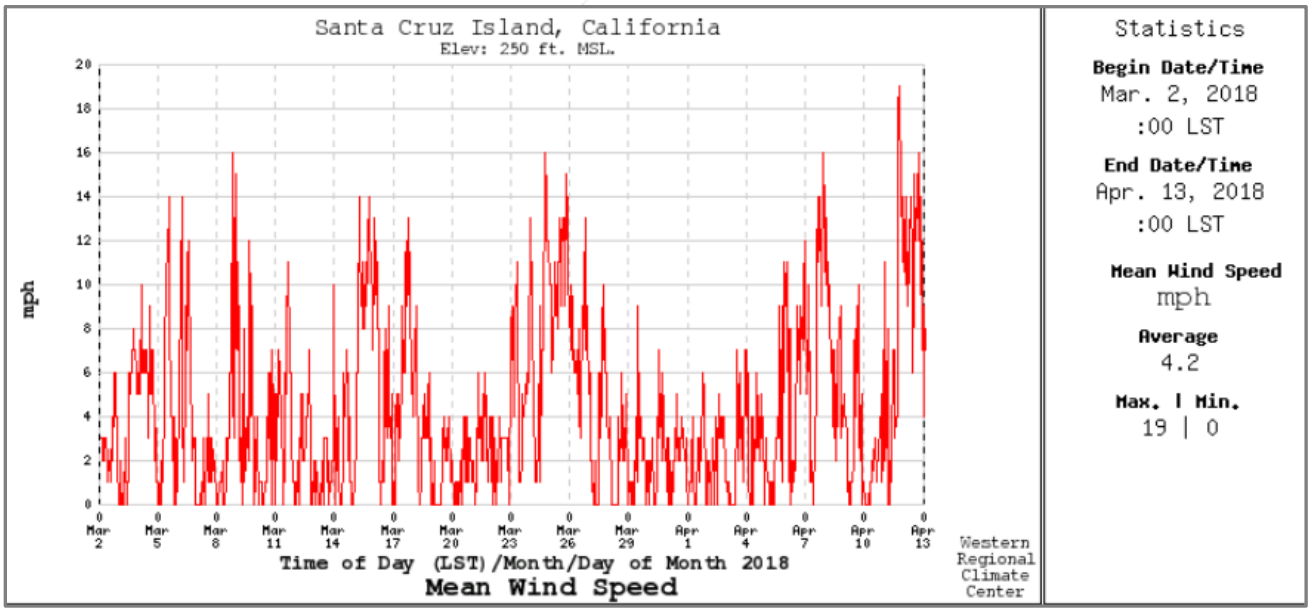


Santa Cruz Island, like much of the southern California Mediterranean Coast, has experienced several recent years of drought. Despite some relief in 2017, and to a lesser extent in 2018, as suggested by the KBDI graph, drought remains an influence on the island. The U.S. Drought Monitor for January 2018 shows a moderate drought on the island while in April drought is shown as severe.

> "That thing kept surprising me. We'd mop up, no smokes for 2 days, then it would pop up again."
> -Incident commander

Several operational personnel expressed some surprise at how well the piles burned, even though there were no control issues. Pile burning fire behavior was within prescriptive limits. Observed fire behavior during the wildfire was more active than expected. Furthermore, several operational personnel found the consumption of dead +1,000-hour fuels was quite high with additional subsurface woody and organic matter consumption as well. This could be caused by drought conditions.





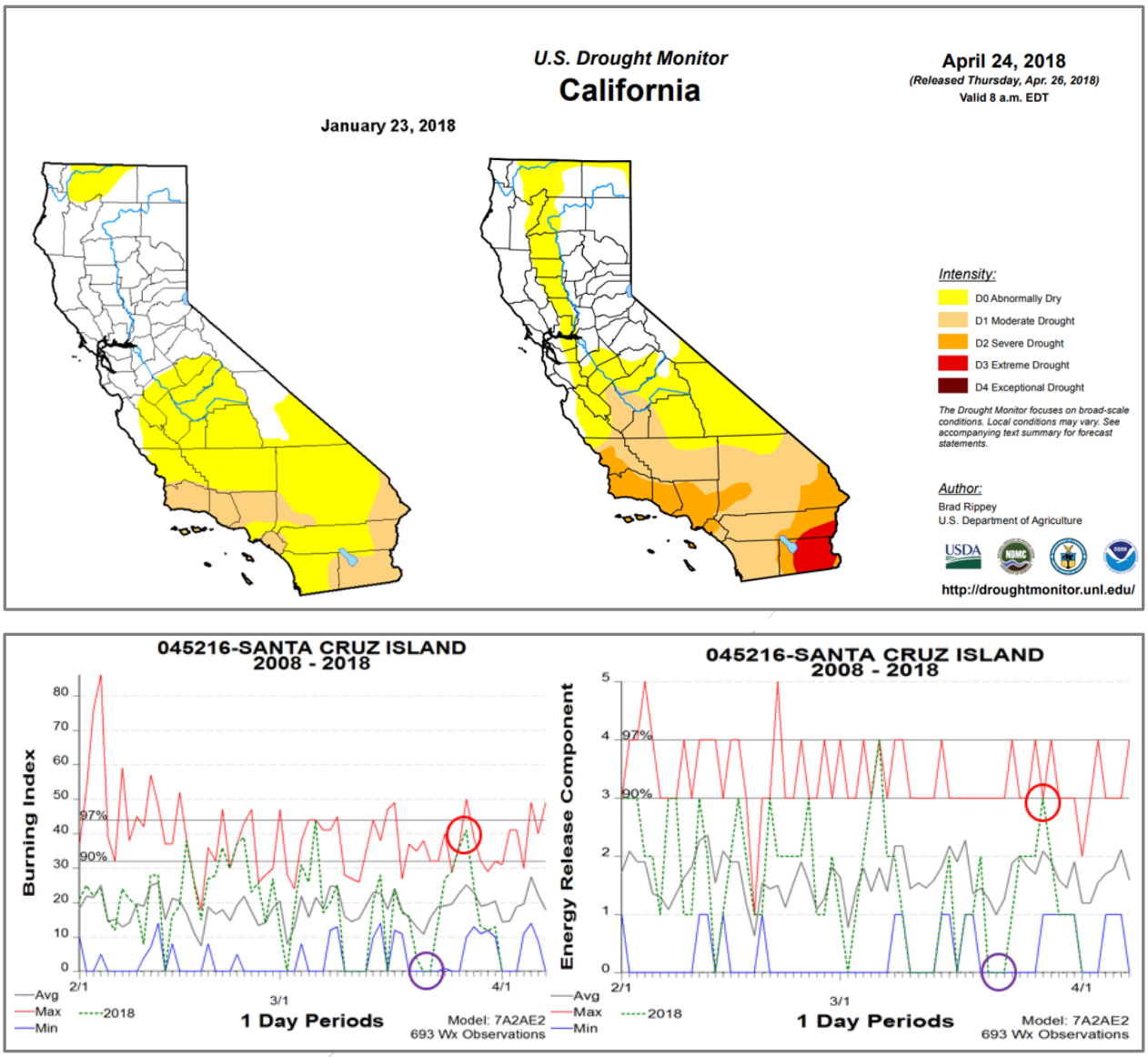
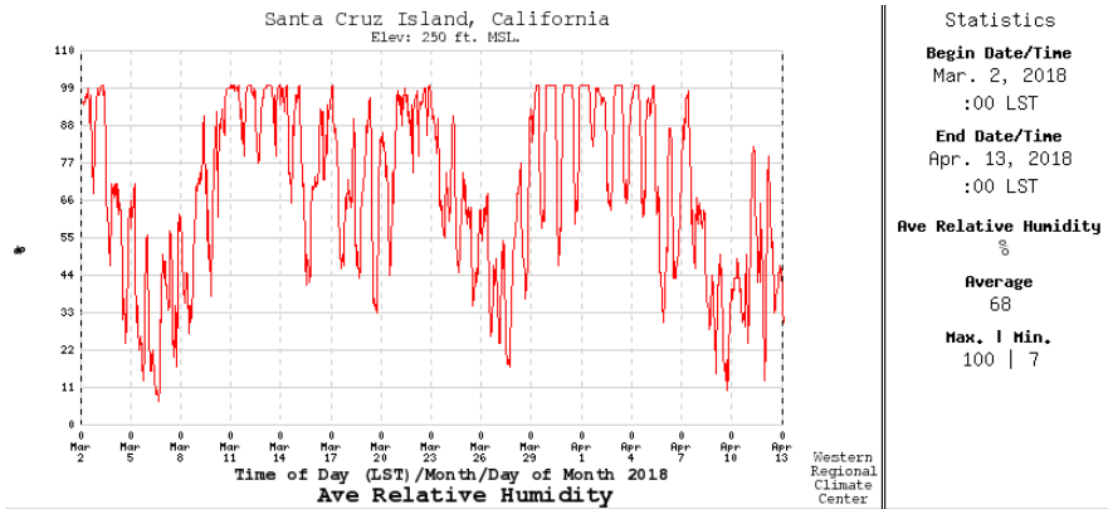
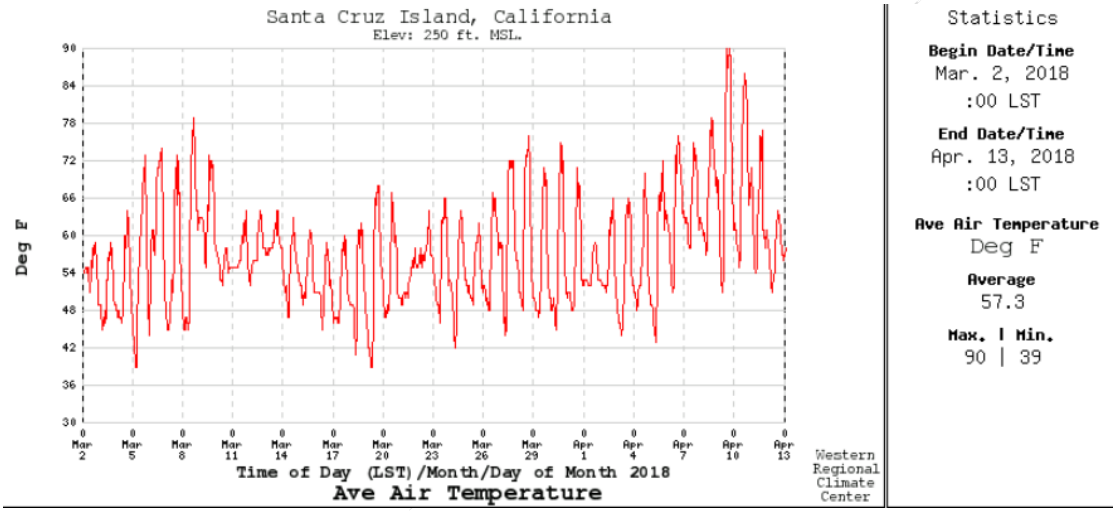


Figure 6: Bottom circles (purple) identify ignition time period. Top circles (red) identify wildfire declared.





Analysis of Qualification, Experience and Engagement

"I would have signed it myself and offered to do so if they wanted to drive over to me." -Superintendent

The superintendent has been in the position for more than 10 years. He is very familiar with, and supportive of, the project as well as the prescribed fire location and resource management planning for Santa Cruz Island. He was familiar with the prescribed fire plan, local fire agreements and the local factors/considerations that affect operations. The superintendent maintains good communication with cooperating partners and stakeholders. The superintendent and FMO have had numerous previous discussions about the project and prescribed fire operations. The chief of cultural resources also has extensive familiarity with the project, prescribed fire location, and Santa Cruz Island resources and resource management. As the superintendent was away from the park at the time of the prescribed fire, the chief of cultural resources was delegated authority as acting superintendent. The FMO and chief of cultural resources had an in-depth discussion covering all items on the Agency Administrator Ignition Approval form as well as additional factors such as logistical coordination, natural and cultural resource management coordination and considerations, and dispatch coordination and communication. The chief of cultural resources and the superintendent

discussed by phone the signature approval of the Agency Administrator Ignition Approval form. The superintendent gave concurrent approval for chief of cultural resources to sign as acting superintendent.

All key operational personnel involved in the prescribed burn met qualifications and were very experienced at their assigned positions. Qualifications were assured and confirmed during the planning phase of the project. Due to the remoteness of the island and complex tree felling operations, as well as the pile burning, the FMO had taken considerable time to focus on getting well-qualified personnel. The prescribed fire burn boss, and other pertinent personnel, met or exceeded minimum requirements for positions assigned. A quick cross-section of personnel qualifications reveals several RXB2, DIVS, ICT3, ICT4, RXB3, FAL1, TFLD, etc. The level of experience was substantial including wildland fire module, interagency hotshot, engine module and aviation experience with the majority of personnel having over a decade of experience. Many of the personnel involved serve in supervisory or overhead positions as a regular part of their positions.

> "We were kind of a bunch of overhead."
> -Operations Chief

It was highly evident from the all participants in the project that there was a high level of individual and collective engagement in the project. "This is one of the most successful projects ever that we have been working on." There was a sense of the importance of the project and a sense of "making sure we do this right" from all staff involved at the park. Operational firefighters involved with the project also have a high sense of value in the work and demonstrated an active engagement to the task, purpose and end state.

Lessons Learned from Participants

"We're at capacity and sometimes beyond."

There is a long-standing cultural norm within wildland fire to work hard and produce results. This drive often comes from a passion for the resources, a passion for the people and job satisfaction itself with pride in accomplishment. It has a tendency to lead to a sense of worth connected to productivity and accomplishment. While this may have very positive effects most of the time, it can also be a challenge. Several key issues became evident during this review:

> "There were so many challenges to pull this off, we want to show production."
> -Crewmember

- Be mindful of trying to do too much. It may have been better to split the operations into two groups formally with one supervisor dedicated and focusing on each aspect (i.e., one cutting and one pile burning).
- Fatigue management is becoming more important with a consistently high level of work expected year-round.
- There were some identified challenges in obtaining resources both for prescribed fire and for wildfire for several reasons:

> "When you're outside of normal fire season there is a resistance to provide stuff"
> -Dispatch

  - Fatigue and needing to recuperate,
  - Administrative priorities for hiring, agreements, cooperator meetings, trainings, etc.,
  - Desire to accomplish unit management targets,
  - Seasonal availability or resources (personnel not in pay status),
  - Reluctance to assist with "project work."

"The test of an organization isn't when it goes according to plan, it is when it doesn't."

- Even with a very experienced group of individuals doing a lot of the right things, there can still be an unintended outcome. One hundred percent success (perfection) in every activity is not realistic. Eventually, something will go wrong. Personnel and organizations should strive to become better and learn more, but there will never be 100% perfection.
- Having a highly dedicated staff that is cross-trained in multiple areas allows for great organizational flexibility and nimble shifts in priorities.

> "You don't know where the holes are until it hits you"
> -Superintendent

- Relationships and partners are vital for success. Previous efforts in coordination, communication, and relationship building greatly added to the effectiveness of the response. Learning the basics of someone else's job allows for insight into what is needed for assistance and collaboration.
- Interagency support and relationships are a major key to success.
- Despite no longer having a formal agreement, Los Padres dispatch assisted and played a key role in the success of response to the wildfire. The relationship between park fire personnel and Los Padres Dispatch was excellent. Agreements should be reinstated.
- Changes in assistance agreements and local assistance agreement interpretation are creating difficulties in getting needed resources. It is necessary to thoroughly consider the impact when creating or changing agreements or interpretation of use. The loss of flexibility in local agreement use caused challenges.

> "Maybe we could have taken a tactical pause but we communicated and did what needed to be done."
> -Operations Chief

- Cause and origin investigation should be considered when there is a wildfire declaration with a prescribed fire. Policy requires all fires be investigated. In this circumstance, there were no witnesses of fire movement from a burn pile to the surrounding vegetation. Although assumptions can be made, and those assumptions may be correct, a cause and origin determination may provide more conclusive evidence.

"The plan could always be better. It is great people that make it happen."

- Patrol and mop-up plan are critical. Prescribed fire plans should have a focus on criteria and condition, objectives and intent, actions, resources and timeframes even after ignitions are completed.
- Pile burning is often viewed as low complexity but it can be deceptively challenging. There needs to be recognition there are a number of factors that can increase difficulty of implementation. This is particularly true as the number or size of piled material increases.
- Recognizing the potential challenges of a project or incident and getting the right people with the right skillset is key. Utilizing local expertise can greatly improve response.

> "I immediately felt confident when I heard who was there. I'm proud of these folks for dealing with an unfortunate situation"
> -Acting superintendent

- Time-lapse photos, video and high quality documentation packages are greatly beneficial. Although this can take additional effort, it can be an exponential benefit later.

- There is great value in planning for the unexpected. Conducting scenario exercises, especially in unique areas or projects, can help identify weakness ahead of time. For example, some rotor wing aircraft cannot use saltwater for internal tanks as it can damage pump systems.
- Policy and regulatory compliance requirements, as well as process, change. Implementing actions to meet policy and regulatory requirements is mandatory. It is vital to carefully examine any prescribed fire plan to determine if it meets both internal and external current requirements.
- A Facilitated Learning Analysis provides an opportunity for learning and improvement. To capitalize on the lessons learned, specific actionable items should be developed and implemented.

Facilitated Learning Analysis Team

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  National Park Service