



BrookhavenTM
National Laboratory

Wildland Fire Management Plan

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Operated by

Brookhaven Science Associates, LLC



BNL

Laboratory Protection Division
Environmental Protection Division

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EXECUTIVE SUMMARY

Brookhaven National Laboratory is located in the heart of the Long Island Central Pine Barrens Region and these rare pine barrens ecosystems have evolved over millennia in the presence of fire. Aggressive fire suppression/exclusion, a lack of forest management, and an increase in wildland urban interface (WUI) have resulted in an increased fire risk on the Laboratory site and the areas surrounding it as evidenced by the Crescent Bow Fire that occurred in 2012. This wildfire was ignited on the BNL site and burned nearly a thousand acres of forest both on and off site, destroyed multiple structures, and resulted in injuries to firefighters. In 2020, the Paumanok Fire burned within this fire scar and resulted in a severe injury to a volunteer firefighter. Wildfires are likely to continue to occur and will increase the chance of injury during firefighting operations.

It is clear that intervention in the form of mechanical and prescribed fire treatments is essential to reduce and alter the wildland fuels. Otherwise, wildfires like these will continue to occur. The risk to the local community, firefighters, and to BNL will only increase with time.

This document was developed to evaluate the threat of wildland fire to the Lab and adjacent communities, identify available response resources, provide guidelines for wildfire response as well as prescribed fire implementation, and establish a plan for mitigation of wildfire risks. It begins with a detailed description of site characteristics and pine barrens ecology, fire history, current fire environment, threatened and endangered species, cultural resources, and other values at risk from wildfires as well as the policy drivers for the creation of a Wildland Fire Management Plan (FMP).

Fire management goals and strategies are then outlined and include information on wildland fuels, limits on and considerations for suppression activities and prescribed fire implementation. A section on planning includes information about various wildfire preparedness planning documents, fire weather indices and fire danger ratings as well as detailed information about staff training requirements, available personal protective equipment, tools, engines, water sources, and other equipment in Fire Rescue's fire cache. Suppression planning provides guidelines for both initial and extended attack as well as designation of a resource advisor (RA) and the role of BNL's Emergency Response Organization.

Thereafter, the prescribed fire program is detailed including burn plan development and approvals, smoke management considerations, site preparation, pre- and post-fire vegetation monitoring, and guidelines for burn implementation. Public safety and other community factors including public education and outreach are also addressed.

The final section is a mitigation plan that addresses specific areas of vulnerability and increased susceptibility to wildfire and how those risks will be mitigated. This section includes information on reducing sources of ignition, plans for fuels treatments like mechanical treatments and prescribed fire, treating vegetation around structures, improving infrastructure related to fire suppression (e.g., water sources), education and outreach, and special considerations like cultural resources and special status species.

This plan is not static and will be reviewed on an annual basis. As the program continues to mature and as new information and research become available, these lessons learned will be

incorporated and the document will evolve and adapt to ensure that it continues to be relevant and usable as a guide for the management of wildland fire at BNL.

PREFACE

The Wildland Fire Management Plan for Brookhaven National Lab (BNL) is written to comply with Department of Energy (DOE) Integrated Safety Management Policy; DOE Order 420.1C: Facility Safety; Protection Act of September 20, 1922; Economy Act of June 30, 1932; Reciprocal Fire Protection Act of May 27, 1955; Disaster Relief Act of May 22, 1974; Wilderness Act of 1964; Federal Fire Prevention and Control Act of October 29, 1974; Wildfire Suppression Assistance Act of 1989; National Environmental Policy Act of 1969; Clean Air Act (42 United States Code (USC) 7401 et seq.); Endangered Species Act of 1973; Federal Fire Management policy of 1995 (2009 Review and Update); Federal Wildland Fire Management Policy and Program Review; and Wildland and Prescribed Fire Management Policy and Implementation Procedures Reference Guide. This current plan incorporates changes resulting from new policies and standards on the national level and now includes a Mitigation Plan to address wildfire risks to the site and adjacent areas. This plan replaces BNL's Wildland FMP dated 2017.

The DOE policy for managing wildland fires requires that all areas managed by DOE and/or its various contractors which can sustain fire must have an FMP that details fire management guidelines for operational procedures associated with wildland fire, operational, and prescribed fires. FMPs provide guidance on fire preparedness, fire prevention, wildfire suppression, and the use of prescribed fires and mechanical means to control the amount of available combustible material. Values reflected in the BNL Wildland FMP include protecting life and public safety; Lab properties, structures, and improvements; cultural and historical sites; neighboring private and public properties; and endangered, threatened, and species of concern. Other values supported by the plan include the enhancement of fire-dependent ecosystems at BNL. The plan will be reviewed and approved annually to ensure fire program advances and will evolve with the missions of DOE and BNL.

This Fire Management Plan is presented in a format that covers all aspects specified by DOE guidance documents which are based on the national template for fire management plans adopted under the National Fire Plan. The DOE is one of the signatory agencies on the National Fire Plan.

The BNL Fire Department is the lead on wildfire suppression on site. However, the BNL Natural Resource Manager will serve as a Resource Advisor (RA) for all wildland fires on the BNL property resulting in the activation of the BNL Emergency Operations Center. In addition, Natural Resource Management staff will take the lead on fuel mitigation/forest management projects.

SELECTED ACRONYMS & DEFINITIONS

AGS	Alternating Gradient Synchrotron
AHJ	Authority Having Jurisdiction
BNL	Brookhaven National Laboratory
Booster	Alternating Gradient Synchrotron Booster
CAD	Collider-Accelerator Division
CVAR	Community Values at Risk
CWPP	Community Wildfire Protection Plan
DOE	Department of Energy
dwf	Down woody fuels
EIC	Electron Ion Collider
EU	Energy & Utilities Division
FMP	Fire Management Plan - Strategic plan that defines a program to manage wildland and prescribed fires and documents the Fire Management Program in the approved land use plan. Supplemented by operational procedures: preparedness plans, preplanned dispatch plans, prescribed fire plans, and prevention plans.
FMU	Fire Management Unit - Area where there are common fire management goals, objectives, and fuels, and where resource uses have been defined. The size of the unit is not important; however, the FMU should relate well to the strategies for managing wildland and prescribed fires that are defined in the FMP.
gpm	Gallons per minute
IC	Incident Commander
ICS	Incident Command System - Combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure with responsibility for managing assigned resources to effectively accomplish specific objective(s) pertaining to an incident.
KBDI	Keetch-Byram Drought Index - Soil/duff drought index that ranges from 0 (no drought) to 800 (extreme drought), based on soil capacity of 8 inches of water. Index factors are maximum daily temperature and daily and annual precipitation.
MIST	Minimum Impact Suppression Techniques - The application of strategy and tactics that effectively meet suppression and resource objectives with the least environmental, cultural, and social impacts.
NEPA	National Environmental Policy Act
NFDRS	National Fire Danger Rating System – a system that yields a wildfire damage index based on weather and other factors.
NWCG	National Wildfire Coordinating Group - Interagency operational group to coordinate fire management programs of the participating agencies. The group provides a platform to agree upon policy, standards of training, equipment, aircraft, suppression priorities, and other operational considerations.
NYSDEC	New York State Department of Environmental Conservation
PDL	Physical Demand Level - refers to the level and/or duration of physical exertion generally required to perform occupational tasks.
PSEG	Public Service Enterprise Group
RA	Resource Advisor - Resource specialist responsible for gathering and analyzing information concerning natural resources and their uses that may be affected by a fire or by fire suppression activities.
RHIC	Relativistic Heavy Ion Collider
SCFRES	Suffolk County Fire Rescue & Emergency Services
SFSP	Strategic Fire Safety Plan

USFWS	U.S. Fish & Wildlife Service
WUI	Wildland Urban Interface - The line, area, or zone where structures and other human development meet or intermingle with undeveloped wildland or vegetative fuels. Describes an area within or adjacent to private and public property where mitigation actions can prevent damage or loss from wildfire.
WFDSS	Wildland Fire Decision Support System - WFDSS accesses national weather data and forecasts, fire behavior prediction, economic assessment, smoke management assessment, and landscape databases to efficiently formulate and apply information to the decision- making process.

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I – INTRODUCTION

1.1 Purpose of a Fire Management Plan

A Fire Management Plan (FMP) provides background, guidelines, standards, and recommendations when dealing with natural fires, human-caused fires (accidentally or intentionally set), operational fires, and prescribed fires. BNL's Wildland FMP provides guidance on the conditions present in the current forested habitats on site, ways to improve upon means for detecting and reacting to fires, and methods for preventing wildland fires from occurring. When implemented, this plan will: 1) safeguard the research mission, life, and property by reducing the risk of widespread fire through reduction of available fuels, 2) improve habitat for native flora and fauna, and 3) provide a wildfire mitigation plan based on risk ranking and available funding resources.

1.2 Site Characteristics

1.2.1 Location and Topography

Brookhaven National Laboratory is a 5,265-acre site located in the heart of the Central Pine Barrens on Long Island, New York, approximately 60 miles east of New York City and 60 miles west of Montauk Point (Appendix D). Long Island is approximately 120 miles long, east-west, and 20 miles wide at its widest point. The terrain on Long Island is relatively flat and low except along the north shore. Elevation ranges from sea level to 405 feet, with the highest points occurring on east-west moraines along the north shore and the midsection of Long Island. Topography south and east of the moraines is generally flat with a south-facing slope.

Roughly 1,815 acres of the BNL site are developed, leaving about 3,450 acres as undeveloped woodland and forest. The neighboring communities are predominantly residential developments scattered among wooded acreage. Many of the neighborhoods are virtually hidden by screens of overgrown, vine-covered woodland that lines most of the roads and highways. The majority of the forest is not managed in any way and contains significant amounts of combustible surface fuel.

1.2.2 Geology and Soils

Six major stratigraphic units that underlie most of Long Island have been identified in test drilling on site (BNL 1977). From the deepest level to the surface, these units include the pre-Cretaceous bedrock, the Raritan formation (with two members), the Magothy formation, the Gardiners clay, and the upper Pleistocene deposits. The upper Pleistocene deposits consist primarily of glacial sand and gravel, as well as associated local silt and clay. This unit represents the outwash and moraine deposits of the Wisconsin period. At BNL, the thickness of the highly permeable upper Pleistocene deposits varies between 120 and 250 feet (BNL 2021a). The sandiest soil is found on the eastern third of the island. On the south shore coastal plain, soils are typically moister. On the north shore, the soil is typically finer than elsewhere on the island.

1.2.3 Vegetation

The vegetative pattern of Long Island is the result of two main processes—fire and substrate (soil) composition. When explorers and colonists arrived on Long Island during the sixteenth and seventeenth centuries, the vegetative patterns were dominated by pitch pine forest types and warm season grasslands (Villani 1997). Covering most of the central portion of what is now Nassau County at the west end of the island, the first major vegetative type was the Hempstead Plains—a large and unique grassland dominated by little bluestem, big bluestem, and switch grass. Bordering the Hempstead Plains to the east and extending to present-day western Suffolk County was the oak-brush plains. This area was dominated by a shrubby growth of oak; particularly scrub oak, mixed with other oak species and pitch pine. The next major vegetative group extending from the oak-brush plains eastward to the end of the island was a mix of pitch pine, pine-oak, and oak-pine forests. In the central portion of this region (now the Eastport and Westhampton areas) are the dwarf pine plains, dominated by pitch pine less than 10 feet high, scrub oak, and heath species. On the south shore's coastal plain, pine barrens vegetation also existed. Only on the north shore of Long Island were there hardwood trees of any size. There, the vegetation typically consisted of oak forest without the pitch pine component. Except for the Hempstead Plains, which have been greatly reduced by development, most of the original Long Island ecosystems still exist in varying degrees. A large portion of the eastern half of the island is protected habitat within the Central Pine Barrens.

Pine Barrens Ecology. Pine barrens have evolved thousands of years in the presence of frequent fires. As a result, plant and animal species of the pine barrens have become adapted to conditions created by periodic fires. For example, pitch pine seeds germinate and grow best on mineral soil in full sunlight, conditions created when fire burns off surface litter and competing vegetation.

As the pine barrens are found on well-drained sandy soils with low nutrients and high acidity, many of the plants in the pine barrens produce waxes, resins, or volatile compounds in their leaves to help retain moisture. These substances tend to be highly flammable. Additional plant characteristics that favor fire include decay-resistant litter of low water-absorbing capacity that accumulates on the soil surface, and abundant dead branches and twigs. Pitch pines are able to survive most fires due to thick, insulating bark and to their unusual ability to rapidly sprout from buds in the trunk and root collar. Pitch pine also produces serotinous cones that require fire to melt the waxes and open the cones to release seeds—an adaptation to high intensity fire. Shrubs and herbs in the pine barrens also rapidly sprout from underground roots and rhizomes.

Some research asserts that pine barrens species alter their environment to favor their own perpetuation (Noble and Slatyer 1977), Rowe 1983). Fire-tolerant species promote ignition with their volatile foliage. Fire then consumes the available litter that would otherwise decompose and enrich the soil making it more hospitable for less fire-tolerant species. Reduced nutrient levels favor species that tolerate fire and poor soil, and the presence of these species favors recurring fire. This feedback loop may be destabilized when fires are suppressed or prevented, when nutrients are added to the soil, or by prolonged wet weather. With prolonged fire exclusion (through active wildfire suppression and fire prevention efforts), plant succession could ultimately result in the replacement of pine barrens with forests dominated by oak, hickory, and beech.

At BNL, fire has been aggressively suppressed for at least 75 years and as a result there has been a large buildup of fuels in the forest understory in the form of leaf litter and branches. This fuel

buildup could ultimately lead to the spread of a catastrophic wildfire which would not only adversely impact the existing ecology, but potentially endanger structures and human life.

Unique Role. What would be lost if pine barrens were converted to oak forests through fire exclusion? We would lose an endangered ecosystem that is an integral part of the natural environment of Long Island and one of only three Atlantic coastal pine barrens ecosystems in the world. We would lose many of the rare species of plants and animals found in the pine barrens. We would lose a landscape element that has historically contributed to the scenic, cultural, and environmental diversity of Long Island. In sum, we would lose biological, environmental, and scenic diversity.

1.2.4 Hydrology

BNL is situated on the western edge of the relatively undeveloped Peconic River watershed (BNL 2021a). The Peconic River, which crosses the site from approximately its northwest to southeast corners, is characterized by a low-gradient streambed and slow flow. The entire Peconic drainage area is considered a Class 1 wetland. Depending on the position of the water table with respect to the riverbed, this shallow river may either receive water from or recharge to the aquifer system underlying Long Island (BNL 2021a). During periods of drought, the river is generally recharging to groundwater. During periods of normal to above-normal precipitation, the aquifer is supplying water to the river. In general, little direct runoff from precipitation feeds surface streams on Long Island; about half of the annual precipitation is lost to evapotranspiration and most of the remainder passes readily through the highly permeable glacial sand and gravel to recharge the groundwater.

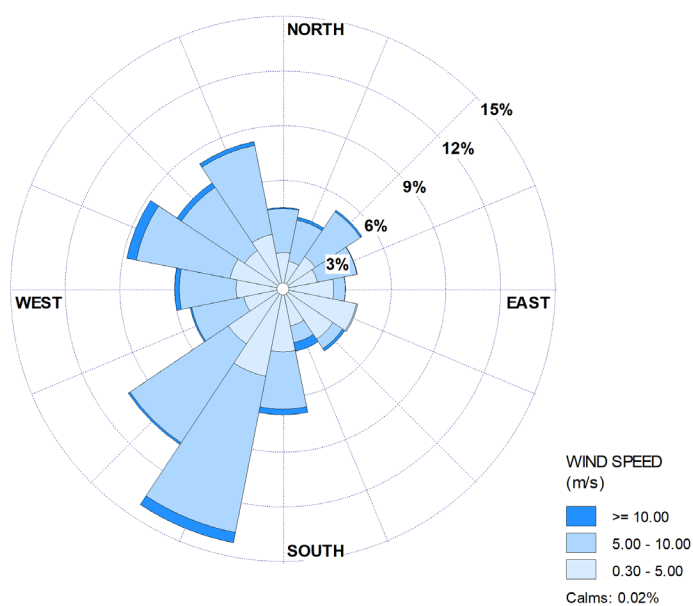
According to the *2020 Site Environmental Report*, BNL draws approximately 1.34 million gallons of groundwater each day to meet its potable water and heating and cooling needs. Most of this water is returned to the aquifer via on-site recharge basins. The remaining water is either consumed or lost through evaporation or sewer line leaks. Remediation wells are the source of an additional 4.2 million gallons per day of groundwater that is returned to the aquifer using recharge basins (BNL 2021b).

In addition to numerous small pocket wetlands that hold water on a seasonal basis, six major regulated wetlands (including the Peconic River drainage area) are also located on site (BNL 2021a). The distribution of wet and dry areas on site is well correlated with differences in topography and depth to the water table.

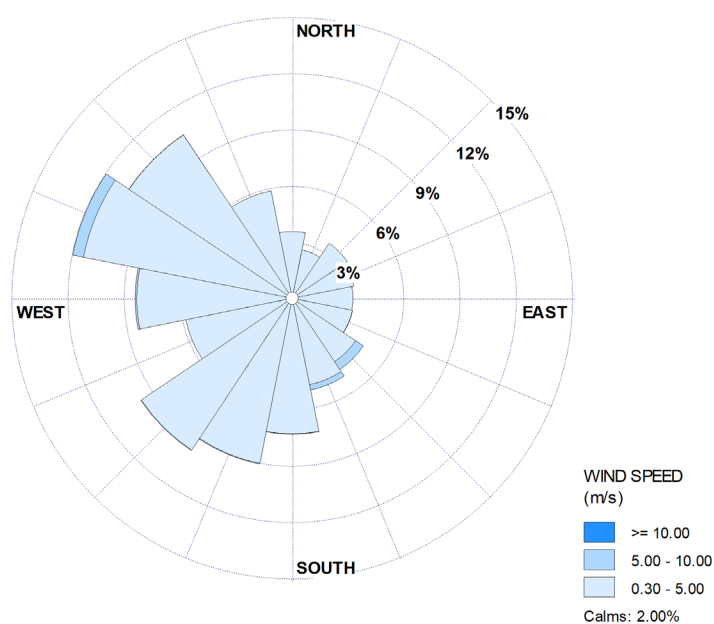
1.2.5 Climate

The climate of Long Island is greatly influenced by the Atlantic Ocean and is categorized as humid continental. The climate is dominated by continental influences, but the proximity of the ocean produces a significant maritime influence. Temperatures are highest in July and August and coldest in January and February. Winds occur from all directions, although winds with a westerly component are most common (BNL 2021b). A sea breeze is a common local occurrence at BNL. The hurricane season and tropical storm season is from August through early October. The average total rainfall for BNL is about 48 inches annually.

Wind Roses for 2020



Wind Rose for Jan 1st to Dec 31st, 2020, taken at the 85m height (BNL 2021b)



Wind Rose for Jan 1st to Dec 31st, 2020, taken at the 10m height (BNL 2021b)

1.2.6 Wildlife

Past and ongoing biological inventories of the BNL property have documented numerous wildlife species that permanently reside on or migrate through the site on a seasonal basis (BNL 2021a). These include 85 species of nesting birds (as well as an additional 130 species that are not known to nest on site but have been observed there), 15 mammal species, 9 amphibian species, 10 reptile species, 9 species of fish, and hundreds of species of invertebrates. The relatively high number of bird species that are documented for BNL can be attributed to the site's location within the Atlantic flyway and to the scrub/shrub habitats present on site that provide food and shelter to migrating songbirds.

There are a number of species of particular concern residing on site. Chief among these is the northern long-eared bat (*Myotis septentrionalis*), which the US Fish & Wildlife Service (USFWS) has listed as threatened, under the Federal Endangered Species Act. This is the first federally listed species that has been documented at BNL and the USFWS is currently reviewing whether to increase this listing to 'endangered' by the end of 2022. Ongoing reviews of habitat needs and the impacts of forest management actions like prescribed fire are likely to result in restrictions in the timing and other aspects of planned forest and fuels management activities. The extent of these restrictions and their impacts on the fire management program at the Lab will have to be evaluated as more information becomes available.

In addition, there are populations of the NYS endangered eastern tiger salamander (*Ambystoma tigrinum tigrinum*), and the NYS threatened banded sunfish (*Etheostoma fusiforme*), swamp darter (*Etheostoma fusiforme*), and frosted elfin (*Calophrys iris*) (BNL 2021a). There are 15 confirmed breeding sites on BNL property for the eastern tiger salamander in vernal ponds and recharge basins. The banded sunfish is known only from the Peconic River system and has been observed in the section of the river on site, while the swamp darter was known to be present at only one location on site. With the change of the STP discharge going from surface water to groundwater recharge, Peconic River flow is now determined solely by fluctuations in groundwater as it relates to precipitation patterns and recent droughts have completely dried up the onsite portions of the river as well as the single pond containing these species, so it is unlikely that either exist on site at the present time.

The frosted elfin has not been documented on site within the recent past but known habitat for this small butterfly remains at the original locations of historic occurrence. Other NYS species that are either found at BNL or are expected to be present include the endangered Persius duskywing butterfly (*Erynnis persius persius*), threatened pine barrens bluet (*Enallagma recurvatum*), and the threatened northern harrier (*Circus cyaneus*) (BNL 2021a).

1.2.7 Cultural Resources

BNL is subject to provisions of both the National Historic Preservation Act and the Archeological Resource Protection Act, which require it to "identify, evaluate, and protect historical and archeological sites eligible for listing in the National Register of Historic Places" (BNL 2021a). The Cultural Resource Management Plan for Brookhaven National Laboratory (BNL 2013) guides the management for all the Laboratory's historical resources. BNL's cultural resources include buildings and structures, World War I (WWI) earthwork features, the Camp Upton Historical Collection, scientific equipment, photo/audio/video archives, institutional records, and two

archeological sites. As various cultural resources are identified, plans for their long-term stewardship are developed and implemented.

Of course, BNL's scientific research mission is the primary, albeit intangible, cultural resource on site—it would be directly threatened by widespread wildfire and the resultant damage to invaluable facilities.

1.2.8 Values at Risk

In 2015-2016 BNL partnered with the Long Island Central Pine Barrens Commission, the New York State Department of Environmental Conservation (NYSDEC), the Ridge and Manorville Fire Departments and other agencies to develop a Community Wildfire Protection Plan (CWPP). Part of this process included the identification of Community Values at Risk (CVAR). In addition to values already discussed (e.g., natural and cultural resources, and threatened and endangered species), a number of socioeconomic CVARs were identified including infrastructure, natural areas, agricultural lands, air quality, schools, churches, BNL's Relativistic Heavy Ion Collider (RHIC), trails and other recreational infrastructure, homes, etc. A more in-depth discussion can be found in the CWPP (Appendix F).

1.3 Natural and Historical Role of Fire

Wildfire has been an important process in shaping the terrestrial vegetative pattern of North America (Pyne 1997a, b). Many habitats in the Northeast belong to fire groupings and regimes that are characterized by “long” (100- to 300-year) return intervals or “very long” (more than 300-year) return intervals between fires (Barbour and Billings 1988, Heinselman 1981). In the pitch pine barrens of Long Island, both light and severe surface fires as well as stand-replacement crown fires occur at “short” (25- to 50-year) return intervals (Olsvig et al. 1979). In fact, both surface and stand-replacement fires may have occurred every 10 to 40 years. Most of the fires on Long Island prior to European settlement are believed to have been the result of Native American activities relating to land management and hunting. With the construction of the Long Island Railroad in the mid-19th century fire frequency and intensity increased (Kurczewski and Boyle 2000). Lightning-sparked fires are less frequent than in the western United States because the few fires that may be ignited by lightning are quickly extinguished due to the large amounts of moisture contained in storms along the coast. Historically, the warm season grasslands (Hempstead Plains), oak-brush plains, and dwarf pine plains had the highest fire frequencies. Fires also occurred frequently, but not to the same extent as the preceding group, in pitch pine, pine-oak, and oak-pine stands. Fires also were common in the pine barrens vegetation along the south shore. Fires were less common in the forests north of the moraines, on the island's north shore.

1.4 Current Fire Environment

Aggressive fire suppression over the past 75 years has resulted in the buildup of large amounts of natural fuels, both alive and dead (leaf litter and branches), in the forest understory at the Lab and in surrounding areas. Results of a fuels inventory conducted at the Lab and in other areas of the Pine Barrens in 2016-2017 have indicated that fuel loading is unnaturally high and may create an unacceptable fire hazard. Other serious disturbances such as Superstorm Sandy in

October 2012 and a blizzard in February 2013 increased the amounts of coarse woody debris present and thus increased dead fuel loading.

There are multiple threats to our pine barrens forests, due in large part to a lack of stand management and fire suppression. A wide variety of pests and pathogens are acting alone or in concert to kill large numbers of trees throughout the region. European gypsy moth (*Lymantria dispar*) has been present on Long Island for many decades and infestations periodically impact the oak species, often in combination with native defoliators. Oak wilt (*Ceratocystis fagacearum*) and the disease complex termed ‘oak decline’ are also considered threats to Long Island forests and are being monitored (BNL 2021a).

Additionally, infestations of southern pine beetle (*Dendroctonus frontalis*) were discovered have been detected throughout the site since 2015 and have recently become a serious problem impacting thousands of pitch pine trees on site. If forest and fuels management is not implemented this may significantly impact the dead fuel loading in the short term as trees die and come down and may increase live fuel loading in the long term as the opened canopy allows more sunlight to reach the understory causing a flush of new growth. In addition, the increase in downed, dead, heavy fuels creates access issues for firefighters and becomes a safety hazard. Fires ignited in these fuels, under extreme conditions, will be more intense, more difficult to control, and could cause great damage to the forest and structures both at BNL and in the surrounding communities.

1.4.1 Wildfire Seasons and Sources of Ignition

On Long Island, wildfires typically occur during two main seasons. Most wildfires occur in the spring—from early March through late May (generally before leaf-out is complete). Fires in these months typically burn just the surface fuels with some localized tree torching. An exception to this occurred in April 2012 after a particularly dry winter which resulted in drought conditions in the area. Fuel moistures were extremely low and, as is typical in spring, there were days of very low relative humidity and high winds. An intentional fire was set resulting in a fast-moving, high intensity fire that included periods of running crown fire. The total area burned was estimated at approximately 1,000 acres.

The second fire season occurs during the late summer (late July) through early autumn (early October), particularly during drought years. Wildfires during this period are not as frequent but have the capacity to become larger and more intense.

Approximately ninety five percent of wildfires on Long Island are human-caused—primarily through debris burning and incendiary fires. Other causes include smoking, equipment, and arson and account for approximately twenty five percent of wildfires in New York (NYSDEC 2018). The few fires ignited by lightning are usually quickly extinguished due to the high moisture content in storms along the coast.

1.4.2 Fuels and Potential Fire Behavior at BNL

Most of the vegetation at BNL consists of pine-oak or oak-pine forest with a dense understory of flammable blueberry and huckleberry. Leaf litter provides a “flashy” fuel: the twigs and branches in the shrub layer ignite easily. Except during spring, leaves of most shrub species will readily

burn. The leaves and stems of the shrubs sustain fire and can carry heat and flames upward to the canopy under high wind conditions. In some stands, the dense shrub layer provides a continuous horizontal and vertical source of fuel. Flames three times the height of the shrub layer is common under extreme wildfire conditions. *Crowning* (burning in the tops of trees) and *spotting* (isolated patches of fire spread by wind carrying firebrands) are a danger when pitch pines are present, because volatile resins in the needles support intense fires during the growing season. High accumulations of standing dead vegetation and coarse woody debris aggravate this situation. Under extreme conditions, the rate of spread, flame height, and intensity under wildfire may exceed the capability of firefighters to carry out a direct attack.

1.4.3 Special Hazards

With only about 35 percent of the Laboratory area developed, BNL research facilities can be seen as an island in a forest of fire fuel. Extreme wildfires equivalent to the Rocky Point and Sunrise fires of August/September 1995, which burned approximately 7,000 acres cumulatively, would seriously jeopardize employee safety and Lab facilities. According to an assessment conducted in 2019 (updates to the 2001-2002, and 2011 assessments) using a nationally recognized model for rating wildland fire risk, the hazard severity at BNL is “moderate”. Adequate precautions are in place to minimize the hazards for most major facilities at BNL. Several necessary physical improvements were identified in two analyses performed in 2001 and 2002, and 2019 outlined in the *BNL Wildland Urban Interface Survey* (Appendix E).

An initial issue of concern was the possibility for a wildfire to release radioactive contaminants into the air, via smoke. Although some areas at BNL contain small amounts of radioactive contamination in the soil, the majority of these materials are found within the developed area of the Laboratory, which would not be subject to catastrophic wildland fire. Naturally occurring radioactive materials are present within the soils and vegetation on Long Island, but to become airborne those radionuclides would have to first be present in plant material that burns. Surveys carried out by the Environmental Protection Division at BNL indicate that almost non-detectable amounts of radionuclides are taken up by plants. If such plants were to burn, particles containing trace amounts of radioactive material would be diluted when the column of smoke mixed with air. The hazards just from non-contaminated smoke would outweigh any possible additional dangers from smoke containing traces of radioactive material.

On the BNL site, only one area historically contained levels of radioactive contamination within the soils significant enough to require management actions. In the event of a wildland fire, this area would be managed administratively to protect equipment from contamination. Analysis of a release situation within a fire scenario indicates little or no health risks associated with this incidence, and this scenario has greatly improved due to environmental cleanup and restoration of the area.

Radionuclide sources for research have numerous layers of protection. Sources are sealed and within shielding; there are security alarms and physical barriers in place; there are administrative controls in place; and consequence assessment studies have been conducted. Buildings that contain sources are typically constructed of noncombustible materials, are equipped with fire detection systems, and/or are equipped with fire suppression systems. These measures severely limit the frequency of events and the potential to release radioactive material. BNL also has a Fire Department that is staffed 24 hours a day, seven days a week, with arrival times of less than 10 minutes after an alarm, further limiting fires to small sizes.

1.5 Fuel Removal/Treatment

Paradoxically, a management policy that prevents and suppresses wildland fires could result in catastrophic wildfires that destroy property and threaten public safety. Such wildfires could occur if there were an unusually large amount of fuel accumulation and a weather pattern involving prolonged drought. If sustained high winds with low humidity (much as in 1995 and 2012) were also to occur in this scenario, the outlook could be grim.

To counter this danger, it is necessary to remove the potential fuels. Removal can be done “mechanically” using heavy equipment, mowing, chemical treatments, grazing, and/or skilled labor using hand tools. Fuel removal can also be accomplished by prescribed burning under conditions that are more moderate. In areas where ecological or safety issues are critical, burn areas are carefully selected. The goal of mechanical fuel reduction is the same as burning and the results are often similar, but the difference is the cost because mechanical fuel reduction is often more expensive than prescribed burning and does not have any of the ecological benefits. However, when the risks of a burning operation are too high, mechanical fuel reduction may be more appropriate.

In some cases, the fuels must undergo a mechanical treatment prior to burning. The fuel is not removed in this case, it is altered to make it safer to implement a prescribed burn. For example, in areas with dense and tall understory vegetation, that vegetation can be cut to reduce the depth of the fuel bed resulting in lower flame lengths during a fire and making it easier to control the fire and prevent escape.

1.6 Collaboration

BNL routinely works in collaboration with several other organizations involved in wildland fire management including the NYSDEC, USFWS, Central Pine Barrens Commission, and local volunteer fire departments. BNL staff attend tabletop exercises related to wildland fire in the Long Island Pine Barrens Region and invite local fire departments as well as other local and regional firefighting agencies to the Lab for training and to familiarize them with the site and its resources in the event of a wildfire. BNL annually hosts the New York Wildfire and Incident Management Academy and works collaboratively in development of curriculum and instruction at the Academy. Specific information regarding these activities can be found in the Emergency Readiness Assurance Plan.

In collaboration with the Long Island Central Pine Barrens Commission, the Ridge and Manorville Fire Departments, and other state and local land management agencies a Community Wildfire Protection Plan (CWPP) was developed for the Ridge-Manorville-Calverton areas and includes portions of BNL. One of the goals of the CWPP is the implementation of prioritized fuel reduction through mechanical treatments of the forest and prescribed fire. BNL has been identified as a priority site for fuel reduction activities in part because of the fuel loading data that have been collected for the forested areas adjacent to the communities on the northern portion of the Lab and because prescribed fire activities have already been planned for these areas.

1.7 Link to Policy

BNL's Wildland Fire Management Plan is a detailed program of action to carry out fire management policies. This plan fulfills the requirements of DOE Order 420.1C Chg 3 (2019) to protect site resources from wildland and operational fires. Fire management policies discussed in this document are intended to agree with and link to the overall policies of the National Fire Management Plan.

1.8 Authorities

Authority and guidance for implementing this plan are found in the following documents:

- DOE Order 420.1C: Facility Safety. Mandates the development of a fire management plan in accordance with NFPA 1140¹ (2021), Standard for Wildland Fire Management.
- Protection Act of September 20, 1922 (42 Stat. 857; 16 U.S.C.594): Authorizes the Secretary of the Interior to protect from fire, lands under the jurisdiction of the Department directly or in cooperation with other federal agencies, states, or owners of timber.
- Economy Act of June 30, 1932: Authorizes contracts for services with other federal agencies.
- Reciprocal Fire Protection Act of May 27, 1955 (69 Stat. 66, 67; 42 U.S.C. 1856, 1856 a and b): Authorizes reciprocal fire protection agreements with any fire organization for mutual aid with or without reimbursement and allows for emergency assistance in the vicinity of agency lands in suppressing fires when no agreement exists.
- Disaster Relief Act of May 22, 1974 (88 Stat. 143; 42 U.S.C. 5121): Authorizes federal agencies to assist state and local governments during emergency or major disaster by direction of the President.
- Wilderness Act of 1964: Provides guidelines for minimum tool use in administering wilderness areas.
- Federal Fire Prevention and Control Act of October 29, 1974 (88 Stat. 1535; 15 U.S.C.2201): Provides for reimbursement to state or local fire services for costs of firefighting on federal property.
- Wildfire Suppression Assistance Act of 1989. (Pub. L 100-428, as amended by Pub. L 101- 11, April 7, 1989).
- National Environmental Policy Act of 1969: Regulations implementing the National Environmental Policy Act (NEPA) encourages the combination of environmental comments with other agency documents to reduce duplication and paperwork (40 CFR 1500.4(o) and 1506.4).
- Clean Air Act (42 United States Code (USC) 7401 et seq.): Requires states to attain and maintain the national ambient air quality standards adopted to protect health and welfare. This encourages states to implement smoke management programs to mitigate the public health and welfare impacts of wildland and prescribed fires managed for resource benefit.
- Endangered Species Act of 1973.
- Federal Fire Management policy of 1995 (2009 Review and Update): Establishes a national policy for all agencies involved with wildland fire.

¹ DOE Order 420.1C Change 3 (2019) references NFPA 1143. The NFPA in 2021 consolidate all the Wildfire standards into NFPA 1140 "Standard for Wildland Fire Protection"

II – WILDLAND FIRE MANAGEMENT STRATEGIES

The term *wildland fire* includes natural or “wild” fires, and fires caused by man, both accidental and prescribed fires (intentionally set for ecological and/or fuel management purposes) that occur in undeveloped land or at the interface between undeveloped and developed land (the *wildland–urban interface*). *Wildland fire management* includes the suppression of wildfires in the wildland and the use of prescribed fires to meet wildland management goals.

2.1 Fire Management Goals

The goals of the fire management program include:

- Ensure protection of life.
- Ensure protection of property and research programs.
- Improve overall health of BNL forests and ecosystems.
- Reduce fuel loading to lessen incidence of catastrophic fire through prescribed fire and mechanical treatment.

2.2 Wildfire Suppression

The suppression strategy for wildfires occurring at BNL and the Upton Reserve will be based on the appropriate management response. Minimum Impact Suppression Techniques (MIST) will be used whenever possible. Natural and human-made barriers will be used to the fullest extent possible in suppressing wildfires. However, fires occurring in the wildland–urban interface with high potential for causing damage to property or threatening human life and health will be aggressively suppressed using the most appropriate means. Suppression strategies included the following measures:

- When possible, suppress wildfires through indirect attack by use of fire/fuel breaks.
- Limit wildfires to the smallest acreage possible.
- Minimize ecological damage by limiting use of vehicles in forest.
- Conduct prescribed fires to improve or maintain wildlife habitats and remove fire fuel; specifically, to maintain forest openings and pine barrens vegetation, to reduce fuel loads and remove exotic/invasive nuisance vegetation, and to manage for insect pests appropriately.
- Monitor fire weather conditions daily and base management decisions on current and predicted fire conditions. This includes monitoring of on-site weather data, KBDI, monthly climatology, and fuel moisture sticks.

2.3 Limits on Suppression Actions

Wildfire suppression activities are limited by the following considerations:

- Accessibility to certain areas by vehicles.*
- Equipment may limit response or suppression options and timing*
- No impact to water resources may occur, such as significant water drawdown of ponds.*
- Aerial and foam retardants will not be used during normal events. Under catastrophic events they would not be used within 300 feet of open water, waterways, and wetland areas.

- Plow/dozer lines must be rehabilitated to avoid unnecessary erosion and habitat fragmentation.

*Note: These are not major concerns for BNL.

2.4 Limits on Prescribed Fires

Prescribed fire activities are limited by the following considerations:

- All prescribed fire operations will be conducted in accordance with federal and state laws and regulations.
- Prescribed fire will not be used in areas with known environmental contamination.
- Prescribed fire will not occur in a fire management unit until vegetation monitoring has occurred.
- Prescribed fire will not be conducted without full concurrence of BSA and DOE management.

2.5 Fire Management Units

BNL will be managed as two Fire Management Units (FMUs) with specific fire management goals and objectives. These two FMUs will be the Upton Reserve (FMU 1) and the rest of BNL (FMU 2). Each unit may be divided into smaller sub-units to facilitate development of prescribed or mechanical treatment management plans. The two units have similar fuels and expected fire behavior but have different operational objectives.

2.5.1 Fuels

A quantitative basis for rating fire danger and predicting fire behavior is based on mathematical models that require descriptions of fuel properties as inputs. The collections of fuel properties have become known as fuel models and can be organized into four groups: grass, shrub, timber, and slash. A custom fuel model has been developed for BNL based on down woody fuel (dwf) transects and harvest plots. The principal fuel of the forest stands throughout BNL are the leaf litter, portions of the woody understory, and downed woody material. The understory is dominated primarily by ericaceous species like blueberry (*Vaccinium spp.*) and black huckleberry (*Gaylussacia baccata*), which produce waxes and oils that not only serve to protect the plant from insects and drought but make these species flammable and burn hot (Joint Fire Science Program 2008).

A fuels inventory was conducted in 2016-2017 in stands located in the northeast portion of the Lab, and it was determined that fuel loading was high in most of the area and could result in more intense fire behavior. Data from this fuels inventory suggest that though the Crescent Bow Fire in 2012 significantly reduced fuel loading in the burn units impacted by it, it has rapidly rebounded. Regenerating vegetation, particularly coppiced oak, has created ladder fuels and high live fuel loading. Dead standing trees are also a hazard and prescribed fire cannot be implemented in this area until those snags are removed, and the fuel bed height decreased. In 2020 a wildfire occurred within the Crescent Bow fire scar and resulted in a firefighter getting seriously injured by a branch falling from a snag. An assessment of fuels in other portions of the Lab needs to be conducted to plan for additional prescribed fire and mechanical treatments.

Current Prescribed Burn Plans have more specific fuels information by area, as well as predicted fire behavior.

2.5.2 Wildland Fire Management Strategies

Table 1. Fire Management Strategies

Management Options	<ul style="list-style-type: none"> ▪ Fire Suppression ▪ Prescribed burning
Resource Management Goals	<ul style="list-style-type: none"> ▪ Protect life and natural resources/property (WUI) from the effects of catastrophic wildfire. ▪ Limit smoke impacts to the surrounding communities and BNL facilities.
Unit Objectives	<ul style="list-style-type: none"> ▪ Suppress wildfires using the appropriate management response commensurate with firefighter and public safety and values of the natural resources and properties at risk. ▪ Use MIST as appropriate. ▪ Employ aggressive mop-up tactics to prevent smoldering fires and minimize smoke production and impacts. ▪ Use prescribed fire and mechanical treatments to reduce hazardous fuel loadings where/when appropriate. ▪ Use prescribed fire with other methods to maintain habitat and control encroachment of invasive species.
Unit Strategies	<ul style="list-style-type: none"> ▪ Identify areas of concern and develop response plans and tactics to expedite the initial attack and full suppression of the fire. ▪ When possible, use natural barriers other than line construction as holding lines during suppression operations. ▪ Develop a prescribed fire plan, as necessary, for identified fuel and ecosystem management objectives. ▪ Use federal assets when fire goes to an extended attack situation.
Limits on Actions	<ul style="list-style-type: none"> ▪ Mechanical equipment should only be a last resort during extreme drought to halt the spread of a wildfire or to protect life and natural resources or property, and under the recommendation of the Natural Resource Manager. ▪ Limit use of aerial retardants within 300 feet of open water or waterways. ▪ Soil conditions may make access difficult.
Special Concerns	<ul style="list-style-type: none"> ▪ Smoke may impact public health, traffic, BNL scientific facilities, and adjacent developments.

III – PLANNING

3.1 Annual Planning

Wildfire preparedness planning for BNL is annually reviewed and updated by BNL Emergency Services, Facilities and Operations, and the Prescribed Fire Program Manager. Updates to applicable documents are distributed to affected parties and record copies are filed at Building 599. The national wildland fire strategies include an *Annual Operations Plan*, *Detection and Dispatch Plan*, *Communications Plan*, and the *Pre-Attack Plan*. BNL has adapted the elements of the national plan to fit local conditions. These adaptations are explained below. Although it is not exactly a “fire preparedness” plan, *Prescribed Burn Plans* (maintained by the Prescribed Fire Program Manager), are reviewed yearly and are part of the overall fire management strategy.

3.1.1 Annual Operations Plan

The national wildland fire standard for an *Annual Operations Plan* requires the following actions under the leadership of BNL Fire Rescue with input from the Prescribed Fire Program Manager, when necessary:

- Review Suffolk County Mutual Aid Agreement. (Fire Chief)
- Update the detection and dispatch elements contained in BNL Fire Rescue Group's "*Wildland Fire Response Procedure*." (Fire Chief)
- Review the communication plan elements and assigned radio frequencies in the "*Brushfire Response Plan*." (Fire Chief)
- Review staffing and availability for prescribed fire planning. (Prescribed Fire Program Manager)
- Review firebreak needs and identify the need for maintenance to Facilities and Operations. (Fire Rescue)
- Complete any needed updates to *Prescribed Burn Plans* and submit for review following Appendix B – Sample Prescribed Fire Plan, so they can be approved by the spring of each year. (Prescribed Fire Program Manager and Burn Boss)
- Carry out site preparation for prescribed burns. (Prescribed Fire Program Manager)

3.1.2 Detection and Dispatch Plan

Because BNL is located in a suburban area, it relies on internal area patrols by the BNL Police Group along with cooperators/neighbors, staff, and visitors to detect and report fires. When the Fire Danger Rating is "High" Fire Rescue notifies the Central Alarm Station (CAS) to increase their patrols of the fire access roads. Beyond that reliance on the general public for detection, there is no further detection plan in place. The national wildland fire "*Detection and Dispatch Plan*" requirements for dispatch are represented in BNL's "*Wildland Fire Response Procedure*" Standard Operating Procedure (<http://intranet.bnl.gov/lpd/emgsvcs/FRSOP.asp>). This procedure is reviewed annually and updated tri-annually. Copies are forwarded to the Suffolk County Fire/Rescue communication center. Emergency Services maintains all of their standard operating procedures (SOP) on the web (<http://intranet.bnl.gov/lpd/emgsvcs/FRSOP.asp>).

3.1.3 Communications Plan

The national wildland fire standard for a *Communications Plan* specifies the means for firefighters to maintain contact. The conditions are inherent in the way business is conducted on Long Island and within the fire departments of Suffolk County. It is also part of the standardized training offered within Suffolk County. Therefore, a separate Communication Plan document does not exist. The following list highlights these conditions and explains how they are implemented:

- *Intra -Complex* - The BNL high band VHF radio system is the primary communication link for Lab operations involving BNL entities. The Radio Spectrum Manager has mapped the site and evaluated the reliability of coverage. Each piece of apparatus is assigned a mobile radio with BNL frequencies. Key people are assigned a portable radio with BNL frequencies. This is augmented by the use of cellular telephones for management personnel and key resources within the BNL emergency responder system.

- *Fire Operations* - Radios are issued to key positions and at least one per group while on fire operations. Local tactical frequencies are assigned during fire operations. As a back-up, cellular telephones are provided and tested to assure communications.
- *Interagency* - Suffolk County has a system of assigned low-band VHF radio frequency based on usage. The county is broken into divisions, with corresponding radio frequency channels assigned to groups of divisions. Mutual aid frequencies are established to facilitate responses involving large numbers of departments. However, departments often have adjacent divisions' frequencies within their radio units for smaller interagency operations. In the event of an incident needing Suffolk County interaction, BNL moves their radio operations to the Suffolk County frequencies (all BNL mobiles 800 band Suffolk County radios). A limited number of extra BNL 800 band radios are also maintained by the Lab to provide to Suffolk County and allow them to operate on BNL government frequencies, if needed.

3.1.4 Pre-Attack Plan

Pre-attack planning is outlined in BNL's "Wildland Fire Response Procedure". This SOP is updated tri-annually. Pre-attack resources are posted on the web and provided in the Command Vehicle. Pre-attack planning resources include:

- Response map(s): structures, restricted areas, boundaries, roads, gates, trails, and water sources;
- Mutual aid zones/fire coordinators' districts (includes map with boundaries);
- Hazard/Risk map: contaminated areas/zones, rivers and streams, power lines, main ditches, canals, drainage systems (Underground injection points and storm water systems and sanitary systems) and trenches;
- Natural and Cultural Resources map: sensitive zones, non-sensitive zones, restricted vehicle access areas;
- Sources of domestic water (hydrants, wells);
- Structure use list.
- SC Fire Comm would handle assigning mutual aid responses based on BNL's needs. This includes the use of SC PD helicopters for aerial observations (visual and IR).

3.1.5 Prescribed Burn Plan

The Prescribed Burn Plans are described in Section VI of this document.

3.2 Fire Weather and NFDRS Indices

The Central Pine Barrens Joint Planning and Policy Commission maintains an automated weather station. Throughout the fire season, the Natural Resource Management staff monitors the National Fire Danger Rating System (NFDRS) indices, drought severity (on the KBDI scale), 1000-hour fuel moisture, and associated weather trends that may contribute to limits of acceptable fire control.

Fire weather is provided to Suffolk County Fire Rescue and Emergency Services (SCFRES) daily. SCFRES communicators announce the fire weather on the dispatcher frequency (FRES 5 OPS 3 band) each day at approximately 1400 hours. An alert is issued by BNL Fire/Rescue during High or Extreme fire weather.

Additionally, BNL maintains a series of atmospheric weather sensors for measurement of real time weather conditions and publishes that data, including local KBDI, in one-minute intervals on the Met Services Dashboard. This data is available outside of the BNL firewall for use by emergency response staff on scene, in command posts, and in emergency facilities.

3.3 Wildland–Urban Interface

As urban/suburban development continues, cooperative planning with the NYSDEC Forest Rangers will be necessary to ensure public and resource protection and safety. BNL must plan for an increasing wildland–urban interface. Wildland–urban interface planning includes:

- Identify and map facilities, resources, and adjacent public and private property that need protection.
- Use mechanical (and potentially chemical) means and prescribed fire to reduce fuels and create/maintain firebreaks and fire access roads.
- Participate in public information and education programs provided by the Wildfire Task Force of the Central Pine Barrens.

As mentioned previously, a CWPP has been developed for the Ridge-Manorville-Calverton areas and includes portions of BNL. BNL has been identified as a priority site for fuel reduction activities in part because of the fuel loading data that have been collected for the forested areas adjacent to the communities in the northern portion of the Lab and because prescribed fire activities have already been planned for these areas. Implementation of a CWPP may make the Lab eligible for funding for these activities, which has been a limiting factor in the implementation of our fuel reduction program.

3.4 Normal Unit Strength (NUS)

3.4.1 Staffing, Qualifications and Physical Fitness

The table located in Appendix C indicates the adequate staffing for the BNL fire program. These positions should be identified and available for assistance from within BNL staff and cooperators.

Cooperators for the fire program at BNL include several local volunteer fire departments, the BNL Fire Department, the USFWS, the NYSDEC, and the Central Pine Barrens Commission.

All fire personnel involved in federal fire management activities must meet the fitness standards established by their agency. All personnel will have as a minimum in training the fire courses S130/S190 (or equivalent). Physical requirements will include a score of “arduous” (or equivalent) for the pack test for hand crews and a score of “moderate” (or equivalent) via the work capacity test for members of engine crews. (Note: State Agencies have similar requirements for qualifications that are considered appropriate for fire management and prescribed fire.) BNL’s Fire Rescue Group adheres to NFPA fitness standards, which includes an annual test of aerobic capacity using a U.S. Department of Labor Physical Demand Level (PDL) scale. A PDL of “heavy” is typically required for firefighters and those who wish to participate in prescribed fire activities at the Lab will be held to this standard. Those who cannot perform to this standard will not be permitted to participate in prescribed burns.

Anyone practicing for a physical fitness test or actually taking a physical fitness test must first read and sign the PAR-Q health-screening questionnaire and an informed consent form. If a person who is being tested to achieve a “moderate” or “arduous” rating answers “yes” to any of the questions in the PAR-Q health screening questionnaire, the test administrator recommends a physical examination prior to training or the test. A trained and qualified American Red Cross Responder (or equivalent) that can recognize symptoms of physical distress and administer appropriate first aid procedures must be on the site during the fitness test. Fitness tests shall not be administered to anyone who has obvious physical conditions or known heart problems that would place them at risk.

3.4.2 Equipment

The BNL Fire Department is supplied and staffed and is capable of handling initial response to all emergencies on site. In addition to the resources of the BNL Fire Department, the following supplies are available through interagency mutual aid if conditions warrant:

1. The fire cache is adequately supplied.
2. A dozer and fire plow are available for all critical fire activity periods.
3. All portable pumps are functional, and pump kits are complete. Pump fuel is mixed and available.
4. All chainsaws are functional and available.
5. Hand tools are adequately maintained and safe to use.
6. 3,000-gallon water tanker - filled and on standby.
7. 1,100-gallon water trailer - filled and on standby.
8. Wildland sprinkler trailer is functional and available.

3.4.3 Firefighting Water Supply

The central campus of the BNL site is supplied with high volume fire hydrants throughout for structural fire protection; however, those hydrants do not extend into the remote areas of the site. Experience has shown that round trip, water re-supply runs are lengthy, and a plan was developed to make water available in the remote areas of the site. BNL has a series of groundwater sampling wells throughout the site and 19 shallow wells in 10 areas have been designated for firefighting use. These wells supply water at a rate of approximately 40 gallons per minute (gpm) using electric powered submersible pumps stored on the sprinkler trailer. A high volume (750 gpm) well was installed on the East Fire Break and a new 1000 gpm well was installed on the south boundary in 2019. Additionally, the Groundwater Protection Group has developed a procedure for the use of the groundwater remediation wells along the south boundary as a high volume (750 gpm) source of water for fire suppression.

3.4.4 Personal Protective Equipment (PPE) – Prescribed Fire Only

Fire Rescue has issued each firefighter Nomex pants and shirts, gloves, helmet, and we have fire shelters for each position on the wildland vehicle.

3.4.5 Engines

BNL engine 3 (Type 3, 1250 gpm, 750-gallon water tank) is the primary initial attack resource on wildfires. Engine 2 is on standby as the pumper, which can carry water but has a limited ability to go off hardpan. These resources are staffed 24 hours a day, all year round.

3.4.6 Annual Training and Refresher

The goal of BNL fire training is to maintain fully qualified individuals to meet the objectives of this plan. Employee development training is a secondary priority, depending on budget limitations. We take advantage of online training through Target Solutions. This allows us to get the appropriate number of hours to meet the required refresher training.

All personnel involved in prescribed fire management activities are required to participate in 8 hours of fire management refresher training annually to be qualified for fire management activities in that calendar year. Refresher training concentrates on local conditions and factors; the Standard Fire Orders; “Lookouts, Communications, Escape Routes and Safety Zones” (LCES); “18 Situations and Common Denominators;” NWCG courses: Standards for Survival, Lessons Learned, and Look Up, Look Down, Look Around; and others to meet the firefighter safety requirements. Efforts are made to vary the training and use all or portions of other NWCG courses to cover the required topics. Annual training also includes practice on how to deploy and use a fire shelter under simulated adverse conditions, a review of BNL’s fire procedures, and the operation of all BNL fire equipment as applicable to specific duties.

IV – SUPPRESSION OPERATIONS

4.1 **Suppression Planning**

With careful planning, land managers can reduce the potential damage resulting from wildfires and wildfire suppression in all areas of BNL. This is especially important in developed facilities, critical research areas, contaminated areas, habitat crucial to threatened and endangered species, and cultural or historical sites. Areas susceptible to wildfires have been identified and methods have been implemented to reduce the probability of a damaging fire. These actions are included in the *Pre-Attack Plan* for each Fire Management Unit. These actions are communicated to suppression forces through annual training and through briefings in times of actual fire.

Road access to the forested areas was evaluated in detail in 2016 and efforts were made to improve the fire access road conditions including removing downed trees, cutting back encroaching brush, regrading, and adding signage to indicate location.

BNL has fully implemented DOE Order 151.1D *Comprehensive Emergency Management System*. BNL’s Site Emergency Plan (Revision 1-2017) provides an overview of the program that has been established to prepare and respond to Operational Emergencies. This would include a functional Emergency Operations Center that supports the incident commander. Staffing at the EOC is fulfilled by the BNL Emergency Response Organization, which is organized under the National Incident Management System.

4.2 Initial Attack

For any wildfires occurring at BNL, the BNL Fire Department has command over all suppression activities. An *initial* attack is a response that does not exceed 24 hours' duration, threaten persons or property off site, or require additional forces from outside BNL. Due to the nature of the BNL site and its proximity to two outside fire districts, wildland fires are occasionally detected and responded to by outside fire departments. These departments inform the BNL Fire Department of their actions and are required to enter the Lab property through the front gate unless given permission to do otherwise. There are additional points of entry and egress on the north end of the Lab (see maps in Appendix D). This type of situation would be included as an "Initial Attack" classification.

4.3 Resource Advisor

A resource advisor (RA) is the individual responsible for gathering and analyzing information concerning critical areas and natural resources that may be impacted by fire or fire suppression activities. At BNL, the Natural Resource Manager is the RA. This person is a crucial link between the fire suppression forces and the Laboratory Management. This person reports to the Planning Chief as a technical resource within BNL's Emergency Operations Center.

4.4 Extended Attack

An *extended* attack is required when a fire is likely to last longer than 24 hours, threatens adjacent public or private lands, or exceeds the capabilities of the BNL Fire Department assisted by on-site fire-trained personnel. The DOE Site Area Manager or designate is notified upon extended attack actions and may coordinate with appropriate BNL officials. Actions may include:

- Completing a Delegation of Authority form (Appendix A), if needed;
- Using the Wildland Fire Decision Support System (WFDSS) to make risk-informed decisions and holding a daily review of that plan with the necessary parties;
- Notifying DOE to request additional state and federal resources.

V – PRESCRIBED BURNS

Each prescribed burn has a unique set of goals or objectives. After each prescribed burn is completed, a report is produced (generally as part of the Annual Report on activities associated with the Natural Resource Management Plan), documenting the first and second order fire effects, extent of invasive species reduced, and so on. If the objectives were not achieved, the report will also state what could have been done differently to achieve the objectives. Some goals may require pre- and post-fire vegetation monitoring for accurate evaluation; post-fire monitoring can extend for up to 5 years.

5.1 Program Overview

The Central Pine Barrens of Long Island is a fire-adapted vegetative type that, in the absence of fire, will change in composition and structure and adversely affect other natural resources. The purpose of the BNL/Upton Reserve Prescribed Fire Program is 1) to use fire as a management

tool for reducing available fuel, 2) to maintain fire-dependent communities such as pine barrens habitats and warm-season grasslands, and 3) to reduce or eliminate exotic nuisance vegetation. The Prescribed Fire Program Manager is the lead for developing and implementing the Prescribed Fire Program, working in cooperation and coordination with BNL Fire Rescue, Fire Protection Engineering, and other agencies.

5.2 Limits on Prescribed Burning

Most prescribed burning will be low to moderate in complexity. Only wildfire-qualified persons with the training and skills necessary to plan, execute, and evaluate the burn program will be used. Usually, a burn crew consists of a qualified Burn Boss (RXB2) and additional fire-qualified individuals. Additional team members may be requested as required from the New York State Forest Rangers, BNL Fire Department, Central Pine Barrens Commission, and/or other qualified cooperators and partners, and local volunteer fire departments.

The following limits have been identified for the Prescribed Fire Program:

- Public safety must not be endangered by the location or extent of a prescribed burn.
- The prescribed fire must not negatively impact the WUI.
- Staffing requirements must be met, despite transfers of fire-trained individuals.
- A qualified Burn Boss (minimum RXB2) must be available.
- NYSDEC, BNL, or cooperator burn crews must be available.
- Appropriate pre-fire vegetation sampling characterization or analysis must be done.
- No known radioactively contaminated soils/vegetation may be involved.
- Personnel must establish and review safety criteria.
- Area to be burned must be within fuel breaks or appropriate fire lines established for each burn.
- Go/No Go checklist must be completed and approved by DOE and BNL designated managers.

5.3 Smoke Management

To minimize negative impacts to visibility and to maintain air quality, plans for prescribed burns must provide for aggressive action to manage smoke. Visibility and clean air are primary natural resource values, and the protection of these resources is given full consideration in fire management planning and operation. BNL complies with all applicable federal, state, interstate, and local air pollution control requirements, as specified within Section 118 of the Clean Air Act, as amended (42 USC 7418). That Act establishes Class I, II, and III areas where emissions of particulate matter and sulfur dioxide are to be restricted. The restrictions are most severe in Class I areas in wilderness areas exceeding 500 acres. However, BNL contains no federally designated wilderness areas.

New York State has developed several implementation plans to administer the Clean Air Act. An approved burn plan is required to conduct prescribed fires in NY State. Since BNL is a federal facility, the NYSDEC does not need to approve the burn plan; however, as a best management practice and because a NYSDEC Ranger may act as the burn boss at BNL, they may review and comment on BNL burn plans. In addition, a technical review is conducted by an outside agency/organization, such as the USFWS.

A section on smoke management is included in each prescribed fire plan, detailing specific actions to be taken to mitigate the impacts of smoke. Aggressive mop-up must be initiated on fires that have the potential to produce levels of smoke that may impact human health or safety.

5.4 Approvals

BNL's Natural Resources Fire Management Specialist, working with the expertise of the NYS Forest Rangers and others, will annually formulate the prescribed burn program and assign a burn boss. The burn boss will review the *Prescribed Burn Plan* (see sample version in Appendix B), which is then submitted for technical review to an outside agency/organization each time the plan is updated on a 5-year cycle.

There are currently no air quality permits required; however, careful monitoring of changing state regulations is necessary to ensure any open burning is done in compliance with regulations. All prescribed burning restrictions or notifications imposed at the state, regional, or national level, as determined by preparedness level, shall be adhered to.

The technical review of a prescribed burn plan serves as both the safety review and work planning documentation. The final authorization and approval for any prescribed fire at BNL comes from the DOE Site Area Manager (Cognizant Field Element).

Work associated with the preparation of a prescribed fire unit must be covered under the BNL Work Planning and Control permit process and documentation.

5.5 Burn Season

Ideally, growing season burns will be conducted; however, weather conditions, opportunities, or objectives may allow burns to be conducted any time during the year. A Prescribed Burn Plan (Appendix B) is a thorough document that details who, what, when, where, why, and how the burn will be implemented.

5.6 Complexity

Complexity for individual burns is calculated using the NWCG *Prescribed Fire Complexity Rating Guide*. This guide requires planners to consider the following factors:

1. Values at risk (on- and off-site)
2. Public/political interest
3. Safety
4. Fuels/Fire behavior
5. Resistance to containment
6. Ignition procedures/methods
7. Prescribed fire duration
8. Smoke management

9. Number and dependence of activities
10. Management organization
11. Treatment/resource objectives
12. Constraints
13. Project logistics

The overall rating is assigned as Low, Moderate, or High, based on the potential risk, potential consequence, and technical difficulty of each element. This in turn helps to establish the degree of difficulty that is involved, suggest whether the personnel resources available can execute the planned fire, and identify specific elements or characteristics of a planned burn that pose special problems or concerns. In short, it can be thought of as a “Go, No Go” checklist to a planned event before the fire is ignited.

Once the complexity of a proposed burn has been calculated that index is stated in the *Prescribed Burn Plan*. Many of the planned burns at BNL would ordinarily be in the Low complexity category. However, air quality considerations and BNL’s proximity to developments and busy highways may elevate some burns to the Moderate complexity level.

5.7 Preparation and Implementation

Site preparation needs are identified and specified within the *Prescribed Burn Plan*. These will be carried out prior to ignition and approved by the Burn Boss. The Burn Boss may impose additional site preparation needs or request additional holding requirements based on potential escape and risk involved. No prescribed burning will occur when a wildfire is in progress within BNL, when fire danger indices are above “moderate,” or when New York State or Suffolk County has issued a burning restriction.

5.8 Monitoring and Evaluation

All prescribed burning performed at BNL is documented by BNL personnel. Additional monitoring needs for fuel reduction and habitat response consist mainly of photos that show whether the burn objectives and resource objectives have been accomplished, Composite Burn Index (CBI) assessment, and quantitative measurements of changes in fuel loading as deemed necessary (Key and Benson 2006). No special equipment is necessary for monitoring fire behavior. Most burns are of low to moderate intensity and easily measured through rate of spread and flame-length observations. Should more conclusive fire behavior and effects information be necessary, it will be documented within the Annual Prescribed Burn Planning process.

5.9 Guidelines for Prescribed Burns at BNL and Upton Reserve

For the type of prescribed burning occurring at BNL, follow these guidelines:

- Conduct the burn according to the terms and conditions of the approved burn plan.

- Burn only when existing wind speed, wind direction, and atmospheric conditions (such as inversions or when stagnant air conditions are evident) will not create any nuisance conditions. Burn on days when wind directions will carry smoke away from sensitive areas.
- Conduct burning only when visibility exceeds 4 miles and when the fire weather forecast indicates that mixing heights are greater than 1500 feet and any unstable air mass is at least that distant.
- Burn when fuels are reasonably dry, at least 3 days after a significant precipitation event for forest fuels.
- Reduce residual smoke by mopping up stumps and snags quickly.
- Use backing and flanking fires, when possible, to minimize particulate emissions. (backing and flanking fires emit 3 to 5 times less particulate matter than head fires.)
- Inform media and other public affairs offices of fire and smoke dispersal conditions throughout the burn.
- Ensure proper approvals – BNL Management, BNL Fire Chief, DOE Site Area Manager (no prescribed fire action will be conducted without BNL and DOE approval on Go/No Go checklist).

VI – COMMUNITY FACTORS

6.1 Public Safety

Safety of wildland firefighters, prescribed fire burn crews, and the general public is the priority goal. This section deals with the safety of the visiting public and BNL's neighbors. In several sections of this plan, references have been made regarding the safeguarding of human life. The references have been in two forms: 1) reducing fuel loadings to lessen the intensity of wildfires, and 2) managing wildfires and prescribed burns in such a manner as to reduce the likelihood of accidents or injuries. The following actions will be taken to safeguard human life:

- The fuels in the wildland-urban interface will be managed in a manner that is designed to reduce fuel loading near human habitation.
- All prescribed fire operations will be conducted in accordance with an approved plan.
- All prescribed fire operations will be conducted in accordance with all applicable federal and state laws, regulations, and policy statements.
- Specific actions to be taken during prescribed burns will be indicated in prescribed burn plans.

The greatest concern is the safety of all suppression personnel and the public when a wildland fire or prescribed burn is in progress. Only properly trained and qualified personnel shall be assigned. Unqualified individuals at the incident should be relieved from suppression duty or be reassigned to a non-fire line function when adequate initial attack forces arrive. The fire scene must be secured from the public for their own protection. Depending on the complexity of the incident, access may have to be controlled.

6.2 Public Information and Education

The BNL Stakeholder and Community Relations Office, working with the NYSDEC Forest Rangers, and the Long Island Central Pine Barrens Commission use existing prevention and public education programs regarding fire on wildlands. Additional public education materials on fire

may be developed and shared with BNL's employees and stakeholders. Public education is necessary to garner support and understanding for any fire management program. Presentations to BNL's Community Advisory Council will be given periodically as the Prescribed Fire Program becomes firmly established to keep stakeholders apprised of fuels management actions taking place at the Lab. In addition, presentations and updates on fuels management activities may be given to civic organizations in adjacent communities—particularly when mitigation actions are conducted in areas immediately abutting populated areas.

Within the Incident Command System (ICS), a Public Information Officer position is identified. This person is responsible for formulating and releasing information about an incident to the news media, incident personnel, and other agencies. Communications to the news media, other non-regulatory agencies, and so on are presented through the BNL Media and Communications group.

VII – WILDLAND FIRE MITIGATION PLAN

Per NFPA 1140 Standard for Wildland Fire Protection (formerly NFPA 1143) the Lab is required to have a Mitigation Plan for wildland fire. The following section addresses all the elements required per the standard and will be updated annually to reflect any changes to the program and/or availability of funding.

7.1 Sources of Ignition

BNL is considered a secure facility and though access through the front gate is limited, recreational users often enter the site through the north and east sides as the site is not entirely fenced. Recreational use of trails, access roads, and fire breaks by employees is allowed and may increase the detection of potential fires. ATV and dirt bike use, which are potential sources of ignition, is prohibited. The site is routinely patrolled for unauthorized use by security and patrols are increased during periods of high fire danger.

7.1.1 ATV/Dirt Bike Trail Removal

The northern portions of the Lab site will be surveyed for ATV/Dirt Bike trails on an annual basis. The AHJ will forward this information to F&O so they can then block the identified trails or otherwise discourage use by recreational users. This along with security patrols will minimize this potential source of ignition.

7.2 Fuels Treatment

7.2.1 Prescribed Burns

7.2.1.1 *Prescribed Burns Identified as High Priority*

A prescribed burn plan has been written for nine units in the northeastern portion of the Lab totaling approximately 184 acres. This is the highest priority area of the Laboratory for fuel treatments because some of the units are adjacent to the community of Ridge. Four and a half of the burn units were burned in the Crescent Bow Fire in 2012. While this reduced the fuel loading

for several years, they require treatment again as the fuel loading is once again very high. However, due to the dead standing trees that remain from the wildfire and the coppiced oak that has increased the fuel bed depth and created ladder fuels, these areas need mechanical treatments before prescribed fire can be safely implemented.

Three other units were burned in 2017 and 2018 and do not require immediate management again. The two western-most units that are adjacent to a community are the highest priority for burning. Unfortunately, the prescribed fire program cannot be implemented until a Memorandum of Understanding with the NYSDEC is approved. New areas for fuels and forest management have already been identified and additional burn plans will be written when the prescribed fire program is once again operational.

The mitigation efforts will require a 3-5 cycle of prescribed burns for the high priority units north of the North Fire Break adjacent to a community and a 5-8 year cycle for those south of the North Fire Break.

7.2.1.2 Prescribed Burns for the Balance of Site

Plans are underway to develop additional prescribed burn plans for other areas of the site particularly for areas east of the East Fire Break Road and within the Upton Ecological Research Reserve. BNL is working with the Pine Barrens Commission and the NYSDEC on efforts to minimize the threat to adjacent communities.

7.2.2 Mechanical Treatments

7.2.2.1 Clearing of Standing Dead Trees in High Priority Areas

As mentioned previously, mechanical treatments will be required before some areas can be safely burned again, however money for this work has not been available until this fiscal year. The Environment, Safety, and Health Directorate will receive \$50K per year for three years to conduct mechanical treatments, however, it is unlikely that this amount will be sufficient to treat the entire area as mechanical treatments are very expensive.

7.2.2.2 Vegetation Beneath PSEG-Owned Aerial Powerlines

Public Service Enterprise Group (PSEG) owns aerial powerlines (138 kV and 69kV) that run roughly 8.25 miles along the East Fire Break and also through the center of the site to two substations. The vegetation beneath the powerlines consists of dense regenerating pitch pine that has not been managed in several years. The buildup of fuel reduces the efficacy of the fire break and is in need of regular treatment. A contractor hired by PSEG began clearing the vegetation in November and the work is expected to be completed in early 2022. PSEG currently has management of the vegetation on a five-year schedule. The next clearing is scheduled for 2026.

7.2.2.3 Vegetation Beneath BNL-Owned Aerial Powerlines

BNL-owned aerial powerlines (13.8 kV and 2.4 kV) run throughout the site. The maintenance of the roughly 5.25 miles of powerlines are the responsibility of the Energy and Utilities Division

(EU). The EU is entering a contract with a contractor that would provide the necessary clearing of the vegetation under the BNL-owned aerial lines in 2022. EU will follow PSEG's five-year schedule of vegetation management.

7.2.2.4 Fire Break & Access Road Maintenance

Fire Rescue, Fire Protection Engineering, and Natural Resource Management work with Production Services to ensure fire access roads are clear throughout the year, but particularly before the start of fire season in March.

The North and East Firebreak roads have not been regularly maintained and were once much wider than they are currently. The north side of the North Firebreak has not been cleared in over twenty years. The south side of the North Firebreak and the west side of the East Firebreak have not been cleared since 2012 and are becoming overgrown with pitch pine seedlings. If staffing allows, this vegetation will be mechanically treated, put into piles, and burned. A prescribed burn plan will be written for this. The north side of the North Firebreak does not necessarily need to be completely cleared, but the dense pitch pines should be thinned so they do not decrease the efficacy of the firebreak.

7.3 Public Education

Presentations to BNL's Community Advisory Council and local civic organizations have been given to educate stakeholders about prescribed fire and they will be kept apprised of future fuels mitigation actions. Existing educational materials will be updated and distributed as necessary, and we will continue to collaborate with the NYSDEC and Pine Barrens Commission on the development/update of these materials. For more information see Section 6.2 – Public Information and Education.

7.4 Structures

New corrective actions are prioritized on a site wide basis through the Strategic Fire Safety Plan. The Program Description for Facility Safety describes the role of Fire Protection Engineering in the design review process. The Engineering Design Subject Area identifies the steps for fire safety issues to be identified and included in designs. For example, the structures being built for the Electron Ion Collider (EIC) project will have exterior elements and the vegetation setbacks designed to meet the WUI requirements of NFPA1140.

7.4.1 Vegetation around CAD Facilities

A survey was conducted by FPE of the vegetation around building elements and outdoor exposed cable trays associated with the Alternating Gradient Synchrotron (AGS), Booster & RHIC facilities in 2018. Collider-Accelerator Division (CAD) is responsible for the maintenance of the vegetation around their facilities. CAD hired contractors to address the identified issues in the 2018 survey. They will continue to monitor the vegetation around their facilities and will include the EIC facilities in their plan once they are completed.

7.4.2 Vegetation around Balance of Site Facilities

Wildland Urban Interface Survey 2019 Update (Appendix F), lists the current hazard classification of all structures as per NFPA 1144 - 2018, *Standard for Reducing Structure Ignition Hazards from Wildland Fire*. The results for each structure have been included into the Strategic Fire Safety Plan (SFSP) database. Projects to be funded by the SFSP each year are risk ranked based on several criteria. Individual facility WUI issues normally do not get ranked high on the list however, FPE would champion to have the WUI issues of those facilities classified as “Significant” if the facility is scheduled to have a major renovation.

7.5 Infrastructure

The AHJ has to consider improvements or modifications to existing infrastructure. NFPA 1140 identifies six areas for consideration: roads, water supply, communications, utilities, transportation corridors, and airports. The following improvement has been identified at this time:

7.5.1 Water Supply: North Fire Break Well

In FY22 an electrified well was funded with \$135k for installation on the North Fire Break. This well was a priority for SFSP projects to be funded with CURL money. This well will be installed to complete the site’s emergency wildland water supply system.

7.6 Special Considerations

7.6.1 Threatened and Endangered Species

Prescribed burn plans address potential impacts to special status species likely to be present in burn units. BNL’s forests are currently utilized by whip-poor-will and other migratory songbirds as well as the state endangered eastern tiger salamander (*Ambystoma tigrinum tigrinum*). Tiger salamanders prefer the sandy, friable soils that are typical of pine-oak communities in the pine barrens. Both adults and sub-adults lead a fossorial existence, foraging for invertebrates, insects, worms, and slugs through their own burrows or existing small-mammal burrows and root-ways. Occasionally, salamanders may move under leaf litter, through hollow logs, or beneath debris, however forest and fuels management are not expected to have impacts on them. In fact, studies have shown that forest management ultimately improves habitat for this species. Any work performed near known breeding ponds, however, may impact this species and will be evaluated during the work planning process.

The only special status species that is likely to be impacted by fuels management is the northern long-eared bat (NLEB, *Myotis septentrionalis*). This species is federally listed as threatened and may utilize trees in the burn units for roosting and rearing of pups during the growing season. Despite the listing, the USFWS initially ruled that most forest management activities are unlikely to have a significant impact on populations of NLEB and its ability to recover so they declined to regulate such activities, however, a federal court ruled in early 2021 that USFWS must review this listing to determine if it warrants an increase to an endangered listing. The agency has until December 2022 to make a decision.

The local USFWS office has recently made new recommendations regarding any fuels and fire management activities. These include:

- No burning can occur during the maternity period (June 1 – July 31).
- No burning can occur in any areas with known roost trees during any time of year.
- Perform acoustic surveys in the area of the planned burns before and after implementation.
- Burning should not occur immediately following heavy rain, high wind, and cold (night temperatures below 50°F), except between November 1 – March 31.
- Tree cutting for fuels management should not occur from April 1 – October 31.
- Snags and cavity trees should not be cut or removed unless considered a safety hazard.

We will continue to keep open lines of communication with the USFWS regarding management activities and potential impacts to bats and track research findings on habitat needs on Long Island.

7.6.2 Historical and Cultural Resources

Several culturally significant areas may be affected by fire management activities. Prior to BNL, the property was part of Camp Upton during World War I and II. As a result, a number of historic elements still exist on the site. WWI trenches and foundations can be found in some of the forested areas as well as unexploded ordnance and military artifacts. An archeological survey has also revealed the remains of two homes from the 1800's. Actions such as prescribed fire, fire suppression, and forest thinning may significantly impact historic features and artifacts if care is not taken during the planning phase, therefore, it is important that knowledge of cultural resources be fully integrated into fire and fuels management planning. The Cultural Resources Manager is consulted during the planning process and known cultural resources are addressed in each burn plan. In addition, pre- and post-fire surveys for cultural resources will be performed in prescribed fire areas.

VIII – LITERATURE CITED

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APPENDIX A: Delegation of Authority – Extended Attack

Name of Incident Commander is assigned as Incident Commander (IC) of the ***Name of Incident***, for Brookhaven National Laboratory (BNL) effective ***Time and Date***.

The IC has full authority and responsibility for managing the fire suppression activities within the framework of the law and BNL policy and direction as provided by this office. The Resource Advisor will provide habitat Management Plans and other appropriate documents.

Names of Resources Advisors and contact Information are assigned as Resource Advisors. They or the Area Manager will be consulted in situations where natural resource decisions or tradeoffs are involved unless life safety issues require immediate attention, and those actions will be documented.

Specific direction and fire suppression priorities for the ***Name of Incident*** are as follows, and are in priority order:

1. Provide for firefighter and public safety.
2. Use of minimal impact techniques should be employed to reduce habitat damage. Use natural barriers, fuel breaks, and roads, if possible, for burnout operations.
3. Use of dozers or tractors requires approval of the Area manager or their designate (resource advisors) prior to implementation. ***Include other Standards or conditions as needed.***

Turn-Back Standards

1. All ***Name of Incident*** contracts, agreements, bills, medical problems, equipment repairs, and fire cache re-supply shall be closed out prior to team being released.
2. Road damage during suppression efforts will be repaired prior to the team's departure.
3. Fire perimeter mopped up ***Specify*** and all lines checked for heat and integrity.
4. Rehabilitation Plan will be completed in Coordination with the BNL Resource Advisors.
5. Fire perimeter mapped by GPS and loaded into the GIS Database.
6. Tort claims reviewed by Area Manager or their designee.

The Deputy Area Manager will represent the Area Manager on any occasion where Manager is not immediately available.

Area Manager, _____, Brookhaven National Laboratory

Date and Time, _____.

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APPENDIX B: Sample - Prescribed Burn Plan (document linked below)

PRESCRIBED FIRE PLAN

Annual Review Sheet

ADMINISTRATIVE UNIT(S): Brookhaven National Lab (BNL)

PRESCRIBED FIRE NAME: Brookhaven National Lab Northeast Units

PREPARED BY: Kathy Schwager DATE: 01/18/18

TECHNICAL REVIEW BY: Alex Entrup DATE: 5/2/18
Alex Entrup - Northeast Forest and Fire Management, LLC

NATURAL RESOURCE REVIEW BY: _____ DATE: _____
Tim Green

BNL FIRE REVIEW BY: _____ DATE: _____
Tim Kelly

EMERGENCY PLANNING

REVIEW BY: _____ DATE: _____
Michael Venegoni

DOE REVIEW BY: _____ DATE: _____
Gerald Granzen

COMPLEXITY RATING: LOW

APPROVED BY: _____ DATE: _____
Bob Gordon, DOE-BH50

APPROVED BY: _____ DATE: _____
Jack Anderson, BNL

Plan Rewrite: April 2023

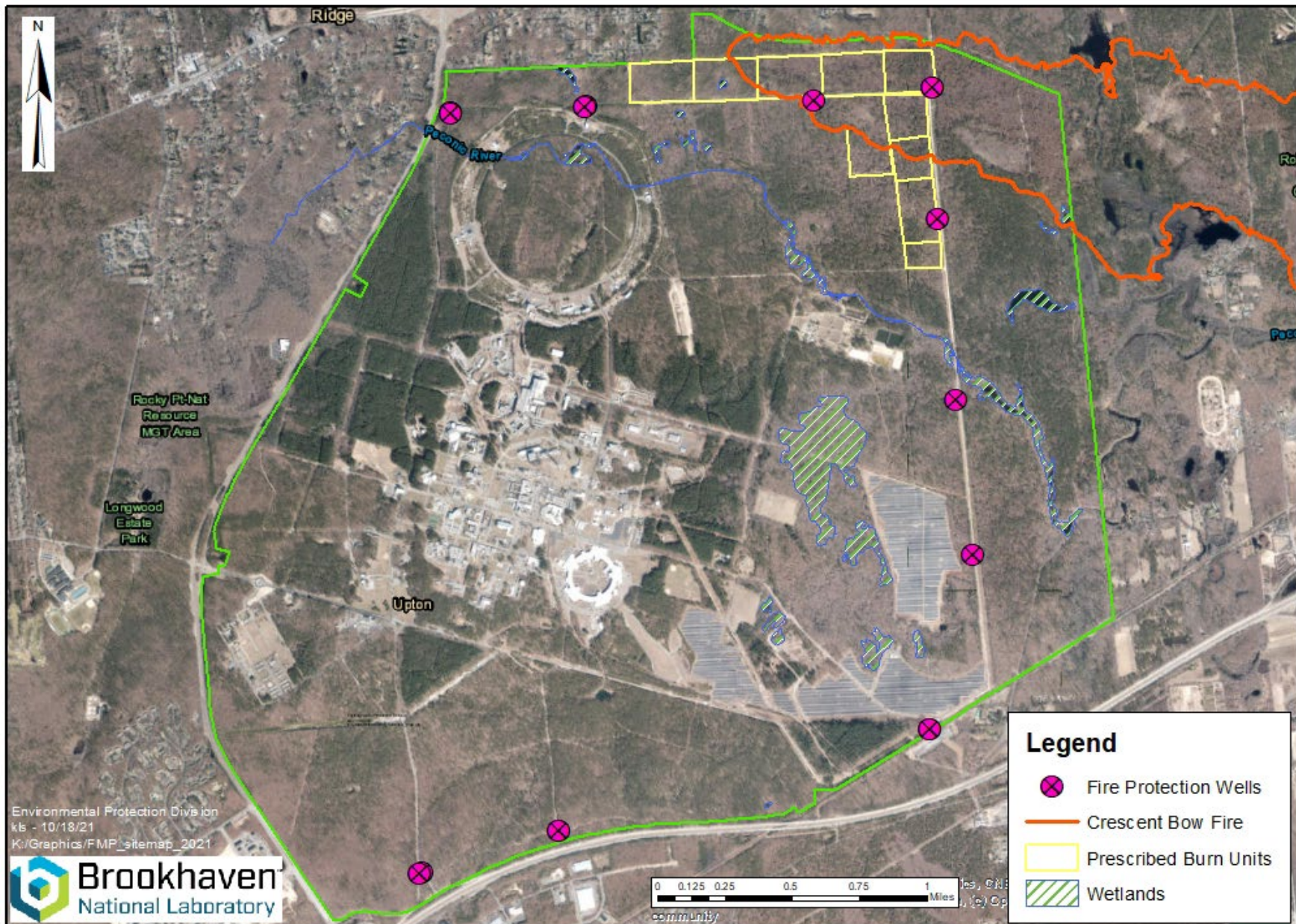
APPENDIX C: Detection and Dispatch Plan, Staffing Table

Alarm	Definition	BNL Resources	SC FRES Dispatch and Notification	
First Alarm	Incipient stage fire, well within the resources of BNL FD to extinguish; or a moderate fire in which BNL FD & immediate mutual aid will extinguish. No other resources are needed.	<ul style="list-style-type: none">BNL Engine 3 & CommandBNL SecurityPager notification for information	As requested BNL Incident Command: 1 Stump Jumper from Ridge, 1 Stump Jumper from Manorville, and/or 1 Stump Jumper from Yaphank	
Second Alarm	Fire(s) are clearly on BNL property and beyond BNL FD resources.	<ul style="list-style-type: none">Implement Brush Fire SOPSite Maintenance D7 DozerFuel TruckPager notifications for IH, HP monitoringBNL SecurityPE puts wells on full supplyCall in 2 off-shiftsActivate EOCHazmat trailer to Bldg. 30Occupational Medicine Clinic	Summon an additional: 4 Stump Jumpers 3 Tankers 2 Engines (1 for BNL Coverage*) 1 Heavy Rescue*(BNL Coverage) 1 Ambulance* (BNL Coverage) 1 Rehabilitation Unit	<ul style="list-style-type: none">SC Fire CoordinatorSC EMS CoordinatorBrookhaven Town Tank retrieverSCPD HelicopterSEMO (518) 457-2200 (information only)US Forest Service (610) 557-4146 (Information only for NYS Forest Ranger)
Third Alarm	Fire(s) require additional resources for relief and for structural protection on site.	<ul style="list-style-type: none">BNL HousingBNL CafeteriaVehicle Repair	Summon an additional 7 Stump Jumpers 3 Tankers 4 Engines 1 Ambulance 1 Rehabilitation Unit 1 Heavy Rescue	<ul style="list-style-type: none">SC Command VehicleNYS Forest RangersFire Island National Seashore RangersAir guard / Army Helicopters (Bambi Buckets)
Fourth Alarm	Fire(s) require additional resources for structural protection on site that are threatened by fire.		Summon an additional: 6 Stump Jumpers 1 Tanker 5 Engines 4 Ambulances 1 Rehabilitation Unit	<ul style="list-style-type: none">Brookhaven/Riverhead Town Heavy EquipmentPSEGVerizon
Emergency Medical Services	The EMS response by Incident Command will consider the following: 1) Medical aid for Firefighters & other Emergency Response Personnel working the incident 2) Rehabilitation of the Firefighters & Emergency Response Personnel 3) Normal EMS response to BNL employees 4) Normal EMS response to surrounding Departments (Ridge & Manorville), such as, MVA at Main Gate or on William Floyd Parkway, emergencies in the immediate vicinity of BNL, in which the resources are available to respond from BNL			
*Coverage for BNL facilities shall stage @ Bldg. 599 (BNL Firehouse) with the following complement: 1 engine (1250 gpm minimum), 1 Heavy Rescue, 1 Ambulance				

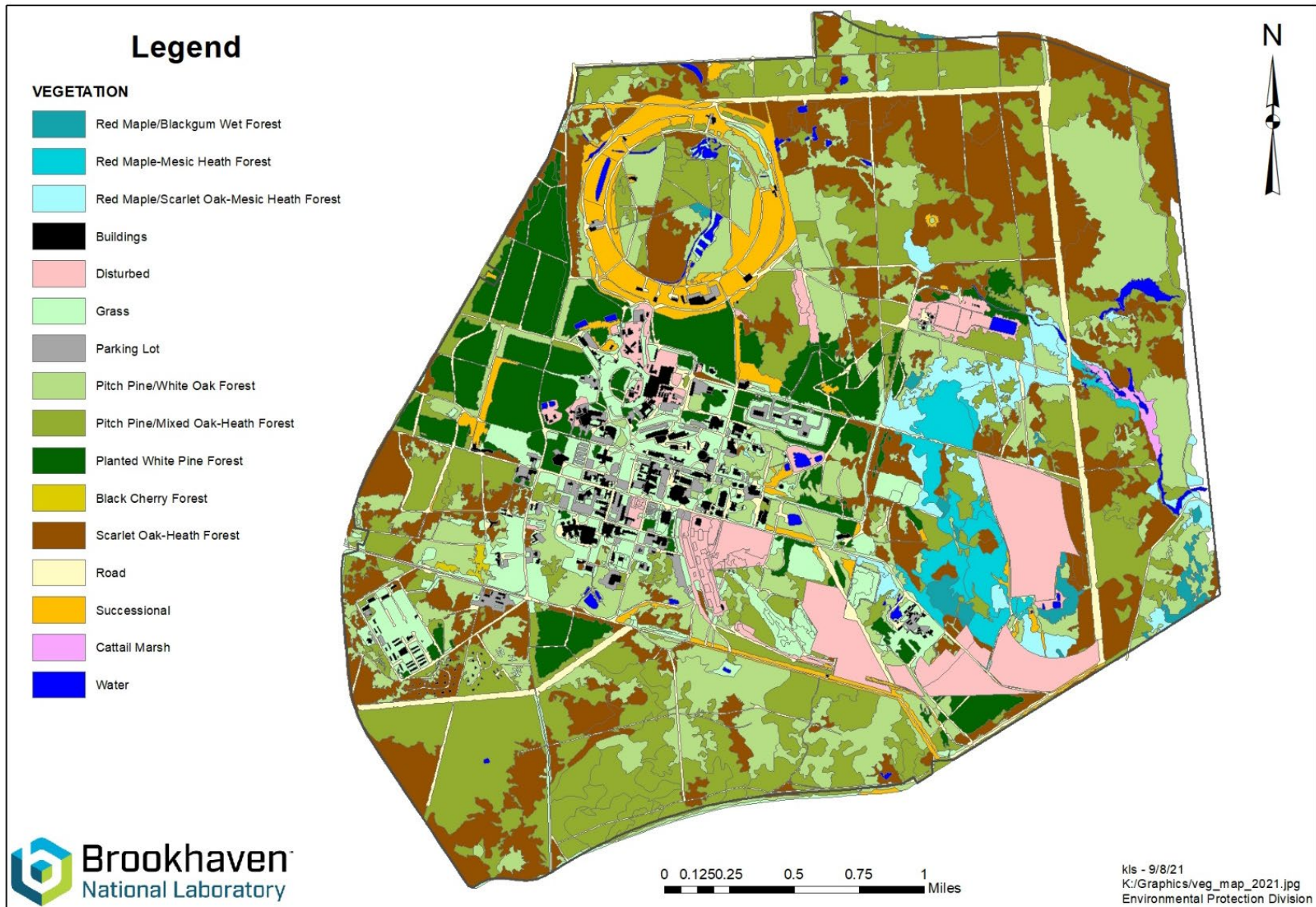
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APPENDIX D: Maps

BNL Site Map



Vegetation Map of Brookhaven National Laboratory



APPENDIX E: Wildland Interface Survey



Wildland Urban Interface Survey
2019 Update



Note: If this final section is missing from your document, you may go to

<https://intranet.bnl.gov/emergency-services/fire-protection-engineering/Wildland-fire/files/pdf/Wildland-Interface-Survey.pdf>

and download the PDF file.

APPENDIX F: Ridge-Manorville-Calverton Community Wildfire Protection Plan

Note: If this final section is missing from your document, you may go to

<https://pb.state.ny.us/file.aspx?DocumentId=1117>

and download the PDF file.