

Burned Area Emergency Response (BAER) Plan

Neighbor Mountain Fire

UNIT: National Park Service, Shenandoah National Park, VA

DATE: June 26, 2012

INCIDENT NUMBER: VA-SHP-120008



Submitted by:

Martha C. Bogle

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Date: 2012.07.20 12:20:39 -04'00'

Approved by:

Date

Date

Superintendent, Shenandoah National Park

Regional Director, Northeast Region

SHENANDOAH NATIONAL PARK MANAGEMENT

In May, 1926 an act (44 Stat.616) was passed providing for the establishment of Shenandoah National Park (SHEN). On July 3, 1936, President Franklin D. Roosevelt dedicated Shenandoah National Park “to the present and future generations of America for the recreation and re-creation which we shall find here.” On October 2, 1968, Congress designated The Appalachian Trail, which runs the entire length of the park, as a National Scenic Trail. On October 20, 1976, an act was passed designating the Shenandoah Wilderness. Through these Acts and others, Shenandoah National Park has developed its goals to:

- Protect, maintain, and restore as appropriate the ecological integrity of this portion of the Blue Ridge/Central Appalachian biome.
- Protect, restore as appropriate, maintain in good condition, and manage in their cultural context, the significant cultural resources and associated values.
- Preserve in partnership with surrounding communities the scenic and rural character of the Shenandoah Valley and the Piedmont.

Park resource management issues are many and varied but one of the largest and widespread threats to park ecological integrity is invasive non-native plants. More than 360 species of non-native plants have been identified and some species are especially aggressive and harm native plant communities. Little invasive plant inventory or management has taken place in the fire area but a few established populations within/near the fire boundaries were noted during suppression activities.

FIRE BACKGROUND

The Neighbor Mountain fire was reported on 6/26/2012 at 0641 hours on park land on the north side of Neighbor Mountain creeping uphill towards the Neighbor Mountain Trail. Several Shenandoah National Park (SNP) Incident Attack resources responded and engaged the fire for two days. Steep rocky terrain and limited access prevented initial attack forces from containing the fire. Unified command was established with Virginia Department of Forestry, Page County, and SNP on June 28, 2012. Low relative humidity combined with dry fuels allowed the fires which were burning in hardwood leaf litter to outpace available local resources and the fire grew to more than 200 acres by the end of the first operational period. On the evening of June 29th, a severe storm (Derecho) impacted the area with strong winds, causing large flare-ups followed by $\frac{3}{4}$ of an inch of rain across the fire. On June 30th, command was transferred to a Type 2 IMT (Southeast Area Red Team, Tony Wilder). Over the following days overall fuel moistures continued to dry despite a threat of rain nearly daily allowing the fire to spread to more than 1,100 acres by the end of June 30th. After containment lines were completed, aerial ignition was utilized (7/3) to burnout ridges between lines and the fire's edge. This work was largely completed the following day (7/4). Sunday, July 8th the fire was handed back to a Type 3 organization at SNP. July 9th a small amount of rain (a couple of tenths) and clouds covered the fire area during the morning.

An additional small, lightning-caused ignition was detected in the South District during the Incident Management Team tenure and was quickly suppressed during initial attack (Lewis Peak 2 fire). Basic rehabilitation by suppression crews was determined to be sufficient.

The acres burned by ownership and designated Wilderness included:

Ownership	Wilderness	Non- Wilderness	Total Acres
NPS	1816	167	1983
Private	0	155	155
Total Acres	1816	322	2138

SUPPRESSION PHASE ACTIONS

During the final stages before fire containment, erosion control measures were taken to stabilize hand lines. Berms and piles created by the crews were leveled and waterbars and other features were used to reduce water runoff impacts. Though many of the dozer lines on private lands were in need of erosion control measures, the state crews were responsible for that work. Despite crew efforts to avoid non-native plant infestations, some work in the infested zone was required to manage the line. Mitigation measures were employed to reduce spread of plant seeds outside the infested zone but it is possible that foot traffic spread seeds to new areas. Below is a summary of fire suppression treatments used specifically on park property (no adjacent property impacts shown):

Impact type	Length (miles)
cold trail	4.15
dozer line	0
hand line	3.45
scratch line	0.16
trail	0.89
Total	8.65

RESOURCE IMPACTS AND THREATS TO RESOURCES

Streams and Waterways: Shenandoah National Park contains over 70 mountain streams. Jeremys Run is one of the most popular recreational fishing streams and is located within the fire perimeter. Jeremys Run is a Tier III waterway according to the Clean Water Act and is designated as "Outstanding National Resource Waters" by EPA and "Exceptional State Waters" by Virginia because of pristine water quality. The stream is known for its native brook trout population and superior water quality. Acidification and shade loss are an ongoing concern for high quality brook trout habitat. The stream drainage was identified as a potential holding line during early stages of the fire. Incident requirements were developed to minimize fire intensity and severity to riparian areas in and around Jeremys run drainage. As a result, the Northeastern section of the fire was cold trailed following a brief rain and fire was not introduced along the drainage. This greatly reduced potential resource impacts to the waterway.



Boundary Survey Markers: 1.3 miles of dozer line was constructed immediately adjacent to the park boundary. There was the potential for a boundary marker to be uprooted during line construction. All boundary survey markers were located, GPSed, and photographed.

Vegetation Resources: The burn area is dominated by forest communities that are very well adapted to disturbance by fire (Appendix D). The dominant vegetation communities - Central Appalachian Northern Piedmont Chestnut Oak forest, and the Dry chestnut oak - northern red oak forest (shown in blue, Appendix C), are very fire tolerant and are expected to be rejuvenated by the burn even if the disturbance appears catastrophic at first. Other fire adapted communities include the Pine-Oak heath woodland (shown in yellow, App C), and the low elevation mixed oak heath forest and acidic oak hickory forest (shown in green, App. C). The remaining forest within the burn is composed of plant communities that are moderately adapted to fire. These include a complex of oak hickory forest types that encompasses the dry-mesic chestnut oak – red oak forest, mountain oak hickory forest, and basic oak hickory forest (shown in orange, App. C), and a complex of northern hardwood forest types that includes the white pine / hemlock / mixed hardwood forest, acid cove forest, and hemlock northern hardwood forest (shown in purple, App. C). The final vegetation community is the sweet birch-chestnut oak talus woodland found on steep dry rocky slopes and boulder fields at higher elevations (shown in pink, App. C). This community is moderately adapted to fire, but likely did not carry fire very well due to the abundance of rocks. The fire burned through a known population of state rare paper birch (G5S2) (*Betula papyrifera*) and roundleaf dogwood (G5S1) (*Cornus rugosa*). Paper birch is found in mid to high elevation rocky talus habitats. It is dependent on periodic fire or other disturbance to perpetuate and has been becoming less frequent due to fire suppression. The fire ecology of roundleaf dogwood is not known, however it prefers open disturbed areas and may be stimulated by the fire.



Exotic Plants: No invasive species inventory exists within the burn area. However, given the plant communities' dry nature and generally nutrient poor soil, invasive species are not likely to be of great concern unless the soil has been disturbed by some sort of management action. The areas of line construction will be surveyed focusing on those that abut areas of moderate to high burn severity with canopy loss. Approximately seven miles of fireline including the Green and Bell Hollow drainages will be surveyed for new exotic infestations imported by fire suppression resources. Though some effort was made to clean crews boots prior to working in the park, crews from Florida, Louisiana, Georgia, New Jersey, Massachusetts and Texas worked on containment lines around the fire and could have carried seeds from adjacent properties as well as their home states.

Archaeological/Cultural Resources: No recorded sites were present in the burn area prior to the fire. One site of possible interest was located outside of the burn but adjacent to a containment line in Green Hollow. It appeared to be the remains of a stone chimney or remnants of a distillery. Two other possible homesites were found during mop-up operations. The locations of all these sites were GPSed and shared with park cultural resource management staff.





Recreation Resources: Forty percent of the park is designated by Congress as Wilderness. The fire burned 1816 acres of designated Wilderness and affected about 2.5 miles of the Neighbor Mountain Trail in the park and 4.5 miles of park boundary. Temporary closures were established on Neighbor Mountain, Jeremys Run, Knob Mountain, Knob Mountain Cutoff and a section of the Appalachian Trail to protect public safety. During final suppression efforts, fire crews assessed and removed fallen and fire weakened trees, so the trails could be re-opened as soon as the fire was contained. Sections of the Neighbor Mountain trail in the burn area were identified as needing rehabilitation (waterbars and check dams to reduce damage from runoff). Other sections will need cribbing to stabilize the burned edge of the trail in an area of higher severity burning.

Soil and Watershed: From a severity standpoint, fire generally consumed various-sized ground fuels, leaf litter, and small shrubs and trees. In many cases, the forest leaf litter was charred but not completely consumed. Even in areas of more complete (large) fuel consumption to include some of the organic layer, soils generally have a dense network of fine roots near the surface that were not damaged by the fire and will reduce erosion. No watershed treatments are recommended.

Burn Severity: Large summer fires are less common than spring and fall fires in Virginia. The fire behavior was mainly backing through hardwood leaf litter and resulted in a patchy mosaic burn pattern. However there were occasional uphill head fires that likely occurred during the Derecho wind event (See Appendix G) and the burn out operation. These areas exhibit more extensive burn severity with a noticeable brown scorched canopy. Most trees and shrubs are likely top-killed and will re-sprout next spring. However, if the summer weather pattern continues to be dry with limited precipitation more extensive mortality would be expected. In a handful of small, more severely burned areas the fire killed all standing vegetation. A Burned Area Reflectance Classification (BARC) map has been requested for the fire. This product is a satellite-derived map of post-fire vegetation condition. Burn severity mapping and monitoring will be carried out by the fire effects monitoring crew at Shenandoah NP.



EMERGENCY FIRE REHABILITATION TREATMENTS: THIS REQUEST

Proposed Treatment Summary:

Treatments	Yr 1 – ES¹ (2012)	Yr 2 – BAR (2013)	Yr 3 – BAR (2014)	Total
W-1 – Neighbor Mountain Trail Repair Support a park trail crew to spend 6 days assessing, cleaning and repairing water control features and under-cut tread.	\$12,050			\$12,050
N-1 - Non-native invasive plant control and restoration Use 2 GS-5 technicians for 14 days per year (plus supplies) to assist with surveillance, treatment, and restoration efforts in the 17 acres of area directly impacted by the firelines.	\$4,950	\$4,950	\$4,950	\$14,850
O-1 - BAER Team Support Support park staff for the preparation of the BAER plan and reports.	\$946			\$946
Totals	\$17,946	\$4,950	\$4,950	\$27,846

¹ ES = Emergency Stabilization, BAR= Burned Area Rehabilitation

NEIGHBOR MOUNTAIN FIRE – BAER – TREATMENT SPECIFICATIONS

SPECIFICATION TITLE:	REPAIR FIRE DAMAGE TO NEIGHBOR MOUNTAIN (HORSE) TRAIL	JURISDICTIONS:	Shenandoah NP
PART E: LINE ITEM:	W-1 Repair Neighbor Mountain Horse Trail	FISCAL YEAR(S) (list each year):	2012

I. WORK TO BE DONE

Number and Describe Each Task:

- A. General Description:** Approximately 2.5 miles of the Neighbor Mountain Trail was impacted by the fire. Much of the trail did not suffer excessive damage due to fire but some damaged areas were identified. Three primary impacts were documented by park trails staff: 1) rock cribbing damage due to burned out stumps and falling trees, 2) trail tread damage due to burned organics from the tread, 3) increased trail erosion potential where surrounding vegetation has been burned. Park trails staff identified areas of fire- damaged trail features and assessed the amount of work needed. During the end of the suppression phase of the fire, one squad of park fire fighters (including experienced trails crew members) were tasked with beginning repair. A few small problematic sections were repaired that day and additional scoping was done on the balance left to complete.
- B. Design/Construction Specifications:**
Schedule trail crew work days in the Fall of 2012 and the Spring of 2013 where possible to:
1. Repair approximately 40ft of damaged cribbing in multiple locations. Rebuild with existing rocks or rocks on location.
 2. Repair areas of tread damage due to fire burning into the edge or through the duff holding the tread together. Build retaining features and/or shift trail tread with cut-and-fill using materials available in the trail corridor.
 3. Evaluate surface water management on the trail in areas that may experience extra runoff following storm events paying special attention to the 0.5 mile where burn severity was highest. May need to add additional check dams and water bars to manage the water and protect the trail tread.
- C. Purpose of Treatment Specifications:** To stabilize and prevent unacceptable degradation of the trail and immediate areas such that dangerous trail conditions could develop with use and erosion.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
1 WS-04/05 @ \$35.64/hr. X 60 hr X 1 FY = \$2,138.40 1 WL-05/05 @ \$30.16/hr. X 60 hr X 1 FY = \$1,809.60 2 WG-05/05 @ \$30.04/hr. X 60 hr X 1 FY = \$3,604.80 4 WG-03/03 @ \$18.74/hr. X 60 hr X 1 FY = \$4,497.60	\$12,050.40
TOTAL PERSONNEL SERVICE COST	\$12,050.40
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost benefits over lease or rental.)	COST/ITEM
Equipment: Supplied by park	\$0
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0

MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
	\$0
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
Vehicle supplied by park	\$0
TOTAL TRAVEL COST	\$0
CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
	\$0
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Miles of trail	\$4820.40	2.5	\$12,050.40	ES	P
FY 2						
FY 3						
TOTAL	Miles of trail	\$4820.40	2.5	\$12,050.40	ES	P

FUNDING SOURCES:

F= Fire Suppression Account
ES = Emergency Stabilization
BAR= Burned Area Rehabilitation
O = Other

METHODS:

P = Agency Personnel Services
C = Contract (Long-Term)
EFC = Emergency Fire Contract
FC = Crew Labor Assigned to Fire

SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services **M** = Materials/Supplies **T** = Travel **C** = Contract **F** = Suppression

III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within BAER Report: See Appendices

NEIGHBOR MOUNTAIN FIRE – BAER – TREATMENT SPECIFICATIONS

SPECIFICATION TITLE:	CONTROL OF NON-INDIGENOUS SPECIES	JURISDICTIONS:	Shenandoah NP
PART E: LINE ITEM:	N-1, Non-Native Invasive Plant Control	FISCAL YEAR(S) (list each year):	2012, 2013(BAR), 2014(BAR)

I. WORK TO BE DONE

Number and Describe Each Task: General Description: Areas of suppression-related impacts will be surveyed and treated for new infestations. Treatments will involve approved protocols already in use at SHEN and will include herbicide application (foliar applications) and hand pulling. Rehabilitation will occur where possible. Tasks: 1. Survey: Surveys will include approximately 17 acres of disturbance, including fire lines and drop points. Seven miles of fireline with a 20 ft buffer will be surveyed. 2. Treatment : Treatments will involve approved protocols already in use at SHEN and will include herbicide application (foliar applications) and hand pulling. 3. Rehabilitation: In treated locations attempts will be made to reestablish native plants through a variety of means. Purpose of Treatment Specifications: To prevent a rapid increase in population growth and reproduction of these disturbance-adapted weeds following the fire. To minimize the probability of new infestations establishing within heavily disturbed sites within the burn area.
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II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
2 GS-5 @ \$17.60/hr. X 100 hr X 3 FY = \$10,560	\$10,560
TOTAL PERSONNEL SERVICE COST	\$10,560
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost benefits over lease or rental.)	COST/ITEM
Equipment: Supplied by park	\$0
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
Supplies: Herbicides, personal protective gear, misc. supplies @ \$1,430 X 3 FY = \$4,290	\$4,290
TOTAL MATERIALS AND SUPPLY COST	\$4,290
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
Vehicle supplied by park	\$0
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
	\$0
TOTAL CONTRACT COST	\$0

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Acre	\$291.18	17	\$4,950	ES	P
FY 2	Acre	\$291.18	17	\$4,950	BAR	P
FY 3	Acre	\$291.18	17	\$4,950	BAR	P
TOTAL	Acre	\$291.18	Same 17 ac three years	\$14,850		P

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EFC = Emergency Fire Contract
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SOURCE OF COST ESTIMATE

1. Estimate obtained from 2-3 independent contractual sources.	
2. Documented cost figures from similar project work obtained from local agency sources.	
3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P,M
5. No cost estimate required – cost charged to Fire Suppression Account.	

P = Personnel Services **M** = Materials/Supplies **T** = Travel **C** = Contract **F** = Suppression

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NEIGHBOR MOUNTAIN FIRE – BAER – TREATMENT SPECIFICATIONS

SPECIFICATION TITLE:	WILDFIRE BAER PLANNING/OVERHEAD	JURISDICTIONS:	Shenandoah NP
PART E: LINE ITEM:	O-1 - BAER Team Support	FISCAL YEAR(S) (list each year):	2012

I. WORK TO BE DONE

Number and Describe Each Task:

General Description: Team reviews incident and READ reconnaissance reports, data and maps. Develop products and components of a BAER plan and gain approval. Team includes Ecologist, Biotech (Exotics), Trail Coordinator

Tasks:

1. Gather information
2. Conduct planning meetings and consultations
3. Compile and draft a BAER plan containing map products, work specifications, background and narrative to justify and direct the identified response.
4. Review, edit, and verify completion and anticipated approval of the final plan.

II. LABOR, MATERIALS AND OTHER COST:

PERSONNEL SERVICES (Grade @ Cost/Hours X # Hours X # Fiscal Years = Cost/Item): Do not include contract personnel costs here (see contractor services below).	COST/ITEM
1 GS-0408-13/04 Chief of NCR @ \$57.24/hr. X 8 hr X 1 FY = \$457.92	\$457.92
1 GS-0404-07/07 Biotech (exotic) @ \$30.07/hr. X 8 hr X 1 FY = \$240.56	\$240.56
1 GS-0300-9/2 Trails Coordinator @ \$30.88/hr. X 8 hr X 1 FY = \$247.04	\$247.04
TOTAL PERSONNEL SERVICE COST	\$945.52
EQUIPMENT PURCHASE, LEASE OR RENTAL (Item @ Cost/Hour or Cost/Day X # Hours or # Days X # Fiscal Years = Cost/Item): (Note: Purchase requires written justification that demonstrates cost benefits over lease or rental.)	COST/ITEM
Equipment: Supplied by park	\$0
TOTAL EQUIPMENT PURCHASE, LEASE, OR RENTAL COST	\$0
MATERIALS AND SUPPLIES (Item @ Cost/Each X Quantity X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL MATERIALS AND SUPPLY COST	\$0
TRAVEL COST (Personnel or Equipment @ Rate X Round Trips X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL TRAVEL COST	\$0

CONTRACT COST (Labor or Equipment @ Cost/Hour X # Hours X # Fiscal Years = Cost/Item):	COST/ITEM
TOTAL CONTRACT COST	

SPECIFICATION COST SUMMARY

FISCAL YEAR	UNIT	UNIT COST	# OF UNITS	COST	FUNDING SOURCE	METHOD
FY 1	Planning Team	\$945.52	1	\$945.52	ES	P
FY 2						
FY 3						
TOTAL						

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3. Estimate supported by cost guides from independent sources or other federal agencies.	
4. Estimates based upon government wage rates and material cost.	P
5. No cost estimate required – cost charged to Fire Suppression Account.	

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III. RELEVANT DETAILS, MAPS AND DOCUMENTATION INCLUDED IN THIS REPORT:

List Relevant Documentation and Cross-Reference Location within BAER Report: See Appendices

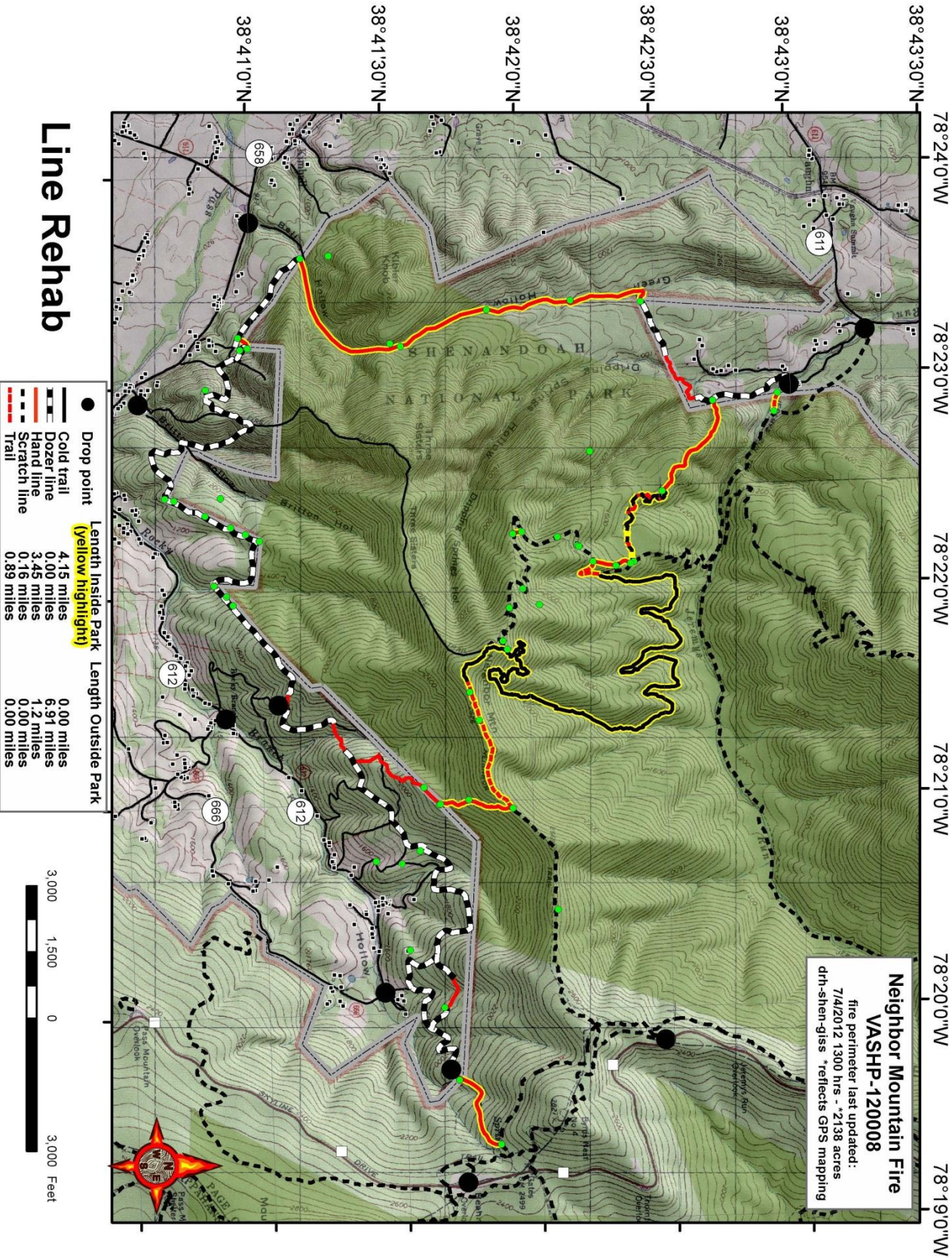
PLAN PREPERATION

Fire Resource Advisors

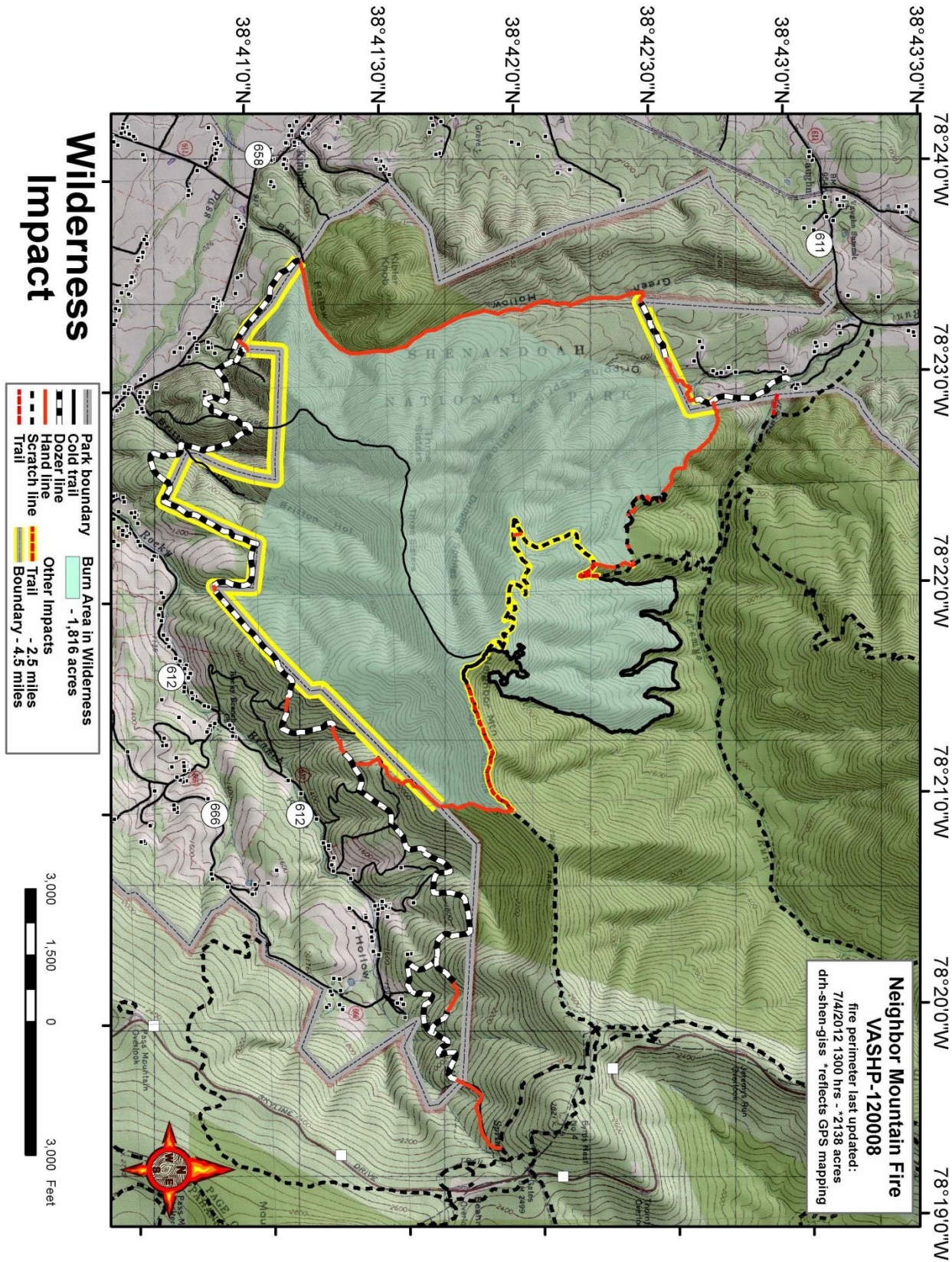
Schaberl, Jim –Natural and Cultural Resources Division Chief
Forder, Melissa – Park Fire Ecologist
Williams, Alan – Park Ecologist
Bentley, Craig – Mid-Atlantic Exotic Plant Management Team Crew Leader
Phillips, Monica – Fire Effects Monitor

Plan Contributors

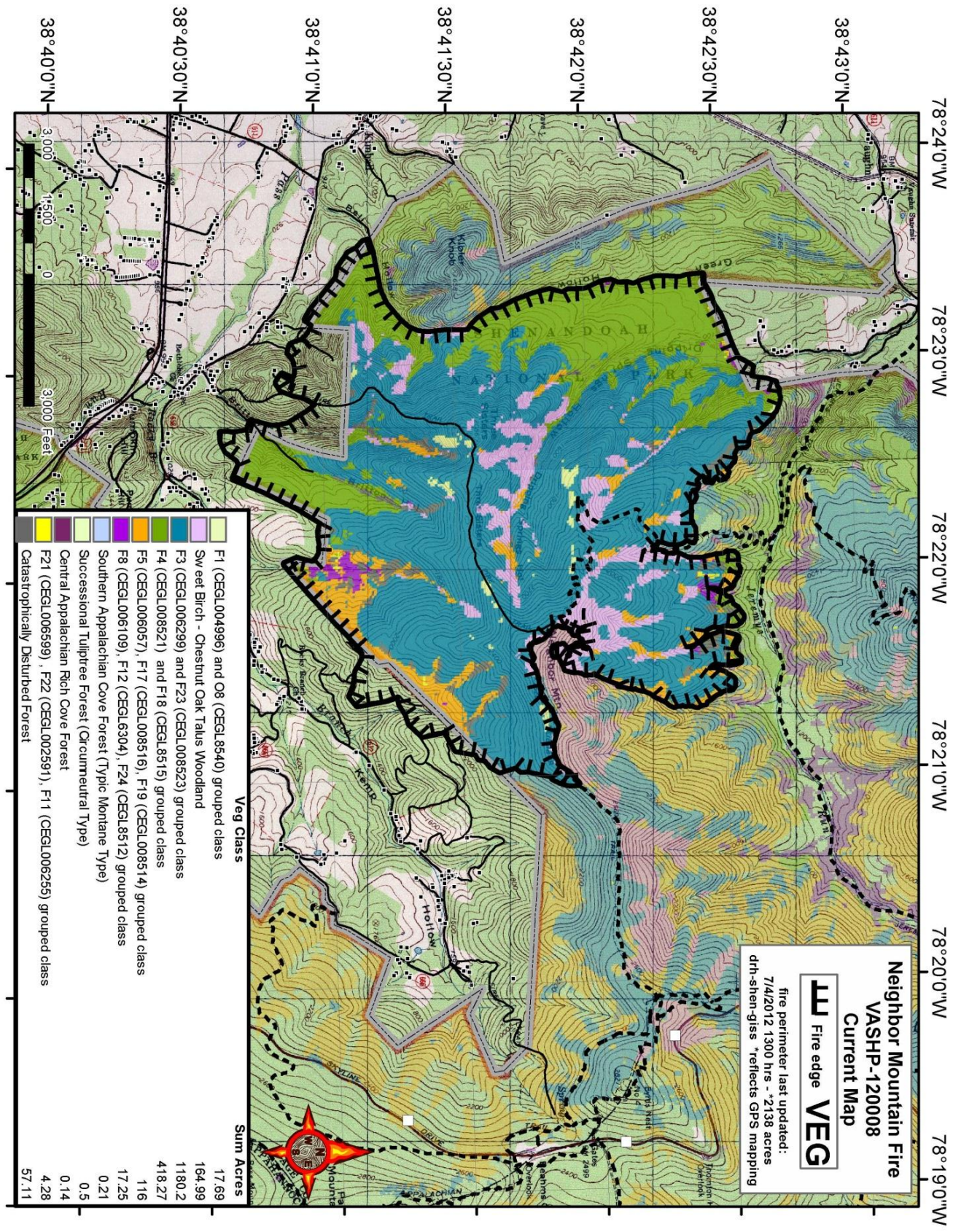
Hurlbert, Dan – Park GIS Specialist
Cass, Wendy – Park Botanist
Hughes, Jake – Park Exotic Plant Specialist
Good, David – Park Trails Laborer
Rudacille, Melissa – Park Trails Coordinator



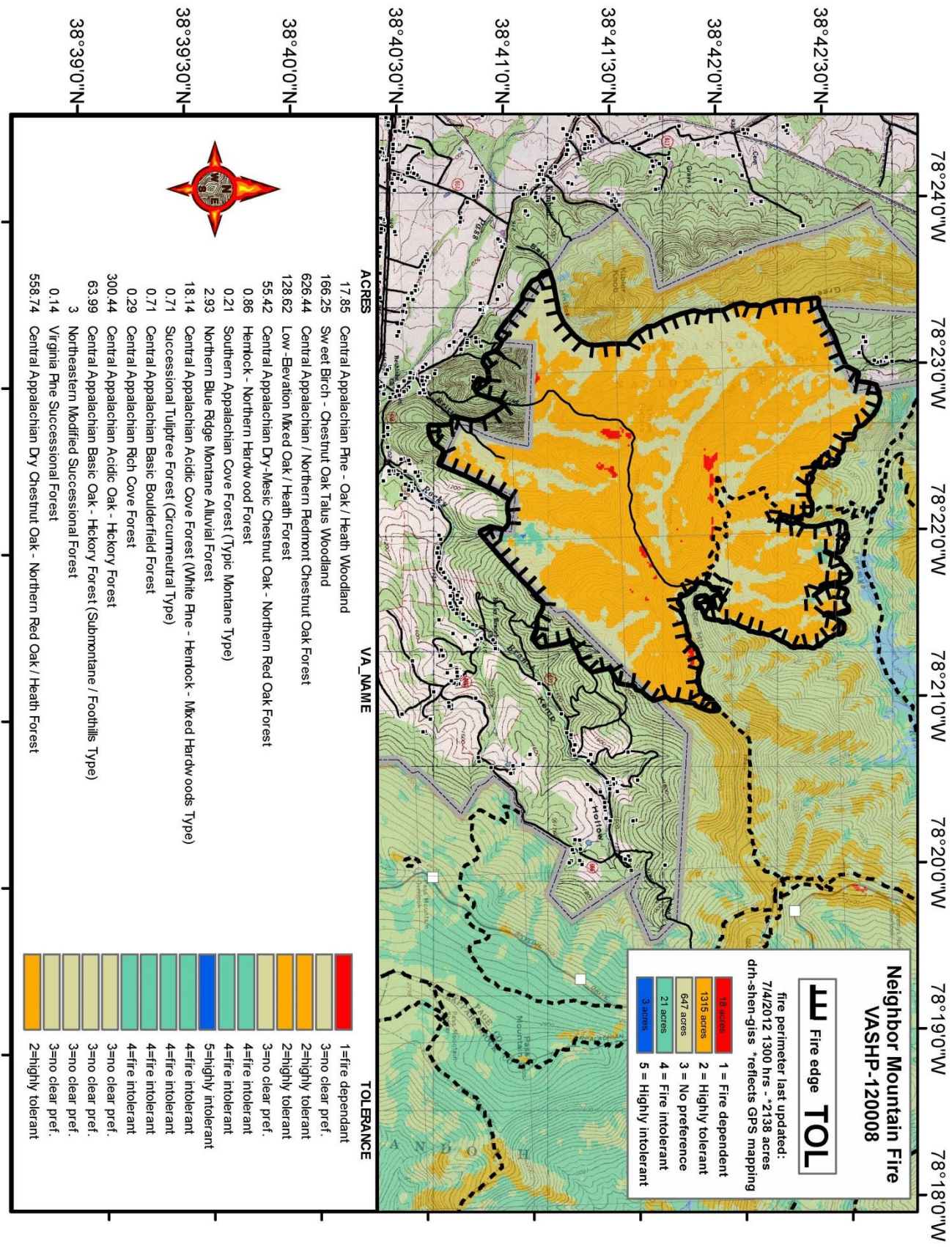
APPENDIX B. - WILDERNESS IMPACT MAP



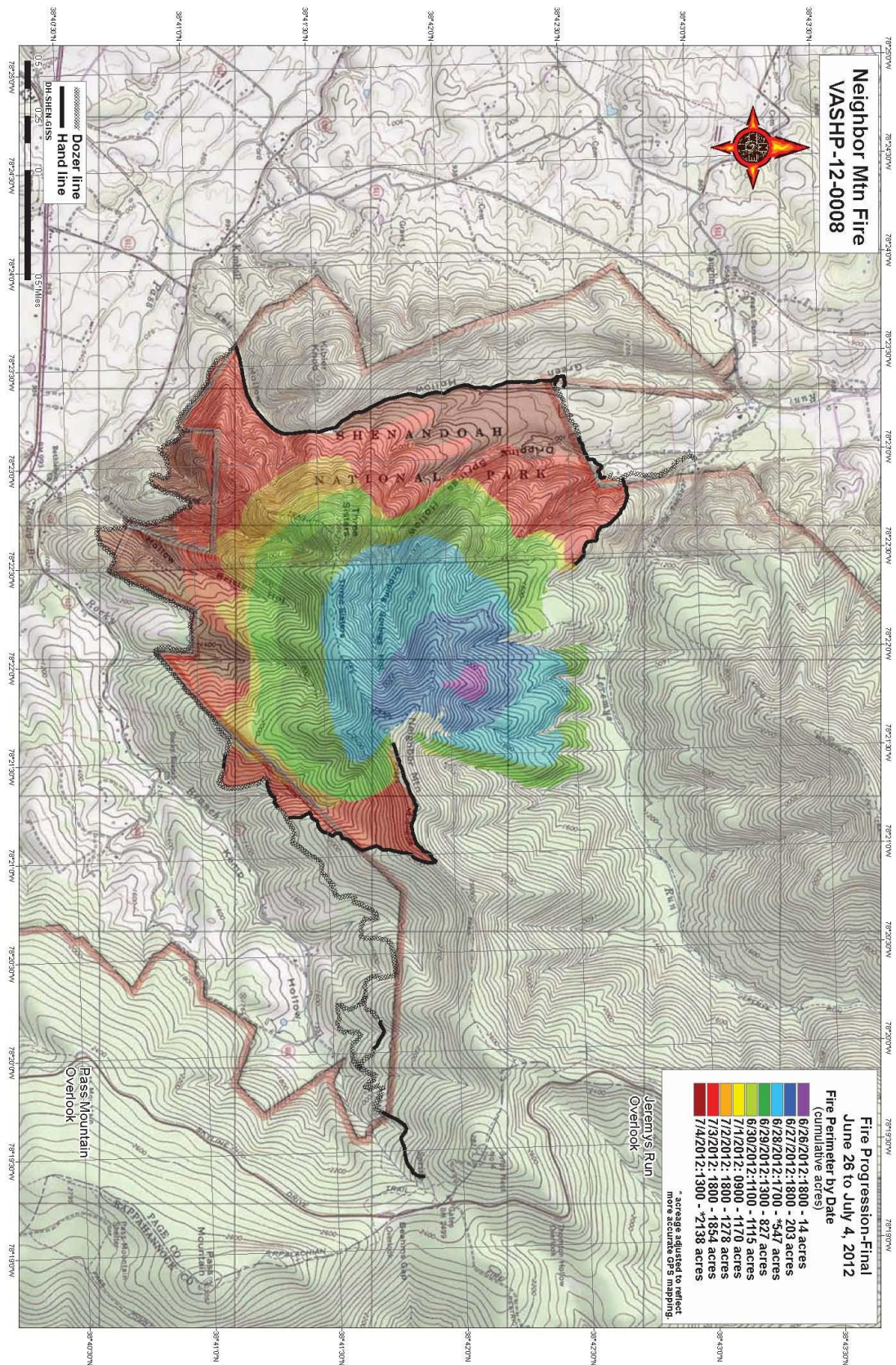
APPENDIX C. – VEGETATION MAP



APPENDIX D. - VEGETATION FIRE TOLERANCE MAP



APPENDIX E. - FIRE PROGRESSION MAP



APPENDIX F. - RESOURCE ADVISOR IDENTIFIED ISSUES

DIVISION SPECIFIC INSTRUCTIONS

Division A

- Green Hollow - Return organic material (natural dams) to creek bottom
- Repair damage at DP6 and other parking areas including camouflaging access trails from drop points to firelines that could become social trails.

Division B

- Repair damage at DP6 and other parking areas including camouflaging access trails from drop points to firelines that could become social trails.

Division E

- Special attention: extra care should be taken on Neighbor Mountain Trail and at the park boundary to scatter debris and limit ATV use on park property.

Division V

- VA DOF will rehab the dozer/handline to State standards.
- Repair damage at Rocky Branch Church and other parking.

Division Z

- Special attention: Waterbars on uphill portion of line approaching the saddle.
- Repair damage at DP14 and other parking areas including camouflaging access trails from drop points to firelines that could become social trails.

OTHER REHABILITATION NEEDS

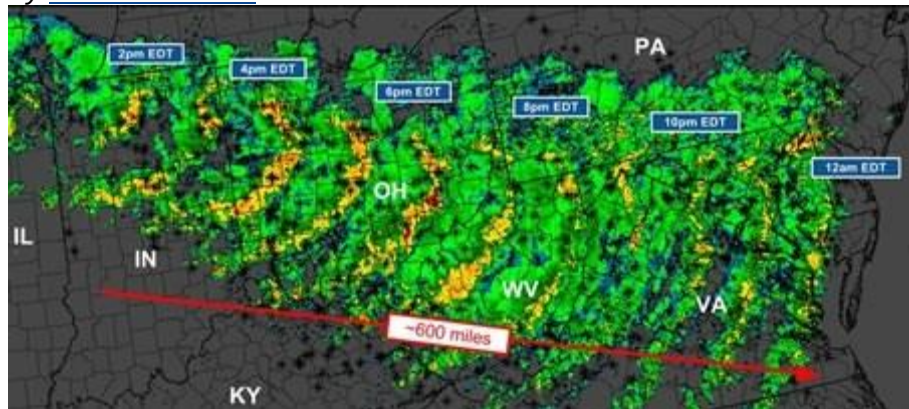
- Tread stabilization and water feature improvement/repair on Neighbor Mountain Trail.
- Felling of hazard trees and removal of trees that have fallen across Neighbor Mountain Trail.
- Mitigate establishment of exotics along trails and firelines used by fire personnel.
- Assess burn severity to determine other rehabilitation needs (CBI).
- Verify that park boundary monuments were not destroyed or disturbed during fireline construction.
- Protect Paper Birch population along Neighbor Mountain trail from hazard tree felling.

APPENDIX G. – WIND EVENT SUMMARY

PM ET, 06/30/2012 TheWashingtonPost

Derecho: Behind Washington, D.C.'s destructive thunderstorm outbreak, June 29, 2012

By [Jason Samenow](#)



Radar sequence of derecho thunderstorm complex. Storm traveled about 600 miles in 10 hours at an average speed of 60 mph. (Storm Prediction Center)

Between 9:30 and 11 p.m. Friday night, one of the most destructive complexes of thunderstorms in memory swept through the entire D.C. area. Packing wind gusts of 60-80 mph, the storm produced extensive damage, downing hundreds of trees, and [leaving more than 1 million area-residents](#) without power.



Blue marks indicate reports of damaging wind. Black squares indicate winds of over 75 mph. (National Weather Service)

Racing along at speeds over 60 mph, the bowing line of thunderstorms formed west of Chicago around 11 a.m. and by midnight approached the Atlantic Ocean. It left a massive trail of destruction spanning from northern Illinois to the Delmarva Peninsula. The National Weather Service has logged [well over 800 reports of damaging winds](#). This kind of fast-moving, long-lived, large, and violent thunderstorm complex is known as [a derecho](#).

Derechos are most common in the Midwest and Great Lakes between May and July. The [National Weather Service indicates](#) they occur about once every four years in the D.C. area.

They often form along the northern boundary of a hot air mass, right along or just south of the jet stream - where upper level winds zip along at high speeds.



Weather map showing fast upper level winds in blue - the location of jet stream, with a front along its southern edge. The derecho formed just south of the front as hot air surged northward.

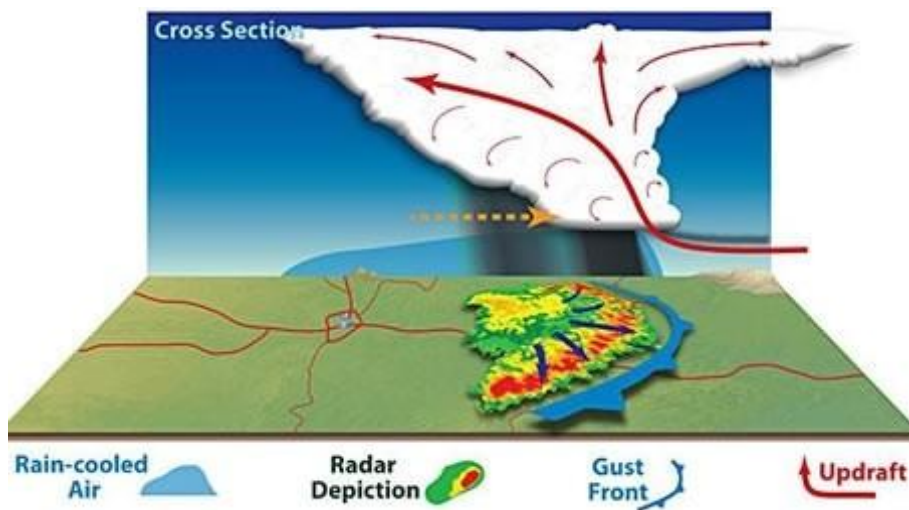
During summer, the jet stream atop a sprawling heat dome is sometimes called a “ring of fire” due to the tendency for explosive thunderstorms to form along this weather front separating hot, humid air to the south and cooler, drier air to the north.

On Friday, a historic, record-setting heat wave covered a sprawling region from the Midwest to the Southeast. All-time high temperature records of 109 were established in Nashville and Columbia, South, Carolina and tied in Raleigh and Charlotte which hit 105 and 104. Here in Washington, D.C., the mercury climbed to an astonishing 104 degrees (breaking the previous record set in 1874 and 2011 by two degrees), [our hottest June day in 142 years of records](#).



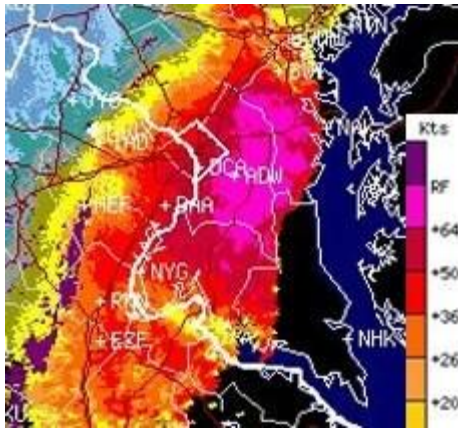
High temperatures on Friday, June 29, 2012 ([Stu Ostro, Weather.com](#))

As this stifling air bubbled northward, clashing with the weather front draped from near Chicago to just north of D.C., thunderstorms erupted. They grew in coverage and intensity as they raced southeast, powered by the roaring upper level winds and fueled by the record-setting heat and oppressive humidity in their path.



Three-dimensional schematic of a mature derecho showing inflow and outflow channels (National Weather Service)

The coverage and availability of this heat energy was vast, sustaining the storms on their 600 mile northwest to southeast traverse. The storms continually ingested the hot, humid air and expelled it in violent downdrafts - crashing into the ground at high speeds and spreading out, sometimes accelerating further.



Winds measured by Doppler radar at 10:05 p.m. Pink shades indicate gusts of over 64 knots or 74 mph which, at the time, were raking Prince George's county. (University Center for Atmospheric Research)

Peak wind gusts in the D.C. region include the following:

- 71 mph near Dulles Airport
- 70 mph in Damascus, Md.
- 79 mph in Reston, Va.
- 65 mph in Rockville, Md.
- 70 mph at Reagan National Airport
- 76 mph in Seat Pleasant, Md. (Prince George's co.)
- 77 mph in Swan Point, Md. (Charles co.)
- 70 mph in Ashburn, Va.
- 69 mph in Leesburg, Va.

In addition, an 80 mph gust was clocked in Fredericksburg, VA. To the north and west, 91 mph and 72 mph gusts were measured in Ft. Wayne, Indiana and Columbus, Ohio.

This derecho event is likely to go down as not only one of the worst on record in Washington, D.C. but also along its entire path stretching back to northern Indiana.

As the intensity of the heat wave, without reservation, was a key factor in the destructiveness of this derecho event - it raises the question about the possible role of manmade climate warming (from elevated greenhouse concentrations). It's a complicated, controversial question, but one that scientists will surely grapple with in case studies of this rare, extraordinary event.