

Assateague Island National Seashore

Alien Plant Management Program (APMP) / Phragmites Control Project Report 2016



Image 1: The 2016 Vegetation Management Crew treating *Carex kobomugi* on the island

Jonathan Chase, Biological Technician
Vegetation Management
Division of Resource Management

Assateague Island National Seashore
7206 National Seashore
Berlin, MD 21811
(410) 641-1443

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Introduction

During 2016 Assateague Island National Seashore's (ASIS) Alien Plant Management Program (APMP) and Phragmites Control Project worked to monitor or control infestations of: *Ailanthus altissima*, *Albezia julibrissan*, *Artemesia vulgaris*, *Carex kobomugi*, *Cirsium arvense*, *Clematis terniflora*, *Elaeagnus umbellata*, *Eragrostis curvula*, *Lezpedeza cuneata*, *Lonicera japonica*, *Ligustrum vulgare*, *Mentha spp.*, *Microstegia viminium*, *Miscanthus sinensis*, *Morus alba*, *Paulownia tomentosa*, *Pennisetum alopecuroides*, *Phragmites australis*, *Pinus thunbergii*, *Rosa multiflora*, and *Rosa wichuraiana*.

Alien plant species infestations that were treated by the Alien Plant Management program (APMP) during FY2016 occurred in the park, as well as around the park's Headquarters area. Previously documented and treated infestation sites were monitored during FY2016 and those sites found to be inactive during each of the past three years were determined to be controlled or eradicated.

During the spring of 2016, ASIS received some much needed assistance from the NCR Exotic Plant Management Team (EPMT) who came to assist us in treating *L. japonica* at the Bayside Peninsula and again in September of 2016 the Team returned to help us treat *P. australis* at Burn Unit 8.

Methods

ASIS Alien Plant Management Program Design 2009-2016

The APMP follows the alien species guidelines found at the NPS inventory and monitoring website (<http://science.nature.nps.gov/im/monitor/index.cfm>) and employs the North American Weed Management Association (NAWMA) standards. The APMP also refers to the Bureau of Land Management's (BLM) Technical Reference 1730-1: Measuring and Monitoring Plant Populations and the Nature Conservancy Weed Handbook for guidance on monitoring and treating targeted alien plant populations. The ASIS APMP database was updated to include 2016 APMP activities. Additionally, the Phragmites database was updated to store and manage data associated with the ASIS Phragmites Control Project. During FY16 the ASIS APMP continued to expand its management of *P. australis* with large scale ground treatments and continued to treat/ retreat the previously mapped/ treated infestations associated with this monitoring and management project. The grand size and complexity of this ambitious project became the responsibility of the permanent biological technician. Three seasonal employees were hired to assist our program in 2016. Additionally, 1 Student Conservation Association (SCA) member was recruited and subsequently delegated to assist with this project along with other Resources Management activities, though the majority of their assistance was dedicated to this project. The permanent biological technician and the Chief of Resources Management shared the coordination of all *P. australis* monitoring and management activities during this reporting period.

Data Management

The ASIS APMP database and the ASIS Phragmites Control Project databases document and track the development and treatment success of each targeted alien plant infestation. Multiple infestations are often grouped into sites for record keeping and reporting purposes. Beginning in 2008, a site code was used to group the infestations so that they could be referred to more generally. This practice has been found to be burdensome, but does at some level help to identify the areas of infestation on the island. For the purposes of continuity, the same sites will be used for this report. The APMP database sites are listed in Table 4. Treatment information for the APMP actions taken in 2016 are presented in Table 5. The herbicide use log associated with treatment information in Table 5, are included for all APMP activities in Table 6.

To indicate multiple different treatments on a single day, each treatment was given a "Rx Code" that included the characters "Rx" and the date of the treatment and if more than 1 treatment was conducted on that day the filename was appended with discreet numbers added to the end of the filename. For example, the second treatment on 7/5/2016 would be labeled "Rx070516_2". This was especially useful in the naming of polygons that represented separate treatments that occurred on the same day.

Safety Precautions

A non-toxic marker dye has been used in herbicide mixtures at ASIS since 2004. The dye assures that proper coverage of the herbicide is administered on the foliage of targeted species. It also ensures the protection of the applicator by making visible, any possible contamination of his/her protective clothing. Proper protective equipment (PPE) was always employed during treatment activities. Employee safety is important to ASIS, especially when working with potentially hazardous materials. Therefore, the project lead assured that all equipment was in good working order and that all permits were current at the start of the season prior to large scale treatment activities. This methodology has been adopted as standard operating procedure by the ASIS APMP. The lead technician responsible for coordinating and implementing the APMP is a certified pesticide applicator (categories 2 and 5) in the State of Maryland who is therefore permitted to conduct and oversee the herbicide treatments described in this report.

Alien Plant Inventory and Monitoring

The criteria used to determine a plant species' status as an alien invasive are:

1. The species has been identified in a previous APMP report as an invasive alien Species of Management Concern (ASIS SOMC).
2. The species is included on the Maryland Department of Natural Resources Wildlife & Heritage Services' list of invasive non-native plants (<http://www.dnr.state.md.us/wildlife/invtro.asp>)
3. The species is considered to be potentially invasive by the NPS Natural Resource Program Center's Invasive Plant Program and its level of abundance at ASIS has been found to warrant our management's consideration.

Island searches for invasive alien plants were conducted in 2016 and Global Positioning System (GPS) units were used to record data. The Trimble® Juno 3B® handheld unit was the preferred unit in 2016. Whenever possible, the perimeter of larger alien plant infestations were mapped, however some infestations were too difficult to circumnavigate and were therefore documented using point data.

The primary focus of this years' work was to revisit previously known infestations of invasive plants on the island while looking for new, or previously unrecognized infestations of invasive, non-native plants.

Results

A summary of the ASIS APMP accomplishments during the fiscal year 2016 follows. This summary includes ASIS APMP monitoring and treatment activities as well as those conducted with the assistance of the National Capital Region's Exotic Plant Management Team. Treatment data are presented by species including the time associated with these treatments in Table 5. The herbicide use log that is associated with the treatments in Table 5 is presented in Table 6. Treatment and monitoring information are presented in the narrative for each species. The sites used by the APMP are found in Table 4 for reference, as mentioned previously.

Ailanthus altissima:

This species is currently eradicated from the island.

Albezia julibrizzan:



Image 2: *A. julibrizzan* tree from @ 12 meters (NPS Photo)

Upon monitoring the site in August of 2016, the trees were found to be dead and there was no new recruitment within a 100 meter radius of the site.

There are no other known occurrences of this species elsewhere on the island (Chase 2014) and no new sites were discovered during the 2016 season.

This species is currently eradicated from the island.

Artemesia vulgaris:

A sizable infestation had appeared in the vicinity of the ASIS Sinepuxent District Visitor Center since 2012 when it was first discovered and has been found to be active on the island, as well. Control efforts at the Visitor Center and Island infestations during 2015 were found to have killed those plants which were treated. Additional treatments in August and September of 2016 at the Headquarters property, the guardrail by the entrance to the Park and by the Visitor Contact Station on the island, on the north side of Bayside Drive between loops B and C further helped to control this species. These sites should be revisited, if time and project funding allow, in 2017.

The total area treated for this species in 2016 was 544.71 meters squared, or 0.1346 Acres.

Carex kobomugi:



Image 3: Pile of flotsam washed ashore during winter storms of 2016



Image 4: Young colony of *Carex kobomugi*



Image 5: 2016 Vegetation Management Crew posing behind a ramet of *Carex kobomugi*

Many storms came to ASIS during the winter of 2015/ 2016. These storms brought flotsom debris that washed onto our island beaches (see Image 3). In some of these piles of debris came rhizomes of the invasive sedge *Carex kobomugi* . These rhizominous masses were quite numerous and widespread which required that we search the island from north to south to locate them entirely and deal with them early following the EDRR credo.

Additionally, the concession area at the Assateague State Park was an active site that received treatment.

These sites were promptly treated after being located with a foliar spray application of 2% Imazapyr herbicide solution of Polaris® in water.

The Seabeach Amaranth Restoration project provides the opportunity to locate new infestations of this species annually both before the census when we attempt to locate and protect as many plants as possible with cages as well as during the island wide census. Because we have frequently found new infestations of this species in the past, as well as re-emergent, or newly emergent populations in

previously treated sites, it is believed this species will be of continued concern for many years to come. It is recommended that all sites be revisited again in 2016.

The total area treated for this species in 2016 was 8023.75 meters squared, or 0.1842 acres.

Cirsium arvense:

This nefarious invader had become established in areas of the Maryland Headquarters starting in 2011 when various disturbances related to landscape buffer construction and large quantities of abandoned vehicles altered mowing practices in the southern portion of this property. Judicious herbicide treatments have helped to reduce, but not eliminate, the prevalence of this species since 2011.

Treatments of this species were conducted throughout the 2016 growing season on the Headquarters property in the un-mowed vegetated buffers that border the property to the south.

The total area treated for this species in 2015 was 745.43 meters squared, or 0.1842 Acres.

Clematis terniflora:



Image 6: *Clematis terniflora* in flower. (Credit: EDDMapS.org)



Image 7: ASIS Vegetation Management Employee stands next to a *Clematis terniflora* that was discovered on the causeway to the Assateague State Park

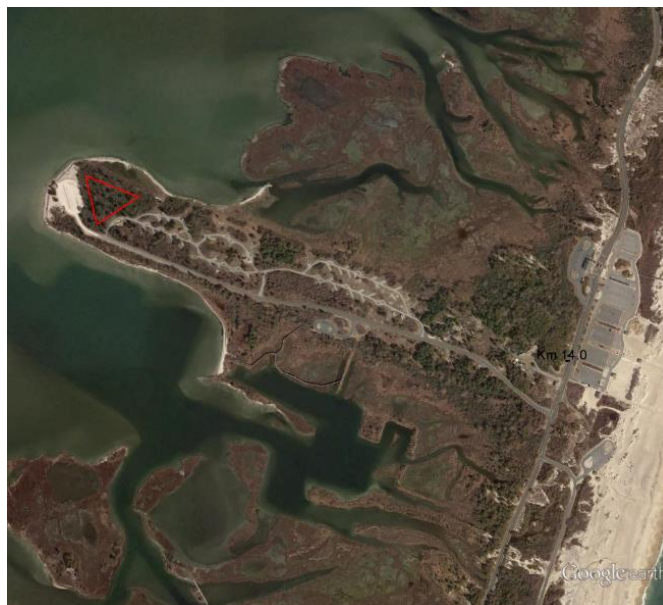


Image 8: *Clematis terniflora* treatment site at Bayside Drive (red triangle)

The reoccurrence of *C. terniflora* at CLTE_Site_01 is likely the result of an abundant seed bank established by the original infestation over many years. The entire CLTE_Site_01 (see Image 8) was found to be highly infested during an early season assessment of the area in April of 2016. The site was treated, in earnest, in late summer of 2016 after access trails were cut using bladed weedwackers. There were some vines discovered at the western portion of loop C campground on Bayside drive about 50 meters east of the dump station on the north side of Bayside Drive.

This species was also discovered on the causeway in 2 small patches (see Image 7) that we treated for the Assateague State park in August of 2016.

The total area treated for this species in 2016 was 26562.89 meters squared, or 0.6098 acres.

Elaeagnus umbellata:



Image 9: *Elaeagnus umbellata* in flower (Credit: Bill Johnson (NPS))

E. umbellata saplings continue to emerge at the Headquarters area of ASIS. Because a great number of these trees have been found bordering the Headquarters land in the past, as well as being well established throughout South Point, it is believed that this species will remain on our watch list for many years to come. Very few trees of this species have become established on the island in the past, but there have been some found and treated in the past on the State Park land near their pump houses along Bayberry Drive as well as at the end of ASIS's Bayside Peninsula. These sites remain active in the State Park, therefore they were targeted for treatment in 2016. A handful of saplings were treated behind the Maryland Visitor, as well.

The total area treated for this species in 2016 was 2713.79 meters squared, or 0.0623 acres.

Elusine indica:

The bike trails and roadways are frequently bordered by this species which causes the pavement to crumble as the plants make their way through it, so we were asked by the Maintenance Division to treat these areas. Both Maryland and Virginia were treated more than once during the growing season. In Virginia the maintenance yard and the area just west of the Chincoteague National Wildlife Refuge were the areas that received treatments in 2016.

In total 49976.39 meters squared, or 1.1473 acres were treated.

Eragrostis curvula:

E. curvula infestations have been treated in the Developed Area (which it has remained confined to) at ASIS since 2005 and the treatments have successfully kept this species under control. Because the detectability of this species had increased in 2016, it was treated along with *L. cuneate* in September of 2016.



Image 10: *Eragrostis curvula* along Bayberry Drive just south of the Northern boundary marker (Credit: NPS ASIS 2004)



Image 11: Crewmembers treat *Eragrostis curvula* tussocks in the field just south of the Park's entrance on the island.

The total area treated for this species in 2016 was 5166.22 meters squared, or 0.1186 acres.

Hedera helix:

A small vine was discovered at the housing buffer in Maryland and another small vine was discovered on the south side of the Clements inholding when the National Capital Region's Exotic Plant Management Team assisted us on the last day of their fall work trip when the wind was too high to spray Phragmites. Both infestations were treated and will require follow up monitoring in 2017.

The total area treated for this species in 2016 was 270 meters squared, or 0.0062 acres.

Lezpedeza cuneata:

The developed area in Maryland was targeted for this species, where this species had become detectable in 2016. The entire developed area was treated along with *E. curvula* in September of 2016. Also several patches of *L. cuneata* were treated behind the Maryland Visitor Center in the Sinepuxent Vegetation Buffer.



Image 12: Crewmembers treating *Lespedeza cuneata* near the “boneyard” on the footprint of where the original Bayside Campground was first established.

This species is present in 2 Park locations, they are: 1. The Sinepuxent Vegetation Buffer: behind the ASIS Sinepuxent District Visitor Center and 2., The Developed Area (See Image 12). Treatments have been conducted on the mainland in the past, but not on the island. This species should be monitored later in the growing season when it is most detectible. Because the level of detection has increased at both locations, treatments of this highly invasive species are recommended to continue in the fall of 2017 if project funding will allow.

The total area treated for this species in 2016 was 3088 meters squared, or 0.0709 acres.

Ligustrum vulgare:

This species may now be considered to have been eradicated from the Headquarters property.

Lonicera japonica:

The National Capital Region Exotic Plant Treatment Teams assisted us tremendously in April of 2016, helping us to treat this species in the Park’s developed area (Bayside Campground Peninsula). These teams (in particular, the National Capital Region) have helped us to treat this species in the past with measurable success. The entire peninsula, save for the easternmost portion of Bayside Drive on the south side of the roadway, was carefully gridded out and all occurrences were treated.

The total area treated for this species in 2016 was 2,114,223.804 meters squared, or 48.5359 acres.

Mentha spp.:

A species of non-native, hybridized mint was discovered to have become well-established in the vicinity of Loblolly house in Park Housing at the Maryland Headquarters property during the 2014 growing season. Because it had escaped the mowed areas behind the house and entered the vegetated islands that do

not get mowed it was able to flourish. The original source is unknown, but is thought to have been planted by a previous resident of Park housing.

This infestation in Maryland Park housing had become quite active in 2016, so it was targeted for treatment along with other species like *L. japonica* and *C. arvense*.

The total area treated for this species in 2016 was 431.24 meters squared, or 0.0099 acres.

Microstegium vimineum:

A very sizable infestation, the extent of which remains unknown, but is thought to occupy more than an acre of cover, was discovered in the fall of 2014 by Seasonal Biological Technician Kristina Fahey. The infestation lies on land owned and managed by the Maryland Department of Natural Resources (MDDNR) which borders the southern and western boundaries of Park Headquarters.

This species had invaded the Park Headquarters at the Sinepuxent Vegetation buffer where animal trails along the bay were heavily infested. All occurrences of this species on Park headquarters land were treated in October of 2016 and will be reported in next year's report.

Miscanthus sinensis:

No treatments of this species were conducted in 2016. However the (2) new, small sites discovered during searches in 2015, will require treatments in 2017. These sites were located at (UTM Zone 18N) N 42247067, E 485229 (4 plants) and N 4224710, E 485231 (2 plants). These 2 small infestations will likely be treated in 2017.

Morus alba:

No infestations were encountered and none were treated in 2016.

Paulonia tomentosa:



Image 13: Closeup of the *Paulonia tomentosa* leaves (NPS Photo)

The single *Paulonia tomentosa*, located at (UTM Zone 18N) N 4224376, E 485171 was not monitored in 2016, but is presumed to have been eradicated from the previous year's treatment. This single infestation should be investigated in 2017 to see if there is any regrowth.

Pennisetum alopecuroides:



Image 14: *Pennisetum alopecuroides* behind the Sinepuxent District Visitor Center in September 2014 (NPS ASIS Photo)

This species had become established once again across our entire Headquarters property in 2016 (see Image 14), so extensive treatments were conducted when the plants had begun flowering in September when they are easier to distinguish.

The total area treated for this species in 2016 was 2692.01 meters squared, or 0.0618 acres.

Phragmites australis:

Abstract

The native coastal communities of Assateague Island National Seashore (ASIS) are threatened by the expansion of *P. australis* (Phragmites or common reed) an invasive, alien plant species. Assateague Island contains the only intact natural barrier island ecosystem remaining in the state of Maryland. At the mid-Atlantic regional scale ASIS represents the largest contiguous expanse of native coastal communities that still collectively functions as an intact barrier island ecosystem. This valuable and unique resource is being degraded and functionally altered by the invasion of *P. australis* and through the development of dense infestations.

P. australis is an aggressive invader that spreads from established infestations by sending out rhizome and root runners thereby creating a thick mat of rhizome which may extend down several feet in depth. *P. australis* spreads to new sites via three routes; through seeds dispersed by wind and water, through dispersal of pieces of rhizome carried in water, and through pieces of rhizome contained in dirt and mud tracked by vehicles and equipment. *P. australis* forms dense monotypic stands, displaces and outcompetes native wetland and terrestrial vegetation, changes marsh hydrology, alters wildlife habitat, and increases wildfire potential.

P. australis has gradually (over a period of years or decades) established an expansive foothold on Assateague Island in a variety of coastal habitats. Individual infestations of varying sizes occur throughout the island. Over time *P. australis* infestations have expanded to the point that today vast areas of once diverse native forest, shrub and marsh communities have been replaced with dense monocultures of itself. Given the comparative rarity of undisturbed coastal communities present elsewhere throughout the region, the serious and continued threat posed by *P. australis* invasion, and the conservation mandate expressed by Congress in ASIS' founding legislation, the park continues to

undertake this large scale project to document and treat *P. australis* infestations in order to restore native coastal communities and ecosystem health. After 7 years of treatments, ASIS has made measurable progress in the effort to gain control of this aggressive invader.

Ground Treatment of Infestations:

The effective control of *P. australis*, particularly larger well-established stands, has required multiple treatments using a combination of methods including aerial applications of herbicide, ground based cut stem treatments followed by applications of concentrated solutions of herbicide, and ground based foliar spraying with herbicide. The use of herbicide treatments is recommended as the primary control method and the first step towards effective control for *P. australis*. By applying herbicide to actively growing green foliage and flower plumes of the target plants after full leaf elongation and up to first killing frost, it is believed to produce the most effective way to control *P. australis*. However, because the window of hiring opportunity and workforce availability occurs earlier than this optimal treatment time period, ASIS has had to conduct their treatments during the growing season, rather than at the end of the growing season. Despite treating this species outside of optimal treatment interval ASIS has had success in gaining control of this species.

During FY2016 *P. australis* was sprayed exclusively from the ground with only foliar backpack applications. With the assistance of (3) seasonal crew members and (1) Student Conservation Association (SCA) intern, the Vegetation Management crew, overseen by the Permanent Biological Technician (Plants), were able to spray, or retreat infested areas that had been sprayed aerially in the past. Backpack sprayers were used in infestations of every density (0-90%) and a 50 gallon ATV sprayer, transported on a Kawasaki Teryx® UTV, was often used to fill the backpacks near the treatment areas.

Since 2015, backpack sprayers were used for the treatment of densities greater than 60% because it was impractical and impossible to get a high volume pump sprayer into the treatment areas and so, there was no other option than to use backpack sprayers on these more dense areas of infestation. The use of backpack sprayers in these areas of density greater than 60% is extremely difficult and time consuming and further justifies the need for future aerial applications of areas of this density, as it is impractical to use backpack sprayers in this fashion. Nonetheless, the crew sprayed these dense areas to “tie in” with previous years’ treatments, to continue to treat the remainder of Burn Units 2 (see Figure 1 for location and Figures 9 and 10 for the treatments there), Burn Unit 5 (See Figure 3 for location and Figure 8 for the treatments there), Burn Unit 8 (see Figure 2 for location and Figures 4, 5, 6, and 7 for the treatments there).

All treatments were sprayed with a solution containing 2% concentration of Polaris® herbicide and 0.5% concentration of surfactant and 0.5% marker dye. The solution was mixed in water and sprayed on *P. australis* infestations starting from the crown of the plant and working down covering approximately 70% of the plant. See Table 1: below for the summary of treatments associated with the *P. australis* at ASIS during FY2016.

When applied to the foliage of actively growing plants, Imazapyr, the active ingredient in Polaris®, is rapidly absorbed and transported throughout the plant tissues. The herbicide kills the entire plant: leaves, stems, and rhizomes. ASIS has primarily used Imazapyr based herbicides to control this species because it has been proven to be statistically superior (see reference below) in efficacy.

Efficacy of Imazapyr and Glyphosate in the Control of Non-Native *Phragmites australis*, Thomas J. Mozdzer^{1*}, Curtis J. Hutto, Paul A. Clarke and Dorothy P. Field, Restoration Ecology, Volume 16 Issue 2, May 2008.

The crews’ efforts during 2016 were employed in the retreatment of *P. australis* within the ASIS burn units 2 and 5 (aerially treated in 2008), 8 (aerially sprayed in 2009) (see Figures listed above for each unit). The National Capital Region’s Exotic Plant Management Team assisted us in the southern end of Unit 8, which was a great help.

The total area treated for this species in 2016 was 344,801.88 meters squared, or 85.2024 acres.

Figure 1: ASIS Prescription Burn Unit Map (Burn Units 1 and 2)

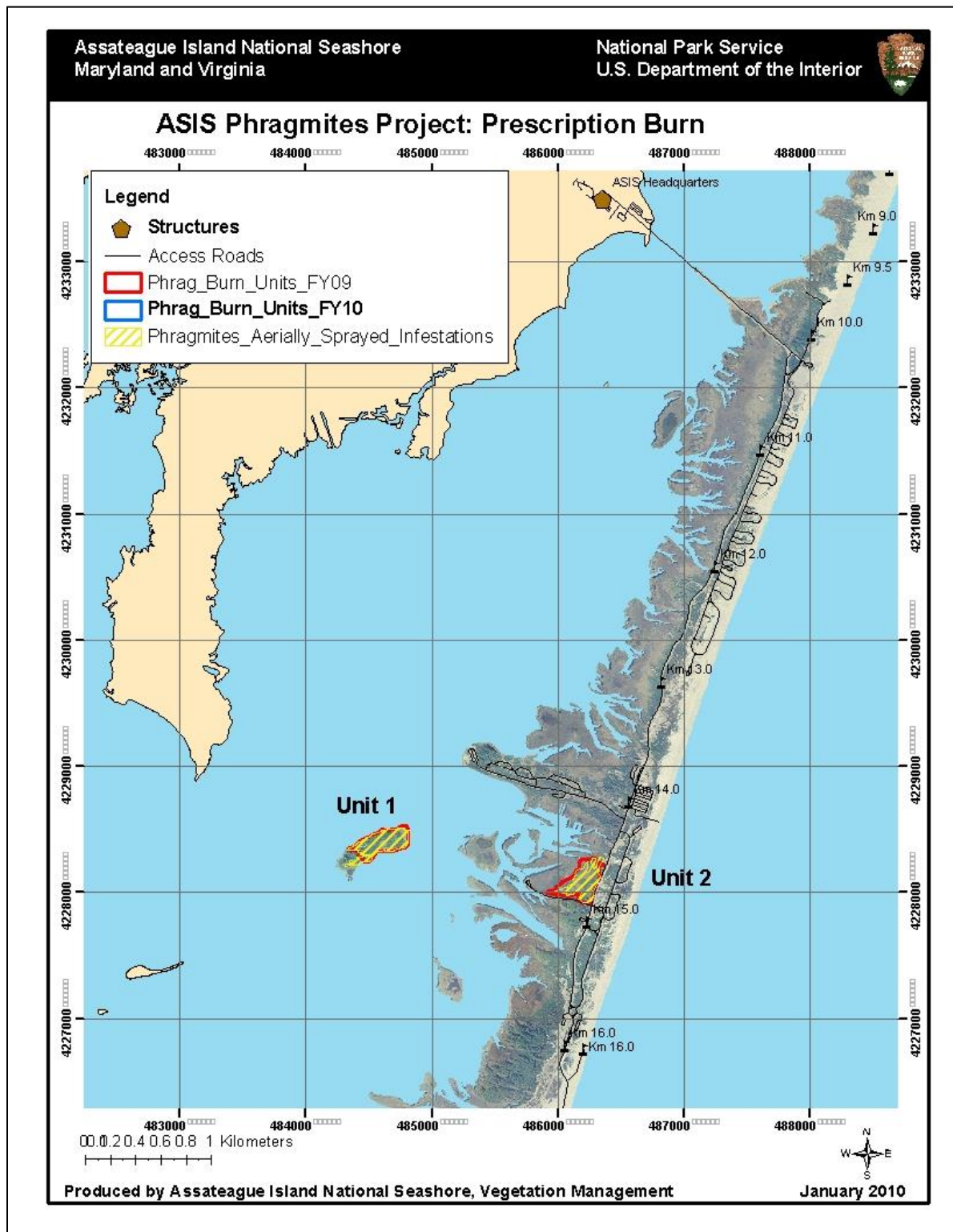


Figure 2: ASIS Prescription Burn Unit Map (Burn Units 3, 4, 7, 8, and 9)

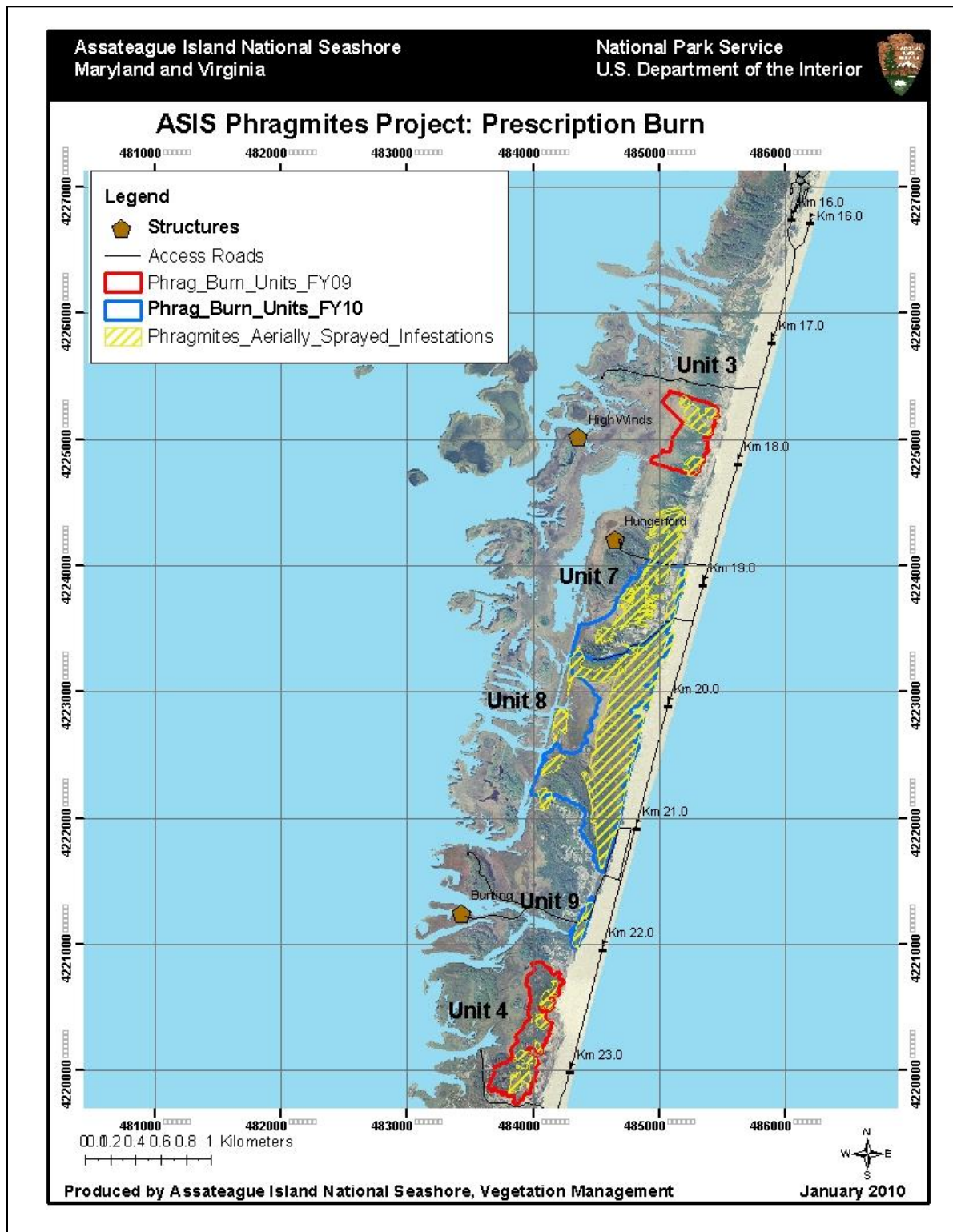


Figure 3: ASIS Prescription Burn Unit Map (Burn Units 5, 6, 11 and 12)

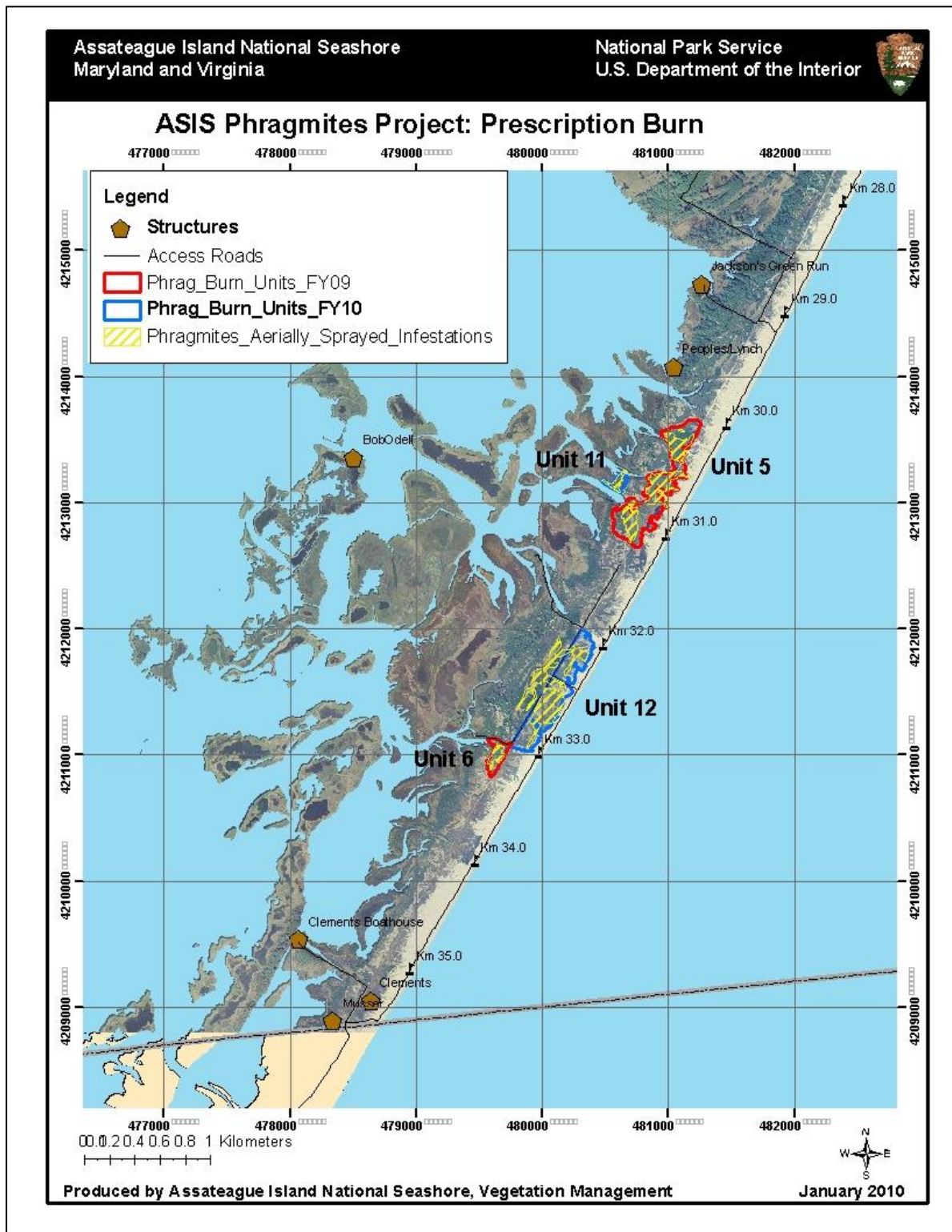


Figure 4: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 8 June 2016

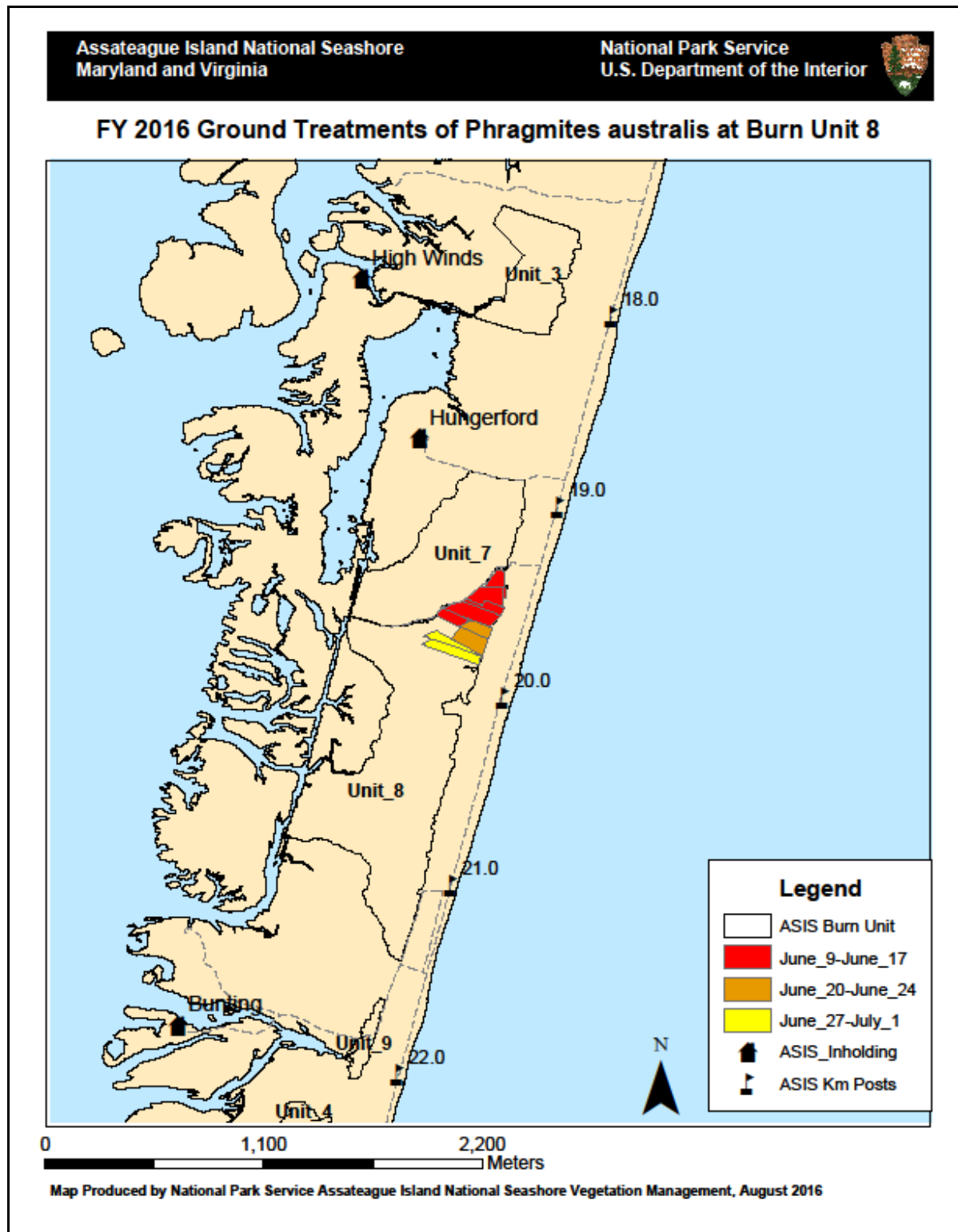


Figure 5: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 8 July 2016

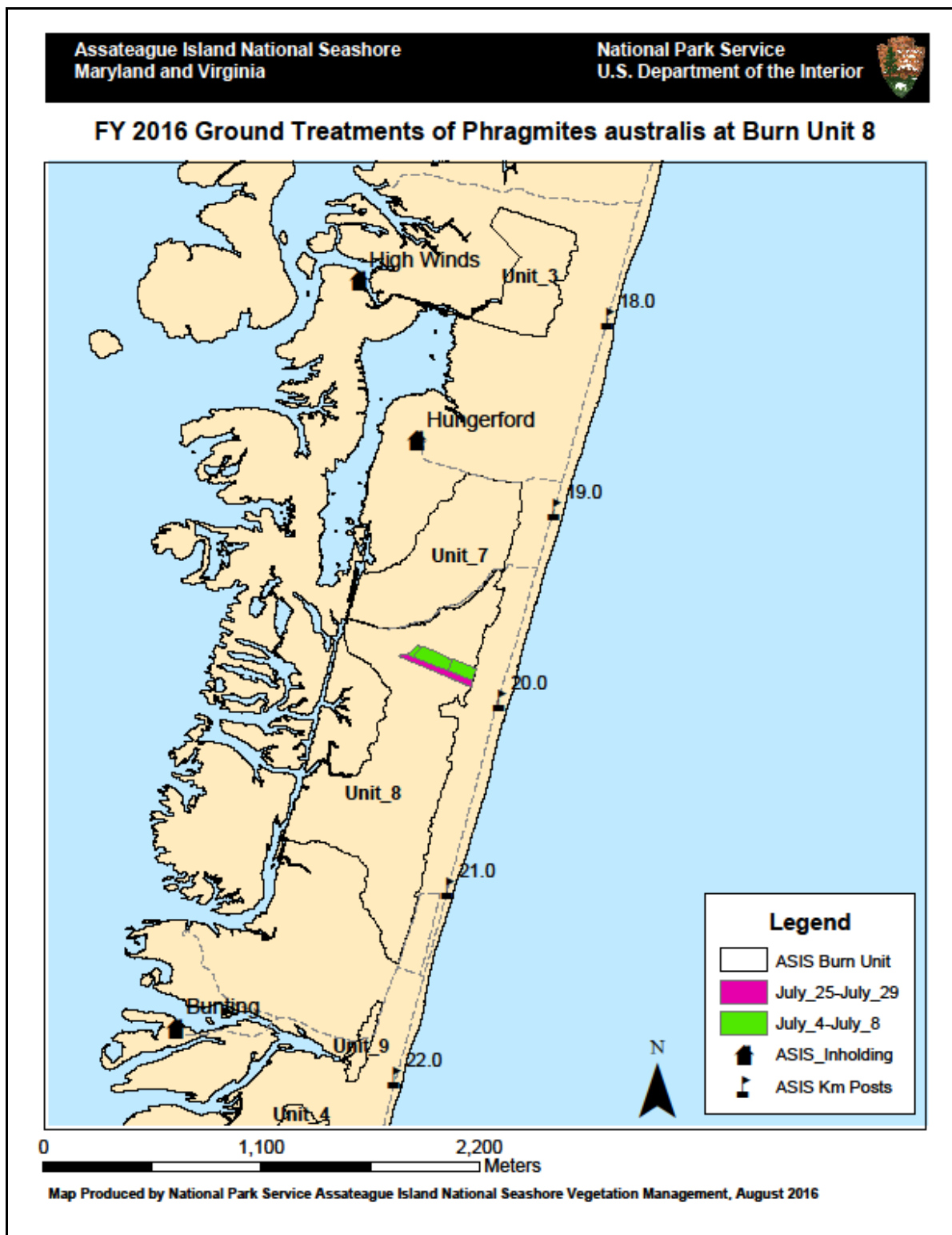


Figure 6: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 8 August 2016

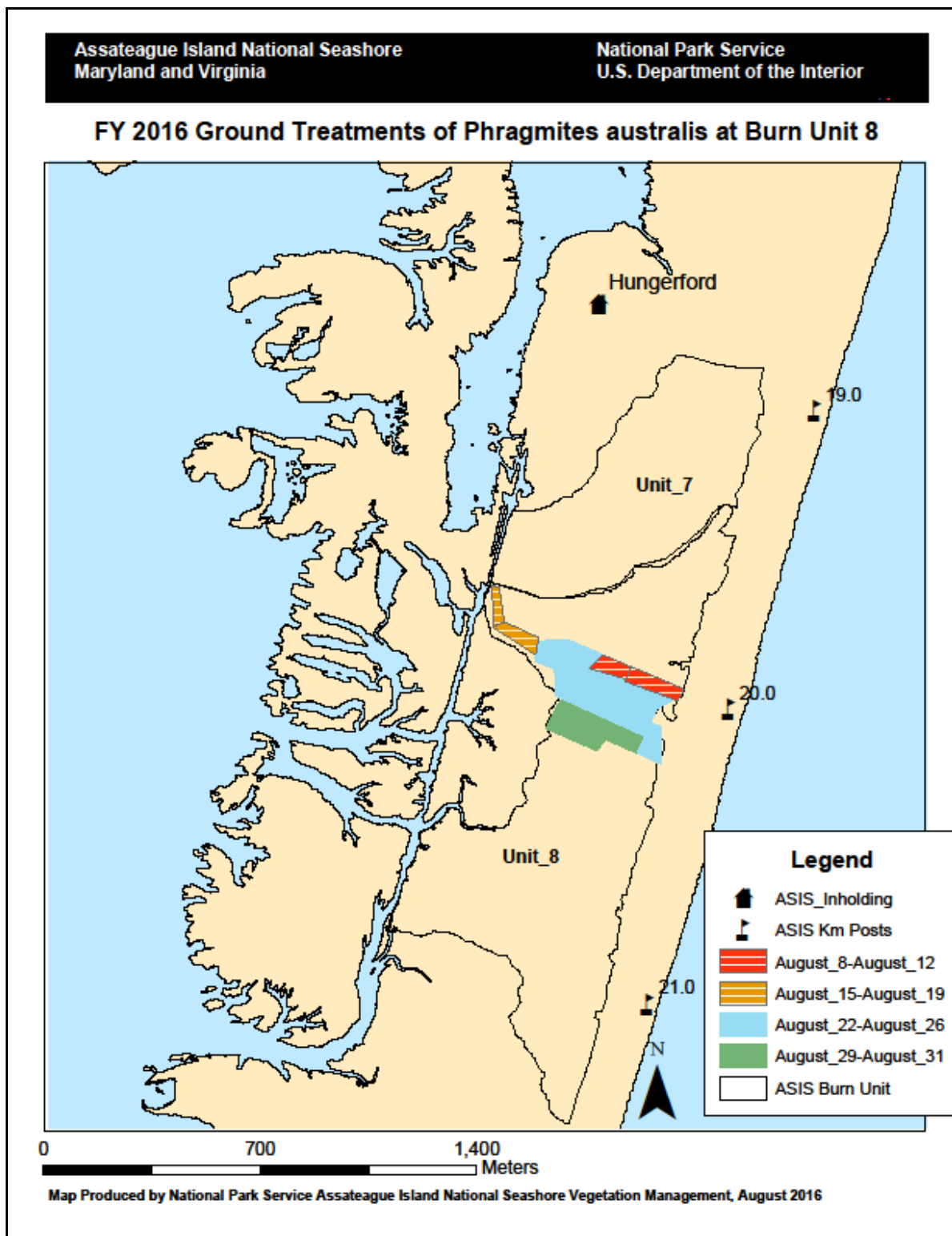


Figure 7: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 8 with NCR EPMT September 2016

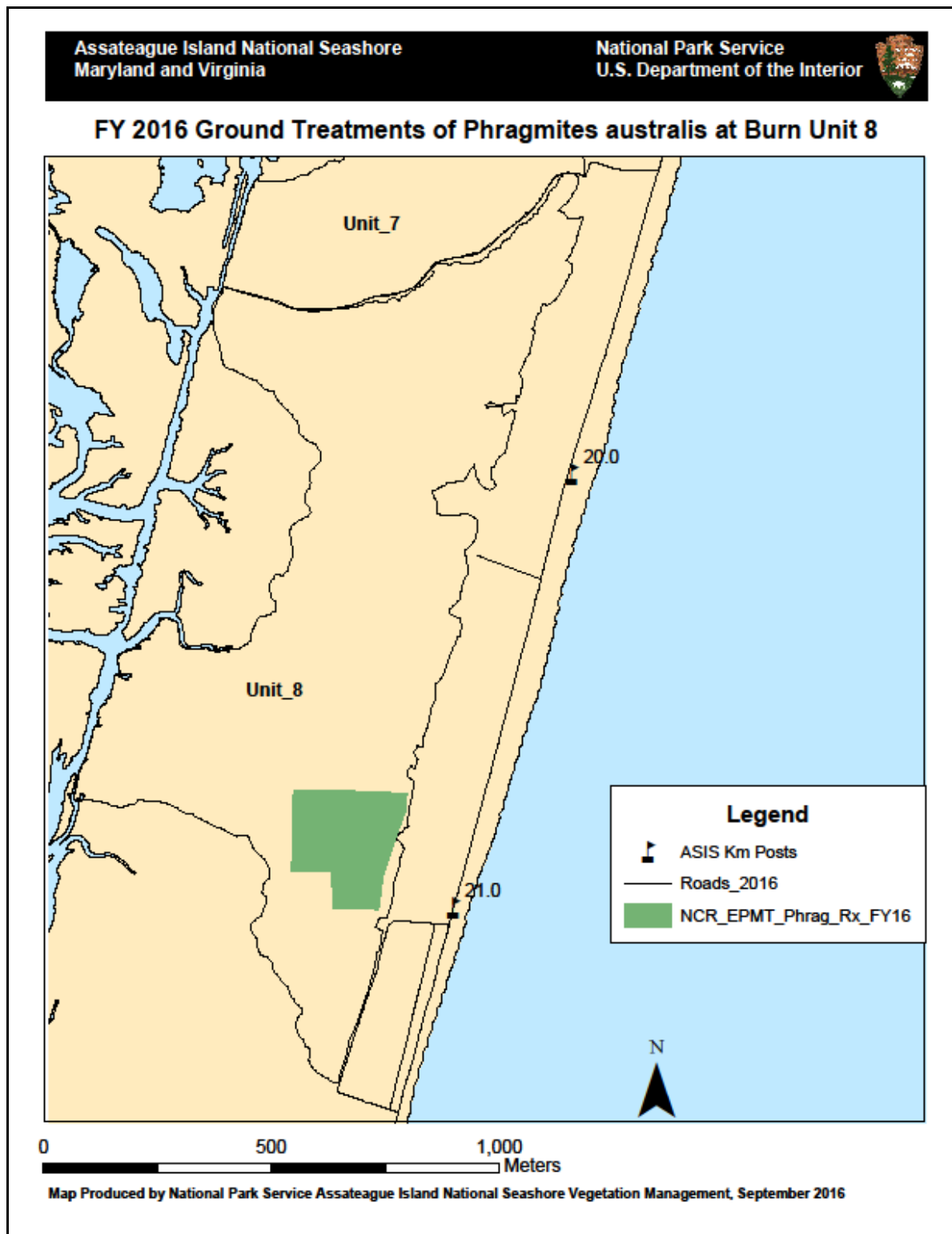


Figure 8: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 5 July 2016

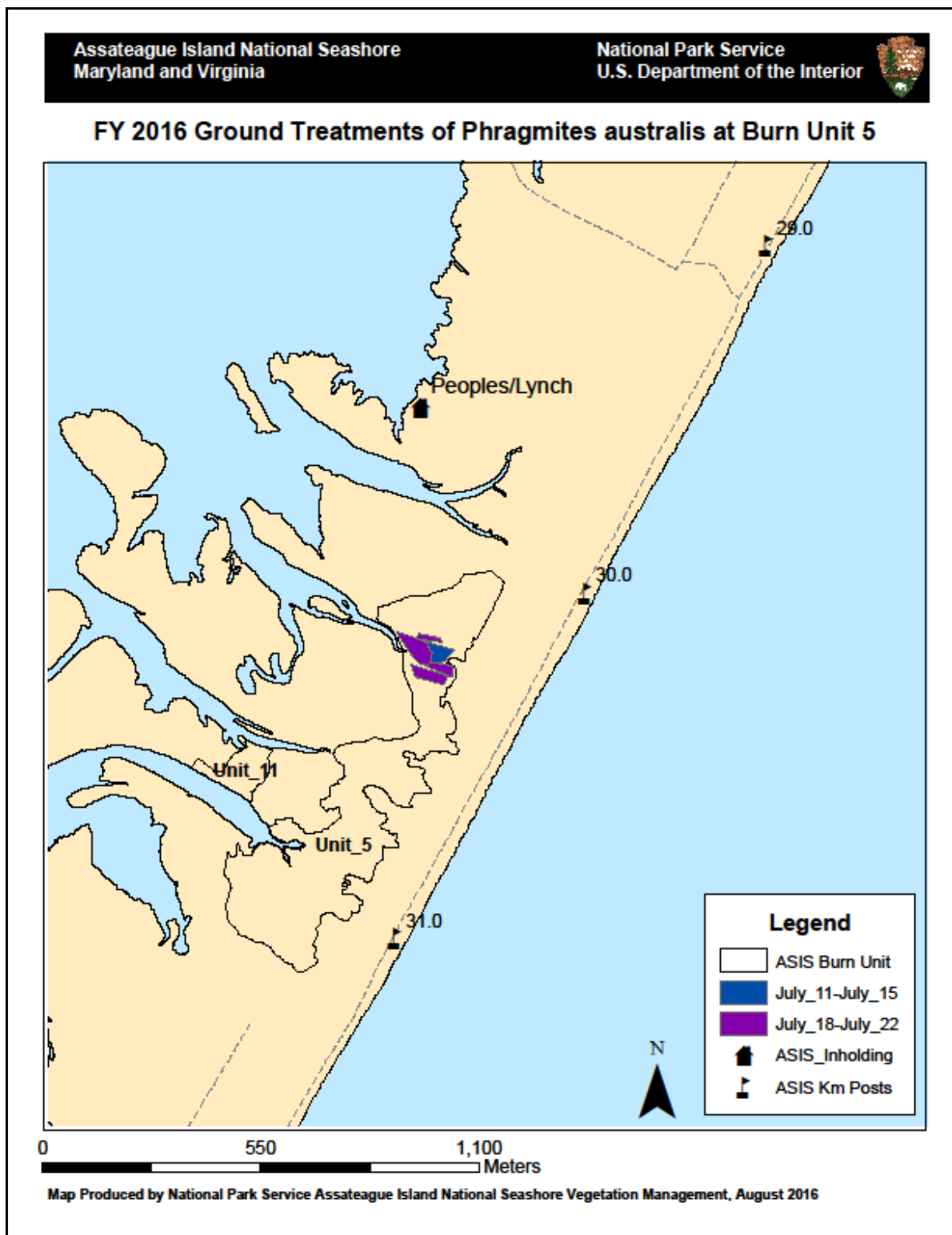


Figure 9: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 2 August 2016

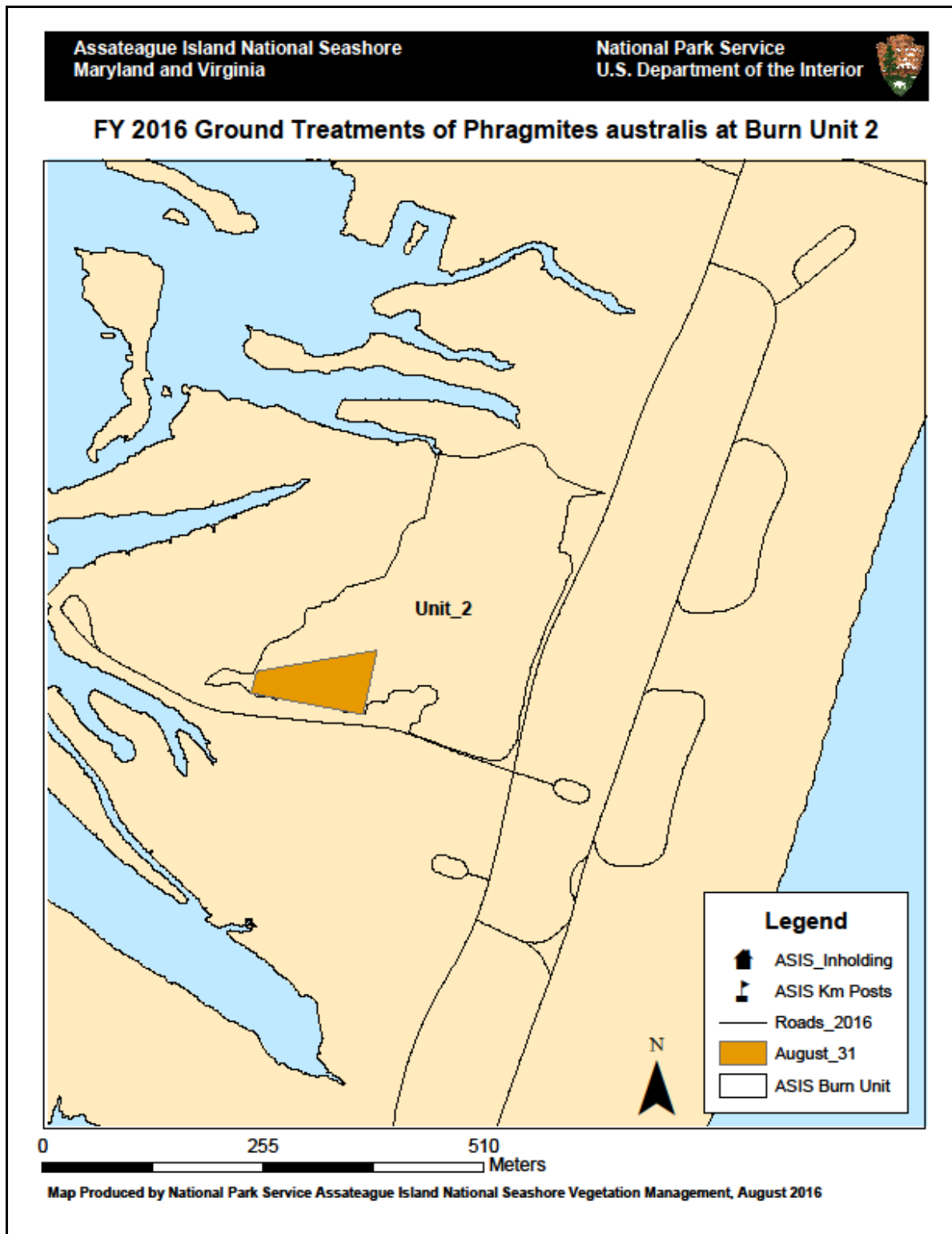


Figure 10: FY 2016 Ground Treatments of *Phragmites australis* at Burn Unit 2 September 2016

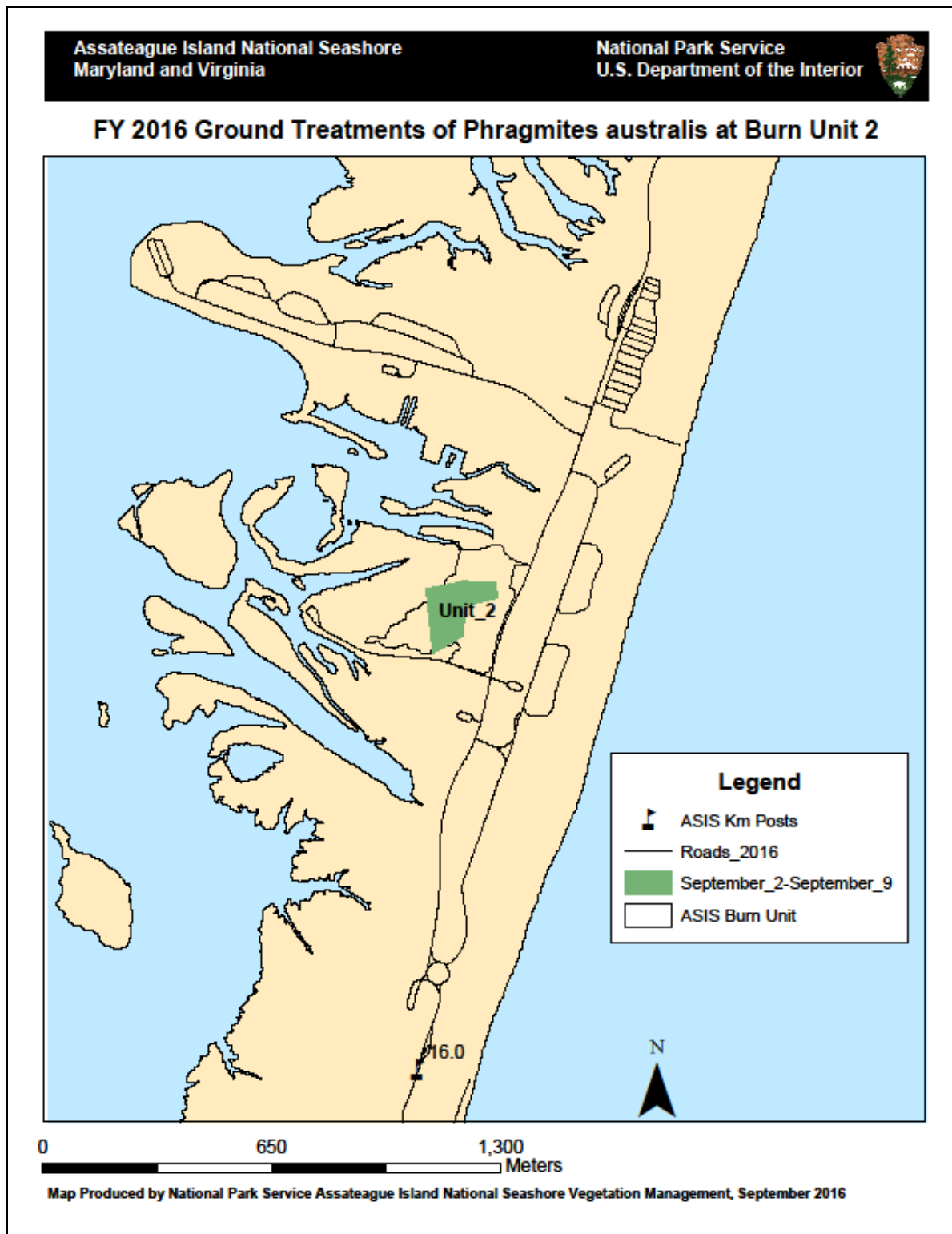


Table 1: FY2016 ASIS Treatment Accomplishments for *P. australis*: (2016 Summer Season)

Site	#Treatments	Days	Acres Treated	Qty. Herbicide Used (L)	Responsible Party	Herbicide Used
50 m south of Ranger Contact Station	1	1	0.0124	0.10	ASIS	Polaris® EPA Reg. Num. (228-534)
Unit 2	3	3	7.1100	5.10	ASIS	Polaris® EPA Reg. Num. (228-534)
Unit 5	5	5	2.32	8.03	ASIS	Polaris® EPA Reg. Num. (228-534)
Unit 8	26	26	62.76	23.14	ASIS	Polaris® EPA Reg. Num. (228-534)

Table 2: FY2016 NCR EPMT/ ASIS Treatment Accomplishments (April 2016)

Site	Species	#Treatments	Days	Acres Treated	Qty. Herbicide Used (L)	Responsible Party	Herbicide Used
Bayside Campground	Lonicera japonica	4	4	48.19	3.73	ASIS/NCREPMT	Rodeo® EPA Reg. Num. (62719-324)

Table 3: FY2016 NCR EPMT/ ASIS Treatment Accomplishments (September 2016)

Site	Species	#Treatments	Days	Acres Treated	Qty. Herbicide Used (L)	Responsible Party	Herbicide Used
Burn Unit 8	Phragmites australis	2	2	13.00	15.28	ASIS/NCREPMT	Polaris® EPA Reg. Num. (228-534)
Clement's	Pinus thunbergii	1	0.5	1.00	0.00	ASIS/NCREPMT	13 saplings cut
Clement's	Hedera helix	1	0.5	0.0062	0.02	ASIS/NCREPMT	Polaris® EPA Reg. Num. (228-534)

P. australis Discussion

There was no additional monitoring of burn units in FY16.

Further treatments at ASIS are recommended to follow the same approach that has been conducted in the past (ie. aerial spray treatments followed by controlled burning and then follow up ground treatments for infestations with high density and poor accessibility. Smaller satellite infestations with densities less than or equal to 60% may still be treated with backpack sprayers, but the effort put into spraying infestations of high density and poor accessibility with backpack sprayers is still not recommended (Chase 2014).

Pinus thunbergii:

Clement's

On the last day of the National Capital Region's Exotic Plant Management Team Fall work trip to ASIS the weather had become too windy for treating *Phragmites*, so we visited the Clement's inholding (PITH_Site_01) near the VA / MD State line to grid the area surrounding the building in search of seedlings that might be there and discovered 13 large saplings which were mechanically removed within the 1 acre, or 4046 meters squared area that was gridded by our combined crews. Periodic monitoring of the site will continue to occur as a result of ongoing activity there.

High Winds

The new Site PITH_Site_02, discovered by our Team on 6/18/2015 at the High Winds inholding on the property surrounding the house that had been thoroughly treated in 2015 was not revisited in 2016 due to time constraints and this species being less invasive and therefore less in need of attention. However, this site should be revisited in 2017, or 2018 to look for any further recruitment of seedlings there once they have become detectable.

Rosa wichuraina

On 9/28/16 while spraying other nuisance weeds on the Headquarters property some *R. wichuraina* was encountered and treated. The total area treated for this species in 2016 was 65.1544 meters squared, or 0.0161 acres.

Table 4: ASIS Alien Plant Management Program Site Coordinates

ID	Site	Northing	Easting	Species	Site Description
1	AIAL_Site_01	4241835	491440.7	Ailanthus altissima	A discreet location the epicenter of which is indicated by the coordinates
2	AIAL_Site_02	4241800	491414.5	Ailanthus altissima	A discreet location the epicenter of which is indicated by the coordinates
3	AIAL_Site_03	4215810	481379.4	Ailanthus altissima	A discreet location the epicenter of which is indicated by the coordinates
4	AIAL_Site_04	4215049	481260.1	Ailanthus altissima	This site is a 100 meter radius surrounding the footprint of the Paradise Hotel site which is situated north of and across the water from the Green Run inholding and just south of the road leading to the Valentine's inholding
5	AIAL_Site_05	4209607	478053.1	Ailanthus altissima	A discreet location the epicenter of which is indicated by the coordinates
6	ALGL_Site_01	4241153	491106	Alnus glutinosa	A discreet location the epicenter of which is indicated by the coordinates
7	ARST_Site_01	4236363	489500	Artemisia stelleriana	This site is a 100 meter radius surrounding the epicenter point near Km 5.75 on the North End of ASIS
8	ARST_Site_02	4226024	485848	Artemisia stelleriana	A discreet location the epicenter of which is indicated by the coordinates
9	CAKO_Site_01	4241654	491796.8	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
10	CAKO_Site_02	4238487	490186.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
11	CAKO_Site_03	4237589	489897	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
12	CAKO_Site_04	4237503	489793.6	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
13	CAKO_Site_05	4237425	489824.1	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
14	CAKO_Site_06	4237420	489843.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
15	CAKO_Site_07	4237419	489825.8	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates

16	CAKO_Site_08	4237404	489838.6	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
17	CAKO_Site_09	4237402	489824	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
18	CAKO_Site_10	4237394	489843.4	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
19	CAKO_Site_11	4237039	489716.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
20	CAKO_Site_12	4236194	489394.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
21	CAKO_Site_13	4236173	489412.3	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
22	CAKO_Site_14	4236123	489409.4	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
23	CAKO_Site_15	4225647	485760.2	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
24	CAKO_Site_16	4225037	485594.4	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
25	CAKO_Site_17	4222491	484802.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
26	CAKO_Site_18	4222447	484789.4	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
27	CAKO_Site_19	4224430	485407.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
28	CAKO_Site_20	4222427	484820.5	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
29	CAKO_Site_21	4216381	482792.6	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
30	CAKO_Site_22	4216370	482801.6	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
31	CAKO_Site_23	4216367	482811.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
32	CAKO_Site_24	4216361	482827.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
33	CAKO_Site_25	4216356	482852.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates

34	CAKO_Site_26	4215252	482321.1	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
35	CAKO_Site_27	4214321	481780.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
36	CAKO_Site_28	4210394	479583.6	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
37	CAKO_Site_29	4209968	479281.4	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
38	CAKO_Site_30	4190275	466183.2	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
39	CAKO_Site_31	4190178	466247.7	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
40	CAKO_Site_32	4190025	466371.8	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
41	CAKO_Site_33	4237292	489768.1	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
42	CAKO_Site_34	4237424	489822.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
43	CAKO_Site_35	4234703	488914	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
44	CAKO_Site_36	4222525	484789	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
45	CAKO_Site_37	4232004	487963	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
46	CAKO_Site_38	4189535	466500.8	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
47	CAKO_Site_39	4234972	488774	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
48	CAKO_Site_40	4236012	489150	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
49	CAKO_Site_41	4208812	478513	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
50	CAKO_Site_42	4216380	482799.9	Carex kobomugi	A discreet location the epicenter of which is indicated by the coordinates
51	CLTE_Site_01	4229108	485365.6	Clematis terniflora	A discreet location the epicenter of which is indicated by the coordinates

52	ELUM_Site_01	4233449	486272	Elaeagnus umbellata	The combined State and Federal lands surrounding the Headquarters building on the mainland
53	ELUM_Site_02	4229033	485466.3	Elaeagnus umbellata	The entire developed area from the northern park boundary to the OSV entrance
54	ERCU_Site_01	4229434	486764.2	Eragrostis curvula	The entire developed area from the northern park boundary to the OSV entrance
55	HEHE_Site_01	4209043	478638	Hedera helix	A discreet location the epicenter of which is indicated by the coordinates
56	LOJA_Site_01	4215263	481374.7	Lonicera japonica	Is a series of infestations located along the access road to Valentines cabin.
57	LOJA_Site_02	4228590	486484	Lonicera japonica	Originally located within the Bayside Campground peninsula, was expanded during 2007 to include ASIS' entire developed area.
58	LOJA_Site_03	4231224	487325	Lonicera japonica	Located along Bayberry Drive within Assateague State Park.
59	LOJA_Site_04	4232259	487949	Lonicera japonica	Located along the Shell Road and the trail leading to the handicapped accessible duck blind.
60	LOJA_Site_05	4241732	491652	Lonicera japonica	This site is a single infestation discovered near the Ocean City inlet on top of the high dunes there.
61	LOJA_Site_06	4225065	485380	Lonicera japonica	Is located within shrub and forested areas between km 17 and 20.
62	LOJA_Site_07	4233405	486447	Lonicera japonica	Is located on the mainland within the ASIS headquarters area Federal land only.
63	LYSA_Site_01	4227399	486228	Lythrum salicaria	A discreet location the epicenter of which is indicated by the coordinates
64	MISI_Site_01	4241657	491485.7	Miscanthus sinensis	A discreet location the epicenter of which is indicated by the coordinates
65	MISI_Site_02	4240156	490579	Miscanthus sinensis	A discreet location the epicenter of which is indicated by the coordinates
66	MISI_Site_03	4239777	490387	Miscanthus sinensis	A discreet location the epicenter of which is indicated by the coordinates
67	MISI_Site_04	4225014	484363	Miscanthus sinensis	A discreet location the epicenter of which is indicated by the coordinates

68	MISI_Site_05	4240009	490500	Miscanthus sinensis	A discreet location the epicenter of which is indicated by the coordinates
69	MOAL_Site_01	4233425	486455	Morus alba	The combined State and Federal lands surrounding the Headquarters building on the mainland
70	MOAL_Site_02	4227399	486228	Morus alba	A discreet location the epicenter of which is indicated by the coordinates
71	PEAL_Site_01	4233296	486521	Penisetum alopecuroides	A discreet location the epicenter of which is indicated by the coordinates
72	PITH_Site_01	4209046	478675	Pinus thunbergiana	This site is a 100 meter radius surrounding the Clements inholding located in MD near the MD/ VA State Line
73	ROMU_Site_01	4228841	485870	Rosa multiflora	The entire peninsula where the Bayside Campground resides on the island and including the Boneyard maintenance staging area
74	ROMU_Site_02	4233583	486209	Rosa multiflora	Is located on the mainland within the ASIS headquarters area Federal land only.
75	ROMU_Site_03	4209058	478625	Rosa multiflora	A discreet location the epicenter of which is indicated by the coordinates just to the west of the Clements inholding located in MD near the MD/ VA State Line
76	ROWI_Site_01	4233405	486447	Rosa wichuriana	The combined State and Federal lands surrounding the Headquarters building on the mainland

Table 5: ASIS Alien Plant Management Program Treatments Information for FY2016

Rx Code	Location	Species	Applicator	Start Time	End Time	Rx Method	Retreatment	Comments
RX092816_1	Headquarters southwest and western border	Artemisia vulgaris	JC, JF, RC	7:30	10:30	Foliar spray	No	
RX081716_1	HQ UMES buffer	Artemisia vulgaris	JC, PE, EM, JF, RC	8:00	11:00	Foliar spray	Yes	
RX081716_2	HQ Housing Buffer	Artemisia vulgaris	JC, PE, EM, JF, RC	12:30	14:00	Foliar spray	Yes	
RX092616	200m North of Entrance Booth on East side of road, under guard rail. Also, next to Deer Check Station.	Artemisia vulgaris		9:00	9:30	Foliar spray	Yes	Each 1 meter squared

								AC-1 ramet, AD-2 ramets, AE-5 ramets, AF-2 ramets, AG-3 ramets, AH-4 ramets, J-26 ramets, AI-2 ramets, AK-ramets, AL-2 ramets, K-6 ramets, AM-1 ramets, AN-1 ramet, AO-2 ramets, AP- 1 ramets, AQ-ramets, AR-1 ramet, AS-ramet, AT-1 ramet, AU-1 ramet, AV-2 ramets, AW- 1 ramet, AX-4 ramets, AY-1 ramet, AZ- 1 ramet, AJ-1 ramet, BA-5 ramets, BB-2 ramets, BC-3 ramets, BD-1 ramet, BE-1 ramet, BF- 3 ramets, BG-1 ramet, BP- 2 ramets, BQ-3 ramets, S1-1 ramets, S2-4 ramets, T-7 ramets, U-4 ramets, V-1 ramet, W-1 ramet, X1-4 ramets, BH- 2 ramets, BI-1 ramet, BJ-2 ramets, BK-2 ramets, X2- 8 ramets, BL-1 ramet, BM-2 ramets, Y1-5 ramets, Y2-3 ramets, BN-1 ramet, Y3-5 ramets, BO-2 ramets, BP-1 ramet, D-100 ramets, Z-7 ramets, BQ-1 ramet, AA-28 ramets, BR-2 ramets, AB-3 ramets
RX072616	OSV	Carex kobomugi	JC, PE, JF, RC, EM	9:00	15:00	Foliar spray	No	
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	154

RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	155
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	156
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	157
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	158
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	159
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	160
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	161
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	163
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	162
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	164

RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	165
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	166
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	167
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	168
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	169
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	170
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	171
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	172
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	173
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	121

RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	120
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	119
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	118
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	117
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	116
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	115
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	114
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	113
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	112
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	111

RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	110
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	106
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	105
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	103
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	99
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	98
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	97
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	96
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	95
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	77

RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	44
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	38
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	29
RX081116	OSV north of 23.4 closure	Carex kobomugi	JC, PE, JF, RC	8:30	14:00	Foliar spray	No	23
RX081216_1	State Park Concession	Carex kobomugi	JC, RC, JF	7:00	7:45	Foliar spray	Yes	
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	139
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	130
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	142
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	148
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	145

RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	149
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	150
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	151
RX081216_2	North End	Carex kobomugi	JC, JF, RC	8:00	12:00	Foliar spray	No	153
RX082516_JCEM1	State Park to national dev	Carex kobomugi	JC, EM	7:30	12:30	Foliar spray	No	Features 1-25 (1L used), Features 26-59 (3L used)
RX090816_2	State Park Concession	Carex kobomugi	JC	8:30	9:00	Foliar spray	Yes	sprayed clematis terniflora and cut paths in thicket
RX081716_1	HQ UMES buffer	Cirsium arvense	JC, PE, EM, JF, RC	8:00	12:00	Foliar spray	Yes	
RX081716_2	HQ Housing Buffer	Cirsium arvense	JC, PE, EM, JF, RC	12:30	14:00	Foliar spray	Yes	
RX081916_1	Causeway Assateague State park	Clematis terniflora	JC, JF	9:00	9:15	Foliar spray	Yes	4m x 3m x 2.5m
RX081916_2	Causeway Assateague State park	Clematis terniflora	JC, JF	9:15	9:30	Foliar spray	Yes	3m x 2m x 2m
RX083116_2	Causeway Assateague State park	Clematis terniflora	JC	8:00	8:30	Foliar spray	Yes	retreatment as Rodeo did not work in this area

RX090716	end of Bayside DR	Clematis terniflora	PE, JF, RC	7:50	12:00	Foliar spray	Yes	sprayed clematis terniflora and cut paths in thicket
RX090816	end of Bayside DR	Clematis terniflora	RC, PE, JF	7:30	13:00	Foliar spray	Yes	sprayed clematis terniflora and cut paths in thicket
RX090916	end of Bayside DR	Clematis terniflora	RC, PE, JF	7:30	10:45	Foliar spray	Yes	
RX091216_1	Bayside dr	Clematis terniflora	JF, RC, PE	7:00	14:00	Foliar spray	Yes	sprayed for clematis at bayside dr, then went to OSV Burn Unit 8 with EMPT until 4:30
RX092316	End of Bayside DR	Clematis terniflora	JC, JF, PE	10:00	14:30	Foliar spray	Yes	
RX092816_10	Sinepuxent Veg Buffer	Elaeagnus umbellata	JC, JF, RC	13:00	15:00	Foliar spray	Yes	1 sapling
RX081916_3	Pump House 2 State Park	Elaeagnus umbellata	JC, JF	9:45	10:00	cut stump	No	2 large trees (3m x 3m x 3m) and 1 small (1m x 1m x 1m)
RX081916_3	Pump House 2 State Park	Elaeagnus umbellata	JC, JF	9:30	9:45	Foliar spray	No	15 saplings (1m x 1m x 1m)

RX081916_4	Across East of Nature Center State Park	Elaeagnus umbellata	JC, JF	10:15	11:15	Foliar spray	No	26 trees: 6 trees (4m x 4m x 4m), 14 trees (1m x 1m x 2m), 6 trees (2m x 2m x 2m)
RX082516_JCEM2	State Park Verizon Sub Station	Elaeagnus umbellata	JC, EM	9:00	11:00	Foliar spray	No	
RX083116_3	UMES, North of Gate to Ratcliffe House	Elaeagnus umbellata	JC	8:45	9:10	Foliar spray	No	
RX090816_3	Sinepuxent veg buffer	Elaeagnus umbellata	JC	9:15	9:45	Foliar spray	Yes	7 saplings
RX092616	Developed Area	Eragrostis curvula	JC, JF, PE, RC	8:00	15:00	Foliar spray	No	
RX091520_1	Clement's Inholding	Hedera Helix	JC, JF, RC, PE, NCR EPMT	7:00	12:00	Foliar spray	Yes	with NCR EPMT
RX092616	Developed Area	Lespedeza cuneata	JC, JF, PE, RC	8:30	15:00	Foliar spray	Yes	
RX092816_7	Sinepuxent Veg Buffer	Lezpedeza cuneata	JC, JF, RC	13:00	15:00	Foliar spray	Yes	
RX092816_2	Headquarters southwest and western border	Lonicera japonica	JC, JF, RC	7:30	10:30	Foliar spray	Yes	

RX081716_2	HQ Housing Buffer	Lonicera japonica	JC, PE, EM, JF, RC	11:00	12:00	Foliar spray	Yes	
RX051916	VA Maintenance	Maintenance Weeds	JC, EM, JF	9:30	13:30	Foliar spray	Yes	Mixed Garlon 3A and Roundup, Super Concentrate together. Various nuisance broadleaf weeds like Trifolium repens (white clover), Lonicera japonica (Japanese honeysuckle), Elaeagnus umbellata (Autumn Olive)
RX092816_4	Headquarters southwest and western border	Mentha Spp.	JC, JF, RC	7:30	10:30	Foliar spray	No	
RX092816_5	Headquarters southwest and western border	Pennisetum alopecuroides	JC, JF, RC	7:30	10:30	Foliar spray	No	
RX092816_6	Sinepuxent Veg Buffer	Pennisetum alopecuroides	JC, JF, RC	10:30	12:00	Foliar spray	Yes	
RX092816_8	Sinepuxent Veg Buffer	Pennisetum alopecuroides	JC, JF, RC	13:00	15:00	Foliar spray	Yes	

RX092816_3	Headquarters southwest and western border	Rosa wichuraiana	JC, JF, RC	7:30	10:30	Foliar spray	Yes	
RX092816_9	Sinepuxent Veg Buffer	Rosa wichuraiana	JC, JF, RC	13:00	15:00	Foliar spray	Yes	
RX051916	VA Maintenance	Weeds	JC, EM, JF	9:30	13:30	Foliar spray	Yes	
RX052016	VA Causeway	Weeds	JC, EM, JF	9:00	12:00	Foliar spray	Yes	
RX052016	VA Causeway	Weeds	JC, EM, JF	9:00	12:00	Foliar spray	Yes	
RX052516	VC Parking Lot	Weeds	JC, JF, EM	8:15	11:15	Foliar spray	Yes	
RX052616	MD Housing and HQ	Weeds	JC, JF, EM	8:00	13:30	Foliar spray	Yes	
RX063016	MD Visitor Center	Weeds	JF, JC	7:50	9:50	Foliar Spray	Yes	
RX072516	HQ	Weeds	JC, PE, JF, RC	8:00	10:00	Foliar spray	Yes	
RX081916_5	HQ bed by WWTP	Weeds	JC, JF	11:30	12:30	Foliar spray	Yes	
RX052616	MD Housing and HQ	Weeds (Eleusine indica)	JC, JF, EM	9:00	10:00	Foliar spray	Yes	
RX062416_1	CNWR-entrance	Weeds (Eleusine indica)	JC, JF, RC, PE	9:00	9:30	Foliar spray	Yes	
RX062416_2	VA Maintenance	Weeds (Eleusine indica)	JC, RC, PE, JF	10:00	12:30	Foliar spray	No	

Table 6: ASIS Alien Plant Management Program and Phragmites Control Project Herbicide Use Information for FY2016

Rx Code	Location	Species	Rx Method	Product	EPA Reg Number	Active Ingredient	Amt Product (mL)	% Conc	Area Treated (m sq)	Total Amt Spray (L)	Equipment Used*
RX092816_1	Headquarters southwest and western border	Artemisia vulgaris	Foliar spray	Polaris	228-534	Imazapyr	20	2%	48.0	1.0	1
RX081716_1	HQ UMES buffer	Artemisia vulgaris	Foliar spray	Rodeo	62719-324	Glyphosate	720	2%	458.0	45.0	1
RX081716_2	HQ Housing Buffer	Artemisia vulgaris	Foliar spray	Rodeo	62719-326	Glyphosate	75	2%	50.0	3.8	1
RX092616	200m North of Entrance Booth on East side of road, under guard rail. Also, next to Deer Check Station.	Artemisia vulgaris	Foliar spray	Polaris	228-534	Imazapyr	trace	2%	1.0	trace	1
RX072616	OSV	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	45	2%	225.0	2.3	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	100	2%	9.0	5.0	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	3.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1

RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	3.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	2.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	5.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	8.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	18.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	9.0	part of 5 L	1

RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	9.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	20.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	8.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	2.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	12.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	4.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	2.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	6.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	9.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	3.0	part of 5 L	1

RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	50.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	2.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	3.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	8.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	8.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	9.0	part of 5 L	1
RX081116	OSV north of 23.4 closure	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 100 mL	2%	1.0	part of 5 L	1
RX081216_1	State Park Concession	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	280	2%	140.0	14.0	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	80	2%	40.0	4.0	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	6.0	part of 4 L	1

RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	2.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	36.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	1.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	1.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	1.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	1.0	part of 4 L	1
RX081216_2	North End	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	part of 80 mL	2%	7.0	part of 4 L	1
RX082516_JCEM 1	State Park to national dev	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	80	2%	10.0	1.0	1
RX090816_2	State Park Concession	Carex kobomugi	Foliar spray	Polaris	228-534	Imazapyr	200	2%	65.0	10.0	1
RX081716_1	HQ UMES buffer	Cirsium arvense	Foliar spray	Rodeo	62719-324	Glyphosate	180	2%	115.0	9.0	1
RX081716_2	HQ Housing Buffer	Cirsium arvense	Foliar spray	Rodeo	62719-325	Glyphosate	75	2%	50.0	3.8	1
RX081916_1	Causeway state park	Clematis terniflora	Foliar spray	Rodeo	62719-324	Glyphosate	50	2%	12.0	2.5	1
RX081916_2	Causeway state park	Clematis terniflora	Foliar spray	Rodeo	62719-324	Glyphosate	40	2%	6.0	2.0	1
RX083116_2	Causeway Assateague State park	Clematis terniflora	Foliar spray	Garlon 3A	62719-37	Triclopyr	60	3%	50.0	2.0	1
RX090716	end of Bayside DR	Clematis terniflora	Foliar spray	Garlon 3A	62719-37	Triclopyr	240	3%	120.0	12.0	1

RX090816	end of Bayside DR	Clematis terniflora	Foliar spray	Garlon 3A	62719-37	Triclopyr	660	3%	330.0	33.0	1
RX090916	end of Bayside DR	Clematis terniflora	Foliar spray	Polaris	228-534	Imazapyr	600	2%	300.0	30.0	1
RX091216_1	Bayside dr	Clematis terniflora	Foliar spray	Polaris	228-534	Imazapyr	1020	2%	510.0	51.0	1
RX092316	End of Bayside DR	Clematis terniflora	Foliar spray	Polaris	228-534	Imazapyr	2272	2%	1140.0	113.6	2
RX092816_10	Sinepuxent Veg Buffer	Elaeagnus umbellata	Foliar spray	Polaris	228-534	Imazapyr	trace	2%	1.0	trace	1
RX081916_3	Pump House 2 state park	Elaeagnus umbellata	cut stump	Garlon 3A	62719-37	Triclopyr	60	25%	10.0	0.2	3
RX081916_3	Pump House 2 state park	Elaeagnus umbellata	Foliar spray	Rodeo	62719-324	Glyphosate	30	2%	15.0	1.5	1
RX081916_4	Across East of Nature Center	Elaeagnus umbellata	Foliar spray	Rodeo	62719-324	Glyphosate	140	2%	134.0	7.0	1
RX082516_JCEM 2	State Park Verizon Sub Station	Elaeagnus umbellata	Foliar spray	Polaris	228-535	Imazapyr	0	2%	30.0	3.0	1
RX083116_3	UMES, North of Gate to Ratcliffe House	Elaeagnus umbellata	Foliar spray	Garlon 3A	62719-37	Triclopyr	90	3%	60.0	3.0	1

RX090816_3	Sinepuxent veg buffer	Elaeagnus umbellata	Foliar spray	Polaris	228-534	Imazapyr	20	2%	7.0		1
RX092616	Developed Area	Eragrostis curvula	Foliar spray	Polaris	228-534	Imazapyr	960	2%	480.0	48.0	1
RX091520_1	Clement's Inholding	Hedera Helix	Foliar spray	Polaris	228-534	Imazapyr	20	2%	25.0	1.0	1
RX092616	Developed Area	Lespedeza cuneata	Foliar spray	Polaris	228-534	Imazapyr	540	2%	270.0	27.0	1
RX092816_7	Sinepuxent Veg Buffer	Lezpedeza cuneata	Foliar spray	Polaris	228-534	Imazapyr	340	2%	17.0	17.0	1
RX092816_2	Headquarters southwest and western border	Lonicera japonica	Foliar spray	Polaris	228-534	Imazapyr	180	2%	240.0	9.0	1
RX081716_2	HQ Housing Buffer	Lonicera japonica	Foliar spray	Rodeo	62719-324	Glyphosate	150	2%	100.0	7.5	1
RX051916	VA Maintenance	Maintenance Weeds	Foliar spray	Garlon 3A	62719-37	Triclopyr	3150	3%	1050.0	105.0	1
RX092816_4	Headquarters southwest and western border	Mentha Spp.	Foliar spray	Polaris	228-534	Imazapyr	90	2%	40.0	4.5	1
RX092816_5	Headquarters southwest and western border	Pennisetum alopecuroides	Foliar spray	Polaris	228-534	Imazapyr	100	2%	50.0	5.0	1

RX092816_6	Sinepuxent Veg Buffer	Pennisetum alopecuroides	Foliar spray	Polaris	228-534	Imazapyr	300	2%	150.0	15.0	1
RX092816_8	Sinepuxent Veg Buffer	Pennisetum alopecuroides	Foliar spray	Polaris	228-534	Imazapyr	100	2%	50.0	5.0	1
RX092816_3	Headquarters southwest and western border	Rosa wichuraiana	Foliar spray	Polaris	228-534	Imazapyr	40	2%	60.0	2.0	1
RX092816_9	Sinepuxent Veg Buffer	Rosa wichuraiana	Foliar spray	Polaris	228-534	Imazapyr	10	2%	5.0	0.5	1
RX051916	VA Maintenance	Weeds	Foliar spray	Roundup Super Concentrate	71995-25	Glyphosate	2100	2%	1050.0	105.0	1
RX052016	VA Causeway	Weeds	Foliar spray	Rodeo	62719-324	Glyphosate	190	2%	95.0	9.5	1
RX052016	VA Causeway	Weeds	Foliar spray	Roundup Super Concentrate	71995-25	Glyphosate	190	2%	95.0	9.5	1
RX052516	VC Parking Lot	Weeds	Foliar spray	Rodeo	62719-324	Glyphosate	760	2%	380.0	38.0	1
RX052616	MD Housing and HQ	Weeds	Foliar spray	Rodeo	62719-324	Glyphosate	600	2%	300.0	30.0	1
RX063016	MD Visitor Center	Weeds	Foliar Spray	Rodeo	62719-324	Glyphosate	430	2%	2150.0	21.5	1
RX072516	HQ	Weeds	Foliar spray	Rodeo	62719-324	Glyphosate	800	2%	400.0	40.0	1

RX081916_5	HQ bed by WWTP	Weeds	Foliar spray	Rodeo	62719-324	Glyphosate	160	2%	80.0	8.0	1
RX052616	MD Housing and HQ	Weeds (Eleusine indica)	Foliar spray	Polaris	228-534	Imazapyr	700	2%	350.0	35.0	1
RX062416_1	CNWR-entrance	Weeds (Eleusine indica)	Foliar spray	Polaris	228-534	Imazapyr	320	2%	160.0	16.0	1
RX062416_2	VA Maintenance	Weeds (Eleusine indica)	Foliar spray	Polaris	228-534	Imazapyr	2360	2%	1180.0	118.0	1

1-Backpack Sprayer
2-Truck Mounted Sprayer
3-Hand Pump