

# Assateague Island National Seashore

## Alien Plant Management Program (APMP) / Phragmites Control Project Report 2015



Image 1: The 2015 Vegetation Management Crew discover a *Paulonia tomentosa* Tree on the island

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## Introduction

During 2015 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 FY2015 occurred in the park, as well as around the park's Headquarters area. Previously documented and treated infestation sites were monitored during FY2015 and those sites found to be inactive during each of the past three years were determined to be controlled or eradicated.

During the fall of 2014, ASIS received some much needed assistance from the NCR Exotic Plant Management Team (EPMT) in October of 2014 at Burn Unit 8. Later in September of 2015, a joint Task Force of 5 (EPMT) crews from the east coast came to ASIS and collectively helped treat *Phragmites australis* infestations in Burn Units 4, 8, and 9 (also in the Over Sand Vehicle Zone of the Park's backcountry), and in the park's Developed Area.

## Methods

### ASIS Alien Plant Management Program Design 2009-2015

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 2014 APMP activities. Additionally, the Phragmites database was updated to store and manage data associated with the ASIS Phragmites Control Project. During FY15 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. Two seasonal employees were hired to assist our program in 2015. 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 2015 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 7/5/2015 would be labeled "Rx070515\_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/invintro.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 2015 and Global Positioning System (GPS) units were used to record data. The Trimble® Juno 3B® handheld unit was the preferred unit in 2015. 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 descriptive data recorded for each infestation includes: species, length (longest axis, m), width (shortest axis, m), height (m), # individuals, phenology and comments. These data were visually estimated in order to increase monitoring efficiency each year. Additionally, these visual estimates are compared with the amount of area treated (which, with the exception of *L. japonica* in 2014 (as was also the exception in 2013) was equal to the known extent of the remaining population for each infestation) these actions enable accurate estimates for reporting purposes. Essentially all species that have been targeted by these efforts since 2004 are at manageable levels ( $\leq 0.1$  Acres) with the exception of *A. vulgaris*, *C. arvense*, *C. terniflora*, *L. japonica*, and *P. australis*.

The primary focus of this years' work was to revisit previously known infestations of invasive plants in the backcountry of ASIS (south of the Bullpen to the VA State Line) while looking for new, or previously unrecognized infestations of invasive, non-native plants. All of the inholdings within the stated area were revisited to determine if they were free of invasive, non-native plants and if encountered, they were treated and recorded. With the exception of the High Winds property and Clements, where *Pinus thunbergiana* trees were found and treated, there was very little discovered that had not already been found and treated in the past.

### Results

A summary of the ASIS APMP accomplishments during the fiscal year 2015 follows. This summary includes ASIS APMP monitoring and treatment activities as well as those conducted with the assistance of the Joint EPMT Task Force. During 2015, the EPMT groups from National Capital Region (NCR), Northeast Region (NER), Southeast Region (SER), Southeast Coast, Mid Atlantic, and WASO leaders visited for a week in September, during which time they helped treat *P. australis* infestations throughout the developed area both within and near to (just south of) the southern portion of Burn Unit 8.

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*:

None of the 5 previously discovered and treated sites were found to be active during 2015.

*Albezia julibrizzan*:



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

Two trees discovered in 2012 (Alb\_jul\_Site\_001) were treated in 2014 with a hack and squirt method with a 50% solution of Garlon 3A® in water and the seeds were cut from the branches of the trees, bagged up and disposed of off of the island.

Upon monitoring the site on 6/25/2015 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 2015 season.

*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 2014 were found to have killed those plants which were treated. Additional treatments in the fall of 2015 at the Headquarters property, the guardrail by the entrance to the Park and by the Visitor Contact Station on the island, further helped to control this species. These sites should be revisited, if time and project funding allow, in 2016.

The total area treated for this species in 2015 was 202.34 meters squared, or 0.05 Acres.

*Carex kobomugi*:

In August of 2016, all of the known *C. kobomugi* sites in Maryland were monitored and if living plants were encountered, they were treated. The active *C. kobomugi* sites in 2015 were Cako\_Site\_11, Assateague State Park and 150m SW of Km post 5.75. The lack of living plants at the sites treated in 2014 indicates that those treatments were successful. The 2014 report should be referred to for these treatments. Repeated treatments are common elsewhere and ASIS is not an exception.

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. Unlike previous years, there were no new discoveries of this species found during these activities. 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 2015 was 119 meters squared, or 0.029 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 in the fall of 2015 on the Headquarters property in the unmowed vegetated buffers that border the property to the south.

The total area treated for this species in 2015 was 200 meters squared, or 0.049 Acres.

*Clematis terniflora*:



Image 3: *C. terniflora* in flower. (Credit: EDDMapS.org)

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 was found to be active during an early season assessment of the area in April of 2016. The site was found to be very active and will require treatment in 2016

No treatments of this species were conducted in 2015 because project funding was to be utilized in backcountry areas of the island.

*Elaeagnus umbellata*:



Image 4: *E. 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.

There are currently no known occurrences of this species on ASIS land it is neither present on the island, nor is it present on the mainland Headquarters property. Only (1) sapling was discovered/ treated at the Headquarters area behind the Sinepuxent Visitor Center in 2015.

*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. In total 3155 meters squared, or 0.78 acres were treated.

*Eragrostis curvula*:



Image 5: *E. curvula* along Bayberry Drive just south of the Northern boundary marker (Credit: NPS ASIS 2004)

*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 remained low in 2015, and because project funding was to be utilized in backcountry areas of the island, it was not treated in 2015.

*Hedera helix*:

The single *H. helix* plant discovered and treated at HEHE\_Site\_01 during 2006 was monitored on 6/12/15 and found to be inactive. We will continue to survey for this species in FY 2016.

*Lezpedeza cuneata*:

This species is present in 2 Park locations, they are: 1. The Sinepuxent Vegetation Buffer: behind the ASIS Sinepuxent District Visitor Center and 2. Bayside Peninsula: along the south side of Bayside Drive in the Developed Area on the island. 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 detectable. Because the level of detection has increased at both locations, treatments of this highly invasive species are recommended to continue in the fall of 2016 if project funding will allow.

*Ligustrum vulgare*:

No further recruitment from the original infestation (500 m<sup>2</sup>), found in the vegetated buffer that borders the Sinepuxent Bay on our Headquarters property was observed in 2015 and it may now be considered to have been eradicated.

*Lonicera japonica*:

On 6/24/2015 our 4 person crew looked for *L. japonica* recruitment at previously known sites in the shrub zone between Km 17 and Km 18. We found just a few sites to be active, they were: Loja110 and Loja113. The Loja113 plant was pulled by hand and the Loja110 will require a return trip with a hand clipper and a concentrated herbicide solution to treat this small infestation in 2016.

On 6/25/2015, (8) *L. japonica* sites were visited in the shrub zone between Km 18 and Km 20 sites were visited. Of the 8 sites visited, *L. japonica* was located in 5 areas. Loja123 had 1 area with *L. japonica*, and will require backpack sprayer treatment. Loja124 had 1 main site with others spread out nearby, and will require backpack sprayer treatment. Loja125 and Loja150 both had 5 sites with numerous plants, and will require backpack sprayer treatment. Loja151 had only 1 plant present, and it was removed by hand. Also, while en route to Loja151, the roadside north of Burn Unit 8 was searched for any *Lonjap* presence. Active sites found during this investigation may be treated in 2016.

On 7/1/2015 while in Burn Unit 7 a small patch of *L. japonica* was discovered in grid 851\_04. One liter of 2% Polaris herbicide mix was sprayed on this while treating *P. australis* in the same area.

On 7/6/15 a small patch of *L. japonica* was discovered along Valentine's road that was sprayed with 3 liters of a 2% mix of Rodeo a glyphosate based herbicide.

On 8/19/15 while spraying other nuisance weeds on the Headquarters property some *L. japonica* was encountered and treated with a 2% solution of Roundup Super Concentrate a glyphosate based herbicide, 1.75 liters of this mix was used to treat the small amount of plants that were encountered.

A total of 61 meters squared, or 0.015 acres of *L. japonica* were treated in FY 2015.

The National Capital Region Exotic Plant Treatment Teams will assist us in treating this species in the Park's developed area (Bayside Campground Peninsula) in April of 2016. These teams (in particular, the National Capital Region) have helped us to treat this species in the past with measurable success.

*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.

The previous years' treatments appear to have been effective from 2014, as the species was not detected in 2015.

*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.

There is now an imminent threat of having this notorious invasive species becoming established on our Park headquarters property. Therefore, the adjacent populations will be monitored closely at the interface of our boundaries in 2016 to prevent introduction onto our park lands. The MDDNR may be contacted in 2016 to share the discovery with them, in hopes that they might take some action to control this aggressive invader.

This species was not seen on ASIS property in 2015 and no treatments were required.

*Miscanthus sinensis*:

No treatments of this species were conducted in 2015. All previously known and treated backcountry sites remained inactive when they were monitored in June of 2015, however (2) new, small sites were discovered during searches that will require treatments in 2016. These sites were located at (UTM Zone 18N) N 42247067, E 485229 (4 plants) and N 4224710, E 485231 (2 plants). These 2 small plants may be treated in 2016.

*Morus alba*:

A single sapling, discovered in 2013 at the entrance of the OSV was treated in 2015 while airing down the vehicle. Only trace amounts of herbicide were used to spray the 1 square meter of leaf cover.

This species is brought to the island by birds that have eaten the ripe fruits from the nearby mainland. We will continue to see this species appear periodically in random locations in the open at the edge of vegetated areas along roadways and paths of the island.

*Paulonia tomentosa*:



Image 6: NPS Seasonal Casey Nolan stands next to the *Paulonia tomentosa* he discovered (NPS Photo)



Image 7: Closeup of the *Paulonia tomentosa* leaves (NPS Photo)

While determining whether *Lonicera japonica* sites were active in the shrub zone west of Km 18.5 and north of Hungerford Road, a single *Paulonia tomentosa* tree was located at (UTM Zone 18N) N 4224376, E 485171. The tree was manually removed on 9/14/2015. A return trip to the area is suggested to see that there is no re-sprouting and/ or recruitment which will determine if the manual treatment was effective. The area treated was 16 meters squared.

*Pennisetum alopecuroides*:



Image 8: *P. alopecuroides* behind the Sinepuxent District Visitor Center in September 2014 (NPS ASIS Photo)

No treatments of this species were conducted during 2015, as the previous years' treatments were highly effective and no recruitment was observed. We will monitor the site for activity in 2016 and treat the plants as we have in the recent past.

*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 out compete 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 6 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, managers have 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 FY2015 *P. australis* was sprayed exclusively from the ground with only foliar backpack applications. With the assistance of (2) 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 sometimes used to fill the backpacks near the treatment areas.

Since last year, 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 4, 5, 6, 7, 10 and 12 respectively (see Figures 4, 5, 6, and 7). Unit 1 has been abandoned and has not received any follow up treatment since the initial aerial applications in 2008. Unit 2 was not sprayed in 2015 because it had received much attention in recent years. Unit 8 was sprayed in the fall of 2014 and again in the fall of 2015 by Exotic Plant Management Team (EPMT) crews. Units 2, 5, and 8 will most likely be revisited in 2016 by the ASIS crew. Units 3 and 11 did not receive treatments in 2015 because they are very difficult to access and there was much work to do elsewhere, but may be visited in 2016.

All treatments were sprayed with a solution containing 2% concentration of Polaris®, or Rodeo® 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 FY2015.

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<sup>1,\*</sup>, Curtis J. Hutto, Paul A. Clarke and Dorothy P. Field, Restoration Ecology, Volume 16 Issue 2, May 2008.

The crews' efforts during 2015 were employed in the retreatment of *P. australis* within the ASIS burn units 4, 5, and 6 (aerially treated in 2008), 7, 10 and 12 (aerially sprayed in 2009) (see Figures 1, 2, 3, 4, 5, 6, 7, and 8 below and Table 1). Additionally, infestations along Valentine's Road were treated to prevent them from potentially invading areas that had been opened up by the Southern Pine Beetle infestations in the area.

Figure 1: ASIS Prescription Burn Unit Map (Burn Units 3, 4, 7, 8, and 9)

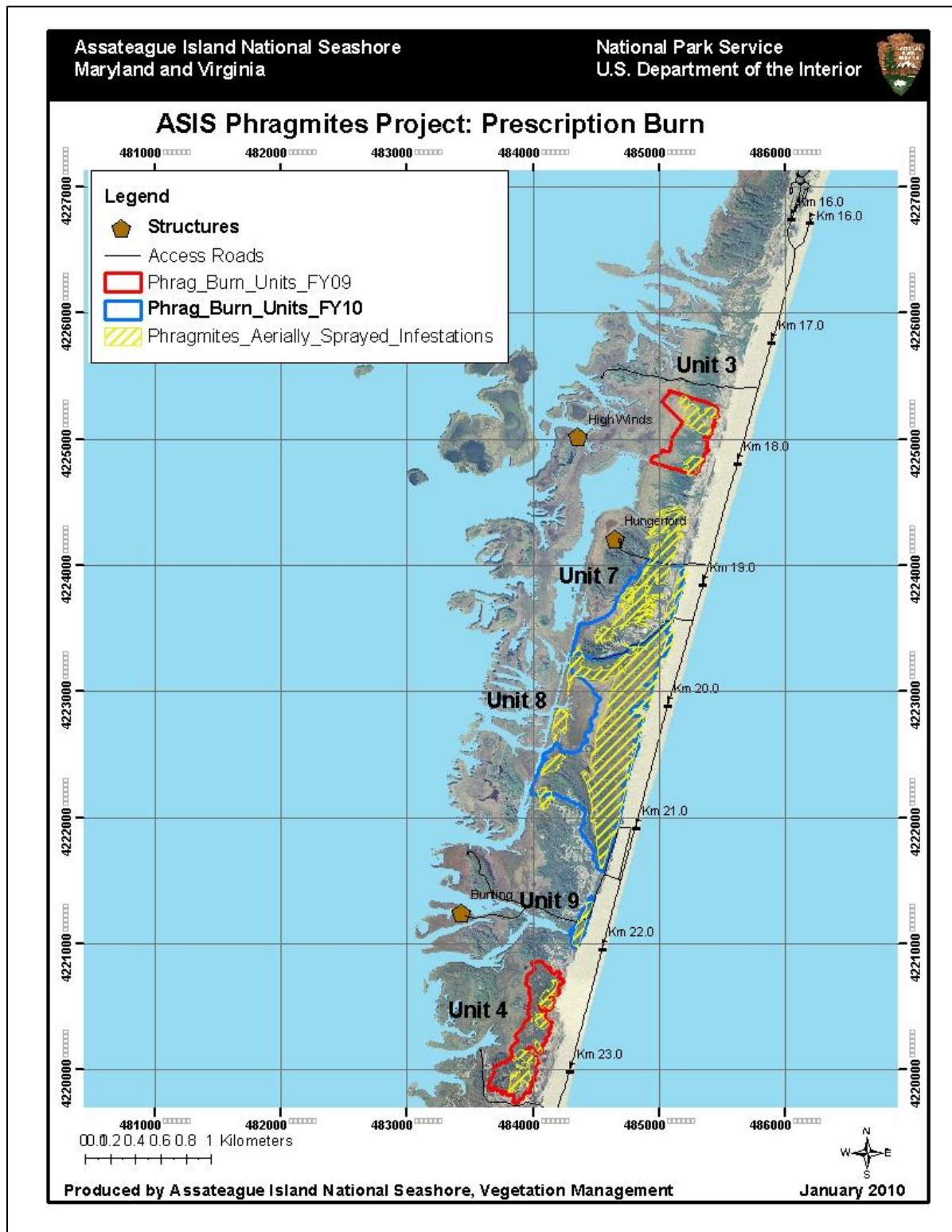


Figure 2: ASIS Prescription Burn Unit Map (Burn Units 4 and 10)

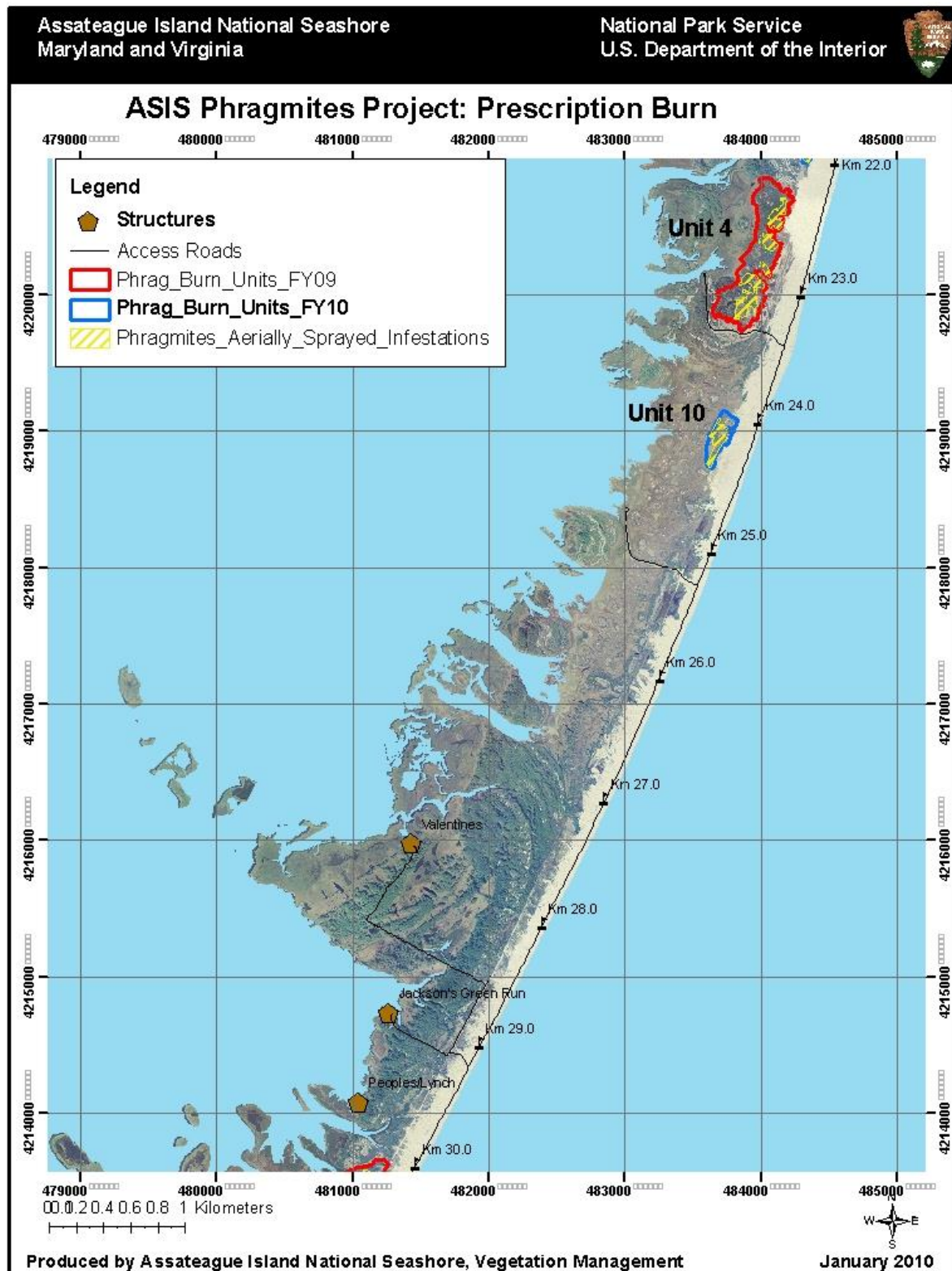


Figure 3: ASIS Prescription Burn Unit Map (Burn Units 5, 6, 11 and 12)

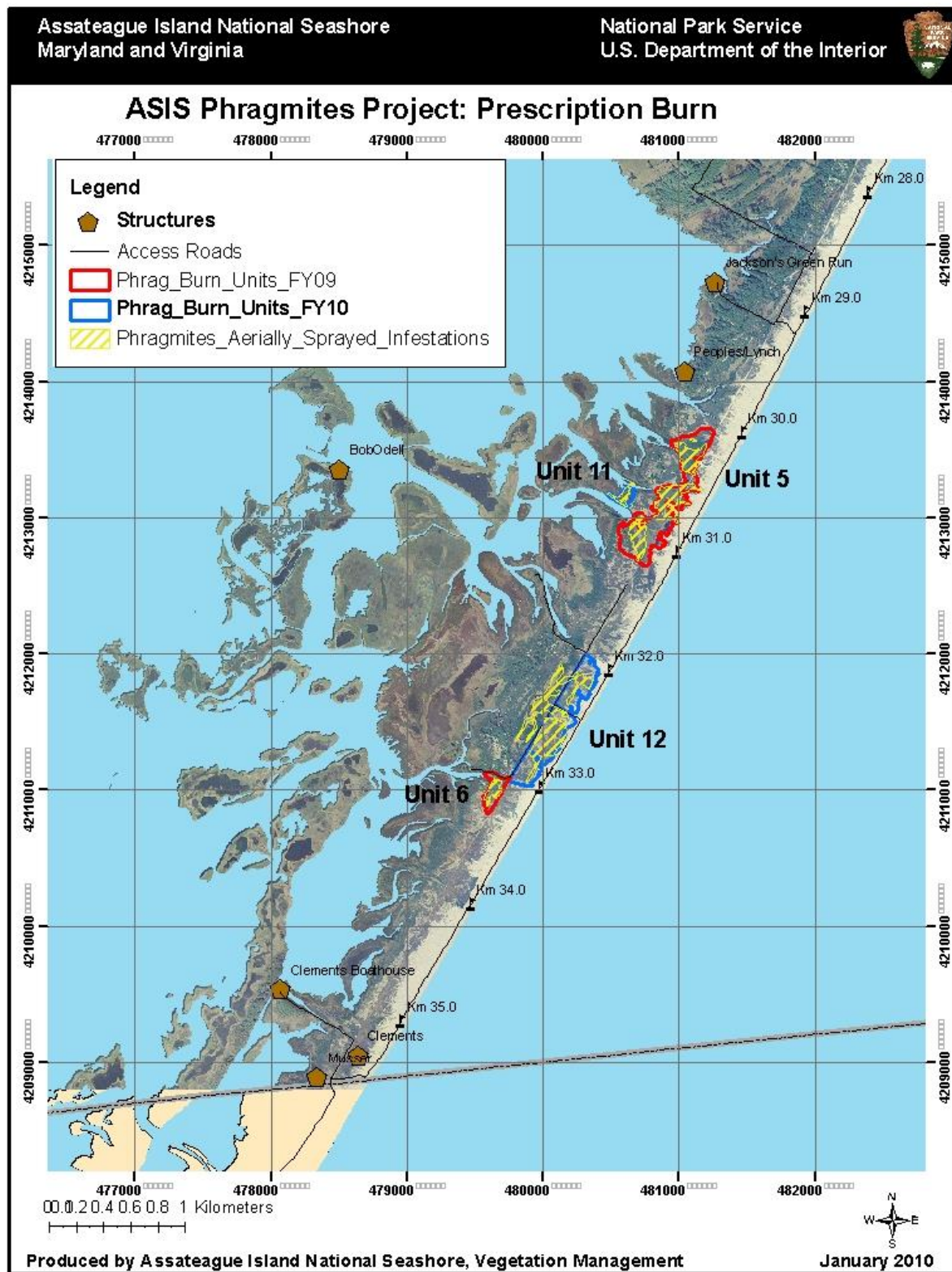


Figure 4: FY15 *P. australis* ground treatments at Burn Unit 7

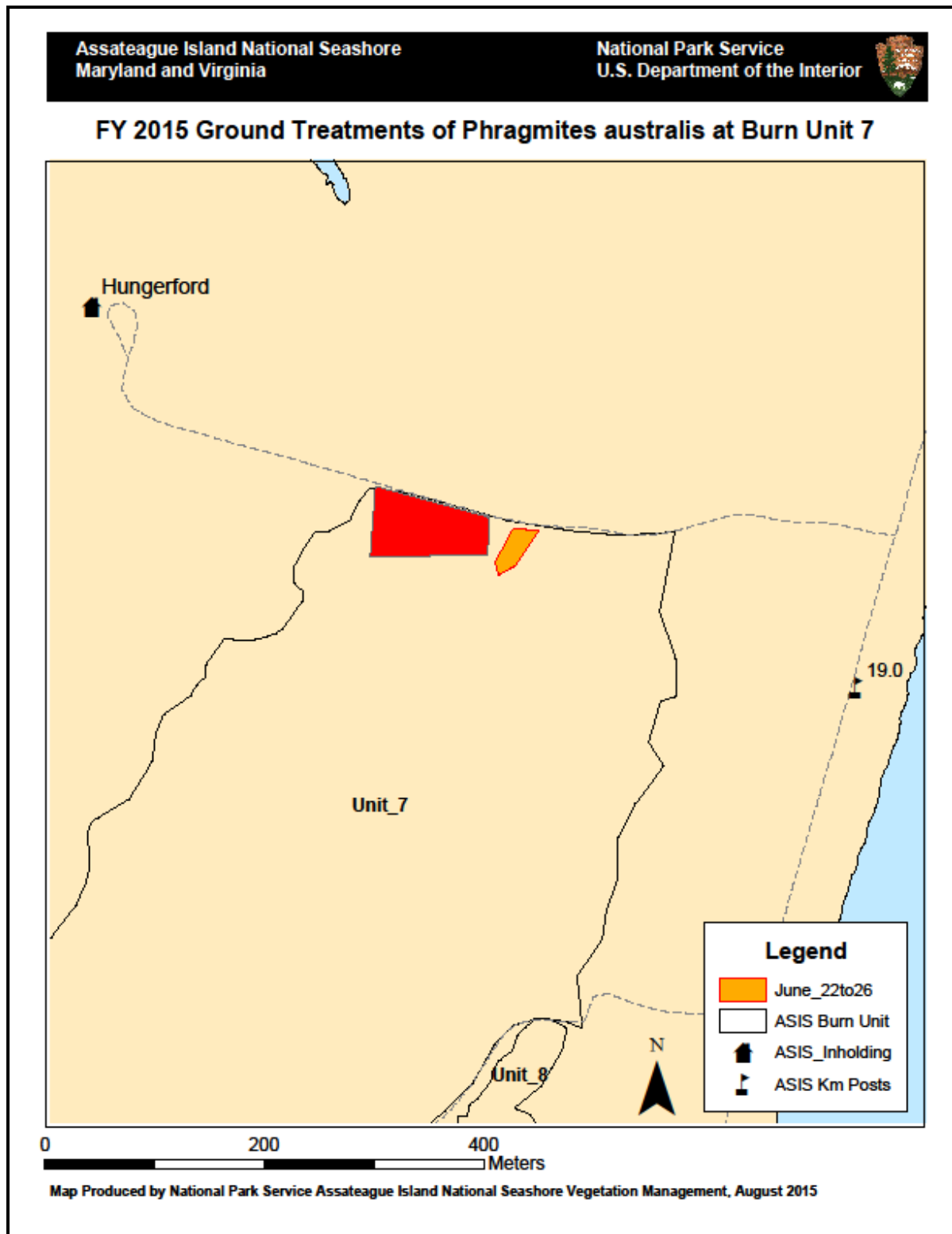


Figure 5: FY15 *P. australis* ground treatments at the road to Valentine's inholding

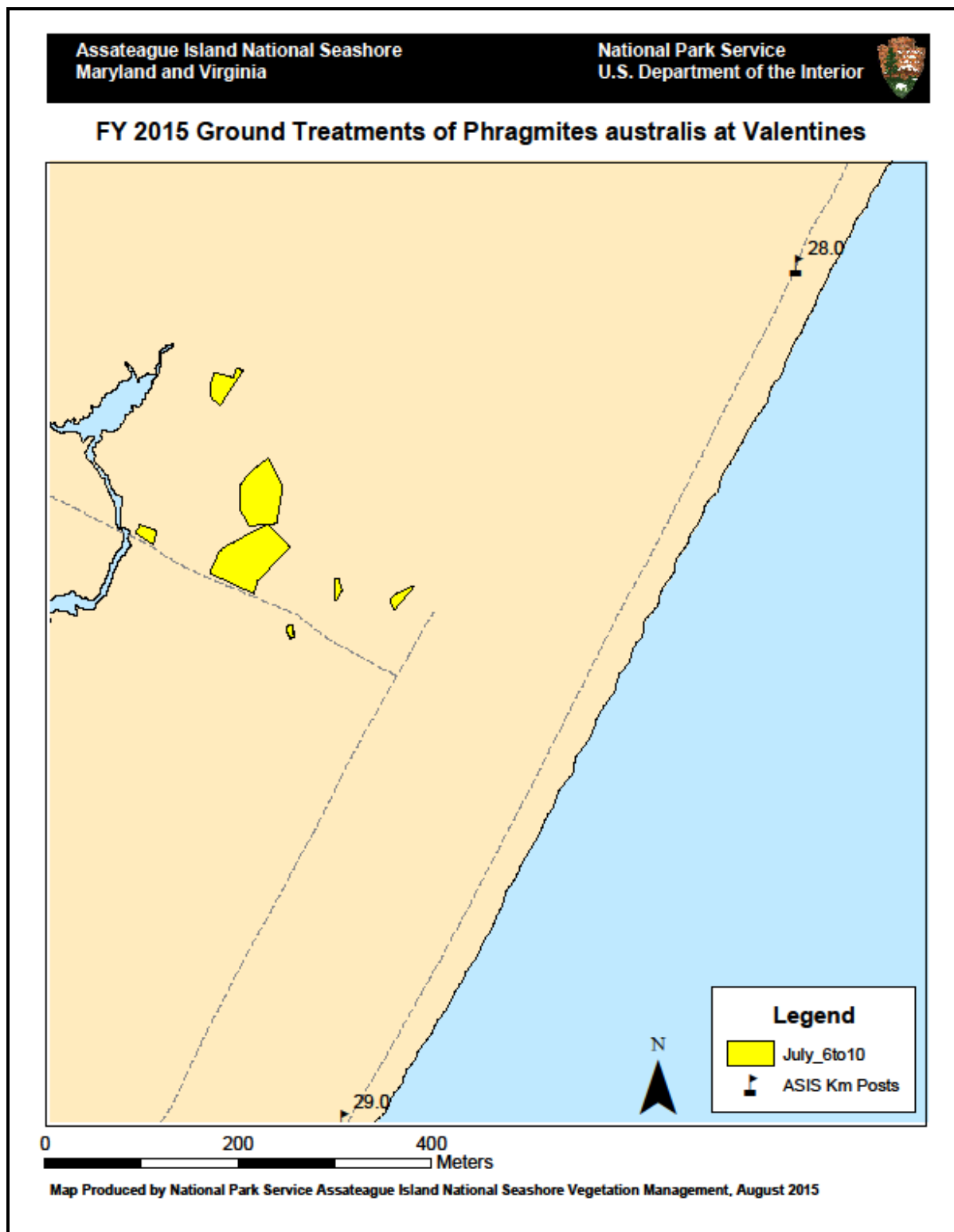


Figure 6: FY15 *P. australis* ground treatments at Burn Units 6 and 12

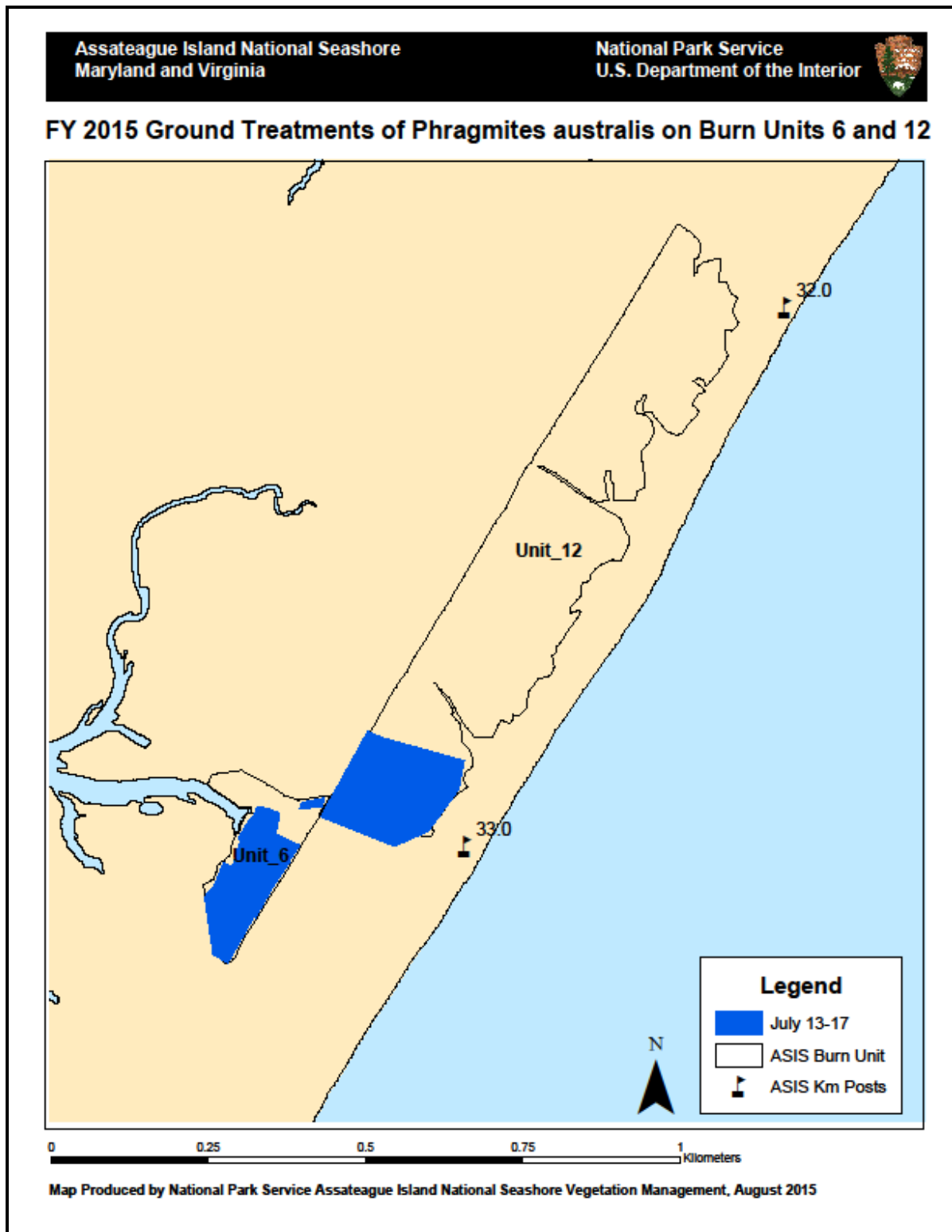


Figure 7: FY15 *P. australis* ground treatments at Burn Unit 5

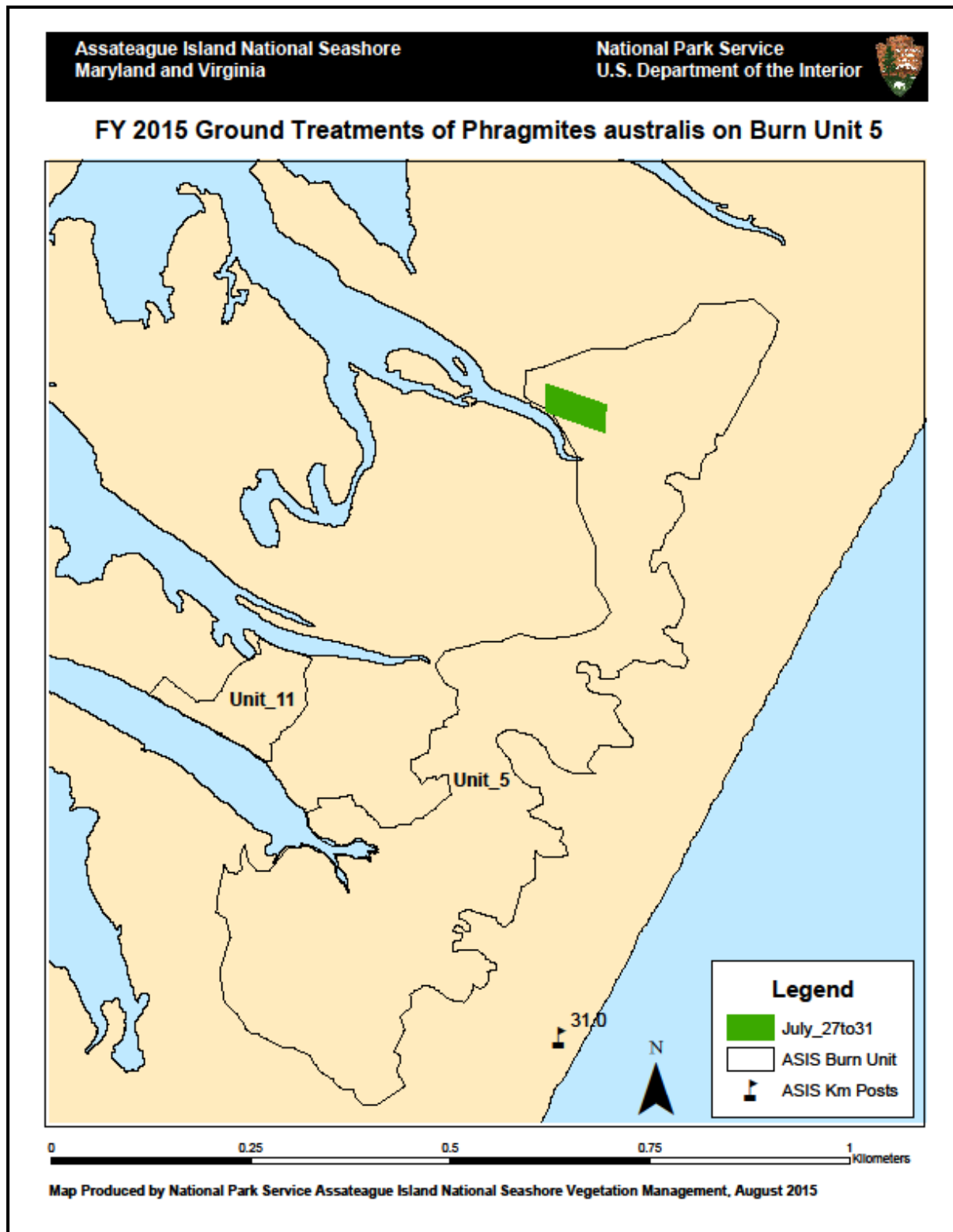


Figure 8: FY15 *P. australis* ground treatments at Burn Unit 4

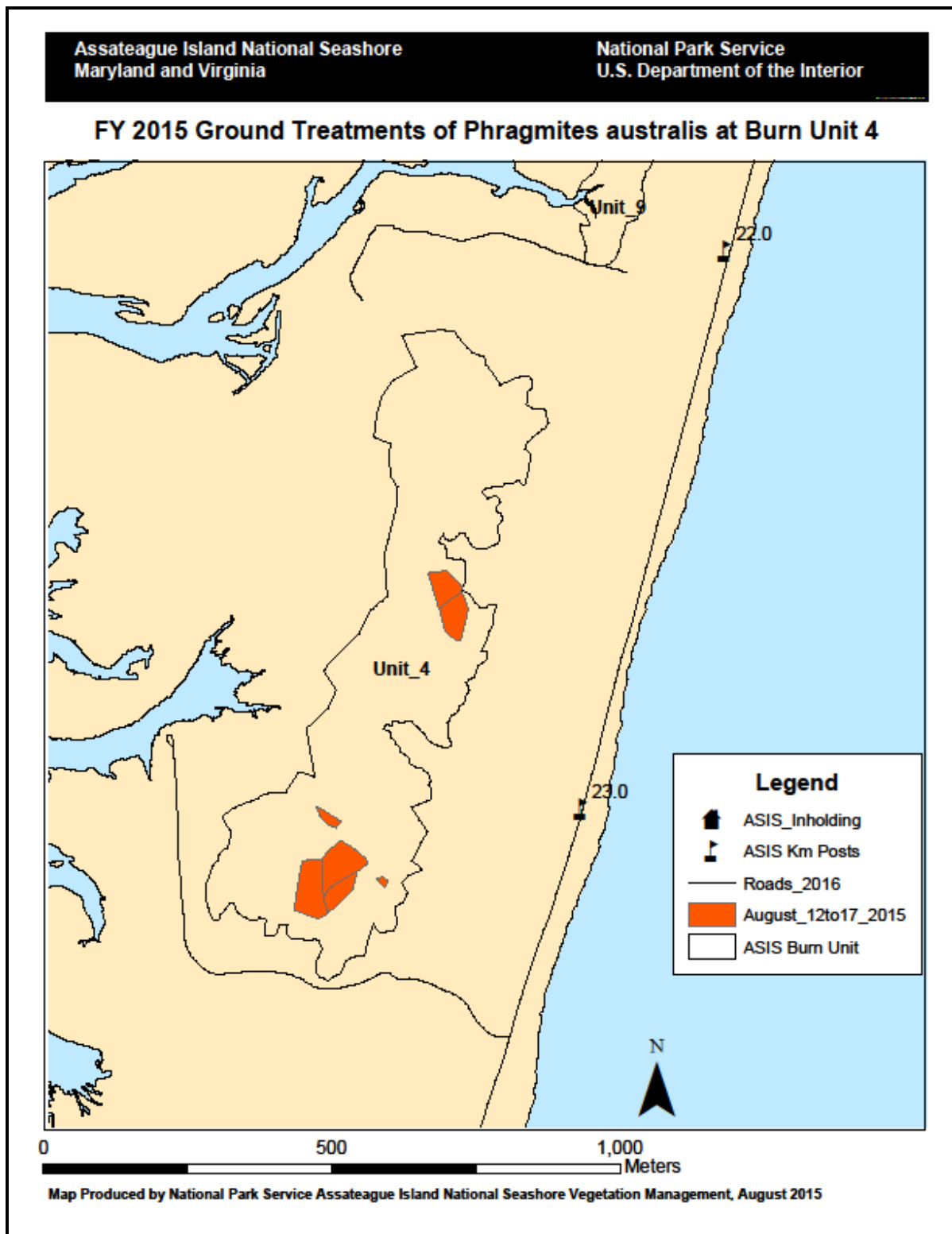


Table 1:  
2015 ASIS Treatment Accomplishments for *P. australis*: (2015 Summer Season)

| Site             | #Treatments | Days | Acres Treated | Qty. Herbicide Used (L) | Responsible Party | Herbicide Used                   |
|------------------|-------------|------|---------------|-------------------------|-------------------|----------------------------------|
| Unit 4           | 6           | 4    | 3.52          | 7.54                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Unit 5           | 1           | 1    | 0.64          | 2.16                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Unit 6           | 6           | 3    | 4.39          | 2.06                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Unit 7           | 6           | 5    | 5.66          | 5.93                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Unit 10          | 1           | 1    | 14.94         | 1.52                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Unit 12          | 2           | 2    | 6.62          | 0.74                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |
| Valentine's Road | 16          | 6    | 4.68          | 9.98                    | ASIS              | Polaris® EPA Reg. Num. (228-534) |

Table 2:  
FY2015 Joint EPMT Task Force/ ASIS Treatment Accomplishments for *P. australis*: (September 2015)

| Site                                         | #Treatments | Days | Acres Treated | Qty. Herbicide Used (L) | Responsible Party     | Herbicide Used                   |
|----------------------------------------------|-------------|------|---------------|-------------------------|-----------------------|----------------------------------|
| 22 sites in Developed Area/ Units 2, 4, 8, 9 | 32          | 3    | 37.5          | 33.77                   | EPMT Joint Task Force | Polaris® EPA Reg. Num. (228-534) |

Table 3:  
FY2015 NCR EPMT/ ASIS Treatment Accomplishments for *P. australis*: (October 2014)

| Site   | #Treatments | Days | Acres Treated | Qty. Herbicide Used (L) | Responsible Party | Herbicide Used                   |
|--------|-------------|------|---------------|-------------------------|-------------------|----------------------------------|
| Unit 8 | 3           | 3    | 4.6           | 6.89                    | NCR EPMT          | Rodeo® EPA Reg. Num. (62719-324) |

Figure 9: EPMT Joint Task Force Fall 2015 Frontcountry *P. australis* Treatments

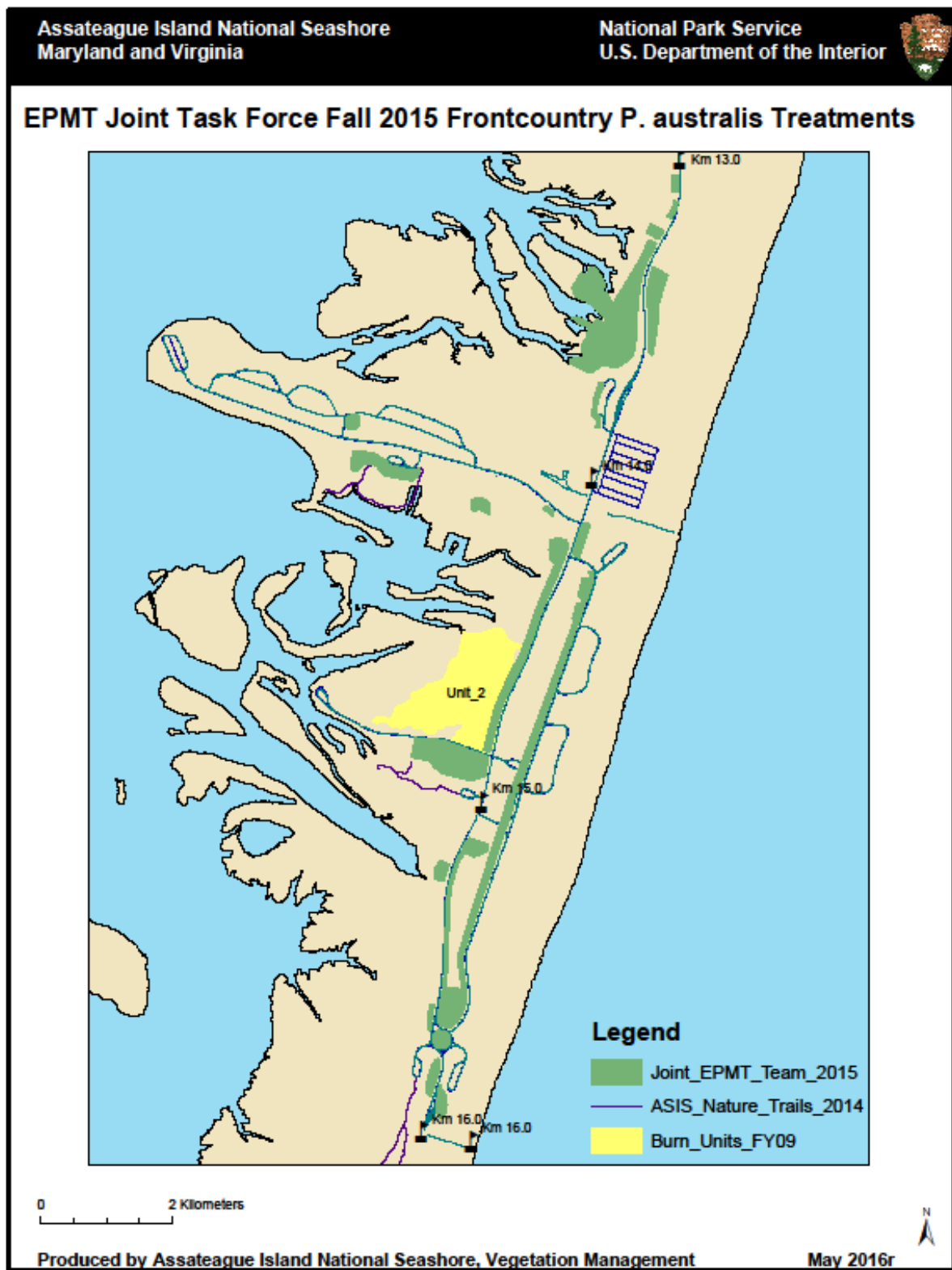
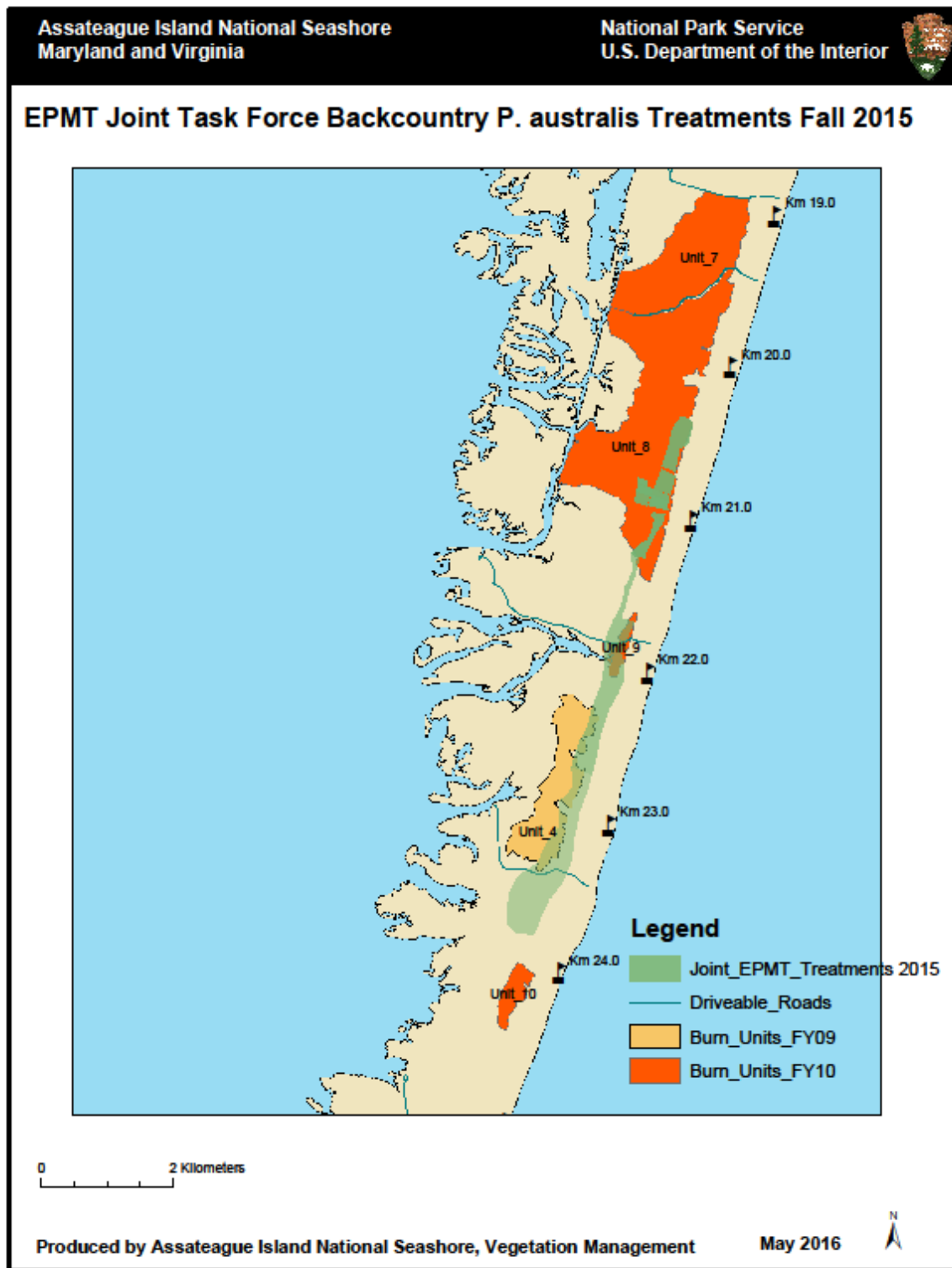


Figure 10: EPMT Joint Task Force Backcountry *P. australis* Treatments Fall 2015



## P. australis Discussion

There was no additional monitoring of burn units in FY15.

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:

Because seedlings continue to emerge at PITH\_Site\_01, it was revisited on 6/12/2015 and 17 saplings were located and cut down at their bases. Annual monitoring of the site will continue to occur as a result of ongoing activity there.

## High Winds

A new Site PITH\_Site\_02 was discovered by our Team on 6/18/2015 at the High Winds inholding on the property surrounding the house. Many trees of all sizes were found that consisted of 13 seedling, 41 small (less than 3m tall), 11 medium (3m to 5m tall), and 19 large (greater than 5m tall) trees. On 6/22/2015 our 4 person crew returned to eliminate this infestation. All trees, saplings and seedlings were either cut at the ground level, or were girdled with a large section of bark being removed near the base of the trunks. See images below.

Image 9: NPS Seasonals Casey Nolan and Kryztal Medina-Torres stand behind the many *P. thunbergii* saplings and small trees they cut at the High Winds inholding (NPS Photo)



Image 10: Student Conservation Association Glenn Hoffman girdles a large *P. thunbergii* tree at High Winds inholding (NPS Photo)



*Rosa wichuraina*

On 8/19/15 while spraying other nuisance weeds on the Headquarters property some *R. wichuraina* was encountered and treated with a 2% solution of Roundup Super Concentrate a glyphosate based herbicide, 1.75 liters of this mix was used to treat the small amount of plants that were encountered.

Table 4: ASIS Alien Plant Management Program Site Coordinates

| ID | Site         | Northing | Easting  | Species                    | Site Description                                                                                                                                                                                                                  |
|----|--------------|----------|----------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1  | AIAL_Site_01 | 4241835  | 491440.7 | <i>Ailanthus altissima</i> | A discreet location the epicenter of which is indicated by the coordinates                                                                                                                                                        |
| 2  | AIAL_Site_02 | 4241800  | 491414.5 | <i>Ailanthus altissima</i> | A discreet location the epicenter of which is indicated by the coordinates                                                                                                                                                        |
| 3  | AIAL_Site_03 | 4215810  | 481379.4 | <i>Ailanthus altissima</i> | A discreet location the epicenter of which is indicated by the coordinates                                                                                                                                                        |
| 4  | AIAL_Site_04 | 4215049  | 481260.1 | <i>Ailanthus altissima</i> | 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 | <i>Ailanthus altissima</i> | 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 FY2015

| Rx Code    | Location            | Species              | Applicator          | Start Time | End Time | Rx Method    | Retreatment | Comments                       |
|------------|---------------------|----------------------|---------------------|------------|----------|--------------|-------------|--------------------------------|
| Rx081915_2 | UMES Buffer         | Atremesia vulgaris   | JC, GH, CN, KMT     | 11:00      | 12:00    | Foliar spray | Yes         |                                |
| Rx082715   | North End           | Carex kobomugi       | CN, KMT             | 7:15       | 13:30    | Foliar spray | Yes         |                                |
| Rx083115   | North End           | Carex kobomugi       | CN, KMT             | 9:00       | 11:20    | Foliar spray | Yes         |                                |
| Rx081915_2 | UMES Buffer         | Circium arvense      | JC, GH, CN, KMT     | 11:00      | 12:00    | Foliar spray | Yes         |                                |
| Rx081915_2 | UMES Buffer         | Elaeagnus umbellata  | JC, GH, CN, KMT     | 11:00      | 12:00    | Foliar spray | Yes         |                                |
| Rx081815   | HQ, VC              | Eleusine indica      | JC                  | 7:30       | 12:00    | Foliar spray | Yes         |                                |
| Rx081915_1 | HQ, VC              | Eleusine indica      | JC, GH, CN, KMT     | 7:45       | 11:00    | Foliar spray | Yes         | Nuisance weeds maintenance     |
| Rx083115   | Headquarters        | Eleusine indica      | CN, KMT             | 7:45       | 8:25     | Foliar spray | Yes         | Sheds, boat barn, parking lots |
| Rx082015   | Bike path- All      | Eleusine indica      | JC, KMT, CN, GH, BW | 8:00       | 12:00    | Foliar spray | Yes         |                                |
| Rx070115_3 | Burn Unit 7         | Lonicera japonica    | JBC                 | 10:30      | 10:40    | Foliar spray | No          | In Grid 851_4                  |
| Rx070615_1 | Valentine's Road    | Lonicera japonica    | JC, CN, GH, KMT     | 8:00       | 9:30     | Foliar spray | Yes         | See data file RX070615_1       |
| Rx081915_2 | UMES Buffer         | Lonicera japonica    | JC, GH, CN, KMT     | 11:00      | 12:00    | Foliar spray | Yes         |                                |
| Rx091415   | N 4224376, E 485171 | Paulonia tomentosa   | CN, KMT             | 9:00       | 12:00    | Mechanical   | No          | Stump Cut                      |
| Rx062615_1 | Burn Unit 7         | Phragmites australis | CN, GH, KMT, JC     | 9:00       | 11:00    | Foliar spray | Yes         |                                |
| Rx062915_1 | Burn Unit 7         | Phragmites australis | CN, GH, KMT         | 8:10       | 12:00    | Foliar spray | Yes         |                                |
| Rx063015_1 | Burn Unit 7         | Phragmites australis | CN, GH, KMT, JC     | 8:10       | 13:53    | Foliar spray | Yes         | Grids 872_4 and 862_2          |
| Rx070115_1 | Burn Unit 7         | Phragmites australis | CN, GH, KMT, JC     | 8:00       | 10:00    | Foliar spray | Yes         | Grid 850_4                     |
| Rx070115_2 | Burn Unit 7         | Phragmites australis | JBC, CN, KMT, GH    | 8:49       | 11:00    | Foliar spray | Yes         | Grid 851_4                     |
| Rx070215_1 | Burn Unit 7         | Phragmites           | CN, JBC, KMT        | 8:00       | 10:00    | Foliar spray | Yes         | Grids 851_4 and                |

|            |                  |                      |                 |       |       |              |     |                                                                          |
|------------|------------------|----------------------|-----------------|-------|-------|--------------|-----|--------------------------------------------------------------------------|
|            |                  | australis            |                 |       |       |              |     | 832_2                                                                    |
| Rx070615_2 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 9:30  | 10:00 | Foliar spray | Yes |                                                                          |
| Rx070615_3 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 10:00 | 10:15 | Foliar spray | Yes |                                                                          |
| Rx070815_1 | Valentine's Road | Phragmites australis | CN, KMT, GH     | 8:00  | 11:10 | Foliar spray | Yes |                                                                          |
| Rx070815_2 | Valentine's Road | Phragmites australis | CN, KMT, GH     | 11:15 | 11:45 | Foliar spray | Yes |                                                                          |
| Rx070915_1 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 8:00  | 12:00 | Foliar spray | No  |                                                                          |
| Rx070915_2 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 8:00  | 8:30  | Foliar spray | No  |                                                                          |
| Rx071015_1 | Valentine's Road | Phragmites australis | JC, CN, KMT     | 8:30  | 9:00  | Foliar spray | No  | 0.5m x 0.5m x 0.2m<br>Lonicera japonica<br>was treated within<br>polygon |
| Rx071015_2 | Valentine's Road | Phragmites australis | JC, CN, KMT     | 9:00  | 10:00 | Foliar spray | No  | Location out on<br>marsh                                                 |
| Rx071015_3 | Valentine's Road | Phragmites australis | JC, CN, KMT     | 10:20 | 11:00 | Foliar spray | No  |                                                                          |
| Rx071315_1 | Burn Unit 6      | Phragmites australis | JC, CN, KMT     | 8:30  | 11:30 | Foliar spray | Yes |                                                                          |
| Rx071315_2 | Burn Unit 6      | Phragmites australis | JC, CN, KMT     | 12:00 | 13:00 | Foliar spray | Yes |                                                                          |
| Rx071415_1 | Burn Unit 6      | Phragmites australis | KMT, CN, GH     | 8:30  | 9:00  | Foliar spray | Yes |                                                                          |
| Rx071415_2 | Burn Unit 6      | Phragmites australis | KMT, CN, GH     | 9:00  | 10:00 | Foliar spray | Yes |                                                                          |
| Rx071415_3 | Burn Unit 6      | Phragmites australis | KMT, CN, GH     | 10:00 | 11:00 | Foliar spray | Yes |                                                                          |
| Rx071515_1 | Burn Unit 6      | Phragmites australis | KMT, CN, GH     | 8:45  | 9:15  | Foliar spray | Yes |                                                                          |
| Rx071515_2 | Burn Unit 6      | Phragmites           | KMT, CN, GH     | 9:15  | 10:00 | Foliar spray | Yes |                                                                          |

|            |                  |                      |                 |       |       |              |     |                                                                      |
|------------|------------------|----------------------|-----------------|-------|-------|--------------|-----|----------------------------------------------------------------------|
|            |                  | australis            |                 |       |       |              |     |                                                                      |
| Rx071515_3 | Burn Unit 6      | Phragmites australis | KMT, CN, GH     | 10:00 | 12:30 | Foliar spray | Yes |                                                                      |
| Rx071615_1 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 8:00  | 9:00  | Foliar spray | No  | Meadow North of the road and East of the bidge gut                   |
| Rx071615_2 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 9:00  | 10:00 | Foliar spray | No  | Large population of "Lin int" on the East side of Valentine's bridge |
| Rx071615_3 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 10:00 | 11:00 | Foliar spray | No  |                                                                      |
| Rx071615_4 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 10:15 | 11:30 | Foliar spray | Yes |                                                                      |
| Rx071615_4 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 11:00 | 12:00 | Foliar spray | No  |                                                                      |
| Rx071915_3 | Valentine's Road | Phragmites australis | JC, CN, GH, KMT | 12:30 | 13:00 | Foliar spray | No  |                                                                      |
| Rx073015   | Burn Unit 5      | Phragmites australis | KMT, CN, GH     | 8:30  | 11:40 | Foliar spray | Yes |                                                                      |
| Rx081015_1 | Burn Unit 10     | Phragmites australis | KMT, CN, GH     | 8:30  | 13:25 | Foliar spray | Yes |                                                                      |
| Rx081215_1 | Burn Unit 4      | Phragmites australis | KMT, CN, GH, BW | 8:30  | 9:10  | Foliar spray | Yes |                                                                      |
| Rx081215_2 | Burn Unit 4      | Phragmites australis | KMT, CN, GH, BW | 9:10  | 12:20 | Foliar spray | Yes |                                                                      |
| Rx081315_1 | Burn Unit 4      | Phragmites australis | KMT, CN, GH, BW | 7:30  | 10:45 | Foliar spray | Yes |                                                                      |
| Rx081415_1 | Burn Unit 4      | Phragmites australis | CN, KMT, GH     | 8:15  | 10:00 | Foliar spray | Yes |                                                                      |
| Rx081415_2 | Burn Unit 4      | Phragmites australis | CN, KMT, GH     | 10:00 | 11:20 | Foliar spray | Yes |                                                                      |
| Rx081715_1 | Burn Unit 4      | Phragmites           | JC, KKMT, GH    | 9:00  | 11:00 | Foliar spray | Yes | Grid 707_1                                                           |

|            |                    |                         |                      |       |       |              |     |                                                                        |
|------------|--------------------|-------------------------|----------------------|-------|-------|--------------|-----|------------------------------------------------------------------------|
|            |                    | australis               |                      |       |       |              |     |                                                                        |
| Rx081715_2 | Burn Unit 4        | Phragmites<br>australis | JC, KKMT, GH         | 12:30 | 14:00 | Foliar spray | Yes |                                                                        |
| Rx061215_1 | Clement's<br>House | Pinus thunbergii        | JBC, CBN, KMT        | 9:30  | 11:30 | Mechanical   | Yes | See data file<br>Rx061215                                              |
| Rx062215_1 | High Winds         | Pinus thunbergii        | JBC, GH, CBN,<br>KMT | 8:30  | 14:00 | Mechanical   | No  | 84 trees were<br>treated, found "Mis<br>sin" See data file<br>Rx062215 |
| Rx081915_2 | UMES Buffer        | Rosa wichuraina         | JC, GH, CN,<br>KMT   | 11:00 | 12:00 | Foliar spray | Yes |                                                                        |

\*1-Backpack Sprayer  
2-Laupers, saws, chisels, or machete

Table 6: ASIS Alien Plant Management Program and Phragmites Control Project Herbicide Use Information for FY2015

| 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* |
|------------|-------------|---------------------|--------------|------------------------------------------------|----------------|-------------------|------------------|--------|---------------------|---------------------|-----------------|
| Rx081915_2 | UMES Buffer | Atremesia vulgaris  | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25       | Glyphosate        | 405              | 2%     | 202.34              | 20.25               | 1               |
| Rx082715   | North End   | Carex kobomugi      | Foliar spray | Habitat®                                       | 241-426        | Imazapyr          | 26               | 2%     | 10                  | 1.3                 | 1               |
| Rx083115   | North End   | Carex kobomugi      | Foliar spray | Habitat®                                       | 241-426        | Imazapyr          | 300              | 2%     | 109                 | 15                  | 1               |
| Rx081915_2 | UMES Buffer | Circium arvense     | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25       | Glyphosate        | 405              | 2%     | 200                 | 20.25               | 1               |
| Rx081915_2 | UMES Buffer | Elaeagnus umbellata | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25       | Glyphosate        | 10               | 2%     | 1                   | 0.5                 | 1               |

|            |                  |                   |              |                                                |           |            |      |    |      |       |   |
|------------|------------------|-------------------|--------------|------------------------------------------------|-----------|------------|------|----|------|-------|---|
| Rx081815   | HQ, VC           | Eleusine indica   | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25  | Glyphosate | 400  | 2% | 200  | 20    | 1 |
| Rx081915_1 | HQ, VC           | Eleusine indica   | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25  | Glyphosate | 2380 | 2% | 1190 | 119   | 1 |
| Rx082015   | Bike path- All   | Eleusine indica   | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25  | Glyphosate | 3270 | 2% | 1635 | 163.5 | 1 |
| Rx083115   | Headquarters     | Eleusine indica   | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25  | Glyphosate | 260  | 2% | 130  | 13    | 1 |
| Rx070115_3 | Burn Unit 7      | Lonicera japonica | Foliar spray | Polaris®                                       | 228-534   | Imazapyr   | 20   | 2% | 9    | 1     | 1 |
| Rx070615_1 | Valentine's Road | Lonicera japonica | Foliar spray | Rodeo®                                         | 62719-324 | Glyphosate | 60   | 2% | 30   | 3     | 1 |

|            |                     |                      |              |                                                |          |            |      |     |         |      |   |
|------------|---------------------|----------------------|--------------|------------------------------------------------|----------|------------|------|-----|---------|------|---|
| Rx081915_2 | UMES Buffer         | Lonicera japonica    | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25 | Glyphosate | 45   | 2%  | 22      | 2.25 | 1 |
| Rx091415   | N 4224376, E 485171 | Paulonia tomentosa   | Mechanical   | N/A                                            | N/A      | N/A        | N/A  | N/A | 16      | N/A  | 2 |
| Rx062615_1 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 290  | 2%  | 809     | 14.5 | 1 |
| Rx062915_1 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1540 | 2%  | 12140.6 | 77   | 1 |
| Rx063015_1 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 2400 | 2%  | 4046    | 120  | 1 |
| Rx070115_1 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1040 | 2%  | 2994    | 52   | 1 |
| Rx070115_2 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 100  | 2%  | 1982    | 5    | 1 |
| Rx070215_1 | Burn Unit 7         | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 560  | 2%  | 300     | 28   | 1 |
| Rx070615_2 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 320  | 2%  | 160     | 16   | 1 |
| Rx070615_3 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 20   | 2%  | 10      | 1    | 1 |
| Rx070815_1 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1120 | 2%  | 2509    | 56   | 1 |
| Rx070815_2 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 310  | 2%  | 242     | 15.5 | 1 |
| Rx070915_1 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1880 | 2%  | 3153.3  | 94   | 1 |
| Rx070915_2 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 100  | 2%  | 30.2    | 5    | 1 |
| Rx071015_1 | Valentine's Road    | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 60   | 2%  | 106.4   | 3    | 1 |

|            |                  |                      |              |         |         |          |      |    |        |     |   |
|------------|------------------|----------------------|--------------|---------|---------|----------|------|----|--------|-----|---|
| Rx071015_2 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 560  | 2% | 748.8  | 28  | 1 |
| Rx071015_3 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 60   | 2% | 108.3  | 3   | 1 |
| Rx071315_1 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 960  | 2% | 3775   | 48  | 1 |
| Rx071315_2 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 300  | 2% | 2022   | 15  | 1 |
| Rx071415_1 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 360  | 2% | 782.39 | 18  | 1 |
| Rx071415_2 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 260  | 2% | 1049   | 13  | 1 |
| Rx071415_3 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 280  | 2% | 453    | 14  | 1 |
| Rx071515_1 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 80   | 2% | 4620   | 4   | 1 |
| Rx071515_2 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 100  | 2% | 5562   | 5   | 1 |
| Rx071515_3 | Burn Unit 6      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 460  | 2% | 26359  | 23  | 1 |
| Rx071615_1 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 1220 | 2% | 1368.3 | 61  | 1 |
| Rx071615_2 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 220  | 2% | 202    | 11  | 1 |
| Rx071615_3 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 700  | 2% | 1108   | 35  | 1 |
| Rx071615_4 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 1120 | 2% | 3035   | 56  | 1 |
| Rx071615_4 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 1000 | 2% | 2383   | 50  | 1 |
| Rx071915_3 | Valentine's Road | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 170  | 2% | 348    | 8.5 | 1 |
| Rx073015   | Burn Unit 5      | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 2160 | 2% | 2609.4 | 108 | 1 |
| Rx081015_1 | Burn Unit 10     | Phragmites australis | Foliar spray | Polaris | 228-534 | Imazapyr | 1520 | 2% | 60467  | 76  | 1 |

|            |                 |                      |              |                                                |          |            |      |     |         |      |   |
|------------|-----------------|----------------------|--------------|------------------------------------------------|----------|------------|------|-----|---------|------|---|
| Rx081215_1 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 220  | 2%  | 213.5   | 11   | 1 |
| Rx081215_2 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 2040 | 2%  | 4811.4  | 102  | 1 |
| Rx081315_1 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 2800 | 2%  | 4471.7  | 140  | 1 |
| Rx081415_1 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1080 | 2%  | 1678.4  | 54   | 1 |
| Rx081415_2 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 520  | 2%  | 666.6   | 26   | 1 |
| Rx081715_1 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 880  | 2%  | 2509    | 44   | 1 |
| Rx081715_2 | Burn Unit 4     | Phragmites australis | Foliar spray | Polaris                                        | 228-534  | Imazapyr   | 1000 | 2%  | 28749.6 | 50   | 1 |
| Rx061215_1 | Clement's House | Pinus thunbergii     | Mechanical   | N/A                                            | N/A      | N/A        | N/A  | N/A | 2500    | N/A  | 2 |
| Rx062215_1 | High Winds      | Pinus thunbergii     | Mechanical   | N/A                                            | N/A      | N/A        | N/A  | N/A | 4046    | N/A  | 2 |
| Rx081915_2 | UMES Buffer     | Rosa wichuraina      | Foliar spray | Roundup® Weed & Grass Killer Super Concentrate | 71995-25 | Glyphosate | 45   | 2%  | 22      | 2.25 | 1 |

1- Backpack Sprayer  
2- Hand Saw