

2019  
Final Report  
Bedford, NY Hardy Kiwi Control Project

Prepared for  
The Lower Hudson Partnership for Regional Invasive Species Management

Prepared by  
Trillium Invasive Species Management, Inc.

This document summarizes the deliverables completed towards the 2019 Bedford hardy kiwi control project. Conception and execution of the project was made possible through a partnership between; The Town of Bedford Conservation Board, Bedford Audubon, Bedford 2020, and Trillium ISM, Inc.



*Trillium*  
invasive species management, inc.  
[www.trilliumism.com](http://www.trilliumism.com)

Northern Westchester Universalist  
Unitarian Church

This project was contracted by the Lower Hudson Partnership for Regional Invasive Species Management (PRISM) using funds from the Environmental Protection Fund as administered by the New York State Department of Environmental Conservation



## Project Introduction

An infestation of hardy kiwi (*Actinidia arguta*) patches was first identified in 2013 along the route 172 corridor in the Town of Bedford, NY. Subsequent surveys over the following year<sup>1</sup> identified nine distinct infestations. This assemblage of infestations occurs on multiple properties of varied use types; public school land, town-owned property, fellowship land, and several residential properties. This infestation is the final of three known hardy kiwi infestations in the LHPRISM to have a project formed to eradicate it.

Hardy kiwi, *Actinidia arguta*, was initially identified in the Town of Bedford in 2013 by a volunteer observer (Carolyn Sears of The Invasives Project – Pound Ridge). In 2014 Steve Young of the Natural Heritage program conducted road surveys and identified several more sites within the general infested area. The general infested area is comprised of several distinct infestations, some of which have produced seed.

In 2014, as part of the hardy kiwi control project in Pound Ridge, Thomas Lewis (Trillium ISM, Inc.) and Carolynn Sears (The Invasives Project – Pound Ridge) presented to the Town of Bedford Conservation Board on the kiwi infestation and its significance to the area.

In 2015, The Town of Bedford Conservation Board (TOBCB) initiated this project to eradicate hardy kiwi infestations and requested aid from Trillium ISM and LHPRISM to help develop the project and provide funding for control activities.

In early 2016, The TOBCB Chair, Simon Skolnik assembled a wide array of stakeholders and project participants to bring the project into fruition. His work enlisted the aid of Bedford 2020, Bedford Audubon, the Town of Bedford and its Conservation Board, and gained permission from several landowners to implement control activities. A proposal was submitted to the LHPRISM for funding to conduct control activities and funding was approved. Control was initiated on infestations where permission was acquired.

In 2017, Trillium ISM submitted a proposal to continue control actions and to expand survey efforts. The proposal was approved. The Town of Bedford, Bedford 2020, and Bedford Audubon worked to increase outreach to neighboring landowners. Trillium ISM continued control efforts on seven infestations and surveyed new properties, resulting in the discovery of ten new infestations.

In 2018, Trillium ISM submitted a proposal to continue control actions and to expand survey efforts. The proposal was approved. Trillium ISM continued control on the sites, and surveyed other properties, resulting in the discovery of 7 new infestations in total.

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<sup>1</sup> Surveys reported on IMAP: Carolynn Sears - The Invasives Project, Pound Ridge; Steve Young – Chief Botanist NYS Natural Heritage Program

## **Project Narrative**

### **Justification of Project and its Importance**

Hardy kiwi (*Actinidia arguta*) is ranked by the LHPRISM as Tier 2<sup>2</sup> (emerging species) and its occurrences are considered classic early detection/rapid response scenarios. It is a perennial vine native to Japan, Korea, Northern China, and Russian Siberia that reproduces by rooting at nodes in contact with soil and by fruiting. Hardy kiwi is most commonly distributed by planting for landscaping and agriculture. Up until recently it has not been common to find fruiting populations escaping into the natural environment, but several populations have been discovered producing fruit and spreading in Westchester County, NY and on Long Island.

Hardy kiwi is dioecious and individuals may have different numbers of chromosomes. As a result, Hardy kiwi patches do not always produce fruit. Fruit production has occurred at several locations in this infestation along Route 172. If no control is exercised, it is reasonable to expect this infestation to continue expanding.

According to personal correspondence from NYS DEC regarding draft invasiveness assessment, hardy kiwi has been ranked as High. Hardy kiwi is an early detection species with three recorded infestations in the Lower Hudson PRISM. This project advances efforts to eradicate the last of the three known infestations.

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<sup>2</sup> <https://lhprism.org/species-status/tier-2-emerging>

## Control Treatment Tracking

In order to accommodate the increasing number of infestations, often with several infestations on a given property (site), each infestation has been assigned an identifying four-digit number. The first two digits indicate the site (from site 01 to site 22) and the second two digits indicate the infestation on the site (e.g., 0102 would be infestation two on site one). This allows us to keep track of infestation control and elimination. The method has increased the count of individual infestations to 40, as enumerated in the following table.

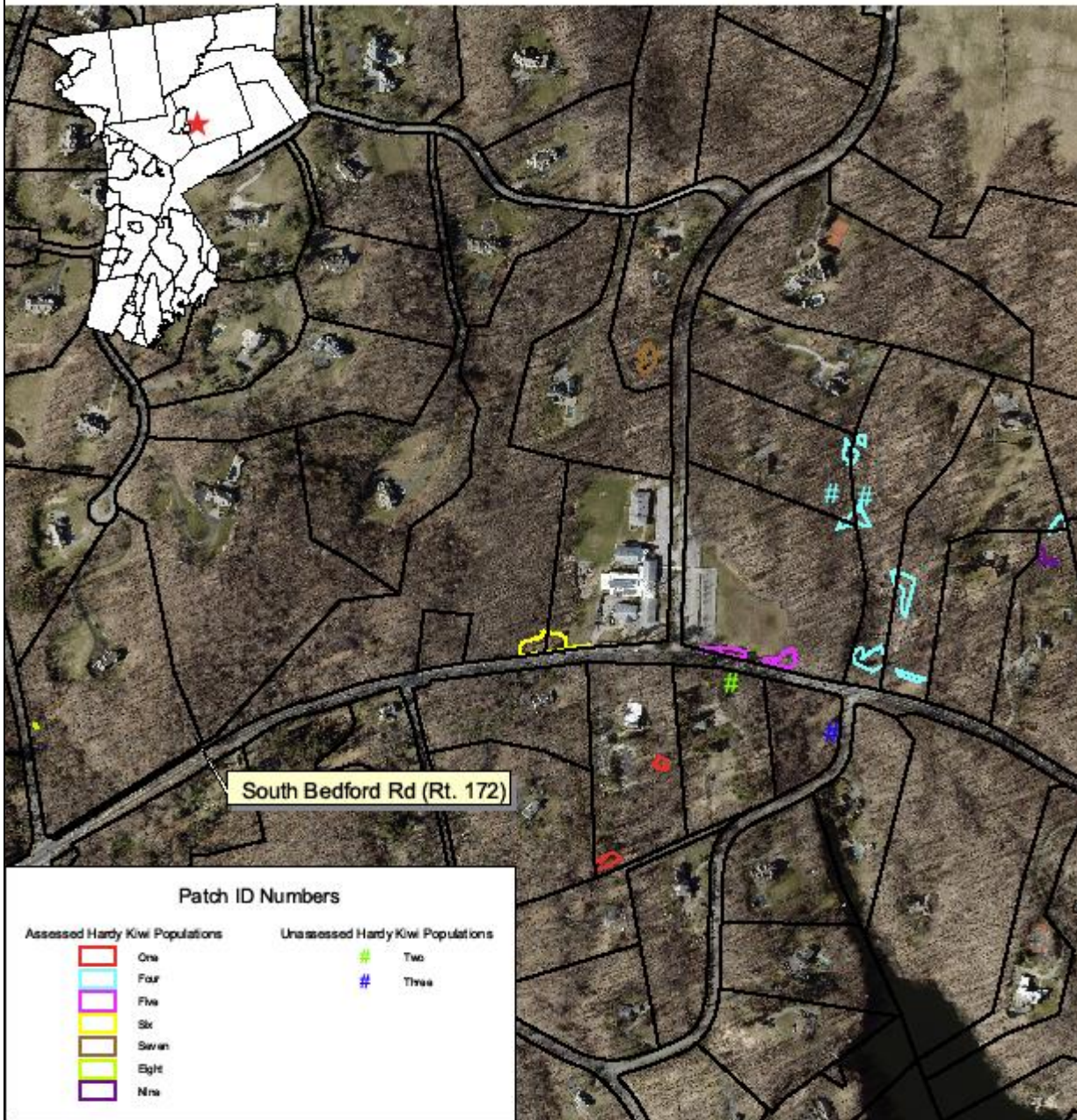
2019 Infestation Details								
Site	Permission to Proceed	Area (sq. ft.)	Area Treated (%)	Current Density	iMapInvasives #	Wetland Permit for Herbicide	Control Action Years	2019 Fruit Presence
0101	Yes	450	100	1	NY-455879U	N/a	2016, 2017, 2018, 2019	No
0102	Yes	200	100	1	NY-455880U	N/a	2016, 2017, 2018, 2019	No
0103	Yes	150	100	0	NY-455881U	N/a	2016, 2017, 2018, 2019	No
0104	Yes	1800	100	3	NY-319719U	N/a	2016, 2017, 2018, 2019	No
0201	Not yet	1100	0	0	NY-319718U	N/a	None	No
0301	Not yet	14000	0	5	NY-326736U	UNK	None	Yes
0401	Yes; no herbicide	900	100	UNK	NY-320902U	Required	2017, 2018	UNK
0402	Yes; no herbicide	1000	100	UNK	NY-455882U	Required	2017, 2018	UNK
0403	Yes; no herbicide	1600	100	UNK	NY-455954U	Required	2017, 2018	UNK
0404	Yes; no herbicide	1500	100	UNK	NY-455955U	Required	2017, 2018	UNK
0405	Yes; no herbicide	1000	100	UNK	NY-455956U	Required	2017, 2018	UNK
0406	Yes; no herbicide	1000	100	UNK	NY-455957U	Required	2017, 2018	UNK
0407	Yes; no herbicide	1000	100	UNK	NY-455958U	Required	2017, 2018	UNK
0408	Yes; no herbicide	1000	100	UNK	NY-455959U	Required	2017, 2018	UNK
0409	Yes; no herbicide	450	100	UNK	NY-411968U	Required	2017, 2018	UNK
0501	Yes	200	100	1	NY-319720U	Required	2016, 2017, 2018, 2019	No
0502	Yes	150	100	1	NY-455960U	Required	2016, 2017, 2018, 2019	No
0503	Yes	75	100	0	NY-446643U	Required	2016, 2017, 2018, 2019 (none found)	No
0504*	Yes	150	100	4	N/a	Required	2019	No
0601	Yes	500	100	1	NY-319721U	Required	2016, 2017, 2018, 2019	No
0602	Yes	500	100	2	NY-446646U	Required	2018, 2019	No
0603	Yes	150	100	1	NY-455972U	Required	2019	No

0604	Yes	200	100	1	NY-455971U	Required	2018, 2019	No
0605	Yes	200	100	1	NY-455970U	Required	2018, 2019	No
0606	Yes	625	100	1	NY-455969U	Required	2018, 2019	No
0707	Yes	4100	100	2	NY-321249U	N/a	2016, 2017, 2018, 2019	No
0801	Yes	900	100	0	NY-320919U	Required	2016, 2017, 2018, (none found), 2019 (none found)	No
0901	Yes	4000	100	1	NY-455883U	N/a	2016, 2017, 2018, 2019	No
1101	Yes	100	100	1	NY-446647U	N/a	2018, 2019	No
1201	Yes	20	100	0	NY-446648U	N/a	2018, 2019 (none found)	No
1202	Yes	15	100	0	NY-455886U	N/a	2018, 2019 (none found)	No
1301	Yes	1500	100	5	NY-446639U	N/a	2018, 2019	No
1401	Yes	533	100	3	NY-446640U	N/a	2018, 2019	No
1501	Not yet	UNK	0	UNK	NY-446641U	N/a	None	UNK
1601	Yes; no herbicide	10	100	0	NY-446642U	N/a	2017, 2018, 2019 (none found)	No
1602	Yes; no herbicide	10	100	1	NY-446644U	N/a	2017, 2018, 2019	No
1801	Yes; no herbicide	10	100	0	NY-455887U	N/a	2017, 2018, 2019 (none found)	No
1901	Yes	10000	100	1	NY-455888U	N/a	2018, 2019	No
2001	Yes	6000	100	5	NY-455884U	Yes	2019	No
2101	Not yet	UNK	0	UNK	NY-455885U	N/a	None	UNK
2201	Yes	25	100	1	NY-446645U	N/a	2018, 2019	No

Table 1. Density is measured in a scale of 0-5 with 5 indicating the most extensive. Area is estimated, based on Trillium ISM site surveys. Highlighted site names were not surveyed in 2019 by Trillium ISM due to lack of permission or that they were omitted from Trillium's 2019 work plan (04xx). Site number followed by (\*) is a newly discovered and newly named infestation.



# Town of Bedford 2016 Hardy Kiwi Infestations



Parcel boundary source -  
Westchester GIS  
2013 Orthophoto source -  
NYSGIS

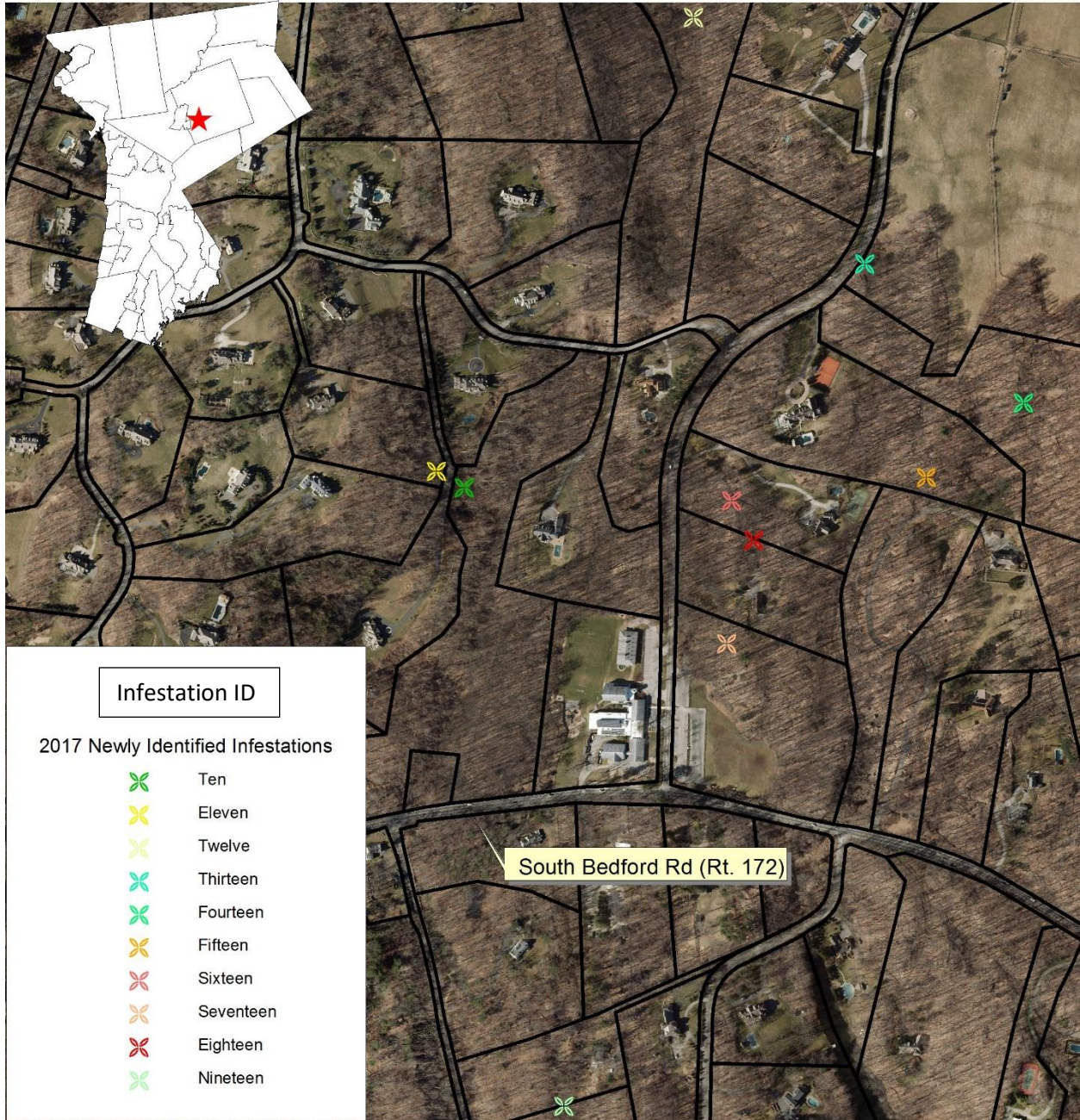
400 0 400 800 Feet

Map Created December 2016 - Copyright Trillium ISM, INC





# Town of Bedford 2017 Hardy Kiwi Survey Results



Parcel boundary source -  
Westchester GIS  
2013 Orthophoto source -  
NYSGIS

700 0 700 1400 Feet

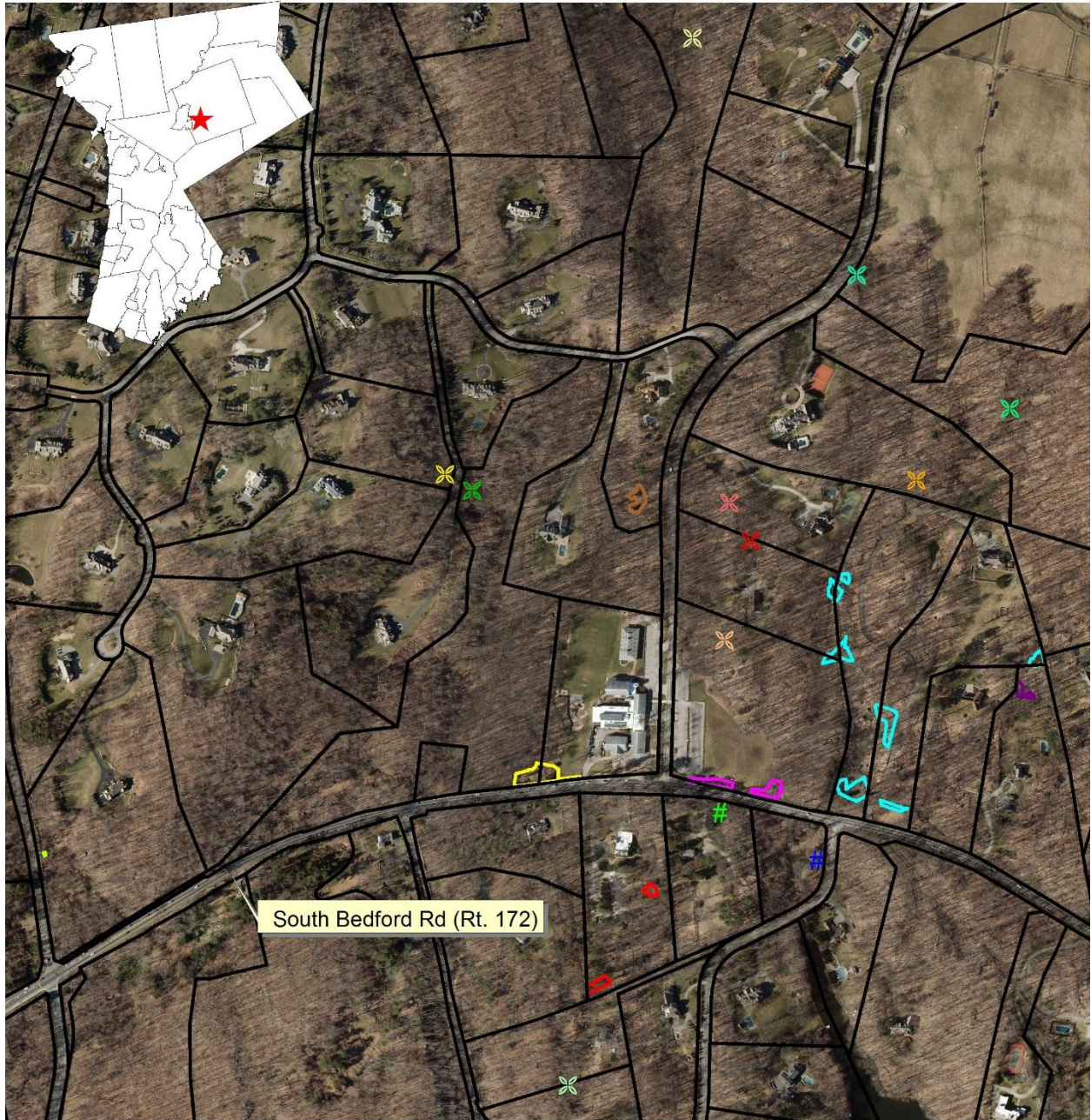


Map Created December 2017 - Copyright Trillium ISM, INC

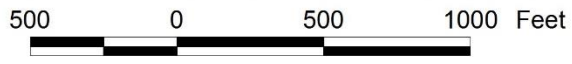


# Town of Bedford

All Known Infestations of Hardy kiwi - 2017



South Bedford Rd (Rt. 172)

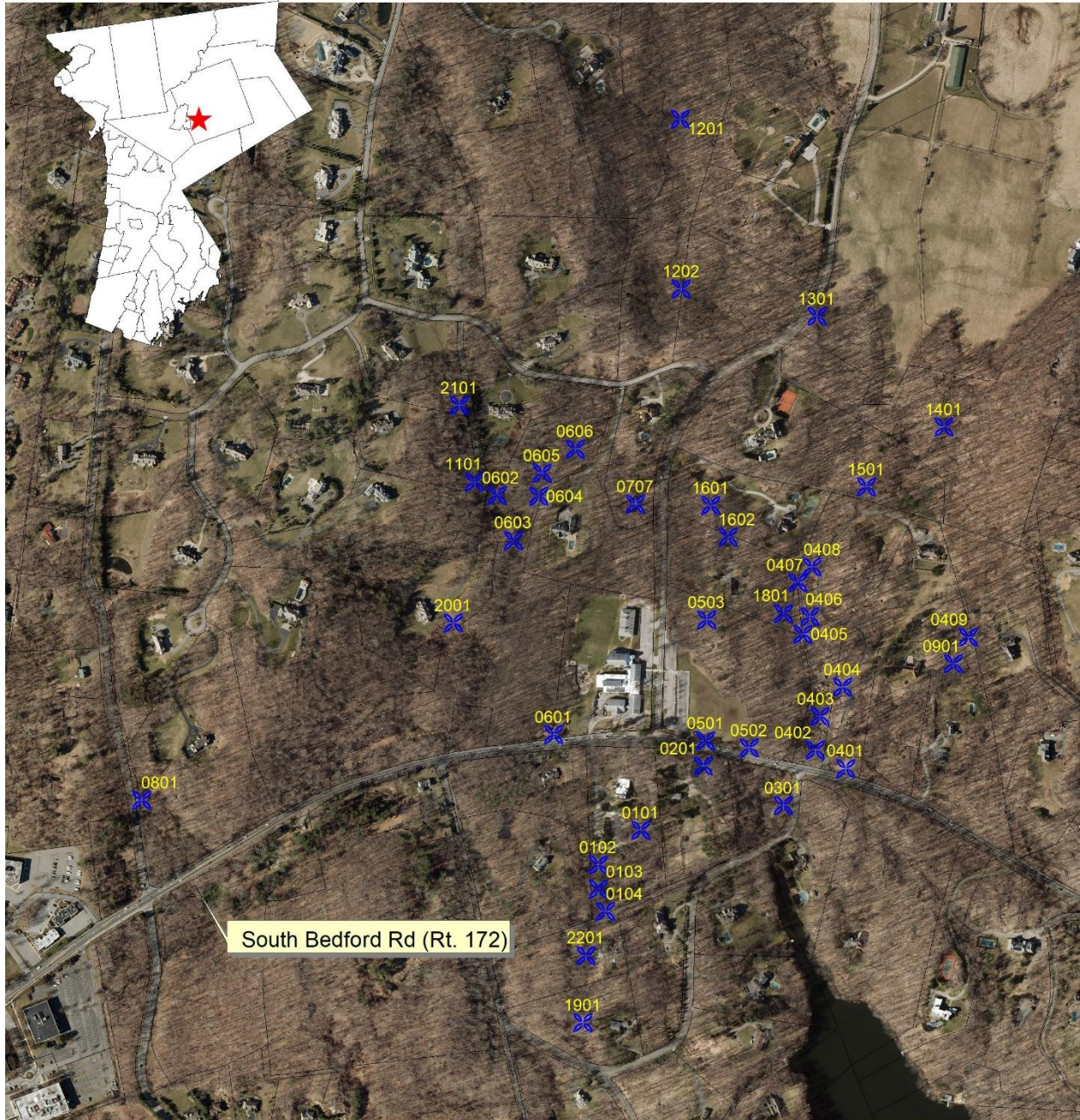


Parcel boundary source - Westchester GIS  
2013 Orthophoto source - NYSGIS

Map Created December 2017 - Copyright Trillium ISM, INC



# Town of Bedford 2018 Hardy Kiwi Infestations



Parcel boundary source -  
Westchester GIS  
2013 Orthophoto source -  
NYSGIS

700 0 700 1400 Feet



Map Created November 2018 - Copyright Trillium ISM, INC



# 2019 Bedford Kiwi Infestations



500 0 500 1000 Feet

Map Created November 2019 - Trillium ISM, INC  
This map is not a survey, for planning purposes only.



1. 2019 map copyright Trillium ISM, Inc.

## Scope of Work and Deliverables

In 2019, Trillium ISM deliverables included implementation of control actions where permission to work was received and of surveys of properties that responded to the Town of Bedford/Bedford Audubon mailing.

Trillium ISM controlled infestations or surveyed for and found absence at all of the sites listed in the above table except for the highlighted properties. Due to continued outreach, new infestations were averted and treated. Photo-documentation of infestations before and after treatments was conducted.

Multiple sites were treated for the first time this year, after receiving approval to access the properties for various control methods. Many property owners allowed the use of herbicide, and where permission was not granted for herbicide use, mechanical / manual control was employed. Three infestation sites were treated this year for the first time: 0504 (newly found and newly named), 0603, and 2001. Regrowth was observed at most but not all locations. Where chemical treatment was employed, whether cut-stem or foliar, Trillium ISM used the herbicide product Rodeo (EPA Reg. No. 62719-324). Infestation sites 0401-0409 cannot employ herbicide use due to landowner restriction. Said landowner agreed to hire a landscaping crew to cut the infestations three times in 2019, however they have not responded to outreach and may or may not have conducted manual treatment in 2019.

June 05 2019 – Introduction of survey technique, Bedford geography, and site locations to crew. Surveys of infestation sites 0501, 0502, 0503, 0707, 0801, 0901, 1201, and 1202. Cut-stem treatment at site 0707 and 0901. Manual treatment at site 0707. A few plants were found at site 0501 but were untreated due to herbicide injury symptoms. No plants were found at the other surveyed sites.

June 06 2019 – Surveys of infestation sites 0101, 0102, 0103, 0104, 0201, 0504, 0601, 1301, 1401, 1601, 1602, and 1801. Foliar treatment at site 1301. Manual treatment at sites 0102 (one seedling), 0504 (including some very large-diameter vines and some “zombies”; it is possible that this particular site had been manually treated by someone in the past), and 1602. No plants were found at sites 0102, 0103, 0201, and 1601. Plants were found, but treatment was not conducted at sites 0101, 0104, 0601, 1301, and 1401.

June 12 2019 – Surveys of infestation sites 1901 and 2201. Cut-stem, foliar, and manual treatments at site 1401. Foliar and manual treatments at site 1901. Cut-stem treatment at site 2201.

June 19 2019 – Survey of Arthur W. Butler Memorial Sanctuary (TNC). No plants found.

August 19 2019 – Surveys of infestation sites 0602, 0603, 0604, 0605, 0606, and 1101. Manual treatment of sites 0101, 0102, 0103, 0601, 0603 (all “zombies”) 0605 (one “zombie”) and 0606 (all “zombies”). Cut-stem treatment at sites 0102, 0103, 0104, 0601, 0602, 0604 (large-diameter vines) 1101, and 1401.

August 24 2019 – Bedford Volunteer Day. Manual treatment at sites 0501 and 0502 by Trillium ISM and four volunteers. In addition, there was a survey from Linden Lane of site 0301; many



plants were noted, some climbing trees, and many fruits. This is the only site where fruit was seen in 2019.

October 24 2019 – Survey of infestation sites 0301 (follow-up) and 2001. At site 2001, large, climbing vines were found in and around a thicket. Cut-stem treatment of the climbers was followed by foliar treatment of the sprawlers. Plant presence was confirmed at site 0301 but the fruit seen earlier in the Summer had either been dropped or consumed.

November 22, 2019 – Survey of Westmoreland Sanctuary. No plants were found.

December 06, 2019 – Mechanical cut-down follow-up treatment of site 2001.

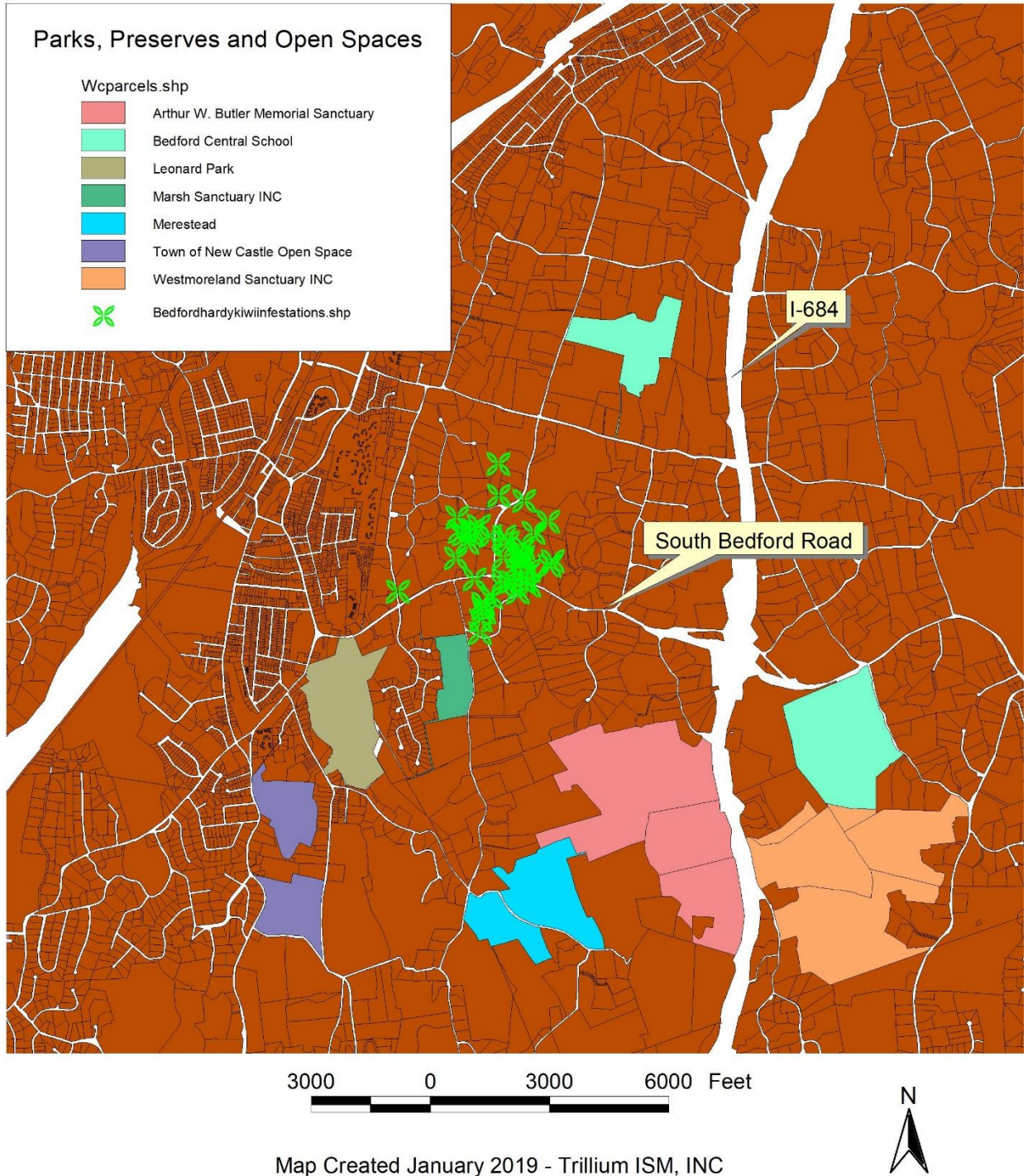
Properties surveyed by other entities: A goal for 2019 was to increase the radius of the area surveyed around the known infestations. To this end, Trillium contacted several landowners and organizations with the hopes of surveying the lands in the map below. Several land managers conducted surveys throughout the year. Hardy kiwi was not found in any of the surveys.

Merestead – On 09/05/2019 by nine Westchester County Parks staff over one hour.

Leonard Park and Marsh Sanctuary – On 02/03/2019 by Mt. Kisco Conservation Advisory Council and Simon Skolnik.

Bedford Central School Properties - UNK

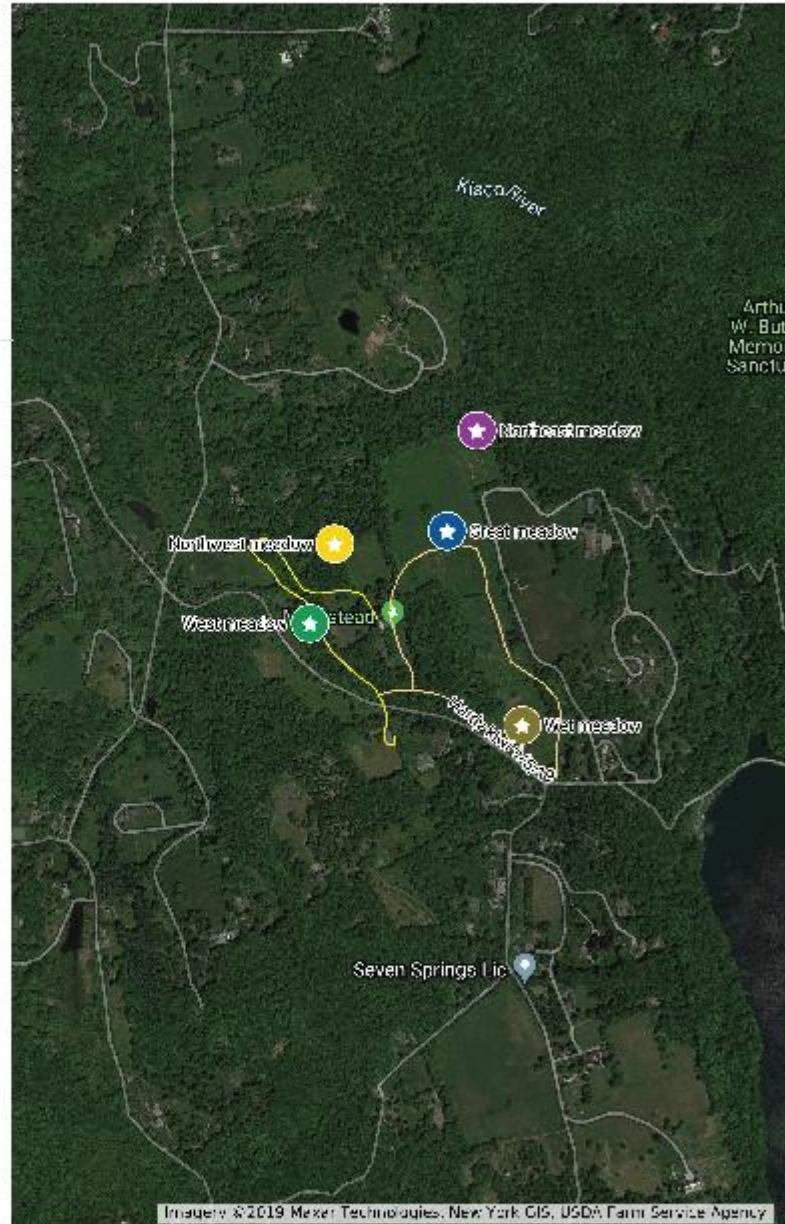
# Suggested Hardy Kiwi Survey Areas



# Merestead meadows Hardy Kiwi Search

Untitled layer

- West meadow
- Northwest meadow
- Northeast meadow
- Great meadow
- Wet meadow
- hardy kiwi search 9/5/19
- Hardy kiwi 9/5/19





### **Control Strategy for all Infestations Where Herbicide *May Be Used*<sup>3</sup>**

Year One (2016) - Cut all Hardy kiwi plants growing into trees and shrubs at ground level and ~5' high from ground and apply herbicide to cut-stump. This cutting should release all trees from the vine mass, leaving the ground layering vine mass for foliar application of herbicide. An initial application of herbicide applied to the layering mass is to be followed up by a second application approximately 4 weeks or more after the initial. The intention being that the follow-up application will contact leaves that were previously obscured by the top layer of the vine mass and will deliver more herbicide to the large root system. The treatment area should be cut down or brush mown during the dormant season.

Year Two (2017) – Foliar application of Rodeo at 2%.

Year Three (2018) – Combination of foliar and cut-stem treatments as appropriate on any re-growth and new growth where found. Window-cutting and proper arrangement of debris to disallow subsequent climbing, to allow for easy crew access/visibility in subsequent years, and to prevent perpetuation of “zombie” growth.

Year Four (2019) – Combination of foliar and cut-stem treatments as appropriate on any re-growth and new growth where found. Window-cutting and proper arrangement of debris to disallow subsequent climbing, to allow for easy crew access/visibility in subsequent years, and to prevent perpetuation of “zombie” growth.

Year Five (2020) and beyond – On-site determination if remaining growth should be controlled by manual removal or by herbicide treatment.

### **Control Strategy for all Infestations Where Herbicide *May Not Be Used***

Year One (2016) – Cut all Hardy kiwi growing into trees and shrubs at ground level and ~5' high from ground. All layering vine masses are cut to the ground with a hand-held or walk-behind brush-cutter twice during the growing season.

Year Two (2017) and Beyond – Assess impact of previous year and adjust cutting as appropriate. On-site determination if remaining growth may be manually removed. Annual monitoring and potentially treatments will be needed in the future, as re-sprouting is likely.

### **Project Summary and Outlook for 2020**

In 2019 all partners met their goals for the project. Outreach was conducted to neighbors immediately adjacent to the infestations and in the surrounding community. Administrative

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<sup>3</sup> All herbicide applications were made using the product Rodeo (EPA Reg. No. 62719-324)

wetland permits were issued by the Town of Bedford for herbicide control of Hardy kiwi at all relevant locations. Control was exercised at all locations where permission was given to proceed with work. Fruiting was observed only at infestation site 1301.

Infestation 0401-0409 has employed cutting for control due to land-owner restriction. Previous experience with cutting of kiwi resulted in significant suppression of re-growth, however cutting at this location in 2017 resulted in vigorous re-growth and it was even able to produce fruit. Therefore, cutting was increased to three times over the season. Given the landowner restrictions and the site conditions (wetland/stream area and steep rocky upland areas), continued cutting is the most reasonable course of action for future years. Ideally cutting will be at least maintained at three visits per year.

Two known infestation sites (0603 and 2001) were newly accessed for treatment in 2019 due to ongoing outreach efforts. These efforts will continue throughout the life of the eradication project. Infestation 1301 will be a high-priority for 2020 outreach due the confirmation in 2019 of fruit and dense climbers.

It is recommended that survey efforts be re-doubled and continue to be conducted around site 04, downstream heading south towards Howland's Lake and north towards the Guard Hill Preserve. This will require outreach to the property owners to the south in-between Linden Lane and Old Wagon Road and to the north in-between West Patent Road and Darlington Road. Furthermore, sanctuaries and preserves in the area should be surveyed for Hardy kiwi, e.g. Arthur W. Butler Memorial Sanctuary (surveyed by Trillium ISM for the first time this year), Westmoreland Sanctuary (also surveyed by Trillium ISM for the first time this year), Merestead, The Marsh Memorial Sanctuary, and Leonard Park to name a few.

In 2020, it is recommended that a mailing be sent out to all property owners living within a mile of the Rippowam Cisca School, and that outreach continues to gain access to potentially large Infestations of Hardy kiwi. 2019 treatment and survey work has confirmed that this species is persisting in the Bedford area, but that control efforts are having a substantial impact on its spread.

Photographs documenting Trillium ISM's 2019 site work (see below for an example) are posted to GoogleDrive; a URL link to the drive has been provided to Linda Rohleder, LHPRISM Coordinator.

**Selected Photos from Site 0504**



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