

**pudding Watershed Inventory Report:  
Survey of Zollner and Bochsler Creeks and a portion of the Pudding River**

*Prepared by Jennifer Meisel, Resource Conservationist  
Marion Soil and Water Conservation District*

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**Introduction:**

The staff at the Marion Soil and Water Conservation District (Marion SWCD), with approval from the Board of Directors, created an Invasive Plant Species (weed) Inventory Program in 2008. The overall goal of this program is to inventory and identify the locations of riparian weed problems in the county so natural resource agencies can focus their education, control and restoration work where it is most needed. 2011 was the fourth year of the inventory, and surveys were conducted in July and August along the banks of Zollner and Bochsler Creeks and a portion of the Pudding River in Marion County. The goal of this survey was to record all the Marion County Weed Board Listed plant species that occurred throughout the riparian sections of the survey area. The survey crew found only 4 species from the weed list along approximately 18 miles of water way. Weed occurrences were spread throughout the entire survey area; however species distributions differed within the survey area. Numerous occurrences of tansy ragwort (*Senecio jacobea*) were found throughout the survey area and a significant infestation of yellow toadflax (*Linaria vulgaris*) was found along the Pudding River. Also found were dense areas of Traveler's Joy (*Clematis vitalba*) along the Pudding River between Zollner Creek and the Little Pudding River, and one location of yellow flag iris (*Iris pseudacorus*) on an upper branch of Zollner Creek. This area is predominantly agricultural land with cultivated fields, many nurseries, and some livestock grazing. Weed locations were almost entirely found on the field edges between the cultivated areas and the riparian vegetation. It is important for these infestations to be controlled and/or managed, as various agricultural practices can aid in the spread and transport of invasive plant species to other locations within the watershed, within Marion County, and beyond. Future plans for this area include providing education and outreach materials to landowners to inform them what weeds were found on their properties; and also assisting landowners with control and restoration plans for properties where invasive plant species were found. A survey of Champoeg and Senecal Creeks in the northern part of Marion County is planned for the summer of 2012. The long term goal of the Weed Inventory Program is to expand surveys to additional watersheds in Marion County including; Mill Creek, Pudding River, Butte Creek, Willamette River, and Chehalem Creek.

**Study Area:**

Surveys were conducted along both banks of Zollner and Bochsler Creeks and a short section of the Pudding River between the Little Pudding River and its confluence with Zollner Creek (Figure 1). These waterways are a part of the Pudding River Watershed, and are located north and east of Mt. Angel in central Marion County. Land ownership within the approximately 30 mile long survey area is all private property. Surveys only took place on properties where verbal or written permission was received from the landowner and in areas adjacent to the creek where vegetation would allow them to walk freely without trampling or cutting vegetation for access. This mostly involved walking along field margins adjacent to heavily vegetated stream borders. Most streamside vegetation consisted of blackberries, reed canary grass or other impenetrable shrubs.

**Methods:**

The survey was conducted by a crew of 1-2 members from a private contracting firm who were trained to identify the 21 weed species on the Marion County Weed Control District Target Weed list (Table 1). Traveler's Joy or Old Man's Beard (*Clematis vitalba*) was added to the target weed list for 2011. All invasive species occurrences and locations were recorded with a Global Positioning System (GPS) unit as a point, line or polygon depending on the size of the infestation. Data were also

recorded by hand on data sheets. Points were used to record an individual plant or a small group of plants up to an area of 15 ft x 15 ft. Infestation size and percent canopy cover of weeds for each point were visually estimated by the surveyors. Infestation size and canopy cover values were used to determine the total area infested for each of the weed species found. Linear infestations were recorded as lines. The GPS units record line length and the surveyors visually estimated line width and percent canopy cover of the weeds. No data was collected as a polygon. Additional information was collected at each weed occurrence regarding the substrate the weed was growing in (i.e.: sand, grass, rock>1", mud, gravel, moss), the site where the weed was growing (stream bank, gravel bar, grassy clearing), and notes about the infestation. The data was collected as  
 Projection: NAD\_1983\_Oregon\_Statewide\_Lambert\_Feet\_Intl, Geographic Coordinate System: GCS\_North\_American\_1983 using Arc Pad Software and a Trimble Juno GPS Unit. All points were then uploaded into a Geographic Information System (GIS) and displayed on maps (Figures 2-7).

**Table 1: Marion County Weed Control District Target Weeds for 2011**

<b>Educate and Control</b>	<b>Immediate Action/Eradicate</b>
<b>False brome</b> ( <i>Brachypodium sylvaticum</i> )	<b>Common gorse</b> ( <i>Ulex europaeus</i> )
<b>Giant, Japanese, and Himalayan or Bohemian knotweeds</b> ( <i>Polygonum</i> sp. or <i>Fallopia</i> sp.)	<b>Diffuse knapweed</b> ( <i>Centaurea diffusa</i> )
<b>Meadow and Spotted knapweeds</b> ( <i>Centaurea pratensis</i> and <i>C. maculosa</i> )	<b>Garlic mustard</b> ( <i>Alliaria petiolata</i> )
<b>Milk thistle</b> ( <i>Silybum marianum</i> )	<b>Giant Hogweed</b> ( <i>Heracleum mantegazzianum</i> )
<b>Puncturevine</b> ( <i>Tribulus terrestris</i> )	<b>Italian thistle</b> ( <i>Carduus pycnocephalus</i> )
<b>Purple loosestrife</b> ( <i>Lythrum salicaria</i> )	<b>Kochia</b> ( <i>Kochia scoparia</i> )
<b>Tansy Ragwort</b> ( <i>Senecio jacobea</i> )	<b>Oblong Spurge</b> ( <i>Euphorbia oblongata</i> )
<b>Yellow flag iris</b> ( <i>Iris pseudacorus</i> )	<b>Paterson's curse</b> ( <i>Echium plantagineum</i> )
<b>Yellow toadflax</b> ( <i>Linaria vulgaris</i> )	<b>Rush skeletonweed</b> ( <i>Chondrilla juncea</i> )
	<b>Yellow starthistle</b> ( <i>Centaurea solstitialis</i> )
	<b>Traveler's Joy/Old Man's Beard</b> ( <i>Clematis vitalba</i> )

**Educate and Control:** These weeds are present in the County, pose a significant threat, and are deemed controllable or eradicable. Some of these weeds are prevalent in large infestations in the County. These large populations should be controlled or suppressed to prevent further spread.

**Immediate Action/Eradicate:** These weeds are not yet known in the County but are likely to move in **OR** have been found only in small, scattered, localized infestations **AND** should be eradicated immediately upon discovery. Notification will occur immediately upon proper identification by MCWCD staff.

The crew began surveys on June 12, 2011 and continued through August 26, 2011, conducting surveys approximately every other week. The surveyors searched for weeds while walking along riparian areas where they had permission to survey approximately 20 ft from the water line. When a weed was

located, data was collected with the GPS unit and on data sheets. All weed location information will be uploaded into the Weedmapper [www.weedmapper.org](http://www.weedmapper.org) program. Weedmapper provides maps showing invasive weed infestations that are viewable at the state or county level. “WeedMapper is designed to facilitate identification, reporting, and verification of noxious weeds in Oregon. Besides providing maps of known infestations of the most serious weed pests, it also contains detailed information on each weed with photographs to assist identification.” (WeedMapper.org website 2009)

In spring of 2011 letters were sent to 74 landowners, who own 124 properties adjacent to the waterways in the proposed study area to inform them of the project and requesting permission to access their land. Landowners were given the choice of three access options for the invasive plant surveys: allow surveyors to access the waterway through their property, allow crews to survey 20 ft above the water line, or no access to property. We received responses from 56 landowners, resulting in a 76.7% return rate. Of these responses, 82.1% of landowners allowed the surveyors to access the waterway and/or survey 20 ft above the water line. There were no publicly owned lands within the survey area. For properties where no permission form was returned, or on those lands where landowners did not want to allow access to the property, the surveyors did not access the property at all. Landowner name and contact information is stored in a separate database from the weed location database for confidentiality. The names of landowners are only available to Marion SWCD staff and partnering agencies on a limited basis.

**Results and Discussion:**

Surveys were conducted along both banks of Zollner and Bochsler Creeks and a short section of the Pudding River between the Little Pudding River and its confluence with Zollner Creek. Much of the area was heavily infested with blackberries or other dense vegetation, which prevented crews from conducting surveys directly adjacent to the water and sometimes prevented them from surveying the entire length of a property where permission was allowed. The total area surveyed encompassed approximately 89 acres along 18.3 stream miles. Within this area, 4 species of weeds have infested approximately 0.586 acres. This acreage includes 23 points (0.114 acre), and 22 line segments (.472 acres). Table 2 includes a list of species found and the number of point and line occurrences. Table 3 includes the area infested by each weed species. Tansy ragwort and Traveler’s Joy cover 93% (0.545 acres) of the total infested area. The 2 other species (Yellow Toadflax and Yellow Flag iris) covers the remaining 7% (0.041 acres/1792 sq. ft.) of the total infested area. *Note: Total infested area is the total area where weeds are present multiplied by the percent canopy cover of the weeds in that area. For example if weeds were found in a 10 ft x 10 ft area with a 10% canopy cover, we would have 100 ft<sup>2</sup> of total area x 10% cover, resulting in 10 ft<sup>2</sup> of area infested.*

**Table 2: List of weed species found and the number of occurrences of each species along Zollner and Bochsler Creeks and a portion of the Pudding River**

<b>Educate and Control</b>	<b>Points</b>	<b>Lines</b>	<b>Immediate action/Eradicate</b>	<b>Points</b>	<b>Lines</b>
<b>Tansy Ragwort</b> <i>Senecio jacobea</i>	51	36	<b>Traveler’s Joy</b> <i>Clematis vitalba</i>	9	12
<b>Yellow Flag Iris</b> <i>Iris pseudochorus</i>	1	0			
<b>Yellow Toadflax</b> <i>Linaria vulgaris</i>	9	4			

**Table 3: Area infested by species (square feet and acres)**

<b>Species</b>	<b>Point area (sq feet)</b>	<b>Line area (sq ft)</b>	<b>Total area (sq ft)</b>	<b>Total area (acres)</b>
<i>Tansy Ragwort</i>	4062.60	6522.18	10584.78	0.242
<i>Traveler's Joy</i>	42.16	13188.86	13231.02	0.303
<i>Yellow Flag Iris</i>	6.75	0	6.75	<.001
<i>Yellow Toadflax</i>	876.80	909.92	1786.72	0.041
<b>Total Area Infested (sq ft)</b>	<b>4988.31</b>	<b>20620.95</b>	<b>20651.95</b>	<b>////////</b>
<b>Total area infested (acres)</b>	<b>0.114</b>	<b>.472</b>	<b>.586</b>	<b>.586</b>

*Location Information:*

Weed occurrences were found throughout the entire survey area; however species distributions differed within the survey area (figures 2-5).

---There were 81 properties surveyed. Invasive plants were found on 44 (54%) of the properties. (figures 1,2)

---There was 1 location of yellow flag iris (2 plants) found on the north-east branch of Zollner Creek near the source (figure 3)

---All occurrences of Traveler's Joy were found along the Pudding River (figure 5)

--Most Traveler's Joy plants were large and taking over trees and surrounding vegetation

---A large infestation of Yellow Toadflax was found along the Pudding River near its confluence with the Little Pudding River (figure 5)

--2 smaller occurrences of yellow toadflax were found during the surveys, one along the Pudding River, and one outside of the riparian area along an access road in a property where we had permission to conduct surveys.

---Tansy Ragwort occurred throughout the entire survey area and was the most prevalent species found, more notably along both branches of Zollner and Bochsler Creeks. Only a few occurrences were found along the Pudding River.

--most occurrences of tansy ragwort were found in the field margins, some populations extended out into pasture areas, but were not included in the survey because they were not within 20 ft of the riparian area

*Prioritization of species and sites:*

Even though we did not find a large number of species during the surveys, it is still important to prioritize the sites and species for treatments. The criteria we considered to prioritize the sites and species for treatment are as follows:

- Size of the infestation
- Location of the infestation within the drainage
- Invasive potential of the weed species
- Ecological impacts of the weed species on native plants and animals
- Proximity of the infestation to valuable resources: agricultural lands, pastures, forests, etc.
- Susceptibility of the invasive species to treatment

With these criteria in mind, the priority species and recommended treatment order are as follows:

1. Yellow Toadflax
2. Traveler's Joy
3. Yellow Flag Iris
4. Tansy Ragwort

An integrated approach (a combination of manual, mechanical, chemical and biological--if available, methods) to controlling these species is recommended. The infestations of Traveler's Joy and Yellow toadflax will most likely require chemical control to eradicate the infestations, as it is the most effective method of control for these species and for larger infestations. The infestation of yellow flag iris is an isolated population of 2 plants, and can most likely be eradicated by digging up the plants and monitoring for any regrowth. The plants were also found well above the water line (during summer flow) so the location is easily accessible and out of the water. The Cinnabar Moth caterpillar was present on many of the tansy ragwort plants that were found during the surveys. However, plants should still be controlled to prevent seeds from forming and dispersing. If one is concerned about keeping the caterpillars around, the best method of control would be to cut off the flowering heads in mid to late summer before they go to seed. We did not find many large or dense infestations of tansy ragwort; most occurrences were scattered plants that are easily controllable, although some populations did extend into pasture areas or properties where we were not allowed access. The occurrences of these species should be treated as soon as possible to prevent further spread.

An important factor we considered in prioritizing our species for control is the location along the stream where these species occur. Those infestations that are located higher up in the drainage should be targeted first, as their seeds may spread downstream with winds and water flow, potentially spreading and affecting areas downstream. Another important factor that should be considered by landowners when choosing whether to control these plants is the spread of invasive plants by farming equipment. Many of the plants were found along field margins and have the potential to be spread by farm equipment and in the field product itself.

*Expanded discussion of tansy ragwort:*

The weather conditions in 2011 were right for the growth of tansy ragwort, in fact the weather conditions have favored tansy ragwort growth for the past few years. According to the Oregon Department of Agriculture, Tansy ragwort has been on the increase since 2005. There are 3 forms of biological control (insects) that are working to control tansy ragwort in the Willamette Valley, however their populations are low right now and need to catch back up to the increasing tansy ragwort population. This may take several years for the insects to naturally start making a difference in the tansy ragwort population. We found evidence of the cinnabar moth on many of the plants during our surveys. Originally these biological controls were released in the 1960's and 1970's and they significantly decreased the plant's populations by the mid 1980's (ODA). With the reduction in the tansy ragwort population, the insect populations also decreased. But with the recent resurgence in the plant populations, we will soon see an increase in the insect population as well. Landowners should continue to control tansy ragwort on their properties, and not assume that the insects will be able to control every single plant. The best time to control tansy ragwort is in spring or early summer before the plants produce flowers and seeds. Landowners should also look to find a source of disturbance that is allowing the plants to grow on their property. Heavy grazing pressure and disturbed soil are the most common reasons why invasive plants become established in a particular area. Encouraging pasture or native grasses will create competition for the weed species and can reduce the chance of weeds becoming established. Reducing grazing pressure will allow the growth of pasture grasses or other desirable plants that can compete with the weeds for resources.

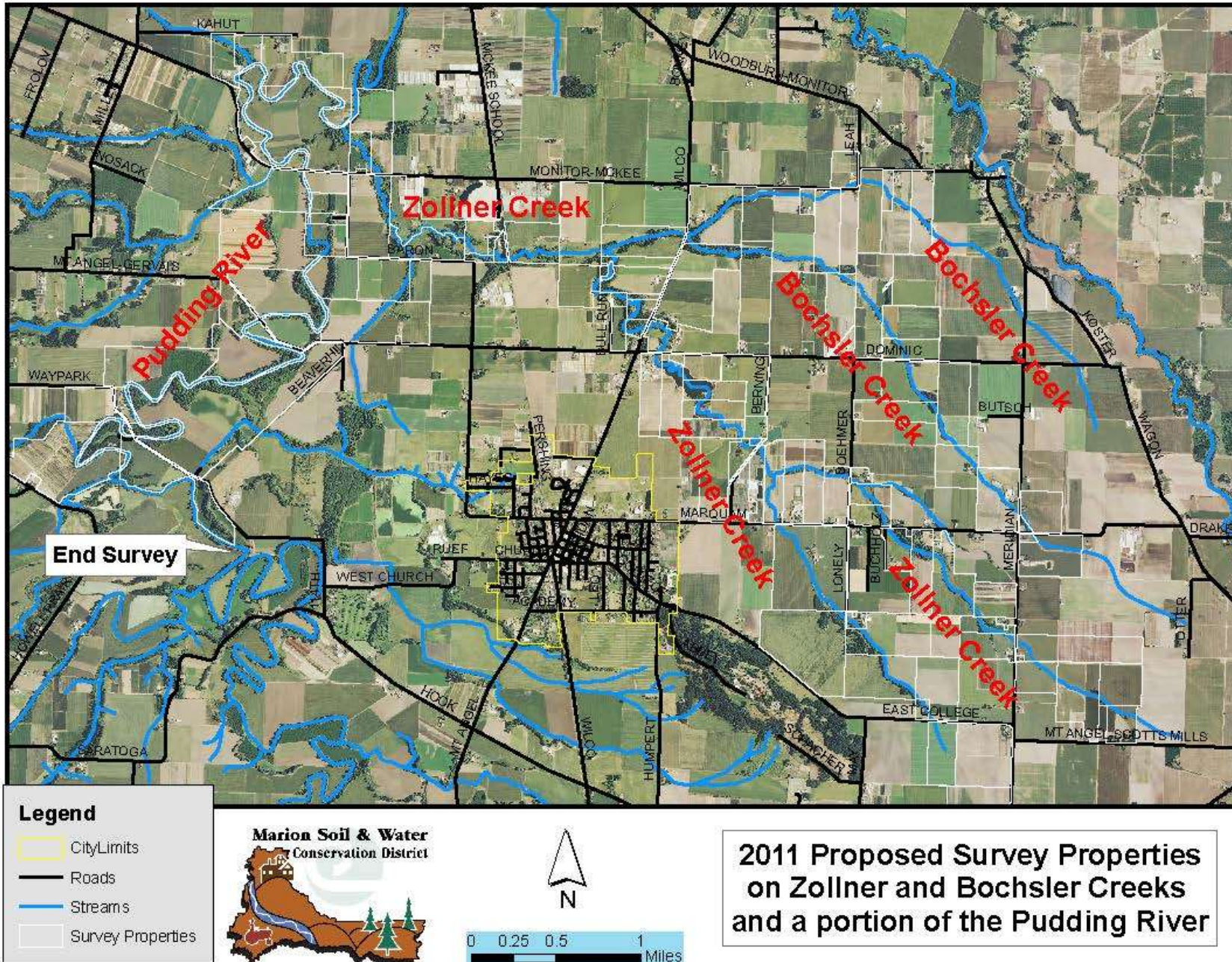
**Conclusion and Future plans:**

This survey was conducted to generate baseline information of weed locations along the Zollner and Bochsler Creeks and a small portion of the Pudding River between the Little Pudding River and Zollner Creek. The overall goal of the Weed Inventory Program is to inventory and identify the locations of riparian weed problems in the county so natural resource agencies can focus their education, control and restoration work where it is most needed. This inventory by the Marion SWCD concludes the fourth year in this multi-year program. These surveys also complemented current efforts by the NRCS (Natural Resource Conservation Service), Oregon State University IPPC (Integrated Plant Protection Center), and the Marion SWCD in the Zollner Creek area that are focused on improving water quality through restoration and Integrated Pest Management practices.

In 2012 we plan to conduct surveys along Champoeg and Senecal Creeks. We will send out a mailing to all private landowners with property along these creeks requesting permission to access their lands for the survey work. Long term plans call for conducting surveys and creating control and restoration plans for the Mill Creek watershed, the Upper Pudding River, the Pudding River, Butte Creek, the Willamette River and Chehalem Creek.

Although the Marion SWCD functions only within the boundaries of Marion County, it is important that we work with multiple partners to prevent the spread of invasive plant species to areas that span multiple jurisdictions. Marion SWCD will work with agency partners to provide technical assistance and advice to private and public landowners regarding the education, control, and restoration of weed occurrences identified during these surveys. Grant programs and/or technical assistance are available to private landowners through the Marion SWCD, Oregon Department of Agriculture (ODA), Oregon Watershed Enhancement Board (OWEB), Marion County Weed Board, Oregon Department of Fish and Wildlife (ODFW), and the US Fish and Wildlife Service (USFWS).

Figure 1: Survey area and proposed survey properties along Zollner and Bochsler Creeks and a portion of the Pudding River, Marion County



**Figure 2: Invasive species occurrences on along Zollner and Bochsler Creeks and a portion of the Pudding River, Marion County**

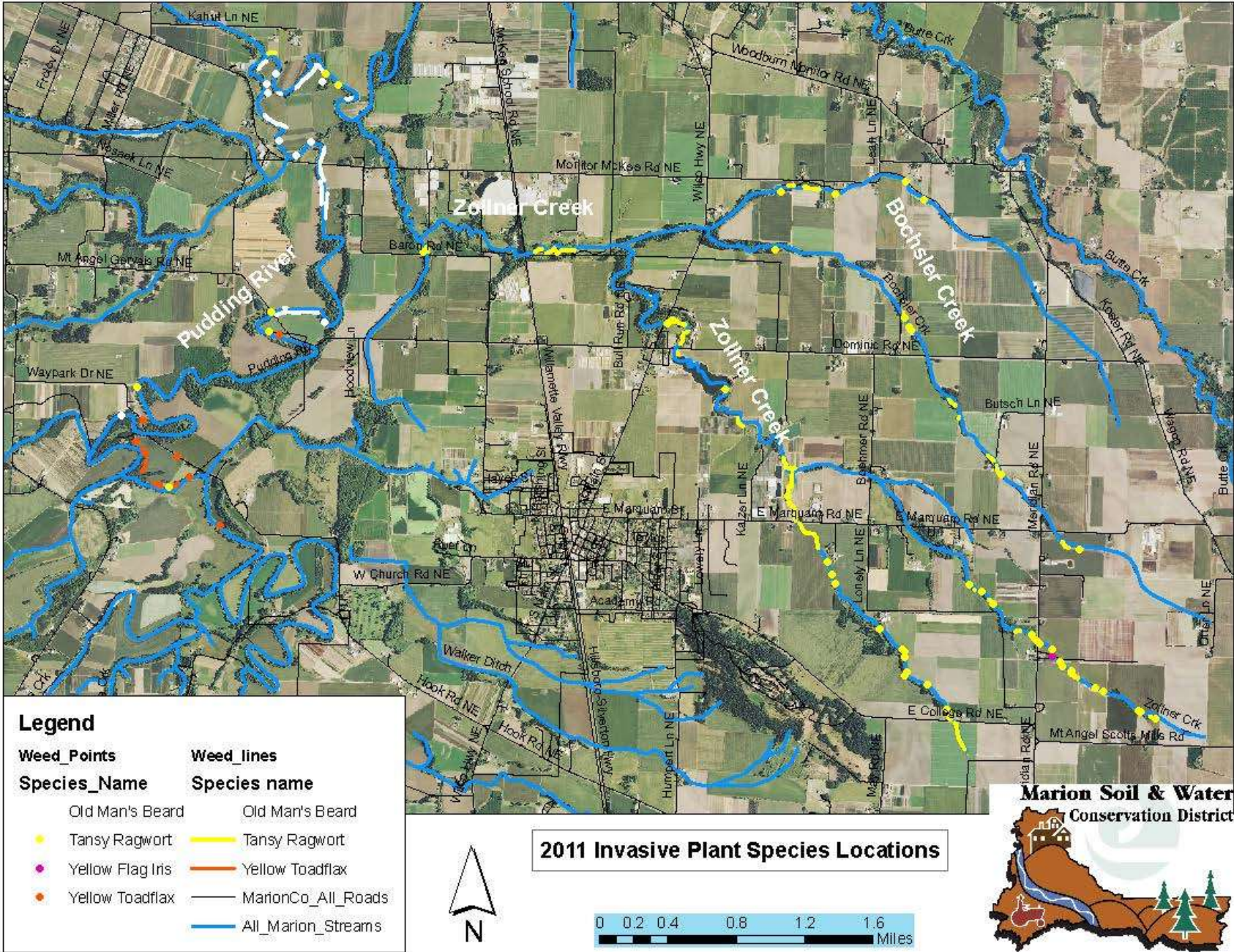


Figure 3: Invasive species occurrences along upper Zollner and Bochsler Creeks, Marion County

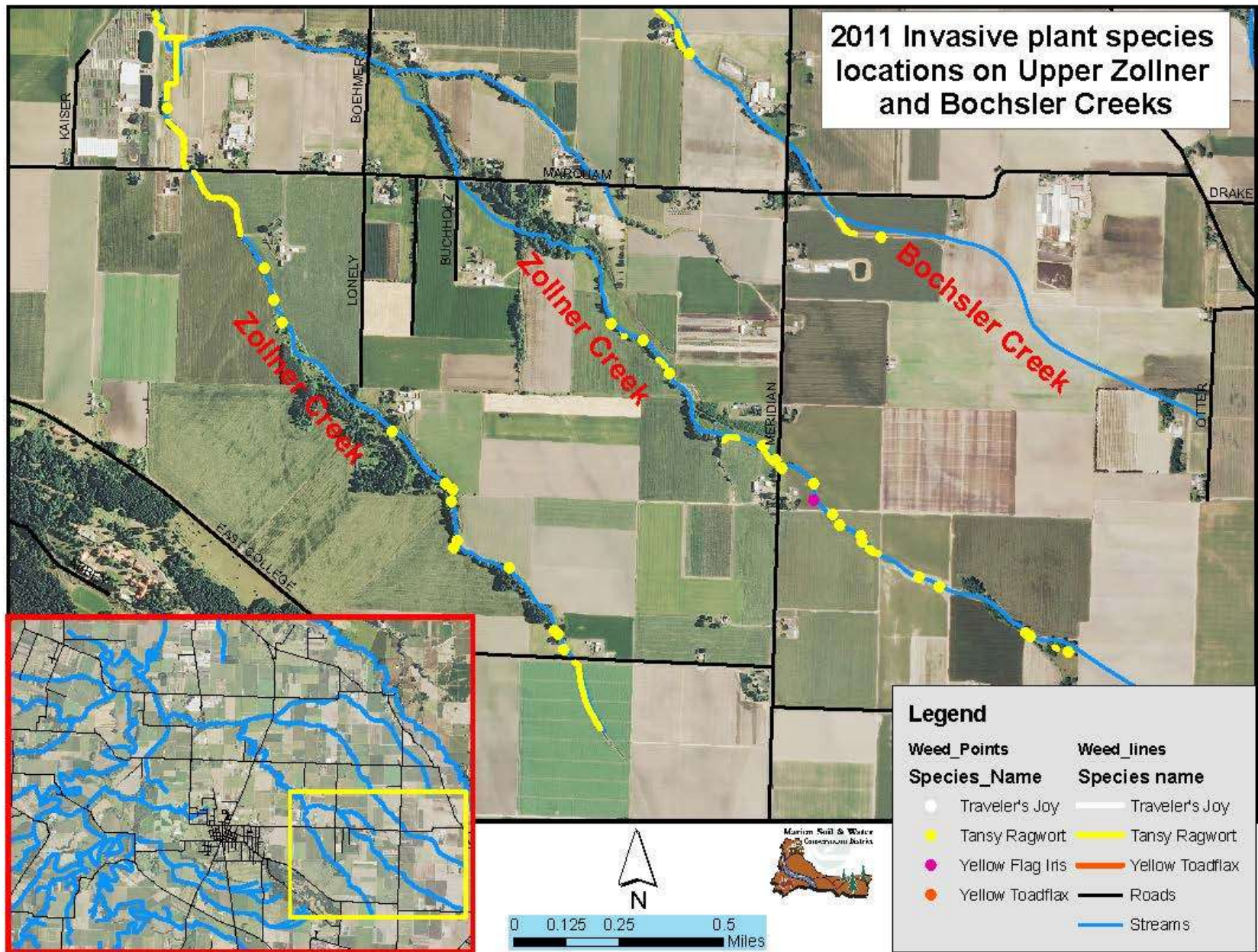


Figure 4: Invasive species occurrences along Zollner and Bochsler Creeks, Marion County

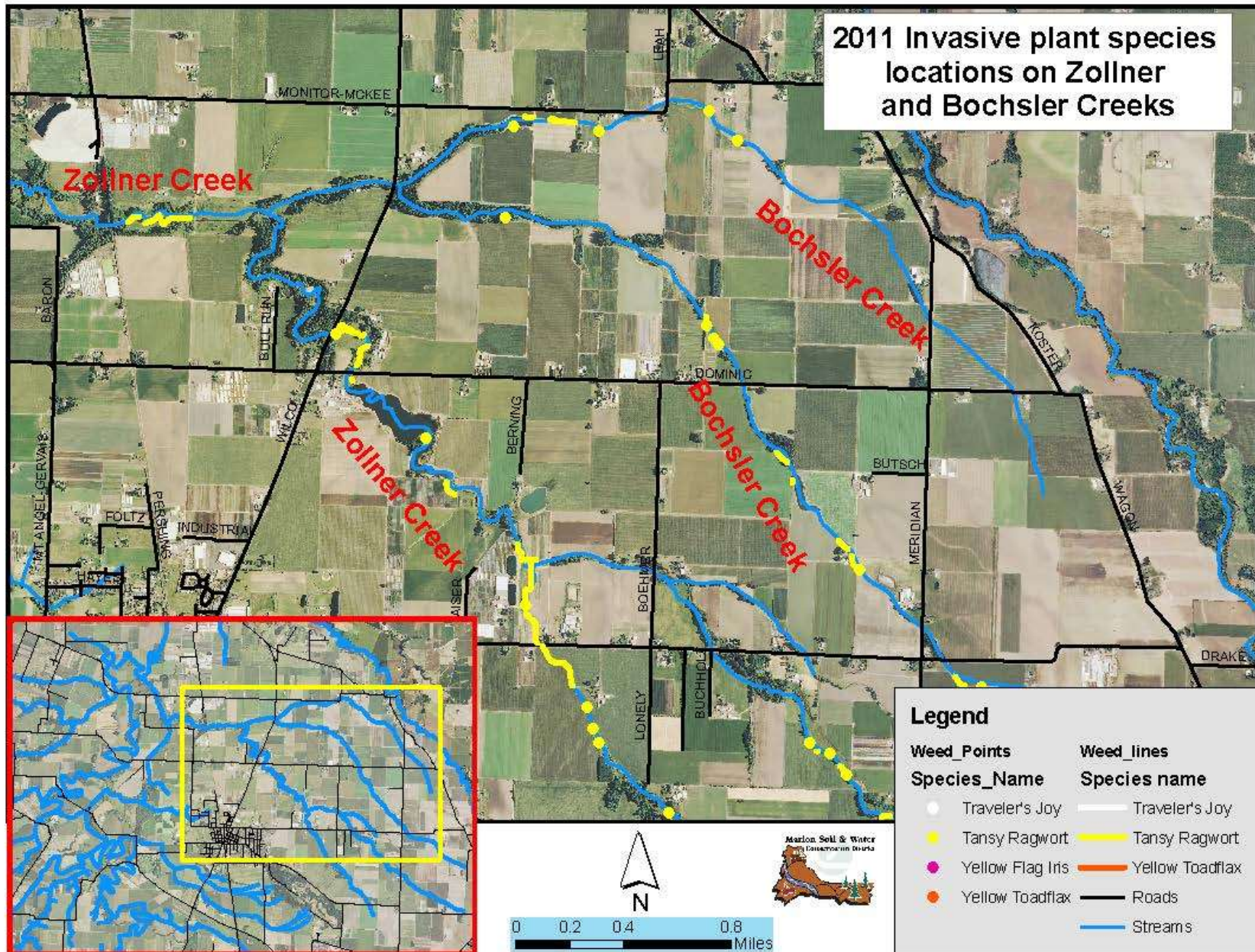
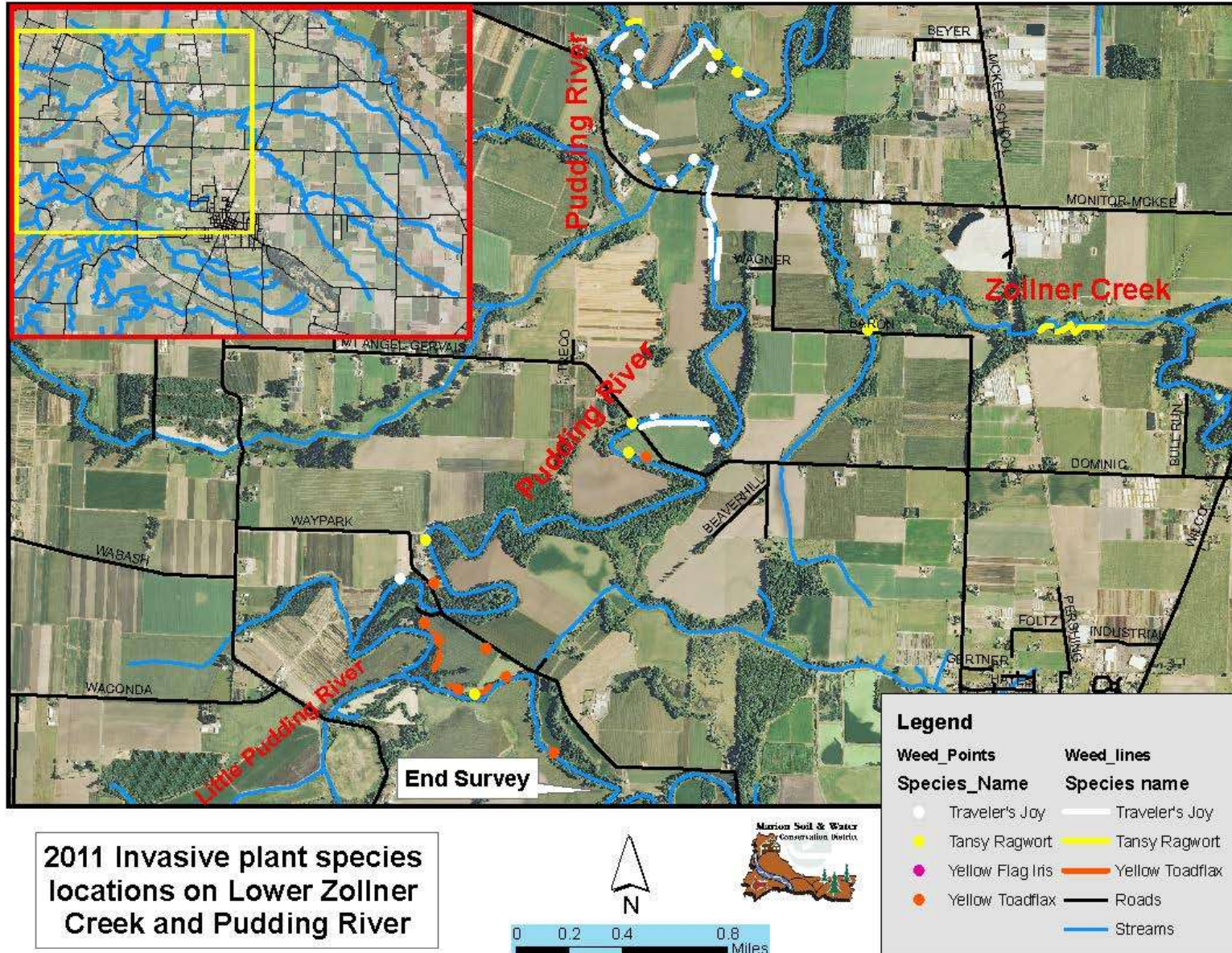


Figure 5: Invasive species occurrences along Lower Zollner Creek and a portion of the Pudding River, Marion County



## Photos from 2011 Invasive Species Surveys



Tansy Ragwort flowering



Numerous Tansy Ragwort rosettes



Dense Vegetation along stream bank

Tansy ragwort infestation spreading into field





Dense Traveler's Joy



Traveler's Joy growing into tree canopy



Yellow toadflax



Yellow toadflax