

WHITE BRYONY CONTROL-DEMONSTRATION PROJECT

Restoring Anadromous Fish in the Lapwai Creek Watershed



**Contract Year 2005
Project Results**

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NEZ PERCE SOIL AND WATER CONSERVATION DISTRICT
White Bryony Control – Demonstration Project

Project Sponsor:



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Mountain Stake Province
Clearwater River Sub basin
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Table of Contents

Introduction	4	APPENDICES	
Project Objectives	4	1. Photographs	26
Biology	4		
Methods	6	FIGURES	
Data Summary and Results	23	1. White Bryony Growing over Shrubs	4
Project Costs	23	2. White Bryony Demonstration Project	
Discussion	24	Location Map	5
Acknowledgements	25	3. Site Detail Map	6
References	25	4. Site Map A	20
		5. Site Map B	21
		6. Site Map C	22
		7. Site Overview Photograph	25
		8. RU5 vines from root	25
		9. Treatment C24 showing dead vine	25
		10. Treatment E24	25
		11. Treatment B14 showing dead vines	25
		12. Treatment B34	25
		13. Treatment B14 showing dead vines	27
		14. Treatment A18 Severed Root	27
		TABLES	
		1. Demonstration Project Treatments	6
		2. Physical Site Data	7
		3. Treatment Completed	8
		4. Project Costs	23

Introduction

The *Restoring Anadromous Fish Habitat in the Lapwai Creek Watershed* is a multi-phase project to enhance steelhead trout in the Lapwai Creek watershed by improving salmonid spawning and rearing habitat. Habitat is limited by extreme high runoff events, low summer flows, high water temperatures, poor instream cover, spawning gravel siltation, and sediment, nutrient and bacteria loading.

Funded by the Bonneville Power Administration (BPA) as part of the Northwest Power Planning Council's Fish and Wildlife Program, the project assists in mitigating damage to steelhead runs caused by the Columbia River hydroelectric dams. The project is sponsored by the Nez Perce Soil and Water Conservation District. Target fish species include steelhead trout (*Oncorhynchus mykiss*). Steelhead trout within the Snake River Basin were listed in 1997 as threatened under the Endangered Species Act.

A stream inventory conducted in 2003 indicated a lack of riparian vegetation was contributing to the habitat limitations. These limitations include poor instream cover (from lack of woody debris), high water temperatures (lack of vegetation to provide shade), low summer flows (low organic matter in banks to store water) and sediment (lack of root mass in streambanks to prevent erosion). Weeds are a major concern in the ability to establish riparian vegetation. One of the weeds identified is white bryony (*Bryonia alba* L.) shown in Figure 1. The extent of white bryony in the watershed is unknown. However, the control of this weed is necessary prior to restoration activities.

The demonstration project was developed to identify treatment methods and educate landowners. The treatment site is located within the Lapwai Creek watershed in Nez Perce County, the site is in bottomland area with intermittent water (Figure 2). Adjacent land uses are cropland.

Project Objectives

- 1) Evaluate chemical and mechanical control methods for white bryony.
- 2) Demonstrate potential methods for control.
- 3) Increase landowner awareness and education level regarding white bryony.

Biology



White bryony (*Bryonia alba* L.) is a white flowering perennial vine. This non-native perennial produces round berries and has 60-150 feet long vines extending from a large tap root. The vine dies back to the root each winter. The plant is poisonous as both roots and berries can cause illness and/or death in livestock and humans. The plant is a native to Europe and is found in central Europe, Denmark and Sweden. White bryony spreads by seed which are disseminated by birds. The plant climbs trees and fence posts and can form dense mats along the ground surface.

Figure 1. White Bryony Growing Over Shrubs

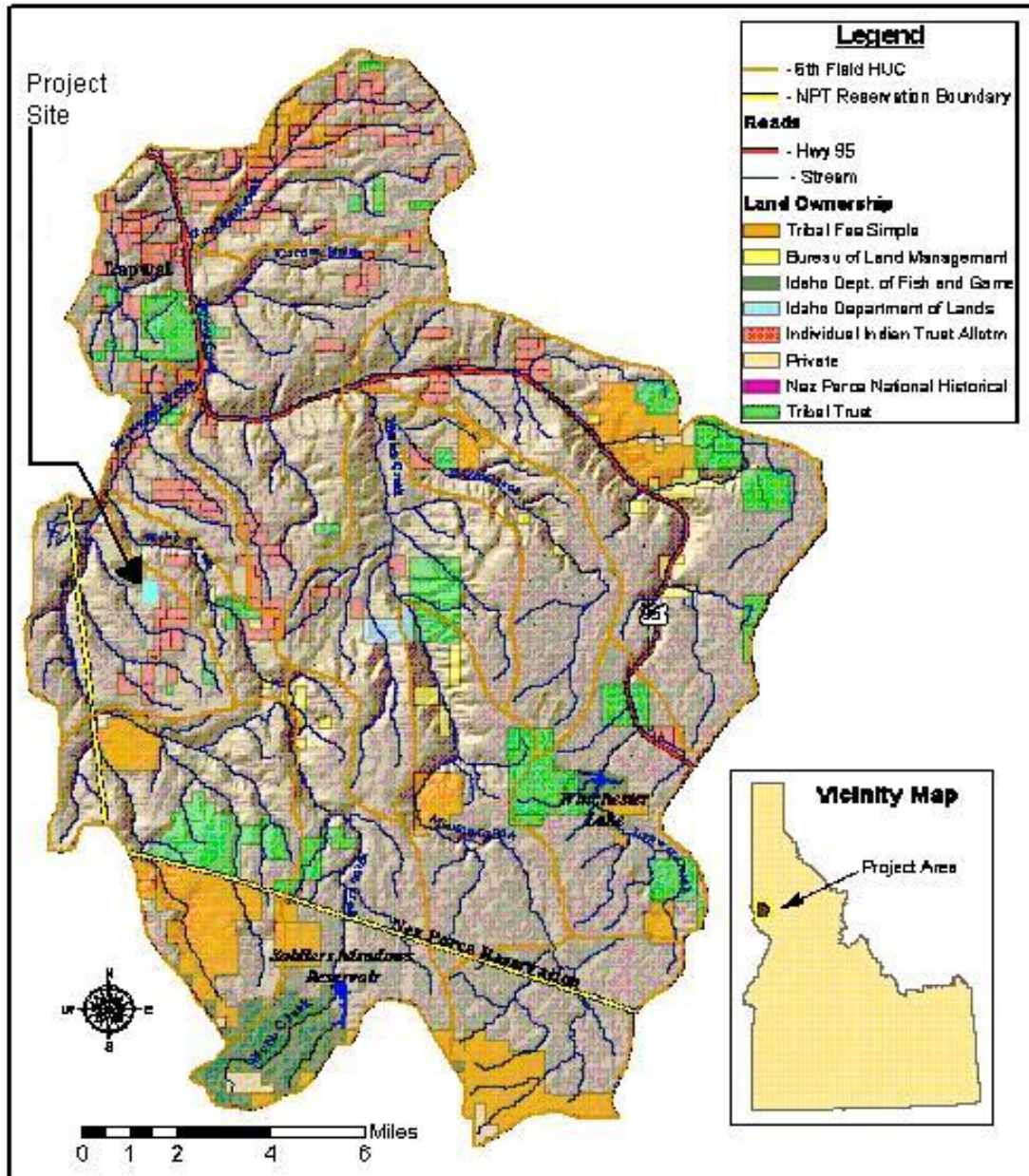


Figure 2. White Bryony Demonstration Project Site Location

White bryony can climb other plants by as much as six inches per day. Plant leaves prohibit light from reaching tree leaves and captures winter snow. The snow weight breaks down the shrub branches.

A literature review was completed prior to selecting control methods for the demonstration. The major control types identified are chemical and mechanical means.

Mechanical treatments include digging or severing the root and cutting the vines. Digging the tubers from ground with a shovel can occur during anytime of the year. Damaging the root by severing it three to four inches below the crown prevents re-sprouting.

Chemical treatments include wiping and foliar methods. The type of chemical used varies and is related to the site and specific chemical label restrictions. The most commonly mentioned herbicides are glyphosate 2,4-D, dicamba and picloram. Foliar spraying needs to occur at a time of year when the chemical will be translocated to the root. Wiping or pouring chemical onto an exposed root is another method found in the literature.

Methods

Site Selection- Site selection was based on ease of access, sufficient stand size to demonstrate all treatments, and a representative site in the watershed. The selected site is located on private land. Figure 3 illustrates the specific site area. The site is located adjacent to cropland and along a field access road.

Treatments - Five treatments were selected based upon findings in available literature. Table 1 lists project treatments. The treatments include a control (no treatment), 2,4-D applied in a wound on the root, glyphosate applied in a wound on the root, glyphosate sprayed onto leaves, and severing of the root.

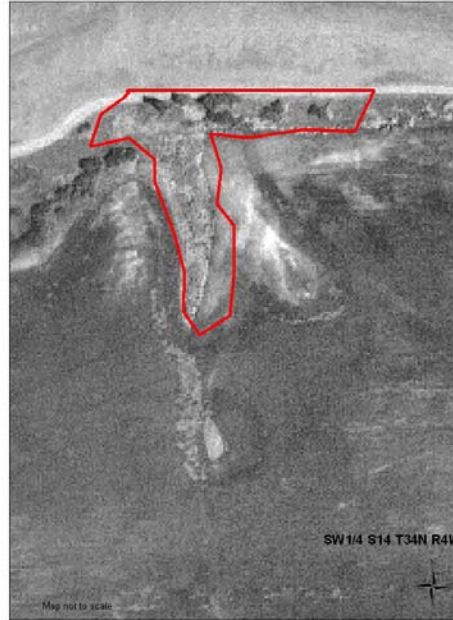


Figure 3. Site Detail Map

Table 1. Demonstration Project Treatments

Treatment #	Treatment Name	Description
A	Root Sever	Using a #2 shovel, roots were severed 3-4 inches below crown or removed entirely. Thirty plants were treated, marked with an orange stake and with the letter "A".
B	Foliar	Glyphosate was applied to plant leaves using a hand sprayer. Vines were pulled from hawthorn trees and sprayed. Thirty-five plants were treated, marked with pink stakes and the letter "B".
C	Drilled and glyphosate	Three quarter inch holes were drilled in plant roots using a battery powered drill. Glyphosate was injected into the hole. Thirty-four treated plants were marked with the letter "C"
D	Drilled and 2,4-D	Three quarter inch holes were drilled in plant roots using a battery powered drill. 2,4-D was injected into the hole. Thirty-five treated plants were marked with green stakes and the letter "D".
E	Control	Thirty five plants were marked as control. No treatment was completed on these plants. Each plant was marked with a stake

		and the letter “E”.
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Plot Layout- Due to the variability in white bryony plant locations, treatments were randomly placed at the site. The goal was to treat thirty-five individual plants per treatment type. Each treatment type was color coded and each individual plant was numbered within the treatment. Figures 4, 5 and 6 show specific treatment locations.

Data collection- Each plant was monitored on a monthly basis to record plant necrosis, plant growth, and survivability. The monitoring began July 2004 and continued through October 2004. Table 2 lists the physical site data for the project area. Table 3 lists the plant data collected in 2004.

Table 2. Physical Site Data

Soil Type	Total Precipitation from 7/1/04 to 7/1/05	Elevation (feet)
Lapwai – Bridgewater Complex (silt loam)	13.3 inches	2,400

Table 3. Treatment Completed.

Stake #	Date Treated	7/1/2004		8/1/2004		9/1/2004		10/1/2004		6/2005
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	
A1	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A2	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A3	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A4	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A5	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A6	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A7	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A8	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A9	6/21/2004	root exposed, vines attached	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A10	6/21/2004	root exposed, vines attached	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A11	6/21/2004	root exposed, vines attached	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
A12	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A13	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A14	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A15	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A16	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A17	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A18	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A19	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A20	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A21	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A22	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
A23	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A24	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A25	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A26	6/21/2004	root exposed, vines attached	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A27	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A28	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A29	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
A30	6/21/2004	root exposed	Poor	Vines are showing signs of stress	Dead		Dead		Dead	Dead
C1	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Poor		Dead		Dead	Dead
C2	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C3	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C4	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C5	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
C6	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C7	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C8	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C9	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C10	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C11	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C12	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C13	6/28/2004	root exposed, no vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C14	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C15	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C16	6/28/2004	root exposed, no vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C17	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C18	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C19	6/28/2004	root exposed, no vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C20	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C21	6/28/2004	root exposed, no vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C22	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Missing

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
C23	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Alive
C24	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C25	6/28/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Missing
C26	6/28/2004	root exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C27	6/28/2004	root exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
C28	6/28/2004	root exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried	Dead	
C29	6/28/2004	root exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried	Dead	
C30	6/28/2004	root exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried	Dead	
C31	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
C32	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
C33	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
C34	6/28/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D1	6/29/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D2	6/29/2004	root exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D3	6/29/2004	roots exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D4	6/29/2004	roots exposed, vines attached	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D5	6/29/2004	root exposed, no vines	Good	Some yellowing of leaves	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D6	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
D7	6/29/2004	roots exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D8	6/29/2004	roots exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D9	6/29/2004	root exposed, no vines	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D10	6/29/2004	roots exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D11	6/29/2004	root exposed vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D12	6/29/2004	root exposed vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D13	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D14	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D15	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Missing
D16	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Missing
D17	6/29/2004	root exposed, no vines	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D18	6/29/2004	root exposed, no vines	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D19	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D20	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Missing
D21	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Missing
D22	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	6/2005
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	
D23	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D24	6/29/2004	root exposed, no vines	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D25	6/29/2004	root exposed, vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D26	6/29/2004	root exposed, vines attached, near roadside	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D27	6/29/2004	vines attached, near roadside	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D28	6/29/2004	small vines attached, near roadside	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D29	6/29/2004	vines attached, near road	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D30	6/29/2004	vines attached along roadside	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D31	6/29/2004	vines attached, near walking path	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Poor	Plant leaves are 50% dried	Dead	Dead
D32	6/29/2004	vines attached, roadside in heavy tree area	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Alive
D33	6/29/2004	no vines attached by creek	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	6/2005
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	
D34	6/29/2004	vines attached, by creek in bushy area	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
D35	6/29/2004	roots exposed, no vines attached	Good	No sign of plant stress	Fair	Yellowing of leaves evident	Dead	Plant leaves are dried		Dead
E1	6/29/2004	Control	Good		Good		Good		Good	Alive
E2	6/29/2004	Control	Good		Good		Good		Good	Alive
E3	6/29/2004	Control	Good		Good		Good		Good	Alive
E4	6/29/2004	Control	Good		Good		Good		Good	Alive
E5	6/29/2004	Control	Good		Good		Good		Good	Alive
E6	6/29/2004	Control	Good		Good		Good		Good	Alive
E7	6/29/2004	Control	Good		Good		Good		Good	Missing
E8	6/29/2004	Control	Good		Good		Good		Good	Alive
E9	6/29/2004	Control	Good		Good		Good		Good	Alive
E10	6/29/2004	Control	Good		Good		Good		Good	Alive
E11	6/29/2004	Control	Good		Good		Good		Good	Alive
E12	6/29/2004	Control	Good		Good		Good		Good	Alive
E13	6/29/2004	Control	Good		Good		Good		Good	Missing
E14	6/29/2004	Control	Good		Good		Good		Good	Alive
E15	6/29/2004	Control	Good		Good		Good		Good	Alive
E16	6/29/2004	Control	Good		Good		Good		Good	Alive
E17	6/29/2004	Control	Good		Good		Good		Good	Alive
E18	6/29/2004	Control	Good		Good		Good		Good	Alive
E19	6/29/2004	Control	Good		Good		Good		Good	Alive
E20	6/29/2004	Control	Good		Good		Good		Good	Alive
E21	6/29/2004	Control	Good		Good		Good		Good	Alive
E22	6/29/2004	Control	Good		Good		Good		Good	Alive
E23	6/29/2004	Control	Good		Good		Good		Good	Alive
E24	6/29/2004	Control	Good		Good		Good		Good	Alive
E25	6/29/2004	Control	Good		Good		Good		Good	Alive
E26	6/29/2004	Control	Good		Good		Good		Good	Alive
E27	6/29/2004	Control	Good		Good		Good		Good	Dead
E28	6/29/2004	Control	Good		Good		Good		Good	Alive

Stake #	Date Treated	Comments	7/1/2004 Plant vigor	Comments	8/1/2004 Plant vigor	Comments	9/1/2004 Plant vigor	Comments	10/1/2004 Plant vigor	6/2005
E29	6/29/2004	Control	Good		Good		Good		Good	Dead
E30	6/29/2004	Control	Good		Good		Good		Good	Dead
E31	6/29/2004	Control	Good		Good		Good		Good	Dead
E32	6/29/2004	Control	Good		Good		Good		Good	Dead
E33	6/29/2004	Control	Good		Good		Good		Good	Dead
E34	6/29/2004	Control	Good		Good		Good		Good	Dead
E35	6/29/2004	Control	Good		Good		Good		Good	Dead
B1	6/28/2004	Near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B2	6/28/2004	Near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B3	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B4	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B5	6/28/2004	near weeds/ dead tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B6	6/28/2004	near weeds/ dead tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B7	6/28/2004	near dead tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B8	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B9	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Missing

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
B10	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B11	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B12	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B13	6/28/2004		Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Missing
B14	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B15	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B16	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B17	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B18	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B19	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B20	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B21	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead

Stake #	Date Treated		7/1/2004 Plant vigor		8/1/2004 Plant vigor		9/1/2004 Plant vigor		10/1/2004 Plant vigor	6/2005
		Comments		Comments		Comments		Comments		
B22	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B23	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B24	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B25	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B26	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B27	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B28	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B29	6/28/2004	near tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B30	6/28/2004	near weeds	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B31	6/28/2004	near dead tree	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B32	6/28/2004	near road	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Missing
B33	6/28/2004	near road	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead

Stake #	Date Treated		7/1/2004		8/1/2004		9/1/2004		10/1/2004	
		Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	Comments	Plant vigor	6/2005
B34	6/28/2004	near road	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead
B35	6/28/2004	near road	Fair	Leaves starting to show yellow color	Poor	Leaves dried	Dead		Dead	Dead

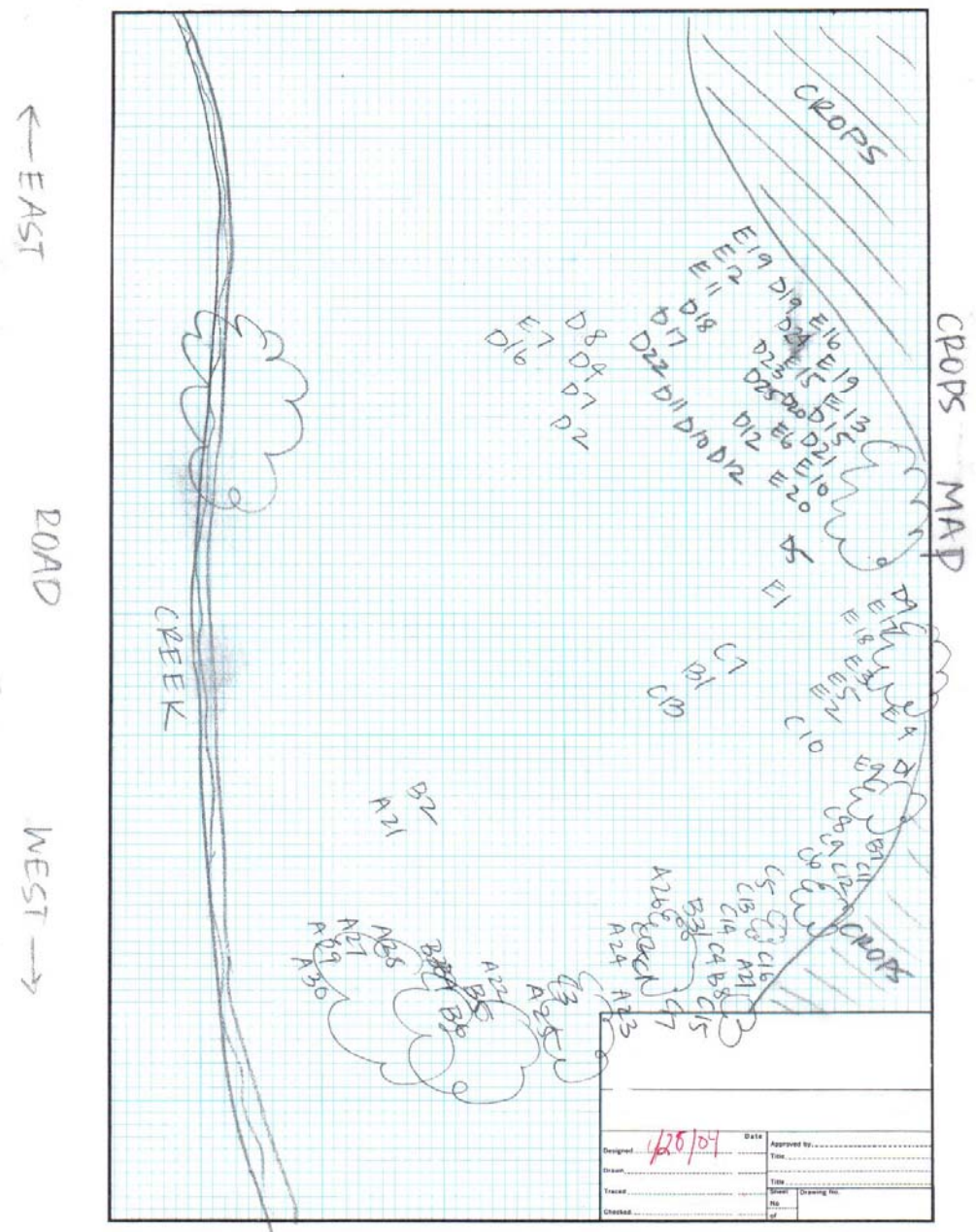


Figure 4. Site Map A

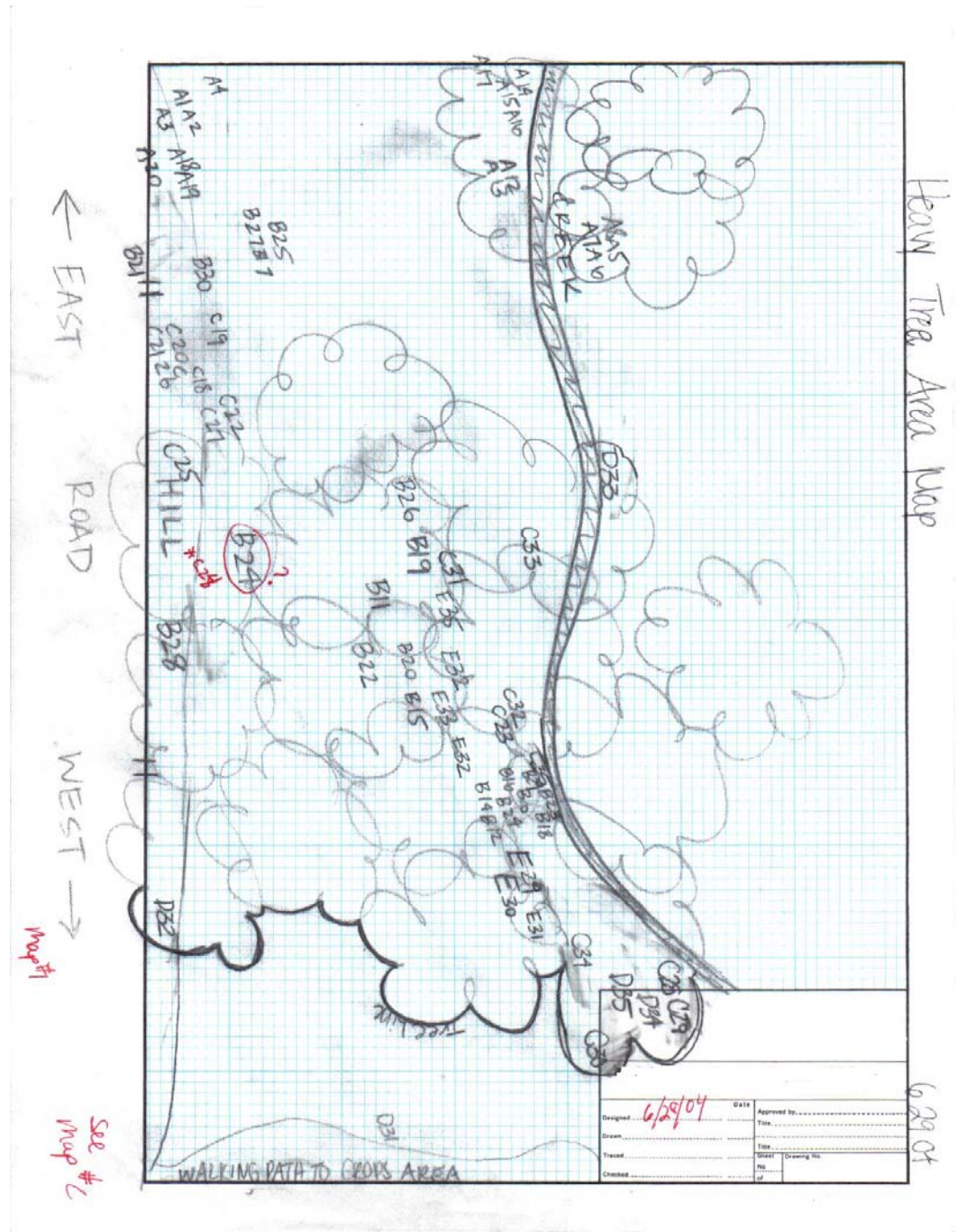


Figure 5. Site Map B

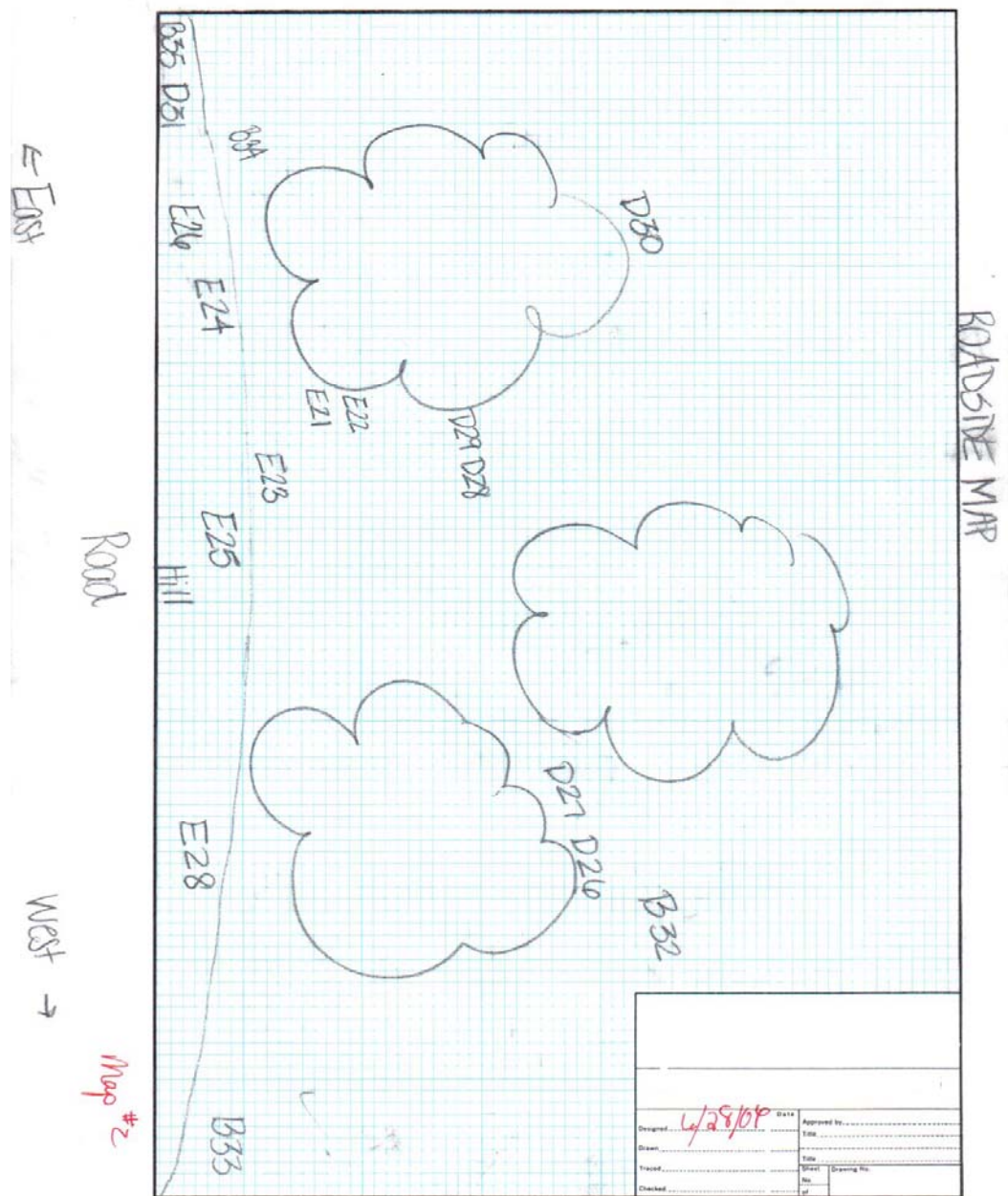


Figure 6. Site Map C

Data Summary and Results

The effectiveness of each treatment was determined by visual examination in June of 2005. Results are summarized in Table 4.

Table 4. Treatment Results

Treatment Type	Alive	Dead	Missing Data	Percent Dead	Stake Numbers	Date Treated
Severed Root	0	29	0	100%	A1-29	6/21/2004
Drilled and glyphosate	1	31	2	97%	C1-34	6/28/2004
Drilled and 2,4-D	2	29	4	94%	D1-35	6/29/2004
Control	24	9	2	27%	E1-35	6/29/2004
Foliar	0	33	2	100%	B1-35	6/28/2004

Treatment A- Treatment was completed on 6/21/04. All plants were showing poor vigor on 7/1/04. All plants were dead on 8/1/04. There was no change in plant growth in 2005. 100% of plants were deceased on 6/21/2005.

Treatment B- Treatment was completed on 6/28/04. Leaves were starting to yellow on 7/1/04. All plants were dead by 9/1/04. There was no change in plant growth in 2005.

Treatment C- Treatment was completed on 6/28/04. All plants showed good vigor and no indicator of plants' stress as of 7/1/04. At the 8/1/04 site review yellowing of plant leaves was evident. All plants appeared dead on 8/1/04. All but one plant was dead in 2005.

Treatment D- Treatment was completed on 6/29/04. No signs of plant stress were evident on 7/1/04. On 8/1/04 yellowing of leaves was evident. On 9/1/04 thirteen of the plants were dead. On 10/1/04 all plants appeared dead. Two plants were alive in 2005.

Treatment E- Control plants were left untreated. No signs of plant stress throughout the 2004 growing season. Plant vigor was good in 2004. Twenty-four plants were alive in 2005, while 9 plants were dead.

Monitoring of plant growth was difficult due to the heavy vegetative growth at the project site. The plant stakes were difficult to locate as the season progressed. Some plants could not be located in 2005. The foliar spraying method was the most difficult to implement due to the potential for spray drift on non-target plants. The root severing method was easy to complete as the roots were easily located and the soil was not compacted. The treatments are similar in their effectiveness but differ greatly in costs and application skill.

Project Cost Summary

Project costs include labor and materials. Americorps costs were determined by the number of hours spent on the project and the mileage traveled. Mileage rate is from the BPA allowed rate. The labor rate used for the Americorps team is determined from the National Volunteer wage rates. All project costs are shown in Table 4.

Table 4. Project Cost Summary

Item	Description	Cost per Unit	Units	Total Cost	BPA Cost	AmeriCorps
Labor	District staff	\$12/ hr	50	\$600	\$600	0
Labor	Americorps	\$17/hr	36	\$612	0	\$612
Labor	Volunteer	\$17/hr	8	\$136	0	0
Materials	Stakes	Lump Sum	1	\$50	\$50	0
Materials	Herbicides	Lump sum	1	\$60	\$60	0
Materials	Sprayer, gloves, paint	Lump Sum	1	\$40	\$40	0
Mileage		\$0.36/mi	500 mi.	\$180	\$72	\$108
Total Costs				\$1,678	\$822	\$720

Discussion

Based on the results observed during the 2004 and 2005 field seasons, the severed root and foliar glyphosate treatments were the most effective control methods for white bryony plants, yielding 100% mortality. The drilled glyphosate and 2,4-D treatments were effective, with 97% and 94% mortality rates, respectively, although plant mortality was greater with the other treatments, excluding the control. Due to the increased mortality and decreased chemical costs, the severed root treatment is the most economical and effective control treatment used in this demonstration project. Although the foliar application yielded 100% mortality, the labor and chemical costs make it less efficient; the white bryony plants had to physically be removed from the nearby vegetation to reduce non-target impacts, thereby significantly increasing labor and cost. In the future, severing the plant root is recommended for control of white bryony plants.

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Emily Hershy, AmeriCorps

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Appendix A - Photographs

Figure 7. Site Overview Photograph August 2003.



Figure 8. RU 5 Vines From Root July 19, 2004. Showing Dead Vines.



Figure 9. Treatment C24 Showing Dead Vines. July 19, 2004.



Figure 10.

Figure 11. Treatment B14 Showing Dead Vines. July 19, 2004.



Figure 12. Treatment B34. July 19, 2004.



Figure 13. Treatment B14 Showing Dead Vines. July 19, 2004.



Figure 14. Treatment A18 Severed Root. July 19, 2004.

