

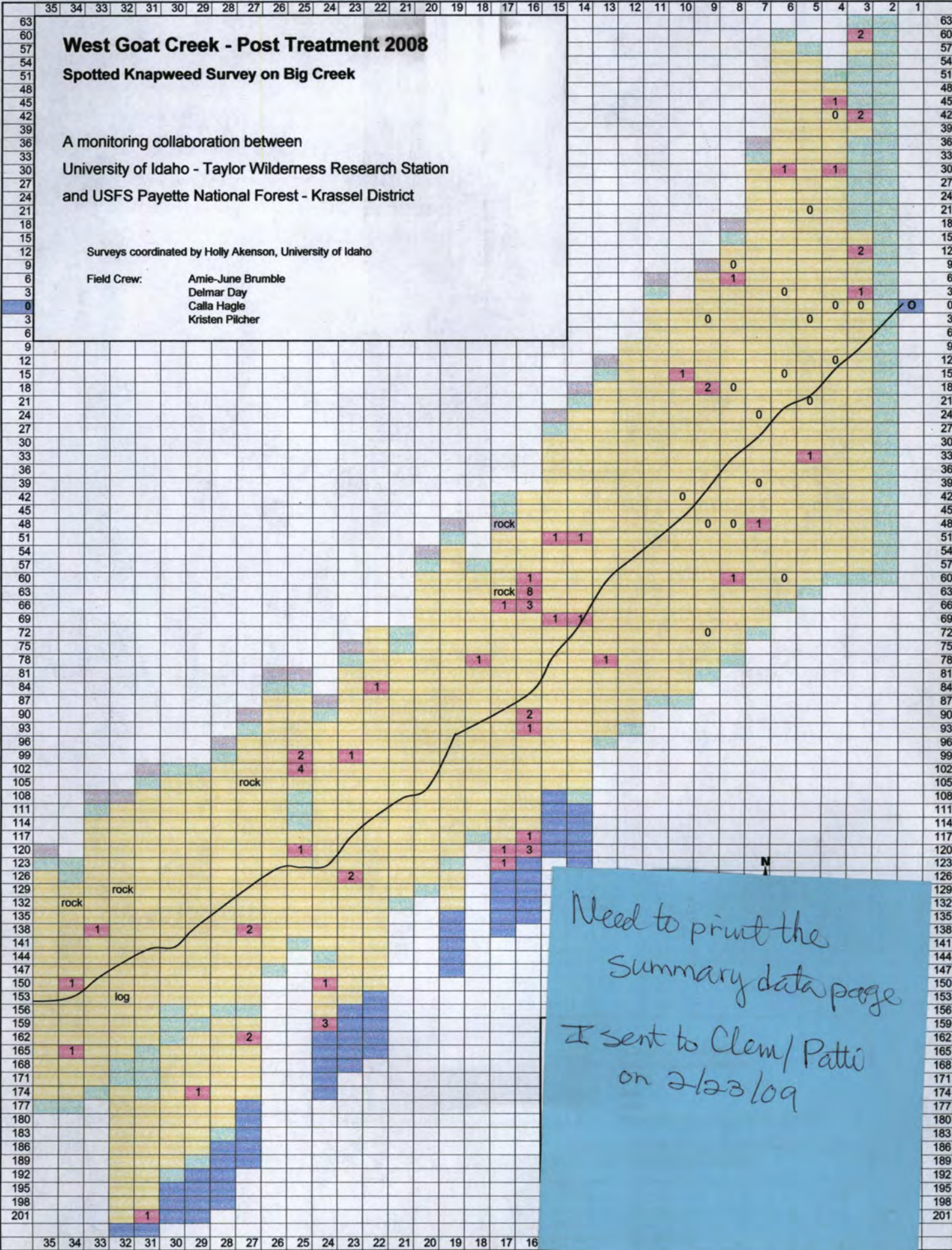
West Goat Creek - Post Treatment 2008

Spotted Knapweed Survey on Big Creek

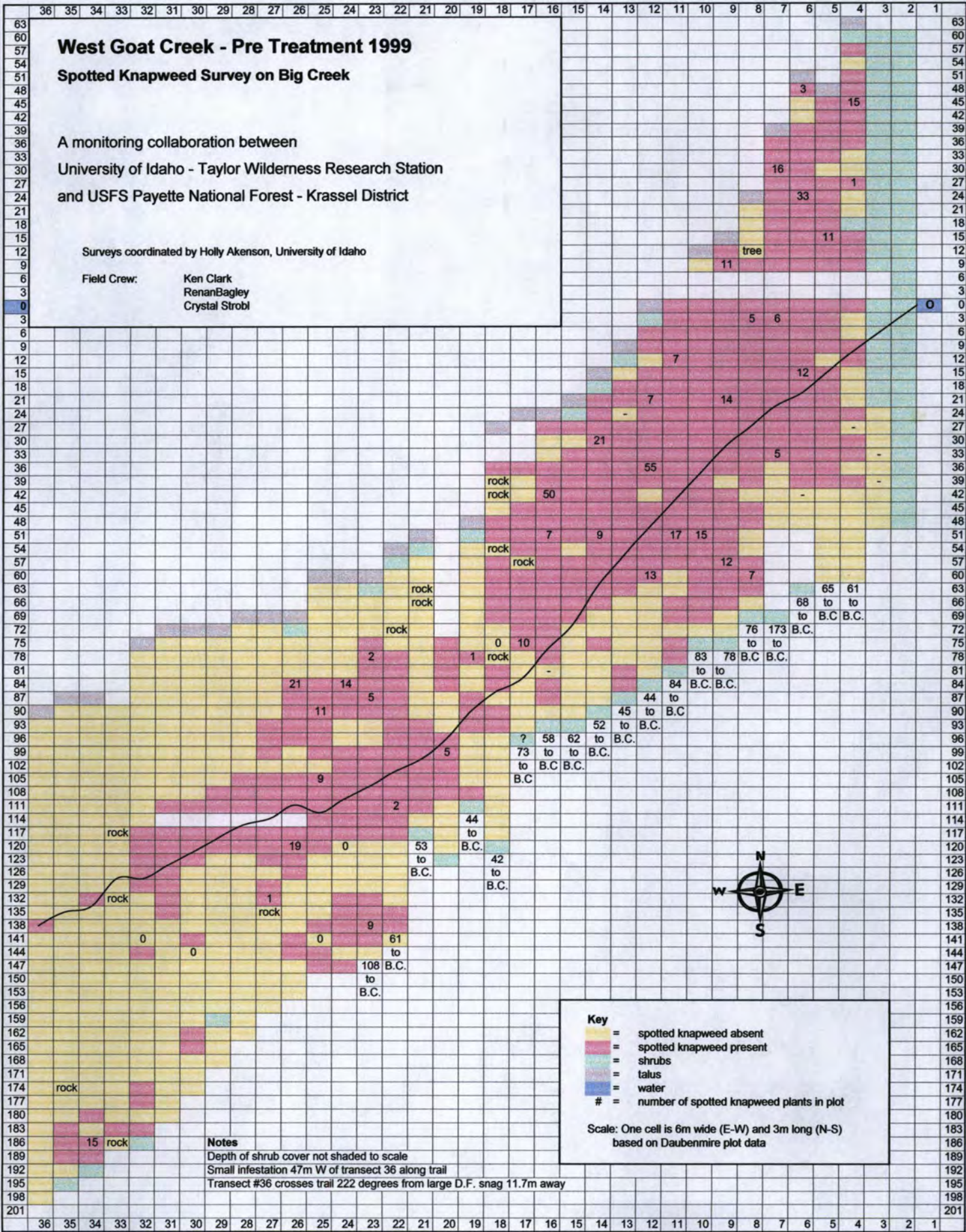
A monitoring collaboration between
University of Idaho - Taylor Wilderness Research Station
and USFS Payette National Forest - Krassel District

Surveys coordinated by Holly Akenson, University of Idaho

Field Crew: Amie-June Brumble
Delmar Day
Calla Hagle
Kristen Pilcher



Need to print the
summary data page
I sent to Clem/Patti
on 2/23/09



West Goat Creek - Pre Treatment 1999

Spotted Knapweed Survey on Big Creek

A monitoring collaboration between
 University of Idaho - Taylor Wilderness Research Station
 and USFS Payette National Forest - Krassel District

Surveys coordinated by Holly Akenson, University of Idaho

Field Crew: Ken Clark
 Renan Bagley
 Crystal Strobl

- Key**
- = spotted knapweed absent
 - = spotted knapweed present
 - = shrubs
 - = talus
 - = water
 - # = number of spotted knapweed plants in plot

Scale: One cell is 6m wide (E-W) and 3m long (N-S)
 based on Daubenmire plot data

Notes
 Depth of shrub cover not shaded to scale
 Small infestation 47m W of transect 36 along trail
 Transect #36 crosses trail 222 degrees from large D.F. snag 11.7m away

Spotted Knapweed Monitoring on Big Creek

A University of Idaho - Taylor Wilderness Research Station (Taylor Ranch)
USFS Payette National Forest - Krassel District
Monitoring Collaboration
1999-2008
Draft information February 23, 2009

Project coordinated by Holly Akenson, Manager/Scientist TWRS

Location

Goat Creek mouth in the lower Big Creek drainage

Study Design

Data was collected at the Goat Creek knapweed site in 1999 before treatment and in 2008 following USFS weed management actions
Data was collected by Taylor Ranch Bleak Wilderness Interns, UI undergraduates, as part of their hands-on wilderness research program
A 3 m (N-S) by 6 m (E-W) grid was laid out on both sides of lower Goat Creek
Grid centerpoint was the intersection of Goat Creek and the Big Creek trail
The survey area encompassed the grassland flats that had been invaded by spotted knapweed (*Centauria maculosa*)
A Daubenmire plot frame was set at each 3x6 gridpoint; knapweed presence or absence was determined for each plot
Within every 10 plots a plot was randomly selected to be counted for number of knapweed plants
Due to low numbers of knapweed present in 2008 plants were counted in all plots

Additional Work to be Done

Taylor Ranch will provide raw data and a summary report to Krassel District
Knapweed densities will be estimated and compared between pre and post treatment data sets
Krassel District wilderness staff will assemble treatment data from 1999 to 2008
Taylor Ranch and Krassel collaborators will jointly complete a publishable report of the project
Taylor Ranch and Krassel collaborators will each use the data, summaries, and reports for science or public relations benefits

Goat Creek site on Big Creek

Spotted Knapweed Extent and Control at Taylor Ranch in the Frank Church River of No Return Wilderness

Kristen Pilcher, Calla Hagle, University of Idaho
August 1, 2008

Introduction

On the 27th and 30th of June 2008 the area to the west of Goat Creek was surveyed for spotted knapweed (*Centaurea maculosa*) by Holly Akenson, Amy June Brumble and the three interns; Calla, Kristen and Delmar. On July 1st Amy June Brumble, interns Kristen and Calla and undergrad researcher Tatiana Gettelman returned to survey the area east of Goat Creek.

This area was last surveyed in 1999 by Holly Akenson and the interns of that summer. Since the 1999 survey the area has been treated with spot spraying and some hand pulling on knapweed by the U.S.F.S. The goal of the current survey was to compare results of the two ^{surveys} to determine if there has been progress in containing the spread of the invasive species over the last decade.

Methods and Materials

Methods were the same as used in 1999

An east-west line was set up from the center of the Big Creek trail and the intersection of Goat Creek and stretched to the talus slope north-west of the flat. North-South lines were then set up every 61 m. A Daubenmire plot was placed every 3^m meters along these transects. Plants found in each plot were counted and recorded. 35 north-south transects were surveyed on the west side of Goat and 21 to the east side. Transects went as far south as Big Creek and as far north as the talus slope.

Conclusion

The previous study carried out in 1999 showed a much higher number of plants. In the 1999 study a random plot out of every 12th plot was counted, some yielding as high as 50 or more plants in a single plot. In the study carried out this summer knapweed plants were so few and far between that every plot was counted, most plots were devoid of knapweed and no single plot contained more than 8 plants. Because it was unfeasible to survey in the riparian zones we were not able to retrieve numbers on some of those transects. However, from an observational standpoint it was obvious that knapweed occurred much more frequently in these riparian zones compared to the open flat. In order to eradicate spotted knapweed from this area it is probable that along with the current practice of spraying in the open areas, hand pulling must also occur in the riparian zones. ?

COMPARE 2 DATA SETS:

- 1) Plant density / D_i plot (where present?)
- 2) Plant density / m² for entire flat
- 3) Area covered by Knapweeds (+ # of plots w/ Knapweed)
- 4) Max plants / plot

Spotted Knapweed Control by Hand Pulling
Research on Effectiveness
Taylor Ranch Field Station 1998-2008
Kristen Pilcher and Calla Hagle, University of Idaho
August 1, 2008

Introduction

On the 2nd of July spotted knapweed was pulled at four formerly established sites; the west property boundary of Taylor Field Station, an adjacent site above the trail, west of airstrip and the airstrip gravel bar. The research was conducted by Holly Akenson and Bleak Interns Calla Hagle, Kristen Pilcher and Delmar Day. These sites have been controlled by hand pulling since the project was begun by Holly Akenson in 1998.

Methods and Materials

Plants found in each location were ^{hand} pulled ^{using gloves} and counted. Photo documentation was also taken by Holly.

Conclusion

The main site (West property Boundary) yielded 5 plants, all of which were second year plants, which would have produced seed. In the past this location had the highest prevalence of knapweed. But this year, a total of 37 plants were pulled in the adjacent site above the trail west of the airstrip. No plants were found on the airstrip gravel bar. After ten years of documentation, the results from 2008 show an alarming trend of re-growth. While west property boundary has displayed an uninterrupted decline in plants, the area west of the airstrip has markedly increased.

Spotted Knapweed Monitoring on Big Creek

A University of Idaho - Taylor Wilderness Research Station (Taylor Ranch)
USFS Payette National Forest - Krassel District
Monitoring Collaboration
1999-2008
Draft information February 23, 2009

Project coordinated by Holly Akenson, Manager/Scientist TWRS

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Goat Creek mouth in the lower Big Creek drainage

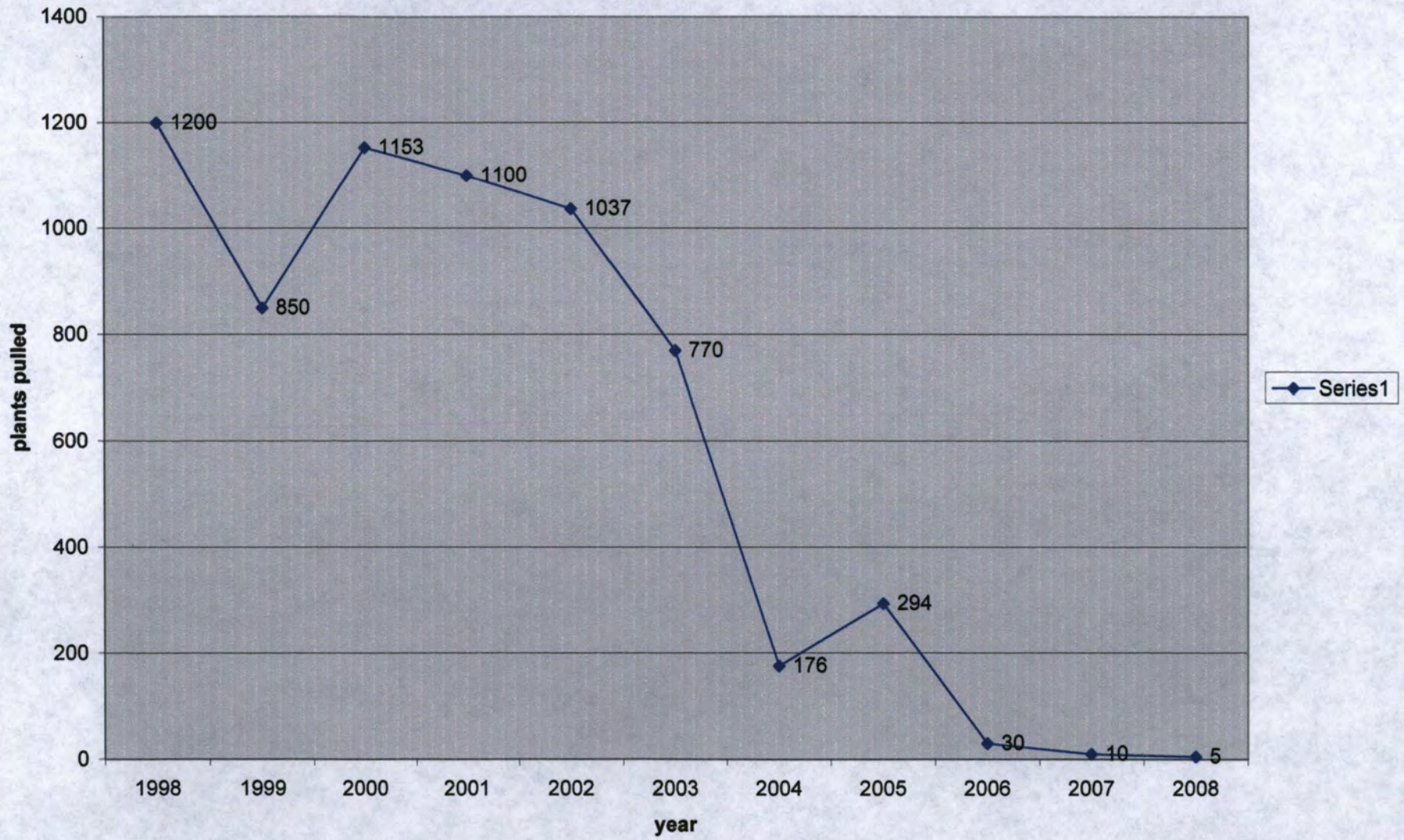
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spotted knapweed control by handpulling research on effectiveness



2008

Summary of Spotted Knapweed Control by Hand Pulling and its Effectiveness 1998-2007

This spotted knapweed control was started by Holly Akenson with the help of the yearly Bleak Interns. The sites in question were first identified in 1988 with an area of 75 square feet. All of the knapweed in 1988 was hand pulled by Holly and the summer interns. Upon Holly and Jim Akenson's departure in 1990 the sites were left unattended in the following years until Jim and Holly's return in 1997. In that 8 year time span the sites in question grew from their original 75 square feet in one patch to 500 square feet between 3 patches.

Hand pulling of spotted knapweed was resumed in 1997 by Holly with the help of the summer interns. The main site which is west of the airstrip along the Big Creek Trail had 1200 spotted knapweed plants in 1998 and with yearly pulling since that time the knapweed has declined to just a mere 10 plants in the summer of 2007. The adjacent site that is on the north side of Big Creek Trail was first identified in 1999. There were 23 knapweed plants pulled in the summer of 2000 by Holly and the interns and in the summer of 2007 there was only 1 knapweed pulled. The third site identified by Holly is at the west side of the airstrip. This site was identified in 1997 and contained 10 knapweed plants and in the summer of 2007 the site contained only 1 knapweed plant.

Attached with this summary is a spreadsheet and graph of the number of spotted knapweed plants pulled from year to year and other information about the study. As is clearly visible by the data the number of knapweed rose dramatically over the years that there was no hand pulling. Once hand pulling was resumed there was a noticeable change in the spread and reproduction of spotted knapweed, declining almost every year. As was mentioned before the most dramatic plot was the main site which had 1200 knapweed plants on it in 1998, and with the yearly diligence of Holly and the summer interns that plot has been reduced to only 10 knapweed plants in the summer of 2007. So in conclusion it is fair to assess that hand pulling spotted knapweed is very effective in limiting its growth and subsequent spread over an area, thus providing better plant biodiversity and animal habitat.

Compiled by Luke Cerise; Bleak Summer Intern 2007.
July 28, 2007

Spotted Knapweed Control by Hand Pulling,
Research on Effectiveness
Taylor Ranch 1999-2007

<u>Month/day</u>	<u>Year</u>	<u>Main Site (West Property Boundary)</u>			<u>Adjacent Site Above Trail</u>			<u>West of Airstrip Site</u>		<u>Airstrip Gravel Bar</u>	
		<u>Plants Pulled</u>	<u>Seed Stalks</u>	<u>Seed Heads</u>	<u>Plants Pulled</u>	<u>Seed Stalks</u>	<u>Seed Heads</u>	<u>Plants Pulled</u>	<u>Seed Stalks</u>	<u>Plants Pulled</u>	<u>Seed Stalks</u>
8/29	1997	not documented						10			
n/d	1998	1200									
6/18	1999	850	1	6	discovered			1	0		
7/1	2000	1153	1	1	23	11	100				
7/13	2001	1100	1	3	2	0		12	0		
6/30	2002	1037	0	0	10	0		18	0		
n/d	2003	770									
7/24	2004	176	4								
7/25	2005	294									
7/30	2006	30	4	45	0	0		50	0	10	0
7/9	2007	10	1	4	1	0		1	0		

*'Plants Pulled' are live knapweed plants including first year basal rosettes and second year plants with main stems that would have produce flowers

**'Seed Stalks' and 'Seed Heads' refer to dead stems from previous years plants that produced seed

In 1998 we pulled all knapweed, around 1200 plants, but it was not documented in the log book or sightings diary.

8/29/1997 Logbook observations by Holly Akenson after a return to Taylor Ranch Field Station following an absence since 1990:

"Knapweed by the big rocks (main site) has expended from ~75 sq feet in 1988 to 500 sq ft in 1997 in 3 patches.

We pulled it all in 1988."

This was a Bleak Wilderness Internship research project, coordinated by Holly Akenson.

Knapweed Summary Summer 2004

On the 24th of July Greg Hansen, Cinnamon Robinson, and Anna Pierce pulled the Knapweed patch North side of Big Creek, across from the mouth of Rush Creek. It took them two hours to pull 176 weeds. Approximately 4 weeds were pulled that were dead and dry with the flower still on them; these were last years plants. The total number of plants went down considerably from previous years. Last summer the interns pulled approximately 750 plants. The 5 previous years of pulling Knapweed always yielded 1100 plants. We hope this year's drastic decline of the Knapweed numbers is showing positive results of hand pulling weeds year after year. Nature Conservancy research has shown that it does take 7 years to effectively remove Knapweed from an area pulling them by hand. We estimate that next summer there will be an even lower number of Knapweed plants!

Spotted Knapweed Control by Hand Pulling,
Research on Effectiveness
Taylor Ranch 1998-2007

Month/day	Year	Main Site (West Property Boundary)			Adjacent Site Above Trail			West of Airstrip Site		Airstrip Gravel Bar	
		Plants Pulled	Seed Stalks	Seed Heads	Plants Pulled	Seed Stalks	Seed Heads	Plants Pulled	Seed Stalks	Plants Pulled	Seed Stalks
8/29	1997	not documented						10			
n/d	1998	1200									
6/18	1999	850	1	6	discovered			1	0		
7/1	2000	1153	1	1	23	11	100				
7/13	2001	1100	1	3	2	0		12	0		
6/30	2002	1037	0	0	10	0		18	0		
n/d	2003	770									
7/24	2004	176									
7/25	2005	294									
7/30	2006	30	4	45	0	0		50	0	10	0
7/9	2007	10	1	4	1	0		1	0		
7/2	2008	5			3			37		0	

*'Plants Pulled' are live knapweed plants including first year basal rosettes and second year plants with main stems that would have produce flowers

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 We pulled it all in 1988."

This was a Bleak Wilderness Internship research project, coordinated by Holly Akenson.

The UTM location of the Main Site 4996658 N; 668452 W

The UTM location of the Adjacent Site Above Trail is 4996682 N; 668514 W

The UTM location of the West of Airstrip Site is 4996539 N; 668657 W

TAYLOR RANCH KNAPWEED PROJECT
STUDENT INTERNS 1999

Objectives

- Students will learn to set up and conduct sampling methods to monitor status of vegetation and the effects of vegetation manipulation.
- Students will gain hands-on experience in field techniques: assessing vegetation density and distribution and conducting manual control of weeds.
- Taylor Ranch will establish a cooperative relationship with the Payette National Forest to accomplish a mutual resource management goal.

Knapweed Project Activities

- Map location and extent of knapweed infestations on lower Big Creek.
- Set up a sampling design for annual monitoring of the extent and density of knapweed at 2-3 sites.
- Control knapweed at 1 site by hand pulling, with assistance from a Forest Service crew. Knapweed control will be done 2-3 times during summer. Knapweed will be removed from the edges of the infestation to control rate of spread, but eradication will not be done.
- Set up a sampling design for annual monitoring of the effects of knapweed control.

Funding will be provided for student intern participation from the Payette National Forest. Funds will go toward student internship stipends (\$2,300 total).

ACCOUNT OF WORK DONE ON BIG CREEK

JUNE 22 THROUGH JULY 1, 1999

THIS REPORT IS A SUMMARY OF NOXIOUS WEED INVENTORY AND TREATMENT IN THE BIG CREEK DRAINAGE, DOWN STREAM OF TAYLOR RANCH. THE DESCRIPTION OF SITES WILL INCLUDE LOCATION, SIZE, AMOUNT OF AREA TREATED AND TIME INVOLVED AT EACH SITE.

THE FIRST SITE DOWNSTREAM OF TAYLOR RANCH INVENTORIED IS RUSHSKEL-ETON WEED, LOCATED 3/4 OF A MILE UPSTREAM OF COUGAR CREEK. THE SITE IS ABOVE THE TRAIL IN A NARROW PATCH WITH AN AREA OF 3786.58m². THERE ARE THREE DENSE CLUMPS OF OLD GROWTH PLANTS, THE REST BEING MOSTLY SCATTERED AND ISOLATED, THE ENTIRE AREA WAS PULLED. THE NEXT LOCATION OF A WEED SITE INVENTORIED IS LOCATED 30 FEET ABOVE BIG CREEK TRAIL, APPROXIMATELY 1/4 OF A MILE UPSTREAM FROM COUGAR CREEK. THE SITE IS IN LINE WITH THE DOWNSTREAM END OF AN ISLAND IN BIG CREEK. THE SITE CONTAINED AN AREA OF 494.48m² OF RUSH SKELETONWEED. THE ENTIRE AREA WAS TREATED BY PULLING.

COUGAR CREEK WAS INVENTORIED FOR SPOTTED KNAPWEED. THE LOCATION IS DESCRIBED AS BEING SEVERAL HUNDRED FEET ABOVE THE BIG CREEK TRAIL JUST BEFORE COUGAR CREEK. THE SITE IS MARKED BY A FAIRLY LARGE HAWTHORN BUSH. THIS SITE HAS BEEN RECORDED AT 464.63m². THE PERIMETERS OF THE WEED SITE WERE PULLED, THE INSIDE OF THE SITE WAS RATHER DENSE.

THE WORK DONE AT GOAT CREEK OCCURRED AT SEVERAL PLACES FOR SPOTTED KNAPWEED. THE LARGEST BEING THE WORK DONE 2M ON EACH SIDE OF THE TRAIL. THE AREA RECORDED AS TREATED IS 702.16m² PULLED AND 336.58m² WHIPPED. THE AREAS THAT HAVE BEEN WHIPPED WERE MARKED BY PINK FLAGS.

THE NEXT LARGEST SITES TREATED AT GOAT CREEK ARE LOCATED BELOW THE CAMP (ADJACENT TO BIG CREEK), MOSTLY ON THE BEACHES. THE AREA INVENTORIED AND TREATED IS 452.06m².

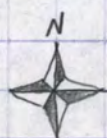
TWO DISTINCT KNAPWEED PATCHES WERE INVENTORIED AND TREATED IN GOAT BASIN. THE FIRST IS LOCATED AT THE SOUTHERN END OF THE BASIN, AS THE TRAIL ENTERS THE BASIN. THE AREA OF THE SITE IS 154m². THE ENTIRE AREA WAS TREATED BY PULLING. THE SECOND PATCH IS LOCATED ON THE EASTERN SIDE OF GOAT CREEK AS YOU ENTER THE BASIN. IT IS ASSOCIATED WITH A STOCK USERS' CAMP. THE AREA OF THE SECOND PATCH IS 431m². THIS ENTIRE AREA WAS TREATED BY PULLING.

TWO SPOTTED KNAPWEED SITES WERE INVENTORIED AND TREATED BETWEEN GOAT CREEK AND THE MOUTH OF BIG CREEK. THE FIRST PATCH IS LOCATED ALONG THE BIG CREEK TRAIL AT THE FIRST LOW SPOT BELOW THE SOLDIER BAR FORD TURN OFF. EIGHT PLANTS WERE FOUND HERE IN AN AREA OF ONE SQUARE METER. THE SECOND PATCH IS LOCATED BELOW THE BIG CREEK TRAIL AT THE BEGINNING OF THE BIG CREEK GORGE. A LARGE ROCK IN THE CENTER OF BIG CREEK IS FIFTEEN YARDS UPSTREAM OF THE SITE. FIFTEEN PLANTS WERE LOCATED IN AN AREA OF 64m² ON A STEEP DECOMPOSING GRANITE SLOPE. BOTH PATCHES WERE ENTIRELY PULLED.

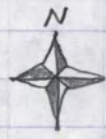
TWO SINGLE KNAPWEED PLANTS WERE LOCATED OUTSIDE THE BIG CREEK DRAINAGE. ONE WAS LOCATED AT THE EASTERN END OF THE MIDDLE FORK PACK BRIDGE. IT WAS DIRECTLY BELOW THE TRAIL SIGN, THE SECOND ISOLATED PLANT WAS LOCATED ONE MILE UP THE WATERFALL TRAIL.

	1	2	3	4	5	6	7	8	9	11	12	13	14	15	16	17
0	x	x	x	x	x	x	x	x	x							
3		x	x	x	x	x	x	x	x							
6		x	x	x	x	x	x	x	x							
9		x	x	x	x	x	x	x	x							
12		x	x	x	x	o	x	x	x							
15		x	x	x	x	x	x	x	x							
18		x	x	x	x	x	x	x	x							
21		x	x	x	x	x	x	x	x							
24		x	x	x	x	x	x	x	x							
27		x	x	x	x	x	x	x	x							
30		x	x	x	x	x	x	x	x							
33		x	x	x	x	x	x	x	x							
36		x	x	x	x	x	x	x	x							
39		x	x	x	x	x	x	x	x							
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126						78
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114						66
111	X					63
108	X	H				60
105	X	X				57
102	X	X				54
99	X	X	H			51
96	X	X	X	H		48
93	X	X	X	X		45
90	X	X	X	X	H	42
87	X	X	X	X	X	39
84	X	X	X	X	X	36
81	X	X	X	X	X	33
78	X	X	X	X	X	30
75	X	X	X	X	X	27
72	X	X	X	X	X	24
69	X	X	X	X	X	21
66	X	X	X	X	X	18
63	O	X	X	X	X	15
60	X	X	X	X	X	12
57	X	X	X	X	X	9
54	X	X	X	X	X	6
51	X	X	O	X	X	3
48	X	X	X	X	X	0
45	X	X	X	X	X	3
42	X	X	X	X	X	6
39	X	X	X	X	X	9
36	X	X	X	X	X	12
33	X	X	X	X	X	15
30	X	X	X	X	X	18
27	X	X	X	X	X	21
24	X	X	X	X	X	24
21	X	X	X	X	X	27
18	X	X	X	X	X	30
15	X	X	X	X	X	33
12	X	X	X	X	X	36
9	X	X	X	X	X	39
6	X	X	X	X	X	42
3	X	X	X	X	X	45
0	X	X	X	X	X	48

East Goat Creek
 June 28 + 30, 2008

Annie-June Brumby
 Tati Gettelman
 Calla Hagle
 Kristen Pitcher

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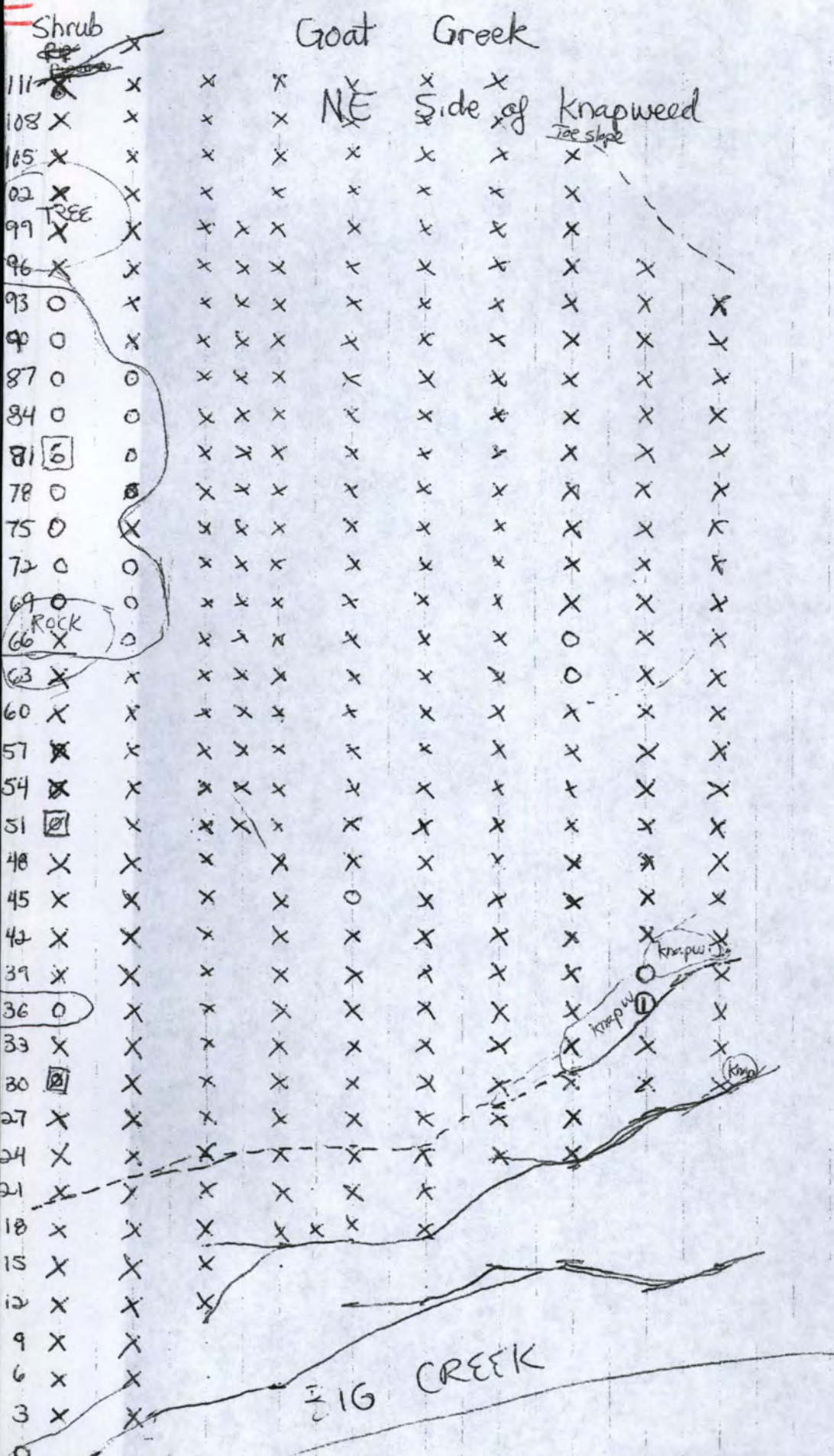
new tunnel

new tunnel

new tunnel

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East Goat
Cr
p 2 of 3

#	11	12	13	14	15	16	17	18	19	20	21
60m	66	72	78	84	90	96	102	108	114	120	

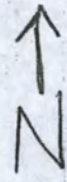
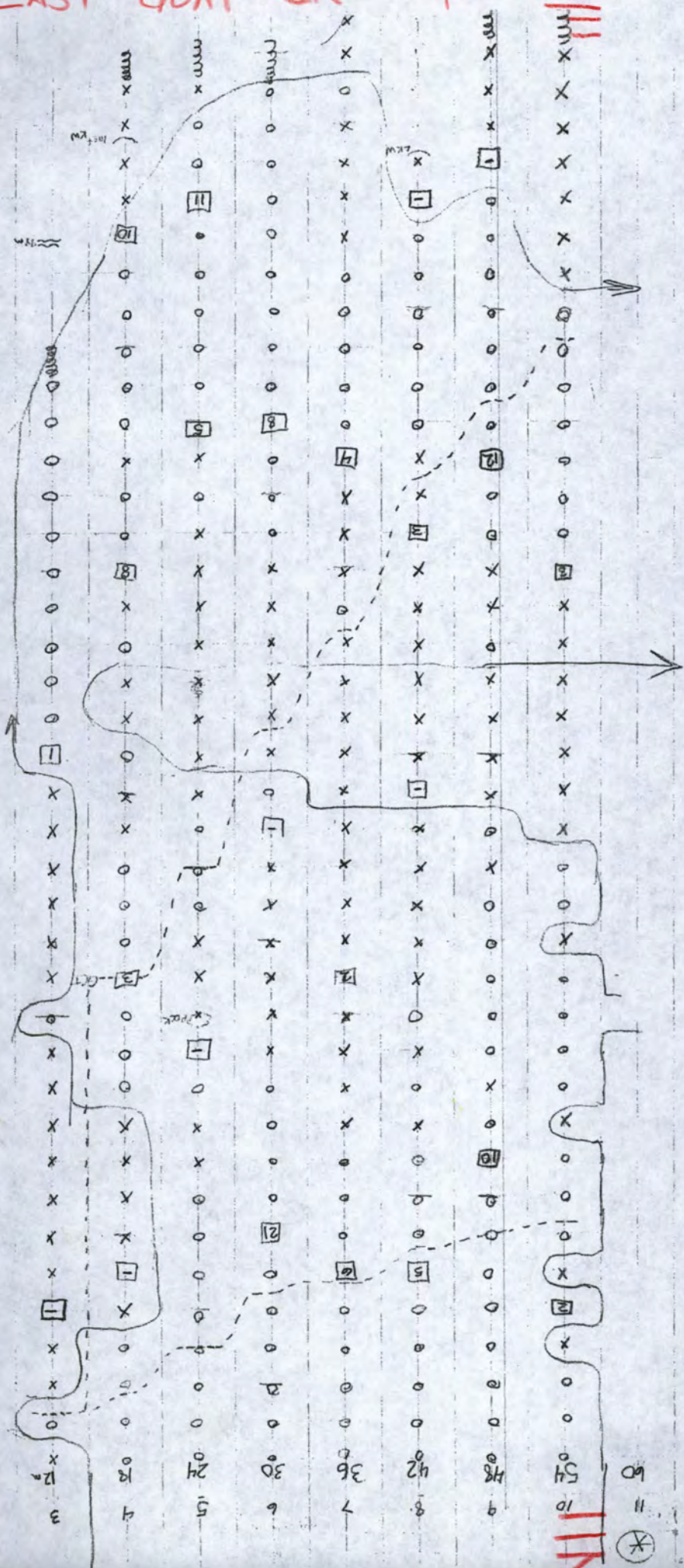
EAST GOAT CR

p 1 of 3



GOAT CREEK

RIPARIAN SHRUBS



64x

Goat Creek

12

60

54

48

42

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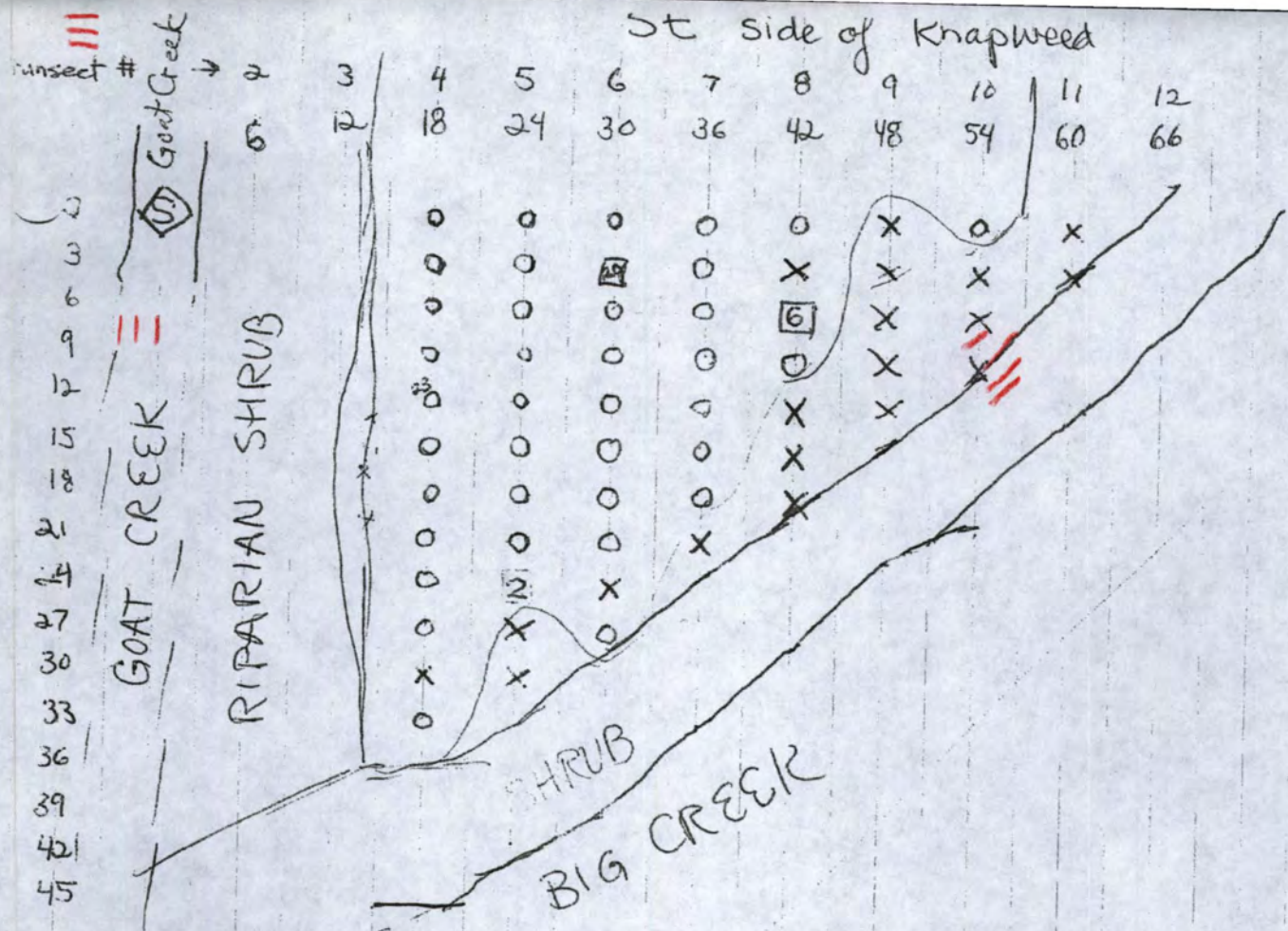
12

2

1



St side of Knapweed



HOLLY'S

Taylor Ranch

From: <ajbrumble@vandals.uidaho.edu>
To: "Taylor Ranch" <tayranch@hughes.net>
Sent: Monday, June 23, 2008 2:05 PM
Subject: Knapweed Project Summary

Hi Holly,

I have the knapweed folder here. Here's what I was able to glean about the methods. I'm bringing the maps up to you...right now.

~Amie-June

Study Area

Ken Clark writes: "This study was conducted from June 6th to August 6th. The Goat Creek site is approximately 4.7 acres (680' x 130' on the west side and 300' x 350' on the east side) and consists of a spotted knapweed stand grading into primarily native bunchgrass surrounded by stands of Douglas fir and ponderosa pine."

Sampling Procedures

Ken Clark writes: "Initially, an east-west line was determined from the intersection of Big Creek trail and the center of Goat Creek. A baseline was laid out from the starting point, and markers were placed at six-meter intervals. Transects were then laid out from these markers, north to the talus slope and south to Big Creek. Daubenmire plots (20 cm x 50 cm) were used at three meter intervals along transect lines to document the presences or absence of knapweed. Within every twelve Daubenmire plots, one plot was randomly selected and the total number of knapweed plots root crowns counted, in order to estimate total population density.

End transect at Topographic Δ or 2 plots w/out Knapweed 0 = presence, X = absence T = topo

Transect lines

Knapweed density was determined by calculating the mean density of knapweed in random plots. Transect lines with plots were mapped and a perimeter drawn around knapweed plots. Knapweed infestation was determined by the number of plots within the perimeter of the map x 3m x 18m area represented by each plot.

Control Methods

Ken Clark writes: "A two-meter border was marked from the center of the trail, spanning the complete length of the infestation. All knapweed plants within this two-meter band swath were pulled and removed using garden digging tools. Care was given to remove the entire root so as to avoid regrowth from the rhizomes. Gloves were worn to avoid the possible carcinogenic effects of the knapweed plants. Spot sites were also removed along the edge of Big Creek, in order to minimize potential see spread via the waterway."

Knapweed was burned on-site.

Results:

Holly Akenson writes: "The Taylor Ranch crew spent 288 hours mapping the Goat Creek site, assessing knapweed density, and pulling knapweed at Goat Creek and other sites. Knapweed at West Goat Creek covered a 10,570 meters squared (2.61 acres) area. Seventy-nine percent of plots within the map perimeter contained knapweed. The 248 m long knapweed area included essentially the entire river terrace not covered by trees or shrubs. The site had a mean knapweed density of 106 plants/m². Knapweed density in plots ranged from 0 to 55 plants, with a median density of 8 plants per plot (80 plants/m²)."

6/23/2008