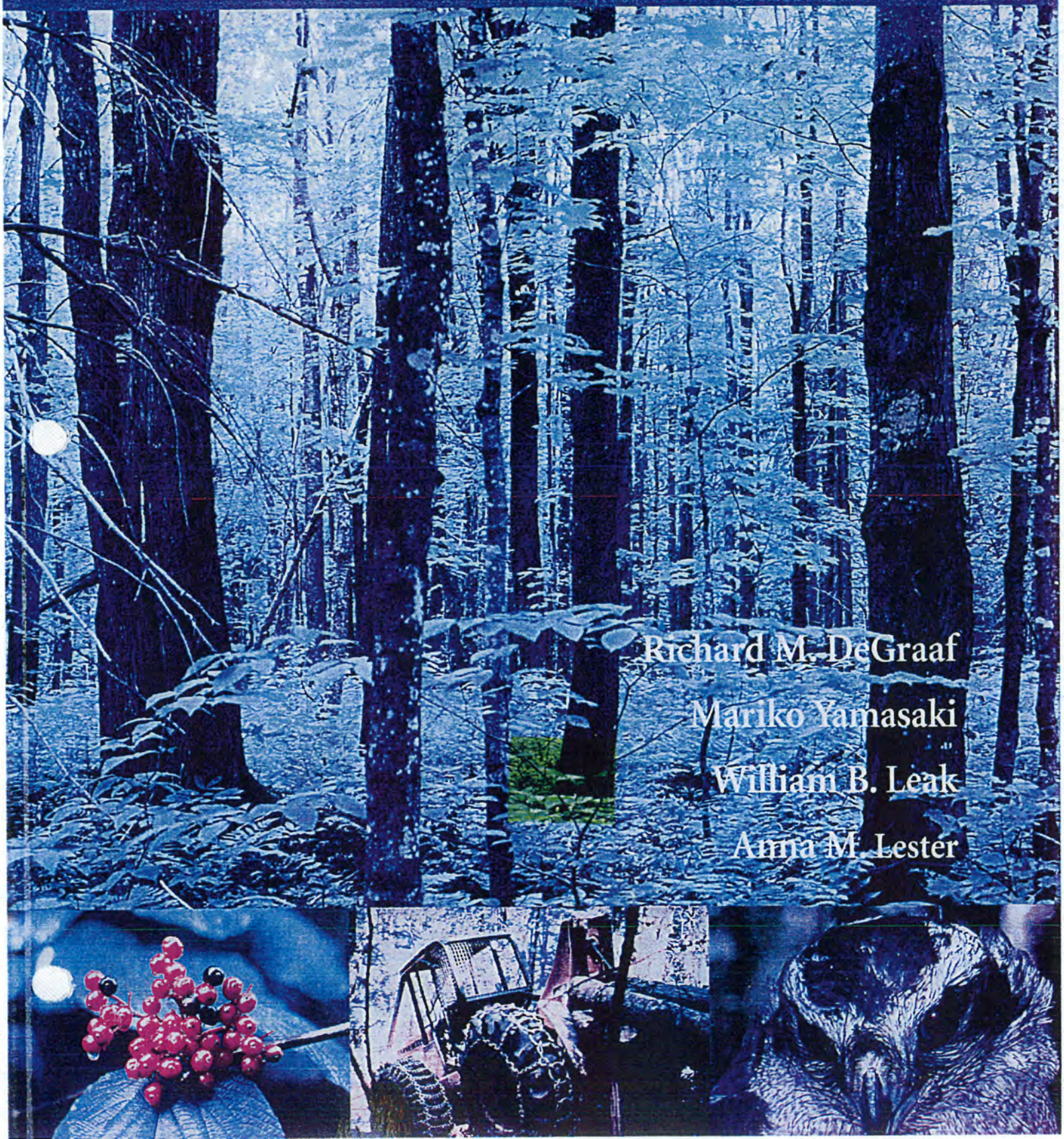
Exhibit 7.

Technical Guide to Wildlife Habitat in New England, DeGraaf, Yamasaki, Leak and Lester, University of Vermont Press (2006), p. 102 -103.

Exhibit 7.

TECHNICAL GUIDE TO Forest Wildlife Habitat Management IN NEW ENGLAND



Richard M. DeGraaf

Mariko Yamasaki

William B. Leak

Anna M. Lester

University of Vermont Press
Published by University Press of New England,
One Court Street, Lebanon, NH 03766
www.upne.com
© 2006 by University of Vermont
Printed in China
5 4 3 2 1

All rights reserved. No part of this book may be reproduced in any form or by any electronic or mechanical means, including storage and retrieval systems, without permission in writing from the publisher, except by a reviewer, who may quote brief passages in a review. Members of educational institutions and organizations wishing to photocopy any of the work for classroom use, or authors and publishers who would like to obtain permission for any of the material in the work, should contact Permissions, University Press of New England, One Court Street, Lebanon, NH 03766.

Library of Congress Cataloging-in-Publication Data

Technical guide to forest wildlife habitat management in New England / Richard M. DeGraaf . . [et al.]. — 1st ed.
p. cm.
Includes bibliographical references and index.
ISBN-13: 978-1-58465-587-9 (pbk. : alk. paper)
ISBN-10: 1-58465-587-9 (pbk. : alk. paper)
1. Wildlife habitat improvement — New England. 2. Forest management — New England. 3. Wildlife management — New England. I. DeGraaf, Richard M.
QL84.22.N47T43 2006
639.9'20974—dc22 2006023177

support many more wildlife species (see table 10). More open canopies and a vigorous herb/shrub layer combine to provide accessible raptor hunting areas the first few years post-harvest, especially where openings and wetlands are uncommon. Rapid changes in bird species occur during the first few years after clearcutting, reflecting the ephemeral nature of this habitat condition and its relative importance in providing important brushy habitat and soft mast component in largely forested landscapes (see table 9).

Shelterwood harvests in northern hardwoods usually are deferred or delayed shelterwoods where 20 to 40 square feet of basal area in vigorous 10- to 14-inch trees are retained for decades, along with a component of wildlife trees (high exposed perches, cavity trees, and coniferous overstory inclusions). On good northern hardwood sites, where there is an understory of sugar maple, the residual density can be on the high end. Where there is

Table 10
Characteristic Structural Habitat Features of and Potential Number of Species Associated with Silvicultural Options in Northern Hardwoods in a Ten-Year Window

Size class	Treatment options	Subtype	Overstory	Structural habitat features	A[a]	R	B	M	Total
Regeneration	None	All	Open	Dense shrub and herbaceous ground cover layers; soft mast	7	9	87	46	149
Sapling-pole	No treatment	All	Closed	Small dead trees	16	9	43	31	99
	Thinning[b]	All	Partial	Deciduous shrubs; small dead trees	16	11	50	39	116
Sawtimber	No treatment	Be/YB/SM[c]	Closed	Large cavity trees; midstory; beech mast; dead and down material	17	9	54	38	118
		Be/RM[c]		Same as above; softwood inclusions; small/medium cavity trees					
	Clearcut	All	Open	Exposed perches and cavity trees (few without reserved wildlife trees); dense shrub layer and herbaceous ground cover; soft mast; slash	7	9	87	46	149
	Shelterwood	All	Partial	Midstory; beech mast; slash	17	11	66	47	141
		Be/RM		Softwood inclusions					
	Selection[d]	All	Closed	Reserved cavity trees; midstory; beech mast; slash	17	9	54	38	118
		Be/RM[c]		Softwood inclusions					
	Thinning	Be/YB/SM and Be/RM	Closed	Midstory; beech mast	17	9	54	38	118
		Be/RM[c]		Softwood inclusions					
	Thinning	All	Partial	Midstory; slight shrub layer; beech mast; slash	17	11	66	47	141
		Be/RM[c]		Softwood inclusions					

[a]A = Amphibians; R = Reptiles; B = Birds; and M = Mammals.
[b]Commercial or noncommercial thinning.
[c]Be = Beech, YB = Yellow birch, SM = Sugar maple, RM = Red maple.
[d]Includes both single-tree and group/patch selection. The latter creates somewhat greater species diversity and small areas of early successional habitat.

an understory of less-desirable species—on the beech–red maples sites for example—the residual overstory should be lower, and the ground disturbance more intensive, to encourage birch regeneration. On such sites, there may be opportunities to reserve some softwood inclusions. Shelterwood harvests result in a partial overstory, a dense woody shrub layer, beech mast (from reserved wildlife trees), and slash. However, the earliest successional benefits—soft mast from *Rubus* species and pin cherry and herbaceous ground cover—are generally less abundant than in clearcuts. These habitat factors combine to provide suitable hunting and feeding areas for species such as Cooper's hawk, red-tailed hawk, American kestrel, phoebe, and olive-sided flycatcher. These are important considerations, especially where upland openings and wetlands that provide dense ground cover are scattered infrequently throughout an area.

The selection system in northern hardwoods can be either single-tree or group/patch. On the best northern hardwood sites, single-tree selection will regenerate an acceptable component of sugar maple. On lower sites, and especially in beech–red maple stands, single-tree selection will result in a dense beech understory. Group/patch selection using openings 0.25 to 0.67 acre or even up to a couple acres in size will provide for a component of birch and small areas of early-successional habitat; however the wildlife habitat potential is not greatly different between single-tree and group/patch selection (unless the groups are large). The habitat features include a mostly closed canopy, large cavity trees, a midstory, moderate amounts of slash, and beech mast and softwood inclusions on beech-red maple sites. Wildlife species that utilize these forest conditions are not greatly different from those that are found in unmanaged sawtimber stands (see table 10), and include sharp-shinned hawk, northern goshawk, barred owl, veery, Philadelphia vireo, American redstart, scarlet tanager, red bat, and hoary bat, among others.

Intermediate treatments in northern hardwoods consist of precommercial and commercial thinning in poletimber and small sawtimber stands. Commercial thinning is the more common alternative. This often consists of the removal of early-maturing species such as paper birch and aspen together with some cultural improvement in other species. It is important at this point to provide additional aspen–paper birch acreage in overall management strategies if commercial thinning is practiced extensively. Thinning produces only a moderate alteration of wildlife habitat features when a partial overstory canopy results (slight shrub layer; see table 10). Where a closed canopy results from thinning, minimal alteration of wildlife habitat features results and the potential wildlife species response differs little from untreated sawtimber stands, as long as larger cavity trees and softwood inclusions are distributed throughout the stand.

Where the presence of early-successional forest types such as aspen and paper birch are desired, the beech–red maple subtype is probably one of the easier places to convert to aspen–birch. This is accomplished by a series of short-rotation complete clearcuttings. Cuttings at rotations of twenty-five to thirty years will result in the most rapid conversion, if costs or markets or both permit. Conversion is most feasible if some aspen component is available

Exhibit 8.

Revised map.

LAND OF PLUM CREEK MAINE TIMBERLANDS, LLC.

NORTHERN KINGDOM UNIT-VT

HARVEST MAP

CLOGH BROOK NORTH

LM-03-01-09

Exhibit 8.

SCALE 1:15,840 1"=1,320'

0 660 1,320 2,640 Feet

MAG 15.5°W

VT STATE PLANE NAD 83 METERS

568000 568500 569000 569500 570000 570500

266500 266000 265500 265000 264500 264000 263500 263000

2SS w/ 1-2 ac. PTC

2SS

2SS

2SS

OSR

OSR

OSR

ITH

STC

LM-03-01-09

Lemington

Camp Number Three (historical)

LandVest

STAND_NUMB	STRATA	OS_TYPE	SILV_PRES	ACRES
LM-03-24	SH34B/SH2B	SH3B	ITH	68.8
LM-03-34.0	H3B	H3B	2SS	137.0
LM-03-43.0	HS3B	HS3B	OSR/ITH	115.1
LM-03-44	H3B	H3A	ITH	37.0
LM-03-46	H3C/H1B	H3C	OSR	15.9
LM-03-54	H3B	H3B	STC	97.4
TOTAL *(Acres derived from GIS)*				471.1

Town:LEMINGTON
County: ESSEX
Compartment:LM-03
Forester: JCH
Job Number:LM-03-01-09
Contractor:TBD

PROPOSED HARVEST
ACTIVE HARVEST
COMPLETE HARVEST
APPROVED HARVEST
POSTPONED HARVEST
FLOWAGE/BOG
GRAVEL PIT
LANDING
OPEN/AGRICULTURAL
RIPARIAN ZONE
SPECIAL TREATMENT AREA
WATER

COUNTY LINE
TOWN LINE
STREAM
STAND LINE
COMPARTMENT LINE
20 FT CONTOUR
100 FT CONTOUR
2500 FT CONTOUR
GATE
CAMP

PAVED PUBLIC ROAD
GRAVEL PUBLIC ROAD
YEAR ROUND GRAVEL
SUMMER ROAD (NOT LIMITED GRAVEL)
IMPROVED WINTER ROAD
UNIMPROVED WINTER ROAD
SKID TRAIL/UNMAINTAINED ROADWAY
UNKNOWN ROAD SURFACE
CUT/HU EDGE

Map Document: (D:\map_projects\VT\clients\PLUM_CREEK_7086\HARVEST_UNITS\LM-03-01-09_CLOUGH_BROOK_NORTH.mxd)
10/21/09 -- 11:27:20 AM

Table 1.

Summary table of inventory findings.

Plum Creek Table #1

Clough Brook North Basal Area Per Acre. Data Collected August and September 2011

Stand	Un-cut portion	Alleged cut contrary	Stand total BA	Harvest Complete
24	Minimal	None	91.6 (26 points)	Yes
34	83.33 (9 points/30 ac.)	28.48 (80 points/90 ac.)	47.44 (39 points)	No
43	Minimal	53.08 (39 points/40 ac.)	73.51 (37 points)	No
44	131.43 (7 points/29 ac.)	36 (10 points/6 ac.)	107.0 (10 points)	No

Table 2.

Stand #24 Plots for Stand Total and All Plots Taken in Stand.

Plum Creek Table #2

Stand #24 Plots for Stand Total and All Plots Taken in Stand

Plots for Stand Total	Total Basal Area	All Plots in Stand	Total Basal Area
6	120	6	120
7	90	7	90
8	80	8	80
9	60	9	60
10	70	10	70
12	130	12	130
13	60	13	60
15	100	15	100
16	80	16	80
17	50	17	50
18	140	18	140
20	110	20	110
21	20	21	20
56	230	56	230
57	10	57	10
84	70	84	70
85	120	85	120

Average	St. Deviation
90.59	**51.05**

Table 3.

Stand #34 Plots Used for Stand Total.

Plum Creek Table #3 Stand #34 Plots Used For Stand Total

Plots For Stand Total	Total Basal Area
1	10
2	30
3	90
4	10
83	50
88	110
89	50
90	100
91	30
92	20
93	30
94	30
95	30
108	90
115	40
116	40
117	90
118	90
119	90
120	70
121	70
122	80
123	60
125	50
128	50
129	0
130	20
131	10
132	0
135	0
136	50
137	20
138	30
139	90
140	80
141	80
142	10
143	20
144	30
Average	St. Deviation
47.44	**32.26**

Table 4.

Stand #34 Alleged Cut Contrary.

Plum Creek Table #4 Stand #34
Alleged Cut Contrary

Alleged Cut Contrary	Basal Area
A-1	80
A2	10
A3	30
A4	20
A5	0
A6	30
B14	0
B15	20
B16	10
B17	0
B18	10
B19	20
B20	30
B21	0
B22	10
B23	70
B24	10
C25	20
C26	10
C27	70
C28	20
C32	0
C34	40
C35	20
C36	20
C37	10
C38	20
C39	20
C40	10
C41	20
C42	0

Alleged Cut Contrary	Basal Area
4	10
83	50
92	20
93	30
94	30
95	30
115	40
116	40
125	50
128	50
129	0
130	20
131	10

Alleged Cut Contrary	Basal Area
45A	10
A45	0
A46	10
A47	20
A48	10
A50	90
A56	0
A57	90
57A	10
A58	60
A59	50
A61	70
A62	70
A63	20
A64	20
A65	50
A66	10
A81	40
A82	30
A83	40
A84	70
A85	10
A86	30
A87	20

Alleged Cut Contrary	Basal Area
132	0
135	0
136	50
137	20
138	30
139	90
140	80
141	80
142	10
143	20
144	30

Average	St. Deviation
28.48	**24.91**

Table 5.

Stand #34 Plots Taken in Un-cut Portion.

Plum Creek Table #5

Stand #34 Plots Taken in Un-cut Portion

Plots in Un-cut Portion	AGS Basal Area	UGS Basal Area	Total Basal Area	
88	100	10	110	
89	30	20	50	
90	100	0	100	
117	80	10	90	
118	80	10	90	
119	70	20	90	
120	70	0	70	
121	60	10	70	
122	60	20	80	
	Average	Average	Average	St. Deviation
	72.22	**11.11**	**83.33**	**18.03**

Table 6. Stand #34 All Plots Taken in Stand.

Plum Creek Table #6 Stand #34
All Plots Taken in Stand

All Plots in Stand	Basal Area	All Plots in Stand	Basal Area
1	10	B17	0
2	30	B18	10
3	90	B19	20
4	10	B20	30
83	50	B21	0
88	110	B22	10
89	50	B23	70
90	100	B24	10
91	30	C25	20
92	20	C26	10
93	30	C27	70
94	30	C28	20
95	30	C32	0
108	90	C34	40
115	40	C35	20
116	40	C36	20
117	90	C37	10
118	90	C38	20
119	90	C39	20
120	70	C40	10
121	70	C41	20
122	80	C42	0
123	60	45A	10
125	50	A45	0
128	50	A46	10
129	0	A47	20
130	20	A48	10
131	10	A50	90
132	0	A56	0
135	0	A57	90
136	50	57A	10
137	20	A58	60
138	30	A59	50
139	90	A66	70
140	80	A65	70
141	80	A64	20
142	10	A63	20
143	20	A62	50
144	30	A61	10
A1	80	A81	40
A2	10	A82	30
A3	30	A83	40
A4	20	A84	70
A5	0	A85	10
A6	30	A86	30
B14	0	A87	20
B15	20		
B16	10		

Table 7.

Stand #43 Alleged Cut contrary and Plots Used for Stand Total.

Plum Creek Table #7
Stand #43 Alleged Cut Contrary and Plots Used for Stand Total

Alleged Cut Contrary	Basal Area	Regeneration	Plots for Stand Total	Total Basal Area
A8	50	A	5	50
A9	40	A	38	100
A10	20	A	52	70
A11	10	A	53	160
B12	40	A	58	100
B13	80	A	59	60
C30	0	A	60	100
C31	50	A	69	120
C33	10	A	70	140
C43	10	A	71	190
C44	20	A	79	20
A51	70	A	80	60
A52	60	A	81	40
A53	130	A	82	0
A54	0	A	95	30
A55	130	A	96	80
A67	20	A	97	160
A68	20	U	104	120
A69	160	A	105	30
73A	30	A	106	50
A74	140	U	107	130
A75	110	A	108	90
A76	50	A	109	60
A77	30	A	110	120
105	30	A	111	20
106	50	A	112	40
108	90	A	113	0
109	60	A	114	60
110	120	U	124	50
111	20	A	126	0
112	40	A	127	60
113	0	A	133	30
126	0	A	134	40
127	60	A	145	20
133	30	A	146	30
134	40	A	147	200
145	20	A	148	90
146	30	A		
147	200	A		
Average	St. Deviation		Average	St. Deviation
53.08	**48.51**		**73.51**	**52.61**

Table 8.

Stand #43 All Plots Taken in Stand.

Plum Creek Table #8 Stand #43 All Plots Taken in Stand

All Plots in Stand	Basal Area		All Plots in Stand	Basal Area
5	50		C44	20
38	100		A51	70
52	70		A52	60
53	160		A53	130
58	100		A54	0
59	60		A55	130
60	100		A67	20
69	120		A68	20
70	140		A69	160
71	190		73A	30
79	20		A74	140
80	60		A75	110
81	40		A76	50
82	0		A77	30
95	30			
96	80			
97	160			
104	120			
105	30			
106	50			
107	130			
108	90			
109	60			
110	120			
111	20			
112	40			
113	0			
114	60			
124	50			
126	0			
127	60			
133	30			
134	40			
145	20			
146	30			
147	200			
148	90			
A7	20			
A8	50			
A9	40			
A10	20			
A11	10			
B12	40			
B13	80			
C30	0			
C31	50			
C33	10			
C43	10			

Table 9.

Stand #44 All Information.

Plum Creek Table #9 Stand #44
All Information

Alleged Cut Contrary	Basal Area			All Plots in Stand	Basal Area
78	50			61	140
98	50			62	110
99	50			63	140
A70	20			75	150
A71	30			76	110
A72	40			77	150
A73	30			78	50
A78	50			98	50
A79	30			99	50
A80	10			100	120
				A70	A70
	Average	St. Deviation		A71	A71
	36.00	**14.30**		A72	A72
				A73	A73
				A78	A78
Plots for Stand Total	Total Basal Area			A79	A79
61	140			A80	A80
62	110				
63	140				
75	150				
76	110				
77	150				
78	50				
98	50				
99	50				
100	120				
	Average	St. Deviation			
	107.00	**41.91**			
Plots in Un-Cut Portion	Total Basal Area				
61	140				
62	110				
63	140				
75	150				
76	110				
77	150				
100	120				
	Average	St. Deviation			
	131.43	**17.73**			

Figure 1.

Stand #24 Basal Area Per Plot, August 2011.

Plum Creek

Clough Brook North Harvest Area
Lemington, VT
Stand #24 Basal Area Per Plot
August 2011

FIGURE 1

Data Taken 8/10/11 and 8/11/11

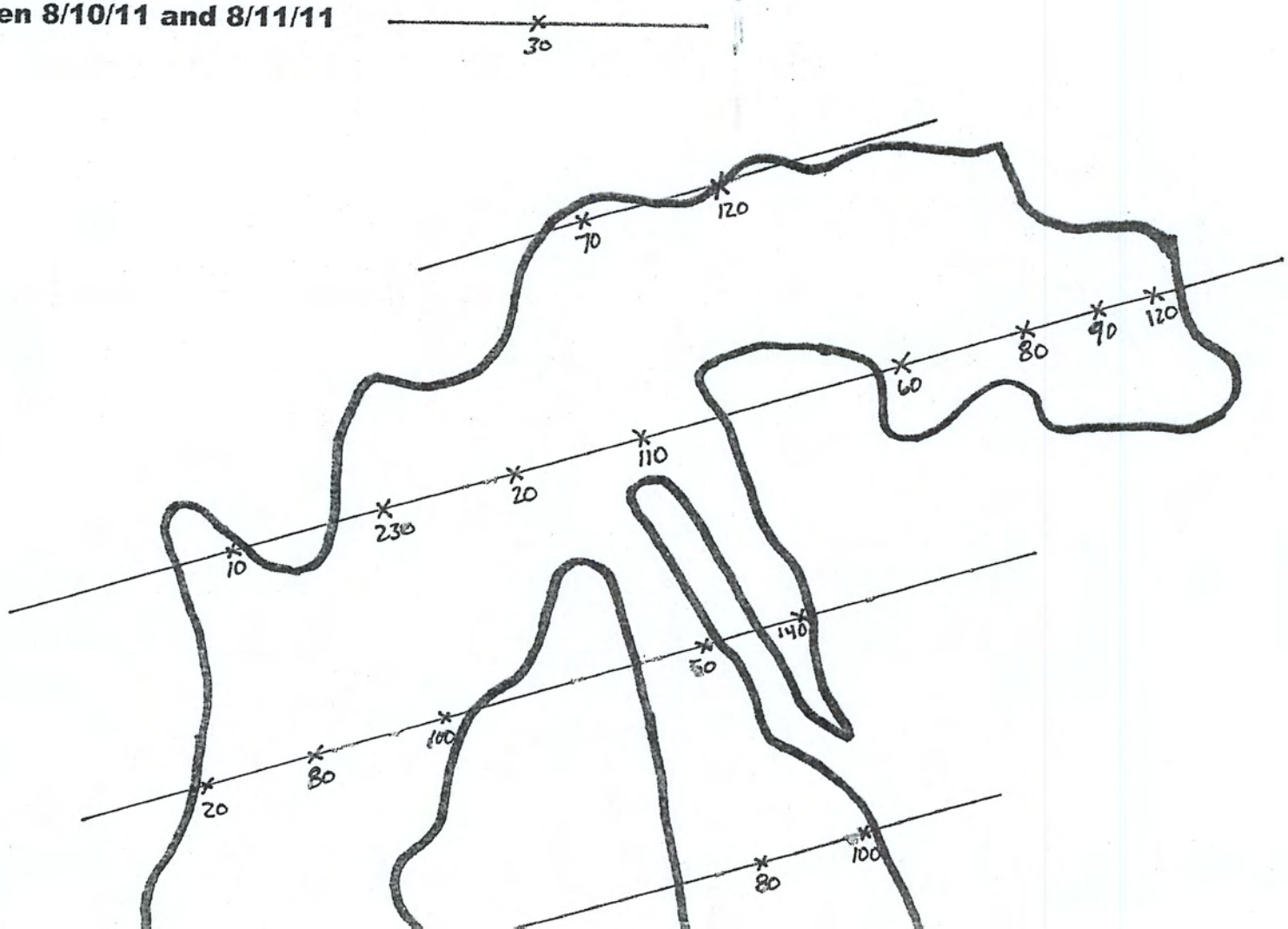


Figure 2.

Stand #34 Basal Area Per Plot, August/September 2011.

Plum Creek

Clough Brook North Harvest Area

Lemington, VT

Stand #34 Basal Area Per Plot

August/September 2011

FIGURE 2

Figure 3.

Stand #43 Basal Area Per Plot, August/September 2011.

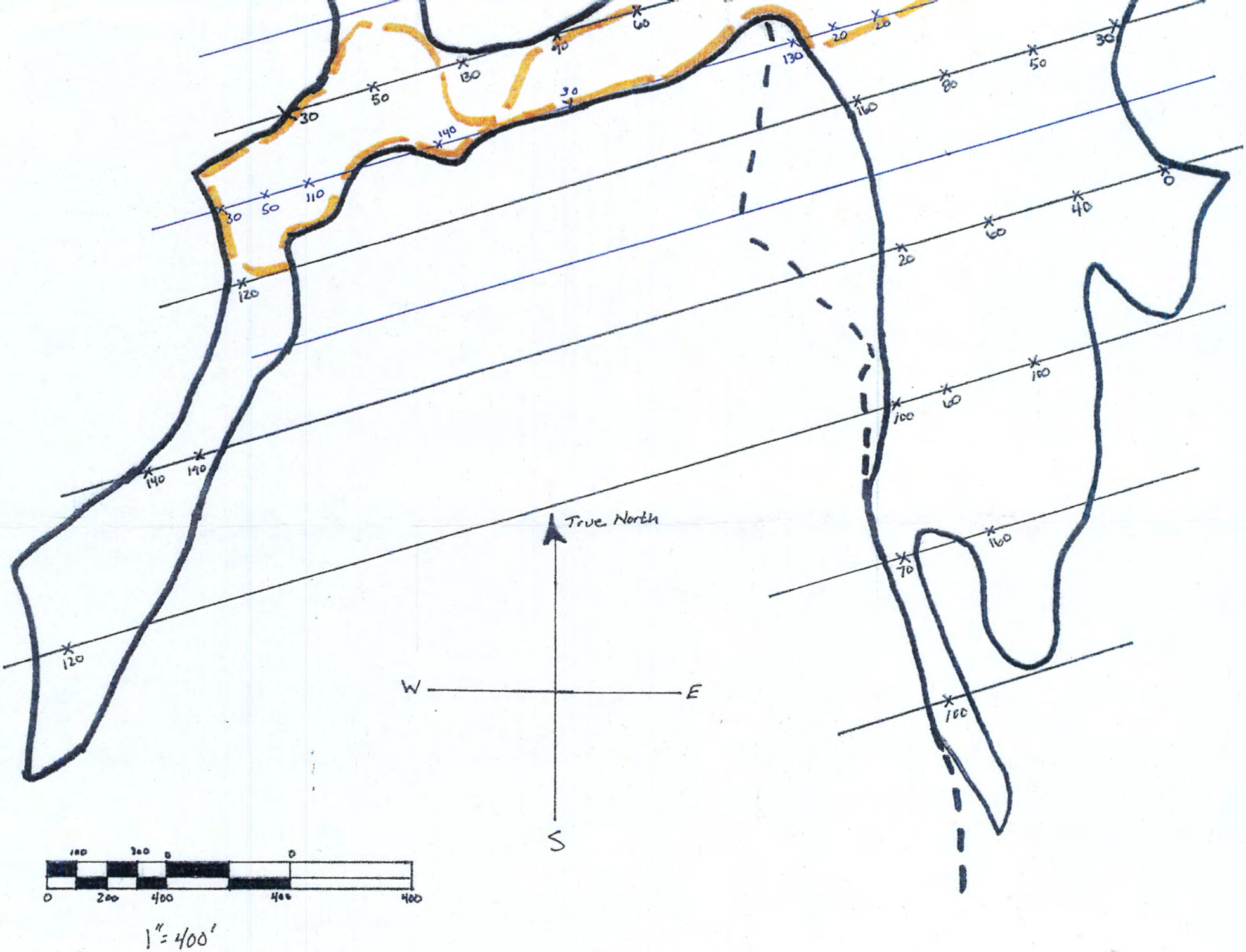

True North
W
E
S
0
200
400
1" = 400'

Figure 4.

Stand #44 Basal Area Per Plot, August/September 2011.

Plum Creek

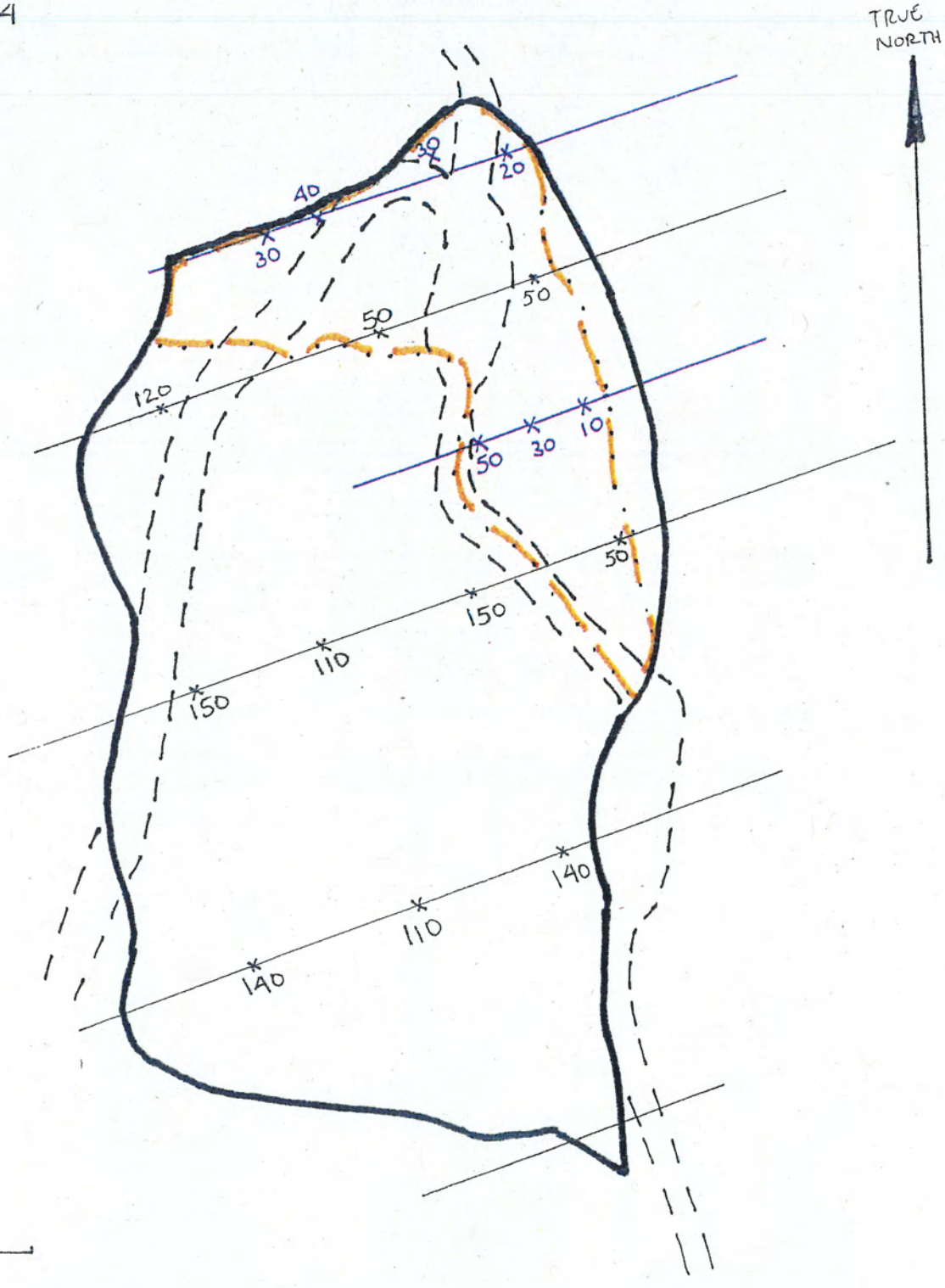
Clough Brook North Harvest Area
Lemington, VT
Stand #44 Basal Area Per Plot
August/September 2011

FIGURE 4

Alleged Cut Contrary Area

Data Taken 8/31/11 and 9/1/11 30

Data Taken 8/10/11 and 8/11/11 30



PC EXHIBIT 52
Docket No.
72-12-10 Excv, et al

PC EXHIBIT 53
Docket No.
72-12-10 Excv, et al