

2006 *Stereocaulon* Survey in Hiawatha

National Forest

Final Report

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This study of *Stereocaulon condensatum* in Hiawatha National Forest, Michigan, was designed to locate sites near the proposed logging areas in the Raco Plains as outlined in the USFS Alternative 4 of the Raco Plains Project. The 2005 report (Wetmore 2006) attempted to find additional sites across the entire Raco Plains but the present study was concentrated on areas adjoining the proposed logging areas.

Methods

During five days from 8-12 August 2006 many of the passable forest roads were driven by car looking for roadside colonies of *Stereocaulon condensatum*. It had previously been shown that these colonies could be seen from a slow-moving car along the roads (Wetmore 2006). When a possible site was found it was ground-checked. If the lichen was present a waypoint was taken with a Garmin GPS Map76CS using the WGS84 map Datum. The site was marked on a topographic quad, photographed and the length and width of the colony was measured. Waypoints were also taken at some sites in or near the logging areas that did not have any *Stereocaulon*. Complete lichen collections were also made in the forest at four localities but no other rare lichens and no colonies of *Stereocaulon* were found.

Table 1 gives all waypoints, the logging unit name, the TRS, location in reference to the USFS roads, whether *Stereocaulon* was found, the size of colonies found, the photograph number, the date and time of the photograph, and the collection number if a voucher was taken. The photographs are included in the CD with this report. Table 2 gives the latitude and longitude for each waypoint.

Stereocaulon condensatum was found at 22 of the 41 sites. Several of these are new sites not seen during the 2005 field work. Two major new colonies were the ones along USFS 3201 on the north side of highway 28. The colony at WP38 extended over 350 ft and was 46 ft. at its maximum width.

Ecology

Stereocaulon condensatum is known from many places in northern Europe (Lamb 1977). In North America it is reasonably common in Canada. In the United States it is known from a few localities in Connecticut, Massachusetts, New Hampshire, and one locality in Wisconsin and two areas in Michigan. In addition to the report for the Raco Plains, Manierre (1999) reported *Stereocaulon condensatum* from the Huron Mountains but I have not seen the collection for confirmation of the report. The locality in Wisconsin was checked in 2006 and the lichen could not be found, probably due to dense vascular plant ingrowth and loss of suitable habitat. All of the known localities are at the southern edge of its range, including the those in Michigan. According to the Natural Heritage Working List of rare plants it probably would be G4, and in Michigan an S2 because it is only known from a small area in Hiawatha National Forest.

In this study the "population" is considered the whole of its occurrence in the Raco Plains area. Within this population there are many "colonies" that are individual places where the lichen can be found. Parts of some of these colonies are composed of many

discrete small pieces of thallus and other colonies have continuous thalli. There is no way to determine the limits of a single thallus or to count individual thalli (see photos).

This lichen is usually found along roadsides in low areas and in roads infrequently traveled, also in the road. This species seems to be a colonizer species but may only appear after about 40 or more years. *Stereocaulon paschale* was frequently found in the same site and this species does not come in until about 40 years or more after disturbance.

Stereocaulon condensatum seems to thrive best in areas with partial shade, especially morning shade, with shade from the trees on the east. Once established it may be able to grow out into less favorable peripheral areas. Dispersal can be by spores or by fragments of thalli blown by the wind or carried by water. Most of the colonies found do not have abundant apothecia for spore production so this may be a less important means of dispersal.

The fact that this lichen has abundant colonies in the study area indicates that the recent forestry practices have not threatened the survival of the population. It is impossible to know what its distribution in the Hiawatha National Forest was before these forestry practices were initiated. The fact that most of the colonies were found north of highway 28 and one colony was found at the abandoned airport south of highway 28 might indicate that the airport and highway may have disrupted one previously continuous population.

Disturbance by traffic or severe rainfall can disrupt the colony. In some cases sand was washed down onto a colony or washed pieces of the colony downstream. In some sites sand had washed down on the colony. These buried thalli will probably die unless soon washed or blown free of the overlying sand. The dislodged thalli could presumably extend the colony into nearby areas or be blown by the wind a further distance. Growth rates are unknown and should be studied. Occasional vehicle tire tracks were found going through colonies. If the damage is minor the lichen will probably not be adversely affected but repeated vehicle traffic would severely disrupt or destroy parts of the colony. road grading would likely destroy the colonies growing on the roadsides.

Unknowns

There is need for much more study of *Stereocaulon condensatum* in this area. There are many things that are still unknown.

- ξ What was the pre-history distribution of the species in the UP of Michigan and in this area of Hiawatha NF?
- ξ What was its distribution before intensive management of the forest began?
- ξ How is the lichen distributed to new sites in the forest?
- ξ How long after disturbance before new colonies can be found?
- ξ How fast does a colony grow?
- ξ How sensitive is the colony to various degrees of disturbance?
- ξ What are the ecological requirements of light and moisture?
- ξ Is the report from the Huron Mountains correct and, if so, what are the ecological conditions there?
- ξ Are there other jack pine areas in the Michigan and Wisconsin that should be checked for this lichen?

These and other questions can only be answered with further study.

Recommendations

Because the present forestry practices do not seem to threaten the survival of this species, if they are continued there should be no threat. However, if these practices are changed, serious study should be done to determine their effects on the population. Under present practices these recommendations should be followed whenever possible.

Recommendation 1. Avoid major disturbance over wide-spread areas of the Raco Plains in any one year.

Recommendation 2. Try to minimize disturbance to the known biggest colonies. Two of the best are along USFS 3041 on the west side of Sec. 13 at WP27 and along USFS 3201 at WP38.

Recommendation 3. Try to determine colonization rates for this lichen by a study of dates of the past disturbance in those areas where the lichen is now present. Also monitor new disturbance areas for the recolonization by *Stereocaulon condensatum*.

Literature Cited

Lamb, I. 1977. A conspectus of the lichen genus *Stereocaulon* (Schreb.) Hoffm. Jour. Hattori Bot. Lab. 43:191-355.

Manierre, W. 1999. Bryophytes and lichens of the Huron Mountain Club. Evansia 16: 152-166.

Wetmore, C. 2006. 2005 Stereocaulon Survey in Hiawatha National Forest. Final Report.

Table 1
2006 *Stereocaulon condensatum* survey in Raco Plains, Hiawatha National Forest

WP	Logging name	RS (all T46N)	Location	Stereo?	Size	Photo	Waypoint	Date	Time	Coll #
1	Pruslk	Sec. 36, R5W	corner 3072 & 3602	N						
2	Star	Sec. 19, R4 & 5	3158, E & W side of road	Y	150'X1-5'		1 WP1	8 Aug. 06	9:08 AM	
3	Star	Sec. 19, R4 & 5	3158, E & W side of road	Y	180' X 1-4'		2 WP2	8 Aug. 06	10:25 AM	
4	Star	Sec. 13/18, R4W	corner 3077 & 3019	N						
5	Star	Sec. 18, R4W	3019	N						
6	Star	Sec. 12, R5W/7,R4W	N half Sec. 12/7	N						
7		Sec. 7, R4W	3634 at junction	N						
8	Square	Sec. 21, R4W	corner 3039 & 3364, S side of road	Y	106'X1-10'	3, 4	WP8	8 Aug. 06	12:47 PM	
9	Slippery Hitch	Sec. 22, R4W	3040	N						
10	Slippery Hitch	Sec. 22, R4W	3040, E side of road	N						
11	Slippery Hitch	Sec. 22, R4W	3040, N side of road	Y	86'X1-2'	5, 6, 7	WP11	8 Aug. 06	2:31 PM	
12	Slippery Hitch	Sec. 23, R4W	3040, N side of road, patchy	Y	20'X1-2'		8 WP12	8 Aug. 06	2:54 PM	
13	Slippery Hitch	Sec. 23, R4W	3040, S side of road	Y	6'X1.5'		9 WP13	8 Aug. 06	3:01 PM	
14	Slippery Hitch	Sec. 23, R4W	3040, N side of road	Y	102'X1-6'		10 WP14	8 Aug. 06	3:12 PM	
15	Slippery Hitch	Sec. 23, R4W	3040, both sides of road	Y	32'X6'		11 WP15	8 Aug. 06	3:25 PM	
16	Star	Sec. 16, R4W	3364, Stand 27 on 3019	N						
17	Star	Sec. 19, R4W	3364 E of 3019, S side of road	Y	31'X104'		12 WP17	9 Aug. 06	8:29 AM	
18	Star	Sec. 20, R4W	3364, S side of road	Y	22'X1-2'		13 WP18	9 Aug. 06	9:06 AM	
19	Wall	Sec. 15, R4W	3364 at 3038	N						
20	Slippery Hitch	Sec. 23, R4W	corner 3605 & 3364, patchy	Y	250'X1-5'		14 WP20	9 Aug. 06	9:59 AM	
21	Slippery Hitch	Sec. 23, R4W	3364, S side of road	Y	33'X1-5'		15 WP21	9 Aug. 06	10:07 AM	
22	Dolly	Sec. 7, R3W	3622	N						
23	Dolly	Sec. 7, R3W	3578	N						
24	Monkey Fist	Sec. 12, R4W	3041 & 3622	N						
25	Timber Hitch	Sec. 12, R4W	3366	N						
26	Timber Hitch	Sec. 13, R4W	3041, E side of road	Y	73'X1-5'		16 WP26	9 Aug. 06	1:55 PM	
27	Timber Hitch	Sec. 13, R4W	3041, E side of road	Y	205'X1-7'		17 WP27	9 Aug. 06	2:07 PM	
28	Timber Hitch	Sec. 13, R4W	3041, E side of road	Y	161'X1-4.5'		18 WP28	9 Aug. 06	2:25 PM	
29	Slippery Hitch	Sec. 23, R4W	3364 between WP20 & 21	Y	3'X6'					95347
30	Fishermans Bend	Sec. 13, R4W	Ranger Road	N						
31	Monkey Fist	Sec. 12, R4W	Ranger Rd., W side of road	Y	6'X3'		19 WP31	10 Aug. 06	8:03 AM	
32	Monkey Fist	Sec. 12, R4W	Ranger Rd.	N						

33 Slippery Hitch	Sec. 22, R4W	3018, lot 4	N					
34 Wall	Sec. 16, R4W	3037, patchy	Y	4'X1'	20 WP34	10 Aug. 06	11:48 AM	
35 Wall	Sec. 15, R4W	3364	N					
36	Sec. 10, R4W	3036 E of 3018	Y	123'X1-6'	21 WP36	10 Aug. 06	3:27 PM	
	Photo of Stereoc. apothecia on 3036, Sec. 10/15, R4W				22	11 Aug. 06	10:23 AM	
37	Sec. 20, R4W	old RR grade on 3201 N of road	Y	93'X20'	23 WP37	11 Aug. 06	2:14 PM	
38 Square	Sec. 21, R4W	old RR grade on 3201 N of road	Y	355'X46'	24 WP38	12 Aug. 06	7:59 AM	95414
39 Square	Sec. 21, R4W	old RR grade on 3201 N of road	N					
40	Sec. 3, R4W	3018, E side of road	Y	124'X10-8'	25 WP40	12 Aug. 06	1:41 PM	
41	Sec. 3, R4W	Cad-Soo Grade & 3018	N					

No Logging Name - not in a proposed logging plot

All TRS are T46N

Y/N - Y=St. cond. present; N=St. cond. not found

Size in feet

On the maps

yellow highlight = roads covered

blue highlight = apparent limits of the population

red = with WP# - 2006 colonies shown on this table

red X = colonies found in 2005

Table 2

Datum Waypoint	WGS 84 Date	Time	Lat.	Long.	Photo
01	08-AUG-06	9:19:09AM	46°20'19.5"N	84°52'05.0"W	
02	08-AUG-06	9:50:52AM	46°22'12.0"N	84°51'51.3"W	1
03	08-AUG-06	10:10:26AM	46°22'28.7"N	84°51'51.3"W	2
04	08-AUG-06	10:30:18AM	46°22'39.5"N	84°51'50.9"W	
05	08-AUG-06	10:34:49AM	46°22'43.0"N	84°51'36.4"W	
06	08-AUG-06	10:51:18AM	46°24'07.1"N	84°51'51.3"W	
07	08-AUG-06	12:24:28PM	46°23'37.3"N	84°50'55.6"W	
08	08-AUG-06	1:29:43PM	46°22'29.7"N	84°48'44.2"W	3, 4
09	08-AUG-06	2:54:31PM	46°22'04.3"N	84°47'51.5"W	
10	08-AUG-06	3:12:18PM	46°22'04.2"N	84°47'05.1"W	
11	08-AUG-06	3:29:13PM	46°22'04.2"N	84°46'55.9"W	5, 6, 7
12	08-AUG-06	3:49:17PM	46°22'04.5"N	84°46'32.1"W	8
13	08-AUG-06	3:55:32PM	46°22'04.5"N	84°46'26.5"W	9
14	08-AUG-06	4:05:01PM	46°22'04.5"N	84°46'22.7"W	10
15	08-AUG-06	4:11:31PM	46°22'15.7"N	84°46'13.5"W	11
16	09-AUG-06	9:06:33AM	46°22'30.2"N	84°51'23.0"W	
17	09-AUG-06	9:16:10AM	46°22'30.2"N	84°50'50.3"W	12
18	09-AUG-06	9:56:12AM	46°22'30.4"N	84°50'03.0"W	13
19	09-AUG-06	10:23:56AM	46°22'30.3"N	84°47'29.0"W	
20	09-AUG-06	10:47:18AM	46°22'30.4"N	84°46'51.2"W	14
21	09-AUG-06	10:56:35AM	46°22'30.5"N	84°46'38.9"W	15
22	09-AUG-06	11:54:46AM	46°24'14.7"N	84°44'07.0"W	
23	09-AUG-06	12:17:14PM	46°23'54.3"N	84°43'44.4"W	
24	09-AUG-06	12:56:38PM	46°24'16.0"N	84°45'36.3"W	
25	09-AUG-06	2:30:35PM	46°23'24.9"N	84°45'06.7"W	
26	09-AUG-06	2:48:07PM	46°23'19.1"N	84°45'36.6"W	16
27	09-AUG-06	2:53:31PM	46°23'17.5"N	84°45'36.7"W	17
28	09-AUG-06	3:08:46PM	46°23'13.6"N	84°45'36.6"W	18
29	09-AUG-06	4:25:51PM	46°22'29.8"N	84°46'42.4"W	
30	10-AUG-06	8:45:21AM	46°22'40.9"N	84°44'20.4"W	
31	10-AUG-06	8:56:08AM	46°23'23.3"N	84°44'21.2"W	19
32	10-AUG-06	9:12:58AM	46°23'48.8"N	84°44'20.7"W	
33	10-AUG-06	11:03:43AM	46°21'46.3"N	84°48'01.4"W	
34	10-AUG-06	12:39:31PM	46°22'56.5"N	84°48'27.3"W	20
35	10-AUG-06	2:00:01PM	46°22'34.0"N	84°47'51.1"W	
36	10-AUG-06	4:10:56PM	46°23'22.6"N	84°47'54.5"W	21
		apothecia only			22
37	11-AUG-06	3:00:56PM	46°21'33.3"N	84°49'34.2"W	23
38	11-AUG-06	3:23:33PM	46°21'33.4"N	84°49'02.8"W	24
39	12-AUG-06	9:59:38AM	46°21'33.4"N	84°48'42.5"W	
40	12-AUG-06	2:35:41PM	46°24'30.4"N	84°48'07.5"W	25
41	12-AUG-06	3:06:29PM	46°24'50.8"N	84°48'04.5"W	

TES PLANT ELEMENT OCCURRENCE - FIELD FORM - USDA FOREST SERVICE 2005

Ⓡ = required field, Ⓡ* = conditionally required field

General Information

1) FS SITE ID: Ⓡ		2) DATE: Ⓡ8-12 AUG. 2006	3) SITE NAME: RACO PLAINS
4) NRCS PLANT CODE: Ⓡ			
5) SCIENTIFIC NAME: ⓇSTEREOCAULON CONDENSATUM			
6) RECORD SOURCE: ⓇFIELD SURVEY		7) SURVEY ID: Ⓡ*	8) Survey Name: Raco Plains timber sale
9) EXAMINER(S)- LAST: ⓇWETMORE		FIRST: Clifford	MIDDLE INITIAL: M
LAST:		FIRST:	MIDDLE INITIAL:
10) OWNERSHIP: ⓇUSFS			
11) E.O. #		12) NEW OCCURRENCE - YES: X OR NO:	
13) STATE: Ⓡ*MI		14) COUNTY: Ⓡ*CHIPPEWA	
15) REGION: Ⓡ*9	16) FOREST: Ⓡ*HIAWATHA	17) DISTRICT: Ⓡ*5	
18) Entire extent mapped: Yes: X No: Uncertain:		19) Area (Est):	20) Area UOM: Ⓡ*
21) Canopy Cover Method Ⓡ* (circle one): COVER PERCENT; DAUBEN; NRMCOV			

Element Occurrence Data

22) EO Canopy Cover: %Cov:33 or Cover Class Code:		23) Lifeform: crustose lichen
24) Number of subpopulations: 45		
25) Plant Count:	26) Count Type: Genets/Ramets/Undetermined	27) Count: Actual or Estimate
28) Revisit needed - Yes or No X		29) Revisit Date:
30) Revisit Justification:		
31) Phenology by % (Sum to 100%): Vegetative ___ Flower/Bud ___ Fruit/Dispersed ___ Seedlings/ Juvenile ___		32) Population Comments: (e.g., distribution, vigor, density, phenology, dispersal) Subpopulations frequent & scattered along roadsides
33) Evidence of disease, competition, predation, collection, trampling, or herbivory: Yes ___ or No _X_		
34) Evidence Comments:		
35) Pollinator observed - Yes or No		36) Pollinator type(s):
37) Pollinator comments:		

Site Morphometry

38) Percent Slope: flat to slightly rolling		39) Slope position:
40) Aspect: azimuth: or cardinal:		
41) Elev.: Ave: 900	Min:	Max:
42) Elev UOM: Ⓡ* FEET		

Soil Characteristics and Light Conditions

43) Substrate on which EO occurs: sand		
44) Parent Material: sand	45) Soil Moisture:	46) Soil Texture:

47) Soil Type:	48) Light Exposure: FS SITE ID:
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Site Classifications

Record taxonomic units of the given type(s) if published classifications exist for the area.			
CLASS TYPE	CLASS CODE	CLASS SHORT NAME	CLASS SET
49) Existing Veg	1	Jack pine	
50) Potential Veg	1	Jack pine	
51) Ecotype			

Habitat Quality and Management Comments

52) Habitat Description: Low depressions along forest roads. Both in low areas of roadsides and in roads in less traveled roads	
53) Dominant Process:	
54) Community Quality (L, M, H):	55) Landscape Integrity (L, M, H):
56) Process Comment:	
57) Disturbance/Threats (present or imminent):	
58) Disturbance/Threats Comment:	
59) Non-Native Comment:	
60) Current Land Use Comment:	

Canopy Cover

Record % canopy cover by actual percent, <i>or</i> by cover class (as indicated in General Information Block).			
Lifeform Canopy Cover	61) % Cov or Code	Ground Cover	62) % Cov or Code
Tree		Bare	
Shrub		Gravel	
Forb		Rock	
Graminoid		Bedrock	
Non-vascular		Moss	
Lichen		Litter/Duff	
Algae		Basal Veg	
		Water	

	Road surface	
	Lichen	FS SITE ID:

Associated Species

List species directly associated with the EO species on this site. Record the NRCS Plant Code, scientific name or both. If desired, indicate lifeform, dominant species, % cover for each species and flag non-native species.

63) Completeness of Species List: ®* C, R, OR S

64) Species List Comment:

65) NRCS Plant Code	66) Scientific Name	67) Life Form	68) Dom. (Y/N)	69) % Cov or Class	70) Non- native

EO Specimen Documentation

71) Reference for ID: Clifford Wetmore		
72) Primary Collector – Last Name: Wetmore	First Name: Clifford	M.I.: M
Other Collectors – Last Name:	First Name:	M.I.
73) Collection #:®* 95347, 95415	74) ID Confirmed: ®* Y: X or N: or Questionable:	

75) Verification: Clifford Wetmore, Univ. of Minnesota

76) Specimen Repository: ®* UNIV. OF MINN. HERBARIUM

FS SITE ID:

Image Information

77) Image ID	78) Image Description
1-25	Photos of habitats and close-ups

Location Information

(State, County, Region, Forest, District will be auto-populated by the database application when the spatial feature is entered)

79) USGS Quad Number:	80) USGS Quad Name: Pendills Lake
81) Forest Quad Number:	82) Forest Quad Name:

83) Legal Description: Required where public land survey is available.

Meridian: Township and Range: T46N, R4W
Section: 10 Q Sec: QQ Sec: QQQ Sec: QQQQ Sec:

84) Latitude and Longitude (either in degrees, minutes, seconds or in decimal degrees)

Geodetic Datum:

Latitude: Degrees 46 N Minutes 21-24 Seconds .

Longitude: Degrees 84 W Minutes 56-51 Seconds .

GPS Datum: WGS84

GPS Lat. Dec. Degrees: GPS Long. Dec. Degrees:

85) UTM

UTM Datum: UTM Zone:
Easting: Northing:

86) GPS Equipment Used (Manufacturer and Model):

Garmin Map76CS

87) Metes and Bounds

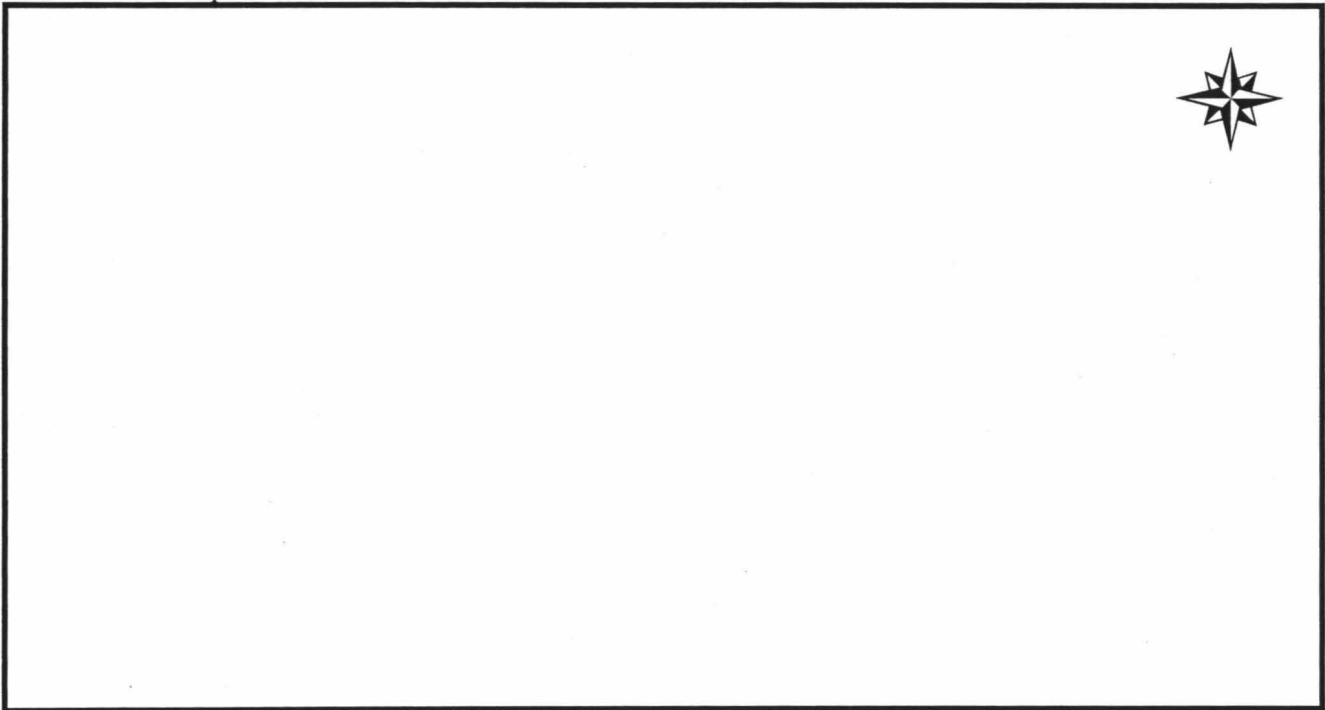
FS SITE ID:

88) Directions to Site

7 miles east of Strongs along Mich28 then north on USFS 3018 1.5 miles

89) Sketch of Site or Area

See attached maps



90) General EO Comments

