[] Dendrochronology Program Library Run RS\_H Program COF 12:41 Tue 21 Apr 2020 Page 1

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[] P R O G R A M C O F E C H A Version 6.06P 31159

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QUALITY CONTROL AND DATING CHECK OF TREE-RING MEASUREMENTS COF12K.for

Title of run: Red Spruce, Groton State Forest, VT (KT

File of DATED series: RS\_H.rrw

CONTENTS:

Part 1: Title page, options selected, summary, absent rings by series

Part 2: Histogram of time spans

Part 3: Master series with sample depth and absent rings by year

Part 4: Bar plot of Master Dating Series

Part 5: Correlation by segment of each series with Master

Part 6: Potential problems: low correlation, divergent year-to-year changes, absent rings, outliers

Part 7: Descriptive statistics

RUN CONTROL OPTIONS SELECTED VALUE

1 Cubic smoothing spline 50% wavelength cutoff for filtering

32 years

2 Segments examined are 50 years lagged successively by 25 years

3 Autoregressive model applied A Residuals are used in master dating series and testing

4 Series not transformed to logarithms N

5 CORRELATION is Pearson (parametric, quantitative)

Critical correlation, 99% confidence level 0.3281

6 Master dating series saved N

7 Ring measurements listed N

8 Parts printed 1234567

9 Absent rings are omitted from master series and segment correlations (Y)

Time span of Master dating series is 1874 to 1993 120 years

Continuous time span is 1874 to 1993 120 years

Portion with two or more series is 1875 to 1993 119 years

>> H212 1983 absent in 1 of 69 series, but is not usually narrow: master index is -0.245

>> H212 1985 absent in 1 of 69 series, but is not usually narrow: master index is 0.111

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*C\* Number of dated series 69 \*C\*

\*O\* Master series 1874 1993 120 yrs \*O\*

\*F\* Total rings in all series 6311 \*F\*

\*E\* Total dated rings checked 6310 \*E\*

\*C\* Series intercorrelation 0.622 \*C\*

\*H\* Average mean sensitivity 0.192 \*H\*

\*A\* Segments, possible problems 0 \*A\*

\*\*\* Mean length of series 91.0 \*\*\*

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

ABSENT RINGS listed by SERIES: (See Master Dating Series for absent rings listed by year)

H212 2 absent rings: 1983 1985

H371 1 absent rings: 1974

3 absent rings 0.048%

PART 2: TIME PLOT OF TREE-RING SERIES: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 2

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

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. . . . . . . . . . . . . . . . . . <======>. . H182 1 1926 1991 66

. . . . . . . . . . . . . . . . . .<=======>. . H192 2 1917 1991 75

. . . . . . . . . . . . . . . . . . <======>. . H191 3 1922 1991 70

. . . . . . . . . . . . . . . . . . <======>. . H181 4 1927 1991 65

. . . . . . . . . . . . . . . . . <========>. . H162 5 1900 1991 92

. . . . . . . . . . . . . . . . . . <======>. . H152 6 1923 1991 69

. . . . . . . . . . . . . . . . . <=========>. . H141 7 1895 1991 97

. . . . . . . . . . . . . . . . . <========>. . H112 8 1902 1991 90

. . . . . . . . . . . . . . . . . <===========>. . H161 9 1878 1991 114

. . . . . . . . . . . . . . . . . <==========>. . H111 10 1888 1991 104

. . . . . . . . . . . . . . . . . .<=======>. . H151 11 1918 1991 74

. . . . . . . . . . . . . . . . . <=========>. . H171 12 1897 1991 95

. . . . . . . . . . . . . . . . . <========>. . H172 13 1907 1991 85

. . . . . . . . . . . . . . . . . <==========>. . H131 14 1889 1991 103

. . . . . . . . . . . . . . . . . <========>. . H122 15 1903 1991 89

. . . . . . . . . . . . . . . . . <==========>. . H121 16 1887 1991 105

. . . . . . . . . . . . . . . . . <========>. . H132 17 1908 1991 84

. . . . . . . . . . . . . . . . . <==========>. . H142 18 1886 1991 106

. . . . . . . . . . . . . . . . . . <======>. . H232 19 1922 1992 71

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. . . . . . . . . . . . . . . . . <========>. . H252 21 1904 1992 89

. . . . . . . . . . . . . . . . . .<=======>. . H281 22 1915 1992 78

. . . . . . . . . . . . . . . . . <========>. . H251 23 1900 1992 93

. . . . . . . . . . . . . . . . . . <======>. . H231 24 1921 1992 72

. . . . . . . . . . . . . . . . . .<=======>. . H222 25 1915 1992 78

. . . . . . . . . . . . . . . . . <========>. . H291 26 1908 1992 85

. . . . . . . . . . . . . . . . . <========>. . H292 27 1902 1992 91

. . . . . . . . . . . . . . . . . <===========>. . H272 28 1874 1992 119

. . . . . . . . . . . . . . . . . <========>. . H212 29 1903 1992 90

. . . . . . . . . . . . . . . . . <==========>. . H262 30 1888 1992 105

. . . . . . . . . . . . . . . . . .<=======>. . H282 31 1918 1992 75

. . . . . . . . . . . . . . . . . <=========>. . H211 32 1893 1992 100

. . . . . . . . . . . . . . . . . <=========>. . H261 33 1890 1992 103

. . . . . . . . . . . . . . . . . <=========>. . H241 34 1895 1992 98

. . . . . . . . . . . . . . . . . <===========>. . H271 35 1875 1992 118

. . . . . . . . . . . . . . . . . <========>. . H242 36 1904 1992 89

. . . . . . . . . . . . . . . . . <===========>. . H371 37 1878 1992 115

. . . . . . . . . . . . . . . . . <==========>. . H372 38 1887 1992 106

. . . . . . . . . . . . . . . . . <========>. . H381 39 1903 1992 90

. . . . . . . . . . . . . . . . . <==========>. . H382 40 1888 1992 105

. . . . . . . . . . . . . . . . . <=========>. . H391 41 1891 1992 102

. . . . . . . . . . . . . . . . . <=========>. . H392 42 1892 1992 101

. . . . . . . . . . . . . . . . . .<=======>. . H361 43 1916 1992 77

. . . . . . . . . . . . . . . . . .<=======>. . H362 44 1912 1992 81

. . . . . . . . . . . . . . . . . <=========>. . H352 45 1892 1992 101

. . . . . . . . . . . . . . . . . <=========>. . H351 46 1899 1992 94

. . . . . . . . . . . . . . . . . . <=====>. . H342 47 1932 1992 61

. . . . . . . . . . . . . . . . . .<=======>. . H341 48 1918 1992 75

. . . . . . . . . . . . . . . . . <========>. . H322 49 1904 1992 89

. . . . . . . . . . . . . . . . . . <=====>. . H311 50 1933 1992 60

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 2: TIME PLOT OF TREE-RING SERIES: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 3

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050 Ident Seq Time-span Yrs

: : : : : : : : : : : : : : : : : : : : : -------- --- ---- ---- ----

. . . . . . . . . . . . . . . . . . <======>. . H312 51 1927 1992 66

. . . . . . . . . . . . . . . . . <========>. . H332 52 1901 1992 92

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. . . . . . . . . . . . . . . . . <========>. . H331 54 1903 1992 90

. . . . . . . . . . . . . . . . . <==========>. . H432 55 1887 1993 107

. . . . . . . . . . . . . . . . . <=========>. . H431 56 1896 1993 98

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. . . . . . . . . . . . . . . . . <=========>. . H422 58 1894 1993 100

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. . . . . . . . . . . . . . . . . <=========>. . H461 61 1897 1993 97

. . . . . . . . . . . . . . . . . <=========>. . H462 62 1890 1993 104

. . . . . . . . . . . . . . . . . <==========>. . H451 63 1881 1993 113

. . . . . . . . . . . . . . . . . <==========>. . H452 64 1883 1993 111

. . . . . . . . . . . . . . . . . . <======>. . H442 65 1927 1993 67

. . . . . . . . . . . . . . . . . <=========>. . H481 66 1891 1993 103

. . . . . . . . . . . . . . . . . <=========>. . H482 67 1898 1993 96

. . . . . . . . . . . . . . . . . <=========>. . H471 68 1895 1993 99

. . . . . . . . . . . . . . . . . <==========>. . H472 69 1886 1993 108

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1050 1100 1150 1200 1250 1300 1350 1400 1450 1500 1550 1600 1650 1700 1750 1800 1850 1900 1950 2000 2050

PART 3: Master Dating Series: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 4

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Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab Year Value No Ab

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1900 1.245 34 1950 -1.415 69

1901 -0.169 36 1951 -0.837 69

1902 0.823 38 1952 -0.583 69

1903 -0.655 44 1953 -1.416 69

1904 -0.098 47 1954 -0.172 69

1905 0.547 48 1955 -0.855 69

1906 -1.080 48 1956 -0.913 69

1907 -0.022 49 1957 0.794 69

1908 -0.331 51 1958 2.167 69

1909 -0.091 51 1959 0.012 69

1910 -0.054 51 1960 1.280 69

1911 -2.158 51 1961 2.258 69

1912 -0.387 52 1962 0.251 69

1913 -0.107 52 1963 0.041 69

1914 0.947 52 1964 0.357 69

1915 2.222 54 1965 1.324 69

1916 0.669 55 1966 -0.308 69

1917 -0.009 56 1967 -1.206 69

1918 0.733 59 1968 -0.311 69

1919 -1.435 59 1969 -0.678 69

1920 0.830 59 1970 -0.186 69

1921 -0.966 60 1971 -0.359 69

1922 0.302 62 1972 -1.242 69

1923 -1.327 63 1973 -1.681 69

1874 -2.139 1 1924 0.959 63 1974 -1.444 69 1

1875 -1.446 2 1925 0.094 63 1975 -0.932 69

1876 -0.585 2 1926 -0.020 64 1976 0.431 69

1877 0.132 2 1927 0.529 67 1977 -0.145 69

1878 1.420 4 1928 -1.056 67 1978 1.741 69

1879 0.693 4 1929 -0.680 67 1979 1.188 69

1880 1.404 4 1930 -0.130 67 1980 0.790 69

1881 -0.603 5 1931 0.934 67 1981 -0.530 69

1882 0.266 5 1932 2.013 68 1982 -1.044 69

1883 0.129 6 1933 -1.361 69 1983 -0.245 69 1<<

1884 -1.374 6 1934 -0.498 69 1984 -0.770 69

1885 0.310 6 1935 0.702 69 1985 0.111 69 1<<

1886 1.061 8 1936 -1.897 69 1986 -0.039 69

1887 -1.095 11 1937 -0.949 69 1987 1.674 69

1888 -1.414 14 1938 0.098 69 1988 0.402 69

1889 0.649 15 1939 0.500 69 1989 -0.592 69

1890 -0.229 18 1940 0.544 69 1990 -0.499 69

1891 0.096 20 1941 1.757 69 1991 -0.620 69

1892 0.803 22 1942 -0.040 69 1992 1.855 51

1893 -0.537 23 1943 -0.050 69 1993 1.947 15

1894 1.007 24 1944 0.467 69

1895 -1.755 27 1945 1.795 69

1896 -0.319 28 1946 0.086 69

1897 1.044 30 1947 0.734 69

1898 0.864 31 1948 -0.676 69

1899 -0.185 32 1949 -1.082 69

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PART 4: Master Bar Plot: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 5

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Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value Year Rel value

1900---------E 1950f

1901----a 1951--c

1902--------C 1952---b

1903--c 1953f

1904-----@ 1954----a

1905-------B 1955--c

1906-d 1956--d

1907-----@ 1957--------C

1908----a 1958----------I

1909-----@ 1959-----@

1910-----@ 1960---------E

1911i 1961----------I

1912---b 1962------A

1913-----@ 1963------@

1914--------D 1964-------A

1915----------I 1965---------E

1916--------C 1966----a

1917-----@ 1967-e

1918--------C 1968----a

1919f 1969--c

1920--------C 1970----a

1921-d 1971---a

1922------A 1972-e

1923e 1973g

1874i 1924--------D 1974f

1875f 1925------@ 1975--d

1876---b 1926-----@ 1976-------B

1877------A 1927-------B 1977----a

1878---------F 1928-d 1978----------G

1879--------C 1929--c 1979---------E

1880---------F 1930----a 1980--------C

1881---b 1931--------D 1981---b

1882------A 1932----------H 1982-d

1883------A 1933e 1983----a

1884e 1934---b 1984--c

1885-------A 1935--------C 1985------@

1886---------D 1936h 1986-----@

1887-d 1937-d 1987----------G

1888f 1938------@ 1988-------B

1889--------C 1939-------B 1989---b

1890----a 1940-------B 1990---b

1891------@ 1941----------G 1991---b

1892--------C 1942-----@ 1992----------G

1893---b 1943-----@ 1993----------H

1894---------D 1944-------B

1895g 1945----------G

1896----a 1946------@

1897---------D 1947--------C

1898--------C 1948--c

1899----a 1949-d

PART 5: CORRELATION OF SERIES BY SEGMENTS: Red Spruce, Groton State Forest, VT 12:41 Tue 21 Apr 2020 Page 5

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Correlations of 50-year dated segments, lagged 25 years

Flags: A = correlation under 0.3281 but highest as dated; B = correlation higher at other than dated position

Seq Series Time\_span 1875 1900 1925 1950

1924 1949 1974 1999

--- -------- --------- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ---- ----

1 H182 1926 1991 .62 .54

2 H192 1917 1991 .47 .37 .41

3 H191 1922 1991 .49 .48 .42

4 H181 1927 1991 .71 .69

5 H162 1900 1991 .50 .52 .51

6 H152 1923 1991 .73 .74 .68

7 H141 1895 1991 .63 .58 .66 .59

8 H112 1902 1991 .82 .77 .66

9 H161 1878 1991 .54 .54 .55 .53

10 H111 1888 1991 .72 .69 .71 .70

11 H151 1918 1991 .69 .74 .61

12 H171 1897 1991 .53 .54 .66 .63

13 H172 1907 1991 .61 .69 .50

14 H131 1889 1991 .53 .67 .62 .49

15 H122 1903 1991 .72 .47 .35

16 H121 1887 1991 .75 .74 .75 .65

17 H132 1908 1991 .54 .44 .43

18 H142 1886 1991 .40 .50 .74 .64

19 H232 1922 1992 .65 .70 .68

20 H221 1903 1992 .53 .57 .64

21 H252 1904 1992 .67 .72 .68

22 H281 1915 1992 .54 .74 .77

23 H251 1900 1992 .59 .47 .50

24 H231 1921 1992 .52 .51 .55

25 H222 1915 1992 .51 .59 .81

26 H291 1908 1992 .75 .75 .76

27 H292 1902 1992 .69 .82 .79

28 H272 1874 1992 .66 .58 .57 .57

29 H212 1903 1992 .65 .56 .59

30 H262 1888 1992 .72 .75 .68 .52

31 H282 1918 1992 .62 .60 .69

32 H211 1893 1992 .55 .52 .69 .67

33 H261 1890 1992 .83 .78 .81 .66

34 H241 1895 1992 .49 .72 .68 .66

35 H271 1875 1992 .56 .58 .73 .64

36 H242 1904 1992 .75 .82 .75

37 H371 1878 1992 .34 .38 .47 .48

38 H372 1887 1992 .77 .74 .74 .71

39 H381 1903 1992 .69 .59 .63

40 H382 1888 1992 .67 .70 .77 .71

41 H391 1891 1992 .69 .72 .73 .58

42 H392 1892 1992 .72 .70 .68 .57

43 H361 1916 1992 .65 .68 .65

44 H362 1912 1992 .58 .64 .71

45 H352 1892 1992 .62 .59 .68 .75

46 H351 1899 1992 .63 .67 .64 .57

47 H342 1932 1992 .63 .54

48 H341 1918 1992 .68 .74 .72

49 H322 1904 1992 .53 .58 .54

50 H311 1933 1992 .51 .52

51 H312 1927 1992 .51 .70

52 H332 1901 1992 .56 .62 .66

53 H321 1903 1992 .62 .57 .56

54 H331 1903 1992 .60 .60 .52

55 H432 1887 1993 .65 .67 .64 .62

56 H431 1896 1993 .49 .54 .56 .59

57 H421 1890 1993 .68 .73 .75 .64

58 H422 1894 1993 .60 .74 .75 .63

59 H412 1905 1993 .58 .62 .72

60 H411 1901 1993 .60 .68 .64

61 H461 1897 1993 .65 .66 .60 .59

62 H462 1890 1993 .45 .45 .64 .66

63 H451 1881 1993 .60 .59 .71 .77

64 H452 1883 1993 .65 .66 .71 .70

65 H442 1927 1993 .57 .58

66 H481 1891 1993 .64 .62 .79 .77

67 H482 1898 1993 .76 .75 .82 .76

68 H471 1895 1993 .73 .73 .78 .78

69 H472 1886 1993 .74 .77 .69 .61

Av segment correlation 0.62 0.63 0.65 0.62

PART 6: POTENTIAL PROBLEMS: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 6

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For each series with potential problems the following diagnostics may appear:

[A] Correlations with master dating series of flagged 50-year segments of series filtered with 32-year spline,

at every point from ten years earlier (-10) to ten years later (+10) than dated

[B] Effect of those data values which most lower or raise correlation with master series

Symbol following year indicates value in series is greater (>) or lesser (<) than master series value

[C] Year-to-year changes very different from the mean change in other series

[D] Absent rings (zero values)

[E] Values which are statistical outliers from mean for the year

====================================================================================================================================

H182 1926 to 1991 66 years Series 1

[B] Entire series, effect on correlation ( 0.611) is:

Lower 1945<-0.071 1958<-0.022 1951>-0.020 1984>-0.010 1934>-0.007 1991>-0.007 Higher 1933 0.020 1987 0.019

====================================================================================================================================

H192 1917 to 1991 75 years Series 2

[B] Entire series, effect on correlation ( 0.453) is:

Lower 1931<-0.032 1948>-0.024 1969>-0.023 1930<-0.017 1961<-0.015 1989>-0.014 Higher 1932 0.035 1978 0.028

====================================================================================================================================

H191 1922 to 1991 70 years Series 3

[B] Entire series, effect on correlation ( 0.539) is:

Lower 1961<-0.073 1948>-0.052 1950>-0.031 1947<-0.023 1982>-0.012 1937>-0.011 Higher 1958 0.028 1978 0.023

====================================================================================================================================

H181 1927 to 1991 65 years Series 4

[B] Entire series, effect on correlation ( 0.691) is:

Lower 1941<-0.024 1958<-0.022 1938>-0.018 1984>-0.016 1988>-0.016 1954>-0.015 Higher 1933 0.022 1987 0.021

====================================================================================================================================

H162 1900 to 1991 92 years Series 5

[B] Entire series, effect on correlation ( 0.524) is:

Lower 1945<-0.026 1902<-0.019 1920<-0.013 1989>-0.013 1982>-0.010 1969>-0.010 Higher 1961 0.020 1919 0.020

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1918 +3.0 SD; 1939 +3.0 SD

====================================================================================================================================

H152 1923 to 1991 69 years Series 6

[B] Entire series, effect on correlation ( 0.660) is:

Lower 1979<-0.032 1975>-0.027 1924<-0.023 1940<-0.021 1991>-0.020 1968<-0.012 Higher 1961 0.028 1978 0.020

====================================================================================================================================

H141 1895 to 1991 97 years Series 7

[B] Entire series, effect on correlation ( 0.619) is:

Lower 1977<-0.017 1946>-0.016 1901>-0.016 1916>-0.014 1950>-0.011 1982>-0.009 Higher 1958 0.021 1933 0.020

====================================================================================================================================

H112 1902 to 1991 90 years Series 8

[B] Entire series, effect on correlation ( 0.747) is:

Lower 1974>-0.016 1975>-0.015 1973>-0.014 1908>-0.012 1978<-0.012 1918<-0.008 Higher 1933 0.014 1961 0.012

====================================================================================================================================

H161 1878 to 1991 114 years Series 9

[B] Entire series, effect on correlation ( 0.547) is:

Lower 1971>-0.021 1920<-0.017 1909>-0.014 1889<-0.013 1945<-0.012 1939<-0.011 Higher 1936 0.017 1932 0.016

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1971 +3.5 SD

====================================================================================================================================

H111 1888 to 1991 104 years Series 10

[B] Entire series, effect on correlation ( 0.694) is:

Lower 1900<-0.015 1939>-0.011 1975>-0.009 1911>-0.008 1908>-0.007 1948<-0.006 Higher 1932 0.012 1919 0.009

====================================================================================================================================

H151 1918 to 1991 74 years Series 11

[B] Entire series, effect on correlation ( 0.608) is:

Lower 1921>-0.043 1987<-0.026 1927<-0.021 1981>-0.019 1982>-0.012 1988<-0.012 Higher 1961 0.031 1978 0.021

====================================================================================================================================

H171 1897 to 1991 95 years Series 12

[B] Entire series, effect on correlation ( 0.576) is:

Lower 1910<-0.022 1988>-0.022 1943>-0.012 1914<-0.011 1978<-0.010 1938<-0.008 Higher 1987 0.015 1958 0.015

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1988 +3.2 SD

====================================================================================================================================

H172 1907 to 1991 85 years Series 13

[B] Entire series, effect on correlation ( 0.584) is:

Lower 1989>-0.017 1914<-0.016 1953>-0.015 1988>-0.013 1978<-0.010 1930<-0.010 Higher 1958 0.020 1915 0.018

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1920 +4.5 SD

====================================================================================================================================

H131 1889 to 1991 103 years Series 14

[B] Entire series, effect on correlation ( 0.532) is:

Lower 1889<-0.041 1924<-0.022 1922<-0.019 1990>-0.012 1890>-0.012 1950>-0.011 Higher 1895 0.024 1941 0.017

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H122 1903 to 1991 89 years Series 15

[B] Entire series, effect on correlation ( 0.554) is:

Lower 1969>-0.034 1988>-0.021 1964<-0.014 1935<-0.012 1971>-0.009 1989>-0.009 Higher 1911 0.024 1915 0.021

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1969 +3.8 SD

====================================================================================================================================

H121 1887 to 1991 105 years Series 16

[B] Entire series, effect on correlation ( 0.715) is:

Lower 1887>-0.013 1975>-0.010 1935<-0.009 1964<-0.009 1904<-0.009 1909>-0.007 Higher 1895 0.014 1987 0.011

====================================================================================================================================

H132 1908 to 1991 84 years Series 17

[B] Entire series, effect on correlation ( 0.537) is:

Lower 1952>-0.028 1960<-0.019 1931<-0.017 1922>-0.016 1945<-0.016 1961<-0.016 Higher 1987 0.024 1911 0.024

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1922 +4.0 SD; 1952 +3.4 SD

====================================================================================================================================

H142 1886 to 1991 106 years Series 18

[B] Entire series, effect on correlation ( 0.534) is:

Lower 1908>-0.027 1886<-0.024 1915<-0.021 1980<-0.020 1924<-0.014 1896<-0.014 Higher 1961 0.021 1978 0.020

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1908 +3.8 SD

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H232 1922 to 1992 71 years Series 19

[B] Entire series, effect on correlation ( 0.611) is:

Lower 1978<-0.029 1982>-0.025 1923>-0.022 1933>-0.015 1976<-0.011 1938<-0.011 Higher 1961 0.027 1936 0.027

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H221 1903 to 1992 90 years Series 20

[B] Entire series, effect on correlation ( 0.599) is:

Lower 1906>-0.023 1945<-0.020 1931<-0.014 1926<-0.013 1987<-0.009 1976<-0.008 Higher 1992 0.026 1911 0.019

====================================================================================================================================

H252 1904 to 1992 89 years Series 21

[B] Entire series, effect on correlation ( 0.677) is:

Lower 1920<-0.034 1987<-0.018 1923>-0.017 1919>-0.013 1965<-0.010 1949>-0.008 Higher 1992 0.018 1915 0.014

====================================================================================================================================

H281 1915 to 1992 78 years Series 22

[B] Entire series, effect on correlation ( 0.608) is:

Lower 1915<-0.045 1917>-0.037 1924<-0.016 1939<-0.012 1922<-0.012 1985<-0.010 Higher 1992 0.027 1958 0.021

====================================================================================================================================

H251 1900 to 1992 93 years Series 23

[B] Entire series, effect on correlation ( 0.546) is:

Lower 1974>-0.024 1949>-0.015 1922<-0.013 1967>-0.013 1909>-0.012 1964<-0.011 Higher 1915 0.019 1945 0.019

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1974 +3.2 SD

====================================================================================================================================

H231 1921 to 1992 72 years Series 24

[B] Entire series, effect on correlation ( 0.530) is:

Lower 1929>-0.084 1956>-0.037 1969>-0.020 1961<-0.015 1982>-0.014 1986>-0.013 Higher 1936 0.029 1923 0.016

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1929 +5.0 SD

====================================================================================================================================

H222 1915 to 1992 78 years Series 25

[B] Entire series, effect on correlation ( 0.599) is:

Lower 1932<-0.091 1915<-0.045 1916>-0.021 1987<-0.014 1936>-0.011 1961<-0.008 Higher 1992 0.030 1958 0.022

====================================================================================================================================

H291 1908 to 1992 85 years Series 26

[B] Entire series, effect on correlation ( 0.760) is:

Lower 1937>-0.020 1948>-0.013 1924<-0.011 1944<-0.009 1982>-0.008 1941<-0.008 Higher 1958 0.013 1992 0.013

====================================================================================================================================

H292 1902 to 1992 91 years Series 27

[B] Entire series, effect on correlation ( 0.728) is:

Lower 1902<-0.037 1911>-0.012 1974>-0.011 1922<-0.010 1941<-0.009 1937>-0.008 Higher 1936 0.017 1992 0.015

====================================================================================================================================

H272 1874 to 1992 119 years Series 28

[\*] Early part of series cannot be checked from 1874 to 1874 -- not matched by another series

[B] Entire series, effect on correlation ( 0.618) is:

Lower 1939>-0.017 1949>-0.016 1924<-0.010 1947<-0.009 1958<-0.008 1919>-0.007 Higher 1911 0.015 1992 0.011

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1939 +3.1 SD

====================================================================================================================================

H212 1903 to 1992 90 years Series 29

[B] Entire series, effect on correlation ( 0.612) is:

Lower 1941<-0.018 1965<-0.017 1904<-0.014 1931<-0.012 1987<-0.011 1960<-0.009 Higher 1992 0.020 1933 0.019

[D] 2 Absent rings: Year Master N series Absent

1983 -0.245 69 1 >> WARNING: Ring is not usually narrow

1985 0.111 69 1 >> WARNING: Ring is not usually narrow

====================================================================================================================================

H262 1888 to 1992 105 years Series 30

[B] Entire series, effect on correlation ( 0.631) is:

Lower 1889<-0.039 1992<-0.027 1888>-0.018 1951>-0.016 1978<-0.015 1944<-0.013 Higher 1958 0.018 1915 0.015

====================================================================================================================================

H282 1918 to 1992 75 years Series 31

[B] Entire series, effect on correlation ( 0.641) is:

Lower 1954>-0.022 1970>-0.019 1942>-0.017 1923>-0.016 1991>-0.009 1964<-0.009 Higher 1992 0.020 1919 0.014

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1954 +3.2 SD

====================================================================================================================================

H211 1893 to 1992 100 years Series 32

[B] Entire series, effect on correlation ( 0.592) is:

Lower 1915<-0.039 1907<-0.021 1987<-0.016 1904<-0.015 1935<-0.010 1902<-0.010 Higher 1992 0.022 1895 0.019

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1914 +3.3 SD

====================================================================================================================================

H261 1890 to 1992 103 years Series 33

[B] Entire series, effect on correlation ( 0.743) is:

Lower 1992<-0.025 1942>-0.009 1980<-0.009 1932<-0.008 1988>-0.007 1978<-0.007 Higher 1895 0.012 1958 0.012

====================================================================================================================================

H241 1895 to 1992 98 years Series 34

[B] Entire series, effect on correlation ( 0.567) is:

Lower 1895>-0.107 1991>-0.013 1946>-0.013 1897<-0.012 1925>-0.007 1990>-0.006 Higher 1911 0.022 1915 0.017

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1895 +4.7 SD

====================================================================================================================================

H271 1875 to 1992 118 years Series 35

[B] Entire series, effect on correlation ( 0.608) is:

Lower 1896>-0.015 1920<-0.015 1918<-0.015 1889<-0.010 1929>-0.009 1909>-0.008 Higher 1992 0.013 1945 0.012

====================================================================================================================================

H242 1904 to 1992 89 years Series 36

[B] Entire series, effect on correlation ( 0.740) is:

Lower 1978<-0.015 1923>-0.012 1916<-0.009 1909<-0.009 1918<-0.007 1961<-0.006 Higher 1933 0.014 1992 0.013

====================================================================================================================================

H371 1878 to 1992 115 years Series 37

[B] Entire series, effect on correlation ( 0.438) is:

Lower 1878<-0.022 1949>-0.019 1915<-0.016 1910>-0.014 1880<-0.014 1948>-0.013 Higher 1978 0.016 1945 0.014

[D] 1 Absent rings: Year Master N series Absent

1974 -1.444 69 1

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1910 +3.4 SD; 1949 +3.1 SD

====================================================================================================================================

H372 1887 to 1992 106 years Series 38

[B] Entire series, effect on correlation ( 0.726) is:

Lower 1967>-0.016 1901>-0.013 1979<-0.012 1892<-0.009 1922<-0.008 1985>-0.008 Higher 1961 0.012 1932 0.010

====================================================================================================================================

H381 1903 to 1992 90 years Series 39

[B] Entire series, effect on correlation ( 0.660) is:

Lower 1953>-0.022 1939>-0.018 1907<-0.017 1989>-0.010 1945<-0.010 1906>-0.009 Higher 1911 0.018 1978 0.016

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1939 +3.0 SD

====================================================================================================================================

H382 1888 to 1992 105 years Series 40

[B] Entire series, effect on correlation ( 0.680) is:

Lower 1900<-0.029 1913<-0.015 1889<-0.011 1965<-0.010 1905<-0.010 1910>-0.009 Higher 1933 0.015 1932 0.012

====================================================================================================================================

H391 1891 to 1992 102 years Series 41

[B] Entire series, effect on correlation ( 0.639) is:

Lower 1981>-0.030 1901>-0.018 1959>-0.016 1987<-0.015 1928>-0.013 1983>-0.012 Higher 1911 0.018 1895 0.017

====================================================================================================================================

H392 1892 to 1992 101 years Series 42

[B] Entire series, effect on correlation ( 0.650) is:

Lower 1971>-0.023 1983>-0.013 1913<-0.011 1958<-0.010 1948>-0.010 1920<-0.010 Higher 1895 0.018 1961 0.017

====================================================================================================================================

H361 1916 to 1992 77 years Series 43

[B] Entire series, effect on correlation ( 0.639) is:

Lower 1928>-0.025 1922>-0.019 1969>-0.018 1924<-0.016 1918<-0.015 1950>-0.015 Higher 1961 0.019 1933 0.018

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1922 +3.3 SD

====================================================================================================================================

H362 1912 to 1992 81 years Series 44

[B] Entire series, effect on correlation ( 0.650) is:

Lower 1919>-0.022 1942>-0.019 1914<-0.019 1945<-0.018 1954<-0.015 1912<-0.013 Higher 1958 0.017 1978 0.016

====================================================================================================================================

H352 1892 to 1992 101 years Series 45

[B] Entire series, effect on correlation ( 0.673) is:

Lower 1984>-0.012 1905<-0.011 1932<-0.011 1916>-0.010 1920<-0.009 1931<-0.009 Higher 1992 0.018 1895 0.017

====================================================================================================================================

H351 1899 to 1992 94 years Series 46

[B] Entire series, effect on correlation ( 0.629) is:

Lower 1947<-0.046 1899>-0.030 1950>-0.015 1972>-0.013 1981>-0.013 1902<-0.013 Higher 1992 0.021 1936 0.015

====================================================================================================================================

H342 1932 to 1992 61 years Series 47

[B] Entire series, effect on correlation ( 0.592) is:

Lower 1988<-0.022 1982>-0.022 1945<-0.019 1972>-0.015 1948>-0.015 1977<-0.013 Higher 1936 0.034 1978 0.024

====================================================================================================================================

H341 1918 to 1992 75 years Series 48

[B] Entire series, effect on correlation ( 0.659) is:

Lower 1918<-0.040 1921>-0.024 1974>-0.013 1939<-0.012 1977>-0.009 1955>-0.009 Higher 1958 0.019 1933 0.018

====================================================================================================================================

H322 1904 to 1992 89 years Series 49

[B] Entire series, effect on correlation ( 0.587) is:

Lower 1953>-0.035 1949>-0.025 1914<-0.017 1970>-0.012 1917>-0.011 1986>-0.009 Higher 1936 0.025 1958 0.018

====================================================================================================================================

H311 1933 to 1992 60 years Series 50

[B] Entire series, effect on correlation ( 0.533) is:

Lower 1971>-0.033 1944<-0.031 1933>-0.028 1964<-0.016 1957<-0.015 1956>-0.014 Higher 1992 0.034 1961 0.024

====================================================================================================================================

H312 1927 to 1992 66 years Series 51

[B] Entire series, effect on correlation ( 0.570) is:

Lower 1945<-0.030 1932<-0.024 1943>-0.022 1928>-0.021 1935<-0.021 1941<-0.021 Higher 1987 0.030 1961 0.029

====================================================================================================================================

H332 1901 to 1992 92 years Series 52

[B] Entire series, effect on correlation ( 0.605) is:

Lower 1904<-0.024 1932<-0.022 1901>-0.019 1991>-0.014 1965<-0.014 1919>-0.011 Higher 1992 0.023 1961 0.018

====================================================================================================================================

H321 1903 to 1992 90 years Series 53

[B] Entire series, effect on correlation ( 0.591) is:

Lower 1990<-0.021 1953>-0.020 1946>-0.013 1924<-0.012 1935<-0.008 1941<-0.008 Higher 1978 0.020 1987 0.016

====================================================================================================================================

H331 1903 to 1992 90 years Series 54

[B] Entire series, effect on correlation ( 0.551) is:

Lower 1981>-0.024 1967>-0.017 1904<-0.017 1957<-0.014 1977>-0.012 1903>-0.009 Higher 1992 0.023 1945 0.019

[E] Outliers 2 3.0 SD above or -4.5 SD below mean for year

1946 +3.5 SD; 1981 +3.2 SD

====================================================================================================================================

H432 1887 to 1993 107 years Series 55

[B] Entire series, effect on correlation ( 0.640) is:

Lower 1971>-0.019 1897<-0.017 1930<-0.010 1887>-0.009 1991>-0.008 1944<-0.007 Higher 1895 0.018 1936 0.014

====================================================================================================================================

H431 1896 to 1993 98 years Series 56

[B] Entire series, effect on correlation ( 0.542) is:

Lower 1897<-0.027 1918<-0.022 1972>-0.015 1904>-0.010 1971>-0.009 1969>-0.007 Higher 1958 0.023 1936 0.018

====================================================================================================================================

H421 1890 to 1993 104 years Series 57

[B] Entire series, effect on correlation ( 0.662) is:

Lower 1987<-0.030 1900<-0.018 1905<-0.012 1960<-0.012 1959>-0.010 1914<-0.010 Higher 1911 0.014 1915 0.014

====================================================================================================================================

H422 1894 to 1993 100 years Series 58

[B] Entire series, effect on correlation ( 0.609) is:

Lower 1894<-0.036 1895>-0.018 1899>-0.016 1984>-0.015 1992<-0.012 1982>-0.008 Higher 1915 0.017 1933 0.016

====================================================================================================================================

H412 1905 to 1993 89 years Series 59

[B] Entire series, effect on correlation ( 0.632) is:

Lower 1932<-0.016 1906>-0.015 1972>-0.013 1905<-0.013 1922<-0.011 1971>-0.011 Higher 1911 0.016 1978 0.014

====================================================================================================================================

H411 1901 to 1993 93 years Series 60

[B] Entire series, effect on correlation ( 0.598) is:

Lower 1972>-0.034 1903>-0.030 1922<-0.017 1921>-0.014 1930<-0.014 1979<-0.013 Higher 1911 0.020 1958 0.015

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1972 +3.2 SD

====================================================================================================================================

H461 1897 to 1993 97 years Series 61

[B] Entire series, effect on correlation ( 0.609) is:

Lower 1922<-0.032 1993<-0.025 1951>-0.015 1935<-0.010 1958<-0.009 1989>-0.008 Higher 1992 0.015 1911 0.014

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1932 +3.2 SD

====================================================================================================================================

H462 1890 to 1993 104 years Series 62

[B] Entire series, effect on correlation ( 0.542) is:

Lower 1920<-0.059 1945<-0.018 1904>-0.015 1929>-0.014 1948>-0.013 1923>-0.013 Higher 1919 0.018 1936 0.017

[E] Outliers 1 3.0 SD above or -4.5 SD below mean for year

1920 -4.8 SD

====================================================================================================================================

H451 1881 to 1993 113 years Series 63

[B] Entire series, effect on correlation ( 0.675) is:

Lower 1921>-0.029 1888>-0.020 1922<-0.018 1897<-0.011 1945<-0.009 1924<-0.009 Higher 1895 0.016 1992 0.014

====================================================================================================================================

H452 1883 to 1993 111 years Series 64

[B] Entire series, effect on correlation ( 0.649) is:

Lower 1888>-0.019 1924<-0.016 1934>-0.014 1921>-0.013 1897<-0.011 1991>-0.010 Higher 1911 0.013 1915 0.012

====================================================================================================================================

H442 1927 to 1993 67 years Series 65

[B] Entire series, effect on correlation ( 0.566) is:

Lower 1992<-0.033 1948>-0.030 1990>-0.023 1935<-0.021 1971>-0.018 1973>-0.017 Higher 1958 0.031 1987 0.017

====================================================================================================================================

H481 1891 to 1993 103 years Series 66

[B] Entire series, effect on correlation ( 0.687) is:

Lower 1901<-0.027 1914<-0.023 1905<-0.016 1923>-0.011 1992<-0.011 1920<-0.010 Higher 1915 0.013 1936 0.013

====================================================================================================================================

H482 1898 to 1993 96 years Series 67

[B] Entire series, effect on correlation ( 0.764) is:

Lower 1905<-0.048 1947<-0.016 1904>-0.010 1977>-0.009 1948>-0.006 1978<-0.005 Higher 1911 0.013 1958 0.011

====================================================================================================================================

H471 1895 to 1993 99 years Series 68

[B] Entire series, effect on correlation ( 0.749) is:

Lower 1973>-0.015 1918<-0.013 1904>-0.013 1920<-0.012 1937>-0.009 1974>-0.008 Higher 1933 0.012 1961 0.010

====================================================================================================================================

H472 1886 to 1993 108 years Series 69

[B] Entire series, effect on correlation ( 0.680) is:

Lower 1992<-0.025 1886<-0.022 1887>-0.011 1969>-0.009 1982>-0.009 1912<-0.007 Higher 1936 0.015 1915 0.013

====================================================================================================================================

[\*] All segments correlate highest as dated with correlation with master series over 0.3281

PART 7: DESCRIPTIVE STATISTICS: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 7

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

--- -------- --------- ----- ----- ----- ------ ----- ----- ----- ----- ----- ----- ----- ----- --

1 H182 1926 1991 66 2 0 0.611 1.53 3.54 1.050 0.942 0.213 0.58 0.299 0.044 1

2 H192 1917 1991 75 3 0 0.453 1.70 3.17 0.606 0.762 0.170 0.53 0.211 0.021 1

3 H191 1922 1991 70 3 0 0.539 2.70 4.32 0.805 0.712 0.174 0.42 0.201 0.002 1

4 H181 1927 1991 65 2 0 0.691 2.02 3.71 1.085 0.925 0.160 0.62 0.260 0.019 1

5 H162 1900 1991 92 3 0 0.524 1.46 2.81 0.507 0.790 0.166 0.75 0.249 0.003 1

6 H152 1923 1991 69 3 0 0.660 1.62 2.96 0.549 0.792 0.156 0.65 0.212 0.000 1

7 H141 1895 1991 97 4 0 0.619 1.72 3.49 0.623 0.726 0.208 0.68 0.262 0.019 1

8 H112 1902 1991 90 3 0 0.747 1.91 4.31 0.742 0.710 0.238 0.83 0.304 0.049 1

9 H161 1878 1991 114 4 0 0.547 1.73 3.64 0.566 0.774 0.177 0.54 0.224 -0.014 1

10 H111 1888 1991 104 4 0 0.694 1.19 2.26 0.430 0.728 0.228 0.68 0.285 -0.020 1

11 H151 1918 1991 74 3 0 0.608 1.78 3.26 0.563 0.737 0.178 0.67 0.226 0.044 1

12 H171 1897 1991 95 4 0 0.576 1.37 3.03 0.630 0.762 0.214 0.86 0.304 -0.008 1

13 H172 1907 1991 85 3 0 0.584 1.39 3.39 0.752 0.817 0.226 1.25 0.297 -0.011 1

14 H131 1889 1991 103 4 0 0.532 1.20 2.86 0.600 0.822 0.247 0.74 0.318 0.014 1

15 H122 1903 1991 89 3 0 0.554 1.47 3.01 0.543 0.755 0.206 0.64 0.275 0.023 1

16 H121 1887 1991 105 4 0 0.715 1.53 2.83 0.512 0.662 0.216 0.79 0.308 0.000 1

17 H132 1908 1991 84 3 0 0.537 1.20 3.36 0.576 0.790 0.209 0.90 0.269 0.000 1

18 H142 1886 1991 106 4 0 0.534 1.46 3.18 0.678 0.865 0.190 0.65 0.245 -0.009 3

19 H232 1922 1992 71 3 0 0.611 1.95 3.49 0.564 0.703 0.165 0.48 0.196 0.020 1

20 H221 1903 1992 90 3 0 0.599 1.23 2.53 0.557 0.827 0.194 0.76 0.266 -0.019 1

21 H252 1904 1992 89 3 0 0.677 1.08 2.29 0.402 0.782 0.191 0.71 0.243 0.037 1

22 H281 1915 1992 78 3 0 0.608 1.76 3.41 0.674 0.791 0.180 0.82 0.260 0.041 1

23 H251 1900 1992 93 3 0 0.546 1.49 2.42 0.510 0.769 0.196 0.52 0.221 -0.034 2

24 H231 1921 1992 72 3 0 0.530 1.92 3.54 0.765 0.872 0.158 0.77 0.213 0.013 1

25 H222 1915 1992 78 3 0 0.599 1.59 3.09 0.694 0.871 0.163 0.74 0.247 -0.016 1

26 H291 1908 1992 85 3 0 0.760 2.02 3.75 0.724 0.736 0.190 0.62 0.249 -0.006 2

27 H292 1902 1992 91 3 0 0.728 1.63 3.46 0.703 0.833 0.183 0.63 0.264 -0.022 1

28 H272 1874 1992 119 4 0 0.618 0.90 2.06 0.446 0.861 0.209 0.89 0.284 0.011 2

29 H212 1903 1992 90 3 0 0.612 1.11 2.41 0.639 0.891 0.327 1.55 0.582 0.012 1

30 H262 1888 1992 105 4 0 0.631 1.43 3.26 0.696 0.831 0.204 0.78 0.260 -0.010 1

31 H282 1918 1992 75 3 0 0.641 1.58 2.85 0.659 0.830 0.210 0.63 0.246 0.004 1

32 H211 1893 1992 100 4 0 0.592 1.29 2.68 0.605 0.816 0.259 1.56 0.490 0.055 1

33 H261 1890 1992 103 4 0 0.743 1.66 3.18 0.768 0.883 0.194 0.66 0.261 -0.002 1

34 H241 1895 1992 98 4 0 0.567 1.34 3.91 0.864 0.905 0.193 0.68 0.258 0.033 2

35 H271 1875 1992 118 4 0 0.608 1.23 2.94 0.689 0.845 0.239 1.02 0.331 -0.015 1

36 H242 1904 1992 89 3 0 0.740 1.20 2.55 0.741 0.926 0.229 0.62 0.302 -0.017 1

37 H371 1878 1992 115 4 0 0.438 1.08 3.43 0.820 0.934 0.229 0.86 0.307 0.018 1

38 H372 1887 1992 106 4 0 0.726 1.11 3.46 0.804 0.919 0.203 0.75 0.251 -0.018 1

39 H381 1903 1992 90 3 0 0.660 1.08 2.71 0.730 0.915 0.217 0.89 0.318 0.004 1

40 H382 1888 1992 105 4 0 0.680 1.36 2.82 0.715 0.875 0.202 0.68 0.281 0.004 1

41 H391 1891 1992 102 4 0 0.639 1.30 2.85 0.799 0.914 0.193 0.45 0.215 0.005 1

42 H392 1892 1992 101 4 0 0.650 1.17 2.74 0.778 0.915 0.197 0.63 0.249 0.007 2

43 H361 1916 1992 77 3 0 0.639 1.89 2.74 0.430 0.561 0.172 0.71 0.238 0.000 1

44 H362 1912 1992 81 3 0 0.650 1.64 2.90 0.379 0.476 0.183 0.49 0.212 -0.002 2

45 H352 1892 1992 101 4 0 0.673 2.38 5.17 1.005 0.875 0.154 0.57 0.196 -0.053 4

46 H351 1899 1992 94 4 0 0.629 1.64 2.99 0.651 0.878 0.144 0.41 0.172 0.015 1

47 H342 1932 1992 61 2 0 0.592 1.81 3.15 0.422 0.698 0.143 0.34 0.179 0.045 2

48 H341 1918 1992 75 3 0 0.659 1.87 3.11 0.474 0.756 0.139 0.44 0.185 0.012 1

PART 7: DESCRIPTIVE STATISTICS: Red Spruce, Groton State Forest, VT (KT 12:41 Tue 21 Apr 2020 Page 8

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Corr //-------- Unfiltered --------\\ //---- Filtered -----\\

No. No. No. with Mean Max Std Auto Mean Max Std Auto AR

Seq Series Interval Years Segmt Flags Master msmt msmt dev corr sens value dev corr ()

--- -------- --------- ----- ----- ----- ------ ----- ----- ----- ----- ----- ----- ----- ----- --

49 H322 1904 1992 89 3 0 0.587 1.41 2.99 0.624 0.874 0.171 0.52 0.198 -0.011 1

50 H311 1933 1992 60 2 0 0.533 2.66 3.94 0.733 0.768 0.148 0.32 0.158 0.006 1

51 H312 1927 1992 66 2 0 0.570 2.07 3.80 0.649 0.824 0.152 0.53 0.184 -0.001 1

52 H332 1901 1992 92 3 0 0.605 1.13 2.36 0.649 0.936 0.162 0.52 0.209 0.088 1

53 H321 1903 1992 90 3 0 0.591 1.51 3.21 0.614 0.832 0.170 0.71 0.227 0.000 1

54 H331 1903 1992 90 3 0 0.551 1.29 3.17 0.555 0.826 0.187 1.04 0.291 -0.007 2

55 H432 1887 1993 107 4 0 0.640 2.11 4.05 0.559 0.696 0.170 0.46 0.194 0.008 1

56 H431 1896 1993 98 4 0 0.542 1.57 2.61 0.484 0.799 0.168 0.47 0.190 0.034 1

57 H421 1890 1993 104 4 0 0.662 1.21 2.33 0.416 0.747 0.194 0.57 0.225 -0.008 1

58 H422 1894 1993 100 4 0 0.609 1.22 2.21 0.379 0.726 0.186 0.67 0.251 -0.033 1

59 H412 1905 1993 89 3 0 0.632 1.61 2.86 0.434 0.751 0.155 0.40 0.172 0.017 1

60 H411 1901 1993 93 3 0 0.598 1.68 2.88 0.494 0.752 0.162 0.43 0.188 0.007 1

61 H461 1897 1993 97 4 0 0.609 1.55 3.33 0.631 0.813 0.191 1.10 0.293 -0.016 1

62 H462 1890 1993 104 4 0 0.542 1.37 2.64 0.588 0.838 0.201 0.60 0.268 -0.001 1

63 H451 1881 1993 113 4 0 0.675 1.27 2.58 0.507 0.844 0.182 0.55 0.239 -0.001 2

64 H452 1883 1993 111 4 0 0.649 1.42 2.95 0.612 0.875 0.174 0.66 0.236 -0.011 1

65 H442 1927 1993 67 2 0 0.566 2.41 4.02 0.636 0.711 0.171 0.43 0.187 0.022 2

66 H481 1891 1993 103 4 0 0.687 1.23 2.55 0.580 0.870 0.180 0.62 0.248 -0.023 1

67 H482 1898 1993 96 4 0 0.764 1.78 3.80 0.810 0.796 0.224 0.80 0.290 -0.004 1

68 H471 1895 1993 99 4 0 0.749 1.76 3.09 0.651 0.876 0.150 0.50 0.190 0.019 1

69 H472 1886 1993 108 4 0 0.680 2.09 3.24 0.471 0.549 0.174 0.47 0.198 0.020 2

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Total or mean: 6311 233 0 0.622 1.53 5.17 0.629 0.807 0.192 1.56 0.254 0.005

- = [ COFECHA RS\_H COF ] = -