A Dendrochronology Study of Select Framing Timbers from the Williams-Boltwood House and Barns Goshen, Massachusetts

photo courtesy of Bob Labrie

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January, 2024

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Introduction

On September 15th and 16th, 2023, a selection of timbers were cored by William Flynt and Eric Gradoia from the Williams-Boltwood house and barns located at 2 Williams Drive in Goshen, Massachusetts for the purposes of conducting a dendrochronology study. In addition, a follow up sampling session occurred on December 12, 2023. All samples were mounted, sanded, measured, and analyzed by the author back in Dummerston, Vermont.

Background

Dendrochronology, or the study of tree ring growth patterns to date the age of archeological timbers, was initially developed in the 1920's by Andrew E. Douglass using long-lived Ponderosa pines in the Southwest United States. An astronomer by training, Douglass was interested in historical sun spot activity and its relationship to earth's climate. He surmised that by looking at yearly growth ring sequences in long-lived trees growing in an arid environment where moisture is key, he might be able to ascertain yearly variations in climate attributable to sunspot activity. (Baillie, 1982). To push the tree ring database back past the age of living trees, samples were taken from roof poles in Pueblo ruins that turned out to eventually overlap the living tree data. Besides fulfilling his research needs, this work revealed the feasibility of dating archeological structures.

In the 1980's the advent of computer programs to collate data, run comparative analyses, and compile master chronologies enabled unknown samples to be compared to known masters with a high degree of accuracy in more temperate climates. Pioneering work in Eastern Massachusetts focusing on Oak (Krusic and Cook 2001, Miles, Worthington and Grady 2002, 2003, 2005) and in the Connecticut River valley initially concentrating on Pitch pine (Krusic 2001,Flynt 2004) and expanding into oak, chestnut, hemlock, spruce, and white pine, has revealed the suitability of using dendrochronology as a mainstream research tool for analyzing and establishing construction timber felling dates in the Northeast, a region heretofore considered too variable climatically to provide reliable results. It should be pointed out that this science is now one more tool in building archaeologists extensive analytical toolbox that allows them to study historic structure construction details with ever greater precision.

Over the past 20 years conducting such studies of historic structures throughout New England and eastern New York state, the author has been able to develop numerous site and regional dated masters for all of the species noted above. These are constantly being updated as additional material is dated and added to the appropriate masters to further enhance the chances of successfully dating future projects. As well, additional New England dated chronologies for some of these species, available online at the International Tree-Ring Databank, are also used as needed.

It should be remembered that trees were usually felled in the winter months with frame preparation occurring shortly thereafter, so the earliest a frame could be raised would be in the year following the felling date delineated in a dendrochronology study such as this.

Procedures

In procuring samples suitable for dendrochronology research, the analyst must be on the lookout for timbers, framing, and boards that exhibit several parameters. First, a bark, or waney, edge must be present if one wishes to establish with certainty the last year of growth. Second, there needs to be a sufficient number of rings in a sample to span several distinctive climactic variations that register as patterns of wide and narrow rings. Ideally, having 100 or more years of growth is best, but more often than not, samples will range from 50 to 100+ years. While it is feasible to get dates on young samples (50-60 rings), spurious results are possible and thus must be reviewed carefully both with longer-lived samples from the same structure as well as with what documentary and stylistic research uncovers. Third, enough samples need to be obtained (10-15 per building episode is usually reasonable) to allow for comparison and the fact that often some will not align for one reason or another. It is also critical that an assessment be made of the building frame to ascertain that the members from which samples are extracted were not reused or inserted at a later date, or, if so, are duly noted. Fourth, all samples must be labeled and entered into a log book that notes the position of each sampled timber within the structure, its species, whether or not it has wane, and any other information pertinent to the sample. In labeling the samples the following codes were employed; GWB (Goshen, Williams-Boltwood (house)), GWBB (Goshen, Williams-Boltwood barn (aka Carriage house)), GWBS (Goshen, Williams-Boltwood shed (aka connector barn)). The numbers that follow simply refer to the sequence in which the samples were taken.

Samples were extracted using a custom coring bit, chucked into a 20 volt, ½" battery-powered drill, that creates a 9/16" hole out of which is obtained a 3/8" core. In addition, several short cut offs were obtained from phase 1 lath nailers. The core samples were glued into custom wood mounts (oriented so as to be looking down, or up, the tree when viewed through the microscope) and sanded, as were the cut offs, using successively finer grit paper (150-600 grit) both on a bench top belt sander and by hand sanding to create a mirror-smooth finish. All samples were then viewed under an Amscope 7.5-45X binocular microscope fitted with cross hairs in one eyepiece to count and mark the number of rings per sample. This was followed with a careful visual review, again under magnification, in an attempt to determine if site-specific growth patterns could be ascertained in order to help cross date the samples. Each sample was then placed under the microscope on a Velmex UniSlide Encoder stage calibrated to read to the nearest micron (.001mm). Measuring begins at the outer, or last year of growth ring (LYOG), established as 1000, and proceeds to the center of the sample or first year of growth, as measured (FYOG). It should be noted that not all cores reach the center of the tree, thus the first year of growth does not necessarily reflect when the tree began to grow. At the junction of each growth ring, the analyst registers the interface electronically, which sends the measurement to the computer via a VMO Digital Readout.

In all of the work in this study, the measuring program MEASURE J2X was used to compile each sample's raw data files. The program transforms the ring widths into a series of indices that relate each ring's growth to its neighbors, thus standardizing the climate-related influences on a year-to-year basis (Krusic 2001). Thus trees from a similar location but growing at different rates should exhibit similar indices. With the raw data in hand, using the program COFECHA (Holmes, 1983) the samples from this site can be compared with each other to determine if all were cut at the same time or within the span of several years or more. The hope is that a floating chronology can be developed revealing the felling relationship between some, if not all of the samples within each species found in the structure. The samples are also compared against one or more dated regional master chronologies or site masters of the same species to determine the exact year or years when the samples in question were felled. As strong samples are uncovered, these are added to a fledgling site master and the raw data is again run against this site master to see if additional samples align.

With COFECHA samples are broken down into ring groups of 50 years that are then compared to either the other undated samples (to create a floating site master) or with various dated masters (to determine a calendar year match). The 50-year ring groups in an individual sample are lagged a certain number of years (in this study a lag of 25 years was used) to provide an overlap of data within the groupings. The results are displayed in a series of ways, with Part 8 "Date Adjustment for Best Fit Matches for Counted or Unknown Series" composed of columns with the "best fit" being in column #1, the next "best fit" in column #2 and so on out 11 columns. The "add" number is the number to be added to the last year of growth (1000) to provide the year date of felling, while the "corr" number relates to how well the "add" meshes with the master. A correlation coefficient of .3281 is considered the threshold of significance for 50-year ring groups. Higher correlation values (preferably over .40) accompanying consistent "add" numbers in the first column usually reveal reliable results for longer-lived samples. It should be noted that samples exhibiting short ring counts (less than 60) are more prone to display spurious results. In the example below, consistent "add" numbers with strong correlations appearing in the first column for samples DLBH-07 and 08 reveal each samples' true date of felling (1000+784 and 782 = 1784 and 1782 respectively). Sample DLBH-09 does not show consistently strong correlation with any particular date. Note that the lag used in this example is 10 years.

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10
DLBH-07	937- 986	784 .51	712 .47	729 .37	713 .37	847 .33	846 .31	728 .30	813 .29	800 .29	763 .28
DLBH-07	947- 996	784 .54	712 .45	760 .33	816 .31	729 .31	800 .29	713 .29	671 .29	847 .26	808 .25
DLBH-07	951-1000	784 .41	760 .35	712 .35	661 .31	787 .30	800 .29	774 .29	729 .27	808 .26	832 .25
DLBH-08	929- 978	782 .44	746 .42	793 .33	760 .32	705 .32	840 .31	858 .30	689 .30	824 .28	685 .26
DLBH-08	939- 988	782 .61	746 .37	689 .34	840 .30	725 .29	708 .27	723 .27	806 .27	684 .25	724 .25
DLBH-08	949- 998	782 .69	669 .47	840 .41	722 .32	806 .28	708 .27	700 .26	683 .25	723 .25	720 .24
DLBH-08	951-1000	782 .69	669 .38	840 .38	722 .34	757 .29	700 .28	730 .25	659 .24	838 .23	723 .23
DLBH-09	932- 981	713 .52	785 .35	848 .35	744 .35	729 .32	863 .31	846 .28	849 .26	693 .26	714 .25
DLBH-09	942- 991	846 .38	713 .36	785 .33	848 .33	729 .29	727 .29	790 .29	693 .28	761 .28	705 .27
DLBH-09	951-1000	799 .43	783 .39	731 .30	689 .30	808 .29	767 .27	756 .26	790 .25	814 .24	846 .24

Once samples from a site are firmly dated and grouped into a site master, Part 2 "Correlations with Master Series of all Segments as Dated and Measured" and Part 3 "Segments Correlating Low, or Higher, at other than Dated Position" of COFECHA can

be viewed to see how well each sample correlates with the others in the group and where weak areas within the ring counts are located for further scrutiny.

Results- See Figures 1, 2, and 3
A total of 87 samples were taken from the various structures on the property. Nineteen came from the main house frame, 14 were extracted from the north ell, 21 were taken from the store, 15 came from the leanto, 10 were obtained from the north-south oriented barn, and 8 came from the failing east-west oriented shed. Eleven of the samples could not be analyzed due to too many breaks, or being species for which there are no dated masters or floating masters (black ash, maple, birch).

For ease of discussion, the following section will review the barns first followed by the various components of the house, basically from youngest to oldest. The hope is that dated material from the later buildings (primarily hemlock and spruce) can be successfully dated and used to help date samples of the same species in the earlier portions of the house.

In each case the first round of testing will attempt to develop floating chronologies for each species present in the specific building, or building section, to ascertain the felling relationship between samples. Were they all felled the same year, or over a period of years? With this information in hand, the next series of tests will compare the raw sample data to local/regional dated master chronologies for the species in question, with the expectation that consistent calendar dates will be revealed for each sample's last year of growth.

Shed (Connector barn)
Spruce
Six of the 8 samples collected from this structure were identified as spruce. The attempt to create a floating master met with success in that all six samples could be aligned with each other, as depicted on Chart 1. Part 2 of Chart 1 reveals decent correlation coefficients for the samples' 50-year ring groups where they overlap each other. Only the last several 50-year ring groups related to sample GWBS04 show a bit of weakness, but nothing to be too concerned about. Part 8 on the Chart finds GWBS-01 having a last growth ring one year later than GWBS06 while GWBS04 and 08 have a last ring two years later than GWBS06. GWBS07 reveals a 13-year difference in relation to GWBS06 (due to a bad break which required starting the measuring process after the break which occurred 13+ rings in from the wane edge), and GWBS05 indicates having been felled 65 years prior to GWBS06. GWBS05 also had a bad break near the wane that required measuring start after the break, though here there are only about 7+ rings in the outer, broken piece. It may be that this piece is reused from some other structure, or a portion of the core is missing at the break.

With this information in hand, the sample data was then compared to an old growth spruce stand in nearby Savoy known as Livingston, MA (developed by H.C. Fritts). The results on Chart 2 reveal GWBS04 aligns strongly with 1839 (and somewhat less so in

GWBS-08), GWBS-07 aligns with 1824 and a date of 1838 can be found lurking in portions of GWBS03 while a date of 1837 is noted on parts of GWBS06. Interestingly, a date of 1772 can be found in the latter years of growth for GWBS05. In all cases these dates align with the offsets noted on Chart 1, Part 8. The samples were then assigned these dates to create a spruce site master for the building, as depicted on Chart 3. While a bit more weakness is noted in parts of GWBS03 and 04 in Part 2 of this Chart, in neither case do they compromise the integrity of the dating.

Hemlock

Two samples identified as hemlock and, when run against GWBS01, as noted on the top of Chart 4, reveal both were felled the same year. They were next run against a Connecticut River Valley of Massachusetts hemlock master with the results displayed on the lower portion of Chart 4. Both samples align strongly with 1839 and were thus assigned these dates.

Barn (Carriage House)

Spruce

The barn sample group was composed of equal numbers of hemlock and spruce. Working with the spruce, the top half of Chart 5 reveals, in Part 8, GWBB06, 08, 09, and 10 all indicate having been felled the same year (as noted by the recurring presence of "0" in the first column) while GWBB-01 does not strongly indicate a relationship with the other samples. Part 2 of this chart shows all 4 samples having strong 50-year ring group correlations where they overlap, indicating the alignments are correct.
When the samples are run against the old growth Livingston, MA spruce master, illustrated at the bottom of Chart 5, no strong date alignments are evident, with the possible exception of GWBB08. However, on close inspection a date of 1834 can also be found within the results for GWBB04, 09, and 10.

Hemlock

When the 5 hemlock samples were tested against each other, 3 aligned relatively well, as noted in the upper portion of Chart 6, Part 8. With GWBB02 set at 0, GWBB04 shows a bit of promise to possibly align with GWBB02 at 0 in in later years of growth, GWBB 03 aligns at 3 years earlier while GWBB-0 indicates a 2-year earlier felling difference.
The samples were then tested against several regional hemlock masters. While none of the tests provided overwhelming alignments with specific dates, the strongest of the group involved a Connecticut River Valley of Massachusetts hemlock master, illustrated at the bottom of Chart 6, where GWBB02 aligns well with 1834, as does the latter years of GWBB04. While GWBB03 reveals a similar date of 1834 and GWBB05 suggests a date of 1837, the correlation coefficients in both cases are very low and the samples are short-lived, thus these results must be viewed with caution.

Coupled with the spruce in this structure, the recurring 1834 date being revealed in both species holds significance. Chart 7 illustrates tests for both the spruce and hemlock samples compared to the dated shed material. In both cases, a date of 1834 coupled with strong correlation coefficients indicates the dating is correct. As such these samples were added to the shed samples to create fledgling site masters for these species.

House leanto

Hemlock

The majority of samples taken from the leanto identified as hemlock. The attempt to create a floating master met with success, as noted on Chart 8 where in Part 2 all samples' 50-year ring groups correlate well with each other where they overlap. In Part 8 on the Chart GWB-60, 64, and 71 all have the same last year of growth while GWB-68 reveals a last ring 3 years earlier. GWB-62 and 63 indicate being 20 years older and may well be reused, though no obvious indicators were noted at the time of sampling. While GWB-61 and 65 seemingly indicate potential offsets, none have strong correlation coefficients associated with them and thus their results hold little significance. GWB-73 suggests aligning 18 years earlier in its last 75 years of growth, though the correlation coefficients are not overly strong.

The samples were then tested against several regional hemlock masters, all of which revealed similar results. The test against a southern Vermont hemlock master, compiled primarily by Christopher Baisan, revealed the strongest alignments, as depicted on Chart 9 where GWB-60, 66, and 71 align well with 1820 while GWB-64 also shows strength for this same date in columns 2 and 3. As well, GWB-62 and 63 align, with varying strength, with 1800, and GWB-68 aligns robustly with 1817. In all instances the varying dates agree with the offsets noted in the floating master on Chart 8. As such these samples were assigned these calendar dates and added to the hemlock site master.

Spruce

Two spruce samples were tested against themselves and other regional dated spruce masters with mixed results. The top portion of Chart 10 reveals the two samples do not relate well to each other even though there is a weak suggestion that they both were felled the same year. The correlation coefficients for the 50-year ring groups are flagged for the fact that they do not meet the criteria of .3281, the threshold for significance. When the samples are tested against dated masters, the best alignments are seen when they are compared to a southern Vermont spruce master compiled by Christopher Baisan and the author, illustrated at the bottom of Chart 10. A date of 1820 is seen both in the early years of GWB-67's growth and throughout GWB-70's growth, a date that agrees with the results seen in some of the hemlock samples. At this stage of the analysis GWB-70 was assigned a calendar date of 1820 and added to the spruce site master.

Beech

The lone beech sample, GWB-69, will be combined with other beech from the house and discussed later in the report.

Store

Spruce

Five of the six store samples were successfully aligned into a floating master, as seen at the top of Chart 11. While GWB-42 also shows an affinity to align with the others in

portions of its growth (Part 8), weakness in both the early and later years of growth prevented it from being included in the floating master at this point in time. As noted in Part 8 of the upper portion of the Chart, all samples indicate the same last year of growth. The strong correlation coefficients associated with the 50-year ring group overlaps indicate the alignments are correct.

When the samples were tested against several regional spruce masters a date of 1812 is suggested for a number of the samples, as noted in the lower part of Chart 11 where the material is compared to a southern Vermont spruce master. A test against the evolving GWB spruce site master, illustrated on Chart 12, reveals consistent correlations with a date of 1812 with varying strength. As such, these samples were assigned this calendar date and added to the spruce site master.

Hemlock
Six samples identified as hemlock which, when compared to each other, revealed all but one was felled the same year, as seen on Chart 13. GWB-59 reveals a last year of growth 3 years previous. With the exception of the early years of growth in GWB-41, all samples' 50-year ring groups correlate strongly with each other where they overlap in Part 2 of the Chart.

When these samples are compared to a large eastern New York/western Massachusetts/southern Vermont hemlock master, as seen on the lower portion of Chart 12, it is clear that a date of 1812 is associated with all samples aligning at 0 in the floating master at the top of the Chart, while GWB-59 aligns with 1809, 3 years earlier, as predicted. The dates being revealed for the hemlock align well with the dates noted in the store spruce results seen previously. As such, these samples were assigned the calendar dates shown on Chart 13 and added to the GWB hemlock site master.

Beech
As with the leanto beech, the two store beech samples will be added to the mix of beech samples and analyzed as a group when discussing the main house.

Main house/North Wing
Due to the fact that a majority of the samples from these two sections of the house are beech, it was decided to combine the few spruce and hemlock samples together for ease of analysis. The beech from all phases of the house and outbuildings will be addressed after.

Hemlock
Three main house samples identified as hemlock along with 5 from the north wing. Chart 14, Part 8, reveals that all samples could be aligned, with three north wing samples coming down the same year (GWB-20, 21, and 22) while two, GWWB-24 and 25, indicate a last ring one year earlier. The main house samples, all north wall planks, have a last year of growth 10 years earlier in the case of GWB-10 and 15, and 17 years earlier in the case of GWB-19.

Comparing these hemlock samples to the large eastern New York/western Massachusetts/southern Vermont hemlock master, as seen at the top of Chart 15, reveals GWB-10 and 15 showing strength for 1794 while GWB-19 aligns well with 1787. In regards to the north wing samples GWB-20, 21, and 22 align with varying strength with 1804 while GWB-24 and 25 align with 1803, all in agreement with the offsets noted on Chart 14. More robust results are seen on the lower portion of Chart 15 where the samples are run against the evolving GWB hemlock site master. With such strong alignments these samples were assigned calendar dates and added to the now-complete hemlock site master, illustrated on Chart 16, spanning the years 1584 to 1839. The overall strong correlation coefficients seen throughout this Chart confirm that the dating is correct.

Spruce

Four samples, two from each section, were determined to be spruce. The attempt to create a floating mater met with partial success, though the overall strength was not as strong as with other similar tests in this study. Chart 17, Part 8, reveals north wing samples GWB-26 and 27 were felled the same year while main house sample GWB-14 came down 10 years earlier.

Testing against the Livingston, MA old growth spruce master and the evolving GWB spruce site master, both depicted on Chart 18, clearly indicate, especially when compared to the GWB evolving spruce site master, that the north wing samples date to 1803 while GWB-14 from the main house aligns with 1793. As such, these samples were assigned their respective dates and added to the now-complete spruce site master seen on Chart 19, spanning the years 1674 to 1839. As with the GWB hemlock site master, illustrated on Chart 16, all spruce samples included in the GWB spruce site master have strong 50-year ring group overlap correlation coefficients, indicating the dating is accurate.

Beech

A majority of the samples extracted from the main house and roughly half from the north wing (along with 3 from the store and 1 from the leanto) were determined to be beech, a species for which, while there are no regional dated masters, a fledgling floating master is available, created with samples collected by the author, from the nearby Wilder homestead barn in Buckland. Beech is a difficult species to work with due to it being a diffuse porous wood with rather indistinct ring boundaries. In spite of these hurdles an attempt was made to create a floating master to see if it could be aligned with the Wilder barn material.

As background, the Wilder barn was dated by sampling oak framing members that were felled primarily in 1779. The rafters, mostly fabricated from beech, were assumed to have been felled at the same time as the other framing members. Several beech samples from the house also aligned as being 14 to 18 years later, in general agreement with the few dated oak and hemlock samples from this structure.

Working with all the Williams-Boltwood beech samples, the attempt to create a floating master was met with limited success. Chart 20, Part 8, reveals two of the store samples

(GWB--49 and 53), successfully aligned at 0 (found on page 2 of Chart 20) while main house samples GWB-07, 17, and 18 align 18 years earlier. GWB-03 and 06 weakly suggest the possibility of aligning 18 years earlier in portions of their growth as well, but the results are not strong enough to assign these offsets and include them in the floating master depicted in Part 2 at the top of Chart 20. Of interest is the fact that, from earlier tests, the store was clearly constructed with framing felled in the winter of 1812/13 and the main house has a few samples felled in the winter of 1794/5, a difference of 18 years, just what these few aligned beech samples indicate.

Working with the aligned Wilder beech (sample prefixes BWB, BWH) in conjunction with the aligned Williams-Boltwood beech, a provisionally dated beech master was created as seen on Chart 21A. While there are several flags present indicating either a correlation coefficient below the .3281 threshold of significance (delineated with an "A"), or there is a better fit at some other position (delineated with a "B"), considering the difficulty in measuring, seeing these flags is not overly concerning. While this small master can only be considered provisional at this time, the results are encouraging. Chart 21B reveals how each Williams-Boltwood beech sample aligns, or doesn't align, with this small master. Unfortunately, other than those samples included in the provisional master, none of the other samples strongly align with any specific date. That said, this bit of new information helps bolster the other dated material from the main house and north wing.

Discussion

It was understood going into this project that attempting to date the main house was going to be a challenge due to the extent that beech was used in most of the framing. Thankfully hemlock and spruce were used extensively in the barns and later portions of the house, all of which dated well and allowed for the creation of strong site masters for each species, which then could be used to confirm the dates of the few hemlock and spruce samples found in both the main house and north wing. Charts 16 and 19 incorporate these house and north wing samples in the respective site masters.

From this study it is clear that the partially collapsed connector barn was framed up with material felled in the winter of 1839/40 (along with some clearly reused material), the carriage house had both reused material(especially below the floor) and framing felled in the winter of 1834/35, the leanto was constructed with material felled in the winter of 1820/21, with reused material also present, the store framing was felled in the winter of 1812/13, and the north wing revealed framing felled in the winters of 1803/4 and 1804/5. While the main house only had a few samples that dated, the fact that three of the north wall planks aligned with 1794/5, coupled with several beech samples provisionally dating to 1794/5, strongly suggests the present main house was constructed no earlier than 1795.

Acknowledgements
The author would like to thank the Williams-Boltwood House Trust board for their interest in having this study included in the Historic Structures Report being undertaken by architectural historian Myron Stachiw. Thanks also go to Myron for his help identifying locations for sampling and for providing support and historical information during and after sampling sessions. Finally, the author is indebted to Eric Gradioa, architectural historian, for his help coring all phases of the house.

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FIGURE 1

WILLIAMS-BOLTWOOD HOUSE AND BARNS, GOSHEN, MASSACHUSETTS

SAMPLE	AGE	FYOG	LYOG	WANE	SPECIES	LOCATION
MAIN HOUSE						
GWB-01	146	855	1000	Y	FAGR	NORTHWEST RAFTER
GWB-02	126	**1666**	**1791**p	Y	FAGR	3RD HIP RAFTER FROM SE CORNER
GWB-03	93	908	1000	Y	FAGR	4TH HIP RAFTER FROM SE CORNER
GWB-04	140	861	1000	Y	FAGR	1ST N.RAFTER FROM W.GABLE
GWB-05	109	892	1000	Y	FAGR	W.GABLE,3RD STUD FROM N.PLATE
GWB-06	93	908	1000	Y	FAGR	NORTH PLATE
GWB-07	154	**1641**	**1794**p	Y	FAGR	1ST S.RAFTER FROM W.GABLE
GWB-08	114	887	1000	Y	FAGR	2ND HIP RAFTER FROM SE CORNER
GWB-09	112	889	1000	Y	FAGR	CUT N.RAFTER AT FORMER CHIMNEY
GWB-10	135	**1660**	**1794**	Y	TCSA	N.WALL PLANK AT NW CORNER
GWB-11	NOT MEASURED			Y	ACSP	CEILING GIRT ABOVE BOTTOM STAIR
GWB-12	NOT MEASURED*			Y	TCSA	WEST SILL
GWB-13	84	917	1000	Y	PCRU	RM202 CEILING NAILER
GWB-14	104	**1690**	**1793**	Y	PCRU	RM202 9TH CEILING NAILER
GWB-15	86	**1709**	**1794**	Y	TCSA	WALL PLANK,4TH FROM NW CORNER
GWB-16	NOT MEASURED			Y	ACSP	WALL PLANK,3RD E.OF 202/203 DOOR
GWB-17	86	**1709**	**1794**p	Y	FAGR	WALL PLANK,1ST E.OF 202/203 DOOR
GWB-18	63	**1732**	**1794**p	Y	FAGR	WALL PLANK,4TH E.OF 202/203 DOOR
GWB-19	81	**1707**	**1787**	Y	TCSA	WALL PLANK,1ST W.OF 202/203 DOOR
NORTH ELL						
GWB-20	117	**1688**	**1804**	Y	TCSA	SE HIP RAFTER
GWB-21	82	**1713**	**1804**	Y	TCSA	E.RAFTER,8TH FROM SE CORNER
GWB-22	110	**1695**	**1804**	Y	TCSA	E.RAFTER,9TH FROM SE CORNER
GWB-23	98	903	1000	Y	FAGR	E.RAFTER,10TH FROM SE CORNER
GWB-24	121	**1683**	**1803**	Y	TCSA	E.RAFTER,5TH FROM SE CORNER
GWB-25	116	**1688**	**1803**	Y	TCSA	E.RAFTER,4TH FROM SE CORNER
GWB-26	88	**1716**	**1803**	Y	PCRU	RIDGEPOLE
GWB-27	92	**1712**	**1803**	Y	PCRU	E.SLOPE,TRUNCATED RAFTER
GWB-28	110	891	1000	Y	FAGR	W.RAFTER,6TH FROM N.GABLE
GWB-29	147	854	1000	Y	FAGR	WEST PLATE
GWB-30	79	922	1000	Y	FAGR	NW GABLE RAFTER
GWB-31	130	871	1000	Y	FAGR	SW CORNER POST
GWB-32	NOT MEASURED			Y	ACSP	N.GABLE STUD,3RD FROM NW CORNER
GWB-33	116	885	1000	Y	FAGR	1ST FL,S.WALL CEILING GIRT
FIRST LEANTO						
GWB-39	NOT MEASURED			Y	ACSP	E.END LEDGER SUPPORT PLANK

FYOG = FIRST YEAR OF GROWTH,AS MEASURED
LYOG = LAST YEAR OF GROWTH,AS MEASURED
FAGR = BEECH
PCRU = SPRUCE
TCSA = HEMLOCK
ACSP = MAPLE
* = SAMPLED HAD TOO MANY BAD BREAK
p = PROVISIONAL

FIGURE 2

SAMPLE	AGE	FYOG	LYOG	WANE	SPECIES	LOCATION
STORE						
GWB-40	100	**1713**	**1812**	Y	PCRU	S.RAFTER,1ST FROM W.GABLE
GWB-41	101	**1712**	**1812**	Y	TCSA	N.RAFTER,5TH FROM W.GABLE
GWB-42	131	**1682**	**1812**	Y	PCRU	N.RAFTER,4TH FROM W.GABLE
GWB-43	NOT MEASURED			Y	ACSP	W.GABLE STUD,N.SIDE WINDOW
GWB-44	NOT MEASURED			Y	FRNI	NW GABLE RAFTER
GWB-45	97	**1716**	**1812**	Y	PCRU	N.RAFTER,2ND FROM W.GABLE
GWB-46	75	**1738**	**1812**	Y	PCRU	N.RAFTER,2ND FROM E.GABLE
GWB-47	97	**1716**	**1812**	Y	PCRU	N.RAFTER,1ST FROM W.GABLE
GWB-48	166	**1647**	**1812**	Y	PCRU	CENTER TIE BEAM,2ND FL.CEILING
GWB-49	168	**1645**	**1812**p	Y	FAGR	N.WALL GIRT IN STAIRWELL
GWB-50	NOT MEASURED			Y	FRNI	W.END TIE GIRT,ATTIC FLOOR LEVEL
GWB-51	NOT MEASURED			Y	BESP	E.END GIRT,2ND FLOOR STAIRWELL
GWB-52	88	**1725**	**1812**	Y	TCSA	2ND FL.REAR CEILING JOIST,4TH FROM W.WALL
GWB-53	113	**1700**	**1812**p	Y	FAGR	N.WALL CENTRAL POST
GWB-54	52	**1761**	**1812**	Y	TCSA	SHOP JOIST,E.SIDE CRAWLSPACE ACCESS
GWB-55	NOT MEASURED			Y	BESP	2ND FL.E-W MIDDLE CEILING GIRT
GWB-56	87	914	1000	Y	FAGR	SHOP JOIST,W.SIDE CRAWLSPACE ACCESS
GWB-57	NOT MEASURED			Y	FRNI	NORTH SIDE SILL
GWB-58	151	**1662**	**1812**	Y	TCSA	EAST SIDE SILL
GWB-59	85	**1725**	**1809**	Y	TCSA	N.WALL PLANK,3RD FROM NE CORNER
GWB-80	60	**1753**	**1812**	Y	TCSA	N.WALL PLANK,1ST W.OF LEANTO ATTIC DOOR
LEANTO						
GWB-60	108	**1713**	**1820**	Y	TCSA	NE PURLIN POST
GWB-61	50	951	1000	Y	TCSA	EAST END PURLIN
GWB-62	76	**1725**	**1800**	Y	TCSA	NW PURLIN POST,E.END
GWB-63	91	**1710**	**1800**	Y	TCSA	NW PURLIN POST,W.END
GWB-64	74	**1747**	**1820**	Y	TCSA	WEST WALL RAFTER
GWB-65	52	949	1000	Y	TCSA	2ND RAFTER FROM E.END
GWB-66	75	**1746**	**1820**	Y	TCSA	KITCHEN,E-W CENTRAL CEILING GIRT
GWB-67	138	**1683**	**1820**	Y	PCRU	KITCHEN,S.WALL CEILING GIRT
GWB-68	128	**1690**	**1817**	Y	TCSA	KITCHEN,2ND SAWN JOIST FROM W.WALL
GWB-69	118	883	1000	Y	FAGR	REUSED E-W CEILING GIRT,OVEN ROOM
GWB-70	79	**1742**	**1820**	Y	PCRU	W.ROOM,N.WALL PLATE
GWB-71	111	**1710**	**1820**	Y	TCSA	W.ROOM,E.WALL CEILING GIRT
GWB-73	100	**1717**	**1816**	Y	TCSA	CRAWLSPACE,1ST LOG JOIST S.OF CENTRAL GIRT
GWB-74	NOT MEASURED			Y	FRNI	CRAWLSPACE WEST SILL

FYOG = FIRST YEAR OF GROWTH,AS MEASURED
LYOG = LAST YEAR OF GROWTH,AS MEASURED
FAGR = BEECH
PCRU = SPRUCE
TCSA = HEMLOCK
FRNI = BLACK ASH
ACSP = MAPLE
BESP = BIRCH
p = PROVISIONAL

FIGURE 3

SAMPLE	AGE	FYOG	LYOG	WANE	SPECIES	LOCATION
NORTH-SOUTH BARN (CARRIAGE HOUSE)						
GWBB01	68	933	1000*	Y	PCRU	BENT 3 (FROM SOUTH) CENTER POST
GWBB02	156	**1679**	**1834**	Y	TCSA	BENT 3, LOWER E-W GIRT, E.OF CENTER POST
GWBB03	49	952	1000*	Y	TCSA	BENT 3, UPPER E-W TIE GIRT
GWBB04	140	**1695**	**1834**w	Y	TCSA	N.END BENT, TRUNCATED GIRT, E.OF CENTER POST
GWBB05	51	**1781**	**1831**	Y	PCRU	BENT 2, EAST WALL POST
GWBB06	108	**1727**	**1834**#	Y	PCRU	SOUTH BENT, LOWER GIRT, E.OF CENTER POST
GWBB07	86	**1747**	**1832**	Y	TCSA	SOUTH BENT, SW CORNER POST
GWBB08	107	**1728**	**1834**	Y	PCRU	W.WALL, UPPER PURLIN BETWEEN BENTS 1&2
GWBB09	81	**1754**	**1834**#	Y	PCRU	SOUTH WALL UPPER TIE BEAM
GWBB10	94	**1741**	**1834**#	Y	PCRU	W.WALL, LOWER PURLIN BETWEEN BENTS 1&2
EAST-WEST SHED (CONNECTOR BARN)						
GWBS01	236	**1604**	**1839**	Y	TCSA	SOUTHWEST CORNER POST
GWBS02	256	**1584**	**1839**	Y	TCSA	WEST WALL, MIDDLE POST
GWBS03	170	**1669**	**1838**	Y	PCRU	NORTHWEST CORNER POST
GWBS04	107	**1733**	**1839**	Y	PCRU	1ST POST EAST OF GWBS03
GWBS05	115	**1658**	**1772***	Y	PCRU	SMALL (6X6) POST EAST OF GWBS04
GWBS06	165	**1673**	**1837**#	Y	PCRU	NORTHEAST CORNER POST
GWBS07	75	**1750**	**1824***	Y	PCRU	BENT 2 FROM EAST, DROPPED TIE BEAM
GWBS08	98	**1742**	**1839**	Y	PCRU	WEST END DROPPED TIE BEAM

FYOG = FIRST YEAR OF GROWTH, AS MEASURED
LYOG = LAST YEAR OF GROWTH, AS MEASURED
FAGR = BEECH
PCRU = SPRUCE
TCSA = HEMLOCK
FRNI = BLACK ASH
w = WEAK
# = PARTIAL LAST RING AT WANE, NOT MEASURED. TREES FELLED THE FOLLOWING SPRING.
* = BAD BREAK PRECLUDED STARTING MEAURING AT WANE. ADD FOLLOWING RINGS TO DATE.
GWBB01 BAD BREAK 13+ RINGS FROM WANE
GWBB03 BAD BREAK 8+ RINGS FROM WANE
GWBS05 1772+7+ = 1779+
GWBS07 1824+14+ = 1838+

CHART 1

PART 2: CORRELATIONS WITH GWBS SPRUCE FLOATING MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	800 849	825 874	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	FLAGS/ TOTAL
1	GWBS03	832-1001	=	.50	.44	.58	.55	.61	.62	.62													
+																							0/ 7
2	GWBS04	896-1002	=	=	=	.52	.50	.38	.35	.32													
+										___A													1/ 5
3	GWBS05	832- 935	=	.63	.53	.60	.55	=	=	=													
+																							0/ 4
4	GWBS06	836-1000	=	.40	.51	.49	.60	.79	.71	.72													
+																							0/ 7
5	GWBS07	913- 987	=	=	=	=	.59	.59	.59	=													
+																							0/ 3
6	GWBS08	905-1002	=	=	=	=	.37	.69	.67	.63													
+																							0/ 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBS SPRUCE VS GWBS SPRUCE ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBS03	831- 880	1 .73	42 .37	25 .31	22 .29	98 .28	119 .27	79 .25	93 .25	52 .25	16 .24	46 .21
GWBS03	856- 905	1 .75	-16 .28	60 .28	72 .26	53 .25	9 .23	21 .23	8 .23	40 .22	50 .22	20 .22
GWBS03	881- 930	1 .77	34 .31	21 .28	-48 .25	53 .23	20 .22	-12 .22	40 .21	35 .21	-37 .21	-50 .20
GWBS03	906- 955	1 .77	-51 .46	-31 .36	40 .32	15 .31	-12 .29	20 .27	39 .27	35 .25	-81 .24	41 .24
GWBS03	931- 980	1 .79	15 .37	-51 .35	2 .29	-70 .26	-100 .24	-33 .23	-56 .22	-31 .21	-53 .21	-89 .18
GWBS03	951-1000	1 .77	2 .40	-23 .39	0 .33	-69 .30	-89 .29	-121 .28	-24 .28	-42 .25	-87 .22	-91 .21
GWBS04	894- 943	2 .66	15 .46	-69 .42	28 .36	-37 .33	-43 .32	-56 .28	42 .28	-10 .24	41 .24	46 .23
GWBS04	919- 968	2 .62	26 .37	15 .35	-86 .32	-12 .32	-81 .29	-95 .26	-24 .25	-69 .23	-11 .23	-10 .22
GWBS04	944- 993	2 .54	0 .29	-24 .28	-64 .27	-95 .25	-38 .24	-12 .22	-109 .22	-44 .20	-42 .20	-1 .20
GWBS04	951-1000	2 .54	-54 .31	0 .30	-56 .28	-38 .28	-64 .26	-124 .25	-42 .24	-127 .23	-76 .21	-43 .20
GWBS05	886- 935	-65 .88	50 .37	6 .33	-16 .28	32 .28	36 .25	-35 .25	-2 .24	-14 .23	23 .22	-48 .22
GWBS05	911- 960	-65 .82	32 .35	11 .32	-43 .28	-13 .28	-40 .25	25 .25	-20 .23	-16 .20	31 .19	-24 .18
GWBS05	936- 985	-65 .75	-82 .28	-85 .27	-87 .25	-26 .24	-45 .24	-13 .23	-90 .23	7 .21	-19 .21	8 .20
GWBS05	951-1000	-65 .72	-104 .38	-78 .29	-87 .29	-21 .29	-52 .27	-31 .26	-85 .26	-33 .26	-53 .23	-40 .23
GWBS06	836- 885	0 .79	71 .33	6 .32	25 .28	-13 .25	45 .25	17 .25	57 .23	90 .23	58 .23	51 .21
GWBS06	861- 910	0 .76	90 .37	68 .35	71 .34	70 .29	66 .28	69 .27	-25 .26	-28 .23	47 .22	-2 .22
GWBS06	886- 935	0 .81	13 .37	-54 .31	-45 .30	66 .30	47 .29	67 .29	27 .25	-51 .24	-25 .23	-20 .22
GWBS06	911- 960	0 .88	-13 .37	-52 .35	14 .27	-19 .24	27 .22	-18 .19	-14 .19	-88 .17	13 .17	-39 .17
GWBS06	936- 985	0 .87	-90 .38	-115 .38	-52 .34	-39 .24	-14 .23	-40 .21	-1 .21	-84 .21	-97 .21	-65 .20
GWBS06	951-1000	0 .84	-25 .35	-90 .30	-70 .29	-115 .25	-1 .24	-21 .21	-59 .21	-108 .20	-20 .19	-24 .18
GWBS07	926- 975	-13 .74	-27 .38	-84 .24	-64 .23	-59 .21	-68 .21	-25 .21	6 .20	-96 .20	-101 .19	-46 .18
GWBS07	951-1000	-13 .77	-103 .33	-128 .33	-84 .32	-12 .25	-79 .25	-14 .22	-96 .21	-57 .20	-47 .20	-52 .19
GWBS08	903- 952	2 .56	-11 .45	-16 .29	36 .27	-50 .26	-61 .26	16 .25	-31 .21	-25 .21	29 .21	-74 .20
GWBS08	928- 977	2 .82	-32 .44	-64 .27	3 .24	-103 .22	-74 .20	-57 .20	-88 .20	-52 .20	-11 .18	-37 .17
GWBS08	951-1000	2 .81	-22 .32	-88 .29	-64 .24	-68 .23	-35 .20	-106 .20	-69 .20	1 .19	-81 .18	-49 .18

CHART 2

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBS SPRUCE VS LIVINGSTON,MA SPRUCE 1697-1858
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBS03	831- 880	879 .37	920 .34	974 .31	917 .30	884 .24	938 .23	949 .23	965 .22	898 .22	904 .21	905 .20
GWBS03	856- 905	941 .35	901 .30	953 .28	929 .27	893 .25	879 .25	846 .21	900 .20	904 .20	909 .19	858 .18
GWBS03	881- 930	838 .65	871 .37	916 .31	885 .31	819 .28	868 .26	872 .24	853 .22	901 .21	816 .20	897 .20
GWBS03	906- 955	838 .49	852 .35	894 .31	835 .31	825 .29	865 .27	853 .26	868 .24	899 .24	819 .23	901 .23
GWBS03	931- 980	876 .41	781 .38	852 .37	838 .32	863 .30	864 .28	786 .26	853 .25	768 .23	801 .21	878 .20
GWBS03	951-1000	838 .38	814 .31	813 .30	781 .28	827 .27	801 .25	768 .24	746 .22	858 .22	761 .21	841 .21
GWBS04	894- 943	839 .50	879 .42	820 .32	852 .32	827 .31	915 .27	836 .26	865 .26	897 .25	866 .22	882 .21
GWBS04	919- 968	839 .68	853 .33	852 .32	826 .27	810 .26	802 .24	794 .23	807 .23	884 .22	840 .21	854 .20
GWBS04	944- 993	839 .61	756 .36	850 .31	840 .30	758 .28	826 .28	851 .27	780 .27	825 .26	810 .26	792 .23
GWBS04	951-1000	839 .57	781 .33	850 .33	826 .31	857 .26	795 .25	810 .25	780 .25	855 .21	758 .21	792 .20
GWBS05	886- 935	857 .44	887 .33	869 .28	886 .27	873 .26	854 .26	835 .25	872 .22	905 .22	913 .21	817 .20
GWBS05	911- 960	810 .36	811 .34	869 .32	787 .28	835 .25	824 .25	885 .24	788 .24	883 .24	802 .23	856 .23
GWBS05	936- 985	772 .63	867 .33	819 .29	855 .29	862 .28	869 .25	818 .23	788 .22	765 .21	774 .21	831 .20
GWBS05	951-1000	772 .62	793 .32	838 .20	794 .19	753 .19	841 .19	819 .17	831 .16	759 .16	790 .16	752 .16
GWBS06	836- 885	895 .42	953 .36	934 .28	876 .24	882 .23	901 .23	965 .23	888 .23	869 .22	919 .22	894 .20
GWBS06	861- 910	945 .38	850 .35	920 .25	908 .25	837 .23	876 .19	919 .17	884 .17	894 .15	892 .15	880 .15
GWBS06	886- 935	837 .49	850 .32	884 .31	851 .31	880 .30	825 .23	867 .17	847 .17	877 .17	896 .16	868 .16
GWBS06	911- 960	837 .61	851 .39	888 .32	840 .24	798 .19	792 .19	898 .18	824 .18	880 .18	814 .18	800 .17
GWBS06	936- 985	837 .42	785 .36	844 .27	801 .26	861 .24	864 .24	840 .23	778 .23	780 .22	811 .22	873 .21
GWBS06	951-1000	855 .47	837 .46	850 .28	826 .27	780 .26	760 .24	767 .24	813 .24	812 .22	844 .22	781 .21
GWBS07	926- 975	824 .48	850 .29	868 .29	773 .27	791 .25	808 .24	838 .24	820 .23	851 .23	806 .22	787 .21
GWBS07	951-1000	824 .40	837 .29	753 .28	851 .27	780 .26	787 .25	844 .22	849 .21	848 .21	761 .20	773 .20
GWBS08	903- 952	898 .38	839 .31	821 .31	795 .29	834 .26	826 .24	853 .24	803 .21	900 .21	806 .20	847 .20
GWBS08	928- 977	877 .37	839 .32	863 .32	864 .27	816 .27	780 .26	813 .23	787 .22	782 .22	842 .22	785 .21
GWBS08	951-1000	839 .45	828 .34	783 .34	815 .34	746 .34	782 .32	756 .28	802 .26	786 .24	761 .22	851 .22

CHART 3

PART 2: CORRELATIONS WITH GWBS SPRUCE SITE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1650 1699	1675 1724	1700 1749	1725 1774	1750 1799	1775 1824	1800 1849	1825 1874	1850 1899	1875 1924	1900 1949	1925 1974	1950 1999	1975 2024	2000 2049	2025 2074	2050 2099	2075 2124	2100 2149	2125 2174	FLAGS/ TOTAL
1	GWBS03	1669-1838	.50	.29	.54	.64	.61	.65	.62	=													
+				__B																			1/ 7
2	GWBS04	1733-1839	=	=	=	.52	.50	.29	.32	=													
+								__A	__A														2/ 4
3	GWBS05	1669-1772	.63	.51	.52	.55	=	=	=	=													
+																							0/ 4
4	GWBS06	1673-1837	.40	.45	.44	.59	.78	.77	.72	=													
+																							0/ 7
5	GWBS07	1750-1824	=	=	=	=	.59	.59	=	=													
+																							0/ 2
6	GWBS08	1742-1839	=	=	=	.37	.54	.72	.63	=													
+																							0/ 4

PART 3: SEGMENTS CORRELATING LOW, OR HIGHER AT OTHER THAN DATED POSITION Tucson-Mendoza-Hamburg-Lamont ProgLib

CORRELATIONS OF 50-YEAR SEGMENTS
FROM TEN YEARS EARLIER (-10) TO TEN YEARS LATER (+10) THAN DATED

SERIES	SEGMENT	HIGH	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
GWBS03	1675-1724		-.09	.32	.10	-.44	.20	.27	.11	.17	-.02	-.16	.29	-.32	.19	.18	-.18	-.26	-.03	.14	.17	.06	-.18
+		-9		<___>									___										
GWBS04	1775-1824		.05	.02	-.13	-.04	-.02	-.13	-.03	.10	.12	.17	.29	.07	-.31	-.19	-.14	-.09	-.26	-.10	-.06	.09	-.04
+		0											<___>										
GWBS04	1790-1839		-.04	-.11	-.10	.13	-.06	.00	.05	.08	.30	.15	.32	=	=	=	=	=	=	=	=	=	=
+		0											<___>										

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBS SPRUCE VS GWBS SPRUCE DATED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBS03	831- 880	838 .73	879 .37	862 .31	859 .29	935 .28	956 .27	916 .25	930 .25	889 .25	853 .25	883 .21
GWBS03	856- 905	838 .75	897 .28	821 .28	909 .26	890 .25	846 .23	858 .23	845 .23	877 .22	887 .22	857 .22
GWBS03	881- 930	838 .77	871 .31	858 .28	789 .25	890 .23	857 .22	825 .22	877 .21	872 .21	800 .21	787 .20
GWBS03	906- 955	838 .77	786 .46	806 .36	877 .32	852 .31	825 .29	857 .27	876 .27	872 .25	756 .24	878 .24
GWBS03	931- 980	838 .79	852 .37	786 .35	839 .29	767 .26	737 .25	804 .23	781 .22	806 .21	784 .21	748 .18
GWBS03	951-1000	838 .77	839 .40	814 .39	837 .33	768 .30	748 .29	716 .28	813 .28	795 .25	750 .22	746 .21
GWBS04	894- 943	839 .66	852 .46	768 .42	865 .36	800 .33	794 .32	781 .28	879 .28	827 .24	878 .24	883 .23
GWBS04	919- 968	839 .62	863 .37	852 .35	751 .32	825 .32	756 .29	742 .26	813 .25	768 .23	826 .23	827 .22
GWBS04	944- 993	839 .54	837 .29	813 .28	773 .26	742 .25	799 .24	825 .22	728 .22	793 .20	795 .20	836 .20
GWBS04	951-1000	839 .54	783 .31	837 .30	781 .28	799 .28	773 .26	713 .25	795 .24	710 .22	761 .21	794 .20
GWBS05	886- 935	772 .88	887 .37	843 .33	821 .28	869 .28	873 .25	802 .25	835 .24	823 .23	860 .22	789 .21
GWBS05	911- 960	772 .82	869 .35	848 .32	794 .28	824 .28	797 .25	862 .25	817 .23	821 .20	868 .19	813 .18
GWBS05	936- 985	772 .75	755 .28	752 .27	750 .25	811 .24	792 .24	824 .23	747 .23	844 .21	818 .21	845 .20
GWBS05	951-1000	772 .72	733 .38	759 .29	750 .29	816 .29	785 .27	806 .26	752 .26	804 .26	784 .23	797 .23
GWBS06	836- 885	837 .79	908 .33	843 .32	862 .27	824 .25	882 .25	854 .25	894 .23	927 .23	895 .23	888 .21
GWBS06	861- 910	837 .76	927 .37	905 .35	908 .34	907 .29	903 .28	906 .27	812 .26	809 .23	884 .22	835 .22
GWBS06	886- 935	837 .81	850 .37	783 .31	792 .30	903 .30	884 .29	904 .29	864 .25	786 .24	812 .23	817 .22
GWBS06	911- 960	837 .88	824 .37	785 .35	851 .27	818 .24	864 .22	819 .19	823 .19	749 .17	850 .17	798 .17
GWBS06	936- 985	837 .87	747 .38	722 .38	785 .34	798 .24	823 .23	797 .21	836 .21	740 .21	753 .21	772 .20
GWBS06	951-1000	837 .84	812 .35	747 .30	767 .29	722 .25	836 .24	816 .21	778 .21	729 .20	817 .19	813 .18
GWBS07	926- 975	824 .74	810 .38	753 .24	773 .23	778 .21	769 .21	812 .21	843 .20	741 .20	736 .19	791 .18
GWBS07	951-1000	824 .77	734 .33	709 .33	753 .33	825 .25	758 .25	823 .22	741 .21	780 .21	790 .20	785 .19
GWBS08	903- 952	839 .56	826 .45	821 .29	873 .27	787 .26	776 .26	853 .26	806 .21	866 .21	812 .21	858 .20
GWBS08	928- 977	839 .82	805 .44	773 .27	840 .24	734 .22	763 .20	780 .20	749 .20	785 .20	826 .18	800 .17
GWBS08	951-1000	839 .81	815 .32	749 .29	773 .24	769 .23	802 .20	768 .20	731 .20	838 .19	756 .18	788 .18

CHART 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBS HEMLOCK VS GWBS01
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBS01	765- 814	01.00	122 .47	113 .31	65 .30	175 .29	52 .28	108 .26	50 .26	125 .25	46 .25	161 .24
GWBS01	790- 839	01.00	78 .34	46 .33	65 .32	122 .31	-4 .31	33 .31	88 .30	156 .29	104 .29	-17 .28
GWBS01	815- 864	01.00	19 .36	-33 .34	32 .34	-46 .31	76 .28	-37 .28	-19 .27	-50 .26	33 .25	28 .24
GWBS01	840- 889	01.00	-33 .39	76 .35	-46 .35	-32 .34	-19 .34	19 .33	57 .30	-51 .29	-65 .27	62 .26
GWBS01	865- 914	01.00	5 .37	57 .35	83 .32	-46 .28	-65 .26	39 .26	80 .24	-14 .23	-32 .23	58 .23
GWBS01	890- 939	01.00	-122 .41	5 .35	-5 .33	53 .29	-105 .29	-76 .28	-72 .25	-71 .25	32 .25	24 .25
GWBS01	915- 964	01.00	25 .40	-57 .37	-126 .34	-94 .31	5 .28	24 .28	-76 .27	-24 .26	-122 .26	-5 .26
GWBS01	940- 989	01.00	-25 .40	2 .36	-2 .36	-129 .31	-175 .29	-53 .28	-171 .27	-51 .27	-24 .27	-80 .24
GWBS01	951-1000	01.00	-154 .38	-25 .37	-171 .33	-66 .31	-2 .30	-137 .28	-46 .28	-83 .27	-175 .27	-135 .26
GWBS02	745- 794	36 .36	161 .33	115 .26	57 .26	53 .24	99 .24	95 .23	76 .23	186 .21	205 .21	83 .21
GWBS02	770- 819	0 .82	122 .46	37 .34	68 .30	51 .29	96 .25	135 .25	83 .24	178 .24	126 .23	31 .23
GWBS02	795- 844	0 .85	156 .39	125 .35	113 .34	88 .32	33 .31	154 .30	37 .30	19 .30	93 .29	-17 .29
GWBS02	820- 869	0 .77	19 .39	-52 .38	-32 .26	17 .25	66 .24	-2 .24	-33 .23	-21 .23	71 .22	57 .22
GWBS02	845- 894	0 .70	57 .50	-19 .32	30 .31	62 .30	-6 .29	25 .29	37 .27	83 .27	103 .26	101 .25
GWBS02	870- 919	0 .64	57 .50	-88 .39	-34 .35	30 .35	-15 .29	25 .27	5 .25	37 .23	60 .22	-55 .21
GWBS02	895- 944	0 .62	24 .45	-80 .35	-13 .33	49 .33	-122 .31	-126 .31	-118 .26	30 .24	25 .23	5 .23
GWBS02	920- 969	0 .72	-57 .37	24 .34	-1 .33	-76 .32	-127 .30	-85 .30	-5 .27	25 .26	-39 .22	-125 .22
GWBS02	945- 994	0 .65	-25 .36	2 .35	-127 .29	-125 .26	-3 .24	-1 .22	-150 .21	-135 .21	-51 .20	-155 .20
GWBS02	951-1000	0 .66	-83 .43	-66 .35	-157 .33	-135 .31	-108 .30	-3 .28	-46 .28	-22 .26	-25 .23	-51 .22

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBS HEMLOCK VS CONNECTICUT RIVER VALLEY OF MASSACHUSETTS HEMLOCK MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBS01	765- 814	1030 .44	969 .38	906 .33	961 .30	974 .28	889 .26	956 .26	952 .25	965 .25	947 .25	912 .25
GWBS01	790- 839	856 .34	895 .32	872 .32	961 .31	917 .30	906 .29	969 .28	952 .27	857 .25	939 .23	995 .22
GWBS01	815- 864	839 .46	919 .33	905 .32	932 .32	856 .30	980 .29	964 .28	906 .24	948 .24	841 .23	924 .22
GWBS01	840- 889	839 .58	820 .35	873 .34	948 .30	807 .29	905 .27	843 .26	816 .25	896 .24	936 .24	886 .23
GWBS01	865- 914	839 .43	834 .41	807 .36	802 .34	873 .34	902 .32	922 .31	915 .28	896 .28	852 .25	790 .25
GWBS01	890- 939	839 .56	834 .43	885 .27	768 .27	773 .27	817 .26	904 .25	814 .25	847 .24	802 .24	905 .22
GWBS01	915- 964	839 .58	834 .33	770 .30	777 .28	804 .28	809 .27	759 .26	838 .25	884 .24	764 .24	860 .24
GWBS01	940- 989	839 .57	813 .31	745 .31	854 .29	815 .26	811 .25	756 .23	795 .23	859 .23	852 .22	764 .21
GWBS01	951-1000	839 .61	751 .35	813 .32	795 .26	761 .25	814 .22	812 .22	701 .21	837 .21	738 .20	700 .19
GWBS02	745- 794	1017 .33	915 .32	938 .27	1005 .25	948 .23	917 .23	1031 .22	949 .22	974 .22	987 .21	1004 .20
GWBS02	770- 819	961 .38	1017 .34	974 .32	926 .28	894 .28	987 .27	969 .27	981 .25	1026 .25	942 .24	947 .24
GWBS02	795- 844	969 .44	856 .42	939 .36	895 .32	995 .32	952 .31	881 .30	961 .30	927 .27	906 .26	872 .25
GWBS02	820- 869	839 .54	896 .33	905 .32	875 .31	932 .31	930 .30	841 .25	864 .25	922 .24	873 .23	856 .22
GWBS02	845- 894	839 .50	896 .45	820 .37	864 .36	852 .34	877 .31	942 .30	816 .29	909 .27	886 .25	807 .23
GWBS02	870- 919	839 .48	896 .36	915 .35	784 .34	807 .31	877 .30	886 .29	852 .26	802 .24	864 .23	820 .21
GWBS02	895- 944	839 .52	826 .39	794 .30	863 .27	885 .27	763 .24	884 .23	834 .23	776 .23	844 .22	754 .20
GWBS02	920- 969	839 .44	731 .34	781 .30	795 .28	763 .28	750 .26	826 .25	859 .24	833 .24	776 .24	853 .23
GWBS02	945- 994	839 .49	814 .33	748 .33	724 .31	795 .31	851 .28	782 .27	756 .26	761 .26	758 .25	737 .24
GWBS02	951-1000	839 .45	782 .34	751 .33	829 .30	773 .30	769 .26	756 .25	814 .23	813 .23	758 .23	760 .23

CHART 5

PART 2: CORRELATIONS WITH GWBB SPRUCE FLOATING MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	1325 1374	1350 1399	FLAGS/ TOTAL
1	GWBB06	894-1000	.39	.45	.60	.62	.60																
+																							0/ 5
2	GWBB08	894-1000	.46	.45	.59	.56	.53																
+																							0/ 5
3	GWBB09	920-1000	=	.43	.62	.60	.58																
+																							0/ 4
4	GWBB10	907-1000	=	.49	.44	.47	.43																
+																							0/ 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB SPRUCE VS GWBB SPRUCE ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB01	933- 982	2 .40	-16 .31	-29 .28	-33 .23	-38 .21	-19 .21	-35 .20	5 .18	-8 .17	-20 .14	15 .14
GWBB01	951-1000	-16 .40	-29 .27	-35 .23	-48 .21	-38 .21	-53 .19	-50 .19	-14 .17	-5 .14	-47 .14	-52 .12
GWBB06	893- 942	0 .80	24 .24	13 .23	15 .20	29 .19	45 .16	14 .15	52 .15	50 .10	30 .10	37 .10
GWBB06	918- 967	0 .81	-19 .25	15 .24	-14 .21	-1 .21	-6 .20	24 .19	32 .19	-24 .17	33 .15	-9 .13
GWBB06	943- 992	0 .85	-24 .26	-1 .25	-33 .23	-37 .19	-38 .17	-14 .16	1 .15	-3 .14	-15 .14	-5 .12
GWBB06	951-1000	0 .80	-24 .29	-38 .20	-33 .20	-56 .18	-52 .18	-39 .17	-37 .15	-15 .15	-47 .12	-51 .11
GWBB08	894- 943	0 .69	19 .37	5 .31	3 .29	38 .28	37 .26	56 .26	13 .24	24 .21	8 .15	35 .14
GWBB08	919- 968	0 .70	18 .28	-24 .28	19 .27	-10 .20	24 .19	5 .19	-5 .19	3 .18	21 .17	-13 .15
GWBB08	944- 993	0 .67	-39 .32	-1 .30	-24 .28	-48 .21	-45 .19	-15 .17	-34 .17	-13 .16	-44 .15	-12 .14
GWBB08	951-1000	0 .71	-39 .31	-1 .27	-12 .25	-53 .25	-50 .21	-13 .21	-51 .18	-48 .17	-15 .16	-24 .12
GWBB09	920- 969	0 .76	-24 .36	24 .31	-5 .30	14 .20	-13 .20	-15 .19	15 .18	-19 .18	25 .15	-9 .14
GWBB09	945- 994	0 .81	1 .32	-14 .30	-38 .22	-23 .20	-24 .19	-37 .18	-11 .18	-1 .16	2 .15	-15 .11
GWBB09	951-1000	0 .81	-38 .24	-25 .23	-24 .23	-37 .19	-36 .14	-23 .14	-14 .14	-11 .13	-1 .12	-35 .12
GWBB10	907- 956	0 .66	5 .41	19 .30	42 .24	10 .21	24 .17	-3 .17	21 .16	8 .15	-14 .15	20 .14
GWBB10	932- 981	0 .62	-19 .21	19 .21	11 .17	-5 .16	5 .16	3 .14	-21 .13	-35 .13	17 .12	-34 .12
GWBB10	951-1000	0 .67	-20 .29	-56 .20	-36 .18	-39 .17	-35 .16	-19 .14	-21 .13	-44 .12	-24 .12	-45 .12

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB SPRUCE VS LIVINGSTON,MA SPRUCE 1697 TO 1858
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB01	933- 982	818 .33	862 .33	800 .30	802 .27	815 .24	769 .24	821 .21	767 .20	774 .20	814 .20	864 .19
GWBB01	951-1000	781 .34	769 .26	754 .26	844 .25	813 .23	751 .22	821 .21	761 .20	814 .20	797 .20	857 .18
GWBB06	893- 942	834 .43	847 .39	878 .31	825 .24	850 .23	848 .21	828 .21	874 .21	831 .20	811 .20	864 .20
GWBB06	918- 967	834 .46	885 .37	789 .29	790 .29	797 .25	871 .25	782 .24	887 .24	816 .24	813 .22	815 .22
GWBB06	943- 992	782 .28	834 .27	858 .26	848 .25	764 .24	860 .23	790 .23	813 .23	797 .22	776 .20	811 .20
GWBB06	951-1000	823 .41	834 .31	810 .24	809 .24	760 .23	783 .23	841 .21	795 .21	757 .20	764 .20	826 .20
GWBB08	894- 943	834 .42	885 .37	864 .30	850 .27	909 .27	911 .24	853 .23	893 .22	816 .21	908 .20	838 .17
GWBB08	919- 968	834 .54	816 .41	801 .32	782 .29	847 .28	885 .28	785 .26	795 .25	837 .22	821 .22	864 .21
GWBB08	944- 993	798 .36	834 .33	841 .27	848 .27	759 .25	847 .24	811 .24	861 .24	797 .24	778 .22	765 .22
GWBB08	951-1000	834 .41	798 .39	751 .35	797 .32	778 .29	841 .26	810 .23	765 .22	823 .22	847 .22	846 .20
GWBB09	920- 969	885 .39	862 .34	835 .30	804 .30	777 .29	790 .28	849 .27	834 .26	837 .23	816 .23	819 .23
GWBB09	945- 994	860 .36	766 .33	834 .31	823 .31	779 .30	811 .29	848 .28	765 .28	820 .24	862 .23	837 .23
GWBB09	951-1000	765 .35	823 .34	834 .33	810 .33	811 .32	781 .29	836 .25	766 .24	809 .22	779 .21	786 .20
GWBB10	907- 956	834 .41	848 .30	890 .29	821 .24	855 .22	795 .21	895 .21	871 .20	801 .18	842 .18	816 .18
GWBB10	932- 981	800 .31	859 .30	826 .30	834 .26	829 .26	871 .23	851 .23	858 .22	782 .22	777 .21	876 .20
GWBB10	951-1000	834 .38	760 .26	823 .25	781 .25	810 .23	790 .23	798 .23	753 .22	763 .22	778 .21	829 .20

CHART 6

PART 2: CORRELATIONS WITH GWBB HEMLOCK FLOATING MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	825 874	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	FLAGS/ TOTAL
1	GWBB02	913- 998	=	=	=	.49	.51	.37	=														
+								___B															1/ 3
2	GWBB05	947- 997	=	=	=	=	.46	.46	=														
+																							0/ 2
3	GWBB07	913- 998	=	=	=	.54	.57	.35	=														
+																							0/ 3

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB HEMLOCK VS GWBB HEMLOCK ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB02	845- 894	01.00	24 .42	68 .32	21 .26	66 .25	22 .25	67 .23	2 .22	98 .20	94 .19	48 .19
GWBB02	870- 919	0 .95	-24 .40	43 .32	-21 .31	30 .28	76 .26	44 .21	-22 .21	-1 .20	1 .18	66 .18
GWBB02	895- 944	0 .84	13 .40	18 .25	-17 .25	-45 .22	-13 .22	-1 .22	30 .21	-14 .20	44 .19	46 .17
GWBB02	920- 969	0 .75	-42 .31	13 .29	-14 .24	-13 .23	20 .22	14 .22	18 .22	-30 .22	-55 .20	26 .20
GWBB02	945- 994	0 .72	-56 .33	-26 .30	-6 .30	-54 .26	-12 .25	-14 .25	-94 .24	-80 .23	-76 .20	-96 .20
GWBB02	951-1000	0 .71	-6 .34	-94 .26	-2 .25	-96 .24	-26 .21	-76 .21	-12 .20	-14 .19	-83 .18	-20 .18
GWBB03	952-1000	-13 .47	-100 .33	-83 .32	-32 .31	-50 .29	-59 .28	-33 .27	-76 .25	-63 .24	-104 .24	-78 .24
GWBB04	861- 910	82 .36	7 .32	-16 .31	26 .28	25 .26	30 .23	-6 .22	51 .22	75 .22	5 .21	2 .20
GWBB04	886- 935	26 .35	-18 .32	-41 .28	9 .24	58 .24	51 .24	57 .24	-40 .24	-39 .23	-36 .23	-17 .21
GWBB04	911- 960	-33 .36	-18 .31	26 .23	-57 .22	8 .22	10 .21	-36 .21	0 .20	-3 .19	-38 .19	-60 .18
GWBB04	936- 985	0 .42	-38 .27	-66 .24	-20 .24	-40 .24	10 .24	-14 .23	-68 .21	-84 .21	-33 .20	-71 .19
GWBB04	951-1000	0 .48	-20 .35	-50 .34	-86 .28	-68 .25	-40 .24	-54 .23	-56 .21	-101 .21	-106 .21	-63 .18
GWBB05	950- 999	-3 .83	-71 .32	-53 .27	-56 .26	-23 .26	-88 .22	-91 .22	-52 .22	-51 .21	-21 .21	-101 .19
GWBB05	951-1000	-3 .83	-71 .33	-56 .26	-53 .26	-23 .25	-91 .23	-88 .22	-51 .20	-21 .20	-101 .19	-52 .18
GWBB07	915- 964	-2 .91	-20 .39	-46 .31	-70 .30	-68 .29	16 .24	24 .24	-45 .23	-16 .21	-34 .21	-32 .20
GWBB07	940- 989	-2 .84	-20 .33	-46 .32	-68 .26	-16 .20	-48 .20	6 .20	-30 .19	5 .18	-45 .17	2 .16
GWBB07	951-1000	-2 .69	0 .31	-48 .28	-63 .26	-20 .24	-68 .19	-86 .19	-61 .19	-85 .18	-49 .18	-22 .18

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB HEMLOCK VS CONNECTICUT RIVER VALLEY OF MASSACHUSETTS HEMLOCK MASTER 1646-1848
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB02	845- 894	834 .40	884 .38	815 .34	928 .31	802 .30	859 .28	826 .27	881 .26	893 .24	852 .23	902 .23
GWBB02	870- 919	834 .42	802 .35	859 .31	847 .29	891 .28	904 .25	916 .24	789 .23	860 .23	780 .22	813 .22
GWBB02	895- 944	834 .51	847 .45	829 .34	817 .30	859 .28	758 .25	893 .24	772 .24	812 .24	815 .23	889 .23
GWBB02	920- 969	834 .60	815 .38	848 .35	759 .34	860 .32	861 .32	804 .31	772 .30	847 .29	791 .28	754 .27
GWBB02	945- 994	834 .67	854 .40	722 .31	746 .31	822 .30	836 .27	759 .27	778 .27	766 .26	814 .24	771 .23
GWBB02	951-1000	834 .70	814 .38	756 .33	702 .31	836 .28	810 .28	722 .28	822 .26	751 .23	790 .23	778 .22
GWBB03	952-1000	834 .39	722 .30	765 .30	756 .28	715 .27	802 .24	827 .21	746 .20	778 .20	828 .19	798 .19
GWBB04	861- 910	911 .53	810 .36	841 .34	828 .31	886 .30	922 .28	853 .26	789 .26	859 .24	844 .24	878 .23
GWBB04	886- 935	872 .33	873 .32	886 .31	810 .31	899 .29	829 .25	834 .24	839 .24	821 .23	761 .23	853 .21
GWBB04	911- 960	834 .42	872 .33	741 .30	745 .28	860 .27	821 .24	870 .21	763 .21	760 .20	880 .19	812 .19
GWBB04	936- 985	834 .65	775 .33	766 .30	846 .28	714 .23	826 .23	796 .22	853 .22	808 .19	822 .18	725 .18
GWBB04	951-1000	834 .60	775 .40	784 .28	696 .27	808 .27	766 .27	840 .26	822 .26	796 .24	814 .24	695 .23
GWBB05	950- 999	837 .32	738 .29	839 .28	813 .27	725 .27	825 .27	763 .26	831 .26	838 .26	696 .23	707 .22
GWBB05	951-1000	837 .33	738 .30	725 .29	825 .28	839 .28	831 .27	813 .26	763 .25	838 .24	696 .22	707 .21
GWBB07	915- 964	734 .42	846 .39	832 .32	810 .31	827 .30	814 .29	844 .27	747 .25	813 .24	757 .22	858 .22
GWBB07	940- 989	846 .38	844 .38	734 .33	800 .29	735 .26	818 .26	743 .26	719 .26	761 .23	751 .21	814 .21
GWBB07	951-1000	844 .46	842 .40	799 .32	717 .32	832 .28	766 .28	846 .24	819 .24	761 .21	817 .20	749 .20

CHART 7

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB SPRUCE VS GWBS SPRUCE DATED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB01	933- 982	818 .36	739 .30	796 .26	774 .26	754 .26	839 .25	805 .25	815 .22	826 .22	837 .21	733 .21
GWBB01	951-1000	754 .41	818 .33	750 .29	739 .26	838 .24	783 .24	781 .23	761 .22	820 .21	752 .19	837 .19
GWBB06	893- 942	834 .55	847 .33	809 .32	795 .31	848 .30	787 .24	815 .23	860 .22	861 .20	838 .20	780 .19
GWBB06	918- 967	834 .61	847 .38	746 .36	815 .34	758 .33	872 .31	848 .27	849 .24	782 .23	749 .22	779 .22
GWBB06	943- 992	834 .46	782 .40	728 .31	779 .30	815 .29	719 .28	801 .28	723 .25	847 .24	731 .23	833 .22
GWBB06	951-1000	834 .37	725 .31	740 .27	772 .25	726 .24	708 .24	712 .24	723 .24	770 .24	823 .23	731 .23
GWBB08	894- 943	834 .55	839 .34	853 .31	826 .31	787 .30	871 .29	891 .28	890 .25	821 .25	882 .22	801 .21
GWBB08	919- 968	834 .71	853 .29	821 .28	750 .28	752 .26	746 .24	763 .24	801 .23	785 .23	800 .23	782 .22
GWBB08	944- 993	834 .62	790 .32	719 .28	823 .28	802 .23	763 .22	789 .20	751 .20	822 .19	768 .19	824 .19
GWBB08	951-1000	834 .56	751 .43	822 .36	823 .29	790 .23	719 .21	784 .21	802 .20	768 .20	743 .19	707 .18
GWBB09	920- 969	858 .33	834 .32	829 .29	777 .28	849 .27	804 .26	802 .25	824 .22	848 .22	772 .21	810 .20
GWBB09	945- 994	834 .39	823 .32	723 .32	820 .31	824 .29	719 .28	835 .26	836 .23	770 .22	766 .22	833 .22
GWBB09	951-1000	834 .39	823 .32	770 .31	721 .30	797 .28	772 .27	727 .25	836 .25	809 .23	723 .23	811 .21
GWBB10	907- 956	834 .67	878 .34	821 .28	855 .28	879 .26	788 .25	758 .24	812 .24	853 .23	844 .22	782 .21
GWBB10	932- 981	834 .59	763 .39	858 .35	737 .27	743 .24	854 .22	768 .21	853 .21	812 .21	800 .20	855 .19
GWBB10	951-1000	834 .65	743 .43	763 .30	814 .27	744 .25	835 .24	768 .21	810 .20	751 .20	726 .20	837 .18

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWBB HEMLOCK VS GWBS HEMLOCK DATED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWBB02	845- 894	815 .41	834 .41	784 .36	938 .32	783 .31	750 .30	889 .30	763 .29	749 .28	910 .28	760 .28
GWBB02	870- 919	834 .55	917 .40	726 .37	916 .33	760 .32	746 .32	800 .32	781 .31	895 .30	891 .29	747 .28
GWBB02	895- 944	834 .54	716 .37	717 .35	847 .34	843 .31	872 .29	729 .27	746 .27	712 .26	767 .24	864 .24
GWBB02	920- 969	834 .48	815 .43	717 .40	817 .34	758 .32	861 .30	810 .30	704 .28	745 .28	821 .27	777 .26
GWBB02	945- 994	834 .59	758 .35	663 .32	778 .30	680 .30	839 .29	810 .28	815 .28	721 .27	814 .26	836 .23
GWBB02	951-1000	834 .60	680 .39	758 .36	814 .31	815 .31	663 .30	648 .29	721 .28	658 .28	839 .28	751 .27
GWBB03	952-1000	656 .35	751 .32	788 .31	834 .31	715 .29	667 .29	647 .29	809 .29	784 .28	752 .28	802 .27
GWBB04	861- 910	897 .49	922 .35	840 .34	916 .33	839 .32	865 .32	744 .30	891 .26	793 .26	809 .24	873 .24
GWBB04	886- 935	872 .43	899 .39	711 .39	726 .39	834 .38	743 .38	897 .37	708 .30	742 .28	816 .27	741 .27
GWBB04	911- 960	834 .44	777 .36	745 .29	708 .29	743 .28	686 .28	678 .26	730 .25	796 .25	763 .25	879 .23
GWBB04	936- 985	834 .53	725 .35	777 .35	678 .33	854 .30	801 .29	751 .29	699 .25	771 .24	731 .23	709 .22
GWBB04	951-1000	834 .36	640 .31	663 .31	751 .30	699 .28	771 .27	758 .26	649 .25	824 .25	715 .25	662 .23
GWBB05	950- 999	696 .33	761 .32	838 .30	818 .28	755 .28	660 .27	743 .23	788 .23	690 .21	831 .21	813 .21
GWBB05	951-1000	696 .33	761 .32	755 .29	838 .29	818 .28	660 .26	633 .24	831 .23	690 .23	743 .23	788 .21
GWBB07	915- 964	823 .38	766 .36	715 .36	680 .33	684 .31	697 .31	747 .30	827 .29	714 .29	819 .29	870 .29
GWBB07	940- 989	844 .43	658 .36	823 .33	819 .30	766 .29	717 .28	826 .28	756 .28	735 .27	651 .27	743 .26
GWBB07	951-1000	766 .35	795 .34	823 .34	673 .34	799 .29	824 .29	634 .28	640 .27	719 .26	669 .26	761 .23

CHART 8

PART 2: CORRELATIONS WITH GWB LEANTO HEMLOCK FLOATING MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	1325 1374	FLAGS/ TOTAL
1	GWB-60	893-1000	=	.45	.50	.58	.50	.48															
+																							0/ 5
2	GWB-62	905- 980	=	=	.60	.59	.65	=															
+																							0/ 3
3	GWB-63	890- 980	=	.49	.58	.67	.68	=															
+																							0/ 4
4	GWB-66	926-1000	=	=	=	.58	.62	.61															
+																							0/ 3
5	GWB-68	890- 997	=	.42	.47	.54	.60	=															
+																							0/ 4
6	GWB-71	890-1000	=	.37	.41	.50	.60	.56															
+																							0/ 5

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB LEANTO HEMLOCK VS GWB LEANTO HEMLOCK ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	ADD # 1	CORR	ADD # 2	CORR	ADD # 3	CORR	ADD # 4	CORR	ADD # 5	CORR	ADD # 6	CORR	ADD # 7	CORR	ADD # 8	CORR	ADD # 9	CORR	ADD #10	CORR	ADD #11	CORR
GWB-60	893- 942	0	.64	-18	.38	39	.27	57	.26	53	.24	31	.22	13	.22	35	.22	26	.18	-3	.16	14	.14
GWB-60	918- 967	0	.72	26	.38	-30	.31	-41	.27	14	.25	25	.24	12	.22	-45	.20	11	.19	-44	.16	-13	.16
GWB-60	943- 992	0	.72	-41	.42	6	.42	-14	.32	-52	.25	-19	.23	-44	.22	-51	.19	-18	.19	-71	.18	-55	.17
GWB-60	951-1000	0	.65	-75	.36	-14	.36	-41	.35	-80	.30	-20	.27	-44	.25	-18	.22	-50	.19	-71	.18	-51	.17
GWB-61	951-1000	-37	.36	-32	.33	0	.27	-13	.27	-38	.25	-8	.24	-69	.20	-64	.19	-27	.18	-18	.15	-66	.15
GWB-62	925- 974	-20	.77	-50	.30	24	.19	-48	.19	-34	.17	-21	.16	-44	.16	8	.15	-49	.14	-8	.13	-33	.13
GWB-62	950- 999	-20	.79	-6	.36	-73	.28	-77	.27	-12	.25	-26	.21	-75	.20	-51	.19	-39	.18	-67	.16	-70	.16
GWB-62	951-1000	-20	.78	-6	.33	-73	.26	-12	.25	-77	.22	-51	.20	-75	.20	-26	.18	-39	.18	-70	.17	-78	.17
GWB-63	910- 959	-20	.73	33	.46	32	.28	-34	.27	5	.26	7	.24	31	.23	-6	.19	21	.19	41	.18	18	.17
GWB-63	935- 984	-20	.84	-50	.42	-59	.31	-6	.31	-8	.30	-47	.20	-34	.19	-14	.17	-52	.17	-61	.17	5	.16
GWB-63	951-1000	-20	.80	-6	.34	-61	.31	-73	.26	-77	.26	-51	.22	-31	.21	-75	.20	-19	.19	-50	.17	-44	.16
GWB-64	927- 976	0	.49	-57	.39	4	.27	-51	.27	-39	.22	2	.21	-19	.20	14	.18	-53	.17	-30	.16	-27	.14
GWB-64	951-1000	0	.47	-14	.47	-41	.29	-20	.28	-53	.27	-72	.27	-22	.26	-2	.24	-81	.22	-65	.22	-28	.19
GWB-65	949- 998	-62	.30	-20	.28	-5	.25	-66	.23	-72	.22	-39	.19	-63	.19	-59	.17	-21	.17	-77	.16	-32	.16
GWB-65	951-1000	-62	.30	-20	.28	-66	.25	-72	.25	-5	.23	-63	.21	-59	.18	-39	.17	-77	.17	-21	.17	-41	.16
GWB-66	926- 975	0	.75	-44	.28	-39	.21	-41	.20	-31	.20	-2	.20	-29	.19	-30	.17	-53	.16	-37	.14	14	.14
GWB-66	951-1000	0	.78	-6	.35	-32	.32	-14	.30	-26	.26	-67	.25	-59	.22	-71	.22	-57	.22	-41	.19	-37	.19
GWB-68	873- 922	-3	.81	54	.44	77	.35	49	.27	27	.24	58	.21	26	.21	72	.19	25	.19	6	.18	73	.18
GWB-68	898- 947	-3	.63	27	.38	-26	.37	28	.36	-4	.26	2	.24	26	.23	16	.21	53	.20	22	.19	49	.17
GWB-68	923- 972	-3	.70	-28	.28	-47	.27	16	.25	22	.21	5	.20	-17	.20	28	.19	2	.19	-36	.18	-9	.18
GWB-68	948- 997	-3	.76	-17	.27	-42	.26	-60	.25	-27	.24	-70	.23	-61	.22	-66	.22	-11	.21	-28	.19	-56	.17
GWB-68	951-1000	-3	.77	-66	.28	-17	.27	-60	.24	-29	.21	-27	.20	-70	.18	-28	.17	-41	.17	-11	.17	-74	.17
GWB-71	890- 939	0	.63	44	.48	14	.31	30	.26	41	.22	-9	.22	33	.21	52	.18	58	.18	55	.17	13	.14
GWB-71	915- 964	0	.64	5	.29	-39	.24	-43	.20	24	.18	-22	.18	33	.17	-31	.16	14	.16	-13	.16	-14	.15
GWB-71	940- 989	0	.71	-52	.38	-61	.33	-14	.28	-22	.27	-58	.21	-26	.21	-53	.20	-8	.19	5	.17	-39	.16
GWB-71	951-1000	0	.71	-71	.39	-14	.37	-52	.36	-26	.35	-61	.31	-53	.26	-80	.22	-75	.22	-51	.19	-18	.17
GWB-73	901- 950	4	.33	47	.30	15	.29	33	.28	41	.26	-4	.22	-17	.20	37	.19	25	.19	-18	.18	21	.18
GWB-73	926- 975	-18	.47	-4	.31	0	.28	-31	.28	-56	.27	-17	.23	1	.22	10	.21	-43	.19	15	.18	14	.16
GWB-73	951-1000	-18	.36	-4	.35	-57	.31	-75	.31	0	.29	-80	.25	-76	.19	-22	.18	-46	.18	-34	.17	-45	.15

CHART 9

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB LEANTO HEMLOCK VS SOUTHERN VERMONT HEMLOCK MASTER — BAISAN/FLYNT
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-60	893- 942	885 .42	855 .40	712 .39	802 .35	1053 .34	565 .34	985 .33	820 .32	776 .31	729 .29	604 .29
GWB-60	918- 967	820 .44	885 .40	681 .38	570 .37	685 .37	846 .36	1000 .30	834 .30	746 .29	667 .29	871 .29
GWB-60	943- 992	820 .44	826 .43	941 .37	597 .31	681 .30	905 .29	524 .28	917 .27	661 .27	788 .26	834 .26
GWB-60	951-1000	970 .39	820 .38	941 .37	935 .32	553 .31	826 .29	740 .28	800 .28	503 .28	681 .27	745 .27
GWB-61	951-1000	834 .60	622 .44	558 .37	643 .37	707 .35	727 .34	982 .32	788 .31	861 .31	765 .31	585 .30
GWB-62	925- 974	800 .54	712 .39	898 .35	677 .35	825 .35	742 .34	853 .33	1002 .33	534 .32	589 .30	545 .30
GWB-62	950- 999	800 .59	915 .45	933 .36	885 .35	714 .35	641 .35	978 .34	691 .31	938 .30	897 .30	659 .30
GWB-62	951-1000	800 .59	915 .46	933 .39	978 .35	885 .34	714 .34	695 .34	641 .33	938 .32	897 .31	659 .31
GWB-63	910- 959	712 .43	692 .39	800 .37	877 .35	1023 .35	575 .35	883 .34	853 .32	825 .31	686 .31	986 .31
GWB-63	935- 984	980 .43	800 .42	589 .41	851 .36	575 .35	795 .34	770 .33	634 .32	729 .30	665 .29	814 .28
GWB-63	951-1000	800 .57	964 .44	897 .41	933 .40	743 .39	915 .36	575 .34	814 .32	515 .31	970 .31	630 .29
GWB-64	927- 976	911 .42	605 .41	820 .40	763 .37	659 .36	846 .35	834 .35	612 .34	622 .32	976 .31	990 .30
GWB-64	951-1000	988 .55	820 .48	913 .45	806 .43	911 .40	976 .40	897 .38	748 .38	990 .38	899 .34	605 .33
GWB-65	949- 998	640 .47	548 .36	562 .34	870 .34	758 .33	934 .31	958 .31	867 .31	622 .30	840 .29	886 .29
GWB-65	951-1000	640 .47	548 .35	562 .34	758 .33	870 .33	934 .33	867 .31	958 .31	840 .29	622 .29	824 .29
GWB-66	926- 975	820 .45	846 .41	925 .37	844 .31	763 .31	859 .30	681 .29	776 .29	612 .28	568 .28	911 .28
GWB-66	951-1000	820 .59	921 .45	788 .42	539 .41	899 .36	990 .35	612 .35	988 .34	935 .34	665 .34	703 .33
GWB-68	873- 922	817 .77	622 .41	708 .38	676 .37	685 .34	874 .34	1049 .32	1030 .31	789 .31	842 .31	713 .30
GWB-68	898- 947	817 .73	611 .41	847 .41	1024 .33	980 .30	822 .29	842 .29	734 .28	676 .27	874 .27	570 .27
GWB-68	923- 972	817 .76	682 .50	980 .39	773 .36	737 .34	564 .32	550 .32	804 .32	873 .30	651 .30	567 .29
GWB-68	948- 997	817 .83	896 .43	704 .42	922 .40	567 .39	773 .37	987 .36	540 .36	760 .35	550 .33	652 .32
GWB-68	951-1000	817 .82	896 .49	704 .41	922 .39	567 .38	550 .37	985 .36	987 .36	773 .35	555 .35	540 .35
GWB-71	890- 939	820 .52	568 .41	911 .36	656 .35	864 .33	992 .33	834 .32	649 .31	600 .31	770 .28	742 .27
GWB-71	915- 964	820 .53	685 .41	568 .36	875 .36	740 .35	834 .34	909 .34	807 .33	1002 .33	1008 .32	812 .32
GWB-71	940- 989	820 .55	768 .47	517 .37	958 .37	681 .36	875 .35	671 .35	812 .35	940 .34	794 .33	684 .33
GWB-71	951-1000	820 .52	517 .50	628 .44	671 .40	768 .39	794 .39	685 .39	553 .38	681 .35	749 .35	891 .35
GWB-73	901- 950	1043 .48	816 .45	660 .34	1009 .33	736 .32	835 .32	885 .31	1031 .31	695 .30	968 .30	950 .29
GWB-73	926- 975	681 .40	816 .38	698 .37	875 .35	680 .35	655 .34	798 .34	736 .34	802 .33	578 .33	789 .32
GWB-73	951-1000	798 .41	681 .39	517 .38	680 .34	663 .34	531 .34	940 .33	698 .33	949 .31	578 .30	736 .29

CHART 10

PART 2: CORRELATIONS WITH MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED Tucson-Mendoza-Hamburg-Lamont ProgLib

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	850	875	900	925	950	975	1000	1025	1050	1075	1100	1125	1150	1175	1200	1225	1250	1275	1300	1325	FLAGS/ TOTAL
			899	924	949	974	999	1024	1049	1074	1099	1124	1149	1174	1199	1224	1249	1274	1299	1324	1349	1374	
1	GWB-67	922-1000	=	=	.35	.28	.29	.30															
+						__B	__A	__A															3/ 4
2	GWB-70	922-1000	=	=	.35	.28	.29	.30															
+						__A	__A	__A															3/ 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB LEANTO SPRUCE VS GWB-67
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-67	863- 912	01.00	39 .33	37 .26	46 .24	55 .24	86 .24	48 .23	88 .21	35 .21	19 .19	2 .18
GWB-67	888- 937	0 .94	48 .36	55 .26	21 .25	33 .22	-10 .21	-19 .20	18 .19	46 .18	35 .18	8 .16
GWB-67	913- 962	0 .86	-48 .30	-18 .29	18 .25	-35 .22	9 .21	-37 .21	-39 .20	-46 .20	13 .20	-2 .19
GWB-67	938- 987	0 .85	-2 .35	-48 .33	-1 .30	-67 .29	-35 .19	-23 .18	9 .18	-66 .18	-46 .17	-65 .16
GWB-67	951-1000	0 .83	-2 .38	-40 .28	-55 .28	-42 .27	-1 .27	-66 .24	-65 .22	-67 .21	-44 .21	-48 .20
GWB-70	922- 971	0 .79	-44 .31	-18 .26	-42 .25	15 .25	-26 .24	-9 .23	-55 .19	-33 .18	4 .17	-24 .17
GWB-70	947- 996	0 .79	-11 .31	-44 .31	-22 .24	-52 .24	-74 .22	-55 .22	-66 .21	-33 .19	1 .17	-21 .17
GWB-70	951-1000	0 .77	-11 .31	-44 .25	-66 .22	-52 .21	-35 .19	-53 .19	-55 .19	-74 .18	-22 .17	-64 .17

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB LEANTO SPRUCE VS SOUTHERN VERMONT SPRUCE MASTER BAISAN/FLYNT
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-67	863- 912	820 .53	976 .45	840 .38	739 .38	762 .36	1040 .36	1011 .35	886 .35	1050 .33	668 .32	688 .32
GWB-67	888- 937	820 .50	604 .40	923 .38	833 .36	910 .36	875 .35	801 .34	688 .34	984 .34	1040 .32	886 .31
GWB-67	913- 962	659 .46	723 .40	875 .37	950 .35	915 .34	999 .34	642 .34	759 .33	729 .33	625 .32	820 .31
GWB-67	938- 987	723 .42	831 .40	702 .38	623 .37	926 .35	621 .34	829 .32	856 .31	787 .29	725 .29	755 .29
GWB-67	951-1000	831 .44	936 .37	723 .36	602 .36	623 .35	862 .35	856 .33	858 .32	702 .30	600 .29	809 .28
GWB-70	922- 971	820 .38	577 .35	607 .34	894 .34	932 .33	831 .31	846 .31	768 .31	685 .30	904 .29	668 .28
GWB-70	947- 996	820 .52	768 .35	705 .35	981 .35	776 .33	741 .32	754 .31	868 .31	589 .29	656 .29	966 .28
GWB-70	951-1000	820 .51	981 .37	768 .36	966 .36	577 .36	741 .34	705 .32	776 .31	604 .31	868 .31	589 .30

CHART 11

PART 2: CORRELATIONS WITH GWB STORE FLOATING SPRUCE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	825 874	850 899	875 924	900 949	925 974	950 975	1000 1025	1050 1075	1100 1125	1150 1175	1200 1225	1250 1275	1300 1349	FLAGS/ TOTAL
1	GWB-40	901-1000	=	=	=	.49	.70	.78	.79							
+																0/ 4
2	GWB-45	904-1000	=	=	=	.46	.48	.47	.46							
+																0/ 4
3	GWB-46	926-1000	=	=	=	=	.47	.48	.52							
+																0/ 3
4	GWB-47	904-1000	=	=	=	.57	.51	.61	.58							
+																0/ 4
5	GWB-48	901-1000	=	=	=	.27	.45	.50	.52							
+						___A										1/ 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB STORE SPRUCE VS GWB STORE SPRUCE ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-40	901- 950	0 .77	-39 .46	-64 .31	-25 .30	47 .30	3 .29	-9 .27	-40 .23	-54 .22	13 .22	-3 .21
GWB-40	926- 975	0 .82	-67 .35	-64 .31	-13 .28	19 .27	-34 .26	-35 .26	-22 .25	-39 .23	-3 .21	-61 .21
GWB-40	951-1000	0 .88	-66 .32	-22 .29	-33 .28	-68 .28	-1 .27	-90 .26	-47 .26	-71 .26	-86 .24	-51 .19
GWB-42	870- 919	25 .40	66 .32	0 .31	-15 .25	-30 .22	52 .21	15 .20	81 .20	58 .20	-24 .15	-35 .15
GWB-42	895- 944	0 .58	55 .39	22 .35	-36 .33	34 .27	-35 .22	3 .22	-25 .21	33 .19	35 .19	-13 .19
GWB-42	920- 969	0 .46	-13 .31	-80 .25	-66 .24	3 .24	22 .23	-63 .22	29 .21	-42 .20	4 .20	-67 .19
GWB-42	945- 994	0 .37	-83 .37	-26 .29	-100 .25	-61 .22	-63 .21	-57 .20	-80 .20	-10 .19	-44 .19	-22 .18
GWB-42	951-1000	-26 .37	-83 .36	0 .31	-61 .28	-44 .24	-100 .23	-66 .23	-22 .23	-80 .22	-115 .20	-86 .18
GWB-45	904- 953	0 .70	-25 .29	-67 .27	13 .26	-53 .24	22 .24	-44 .20	33 .20	9 .20	46 .19	-68 .18
GWB-45	929- 978	0 .72	-70 .31	-44 .29	20 .29	22 .28	-13 .26	-46 .24	-61 .23	-67 .22	9 .21	-4 .19
GWB-45	951-1000	0 .64	-97 .37	-71 .35	-66 .26	-101 .25	-4 .24	-102 .24	-26 .24	-37 .21	-58 .19	-69 .19
GWB-46	926- 975	0 .70	-22 .32	-35 .32	-13 .29	-64 .25	-86 .23	-19 .21	-88 .21	-40 .19	-58 .19	-10 .19
GWB-46	951-1000	0 .72	-47 .52	-86 .38	-1 .31	-111 .29	-22 .26	-114 .26	-100 .20	-26 .19	-91 .19	-58 .18
GWB-47	904- 953	0 .76	-67 .38	-39 .32	18 .25	22 .24	-28 .21	-21 .20	-35 .20	13 .20	-3 .20	47 .19
GWB-47	929- 978	0 .72	-57 .34	-64 .28	-67 .23	1 .23	-86 .22	-13 .22	4 .22	-43 .21	-61 .19	-22 .18
GWB-47	951-1000	0 .74	-86 .45	-47 .36	-33 .33	-90 .32	-69 .31	-66 .24	-1 .23	-23 .22	-22 .22	-96 .21
GWB-48	835- 884	01.00	97 .35	67 .34	64 .28	10 .27	3 .27	70 .27	100 .26	54 .25	96 .24	39 .21
GWB-48	860- 909	0 .94	39 .35	86 .35	70 .34	64 .28	-4 .25	90 .25	33 .23	28 .23	3 .22	-3 .21
GWB-48	885- 934	0 .70	66 .35	63 .30	34 .28	-5 .25	-48 .25	-28 .25	4 .24	-31 .23	-20 .20	-24 .20
GWB-48	910- 959	0 .62	-54 .29	-19 .28	-20 .26	-70 .24	38 .21	34 .21	-22 .21	-34 .20	37 .18	13 .18
GWB-48	935- 984	0 .64	-53 .34	-87 .31	-37 .28	-97 .26	-59 .24	-34 .22	-43 .22	-62 .21	-68 .20	5 .20
GWB-48	951-1000	0 .72	-87 .31	-66 .31	-48 .29	-90 .29	-1 .28	-34 .28	-53 .26	-19 .25	-81 .23	-24 .22

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB STORE SPRUCE VS SOUTHERN VERMONT SPRUCE MASTER BAISAN/FLYNT
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-40	901- 950	812 .50	599 .41	596 .40	748 .37	803 .36	883 .35	703 .33	1024 .32	1041 .30	939 .30	1003 .29
GWB-40	926- 975	812 .53	748 .42	1024 .41	923 .40	822 .39	596 .38	803 .38	849 .35	939 .35	942 .32	904 .32
GWB-40	951-1000	956 .47	973 .44	746 .40	596 .39	908 .34	671 .33	923 .33	849 .32	848 .30	860 .29	595 .29
GWB-42	870- 919	981 .42	1022 .38	812 .37	782 .35	837 .34	989 .34	723 .33	1077 .33	706 .33	951 .33	935 .32
GWB-42	895- 944	858 .40	871 .40	691 .39	856 .39	803 .38	724 .36	915 .35	869 .34	812 .33	961 .32	773 .31
GWB-42	920- 969	812 .43	587 .36	976 .34	903 .33	777 .33	803 .32	651 .31	586 .30	856 .30	724 .30	857 .30
GWB-42	945- 994	604 .50	570 .40	558 .39	812 .38	786 .35	586 .35	855 .31	950 .30	956 .29	686 .29	860 .29
GWB-42	951-1000	604 .41	558 .38	855 .35	843 .34	786 .33	812 .33	570 .32	981 .32	643 .31	1001 .31	932 .30
GWB-45	904- 953	812 .55	956 .36	734 .34	895 .31	774 .29	869 .29	803 .28	653 .28	736 .28	856 .28	787 .27
GWB-45	929- 978	812 .58	956 .41	849 .38	768 .37	803 .36	794 .35	712 .33	821 .31	716 .30	695 .30	993 .30
GWB-45	951-1000	768 .43	973 .41	716 .36	812 .33	800 .31	690 .31	744 .31	596 .29	718 .29	645 .29	942 .29
GWB-46	926- 975	596 .52	904 .37	716 .33	669 .32	812 .32	729 .31	663 .30	913 .28	712 .28	923 .27	885 .27
GWB-46	951-1000	595 .48	694 .42	596 .35	956 .32	552 .32	860 .32	993 .31	558 .29	851 .29	863 .28	651 .27
GWB-47	904- 953	812 .42	991 .35	837 .35	653 .33	1042 .33	849 .33	599 .31	881 .29	631 .28	989 .28	734 .27
GWB-47	929- 978	812 .41	956 .40	838 .33	783 .32	730 .32	882 .30	596 .30	794 .29	826 .28	618 .27	923 .27
GWB-47	951-1000	596 .50	956 .44	923 .43	595 .37	994 .33	826 .31	974 .30	581 .30	746 .30	783 .29	849 .29
GWB-48	835- 884	812 .49	1095 .44	721 .37	1009 .36	923 .34	937 .32	742 .32	870 .30	797 .30	1006 .28	948 .27
GWB-48	860- 909	812 .49	638 .42	923 .41	840 .35	742 .35	1009 .32	737 .32	654 .30	721 .29	1064 .28	664 .27
GWB-48	885- 934	667 .52	812 .45	737 .36	643 .36	955 .35	923 .34	633 .32	671 .31	807 .29	1064 .29	1027 .29
GWB-48	910- 959	955 .39	812 .37	849 .36	720 .36	630 .35	667 .35	621 .34	988 .33	1027 .32	990 .32	783 .31
GWB-48	935- 984	744 .42	902 .40	599 .37	812 .35	913 .33	971 .33	849 .32	889 .30	567 .30	783 .30	775 .28
GWB-48	951-1000	908 .53	746 .44	889 .40	801 .34	595 .33	671 .33	870 .31	973 .31	971 .30	803 .29	812 .29

CHART 12

PART 2: CORRELATIONS WITH GWB EVOLVING SPRUCE SITE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1650 1699	1675 1724	1700 1749	1725 1774	1750 1799	1775 1824	1800 1849	1825 1874	1850 1899	1875 1924	1900 1949	1925 1974	1950 1999	1975 2024	2000 2049	2025 2074	2050 2099	2075 2124	2100 2149	2125 2174	FLAGS/ TOTAL
1	GWBS03	1669-1838	.50	.29 __B	.50	.69	.69	.71	.65	=													1/ 7
2	GWBS04	1733-1839	=	=	=	.56	.53	.33	.29 __B	=													1/ 4
3	GWBS05	1669-1772	.63	.51	.50	.55	=	=	=	=													0/ 4
4	GWBS06	1673-1837	.40 __B	.45	.45	.60	.76	.74	.64	=													1/ 7
5	GWBS07	1750-1824	=	=	=	=	.58	.61	=	=													0/ 2
6	GWBS08	1742-1839	=	=	=	.39	.52	.71	.67	=													0/ 4
7	GWBB06	1727-1834	=	=	=	.55	.65	.58	.50	=													0/ 4
8	GWBB08	1728-1834	=	=	=	.57	.70	.66	.60	=													0/ 4
9	GWBB09	1754-1834	=	=	=	=	.40	.59	.51	=													0/ 3
10	GWBB10	1741-1834	=	=	=	.67	.69	.64	.65	=													0/ 4
11	GWB-70	1742-1820	=	=	=	.40	.49	.56	=	=													0/ 3

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB STORE VS GWB EVOLVING SPRUCE SITE MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	ADD # 1	CORR	ADD # 2	CORR	ADD # 3	CORR	ADD # 4	CORR	ADD # 5	CORR	ADD # 6	CORR	ADD # 7	CORR	ADD # 8	CORR	ADD # 9	CORR	ADD #10	CORR	ADD #11	CORR
GWB-40	901- 950	812	.39	758	.34	825	.33	830	.31	773	.29	883	.29	776	.28	860	.21	869	.21	884	.20	880	.19
GWB-40	926- 975	812	.54	825	.39	746	.27	743	.26	748	.26	790	.25	822	.25	849	.25	770	.24	773	.23	803	.22
GWB-40	951-1000	812	.54	746	.35	741	.34	729	.30	836	.29	827	.27	737	.26	778	.26	793	.24	811	.23	757	.23
GWB-42	870- 919	812	.49	864	.45	915	.37	845	.36	840	.32	825	.31	859	.25	894	.25	827	.25	837	.23	829	.21
GWB-42	895- 944	812	.52	846	.33	773	.33	795	.28	858	.25	859	.25	847	.25	776	.25	882	.23	895	.23	834	.20
GWB-42	920- 969	812	.42	741	.32	817	.31	770	.27	846	.26	746	.25	868	.23	860	.23	745	.23	815	.22	829	.22
GWB-42	945- 994	812	.38	817	.31	786	.28	715	.27	783	.24	798	.22	768	.22	842	.21	720	.20	802	.19	724	.19
GWB-42	951-1000	812	.34	768	.28	817	.27	786	.25	834	.25	732	.24	836	.24	715	.23	744	.23	820	.22	765	.22
GWB-45	904- 953	787	.47	812	.44	825	.40	839	.39	858	.28	768	.26	844	.25	826	.25	869	.24	792	.21	783	.20
GWB-45	929- 978	812	.63	736	.30	794	.27	851	.25	763	.25	825	.25	787	.24	834	.23	749	.22	766	.21	860	.20
GWB-45	951-1000	812	.61	712	.29	761	.29	737	.28	710	.25	836	.24	707	.24	766	.23	741	.22	757	.22	800	.21
GWB-46	926- 975	812	.43	860	.29	757	.27	733	.23	799	.22	795	.22	839	.22	765	.22	752	.21	834	.21	790	.20
GWB-46	951-1000	812	.50	813	.35	740	.27	827	.26	774	.25	749	.24	768	.23	757	.23	765	.23	729	.22	839	.21
GWB-47	904- 953	812	.46	825	.35	755	.26	864	.25	881	.25	830	.25	773	.23	793	.22	860	.21	761	.20	796	.20
GWB-47	929- 978	812	.53	826	.41	774	.34	825	.28	793	.24	838	.24	767	.21	743	.20	729	.20	787	.19	770	.18
GWB-47	951-1000	812	.53	826	.35	837	.33	813	.31	774	.30	746	.27	775	.26	793	.26	741	.25	711	.24	767	.22
GWB-48	835- 884	909	.36	863	.33	912	.32	948	.24	838	.23	951	.23	866	.22	913	.22	927	.20	923	.19	947	.17
GWB-48	860- 909	812	.39	923	.34	892	.25	840	.23	810	.22	815	.21	883	.18	859	.17	879	.17	919	.17	898	.16
GWB-48	885- 934	812	.53	859	.40	864	.33	883	.30	807	.29	878	.28	902	.28	832	.27	898	.27	899	.25	782	.22
GWB-48	910- 959	812	.51	859	.34	864	.33	758	.28	795	.25	825	.24	754	.23	830	.23	860	.23	878	.22	849	.22
GWB-48	935- 984	783	.38	812	.36	744	.33	742	.32	727	.31	798	.31	796	.30	849	.28	759	.24	766	.24	827	.21
GWB-48	951-1000	812	.46	793	.40	746	.31	827	.30	791	.29	759	.29	744	.29	778	.29	836	.28	788	.22	764	.22

CHART 13

PART 2: CORRELATIONS WITH GWB STORE FLOATING HEMLOCK MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	825 874	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	FLAGS/ TOTAL
1	GWB-41	900-1000	=	=	=	.23	.48	.59	.59														
+						___B																	1/ 4
2	GWB-52	913-1000	=	=	=	.66	.68	.78	.75														
+																							0/ 4
3	GWB-54	949-1000	=	=	=	=	.54	.56	.55														
+																							0/ 3
4	GWB-58	900-1000	=	=	=	.36	.64	.66	.64														
+																							0/ 4
5	GWB-59	913- 997	=	=	=	.54	.57	.65	=														
+																							0/ 3
6	GWB-80	941-1000	=	=	=	=	.43	.51	.47														
+																							0/ 3

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB STORE HEMLOCK VS GWB STORE HEMLOCK ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-41	900- 949	0 .68	51 .36	-42 .34	-10 .25	-32 .23	37 .23	-7 .23	19 .22	-25 .20	44 .20	27 .20
GWB-41	925- 974	0 .75	-52 .34	-71 .30	-13 .30	-32 .26	-30 .22	-31 .21	-53 .21	26 .21	22 .19	-26 .18
GWB-41	950- 999	0 .78	-52 .41	-71 .39	-80 .34	-14 .30	-76 .30	-26 .28	-91 .25	-19 .24	-57 .23	-72 .23
GWB-41	951-1000	0 .78	-52 .41	-71 .38	-80 .34	-76 .30	-14 .29	-26 .27	-91 .25	-19 .23	-57 .23	-82 .23
GWB-52	913- 962	0 .78	-39 .36	12 .36	13 .36	-19 .29	-50 .25	38 .24	14 .23	26 .21	-20 .20	31 .20
GWB-52	938- 987	0 .81	13 .36	-44 .31	-14 .26	-71 .26	12 .22	-72 .20	-40 .20	-39 .19	-57 .19	-76 .18
GWB-52	951-1000	0 .82	-71 .40	-44 .34	-94 .32	-14 .32	-52 .28	-32 .25	-13 .22	-100 .20	-57 .20	-91 .19
GWB-54	949- 998	0 .71	-66 .34	-14 .32	-51 .28	-71 .28	-27 .27	-68 .23	-85 .22	-94 .22	-19 .21	-52 .21
GWB-54	951-1000	0 .71	-51 .35	-14 .30	-52 .26	-71 .26	-66 .26	-85 .25	-94 .23	-27 .23	-76 .23	-79 .22
GWB-58	850- 899	01.00	28 .42	19 .34	32 .26	94 .24	76 .24	89 .24	71 .22	9 .21	72 .20	56 .20
GWB-58	875- 924	0 .88	28 .40	-19 .35	57 .31	71 .26	76 .25	52 .23	66 .23	39 .22	19 .22	42 .22
GWB-58	900- 949	0 .71	-47 .45	-28 .43	29 .32	38 .29	27 .23	42 .22	-19 .22	-37 .20	-14 .20	28 .20
GWB-58	925- 974	0 .77	-56 .38	14 .34	-75 .27	5 .26	-71 .26	24 .25	13 .24	-57 .23	-29 .23	-61 .22
GWB-58	950- 999	0 .77	-51 .39	-52 .31	-89 .30	-57 .28	-24 .28	-80 .27	-39 .24	-85 .24	-61 .23	-76 .20
GWB-58	951-1000	0 .76	-51 .37	-89 .32	-52 .30	-80 .28	-57 .28	-39 .23	-24 .23	-61 .21	-85 .21	-22 .21
GWB-59	916- 965	-3 .71	16 .33	-22 .32	2 .30	-59 .23	-53 .23	-8 .22	-55 .21	-27 .21	29 .18	24 .18
GWB-59	941- 990	-3 .72	-47 .35	-33 .32	-60 .27	-16 .24	-69 .23	-78 .20	-64 .20	-7 .20	-88 .20	-34 .20
GWB-59	951-1000	-3 .76	-47 .39	-33 .29	-54 .27	-92 .26	-16 .24	-17 .23	-60 .21	-42 .21	-86 .21	-61 .20
GWB-80	941- 990	0 .57	-38 .48	-14 .34	-44 .31	-83 .30	-11 .28	-25 .25	-58 .23	-12 .21	8 .21	-24 .20
GWB-80	951-1000	0 .61	-38 .43	-12 .30	-39 .27	-14 .27	-83 .25	-100 .25	-58 .25	-44 .24	-94 .24	-25 .24

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB STORE HEMLOCK VS NY/MA/VT HEMLOCK MASTER TO 1848
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-41	900- 949	890 .45	582 .39	834 .36	557 .36	711 .35	844 .34	608 .31	812 .31	611 .28	666 .28	565 .27
GWB-41	925- 974	812 .39	863 .36	807 .34	562 .34	535 .33	564 .32	865 .30	715 .30	781 .29	794 .29	730 .28
GWB-41	950- 999	812 .44	730 .42	564 .41	622 .40	824 .39	535 .37	741 .33	589 .33	611 .32	793 .31	736 .30
GWB-41	951-1000	730 .47	812 .44	564 .40	622 .40	824 .39	535 .37	589 .35	741 .33	611 .32	793 .31	736 .30
GWB-52	913- 962	793 .44	807 .43	603 .39	782 .33	812 .33	850 .32	641 .32	743 .31	882 .31	741 .30	863 .28
GWB-52	938- 987	812 .51	794 .38	851 .37	671 .37	793 .37	849 .35	782 .34	591 .34	768 .33	649 .33	769 .31
GWB-52	951-1000	812 .63	793 .37	712 .35	768 .33	671 .31	794 .31	780 .31	782 .31	577 .31	564 .30	591 .29
GWB-54	949- 998	793 .40	812 .40	827 .39	768 .37	731 .34	718 .33	744 .32	565 .31	663 .29	517 .29	746 .29
GWB-54	951-1000	827 .46	812 .40	793 .39	768 .37	565 .34	718 .33	744 .31	516 .30	579 .29	545 .28	663 .27
GWB-58	850- 899	812 .61	895 .43	708 .33	694 .33	897 .33	797 .31	753 .31	840 .30	906 .29	766 .29	831 .29
GWB-58	875- 924	812 .73	672 .40	921 .33	784 .33	878 .32	765 .32	719 .30	663 .29	691 .28	865 .28	919 .27
GWB-58	900- 949	812 .49	784 .42	850 .39	592 .37	759 .33	741 .32	765 .30	756 .30	616 .29	798 .29	809 .29
GWB-58	925- 974	812 .50	559 .48	756 .38	592 .36	691 .35	589 .34	793 .33	677 .33	695 .33	545 .32	591 .32
GWB-58	950- 999	812 .53	540 .42	826 .39	564 .37	619 .36	671 .33	712 .32	755 .31	769 .30	691 .30	814 .29
GWB-58	951-1000	812 .52	540 .42	826 .41	564 .38	619 .36	671 .32	691 .32	712 .32	704 .31	755 .31	814 .30
GWB-59	916- 965	809 .66	589 .40	669 .34	687 .34	638 .33	542 .33	605 .32	619 .30	804 .29	759 .29	664 .28
GWB-59	941- 990	809 .63	561 .43	532 .35	644 .33	696 .32	779 .32	848 .32	748 .31	787 .30	687 .30	543 .30
GWB-59	951-1000	809 .66	696 .39	561 .39	644 .37	779 .34	709 .33	748 .32	608 .31	848 .29	679 .28	603 .28
GWB-80	941- 990	812 .66	703 .48	838 .44	578 .33	744 .31	782 .31	699 .30	550 .30	825 .30	826 .29	729 .29
GWB-80	951-1000	812 .74	550 .41	647 .36	703 .35	578 .35	553 .34	699 .34	826 .32	755 .32	604 .32	838 .30

CHART 14

PART 2: CORRELATIONS WITH GWB MAIN HOUSE/NORTH ELL FLOATING HEMLOCK MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

ØSEQ	SERIES	INTERVAL	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	1325 1374	FLAGS/ TOTAL
1	GWB-10	879- 990	=	.22	.44	.68	.61	=															
+				___B																			1/ 4
2	GWB-15	905- 990	=	=	.37	.70	.57	=															
+																							0/ 3
3	GWB-19	903- 983	=	=	.39	.46	.47	=															
+																							0/ 3
4	GWB-20	884-1000	=	.46	.44	.71	.69	.71															
+																							0/ 5
5	GWB-21	909-1000	=	=	.37	.62	.70	.74															
+																							0/ 4
6	GWB-22	891-1000	=	.67	.58	.70	.73	.76															
+																							0/ 5
7	GWB-24	879- 999	=	.43	.41	.56	.73	=															
+																							0/ 4
8	GWB-25	884- 999	=	.50	.52	.70	.69	=															
+																							0/ 4

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB MAIN HOUSE/NORTH ELL HEMLOCK VS GWB MAIN HOUSE/NORTH ELL HEMLOCK ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	ADD # 1	CORR	ADD # 2	CORR	ADD # 3	CORR	ADD # 4	CORR	ADD # 5	CORR	ADD # 6	CORR	ADD # 7	CORR	ADD # 8	CORR	ADD # 9	CORR	ADD #10	CORR	ADD #11	CORR
GWB-10	866- 915	-10	.65	24	.37	71	.33	21	.25	1	.23	13	.23	79	.23	32	.21	81	.19	57	.18	48	.18
GWB-10	891- 940	-10	.45	-21	.28	4	.26	18	.25	28	.25	20	.22	1	.21	48	.19	57	.18	-18	.18	47	.16
GWB-10	916- 965	-10	.54	-22	.30	20	.28	31	.28	33	.27	7	.21	-24	.20	17	.20	-35	.19	-48	.19	-1	.19
GWB-10	941- 990	-10	.71	-77	.28	-50	.25	-49	.24	-22	.23	-48	.22	-82	.22	3	.22	-79	.22	-70	.21	-54	.21
GWB-10	951-1000	-10	.72	-22	.38	-35	.35	-54	.34	-77	.31	-63	.27	-40	.24	-79	.24	-82	.21	-93	.21	-11	.19
GWB-15	915- 964	-10	.51	20	.29	-51	.28	33	.25	-48	.25	-1	.23	-21	.23	31	.22	7	.22	-38	.21	-12	.21
GWB-15	940- 989	-10	.77	-49	.31	-76	.28	-70	.24	-81	.23	-37	.22	-23	.21	-48	.20	-68	.20	-35	.19	-15	.18
GWB-15	951-1000	-10	.69	-23	.38	-37	.37	-24	.33	-54	.33	-76	.32	-90	.30	-49	.24	-36	.24	-81	.19	-91	.18
GWB-19	920- 969	-17	.53	2	.24	-64	.21	-37	.21	-53	.20	-59	.19	-55	.18	-23	.17	-56	.17	13	.16	12	.15
GWB-19	945- 994	-17	.58	-84	.34	-73	.32	-12	.27	-77	.27	-56	.25	-34	.23	-55	.22	2	.22	-54	.17	-16	.17
GWB-19	951-1000	-17	.59	-84	.40	-12	.33	-73	.27	-56	.27	-77	.23	-34	.23	-59	.21	-42	.21	-55	.17	-89	.15
GWB-20	884- 933	0	.69	13	.27	66	.26	39	.23	27	.22	11	.18	-23	.18	-13	.17	29	.17	55	.17	-14	.16
GWB-20	909- 958	0	.61	27	.29	30	.28	-13	.26	13	.24	-44	.22	-2	.20	-39	.20	-14	.19	-42	.18	35	.18
GWB-20	934- 983	0	.78	-66	.44	-25	.34	-13	.32	14	.29	-52	.27	-68	.27	-39	.25	-44	.24	-30	.24	-27	.23
GWB-20	951-1000	0	.79	-25	.39	-66	.37	-44	.31	-68	.20	-30	.19	-14	.19	-86	.19	-39	.16	-67	.16	-6	.15
GWB-21	909- 958	0	.62	-39	.43	-2	.34	-41	.32	-21	.23	-9	.22	-27	.22	2	.21	28	.19	-43	.19	-29	.18
GWB-21	934- 983	0	.76	-39	.32	-30	.27	-14	.27	-68	.27	-66	.27	-43	.25	-41	.24	-58	.22	-13	.21	14	.20
GWB-21	951-1000	0	.81	-14	.35	-67	.30	-68	.29	-58	.23	-69	.23	-80	.23	-57	.22	-87	.21	-55	.21	-30	.20
GWB-22	891- 940	0	.79	39	.43	30	.31	-19	.26	57	.25	-28	.22	44	.19	2	.18	55	.18	25	.18	11	.18
GWB-22	916- 965	0	.78	-39	.36	-28	.29	25	.27	30	.27	5	.24	-19	.20	-30	.19	-5	.18	13	.17	-9	.15
GWB-22	941- 990	0	.75	-67	.34	-66	.28	-39	.27	-30	.27	-69	.26	-68	.24	-80	.23	-25	.18	-22	.16	-41	.16
GWB-22	951-1000	0	.84	-67	.37	-69	.26	-39	.25	-66	.21	-58	.19	-25	.18	-14	.18	-80	.17	-68	.17	-42	.16
GWB-24	880- 929	-1	.69	38	.54	-20	.26	36	.24	65	.23	66	.23	-4	.20	67	.19	68	.18	-22	.17	0	.16
GWB-24	905- 954	-1	.62	43	.35	34	.30	38	.26	24	.22	-40	.21	-43	.20	-20	.19	-46	.18	29	.16	26	.15
GWB-24	930- 979	-1	.71	12	.39	-55	.33	-67	.29	-14	.27	-56	.24	-40	.21	-45	.20	-68	.20	4	.20	-18	.19
GWB-24	951-1000	-1	.79	-54	.29	-27	.26	-15	.26	-14	.25	-68	.25	-77	.25	-56	.22	-43	.20	-40	.20	-28	.19
GWB-25	885- 934	-1	.69	65	.37	38	.25	43	.24	8	.21	66	.18	20	.18	7	.18	49	.18	22	.17	-24	.17
GWB-25	910- 959	-1	.69	-40	.35	29	.29	41	.28	-20	.24	-37	.21	-17	.20	8	.20	-31	.18	-42	.15	-51	.14
GWB-25	935- 984	-1	.77	13	.48	-40	.34	-15	.34	-31	.34	-59	.34	-72	.30	-14	.27	-58	.19	-70	.18	-6	.17
GWB-25	951-1000	-1	.79	-15	.39	-59	.36	-72	.29	-81	.29	-86	.28	-58	.26	-44	.25	-92	.24	-54	.22	-70	.21

CHART 15

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB HEMLOCK VS NY/MA/VT HEMLOCK MASTER TO 1848
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-10	866- 915	794 .44	875 .36	627 .34	851 .34	813 .30	861 .29	685 .29	596 .28	932 .28	622 .27	836 .27
GWB-10	891- 940	794 .46	599 .37	602 .36	662 .36	699 .35	766 .33	753 .33	819 .31	903 .30	735 .30	627 .30
GWB-10	916- 965	602 .45	794 .44	649 .39	803 .37	876 .35	614 .34	686 .31	553 .31	604 .29	715 .28	685 .28
GWB-10	941- 990	794 .60	517 .34	558 .34	805 .32	676 .32	618 .32	850 .31	713 .29	588 .29	764 .29	696 .28
GWB-10	951-1000	794 .68	558 .43	750 .42	820 .40	764 .39	711 .36	618 .33	676 .32	546 .31	840 .30	633 .29
GWB-15	915- 964	649 .49	602 .48	803 .47	614 .41	753 .39	794 .38	604 .38	827 .38	662 .35	568 .31	553 .30
GWB-15	940- 989	794 .66	659 .37	525 .33	517 .33	789 .31	847 .30	604 .28	803 .27	764 .26	627 .26	736 .26
GWB-15	951-1000	794 .53	627 .48	659 .38	781 .37	544 .33	762 .30	677 .30	806 .30	818 .29	606 .28	750 .28
GWB-19	920- 969	787 .46	679 .39	844 .38	731 .35	869 .34	566 .33	561 .32	562 .30	735 .29	642 .29	591 .29
GWB-19	945- 994	787 .56	731 .48	540 .34	652 .34	679 .32	811 .31	520 .30	595 .28	712 .27	562 .27	511 .26
GWB-19	951-1000	787 .56	731 .47	652 .36	679 .35	540 .31	515 .29	798 .28	617 .28	657 .27	511 .27	595 .26
GWB-20	884- 933	804 .39	639 .39	776 .38	852 .37	789 .37	674 .35	801 .34	606 .32	651 .31	839 .30	752 .29
GWB-20	909- 958	804 .48	552 .41	638 .41	640 .38	584 .34	861 .33	831 .32	776 .32	553 .31	746 .29	881 .28
GWB-20	934- 983	804 .52	629 .45	746 .36	587 .33	669 .31	830 .30	786 .29	799 .28	722 .27	785 .26	642 .26
GWB-20	951-1000	804 .65	832 .40	812 .35	774 .34	704 .34	556 .33	723 .30	830 .30	645 .29	691 .28	722 .27
GWB-21	909- 958	765 .48	545 .43	640 .38	661 .36	631 .34	577 .31	788 .31	580 .31	612 .30	746 .28	595 .27
GWB-21	934- 983	785 .43	746 .38	804 .37	761 .37	855 .37	772 .37	580 .37	640 .33	655 .33	582 .32	584 .31
GWB-21	951-1000	804 .53	816 .39	655 .34	519 .34	570 .33	785 .32	537 .31	583 .30	774 .30	798 .29	772 .28
GWB-22	891- 940	804 .52	853 .36	904 .35	623 .34	753 .32	683 .32	776 .31	711 .31	867 .31	875 .30	843 .29
GWB-22	916- 965	804 .42	785 .40	633 .34	799 .33	681 .33	600 .29	746 .29	704 .29	776 .28	580 .28	540 .28
GWB-22	941- 990	804 .50	537 .42	774 .40	724 .36	633 .33	527 .32	532 .31	557 .29	655 .29	799 .28	816 .28
GWB-22	951-1000	804 .62	537 .48	655 .38	704 .36	687 .34	583 .32	816 .30	691 .30	603 .29	774 .29	532 .29
GWB-24	880- 929	680 .40	842 .40	789 .34	616 .33	784 .32	615 .31	696 .30	622 .29	584 .29	803 .28	897 .28
GWB-24	905- 954	803 .43	654 .36	753 .36	766 .35	561 .33	866 .33	680 .32	579 .32	795 .30	874 .29	828 .28
GWB-24	930- 979	803 .56	628 .39	654 .39	764 .36	686 .34	745 .34	772 .32	753 .31	637 .30	529 .29	539 .29
GWB-24	951-1000	803 .63	686 .41	580 .37	786 .35	690 .32	628 .31	727 .30	745 .29	595 .29	569 .28	627 .28
GWB-25	885- 934	803 .53	847 .35	716 .33	877 .31	752 .30	903 .28	736 .28	694 .27	600 .27	845 .26	622 .26
GWB-25	910- 959	803 .52	732 .45	583 .43	558 .40	847 .40	548 .39	845 .38	784 .36	611 .33	694 .33	745 .32
GWB-25	935- 984	803 .46	628 .43	732 .43	798 .37	518 .36	680 .35	841 .33	784 .33	734 .32	583 .32	817 .31
GWB-25	951-1000	803 .53	569 .40	745 .38	784 .35	760 .31	732 .31	627 .30	595 .30	628 .30	686 .29	580 .29

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB HOUSE/NORTH WING HEMLOCK VS GWB EVOLVING HEMLOCK SITE MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-10	866- 915	794 .51	842 .33	893 .31	880 .31	828 .28	861 .28	836 .27	776 .26	899 .26	804 .26	813 .24
GWB-10	891- 940	794 .45	735 .40	699 .40	772 .36	753 .36	766 .31	823 .25	808 .25	819 .25	850 .24	891 .22
GWB-10	916- 965	794 .42	732 .40	821 .31	835 .30	705 .28	769 .27	685 .27	824 .25	850 .25	671 .24	672 .22
GWB-10	941- 990	794 .63	659 .36	676 .32	705 .29	741 .29	672 .29	764 .27	722 .25	847 .23	663 .22	703 .22
GWB-10	951-1000	794 .64	750 .42	676 .35	672 .30	769 .30	711 .29	633 .27	659 .27	741 .27	780 .27	764 .27
GWB-15	915- 964	794 .36	770 .33	736 .33	705 .31	685 .30	783 .29	734 .28	671 .27	715 .26	824 .26	851 .26
GWB-15	940- 989	794 .69	659 .39	742 .29	767 .28	672 .28	663 .27	660 .27	705 .26	770 .25	780 .25	736 .25
GWB-15	951-1000	794 .60	767 .46	838 .43	781 .39	780 .39	709 .36	728 .35	672 .30	659 .30	663 .29	799 .28
GWB-19	920- 969	787 .58	698 .41	694 .35	679 .31	683 .27	870 .25	857 .24	731 .24	664 .23	806 .22	767 .22
GWB-19	945- 994	787 .59	792 .37	698 .35	811 .29	844 .28	806 .27	731 .27	652 .27	694 .27	817 .26	773 .25
GWB-19	951-1000	787 .56	698 .41	792 .41	806 .30	735 .28	636 .27	633 .27	825 .26	652 .25	662 .25	811 .25
GWB-20	884- 933	804 .48	709 .43	895 .36	739 .31	755 .29	820 .28	843 .27	870 .27	753 .25	857 .24	752 .24
GWB-20	909- 958	804 .65	861 .47	687 .38	740 .34	681 .32	772 .30	742 .30	831 .28	696 .26	817 .25	754 .25
GWB-20	934- 983	804 .68	752 .39	687 .35	686 .34	791 .33	738 .32	669 .31	651 .31	779 .27	719 .25	705 .24
GWB-20	951-1000	804 .76	687 .38	790 .36	779 .34	686 .32	682 .29	832 .29	818 .27	719 .27	704 .26	705 .26
GWB-21	909- 958	763 .57	744 .44	765 .37	746 .30	732 .28	782 .25	711 .25	832 .25	791 .22	729 .21	841 .21
GWB-21	934- 983	804 .59	651 .43	752 .37	761 .35	713 .33	714 .33	803 .32	790 .28	652 .26	728 .22	655 .22
GWB-21	951-1000	804 .72	790 .40	685 .32	686 .31	803 .31	687 .31	682 .26	704 .26	816 .25	733 .25	751 .25
GWB-22	891- 940	804 .64	776 .36	711 .35	861 .34	843 .33	795 .31	753 .31	754 .30	875 .29	829 .28	772 .25
GWB-22	916- 965	804 .65	681 .37	687 .34	776 .32	829 .30	867 .29	711 .26	809 .24	848 .23	765 .23	779 .22
GWB-22	941- 990	804 .70	687 .42	686 .37	724 .31	674 .28	774 .26	669 .24	843 .24	752 .24	723 .23	664 .23
GWB-22	951-1000	804 .79	687 .47	686 .36	790 .34	836 .33	704 .33	772 .28	655 .27	723 .25	669 .25	818 .24
GWB-24	880- 929	842 .45	752 .40	803 .38	784 .30	770 .27	716 .26	732 .25	869 .25	897 .24	753 .22	751 .22
GWB-24	905- 954	803 .51	753 .37	747 .35	680 .35	716 .32	847 .30	795 .26	720 .26	860 .26	866 .25	838 .25
GWB-24	930- 979	803 .67	654 .38	816 .36	686 .34	764 .33	749 .31	852 .29	790 .28	821 .28	847 .28	736 .28
GWB-24	951-1000	803 .77	686 .44	727 .38	764 .33	681 .31	714 .30	816 .28	736 .28	789 .27	737 .26	685 .25
GWB-25	885- 934	803 .51	752 .39	716 .36	869 .34	897 .29	877 .26	747 .26	826 .25	756 .25	784 .23	845 .23
GWB-25	910- 959	803 .63	764 .40	855 .37	784 .34	762 .29	679 .28	682 .28	778 .27	756 .26	732 .26	680 .25
GWB-25	935- 984	803 .69	732 .47	817 .40	784 .35	760 .33	764 .33	789 .32	650 .31	751 .29	798 .28	734 .26
GWB-25	951-1000	803 .71	732 .42	817 .41	789 .40	760 .37	784 .36	746 .36	723 .30	718 .29	681 .27	686 .27

CHART 16

PART 2: CORRELATIONS WITH GWB HEMLOCK DATED SITE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1575-1624	1600-1649	1625-1674	1650-1699	1675-1724	1700-1749	1725-1774	1750-1799	1775-1824	1800-1849	1825-1874	1850-1899	1875-1924	1900-1949	1925-1974	1950-1999	1975-2024	2000-2049	2025-2074	2050-2099	FLAGS/ TOTAL
1	GWBS01	1604-1839	=	.80	.81	.65	.64	.49	.50	.52	.49	.56	=										0/ 9
2	GWBS02	1604-1839	=	.80	.84	.77	.67	.46	.47	.44	.48	.57	=										0/ 9
3	GWBB02	1679-1834	=	=	=	=	.58	.55	.65	.80	.75	.74	=										0/ 6
4	GWBB04	1695-1834	=	=	=	=	.28	.29	.49	.45	.57	.47	=										2/ 6
							__A	__A															
5	GWBB05	1781-1831	=	=	=	=	=	=	=	=	.42	.43	=										0/ 2
6	GWBB07	1747-1832	=	=	=	=	=	=	.63	.66	.60	.50	=										0/ 4
7	GWB-10	1660-1794	=	=	=	.44	.42	.45	.68	.65	=	=	=										0/ 5
8	GWB-15	1709-1794	=	=	=	=	=	.39	.65	.60	=	=	=										0/ 3
9	GWB-19	1707-1787	=	=	=	=	=	.55	.54	.55	=	=	=										0/ 3
10	GWB-20	1688-1804	=	=	=	=	.48	.59	.70	.72	.77	=	=										0/ 5
11	GWB-21	1713-1804	=	=	=	=	=	.28	.52	.67	.74	=	=										1/ 4
								__A															
12	GWB-22	1695-1804	=	=	=	=	.69	.64	.72	.76	.79	=	=										0/ 5
13	GWB-24	1683-1803	=	=	=	=	.42	.47	.63	.75	.77	=	=										0/ 5
14	GWB-25	1688-1803	=	=	=	=	.55	.66	.72	.70	.72	=	=										0/ 5
15	GWB-41	1712-1812	=	=	=	=	=	.35	.53	.67	.70	=	=										0/ 4
16	GWB-52	1725-1812	=	=	=	=	=	=	.71	.74	.76	=	=										0/ 3
17	GWB-54	1761-1812	=	=	=	=	=	=	=	.57	.56	=	=										0/ 2
18	GWB-58	1662-1812	=	=	=	.47	.61	.66	.72	.59	.66	=	=										0/ 6
19	GWB-59	1725-1809	=	=	=	=	=	=	.66	.66	.69	=	=										0/ 3
20	GWB-80	1753-1812	=	=	=	=	=	=	=	.58	.61	=	=										0/ 2
21	GWB-60	1713-1820	=	=	=	=	=	.34	.43	.59	.47	=	=										0/ 4
22	GWB-62	1725-1800	=	=	=	=	=	=	.60	.64	.63	=	=										0/ 3
23	GWB-63	1710-1800	=	=	=	=	=	.50	.60	.68	.68	=	=										0/ 4
24	GWB-64	1747-1820	=	=	=	=	=	=	.50	.56	.53	=	=										0/ 3
25	GWB-66	1746-1820	=	=	=	=	=	=	.50	.55	.65	=	=										0/ 3
26	GWB-68	1690-1817	=	=	=	=	.56	.58	.65	.72	.78	=	=										0/ 5
27	GWB-71	1710-1820	=	=	=	=	=	.50	.51	.65	.62	=	=										0/ 4
28	GWB-73	1717-1816	=	=	=	=	=	.46	.52	.58	.45	=	=										0/ 4

CHART 17

PART 2: CORRELATIONS WITH GWB MAIN HOUSE/NORTH ELL FLOATING SPRUCE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL		875 900 925 950 975 1000 1025 1050 1075 1100 1125 1150 1175 1200 1225 1250 1275 1300 1325 1350	FLAGS/ TOTAL
				924 949 974 999 1024 1049 1074 1099 1124 1149 1174 1199 1224 1249 1274 1299 1324 1349 1374 1399	
1	GWB-14	909- 990	=	.15 .36 .52 =	1/ 3
+				___B	
2	GWB-26	913-1000	=	.36 .43 .67 .67	0/ 4
+					
3	GWB-27	909-1000	=	.12 .32 .67 .68	2/ 4
+				___B ___A	

PART 3: SEGMENTS CORRELATING LOW, OR HIGHER AT OTHER THAN DATED POSITION Tucson-Mendoza-Hamburg-Lamont ProgLib

CORRELATIONS OF 50-YEAR SEGMENTS
FROM TEN YEARS EARLIER (-10) TO TEN YEARS LATER (+10) THAN DATED

SERIES	SEGMENT	HIGH	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
GWB-14	909- 958		-.15	.00	-.27	.20	.16	.17	-.19	-.17	-.16	-.05	.15	-.16	-.11	.19	-.32	.05	.11	.21	.12	-.04	.15
+		7											____							<___>			
GWB-27	909- 958		.05	.10	-.11	-.21	-.22	.10	.27	.23	-.10	-.14	.12	-.08	-.12	.12	-.03	.05	-.03	.07	-.08	-.10	-.17
+		-4							<___>				____										
GWB-27	925- 974		-.27	.08	.07	-.06	-.10	.16	-.08	.30	-.04	-.11	.32	.13	-.19	.00	.07	-.14	-.13	-.08	-.26	-.09	.15
+		0											<___>										

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB SPRUCE VS GWB SPRUCE ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-13	917- 966	-25 .21	-8 .21	-20 .19	34 .19	21 .19	-1 .18	29 .18	25 .17	0 .16	-18 .16	-2 .15
GWB-13	942- 991	-18 .28	-25 .26	-44 .23	-17 .22	-42 .22	5 .21	-5 .19	-4 .18	9 .18	1 .17	-14 .16
GWB-13	951-1000	-45 .25	-4 .25	-12 .25	-22 .23	-58 .22	-42 .22	-48 .20	-41 .20	-18 .20	-35 .18	-21 .17
GWB-14	897- 946	-10 .73	44 .26	15 .25	29 .24	30 .23	9 .22	23 .14	2 .13	-5 .13	47 .13	45 .12
GWB-14	922- 971	-10 .58	29 .21	19 .19	15 .19	-24 .19	-16 .17	23 .13	5 .13	-35 .13	-3 .12	-4 .12
GWB-14	947- 996	-10 .68	-25 .42	0 .31	4 .29	-49 .27	-43 .26	-40 .24	-11 .23	-37 .20	3 .19	-44 .19
GWB-14	951-1000	-10 .72	-25 .41	-11 .31	-44 .30	-24 .23	-40 .22	0 .22	-43 .21	-59 .19	-47 .17	-26 .16
GWB-26	913- 962	0 .70	-19 .30	15 .26	12 .26	34 .23	27 .22	-25 .21	-7 .20	19 .19	-3 .18	16 .18
GWB-26	938- 987	0 .82	-13 .33	-14 .28	13 .26	1 .24	-42 .19	-33 .19	-16 .15	-40 .13	-15 .13	-25 .12
GWB-26	951-1000	0 .87	-14 .38	-13 .25	-41 .24	-53 .23	-55 .19	-15 .18	-26 .17	-27 .16	-39 .16	-12 .15
GWB-27	909- 958	0 .78	23 .33	-3 .26	33 .24	-19 .23	3 .23	30 .22	20 .15	14 .14	36 .13	-12 .12
GWB-27	934- 983	0 .86	14 .33	-3 .25	-16 .23	15 .22	-23 .22	-15 .20	13 .18	-40 .15	3 .14	-39 .14
GWB-27	951-1000	0 .90	-14 .28	-13 .26	-54 .24	-57 .23	-15 .20	-55 .14	-1 .13	-27 .12	-37 .11	-45 .10

CHART 18

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB SPRUCE VS LIVINGSTON, MA OLD GROWTH SPRUCE TO 1858
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-13	917- 966	795 .50	780 .34	864 .29	877 .25	803 .25	849 .24	850 .23	816 .23	832 .22	865 .22	825 .21
GWB-13	942- 991	852 .32	786 .30	799 .29	812 .26	773 .25	808 .25	766 .20	789 .20	795 .20	826 .20	825 .18
GWB-13	951-1000	799 .30	847 .25	856 .24	795 .24	758 .21	840 .21	808 .20	825 .20	791 .18	844 .18	746 .18
GWB-14	897- 946	873 .36	815 .35	834 .29	904 .27	910 .25	898 .23	862 .22	833 .22	828 .21	886 .20	890 .19
GWB-14	922- 971	803 .39	862 .36	815 .35	848 .32	833 .29	793 .28	834 .23	789 .23	796 .22	872 .21	795 .19
GWB-14	947- 996	793 .33	852 .31	800 .28	778 .28	807 .26	844 .24	803 .24	819 .22	833 .22	774 .21	788 .21
GWB-14	951-1000	793 .42	852 .38	747 .29	803 .28	790 .27	756 .26	757 .25	774 .22	800 .22	833 .21	778 .21
GWB-26	913- 962	819 .49	816 .35	803 .33	837 .28	895 .27	875 .25	793 .24	844 .24	800 .24	825 .23	881 .18
GWB-26	938- 987	803 .59	817 .38	816 .32	832 .31	830 .29	800 .28	818 .27	785 .25	770 .21	833 .20	759 .19
GWB-26	951-1000	803 .64	759 .37	854 .34	816 .34	818 .33	817 .32	847 .26	815 .25	832 .24	831 .22	845 .22
GWB-27	909- 958	803 .32	866 .31	791 .30	800 .29	895 .27	819 .26	814 .24	833 .24	821 .22	858 .21	804 .21
GWB-27	934- 983	803 .57	854 .37	843 .30	814 .29	847 .24	800 .23	817 .23	840 .21	788 .20	795 .20	828 .20
GWB-27	951-1000	803 .51	828 .37	840 .31	854 .29	759 .28	841 .28	827 .27	746 .25	774 .25	814 .25	816 .24

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB MAIN HOUSE/NORTH WING SPRUCE VS GWB EVOLVING SPRUCE SITE MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-13	917- 966	803 .36	837 .31	832 .31	758 .29	850 .27	795 .25	750 .25	737 .24	782 .24	873 .23	872 .22
GWB-13	942- 991	786 .35	808 .31	715 .28	799 .28	711 .27	781 .26	707 .25	764 .24	798 .23	789 .23	744 .22
GWB-13	951-1000	711 .32	799 .29	781 .28	764 .28	737 .28	739 .26	698 .26	791 .23	761 .22	795 .22	762 .22
GWB-14	897- 946	793 .46	776 .37	859 .27	750 .25	826 .24	815 .24	832 .23	763 .22	846 .21	818 .19	879 .19
GWB-14	922- 971	793 .43	733 .31	748 .25	815 .23	801 .23	754 .23	848 .22	803 .21	847 .19	730 .19	735 .19
GWB-14	947- 996	793 .51	778 .29	831 .26	741 .25	807 .25	729 .24	830 .23	815 .23	735 .21	826 .19	754 .19
GWB-14	951-1000	793 .55	815 .28	830 .28	759 .27	778 .26	816 .26	792 .25	696 .25	774 .22	706 .22	756 .21
GWB-26	913- 962	803 .65	855 .38	778 .32	761 .31	816 .31	740 .29	806 .24	784 .22	752 .22	830 .22	837 .21
GWB-26	938- 987	803 .72	718 .30	817 .27	757 .27	742 .27	727 .26	816 .25	841 .24	789 .23	736 .23	840 .22
GWB-26	951-1000	803 .76	789 .32	706 .31	718 .29	757 .23	715 .21	759 .21	769 .20	827 .19	736 .18	701 .17
GWB-27	909- 958	803 .39	781 .34	784 .33	826 .31	872 .31	775 .29	874 .27	839 .27	755 .26	787 .24	806 .23
GWB-27	934- 983	803 .69	851 .41	839 .31	800 .27	817 .25	751 .25	749 .24	854 .24	840 .23	736 .22	768 .22
GWB-27	951-1000	803 .70	827 .36	839 .28	703 .27	789 .27	715 .27	716 .25	826 .23	757 .22	769 .20	828 .19

CHART 19

PART 2: CORRELATIONS WITH GWB SPRUCE SITE MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1625 1650 1675 1700 1725 1750 1775 1800 1825 1850 1875 1900 1925 1950 1975 2000 2025 2050 2075 2100	FLAGS/ TOTAL
			1674 1699 1724 1749 1774 1799 1824 1849 1874 1899 1924 1949 1974 1999 2024 2049 2074 2099 2124 2149	
1	GWBS03	1669-1838	= .57 .42 .50 .66 .63 .66 .65	0/ 7
2	GWBS04	1733-1839	= = = = .65 .66 .44 .35	0/ 4
3	GWBS05	1658-1772	= .61 .52 .53 .55 = = =	0/ 4
4	GWBS06	1673-1837	= .48 .51 .63 .71 .74 .68 .62	0/ 7
5	GWBS07	1750-1824	= = = = = .62 .63 =	0/ 2
6	GWBS08	1742-1839	= = = = .33 .48 .72 .68	0/ 4
7	GWBB06	1727-1834	= = = = .70 .73 .55 .48	0/ 4
8	GWBB08	1728-1834	= = = = .61 .67 .65 .60	0/ 4
9	GWBB09	1754-1834	= = = = = .36 .58 .51	0/ 3
10	GWBB10	1741-1834	= = = = .64 .68 .67 .67	0/ 4
11	GWB-14	1690-1793	= = .44 .40 .43 .56 = =	0/ 4
12	GWB-26	1716-1803	= = = .64 .67 .77 .77 =	0/ 4
13	GWB-27	1712-1803	= = = .38 .52 .69 .71 =	0/ 4
14	GWB-40	1713-1812	= = = .51 .61 .63 .65 =	0/ 4
15	GWB-42	1682-1812	= = .49 .59 .53 .39 .33 =	0/ 5
16	GWB-45	1716-1812	= = = .54 .54 .66 .63 =	0/ 4
17	GWB-46	1738-1812	= = = = .49 .48 .54 =	0/ 3
18	GWB-47	1716-1812	= = = .61 .59 .57 .56 =	0/ 4
19	GWB-48	1658-1812	= .47 .46 .53 .51 .48 .51 =	0/ 6
20	GWB-67	1683-1820	= = .49 .43 .38 .40 .40 =	0/ 5
21	GWB-70	1742-1820	= = = = .43 .52 .62 =	0/ 3

CHART 20

PART 2: CORRELATIONS WITH GWB BEECH PROVISIONAL FLOATING MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	825 874	850 899	875 924	900 949	925 974	950 999	975 1024	1000 1049	1025 1074	1050 1099	1075 1124	1100 1149	1125 1174	1150 1199	1175 1224	1200 1249	1225 1274	1250 1299	1275 1324	1300 1349	FLAGS/ TOTAL
1	GWB-07	833- 982	.60	.51	.38	.37	.62	.50	=														1/ 6
+						___B																	
2	GWB-17	897- 982	=	=	.39	.52	.55	.54	=														0/ 4
+																							
3	GWB-18	920- 982	=	=	=	.54	.54	.46	=														0/ 3
+																							
4	GWB-49	833-1000	.60	.51	.45	.44	.50	.53	.53														0/ 7
+																							
5	GWB-53	888-1000	=	=	.26	.47	.47	.38	.39														1/ 5
+					___B																		

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB BEECH VS GWB BEECH ALIGNED
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-01	855- 904	61 .37	38 .30	91 .29	75 .26	65 .26	73 .24	14 .22	68 .20	80 .19	-11 .18	-18 .18
GWB-01	880- 929	-30 .54	-18 .38	-4 .36	42 .29	28 .28	64 .28	-49 .26	8 .25	65 .25	-16 .24	30 .24
GWB-01	905- 954	-30 .48	31 .38	-28 .33	-31 .30	-17 .29	-16 .28	-18 .28	40 .28	30 .27	6 .27	41 .27
GWB-01	930- 979	-54 .34	-52 .34	-14 .32	-72 .31	-26 .29	-34 .28	-3 .26	-28 .26	-53 .24	-50 .24	-36 .24
GWB-01	951-1000	-87 .35	-85 .33	-70 .29	-101 .29	-72 .29	-26 .27	-16 .26	-51 .26	-86 .24	-18 .23	-34 .22
GWB-02	875- 924	39 .31	56 .26	-22 .24	21 .24	36 .24	-32 .23	-21 .23	-35 .22	54 .22	-30 .21	14 .20
GWB-02	900- 949	-31 .35	39 .34	-30 .34	4 .29	-22 .27	-21 .26	-32 .24	24 .22	-49 .22	2 .19	47 .19
GWB-02	925- 974	-64 .33	-31 .32	-10 .28	-83 .26	-60 .23	-65 .23	-30 .23	-6 .23	-12 .21	-93 .21	-50 .20
GWB-02	950- 999	-21 .51	-82 .32	-12 .29	-10 .27	-114 .25	-44 .24	-103 .22	-56 .22	-47 .22	-96 .21	-1 .21
GWB-02	951-1000	-21 .52	-82 .31	-12 .29	-10 .27	-96 .24	-47 .24	-114 .24	-103 .22	-44 .22	-1 .21	-56 .20
GWB-03	908- 957	-26 .24	-56 .23	12 .23	31 .22	-54 .21	-10 .21	-28 .19	-23 .19	-35 .19	34 .18	-72 .18
GWB-03	933- 982	-18 .42	-78 .32	-79 .32	-6 .30	-9 .23	-100 .23	-32 .22	-53 .21	-77 .20	-76 .20	7 .19
GWB-03	951-1000	-79 .37	-18 .32	-6 .31	-43 .30	-53 .29	-78 .29	-105 .29	-77 .27	-121 .26	-39 .23	-17 .22
GWB-04	861- 910	4 .41	58 .36	90 .36	76 .29	-24 .26	65 .25	22 .23	88 .21	35 .21	37 .20	20 .20
GWB-04	886- 935	-24 .34	-15 .33	37 .32	-34 .29	-50 .28	-29 .25	43 .24	13 .24	-45 .23	58 .22	23 .22
GWB-04	911- 960	-17 .30	37 .29	-15 .28	-67 .27	-76 .27	-49 .27	6 .26	-48 .26	26 .25	-33 .24	-66 .23
GWB-04	936- 985	-84 .42	-17 .39	-51 .34	-67 .29	-31 .25	-85 .24	-25 .23	-86 .23	-65 .21	-32 .20	-33 .18
GWB-04	951-1000	-41 .37	-17 .36	-84 .33	-85 .31	-33 .27	-98 .24	0 .21	-52 .21	-25 .20	-114 .20	-1 .20
GWB-05	892- 941	-55 .41	-37 .33	47 .31	-54 .30	13 .28	-60 .24	-5 .23	-23 .21	-3 .21	-9 .21	-1 .20
GWB-05	917- 966	-31 .38	20 .31	13 .28	-37 .26	-55 .25	-54 .23	-29 .21	31 .21	-75 .21	-81 .19	5 .19
GWB-05	942- 991	-35 .36	-97 .30	-57 .28	-111 .28	-95 .27	-81 .26	-83 .25	-39 .22	-13 .19	-59 .18	-25 .17
GWB-05	951-1000	-57 .38	-81 .36	-35 .31	-46 .29	-23 .29	0 .24	-83 .24	-79 .23	-82 .22	-2 .20	-61 .20
GWB-06	908- 957	-48 .39	-76 .38	27 .31	-16 .26	-13 .25	-69 .25	24 .25	31 .24	-18 .21	43 .20	7 .20
GWB-06	933- 982	-39 .43	-18 .40	-75 .32	7 .32	-29 .29	-76 .29	-86 .28	-37 .27	-4 .26	-62 .25	-55 .24
GWB-06	951-1000	-18 .44	-88 .32	-16 .32	-27 .32	-41 .31	-116 .29	-87 .29	-30 .28	-39 .25	-77 .23	-53 .23
GWB-07	847- 896	-18 .88	29 .31	9 .26	-17 .25	55 .24	15 .24	45 .24	11 .23	70 .22	95 .22	81 .21
GWB-07	872- 921	-18 .85	-17 .33	54 .32	-3 .24	15 .23	-19 .22	66 .19	70 .18	40 .18	-32 .17	20 .17
GWB-07	897- 946	-18 .77	17 .41	-56 .39	-19 .37	-17 .33	18 .32	19 .31	-55 .29	52 .27	6 .25	-16 .24
GWB-07	922- 971	-18 .64	-54 .48	-28 .43	29 .38	-56 .37	7 .33	5 .32	18 .30	-41 .29	-40 .26	-52 .24
GWB-07	947- 996	-18 .77	-16 .31	-41 .28	-109 .25	-51 .25	-86 .23	-111 .22	-79 .22	-77 .20	-50 .20	-76 .19
GWB-07	951-1000	-18 .71	-16 .37	-51 .33	-109 .26	-41 .23	-86 .22	-76 .20	-2 .20	-111 .20	-77 .19	-79 .19
GWB-08	887- 936	57 .37	-48 .34	12 .33	-12 .27	22 .25	-32 .19	47 .19	-49 .19	-31 .19	-19 .17	-47 .16
GWB-08	912- 961	-77 .31	22 .29	4 .27	-17 .24	-65 .24	-66 .22	-46 .21	24 .21	-61 .21	-11 .20	-69 .19
GWB-08	937- 986	-43 .31	-9 .31	-33 .30	-11 .28	-69 .26	-18 .26	4 .23	-98 .23	-66 .22	-47 .22	-77 .21
GWB-08	951-1000	-47 .31	-33 .31	-9 .31	-43 .31	-66 .28	-65 .28	-51 .27	-79 .26	-69 .26	-55 .22	-121 .21
GWB-09	889- 938	-33 .39	19 .29	-49 .26	54 .26	-32 .24	-47 .23	5 .23	-3 .22	-14 .22	56 .21	1 .21
GWB-09	914- 963	5 .36	-33 .31	-32 .30	-16 .29	19 .27	-47 .27	-61 .24	1 .23	-9 .22	-49 .22	-53 .21
GWB-09	939- 988	-49 .32	-35 .31	-9 .30	-82 .28	-34 .24	8 .24	-25 .23	7 .21	-3 .20	-13 .19	-97 .19
GWB-09	951-1000	-9 .39	-121 .26	-44 .25	-34 .24	-111 .23	-25 .22	-70 .21	-68 .19	-95 .19	-35 .19	-69 .19
GWB-17	915- 964	-18 .67	17 .43	-51 .40	-50 .29	-67 .28	8 .27	-52 .25	26 .23	-8 .22	-65 .21	-78 .19
GWB-17	940- 989	-18 .75	-7 .35	-44 .30	-78 .29	-42 .28	-64 .27	-32 .27	-111 .26	-106 .25	-54 .25	-76 .23
GWB-17	951-1000	-18 .73	-111 .36	-38 .33	-7 .32	-53 .30	-76 .27	-78 .27	-42 .23	-27 .21	-95 .18	-9 .17
GWB-18	938- 987	-18 .72	-32 .40	-90 .33	-42 .31	-53 .31	-7 .29	-29 .28	-86 .28	-95 .24	-33 .22	-76 .22
GWB-18	951-1000	-18 .66	-53 .48	-7 .41	-42 .39	-90 .35	-29 .32	-68 .25	-54 .25	-79 .24	-86 .24	-9 .24
GWB-23	903- 952	12 .50	-34 .35	2 .35	-49 .26	24 .24	-13 .21	34 .20	26 .20	37 .20	44 .19	1 .19
GWB-23	928- 977	12 .56	-13 .33	21 .30	-93 .26	-81 .24	-23 .23	-34 .21	-65 .21	1 .20	-56 .20	5 .18
GWB-23	951-1000	-74 .35	-56 .29	-119 .28	-13 .28	-100 .27	-72 .26	-93 .24	-69 .23	-65 .21	-110 .20	-88 .20
GWB-28	891- 940	33 .41	-56 .32	-46 .29	-42 .29	-3 .28	51 .27	56 .24	-4 .23	40 .23	31 .23	53 .22
GWB-28	916- 965	-27 .34	19 .33	-39 .30	-42 .28	-41 .28	33 .24	-40 .24	29 .23	-23 .23	-46 .23	-4 .22
GWB-28	941- 990	-42 .37	-65 .29	-7 .26	-109 .26	-104 .25	-21 .23	-93 .23	-46 .23	-110 .23	-90 .22	-41 .18
GWB-28	951-1000	-42 .47	-114 .32	-65 .28	-77 .26	-21 .26	-41 .24	-7 .24	-104 .23	-120 .23	-76 .22	-38 .22

CHART 20 continued

GWB-29	854- 903	71 .38	-2 .33	11 .31	-13 .30	13 .28	-18 .23	14 .22	57 .18	-15 .18	95 .18	31 .18
GWB-29	879- 928	54 .38	-41 .34	-2 .33	-13 .28	31 .28	-39 .27	11 .27	45 .26	-14 .23	12 .23	-12 .22
GWB-29	904- 953	-27 .40	45 .34	-65 .33	8 .30	-12 .28	-14 .28	-41 .27	-46 .27	43 .26	-13 .26	31 .24
GWB-29	929- 978	-26 .40	-60 .38	-79 .37	-50 .34	-70 .33	-65 .31	-97 .28	-32 .26	-8 .26	-98 .25	-42 .23
GWB-29	951-1000	-103 .35	-65 .34	-104 .33	-66 .33	-8 .30	-16 .28	-32 .26	-64 .25	-50 .24	-51 .23	-118 .22
GWB-30	922- 971	-42 .40	-56 .36	26 .32	16 .28	-20 .28	-9 .27	-40 .25	-55 .24	-17 .23	-30 .21	-86 .21
GWB-30	947- 996	-112 .33	-40 .33	-83 .28	-78 .28	-16 .27	-17 .27	-50 .27	-30 .25	-7 .23	-84 .22	-97 .19
GWB-30	951-1000	-112 .38	-50 .33	-17 .28	-74 .27	-60 .27	-78 .25	-40 .24	-108 .23	-9 .22	-30 .22	-56 .20
GWB-31	871- 920	-27 .42	11 .31	25 .31	61 .29	-32 .26	-5 .26	-28 .24	45 .24	1 .22	24 .20	47 .19
GWB-31	896- 945	29 .33	-27 .27	-53 .26	31 .26	6 .25	-19 .24	54 .23	41 .22	-52 .21	40 .21	-42 .20
GWB-31	921- 970	-79 .33	-19 .33	14 .31	-20 .29	-42 .28	-81 .27	-43 .27	-52 .26	-53 .25	-21 .23	-55 .23
GWB-31	946- 995	-21 .48	-80 .33	-19 .33	-56 .31	-81 .30	-79 .30	-10 .26	-33 .26	-57 .25	-9 .25	-67 .23
GWB-31	951-1000	-21 .44	-79 .37	-80 .37	-56 .34	-19 .33	-33 .30	-81 .25	-10 .25	-107 .24	-105 .23	-94 .21
GWB-33	885- 934	-9 .47	13 .45	-43 .37	-10 .36	27 .32	-11 .30	-42 .28	-33 .26	-47 .26	28 .23	60 .22
GWB-33	910- 959	-9 .50	-33 .36	26 .33	13 .31	-10 .29	24 .29	-11 .24	-43 .23	5 .23	-60 .21	-44 .20
GWB-33	935- 984	-67 .38	-77 .35	-44 .34	-9 .28	-21 .28	-104 .27	1 .26	-31 .25	-10 .24	-82 .23	12 .21
GWB-33	951-1000	-67 .36	-8 .35	-109 .35	-110 .34	-17 .33	-43 .26	-21 .24	-57 .23	-71 .23	-32 .22	-10 .21
GWB-49	833- 882	0 .90	26 .45	5 .41	52 .31	72 .29	58 .27	-1 .27	93 .24	82 .21	10 .19	38 .19
GWB-49	858- 907	0 .84	44 .35	58 .35	28 .33	32 .32	14 .31	-26 .31	-5 .29	33 .27	93 .27	-14 .26
GWB-49	883- 932	0 .69	-38 .35	44 .28	-52 .27	-33 .27	18 .27	-26 .27	-2 .25	-28 .24	10 .23	14 .22
GWB-49	908- 957	0 .72	14 .41	-22 .38	-72 .34	-58 .30	10 .29	-36 .28	-26 .27	-24 .24	35 .24	-73 .24
GWB-49	933- 982	0 .76	-72 .32	-35 .32	14 .32	-44 .30	-95 .30	-11 .25	-22 .25	-99 .25	-36 .23	-68 .23
GWB-49	951-1000	0 .77	-11 .41	-35 .34	-57 .33	-93 .29	-70 .27	-46 .24	-72 .23	-95 .23	-66 .23	-79 .23
GWB-53	888- 937	0 .51	-30 .43	2 .41	-28 .36	-18 .34	-56 .33	22 .33	26 .32	16 .31	-4 .31	24 .30
GWB-53	913- 962	0 .67	-56 .33	-82 .27	-36 .26	10 .23	-4 .21	26 .20	-58 .20	-62 .20	-57 .18	-23 .18
GWB-53	938- 987	0 .70	-35 .45	-25 .27	-102 .24	-81 .22	-69 .20	11 .20	-33 .18	-58 .18	-107 .18	-23 .18
GWB-53	951-1000	0 .70	-35 .35	-57 .34	-84 .33	-85 .29	-102 .22	-55 .22	-81 .22	-95 .22	-25 .22	-59 .20
GWB-56	914- 963	-70 .45	30 .28	-14 .25	-71 .25	7 .25	-65 .23	-72 .23	-39 .22	-33 .21	21 .20	-60 .20
GWB-56	939- 988	2 .38	-70 .38	-12 .35	0 .31	-35 .31	-107 .29	-58 .28	-20 .28	-56 .28	-54 .28	-93 .26
GWB-56	951-1000	-70 .43	0 .40	-58 .40	-12 .36	-35 .36	-108 .34	-72 .33	-93 .32	-56 .32	-107 .29	-92 .28
GWB-69	883- 932	-5 .35	-37 .32	1 .27	47 .25	67 .23	58 .21	-19 .19	-4 .18	31 .18	35 .18	19 .17
GWB-69	908- 957	-35 .43	-53 .31	-37 .30	-5 .29	-39 .29	-63 .27	-23 .25	-21 .24	-78 .24	15 .22	-54 .21
GWB-69	933- 982	-35 .54	-83 .39	-11 .35	-84 .34	-45 .30	-103 .29	-51 .28	0 .27	-71 .27	-36 .23	-70 .21
GWB-69	951-1000	-71 .39	-36 .37	-108 .33	-109 .30	-35 .30	-57 .29	-83 .26	-25 .26	-50 .23	-59 .23	-15 .22

CHART 21A

PART 2: CORRELATIONS WITH WESTERN MASSACHUSETTS PROVISIONAL BEECH MASTER SERIES OF ALL SEGMENTS AS DATED AND MEASURED

32-YEAR CUBIC SPLINE FILTER; CORRELATIONS OF 50-YEAR SEGMENTS LAGGED 25 YEARS

FLAGS: __A = CORRELATION UNDER 0.3281; __B = CORRELATION HIGHER AT OTHER POSITION

0SEQ	SERIES	INTERVAL	1600 1649	1625 1674	1650 1699	1675 1724	1700 1749	1725 1774	1750 1799	1775 1824	1800 1849	1825 1874	1850 1899	1875 1924	1900 1949	1925 1974	1950 1999	1975 2024	2000 2049	2025 2074	2050 2099	2075 2124	FLAGS/ TOTAL
1	BWB-21	1649-1778	=	.14	.20	.35	.43	.62	.64	=	=												
+				__B	__A																		2/ 6
2	BWB-24	1622-1779	.56	.51	.60	.56	.52	.65	.63	=	=												
+																							0/ 7
3	BWB-25	1631-1779	=	.51	.42	.54	.40	.49	.54	=	=												
+																							0/ 6
4	BWH-06	1622-1796	.47	.45	.34	.36	.46	.35	.46	=	=												
+							__B																1/ 7
5	GWB-02	1666-1791	=	=	.26	.33	.28	.38	.53	=	=												
+					__A	__A	__B																3/ 5
6	GWB-07	1641-1794	=	.22	.41	.56	.36	.45	.52	=	=												
+				__B																			1/ 6
7	GWB-17	1709-1794	=	=	=	=	.44	.63	.67	=	=												
+																							0/ 3
8	GWB-18	1732-1794	=	=	=	=	=	.54	.48	=	=												
+																							0/ 2
9	GWB-49	1645-1812	=	.47	.38	.27	.23	.40	.63	.56	=												
+						__A	__B																2/ 7
10	GWB-53	1700-1812	=	=	=	=	.09	.48	.53	.37	=												
+							__B																1/ 4

PART 3: SEGMENTS CORRELATING LOW, OR HIGHER AT OTHER THAN DATED POSITION Tucson-Mendoza-Hamburg-Lamont ProgLib

CORRELATIONS OF 50-YEAR SEGMENTS
FROM TEN YEARS EARLIER (-10) TO TEN YEARS LATER (+10) THAN DATED

SERIES	SEGMENT	HIGH	-10	-9	-8	-7	-6	-5	-4	-3	-2	-1	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+10
BWB-21	1649-1698		-.10	.01	-.10	-.29	.08	.26	.08	-.01	.01	.13	.14	-.06	-.11	.05	.12	-.01	-.05	-.08	-.22	-.22	-.13
+		-5						<___>					___										
BWB-21	1650-1699		-.17	.02	-.07	-.27	.04	.20	.02	-.08	.10	.18	.20	-.03	-.07	.07	.11	.01	-.06	-.08	-.25	-.24	-.14
+		0											<___>										
BWH-06	1700-1749		-.25	-.16	-.04	-.11	.18	.16	.05	-.19	.09	.02	.46	-.05	-.08	-.16	-.07	-.21	-.22	-.06	.08	.36	.56
+		10											___										<___>
GWB-02	1666-1715		.14	-.03	-.05	-.11	-.22	-.27	-.13	-.31	.07	.14	.26	.16	.02	.13	-.19	-.01	-.11	.13	-.05	.17	-.25
+		0											<___>										
GWB-02	1675-1724		.16	.05	-.10	-.10	-.19	-.37	-.10	-.44	-.02	.13	.33	.23	.04	.15	-.15	.00	-.10	.13	-.06	.14	-.32
+		0											<___>										
GWB-02	1700-1749		.29	.06	-.25	-.19	-.20	-.24	-.12	-.05	-.09	.05	.28	.07	-.01	.19	-.13	.22	-.43	.04	-.27	.22	-.18
+		-10	<___>										___										
GWB-07	1641-1690		.08	.07	-.26	.01	.19	.29	-.21	-.21	-.04	.10	.22	.16	-.16	-.01	-.12	.08	-.08	-.35	-.09	-.01	.24
+		-5						<___>					___										
GWB-49	1675-1724		-.08	-.08	-.30	.20	.19	.17	-.07	-.17	.25	.06	.27	.05	-.16	-.24	-.21	-.21	-.25	-.04	.09	.21	.10
+		0											<___>										
GWB-49	1700-1749		-.07	-.10	-.21	.07	.07	.09	-.11	-.18	.25	.16	.23	-.12	-.31	-.16	.14	-.16	.03	-.17	.28	.15	.38
+		10											___										<___>
GWB-53	1700-1749		-.05	.06	-.36	-.32	-.17	-.01	.04	.18	.14	-.07	.09	.15	.13	-.10	.08	-.10	.22	-.36	.03	-.22	.16
+		6											___						<___>				

CHART 21B

PART 8: DATE ADJUSTMENT FOR BEST MATCHES FOR COUNTED OR UNKNOWN SERIES — Tucson-Mendoza-Hamburg-Lamont ProgLib

GWB BEECH VS WESTERN MASSACHUSETTS PROVISIONAL BEECH MASTER
50-YEAR SEGMENTS LAGGED 25 YEARS

SERIES	COUNTED SEGMENT	CORR ADD # 1	CORR ADD # 2	CORR ADD # 3	CORR ADD # 4	CORR ADD # 5	CORR ADD # 6	CORR ADD # 7	CORR ADD # 8	CORR ADD # 9	CORR ADD #10	CORR ADD #11
GWB-01	855- 904	850 .43	903 .34	794 .31	873 .28	880 .24	772 .23	835 .23	820 .22	887 .22	885 .22	787 .21
GWB-01	880- 929	794 .39	876 .32	840 .32	842 .31	738 .30	808 .28	820 .26	852 .23	776 .22	782 .22	875 .22
GWB-01	905- 954	843 .41	782 .39	794 .36	708 .33	842 .33	775 .29	809 .28	730 .27	720 .26	834 .25	783 .25
GWB-01	930- 979	773 .47	786 .38	741 .34	758 .28	809 .28	788 .25	784 .23	697 .23	742 .22	683 .20	726 .20
GWB-01	951-1000	786 .36	711 .35	726 .34	742 .31	727 .28	773 .28	657 .27	665 .26	725 .25	724 .24	664 .23
GWB-02	875- 924	791 .47	851 .27	830 .25	777 .24	735 .24	776 .21	875 .20	754 .20	868 .20	747 .19	779 .19
GWB-02	900- 949	791 .57	776 .43	735 .36	714 .35	712 .33	851 .29	717 .29	836 .26	748 .24	761 .22	859 .22
GWB-02	925- 974	791 .44	806 .28	729 .27	781 .26	742 .24	719 .24	704 .24	746 .22	776 .21	748 .20	808 .20
GWB-02	950- 999	791 .61	800 .30	688 .30	714 .26	766 .25	756 .24	716 .24	730 .24	686 .23	742 .23	731 .22
GWB-02	951-1000	791 .62	800 .30	688 .28	686 .27	716 .26	714 .26	731 .25	766 .25	756 .23	730 .23	742 .22
GWB-03	908- 957	712 .32	729 .30	812 .24	756 .23	709 .23	750 .23	843 .22	745 .22	824 .21	771 .21	786 .20
GWB-03	933- 982	794 .48	705 .31	734 .31	719 .30	806 .26	769 .26	735 .25	720 .25	717 .21	706 .21	750 .21
GWB-03	951-1000	657 .33	769 .32	734 .32	682 .31	794 .29	719 .28	806 .27	691 .27	735 .26	773 .26	759 .24
GWB-04	861- 910	816 .44	788 .44	902 .35	870 .31	877 .30	795 .28	855 .28	832 .27	900 .26	772 .26	809 .24
GWB-04	886- 935	788 .33	781 .32	825 .30	795 .26	739 .26	746 .24	809 .24	849 .24	777 .24	757 .23	840 .22
GWB-04	911- 960	718 .42	779 .41	736 .38	849 .30	717 .26	838 .25	840 .25	781 .24	795 .22	764 .21	757 .19
GWB-04	936- 985	795 .35	727 .35	770 .32	787 .30	736 .28	761 .28	673 .21	709 .21	779 .20	743 .20	712 .20
GWB-04	951-1000	727 .40	675 .30	795 .29	771 .29	779 .24	666 .22	811 .22	804 .22	760 .21	791 .20	812 .19
GWB-05	892- 941	743 .28	859 .28	731 .28	757 .28	817 .27	758 .25	770 .24	769 .23	726 .22	752 .21	746 .20
GWB-05	917- 966	757 .34	832 .29	705 .29	825 .29	725 .24	799 .23	787 .22	746 .21	727 .20	742 .20	821 .20
GWB-05	942- 991	777 .49	716 .35	715 .32	755 .26	701 .25	799 .25	717 .24	787 .24	673 .24	729 .23	727 .22
GWB-05	951-1000	755 .38	777 .37	716 .27	766 .26	812 .25	688 .25	694 .24	780 .23	731 .22	789 .21	717 .20
GWB-06	908- 957	764 .49	839 .40	736 .39	719 .35	794 .33	796 .31	731 .28	855 .25	757 .23	779 .23	843 .22
GWB-06	933- 982	773 .43	794 .36	819 .32	736 .32	705 .31	759 .29	737 .28	722 .27	783 .26	694 .26	696 .24
GWB-06	951-1000	696 .41	794 .41	694 .35	785 .31	771 .30	737 .30	796 .27	759 .26	682 .26	735 .24	773 .23
GWB-07	847- 896	794 .41	806 .29	789 .28	907 .27	882 .26	821 .26	897 .25	804 .25	857 .25	822 .23	871 .23
GWB-07	872- 921	794 .63	793 .33	795 .32	778 .28	766 .25	751 .25	827 .25	809 .24	866 .24	777 .23	838 .23
GWB-07	897- 946	794 .71	793 .40	818 .36	731 .31	840 .30	795 .30	751 .28	757 .26	855 .26	807 .25	831 .25
GWB-07	922- 971	784 .48	794 .47	841 .36	756 .31	806 .30	771 .30	693 .29	769 .29	819 .29	758 .28	740 .26
GWB-07	947- 996	794 .70	694 .34	726 .33	703 .28	701 .27	771 .27	796 .26	783 .23	719 .23	663 .23	717 .22
GWB-07	951-1000	794 .65	694 .39	726 .36	796 .32	701 .29	761 .28	663 .26	771 .25	703 .25	810 .24	717 .24
GWB-08	887- 936	824 .44	809 .40	746 .37	764 .35	869 .35	794 .32	745 .28	763 .27	834 .25	780 .25	721 .23
GWB-08	912- 961	735 .45	734 .38	794 .33	809 .29	779 .27	834 .24	795 .23	816 .21	766 .21	791 .20	812 .19
GWB-08	937- 986	735 .30	734 .28	801 .28	794 .26	816 .25	765 .25	803 .25	779 .25	744 .24	769 .24	672 .22
GWB-08	951-1000	765 .30	771 .28	761 .28	682 .28	691 .27	665 .27	803 .27	779 .25	735 .25	734 .25	707 .25
GWB-09	889- 938	763 .40	736 .38	779 .36	793 .35	806 .30	813 .28	792 .28	831 .28	807 .26	778 .26	815 .24
GWB-09	914- 963	763 .36	802 .35	831 .28	780 .28	735 .26	778 .26	793 .26	694 .26	774 .25	809 .25	715 .25
GWB-09	939- 988	763 .32	777 .32	809 .31	803 .30	719 .29	743 .28	787 .26	686 .26	774 .25	742 .23	799 .22
GWB-09	951-1000	803 .40	768 .32	777 .28	743 .28	701 .26	787 .25	719 .21	717 .21	679 .21	809 .21	742 .21
GWB-17	915- 964	794 .57	829 .39	820 .38	761 .37	715 .33	760 .32	693 .31	716 .30	838 .28	762 .26	729 .25
GWB-17	940- 989	794 .78	701 .32	759 .30	805 .27	780 .26	758 .26	734 .26	705 .25	768 .25	691 .24	754 .21
GWB-17	951-1000	794 .77	701 .46	660 .31	759 .29	734 .28	785 .26	702 .26	717 .25	774 .24	745 .24	681 .24
GWB-18	938- 987	794 .64	705 .39	759 .35	726 .34	783 .34	770 .30	701 .27	744 .26	722 .24	769 .23	678 .22
GWB-18	951-1000	794 .60	759 .43	805 .34	726 .31	734 .31	681 .30	744 .30	657 .30	783 .29	722 .29	770 .28
GWB-23	903- 952	824 .57	778 .37	814 .34	799 .33	722 .31	757 .29	764 .25	836 .25	821 .25	749 .24	731 .22
GWB-23	928- 977	824 .58	799 .41	731 .36	700 .32	756 .30	833 .29	789 .26	693 .26	712 .25	710 .24	764 .24
GWB-23	951-1000	668 .44	756 .33	738 .32	731 .31	675 .30	740 .29	712 .28	670 .27	799 .26	677 .23	724 .22
GWB-28	891- 940	756 .40	752 .36	845 .36	770 .31	766 .31	729 .30	828 .28	868 .27	809 .26	865 .25	831 .25
GWB-28	916- 965	831 .40	752 .33	770 .30	729 .30	795 .28	694 .27	841 .26	773 .25	708 .24	707 .23	845 .23
GWB-28	941- 990	731 .42	692 .32	691 .30	703 .30	770 .28	780 .25	667 .24	729 .24	748 .23	730 .21	805 .20
GWB-28	951-1000	731 .45	691 .38	666 .36	770 .35	692 .34	667 .31	746 .29	671 .28	729 .25	730 .25	735 .24
GWB-29	854- 903	883 .31	794 .29	810 .28	809 .27	869 .26	823 .24	836 .24	792 .22	771 .22	866 .21	907 .21
GWB-29	879- 928	866 .43	745 .33	810 .31	809 .31	747 .29	766 .28	767 .27	729 .26	771 .26	857 .25	823 .24
GWB-29	904- 953	798 .33	785 .32	784 .32	857 .31	800 .28	846 .27	710 .26	719 .25	855 .23	766 .22	775 .21
GWB-29	929- 978	786 .39	747 .38	736 .32	692 .29	719 .26	776 .26	828 .25	687 .24	826 .23	761 .23	699 .21
GWB-29	951-1000	747 .37	708 .34	709 .31	771 .30	687 .29	796 .29	804 .27	704 .27	692 .26	682 .26	665 .26
GWB-30	922- 971	770 .45	803 .32	838 .31	756 .31	746 .28	728 .26	796 .25	795 .24	768 .22	830 .22	731 .21
GWB-30	947- 996	746 .37	728 .33	795 .29	683 .27	681 .27	703 .27	682 .26	762 .25	805 .24	772 .23	796 .22
GWB-30	951-1000	762 .34	659 .32	695 .31	672 .28	795 .27	713 .25	703 .24	752 .23	803 .22	746 .22	782 .22
GWB-31	871- 920	759 .33	780 .29	823 .28	784 .28	739 .28	873 .26	807 .24	837 .24	758 .21	797 .21	836 .21
GWB-31	896- 945	841 .35	739 .31	715 .29	818 .27	784 .24	843 .24	712 .23	732 .23	852 .22	809 .21	754 .21
GWB-31	921- 970	716 .36	784 .29	816 .27	769 .27	826 .26	695 .25	755 .25	754 .25	803 .23	770 .23	793 .23
GWB-31	946- 995	791 .43	689 .39	731 .36	756 .34	732 .29	802 .26	793 .26	668 .25	816 .22	815 .22	679 .22
GWB-31	951-1000	791 .40	731 .37	732 .33	756 .30	657 .29	793 .29	689 .26	700 .25	702 .25	802 .25	779 .24
GWB-33	885- 934	825 .52	802 .40	765 .37	803 .33	815 .27	724 .26	851 .26	764 .25	847 .25	740 .23	829 .21
GWB-33	910- 959	724 .50	765 .35	803 .33	825 .31	829 .31	838 .28	813 .26	700 .26	763 .26	817 .25	779 .25
GWB-33	935- 984	791 .35	702 .33	768 .30	745 .30	778 .27	813 .27	724 .25	680 .25	729 .24	735 .24	679 .23
GWB-33	951-1000	702 .45	804 .35	769 .35	745 .32	795 .28	703 .27	791 .25	717 .23	727 .23	701 .21	778 .21

CHART 21B CONTINUED

GWB-49	833- 882	812 .63	850 .37	806 .33	865 .31	884 .25	811 .24	910 .24	807 .24	880 .23	894 .23	870 .22
GWB-49	858- 907	812 .39	856 .36	870 .33	807 .32	806 .29	826 .28	905 .27	844 .26	796 .25	763 .24	756 .23
GWB-49	883- 932	812 .36	733 .33	856 .33	830 .30	773 .28	810 .27	743 .26	769 .25	822 .22	852 .22	758 .20
GWB-49	908- 957	812 .61	754 .39	753 .32	733 .31	776 .30	822 .27	826 .27	769 .24	786 .23	755 .22	709 .21
GWB-49	933- 982	812 .69	777 .40	733 .37	755 .36	691 .32	754 .29	712 .28	826 .28	690 .27	801 .26	752 .24
GWB-49	951-1000	812 .74	755 .41	777 .37	801 .36	733 .30	712 .29	765 .29	663 .27	705 .27	740 .24	744 .23
GWB-53	888- 937	794 .32	838 .30	828 .30	733 .30	739 .29	852 .28	782 .27	738 .25	798 .23	860 .23	818 .23
GWB-53	913- 962	812 .58	838 .28	787 .25	789 .23	822 .23	751 .23	737 .21	738 .20	725 .20	797 .19	712 .19
GWB-53	938- 987	812 .64	787 .45	777 .40	681 .28	712 .25	737 .25	710 .25	789 .25	698 .24	675 .24	751 .24
GWB-53	951-1000	812 .63	777 .34	712 .34	787 .31	678 .29	755 .28	710 .26	743 .24	740 .21	785 .21	737 .21
GWB-56	914- 963	740 .48	742 .44	741 .35	705 .30	698 .28	752 .27	819 .25	725 .24	842 .23	715 .23	817 .22
GWB-56	939- 988	677 .40	814 .39	742 .35	740 .34	678 .32	741 .30	800 .29	789 .28	792 .27	714 .25	699 .24
GWB-56	951-1000	740 .38	800 .34	812 .32	677 .31	678 .31	742 .30	777 .28	741 .26	766 .24	719 .24	789 .24
GWB-69	883- 932	817 .32	859 .30	879 .30	847 .23	789 .23	841 .22	791 .22	851 .22	802 .21	743 .21	770 .21
GWB-69	908- 957	704 .42	773 .40	759 .33	728 .32	730 .30	707 .29	791 .28	789 .26	771 .25	792 .25	777 .24
GWB-69	933- 982	777 .49	741 .39	742 .32	728 .29	801 .28	823 .27	767 .27	699 .23	812 .21	743 .21	730 .21
GWB-69	951-1000	741 .38	765 .32	702 .30	762 .30	787 .25	776 .25	687 .24	777 .23	728 .23	716 .22	755 .22