

Dendrochronologic Report to
Bryce Canyon National Park

Dave Grow

July 1, 2000

Mr. Wallen,

My apologies for taking so long to send the report, but I just finished the last chronology in May 2000. Although only 2 sites were actually within Bryce Canyon National Park, I have included the other chronologies that I developed for this phase of the project for your info (1 in Henderson Canyon [USFS], and 1 on the Paria Plateau [BLM] in Arizona). In addition to the summaries and attached maps, I have included an EXCEL spreadsheet with the average ring widths for each year and the standardized indices. I have attached the file layout; the columns are labeled appropriately. Raw ring widths are in mm.

Methods

Field:

In May and November of 1999, four sites were sampled by extracting cores using an increment borer from trees to be used for chronology development (Fig. 1; Attached maps with sites highlighted). The sites were chosen for their relative remoteness from anthropogenic disturbance and site characteristics conducive to assessing both winter and summer precipitation (Fritts, 1976). Three different species were sampled at each site on the upper basin plateaus (elevation 2740 -2895 m), *Pinus flexilis*, *Pinus longaeva*, and *Pseudotsuga menziisei*; only the Douglas-fir trees (*Pseudotsuga menziisei*) were used in the chronology development because of their crossdatability and sensitivity to precipitation. In the lower basin on Paria Plateau, species collected at an elevation of 1830 m were western Juniper (*Juniperus occidentalis*) and Piñon pine (*Pinus edulus*). Only the *Pinus edulus* samples were used. Trees were sampled at each site according to methods described by Stokes and Smiley, (1968).

Laboratory:

A total of 18 Douglas-fir trees from the Henderson Canyon site, 17 Douglas-fir trees from Yovimpa Point, 16 Douglas-fir trees from Bryce Point, and 19 Piñon pine trees from Paria Plateau; 2 cores per tree were mounted, prepared, skeleton plotted, dated, and measured to within 0.01 mm (Stokes and Smiley, 1968). Measurements were then analyzed using the programs COFECHA and ARSTAN to verify the data and to create a standardized chronology (Holmes, et al., 1986). A cubic spline was used to remove the growth trend in the trees to create a weakly stationary time series (consistent mean and variance through time).

Dave Graw

References Cited

Fritts, H.C., 1976. Tree rings and climate. Academic Press, San Francisco, 587 p.

Holmes, R.L., Adams, R.K., and Fritts, H.C., 1986. Tree-ring chronologies of Western North America: California, eastern Oregon and northern Great Basin, with Procedures used in the chronology development work, including users manuals for computer programs COFECHA and ARSTAN. Laboratory of Tree-Ring Research, University of Arizona, Chronology Series VI, 182 p.

Stokes, M.A. and Smiley, T.L., 1968. *An introduction to tree-ring dating*. The University of Arizona Press, Tucson, 73 p.

EXCEL File Layout

File: **Chrons.xls**

RW = Raw ring widths (in mm), and Sx = standard chronology.

HCP = Henderson Canyon

YPP = Yovimpa Point

PP = Paria Plateau

BRP = Bryce Point

<u>Column</u>	<u>Description</u>
1	Year
2	HCP RW
3	HCP Sx
4	YPP RW
5	YPP Sx
6	PP RW
7	PP Sx
8	BRP RW
9	BRP Sx

Bryce Point (BRP)

Bryce Point is located within Bryce Canyon National Park. The site was chosen because a previous chronology was developed in the same area in 1965. The current investigation will bring the older chronology up to date. Samples collected included Douglas-fir, bristlecone pine, and limber pine. Sixteen Douglas-fir were used to develop the chronology.

Date of Collection:	May 18, 1999
Investigators:	Dave Grow
Site ID:	BRP
Location:	7.5' Bryce Point quad; T37S, R3W Garfield County, Utah Lat N37° 28', Long W112° 09'
Elevation:	2377-2440 m
Parent Material:	Limestone
Aspect:	E, NE
Attachments:	Map of site
Chronology:	1336-1998

Yovimpa Point (YPP)

Yovimpa Point is located within Bryce Canyon National Park near the southern park boundary. The site was chosen because it is relatively isolated and exposed. Samples were collected from Douglas-fir and limber pine; a total of 17 Douglas-fir were used to create the chronology.

Date of Collection:	May 19, 1999
Investigators:	Dave Grow
Site ID:	YPP
Location:	7.5' Rainbow Point quad; S29, T38S, R4W Kane County, Utah Lat N37° 28', Long W112° 14'
Elevation:	2740 +/- 10 m
Parent Material:	Limestone
Aspect:	E - SE
Attachments:	Map of site
Chronology:	1436-1998

Henderson Canyon (HCP)

A total of 24 trees were sampled, 21 Douglas-fir and 3 Limber and Bristlecone pine. Only the Douglas-fir were used in chronology development. In the final chronology a total of 18 were used, the remainder being eliminated for reasons such as encountering heart rot or the inability to effectively crossdate because of excessive missing rings. The final HCP chronology compared extremely well with the previously collected (1970s) chronology from Bryce Canyon.

Date of Collection:	May 20, 1999
Investigators:	Dave Grow
Site ID:	HCP
Location:	Utah, Escalante quad; T35S, R1W, S 31-32 Garfield County, Utah Lat N37° 44', Long W111° 52'
Elevation:	2700-3100 m
Parent Material:	Limestone
Aspect:	S - SW
Attachments:	Map of site
Chronology:	1259-1998

Paria Plateau (PP)

Paria Plateau is located near the southern boundary of the basin. The area was chosen as a dry site. Samples were collected from Pinyon pine; a total of 19 trees were used to create the chronology.

Date of Collection:	May 22, 1999
Investigators:	Dave Grow
Site ID:	PP
Location:	7.5' Rainbow Point quad; S29, T38S, R4W Coconino County, Arizona Lat N37° 28', Long W112° 14'
Elevation:	2740 +/- 10 m
Parent Material:	Sandstone
Aspect:	N
Attachments:	Map of site
Chronology:	1540-1998

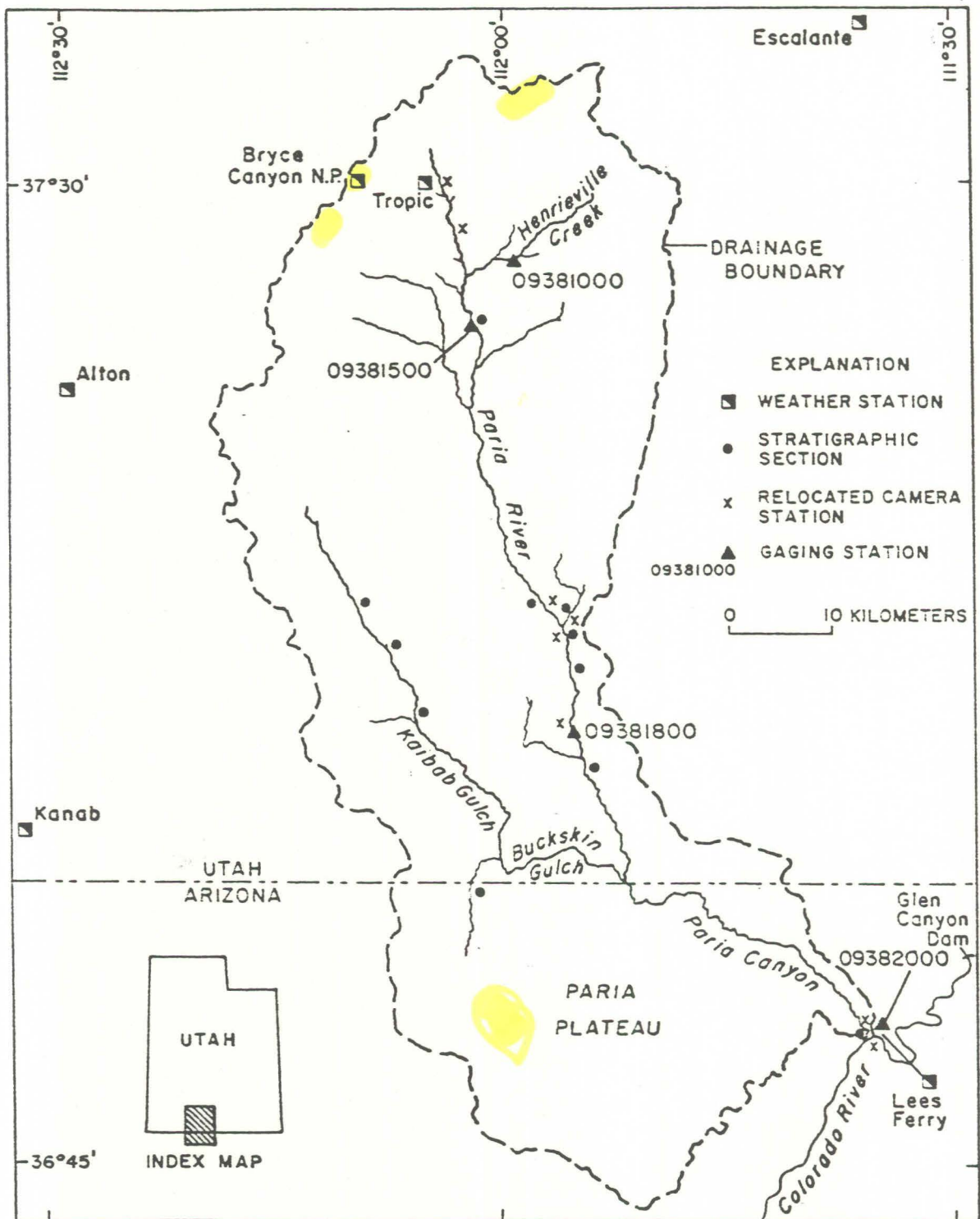


Figure 1. Paria River drainage basin in southern Utah and northern Arizona.

