Paleoindian Occupations in Eastern North America

David G. Anderson

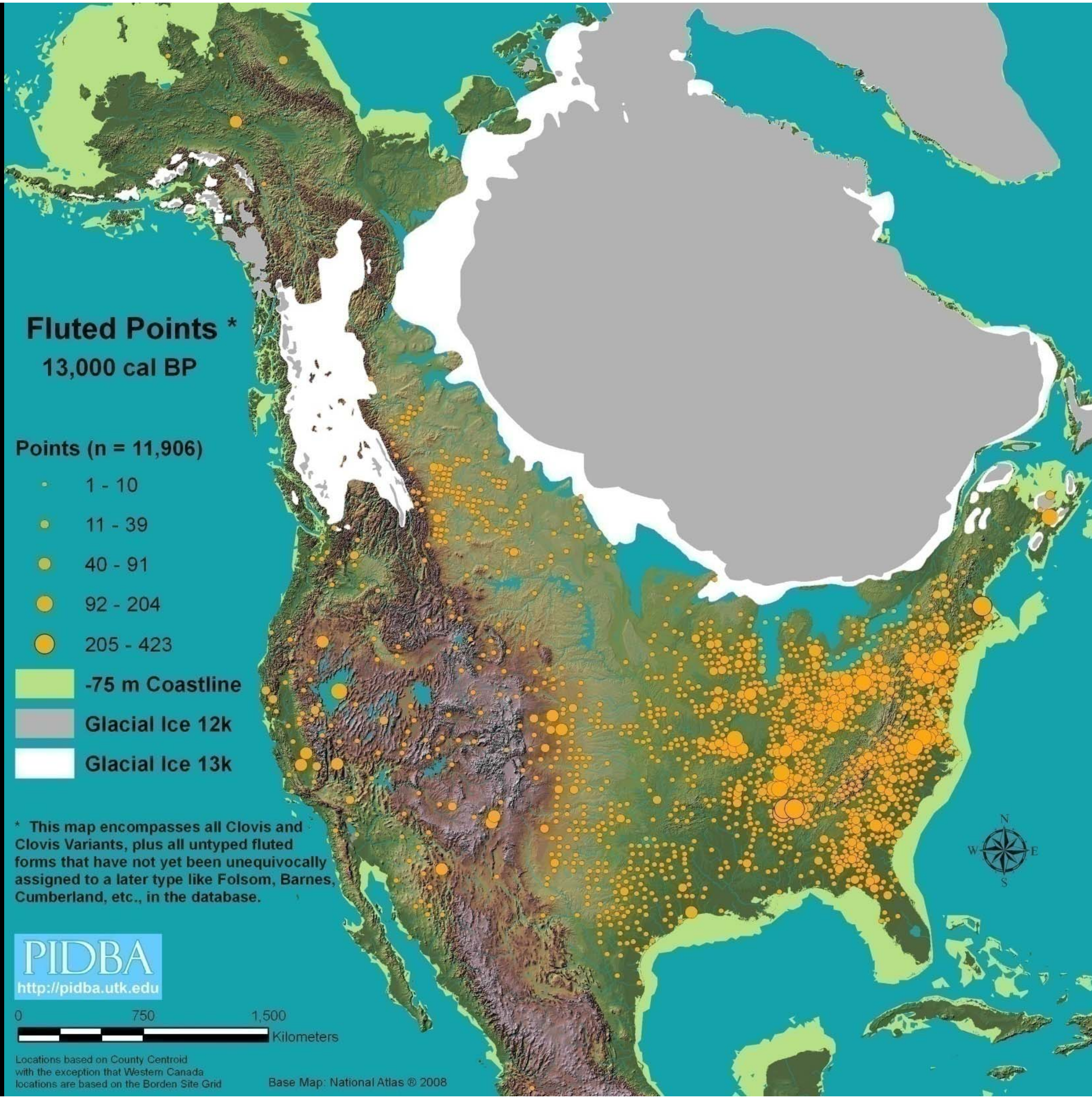
THE UNIVERSITY of TENNESSEE UT
Department of Anthropology

PIDBA

A presentation for the Peopling of the Americas Workshop, Sante Fe Institute: 24-26 September 2010, Sante Fe, New Mexico

Fluted Points

(including Clovis, excluding later fluted types)



13,000 - 12,000 cal BP

n=11,906 points

>1500 locations.

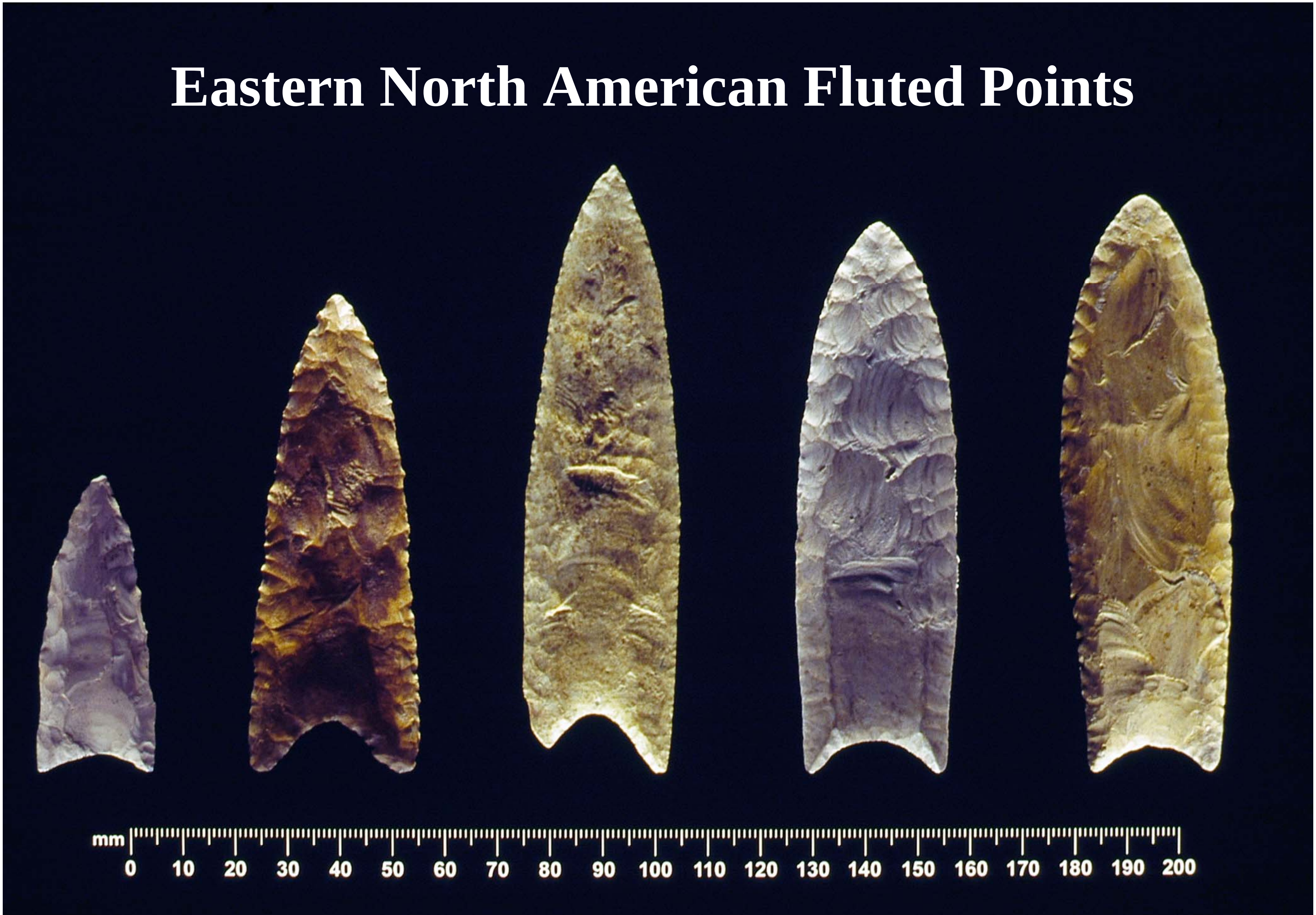


Image courtesy Albert C. Goodyear

Clovis Technology/Lifeways

Stages in the manufacture of a Clovis point, illustrated on materials from the Lincoln-Hills site in southern Illinois.

Image and text (modified somewhat) courtesy of Jess Ready and Pete Bostrom collection

Clovis Blades/Blade Cores

Blade cores and blades of presumed Clovis age from Florida, Illinois, Kentucky, and Texas.

Image and text (modified somewhat) courtesy of Carl Yahnig , Texas Archaeology Research Laboratory and Pete Bostrom, Lithic Casting Lab.

Clovis flake/blade, graving, and scraping tools

Image and text (modified somewhat) courtesy of Jess Ready, Gary Fogelman, Dana Racine, Private Collections and Pete Bostrom, Lithic Casting Lab.

Clovis Ivory Points

Three views of a large (ca. 30 cm) ivory point found in the Aucilla River in northern Florida

Image and text courtesy Hugh Lilliot Collection and Pete Bostrom, Lithic Casting Lab

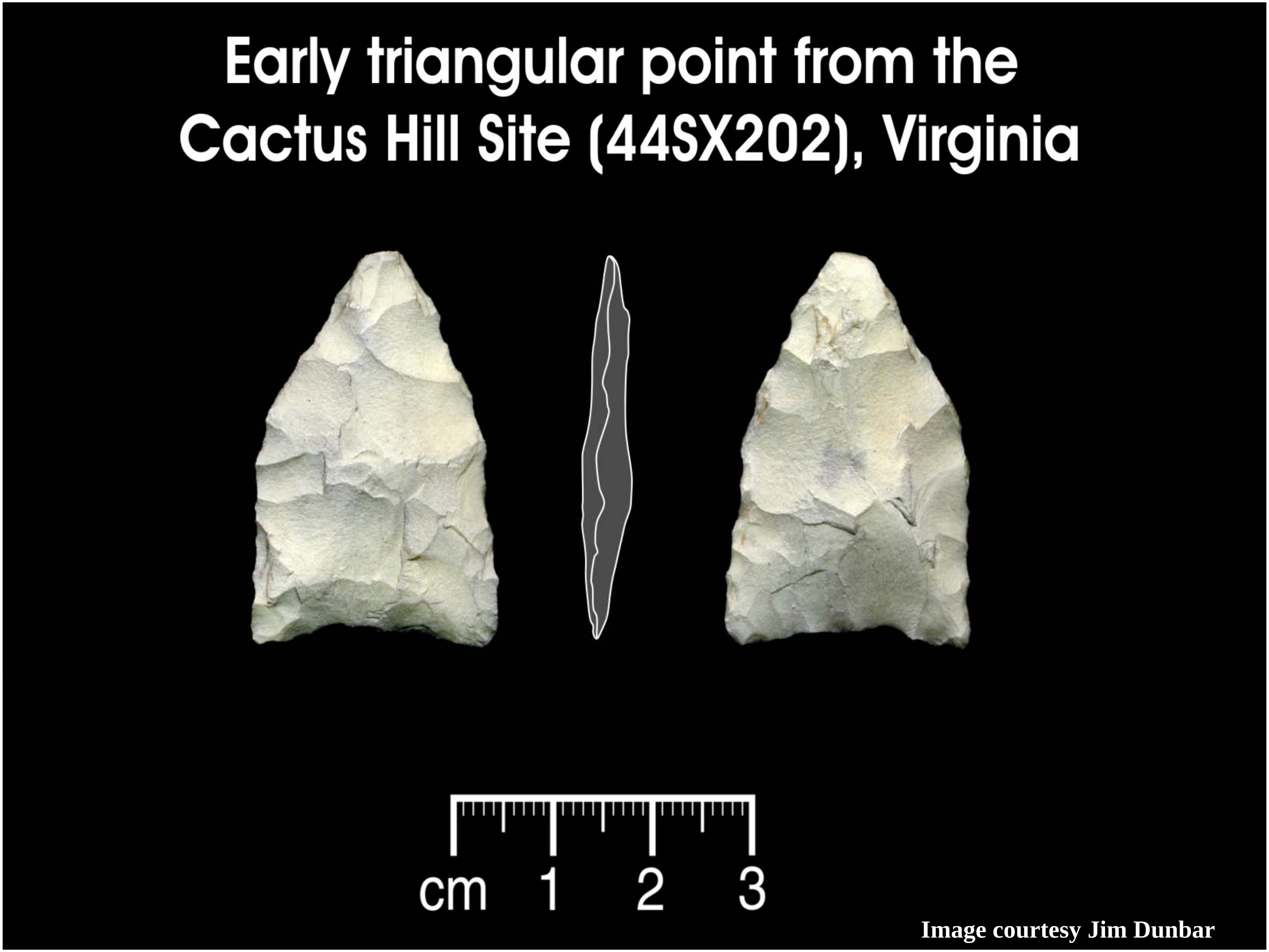
When Did People First Arrive in Eastern North America?

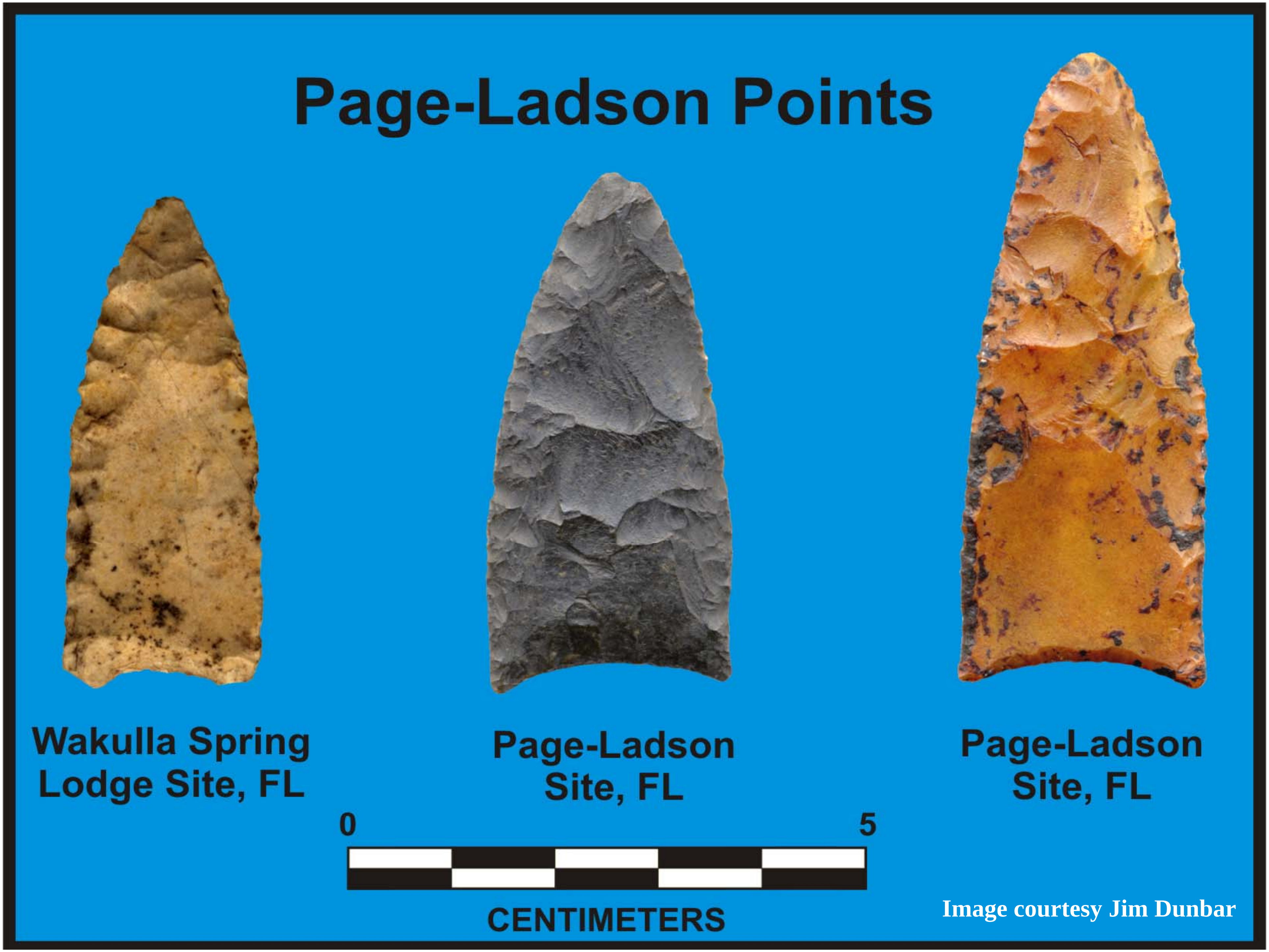
We Don’t Know!

Definitely upwards of 13,000 cal yr BP, Perhaps as far back as 20,000 to 25,000 cal yr BP.

Miller Lanceolate, Meadowcroft Rockshelter, Pennsylvania

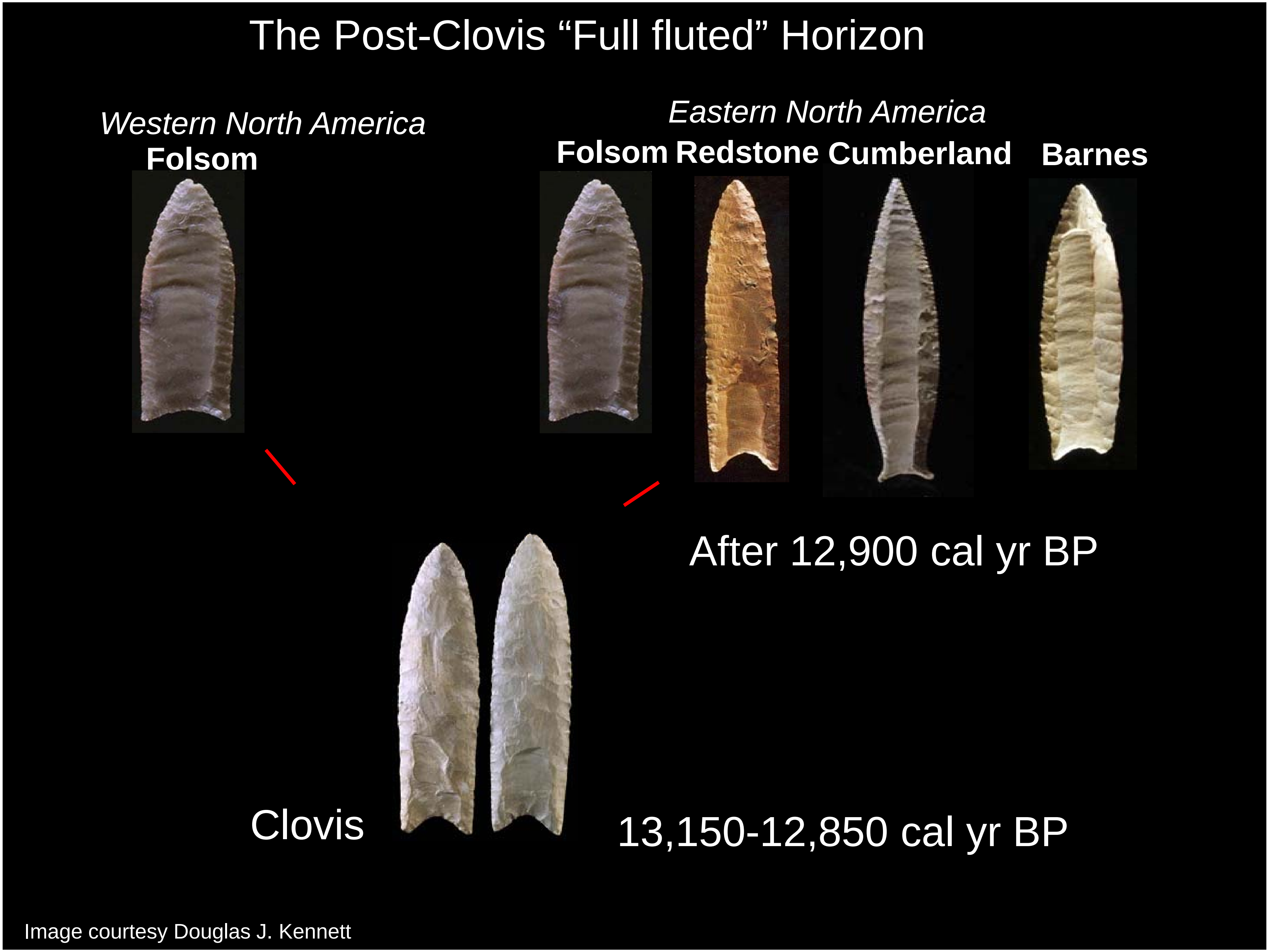
Image courtesy Dr. J. M. Adovasio, Mercyhurst Archaeological Institute. explorepahistory.com/displayimage.php?imgId=2399


Early triangular point from the
Cactus Hill Site (44SX202), Virginia
cm 1 2 3
Image courtesy Jim Dunbar

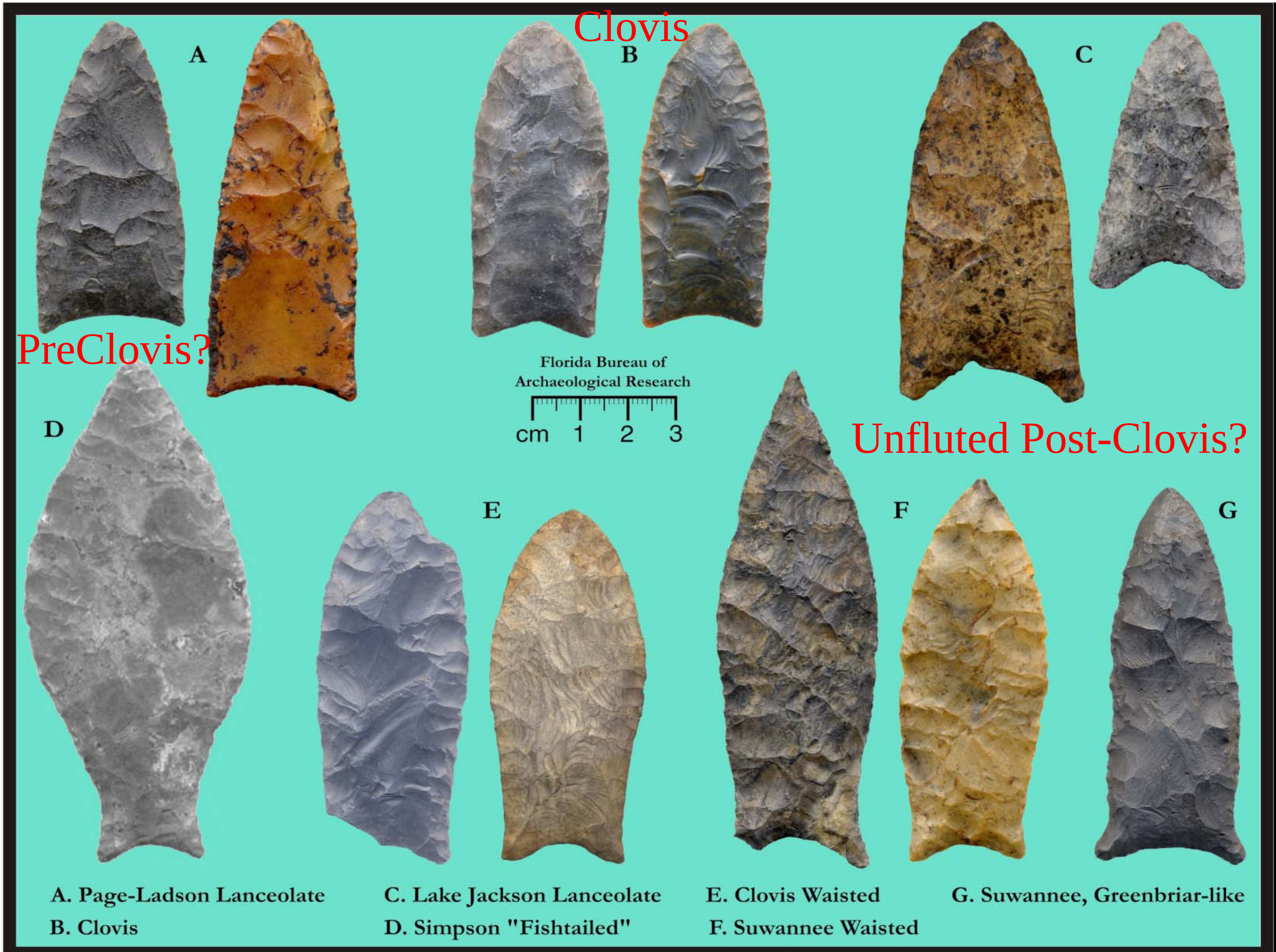

Page-Ladson Points
Wakulla Spring Lodge Site, FL
Page-Ladson Site, FL
Page-Ladson Site, FL
0
5
CENTIMETERS
Image courtesy Jim Dunbar

Possible entry routes, pre-Clovis sites, and the location of the Blackwater Draw Clovis type site near Clovis, New Mexico.

(Newsweek Magazine 26 April 1999)


The Post-Clovis "Full fluted" Horizon
Western North America
Folsom
Eastern North America
Folsom
Redstone
Cumberland
Barnes
After 12,900 cal yr BP
Clovis
13,150-12,850 cal yr BP
Image courtesy Douglas J. Kennett

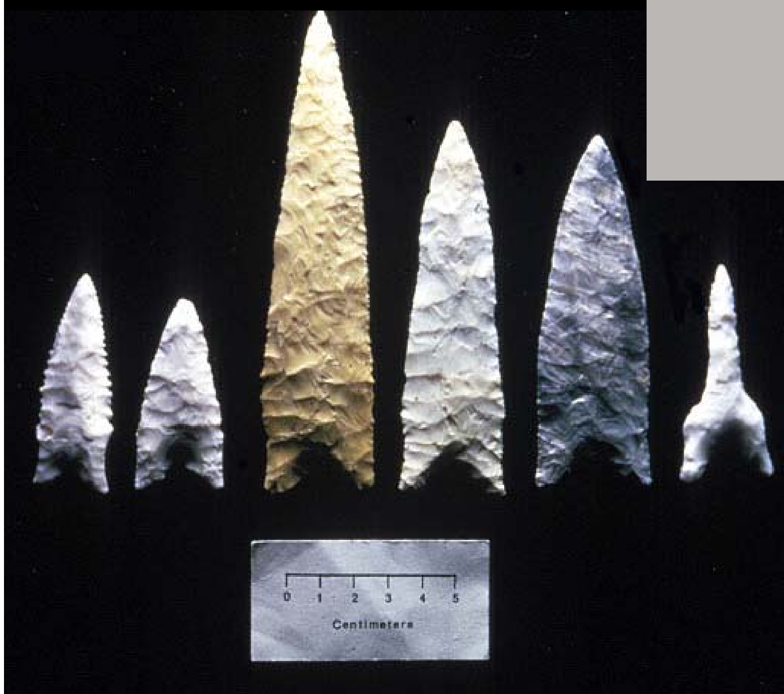

Folsom –
Blackwater Draw,
Barnes[1]
Cumberland[1]
Vail, ME[3]
2 cm
SGA 655 Burke County
0 2
cm
Redstone
(GA Fluted
Point Survey[2])
East
West
2 cm
Clovis –
Blackwater Draw, NM[3]
Clovis-
Shawnee-Minisink, PA[1]
1 Lithics Castng Lab - http://lithiccastinglab.com
2 Georgia Fluted Point Survey - http://pidba.utk.edu/georgia.htm
3 C. Vance Haynes Cast Collection - http://www.argonaut.arizona.edu/projects/castcollection.htm
Image courtesy D. Shane Miller



Paleoindian points in Florida

Image courtesy Jim Dunbar

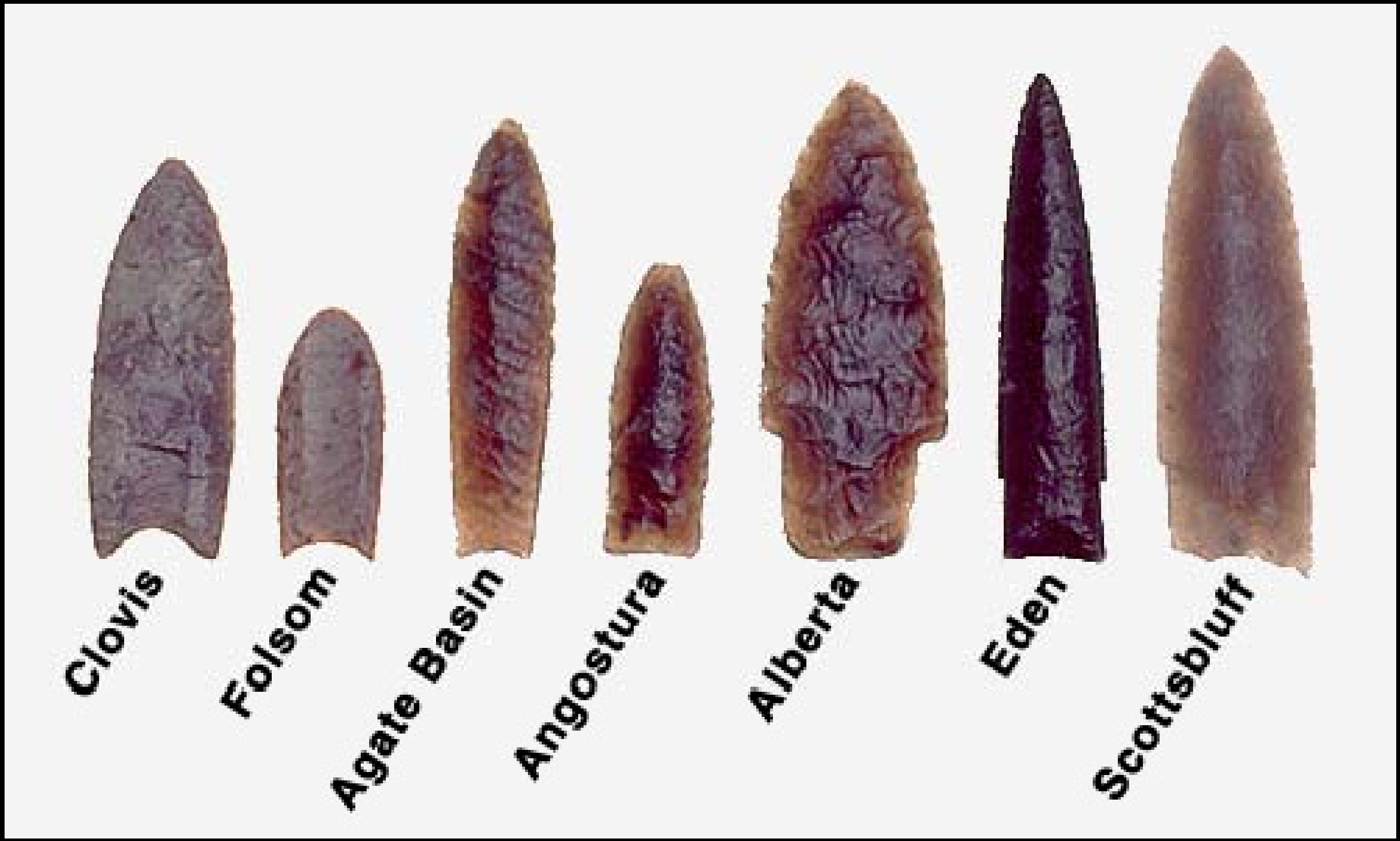
Dalton Culture



Dalton Points were resharpened, probably to process numerous small animals.

Images: http://users.stlcc.edu/mfuller/montgomery/MontgomeryDaltons.jpg; http://www.learnnc.org/learnnc/resources/anthro2.nsf/0/a717eff74c970bb48525663c004cf0bd?OpenDocument

‘Plains’ Projectile Points



Plains Paleoindian and Archaic points, from 8,000 to 11,500 years old.
Similar forms are found in parts of Eastern North America.

Image courtesy Nebraska Game and Parks Commission.
http://www.nebraskastudies.org/0200/frameset_reset.html?http://www.nebraskastudies.org/0200/stories/0201_0111.html

Meadowcroft Rockshelter, Pennsylvania

View looking across Cross Creek at the rockshelter.

Photo by Mark McConaughy
http://people.delphiforums.com/MCCONAUGHY/meadowcroft/meadcr07.htm

Meadowcroft Rockshelter, Pennsylvania

Archaeologist James Adovasio showing the stratigraphy in the shelter.

http://www.ohiohistorycentral.org/ohc/archaeol/p_indian/pictures/meadowin.shtml

View of profile wall in the "Deep Hole". Paleoindian materials came from the lowest levels shown.

August 1974 photograph by Mark McConaughy

http://people.delphiforums.com/MCCONAUGHY/meadowcroft/meadcr05.htm

Topper Site,

South Carolina

- Contains a few, small stone "tools" (microliths) from excavated context below Clovis occupation
- Problem: very sandy soil, possible movement of artifacts downward

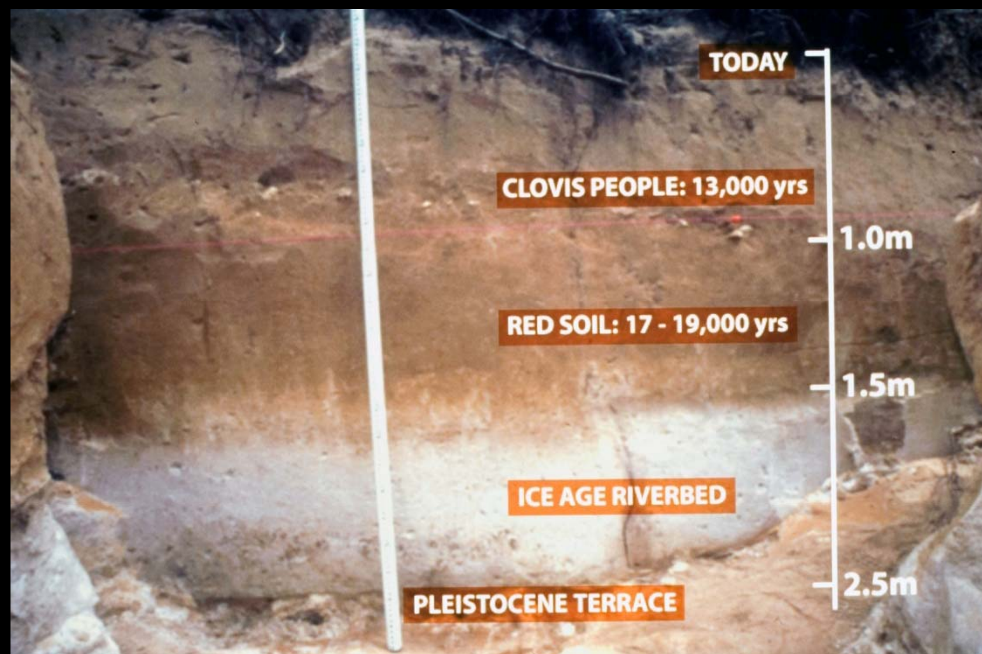


Image courtesy Albert C. Goodyear, Scott Meeks

Luminescence Dating

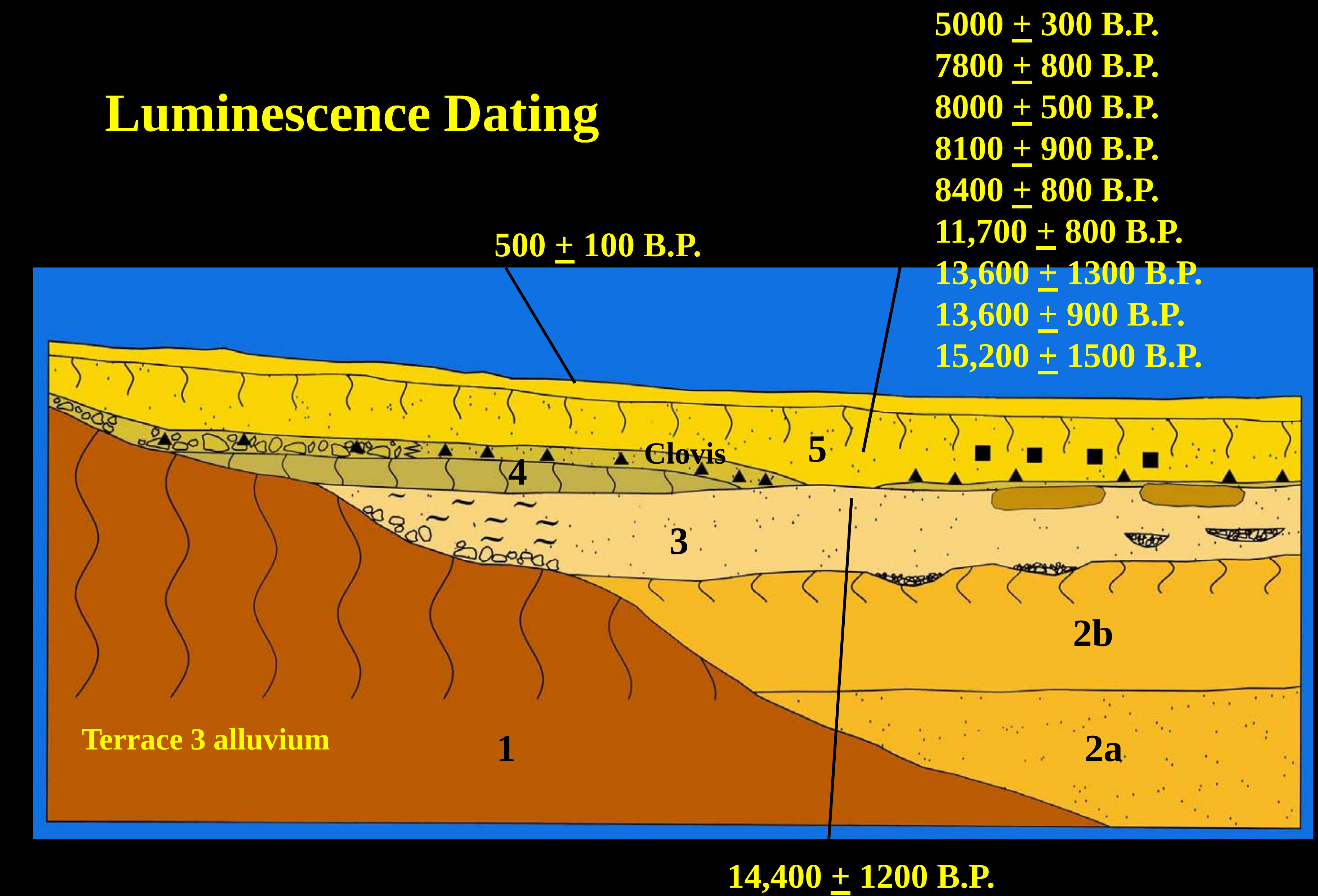
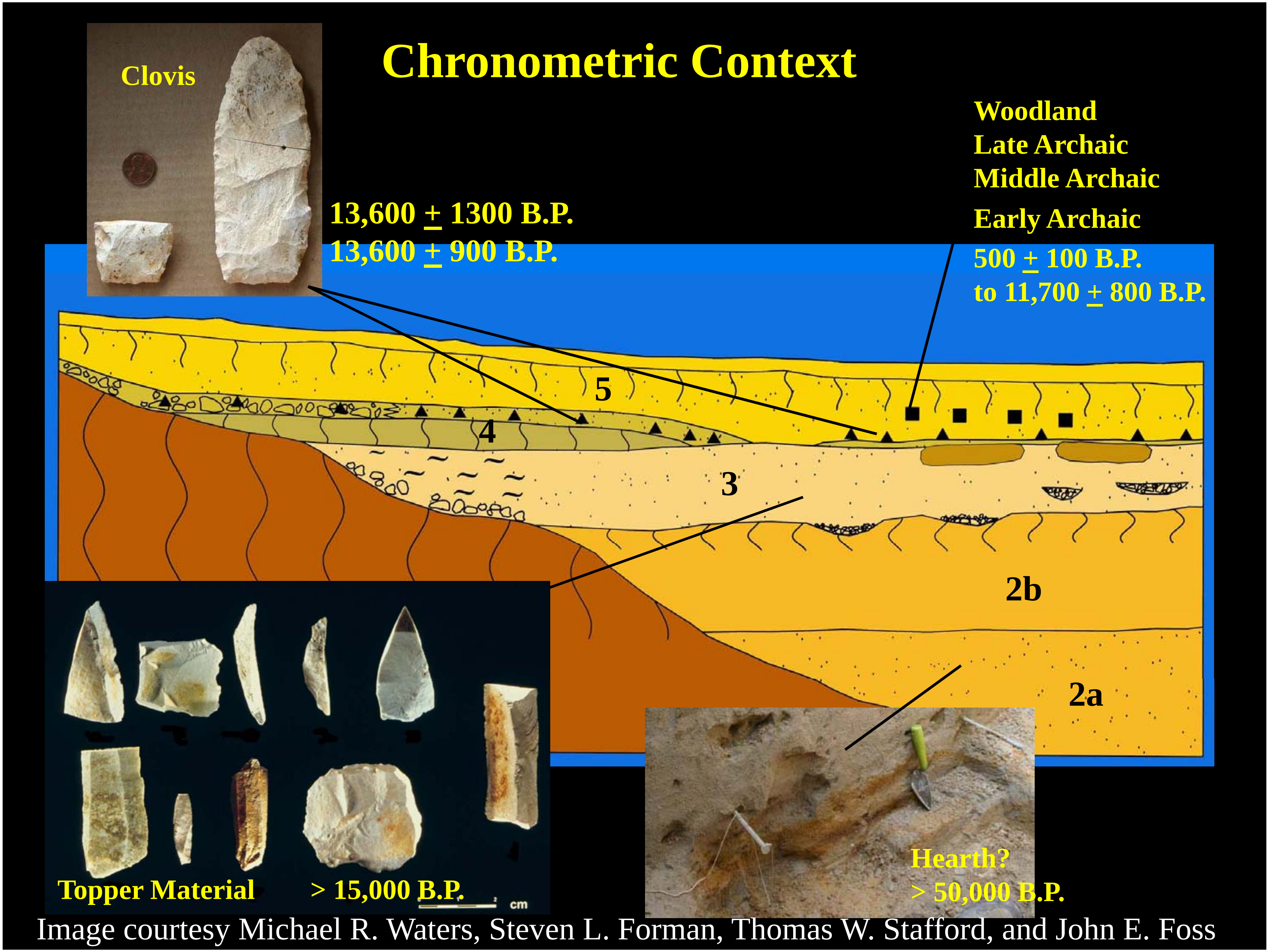


Image courtesy Michael R. Waters, Steven L. Forman, Thomas W. Stafford, and John E. Foss


Chronometric Context
Clovis
13,600 + 1300 B.P.
13,600 + 900 B.P.
Woodland
Late Archaic
Middle Archaic
Early Archaic
500 + 100 B.P.
to 11,700 + 800 B.P.
5
4
3
2b
2a
Topper Material
> 15,000 B.P.
cm
Hearth?
> 50,000 B.P.
Image courtesy Michael R. Waters, Steven L. Forman, Thomas W. Stafford, and John E. Foss

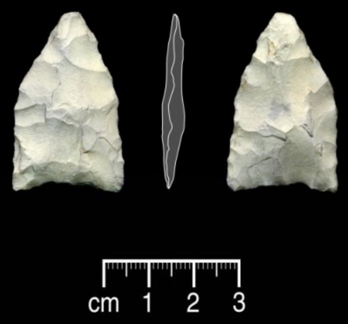
Cactus Hill, Virginia

•Contains numerous small stone "tools" (microliths) from excavated context below Clovis occupation

• Has unfluted "Clovis-like" bifaces, possibly precursor to the Clovis point

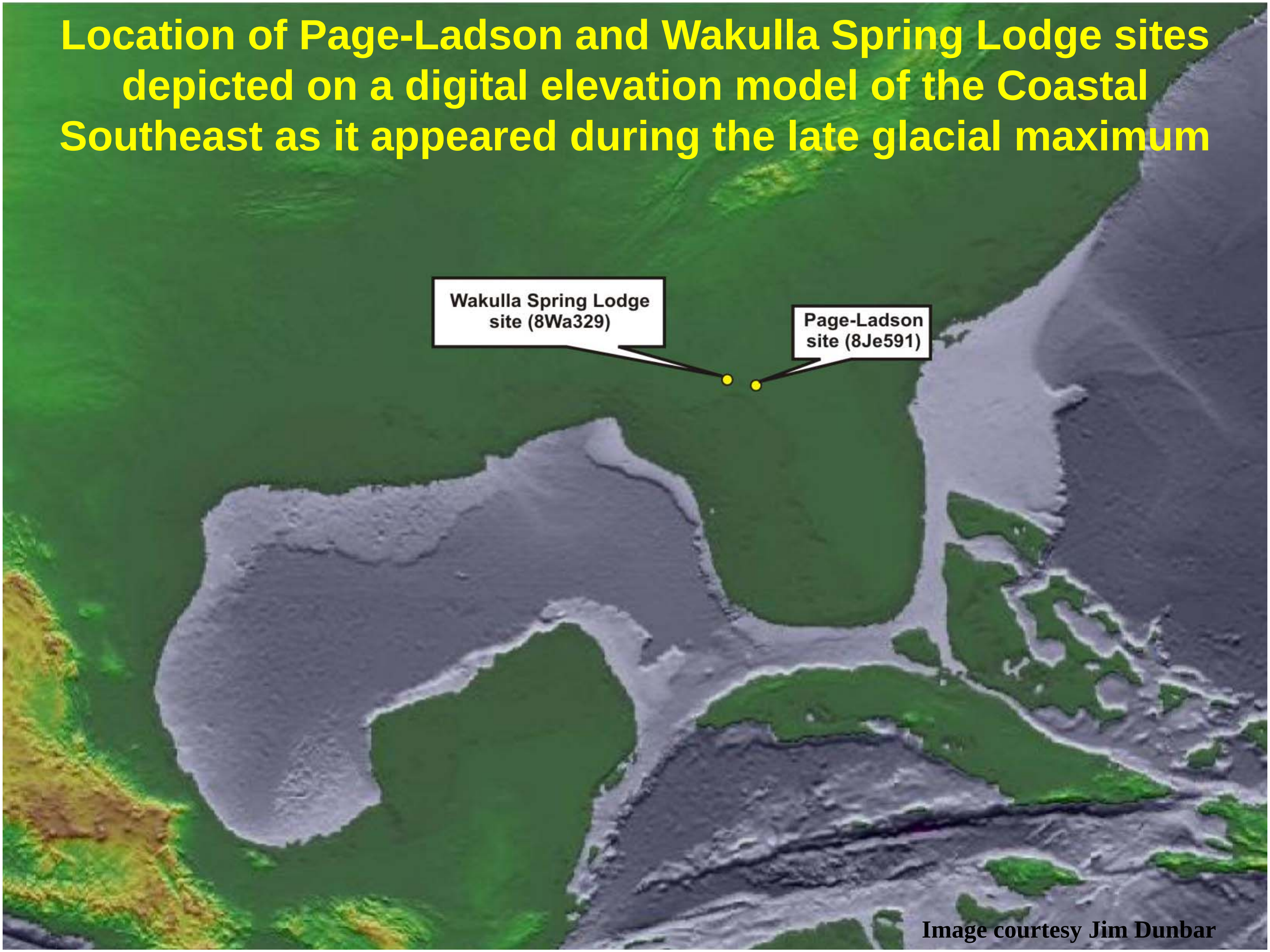
•Problem: very sandy soil, possible movement of artifacts downward

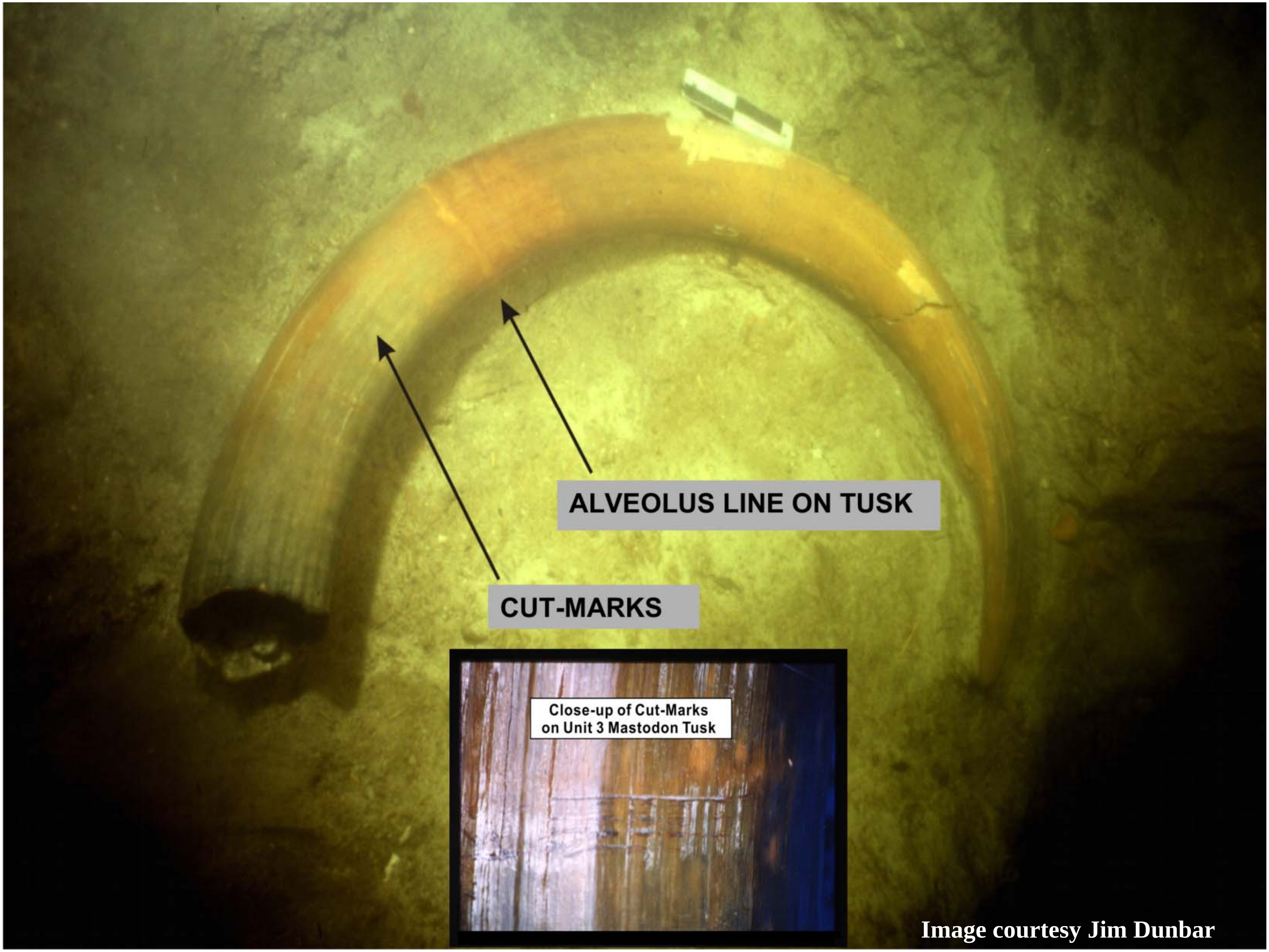
Early triangular point from the Cactus Hill Site (44SX202), Virginia



Cactus Hill

Image courtesy Scott Meeks

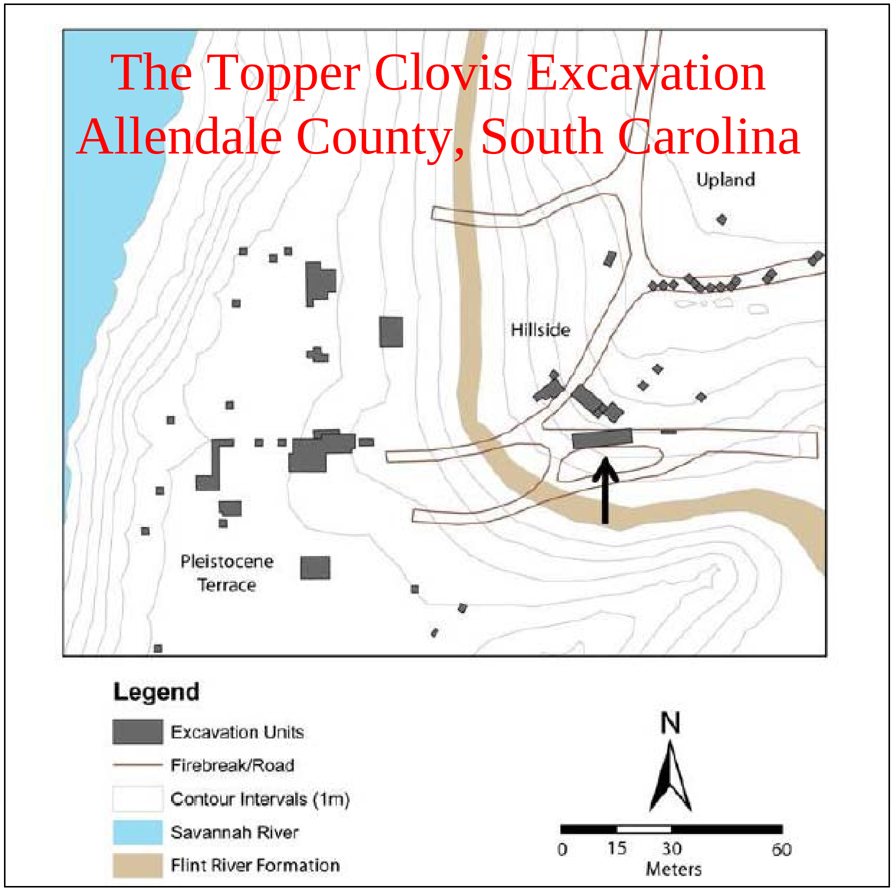

Location of Page-Ladson and Wakulla Spring Lodge sites depicted on a digital elevation model of the Coastal Southeast as it appeared during the late glacial maximum
Wakulla Spring Lodge site (8Wa329)
Page-Ladson site (8Je591)
Image courtesy Jim Dunbar



ALVEOLUS LINE ON TUSK
CUT-MARKS
Close-up of Cut-Marks
on Unit 3 Mastodon Tusk
Image courtesy Jim Dunbar


Lithic Artifacts from Unit 3, Page-Ladson Site
A
B
C
D
E
F
G
H
0
5
CENTIMETERS
Image courtesy Jim Dunbar

The Topper Clovis Excavation Allendale County, South Carolina



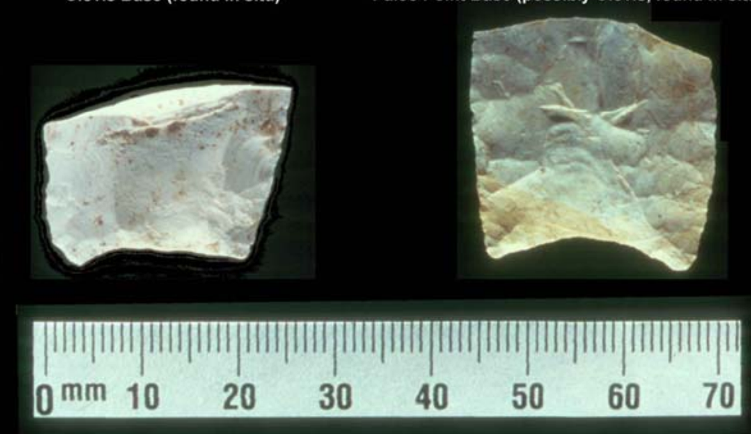
The Topper Clovis Excavation
Allendale County, South Carolina

Clovis Industrial Floor 2003 Field Season

Large Clovis Preform Refit (Side A)

Clovis Base (found in situ)

Paleo Point Base (possibly Clovis, found in situ)



Images courtesy: Albert C. Goodyear and http://www.allendale-expedition.net/

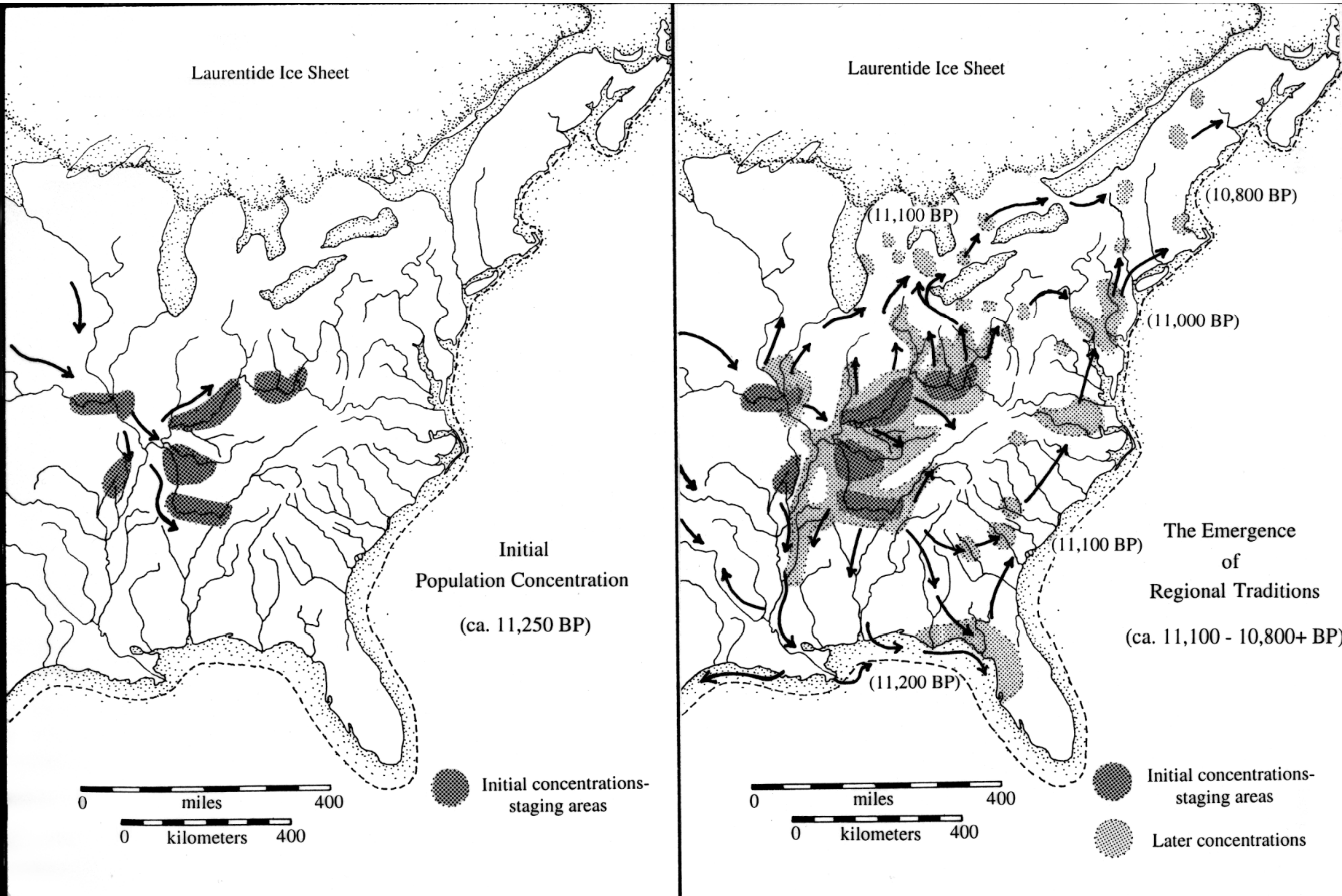
Cactus Hill, Virginia

Tools grouped on the sand at Cactus Hill in Virginia may be perhaps 18,000 years old.

Images and text courtesy of National Geographic, December 2000.

Carson-Conn-Short.
Tennessee

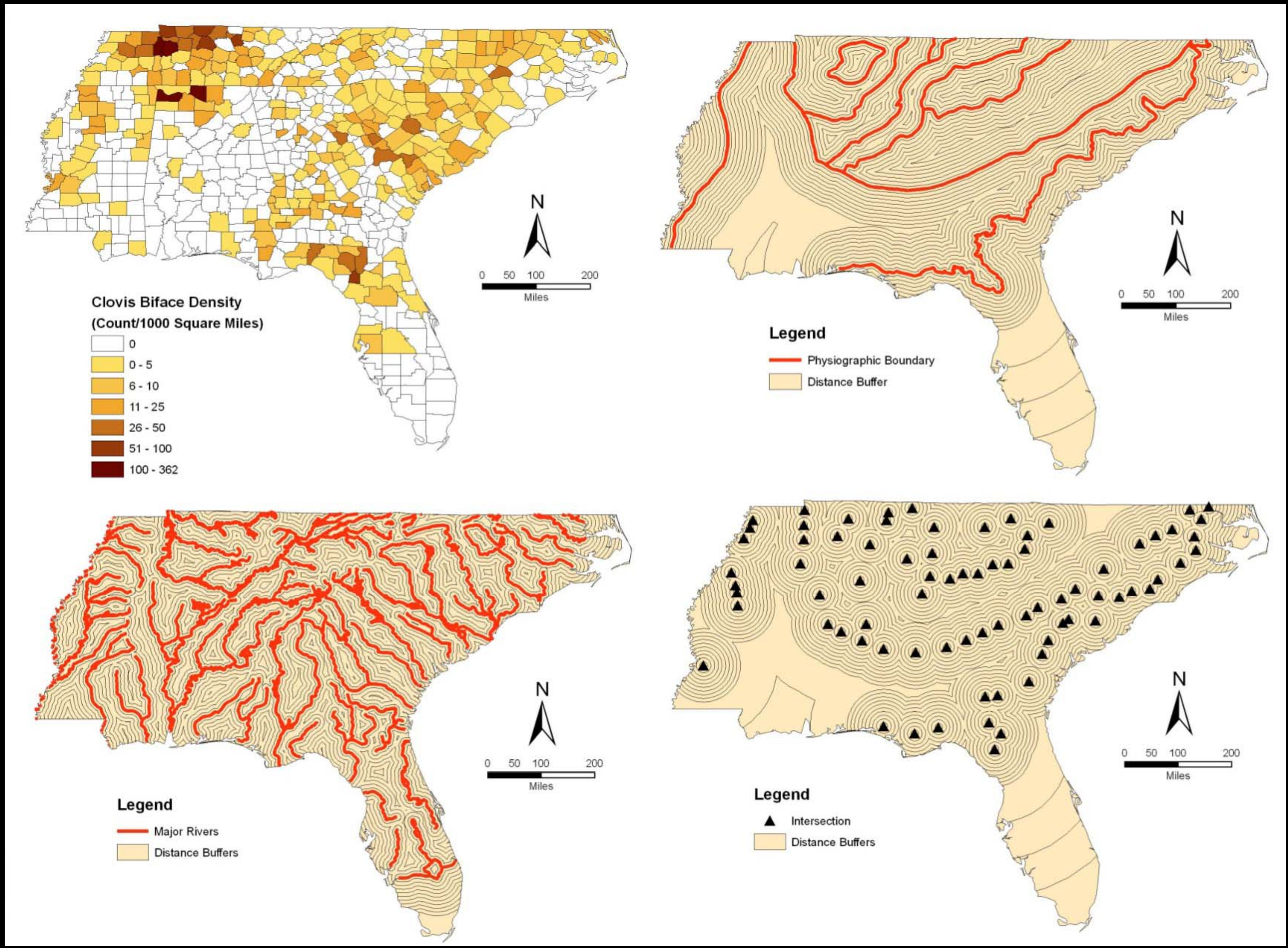
Images courtesy:
John Broster and Mark Norton



The settlement of the larger region (or radiation of fluting technology) from 'staging' areas.

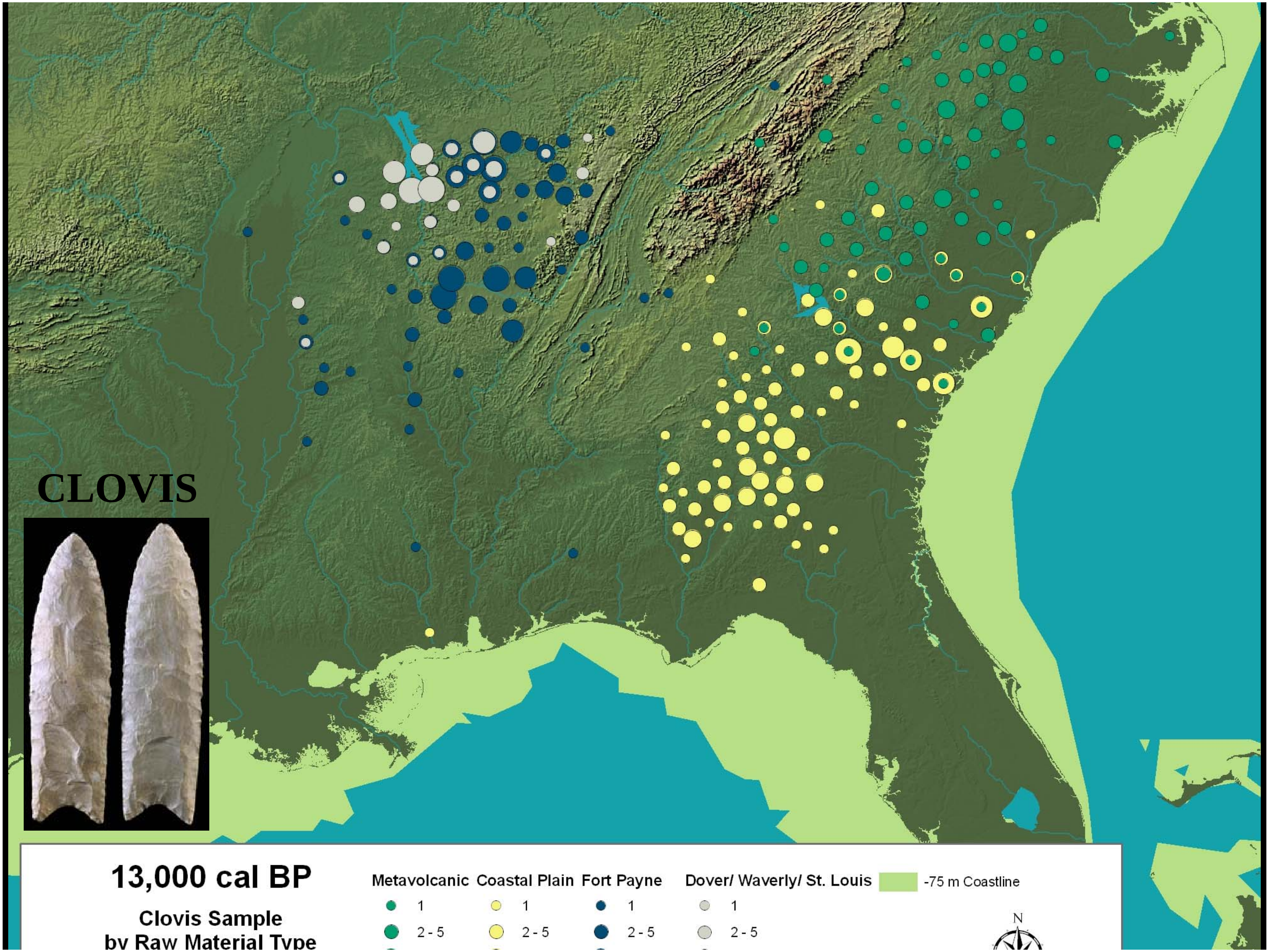
Anderson, David G.
1990 The Paleoindian Colonization of Eastern North America: A View from the Southeastern United States. In Early Paleoindian Economies of Eastern North America, edited by Kenneth Tankersley and Barry Isaac, pp. 163–216. Research in Economic Anthropology Supplement 5.

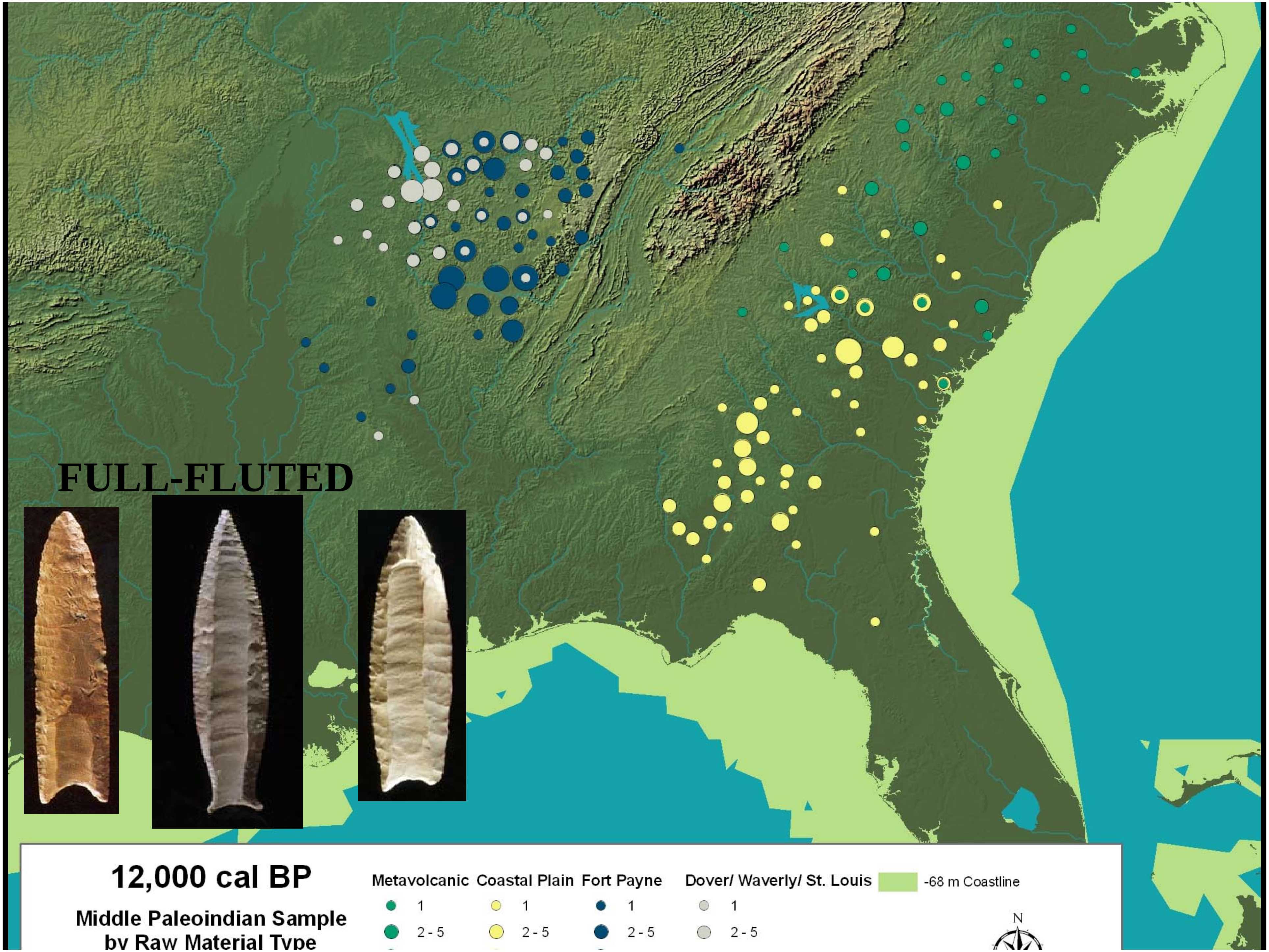
Miller-Smallwood Paleoindian Aggregation Model



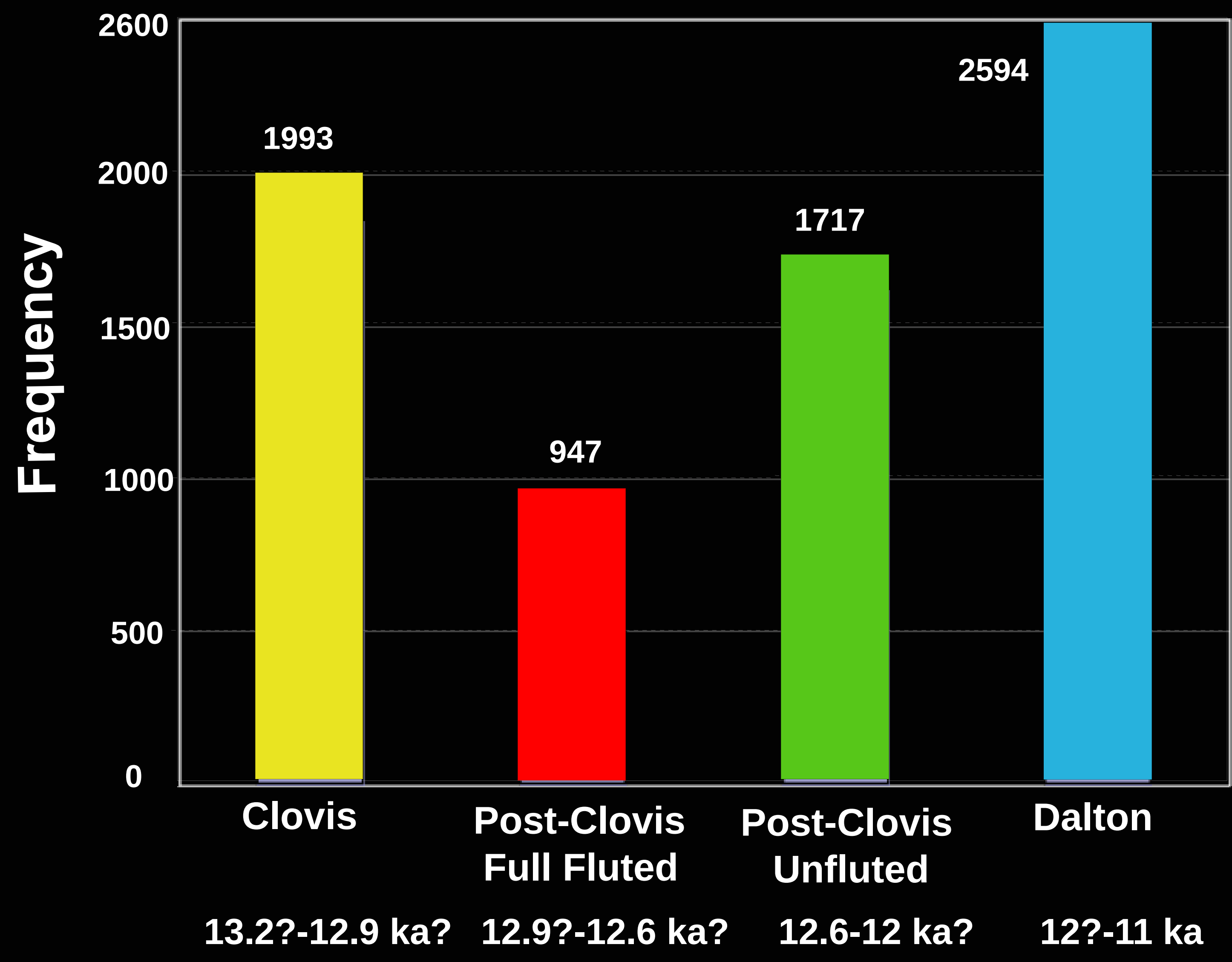
Large Clovis sites occur at the intersection of major rivers, macro-ecotones, and sources of toolstone.

Image courtesy of D. Shane Miller and Ashley Smallwood.

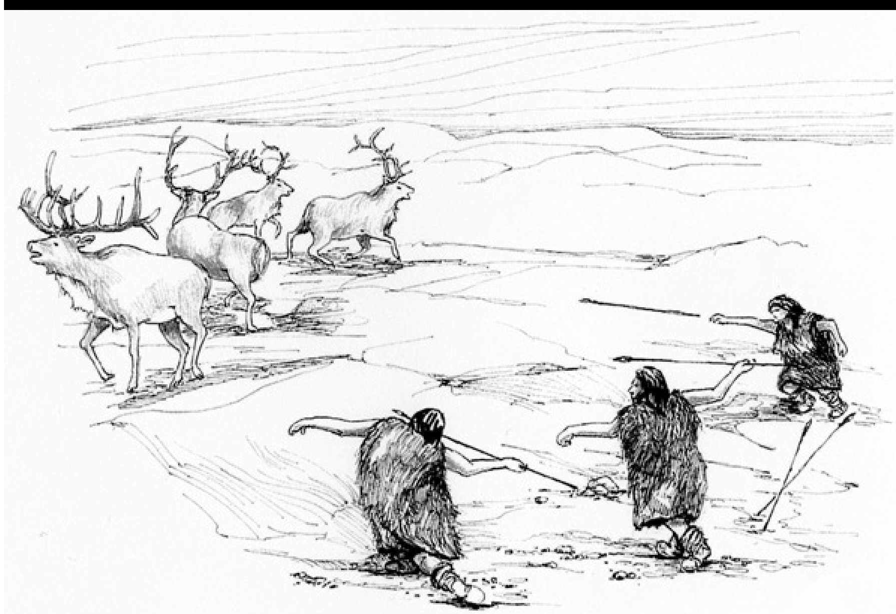

CLOVIS
13,000 cal BP
Clovis Sample
by Raw Material Type
Metavolcanic
Coastal Plain
Fort Payne
Dover/ Waverly/ St. Louis
-75 m Coastline
1
2 - 5
N

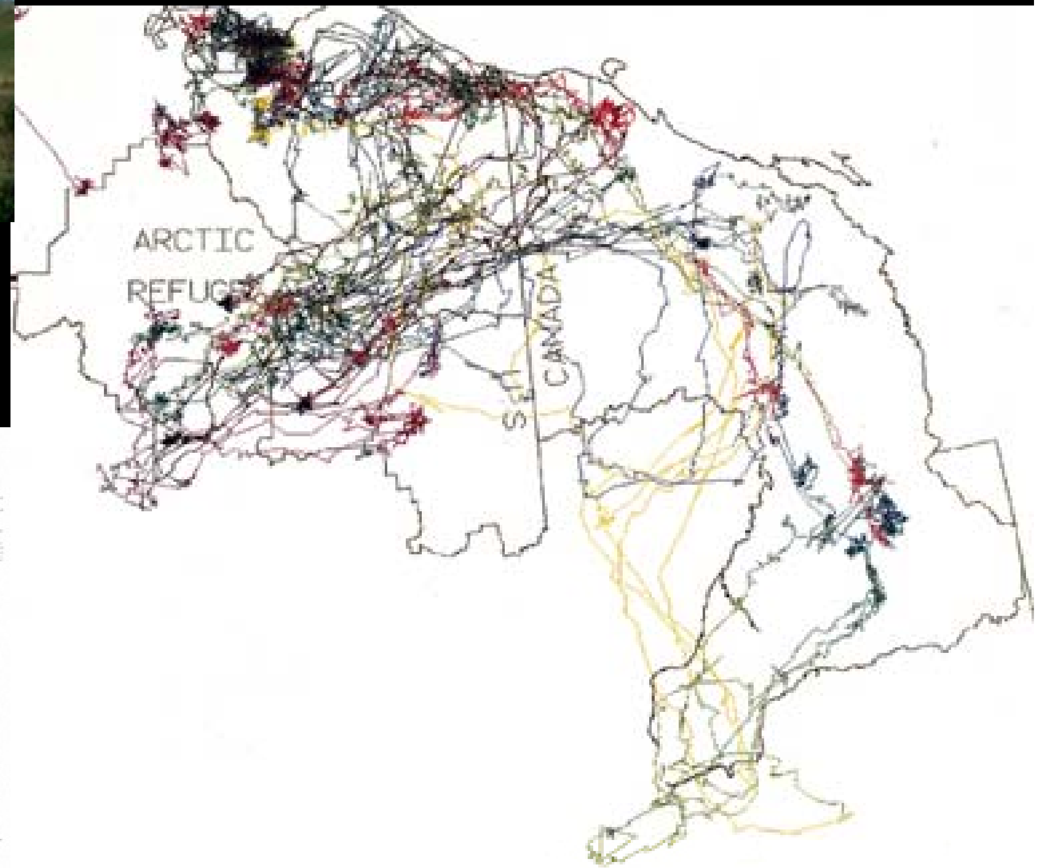

FULL-FLUTED
12,000 cal BP
Middle Paleoindian Sample
by Raw Material Type
Metavolcanic
Coastal Plain
Fort Payne
Dover/ Waverly/ St. Louis
1
2 - 5
-68 m Coastline
N

Southeastern North America



The Upper Midwest and the Northeast
Caribou Migration Routes: A Predictable Resource





Slide courtesy Scott Meeks

Northeastern Hunters

Debert, Nova Scotia

Images courtesy http://museum.gov.ns.ca/arch/sites/debert/debert.htm

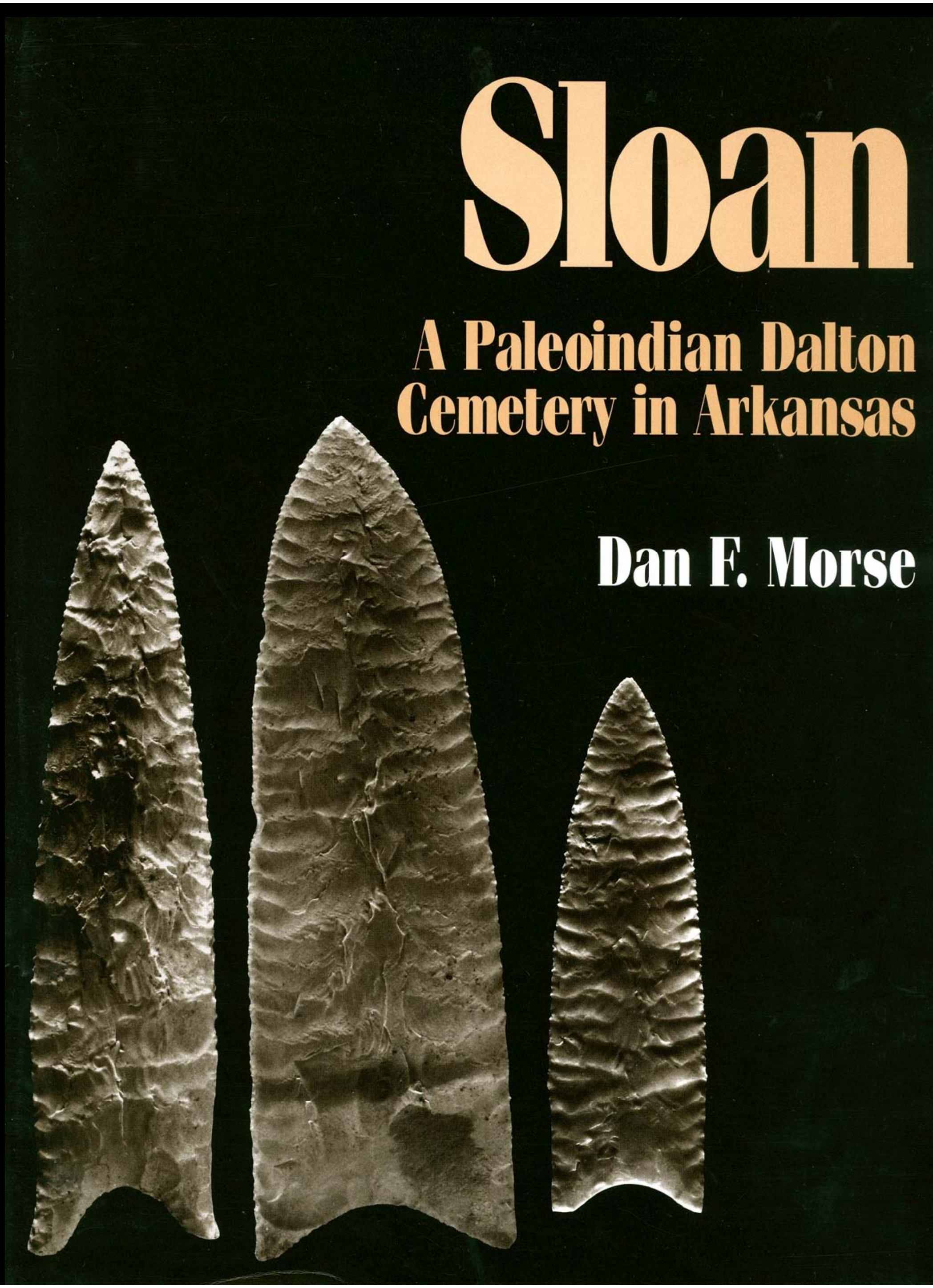
East Wenatchee, Washington

The East Wenatchee or Richey/Roberts site was discovered in 1987 by workers excavating an irrigation ditch in an apple orchard. Shown *in situ* here are two fluted point preforms, a bifacial knife, a side-scraper, a large blank and five beveled bone rods.

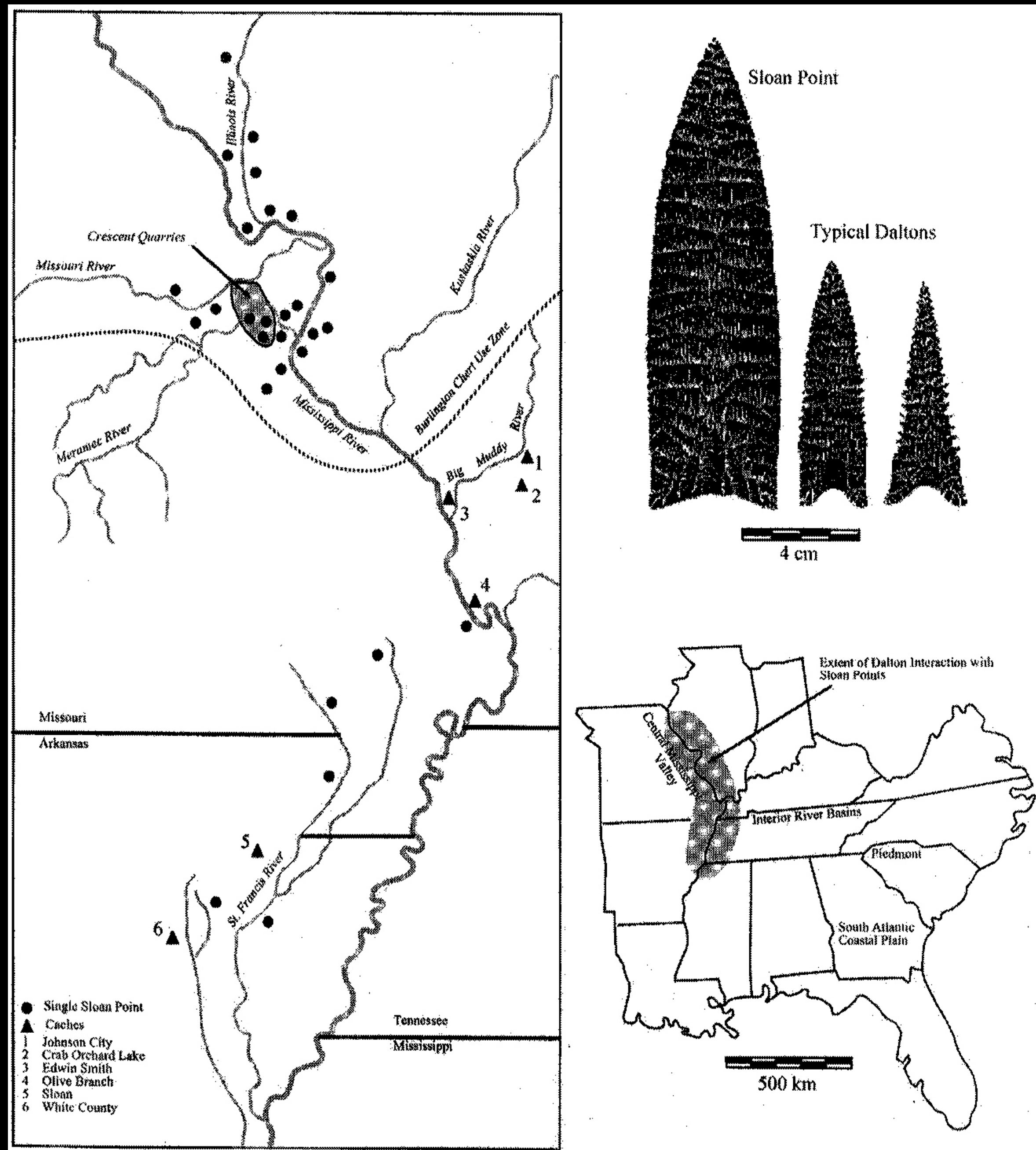
Image courtesy Washington State Historical Society Museum Collection, Dr. Gramly and Pete Bostrom, Lithic Casting Lab.

Sloan Points, some up to ten inches long, were identified as burial goods at a cemetery site in northeast Arkansas. It is the oldest cemetery in the Americas.

(Morse 1997).



Sloan Point occurrence has been used to infer the existence of an elaborate culture or interaction network in the central Mississippi Valley at ca. 12000 BP



(Images adapted from Walthall and Koldehoff 1998:260–261).

The Dalton Culture

ca. 12,900 – 11,250 cal BP
ca. 10,800? -9,900 rcbp

- **The Dalton culture of ancient Native American hunter-gatherers made a distinctive set of stone tools that are today found at sites across the eastern United States.**

- **The name “Dalton” was first used in 1948 to refer to a style of chipped stone projectile point/knife.**

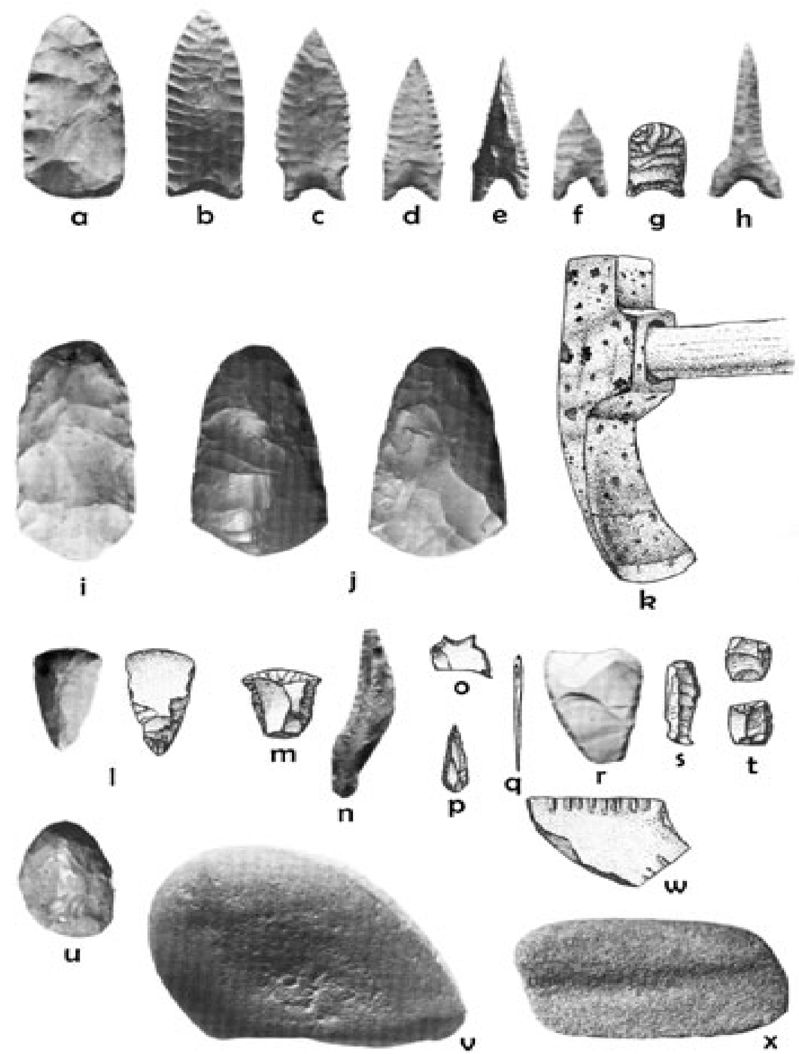
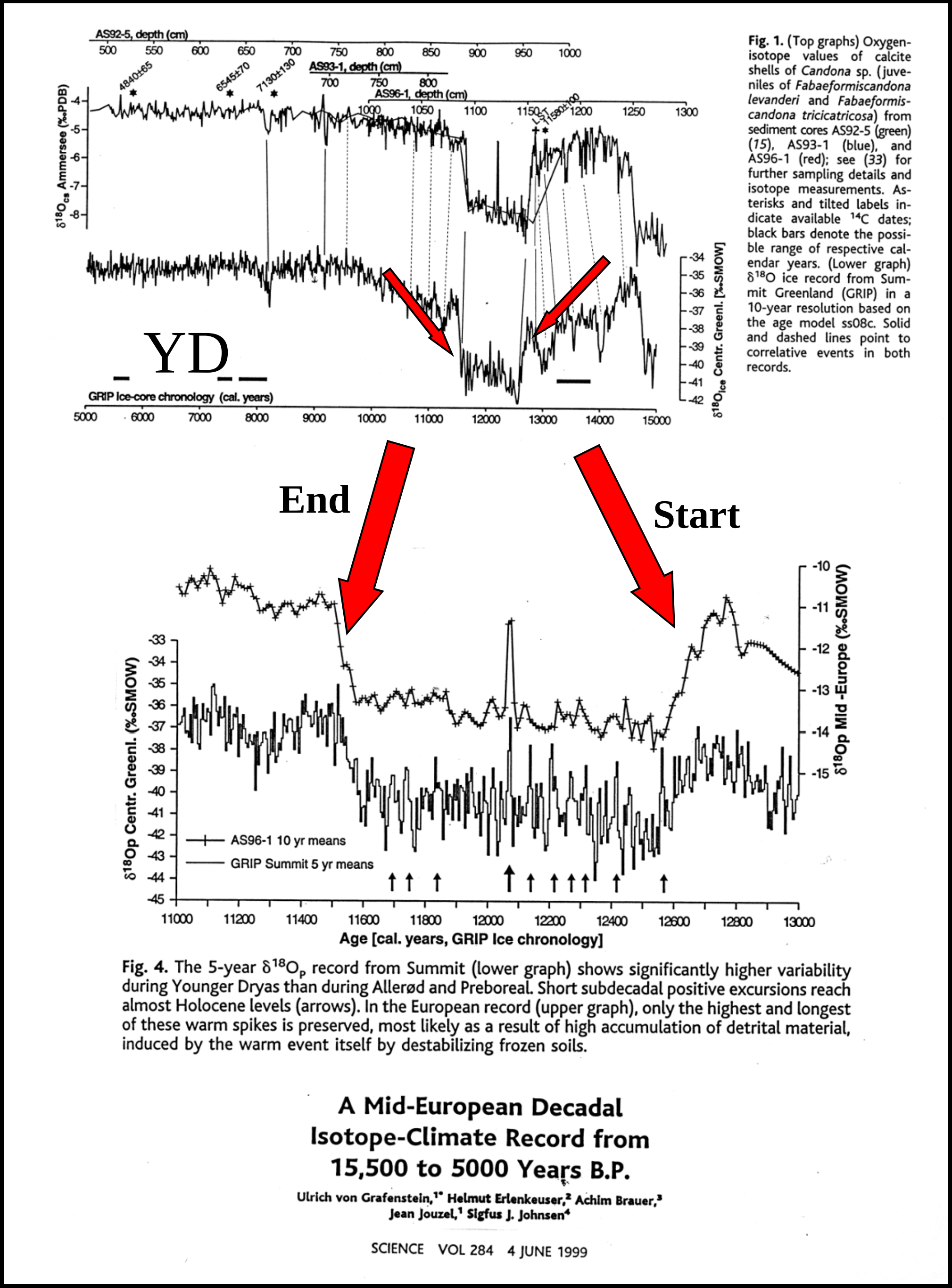


FIGURE 1 Typical Dalton artifacts. (a)–(b) Point preforms. (c) Unresharpened point. (d)–(e) Resharpened points. (f) Burin. (g) End scraper. (h) Awl. (i) Adz preform. (j) Adz. (k) Nineteenth-century English hand adz for comparison. (l) End scraper. (m) End scraper with "graver spurs." (n) Backed uniface. (o) Graver. (p) Microlith. (q) Bone needle found at Graham Cave in Missouri. (r) Retouched scraper. (s) Unretouched blade. (t) *Pièce esquillé*. (u) Discoid hammer. (v) Edge-abraded cobble. (w) Notched abrader. (x) Grooved abrader. [Courtesy of the Arkansas Archeological Survey.]

Image and text courtesy http://encyclopediaofarkansas.net/encyclopedia/entry-detail.aspx?entryID=545
Image by Jaime Walker.

Repeated decadal scale or longer temperature fluctuations characterized the Younger Dryas (YD), likely heightening subsistence stress and uncertainty.

(Graftenstein et al. 1999)



The Big Unanswered Questions: Research Directions for the Future

Critical Needs:

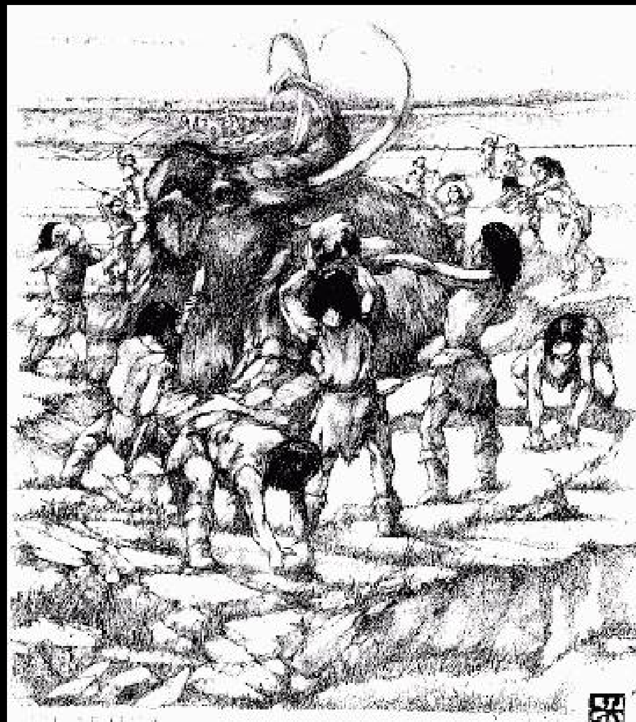
What Did Paleoindian Peoples Eat?

Large animals?
(Specialized adaptation)

A Wide Range of Animal and Plant Foods?
(Generalized adaptation)

Answer: Probably both, depending upon circumstances.

Earlier Paleoindians may have been more generalized than Clovis, which exhbits characteristics of a specialized big game hunting adaptation. Post-Clovis peoples were again more generalized.



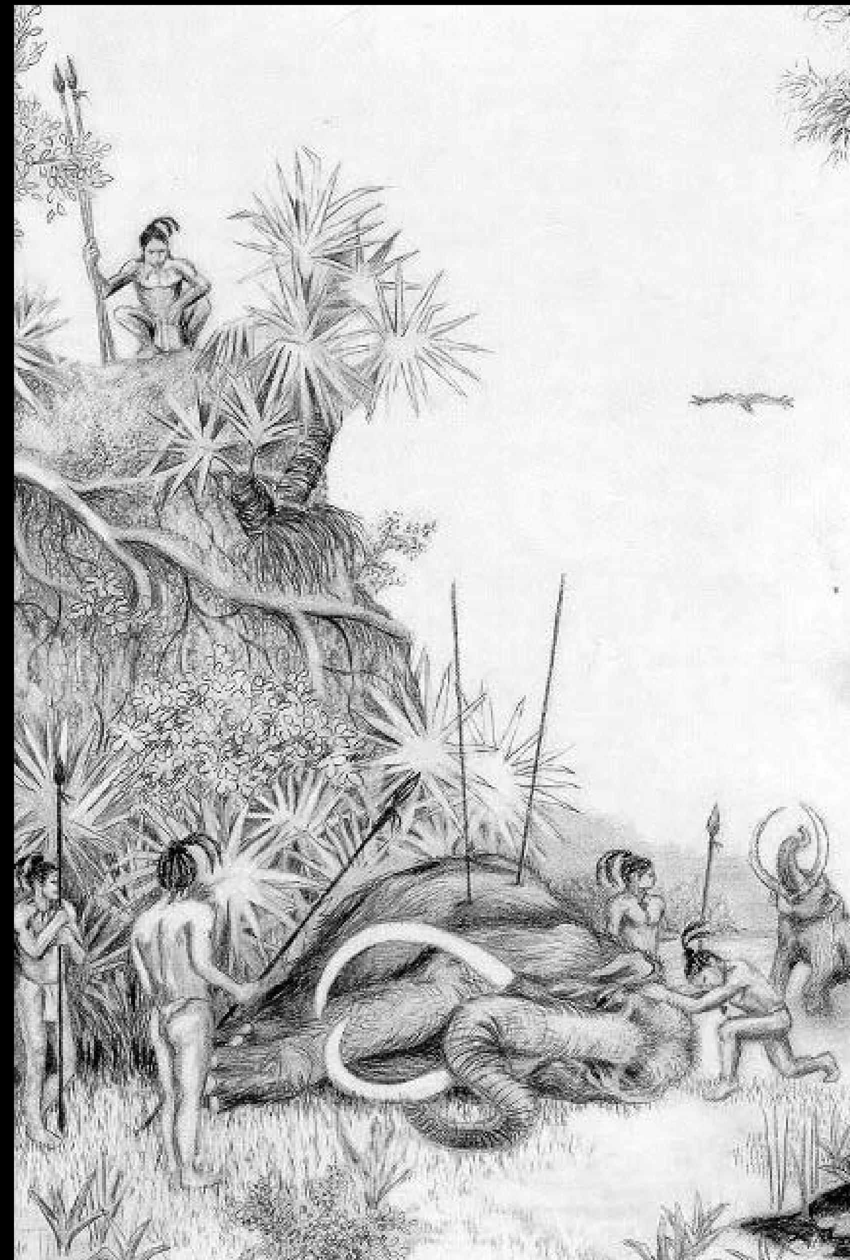


Image “Showing Reverence. Florida's first people.” courtesy Marisa Renz. . http://www.fossilexpeditions.com/history1.htm

Innumerable pictures in popular textbooks show Paleoindian people, typically men, hunting large game animals.

These people unquestionably ate a much greater array of foods.

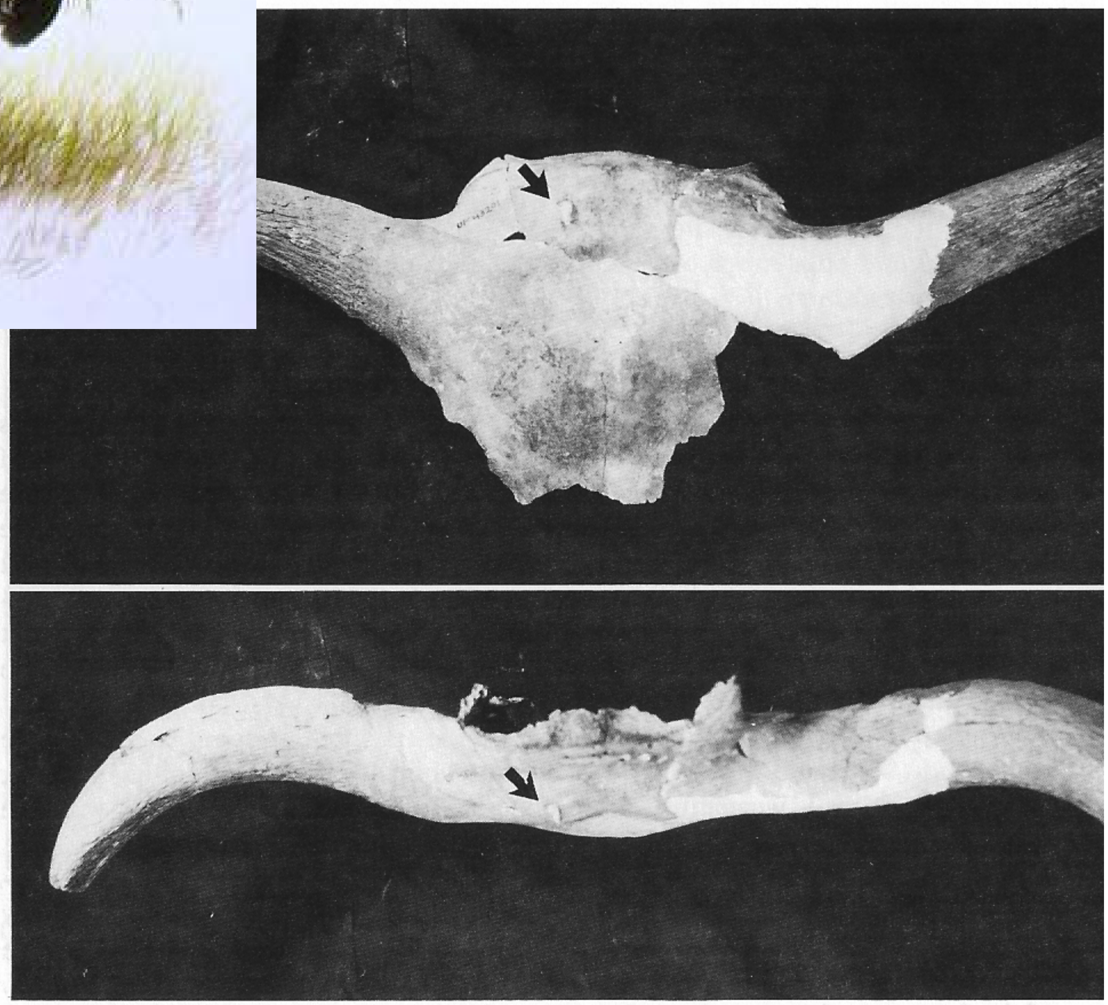


Figure 3. Above, dorsal view of reconstructed *Bison* skull roof and horn cores; below, occipital

Wacissa River *Bison antiquus* with projectile point fragment embedded in skull.

Image from S. David Webb, Jerald T. Milanich, Roger Alexon, and Jam
1984 "A Bison Antiquus Kill Site, Wacissa River, Jefferson County, Fl

Coats-Hines Site, Tennessee
40WM31

Coats-Hines Site, Tennessee
40WM31

Coats-Hines Site, Tennessee
40WM31

Identified Species Used for Clovis Tool Manufacture in North America

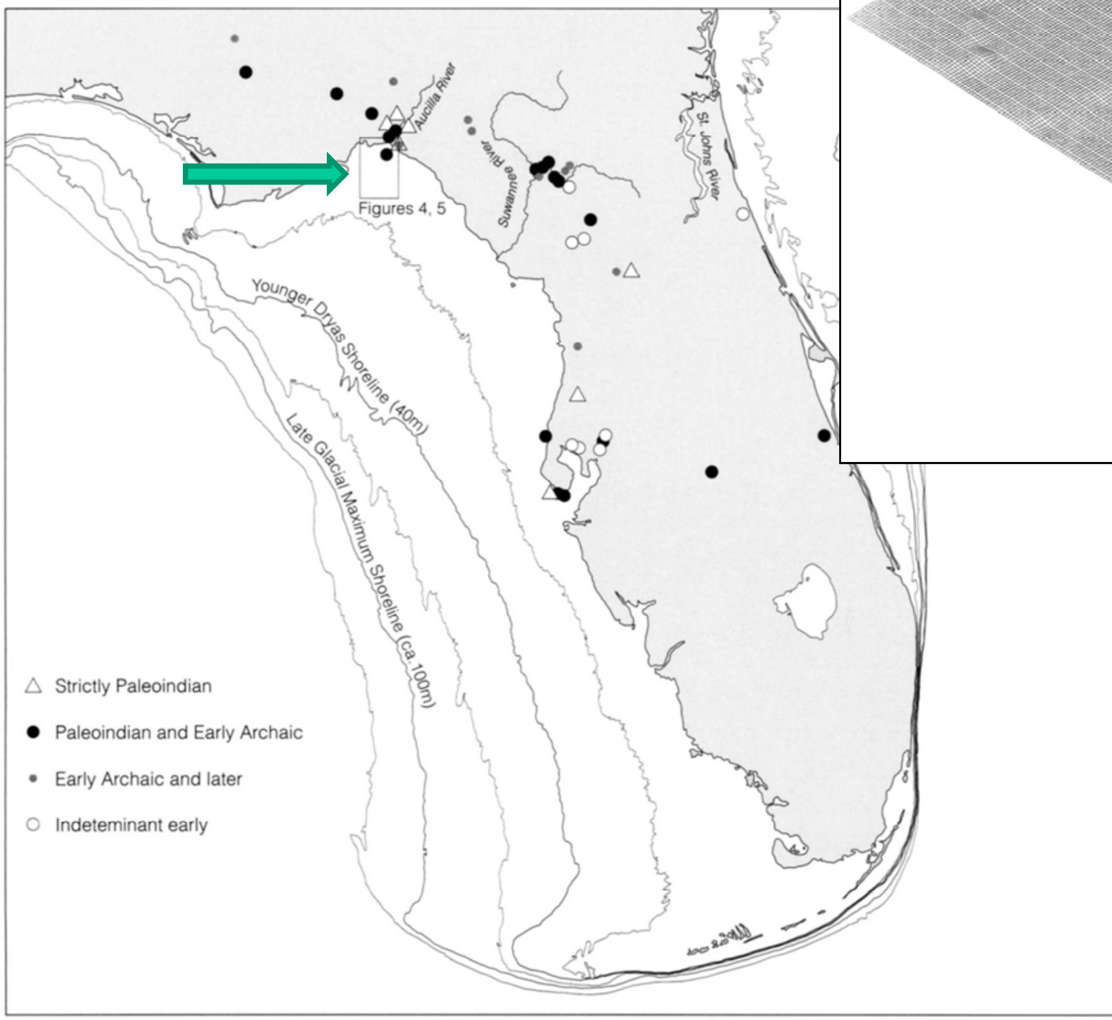
- Canis dirus- dire wolf
- Paleaolama mirifica
- Odocoileus virginanus- white tailed deer.
- Equus sp.- horse
- Mammut americanum- mastodon
- Mammuthus columbi- mammoth

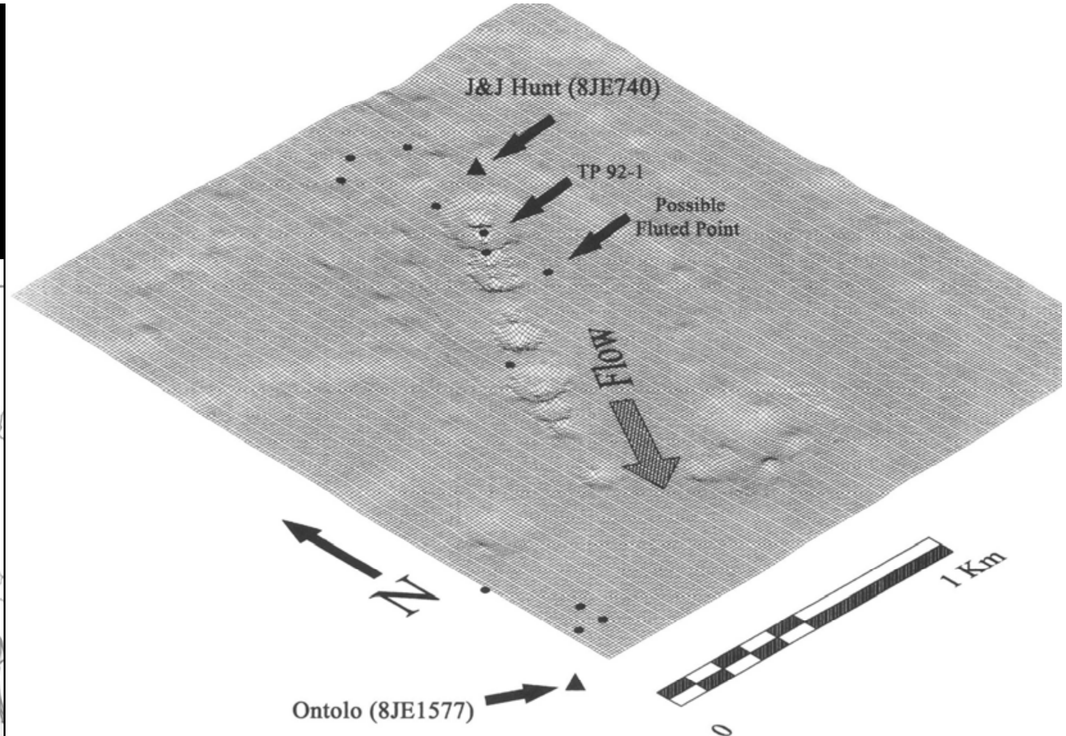
Image courtesy C. Andrew Hemmings

Critical Needs

EXPLORING THE EASTERN CONTINENTAL SHELF

Exploring the Paleo Aucilla River in the eastern Gulf of Mexico





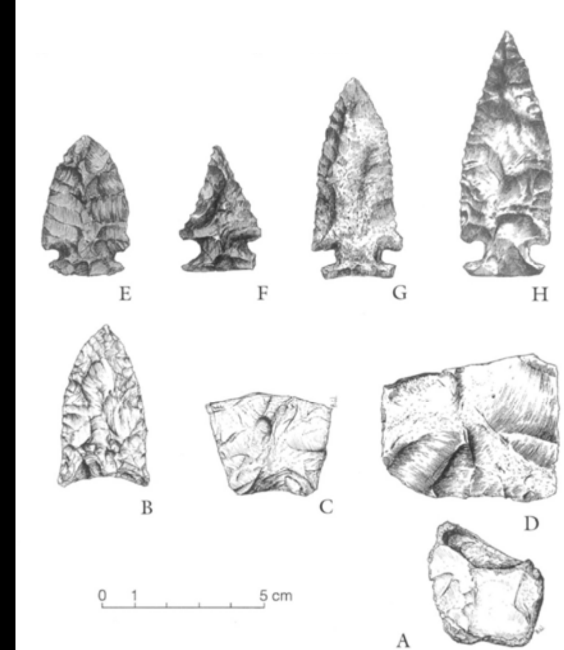
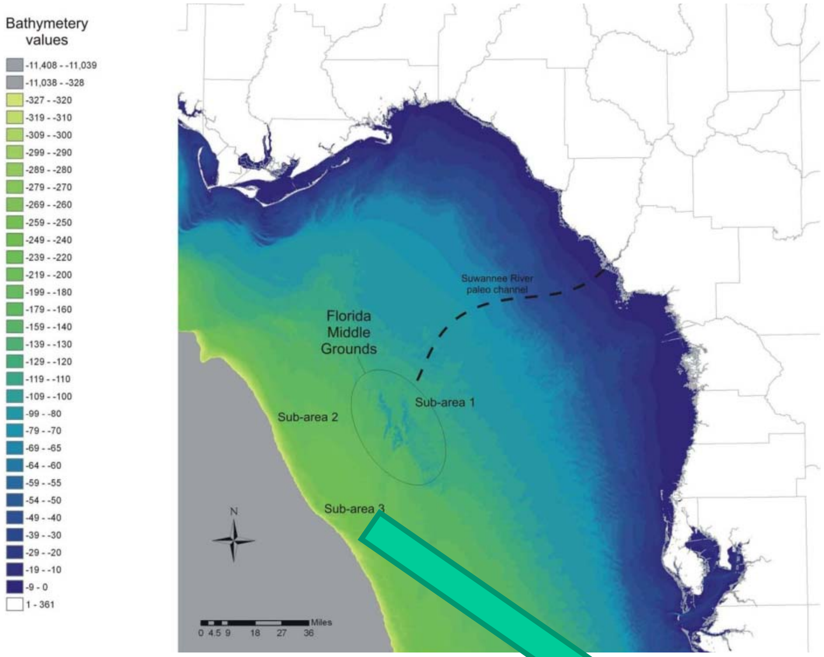


Image courtesy: Faught, Michael K. 2004 Submerged Paleoindian and Archaic Sites of the Big Bend, Florida. *Journal of Field Archaeology* 29:273-290.



Bathymetric map of survey area.

Exploring submerged shorelines back to the Late Glacial Maximum

Images courtesy James M. Adovasio and C. Andrew Hemmings

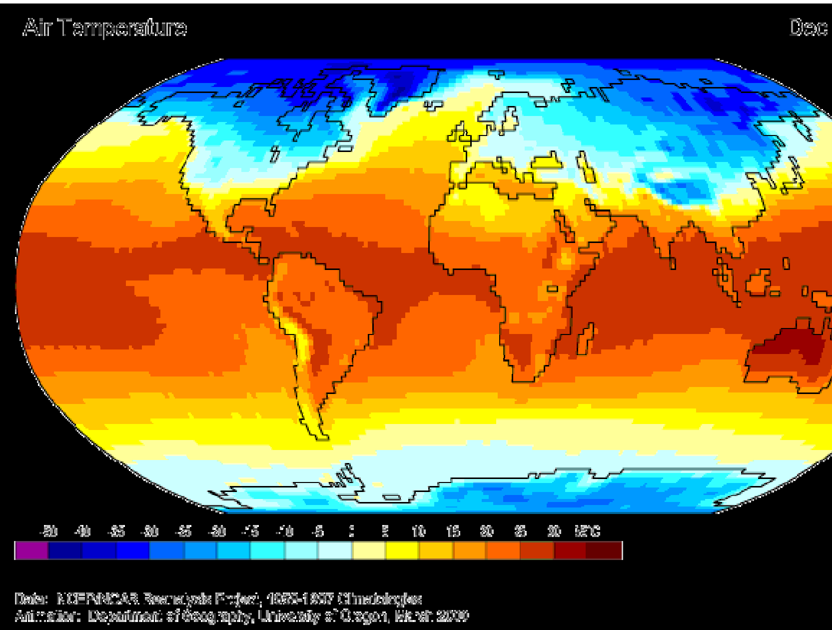
Sonar imaging of presumed Late Glacial Maximum beach features ca. 21,000 years ago.

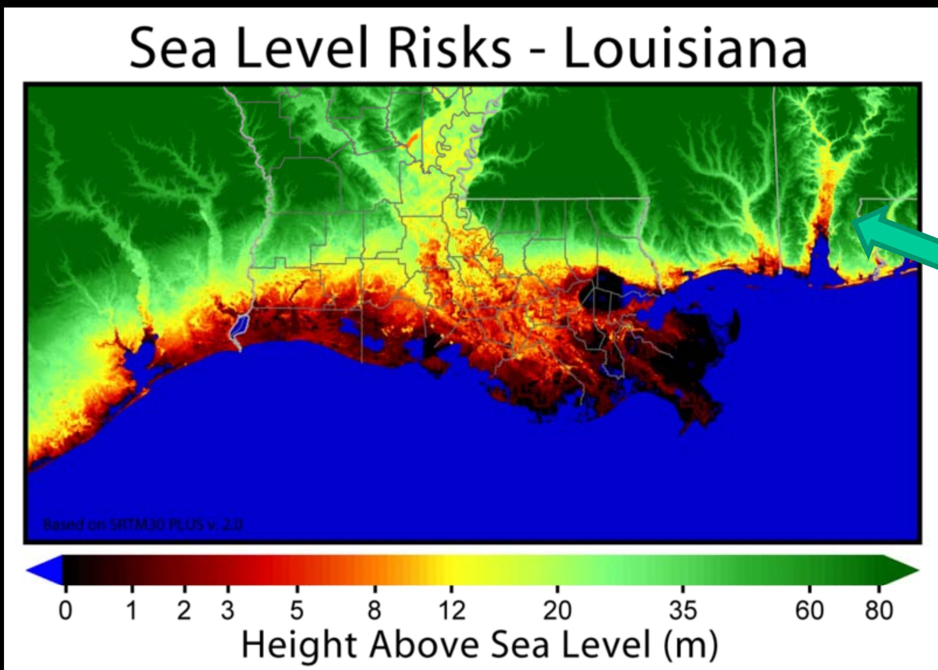
Image courtesy of the Northeastern Gulf of Mexico Science Party, NOAA-OE.

http://oceanexplorer.noaa.gov/explorations/08negmexico/logs/slideshow/slideshow.html#

Images courtesy NOAA 2009 and James Adovasio

Areas at risk from Sea Level Rise





Mobile

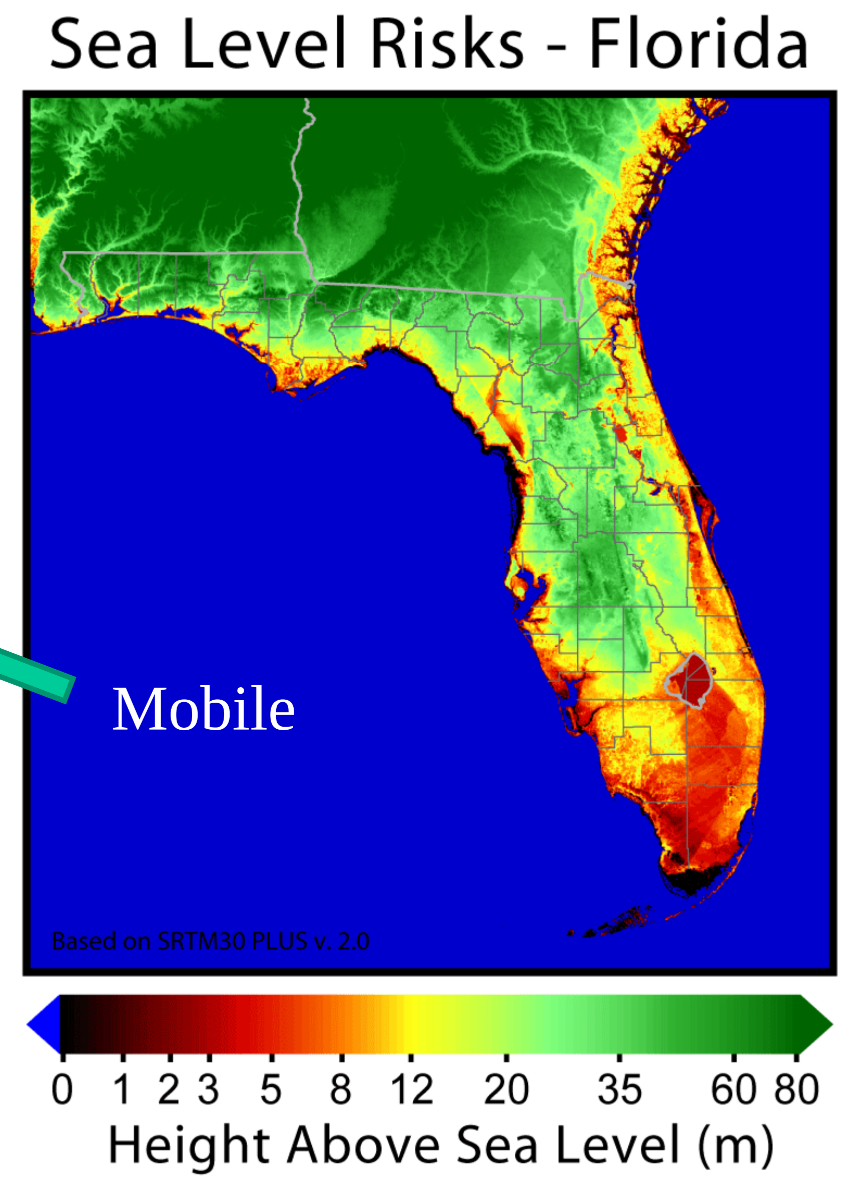


Image courtesy http://www.globalwarmingart.com/images/f/fa/Eastern_USA_Sea_Level_Risks.png

Critical Needs:

More Work on Clovis Occupation Sites and Settlement Modeling

Southeastern Paleoindian Points with Detailed Attribute Data Recorded

November 2009

Total Sample n= 10,798 Points

(includes ca. 3500 Dalton and Early Side Notched Forms)

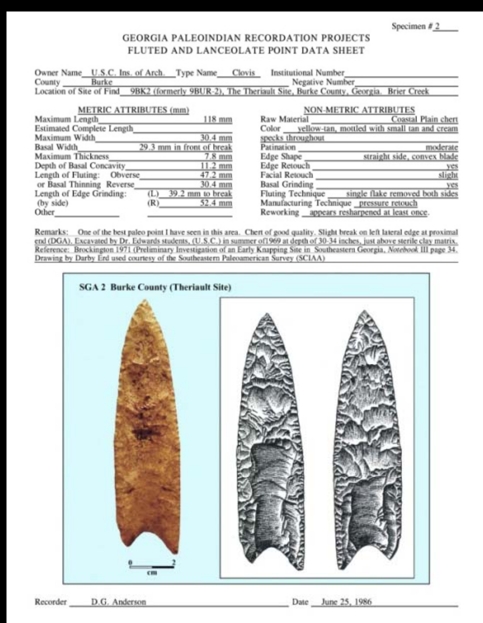
State	# Points	Source
ALABAMA	618	Futato et al. pers. com. 2005
ARKANSAS	91	Morse and Gillam, pers. com. 2005
FLORIDA	134	Dunbar pers. com. 2005
GEORGIA	1445	Ledbetter pers. com. 2005
MISSISSIPPI	2146	McGahey pers. com. 2005
NORTH CAROLINA	ca. 500*	Perkinson 1971, 1973 (n=83), Peck 1988 (n=444), Daniel 2005, pers. com. (n=253)
SOUTH CAROLINA	472	Michie 1977, Goodyear and Charles 2005: pers. com.
TENNESSEE	4376	Broster and Norton: pers. com. 2005
VIRGINIA	1016	Hranicky and Johnson 2005

MISSING STATES: LOUISIANA, KENTUCKY

*OVERLAP BETWEEN DIFFERING SURVEYS NOT FULLY RESOLVED.

Clovis Blade and Fluted Point Technology

Blades and Blade Cores



Specimen # 2

GEORGIA PALEOINDIAN RECORDATION PROJECTS
FLUTED AND LANCEOLATE POINT DATA SHEET

Owner Name U.S.C. Ins. of Arch. Type Name Clovis Institutional Number
County Burke Negative Number
Location of Site of Find 9BK2 (formerly 9BUR-2), The Theriault Site, Burke County, Georgia. Brier Creek

METRIC ATTRIBUTES (mm)		NON-METRIC ATTRIBUTES	
Maximum Length	118 mm	Raw Material	Coastal Plain chert
Estimated Complete Length		Color	yellow-tan, mottled with small tan and cream specks throughout
Maximum Width	30.4 mm	Patination	moderate
Basal Width	29.3 mm in front of break	Edge Shape	straight side, convex blade
Maximum Thickness	7.8 mm	Edge Retouch	yes
Depth of Basal Concavity	11.2 mm	Facial Retouch	slight
Length of Fluting: Obverse	47.2 mm	Basal Grinding	yes
or Basal Thinning Reverse	30.4 mm	Fluting Technique	single flake removed both sides
Length of Edge Grinding: (by side) (L)	39.2 mm to break	Manufacturing Technique	pressure retouch
(R)	52.4 mm	Reworking	appears resharpened at least once.
Other			

Remarks: One of the best paleo point I have seen in this area. Chert of good quality. Slight break on left lateral edge at proximal end (DGA). Excavated by Dr. Edwards students, (U.S.C.) in summer of1969 at depth of 30-34 inches, just above sterile clay matrix. Reference: Brockington 1971 (Preliminary Investigation of an Early Knapping Site in Southeastern Georgia, *Notebook* III page 34. Drawing by Darby Erd used courtesy of the Southeastern Paleoamerican Survey (SCIAA)

SGA 2 Burke County (Theriault Site)

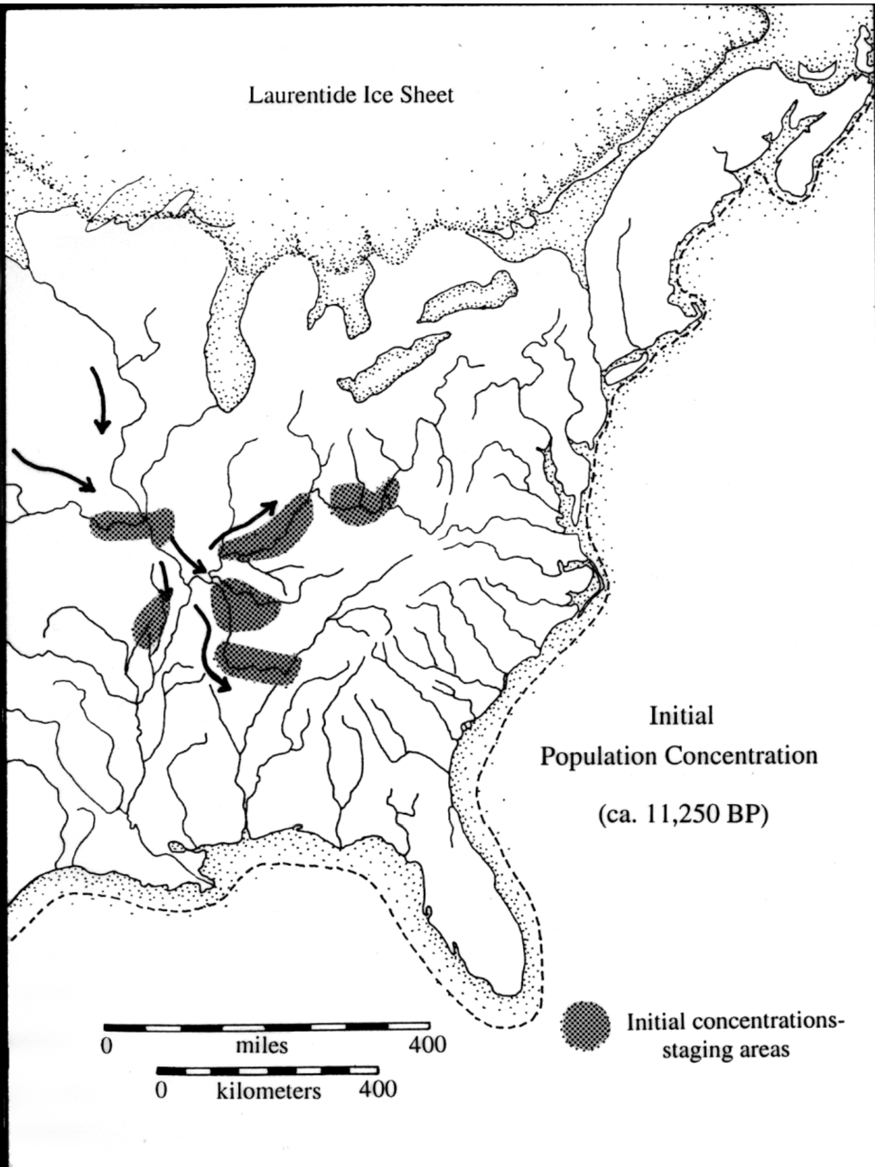
0 2 cm

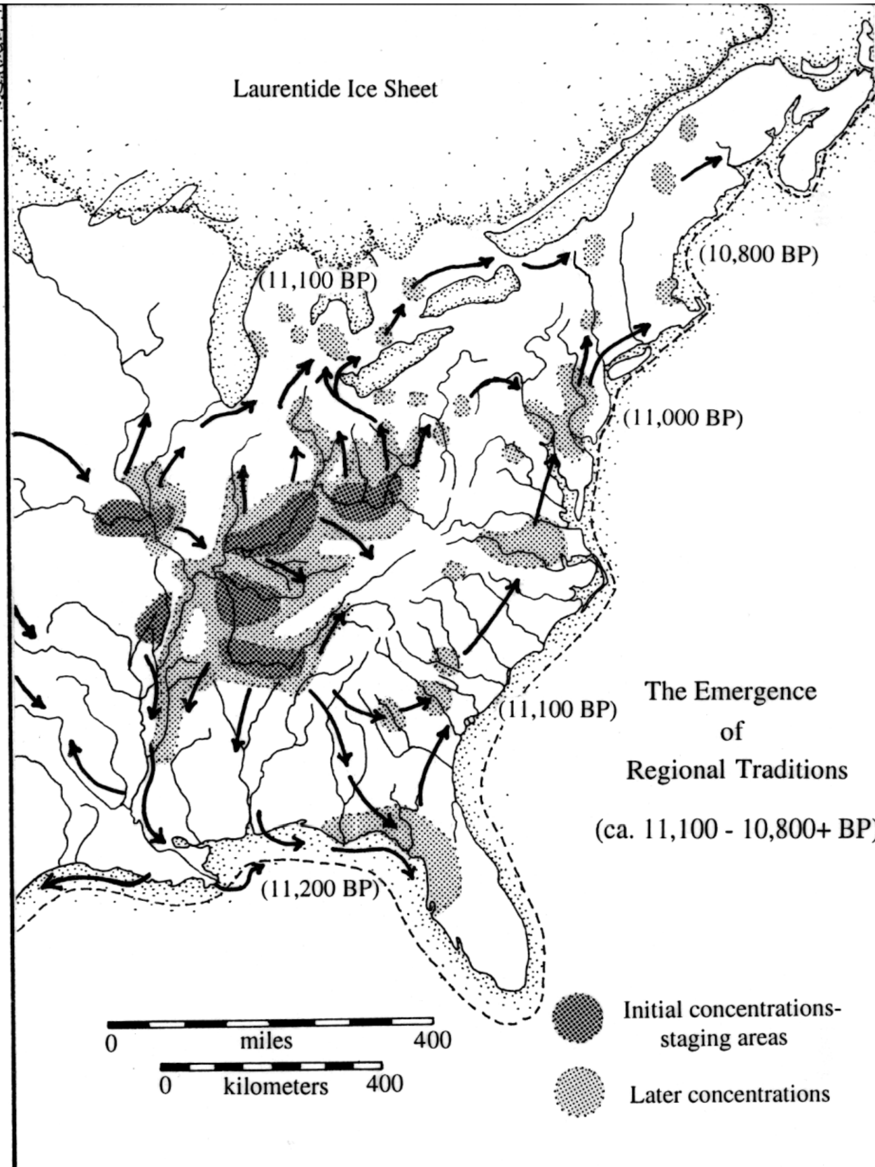
Recorder D.G. Anderson Date June 25, 1986

Attribute Recording form

Clovis points and early stage preforms

Images courtesy of Carl Yahnig Collection and Pete Bostrom, Lithic Casting Lab., and the Society for Georgia Archaeology Paleoindian Recording Project.

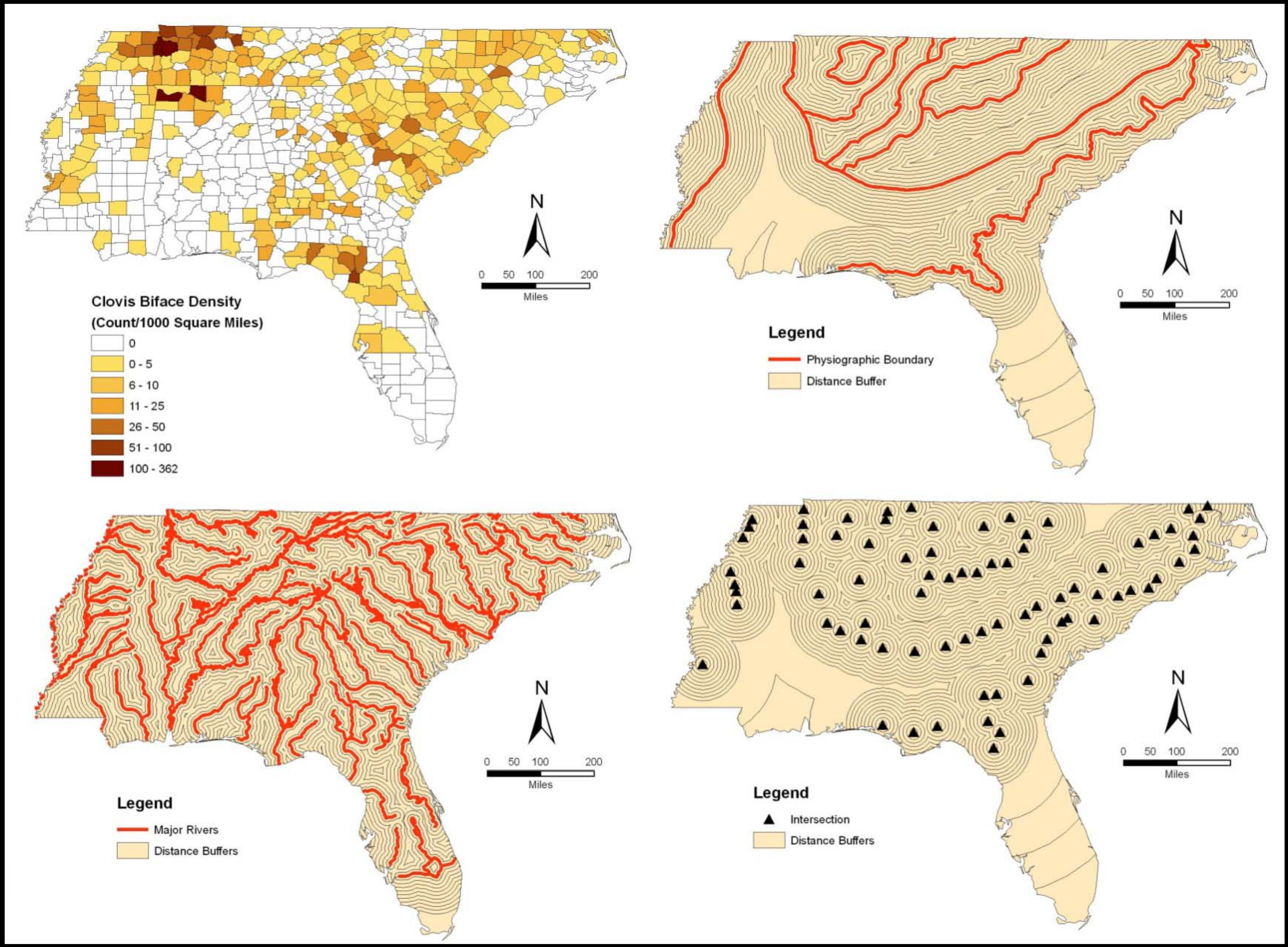




The settlement of the larger region (or radiation of fluting technology) from 'staging' areas.

Anderson, David G.
1990 The Paleoindian Colonization of Eastern North America: A View from the Southeastern United States. In Early Paleoindian Economies of Eastern North America, edited by Kenneth Tankersley and Barry Isaac, pp. 163–216. Research in Economic Anthropology Supplement 5.

Miller-Smallwood Paleoindian Aggregation Model



Large Clovis sites occur at the intersection of major rivers, macro-ecotones, and sources of toolstone.

Image courtesy of D. Shane Miller and Ashley Smallwood.

Carson-Conn-Short.
Tennessee

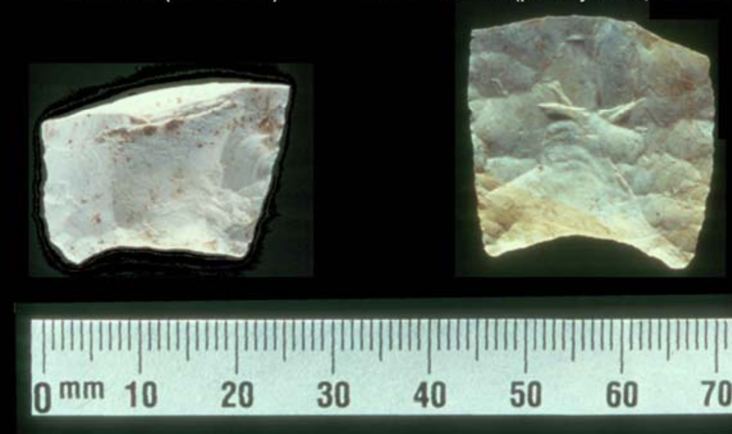
Images courtesy:
John Broster and Mark Norton

The Topper Clovis Excavation
Allendale County, South Carolina

Large Clovis Preform Refit (Side A)

Clovis Base (found in situ)

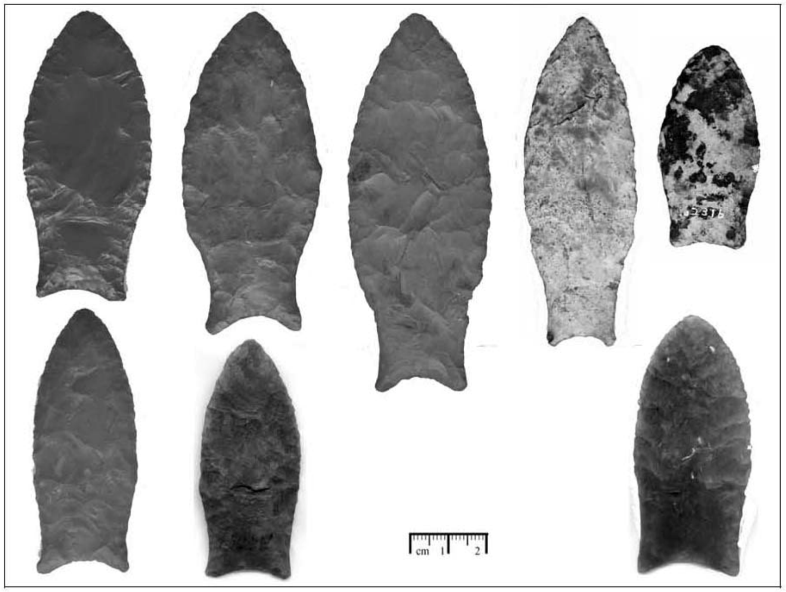
Paleo Point Base (possibly Clovis, found in situ)

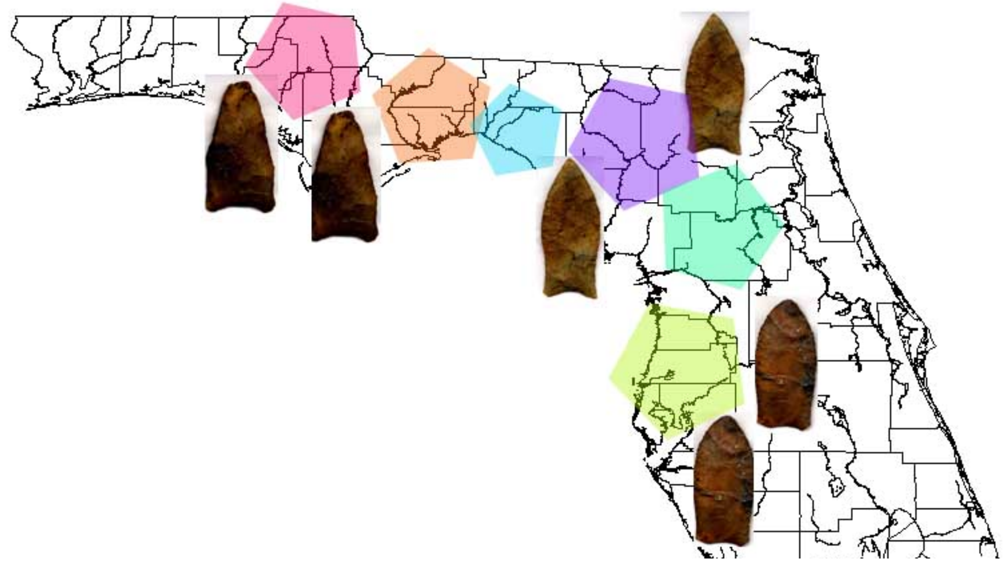


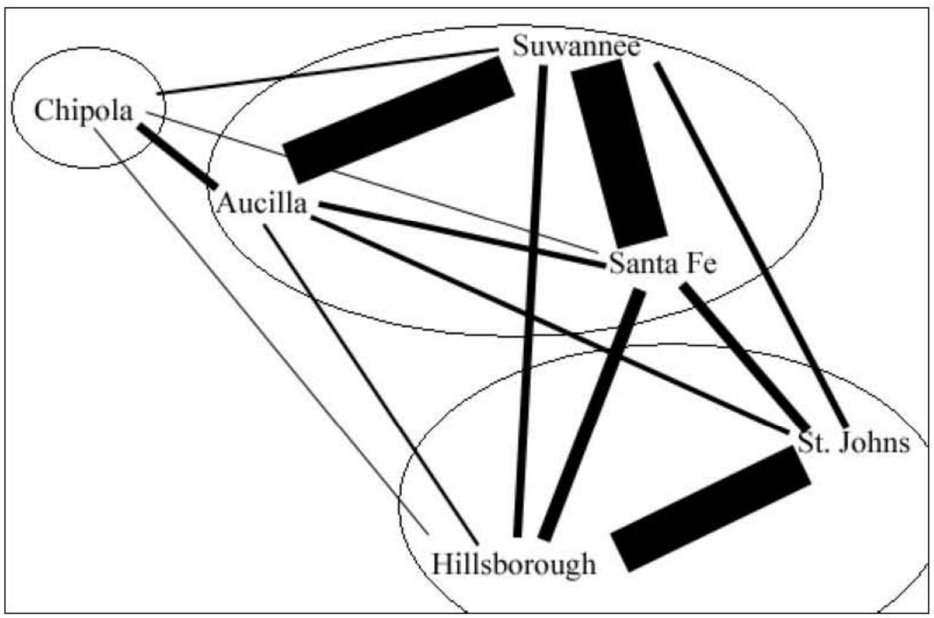
Images courtesy: Albert C. Goodyear and http://www.allendale-expedition.net/

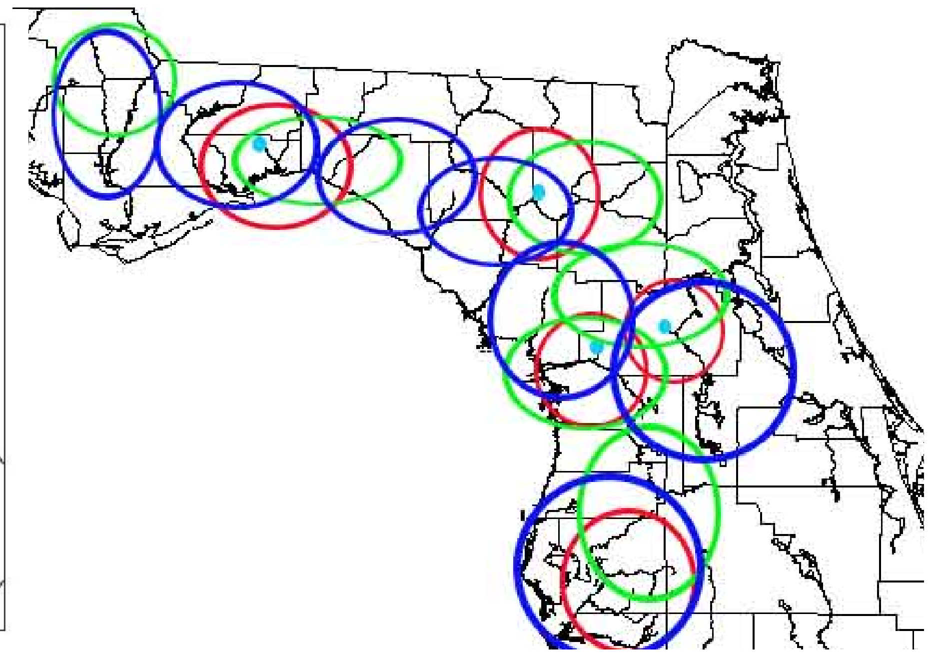
Morphological Variability in Florida Paleoindian Point

Images courtesy David K. Thulman (PhD FSU 2006)







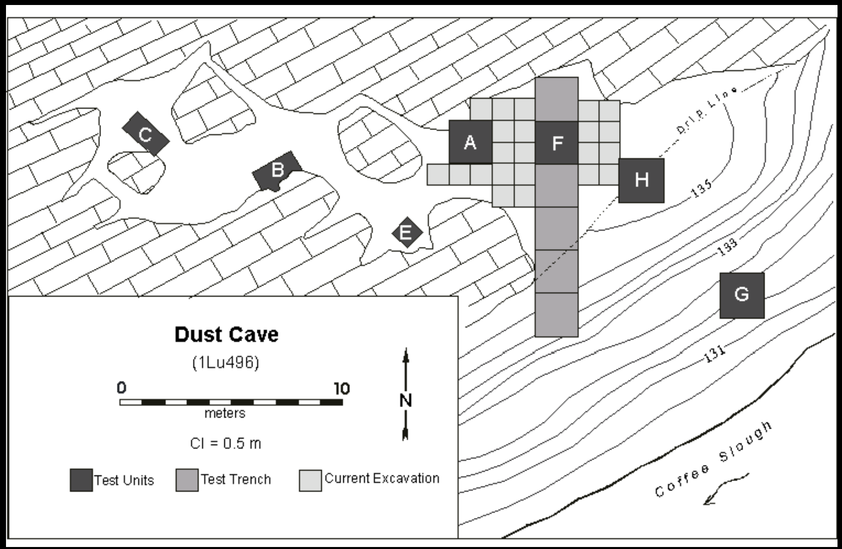


Critical Needs:

What Happened in the Terminal Pleistocene/Early Holocene

May Help Us Understand Much Earlier Occupations!

Dust Cave, Alabama



Micromorphology:
reworked hearth material
(charcoal, burned clay soil
pellets and some ash).

Images and text (modified somewhat) courtesy Renee Walker, Boyce Driskell, Paul Goldberg, and Sarah Sherwood www2.env.uea.ac.uk/gmmc/soilmcro/micmonth.html; http://www.alabamaheritage.com/images/issueimages/65/65dustcave1.jpg

Late Paleoindian/Early Archaic Settlement Models

The Band-Macroband, Uwharrie-Allendale, and Dust Cave Models

Probably useful for earlier Paleoindian and PreClovis as well

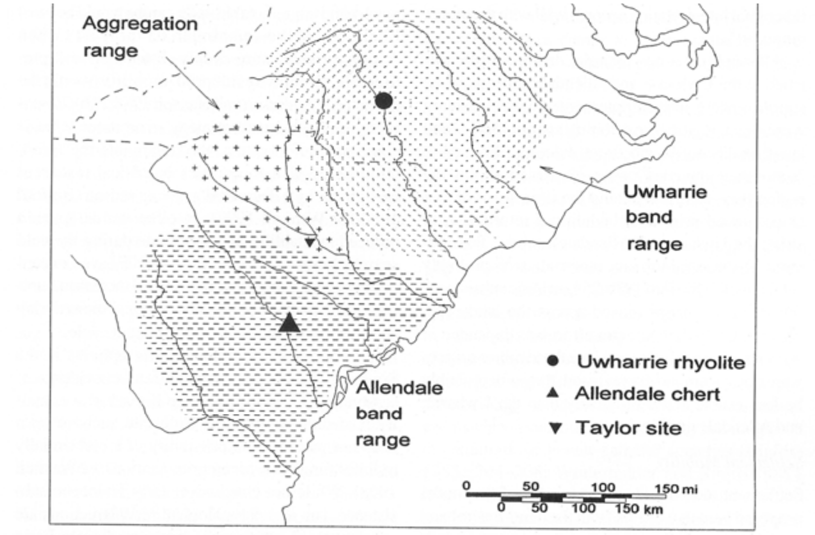
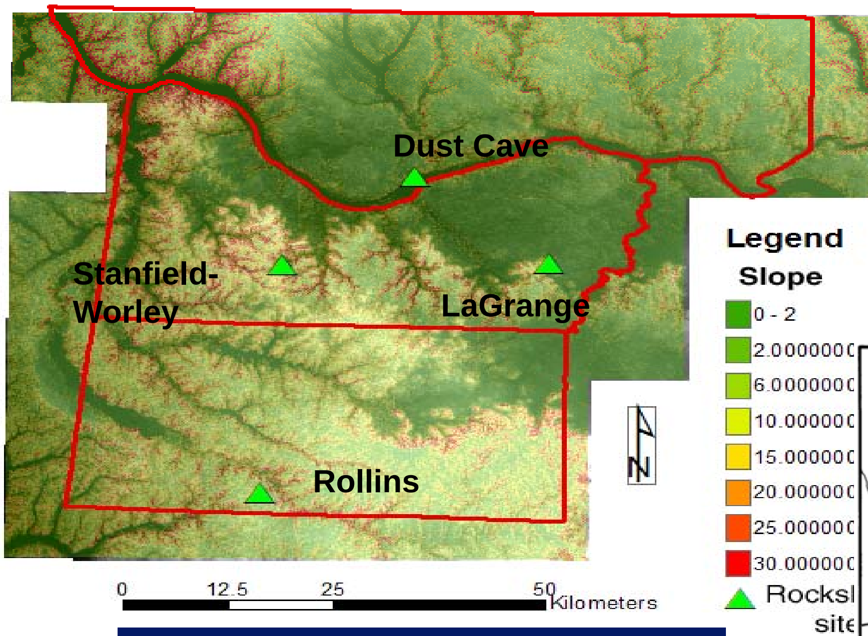
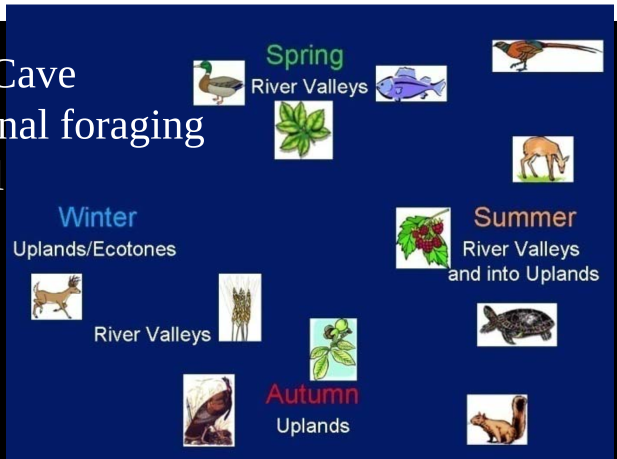
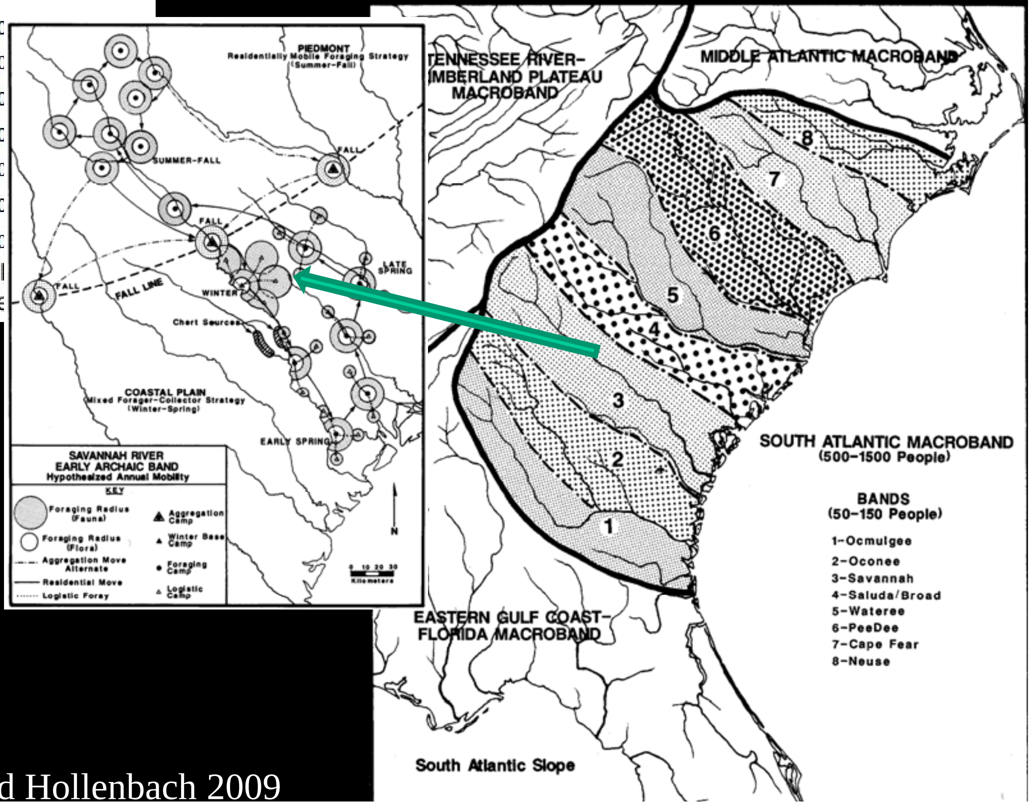


Figure 7. The Uwharrie-Allendale settlement ranges. From *Hardaway Revisited: Early Archaic Settlement in the Southeast* by I. Randolph Daniel, Jr. (1998, University of Alabama Press). Used by permission.

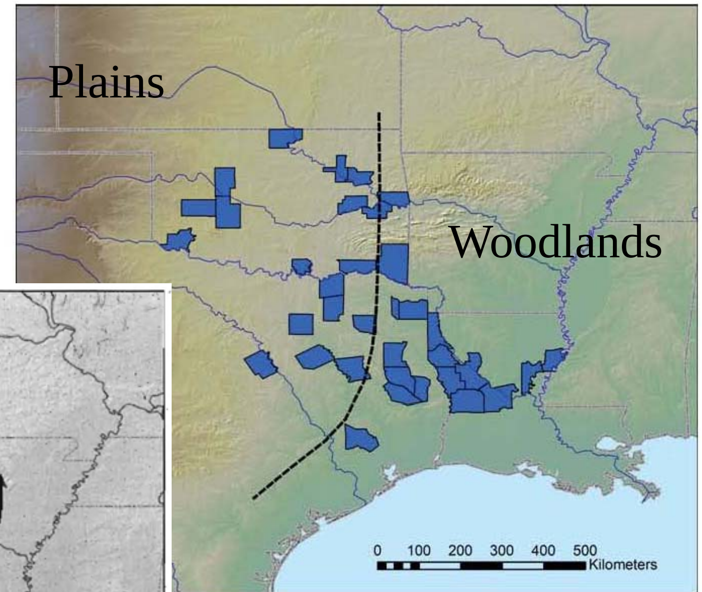


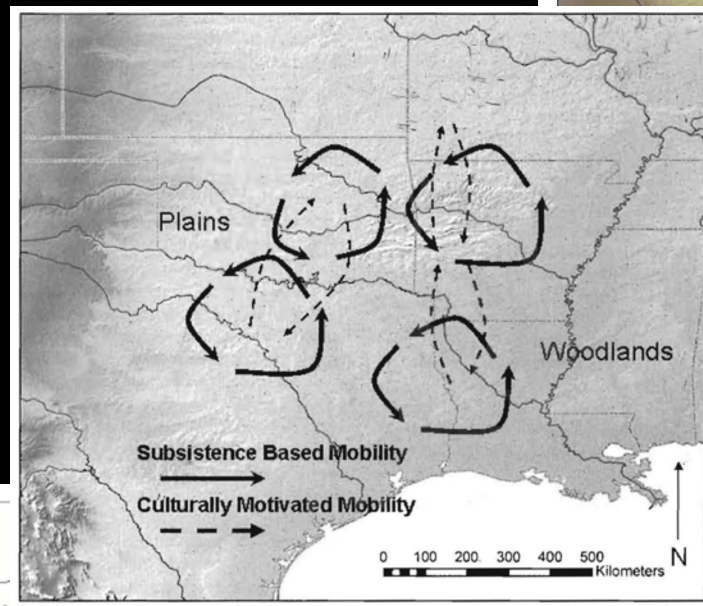


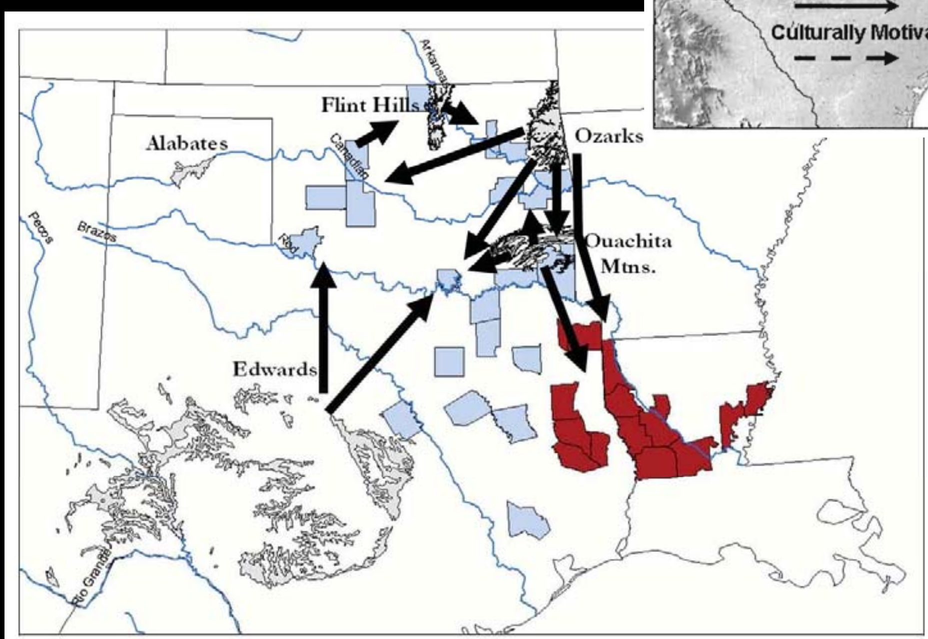
Dust Cave Seasonal foraging model



Images from Anderson and Hanson 1988, Daniel 1998, and Hollenbach 2009







San Patrice Settlement: A Useful Model of Early Plains—Eastern Woodlands Interaction

Images courtesy Tom Jennings (from Jennings 2007:554)

Critical Needs:

Where are the Women and Children?

Were all stone tools made by men?

Almost certainly not!

What about perishables like wood, bone and fiber?

Critical Needs:

More Primary Data Collection and Analysis

Sinclair Site, West Tennessee
July 2009

Sinclair Site, West Tennessee July 2009

Contributions from the Avocational Archaeological Community

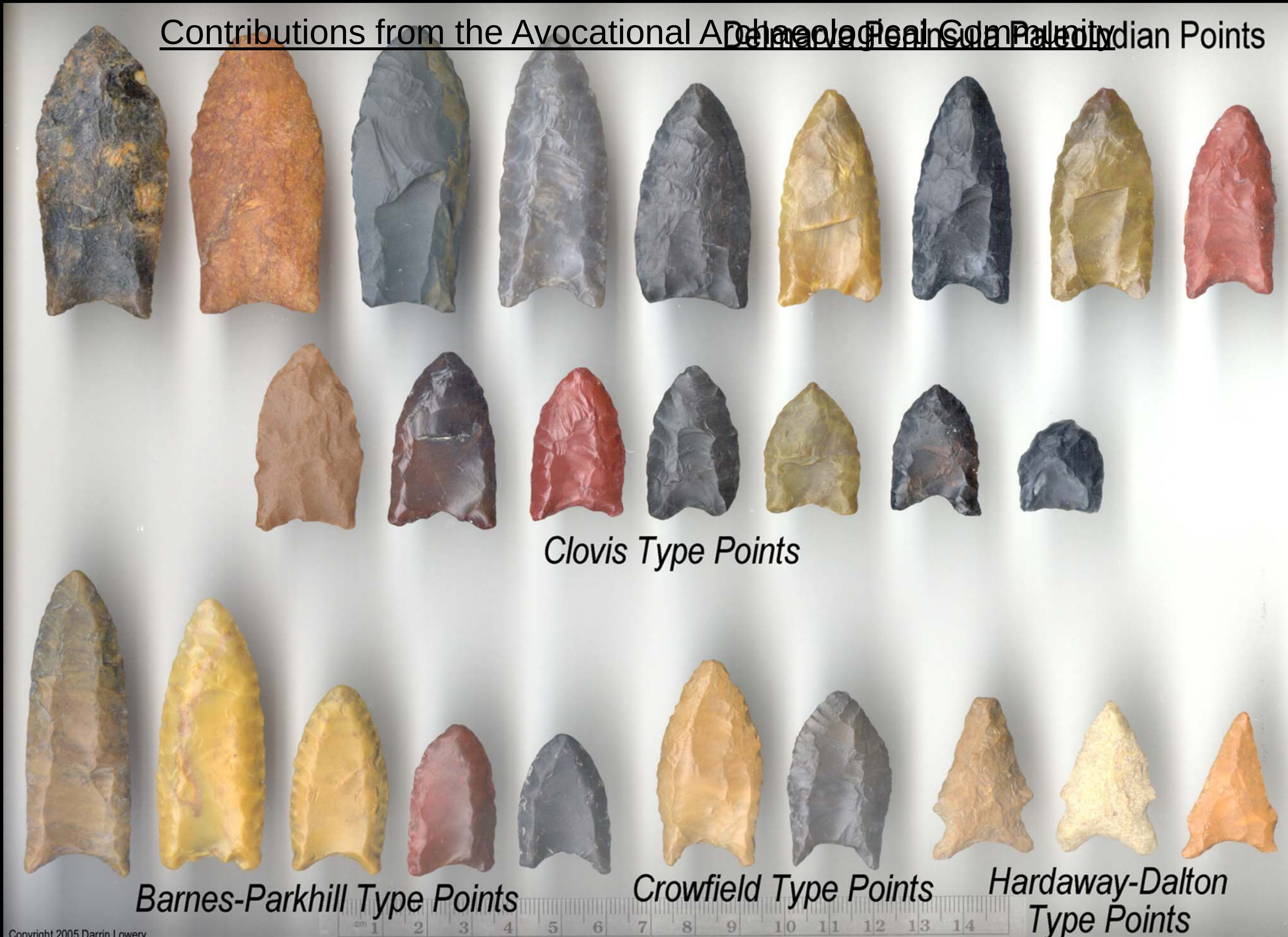
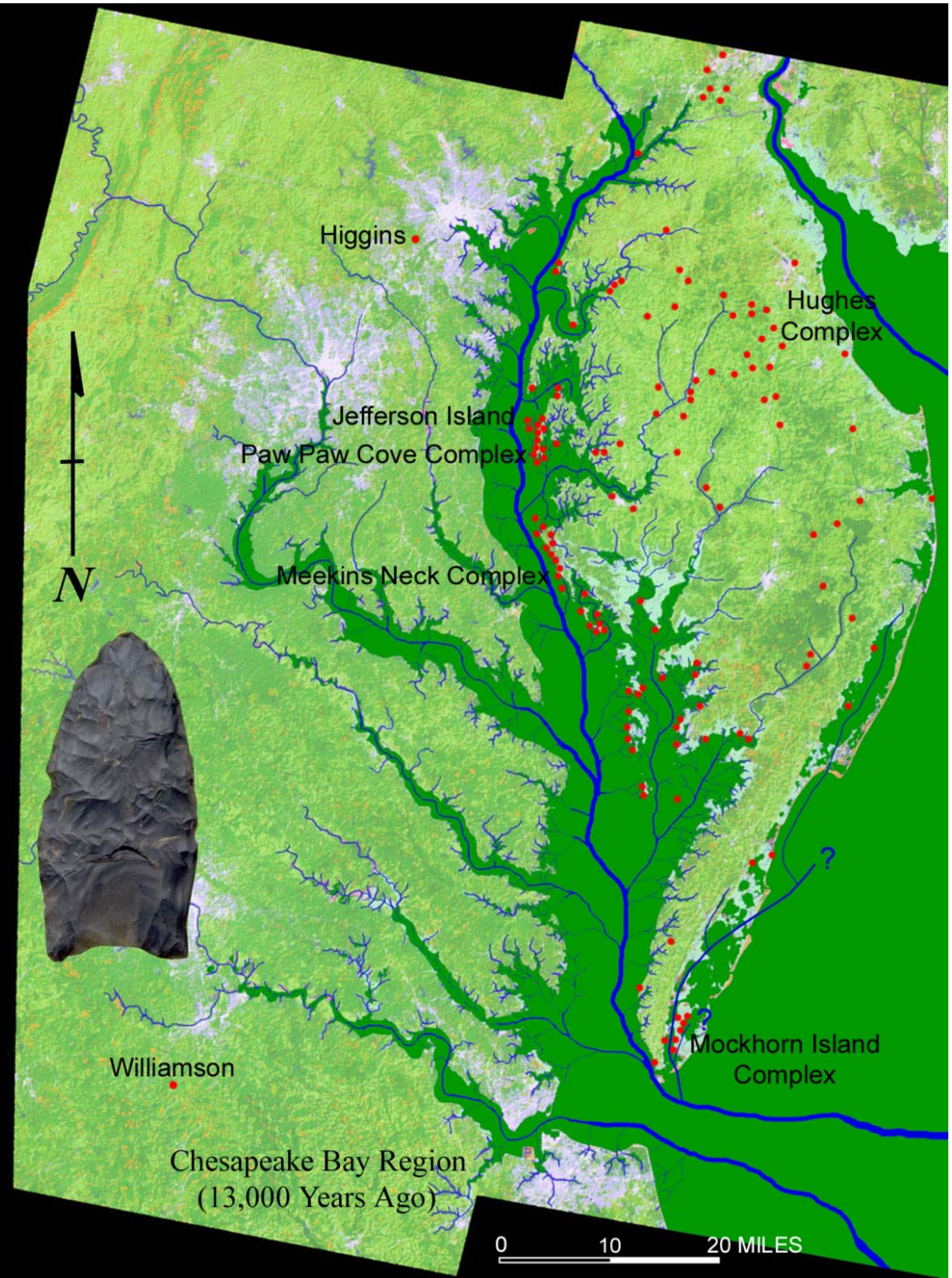


Image courtesy Darrin L. Lowery

Isolated Fluted Point Findspots and Regionally Significant Paleoindian Sites

Delmarva Peninsula Paleoindian Site Inventory

-Over 100 Site Locations



Site Data Generated by the Avocational Community and Focused Research

Image courtesy Darrin L. Lowery

Many people are compiling Paleoindian site and artifact data at progressively larger geographic scales.

(Photograph courtesy: Tommy Charles, South Carolina Institute of Archaeology and Anthropology)

Specimen # 1

GEORGIA PALEOINDIAN RECORDATION PROJECTS
FLUTED AND LANCEOLATE POINT DATA SHEET

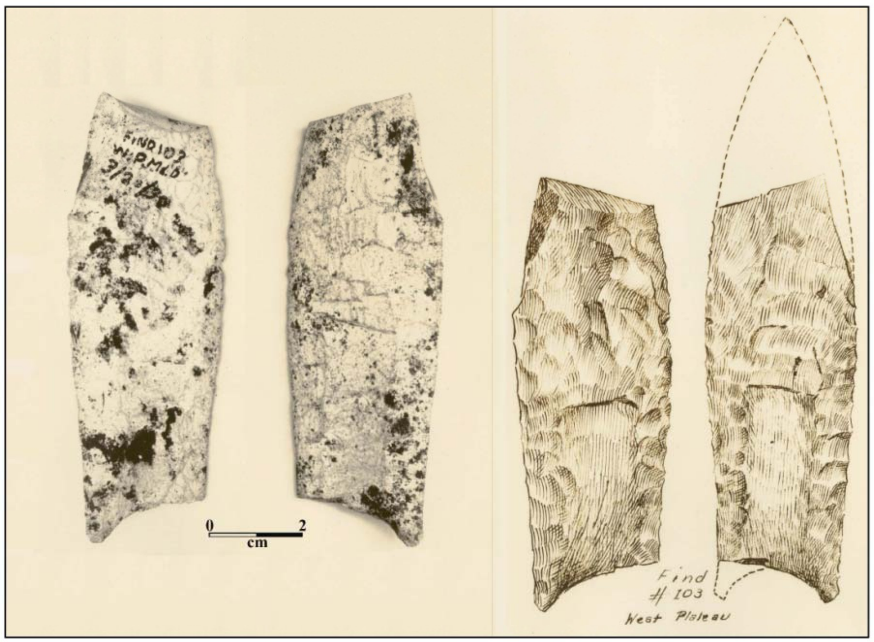
Owner Name NPS Type Name Clovis Institutional Number ______

County Bibb Negative Number ______

Location of Site of Find Macon Plateau (Ocmulgee National Monument)

METRIC ATTRIBUTES (mm)		NON-METRIC ATTRIBUTES	
Maximum Length	91 mm	Raw Material	Costal Plain chert
Estimated Complete Length	115 mm	Color	white
Maximum Width	30 mm	Patination	heavy
Basal Width	25 mm	Edge Shape	straight
Maximum Thickness	N/A	Edge Retouch	fine serrations
Depth of Basal Concavity	5 mm	Facial Retouch	present
Length of Fluting: Obverse	40 mm	Basal Grinding	single long flute
or Basal Thinning Reverse	37 mm	Fluting Technique	
Length of Edge Grinding: (L)	N/A	Manufacturing Technique	
(by side) (R)	N/A		
Other		Reworking	

Remarks: References: Kelly 1938; Anderson et al 1990:Figure 17a, also A.R. Kelly n.d. Discovery of a Folsom Projectile Pint at Macon, Georgia (UGA Manuscript 428). Illustrations from UGA Macon Plateau photo files



Recorder D.G. Anderson Date June 25, 1986

Specimen # 2

GEORGIA PALEOINDIAN RECORDATION PROJECTS
FLUTED AND LANCEOLATE POINT DATA SHEET

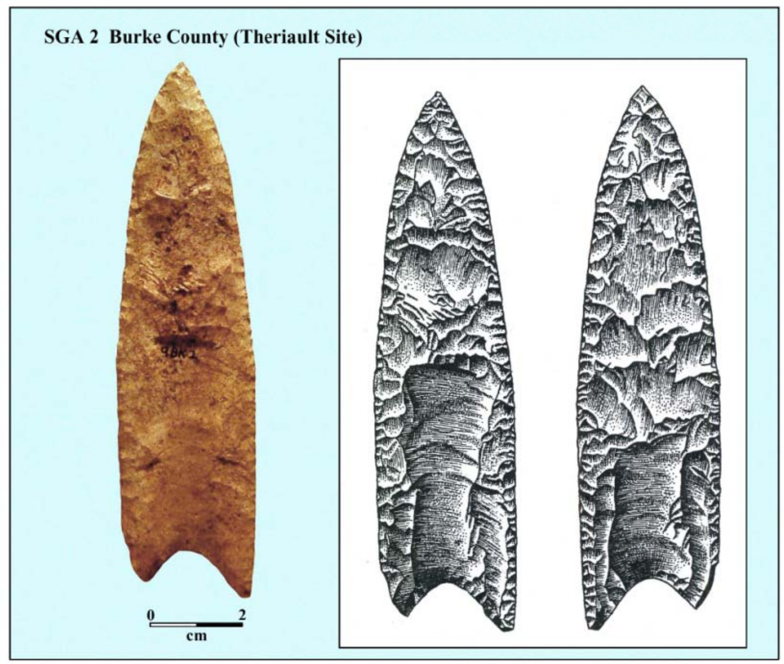
Owner Name U.S.C. Ins. of Arch. Type Name Clovis Institutional Number ______

County Burke Negative Number ______

Location of Site of Find 9BK2 (formerly 9BUR-2), The Theriault Site, Burke County, Georgia. Brier Creek

METRIC ATTRIBUTES (mm)		NON-METRIC ATTRIBUTES	
Maximum Length	118 mm	Raw Material	Coastal Plain chert
Estimated Complete Length		Color	yellow-tan, mottled with small tan and cream specks throughout
Maximum Width	30.4 mm		
Basal Width	29.3 mm in front of break	Patination	moderate
Maximum Thickness	7.8 mm	Edge Shape	straight side, convex blade
Depth of Basal Concavity	11.2 mm	Edge Retouch	yes
Length of Fluting: Obverse	47.2 mm	Facial Retouch	slight
or Basal Thinning Reverse	30.4 mm	Basal Grinding	yes
Length of Edge Grinding: (L)	39.2 mm to break	Fluting Technique	single flake removed both sides
(by side) (R)	52.4 mm	Manufacturing Technique	pressure retouch
Other		Reworking	appears resharpened at least once.

Remarks: One of the best paleo point I have seen in this area. Chert of good quality. Slight break on left lateral edge at proximal end (DGA). Excavated by Dr. Edwards students, (U.S.C.) in summer of1969 at depth of 30-34 inches, just above sterile clay matrix. Reference: Brockington 1971 (Preliminary Investigation of an Early Knapping Site in Southeastern Georgia, *Notebook* III page 34. Drawing by Darby Erd used courtesy of the Southeastern Paleoamerican Survey (SCIAA)



Recorder D.G. Anderson Date June 25, 1986

THE IMPORTANCE OF DEVELOPING AND INTEGRATING LARGE DATASETS…

A CHALLENGE FOR THE 21st CENTURY

nature
www.nature.com/nature
Vol 461 | Issue no. 7261 | 10 September 2009

Data's shameful neglect

Research cannot flourish if data are not preserved and made accessible. All concerned must act accordingly.

More and more often these days, a research project's success is measured not just by the publications it produces, but also by the data it makes available to the wider community. Pioneering archives such as GenBank have demonstrated just how powerful such legacy data sets can be for generating new discoveries — especially when data are combined from many laboratories and analysed in ways that the original researchers could not have anticipated.

All but a handful of disciplines still lack the technical, institutional and cultural frameworks required to support such open data access (see pages 168 and 171) — leading to a scandalous shortfall in the sharing of data by researchers (see page 160). This deficiency urgently needs to be addressed by funders, universities and the researchers themselves.

Research funding agencies need to recognize that preservation of and access to digital data are central to their mission, and need to be supported accordingly. Organizations in the United Kingdom, for instance, have made a good start. The Joint Information Systems Committee, established by the seven UK research councils in 1993, has made data-sharing a priority, and has helped to establish a Digital Curation Centre, headquartered at the University of Edinburgh, to be a national focus for research and development into data issues. Other European agencies have also pursued initiatives.

The United States, by contrast, is playing catch-up. Since 2005, a 29-member Interagency Working Group on Digital Data has been trying to get US funding agencies to develop plans for how they will support data archiving — and just as importantly, to develop policies on what data should and should not be preserved, and what exceptions should be made for reasons such as patient privacy. Some agencies have taken the lead in doing so; many more are hanging back. They should all being moving forwards vigorously.

What is more, funding agencies and researchers alike must ensure that they support not only the hardware needed to store the data, but also the software that will help investigators to do this. One important facet is metadata management software: tools that streamline the tedious process of annotating data with a description of what the bits mean, which instrument collected them, which algorithms have been used to process them and so on — information that is essential if other scientists are to reuse the data effectively.

Also necessary, especially in an era when data can be mixed and combined in unanticipated ways, is software that can keep track of which pieces of data came from whom. Such systems are essential if tenure and promotion committees are ever to give credit — as they should — to candidates' track-record of data contribution.

"Data management should be woven into every course in science."

Who should host these data? Agencies and the research community together need to create the digital equivalent of libraries: institutions that can take responsibility for preserving digital data and making them accessible over the long term. The university research libraries themselves are obvious candidates to assume this role. But whoever takes it on, data preservation will require robust, long-term funding. One potentially helpful initiative is the US National Science Foundation's DataNet programme, in which researchers are exploring financial mechanisms such as subscription services and membership fees.

Finally, universities and individual disciplines need to undertake a vigorous programme of education and outreach about data. Consider, for example, that most university science students get a reasonably good grounding in statistics. But their studies rarely include anything about information management — a discipline that encompasses the entire life cycle of data, from how they are acquired and stored to how they are organized, retrieved and maintained over time. That needs to change: data management should be woven into every course in science, as one of the foundations of knowledge. ■

OPINION

Prepublication data sharing

Rapid release of prepublication data has served the field of genomics well. Attendees at a workshop in Toronto recommend extending the practice to other biological data sets.

THE UNIVERSITY of TENNESSEE
Department of Anthropology

PIDBA

OPINION

Post-publication sharing of data and tools

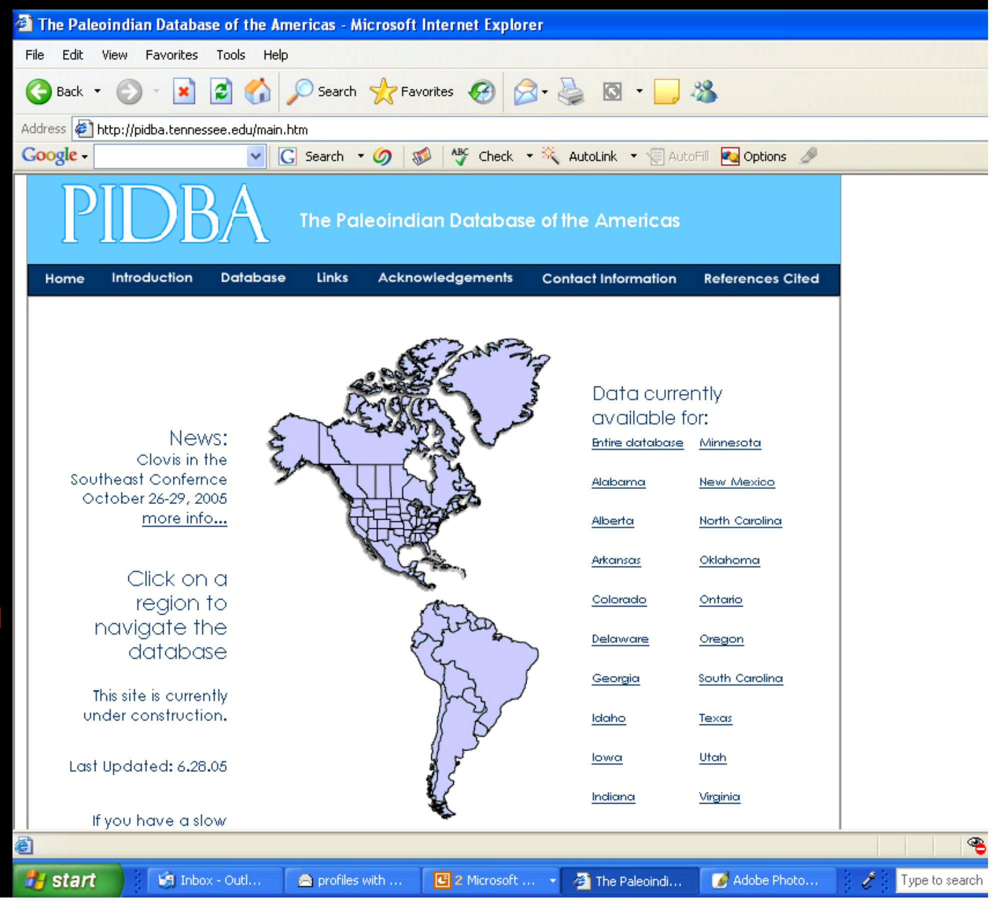
Despite existing guidelines on access to data and bioresources, good practice is not widespread. A meeting of mouse researchers in Rome proposes ways to promote a culture of sharing.

Paleoindian Database of the Americas

Primary Data Is Available Online at:

http://pidba.tennessee.edu/main.htm

THE UNIVERSITY of TENNESSEE UT
Department of Anthropology
PIDBA



http://pidba.tennessee.edu/main.htm

It Takes Collaboration… thanks for the help!

We wish to thank the many individuals at the state and local levels who have sent us primary data down through the years: Daniel S. Amick, Derek Anderson, Tyler Bastian, Jonathan E. Bowen, Mark J. Brooks, David S. Brose, John B. Broster, Tommy Charles, Mark Cole, Leslie B. Davis, R. P. Stephen Davis, B. D. Dillon, James S. Dunbar, Chris Ellis, Jon Erlandson, Metin Eren, James P. Fenton, Eugene Futato, William M. Gardner, J. Christopher Gillam, Jason Gillespie, Albert C. Goodyear III, R. Michael Gramly, Robert S. Grumet, Daniel K. Higginbottom, Jack L. Hofman, John D. Holland, Steve Holen, Wm Jack Hranicky, Charles Hubbert, Bruce B. Huckell, Erik Johanson, Michael F. Johnson, Scott Jones, Jack Ives, Richard Kilborn, Howard King, Van King, Brad Koldehoff, R. Jerald Ledbetter, Bradley T. Lepper, Phil LeTourneau, Tom Loebel, Martin Magne, Sam McGahey, David J. Meltzer, Shane Miller, Juliet E. Morrow, Toby Morrow, Dan F. Morse, Mark Norton, Lisa D. O'Steen, Olaf Prufer, Philip "Duke" Rivet, Don Simmons, Arthur E. Spiess, Eugene Stewart, Kenneth B. Tankersley, Amanda Taylor, Gene L. Titmus, William Topping, Sam Wills, Andy White, Robert G. Whitlam, Ellis Whitt, James C. Woods, Henry T. Wright, and Bryan Wygal. We apologize for anyone we have missed.

1937!

People have been talking about Paleoindian Site and Artifact Distributions for Decades….

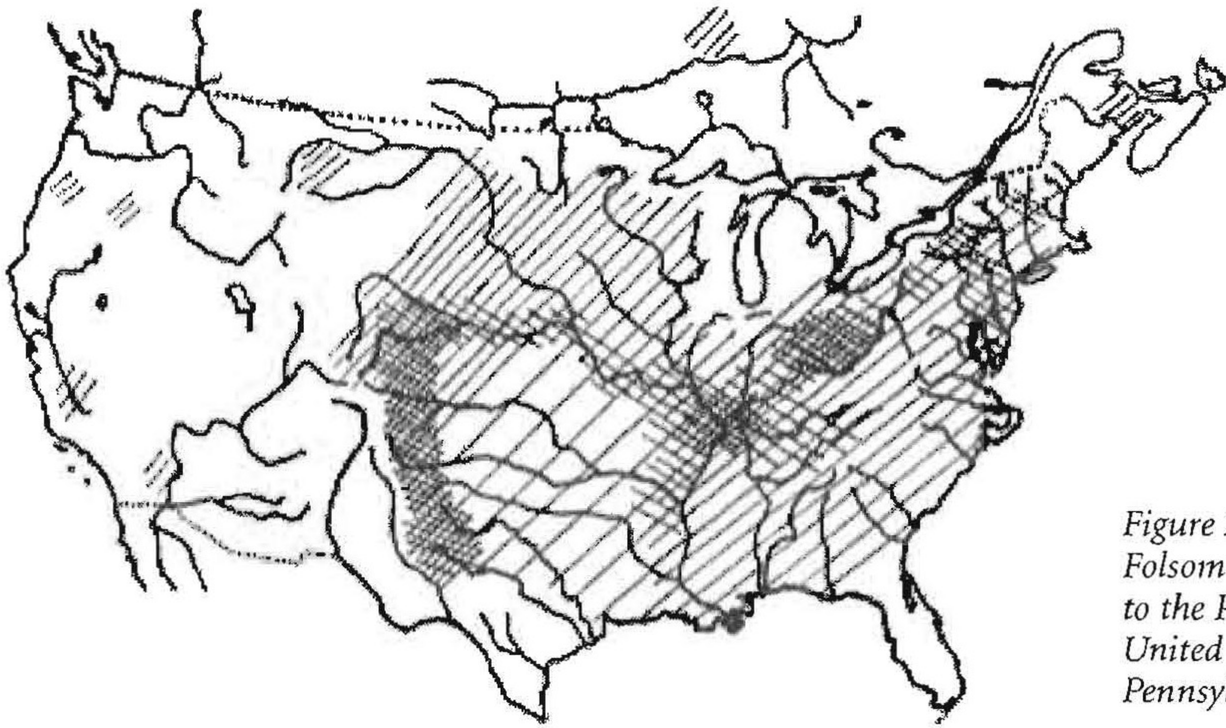
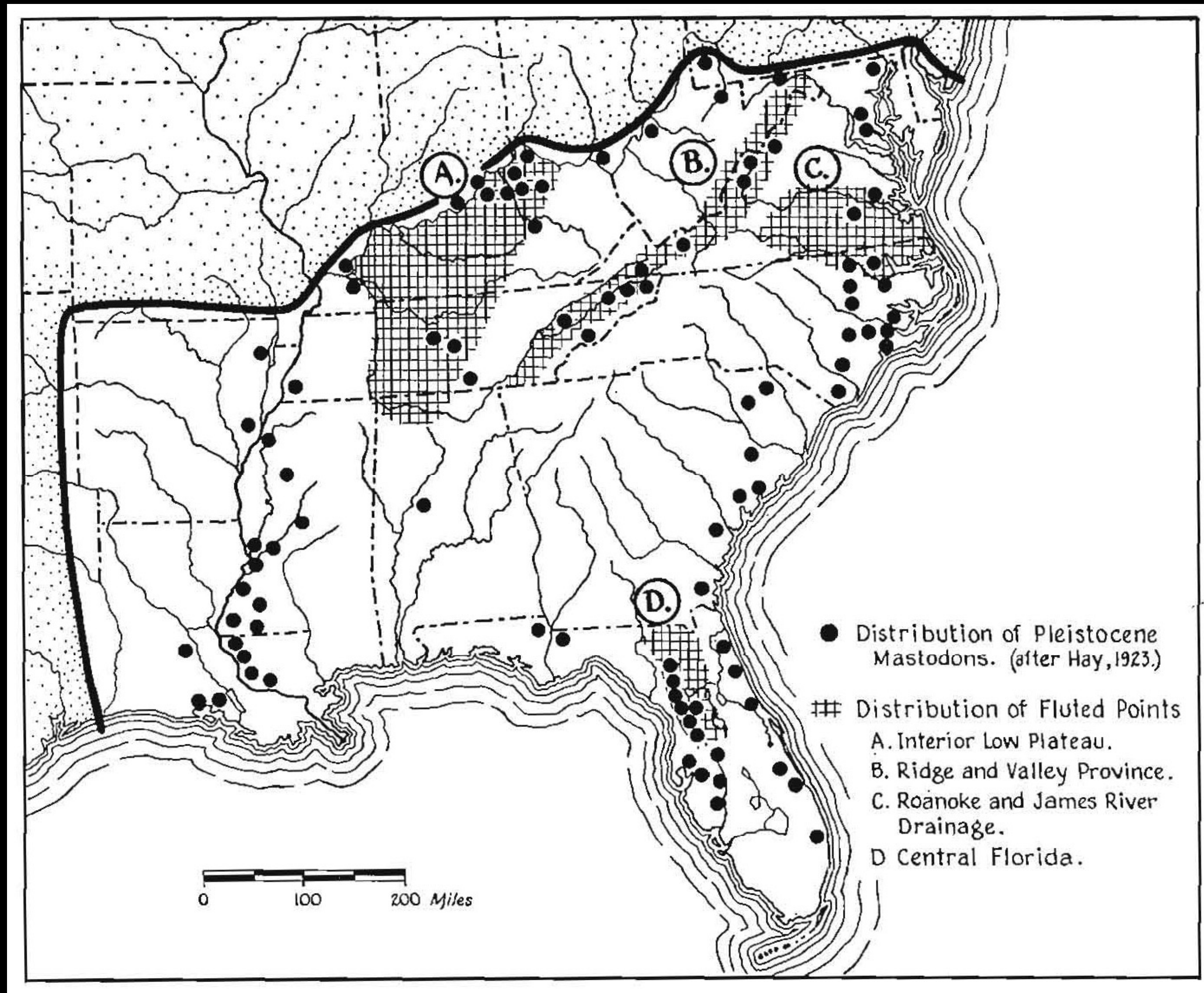


Figure 2. Relative Frequency of Folsom and Folsom-like Artifact Occurrence in Relation to the Principle Drainage Systems of the United States. Courtesy University of Pennsylvania Press.

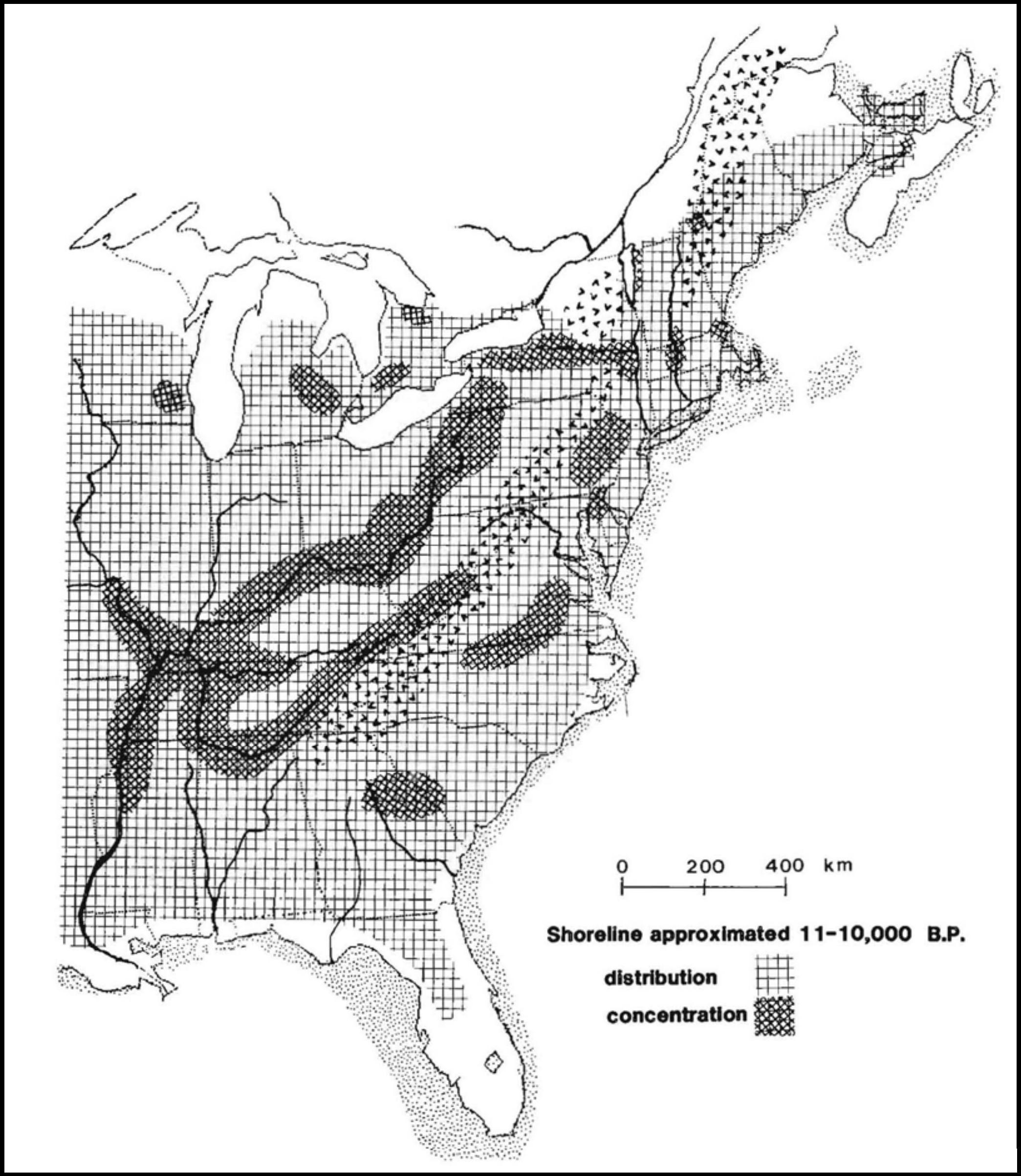
John L. Cotter. 1937. The Significance of Folsom and Yuma Artifact Occurrences in the Light of Typology and Distributions. Publications of the Philadelphia Anthropological Society Volume 1, Twenty-fifth Anniversary Studies, edited by D.S. Davidson, pp. 27-35. University of Pennsylvania Press. Reprinted in 2007 by the Society for American Archaeology, Witness to the Past: The Life and Works of John L. Cotter, edited by Daniel G. Roberts and David G. Orr. Image from page 34.

1965!



Williams, Stephen, and James B. Stoltman. 1965. An Outline of Southeastern United States Prehistory with Particular Emphasis on the Paleoindian Era. In *The Quaternary of the United States*, edited by H. E. Wright and D. G. Frey, pp. 669–83. Princeton University, Princeton, New Jersey. Image from page 677.

1993!



Dincauze, Dena F. 1993. Fluted Points in the Eastern Forests. In *From Kostenki to Clovis: Upper Paleolithic Paleo-Indian Adaptations*, edited by Olga Soffer and N. D. Praslov, pp. 279–92. Plenum, New York. Image from page 282.

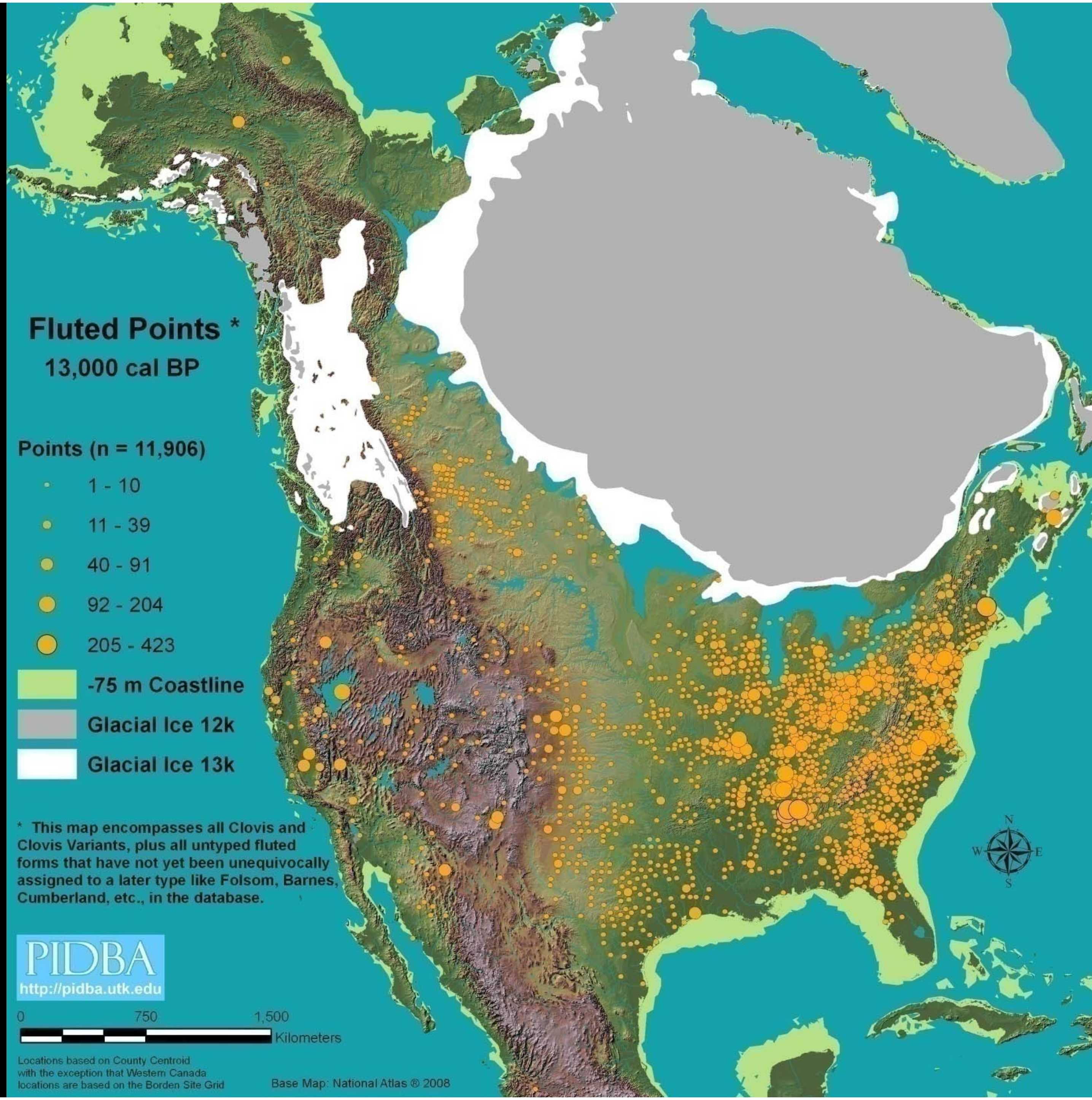
Fluted Points

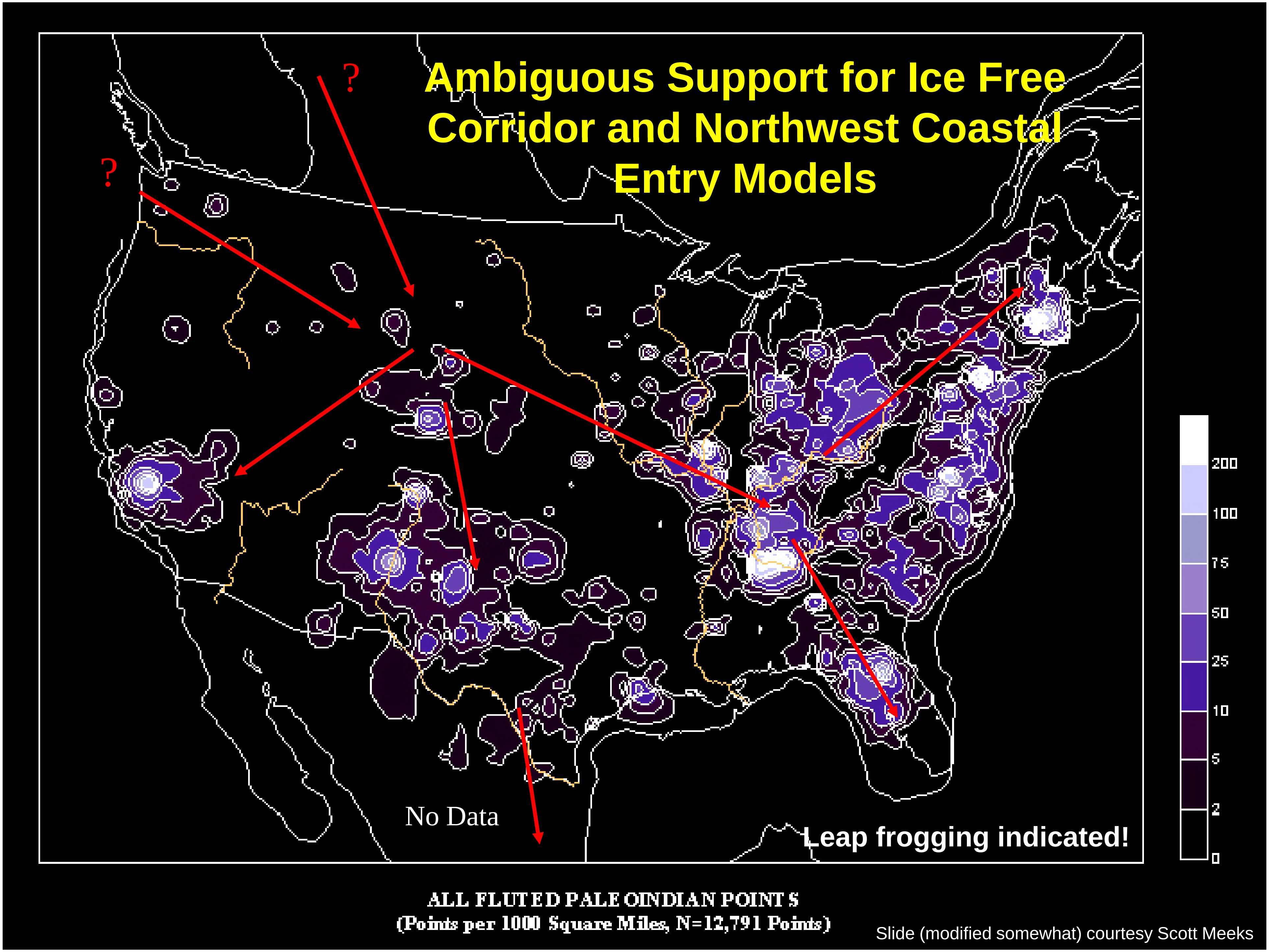
(including Clovis, excluding later fluted types)

13,000 - 12,000 cal BP

n=11,906 points

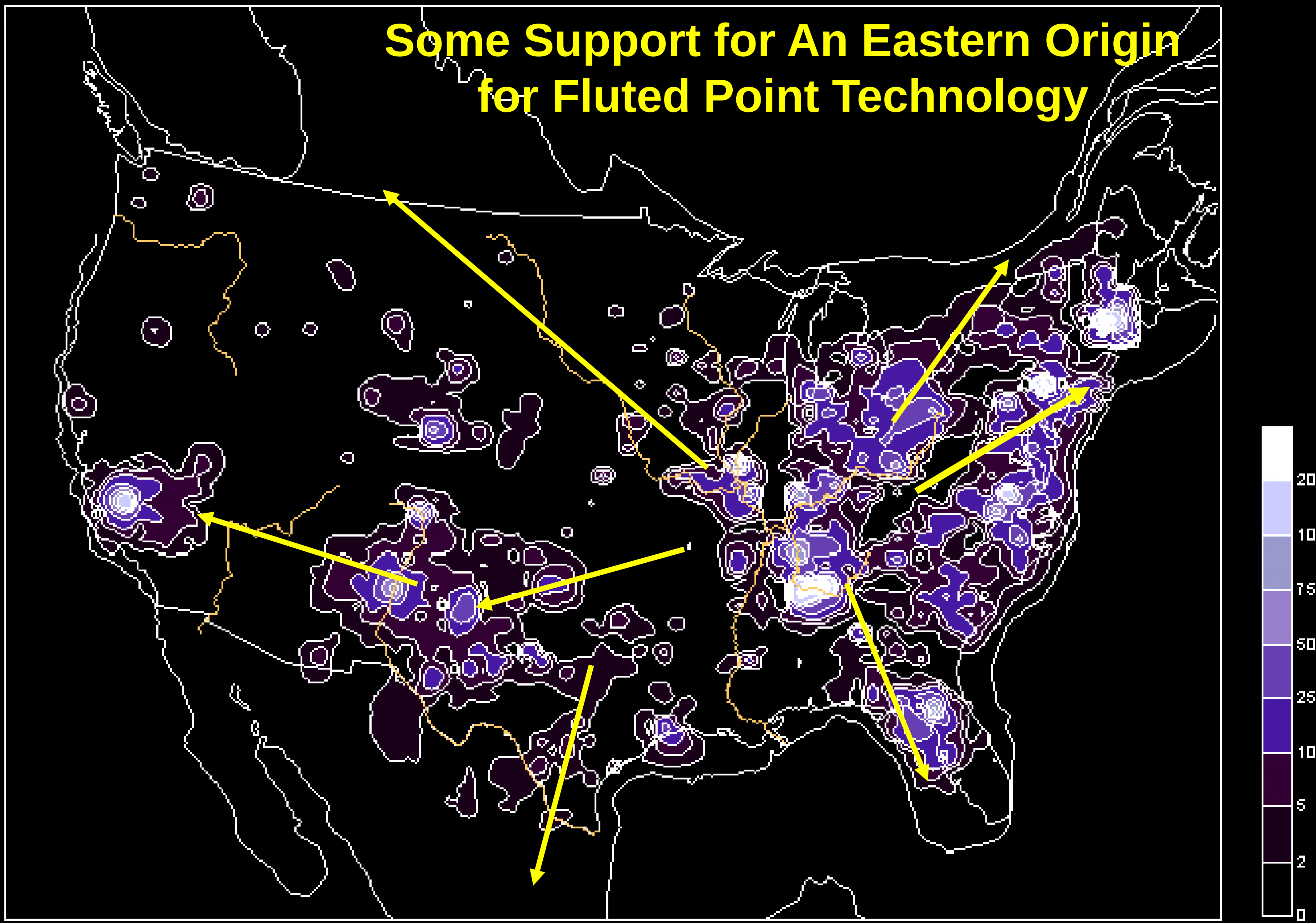
>1500 locations.





Slide (modified somewhat) courtesy Scott Meeks

Some Support for An Eastern Origin for Fluted Point Technology

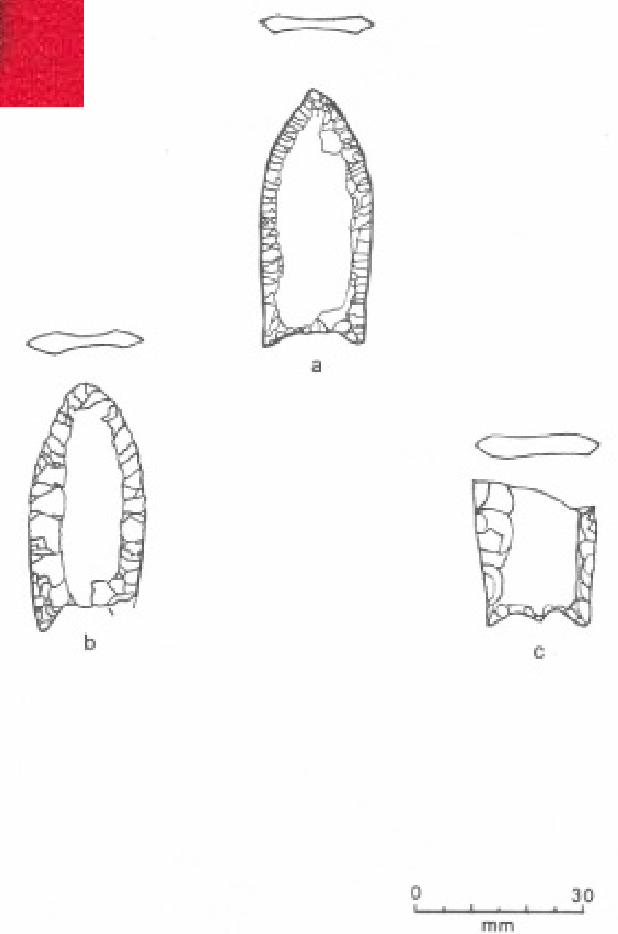


ALL FLUTED PALEOINDIAN POINTS
(Points per 1000 Square Miles, N=12,791 Points)

Slide (modified somewhat) courtesy Scott Meeks

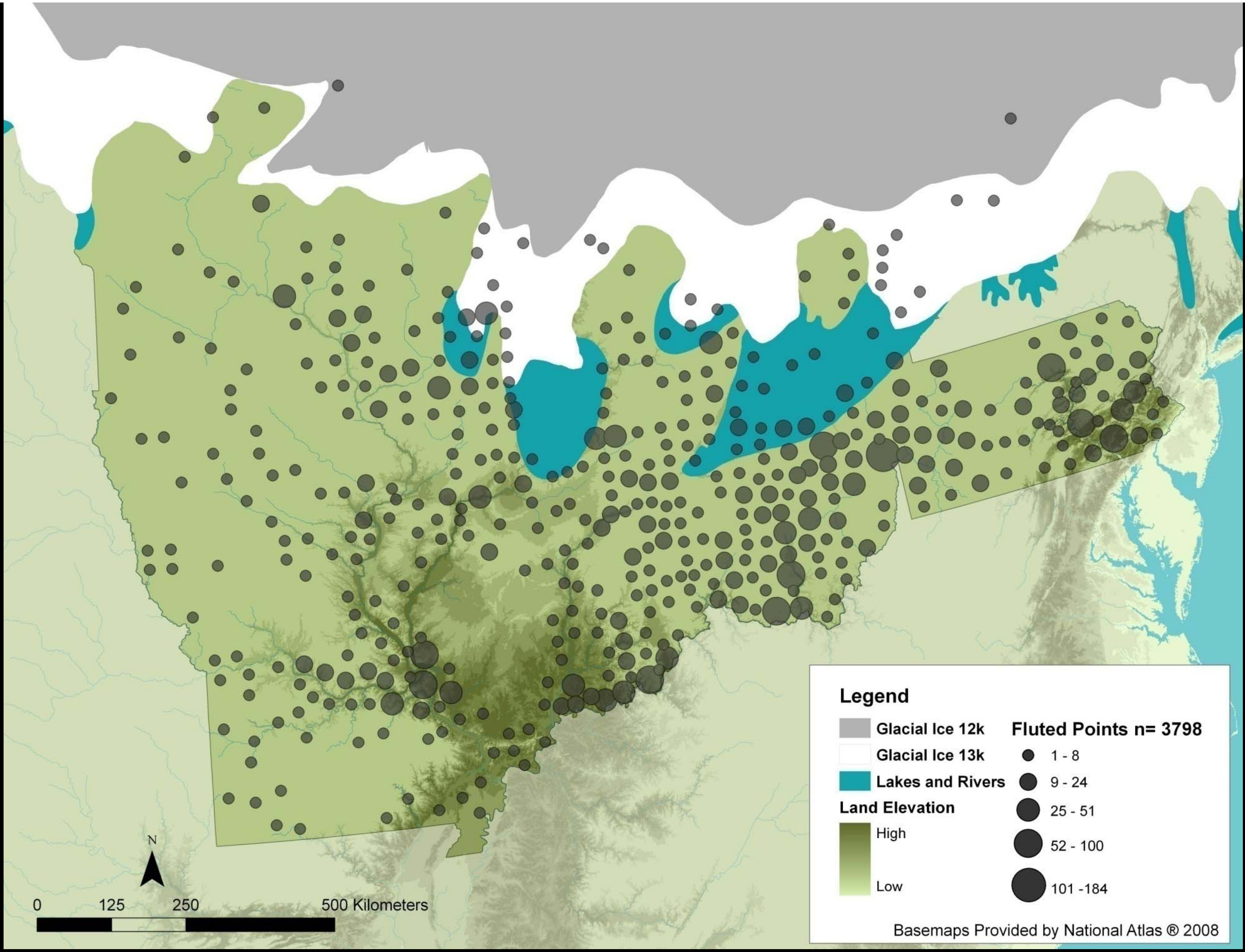
Folsom Cluster

Map 7: Folsom—Distribution and Important Sites

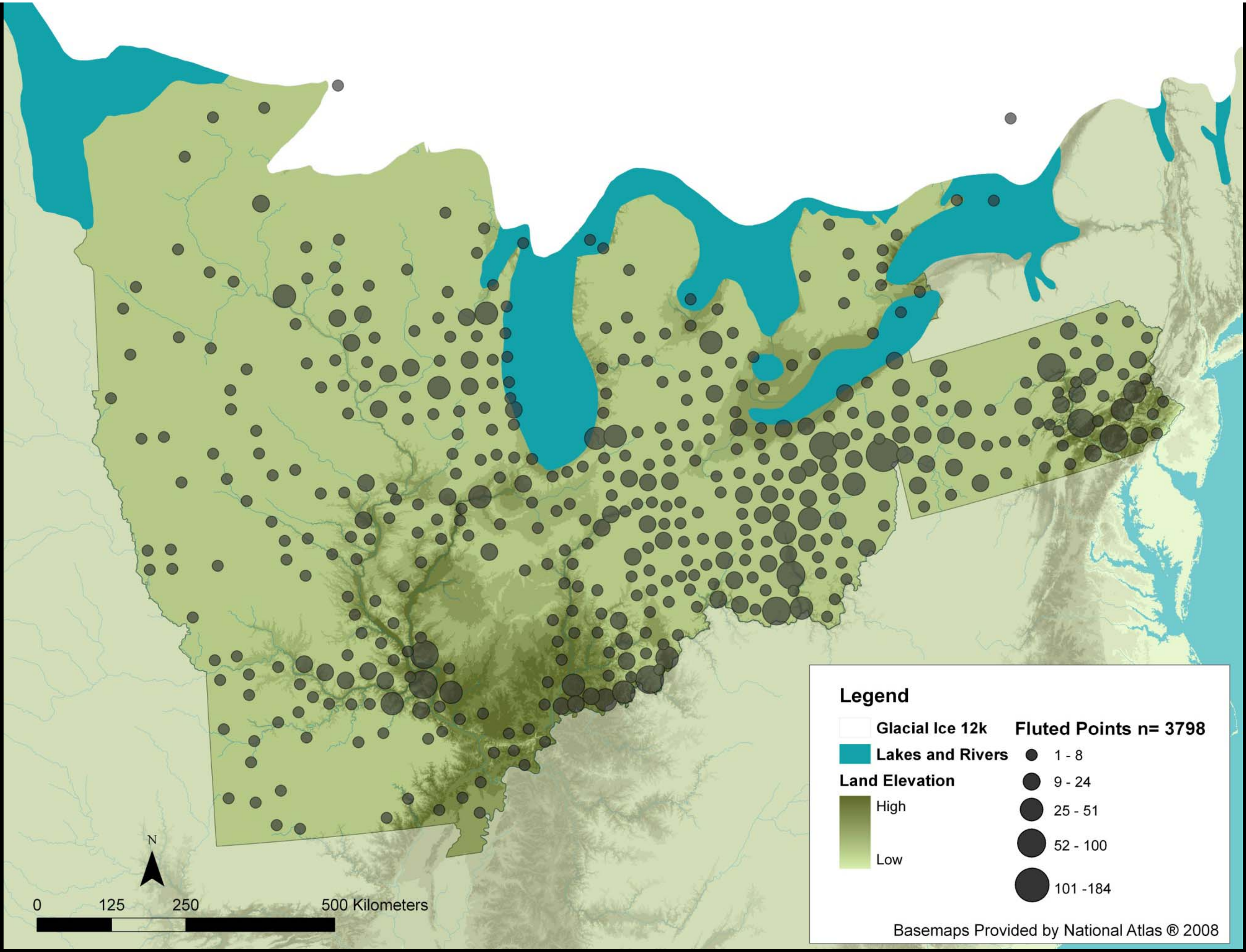


Justice, Noel D.
1987 *Stone Age Spear and Arrow Points of the Midcontinental and Eastern United States*. Bloomington: Indiana University Press. Images from pp. 28, 29, Plate 1.

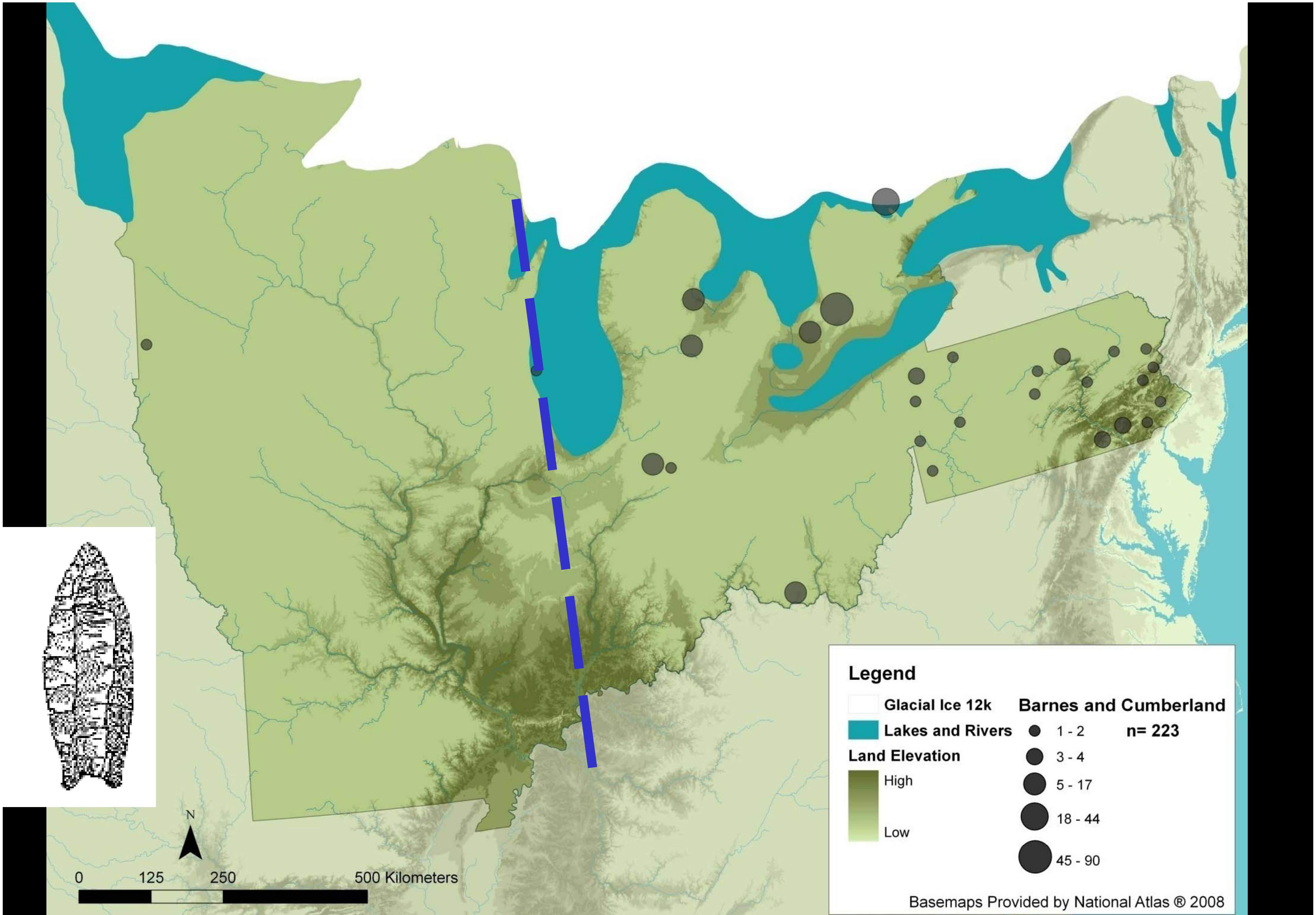
Presumed Post-Clovis, Paleoindian Projectile Point Types: Folsom, Redstone/Cumberland/ Barnes/Holcombe/Vail, and Suwannee/Simpson forms.



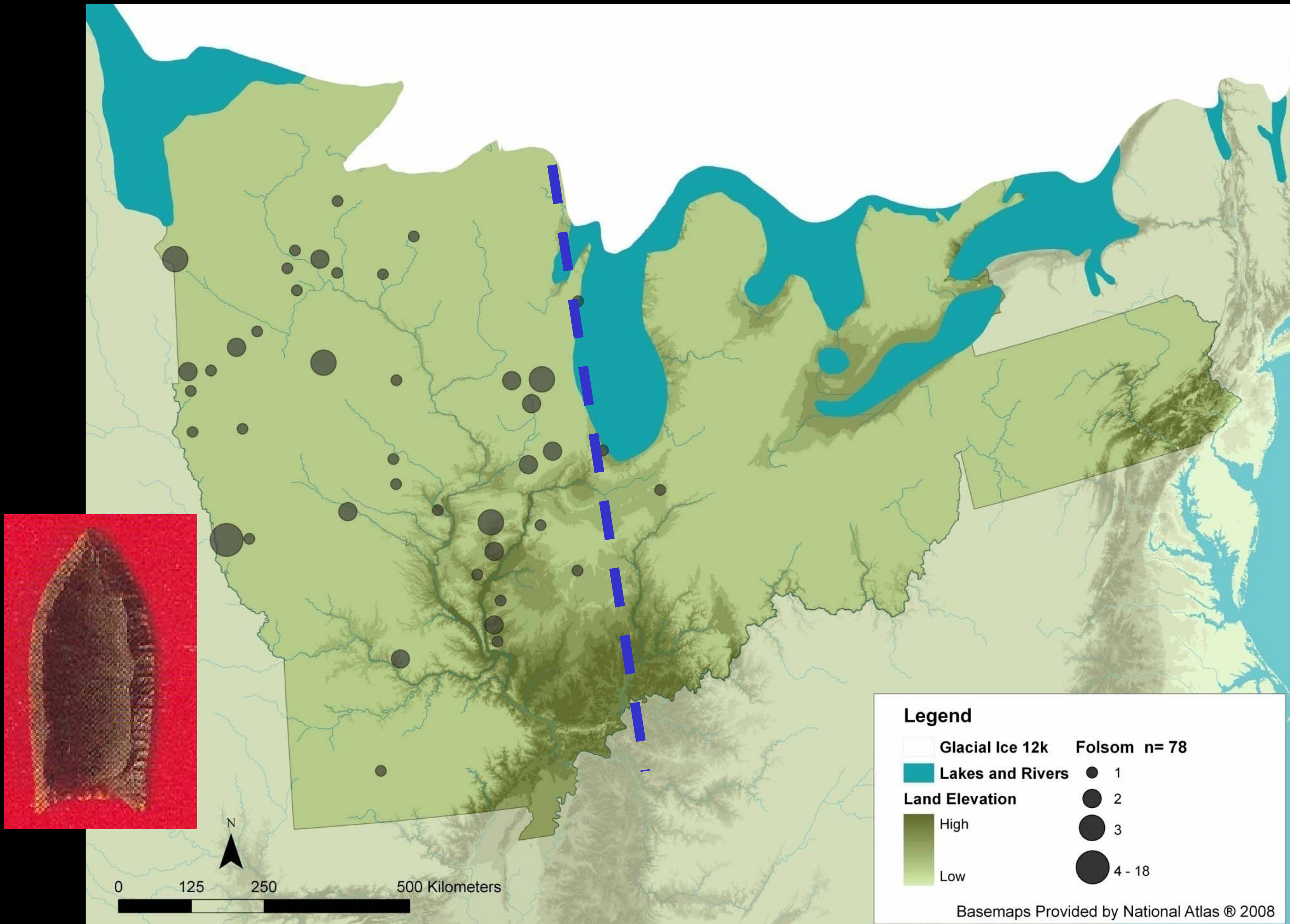
All Fluted Points, Ice and Lakes at 12, 13 k cal yr BP



All Fluted Points, Ice and Lakes at 12,000 cal yr BP



Barnes and Cumberland Points, Ice and Lakes at 12,000 cal yr BP



Folsom Points, Ice and Lakes at 12,000 cal yr BP

Critical Needs:

More
Stratified Sites!

Ice House Bottom, TN

http://mcclungmuseum.utk.edu/pe[illegible]n t/native/images/ara-iceh.jpg

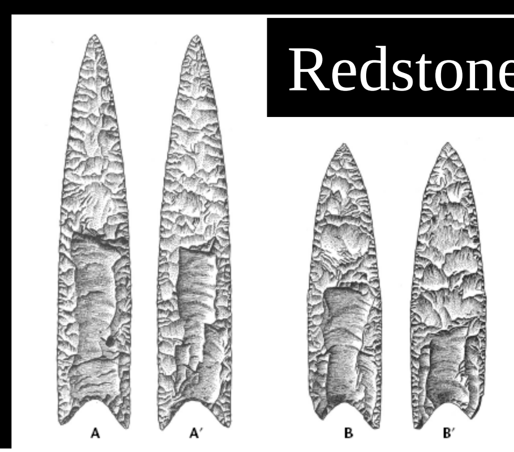
Koster, IL

http://www.caa-archeology.org/ photos/Koster_site.jpg

+

Barnes[1]

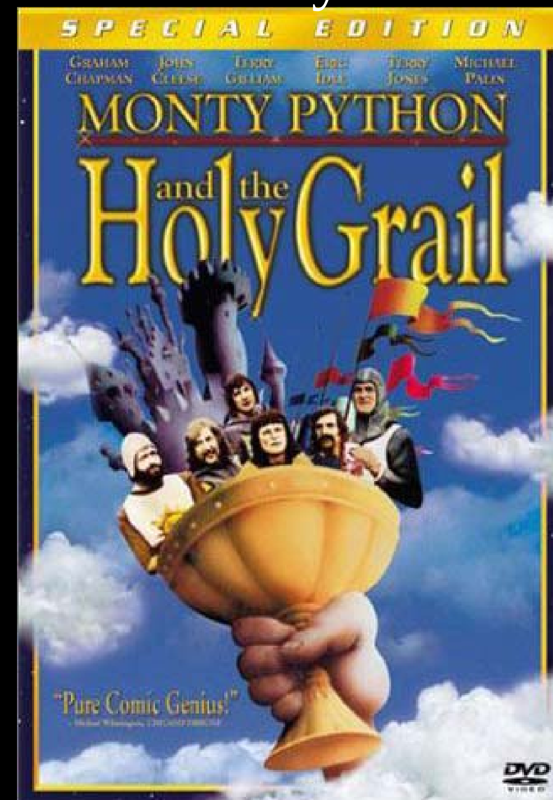
Cumberland[1]



Redstone[2]

=

The Holy Grail[3]



1 Lithics Castng Lab - http://lithiccastinglab.com
2 Goodyear 2006
3 http://www.keygenguru.com /movie/covers/40980_3.jpg

Image courtesy D. Shane Miller

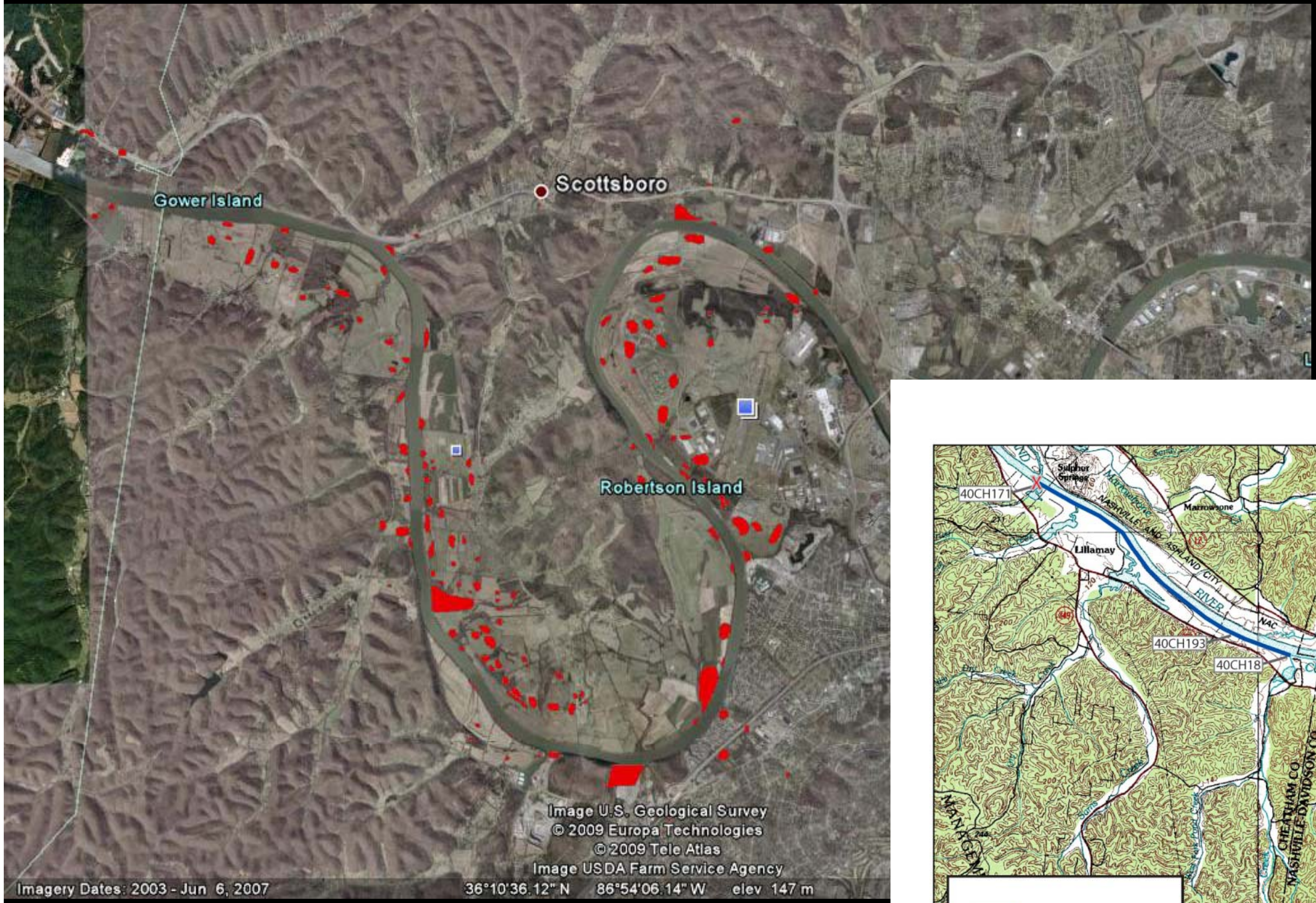
Johnson Site, Tennessee

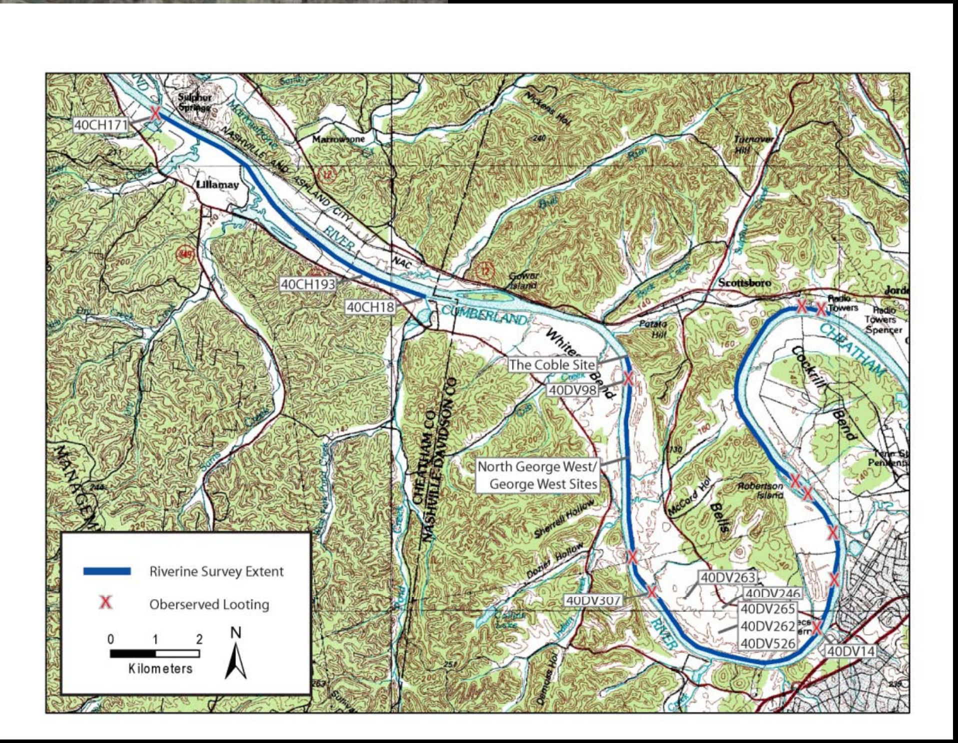
Image courtesy
John B. Broster
and Mark R. Norton

Johnson Site, Tennessee - 40DV400

Images courtesy
John B. Broster
and Mark R. Norton

Cumberland River Survey Project
Nashville, Tennessee 2010





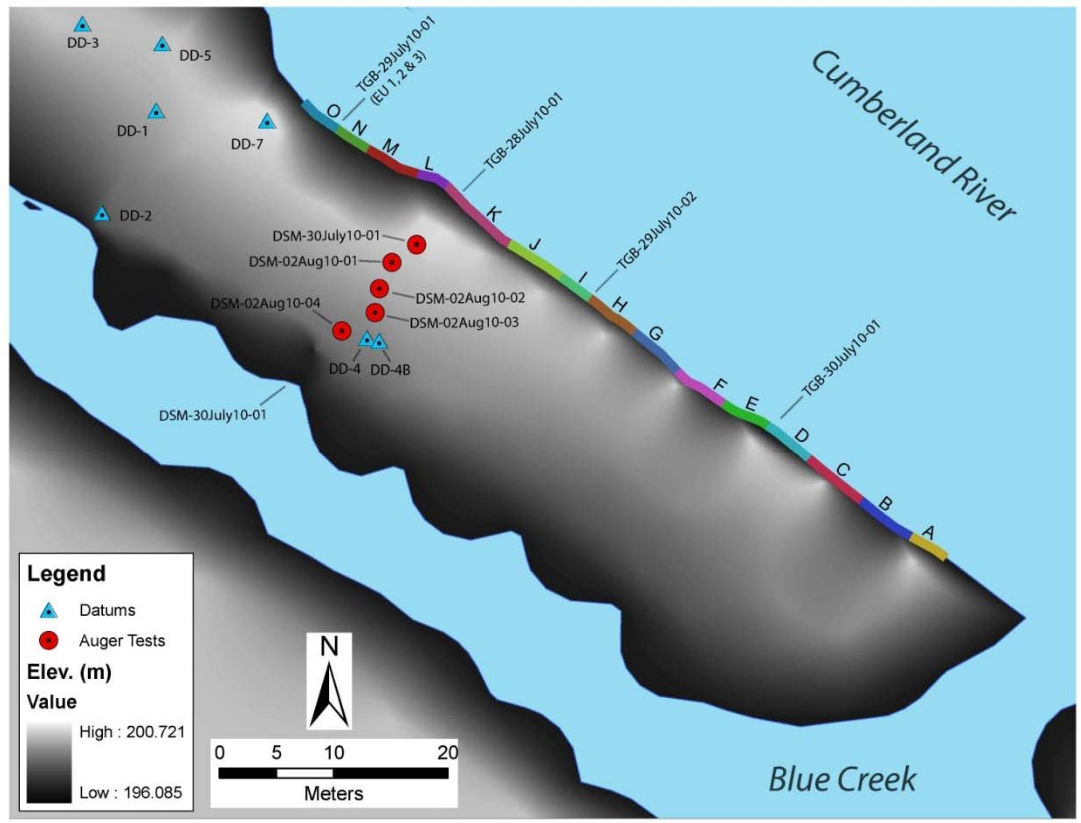
Cumberland River Survey Project
Nashville, Tennessee 2010

Cumberland River Survey Project
Nashville, Tennessee 2010

Clovis Biface from site.

Shoreline of the Cumberland River on the western side of Bells Bend. The left arrow is pointing a tree that has been undercut by erosion. The right arrow points to large chunks of the river bank that have recently collapsed.

Cumberland River Survey Project
Nashville, Tennessee 2010



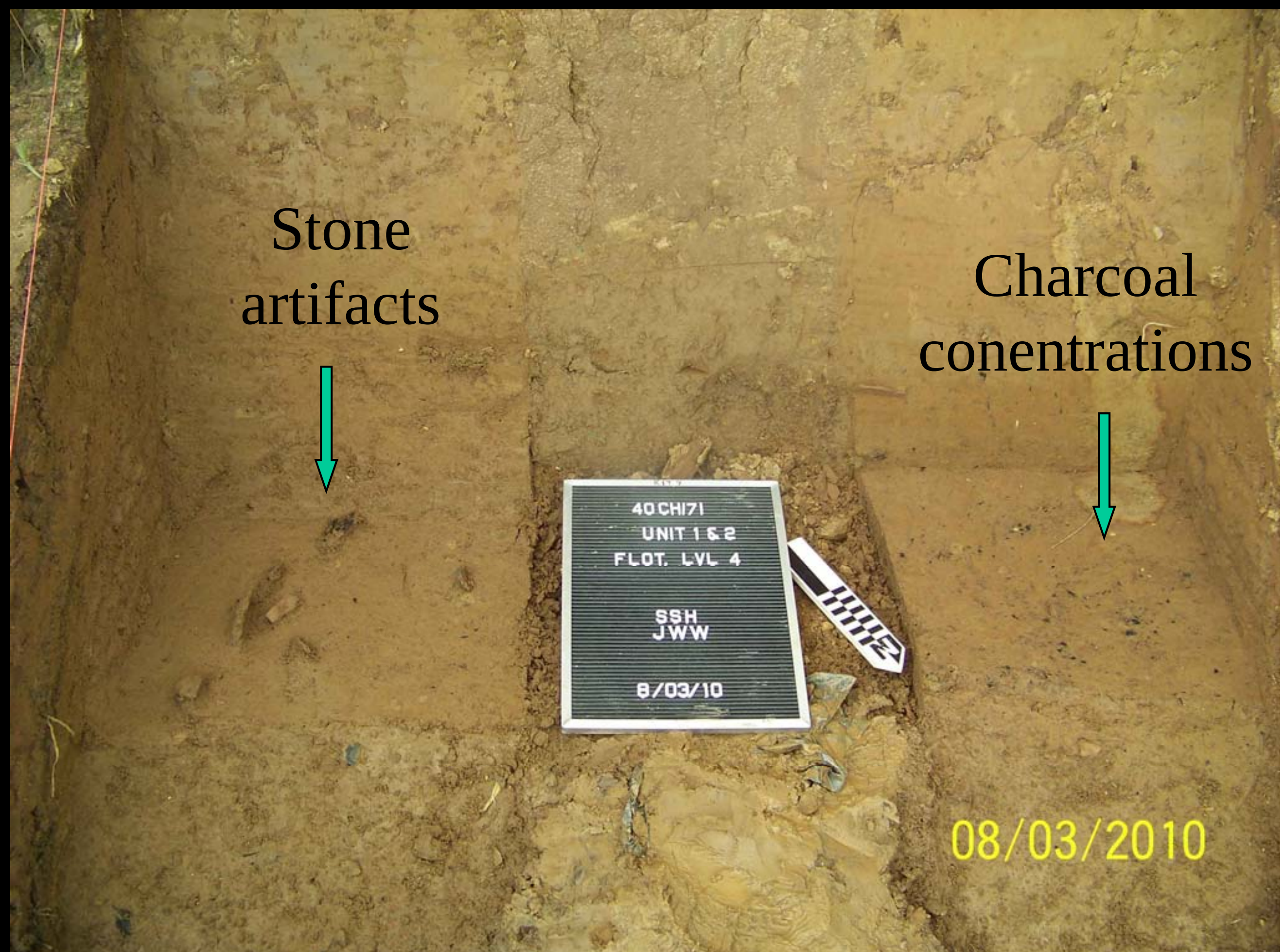
40CH171
Flagging locations of artifacts in the bank

40CH171

Collecting the artifacts along the bank

40CH171

Profiling the bank and sampling an artifact concentration with charcoal near the waterline.



40CH171

Getting good photographs is critical!

40CH171

Hafted end scraper found near base of profile

9 August 2010

Critical Needs:

More Absolute Dates!

PIDBA – All Fluted Distribution

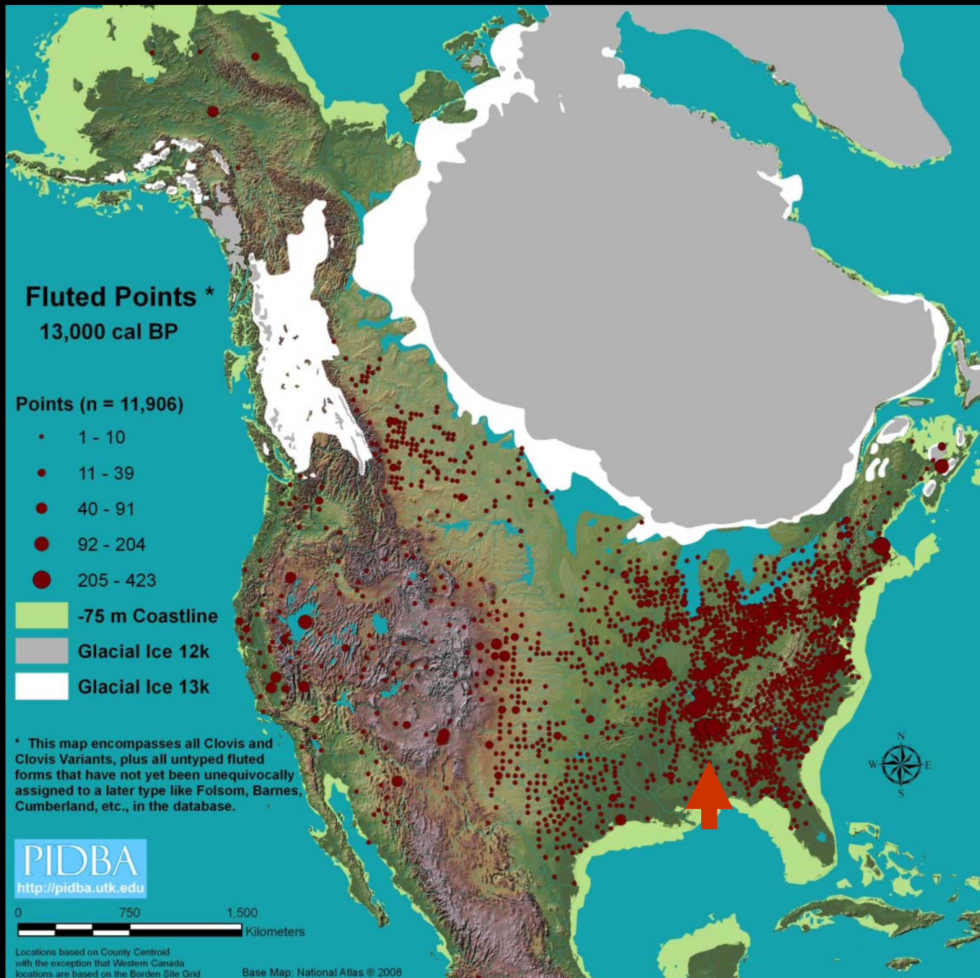
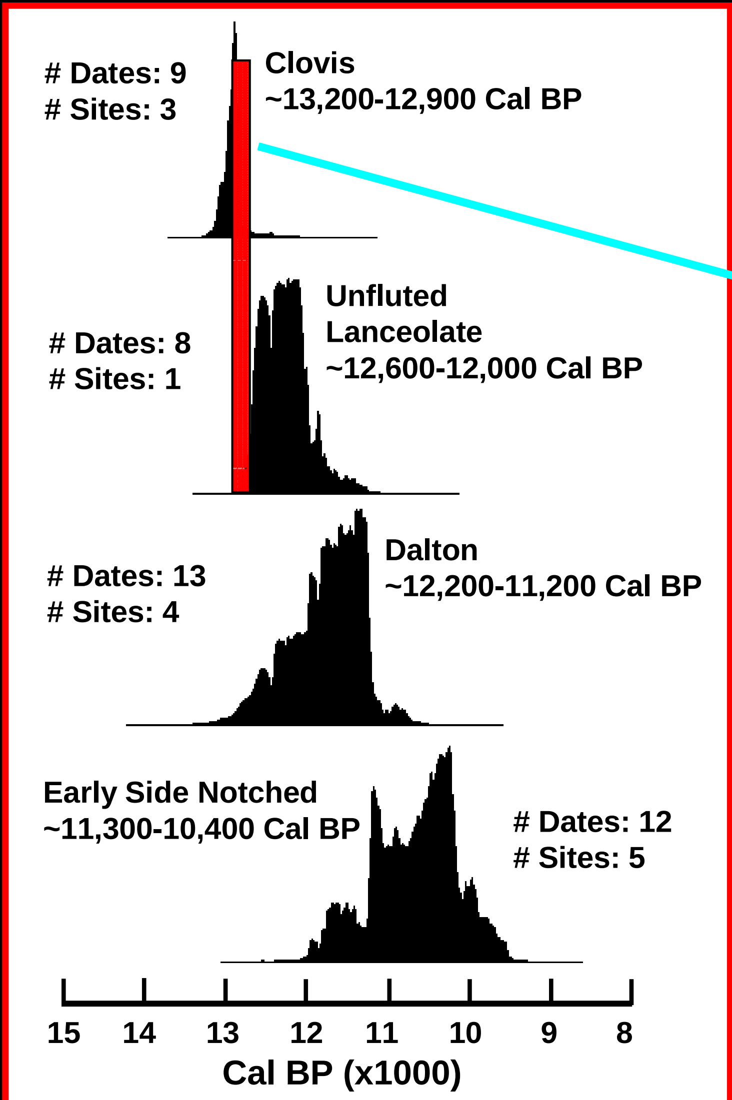


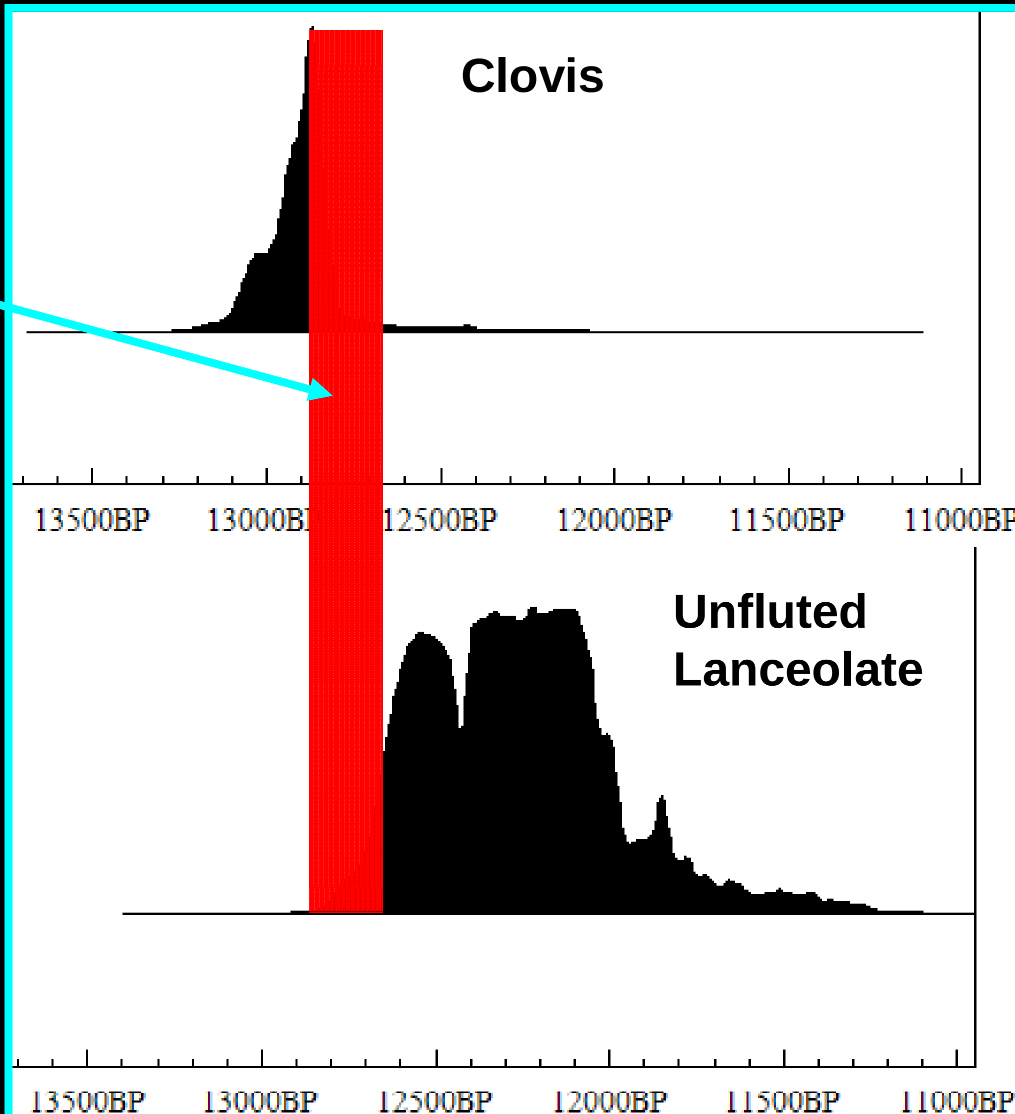
Fig. 1. Map showing the location of Clovis and other early sites. The numbers correspond to those found in Table 1. Other sites are 31, Monte Verde, Chile; 32, Nenana Complex sites, Alaska; and 33, Broken Mammoth, Alaska.

Anderson, David G., D. Shane Miller, Stephen J. Yerka, J. Christopher Gillam, Erik N. Johanson,, Derek T. Anderson, Albert C. Goodyear, and Ashley M. Smallwood
In press PIDBA (Paleoindian Database of the Americas) 2010: Current Status and Findings. Archaeology of Eastern North America x(x):xx-xx.

Waters, Michael R. and Thomas W. Stafford, Jr.
2007 Redefining the Age of Clovis: Implications for the Peopling of the Americas. Science 315: 1122-1126.

Comparison of Clovis and Unfluted Lanceolate Sum Probabilities



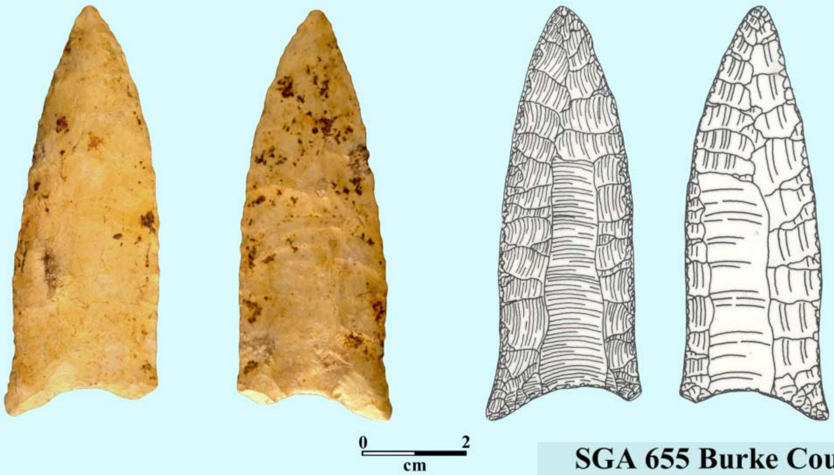


~250-300 year "gap" tentatively considered to encompass **post-Clovis fluted lanceolates** in the Southeast (Importantly, this range encompasses a major a 'cliff' in the calibration curve, and the gap may be much shorter, perhaps a century or two)

(Image courtesy Scott Meeks)

Redstone (Age=??)

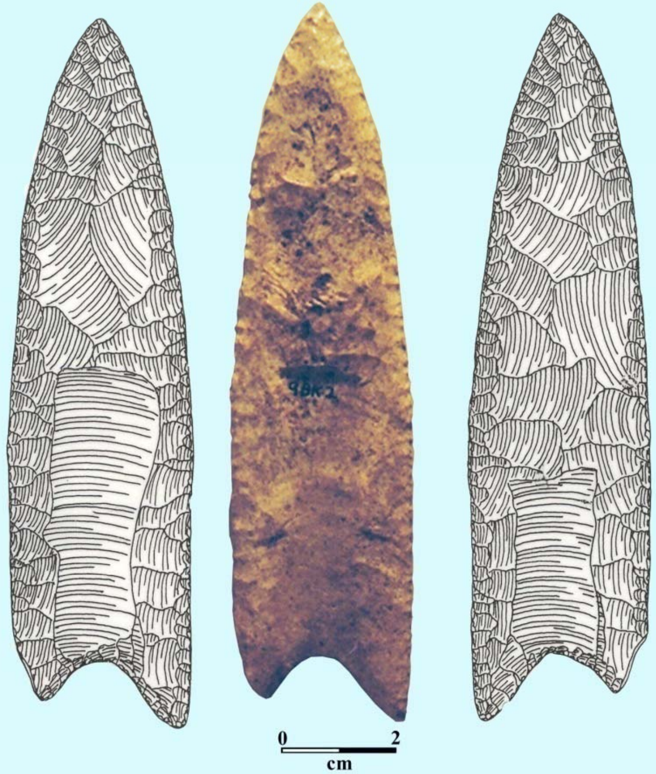
SGA 70 Greene County (near 9GE952)



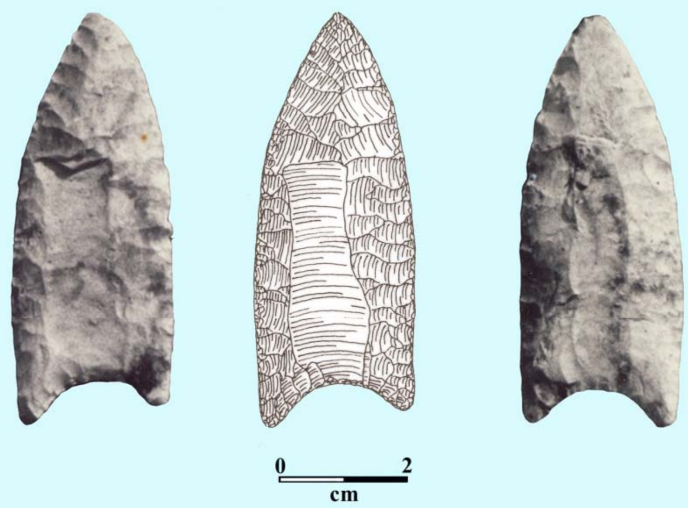
SGA 409 Dougherty County (Flint

SGA 655 Burke County

SGA 2 Burke County (Theriault Site)



SGA 78 Lee County



Images courtesy R. Jerald Ledbetter

Page-Ladson Site Unit 3 - Radiocarbon to Calendar Years Before Present (BP) Calibration Using CALIB Revision 5 with Database Intcal04.14c

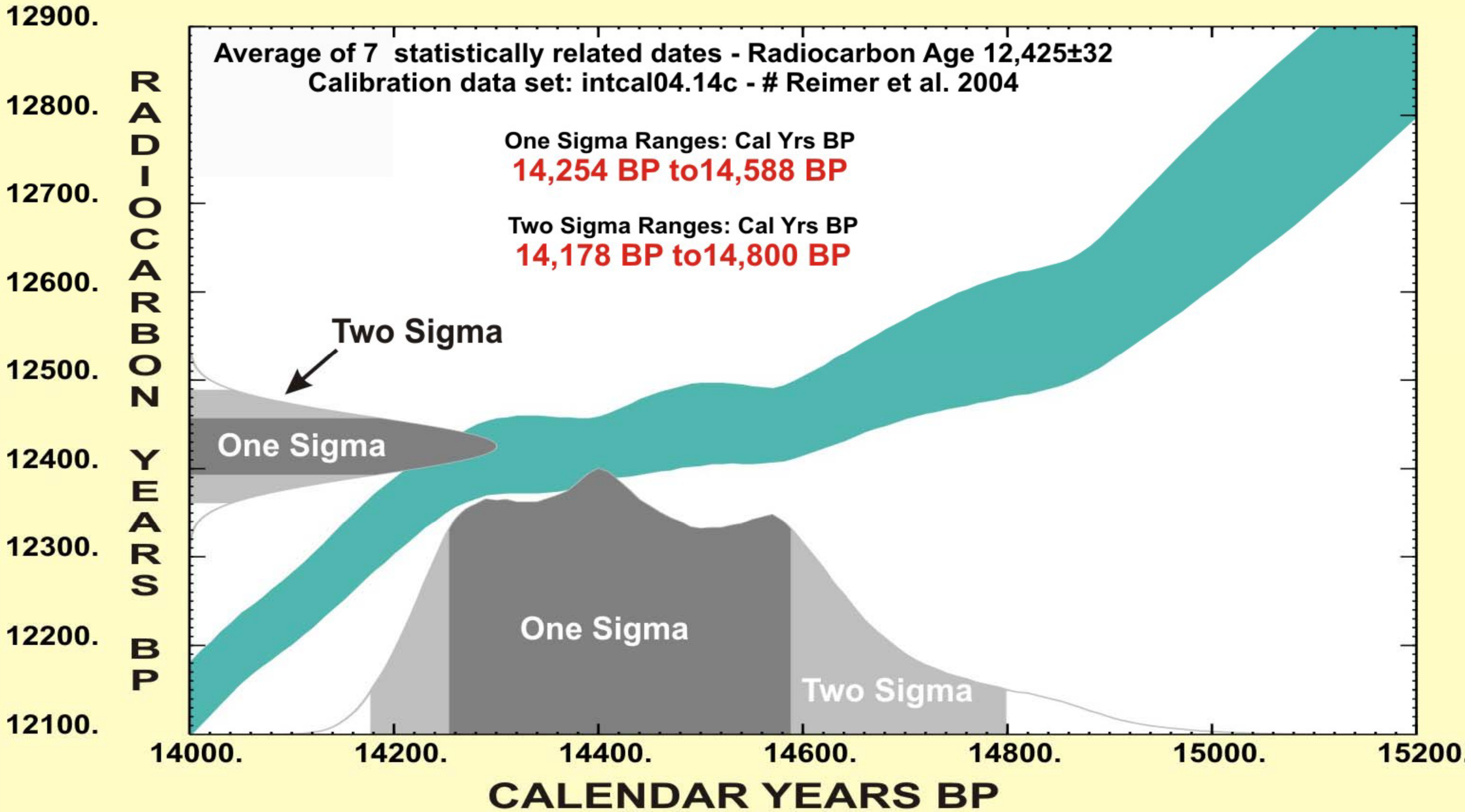
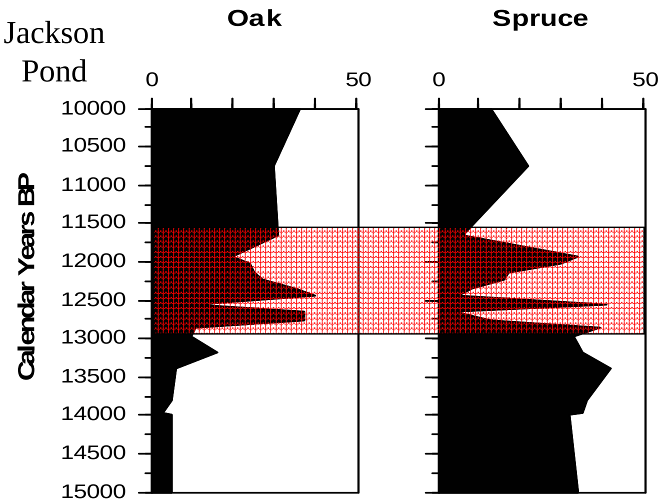
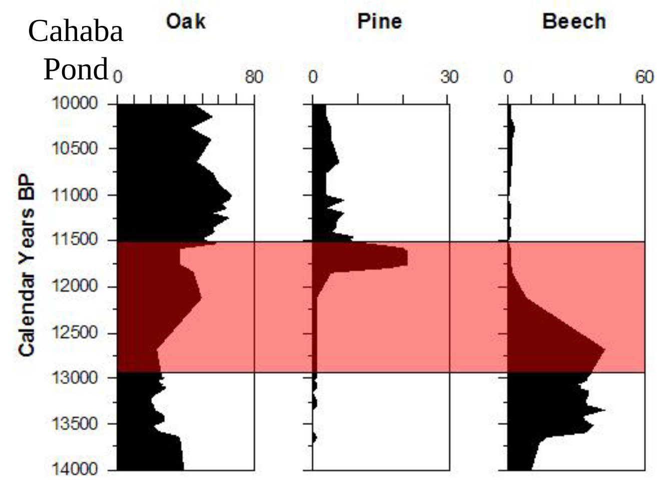


Image courtesy Jim Dunbar

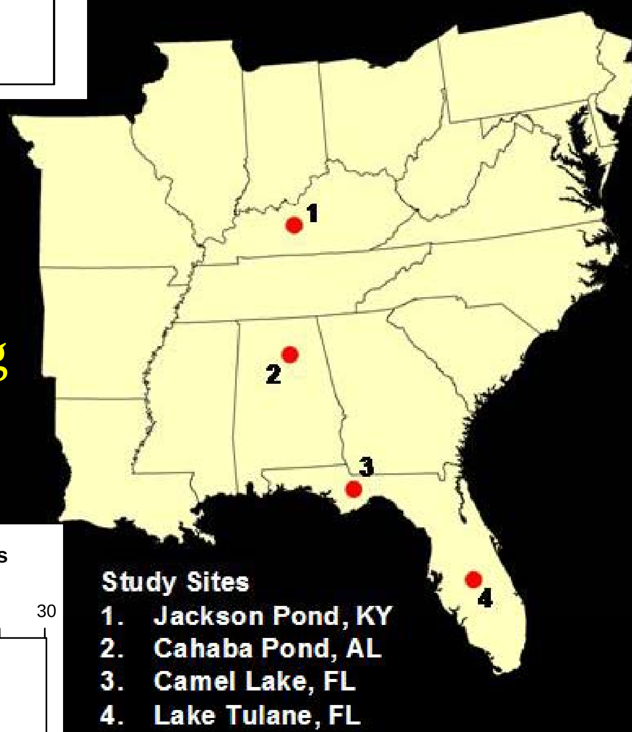
Critical Needs:

More Multidisciplinary Paleoenvironmental Research

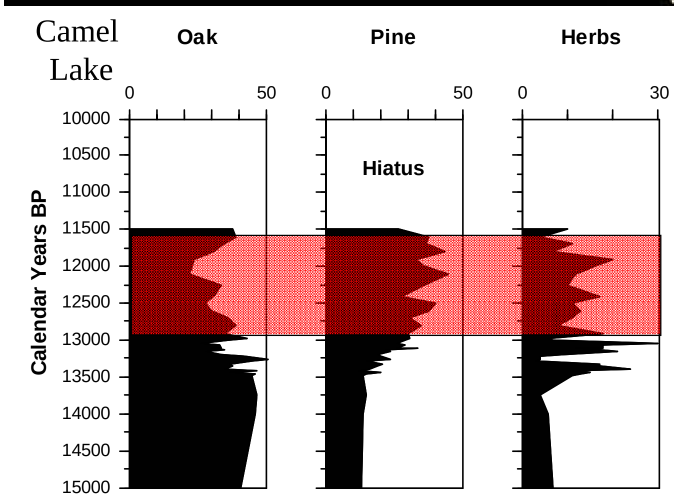




Major vegetational shifts (both abrupt and characterized by oscillations) were occurring during the Younger Dryas.



The environment was thus anything but stable, nor was it trending or changing in a uniform direction.



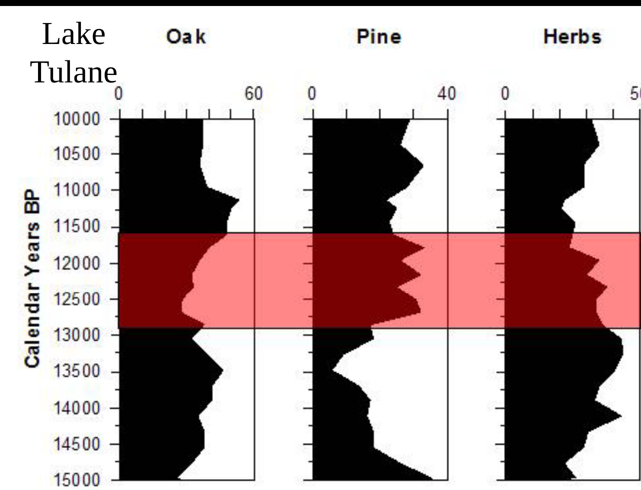
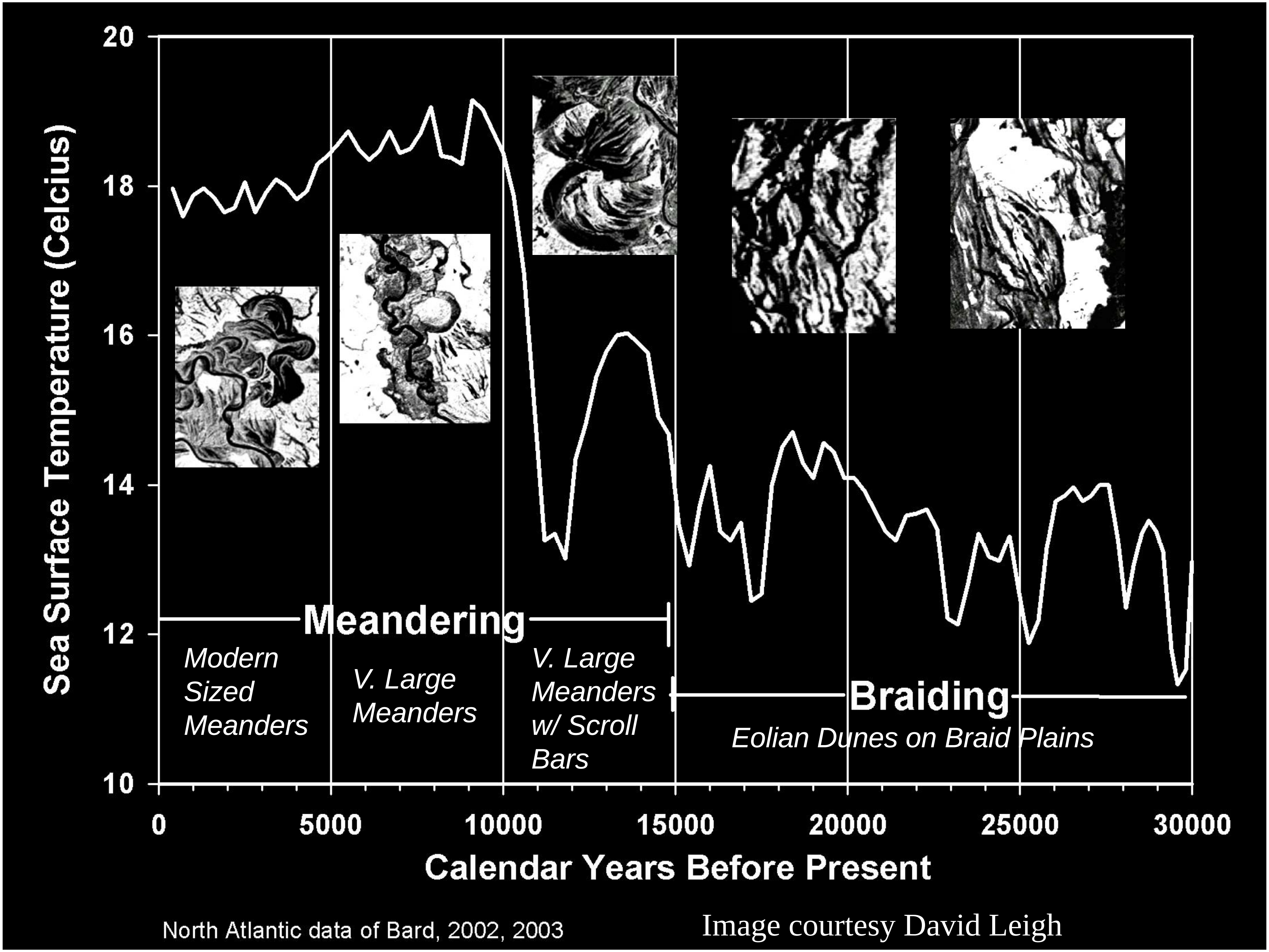
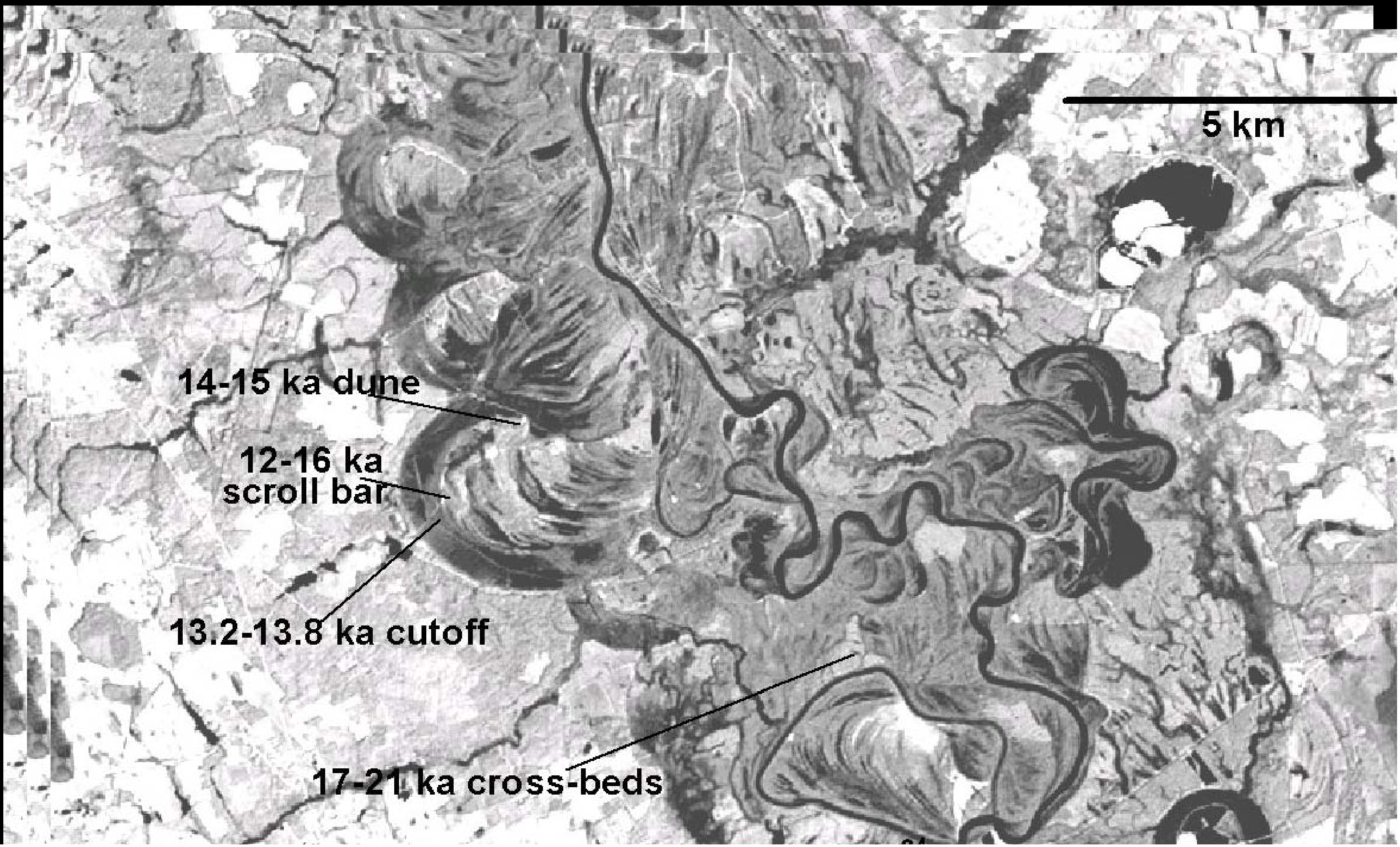


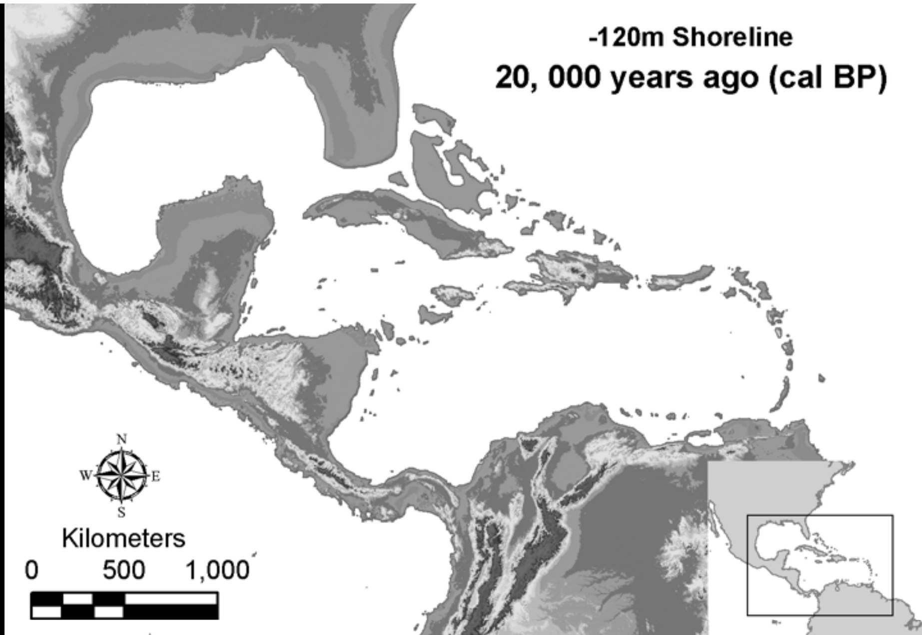
Image courtesy Scott Meeks


Sea Surface Temperature (Celcius)
20
18
16
14
12
10
0
5000
10000
15000
20000
25000
30000
Calendar Years Before Present
Meandering
Modern Sized Meanders
V. Large Meanders
V. Large Meanders w/ Scroll Bars
Braiding
Eolian Dunes on Braid Plains
North Atlantic data of Bard, 2002, 2003
Image courtesy David Leigh

Halfway River, northern British Columbia (photo by Martin Geertsema) Image courtesy David Leigh

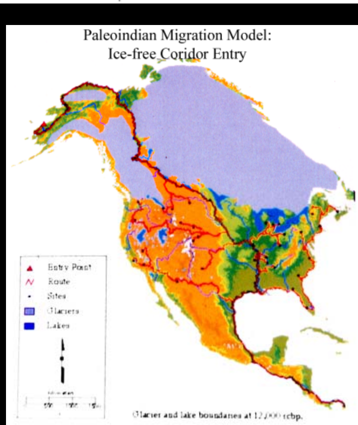
Braiding switched to very large scrolled meanders at ~15 ka and sandy scrolling persisted to perhaps 10 ka. Lateral migration (bank erosion) rates were rapid (0.35-0.67 m/yr).

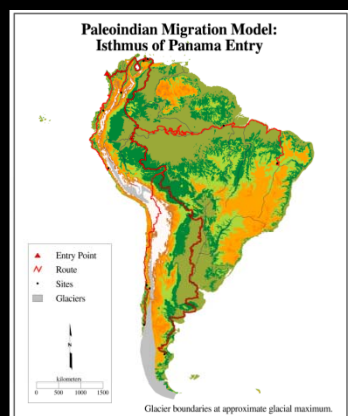




Employing high resolution bathymetric data to infer possible migration routes of Pleistocene populations…

And possible answers to the 'Beringian Standstill' problem!





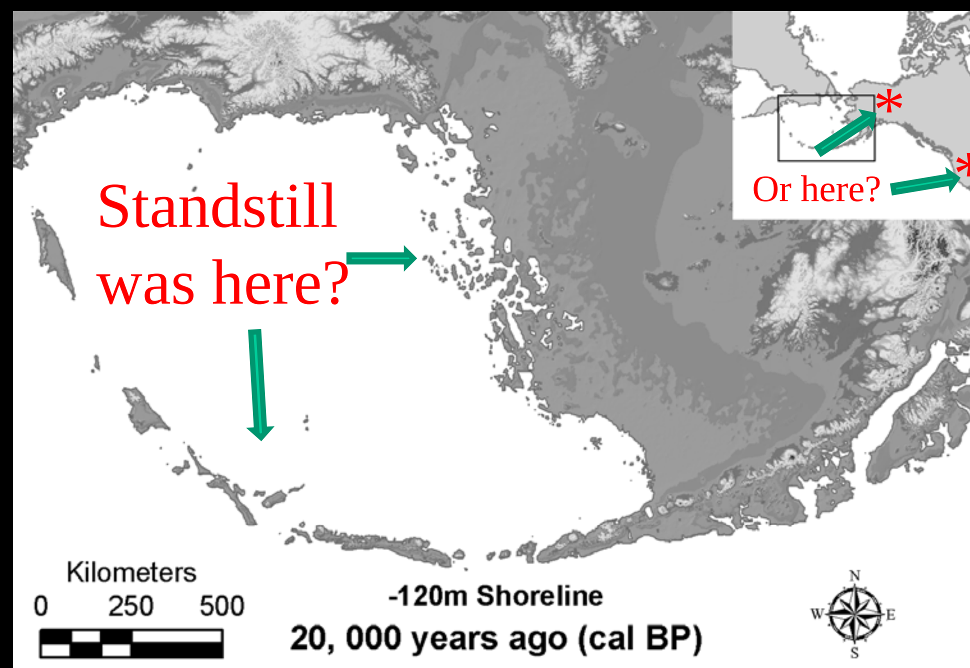
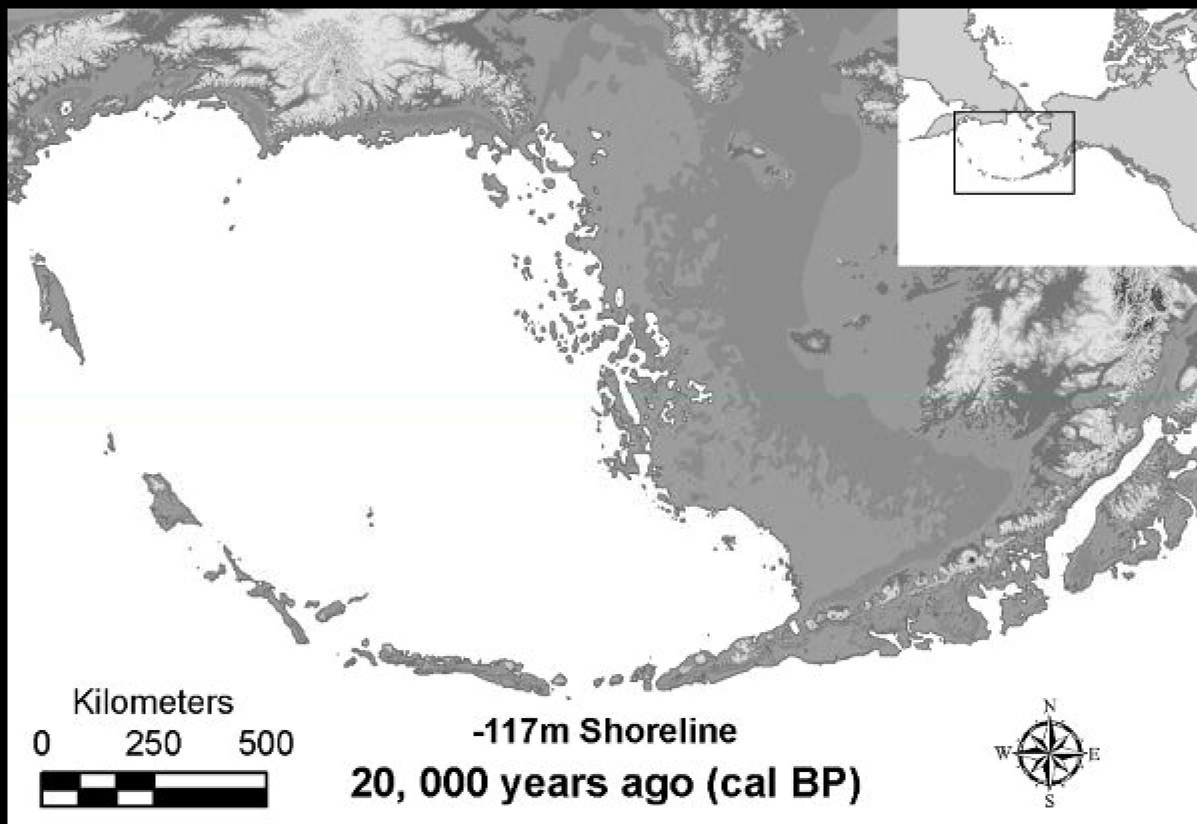


Image modified from Brigham-Grette, J., A.V. Lozhkin, P.M. Anderson, and O.Y. Glushkova 2004. Paleoenvironmental conditions in western Beringia before and during the last glacial maximum. In *Entering America: northeast Asia and Beringia before the last glacial maximum*, edited by D.B. Madsen, pp. 29-61. University of Utah Press, Salt Lake City.

Images derived from the island archipelagoes of southern Beringia and the Aleutians at various periods in the late Pleistocene and initial Holocene (based on sea-level data in Manley [2002] and Lambeck and colleagues [2002], bathymetric data from http://ngdc.noaa.gov/mgg/global/global.html [Amante and Eakins 2009], and a mapping approach adapted from Manley [2002] and Brigham-Grette and associates [2004:38]).



Anderson, David G. Human Settlement in the New World: Multidisciplinary Approaches, the ‘Beringian’ Standstill, and the Shape of Things to Come. In *Human Variation in the Americas: The Integration of Archaeology and Biological Anthropology*, edited by Benjamin M. Auerbach, pp. 311-346. Center for Archaeological Investigations, Southern Illinois University, Carbondale, Occasional Paper. (In Press).

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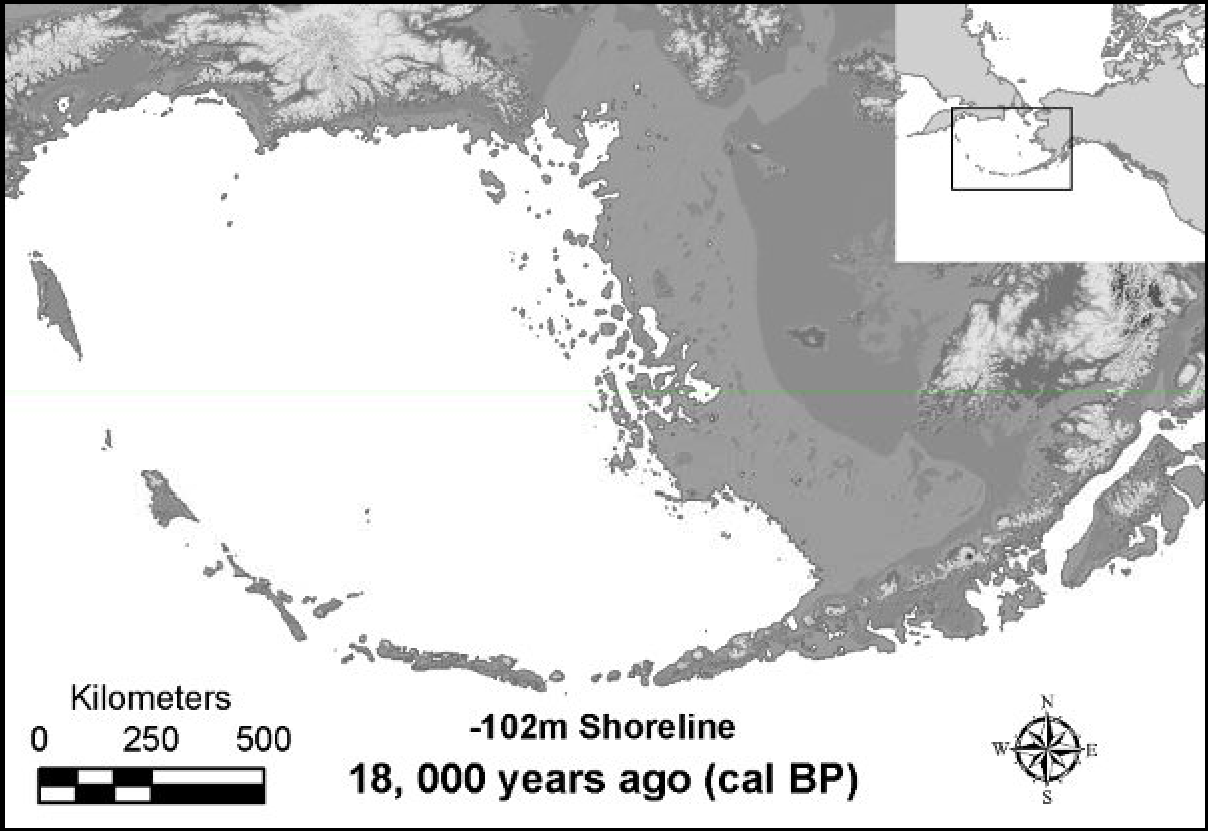

Anderson, David G. Human Settlement in the New World: Multidisciplinary Approaches, the 'Beringian' Standstill, and the Shape of Things to Come. In *Human Variation in the Americas: The Integration of Archaeology and Biological Anthropology*, edited by Benjamin M. Auerbach, pp. 311-346. Center for Archaeological Investigations, Southern Illinois University, Carbondale, Occasional Paper. (In Press).

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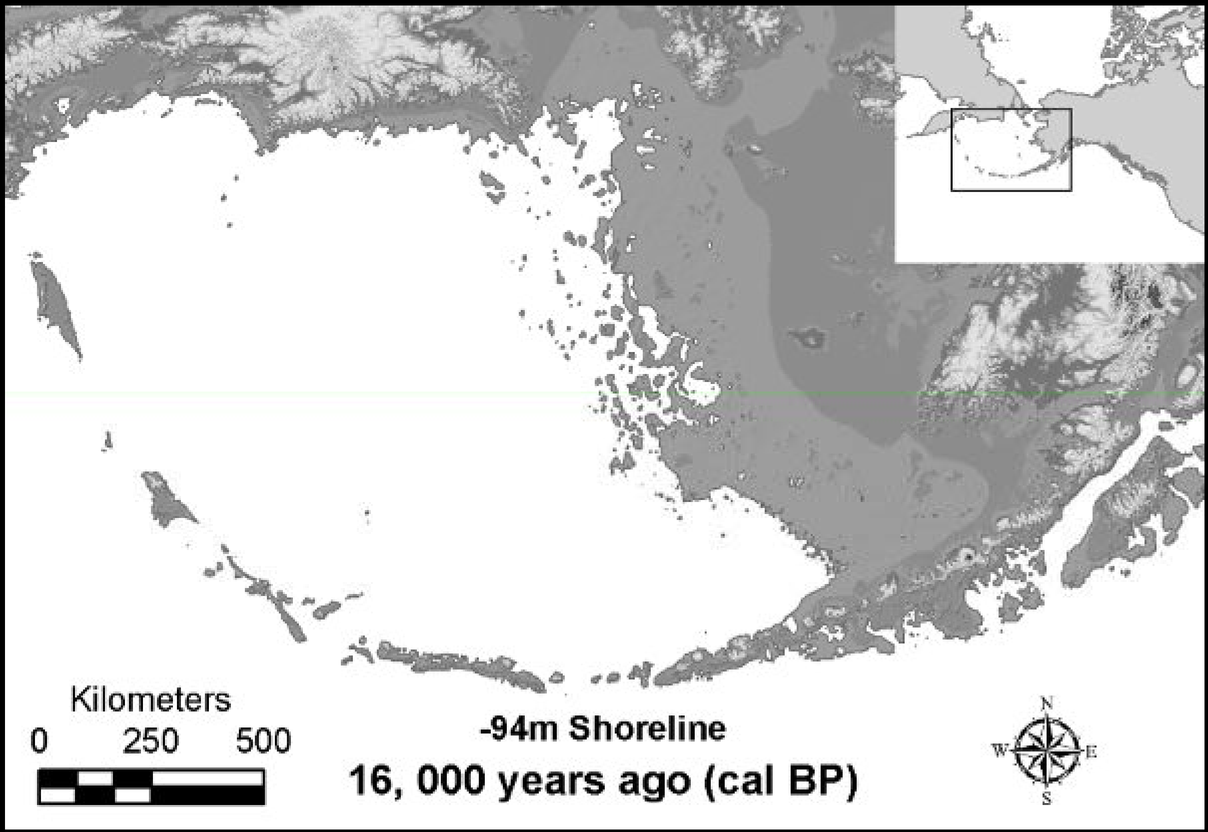

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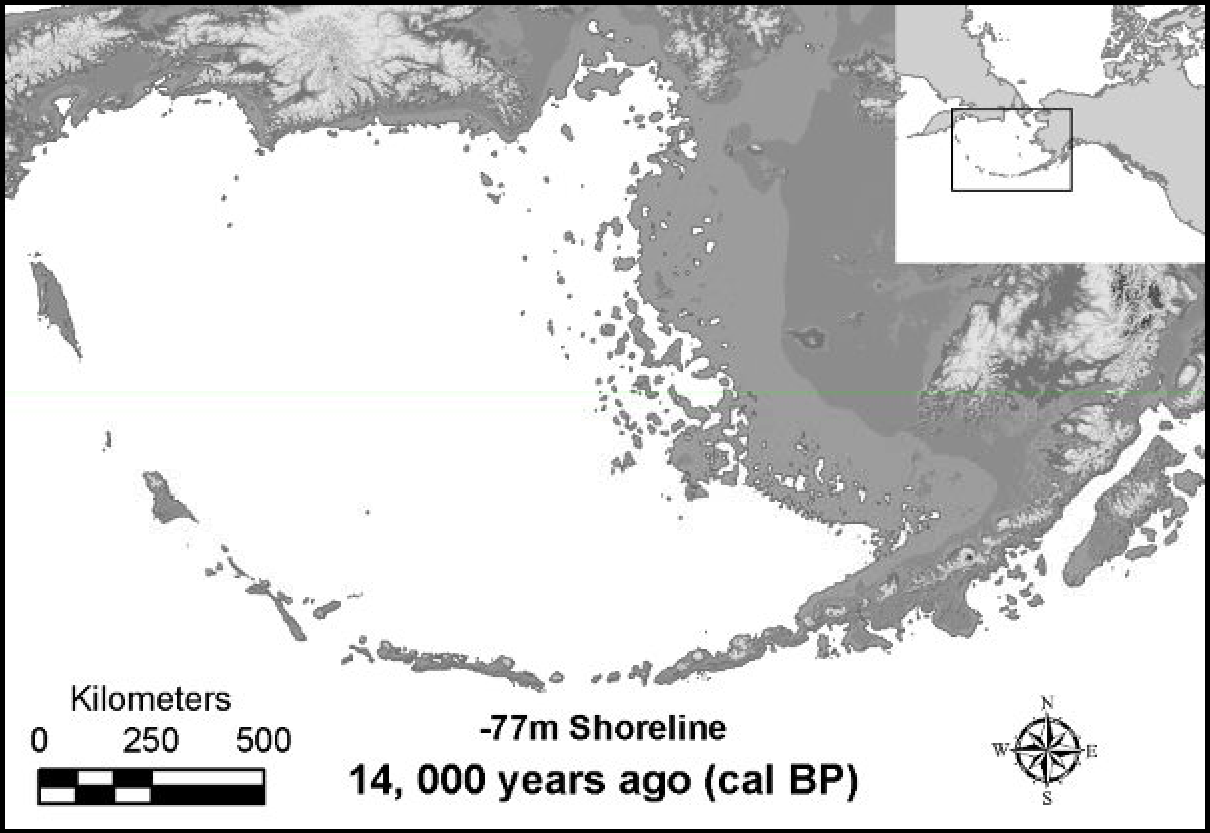

Anderson, David G. Human Settlement in the New World: Multidisciplinary Approaches, the 'Beringian' Standstill, and the Shape of Things to Come. In *Human Variation in the Americas: The Integration of Archaeology and Biological Anthropology*, edited by Benjamin M. Auerbach, pp. 311-346. Center for Archaeological Investigations, Southern Illinois University, Carbondale, Occasional Paper. (In Press).

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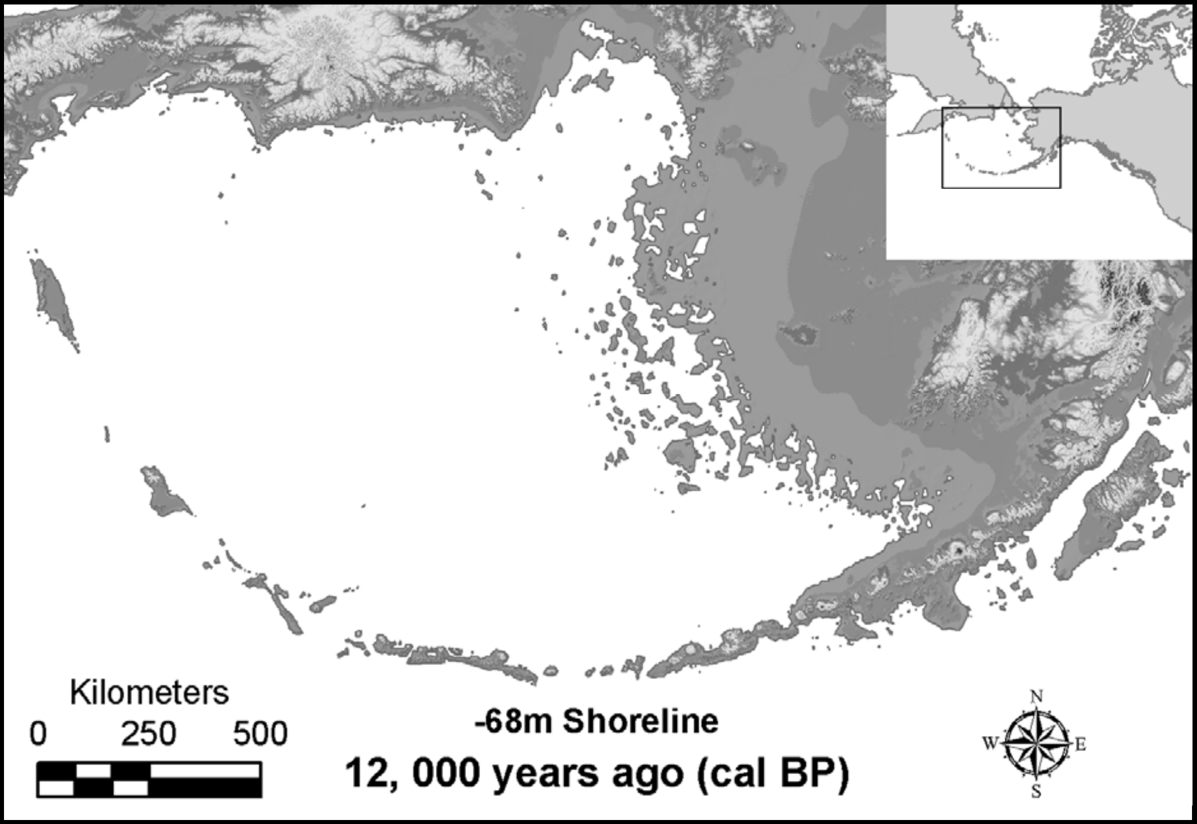


Anderson, David G. Human Settlement in the New World: Multidisciplinary Approaches, the 'Beringian' Standstill, and the Shape of Things to Come. In *Human Variation in the Americas: The Integration of Archaeology and Biological Anthropology*, edited by Benjamin M. Auerbach, pp. 311-346. Center for Archaeological Investigations, Southern Illinois University, Carbondale, Occasional Paper. (In Press).

Area of greatest linguistic diversity

Dahl, Östen , J. Christopher Gillam, David G. Anderson, José Iriarte, and Silvia M. Copé.
Linguistic Diversity Zones and Cartographic Modeling: GIS as a Method for Understanding the Prehistory of Lowland South America. In Ethnicity in Ancient Amazonia: Reconstructing Past Identities from Archaeology, Linguistics, and Ethnohistory, edited by Alf Hornborg & Jonathan D. Hill. University of Colorado Press, Boulder. (In Press)

Critical Needs:

How Did the Terminal Pleistocene Extinctions Play Out in the East?

Late Pleistocene Fauna

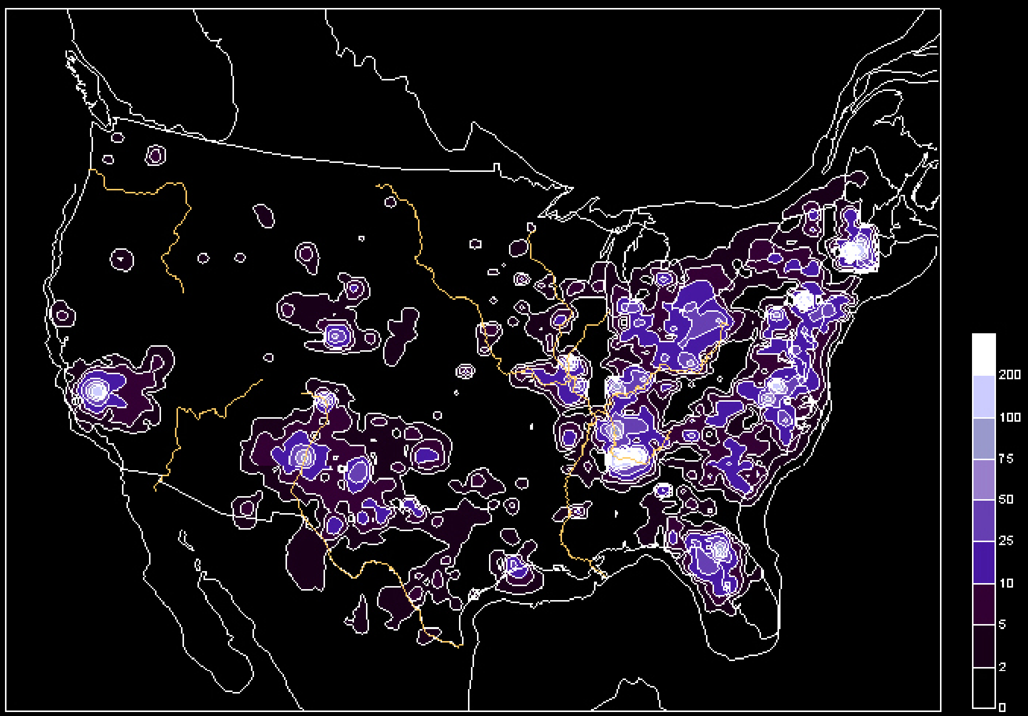
Image courtesy Thomas W. Stafford

Late Pleistocene Extinction — Taxa Lost

Image courtesy Thomas W. Stafford

The irregular distributions do not support the “Wave-of-advance” overkill model.

(Martin 1973; Mosimann and Martin 1975).



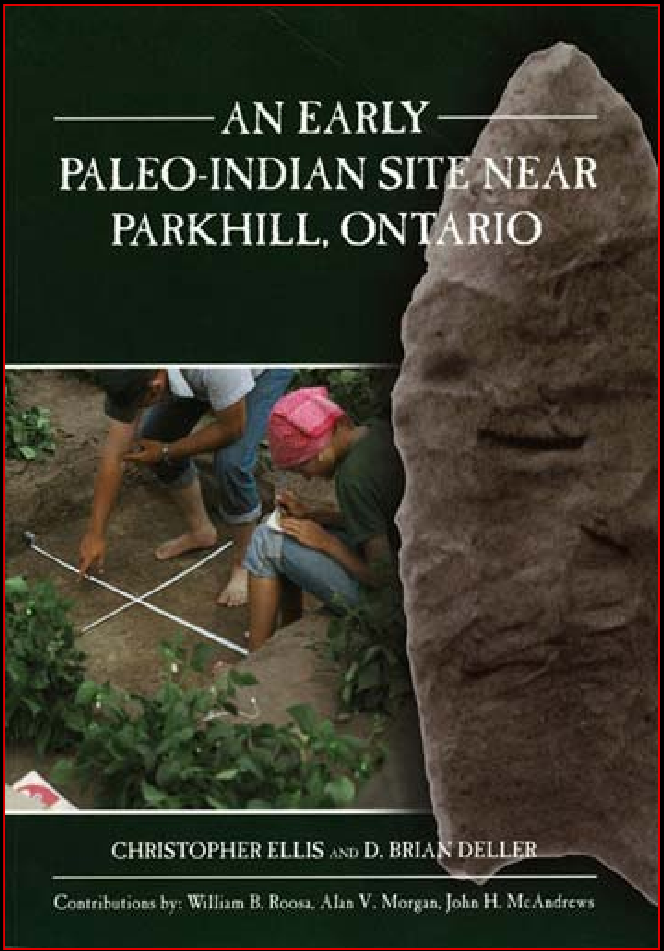
ALL FLUTED PALEOINDIAN POINTS
(Points per 1000 Square Miles, N=12,791 Points)

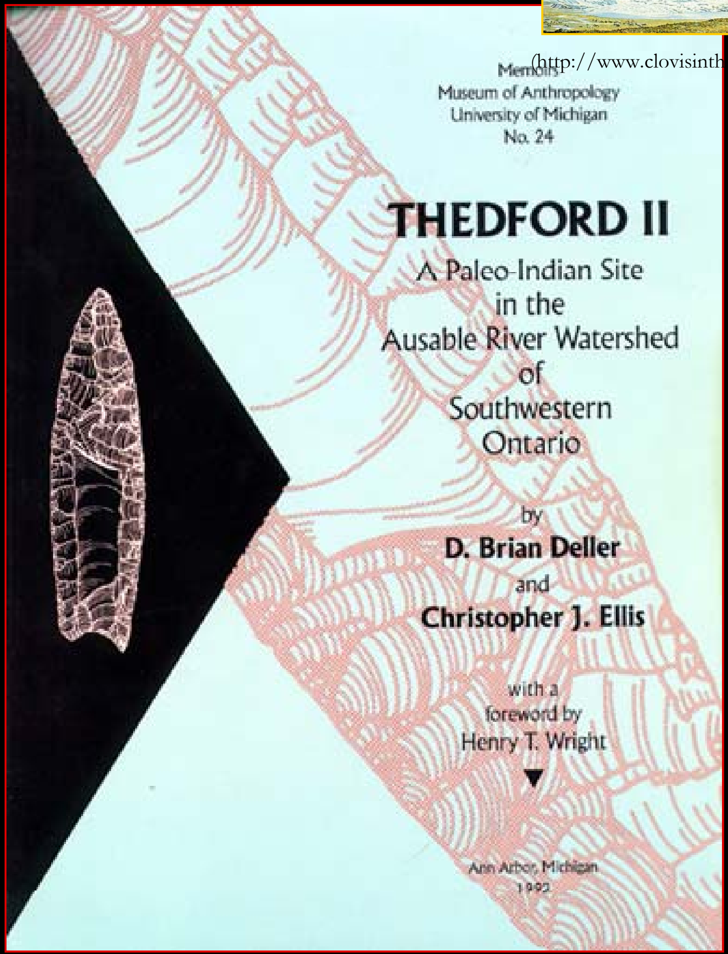
Images courtesy Image from Matsch 1976 <u>North America and the Great Ice Age</u>. McGraw-Hill, Inc., New York

Critical Needs:

More Publication
(and data sharing)!

(http://www.clovisinth



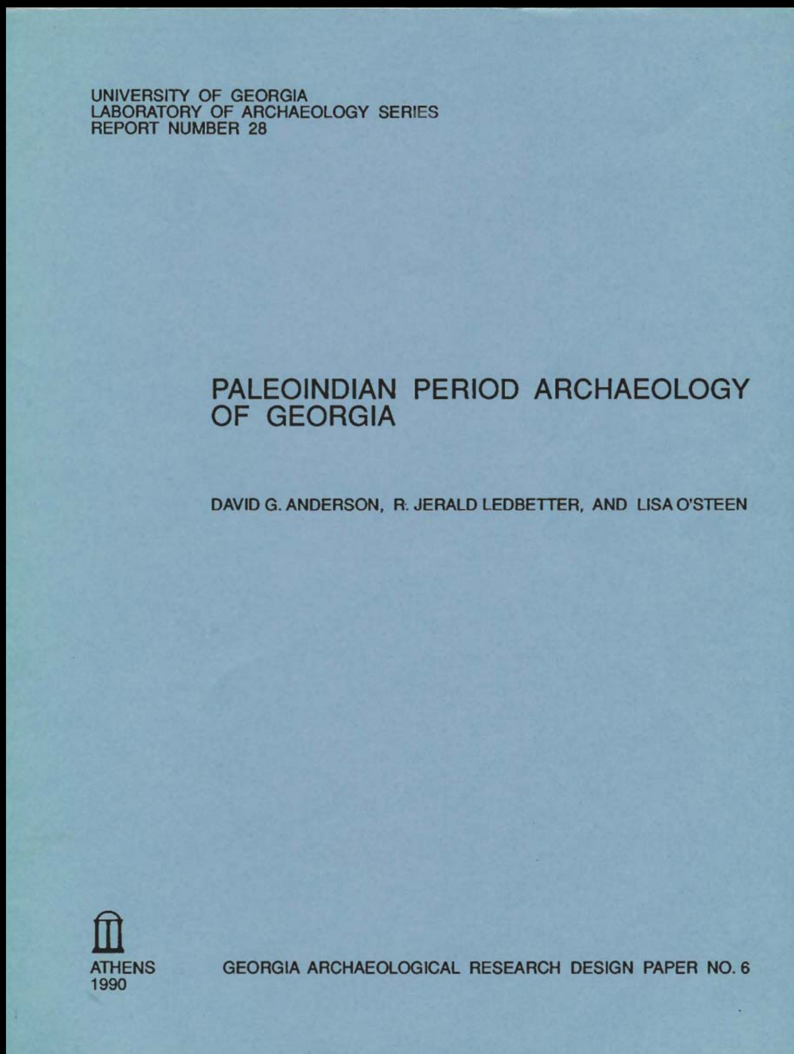


Ellis, Christopher and D. Brian Deller
2000 *An Early Paleo-Indian Site Near Parkhill, Ontario.* Mercury Series Paper 159. Canadian Museum of Civilization, Hull, Quebec.

Deller, D. Brian and Christopher Ellis
1992 *Thedford II: A Paleo-Indian Site in the Ausable River Watershed of Southwestern Ontario.* University of Michigan, Ann Arbor.

Image courtesy Elijah C. Ellerbusch and Stephen J. Yerka

Collection and publication of primary data is critical!

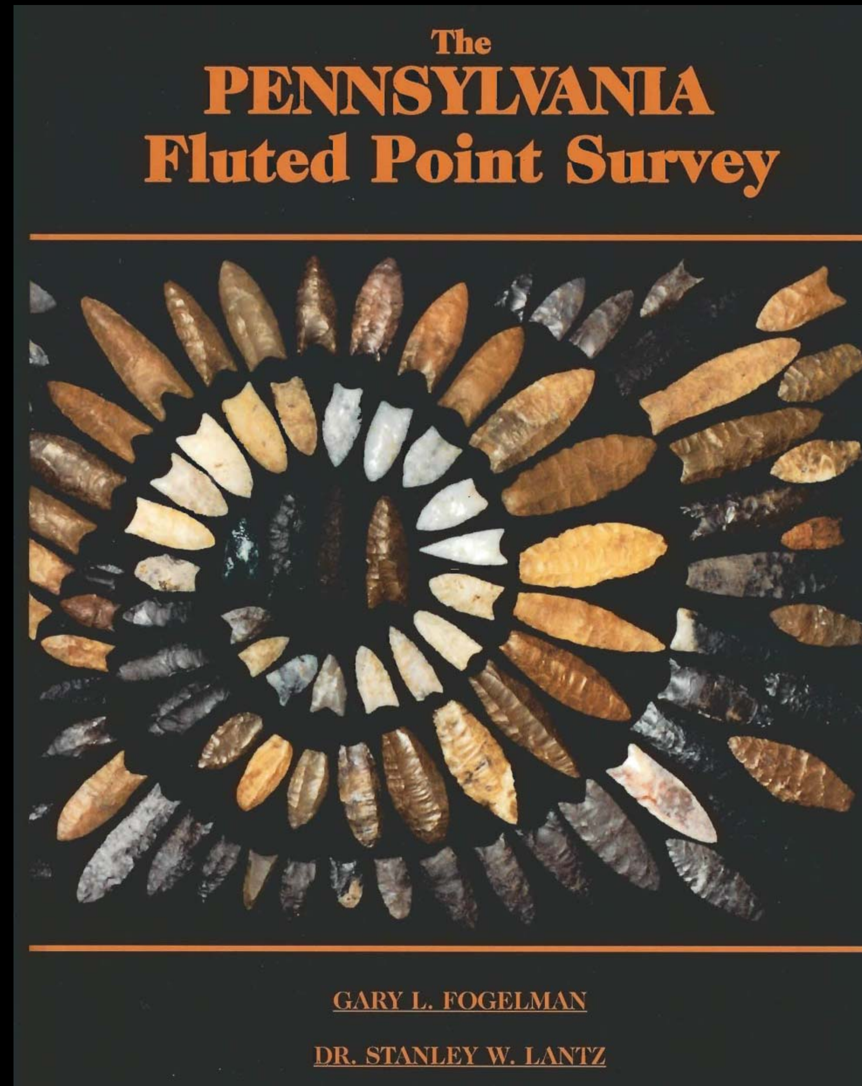

UNIVERSITY OF GEORGIA
LABORATORY OF ARCHAEOLOGY SERIES
REPORT NUMBER 28

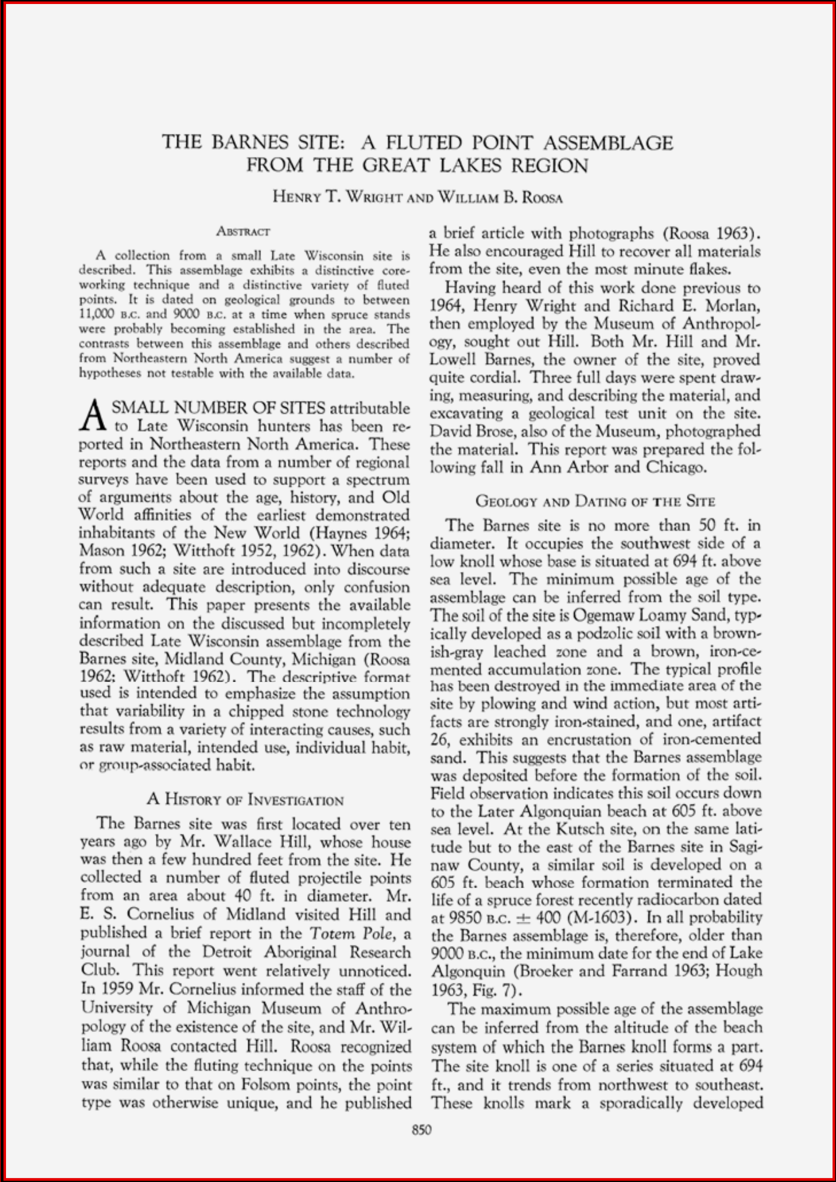
PALEOINDIAN PERIOD ARCHAEOLOGY
OF GEORGIA

DAVID G. ANDERSON, R. JERALD LEDBETTER, AND LISA O'STEEN

ATHENS
1990

GEORGIA ARCHAEOLOGICAL RESEARCH DESIGN PAPER NO. 6





THE BARNES SITE: A FLUTED POINT ASSEMBLAGE FROM THE GREAT LAKES REGION

HENRY T. WRIGHT AND WILLIAM B. ROOSA

ABSTRACT

A collection from a small Late Wisconsin site is described. This assemblage exhibits a distinctive core-working technique and a distinctive variety of fluted points. It is dated on geological grounds to between 11,000 B.C. and 9000 B.C. at a time when spruce stands were probably becoming established in the area. The contrasts between this assemblage and others described from Northeastern North America suggest a number of hypotheses not testable with the available data.

A SMALL NUMBER OF SITES attributable to Late Wisconsin hunters has been reported in Northeastern North America. These reports and the data from a number of regional surveys have been used to support a spectrum of arguments about the age, history, and Old World affinities of the earliest demonstrated inhabitants of the New World (Haynes 1964; Mason 1962; Witthoft 1952, 1962). When data from such a site are introduced into discourse without adequate description, only confusion can result. This paper presents the available information on the discussed but incompletely described Late Wisconsin assemblage from the Barnes site, Midland County, Michigan (Roosa 1962; Witthoft 1962). The descriptive format used is intended to emphasize the assumption that variability in a chipped stone technology results from a variety of interacting causes, such as raw material, intended use, individual habit, or group-associated habit.

A HISTORY OF INVESTIGATION

The Barnes site was first located over ten years ago by Mr. Wallace Hill, whose house was then a few hundred feet from the site. He collected a number of fluted projectile points from an area about 40 ft. in diameter. Mr. E. S. Cornelius of Midland visited Hill and published a brief report in the *Totem Pole*, a journal of the Detroit Aboriginal Research Club. This report went relatively unnoticed. In 1959 Mr. Cornelius informed the staff of the University of Michigan Museum of Anthropology of the existence of the site, and Mr. William Roosa contacted Hill. Roosa recognized that, while the fluting technique on the points was similar to that on Folsom points, the point type was otherwise unique, and he published a brief article with photographs (Roosa 1963). He also encouraged Hill to recover all materials from the site, even the most minute flakes.

Having heard of this work done previous to 1964, Henry Wright and Richard E. Morlan, then employed by the Museum of Anthropology, sought out Hill. Both Mr. Hill and Mr. Lowell Barnes, the owner of the site, proved quite cordial. Three full days were spent drawing, measuring, and describing the material, and excavating a geological test unit on the site. David Brose, also of the Museum, photographed the material. This report was prepared the following fall in Ann Arbor and Chicago.

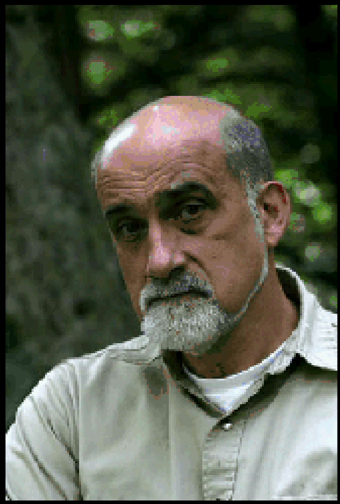
GEOLOGY AND DATING OF THE SITE

The Barnes site is no more than 50 ft. in diameter. It occupies the southwest side of a low knoll whose base is situated at 694 ft. above sea level. The minimum possible age of the assemblage can be inferred from the soil type. The soil of the site is Ogemaw Loamy Sand, typically developed as a podzolic soil with a brownish-gray leached zone and a brown, iron-cemented accumulation zone. The typical profile has been destroyed in the immediate area of the site by plowing and wind action, but most artifacts are strongly iron-stained, and one, artifact 26, exhibits an encrustation of iron-cemented sand. This suggests that the Barnes assemblage was deposited before the formation of the soil. Field observation indicates this soil occurs down to the Later Algonquian beach at 605 ft. above sea level. At the Kutsch site, on the same latitude but to the east of the Barnes site in Saginaw County, a similar soil is developed on a 605 ft. beach whose formation terminated the life of a spruce forest recently radiocarbon dated at 9850 B.C. ± 400 (M-1603). In all probability the Barnes assemblage is, therefore, older than 9000 B.C., the minimum date for the end of Lake Algonquin (Broeker and Farrand 1963; Hough 1963, Fig. 7).

The maximum possible age of the assemblage can be inferred from the altitude of the beach system of which the Barnes knoll forms a part. The site knoll is one of a series situated at 694 ft., and it trends from northwest to southeast. These knolls mark a sporadically developed

Wright, Henry T. and William B. Roosa
1966 The Barnes Site: A Fluted Point Assemblage From The Great Lakes. *American Antiquity* 31(6):850-860.

FIG. 3. Bifacially Retouched Points, Widest Near Midpoint; Barnes site (artifacts 13–19); *a, b*, Unfinished fluted point bases; *c–g*, Semi-finished and finished fluted points and bases. Basal portion of channel flake is shown in place in "a" (left).



http://www.lsa.umich.edu/UofM/Content/umma/image/HTW.gif

Image courtesy Elijah C. Ellerbusch and Stephen J. Yerka

THE END!

Middle Paleoindian Points
12,000 cal BP
sample = 4,420
,141)
berland/Barnes**
(n = 1587)
pson (n = 692)
astline
e 12k
e and Vail
1,500
Kilometers
Base Map: National Atlas ® 2008
Locations based on County Centroids
with the exception that Western Canada
locations are based on the Borden Site Grid
Fluted Points *
13,000 cal BP
Points (n = 11,906)
1 - 10
11 - 39
40 - 91
92 - 204
205 - 423
-75 m Coastline
Glacial Ice 12k
Glacial Ice 13k
* This map encompasses all Clovis and Clovis Variants, plus all untyped fluted forms that have not yet been unequivocally assigned to a later type like Folsom, Barnes, Cumberland, etc., in the database.
PIDBA
Kilometers