



Association of Professional Archaeologists

Working to Promote Professionalism in Ontario Archaeology

New Series 2019:1
Summer 2019

APA Executive

Lawrence Jackson,
President

Dave Norris, Vice
President and Northern
Ontario Liaison

Cathy Crinnion,
Secretary and Treasurer

Jeffrey Dillane,
Director of
Investigations and
Research

Laura McRae, Director
of First Nations
Relations

Ben Mortimer,
Membership Director

Norbert Stanchly,
Field Director Liaison

Nadine Kopp, Director
of Communications and
Newsletter Editor

www.apaontario.ca



@APA_Ontario



@APAOntario

Table of Contents

President's Message.....	2
Vice President's Message.....	3
In Memoriam.....	4
Workshop, MTCS, and AGM Summary.....	5
Reserve Lands Reserach Grant.....	7
Calibrating the Age of Meadowood in South-Central Ontario – NewData from the Dawson Creek Site (BaGn-16), Rice Lake.....	8
Upcoming dates to apply for Member Awards.....	11-12

APA Occasional Paper Series

APA Occasional Paper No. 3

*The Rice Lake Early to Middle Archaic: Evidence of Bifurcate and Stanly/Neville Projectile
Points in the Rice Lake/Trent River Wetlands of South-Central Ontario*
is now available.

Dr. Scott Hamilton, Editor for the APA Occasional Papers in Archaeology Series, invites contributions from APA members and is seeking contributiouons for APA Occasional Paper No. 4. Guidelines for contributors will be coming out soon.

The APA encourages its members to share your work with colleagues in news snippets (Twitter or Facebook), in small articles (Newsletter), or in full versions (Occasional Paper Series). Contact us at members@apaontario.ca with your short pieces or directly to shamilto@lakeheadu.ca to inquire about the format for the Occasional Papers.

Current and past issues in APA's Occasional Papers Series are available for download at <http://apaontario.ca/research>.

President's Message

Hopefully this very wet spring weather will come to an end soon. It has certainly set back a good many archaeological projects in Ontario. APA is continuing to address issues on behalf of its members. Foremost among these has been that of Unionization and we, as an Executive, made clear at our Annual Meeting that the organization will not be drawn into advocating for or against this issue. At the same time, in our own dealings with LiUNA we have noted a certain amount of inaccuracy, such as claiming official correspondence from LiUNA to APA at a time when all we had was a member letter sent with no credentials. We have also been attempting to verify some statements such as numbers of archaeologists who are Union members, a figure which seems to vacillate between 300 and then 200. To date, there are only three firms in Ontario which have unionized, which does suggest, after a year of attempting to unionize firms, that perhaps a Union might not be what is wanted by archaeologists in Ontario. Archaeologists in Quebec have set up an organizational alternative to unions (see CAA Conference 2019) which shows there are many ways to proceed to improve working conditions in our province, including but not limited to unions.

Meanwhile, following on our work many years ago in setting a minimum archaeological wage standard (voted on by members and ratified as a by-law), we are reviewing things which might assist field technicians – including Group Benefit packages. APA already has a very modest priced Group Liability Insurance policy which is always available to members. We hope to add new packages this fall. Cathy Crinnion, will be sending out the Unionization survey results soon and please see the following set of resources which may be accessed by any archaeologist so they can inform themselves about Unions.

This newsletter includes a tribute written by Cathy Crinnion on the passing of Charlie Garrad. I used to spend quite a bit of time with Charlie and enjoyed his company and insights into archaeology, though our career paths were very different ones. The archaeological community will deeply miss his presence and character as a powerful force advocating for research in Ontario for decades.

This summer will also see release of the third APA Occasional Paper in Archaeology by our Editor Scott Hamilton. Any member of APA is welcome to submit material to Scott. This particular number is an Early and Middle Archaic paper authored by Frank Krist and myself. Scott has developed a new format for the Occasional Paper series and we hope to produce more issues in the near future, including timely research by students and professionals. APA continues to make significant awards to our younger members as student fellowships, radiocarbon awards, and travel grants. Annually, we award about \$2,500 in research prizes and fellowships. Odds of winning are way better than any lottery in Ontario! We all hope everyone has a productive summer, with minimum problems and good weather!

- Laurie Jackson

Resources for APA Members with Questions about Unions and Labour Law In Ontario

1. Ontario Ministry of Labour Collective Agreements e-Library Portal
https://www.sdc.gov.on.ca/sites/mol/drs/ca/Pages/default_en.aspx
2. Law Society of Upper Canada. Directory of Certified Labour Specialists
<http://www.lso.ca/specialist/jsp/namelist1.jsp?code=LBL®ion=>
3. Ontario Ministry of Labour and Affiliated Agencies
<https://www.ontario.ca/page/ministry-labour>
4. Examples of Employer Contribution Reporting Forms
Go to Ontario Ministry of Labour Collective Agreements e-Library.

5. Examples of different types of unions and labour associations:
<http://www.liuna.org/> <https://bacweb.org/bac-canada> <https://cupe.on.ca/>
<https://www.otffeo.on.ca/en/>
<https://www.clac.ca/>
6. List of Unions and Labour Associations in Canada
<https://www.canada.ca/en/employment-social-development/services/collective-bargaining-data/labour-organizations.html>

Vice President's Message

Greetings Everyone,

This past May I was invited to join a roundtable discussion regarding “working conditions” within archaeology. Although in attending the roundtable, I represented the CAA, APA and to a lesser extent the OAS, my main perspective was from the APA vice-president role. Members from other professional organizations across Canada were invited to participate to gain a sense of working conditions from across the country. The roundtable was organized into a question and answer session and then comments from the audience. Representation from the professional organizations included New Brunswick, Quebec, and Ontario. Each province was sent the questionnaire prior to the conference and responses were obtained from B.C., Alberta, Quebec, New Brunswick, and Ontario.

Discussions revolved around these three topics:

- Do the current legal provisions (laws, regulations, government directives) offer satisfactory conditions for professional archaeological practice?
- What are the factors/conditions that would improve professional archaeological practice?
- What are possible solutions that would ensure better professional archaeological practice?

I won't summarize the issues that were discussed in this summary as I believe they are being submitted for publication; I can comment briefly on the overall impressions from the event. As expected, and given that archaeology is provincially regulated, experiences within each province differ to quite an extent. The big issue that was being discussed in a roundabout way, was the Unionization of archaeology. APA has received reports that some are suggesting about 90% of the APA membership supports unionization. Although this is in contrast to our internal information – APA has tried to remain neutral on the subject. In the west, companies haven't had to deal with this issue as of yet. In the east, New Brunswick is facing an issue whereby the provincial government is doing more work than independent companies. In Quebec workers have noted that scientific standards are being lost within the lack of legislation and regulations.

Although the topics revolved around working conditions, they were brought back to the idea of wages and keeping people within the field of archaeology. LiUNA promoted the fact that unionization would “level” the playing field with regards to wages and bidding. However, they were a little vague on specifics. LiUNA suggested that having a pool of workers to draw from could mean that larger projects could be supplemented with workers from the union thereby allowing any firm to bid on any project. Experts who belonged to the union could be used for projects where companies didn't have the necessary expertise already on hand. This was promoted as a free enterprise, whereby the experts or crew would be sent to job locations and allow companies to complete projects in a timely manner. LiUNA proudly took responsibility for the latest defeat of Bill 66 introduced by the Conservative Government, suggesting that as a lobby group, the union could influence the government in a more archaeology friendly way.

One of the things I did find interesting is the establishment of CNTAQ in Quebec. This organization promotes higher quality of archaeological standards and working conditions for its members and all who work in the CRM archaeological business. The lack of standards within the province has produced a negative consequence for conditions in which this work is carried out, for the scientific quality of the work done and, consequently, for the protection of the archaeological heritage. CNTAQ is not a union, nor is it promoting unionized practices. The CNTAQ is an NPO whose purpose is to document the state of professional archaeological practice in Quebec and to find answers to the problem of precariousness of professional archaeologists. It is also to consolidate the archaeological community so that it can regain control of its environment, improve its working conditions, and project itself into a more predictable future.

In the end, Unionization of archaeology will prove to be rather difficult. Personal opinions aside, there are advantages to having a larger lobbying group within archaeology to help protect what we do. But does this offset the costs that would be associated with such a move? APA has looked into the matter and costs for an employer would increase approximately 46% alone per hour per employee! Without even raising wages. Wages seemed to be a sticking point for LiUNA. They seemed to feel that wages across the board need to be increased to keep talented workers in the profession. But these overall costs alone would be substantial for any small to medium sized business to handle!! In the end it could substantially alter the landscape of archaeology as we know it – it is hard enough to win contracts, it will be harder still to increase costs to cover unionized employees while remaining competitive.

- David Norris

In Memoriam



Charles “Petun Charlie” Garrad has recently passed, and APA Ontario would like to share a few words of remembrance and respect for Charlie and his legacy. Charlie was an Avocational Archaeologist whose passion for the archaeology of the Great Lakes Region was undeniable. He was honoured with the Order of Ontario in 2012 which recognized his significant contributions to Ontario history as the province’s longest licensed archaeologist. Charlie worked in the field and in the lab, coming to focus on the material culture of the Petun, the ‘Tobacco Nation’; an Iroquoian nation south and west of Georgian Bay who seemed to be overshadowed in the archaeological record by the Huron-Wendat, their neighbours to the east. Charlie’s dedication to spreading knowledge of the Petun peoples was one of his life’s missions - be it to a group of high school students, to archaeologists, with researchers and academics, to local and provincial government staff - he was generous with his time and produced many publications. Charlie showed others

how important it is to reach out to and involve descendant people and communities, and was well respected for doing so. He was adopted by the Wyandotte Nation of Oklahoma and, later, the Wyandot Nation of Kansas. APA honours Charlie Garrad’s impact on the development of Ontario archaeology. A memorial tree has been donated in Charlie’s memory on behalf of APA’s members.

Charlie’s obituary is available at: [View CHARLIE GARRAD’s Obituary on thestar.com and share memories](#)

- Cathy Crinnion

Workshop, MTCS, and AGM Summary

The APA's 2019 Annual General Meeting and Workshop Day took place on Saturday March 30th. Our Association's annual meeting coupled with a cultural awareness workshop was an enjoyable day for many members. We were welcomed to Hiawatha First Nation on the shore of Rice Lake by Tom Cowie. APA's Board of Directors extend a heartfelt thanks to Tom and his colleagues at Hiawatha, to Elders Dorothy Taylor and Doug Williams, to Katherine Cappella of MTCS, to the people who prepared an amazing lunch, to Julie Kapyrka of the Training and Workshop Committee, to the numerous people who pitched in to make this event great, and to the members who participated – although we can't do it often, it is very rewarding to get together to share learning, discussion, food and camaraderie.

Michi Saagiig Oral History and Cultural Awareness Workshop

The Elders spoke from the heart in a way that connected with everyone in the room during the workshop session about Michi Saagiig (“Mississauga”) Oral History and Cultural Awareness. Where there are people like Doug Williams and Dorothy Taylor entrusted with a wealth of traditional knowledge to share and there are those of us who have been trained with material culture and the structure of the scientific method, there are meaningful connections that are made when we come together to talk, listen and find our common pursuits. I won't try to summarize the stories and messages that were given to us by Doug and Dorothy, as no doubt I will fall short. I will relay how pleased I am to see the steadily growing number of archaeologists (both the new and the seasoned) becoming engaged in these dialogues with knowledge and language keepers, water and land protectors, and those who are able to connect with consultants, researchers and academics to add layers of meaning to archaeological endeavours. I note that Curve Lake's Consultation web page features a short introductory video that incorporates a message from Dorothy Taylor as well as a reminder of the Curve Lake First Nation Consultation and Accommodation Standards (2016) at www.curvelakefirstnation.ca/services-departments/lands-rights-resources/consultation/

Julie Kapyrka had the floor next, speaking as a university-trained archaeologist who now works in Lands, Rights and Resources at Curve Lake First Nation, and she emphasized the importance of connection and communication between those who conduct archaeological assessments and research with those who traditionally know and protect the land and cultural landscapes. The evidence found or found to be absent during the archaeological process may make it very problematic to assign an ethnic label to a resource; Consultation staff have noticed this in AA reports and are sympathetic to the issue. The importance of including living descendants in the process is key, and ongoing efforts to train and involve archaeological liaisons from First Nations is a critical piece of the reciprocal relationship. There is a need for standardization for liaisons from all nations. There is also a need to increase capacity for review at MTCS with only 5 Archaeological Review Officers, where formerly there were 17.

MTCS Meeting

Katherine Cappella, the Archaeology Programs Unit Manager at MTCS, also volunteered her time to be present for this day, and relayed how she values in-person discussions to help alleviate any strained relationships that may have grown in the past. Katherine spoke on a number of issues and also fielded questions from the room.

Topics covered included:

- Conservative Government priorities and how those affect operations at MTCS, government consultation currently moves fast and is technology-driven, the Unit has been asked to outline how archaeology fits in with development, the Unit saw the need to educate senior officials about obligations the government

has with Indigenous nations and have seen progress, also advocating that improvements to the Unit's operational programs could help to streamline the development approvals process, hiring freeze is on and the Unit is operating with minimal personnel;

- The Culture Strategy and update to the Standards and Guidelines, including an artifact repositories strategy that was approved by the former government must now be reviewed and approved under the new government, the Unit anticipates no funding for improvements to PastPort (including accuracy with GIS mapping) until S&G review completed;
- Noting that areas of focus in the S&G review should include collections management and relationship building/stronger engagement with Indigenous communities;
- Recognizing that some Indigenous communities have capacity for land management, liaisons, collections while others do not;
- With AA reports that have been included in the Ontario Public Register of Archaeological Reports, noted that in some cases requests have been made for those reports to contain an addendum that includes more Indigenous knowledge than may have been known at the time of submission/review
- Question/discussion about legacy collections – resources for older collections and the possibility of de-accessioning some 19th century artifacts; Katherine noted the possibility of looking to Alberta and elsewhere for solutions that work; sampling strategies in the field could be different; working with Indigenous communities for possible storage options
- Question/discussion about requirements for licensee care/storage of artifacts (individual) vs requirements for Indigenous repositories (museum standards) – Katherine noted that an Artifact Management Strategy is needed and that artifacts need to be accessible, not just stored; Indigenous Affairs Ontario would also be involved
- Discussion about information sharing between Indigenous communities, proponents, municipal authorities – info about proposed projects, info about resources that need protected – through conversations starting at Stage 1 rather than later, through data sharing with First Nations, through shared understandings of cultural histories
- Katherine's goal every month is to circulate a Manager's Memo to licensees; and she welcomes APA members to submit thoughts to her on frustrations, creative solutions to issues, bigger picture ideas

Annual General Meeting 2019

Our standard business meeting for general members had sixteen members in-person, 7 members attend remotely via internet, and 2 guests in attendance. There were no requested revisions to the draft minutes of the 2018 AGM - the approved minutes document is posted online at www.apaontario.ca/minutes.

The Treasurer's report for our fiscal year of March 1, 2018 to February 28, 2019 was reviewed, with no additional questions about revenues or expenditures. APA's member awards can be supported for another year, and so we encourage all members to check out the details for the Student Bursaries, the Radiocarbon Lottery and Merit awards, the Conference Travel Grant, and the *new* APA Grant for Research on First Nations Lands – details for each are posted below and online.

Other reports were provided by Board members including President Laurie Jackson, Vice President Dave Norris, Secretary Cathy Crinnion, Communications / Newsletter Editor Nadine Kopp, Membership Ben Mortimer, First Nations Relations Laura McRae, Research and Investigations Jeff Dillane, and Field Directors' Liaison Norbert Stanchly; as well as Committee reports from Membership (Ben) and from Training and Workshops Chair Julie Kapyrka.

New Business brought forward included the announcement of a new grant for members: APA Research Grant on First Nations Lands! In an effort to promote studies and collaboration with First Nations communities, APA Ontario is pleased to offer a special grant for those who conduct work in conjunction with and on First Nation reserve lands. APA wishes to foster collaboration between First Nation communities and APA members in an effort to disseminate important information regarding the cultural past of Ontario. It is hoped that this grant will aid in such endeavours. Grant Amount: \$1000. First deadline for application will be announced by

group email to all members and a new tab added to the APA website for easy access: www.apaontario.ca/FirstNationsLands.

The final item on the AGM agenda was Ontario Archaeology and Unions, which generated a good amount of discussion in the room as well as from the remote participants. The Board reported that a large number of active APA members participated in the 'Opinions about Unionization' survey in March, and also that a meeting took place on March 21st between APA Exec reps and LiUNA reps – 15 questions were posed by APA and the information supplied by LiUNA is now being shared and discussed by the full APA Executive. A synopsis of these information-gathering initiatives will be circulated to the APA membership.

Draft Minutes from the 2019 AGM will be posted once ready at www.apaontario.ca/minutes.

- Cathy Crinnion

Reserve Lands Research Grant

In an effort to promote studies and collaboration with First Nation communities, APA Ontario is pleased to offer a special grant to assist those who conduct work in conjunction with and on First Nation reserve lands. APA wishes to foster collaboration between First Nation communities and the Archaeological work force in an effort to disseminate important information regarding the cultural past of Ontario. It is hoped that this grant will aid in such endeavours.

Value: \$1,000

To apply for the grant, provide APA with the following information:

- Your organization
- The Community you are working with
- Brief (1 page) summary of the project
- How this will contribute to archaeological research in Ontario
- Brief history of the investigations
- What the monies will be used for

The primary condition of the grant is acknowledgement of the APA Reserve Lands Research Grant if the information obtained from the research is published, as well as a submission of a short note for the APA website and newsletter. This newsletter/ website report can be a brief summary of the project, site, context and how the community and archaeology will benefit from the research.

A small committee will evaluate proposals from members before awarding the grant.

Deadline to Apply:
Monday September 30, 2019
at 11:59pm EST

Calibrating the Age of Meadowood in South-Central Ontario – New Data from the Dawson Creek Site (BaGn-16), Rice Lake

Recent work investigating Point Peninsula phase sites on Rice Lake in co-operation with Curve Lake First Nation has prompted a re-evaluation of the local timing and expression of the preceding Early Woodland Meadowood phase. Excavated in 1976, 1981 and 1982, the Dawson Creek site (BaGn-16) on the northwest shore of Rice Lake (Figure 1) remains the only site in south-central Ontario with a large number of conventional radiocarbon dates on hearth and pit features containing Meadowood phase diagnostics. Examples from the site are shown in Figure 2 (Jackson 1986, 1988). Seven dates on feature charcoal from six features were run in the early 1980s. More recently, two additional AMS dates, one on wood charcoal and one on charred nutshell, were run on two features – one dating a charred nutshell

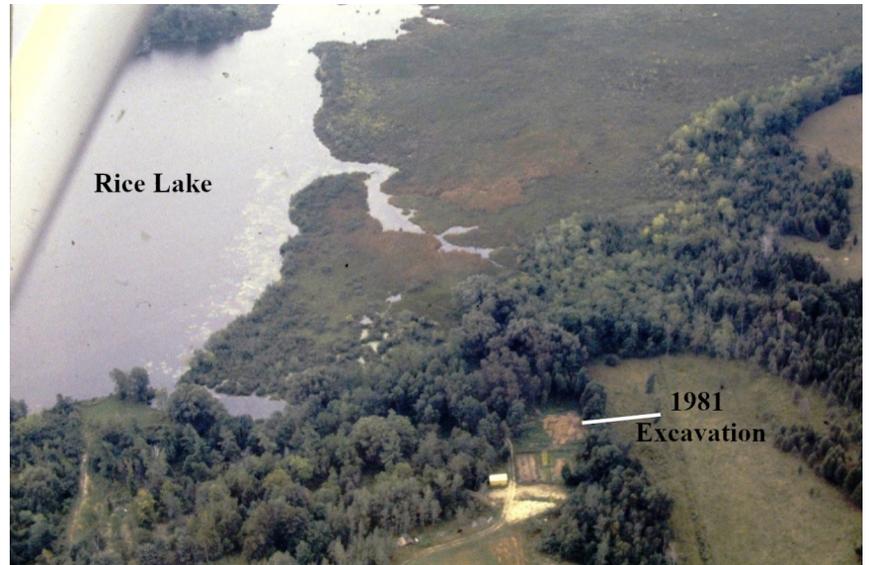


Figure 1: View Southwest of 1981 Dawson Creek Site Excavation, North Shore of Rice Lake.

lens in the deepest part of pit Feature 15 and one dating a new hearth (Feature 25) with a Meadowood point/drill. This brings the site total to seven Meadowood features and nine radiocarbon dates.



Figure 2: Vinette 1 ceramics and Meadowood lithics from C14 dated Dawson Creek features.

Radiocarbon calibrations in this study use the R Statistical Program and the R. Carbon Package (Bevan and Crema 2019; R. Core Team 2019). All statistical comparisons of radiocarbon dates in this study use Calib 7.0.4. We cite statistical variance at two sigma to add accuracy to graphed results both for individual dates and sum probability distributions.

In addition to period specific radiocarbon dates, the seven Dawson Creek site features are identified as Meadowood from artifact inclusions which include Vinette 1 ceramics and Meadowood points or cache blades. Figure 3 shows the distribution of the dated features. Features 1, 2, 13, 14, 15 and 17 all have Vinette 1 ceramics, though quantities are variable, Feature 1 has a cache blade, and Features 15 and 25 have Meadowood points. Uncalibrated radiocarbon ages for the features range from just short of 3,000 B.P. to about 2,300 B.P. One sigma variance range from 40 to 90 years. Calibration of these dates, with two sigma variance, as shown in Figure 4, and a sum probability distribution for all of the dates, as shown in Figure 5, suggest several interesting trends. First, Meadowood at Dawson Creek appears to end close to cal. 400 B.C. Second, the primary date cluster, falls between about cal. 850 and 400 B.C. which appears to be a continuous event. Third, there are

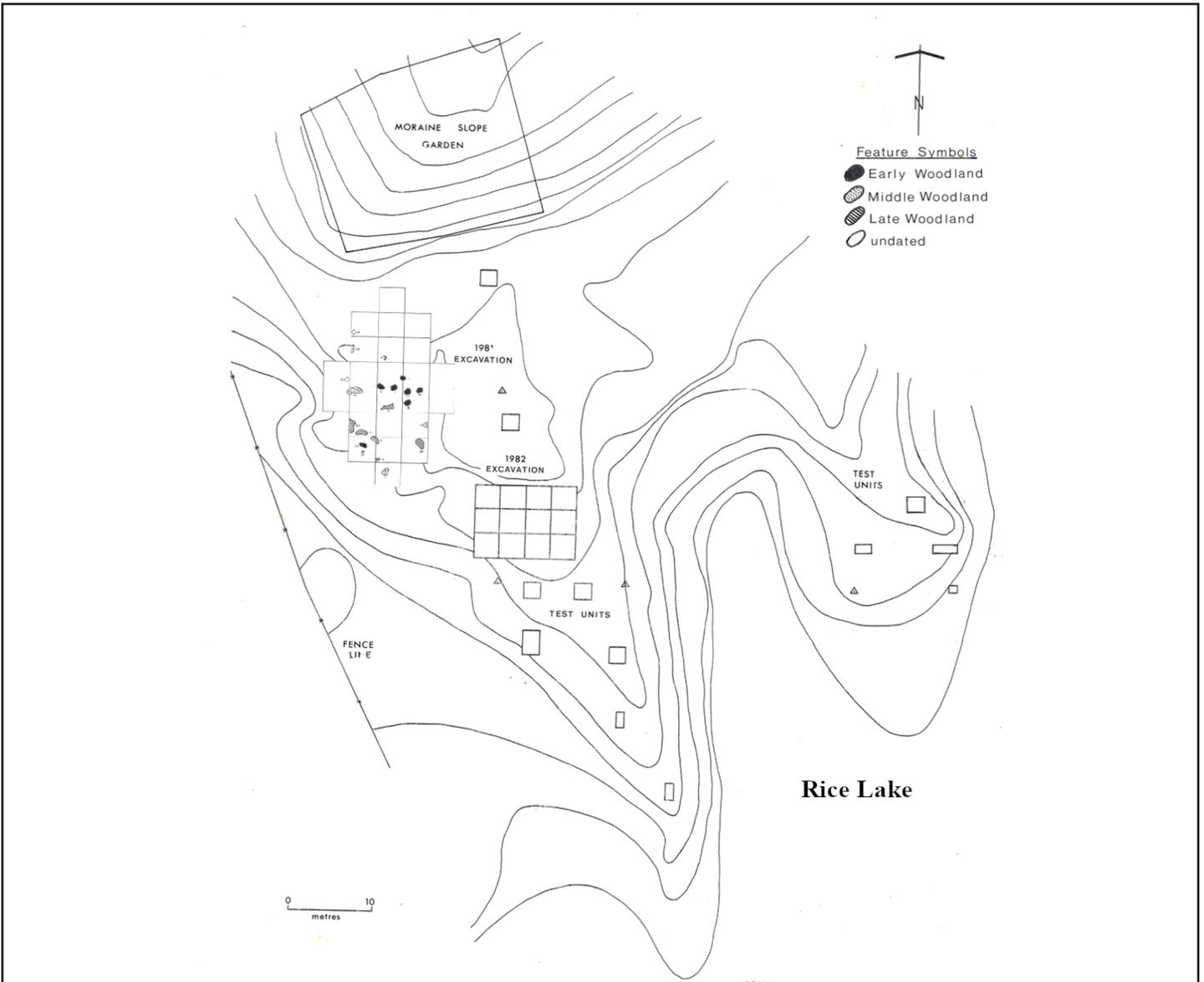


Figure 3: Radiocarbon Dated Early Woodland Features at Dawson Creek site.

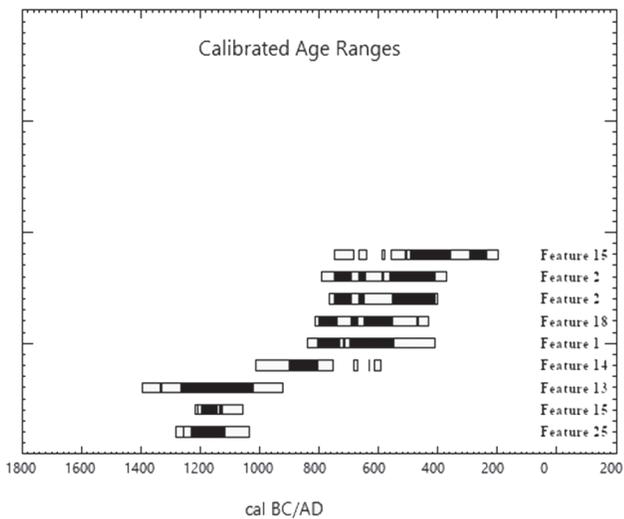


Figure 4: Calibrated Meadowood Feature Dates at Dawson Creek Site with Two Sigma Variance.

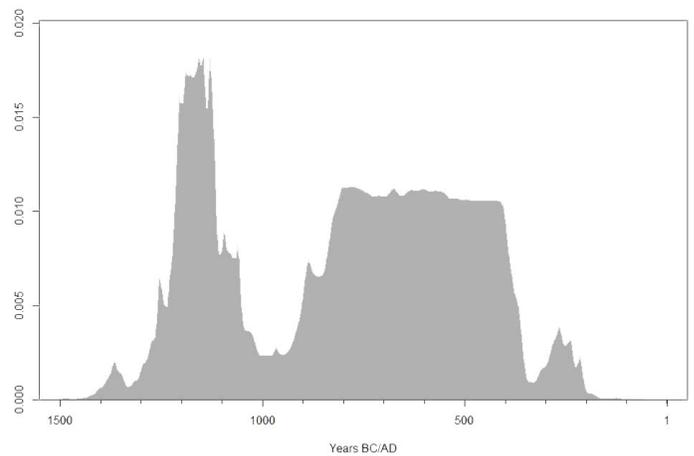


Figure 5: Sum Probability Distribution of Early Woodland Dawson Creek Feature Dates.

several consistently older and statistically related dates, circa cal. 1200-1000 B.C. on Features 13, 15 and 25, which suggests the possibility of an earlier inception of Meadowood than previously suspected for Ontario. The sum probability graph does show a blank area circa cal. 1000 to 850 B.C. This could be interpreted as a data gap, as an interval between an early and later phase of Meadowood, as in New York and Michigan (Granger 1878), an interval between a terminal Archaic and Early Woodland expression, or as a C14 skewing effect which has yet to be identified.

We suggest that the Meadowood phase of the Early Woodland in south-central Ontario definitely begins circa cal. 850 B.C. and persists to cal. 400 B.C. and may have an earlier phase cal. 1200 to 1000 B.C. with unknown continuity. It is unclear from our ongoing Rice Lake research whether Point Peninsula actually begins around 400 B.C. after Meadowood (Curtis 2002), whether the mortuary phase of Middlesex is synonymous with Point Peninsula or whether Point Peninsula begins later (Spence et al. 1990).

- Lawrence Jackson, Daniel Smith, and Josh Garrett
Northeastern Archaeological Associates Ltd.

References Cited

Bevan, A. and Crema, E.R.

2018 rcarbon v1.2.0: Methods for calibrating and analysing radiocarbon dates URL: <https://CRAN.R-project.org/package=rcarbon>

Curtis, Jenneth

2002 A Revised Temporal Framework for Middle Woodland ceramics in South-central Ontario. *Ontario Archaeology* 73:15-28.

Granger, Joseph E. Jr.

1978 Meadowood Phase Settlement Pattern in the Niagara Frontier Region of Western New York State. *Anthropological Papers, Museum of Anthropology, University of Michigan, No. 65.*

Jackson, L.J.

1986 New Evidence for Early Woodland Seasonal Adaptation from Southern Ontario, Canada. *American Antiquity* 51(2):389-401.

1988 Dawson Creek Feature Analysis: 4,000 Years of Ontario Prehistory. Trent University Occasional Publications in Anthropology, No. 5, Peterborough.

R Core Team

2019 R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL <https://www.R-project.org/>.

Spence, M.W., Pihl, R.H., and Murphy, C.R.

1990 Cultural Complexes of the Early and Middle Woodland Periods. In Ellis, C.J. and N. Ferris (Eds.) *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, OAS, pp. 125-169.

Acknowledgements

With special thanks to the Michi Saagiig First Nations within whose territories we carry out our research. We wish to thank the Ontario Heritage Foundation for major support in the 1980s of excavations and radiocarbon dating of the Dawson Creek site. Northeastern Archaeological Associates sponsored additional C14 dates in 2018 and 2019.

2019 Student Bursary Awards

The APA Post-Secondary Student Bursary and Indigenous Post-Secondary Student Bursary

Two Student Bursaries will be awarded once per calendar year to two student members in the amount of \$750 each. Each bursary would be the approximate amount of tuition for 1 single-semester course.

Upcoming deadline to apply:

August 30, 2019

For eligibility and how to apply, check it out here:

<http://www.apaontario.ca/StudentBursaries>

Conference Travel Award

The Conference Travel Award for members in the Field Director category will assist with expenses to travel to a conference/symposium to present a paper or poster to the APA or other archaeological organizations within Canada or abroad.

Value: \$250

Upcoming deadline to apply for

fall 2019 conferences:

August 30, 2019

For more information, visit <http://apaontario.ca/ConferenceTravelAward>

2019 Radiocarbon Date Merit Award

Apply for a future Radiocarbon Date Merit Award. The prize is the cost of one sample dated at A.E. Lalonde AMS Facility, one of APA's sponsors. Open to APA members holding the PIF on a recent/current project, or all APA members conducting research on a project with no active PIF.

Current projects or past projects - you decide which samples are likely to provide valuable information to yourself and your colleagues.

Upcoming deadline to apply:

TBD 2019

Visit our website (<http://www.apaontario.ca/c14Awards>) for details on how to apply.

A. E. Lalonde AMS Laboratory

Canadian centre for AMS and environmental radionuclide research



uOttawa

Radiocarbon • Radioiodine
Cosmogenic Isotopes • Actinides

Actinides • Tritium • Noble Gases
AMS Research & Development

www.ams.uottawa.ca

@Lalonde_AMS