After the flood: Investigations of impacts to archaeological resources from the 2013 flood in southern Alberta

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A summary of radiocarbon dates from the Southern Alberta Flood Investigation Program

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ABSTRACT

During the Southern Alberta Flood Investigation Program, a total of 72 radiocarbon dates were obtained from 23 archaeological sites. Radiocarbon dates submitted too late to be incorporated into final reports (n=47) account for 65% of the dates and are presented here. This paper provides a summary and evaluation of all radiocarbon dates for the Flood Investigation Program.

KEYWORDS

Flood Investigation Program, radiocarbon dates, Protohistoric Period, Late Prehistoric Period

1. Introduction

Radiocarbon dates, along with diagnostic artifacts, have defined and refined temporal models of culture history in Alberta (e.g., Wormington and Forbis 1965; Reeves 1969, 1970; Brumley and Rushworth 1983; Vickers 1986; Brumley and Rennie 2005; Peck 2011). While numerous articles in this volume present dates, many of the results were obtained too late to be incorporated into articles or associated final permit reports. Because of the valuable information radiocarbon dates bring to archaeological research, this paper summarizes all of the radiocarbon dates obtained during the Southern Alberta Flood Investigation Program undertaken in response to large-scale flooding along rivers and creeks in June, 2013.

2. Data

A total of 72 radiocarbon dates were obtained from 23 sites during the Southern Alberta Flood Investigation Program (Figure 1 and Table 1). Radiocarbon dates submitted too late to be incorporated into final reports (n=47) account for 65% of the dates associated with the Southern Alberta Flood Investigation Program and can only be found in this article (these are demarcated in Table 1 with an '*').

The materials selected for radiocarbon dating in the Flood Investigation Program are from sites that merited further excavation due to their interpretive value in combination with their perceived risk to impacts from flooding. A total of 45 radiocarbon dates were obtained from seven sites on the Bow River (EePj-103, EePk-253, EePk-256, EfPk-1, EfPk-2, EfPm-37, and EgPn-762); 22 radiocarbon dates were obtained from 13 sites along High River (EcPm-9, EdPl-10, EdPl-13, EdPl-72, EdPm-7, EdPm-9, EdPm-10, EdPm-11, EdPm-12, EePk-4, EePk-20, EePl-261, and EePn-97); and 10 radiocarbon dates were obtained from three sites along Jumpingpound Creek (EgPp-11, EgPp-26, and EhPp-78). No radiocarbon dates were obtained for sites on the Sheep River or on Tongue Creek despite their inclusion in the program.

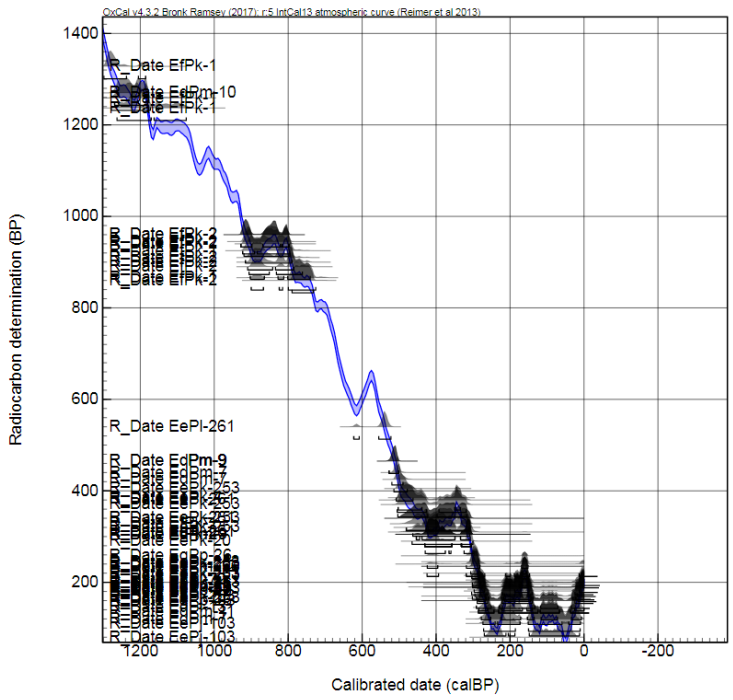

Figure 1. Distribution of all radiocarbon dates from the Southern Alberta Flood Investigation Program between 1,400 BP to 200 BP showing lack of dates for about 1,250 BP to 1,000 BP and from 850 BP to 550 BP (Bronk Ramsey 2013). Prepared by Robin Woywitka.

Table 1. Southern Alberta Flood Investigation Program radiocarbon dates listed chronologically (most recent at top). Permit Numbers with an asterisk (*) indicate samples that were collected under permit but processed too late to be included in the final permit report. An (†) indicates those dates that contain modern or out of range dates and are not considered reliable. Table drafted by Sheila Macdonald.

Period	Site	C14 Date	SD	Delta C13	Depth (cm)	Lab Number	Permit Number	Material	Taxon	Element
Protohistoric	EePj-103	80†	30	-25.8	63	BETA-451871	16-123	charred bone	n/a	n/a
	EePj-103	110†	30	-26.6	45-75	BETA-4518732	16-123	charcoal	n/a	n/a
	EdPm-7	120†	30	-20.3	0-10	BETA-453314	16-147	bone collagen	bison	tibia shaft fragment
	EdPm-11	135†	20	-19.28	10	QLN-101	14-250 *	bone	large ungulate	thoracic vertebra
	EdPl-13	145†	15	-21.02	60	QLN-93	14-250 *	bone	large ungulate	navicular cuboid
	EgPp-26	160†	30	-19.2	11-24	BETA-453516	16-144	bone	bison	navicular cuboid
	EePj-103	160†	30	-23.9	38-40	BETA-451873	16-123	charcoal	n/a	n/a
	EePk-253	165†	15	unknown	40	QLN-78	14-198 *	bone	large ungulate	phalange
	EePj-103	170†	30	-26.0	60-70	BETA-451874	16-123	charcoal	n/a	n/a
	EgPp-26	181†	22	-18.64	150	UOC-2678	15-165 *	bone	bison	maxilla
	EePk-253	185†	15	-19.59	100	QLN-81	14-198 *	bone	mammal	n/a
	EgPp-26	189†	22	-17.88	193	UOC-2679	15-165 *	bone	bison	rib
	EgPp-11	189†	22	-19.39	10-15	UOC-2674	15-165 *	bone	bison	mandible
	EgPp-26	190†	30	-19.0	62-72	BETA-453517	16-144	bone	bison	long bone fragment
	EgPp-26	196†	22	-19.1	125	UOC-2677	15-165 *	bone	bison	rib
	EePk-253	200†	30	-19.2	133	BETA-451867	16-123	bone	n/a	n/a
	EdPl-72	205†	15	unknown	100	QLN-94	14-250 *	bone	large mammal	n/a
	EePk-253	215†	15	-19.21	50	QLN-80	14-198 *	bone	large ungulate	metatarsal
	EePk-253	220†	15	-19.00	80	QLN-82	14-198 *	bone	large ungulate	thoracic vertebra
	EePk-256	235†	15	-19.24	unknown	QLN-75	14-198 *	bone	large ungulate	skull fragment
	EdPm-12	235†	15	-18.98	50	QLN-102	14-250 *	bone	large mammal	rib fragment
	EePk-253	240†	30	-26.6	320	BETA-451870	16-123	charcoal	n/a	n/a
	EePk-253	245†	15	-19.05	150	QLN-77	14-198 *	bone	large ungulate	radial carpal
	EgPp-26	258†	22	-18.64	75	UOC-2676	15-165 *	bone	bison	thoracic vertebra

Table 1. Continued.

Period	Site	C14 Date	SD	Delta C13	Depth (cm)	Lab Number	Permit Number	Material	Taxon	Element
Late Prehistoric	EePk-20	290	15	-19.24	30	QLN-104	14-250 *	bone	large mammal	long bone shaft fragment
	EdPm-9	305	15	-18.57	30	QLN-97	14-250 *	bone	large mammal	rib fragment
	EdPm-9	305	15	-19.01	60	QLN-98	14-250 *	bone	large mammal	rib fragment
	EfPk-2	305	15	-19.76	30	QLN-67	13-248 *	bone	large ungulate	tibia shaft fragment
	EfPk-2	305	15	-19.42	30-60	QLN-71	13-248 *	bone	large ungulate	pelvis
	EePl-261	310	30	-19.4	60-70	BETA-453312	16-147	bone	bison	rib
	EePk-253	320	15	-19.38	250	QLN-76	14-198 *	bone	large ungulate	rib
	EfPk-1	328	22	-18.19	35	UOC-2687	15-147*	bone	bison	cranial fragment
	EePl-261	340	30	-20.2	30-40	BETA-453311	16-147	bone	bison	rib
	EePk-253	340	30	-19.5	222-233	BETA-451868	16-123	bone	n/a	n/a
	EePk-253	370	30	-18.5	280-290	BETA-451869	16-123	bone	n/a	n/a
	EePl-261	380	30	-20.3	70-80	BETA-453313	16-147	bone	bison	unknown
	EePk-4	385	15	-19.24	0-30	QLN-103	14-250 *	bone	large ungulate	phalange
	EePk-253	405	15	-19.19	300	QLN-79	14-198 *	bone	large ungulate	axis
	EdPm-7	425	15	-19.92	25	QLN-95	14-250 *	bone	large ungulate	humerus shaft fragment
	EdPm-7	440	15	-18.93	50	QLN-96	14-250 *	bone	large ungulate	cervical vertebra
	EcPm-9	465	15	-18.73	15	QLN-91	14-250 *	bone	large ungulate	skull fragment
	EdPm-9	465	15	-15.14	80	QLN-99	14-250 *	bone	large mammal	rib fragment
	EePl-261	540	15	-17.89	120	QLN-106	14-250 *	bone	large mammal	long bone shaft fragment
	EfPk-2	860	15	-19.41	60	QLN-68	13-248 *	bone	large ungulate	femur shaft fragment
	EfPk-1	866	22	-19.18	78	UOC-2685	15-147*	bone	bison	terminal phalanx
	EfPk-2	890	15	-19.60	60	QLN-84	13-248 *	bone	large ungulate	pelvis
	EfPk-2	900	15	-19.27	130	QLN-70	13-248 *	bone	large ungulate	navicular cuboid
	EfPk-2	910	15	-19.04	130	QLN-83	13-248 *	bone	large ungulate	mandible
	EfPk-1	925	22	-18.91	115	UOC-2686	15-147*	bone	ungulate	unknown
	EfPk-2	940	15	-19.34	230	QLN-86	13-248 *	bone	large ungulate	unknown
	EfPk-2	945	15	-17.98	300	QLN-73	13-248 *	bone	large ungulate	pelvis
	EfPk-2	960	15	-19.52	230	QLN-72	13-248 *	bone	large ungulate	cervical vertebra
	EfPk-2	960	15	-18.97	300	QLN-85	13-248 *	bone	large ungulate	rib head
	EfPk-1	1237	22	-18.39	57	UOC-2682	15-147*	bone	large ungulate	unknown
	EfPk-1	1259	22	-18.9	150	UOC-2684	15-147*	bone	mammal	unknown
	EdPm-10	1270	15	-19.10	0-30	QLN-100	14-250 *	bone	large ungulate	humerus fragment
	EfPk-1	1328	22	-18.05	175	UOC-2683	15-147*	bone	mammal	unknown
Middle Prehistoric	EgPp-11	1571	22	-19.16	158	UOC-2675	15-165 *	bone	bison	tibia
	EfPm-37	2100	30	-19.1		BETA-419054	15-062	bone		ulna
	EfPm-37	2130	30	-25.0	unknown	BETA-419052	15-062	charcoal	n/a	n/a
	EfPm-37	2180	30	-18.6	80	BETA-419053	15-062	bone	n/a	n/a
	EfPm-37	2290	30	-18.9	unknown	BETA-419051	15-062	bone	bison	tibia
	EfPm-37	2365	15	-18.55	120	QLN-74	14-198 *	bone	large ungulate	phalange
	EfPm-37	2460	30	-18.9	unknown	BETA-397887	14-198	bone collagen	bison	metacarpal
	EePn-97	3020	30	-18.4	unknown	BETA-427998	15-136	bone	n/a	n/a
	EhPp-78	3412	24	-18.45	115	UOC-2680	15-165 *	bone	bison	skull
	EdPl-10	5000	30	-21.1	30-40	BETA-451320	16-146	bone	bison	astragalus
	EePn-97	5400	30	-19.2	unknown	BETA-427997	15-136	bone	n/a	n/a
	EhPp-78	5488	28	-19.62	370	UOC-2681	15-165 *	bone	bison	radius
	EdPl-10	5950	30	-18.4	50-60	BETA-451319	16-146	bone	bison	radius or metapodial
	EfPm-37	5980	30	-18.5		BETA-427996	15-136	bone		
Early Prehistoric	EgPn-762	10840	50	Unknown	413	BETA-372155	13-248	bone	*Bison bison antiquus*	skull

3. Results

Of the 72 radiocarbon dates obtained, 24 are within the Protohistoric Period, 33 dates had values within the Late Prehistoric Period, 14 dates are in the Middle Prehistoric Period, and one date is from the Early Prehistoric Period (Table 1). The skewed distribution towards recent sites likely relates to the dynamic nature of rivers and their formation processes. The potential for earlier landforms to be eroded and removed by natural processes is much higher than for more recent landforms for the simple reason that they have been exposed to potential disturbances for a longer duration. In addition, the Southern Alberta Flood Investigation Program surveys were restricted to current river margins; therefore, older landforms that have been isolated and are now well back from modern rivers were not within the study area and were not investigated. This lowered the potential to find older landforms and older sites.

One site dating to the Early Prehistoric Period was encountered: EgPn-762 is an isolated Bison antiquus skull found 2.5 metres below Mazama Ash (Vivian et al. 2017). It was not associated with cultural material and is not considered an archaeological site. The lack of other finds of this age encountered during the program speaks to the rarity of intact early landforms in proximity to modern river edges.

Five dates were obtained for sites in the Middle Prehistoric Period (EdPl-10, EePn-97, EfPm-37, EgPp-11, and EhPp-78): 1) EdPl-10 (Metke site) is a Calderwood Complex campsite on Highwood River (Vivian and Blakey 2017); 2) EePn-97 (Levi-Brown site) on the Highwood River has two components dating to the middle Middle Prehistoric Period and late Middle Prehistoric Period; 3) EfPm-37 is a Bracken Phase campsite on the Bow River with components from the Middle Precontact Period and Late Precontact Period; 4) EgPp-11 is a multi-component, stratified site on Jumpingpound Creek with components from the middle Middle Prehistoric Period and late Middle Prehistoric Period; and 5) EhPp-78 is a highly stratified site from the middle Middle Prehistoric Period and late Middle Prehistoric Period.

The Late Prehistoric Period is represented by 33 dates from ten sites studied in the Flood Investigation Program (Table 1). Of the 33 dates, 19 are younger than 550 before present (BP). There are no dates between 550-850 BP (Figure 1); the reason for this is unknown but random chance, cultural dynamics, and environment influences may all be factors. A second hiatus with regard to dates in the Late Prehistoric Period occurs around 1,000-1,250 BP (Figure 1). This may also be explained by random chance or a host of other factors. While dates were obtained to suggest Avonlea Phase occupations at EfPk-1 and EdPm-10, no diagnostics were recovered. All remaining sites with dates fall within the Old Women's Phase; however, diagnostics were only recovered at EdPm-7, EePl-261, EfPk-1, and EgPp-26.

Perhaps most interesting is the number of radiocarbon dates attributed to the Protohistoric Period. Twenty-three radiocarbon dates from ten sites fall within the last 250 years BP. It should be noted that a curiousity of radiocarbon dating is that the last few hundred years produces unreliable dates. Put another way, samples dated within the last ca. 250 years BP only indicate that the samples likely date to within the last 250 years; the specific date provided is not reliable. In assemblages with late dates, it is the artifacts and their stratigraphic relationships that provide the most accurate measure of a site's age rather than the date. All of the protohistoric dates from the Flood Investigation Program should be viewed in this light (see Table 1).

Meyer and Amundsen-Meyer (2017), working at Margaret's Site, encountered a stratified protohistoric site with few lithics and fire-broken rock but a number of features, some bone, and the occasional historic artifact. The ramifications of such an assemblage were clear to the excavators:

> *...Peck (2011:433) has identified the true issue in our archaeological understanding of this time period [Protohistoric] when he states that, "Still, a recurring problem in interpreting protohistoric sites rests in the ability to demonstrate a single unmixed occupation." There are actually many sites in southern Alberta with the occasional protohistoric artifact, but there are almost none with discrete protohistoric occupations. Put concisely, sites with protohistoric occupations are uncommon, sites with protohistoric occupations not mixed with Late Precontact Period materials are rare, and sites with more than one stratified protohistoric occupation are practically unheard of.*
>
> *EePj-103 is unique in that it has two stratigraphically distinct protohistoric/very early historic occupations, at least in portions of the site, neither of which are mixed with earlier Late Precontact Period materials, nor with later Historic Period occupations. This alone places the site in a unique position to elucidate a number of research questions, most specifically, the impact of European trade goods on Aboriginal peoples' toolkits, and changes to Aboriginal lifeways and attendant social systems at the time* (Meyer and Amundsen-Meyer 2017:37).

The stratigraphic nature of deposits at Margaret's Site allowed for measurement of the change in time. The lack of lithic and firebroken rock was conspicuous, suggesting to the excavators that European trade goods had rather rapidly replaced many tradition tools.

Similarly, EePj-26, a bison killsite on Jumpingpound Creek, showed obvious signs of being a stratified killsite during survey; ultimately it produced a stratified protohistoric record including metal points, a seed bead, and a horse bone (Leyden and Landals 2017). All of the layers indicated

the use of metal cutting tools in the butchering process with only a slight increase in the use of stone cutting tools in earlier layers. Meyer and Amundsen-Meyer (2017:37) note that Pyszczyk (1997) had argued: "European goods did not significantly alter the use and importance of traditional forms of material culture, and that traditional technologies were not replaced, as the European goods may have in part been performing non-utilitarian functions in First Nations societies." In contrast, the stratified sites encountered in the Flood Investigation Program suggest a more rapid replacement of traditional technology. The view that Aboriginal lifeways were modestly or gradually influenced by European trade goods has been heavily biased by a data set of mixed Protohistoric and Late Prehistoric Period occupations (Meyer and Amundsen-Meyer 2017). The actual transition from the Late Prehistoric to Protohistoric Period is likely more complex with various technologies having been impacted more rapidly than others.

4. Conclusion

This paper draws together all the radiocarbon dates obtained during the Southern Alberta Flood Investigation Program. The data are intended to be used as a reference tool and primary reference source only for those dates not provided in any other publication. Researchers are encouraged to examine original sources whenever possible to ensure transcription errors have not occurred and source documents are acknowledged. Reviews of primary sources will also allow for evaluations of associations between dated material and artifacts/occupations being investigated, a step not undertaken in this review.

5. Acknowledgments

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