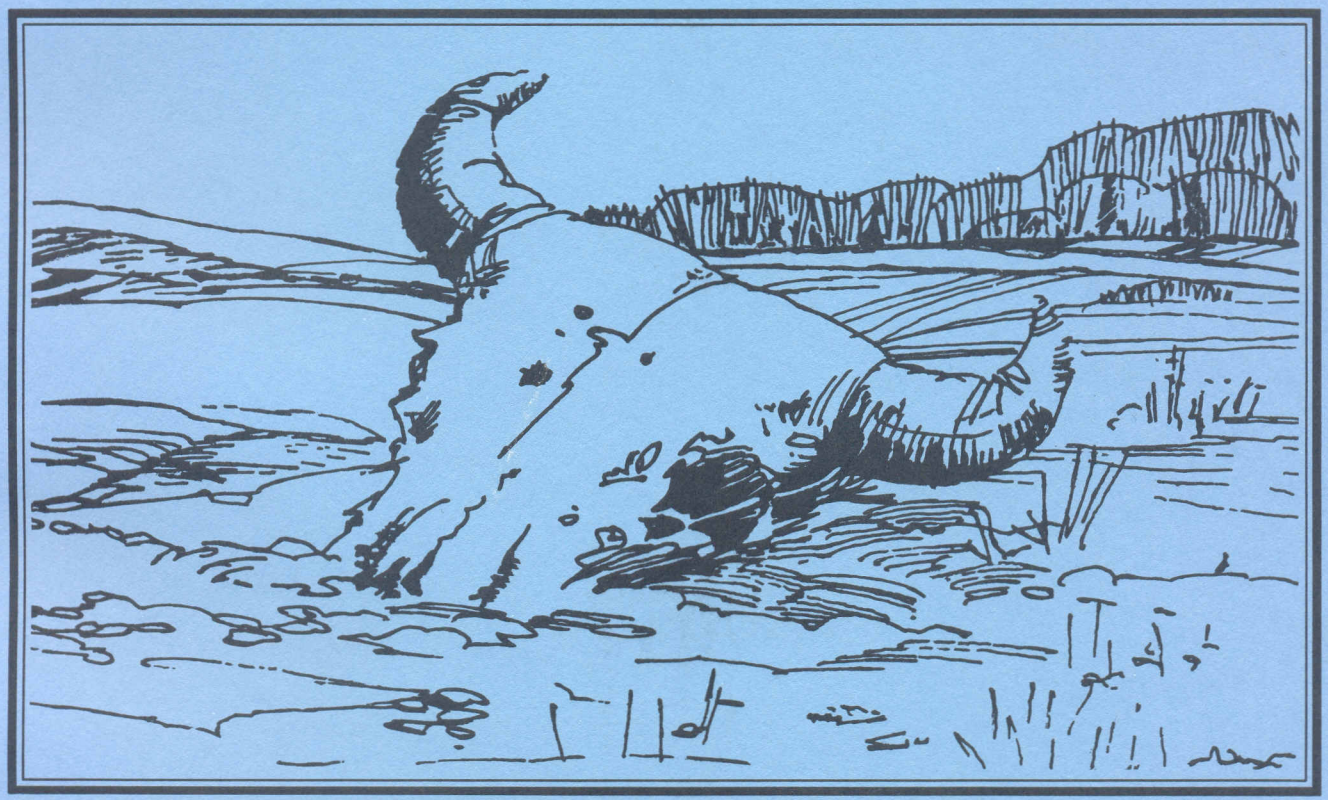
ARCHAEOLOGICAL SURVEY OF ALBERTA

ARCHAEOLOGY IN ALBERTA 1981

Occasional Paper
No. 19
1982

Jack Brink



Alberta
CULTURE
Historical Resources

ARCHAEOLOGY IN ALBERTA, 1981

Compiled by
Jack Brink

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Objectives

These Occasional Papers are designed to permit the rapid dissemination of information resulting from Historical Resources' programmes. They are intended primarily for interested specialists, rather than as popular publications for general readers. In the interests of making information available quickly to these specialists, normal publication procedures have been abbreviated.

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FOREWORD

Paul F. Donahue

ARCHAEOLOGY IN ALBERTA: 1981

The 1981 Annual Review of Archaeology in Alberta is markedly different from its predecessors. The new format includes abstracts of 1981 permit projects submitted as of press time as well as brief research papers. By shifting to this format, those individuals wanting a broad perspective of Alberta archaeology can scan the abstracts to obtain an appreciation of the nature and results of those projects. Approximately 50% of the permits issued in 1981 are represented here by abstracts. Those not submitted in time for publication will be produced next year. In the future, it is anticipated that all abstracts will be ready by press time.

The research papers included in this issue are also an indication of what will occur more frequently in the Annual Review. Ives' Birch Mountain Archaeological Study, 1981, is a brief summary of excavations undertaken at three sites in the Birch Mountains following increasingly intensive surveys and assessments of sites in the region. Ives will continue excavations there in order to further study what activities occurred at specific sites at different points in time. Paleoecological studies of faunal, pollen, diatom and limnological data are being carried out in conjunction with Ives' projects. Pollock's H.R.I.A. of a portion of the Interlakes area in Kananaskis Provincial Park elucidates on the three major variables he has found useful for selecting areas of high archaeological potential. This paper also provides a useful example of a basic historical resource impact assessment from start to completion. In the paper by Bobrowsky and Ball the authors address the utility and

effectiveness of intensive data recovery strategies using samples of soil matrix. Their case study focuses on material gathered from the Ross Site (DlPd-3). The authors present a strong argument in favour of intensive data recovery. It is supported by an increased data base on which better interpretations can be made, an assessment of cost factors vis-a-vis different techniques and increased information retrieval, as well as an appreciable decrease in factors related to site disturbance. Brumley's report on the Gilchrist site, a cache of imported obsidian and probable Avon chert presumably intended to be made into finished tools, is an indepth analysis of the 35 pieces of flakeage, shatter and bifaces from an area near Writing-On-Stone in south-central Alberta. Obsidian hydration dates for four specimens ranged from 425 - 735 B.P. with a mean of 575 B.P. (A.D. 1405). The obsidian is most likely derived from Yellowstone Park located some 480 km (298 miles) south of the cache. Brumley's analysis was accomplished under contract to the Archaeological Survey. The report on excavations of Carson-Pegasus Provincial Park by Brian Ronaghan focuses on mitigative excavations at two sites scheduled to be impacted by park development. At one site (GbPv-1), approximately .2% of the potential undisturbed site area was excavated and three techno-cultural complexes were inferred. These represented the Late Prehistoric, Middle Prehistoric and Early Prehistoric periods. The latter is predicated on the occurrence of a possible Plainview point. Significantly, formed and utilized tools comprised 12% of the total assemblage; an exceptionally high percentage for sites in the north and apparently indicative of intensive and settled camping in the area. Sites this spatially extensive, rich in cultural material and of such potential time depth are rare in the north and their historical value extends far beyond the immediate area. The final paper by Fenton and Ives is directed at discussing the geological origins of Beaver River Sandstone (previously termed Beaver Creek or Beaver River quartzite). The prehistoric Beaver River Quarry (HgOv-29) was first discovered in the early 1970's and since then similar lithic material has been recorded at nearly 300 sites

near Fort MacKay, in northeastern Alberta. Fenton and Ives provide a concise description and analysis of the material and its distribution, briefly elaborate on artifacts made from Beaver River Sandstone and their distribution, and discuss the archaeological implications of knowing source areas for the material.

In review, 213 permits were issued in 1981, of which six were later cancelled. Over 1,000 excavation permits have been issued through the Archaeological Survey since the Historical Resources Act came into being. Accordingly, close to 1,000 reports are now on file at the Archaeological Survey, which when combined with the approximately 13,000 recorded sites (800 - 900 are added each year) and the collections currently stored in-house, constitutes a vast amount of historical data that can be made available to researchers. It also represents a portion of Alberta's heritage, which will be conserved for the future. Further to resource management concerns, Archaeological Survey staff have recently been involved in a number of internal projects. To mention a few, Jack Brink has worked closely with ACCESS Alberta to produce a videotape on Alberta prehistory and the public interpretation programme at the Strathcona Science Park Site. This tape will be made accessible to schools and should soon be aired on television. Over 10,000 people visited this site last year. Staff have also produced four public information pamphlets which will be printed as both separate folded pamphlets and as single poster combining the four storylines. A major, but as yet uncompleted study, has been to ascertain the number of previously undisturbed acres or hectares which are currently being impacted each year in the Province. Determining what agencies are the major impactors and where the impacts occur, when correlated with predicted site densities, should enable us to better evaluate and respond to development proponents' projects. At present, many development projects are not referred to the Archaeological Survey, but 62% of these that were referred and for which an H.R.I.A. was requested evidenced historical resources. Research staff

have also been monitoring projects undertaken by permit holders in order that staff can be better informed as to what is happening in their region and also to ensure that quality work is being accomplished. Of note also, is that an excellent comparative faunal collection is being compiled at the Archaeological Survey and is accessible to researchers. Lastly, an archaeological interpretive display funded by the Dickson Dam Project and designed by the Historical Resources Division of Alberta Culture was recently put in place at the Dickson Dam Visitor Centre. Other items of significance are that the Resource Management Section of the Archaeological Survey is now responsible for co-ordinating impact assessments of paleoentological, historic and natural historical resources, and that Head-Smashed-In Buffalo Jump has been declared a U.N.E.S.C.O. World Heritage Site.

Staff field research in 1981 included investigations by Bruce Ball (Parklands Archaeologist) near Buck Lake, Stettler, Alliance, Rumsey, Cochrane and Hinton; Jack Ives (Northeast Archaeologist) undertook excavations and surface surveys in the Birch Mountains and near Fort MacKay; Rod Vickers (Plains Archaeologist) investigated a site near Bowden; Ray LeBlanc (Northwest Archaeologist) continued his research near Grouard on Lesser Slave Lake, and Michael Foreman (Historic Archaeologist) assessed the McDougall Methodist Mission at Fort Victoria. Of the 207 excavation permits assigned in 1981, 11 were for research purposes, i.e., not in response to a particular development project. Three of the 11 were assigned to non-staff, although only one (81-107) was initiated outside the Historic Resources Division. Straight research projects comprised 5.3% of the 1981 permits issued. In 1975, they constituted 46% of the 56 permits issued. Given that 95% of the archaeology being accomplished in Alberta today is development oriented, it is imperative that investigations take into account both research and resource management concerns, a subject which I address in the final paper in this volume.

I trust the new format will be a welcome and useful change, and will aid all readers in their appreciation of current events in Alberta archaeology. We look forward to receiving your comments.

TABLE 1: 1980 PROJECT PERMITS ISSUED
THE ARCHAEOLOGICAL SURVEY OF ALBERTA

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-1	Barry Newton	Greif, Manzie, Dant Subdivision, Edmonton
81-2	J.M. Quigg	City of Medicine Hat Subdivision, Medicine Hat
81-3	Jennifer Hunt	Shell plant expansion M.D. 44 Jumpingpound
81-4	Stan VanDyke	Melcor Subdivision (EdPm-179) Calgary
81-5	Timothy Losey	Hope & Assoc./Rosan Ranches/Suvan Fettig Subdivision/ haul road/ borrow pit Hinton
81-6	B.O.K. Reeves	Gulf Pipeline Magrath
81-7	Ed. McCullough	Calgary Power, Transmission line 240 kV Entwistle to Whitecourt
81-8	Sheila Minni	John Atkins, Subdivision Ardrossan
81-9	Sheila Minni	Mr. Hude Subdivision Ardrossan
81-10	Timothy Losey	Ron Hope et. al. (Styline), Subdivision Hinton
81-11-C	A. Graspointner	Transportation, Roads, Medicine Hat
81-12	Bruce Wright	NOVA Pipeline (EeOv-22), Patricia
81-13	Bruce Wright	Qaulico, Subdivision, Calgary
81-14	PROJECT CANCELLED	
81-15	B. Ronghan	NOVA Pipeline (Monitor only) Grande Prairie
81-16	Stan Van Dyke	Town of Airdrie, Sewer pipeline, Airdrie

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-17	Ed. McCullough	Marketplace Properties, Subdivision, Calgary
81-18	Sheila Minni	Campac Developments, Subdivision, Edmonton
81-19	Stan Van Dyke	City of Calgary, Sewer & Water Pipeline, Calgary
81-20	B.O.K. Reeves	Tri-Media, Movie studio, etc. Happy Valley, Calgary
81-21	Alan Bryan	Shell-Nova, Polystyrene plant, FkPg-42 & 43, N. of Scotford
81-22	Sheila Minni	Environment/AESL, Regional water supply system, Ft. Sask./Vegreville
81-23	John Pollock	Bemoco Ltd., Subdivision, Breton (County 25)
81-24	John Pollock	Town of Stoney Plain, Subdivision, Stoney Plain
81-25	John Pollock	NOVA, Pipelines, Two Hills/Smoky Lake
81-26	J.M. Quigg	Hat Development Ltd., Subdivision, Medicine Hat
81-27	Timothy Losey	Wabaco Property Services Ltd., Subdivision, Stoney Plain
81-28	Ed. McCullough	Soars Pipeline / Worldwide Energy, Pipeline, Bonnyville
81-29	G. Fedirchuk	Northwestern Utilities Ltd., Gas gathering system, Vermilion
81-30	R. Heitzmann	Oscar Peterson, Subdivision (gravel pit) Marwayne
81-31	Barry Newton	Belvedere Developers, Subdivision, Spruce Grove

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-32	Bruce Wright	Carma Developers, Subdivision (EgPm-81) Calgary
81-33	Ed. McCullough	Transportation, Gravel pit (EhPo-38,40) Calgary
81-34	B. Ronaghan	Canuck Engineering (A.E.C.), Pipeline ("Bitchmuen"), Cold Lake/Smoky Lake/ Edmonton
81-35	B. Ronaghan	Alberta Power, Power line, Peace River
81-36	R. Heitzmann	Cline River Devt. Co. Ltd., Hotel, recreation complex, Nordegg
81-37	Stan Saylor	Canadian Superior Oil, Pipeline, Buffalo
81-38	Stan Saylor	Douglas Dale Estates, Subdivision EfPm-104, 110; EfPl-114; EfPl-105-108 Calgary
81-39	G. Fedirchuk	Alberta Housing, Subdivision, Grande Cache
81-40	John Pollock	Century 21, Subdivision, Colinton
81-41	Bruce Wright	B.C. Forest Products, Haul roads, Knight
81-42	Bruce Wright	Gulf Canada Resources, Gas gathering system, Robb
81-43	Stan Saylor	City of Medicine Hat, Subdivision, Medicine Hat
81-44	Sheila Minni	Edmonton Power / City, Traffic circle 105th St. (FjPi-63), Edmonton
81-45	Timothy Losey	Wabaco Property Services, Subdivision, Genesee
81-46	G. Fedirchuk	Environment, Sewer line, Edmonton
81-47	Bea Loveseth	NOVA, Pipeline, Elnora

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-48	Bea Loveseth	Sundance Oil, Pipeline, Hussar/Dorothy
81-49	Don Steer	Alberta Housing & Public Works, Subdivision, Indian Industrial School St. Albert
81-50	G. Fedirchuk	Alberta Housing Corp., Subdivision, Athabasca
81-51	Jennifer Hunt	Western Mines / Adept, Pipeline (gas) - N. Beauvallon, Myrnam
81-52	B.O.K. Reeves	Union Oil, Surface coal mine, Hinton
81-53	B.O.K. Reeves	Gulf Oil, Pipeline, Pincher Creek
81-54	Ed. McCullough	Calgary Power, Transmission Line, Keep Hills - Ellerslie
81-55	John Pollock	Town of Hinton, Subdivision, Hinton
81-56	Jennifer Hunt	Calgary Power, Subdivision, Duffield
81-57	G. Fedirchuk	Akley Design, Subdivision 65.15 ha. Lac Ste. Anne
81-58	G. Fedirchuk	Akley Design, Subdivision 46.13 ha. Lac Ste. Anne
81-59	Mara Kennedy	Parks, Access road / check - in stn., Redlodge PP
81-60-C	John Pollock	Transportation/Parks, Road/Day-use sites Interlakes, Kananaskis Lakes
81-61	Ed. McCullough	Pancanadian, Gem gathering system, Bassano
81-62	Ed. McCullough	Calgary Power, Transmission line, Brooks - Vauxhall
81-63	John Ives	ASA, HkPb-1,4; HkPa-1,2,11,14,18,20,22 Eaglenest & Clear Lakes, Birch Mountains

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-64	John Ives	ASA, HhOv-70,71, Fort MacKay
81-65	Bruce Ball	ASA, Athabasca R. Valley/Parklands Study Hinton
81-66	Jennifer Hunt	NOVA, Spoil disposal site EeOm-20, McNeil
81-67	Jon Damp	Edmonton Power, Coal drilling exploration, Genesee
81-68-C	Rod Heitzmann	Transportation, SR 627:02 and SR 779, Stony Plain
81-69	G. Fedirchuk	Esso/Alberta Energy (Petalta), Styrene plant, Lamont/Bruderheim
81-70	J.M. Quigg	Environment / Associated Eng., Water Pipeline/canal diversion,Deadfish Creek
81-71	Mike Wilson	I.A.C. Investors, Apartment building, Calgary
81-72	B.O.K. Reeves	Crowsnest Resources, Coal drilling, program, Taber
81-73-C	A. Graspointner	Transportation, DlOo-3,4,5; DkOm-17,18; DgOm-1,2,3; DgOn-16 to 20, Medicine Hat
81-74	Jon Damp	Dupont, Polyethelene plant, Redwater
81-75	Bruce Wright	Burnco, Gravel pit (80-7), Calgary
81-76	PROJECT CANCELLED	
81-77	Rod Vickers	ASA, ElPl-3, Bowden
81-78	Bruce Ball	Alberta Forest Service, Campground, Bergen
81-79	Bruce Ball	ASA, EgPr-2, Cochrane
81-80	B.O.K. Reeves	Parks, Fish Creek P.P., Calgary

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-81	Stan Van Dyke	Wimpey. Subdivision EgPn-146, Calgary
81-82	Jon Damp	Fording Coal, Coal mine, Lethbridge
81-83	Bea Loveseth	Sundance Oil, Pipeline/gathering system Wintering Hills
81-84	Bea Loveseth	Gulf Canada, Pipeline: "Apple", Leduc/Lacombe
81-85	Jon Driver	Research, FjPi-29, Edmonton
81-86	Don Steer	Terraventure Investments, Subdivision, Airdrie
81-87	G. Fedirchuk	Esso, Petrochemical facility, Redwater
81-88	Timothy Losey	Brassard Agencies, Subdivision, Hinton
81-89	John Pollock	Poplar Grove Dev. Ltd., Subdivision, Cold Lake
81-90	Stan Saylor	NOVA, Pipeline, No. of Buffalo
81-91	John Pollock	Reid, Crowther & Partners, Subdivision, Bonnyville
81-92	Don Steer	NOVA (Pan - Alberta), Pipeline lateral, Robb (Hanlan)
81-93	B.O.K. Reeves	Nu - West, Subdivision: Scenic Acres Stage II, Calgary
81-94	Ed. McCullough	Canstar Oil Sands Ltd., Campground/ access road, Fort McMurray
81-95	J.M. Quigg	Hat Development, Ross Glen Site (DlOp-26), Medicine Hat (Subdivision)
81-96	Ray LeBlanc	ASA, GjPx-6; GiQa-3; GiPx-3 & Survey Grouard
81-97	Stan Saylor	Clarion Petroleum, Well Pad, Medicine Hat

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-98	Ed. McCullough	Esso Resources, Access road/gravel pit, Grande Centre
81-99	John Pollock	Carma, Subdivision, Leduc
81-100	Becky Balcom	Union Carbide, Ethylene glycol plant, Joffre
81-101	B.O.K. Reeves	Burnco, Gravel quarry EgPm-144, Calgary, Nose Hill
81-102	Rebecca Balcom	Canadian Western Natural Gas, Pipeline, Okotoks
81-103	Biron Ebell	Calgary Power Ltd., Subdivision/access road FiPo-60,65 Duffield
81-104-C	J.M. Quigg	Transportation, EcPp-24, EfPq-5, Bragg Creek, Longview
81-105	Jennifer Hunt	NOVA, Pipeline, Grande Prairie south to Kakwa (Cutbank Lateral)
81-106	R. Heitzmann	Environment, Slave River Hydro Feasibility Study, Ft. McMurray, Ft. Chip., Fitzgerald
81-107	Russell Brulotte	Research, Racehore Pass and Tornado Pass, Coleman
81-108-C	Eugene Gryba	Transportation, SR 940:35 (E. Grande Cache - N. of Kakwa R.), Grande Cache
81-109	Rebecca Balcom	Calgary Power, Coal mine FjPq-6 ("Highvale"), Gainford
81-110	Ed. McCullough	City of Medicine Hat, Park / road, Medicine Hat
81-111	Ed. McCullough	Parks, Miquelon Lake, Crimson Lake, Cypress Hills, (Elkwater) Big Knife and Pioneer Lake P.P.

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-112	Jennifer Hunt	Nova, Spoil sites SPS-6-5, Carstairs/ Rosebud
81-113	J. Calder	Home Oil: Area 'D', Pipeline EhPm-34, Balzac
81-114	B. Ronaghan	Dennison Mines, Thermal coal mine, Robb/Coalspur
81-115	Bruce Ball	Research, Parklands Site Sampling: FbPf-1, FbPe-3, FbOv-1, FbOw-1, FcOv-1, ElPf-1, Buck Lake, Stettler, Alliance, Rumsey
81-116-C	Eugene Gryba	Transportation Contract, Highway Survey, Province of Alberta
81-117	A. Graspointner	County of Warner, Gravel pit DgOw-33, Milk River
81-118-C	B. Ronaghan	Provincial Parks, Carson Pegasus GbPv-1, 2, Whitecourt
81-119	Jennifer Hunt	Gulf Canada Resources Inc., Pipeline - Sour gas gathering system "Hanlan"/ "Foothills", Robb ("Shaw-Mountain Park" segment)
81-120	Don Steer	NOVA, Pipelines: 2 laterals, Halkirk / AECO 1 Ralston
81-121	B.O.K. Reeves	S.L. Goodrich, Subdivision, Cochrane
81-122	B.O.K. Reeves	J.F.R. Ranches, Subdivision, Cochrane
81-123	Rod Heitzmann	Alberta Environment, Irrigation System-LNID, Willow Creek/Kenex Coulee
81-124	Mike Forsman	Research, McDougall Methodist Mission at Victoria, GaPc-7, Smoky Lake
81-125	Stan Saylor	NOVA, Pipeline, Crowfoot

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-126-C	G. Fedirchuk	Alberta Transportation Highway Projects Mitigation: EdPp-21,22;EgPa-2 FjPj-19,13,14; FjPk-6; GhPh-10,11,12,6. SR546 - Canyon Creek/SR813 - Finnigan / SR862 - Calling Lake
81-127	B. Ronaghan	Manalta Coal, Coal Lease-McLeod River, Hinton
81-128	B. Ronaghan	Manalta Coal, Coal Lease - Mercoal, Robb
81-129	Ed. McCullough	Canstar Oil Sands Ltd., Oil Sands Lease(s), Fort McKay
81-130	Bea Loveseth	Cannuck Eng. / Alberta Energy Co., Oil Pipeline Mitigation: GaPb-11,12,13,14, and 15; FlPf-14,8; FjPh-7,8 (Cold Lake to Edmonton Pipeline), Smoky Lake
81-131	Stan Saylor	NOVA, Pipeline, Chard and Conklin
81-132	Stan Saylor	NOVA, Pipeline: Leige Lateral, Pelican Portage - Chipewyan Lake
81-133	Rebecca Belcom	Klippert Concrete, Calgary: Bowness Flats
81-134	Rebecca Balcom	AMOCO, Pipeline - gas gathering system "Marten Hills", Slave Lake
81-135	Sheila Minni	Dome / AESL / Alta. Environment, Water pipeline mitigation-Vegreville Corridor FkPg-10, Fort Saskatchewan
81-136	John Pollock	R. Kushinki, Subdivision - farm, Leduc
81-137	Rebecca Balcom	City of Calgary, Sewer Line - Fort Calgary, EgPm-5, Calgary
81-138	Bea Loveseth	Concept Resources, Gas gathering system - Wintering Hills, Drumheller
81-139	Richard Forbis	Town of High River, Industrial Park / Subdivision, High River

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-140	PROJECT CANCELLED	
81-141	Jennifer Hunt	Alberta Power, Water Pipeline (Follow - up 80-164), Sheerness
81-142	G. Fedirchuk	Tritek Engineering / Town of Athabasca, Water pipeline, Athabasca
81-143	B.O.K. Reeves	Ducks Unlimited (Canada), Reservoirs: Archibald, Gilchrist #2 & #3, Milk River
81-144	B.O.K. Reeves	Rozsa Management Corp., Gas wellsite and access road, Milk River
81-145	Marg Kennedy	Trimedia Studios Ltd. / CEP Consultants Ltd., Subdivision - Valley Ridge Park / Golf Course Mitigative excavation: EgPn-138,139,227,228,229. Calgary
81-146	John Pollock	Texaco / CU Engineering, Gas gathering system, Wabasca
81-147	Jennifer Hunt	Dennison Mines / Gulf Canada Resources, Railspur: Mitigation FhQf-8, 9, 10, 12 and 13. Robb
81-148	Bea Loveseth	Foothills Pipeline (Yukon) Ltd., Pipeline - realignment and stockpile sites. Rocky Mountain House
81-149	Bea Loveseth	Kan Energy (Adept Consulting) Ltd., Gas gathering system, Cluny
81-150	Timothy Losey	Styline Developers/Kenro Loading Ltd., Subdivision: Mitigation FlGj-3, 6 & 7 Hinton
81-151	John Pollock	Groveridge/Imperial Group, Subdivision, Edmonton
81-152	Jon Damp	Edmonton Power/Fording Coal, Coal mine and Thermal plant: Genesee Leduc (County of)

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-153-C	B. Ronaghan	Alberta Transportation: SR963:14 Mitigation - controlled surface collection HhOv-16, Cree Burn Lake Site, Fort MacKay
81-154	Timothy Losey	Kiriak & Associates Ltd., Subdivision, Barrhead
81-155	Bea Loveseth	Home Oil, Pipeline: Mitigation EhPm-34, Area - Balzac
81-156	Rebecca Balcom	Gulf Canada, Pipeline: mitigation Yellowhead Mine Townsite, FhQg-5, Robb
81-157	John Pollock	Transalta Utilities, 138 kV Transmission Line - Lac La Biche to Winnefred
81-158-C	John Pollock	Transportation, Highway construction and gravel pit, Bonnyville / Grimshaw / Woking
81-159-C	John Brumley	Environment, Dam/Reservoir - Forty Mile Coulee, Foremost
81-160	J. Calder	Rozsa Management, Wellsite drilling program, Warner/Milk River
81-161	Ed. McCullough	Alberta Utilities & Telephone / Matador Engineering, Pipeline (gas): Swan River Steel Line, Lesser Slave Lake
81-162	B. Ronaghan	Aquitane, Pipeline: Hanlan to Brown Creek, Rocky Mountain Forest Reserve
81-163	B. Ronaghan	Alsands, Pipeline (water), Fort MacKay
81-164-C	Arnoud Stryd	Alberta Environment, Red Deer River Impoundment: Dickson Damsite Reservoir Dickson/Mitigation: FaPn-17,27,28,29, 46,47,54: FaPo-15 and H.R.I.A.
81-165	J. Calder	Pembina Pipelines / Techman Eng., Pipeline (hydrocarbon), Drayton Valley/ Lodgepole

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-166	Ed. McCullough	Lutz Properties Ltd., Subdivision: Investig. GiQq-1, Ski Hill Site, Grande Prairie
81-167	B. Ronaghan	NOVA, Pipeline lateral, Watino
81-168	B. Ronaghan	Gulf, Pipeline (gas), Beaverlodge
81-169	B. Ronaghan	Foothills Pipeline (Yukon) Ltd., Pipeline (gas), Lodgepole
81-170	Mike Kelly	Dome Petroleum, Gas Gathering System and plant site, Milo
81-171	Stan Van Dyke	Melcor, Subdivision, Balzac
81-172	Stan Van Dyke	Beddington Business Park Ltd., Subdivision, Calgary
81-173	Stan Van Dyke	Agra Park Holdings Ltd., Subdivision, Calgary
81-174	J. Calder	Bar O.W. Ranches for Conlin Real Estate Ltd., Subdivision, Calgary
81-175	J. Calder	Optimax Developments Ltd. for Conlin Real Estate Ltd., Subdivision, Calgary
81-176	Ed. McCullough	PanCanadian, Gas Gathering System , Carseland Phase I
81-177	G. Fedirchuk	Northwestern Utilities Ltd., Pipeline Edmonton to Ft. Saskatchewan
81-178	John Brumley	Dome Petroleum, Wellsites, Jenner
81-179	John Pollock	Transalta Utilities Ltd., Transmission line: 240 kV line 773L/774L, Entwistle to Bickerdike
81-180	Marg Kennedy	Research, Sample excavation DjPo-112 Lille Townsite

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-181	Bea Loveseth	Transalta Utilities Ltd., 500kV transmission line & access roadway, Nanton to Crowsnest
81-182	Stan VanDyke	Wildeman, L.W., Subdivision, Okotoks
81-183	G. Fedirchuk	Environment / AESL, Sewer line, Stoney Plain to Spruce Grove
81-184	Jennifer Hunt	Alberta Power, Railspur, Sheerness
81-185	Barry Newton	Dome Petroleum, Pipeline, Rocky Mountain House
81-186	Jon Damp	Paramount Resources, Gas gathering systems: Granor, Liege, Saleski, Chard, Lateral, Fort McMurray
81-187	Don Steer	Esso Resources, Pipeline, Rocky Mountain House to Strachan
81-188	Ed. McCullough	Transalta Utilities, Transmission line: Jenner
81-189	Brian Kooyman	Passburg Petroleum/R.D. Niven, Pipeline Camrose
81-190-C	Bea Loveseth	Environment, Impoundment: Buffalo Lake Stabilization, Alex
81-191	Jennifer Hunt	Hat Development, Subdivision: Medicine Hat
81-192	Jennifer Hunt	Business Home & Farm Locaters Inc., Subdivision: Saleski, Medicine Hat
81-193	PROJECT CANCELLED	
81-194	Bea Loveseth	Thornton Real Estate Ltd., Subdivision: Morningside
81-195	PROJECT CANCELLED	

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-196	John Pollock	NOVA, Pipeline (gas): Lac La Biche - Caslan and Caslan East Laterals.
81-197	M.J. Quigg	New Lake Resources/Canada Land Masters, Wellsites, Jenner
81-198	PROJECT CANCELLED	
81-199	PROJECT CANCELLED	
81-200	PROJECT CANCELLED	
81-201	Rebecca Balcom	Transalta Utilities, Transmission line: Whitecourt
81-202	Jennifer Hunt	Nova, Pipeline (gas): Alaska Gas Pipeline - Mitigation, Jenner
81-203	R. Heitzmann	Alberta Environment, Irrigation / Impoundmant, Vauxhall (Badger Lake)
81-204	Jon Damp	Nu - West, Subdivision: Scenic Acres Phase III, Calgary
81-205	Jon Damp	Nu-West, Subdivision: Strathcona Cell G Calgary
81-206	Jon Damp	Jaeger (Landowner), Subdivision: Strathcona Heights Cell G, Calgary
81-207	Jon Damp	Gulf Canada Resources, Pipeline: Big Valley, Stettler (Fenn to Big Valley)
81-208	J. Calder	Town of Sundre, Pipeline (water) & sewage lagoon: Sundre
81-209	G. Fedirchuk	Dome Petroleum, Industrial Plantsite expansion: petrochemical, Redwater / Scotford
81-210	Jon Damp	Subdivision: MacKenzie, Calgary

PERMIT NO.	ARCHAEOLOGIST	PROJECT
81-211	B.O.K. Reeves	Lombard North / Fish Creek Management Committee: Park, Fish Creek Provincial Park: water system & pipeline, Calgary
81-212	B.O.K. Reeves	Johnson Eng. & Management Services, Subdivision: Cochrane
81-213	Don Steer	PanCanadian Petroleum Ltd., Coal leases Vulcan

ABSTRACTS

For 1981 Permits Obtained From The Archaeological Survey of Alberta

The following abstracts represent those available for 1981 permit reports at the time of publication. Abstracts for the remaining permit reports will be published next year along with 1982 permit abstracts.

J.B.

PERMIT NO.	PERMIT HOLDER	PROJECT
81-2	J.M. Quigg Ethos Consulting Ltd.	City of Medicine Hat Subdiv., Medicine Hat

A historical resource inventory was conducted for Lombard North of Edmonton as part of the planning input into the City of Medicine Hat's proposed golf course subdivision.

The entire surface of the 32 hectare development area was examined along with the excavation of twelve backhoe tests and inspection of the cutbank along the river in order to determine if historical resource materials were present.

No prehistoric sites were identified in this development area. Consequently, we recommend this development be allowed to proceed. However, we are also recommending a re-examination of the area following the topsoil stripping phase of development. We feel this re-examination is necessary because the development lies within what is normally considered an area of high probability of site occurance and in light of cultural materials located subsequent to other topsoil stripping in other subdivision projects in the area (Dau and Brumley 1980).

81-3	J. Hunt ARESCO Ltd.	SHELL, Plant Extension, Jumpingpound

In February 1981, ARESCO Ltd. conducted an historical resources survey and testing programme at the Jumpingpound Gas Plant south of Mitford, Alberta.

Both the plant extension area and the LPG storage area were surveyed by systematic foot traverses and shovel tests.

No archaeological sites were located in the study area and hence no further work is recommended.

81-5	T.C. Losey Historical Resources Consultant	ROSAN RANCHES, Subdiv. Hinton

An historical resources impact assessment was conducted on a proposed country residential subdivision near Hinton.

Visual inspection of the area was augmented by the judgemental placement of 42 shovel-test holes and 11 ripper tooth tests.

No evidence of significant historical materials was observed or recovered. Therefore, no mitigative measures are recommended and no further inspection is necessary.

81-7	E.J. McCullough Fedirchuk McCullough and Assoc. Ltd.	CALGARY POWER, Transmission Line, Entwistle to Whitecourt

An historical resources impact assessment was conducted of Calgary Power Ltd.'s proposed Entwistle to Whitecourt 240 kV Transmission Line scheduled for development in central Alberta

The entire right-of-way was traversed by foot. All prehistoric sites encountered were shovel tested to estimate the size, content and dimensions.

The survey resulted in the identification of two historical resource sites, a prehistoric campsite (FlPu-1) and an isolated find (FlPu-2). No further study is recommended. Photographic documentation, recording and collection of the artifacts have mitigated impact.

Based on the results of this study, it is recommended that Calgary Power Ltd. be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

81-8	S.J. Minni Historical Resources Consultant	JACK ATKINS, Subdiv., Ardrossan

At the request of Mr. Jack Atkins on behalf of himself, Mr. Glen Stennes and Mr. Albert Shimbashi, an historical resources impact assessment was undertaken for an area of land approximately 6.5 km south east of Ardrossan, Alberta.

Survey and subsurface testing of the proposed development area located two prehistoric archaeological sites (FjPg-11 and 12).

FjPg-11 was located by shovel testing a level area beside a large slough. Further investigation by 35 shovel tests exposed a few more pieces of cultural material.

FjPg-12 was initially located by the exposure of cultural material on the cleared surface of the subdivision road right-of-way. Further investigation of the site by inspection of all surface eroded areas and 10 shovel tests exposed one piece of cultural material.

The recording and assessment of these historical resources resulted in the conclusion that neither FjPg-11 or 12 are of significant value in the study and understanding of the prehistoric occupation of the parkland region of central Alberta.

It is the consultant's opinion that the proposed development of the country residential subdivision 4 should be allowed to proceed without further concern for historical resources.

81-9 S.J. Minni
Historical Resources
Consultant

MR. HUDE, Subdiv.
Ardrossan

At the request of Mr. Bert Hude, an historical resources impact assessment was undertaken for an area of land approximately 8 km south east of Ardrossan, Alberta.

Survey and subsurface testing of the proposed development area located one prehistoric archaeological site (FjPg-13) situated above and overlooking a pond.

The recording and assessment of this historical resource resulted in the conclusion that FjPg-13 is not of significant value in the study and understanding of the prehistoric occupation of the parkland region of central Alberta.

It is the consultant's opinion that the development of the country residential subdivision should be allowed to proceed without further concern for historical resources.

81-10	T.C. Losey Historical Resources Consultant	STYLINE DEVELOPERS Subdiv., Hinton

An historical resources impact assessment was conducted of the Styline Developments Limited proposed residential subdivision near Hinton.

The methods employed in the survey utilized visual scans along 14.4 km of foot traverses, placement of 106 shovel tests along those traverses, and excavation of 55 bulldozer rippertooth holes in frozen ground.

The study resulted in the identification and assessment of one prehistoric site (FiQj-3), and two ethnoarchaeological sites (FiQj-6 and FiQj-7).

Recommendations include excavation of at least three, one meter test units and complete excavation of the hearth in Site FiQj-3. Mitigative action recommended for the ethnoarchaeological sites (FiQj-6 and FiQj-7) include complete detailed site mapping and photographic coverage as well as excavation of selected associated features.

81-13	B. Wright ARESCO Ltd.	QUALICO, Subdiv., Calgary

Due to the proposed construction of a residential subdivision in northeast Calgary, ARESCO Ltd. conducted an archaeological survey of the development area. The survey consisted of a systematic foot traverse of the area, and shovel testing. Three heritage sites were located. However, because of the paucity of artifact materials, and the small, disturbed nature of the sites, no further work is recommended.

81-16	S.G. Van Dyke Lifeways of Canada Ltd.	TOWN OF AIRDRIE Sewer Pipeline, Airdrie

Lifeways of Canada Limited carried out an historical resources impact assessment of an alignment for a water supply line and a sanitary forcemain between the Town of Airdrie and the City of Calgary.

The archaeological study involved an inventory search and a ground reconnaissance of the entire line. Shovel testing was utilized on unbroken surfaces, in plowed fields and other areas of particular archaeological potential to supplement visual observations.

Four prehistoric sites were identified. A previously recorded site was observed, but not recorded further. Three of the recorded prehistoric sites were found to lie within the right-of-way and were characterized by isolated or small finds.

Areas of high archaeological potential for which shovel testing was not considered to be adequate are recommended for monitoring. The purpose of the recommended program would be to identify potential, deeply buried, kill-type sites at the base of the escarpement along the southernmost portion of the right-of-way.

81-18	S.J. Minni Historical Resources Consultant	CAMPAC DEVELOPMENTS, Subdiv., Calgary

At the request of Campac Developments Ltd., an historical resources impact assessment was undertaken for an area of land approximately 5 km west of the city of Edmonton.

Survey and subsurface testing of the proposed development area located one prehistoric archaeological site (FjPk-9) and one prehistoric and historic archaeological site (FjPk-10). Both sites were located above and overlooking separate areas of lowland which contained water on a seasonal or permanent basis.

The recording and assessment of these historical resources resulted in the conclusion that neither FjPk-9 or FjPk-10 are of significant value in the study and understanding of the prehistoric occupation of the parkland region of central Alberta.

It is the consultant's opinion that the development of an industrial subdivision on the property should be allowed to proceed without further concern for historical resources.

81-19	S. Van Dyke Lifeways of Canada Ltd.	CITY OF CALGARY, Sewer and Water Pipeline, Calgary

Lifeways of Canada Limited carried out an historical resources impact assessment of the City of Calgary water supply line and sanitary forcemain between 80th Avenue N.E. and Beddington Road. The right-of-way parallels the C.P.R. right-of-way over its 3.42 km distance.

The historical resource impact assessment involved an inventory search and a ground reconnaissance. Two of the previously recorded prehistoric sites were tentatively defined as being of concern - EgPm-41 and EgPm-197.

The ground reconnaissance consisted of a foot traverse of the alignment. Shovel testing was carried out at only one location of the alignment. At that location a number of small bone fragments were noted on the surface. Intensive examination and shovel testing failed to yield additional material.

No prehistoric or historic sites were noted or recorded during the course of the program. Both EgPm-41 and EgPm-197 are located west of the alignment and well clear of any proposed development.

It is recommended that the area beneath EgPm-43 be monitored during the excavation of the trench. A limited but important potential for secondary deposits and/or evidence of kills exists for the segment of the right-of-way beneath EgPm-41 and to the north over a distance of several hundred meters.

81-20	B.O.K. Reeves Lifeways of Canada, Ltd.	TRI-MEDIA, Movie Studio Happy Valley, Calgary

Lifeways of Canada Limited carried out an historical resource inventory of Valley Ridge Park on behalf of CEP Consultants. The park is located on the south side of the Bow River, at the western limit of the City of Calgary.

During the course of the reconnaissance, 17 prehistoric sites were inventoried. Five of these sites had previously been recorded. Of

the 17 sites assessed, 12 were found to exhibit sufficient cultural material to warrant concern. On the basis of close examination, five were found to be of no further value.

It is recommended that an historical resources impact assessment be carried out of the property. This study would consist of mapping and testing of a number of these sites to provide base line historical resource data for use in initial concept planning, maximizing opportunities for historical resource conservation in the final project design.

81-21	A.L. Bryan Archaeological Researches International	SHELL-NOVA, Polystyrene Plant, N. of Scotford

An historical resources impact assessment was conducted on the site of a proposed styrene plant north of Scotford, Alberta.

The north-eastern portion of the property was surveyed in 1981 by Archaeological Researches International. Five sites were recorded on and immediately adjacent to the development site. Only two sites are slated for destruction, one (FkPg-44) of which is simply a scatter of seven flakes in a blowout. The other (FkPg-45) was a scatter of many flakes, bone fragments and fired rocks in a plowed field. Test excavations showed that no cultural information remained below the plow line.

FkPg-42 proved to be the only site of any significance. Fortunately it is not slated for destruction because artifacts and a cultural feature were exposed in undisturbed contexts. It has been recommended that the undisturbed portion of this site not be disturbed by construction unless complete excavations are first carried out.

81-22	S.J. Minni Historical Resources Consultant	ENVIRONMENT/AESL. Regional Water Supply System Ft. Sask./Vegreville

At the request of Associated Engineering Services Ltd. an historical resources impact assessment was undertaken for a water pipeline right-of-way which extended from near Vegreville to near Fort Saskatchewan, Alberta.

The field survey located 22 prehistoric and 2 historic archaeological sites within the right-of-way. Each site was surficially apparent in cultivated fields. The prehistoric archaeological sites (except for FkPg-10) contained limited and/or generally unimpressive cultural remains. FkPg-10 was a large site by the North Saskatchewan River which contained several hundred cultural remains.

The two historic archaeological sites consisted of cultural remains which were considered to be related to homesteads dating to the early 20th century. Both sites were seriously disturbed by cultivation.

The recording and assessment of the 24 historical resources sites resulted in the conclusion that only one of the archaeological sites (FkPg-10) would be of further value in the study of prehistoric culture. Although all of the sites will be directly affected by pipeline construction the recording of 23 of the sites has mitigated the potential impact by the proposed development. FkPg-10 has been extensively disturbed but the presence of artifact clustering over the site suggests that controlled mapping and collection procedures would provide important information in the study and understanding of the prehistoric occupation of the parkland region of central Alberta.

81-23	J. Pollock Settlement Surveys Ltd.	BEMOCO LTD., Subdiv., Breton

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on approximately 32.4 ha of land in a proposed subdivision south of the hamlet of Breton, Alberta.

The property under consideration was examined by a systematic surface and subsurface survey resulting in the discovery of the remains of a sawmill built around 1931 on the east bank of Modest Creek. The site is located within the boundaries of the proposed Environmental Reserve and will not be impacted by development. No other historical resources sites were discovered on the property.

As no historical resources sites requiring conservation mitigation will be impacted, it is recommended that the development be allowed to proceed without further regard for historical resources.

81-24 J. Pollock, Settlement Surveys Ltd. — TOWN OF STONEY PLAIN Subdiv., Stoney Plain

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on a proposed industrial subdivision in the town of Stony Plain, Alberta.

A systematic program of subsurface testing was carried out on the property in general. In addition, surface survey was done of the trench sides and backdirt piles from the drainage ditch excavated by the contractors.

The survey resulted in the discovery of three historic resources sites consisting of two isolated prehistoric findspots (FjPl-11 and 12) of limited scientific value and a deposit of faunal material (FjPl-13) associated with a deeply buried peat bed uncovered by trenching operations. The bones have been tentatively identified as belonging to elk and fossil bison (possibly Occidentalis) and in one instance may show signs of human fracturing.

Based on the preliminary analysis of the faunal material, FjPl-13 is considered to have palaeontological and possibly archaeological potential and conservation mitigation has been recommended. The two isolated findspots are considered to have little archaeological significance and no further work is recommended on these sites beyond their initial documentation in this report.

It is recommended that the subdivision be allowed to proceed subject to consideration of the recommendations for mitigation outlined in this report.

81-25 J. Pollock, Settlement Surveys Ltd. — NOVA, Pipelines Two Hills/Smoky Lake

An archaeological survey was conducted by Settlement Surveys Ltd. on NOVA, AN ALBERTA CORPORATION'S two short lateral pipeline projects in northeastern Alberta.

Despite intensive fieldwork one of the two proposed projects, the Morecambe Lateral, proved negative in respect to historical resources sites and no further work is recommended for the pipeline route.

A second pipeline in the Vilna Lateral produced one large prehistoric site (GaPb-7) spanning the Right-of-Way. As the pipeline has been rerouted to avoid the site and the area was traversed, no further survey of the alternate route is needed.

It is recommended that both pipelines be allowed to proceed subject to Alberta Culture's agreement with the recommendations as outlined.

81-26	J.M. Quigg Ethos Consultants Ltd.	HAT DEVELOPMENT LTD., Subdiv., Medicine Hat

An historical resource impact assessment has been conducted for Hat Development Ltd. on the proposed subdivision development of the Ross Glen Buffer Strip in the City of Medicine Hat, Alberta.

The entire area was foot traversed and backhoe trenches (N=13), and 1 meter evaluation units (N=14) were excavated to locate and assess the cultural material. The area was again inspected subsequent to removal of topsoil. A total of 970 rodent holes, stripped areas, an irrigation canal etc., were also examined for signs of cultural material.

Two previously unidentified prehistoric sites, DlOp-4 and 5 were recorded and assessed in conjunction with the area immediately west of a known significant site (DlOp-2 Ross Glen). All three site areas are within the development zone and will be totally destroyed by the housing development.

We recommend no further investigations at DlOp-5, although monitoring of the topsoil stripping is recommended for DlOp-4 and DlOp-2 following the completion of the mitigation excavations.

81-28	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	SOARS PIPELINE/WORLDWIDE ENERGY, Pipeline, Bonnyville

An historical resources impact assessment of Cold Lake Transmission Limited Soars Pipeline Extension scheduled for development in east-central Alberta resulted in the identification of three historical resource sites. Two of the sites, GbOn-2 and GbOn-3 are prehistoric

surface scatters which will be subject to primary impact. No further study has been recommended. Photographic documentation, recording, and collection of the artifacts have mitigated impact. The remaining site, GaOn-1, is the foundation remains of a homestead. The site lies outside the right-of-way and will not be subject to primary impact. No further study relative to the proposed project has been recommended.

Based on the results of this study, it is recommended that Cold Lake Transmission Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

81-29	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	NORTHWESTERN UTILITIES LTD., Gas Gathering System, Vermilion

An historical resource impact assessment was conducted for Northwestern Utilities Limited's proposed Wainwright - Auburndale Gas Gathering System scheduled for development in east-central Alberta.

The entire area of the proposed right-of-way was traversed by foot and shovel testing was carried out at 400 - 500 meter intervals. In addition, shovel testing was intensified at the Buffalo Creek crossings.

The survey resulted in the identification of one historical resource site, a prehistoric surface scatter (FfOr-1). No further study is recommended. Photographic documentation, recording, and collection of the artifacts have mitigated impact.

Based on the results of this study, it is recommended that Northwestern Utilities Limited be granted historical clearance.

81-30	R. Heitzmann Heitzmann Consulting Ltd.	OSCAR PETERSON, Subdiv., Marwayne

An historical resources impact assessment was carried out of a proposed gravel extraction site about 17 km north of Marwayne, Alberta.

Archaeological procedures included foot traverses and spaced shovel testing to the gravel surface. One archaeological locality, FkOn-1, was discovered, and consisted of an isolated find of a core/hammerstone. This locality is not recommended for further work.

It is recommended that this subdivision and subsequent gravel extraction operation be allowed to proceed. It is also recommended that all pit operations, including overburden stockpiling and possible ancillary operations such as haul road construction be done completely within the boundaries surveyed.

81-31	B. Newton Settlement Surveys Ltd.	BELVEDERE DEVELOPERS, Subdiv., Spruce Grove

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on Stage One of Belvedere Developments Ltd.'s Aspen Meadows Subdivision, north of the town of Spruce Grove, Alberta.

The area was examined by a systematic program of subsurface testing along a series of north-south transects. Upon discovery of archaeological material, additional test pits were excavated to determine the extent of subsurface cultural material.

The survey resulted in the discovery of three archaeological resources sites consisting of two isolated prehistoric findspots (FjPl-14, 16) of limited scientific value and one small prehistoric campsite (FjPl-15). In addition to the prehistoric finds, an isolated paleontological find consisting of an elk antler was recovered from mud flats along the shore of Gladu Lake.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the subdivision be cleared for historical resources concerns.

81-32	B.W. Wright ARESCO Ltd.	CARMA DEVELOPERS, Subdiv. (EgPm-81), Calgary

EgPm-81 is interpreted as a combination kill site and campsite located in a small coulee in northwest Calgary. The site was tested via excavation of 27 holes, including two 1 x 1 m units on a small knoll within the coulee. A buried component containing butchered bone, a bone tool and 8 quartzite flakes and 1 piece of firebroken rock was found on this knoll. Other test units located throughout the site yielded minor amounts of bone. A Duncan projectile point was found on the surface of a nearby knoll.

Due to the low density of lithic materials, absence of features in areas tested and lack of positive evidence for a kill location, it is recommended that the testing conducted to date at EgPm-81 be considered sufficient and that no further work be required of the developer prior to construction.

81-33	E. J. McCullough Fedirchuk McCullough & Assoc. Ltd.	TRANSPORTATION, Gravel Pit, Calgary

An historical resources impact assessment was conducted of the Alberta Transportation Cochrane Aggregate Area, situated west of the Town of Cochrane.

Two previously recorded prehistoric sites were examined. Shovel tests and 1 x 1 meter excavation units at EhPo-38 revealed a historic and a prehistoric component. It is recommended that the portion of the site lying outside the Aggregate Area be evaluated in the event that it is threatened by future development. A minimum of ten 1 x 1 meter units are recommended.

EhPo-40 lies well outside the Aggregate Area and will not be adversely affected by gravel extraction operations. The stockpile, however, lies along the south boundary of the site and further northward expansion would impinge upon the site. It is recommended that stockpiling be restricted to the area presently being used or that the site be evaluated to access its potential to yield further scientific data.

81-35	B.M. Ronaghan Lifeways of Canada Ltd.	ALBERTA POWER, Power Line, Peace River

Lifeways of Canada Limited carried out an historical resources impact assessment of a proposed 144 kV powerline from the West Peace River substation to a proposed substation at Friedenstal southeast of Fairview, Alberta.

Field studies involved a foot traverse of all sections of the right-of-way which did not fall within developed road allowances, visual exam-

inations of exposed areas, and the use of subsurface probes in areas of archaeological potential regardless of whether these occurred along developed road allowances or elsewhere.

Eleven prehistoric sites were identified in the course of research. Six of these consist of isolated finds of lithic artifacts, four are disturbed campsites, and one is a small workshop.

The results indicate that all of these sites are highly disturbed, if not destroyed, by previous agricultural cultivation which is characteristic of all but very small sections of the right-of-way. None of these sites are considered to be of sufficiently significant value to warrant any mitigation. These recommendations are not necessarily consistent with the requirements of the Alberta Historical Resources Act.

81-36	R.J. Heitzmann Heitzmann Consulting Ltd.	CLINE RIVER DEVELOPMENT CO. LTD., Recreation Complex, Nordegg

An historical resources impact assessment was carried out of a proposed resort complex located on the south side of the Cline River and west of Abraham Lake.

Archaeological procedures included foot traverses and shovel testing. Two archaeological localities, FbQc-34 and 35, were located. FbQc-34 is a small chipping station which is contained within buried sands of a terrace locality adjacent to the Cline River. The site has considerable potential, but it is unlikely to be directly affected by the projected development. FbQc-35 is an isolated find locality and has low potential for yielding further archaeological data and is not recommended for further research.

81-37	S.G. Saylor Ethos Consulting Ltd.	CANADIAN SUPERIOR OIL, Pipeline, Buffalo

An heritage resource impact assessment was conducted for Canadian Superior Oil Ltd., in response to wellsite and pipeline development north of Buffalo, Alberta. A total of 61 km of proposed pipeline, 39 proposed and 10 existing wellsites, and approximately 25 km of proposed access road were investigated.

Eight prehistoric archaeological sites were located and recorded within the development right-of-way. Seven of the sites were stone circles and one was a stone circle and stone alignment site.

Relocation was successfully conducted at all heritage resource sites, thus avoiding damage to the features. Shovel testing yielded a single cultural item.

Relocation of the proposed right-of-ways to avoid heritage resource sites is felt to have effectively mitigated the potential deleterious effects of the proposed developments and no further work is recommended.

81-39	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	ALBERTA HOUSING, Subdiv., Grande Cache

An historical resources impact assessment was undertaken at the request of Epec Consulting Western Ltd. on the proposed subdivision development in Grande Cache, Alberta.

Foot traverse and visual inspection were used along the recently cleared access road; subsurface tests were excavated in the areas where no surficial exposure was present. A total of 26 subsurface tests were excavated.

No historical resource sites were encountered during visual inspection or in the subsurface testing program. On the basis of the results of the survey, it is recommended that development be allowed to proceed.

81-40	J. Pollock Settlement Surveys Ltd.	CENTURY 21, Subdiv., Colinton, Alberta

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on a proposed residential subdivision to the south of the town of Athabasca, Alberta.

Fieldwork consisted of a systematic transect sampling augmented by a series of auger holes bored along the rim of the former meltwater channel.

The survey resulted in the discovery of three historic resources sites consisting of a prehistoric campsite (GdPh-1) and two historic building locations, all of which are considered to be of limited archaeological significance. No further work is recommended on these sites beyond their initial documentation in this report.

It is recommended that this subdivision development be allowed to proceed without further regard to historical resources.

81-41	B.W. Wright ARESCO Ltd.	B.C. FOREST PRODUCTS, Haul Roads, Knight

An historical resource impact assessment was undertaken of a proposed forestry haulroad network in northwestern Alberta.

On the basis of 1:50,000 map and air photo study the roads were priorized in terms of historical resource site location potential. All creek crossings were thought worthy of inspection although in some cases previous disturbance was used as a criteria to eliminate these from field inspections.

Five helicopter landings were made and high potential areas were examined via foot traverse and shovel testing.

No historical resource sites were located nor is further work recommended.

81-43	S.G. Saylor Ethos Consultants Ltd.	CITY OF MEDICINE HAT, Subdiv., Medicine Hat

A heritage resource impact assessment was conducted for the City of Medicine Hat in response to their proposed expansion of the Brier Park Industrial Subdivision.

Field investigations consisted of preliminary surface reconnaissance, followed by shovel test excavation and examination of the ground after sod removal.

All investigations were negative, and no further mitigation is recommended.

Absence of prehistoric sites is tentatively interpreted as a consequence of the small area examined and as yet undetermined environmental and/or cultural factors.

81-46	G.F. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	ENVIRONMENT, Sewer Line Edmonton

An historical resources impact assessment was conducted on the proposed route of a sewer line. The assessment was requested by Stanley Associates Engineering Ltd. on behalf of Alberta Environment. Fedirchuk McCullough & Associates Ltd. carried out a foot traverse and visual inspection program of the route extending from the City of Edmonton sewage lagoon north across the North Saskatchewan River to the St. Albert sewage lagoon. The survey failed to reveal the presence of any heritage sites on the route which would be impacted by construction.

On the basis of the negative results of the survey, it is recommended that the development of this sewer line be allowed to proceed without any further concern for heritage resources.

81-50	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	ALBERTA HOUSING CORP., Subdiv., Athabasca

An historical resources impact assessment was conducted on behalf of Alberta Housing Corporation at the request of Associated Engineering Services Ltd. on the proposed subdivision development near the town of Athabasca, Alberta.

Systematic surface inspection and subsurface testing were used to locate sites. The survey resulted in the discovery of three prehistoric sites, GePh-5 through 7.

All of these sites have been substantially disturbed by cultivation, contained relatively few remains and did not have subsurface materials associated. On the basis of these factors, no further work was recommended at the sites.

81-51	J. Hunt ARESCO Ltd.	WESTERN MINES/ADEPT, Gas Pipeline, Myrnam

An historical resources inventory assessment was conducted of areas to be impacted by the construction of a gas gathering system in east central Alberta.

The field survey was conducted by a foot traverse of the entire gas gathering system. Shovel tests were dug in all non cultivated areas and in areas of poor surface visibility, with special emphasis given to hills and other elevated alignments and to creek/lake margins. Sites located during the study were shovel tested to determine the lateral extent of the site and also the presence of subsurface materials.

Five prehistoric sites were recorded during the survey. Although the sites were not prolific, two projectile points and one biface were recovered. With the exception of the lithic surface scatter, all sites were found in cultivated fields.

Despite the quality of the cultural materials found none of the sites have been recommended for additional testing for some or all of

the following reasons: scarcity of cultural material at sites; disturbed site area, hence lack of contextual data; and lack of subsurface cultural deposits.

81-52	B.O.K. Reeves Lifeways of Canada Ltd.	UNION OIL, Surface Coal Mine, Hinton

Archaeological investigations in the Hinton region located six prehistoric and three modern sites in areas to be affected by Union Oil's planned thermal coal mining project on Obed South, Obed North and Marsh South leases.

The prehistoric sites located in the survey were of several types: three small campsites, two small finds of a few artifacts, and one isolated artifact find. The three small campsites are all situated in the Obed South Mine. One (FjQi-2) on the north end is highly disturbed by an unimproved roadcut through a small terrace. The site merits further excavations to determine if any of it remains. The two other campsites are located on the southern edge of the mesa on high ground surrounded by filled ponds, now marshes. Excavation of these sites and further testing of adjacent terrain is recommended before they are lost in mine development.

Modern sites are also located on Obed South Mine. These sites do not merit further study. Remains of a Canadian Northern trestle were found in the roadcut area. They are of no particular interest.

81-55	J. Pollock Settlement Surveys Ltd.	TOWN OF HINTON, Subdiv., Hinton

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on a proposed residential subdivision to the south of Hinton.

A system of systematic and judgemental surface inspection resulted in the discovery of one historic resources site consisting of a prehistoric campsite (FiQj-4) which is considered to be of limited archaeological

significance. No further work is recommended on this site beyond its initial documentation in this report.

It is recommended that this subdivision development be allowed to proceed without further regard to historical resources.

81-57	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	AKLEY DESIGN, Subdiv., Lac Ste. Anne

An historical resources impact assessment on the proposed subdivision development northwest of the village of Gunn on Lac Ste. Anne was conducted for Akley Design Ltd. on behalf of 120359 Holdings Ltd.

Systematic surface inspection and subsurface testing were used to assess the property. Particular emphasis was placed on areas adjacent to sloughs. The survey resulted in the location of a single prehistoric isolated find, FkPo-11.

The paucity of cultural material recovered from the site combined with existing conditions of site disturbance indicate that its potential is limited. Subsurface testing failed to expose any undisturbed cultural materials. On the basis of these factors, no further work is recommended on this site.

81-58	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	AKLEY DESIGN, Subdiv., Lac Ste. Anne

An historical resources impact assessment on the proposed subdivision development north of Lac Ste. Anne for Akley Design Ltd. on behalf of 120359 Holdings Ltd.

A program of surficial examination of exposures supplemented by relatively intensive subsurface testing, with particular emphasis on areas adjacent to sloughs, was employed. The survey failed to reveal the presence of any prehistoric, historic or palaeontological sites on the property.

On the basis of the negative results of the survey, it is recommended

that the development of this subdivision be allowed to proceed without any further concern for historical resources.

81-60-C	J. Pollock Settlement Surveys Ltd.	TRANSPORTATION/PARKS, Road/Day-Use Sites, Kananaskis Lakes

An historical resources impact assessment was conducted by Settlement Surveys Ltd. of the Kananaskis Interlakes Road and proposed park facilities. The survey resulted in the discovery of two new archaeological resources sites consisting of two isolated prehistoric findspots (EdPs-82, 83) of limited scientific value and re-examination of previously recorded prehistoric campsites. Testing, with one exception, at these three sites showed them to be of limited value and no further work is recommended.

One site (EdPs-78), however, has the potential to produce valuable scientific information. Although this site will not be directly impacted by park development and, as such, is not the responsibility of the development proponent, it is threatened by shoreline erosion caused by the very large annual fluctuations in the water levels of Lower Kananaskis Lake. We recommend that Alberta Culture conduct a small test excavation on this site during early spring 1982, before the site is covered by approximately one metre of water at maximum lake levels during the summer.

81-61	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	PANCANADIAN, Gem Gathering System, Bassano

An historical resources impact assessment of PanCanadian Petroleum Limited's proposed Gem Gas Gathering System scheduled for development in southern Alberta resulted in the identification of nineteen historical resource sites.

One site is an isolated find, two sites are surface scatters, and sixteen sites are stone feature sites. Two of the sites, EfPb-9 and

EfPb-10, will be subject to primary impact. No further study has been recommended. Photographic documentation, recording, and collection of the artifacts have mitigated impact.

The remaining sites are situated outside the proposed development zone and will not be subject to primary impact. No further studies have been recommended if construction activities are confined to the proposed right-of-way.

Based on the results of this study it is recommended that Pan-Canadian Petroleum Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

81-63	J.W. Ives Archeological Survey of Alberta	RESEARCH, Birch Mountain Archaeological Study

The Birch Mountain Archaeological Study is a continuing project designed to integrate archaeological materials from the Birch Mountains upland with archaeological materials from the Athabasca River valley. Emphasis during the 1981 field season shifted from survey to excavation. Excavations were carried out at the smaller Kediya (HkPa-36) and Nata II (HkPb-3) sites. More extensive transects and block excavations were conducted at the Satsi Site (HkPb-1). There, dense concentrations of artifacts were recovered, some in association with two fire-related features. Stratigraphic excavations were undertaken at the Pelican Beach Site (HkPa-14) and a sequence of radiometric dates on late prehistoric debitage is anticipated. The only diagnostic items came from the Satsi site. Comparisons to the north are again most desirable and dates of younger than 2,000 - 3,000 years B.P. are suggested. This project is being carried out in conjunction with paleo-ecological studies of a sediment core from Clear Lake. It is the objective of the entire study to reconstruct complete settlement subsistence systems for northeastern Alberta.

81-64	J.W. Ives Archaeological Survey of Alberta	Archaeological Review of Alberta Oil Sands Project

Two projects were carried out under this permit. In the first, archaeological survey was conducted on the Alsands lease which is situated approximately 60 kilometres north of Fort McMurray. Extensive clearance on the Alsands plant and mine sites permitted intensive foot survey. In a brief period, 25 sites were discovered. This yielded a density of 12.9 sites/square kilometre or roughly one site/terrain feature surveyed. Significant portions of 88% of the sites were discovered to be undisturbed by clearing. Controlled surface collection was undertaken at several sites and revealed that small and moderate sized sites do not produce strictly redundant assemblages. The practical and theorectical implications of the study will be discussed in a forthcoming publication.

The second project involved a joint effort with Dr. Mark Fenton, Alberta Geological Survey, Alberta Research Council, to determine the source of Beaver River Sandstone (formerly known as Beaver Creek quartzite). Although this raw material comprises over 99% of most assemblages from the oil sands area, no rigorous attempt to discern the source of this material has been previously undertaken. The distribution of archaeological specimens is outlined and a geological description is provided for Beaver River Sandstone samples from Beaver River Quarry (HgOv-29). Preliminary observations on hand specimens, artifacts and the stratigraphic section at Beaver River Quarry permit discussion of the composition and stratigraphic position of Beaver River Sandstone. The raw material comes from an outcrop correlated with the "Pre-McMurray?" of Carrigy (1966). This unit unconformably overlies the Devonian Waterways Formation and underlies the McMurray Formation (Carrigy 1966). The significance of the raw material source is discussed in relation to archaeological research objectives in the oil sands area.

81-65	B.F. Ball Archaeological Survey of Alberta	Archaeological Survey of the Jasper-Hinton Athabasca River Valley

An archaeological survey of the Athabasca River Valley between Pedley and Jasper was carried out during the summer of 1980. Several previously recorded sites were visited and twenty one new site locations were added to the inventory of this area. Of the newly found sites several are datable through projectile point morphology and appear to relate archaeologically with the northern plains complex rather than with other areas. Of particular interest is a stratified site located in sandy deposits on the western shores of Brule Lake. An Alberta type point along with a Hanna type indicates the site contains components from at least two major Alberta prehistoric time periods.

81-67	J. Damp Lifeways of Canada Ltd.	EDMONTON POWER, Coal Drilling Exploration, Genesee

A site specific historical resources impact assessment was undertaken of Edmonton Power's planned subcrop coal drilling project, part of the Genesee Power and Mine project. Conflicts with sites of potential value were identified and avoided by drill site relocation, maximizing site protection. The HRIA field program was integrated with the subcrop drill program.

Field investigations examined 155 drill hole locations as well as the SR770 road relocation. Each hole was included within a 1 ha archaeological assessment area. Forty-six prehistoric sites consisting of 30 isolated artifact finds and 16 campsites were recorded on the two projects. Thirteen of these lay within the 1 ha area.

Analysis of the Genesee archaeological data indicates a structured prehistoric land use pattern exists which is of regional significance. A program of systematic inspection, collection and test evaluation is recommended to assess regional scientific value, for contributing to the knowledge of prehistoric landuse patterns in the Genesee area.

81-69	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	ESSO/ALBERTA ENERGY Styrene Plant, Lamont/Bruderheim

An heritage resource overview was conducted along the south bank of the North Saskatchewan River from the latitude of Gibbons north to Skaro, Alberta for the proposed water intake facility at Bruderheim. In addition, two adjacent alternate routes and a route for supplying potable water to the plant were surveyed.

The field overview involved cursory examination of nine locations accessible by road or road allowance. Primarily visual observation was used for site location but in areas of impeded exposure, shovel tests were excavated. Primarily visual inspection was used along foot traverse of the alternate routes but in areas of obscured ground cover and natural vegetation, subsurface tests were excavated. This portion of the project was conducted between November 3 and 13, 1981.

The field overview resulted in the recording of nine new sites. Two contain evidence for at least some undisturbed cultural deposits. Further investigation has been recommended at all sites should development proceed in these areas. During survey of the water pipeline systems, five prehistoric archaeological sites were identified. All are relatively limited in cultural contents and none produced indications of subsurface undisturbed materials. Consequently, none of these prehistoric sites have been recommended for further work.

81-74	J.E. Damp Lifeways of Canada Ltd.	DUPONT, Polyethelene Plant, Redwater

An historical resources impact assessment of AEC DuPont Canada's proposed polyethylene project located near Redwater, Alberta.

Seventeen archaeological sites were located which vary from isolated finds of one artifact to campsites of various sizes to possible bison kill sites with butchering/processing areas.

Three of the sites located (FlPg-58, 59, 60) are considered to be

of significance. Systematic collection, additional testing and/or excavations are recommended for these sites. Specific recommendations concerning the other sites are found in the final report.

81-75	B.W. Wright ARESCO Ltd.	BURNCO, Gravel Pit Calgary

ARESCO Ltd. conducted a reassessment of a portion of the Burnco Gravel Pit in Bowness.

The survey utilized judgemental transects focusing on the valley margin and four test pits excavated in a line at the base of a low ridge.

Three previously recorded isolated find sites were lumped into one prehistoric campsite (EgPn-208) also found to contain a possible human burial.

An attempt was made to determine if the bones were human, but the government consultant who inspected the remains was unable to do so.

While protection of the faunal remains is recommended, no further work is suggested on the remainder of the site area.

81-77	J.R. Vickers Archaeological Survey of Alberta	Archaeological Investigations at ElPl-3, Bowden

In late June, a small crew was sent to examine ElPl-3. The site was first observed by B.O.K. Reeves in 1976 who described it as a large pit similar to that observed by W. J. Byrne at the Morkin Site (DlPk-2). Reeves submitted a bone sample and received a date of 1110 ± 100 years BP (RL-598). The site has been extensively disturbed by the landowner's excavation.

This disturbance has, unfortunately, continued and much effort was expended attempting to discover remnants of the aboriginal pit edges. This was largely unsuccessful, so a backhoe was used to section the feature. This revealed blocky pit fill extending into soft sandstone bedrock at ca. 1.6 meters below surface. The pit was ca. 4.5

meters long with an irregular base sloping upwards to the north. The function of the feature is unknown although a reported arrangement of bison skulls noted by the landowner near the base of his excavations suggests a relationship to Byrne's prepared cobble floor and bison skull arrangement in the Morkin pit. No diagnostic artifacts were recovered.

81-78	B.F. Ball Archaeological Survey of Alberta	Archaeological Survey of the Cartier Creek, Alberta Forest Service Campground

An historical resources impact assessment was undertaken at the Alberta Forest Service's Cartier Creek Campground development. Recent disturbance of this campground precluded the possibility of finding any archaeological or historic remains. No historic resources sites were found.

81-79	B.F. Ball Archaeological Survey of Alberta	Column Sampling at EgPr-2, Jumpingpound Creek

Two column samples were recovered from EgPr-2 site deposits. The samples are 50 cm X 50 cm to a depth of 45 and 50 cm and were collected at 5 cm intervals for the purpose of retrieving charcoal for ^{14}C age estimations. Materials recovered include lithics, seeds and charcoal. These results compliment other studies undertaken by the author in intensive data recovery from archaeological sites.

81-86	J.C. Driver University of Calgary	RESEARCH, FiPi-29, Edmonton

Excavations were carried out by the University of Calgary at the Strathcona Archaeological Center Site (FiPi-29) in Edmonton. The excavation methodology employed in 1981 has demonstrated the value of large area exposure in identifying clusters of finds, and this methodology should certainly be continued for at least one more season.

Based on the results of the seasons work we would interpret the area as containing a series of campsites, at which a range of activities were undertaken. One of these was certainly artifact manufacture, although not all stages of the process are represented.

Future research at the site can proceed in a number of directions - experimental projects, lithic analysis, spatial analysis, and the study of disturbance factors. The latter has particular applicability in Alberta, where so many sites are contained within shallow soil profiles. Many of these projects will be served better by the excavation of material from large contiguous areas. This does not preclude the use of certain sampling techniques, but it should be stressed that sampling methods can be applied best when the nature of the site is better understood.

81-86	D.N. Steer DS Consulting	TERRAVENTURE INVESTMENTS, Subdiv., Airdrie

In June 1981 DS Consulting conducted an historical resources survey and assessment of one-half section of land immediately west of Airdrie, Alberta

The field studies entailed an on-ground survey of the entire study area in an attempt to locate historical resource sites of prehistoric, historic or paleontologic origin.

Four historical resource sites were identified and recorded. Two prehistoric sites and two historic period sites were included in the inventory. Investigation, recording and assessment of each site resulted in the conclusion that none of the sites were of significant value to warrant further study. Although the sites will be destroyed by proposed subdivision construction, no further archaeological work is recommended. Therefore, it is the consultant's opinion that the proposed development be allowed to proceed without further concern for historical resources.

81-88	T.C. Losey Historical Resources Consultant	BRASSARD AGENCIES, Subdiv., Hinton

An historical resource impact assessment was conducted of the Mountain View Estates west of Hinton.

A total of two man days was expended on the study area during which foot traverses totalling 10.08 km and 50 shovel test holes were conducted. Although excellent exposure was created by the already completed internal roadways system, no significant historical resources were encountered.

There does not appear to have been any longterm human activities which would have created significant historical resource sites on the property and therefore, no mitigative measures are necessary, and no further work is recommended.

81-89	J. Pollock Settlement Surveys Ltd.	POPLAR GROVE DEVT. LTD., Subdiv., Cold Lake

An archaeological survey of a proposed residential subdivision in the town of Cold Lake was undertaken by Settlement Surveys Ltd.

A systematic surface and subsurface survey was undertaken. The southern boundary of the property was divided into 50 metre sections and foot transects made north and then returning south consecutively along each transect line. Test pits were excavated at 50 metre intervals along each line. All available surface exposures were also examined and in a few areas further test pits were placed to sterile subsoil.

During the course of the survey no archaeological, historical or palaeontological sites were discovered. As no historical resources will be impacted, it is recommended that the development be allowed to proceed without further regard for historical resources.

81-90	S.G. Saylor Ethos Consultants Ltd.	NOVA, Pipeline North of Buffalo

A heritage resource impact assessment was conducted for Nova: An Alberta Corporation in response to a proposed gas pipeline development north of Buffalo.

Examination of the development areas involved foot and vehicular traverses, subsurface shovel test excavations, and examination of rodent holes, deflated areas and other existing ground disturbances. When an archaeological site was encountered, the immediate vicinity was thoroughly examined in order to ascertain its nature, extent and the probable impact of the proposed development.

Four prehistoric archaeological sites were located and recorded within the development right-of-way. Two were stone circle sites, and two were stone circle and cairn sites.

Relocation was successfully conducted at all heritage resources sites, thereby avoiding damage to the features. Shovel testing of relocation routes failed to yield cultural items. Monitoring of pipeline ditching at sites EfOp-395 and 397 is recommended.

81-91	J. Pollock Settlement Surveys Ltd.	REID CROWTHER & PARTNERS, Subdiv., Bonnyville

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on a proposed industrial subdivision north of the town of Bonnyville, Alberta. The survey resulted in the discovery of one historic resources site consisting of an isolated prehistoric findspot (GcOq-2) of limited scientific value.

The findspot is considered to have little archaeological significance and no further work is recommended on this site beyond its initial documentation in this report.

It is recommended that the subdivision be allowed to proceed subject to consideration of the recommendation for mitigation outlined in this report.

81-92	D. Steer DS Consulting	NOVA, Pipeline Lateral, Robb (Hanlan)

In June 1980 DS Consulting conducted a heritage resources impact assessment of a gas pipeline right-of-way east of Robb, Alberta.

One prehistoric site was located and recorded. The site was identified as a workshop consisting of a small concentration of lithic material. The site was located off the pipeline right-of-way and will not be directly affected by proposed construction. Preliminary investigations at the site indicated the presence of buried cultural deposits and that the site exhibited certain potential for yielding further archaeological information.

Considering known historical resources in the study area, no further archaeological work is recommended for the immediate pipeline project over and above that which is presented in this report.

81-93	B.O.K. Reeves Lifeways of Canada Ltd.	NU-WEST, Subdiv., Calgary

Lifeways of Canada Limited undertook a detailed historic resources impact assessment for Nu-West Development Corporation at a planned housing subdivision in northwest Calgary. Subsequently, archaeological excavations including eight backhoe and four auger tests were completed.

The 36 ha area was first examined on foot and a prehistoric tipi ring site was located. This site, which consisted of 12 stone rings, had been previously identified and designated as EgPn-5. No other surface archaeological sites were detected.

Visual assessment of the 12 tipi rings indicated that these were of value and would require various degrees of study prior to subdivision development. All rings were mapped and photographed and the rocks weighed. Two rings were completely excavated, four rings partially excavated by removal of a quadrant, while the perimeters of two additional rings were excavated. Central rockfull hearths were found in four rings.

The archaeological excavations at EgPn-5 resulted in recovery and preservation of data valuable to the full understanding of these patterns, thereby mitigating the possible effects of Scenic Acres Stage II development.

81-94	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	CANSTAR OIL SANDS LTD., Campground/Access Road, Fort McMurray

An historical resources impact assessment was conducted of the proposed Calumet Construction Camp and Athabasca River Access Road scheduled for development in northeastern Alberta resulted in the identification of one historical resource site, a prehistoric isolated find (HiOv-24). No further study is recommended. Photographic documentation, recording, and collection of the artifact have mitigated impact.

Based on the results of this study, Canstar Oil Sands Ltd. was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture, on June 15, 1981.

81-96	R.J. LeBlanc Archeological Survey of Alberta	Final Report on Archaeological Investigations, Lesser Slave Lake

During the 1980 and 1981 field seasons, archaeological reconnaissance and testing was undertaken in the Lesser Slave Lake region of north-central Alberta. Reconnaissance was concentrated on the north shore at the western end of the lake and on former shorelines in the area north and west of Buffalo's Bay, a small drainage basin which feeds into the extreme north-west corner of the lake. More restricted survey was also conducted in other areas on the lake as time and access allowed.

A total of 76 prehistoric sites were recorded as a result of these activities. In addition, two of the sites located on the north shore of the lake near Shaw Point were subjected to test excavations. This report presents the details of the reconnaissance and excavations and offers

tentative conclusions regarding the long-term prehistoric occupation of this region of Alberta.

81-97	S.G. Saylor Ethos Consultants Ltd.	CLARION PETROLEUM, Wellpad, Medicine Hat

An heritage resource impact assessment was conducted of a proposed Clarion Petroleum Ltd. wellsite in southeastern Alberta.

Field examination consisted of foot traverses and subsurface shovel testing which failed to reveal evidence of heritage resources within the proposed location.

It is recommended that wellsite development be allowed to proceed. It is further recommended that any subsequent wellsite development and pipeline ditching be preceeded by additional heritage resource impact assessments.

81-98	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	ESSO RESOURCES, Access Road/Gravel Pit Grande Center

An historical resources inventory assessment conducted in three areas near Grande Center, Alberta resulted in the identification of three historical resoure sites.

One of the sites consists of the remains of an historic farmstead. The remaining two sites are prehistoric and consist of a surface scatter (GbOr-8) and an isolated find (GdOn-10). The three sites will be subject to primary impact.

No further study is recommended. Photographic documentation, recording and collection of the artifacts have mitigated impact. Based on the results of this study, it is recommended that Esso Resources Canada Limited be granted historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

81-100	R. Balcom ARESCO Ltd.	UNION CARBIDE, Ethylene Glycol Plant, Joffre

Due to the proposed construction of an ethylene glycol plant near Prentiss, Alberta, ARESCO Ltd. has prepared a heritage resources overview of all developments and an impact assessment of two of the components proposed for development has been done.

The survey consisted of a systematic foot traverse of the plant site and pumphouse areas, and shovel testing. No heritage sites were located. No further work is recommended at the plant and pumphouse sites but the pipeline route will require assessment when the route is finalized.

81-101	B.O.K. Reeves Lifeways of Canada Ltd.	BURNCO, Gravel Quarry, Calgary

An historical resources impact assessment was conducted of a proposed gravel quarry site in Calgary.

In-field studies were concluded in two stages. The first involved foot traverses of the area and examination of existing exposures. The second was a program of backhoe tests conducted to determine the nature of the historic mound sites previously recorded and to determine if buried and previously unknown historical resources could be located.

The survey resulted in the re-identification of a single historic and three prehistoric period sites. The historic site (EgPm-144) consists of a number of mounds, none of which are of historic value or concern. The three prehistoric sites (EgPm-142, 143, and 146) all contain tipi rings and scatters of other lithic material; subsurface testing located no buried cultural material. Buried soils at least 7,000 years in age were noted.

Additional work is recommended for all three prehistoric sites should development proceed in the southeast portion of the area.

81-102	R.J. Balcom ARESCO Ltd.	CANADIAN WESTERN NATURAL GAS, Pipeline, Okotoks

ARESCO Ltd. has conducted a heritage resources impact assessment of the lands to be disturbed by the construction of the Canadian Western Natural Gas Okotoks - Cayley pipelines. Fieldwork consisted of a foot traverse of the entire right-of-way length with the exception of three areas.

Two prehistoric sites were located during the course of the study. EdPk-16 is represented by an isolated find, a crude quartzite chopping tool. EdPk-15 is represented by a small basalt flake and some pieces of fire cracked rock. ARESCO Ltd. recommends no further work on these sites.

An historic site dating to the early 1900's was also discovered during the field survey. ARESCO Ltd. feels that this site should undergo minor testing and archival research.

81-104-C	J.M. Quigg Ethos Consultants Ltd.	TRANSPORTATION, EcPp-24, EfPq-5, Bragg Creek, Longview

A mitigation project was conducted at EcPp-24, southwest of Calgary and EfPq-5, southwest of Bragg Creek.

A total of 72 square meters plus 14 auger holes were excavated with the recovery of artifacts being stressed. Both sites yielded numerous artifacts and fragments of faunal remains.

The excavations of EcPp-24 and EfPq-5 revealed archaeological data pertaining to two separate time periods, the Late Prehistoric and Middle Prehistoric respectively. If both sites prove to represent single components through the subsequent analysis then these two sites will contribute significantly to our understanding of the life styles and practices of each period.

81-105 J. Hunt, ARESCO Ltd. — NOVA, Pipeline, Grande Prairie

As requested by Nova, an Alberta Corporation, ARESCO Ltd. conducted an historical resource impact assessment of a proposed pipeline route referred to as the Cutbank Lateral. This proposed pipeline commences south of Grande Prairie, Alberta and extends in a southerly direction for 65 km.

The survey was limited to an examination of creek/river crossings and areas close to water bodies. Surface surveillance and subsurface testing were carried out at each crossing. Since no historical resource sites were found on or near the pipeline right-of-way, it is recommended that construction proceed as scheduled.

81-107 R.K. Brulotte, University of Alberta — RESEARCH, Racehorse Pass and Torenado Pass, Coleman

In August 1981 a three week preliminary archaeological survey in the upper drainage of Racehorse Creek in southwestern Alberta was conducted by myself and two volunteers, George Chalut and Coreen Chiswell. It was a research project generally aimed at recording climatological and archaeological data. The specific intent of the survey was to investigate the likelihood of intensive prehistoric utilization of high altitude areas in chinook zones within the lee side of the Alberta Rocky Mountains.

The project concentrated on Racehorse Pass, South Racehorse and North Racehorse Creeks. The creeks were not as intensively surveyed as they should have been and areas in the drainage, such as North Fork Pass, along the Continental Divide, and Tornado Pass were neglected this season. However, five small lithic sites were recovered along with a Late Prehistoric component in a rockshelter. The shelter contained deeper deposits which were not investigated this season. A large quantity of faunal material was retrieved from the small test conducted in the shelter including deer, hares and other small mammal remains.

Research will continue in the summer of 1982. An intensive survey, excavation of the Racehorse Rockshelter and testing of other archaeological resources in the project area may yield significant results.

81-108	E.M. Gryba Contract Archaeologist	TRANSPORTATION, SR 940:36 Grande Cache

An historical resources impact assessment was undertaken of a proposed right-of-way for a planned new Forestry Trunk Road which will extend from east of Grande Cache north to Grande Prairie.

Seven prehistoric archaeological sites were discovered along the proposed alignment. Three sites comprise small campsites while four others represent isolated finds of quartzite flakes. The sites are neither very productive nor unique in terms of Alberta archaeology.

Although all of the sites have been initially exposed on the bulldozed center line, and will be further impacted by highway construction, the condition of the sites and the quantity of material present does not warrant any archaeological mitigative action. It is recommended that the western part of one site, GbQp-1, which extends west beyond the alignment boundary be avoided as a possible borrow pit area.

81-110	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	CITY OF MEDICINE HAT, Park/Road, Medicine Hat

An historical resources impact assessment was conducted of planned facilities areas scheduled for development within Police Point Park in the city of Medicine Hat.

One historical resource site, a prehistoric artifact scatter (EaOp-29), was identified. No further study is recommended for this area. Photographic documentation, recording, and collection of the materials have mitigated impact.

In the event that further development of facilities within Police Point Park is planned, an historical resources impact assessment of those areas subject to potential impact is recommended since the lands within

the park have a medium to high potential for prehistoric sites.

The planned Devonian Trail and Utilities Corridor were visually inspected to determine whether an historical resources impact assessment was warranted. No further study of these areas is recommended.

81-111-C	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	Provincial Parks

On behalf of Alberta Recreation and Parks, under contract to Alberta Culture, an historical resources impact assessment was conducted on the following provincial parks: Crimson Lake, Miquelon Lake, Cypress Hills, Big Knife and Pioneer Lakes. With the exception of the Pioneer Lakes (Horseshoe Lake) proposed park, assessment was required only on specific facility areas. At Pioneer Lakes, an historical resources impact assessment of the entire proposed park was requested. However, areas of extremely low potential, such as muskeg, were to be eliminated.

Field methodology consisted of visual inspection of existing exposures and surface inspection and subsurface testing, at the discretion of the field archaeologist.

The survey resulted in the identification of ten prehistoric archaeological sites. No further work was recommended for three of the sites. Specific recommendations regarding the remaining sites are dealt with in the end-of-season report.

81-115	B.F. Ball Archeological Survey of Alberta	Core Sampling of Archaeological Sites in the Parkland Region of Alberta

Core samples were obtained from two sites in the Parkland region of central Alberta. An Oakfield sampler was used to obtain samples of archaeological deposits from the Mulbach and Castor Creek Sites. The purpose of this study is to investigate the utility of this technique as an acceptable site testing procedure. Results appear inconclusive at this time and indicates more testing is needed before any conclusions can be reached.

81-116-C E.M. Gryba
Contract Archaeologist

TRANSPORTATION CONTRACT
Highway Survey, Province of Alberta

Historical resources assessments were conducted of proposed highway development projects throughout the southern half of Alberta. A total of 218.5 kilometers of highway alignment and 17 gravel pits operated by Alberta Transportation were investigated. The projects were distributed from near the Sasktachewan border west to the Rocky Mountains, and from the Pincher Creek district north to Peace River.

The majority of the projects were covered in their entirety on foot. The coverage was more intense where the terrain displayed marked diversity or reflected some archaeological potential. Shovel testing was used to check the forested areas which reflected archaeological potential, or to evaluate those sites which had been discovered within or near the highway alignments.

Sixty nine archaeological sites and one standing historic building were recorded during this reconnaissance. Salvage excavations are recommended for six, and possibly seven, of the sites while future testing of three other sites is suggested. An additional nine sites are situated on terrain that might be identified as potential borrow pit locations and, for these, avoidance is recommended. The remaining 53 sites are either insignificant in their return of data, or are too far removed from the zone of development, to require further archaeological attention in terms of the highway programme.

81-118-C B.M. Ronaghan
Lifeways of Canada Ltd.

PROVINCIAL PARKS,
Carson-Pegasus,
Whitecourt

Conservation excavations were undertaken in the summer of 1981 at two prehistoric sites endangered by construction of recreational facilities at Carson-Pegasus Provincial Park near Whitecourt. A large site extending the length of a gravel pit on Carson Lake (GbPv-1) revealed a somewhat mixed but lengthy span of prehistoric occupation. Early, Middle and

Late prehistoric periods are represented. A small lake terrace site (GbPv-2) revealed a single Middle Prehistoric occupation.

Because of its age, intensity of occupation, and potential for revealing further significant information, it is recommended that either further disturbance be avoided or a larger sample be excavated from GbPv-1. Further work may be able to lessen mixing problems. The sample taken from GbPv-2 is considered sufficient mitigation of proposed impact, no further work is recommended.

81-119	J. Hunt ARESCO Ltd.	GULF CANADA RESOURCES LTD. Pipeline, Robb

At the request of Gulf Canada Resources, ARESCO Ltd. conducted an historical resource impact assessment of the proposed Shaw-Mountain Park segment of the Foothills gas-gathering system near Robb, Alberta

The survey concentrated on major river and creek crossings and other areas considered to have a moderate to high historical resource potential.

Five sites were recorded, three of these being historic, and two prehistoric. The most significant site located is the Yellowhead Townsite which was associated with the Yellowhead Mine in operation until 1923. Recommendations for archival research, archaeological work and subject interviews have been made. A second historical site contains three standing structures and avoidance of the site has been suggested. No further work is recommended for the third historic site (FhQe-2) which is mostly destroyed.

One of the prehistoric sites, FgQg-1, has been previously recorded and requires no additional work. FgQg-2, located on the east bank of the Embarass River should be avoided. If this is not possible, monitoring of the site during construction should be considered.

81-120	D. Steer DS Consulting	NOVA/AECO, Pipelines, Ralston

In August 1981 DS Consulting conducted a heritage resources impact assessment of two short length gas pipeline right-of-ways in south-eastern and south central Alberta. The resource survey of the two alignments, Aeco 'I' Lateral and Halkirk Lateral, resulted in the identification of five historical resource sites.

Two prehistoric sites and one historic site were recorded during survey of the Aeco 'I' Lateral. The two prehistoric sites (stone cairn; stone ring and hearth) were situated in close proximity to, but off the proposed pipeline right-of-way. Extant recording and flagging of both sites represents sufficient mitigation. The historic site, a stone section line alignment, will be intercepted by the proposed pipeline. However, the site is not considered of significance and will be minimally disturbed, therefore further impact mitigation is not considered warranted.

Two historic sites, a well and a farmstead, were located during field reconnaissance along the Halkirk Lateral. Both sites were situated well off the proposed right-of-way and will not be affected by construction. Recording of the sites represents sufficient mitigation.

Considering the known historical resources in the two study areas, no further archaeological work is recommended for the immediate pipeline projects above that which has been completed to date.

81-122	B.O.K. Reeves Lifeways of Canada Ltd.	J.F.R. RANCHES, Subdiv. Cochrane

In August of 1981 Lifeways of Canada conducted an historical resources impact assessment of a proposed residential subdivision north of the Bow River.

Detailed inspection of terrace surfaces coupled with a program of subsurface testing using a backhoe resulted in the identification of four prehistoric sites within the project area.

All of the sites are considered to be of significance and a program of excavation is recommended.

81-123 R.J. Heitzmann, Fedirchuk McCullough & Assoc. Ltd. — ALBERTA ENVIRONMENT, Irrigation System Willow Creek/Kenex Coulee

An historical resources impact assessment of the Lethbridge Northern Irrigation's proposed upgrading of the Willow Creek Flume and the Kenex Coulee Syphon resulted in the identification of both existing structures as historic sites. The Lethbridge Northern Irrigation District main headworks and canals were constructed between 1920 and 1923, but they are of relatively late date compared to many other irrigation developments in southern Alberta.

The Willow Creek Flume has been photographed and recorded. It will be necessary to remove this structure. The Kenex Coulee Syphon will be replaced by a new canal in a different location. It is, therefore, possible to preserve the existing syphon in its current location.

In addition to assessing the historic structures noted above, the areas required for new construction were examined for historical resources. No additional prehistoric or historic sites were located in these areas.

Based on the results of this study, it is recommended that Alberta Environment be granted historical clearance.

81-124 M.R.A. Forsman, Archaeological Survey of Alberta — RESEARCH, McDougall Methodist Mission, Smoky Lake

An archaeological survey of the McDougall Methodist Mission site (GaPc-7) at Victoria Settlement was carried out during a seven day period in August, 1981. The study was initiated as an outgrowth of interpretive needs resulting from opening the settlement area to the public. The existence and development of the community derives from the prior establishment and significance of the mission site. The mission site has not been surveyed before. A quantity of exposed artifacts was collected, obvious cultural features mapped and recorded, and part of a structural feature exposed by sweeping away a thin overlying layer of loose topsoil. This feature, believed to be part of the McDougall mission house, was re-covered

after recording. The site area contains mission ruins, features, and artifacts dating from the beginning of missionary activities in 1862 to their demise in the twentieth century. The remains have not been extensively impacted and there is no doubt that the site represents an important historical resource. Recommendations are made for enhancing its accessability and interpretation.

81-125	S.G. Saylor Ethos Consulting Ltd.	NOVA, Pipeline Crowfoot

A heritage resource impact assessment was conducted for Nova: An Alberta Corporation, in response to a proposed gas pipeline development termed the Gleichen Lateral. The project was located approximately 5 miles north of the Bow River.

No heritage resource sites were encountered within the development area. Further mitigation is not recommended.

Absence of heritage resource materials within the right-of-way is postulated to be a result of cultivation, distance from major river systems, undetermined environmental and cultural factors, and fortuitous pipeline placement.

81-134	R. Balcom ARESCO Ltd.	AMOCO, Pipeline, Slave Lake

As requested by AMOCO Canada Ltd., ARESCO Ltd. conducted an historical resources impact assessment of a proposed gas gathering system near Lesser Slave Lake, Alberta.

Approximately 57 percent of the route was inspected by means of foot traverses along the 20 metre wide right-of-way (the center line of which was almost entirely cut and flagged).

As no sites were found during the historic resources impact assessment, ARESCO Ltd. is of the opinion that development proceed as scheduled.

81-135	S.J. Minni Historical Resources Consultant	DOME/AESL/ALBERTA ENVIRONMENT Water Pipeline Mitigation, Ft. Saskatchewan

At the request of Associated Engineering Services Ltd., mitigative archaeological research was undertaken at FkPg-10. The mitigation was necessary in order to lessen the impact by a proposed water pipeline of the Vegreville Corridor Regional Water Supply System which is to be installed across part of the site.

FkPg-10 is a large campsite which stretches 1.5 km along the lower terrace of the North Saskatchewan River north east of the town of Fort Saskatchewan. The site was initially located in 1976 (Permit 76-57) and was test excavated in 1977 (Permit 77-11).

Information recovered from the mitigation as well as from previous research at the site indicates that FkPg-10 was a campsite with lithic extraction/reduction for the purpose of tool manufacture as the primary purpose for site occupation. The recovery of a lanceolate point fragment indicates site use during Early Prehistoric times (ca. 6-8000 B.C.). It is assumed that occupation of the site has occurred discontinuously since that time.

The research at FkPg-10 resulted in the definition of areas of occupation within the overall confines of the site. Further divisions or specific activity areas however, were not evident. All useful information was recovered during the initial map/collection process. There is no apparent value in the investigation of sub-surface remains at a site where there are no undisturbed buried deposits.

In spite of the various limitations of FkPg-10, the site has value for further archaeological research. Additional controlled surface collections would determine the extent and location of other cultural concentrations at the site. Such collections may in time permit the definition of various cultural/temporal/seasonal occupations. Further research at FkPg-10 should be undertaken in conjunction with every proposed development activity which will impact the site. FkPg-10 is located in a

prime industrial area and ultimately will be affected by additional developments.

The controlled surface collection of the Vegreville Corridor Regional Water Supply System right-of-way which crosses FkPg-10 has mitigated any impact the development will have on the site. It is recommended that the installation of the water pipeline proceed without further concern for FkPg-10.

81-136	J. Pollock Settlement Surveys Ltd.	R. KUSHINKI, Subdiv., Leduc

An historical resources impact assessment was conducted of a proposed subdivision development near Calmar, Alberta.

The field reconnaissance involved foot traverse of the entire property. Foot transects were made every 25 metres with subsurface testing every 25 metres in a north/south direction. A zig-zag traverse pattern was used to extensively inspect the creek bank area.

Despite extensive fieldwork, no historical resources were located on the proposed subdivision development. There is no evidence to suggest that the proposed development will impact any sites of historical, archaeological or paleontological value and it is recommended that this subdivision be allowed to proceed without any further work in regard to historical resources.

81-137	R.J. Balcom ARESCO Ltd.	CITY OF CALGARY, Sewer Line - Ft. Calgary; EgPm-5, Calgary

During the summer and fall of 1981, ARESCO Ltd., under contract with the City of Calgary, carried out a program of archaeological test excavation from 8th Street S.E., across the grounds of Fort Calgary to 6th Street S.E. This was done in conjunction with the construction of a sanitary relief trunk by the City of Calgary.

On the east side of the Elbow River, a test trench was excavated by a backhoe from the river banks to the street. The material culture in association with this area was of a relatively recent nature.

On the west side of the Elbow River, 14 test holes were excavated by backhoe prior to sewer line construction. Due to the presence of material culture dating to the time period of occupation at Fort Calgary, construction of the sewer line was closely monitored from test holes 1 through 6 and 11 through 14. Artifacts were collected at this time and will be described in the forthcoming report.

81-139	R.G. Forbis University of Calgary	TOWN OF HIGH PRAIRIE, Industrial Park, Subdiv.

An historical resources impact assessment was conducted on a proposed industrial park subdivision in the town of High River, Alberta.

A foot traverse was carried out along the perimeters of the field, criss-crossing it twice. In addition, a number of shallow test pits were dug at random.

Aside from litter attributable to the past decade or so, no remains of paleontological, historical or archaeological interest were found on the land. It is therefore recommended that development be allowed to proceed.

81-141	J.M. Hunt ARESCO Ltd.	ALBERTA POWER, Water Pipeline Sheerness

An historical resources impact assessment was conducted of realignments in the Sheerness make-up pipeline.

Re-survey of the 40 km pipeline, which extends north from the Red Deer River to a cooling pond west of Highway 36, amounted to approximately 7.5 km. Changes in the alignment avoided seven previously recorded sites by an average of 25 - 30 m (ARESCO Ltd. 1981). An additional 10 sites were recorded as a result of the latest survey. Eight of these are prehistoric, represented mainly by isolated finds. Archaeological testing of these sites is not warranted due to limited artifact content and negative subsurface test results.

Two historical sites (homesteads) recorded during the survey are likewise not recommended for further work on the basis of material content

and the distance of major features from the proposed pipeline.

Recommendations made for sites located during the original surveys of the railspur and pipeline are also reviewed in the report.

81-142	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	TRITEK ENGINEERING/ TOWN OF ATHABASCA, Water Pipeline, Athabasca

An historical resources impact assessment was conducted on 2.6 kilometres of proposed water pipeline route in the Town of Athabasca.

Fedirchuk McCullough & Associates Ltd. conducted the field work using primarily visual inspection of current and older disturbances along the route. No historical resource sites were found.

Much of the route lies on gravel roads; the remainder follows existing road allowance and previously constructed pipeline easement. It is recommended that construction be allowed to proceed without further concern for historical resources.

81-143	B.O.K. Reeves Lifeways of Canada Ltd.	Historical Resources Impact Assessment, Archibald, Gilchrist No.'s 2 and 3 Projects

An historical resources impact assessment was undertaken of three reservoir projects--Archibald and Gilchrist Nos. 2 and 3--proposed by Ducks Unlimited for development in the Milk River country of Southern Alberta.

Archaeological reconnaissance located two historic sites, a cobble foundation (DgOu-30) representing a range cabin constructed ca. 1900 in the Archibald project area adjacent to the damsite, and two cairns (DgOu-31), adjacent to a long abandoned wagon road within the full supply line in Gilchrist No. 2 reservoir. The sites are of limited historic value. We recommend DgOu-30 be avoided or investigated before damsite construction and DgOu-31 be mapped and excavated prior to project development.

All the projects have potential for animal kills of considerable antiquity deeply buried within the ephemeral channels. To evaluate this

potential, we recommend a program of backhoe testing be undertaken prior to project development.

81-146	J. Pollock Settlement Surveys Ltd.	TEXACO/CU ENGINEERING, Gas Gathering System, Wabasca

An historical resources survey was conducted of a proposed natural gas gathering system in the Wabasca area of northeastern Alberta.

A program of systematic subsurface testing of the proposed alignment failed to disclose any sites of significance.

As no historical resources sites were discovered along the proposed route, it is recommended that the development be allowed to proceed without further regard to historical resources.

81-147	J.M. Hunt ARESCO Ltd.	DENNISON MINES/GULF CANADA RESOURCES, Railspur: Mitigation, Robb

In October 1981, ARESCO Ltd. was requested by Dennison Mines Ltd. and Gulf Canada Resources Inc., to mitigate six prehistoric sites located on a proposed railspur near Robb, Alberta. Five of the sites (FhQf-8, 9, 10, 12 and 13) were located during a survey of the rail line in August 1981, on terraces flanking the Embarass River and related drainages. All the sites had been previously disturbed by tree clearing and bulldozing activities.

Mitigation of FhQf-8 and 9 consisted of site mapping, shovel testing and surface collection. FhQf-10, 12 and 13 were excavated in addition to site mapping and surface collection.

The mitigation of FhQf-10 produced a great number of artifacts. The majority of these are flakes and debitage, however, there is also a significant proportion of finished tools such as scrapers, bifaces, unifaces and 13 projectile points. More unique specimens include a 15 cm long blade and a drill. A Middle Prehistoric component is indicated at the site by the presence of McKean and Pelican Lake type projectile points. Other temporally diagnostic tools have yet to be identified.

A sixth site, FhQf-25 was located during backhoe trenching of a lower terrace 30 m south of FhQf-10. The site, which lies adjacent to a fen was test excavated by 9 - 1 x 1 m units. A series of deep (70 cm) shovel tests and 12 - 50 x 50 cm units were dug and trowelled. The site contained several flake concentrations and tools.

Three thousand artifacts have been catalogued from sites FhQf 8, 9, 12, 13 and 25. It is expected that cultural materials recovered from FhQf-10 will exceed 5,000 specimens. The analysis of artifacts found at the six sites on the proposed railspur is currently in progress.

81-150	T.C. Losey Historical Resources Consultant	STYLINE DEVT./KENRO LOADING LTD., Subdiv., Mitigation Hinton

This report summarizes historical resources impact assessment and mitigation performed at five sites in Improvement District 14 near Hinton. Three of the sites were located during a previous assessment and are recommended for further work. These include a stone tool manufacturing site (FiQj-3) and two ethnoarchaeological sites (FiQj-6 and FiQj-7), both of recent native ceremonial origin. Two additional sites were also assessed at the request of the Archaeological Survey of Alberta which were noted during an independent study conducted in the area. One is an alleged prehistoric site of unknown significance; the other a recent log structure of unknown origin.

Results of the mitigation provided indicate that FiQj-3 is a single component occupation of unknown temporal and cultural dimensions, and that its primary function was as a site for tool preform production as opposed to the manufacturing of finished implements.

The two ethnoarchaeological sites, FiQj-6 and FiQj-7, are believed to be ceremonial sweatlodge complexes of similar cultural and temporal origin. Both were mapped and photographed with details of structures, dimensions and associated features appended.

The assessment performed at the prehistoric site known only as the

Bronson site, failed to produce cultural or artifactual materials of any kind and thus no further work is recommended.

81-151	J. Pollock Settlement Surveys Ltd.	GROVERIDGE/IMPERIAL GROUP, Subdiv., Edmonton

An historical resources impact assessment was conducted by Settlement Surveys Ltd. of a proposed subdivision development north of Castledowns, Edmonton.

In addition to a program of systematic subsurface testing of the property in general, particular emphasis was placed on the form of surface and subsurface survey of the intermittent stream and any sloughs present.

The survey resulted in the discovery of four archaeological resources sites consisting of two isolated prehistoric find spots (FjPj-34 and FjPi-89) of limited scientific value and two prehistoric campsites (FjPj-33 and FjPi-90). Testing at all these sites show them to be of limited value and no further work is recommended at any of the above sites.

No further work is recommended on any of the above sites beyond their initial documentation in this report and it is recommended that the subdivision be cleared for historical resources concerns.

81-154	T.C. Losey Historical Resources Consultant	KIRIAK & ASSOC. LTD., Subdiv., Barrhead

An historical resources impact assessment was conducted of a 61.5 hectares proposed subdivision bordering Peanut Lake, Barrhead County, Alberta. A vigorous investigation of all proposed impact areas failed to locate any new prehistoric sites and only one historic structure of limited importance was found. The latter is the remains of the original c. 1910 homestead site which, although of an interesting semi-subterranean type, is lacking sufficient structural and artifactual data elements to qualify as a significant historical resource. Therefore, no additional study beyond that contained in the impact assessment is recommended.

81-157	J. Pollock Settlement Surveys Ltd.	TRANSALTA UTILITIES, Transmission Line, Lac La Biche to Winnefred

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on a hydro transmission line south of Lac La Biche to north of the Cold Lake Air Weapons Range.

The field investigation was divided into two segments; (a) foot traverses where road access permitted, and (b) helicopter supported testing at specific designated areas along the unaccessable northern portion of the R.o.W. Subsurface test pits were made along the foot traverses where applicable.

The survey resulted in the discovery of two archaeological resource sites consisting of two isolated prehistoric findspots. Testing at these sites showed them to be of limited scientific value and no further work is recommended beyond their initial documentation in this report.

81-158-C	J. Pollock Settlement Surveys Ltd.	TRANSPORTATION, Highway Construction and Gravel Pit, Bonnyville

An historical resources impact assessment was conducted of three highway construction projects and one gravel pit in northern Alberta. The project involved the examination of 45.4 kilometres of highway right-of-way and one gravel pit of approximately 160 acres. Four prehistoric archaeological sites and three historic sites were located during the above work.

81-164-C	A. Stryd Arcas Heritage Cons.	ALBERTA ENVIRONMENT Dickson Dam Project

In the fall of 1981 Arcas Heritage Consultants, under contract to Alberta Environment, carried out archaeological investigations about 25 km west of Innisfail, Alberta. This work was the final stage of an archaeological reconnaissance, assessment, and mitigation program associated with the construction of the Dickson Dam on the Red Deer River. The

objectives of the 1981 field season were: (1) to conduct an historical resources impact assessment of 7 parcels of land which had not been previously inventoried, (2) to assess the scientific significance of 8 known historical sites, and (3) to provide a prehistory of the Dickson Dam region with emphasis on settlement and subsistence.

There were 18 new sites (FaPn 60-77) recorded during the site inventory. These were evaluated by systematic surface collecting and test pitting. No mitigative excavation took place at any of the new sites as the initial evaluation provided sufficient settlement-subsistence data. Six previously recorded sites (FaPn-17, 27, 28, 29, 56 and 57) were assessed. Additional mitigative excavation took place at FaPn-57, which was the only site to exhibit undisturbed, buried cultural deposits below the plow zone. A settlement-subsistence analysis of the study area using data gathered over 5 field seasons was also undertaken.

81-166	E.J. McCullough Fedirchuk McCullough & Assoc. Ltd.	LUTZ PROPERTIES LTD., Subdiv., Investig. GiQq-1, Grande Prairie

An historical resources impact assessment of the proposed Lutz Properties Ltd. Park Royal Estates Subdivision in the County of Grande Prairie, resulted in the identification and re-assessment of two previously recorded historical resource sites. Site GiQq-3, the Ski Hill Site, is a prehistoric quarry-workshop and site GiQq-9 is an historic foundation.

Site GiQq-3 is a major prehistoric site in northwestern Alberta and has the potential to yield further scientific information. The proposed Park Royal Estates Subdivision will result in major impact to the site. Evaluative studies are recommended.

Site GiQq-9, the historic foundation, was destroyed by activities associated with the construction of General Crude Oil Company Limited's Teepee Creek Gas Project. No further studies are recommended.

81-167	B.M. Ronaghan Lifeways of Canada Ltd.	NOVA, Pipeline Lateral, Watino

An historical resources impact assessment of the proposed Watino Lateral Pipeline was undertaken for Nova: an Alberta Corporation. The pipeline is located west of the Smoky River. The ground reconnaissance was carried out in late October 1981 by a two person crew.

The foot traverse along the entire length of the proposed route as well as extensive shovel testing did not produce any historical resource sites. On the basis of the shovel testing and lack of visible surface remains, no further work is recommended.

81-175	J. Calder Lifeways of Canada Ltd.	OPTIMAX DEVT. LTD., Subdiv., Calgary

An historical resources impact assessment was conducted of a proposed subdivision development in Calgary.

The archaeological survey consisted of the visual examination of the ground surface along three irregular transects. Shovel testing was undertaken on features with archaeological potential.

No prehistoric sites were identified in the development area. On the basis of the archaeological reconnaissance, no further work is recommended. These recommendations are those of the consultant, and do not necessarily follow Archaeological Survey of Alberta policy.

81-177	G.F. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	NORTHWESTERN UTILITIES LTD., Pipeline, Edmonton to Fort Saskatchewan

An historical resources inventory and assessment was conducted on the Inland-Celanese Pipeline route proposed by Northwestern Utilities Limited and the adjacent N.E. Edmonton pipeline corridor. Subsequently, surface collection was carried out at FjPh-8. Fedirchuk McCullough & Associates Ltd. conducted the field programme between October 26 and November 11, 1981. The field programme involved systematic visual inspection of the pipeline route and corridor area along parallel straight line routes.

Subsurface testing was conducted in areas where visibility was obscured and when archaeological sites were encountered. Two prehistoric sites located along the right-of-way of the parallel line proposed by Alberta Energy Company Limited were also reassessed relative to potential impact of twinning of the pipeline.

Eighteen previously unrecorded archaeological sites were located and five recorded sites were re-investigated. All of the sites are represented by surficial remains; only two sites, FjPh-68 and 75, contained some subsurface materials. The material observed on the surface at FjPh-8 was collected. On the basis of the collections and assessments, no further work is necessary at any of the sites prior to construction.

81-179	J. Pollock Settlement Surveys Ltd.	TRANSALTA UTILITIES LTD. Transmission Line, Entwistle to Bickerdike

An archaeological survey was conducted of the proposed transmission right-of-way from Entwistle to Bickerdike.

One paleontological site of limited significance (one isolated petrified tree trunk fragment) was located on the west side of the Mcleod River crossing.

It is recommended that, (1) the proposed transmission line be allowed to proceed without any further concerns or constraints in regards to historical resources west of the Pembina River crossing, and (2) development at the Pembina River crossing be allowed to proceed on completion of the requisite H.R.I.A. at that crossing. The H.R.I.A. at the Pembina River crossing shall be initiated in the spring of 1982.

81-184	J.M. Hunt ARESCO Ltd.	ALBERTA POWER, Railspur, Sheerness

An historical resources impact assessment was conducted of realignments in the Sheerness make-up railspur.

The railspur re-survey located one historic homestead west of the right-of-way. The site, which consists mainly of old machinery will

most likely not be impacted. Further work has not been recommended.

Two possible cairns were noted overlooking a sloughbed at the west end of the railspur. Since there is some question related to their cultural identification, it is suggested that one feature be tested by a single 1 x 2 m or 2 x 2 m unit.

Recommendations made for sites located during the original surveys of the railspur and pipeline are also reviewed in the report.

81-185	B. Newton Fedirchuk McCullough & Assoc. Ltd.	DOME PETROLEUM, Pipeline Rocky Mountain House

Seven historical resource sites were identified during an historical resources impact assessment of the planned Dome Petroleum Limited Caroline Miscible Flood Pipeline rights-of-way scheduled for development in west-central Alberta. Two sites are isolated finds; three sites are artifact scatters; and two sites are campsites.

With the exception of FaPq-3, the sites all lie within the proposed right-of-way and will be subject to primary impact. Site FaPq-3 lies west of the proposed right-of-way and will not be subject to primary impact. No further studies have been recommended. Photographic documentation, recording and collection of the artifacts have mitigated impact.

Based on the results of this study, Dome Petroleum Limited was granted verbal historical clearance by the Archaeological Survey of Alberta, Alberta Culture.

81-187	D. Steer DS Consulting	ESSO RESOURCES, Pipeline Rocky Mountain House to Strachan

An historical resources impact assessment was conducted for Esso Resources Canada Limited by DS Consulting in response to pipeline development in the South Ferrier Field near Rocky Mountain House, Alberta.

The entire right-of-way was traversed on foot. In addition, subsurface shovel testing was carried out in areas believed to hold the greatest potential for site location.

Despite a detailed field examination of the pipeline alignment, no historical resource sites were located. A previously recorded prehistoric site was relocated in the immediate study area but the site was found to be situated well outside the development zone.

Considering known historical resources in the study area, it is recommended that no further work is necessary for the immediate pipeline project over and above that which is presented in this report.

81-191 J. Hunt, ARESCO Ltd. — HAT DEVELOPMENT, Subdiv., Medicine Hat

In November 1981, ARESCO Ltd. conducted an heritage resource impact assessment of the proposed Burnside Farm Subdivision in west Medicine Hat. The survey consisted of surface surveillance of the study area along with shovel and auger testing. Six prehistoric sites and one historic were located, and have been designated EaOq-19 through 25. The site designation refers primarily to areas of artifact concentrations. Due to the nature of the disturbance in cultivated fields the allocation of site numbers tends to be arbitrary.

Based on the results of the study, it is recommended that EeOq-19, which may be part of a larger prehistoric tipi ring site previously recorded as EeOq-10, be further tested. In the event of future impacts, limited excavation is warranted at EeoQ-20 and 21. It is also recommended that the remaining sites be surface collected.

Finally, given the high historical resource potential of the area, two additional recommendations have been made. It is suggested that 50% of the west half of the study area be resurveyed since at the time of the impact assessment surface visibility was obscured by slash. Secondly, backhoe testing or deep trench monitoring is recommended on the intermediate river terrace as a means of discovering sites buried beneath alluvial deposits.

81-192 J. Hunt
ARESCO Ltd.

BUSINESS HOME & FARM LOCATERS INC., Subdiv., Medicine Hat

In October 1981, ARESCO Ltd. conducted an historical resource impact assessment of a 32 acre parcel to be developed as acreages. The study area is 4 miles south of Medicine Hat.

The field survey consisted of an examination of all knolls in the study area and systematic transects in the cultivated field. Shovel tests were placed randomly across the field and five tests were dug on the hills.

The survey located ten stone features, namely tipi rings and cairns (DlOp-13) and one anomalous rock configuration resembling a small "compartmentalized" house foundation (DlOp-14). A lithic scatter (DlOp-15) is located on the western periphery of the study area and contained an incomplete projectile point tentatively identified as Late Prehistoric.

As there is reason to believe that the proposed subdivision contains significant cultural resources, it is recommended that the site be extensively tested. Further recommendations are included in the final report.

81-193 B. Wright
ARESCO Ltd.

UNION CARBIDE, Pipeline Red Deer

An historical resources impact assessment was conducted of a water pipeline right-of-way proposed by Union Carbide Limited near Prentiss, Alberta. An isolated find was found in an area of high site potential, but additional corroborative evidence of cultural significance could not be located. It is concluded that no appreciable damage to historical resources is likely to occur as the result of this project and that it should be allowed to proceed without further concern for historical resources.

81-196	J. Pollock Settlement Surveys Ltd.	NOVA, Pipeline Lac La Biche

An historical resources impact assessment was conducted by Settlement Surveys Ltd. on the Caslan Lateral and the Caslan East Lateral pipelines near Lac La Biche.

The entire lengths of the R.o.W.s were walked except for the first 1.6 km of the Caslan East Lateral which was generally checked and appears to be of low potential. Subsurface test pits were dug at 100 metre intervals except in extremely low ground where less testing was made and on topographic highs and creek crossings where more extensive testing was implemented.

No cultural resource sites were found during the course of the survey. Due to the negative results, it is recommended that the pipeline project be allowed to proceed without further regard to historical resources.

81-201	R.J. Balcom ARESCO Ltd.	TRANSALTA UTILITIES Transmission Line Whitecourt

Due to the proposed development of a 240 kV transmission line by TransAlta Utilities Corporation, an heritage resource impact assessment was conducted of selected portions of the right-of-way scheduled for disturbance. Two sections were inspected, 6.63 km west of the Carson-Pegasus Provincial Park and the Athabasca River crossing.

Although no sites were located, ARESCO Ltd. feels that the south side of the Athabasca River should undergo backhoe testing. This area exhibits high site potential but there has been extensive flooding here. Sites would only be found by deeper testing. Furthermore, a ploughed field (approximately 875 meters long) immediately north of the CNR tracks on the south side of the Athabasca River exhibits considerable site potential and should be inspected. This area was not previously specified for inspection by the Archaeological Survey of Alberta.

ARESCO Ltd. recommends that development be allowed to proceed north of the Athabasca River and west of the Carson-Pegasus Provincial Park.

81-209	G.J. Fedirchuk Fedirchuk McCullough & Assoc. Ltd.	DOME PETROLEUM, Industrial Plantsite Extension Redwater/Scotford

An historical resources impact assessment was conducted on the proposed location of a Fractionation Plant and associated pipeline system near Fort Saskatchewan.

Field investigations consisted of surficial examination along with the excavation of sixteen backhoe tests.

As no heritage resources were located, it is recommended that this portion of the development proceed without further concerns for heritage resources.

81-213	D. Steer DS Consulting	PANCANADIAN PETROLEUM LTD. Coal Leases, Vulcan

In December 1981 DS Consulting carried out an historical resources site survey of six small coal exploration leases of PanCanadian Petroleum Limited east of Vulcan, Alberta

Despite detailed surface examination and subsurface testing, all six proposed development areas proved negative with respect to the presence of historical resource sites. No further archaeological work is recommended for the areas over and above that which has been carried out to-date and documented in this report.

BIRCH MOUNTAIN ARCHAEOLOGICAL STUDY, 1981

Permit 81-64

John W. Ives
Archaeological Survey of Alberta

INTRODUCTION

Based upon the premise that the area immediately affected by oil sands developments must reflect only a segment of prehistoric lifeways, the Birch Mountain Archaeological Study is a continuing project designed to integrate archaeological investigations in northeastern Alberta. The object of the study is to construct subsistence settlement systems for different time periods in the mixedwood section of the boreal forest. This is to be achieved by discovery and data recovery from selected sites in the Athabasca corridor and the neighbouring Birch Mountains uplands (Figure 1).

During the field season of 1981, the project emphasis shifted from survey to site excavation. Research in the last six years has led to the discovery of 40 prehistoric sites within the Eaglenest-Clear Lake study area (Ives, 1981a) (Figure 2). Prior to 1981, only three sites within the study area had been the subject of excavation: the Eaglenest Portage site (HkPa-4), which is extremely large and archaeologically productive; the Mamowechiwun Lookout Site (HkPa-11), a relatively small site situated atop a knoll near the confluence of streams between Eaglenest and Clear lakes; and the Tumaxale Site (HkPa-13), a small site located on the edge of muskeg on the east shore of Eaglenest Lake (Ives, 1977a; Ives, 1981b). An additional four sites were investigated in 1981.

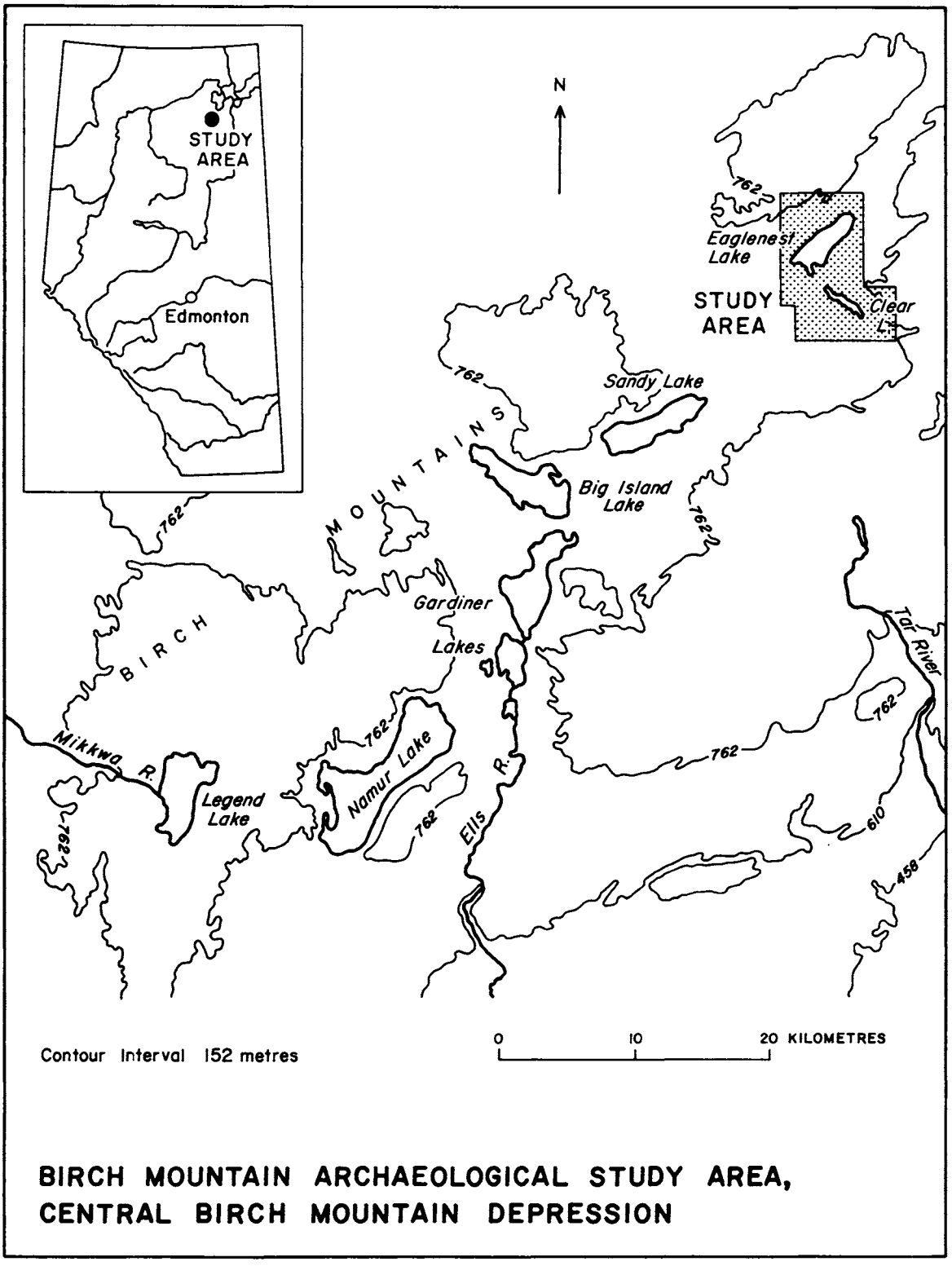

Figure 1: The Eaglenest-Clear Lake drainage system located at the northeast end of the Central Birch Mountain Depression.

Considerable effort was directed toward two excavation areas at another large and productive site, the Satsi Site (HkPb-1) on the south end of Eaglenest Lake. The Pelican Beach Site (HkPa-14), the only known stratified site within the study area, was also investigated in some detail. Finally, excavations were conducted at two smaller sites, the Nata II Site (HkPb-3) and the Kediya Site (HkPa-36).

METHODS

Horizontal discontinuities in artifact distributions provide an important means by which temporally related artifacts may be discriminated on thinly stratified boreal forest sites. Because future research will rely upon such distinctions, this criterion guided excavation methodology. It was essential to choose suitable areas for excavation (in terms of density of artifacts), while piece plotting of artifacts was also absolutely necessary. I employed effectively the same methods as had been used during an earlier study of the Eaglenest Portage Site (Ives, 1977a).

The Satsi Site (HkPb-1) occurs on a peninsula jutting eastward into Eaglenest Lake. Two segments of a 25 centimetre wide transect, totalling 63 metres in length, were arranged along the axis of the peninsula. Transect I ran across a central, relatively flat and densely occupied front portion of the site. Transect II ran along a high embankment west of this which overlooked Eaglenest Lake. Transects were excavated by shovelling and screening four levels of 5-10 centimetres in depth for each metre of length. Bulk samples of soil matrix were retained from each level. When artifact and tool densities had been tabulated, I decided to excavate a 6 X 6 metre grid (Block A) in the centre of Transect I as well as an 11 square metre area (Block B) on transect II (Figure 3).

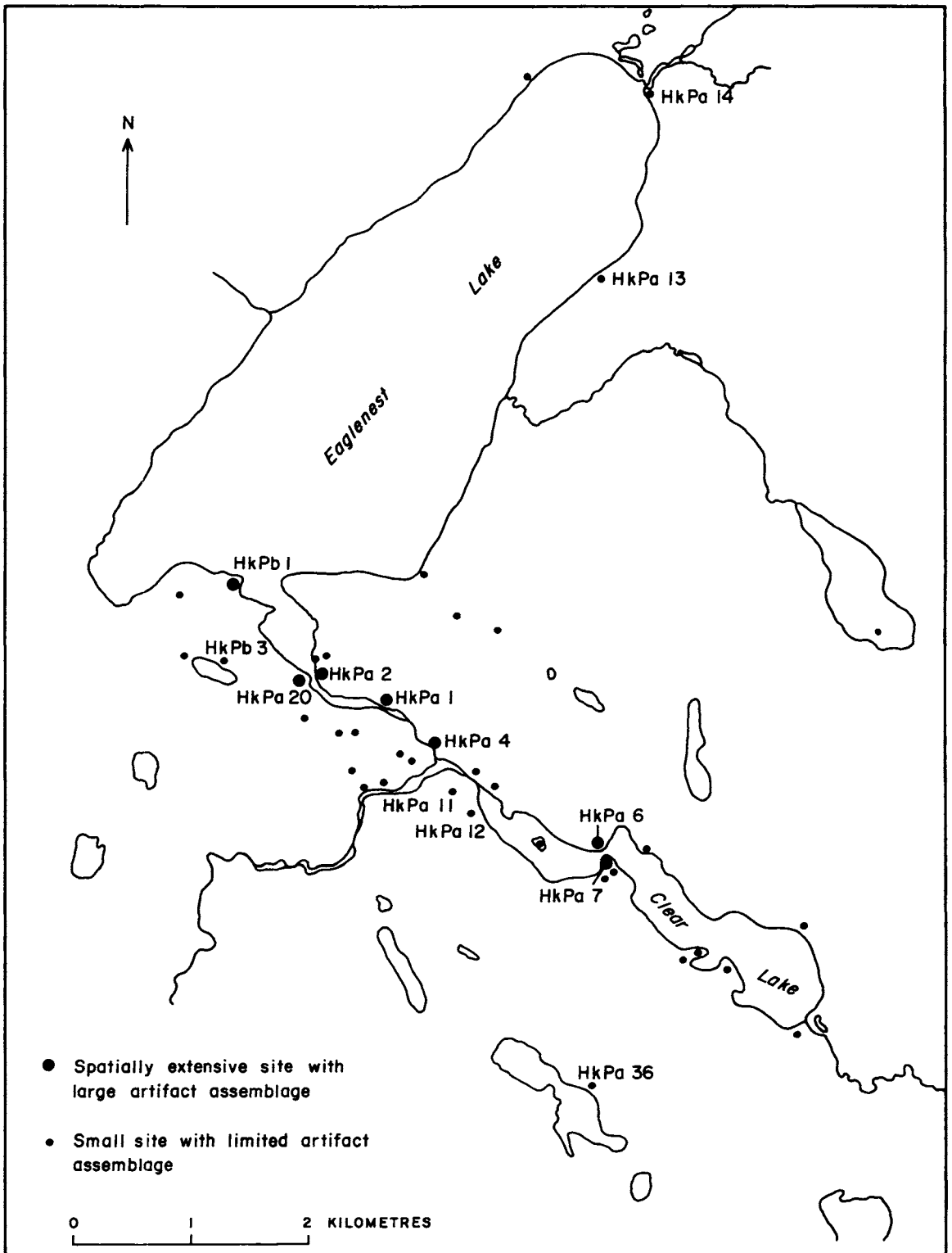

Figure 2: Distribution of archaeological sites within the study area. The Borden numbers are for sites referred to in the text as well as larger, more productive sites.

Artifacts were located by careful hand-trowelling. Besides extremely small retouch flakes and other fragments, each specimen was plotted and bagged individually. Excavation was conducted by levels oriented within natural soil horizons (LHF, Ae, etc.).

Similar techniques were employed during the excavation of a 2 X 2 metre unit at the Kediya Site (HkPa-36) and a 2 X 4 metre unit at the Nata II Site (HkPb-3). Transects were not necessary on these relatively small sites. A significant portion of the summer was spent on the excavation of a 2 X 3 metre unit at the Pelican Beach Site. Similar plotting methods were followed for artifacts occurring in levels defined by organic staining; in some instances, extraordinarily dense concentrations of debitage were removed by 20 X 20 centimetre grid units within a metre square. A deeper sondage to interpret the nature of beach ridging was conducted at the west end of the 2 X 3 (Figure 4). The stratigraphic record provided by the site was regarded as highly important, and the final phase of excavation was devoted to removing two "Lackfilms" or sedimentary peels from the walls of the deepest unit (Voigt and Gittins, 1977). These are intended for mounting and study in the laboratory, and were supplemented by soil samples.

RESULTS

At the Satsi Site (HkPb-1), Transect I revealed a concentration of diagnostic items and tools along its middle portion. Artifacts occurred in tremendous density in the 6 X 6 metre unit selected, and it was not possible to complete excavation. A concentration of calcined bone and tooth appeared in the northwest corner of this unit. These seem to be the remains of a relatively recent hearth. Schowalter (pers. comm.) has identified caribou and ungulate bone, fish bone, mouse and hare-sized

small mammal remains, and small bird to grouse-sized bird remains amongst the highly fragmentary specimens.

Some potential for functional differentiation was anticipated between Transect I and II, the latter providing a superlative view of Eaglenest Lake. Artifacts occurred in moderate density and relatively discrete spatial clusters. A burned feature has been identified at this location. This shallow pit, containing charred green spruce cones and wood, is likely cultural in origin. The possibility of its being a squirrel's (Tamiasciurus hudsonicus) nest cannot be entirely discounted. Artifacts occur mainly above and around the feature, and not within the feature fill. Collections from this site and those described below are just now being catalogued, with analysis to follow.

Considerable effort was directed toward the Pelican Beach Site. This site occurs on a beach ridge at the north end of Eaglenest Lake; stratification would appear to have been created by processes highly similar to those active at the Wentzel Lake Site (IfPo-1) (Conaty, 1977). Of six upper levels, four produced artifacts in relatively low density. However, levels four and five yielded many hundreds of items of grey quartzite debitage. Level five has been dated to 1280 $\pm$ 95 radiocarbon years (S-1974) (Ives, 1981a). Several of these levels have produced sufficient additional charcoal for dating purposes. Regrettably, no diagnostic artifacts were obtained, an unfortunate fact considering the comparatively well developed stratigraphy. A 2 X 1 metre sounding at the west end of the excavation unit revealed organic and charcoal staining in a series of over 20 layers extending downward some 1.5 metres. No artifacts were recovered below the uppermost six levels described above.

The Kediya Site (HkPa-36) is probably the most ephemeral find made thus far in the study area. A total of nine chert, siltstone, and grey quartzite flakes and fragments have been recovered, in addition to two possible instances of firebroken rock. The site provides an excellent view of a small lake situated roughly 1.6 kilometres south of Clear Lake. It may have functioned as an observation point, a highly transient camp or a more specific task location. The Nata II (HkPb-3) site yielded large quantities of quartzite debitage apparently related to bifacial reduction; discovered earlier by Donahue (1976), it produced a scraper as well. This site allows a sweeping view of both Eaglenest and a small lake just south of Eaglenest, and it is difficult not to conceive of it as some type of observation point (Figure 5).

A series of artifacts recovered from the Satsi Site is shown in Figure 6. Included are bifaces, side and end scrapers, a retouched flake and projectile points. The stemmed grey quartzite specimen (centre) is similar to a number of specimens reported from different locations in the Birch Mountains (Ives, 1977b). The asymmetric, square-based grey quartzite specimen (left of centre) is reminiscent of an item recovered by Sims from the Gardiner Lake Narrows Site (HjPd-1). The small, side to corner-notched black chert projectile point (right of centre) bears comparison with a somewhat larger specimen excavated at the Eaglenest Portage Site (HkPa-4) (ibid.). Again, nothing in this assemblage suggests an antiquity of greater than 2,000 to 3,000 years.

CONCLUSIONS

Analysis of site location information and artifact assemblages provided by the Birch Mountain Archaeological Study will continue. In future field seasons, it is planned to increase excavation samples

from a series of representative sites in the study area. Among these are suspected residence locations, game intercept and processing sites, observation points, transient camps and scenes of extractive activities such as snaring and trapping. Both individual sites and site distribution patterns in northeastern Alberta represent an overlay of occupations from different time periods. Every effort will be made to disarticulate this complex arrangement. Accordingly, small sites, apt to reflect single or relatively few episodes of occupation, will be emphasized. When equally important large sites are approached, spatial analytical techniques, refitting studies and raw lithic material studies will be used to define artifact assemblages exhibiting greater synchroneity.

The Birch Mountain Archaeological Study is proceeding in conjunction with paleoecological studies centring on the east basin of Clear Lake. In March of 1981, a 4.25 metre sediment core was collected from this location. Dr. Michael Hickman, Department of Botany, University of Alberta, is presently carrying out diatom and related limnological studies. Mr. Robert Vance, Archaeological Survey of Alberta, has undertaken pollen analysis. His studies are being supplemented by investigations of modern vegetation and modern pollen rain. Technical problems prevented recovery of basal sediments from the lake. A radiocarbon sample from near the base of the core has yielded a date of 2800 $\pm$ 150 years B.P. (GX-8361). This result suggests either that the record for Clear Lake is truncated, or that it involves appreciably greater depths of sediments. Paleoenvironmental reconstructions for later time periods will of course be useful in understanding lake level histories and potential shifts in game species such as moose, bison and caribou.

FIGURE 3: Excavation taking place on Block B at the Satsi Site (HkPb-1).

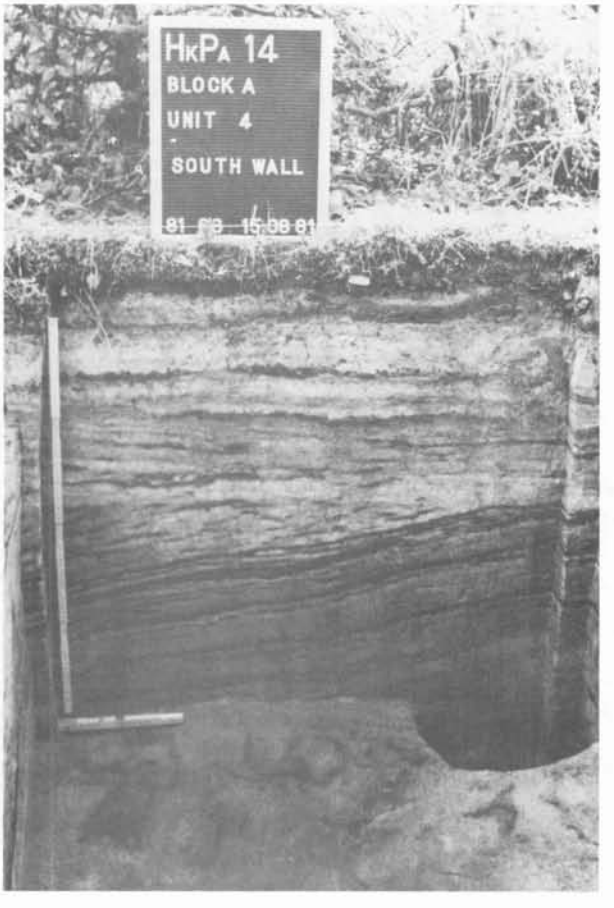

FIGURE 4:

Stratigraphy of the south wall of the test sounding at the Pelican Beach Site (HkPa-14). The upper six levels are the relatively level dark layers towards the top of the unit. Note the disconformity between these and the deeper levels.

FIGURE 5: View of Eaglenest Lake from Nata II (HkPb-3).

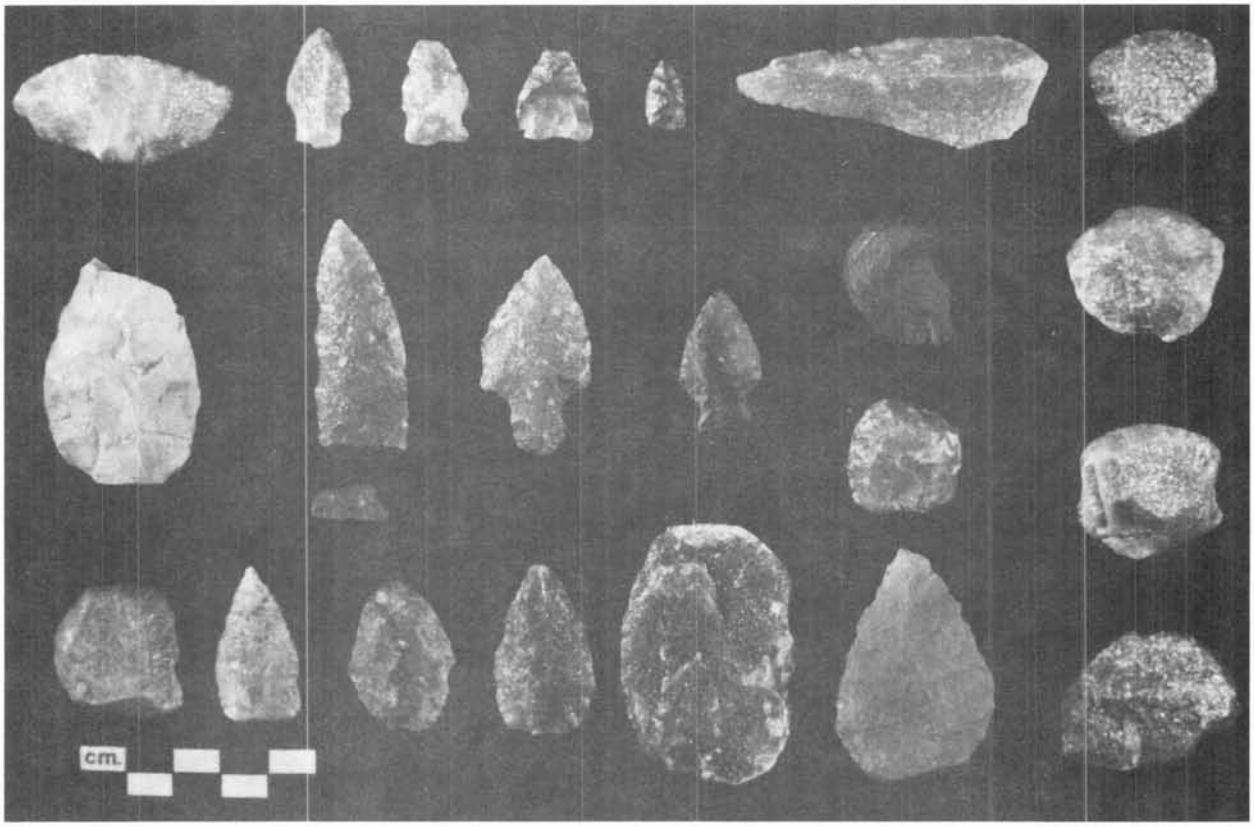

FIGURE 6: Specimens recovered from the Satsi Site (HkPb-1).

HISTORICAL RESOURCES IMPACT ASSESSMENT
KANANASKIS INTERLAKES ROAD AND PROPOSED PARK FACILITIES
IN THE INTERLAKES AREA

Permit 81-60-C

John Pollock
Settlement Surveys Ltd.

INTRODUCTION

An histocial resources impact assessment was conducted during May 1981 in the Kananaskis Interlakes area. Kananaskis Provincial Park is a 508 square kilometer area of mountains, alpine meadows, glacial lakes and pine forests. The study area itself comprised only a small portion of the total park area (see Figure 7) which was due for road construction and campground development during 1981. The interlakes study area lies between the two largest waterbodies in the Kananaskis Valley; Upper and Lower Kananaskis Lakes, created by utility company dams in the 1930's (Spalding 1981:120). Besides the main park access road (Figure 10), slated for upgrading (Figure 11), six campground and facility areas were slated for construction. These were the Upper Dam area, the Lakeshore Campground area, the Third Saddle area, the Haven Pit area, the Sawmill Pit area and the Trailhead Day Use area. The above areas only comprise a portion of the total interlakes area.

Physiographically, the area is located in the Upper Kananaskis Valley (Figures 10 and 12), an area of high altitude along the front range of the Rocky Mountains. Upper and Lower Kananaskis Lakes which form the headwaters of the Kananaskis River are fed by water from glaciers along with numerous snow and ice fields. There are a variety of large mammals present including mountain goat, sheep,

moose, elk and deer. Grizzly bears are also present. Fish, ptarmigan and grouse are also present and would have been available to prehistoric peoples utilizing the area (Spalding 1980:120-1).

ANTICIPATED IMPACT ON HISTORICAL RESOURCES

Archaeological sites are a non-renewable resource requiring proper planning, development, management and protection similar to that afforded to most natural resources. A total of eighteen historical resources sites are located in the general area, although only four are located within the confines of the proposed road and park developments. All of the sites have already been previously disturbed by erosion and recreational activity. The majority of sites represent isolated find spots or small campsites and are considered to be of limited scientific value due to the paucity of cultural material obtained and the negative results of further surface and subsurface testing at each. The recording of these sites is considered to be sufficient mitigation prior to development.

RECORD REVIEW AND ARCHIVAL RESEARCH

Before initiation of fieldwork, the site files and catalogued reports at the offices of the Archaeological Survey of Alberta were checked to determine if any prehistoric sites had been previously recorded either in or near the study area.

The proposed Kananaskis Interlakes development lies within the EdPs Borden Block and there has been 16 sites recorded within the study area. Of these, 10 are prehistoric and 6 are historic sites (see Table 2).

Previous work in the area had been undertaken by J. Fromhold and J. Rogers of the University of Calgary during 1973 under permit 73-11. During 1976, Tom Head of ARESCO Ltd. undertook an extensive survey of the park under research permit 76-55 (ARESCO Ltd. 1977). Table 2 lists the prehistoric sites in or near the study area.

PREHISTORIC SITE DISTRIBUTION AND SETTLEMENT PATTERNS

Table 2 presents a summary of the location and condition of the sixteen sites mentioned above. The sample size for the area is good and the data from these and other sites outside of the study area suggest a trend in prehistoric settlement patterns involving orientation towards major lake and river systems and inland to tributary streams and ponds.

From the writer's previous experience in the Boreal Forest of Canada (1975, 1977) it would appear that the settlement pattern in the Kananaskis Lakes area closely follows the patterns for forested areas generally. Previous research in forested areas of Northern Canada has demonstrated that the probability of an archaeological site being located in a given area can, to a certain extent, be predicted on the presence or absence of a series of variables in combination in that location. The variables used in assessing the archaeological potential of the Kananaskis Interlakes area are as follows:

a) Primary Variables - High Potential Areas
   Areas within .5 km of primary/secondary lakes, rivers have a high site probability rating.

b) Secondary Variables - High Potential Areas
   The potential for site occurrences within the above general area is significantly increased if one of the folliwng microenvironmental factors is present:
   1. The waterway is a headwaters lake (destination for

early peoples)

2. A good fishing locality
3. Areas near inlet or outlet streams
4. Unusual shoreline configuration (applies to rivers)
5. Lake narrows
6. Terraces on shoreline

c) Third Order Variables

If variables from a and b above already exist for a locale, the presence of any of the following would again raise the overall site potential into the excellent category. These are as follows:

1. Presence of a transportation/travel route
2. Moose/caribou crossing area
3. High area or terrace above river flood plain
4. Lithic/quarry source of raw stone for tool manufacture
5. Well drained lake shoreline with or without beach
6. Sandy beach
7. Island
8. Point of land
9. Portage
10. Upland area near water
11. Sand ridges or eskers
12. Sand dunes or sandy glacial outwash areas
13. A complex of topographic highs (hills)

Lakes and rivers that are major travel routes or destination points have a high density of sites associated with major environmental features such as a point near a narrows that would have provided good fishing, the possibility of obtaining crossing animals and relief from insect pests during warm weather conditions. Generally, from previous research it would appear that one micro-environmental factor alone (e.g., a good fishing station) may

Table 2: Previously Recorded Historic Sites In The Interlakes Area

#	Borden No.	Type	Recommendations*
1.	EdPs-14	surface scatter	none[a]
2.	EdPs-15	surface scatter	test[b]
3.	EdPs-29	surface scatter	no further work
4.	EdPs-46	isolated find	no further work
5.	EdPs-48	cabins (historic)	map, document, Interp.
6.	EdPs-49	const. camps (historic)	map, document, Interp.
7.	EdPs-50	workshop 8 x 10 m^2	no further work
8.	EdPs-51	surface scatter	minor excavation & syst. collection from beach
9.	EdPs-52	workshop	test excavation to det. buried material
10.	EdPs-53	workshop	test excavation
11.	EdPs-54	cabin (historic)	document for Park Interp.
12.	EdPs-55	workshop 8 x 10 m^2	no further work
13.	EdPs-65 ??	cache (historic) 1900's	locate exactly
14.	EdPs-66	damsite (historic)	no further work
15.	EdPs-67	damsite (historic)	no further work
16.	EdPs-78	surface scatter	limited excavations to determine if undisturbed portions exist

* All of the above recommendations were made by T. Head (1976) with the exception of: a, J. Rogers (1973); and b, J. Fromhold (1973).

produce a site but this would not necessarily be unusually rich or excavatable. In order to produce a significant, perhaps stratified site, a combination of variables are usually required.

As many of the above variables are present in the Kananaskis Lakes system, one would expect large numbers of sites as reflected in the archaeological record.

RESEARCH OBJECTIVES

The objectives were to locate and assess all prehistoric, historic and paleontological sites within the proposed project area prior to development.

RESEARCH PLAN AND METHODOLOGY

Fieldwork was initiated by Walde and Pollock from May 26 to May 30, 1981. In addition to a program of systematic subsurface testing of the property in general, particular emphasis was placed on judgemental surface and subsurface survey of likely areas adjacent to stream and lake shores.

The proposed road construction (widening and upgrading of an old Calgary Power Company road) (Figures 10 and 11) was tested by means of a foot traverse by two persons with subsurface testing every 50 metres. Additional tests as well as examination of surface exposures were undertaken. The proposed parking lots, new campgrounds, day use, interpretive and beach development areas were covered extensively by foot transects 30-50 metres apart with judgemental subsurface testing. Previously recorded sites were re-examined and further tests made to determine whether or not mitigative measures were appropriate. The total size of the study area (Figure 7) was not large (about 480 acres or 3 - ¼ sections) and work was

targeted on specific development units within the above area, allowing the research team to conduct a thorough examination of all zones including previously known sites.

ARTIFACT ANALYSIS

Site EdPs-82 - Straight Platform Flake (Figure 19: top left)

This flake of grey/black chert has a minimum of nine previous flake scars on its dorsal face indicating it was removed from a prepared core. Overall measurements are length 3.1 cm, width 3.35, thickness .6 cm. The platform is straight and measures 2.2 cm long and .35 cm thick.

Site EdPs-83 - Projectile Point (Figure 19: top right)

Bifacially flaked, this projectile point most closely resembles the Besant point type, which researchers attribute to the Besant Culture dating circa 500 B.C. - 500 A.D. The base measures 2.0 cm, notch widths are .7 and 1.1 cm. Overall measurements are length 2.5 cm, width 2.0 cm and thickness .3 cm. Material is grey/black chert.

Site EdPs-55 - Ovoid Biface (Figure 19: bottom left)

This ovoid biface manufactured from the same grey/black chert as the previous two specimens is at a stage 4 of reduction or completion (Callahan 1979:18) where the thickness is less than 1/4 of the width. The specimen is almost completely finished except for a "ridge" of material left on the left lateral side (see Figure 19). This material could have been removed from the distal end as there is sufficient thickness to prepare a series of platforms for removal of end thinning flakes. This may have, however, resulted in a loss

of the ovoid symmetry and/or a reduction in tool size. As the edge has been pressure flake trimmed, one might conclude that despite the thick ridge, this is a finished tool rather than a preform or tool blank. Overall measurements are length 7.9 cm, width 6.75 cm and thickness ranging from 1 cm to 1.7 cm (on ridge).

Site EdPs-15 - Assorted Flakes (Figure 19: bottom right)

A number of grey/black primary reduction flakes from cores and one or two biface trimming flakes are illustrated.

Site EdPs-78 - Projectile Point Tip (Figure 20: top left)

This finely flaked projectile tip has snapped in mid-section. Based purely on guesswork, it may represent the tip of an Avonlea side-notched or triangular point dating circa 0 A.D. to 1000 A.D. This would be interesting as it falls into the same era as the Besant point discussed earlier, indicating perhaps dual use of the Kananaskis area by co-existing prehistoric groups. Overall measurements (on broken specimen) are length 2.1 cm, width 1.4 cm, and thickness .35 cm.

Site EdPs-78 - Small Biface/Uniface Fragment (Figure 20: top row, centre)

This small item could possibly be considered a uniface as it is made from a flake, with most of the flake scars present on the dorsal surface. It may be a spall from a biface that has been curated and subsequently retouched for use as a flake tool. Overall measurements are length 3.0 cm, width 1.95 cm and thickness .35 cm. Material is a translucent quartzite.

Site EdPs-78 - Scraper (Figure 20: top right)

Made from a white chert, this fragmental end scraper has a very steep and high (.6 cm) working face which exhibits little spalls and micro step fracturing as a result of use-wear. Overall measurements are length 2.0 cm, width 2.0 cm and thickness .7 cm.

Site EdPs-78 - Bone Fragment (Figure 20: bottom row, far left)

This split longbone fragment from a large mammal has been roughly pointed. It is badly water worn and tumbled, making any speculation on use-wear, etc., impossible. Overall metrics are length 5.75 cm, width 2.35 (tapers to tip), and thickness .7 cm.

Site EdPs-78 - Large Flake (Figure 20: bottom row, centre)

This large flake of grey/black chert was removed from a "blocky" core that was 4.0 cm thick as both core platforms are present. The proximal or striking platform which removed the core trimming flake is 2.0 cm long and .6 cm wide. The remnant core face on the distal end is 2.5 X .8 cm in size. Overall measurements are length 4.1 cm, width 2.7 cm and thickness .7 cm.

Site EdPs-78 - Assorted Flakes (Figure 20: bottom row, far right)

These flakes represent a variety of material (i.e., chalcedony, brown chert, white chert and white quartzite) not common on many Kananaskis sites. Based on this very slim evidence, one might suggest these people were visitors to the area rather than permanent residents.

STUDY RESULTS

As a result of the field investigations, several of the previously known sites were located and evaluated (Figures 13, 14, 15 and 18). These were generally found to be of little value although additional material was recovered from several as outlined in Table 3.

Of the sixteen previously located sites in the interlakes area (Table 2), an historic cabin site, EdPs-54, lies outside the development areas and was not investigated.

The reported location of the following sites: EdPs-14, 29, 46, 50, 51, 52 and 53, were all surface inspected and subsurface tested. In all cases, results were negative. It would appear that the surface materials relating to these sites were removed during initial investigations or later by private collectors. As subsurface testing at these areas was also negative, we feel that these sites may no longer exist. The possible exceptions are the beach sites EdPs-52, 53, 51 and 50; these may have been covered up by recent sediment deposits and further materials may still be present. These areas were not intensively subsurface tested as they will not be impacted by development.

Six historic sites, EdPs-48, 49, 54, 65, 66 and 67 will not be adversely affected by the park and road developments.

Three other previously recorded prehistoric sites did produce further cultural material. At EdPs-15, eleven flakes were recovered after an extensive surface and subsurface testing program. Only one small area of the site produced the flakes in a test pit. The entire site area has been heavily compacted by recreational use and has little potential for future scientific research.

At EdPs-55 a very extensive search revealed a number of artifacts (see Table 3). Unfortunately, this area has undergone severe soil compaction and shoreline erosion due to very heavy recreational use. There is only a very small zone available here for camping and this has only intensified the impact. As shovel testing of all areas that might be excavatable produced only a few small flakes near the surface, no further work is recommended here. Site EdPs-78 is described under the suggested recommendations section of this paper.

Two new prehistoric sites (EdPs-82 and EdPs-83) were located in the interlakes area. Both consist of isolated finds. One site (EdPs-82) (Figure 16) consisting of a single flake, is located on Upper Kananaskis Lake and was located in a test pit along an eroding bank. A second site (EdPs-83) (Figure 17) is located along the old or original outlet stream channel of Upper Kananaskis Lake (before utility dam construction). The stream is now largely a remnant trickel. A high outlook area near a former outlet falls on the stream produced a Besant point of black Kananaskis chert. Despite extensive testing, no further cultural materials were located at the above sites and no further work is recommended.

RECOMMENDATIONS

In light of the restricted nature and paucity of cultural material recovered from the Kananaskis Interlakes sites, it is recommended that no further work is necessary on these sites prior to development beyond their recording and documentation in this report.

CONCLUSION

In conclusion, it is recommended that this development be allowed to proceed without any further concerns or constraints in regards to historical resources.

Table 3: Cultural Materials Recovered from Previously Known Interlakes Area Sites

Site	Artifacts Recovered	Recommendation
EdPs-15	11 flakes	no further work, site already disturbed
EdPs-55	13 flakes, 1 ovoid biface	no further work, site already extensively disturbed
EdPs-78	Surface - 24 flakes, 4 pieces bone Test Pit 1 - 1 f.b.r. 3 flakes, 1 scraper Test Pit 2 - 2 flakes Test Pit 3 - 14 flakes, utilized flake, 1 projectile point Test Pit 4 - 3 flakes Test Pit 5 - 3 flakes, 1 piece bone	

SUGGESTED RECOMMENDATION FOR FURTHER RESEARCH (Not Related to Development)

Many of the sites will not be directly impacted by the developments and therefore will be preserved. Of the sites threatened, none were found to be of sufficient value to warrant mitigation or special protective measures. Of all the eighteen sites now known for the immediate interlakes area only one, EdPs-78 (see Figure 8), surface collected by Tom Head, Mike Quigg, Don Barr and Colin Poole in 1977 and reported by Tom Head in May 1977 (permit 76-55), has the potential to produce valuable scientific information. This site, however, is located on the lake flood plain and is subject to inundation under 160 cm of water each summer. Material is spread out along the lake flood plain (formerly a stable shoreline before the utility company dams were constructed). A 10 metre diameter depression, formerly a flat spot on a point of land on the original lakeshore proved to be very productive in five .50 metre test pits (see Table 3). Here, only the humus layer is missing and the stratigraphy consists of from the top down, 2 cm of brown silt, 8 cm of orange sand with the bottom layer consisting of a pale grey clay and/or till gravel subsoil. The stratigraphy, therefore, only appears to be slightly collapsed and there is a quantity of cultural material left in the top 10 cm of the soil profile. The possibility also exists for preserved features on the site as test pit #5 had organic matter extending to a depth of 15-20 cm and this may represent a feature. Although the "new" shoreline was extensively tested all along the lower lake, only one small area produced any material near EdPs-78. These were 2 flakes and there did not appear to be an excavatable area. Settlement Surveys Ltd. recommends further work on this site (EdPs-78) which would have to be conducted in very early spring before the reservoir filled up. At the high water mark, the site, as mentioned previously is covered by approximately 160 cm of water (as estimated from the elevation of a nearby brass benchmark on modern shoreline).

ARTIFACTS NOTED AT SITES OUTSIDE THE FORMAL STUDY AREA

INTRODUCTION

During the evenings spent in Kananaskis Park during which portions of the shoreline were walked several artifacts were found eroding from sites EePs-2, EePs-9 and EePs-7.

EePs-2 and EePs-9

These sites are located at the base and tip of a point of land in the S.E. 1/4, Sec. 14 and the N.E. 1/4, Sec. 11, Twp. 20, Rge. 9, W5M (NTS map 82J11). They were originally recorded by Tom Head of ARESCO Ltd. in 1976 (permit 76-55) who recommended some minor excavation and systematic collection. As the area is now being developed as a picnic/interpretive area with trails being cut and a gravel base laid down, this potentially productive site is being severely impacted (see Figures 21 and 22). The site appears to be worthy of further work and we recommend Alberta Culture investigate the site during 1982. Some areas are below and some are above the high water mark.

EePs-7

This site also appears to have some remnant values although it is completely under water during the summer and fall months. One biface and a number of flakes were noted (see Figure 22). The site was originally reported by Tom Head in 1976 (ARESCO 1977).

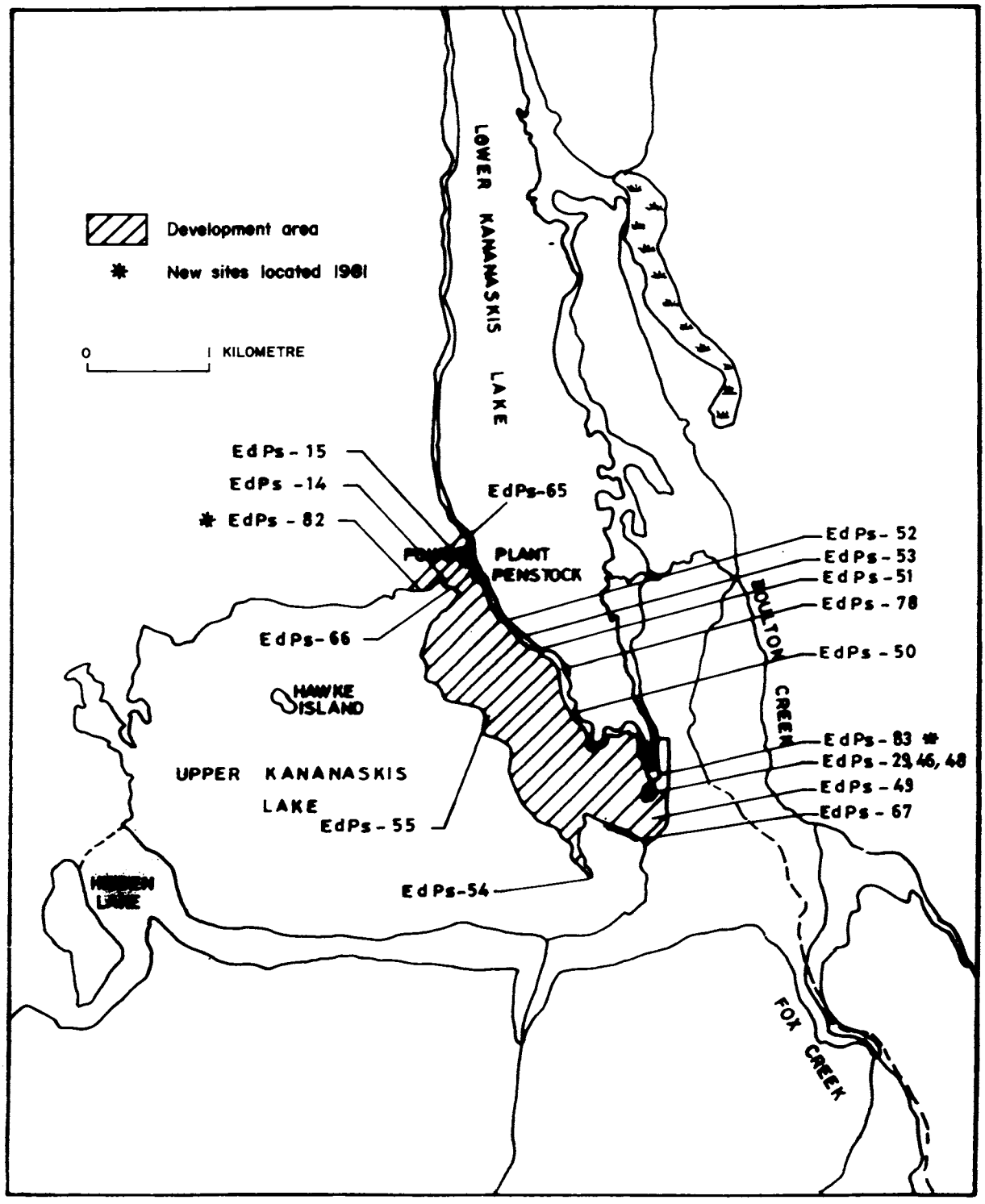

FIGURE 7: Total known prehistoric archaeological sites in the Interlakes area.

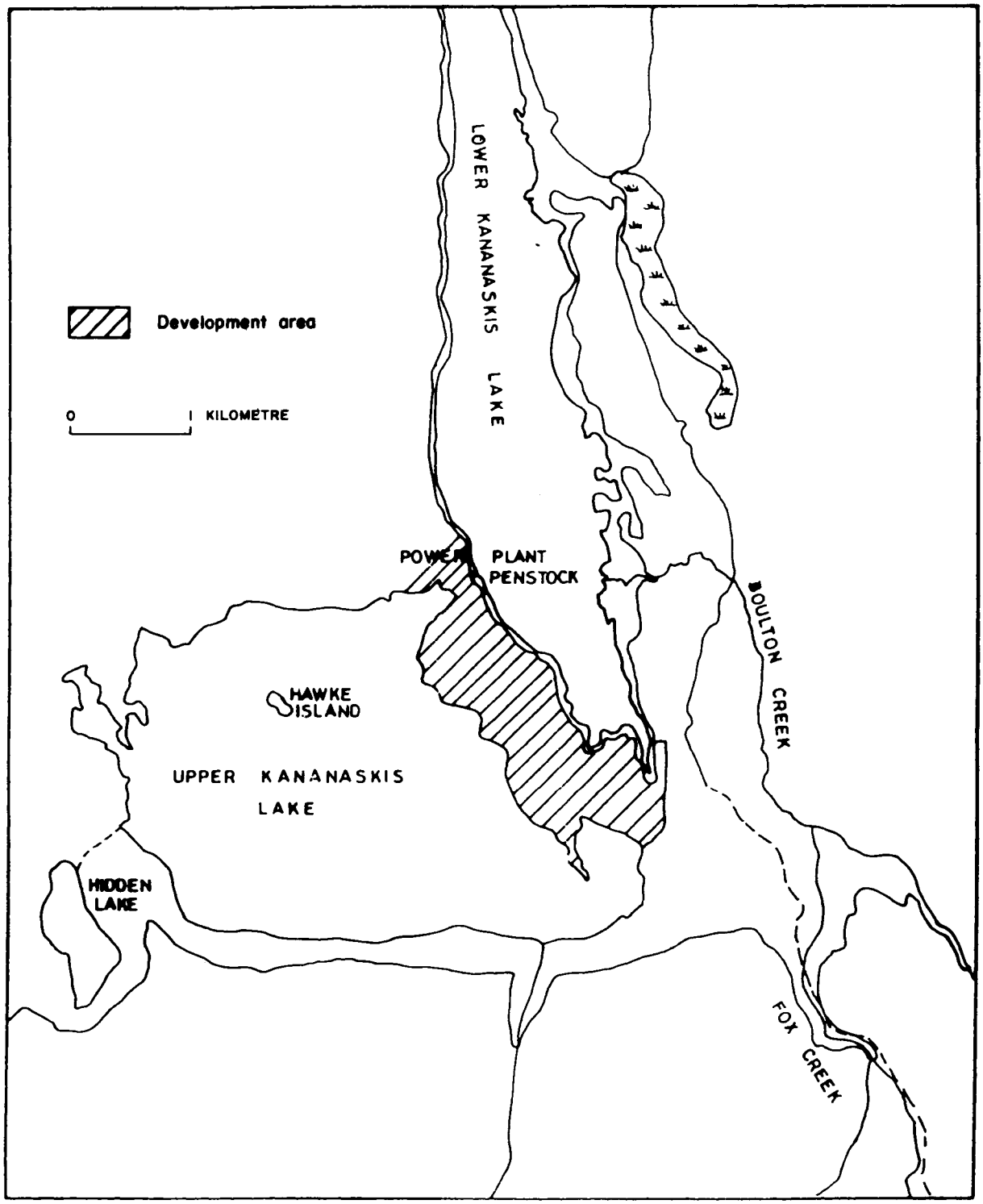

FIGURE 8: Project location map.

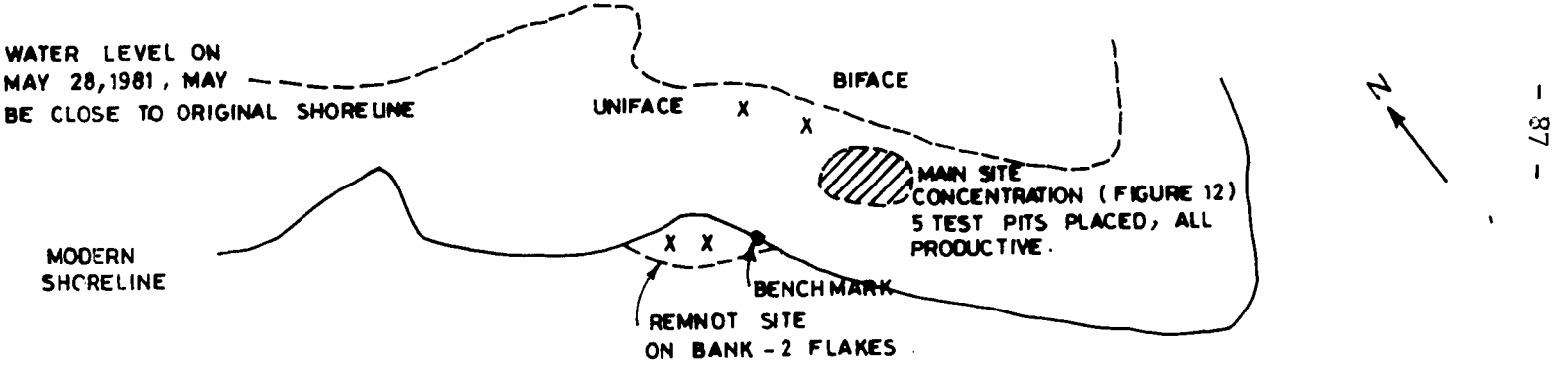

FIGURE 9: Sketch Map of site EdPs-78.

Prehistoric Archaeological Site EdPs-78 (not to scale)

Notes: 1. At high water site is inundated by 160 cm of water.
2. Main area located 40.5 metres N 40° East of Alberta.
Parks Brass Benchmark #80 dated 1978 situated on modern shore.

FIGURE 10:

Original park access road built by Calgary Power, slated for upgrading in 1981.

FIGURE 11:

New survey lines for widening and straightening of former Calgary Power (now TransAlta Utilities) road. Archaeological survey of new construction zones was negative.

FIGURE 12:

General view: Upper Kananaskis Lake from the Upper Dam area during late May 1981. Note the low lake level and tree stumps indicating former shoreline.

FIGURE 13:

Site of previously reported surface scatter (EdPs-14) by J. Rogers in 1973 (73-11). No cultural materials were found on surface or subsurface in the 1981 testing. Site located in the Upper Dam area.

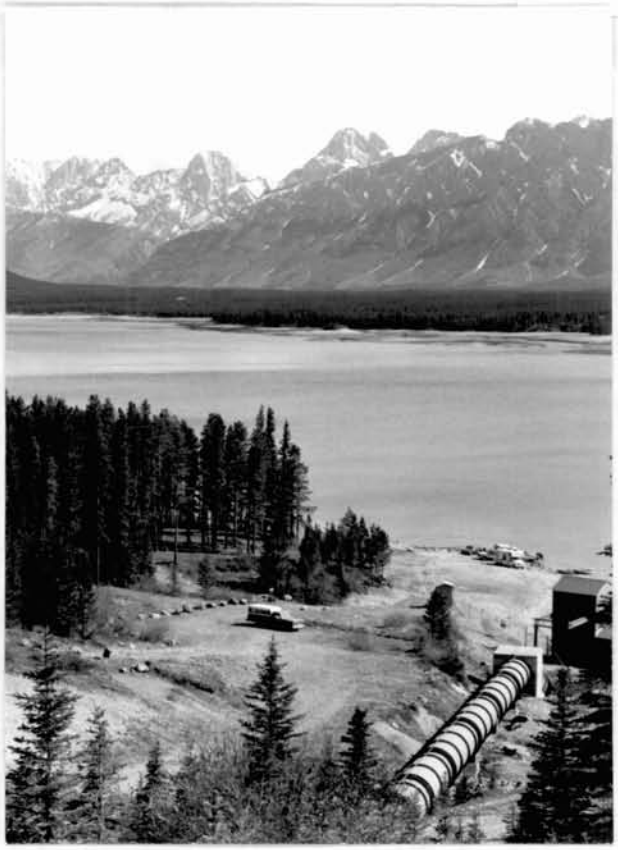

FIGURE 14:

Site of EdPs-15. Only a few flakes were recovered (see Figure 13)during the 1981 testing program. The site is located in trees behind truck in foreground of photo. Site located in the Upper Dam area.

FIGURE 15:

Site EdPs-55 recorded by Tom Head in 1976 (76-55). Although some artifacts were recovered here in subsurface tests no significant concentrations or features were present (see Table 2 and Figure 13). This site is located in the Third Saddleback area.

FIGURE 16:

New prehistoric site (EdPs-82) located in 1981 by Settlement Surveys Ltd. in the Upper Dam area. It consists of an isolated chert flake find (Table 2, Figure 13).

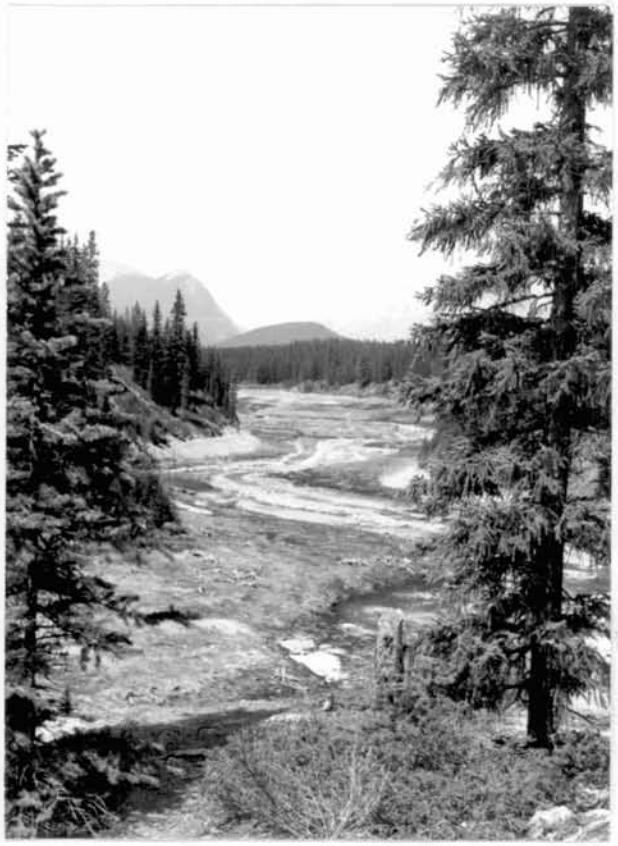

FIGURE 17:

View from new prehistoric site (EdPs-83) located in 1981 by Settlement Surveys Ltd. It consists of an isolated projectile point find (Table 2, Figure 13) at the former waterfalls on the original creek draining Upper Kananaskis Lake (now reduced to seepage from dam).

FIGURE 18: Prehistoric site EdPs-78. Present day high water levels are due to a utility company dam. In original times the main site area (where man is walking) comprised a flat area on a lakeshore point. Except for early spring the site is covered by an estimated 160 cm of water during summer and fall. Despite the fluctuating water levels, a small 10 m^2 area still contains valuable scientific data. Stratigraphy is only partially collapsed (artifacts recovered are listed in Table 2 and illustrated in Figure 14).

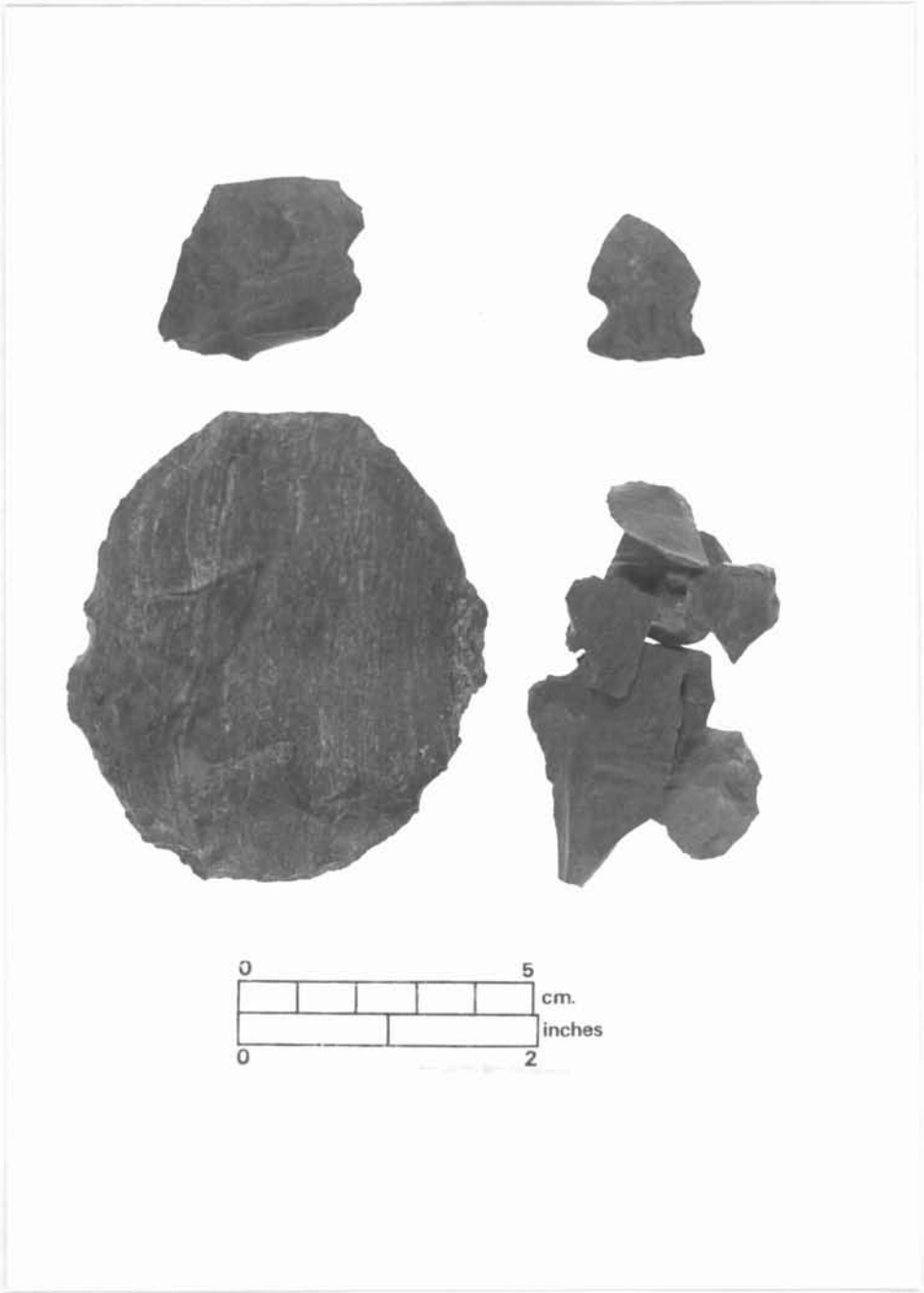

FIGURE 19: Artifacts from EdPs-82 (top left), EdPs-83 (top right), EdPs-55 (bottom left) and EdPs-15 (bottom right).

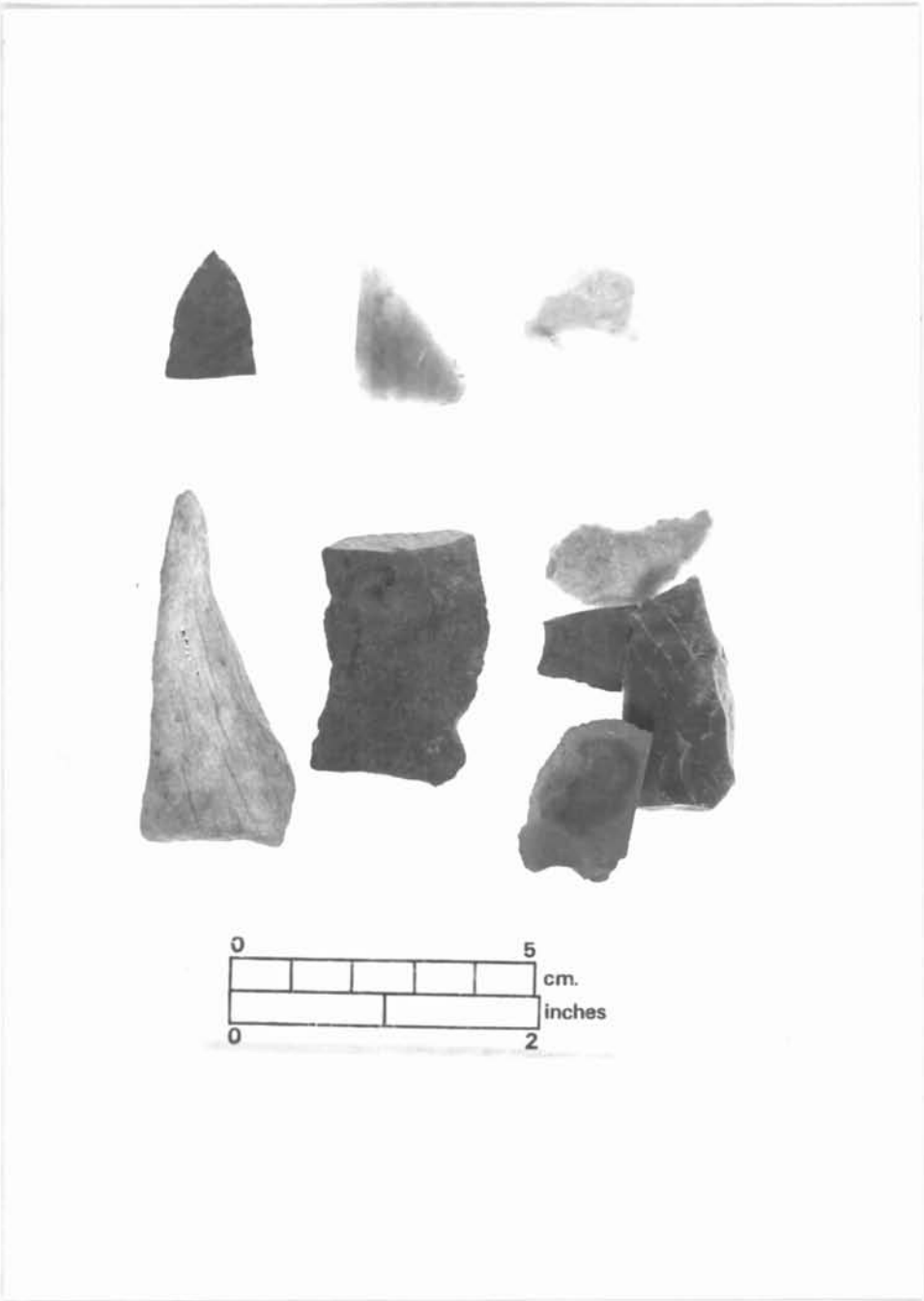

FIGURE 20: Artifacts from EdPs-78 collected during May 1981 by John Pollock and Keary Walde.

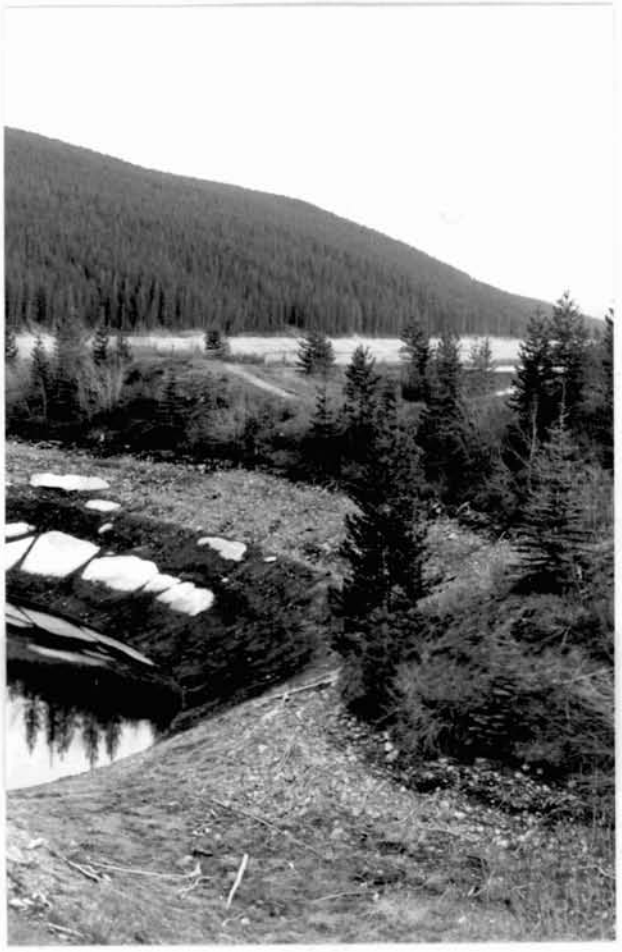

FIGURE 21: The EePs-2 and EePs-9 prehistoric sites are located on a prominent point of land where the Smith-Dorrien Creek enters Lower Kananaskis Lake. Visible in the photo is the gravel trail being constructed (1981) to picnic and interpretive areas. One biface was recovered on the edge of the trail where surface disturbance had taken place.

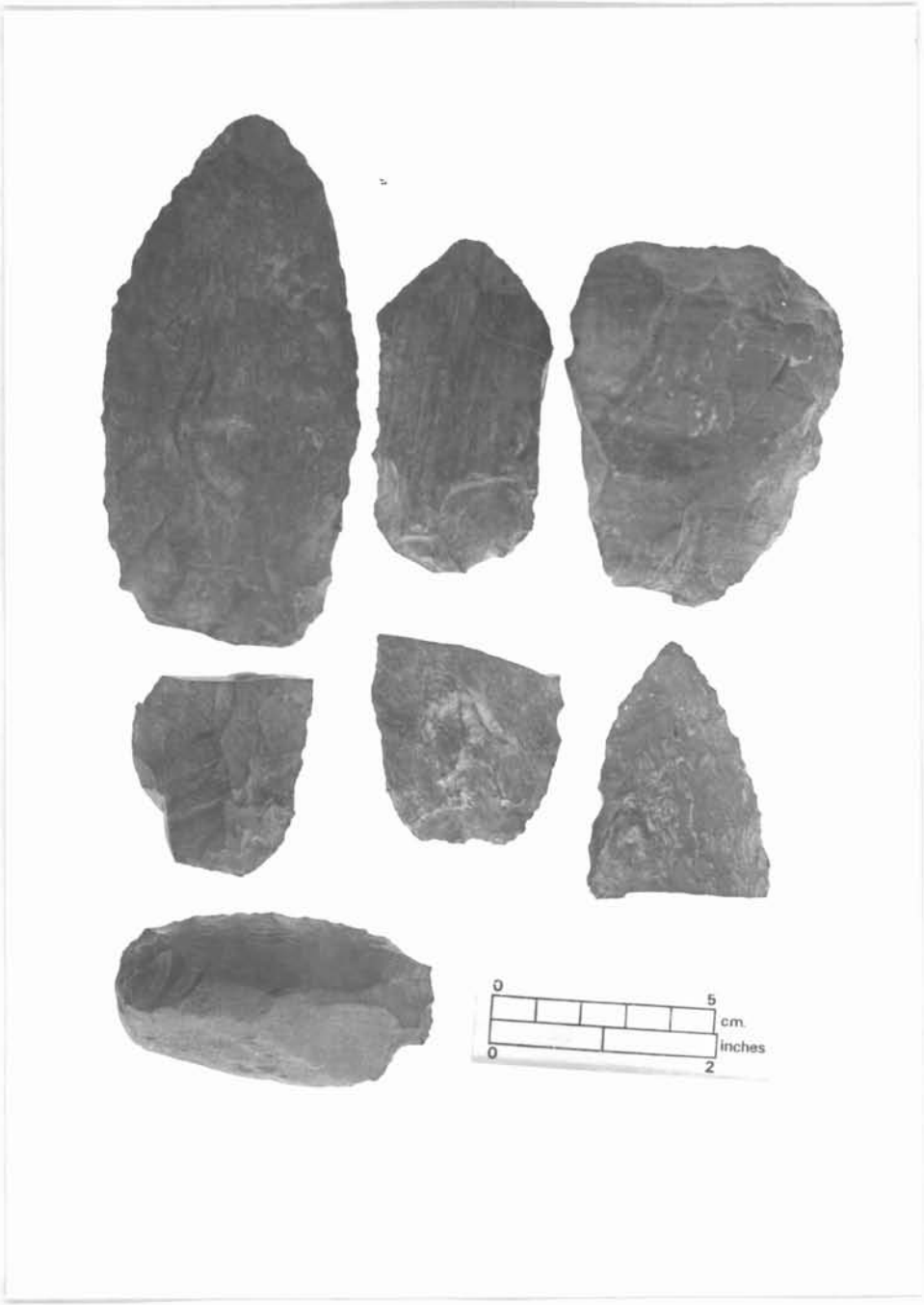

FIGURE 22: Bifaces from EePs-2 and EePs-9 (probably part of the same site). Only the bottom most artifact is from a different site, EePs-7.

A POSTSCRIPT ON ARCHAEOLOGICAL DATA RECOVER: AN EXAMPLE OF INTENSIVE RECOVERY FROM THE ROSS SITE (DlPd-3)

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> "... it is apparent that the archaeologist selects, either conciously or unconciously, techniques which will recover classes of data relevant to his goals. In so doing one accepts, again either implicitly or explicitly, certain biases inherent in these recovery techniques" (Casteel 1972: 382-383)

INTRODUCTION

In the last several years considerable attention has been directed towards increasing the reliability of recoverable archaeological information. This attention has primarily taken the form of efforts to implement more effective and precise data recovery techniques such as wet sieving and flotation (c.f. Cherry 1975; Dennell 1972; Diamont 1979; French et. al. 1972; Guerreschi 1973; Jacobsen 1974; Kay et. al. 1980; Pendleton n.d.; Shay n.d.; Schaaf 1981; Struever and Carlson 1977; Wagner 1982; and Williams 1976). Most often these studies have been concerned with faunal or paleoenvironmental remains and have generally shown that intensive recovery methods such as wet sieving and flotation are superior to other collection strategies. Nevertheless, some researchers remain unconvinced and arguments centering upon such concerns as technical problems (Munson 1981), and an apparent lack of sufficiently convincing evidence (Martin

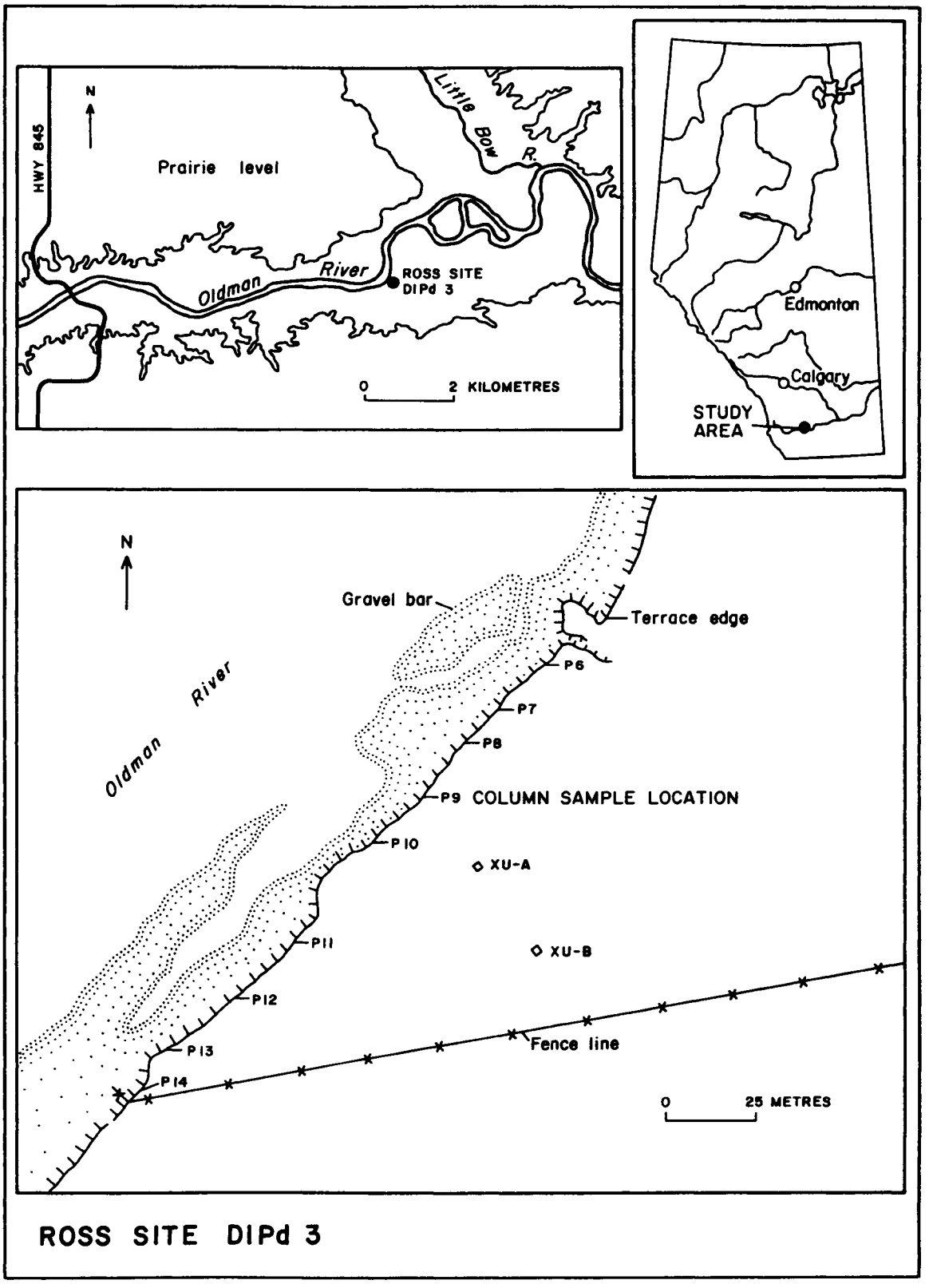


Figure 23: Location and plan of the Ross Site.

1980) to justify the "added" expense continue to be made. Thus, while intensive recovery appears to be a simple, rapid and effective method of data recovery, not everyone is convinced. This paper presents evidence in support of intensive recovery strategies obtained from results of a case study, and presents a discussion of cost-effectiveness to further support the argument.

In the following discussion we provide results from an analysis of a column sample obtained from the Ross Site (KlPd-3) located in southern Alberta (Figure 23). Sample deposits were screened through five different mesh sizes and the remains identified, counted and then compared. These data are then collated with results and data from several other related studies. As well, a summary of information is provided on recovery, processing and sorting rates as they relate to cost-effective analysis. First, we present a review of intensive recovery as it relates to our case study. Following this, we proffer our case study on the Ross Site and the results of our analysis. These data are compared with other studies in a discussion of statistically reliable and efficient techniques of archaeological data recovery.

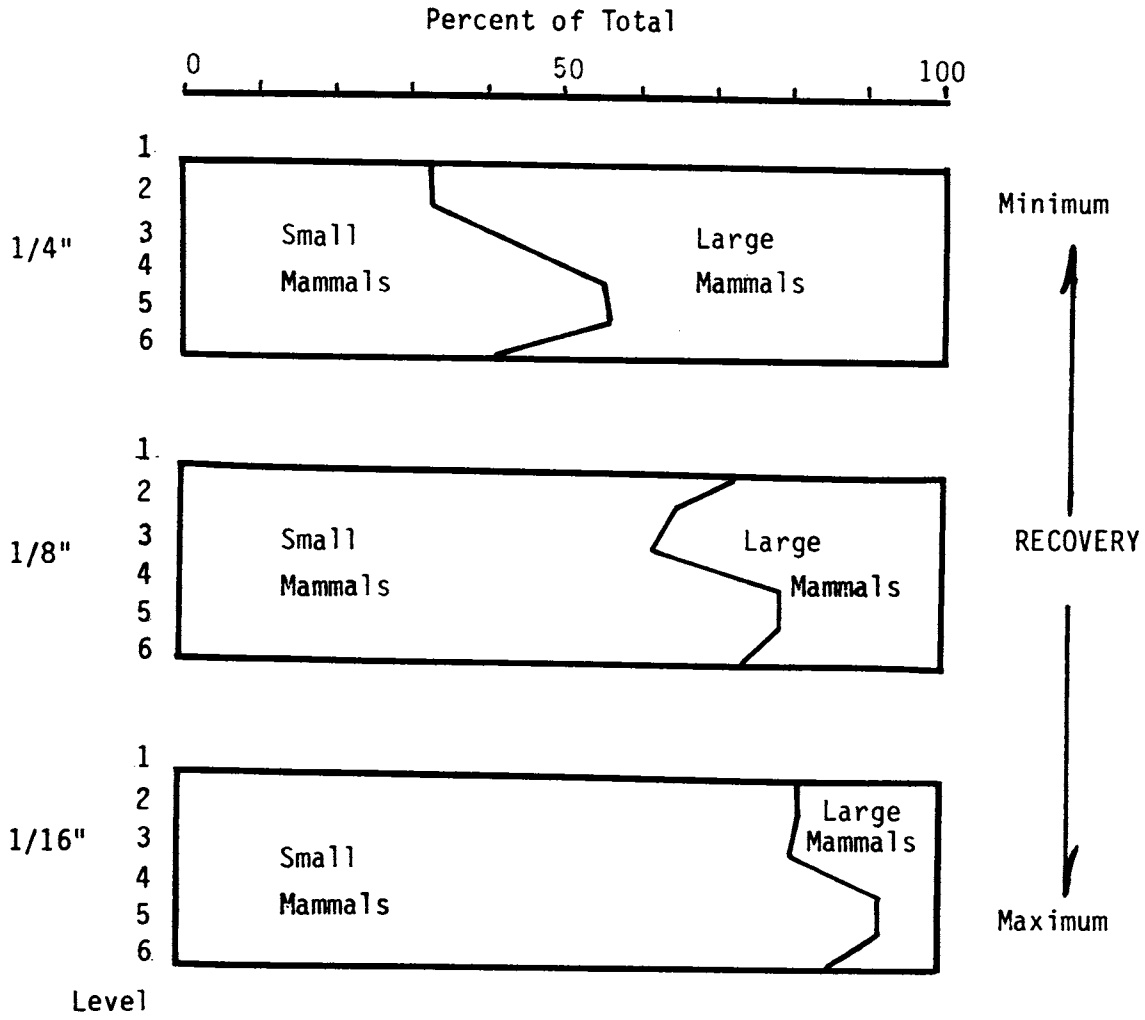
Our purpose in this analysis is to investigate the usefullness and efficiency of sampling techniques in archaeological excavation situations whereby small samples may be used to provide information comparable to that gained from other more expensive techniques of data recovery. This study follows from an earlier paper presented on the use of core samples of site deposits to predict the extent of undisturbed deposits prior to the formulation of the excavation research design (Ball and Borowsky n.d.). Given the restrictions of time and money that are so often present in archaeological research, methods of improving results and project cost estimates are viewed as necessary and important, especially when the majority of research now carried out in the province of Alberta as well as in other provinces (e.g. Saskatchewan, British Columbia and Quebec) is

done under C.R.M. conditions.

By way of caveat, our purpose is not to advocate or recommend widespread or unlimited application of intensive recovery techniques, nor do we suggest that the Ross Site is a typical Alberta or northern plains archaeological site. We do, however, see great potential in the application of these techniques for sites such as the Ross Site in which deposits exhibit a stratigraphic profile more than a few centimetres in depth.

RECOVERY BY SIEVING AND FLOTATION

Early in this century, Gifford (1916) initiated the first of several experiments directed towards testing the efficiency of varying mesh sizes in the recovery of archaeological remains. Since then several studies have illustrated that numerous biases are introduced into the data base when screening is avoided or coarse screening is employed during archaeological excavations (e.g. Casteel 1972; Payne 1972, 1975; Clason and Prummel 1977). In each of these studies it was concluded that casual or visually collected samples cannot maintain reliability for sound interpretation of the archaeological record. Accepting the philosophy that some sort of sieving is better than no sieving, what size of mesh should be used and how reliable are the various sieve sizes in retrieving representative data? Data from Thomas' (1969) study of sites in the Great Basin show how the importance of animal species in a prehistoric economy varies as a function of screen size or recovery technique. This is illustrated in Figure 24 wherein we see the percentage of larger mammals to be greatest using the larger (1/4") mesh, while in reality the smaller mammals become increasingly preponderant with the use of the smaller sized mesh. Modifying these data to an ordinal scale and rank ordering the faunal classes we can further compare reliability in the use of different mesh sizes through regression analysis. Figure 25 shows the results of this regression analysis indicating that recovery data from both 6.35 mm and



Small Mammals: All mammals less than 5 Kilograms (Classes I, II, and III).

Large Mammals: All mammals greater than 5 Kilograms (Classes IV and V).

Figure 24. Frequency diagrams illustrating changes through time of mammal classes at Hanging Rock Shelter, depending on mesh sizes employed (Raw data from Thomas 1969).

3.18 mm sieves are not statistically significant at the .05 level. Thus, large mesh sizes appear to be deceptive and inaccurate estimators of recoverable data.

Within the last decade studies have attempted to increase the efficiency of recovering archaeological remains by reducing both time spent in collection and analysis as well as to minimize the amount of information loss. Modifying mid-19th century flotation attempts in Egyptology (Watson 1976), with everything from diapers (Minnis and LeBlanc 1976) to carburetor screens (Struever 1968; Stewart and Robertson 1973) being used in the equipment designs, the technique has improved substantially and is now considered to be a reliable and efficient means of intensive data recovery. Furthermore, it has been demonstrated that with the collection of plant, insect and snail remains, the socioeconomic and paleoecologic interpretive potential of archaeological sites may be vastly improved (Bohrer 1970; Constantini et. al. 1975-77; Kay et. al 1980; Lange and Carty 1975; and, Waines and Stanley Price 1977).

To look at the effect that various mesh sizes may have on sample results, variability inherent in mesh size differentiation may be examined. In the following case study the results obtained from a screening exercise are discussed from a "cost-effective" point of view. Data used in this study were recovered from a single column sample and sieved through five different mesh sizes.

THE ROSS SITE: A CASE STUDY

The Ross Site (DlPd-3), situated on the south bank of the Oldman River in southern Alberta (Figure 23), was first investigated by Forbis in 1957 (Forbis 1960, 1970; Wormington and Forbis 1965). Material, dated from A.D. 1400 to A.D. 1700 and representative of the Late Prehistoric Old Woman's Phase, was recovered from deposits of up to three

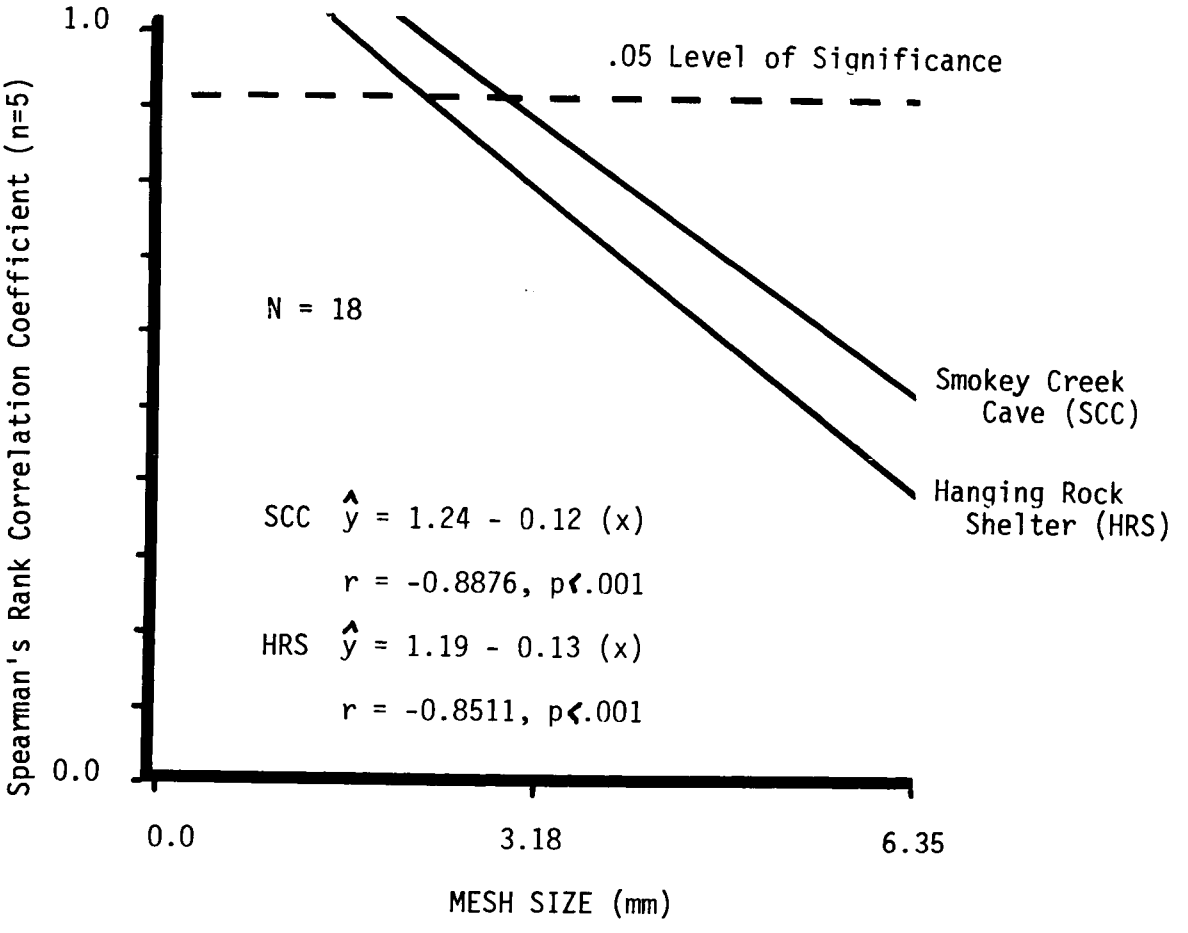


FIGURE 25: Best fit lines illustrating changes in Spearman's Rank Correlation Coefficients for faunal size classes (n=5) against changing mesh sizes (mm) for Hanging Rock Shelter (HRS) and Smoky Creek Cave (SCC). (Raw data from Thomas 1969.)

metres in depth (Forbis 1960:159; Vickers 1981). The site was again investigated by Vickers during the summer of 1980; river erosion has destroyed a large part of the site and a testing program was undertaken to determine how much of the site remained (Vickers 1981). Forbis (1960) describes three occupation layers which are referred to as Layers I, II and III; cultural Layer III being the most recent evidence of occupation. The occurrence of these three main zones of occupation was verified during Vickers' testing program (1981), as well as a number of discontinuous cultural levels identified among the main cultural layers; apparently resulting from erosional and depositional events throughout the periods of habitation (Vickers pers. comm.).

Accompanied by Ball and Mr. Armin Dyck, Vickers returned to the site during the fall of 1980 and took a column sample from one exposed portion of the site (Figure 23). The column sample size was 25 cm deep, 25 cm wide and 10 cm thick; these were extracted at 10 cm intervals to a depth of 2.6 m yielding a total of 26 samples. Following analysis of Vickers' excavated materials, it appears this column sample was terminated prematurely and three lower cultural levels were missed (Vickers pers. comm.). Each sample was processed through a series of dry sieves, 12.7 mm, 6.35 mm and 3.18 mm mesh respectively. The passed fraction was then water screened through sieves of 1.59 mm and .85 mm in size. The individual sieve fractions recovered from each sample were sorted, materials identified, counted and weighed. Analysis time was monitored at each stage of the process. The results of this analysis are presented below.

A variety of materials were recovered from the various sieves. Figure 26 is a cummulative diagram showing the presence or absence of the different classes of materials at each sampling interval. Examination of Figure 26 reveals some interesting results. Had we relied solely upon 6.35 mm mesh screens for recovery, our data would have been biased in that snails, spider eggs and seeds would have been absent from our

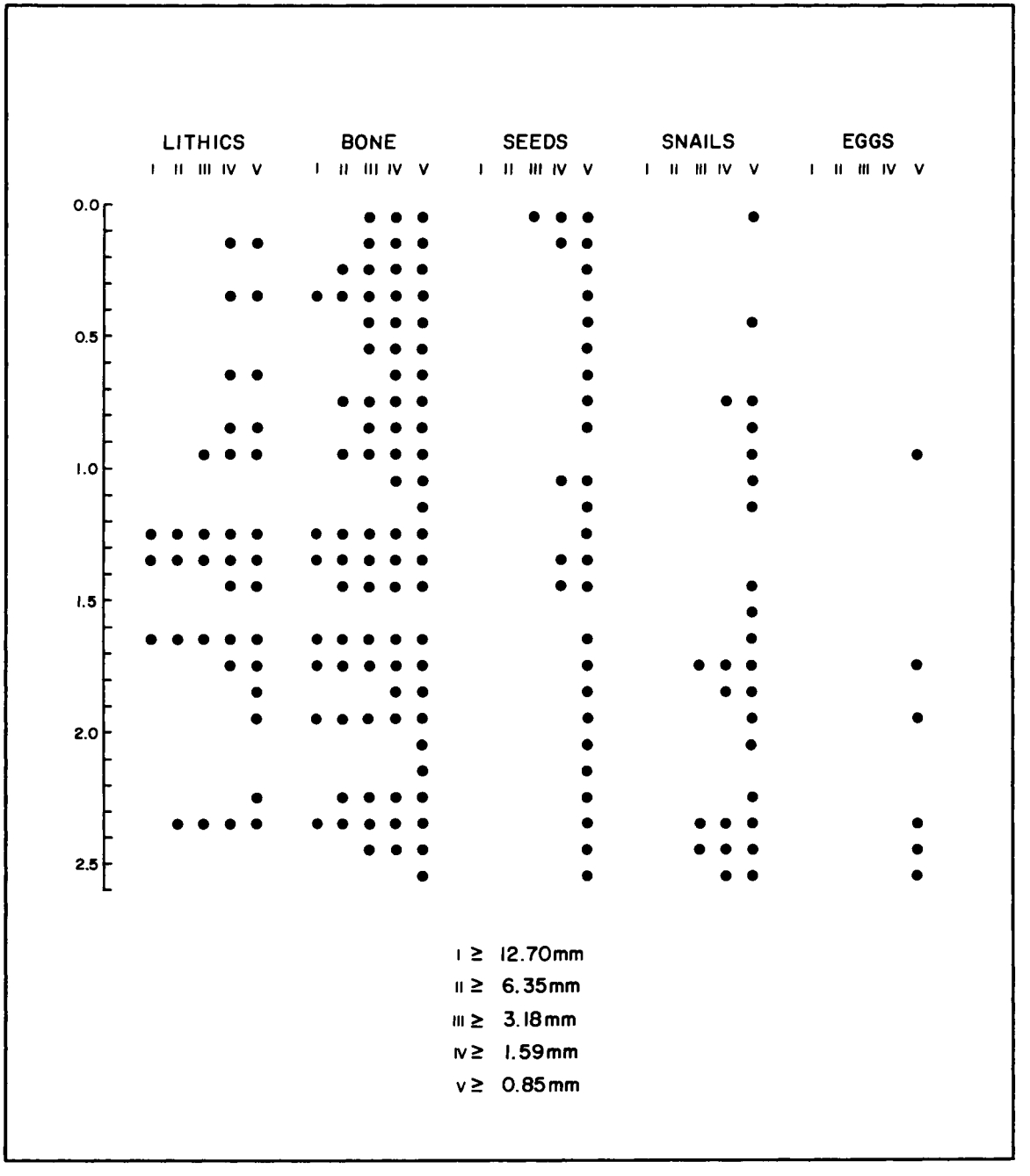


FIGURE 26: Cumulative presence/absence data for various mesh sizes through column sample at the Ross Site. (I ≥ 12.7 mm, II ≥ 6.35 mm, III ≥ 3.18, IV ≥ 1.59, V ≥ 0.85 mm)

inventory. This could be particularly unfortunate since these data classes provide a basis for paleoecological interpretation. Bobrowsky (n.d.a) has shown elsewhere that both cultural and paleoclimatic inferences are realistically accessible from an examination of snail shells. Also note how in Figure 26 frequencies of gastropod shells parallel those of other materials at the cultural occupation peaks at the 1.7 and 2.4 metre levels. Similarly, the continuous presence of grass seeds throughout the column is noteworthy.

The importance of seeds in the archaeological record cannot be underestimated. In 1960, an apparent cache of 4 - 5 liters of seeds was found at the Ross Site:

> ... about 30 m east of Forbis' excavation. At a point along Layer III ... they cut into a cache of seeds ... in a circular, straight-sided hole about 15 - 17 cm wide and 20 - 22 cm deep that was "just like a jar" (Johnston 1962: 129-130).

The same species, Chenopodium Album, was found in our sample along with two other types (Polygonum sp., Lithospermum incisum). There exists considerable ethnographic evidence to indicate the use of this species as a food source (c.f. Yarnell 1964; Johnston 1962; Blankinship 1905). It is also interesting to note that Polygonum coccineum was "... smoked by Ojibwa to attract deer" (Yarnell 1964:157) and Lithospermum caroliniense was used as a dye (Yarnell 1964:184; Desmore 1928:290).

A similar situation is apparent for the lithics in that only three occurrences of occupation are indicated at the 6.35 mm mesh size. Albeit, this is clearly not the case for bone. While use of at least the 6.35 mm mesh would at least identify the three main cultural layers at the site, results from the bone fraction indicates more components may be present.

Next we looked at the rate of information loss at each of the sieve sizes. By examining the changes in the percentage of materials recovered

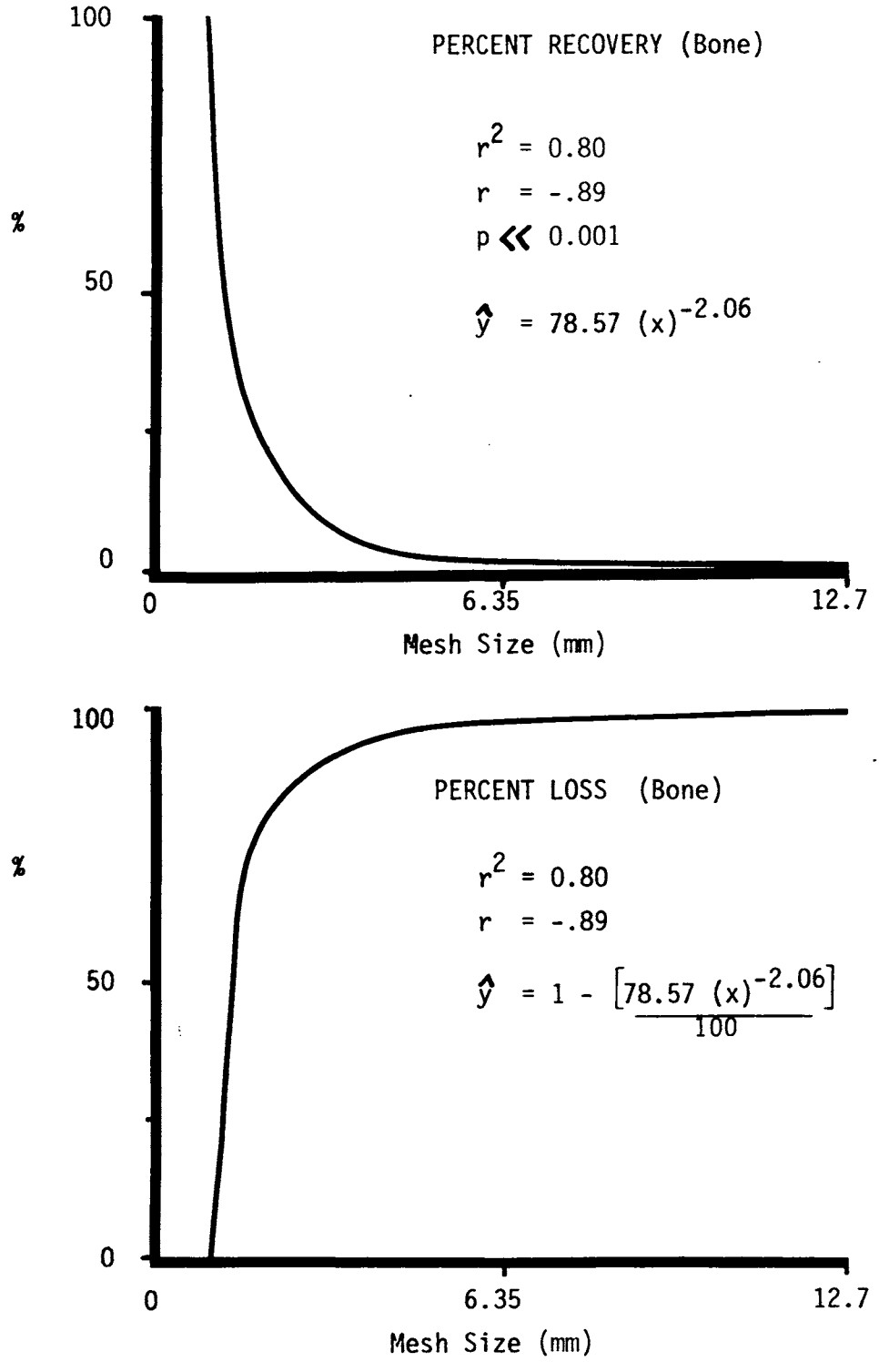


FIGURE 27: Best fit curves illustrating the percent recovery and loss of bone at the Ross Site as a function of mesh size.

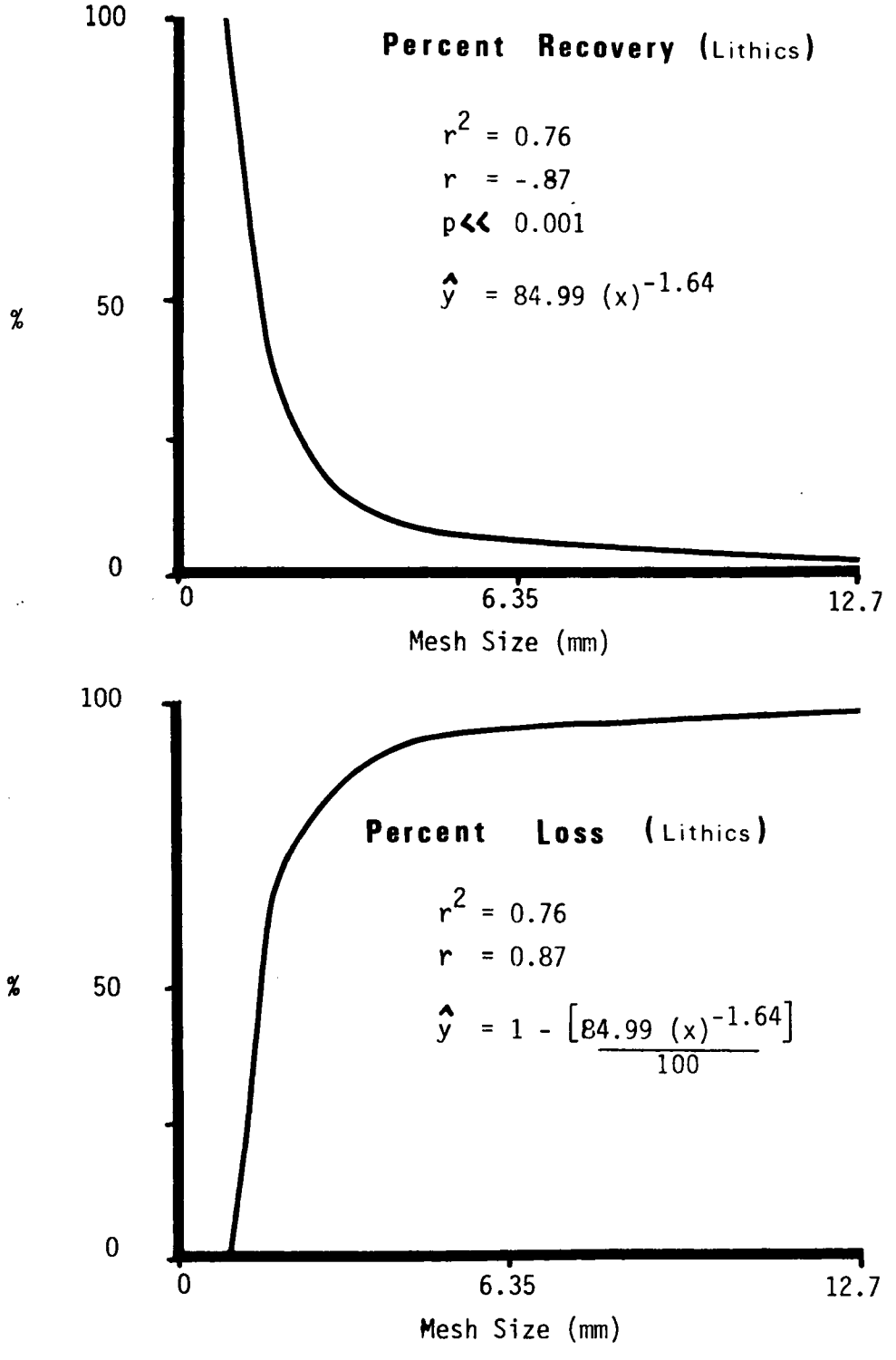


FIGURE 28: Best fit curves illustrating the percent recovery and loss of lithics at the Ross Site as a function of mesh size.

at the varying sieve sizes employed, we calculated the percent recovery and loss of bone and lithic materials. These changes were described using regression equations belonging to the power curve family (Casteel n.d.). Figures 27 and 28 show the amount of bone and lithics, respectively, recovered and lost at the different mesh sizes. In Figure 27, the best fit curve, shows a high negative correlation of -.89 between the frequency of bone remains retrieved and screen size used. The correlation is significant at the .001 level. Figure 28 shows an analogous situation for lithics resulting in a similar power curve. The curve for lithic loss predicts that a 6.35 mm sieve failed to recover almost 96% of the total number of items contained in the sample, assuming of course that our .85 mm mesh represents total recovery. These indicate a significant loss of materials using the larger mesh sizes.

But what of the importance of such small sized materials? Recent studies in lithic analysis indicate important information may be gained from examination of small lithic pieces. For instance, Fladmark (n.d.) utilizes sample fractions as small as one tenth of a millimeter in his examination of microdebitage. And, as this study has shown, there exists considerable potential in using presence/absence data for delineating cultural levels within a profile (Figure 26). An obvious application of this is in the use of cores for testing the integrity and extent of subsurface deposits in an archaeological site (e.g. Ball and Bobrowsky n.d.; Chatters n.d.; Casteel 1970); and as an aid to identifying cultural layers at sites lacking visible stratigraphy.

To derive an impression of the amount of disturbance in the deposits we looked at the fluctuation in density of the cultural debris in our sample. More specifically, we examined the variation in the proportion of total frequency within item classes as a function of depth. Again, assuming complete recovery by our standards, we calculated within class changes in the frequency proportions of bone and lithics. These are

presented in Figures 28 and 29 respectively. The graphs indicate negligible mixing or post-depositional disturbance has occurred and consequently the percentage peaks in the column relate to original cultural patterning. It is interesting to note that both curves (Figures 28 and 29) isolate the three cultural layers identified in the initial site interpretation (Forbis 1960) as well as several other less intensive levels of cultural activity.

Another benefit that can be identified in the use of intensive recovery techniques is the minimal amount of destruction to the site that results from using this sampling procedure. And, as other studies have shown, data obtained from cores and columns are statistically comparable to the data obtained from larger excavation units, while requiring less time to collect and analyze. For example, Casteel (1970) compared materials and deposits recovered by coring, columns and excavation. He concludes that comparable information may be gained from the intensive recovery techniques:

> ... in an hour and 30 minutes one man may produce material for microanalysis comparable to that which previously required complete excavation of entire units (Casteel 1970:466).

Similar tests by Casteel (1976) at the Glenrose Cannery Site in southwestern British Columbia indicate that not only is greater statistical precision obtained from fine sieved column samples, but the work effort measured in time expended can be reduced by as much as 90%:

> The results indicated that laboratory analysis of column samples required only one-tenth the effort required for analysis of whole-unit samples. In addition, this detailed study of column sample material produced an approximately 30% increase in the types of fishes identified over the number identified in the whole-unit, field sorted samples (Casteel 1976:195).

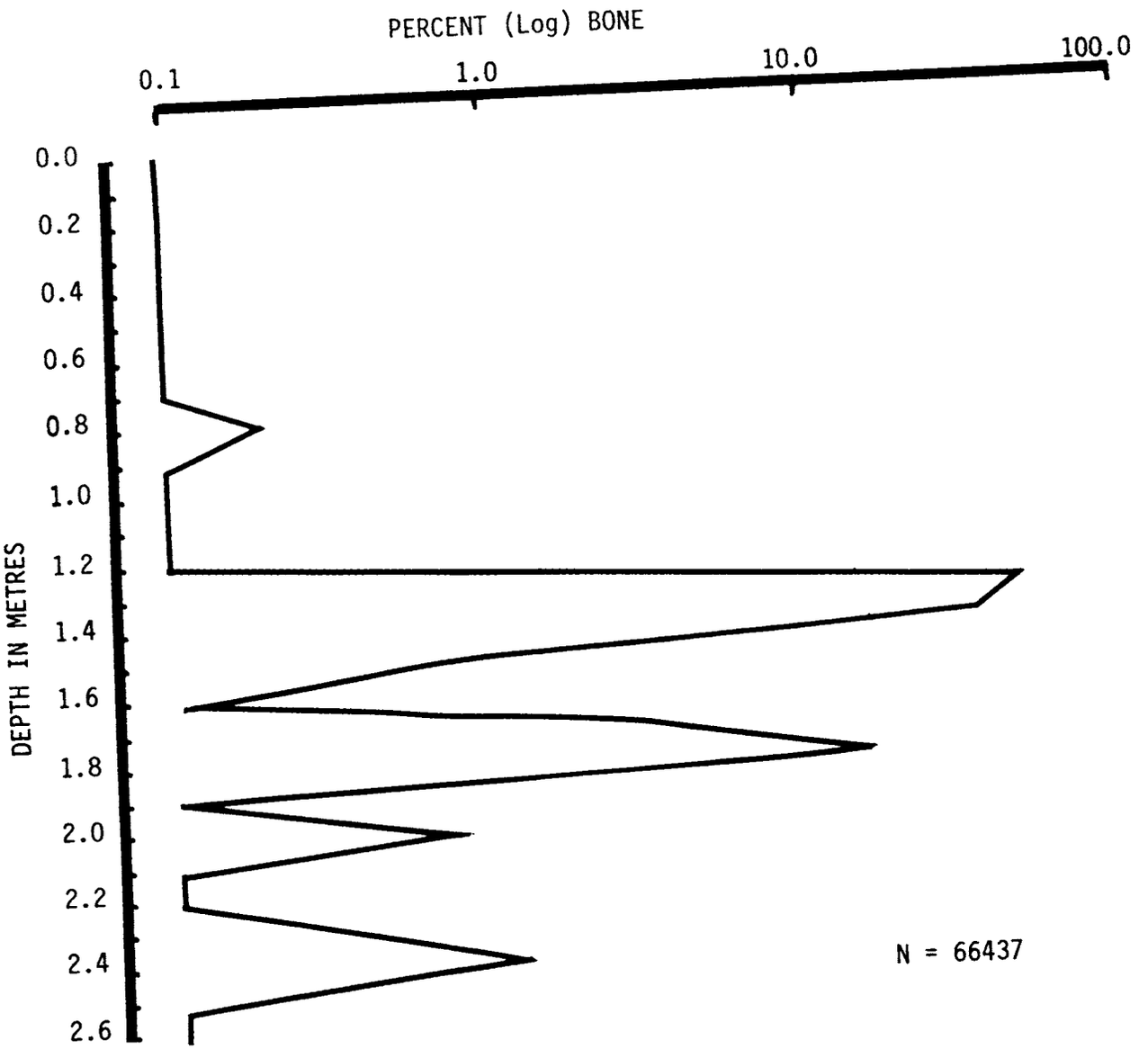


FIGURE 29: Variation in proportion of bone fragments through column sample expressed as percentage on log scale. Bone data derived from ≥ 0.850 mm mesh. (Ross Site)

Sample Number	No. Bone Frags. 1/8" Mesh	(Bone) Recovered per m^3 Flotation	% Loss in 1/8" Mesh
1	114	19,700	99.42%
2	42	12,750	99.70%
3	104	875	88.10%
4	16	1,062	98.50%

TABLE 4: Illustrates differences in recovery rate between 1/8" mesh (3.18 mm) and floatation for 4 samples (Data from Garson 1980).

COST EFFECTIVE DATA RECOVERY

Simple reduction in sieve size for large excavation units will not necessarily result in increased efficiency in the recovery. For example, Garson (1980) has shown quite clearly how excavation units sieved through 1/8" mesh lose between 88.1% and 99.7% of the identifiable fish bones recovered through flotation of much smaller volume column samples (See Table 4). Important here is the fact that efficiency is best measured in terms of cost-benefit estimates. One wishes to retrieve the maximum amount of information for the minimum amount of time input. Or conversely, if an archaeologist can triple data recovery by doubling the time effort, an increase in efficiency is attained.

Utilizing this proposition, time-effort at the Ross Site was documented as a function of sieve size. Figure 30 shows this relationship to be curvilinear, similar to that of the material recovery curves (Figures 27 and 28). Since the relationships are of a curvilinear nature, a judgemental assessment of cost-efficiency is not readily apparent. Cost-effectiveness may be identified more explicitly, however, by referring to the ratio:

$$\frac{\text{PERCENT MATERIAL RECOVERED OUT OF TOTAL}}{\text{PERCENT TIME EXPENDED OUT OF TOTAL}}$$

Figure 31 shows the quantitative changes in cost-effectiveness which occur, as measured by the ratio given above, for the 5 sieve sizes for 3 item classes. These curves indicate that the greatest amount of inefficiency occurs between 12.7 and 3.18 mm sieves, when benefit is measured in frequency units. At the Ross Site, the change from 12.7 mm to .85 mm involves 14.6 times the sorting effort but results in a 98.7% increase in lithic material, a 99.6% increase in bone material, and a 100% increase in floral material.

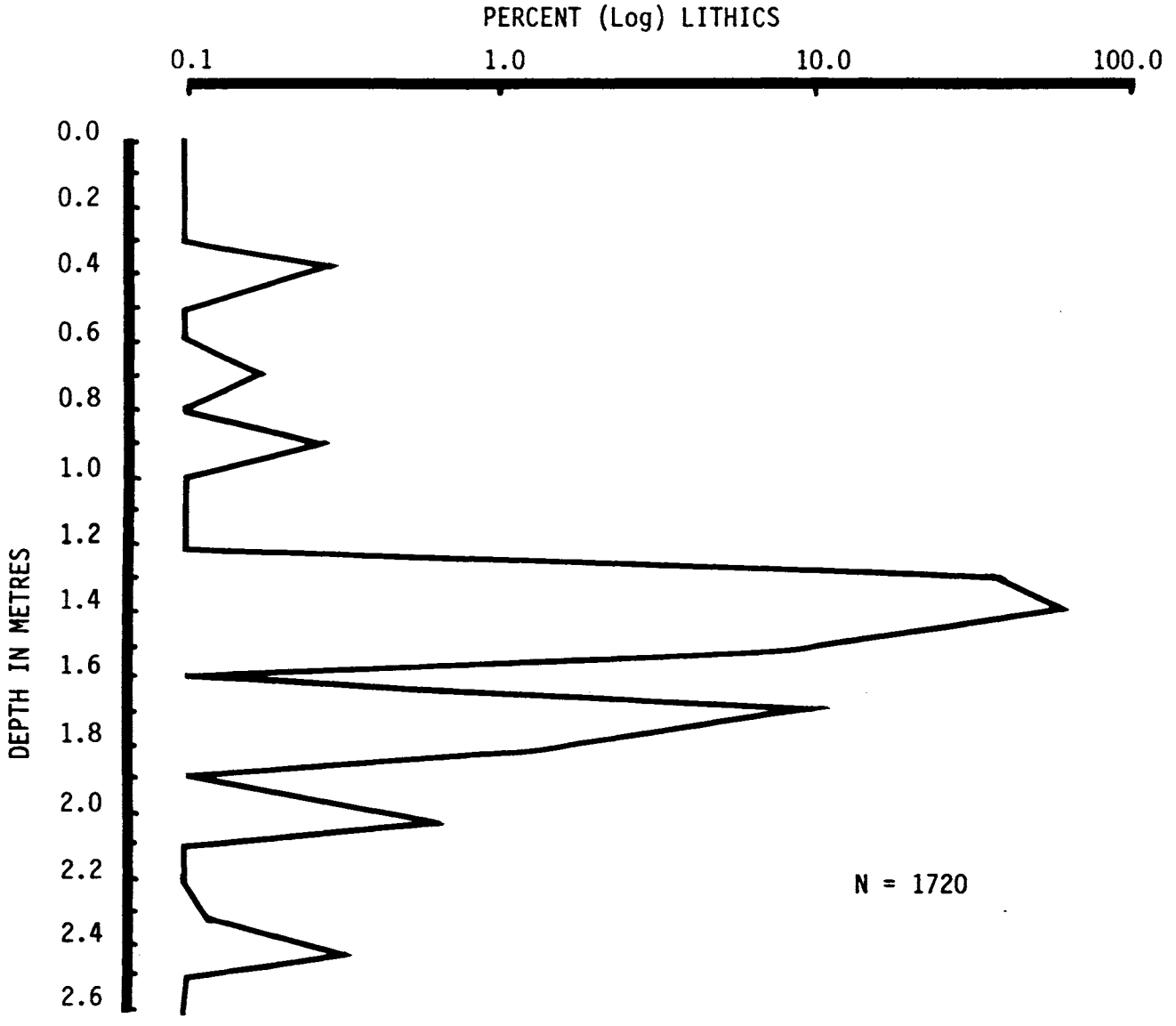


FIGURE 30: Variation in proportion of lithics through column sample expressed as percentage on log scale. Lithic data derived from $\geq$ 0.850 mm mesh. (Ross Site).

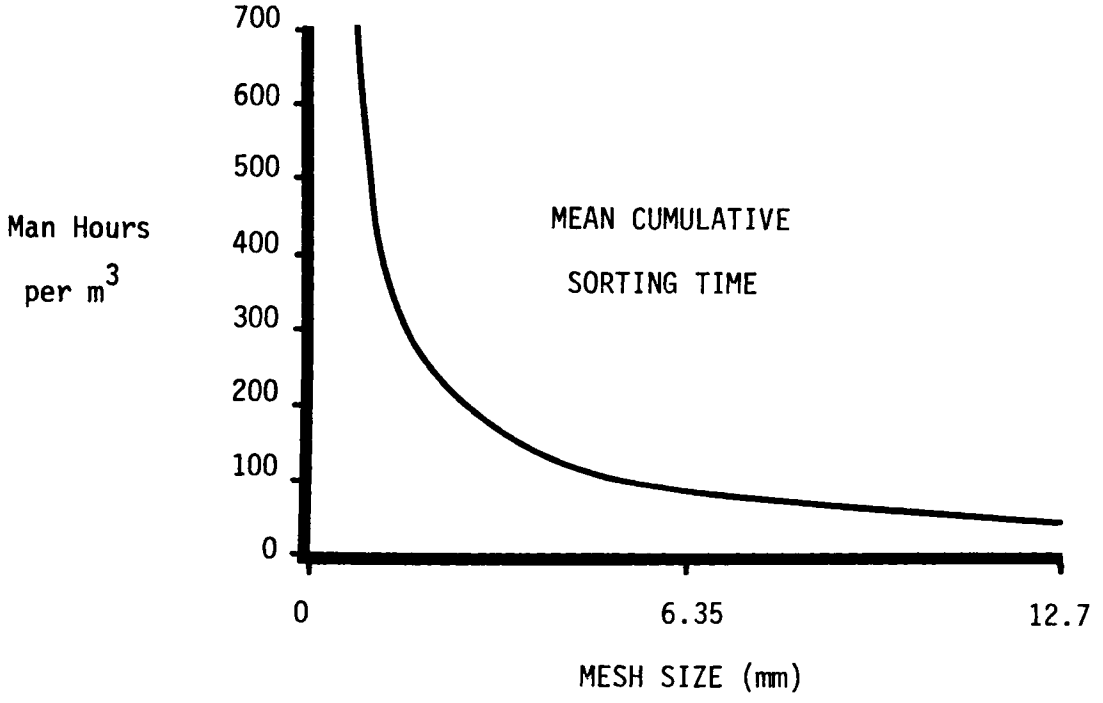


FIGURE 31: Graph illustrating cumulative sorting time measured in man hours per cubic meter at varying mesh sizes (mm) - Mean values from Ross Site.

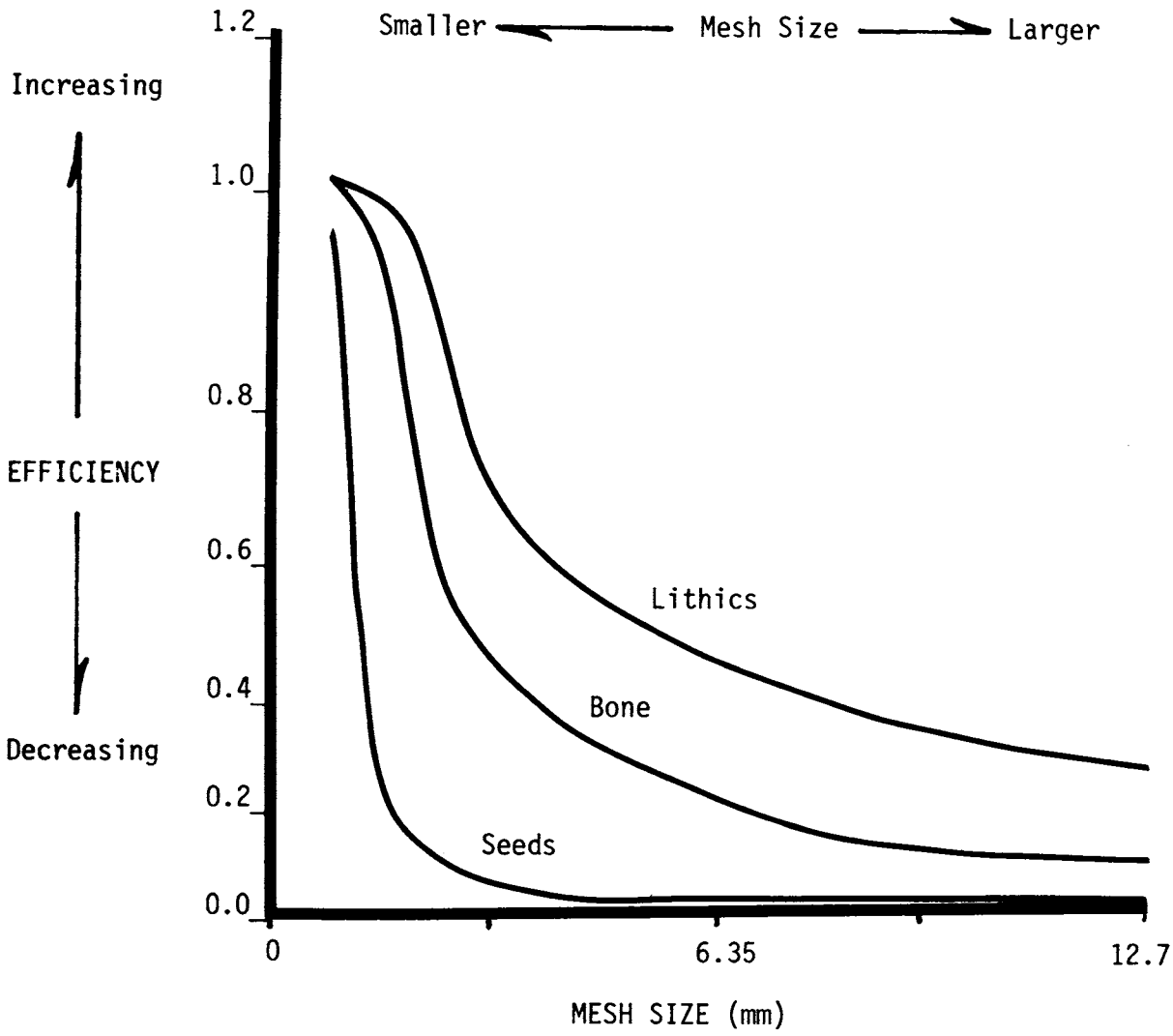


FIGURE 32: Graph illustrating cost effectiveness of data recovery. Efficiency calculated as ratio:

$$\frac{\text{Percent Material Recovered Out Of Total}}{\text{Percent Time Expended Out Of Total}}$$

At varying mesh sizes.

To date, processing rates appear to be relatively poorly documented (c.f. Cherry 1978). Table 5 lists mean processing rates in man-hours per cubic metre for a number of recovery systems currently in use. Of these the most expedient systems are either the simple flotation apparatus modeled after Watson (1976) with a mean rate of 17.62 man-hours per cubic meter, or the froth flotation apparatus developed by Cambridge (Jarman et. al. 1972) with a mean rate of 27.20 man-hours per cubic metre. Although use of a finer mesh increases total recovery and therefore results in data which are more amenable to analysis and interpretation, variability in processing rates result in a ranking of techniques by cost-effectiveness. Dry sieving is the least effective technique for fine meshes, followed by wet sieving. Tub or water separation following Struever (1968) is both time consuming (Davis and Weslowsky 1975) and poor in recovery (Limp 1974; Pendleton n.d.). Again, as shown in Table 5, 27.2 and 17.6 man-hours/cubic meter is exceptionally efficient. Furthermore, according to Nance (n.d.) and French et. al. (1972) the recovery accuracy for flotation systems is very high, ranging between 91% and 95% for certain classes of data.

Sorting time is equally poorly documented. Table 6 provides some of the sorting rates reported in the literature. Variations in sorting time are a function of cultural material density and diversity, sediment nature, personel expertise, and the sieve size utilized. Similarly, the actual technique employed affects the eventual speed of sorting of materials. Our own subjective estimate for sorting time for the average deposit recovered through flotation is in the range of 100 to 150 man-hours/cubic meter. This rate can be significantly reduced through the use of certain inexpensive chemicals (Bodner and Rowlett 1980; Struever and Carlson 1977).

TABLE 5: Selected Processing Rates for Various Recovery Techniques

SYSTEM-TECHNIQUE	MEAN PROCESSING RATE (MAN HOURS/M^3)	SAMPLES (n)	RANGE	STANDARD DEVIATION
TUB-WATER SEPARATION (e.g. Struever 1968)	80.86	7	17.36-118.8	41.14
WET/WATER SIEVING (Bobrowsky n.d.b.)	150.0	1	-	-
FROTH FLOTATION/WET SIEVING (Keeley 1978)	133.3	1	-	-
DRY SIEVING (e.g. Koloseike 1970)	210.0	3	196-233	20.07
SIMPLE FLOTATION (e.g. Watson 1976)	17.62	8	8-58.8	16.83
FROTH FLOTATION (e.g. Jarman et. al. 1972)	27.20	5	12-44	11.99

TABLE 6: Reported Sorting Rates for Various Mesh Sizes

MEAN SORTING RATE (MAN HOURS/M^3)	MESH SIZE (mm)	SOURCE
13.33	12.7	French 1971
128.5	?	Keeley 1971
76.5	2 - 3	Williams 1973
100.0	3	Williams 1973
150.0	5	Williams 1973
21.0	?	Cherry 1978
320.0	?	Cherry 1978
24.56	12.7	Koloseike 1970
188.77	6.35	Koloseike 1970
1187.31	3.18	Koloseike 1970
8008.21	1.59	Koloseike 1970
45.94	12.7	This study
82.53	6.35	This study
153.87	3.18	This study
284.22	1.59	This study
670.83	0.85	This study

SUMMARY AND CONCLUSION

Results from a multiple mesh case study of a column sample from the Ross Site are presented, discussed and compared with those of several other related intensive recovery studies. In this analysis we show how the importance of various classes of archaeological data may be affected by either the non-use or use of various screen sizes. Results corroborate those of several other similar studies to show how intensive recovery techniques are superior to other methods of data recovery. An increase in the number of information classes is evident as well as greater statistical precision. Recovery and loss statistics are provided to show that the rate of information loss increases with the use of larger mesh screen while recovery percentages increase with the use of small mesh sizes. The notion of site disturbance is also discussed and it is noted that intensive recovery testing procedures result in less destruction to archaeological deposits than do other larger unit testing methods. In addition, the amount of effort required to gain comparable results appears to be significantly less with intensive recovery techniques than with the excavation of larger test units. And finally, recovery efficiency is discussed in terms of cost-effectiveness and it is concluded that simple flotation or methods of froth flotation are the most cost-effective means of intensive data recovery.

Interest in and the use of intensive recovery techniques has been more apparent in the study of faunal and paleoenvironmental remains from archaeological sites than in the analysis of artifactual materials. Obviously some of the more tangible archaeological materials will not be recovered in small samples and therefore intensive recovery cannot hope to satisfy the quest for this portion of the archaeological record. However, it seems clear that concentrations of micro-fauna and micro-debitage correlate well with cultural layers and therefore are useful in isolating and identifying levels of cultural activity. Stratigraphic

information of this type may be used most effectively in the subsequent formulation of an excavation research design in which specific types of site data are of interest.

With regard to cost-effectiveness, dry and wet sieving through fine screens are both time expensive and inaccurate. Flotation techniques provide a more reasonable method for treating archaeological sediments. Flotation requires a minimum time expenditure, far less than that required in dry sieving and the recovered fractions can be almost totally sorted chemically, thereby further reducing time-effort expense. With respect to the sample size required, it appears that column samples are sufficient estimators of cultural element behavior within larger units, although further experimentation is perhaps needed to justify any reduction in sample sizes.

The application of intensive recovery techniques is not restricted to deeply stratified sites such as the Ross Site. Early results from an analysis of column samples taken from EgPr-2, a site in southern Alberta's foothills in which deposits average 40 cm and the culture history appears to extend well into the Early Prehistoric Period, indicate similar success despite the lack of stratigraphic depth or visual clarity in the profiles. Given the fact that a large number of sites within the province exhibit such depositional characteristics and as a result present major interpretive difficulties (c.f. Brink n.d.), intensive recovery techniques offer excellent research potential in the interpretation and description of Alberta's prehistory.

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A DESCRIPTION AND DISCUSSION OF THE GILCHRIST SITE, DgOu-29 IN THE WRITING-ON-STONE LOCALITY OF SOUTH CENTRAL ALBERTA

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Ethos Consultants Ltd.

INTRODUCTION

In the spring of 1978 Hazel Bowen, whose husband works on the Deer Creek Ranch owned by Tom and Lois Gilchrist, noted a number of chipped stone specimens on the surface of a partially eroded portion of the wall of Black Coulee in South Central Alberta (Figure 33). Closer examination and collection in the area by the Bowen and Gilchrist families resulted in the collection of 33 flakes or shatter and 2 chipped stone bifaces from the eroded valley wall surface and the wall of a recent badger burrow, near its mouth. Quite clearly the badger, in digging its burrow, had disturbed a tightly clustered sample of cultural material, displacing most of it downslope below the burrow.

In the spring of 1980 Roger Moore, a friend of the Gilchrist family, brought this discovery to the author's attention, and subsequently accompanied him to the Deer Creek Ranch in order to meet the Gilchrists, examine the cultural materials recovered, and examine the locality where these materials had been found. Subsequently, on July 17, 1980 the writer and Stanley Saylor returned to the Deer Creek Ranch in order to conduct a detailed examination and recording of all specimens recovered. In this report, the writer will present a description of the locality where this cultural material was found, a description of the cultural material itself, and a discussion of what the material may represent and reflect.

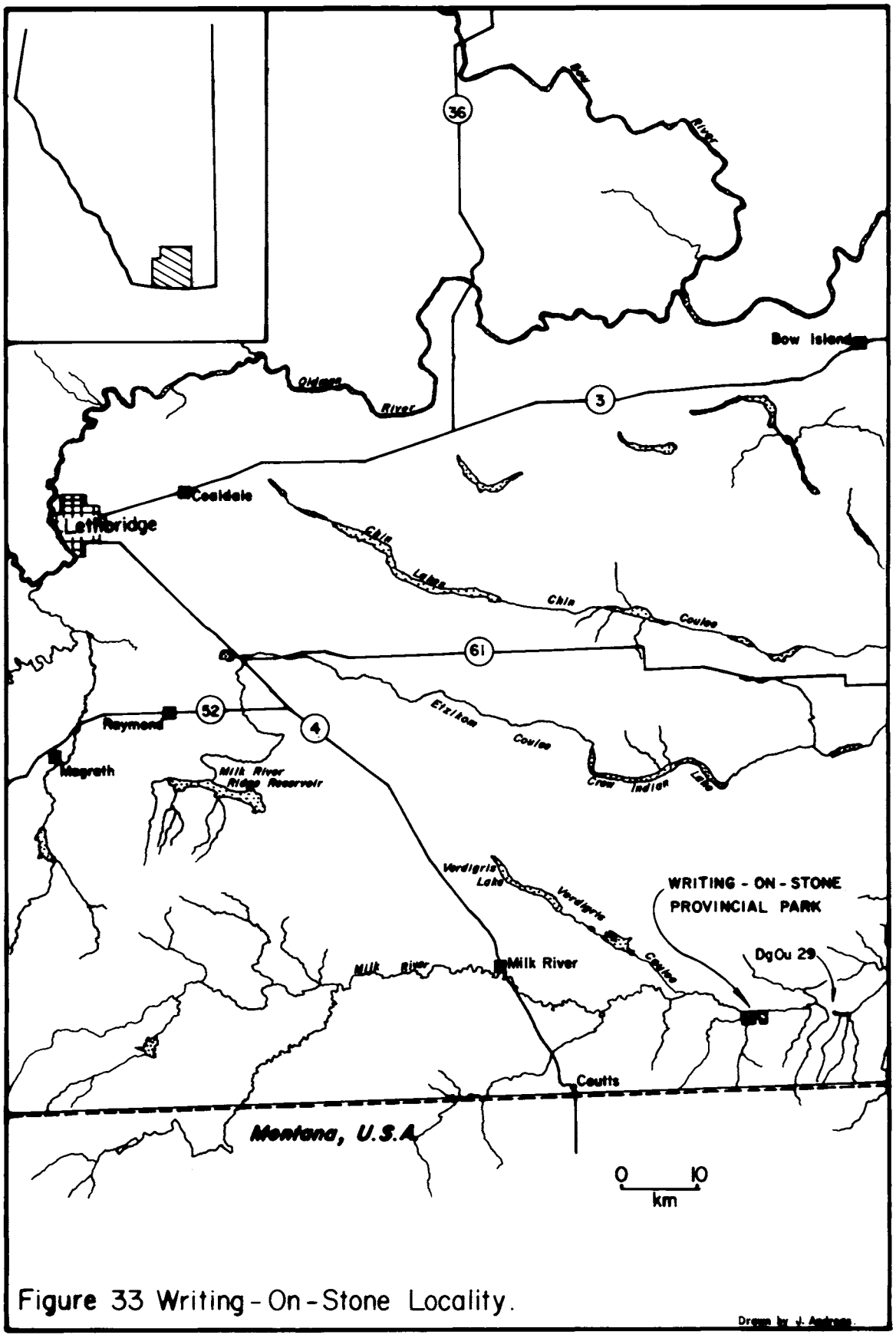

Figure 33 Writing - On - Stone Locality.

Drawn by J. Andrews

SITE DESCRIPTION

The find locality, designated the Gilchrist site and assigned Borden site number DgOu-29, is located near the top of the north wall of Black Coulee (Figure 33-37). The badger burrow from which the cultural material was found and displaced is situated in the prairie level, approximately 2 to 2.5 meters from the coulee wall. Cultural material was found scattered downslope from the badger burrow for a distance of about 10 to 15 meters. In examining the find locality, the writer observed no additional cultural materials either in the wall of the badger burrow or downslope. It is estimated that cultural materials collected by the Bowen and Gilchrist families represents from 75 to 100 percent of that originally present. From observation of the find locality, examination of recovered cultural materials, and discussion with the Gilchrists, it seems probable that the site represents a cache of imported lithic raw materials intended for subsequent modification into finished stone tools.

Black Coulee is essentially east-west trending in the site vicinity and incised approximately 50 meters below the surrounding prairie surface. The coulee ranges from 0.6 to 1.1 km in width and, in the site area, roughly parallels the valley of the Milk River located approximately 4.1 km north. The prairie surface in the surrounding area varies topographically from gently to strongly rolling and is composed primarily of glacial tills. Bedrock deposits in the region are normally exposed only along major coulee, stream and river valley systems. These bedrock formations are primarily of Cretaceous age and consist of poorly consolidated or unconsolidated shales, sandstones, siltstones, coal and ironstone. The north base of the Sweetgrass Hills, which is situated 13 km south of the site and across the international boundary, rises some 900 m above the surrounding prairie. A number of very prominent coulee systems originate near the north base of the Sweetgrass Hills and flow north where they terminate along the Milk River, to the east and west of DgOu-29.

FIGURE 34: View of DjOu-29 looking north. Arrow indicates find spot.

FIGURE 35: View of DjOu-29 looking east. Figures indicate find spot.

Vegetation, on the prairie as well as on the higher colluvial surfaces in river and coulee bottoms, is characteristic of the shortgrass prairie and consists of a variety of grasses, cactus and forbs. Vegetation in valley bottoms along alluvial surfaces include extensive stands of cottonwood, deciduous bushy willow and chokecherries. Large stands of coniferous forest are present in several areas of the Sweetgrass Hills.

DgOu-29 is located immediately east of the Writing-On-Stone locality recognized by local residents as that portion of the Milk River valley extending east from the town of Milk River for approximately 39 km (Figure 33). The Writing-On-Stone locality has attained public and scientific prominence because of its unique and beautiful badlands topography, the presence of a large number of aboriginal pictographs and petroglyphs, and because it contains the site of a late nineteenth to early twentieth century Mounted Police outpost. The Writing-On-Stone locality contains the largest concentration of rock art sites in the Northwestern Plains. A total of 59 rock art sites, collectively containing several thousand individual motifs (Keyser 1977), have been located and recorded in the area to date. The Writing-On-Stone region is situated within the historic territory of the Blackfoot Indians (Dempsy 1973).

RECORDING PROCEDURES AND DESCRIPTIVE TERMS

The entire sample of cultural material collected by the Bowen and Gilchrist families was examined and is discussed here. All specimens are illustrated at full scale in Figures 38 to 46. Metric and non-metric observations taken are summarized in Tables 7 and 8. Orientation of specimens for measurement follows that presented in Brumley (1980) for marginally retouched stone tools.

Debitage, as referred to here, consists of chipped stone material

FIGURE 36: Tom Gilchrist standing next to badger hole from where cultural material was recovered.

FIGURE 37: View from DjOu-29 south across Black Coulee towards Sweetgrass Hills.

removed either intentionally or inadvertently during the course of chipped stone tool production. Debitage is classified further into shatter and flakes. Flakes are pieces of debitage which display the production characteristics of either a striking platform, discernable bulbs of percussion, or ripple marks. Shatter are pieces of debitage which do not display the aforementioned production characteristics. Shatter is assumed to represent materials removed inadvertently in the course of flake removal, fragments of flakes, or flakes not clearly discernable as such. Debitage will normally exhibit no evidence of subsequent modification or use. However, all pieces of debitage from DgOu-29 had one or more edge segments characterized by what the author refers to as use retouch. Use retouch is assumed to have been produced indirectly as a result of use wear or battering along an unmodified edge. In the case of the DgOu-29 specimens, the use retouch is interpreted as resulting from the battering of specimens in the course of transport.

Two types of platform surfaces were observed: cortex and flaked. Cortex refers to the natural weathered surface of the stone. A flaked surface is one characterized by an unweathered natural surface or a smooth surface produced in the course of chipped stone tool production.

Two varieties of lithic raw materials are represented by the sample from DgOu-29. Obsidian comprises the majority of specimens, is essentially black in color and is semitransparent with individual pieces differentiated by varying amounts of parallel linear banding. Following David (1972: 1981 personal communication) obsidian from DgOu-29 is assumed to be most probably derived from the Yellowstone Park area of northwestern Wyoming, approximately 480 km to the south.

Chert from DgOu-29 is fine grained and free of internal fracturing. Individual specimens may be solid or multicolored with predominent colors being white, light grey or dark brown. Comparison of chert specimens

FIGURE 38: Lithic materials from DgOu-29. Scale: Actual size.

FIGURE 39: Lithic materials from DgOu-29. Scale: Actual size.

from DgOu-29 with lithic samples from known quarry sources throughout the northwestern plains, suggests that they are identical to or very similar to materials from the Avon quarries located 280 km south of the site in the mountains of west central Montana.

SAMPLE DESCRIPTION

The 35 specimens comprising the entire sample of cultural materials recovered from the Gilchrist site are all illustrated in Figures 38 to 46 with select metric and non-metric data summarized in Table 7. Specimen Figure 41 number 7 is a piece of obsidian shatter found to fit into one surface of specimen Figure 41 number 2. Specimens Figure 41 number 4 and Figure 41 number 5, were also two pieces of obsidian found to fit together. Breakage of these pieces may have occurred either before or after they were deposited at the site. For the purpose of analysis, these four pieces have been fitted together and are discussed as two specimens.

The 33 cultural items have been subdivided into five categories for the purposes of description and discussion.

Group 1: Obsidian Flakeage (N=17)

The 17 obsidian flake specimens comprise 51% of the total sample by number and 46% of the sample by weight. Five specimens are characterized by flaked platform surfaces which may (N=2) or may not (N=3) exhibit evidence of trimming (Brumley 1980:7.6). A single weathered cortex platform with no trimming is present. The remaining 11 specimens do not display striking platforms but are identifiable as flakes because of the presence of ripple marks or positive bulbs of percussion. All of these latter specimens appear to have collapsed striking platforms. That is, the striking platform and immediately adjacent area was apparently disintegrated by the force of the blow which detached the flake.

FIGURE 40: Lithic materials from DgOu-29. Scale: Actual size.

FIGURE 41: Lithic materials from DgOu-29. Scale: Actual size.

Platform angles were observable on five specimens and were either medium (N=4) or steep (N=1).

All obsidian flakes exhibited from one to four use retouched edge segments with a mean of 2.5 retouched edge segments per specimen.

Length:	Range 60.6 to 142.9 mm
	Mean 92.3 mm
Width:	Range 34.5 to 91.0 mm
	Mean 61.6 mm
Thickness:	Range 7.3 to 20.6 mm
	Mean 14.2 mm
Weight:	Total 1179.5 g
	Range 54.6 to 145.9 g
	Mean 103.9 g

Group 2: Obsidian Shatter (N=3)

The three pieces of obsidian shatter comprise 9% of the total sample by number and 7% of the sample by weight. Obsidian shatter exhibited no (N=1) or three (N=2) use retouched edge segments.

Length:	Range 23.2 to 107.4 mm
	Mean 62.4 mm
Width:	Range 16.8 to 65.6 mm
	Mean 40.8 mm
Thickness:	Range 6.3 to 21.2 mm
	Mean 15.1 mm
Weight:	Total 174 g
	Range 1.3 to 143.3 g
	Mean 58 g

Group 3: Chert Flakes (N=10)

The ten chert flakes from DgOu-29 comprise 30% of the sample by number and 40% of the sample by weight. Two specimens are characterized by flaked platform surfaces which may (N=1) or may not (N=1) exhibit evidence of trimming. Seven specimens are characterized by cortex covered striking platforms which may (N=2) or may not (N=5) show evidence of trimming. The remaining chert flake did not have a discernable striking platform but is identifiable as a flake because of the presence of ripple marks. This latter specimen is believed to have a collapsed striking platform as discussed for Group 1 specimens. Platform angles were observable on six chert flakes and were either medium (N=3) or steep (N=3).

All chert flakes exhibited from 2 to 4 use retouched edge segments with a mean of 2.4 retouched edge segments per specimen.

Length:	Range 83.6 to 113.7 mm
	Mean 97.4 mm
Width:	Range 55.9 to 96.0 mm
	Mean 70.3 mm
Thickness:	Range 16.6 to 22.7 mm
	Mean 19.3 mm
Weight:	Total 1038.8 g
	Range 54.6 to 145.9 g
	Mean 103.9 g

Group 4: Chert Shatter

A single piece of chert shatter was present comprising 3% of the sample by number and 4% by weight. The specimen has two use retouched edge segments.

Length:	102.9 mm
Width:	72.5 mm

Thickness: 15.5 mm
Weight: 97.9 g

Group 5: Chert Bifaces (N=2)

The two chert bifaces from the Gilchrist site are illustrated as Figure 42 number 1 and Figure 46 number 1. The Figure 42 number 1 specimen has what appears to be a platform remnant at the distal end characterized by a flaked platform surface with adjacent platform trimming. The dorsal surface is characterized by overall irregular primary flaking and irregular to well patterned secondary flaking along the lateral edges and at the proximal end. The ventral surface is characterized by extensive irregular primary flaking. Secondary flaking on the ventral surface is irregular to well-patterned and restricted to a portion of one lateral edge.

Specimen Figure 46 number 1 has a small section of cortex present along the distal end and an adjacent portion of a lateral edge. Irregular overall primary flaking characterizes both surfaces. Small sections of irregular to well-patterned marginal secondary flaking are also present on both surfaces.

See Table 7 for metric data for biface specimens Figure 42 number 1, and Figure 46 number 1.

A comparison of obsidian and chert flakeage indicates a few interesting similarities and differences. The mean length/width ratio of specimens in both groups is quite similar. Obsidian flakes show a much greater range of metric variation than do chert flakes. In overall terms, chert flakes are larger than obsidian flakes with the greatest difference being in thickness and weight. Obsidian flakes exhibit a high frequency of collapsed platforms and exhibit a lower frequency of steep platform angles.

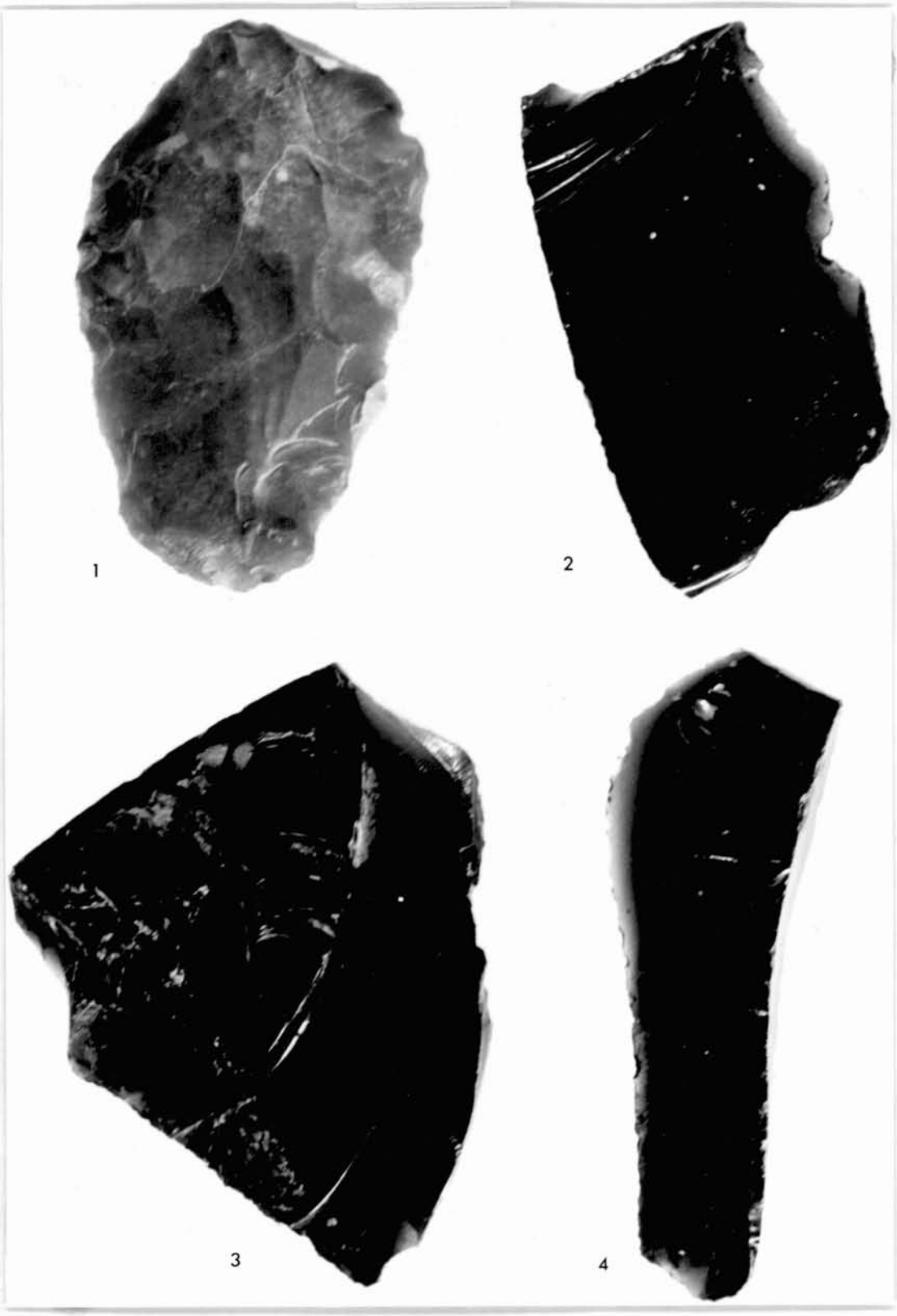

FIGURE 42: Lithic materials from DgOu-29. Scale: Actual size.

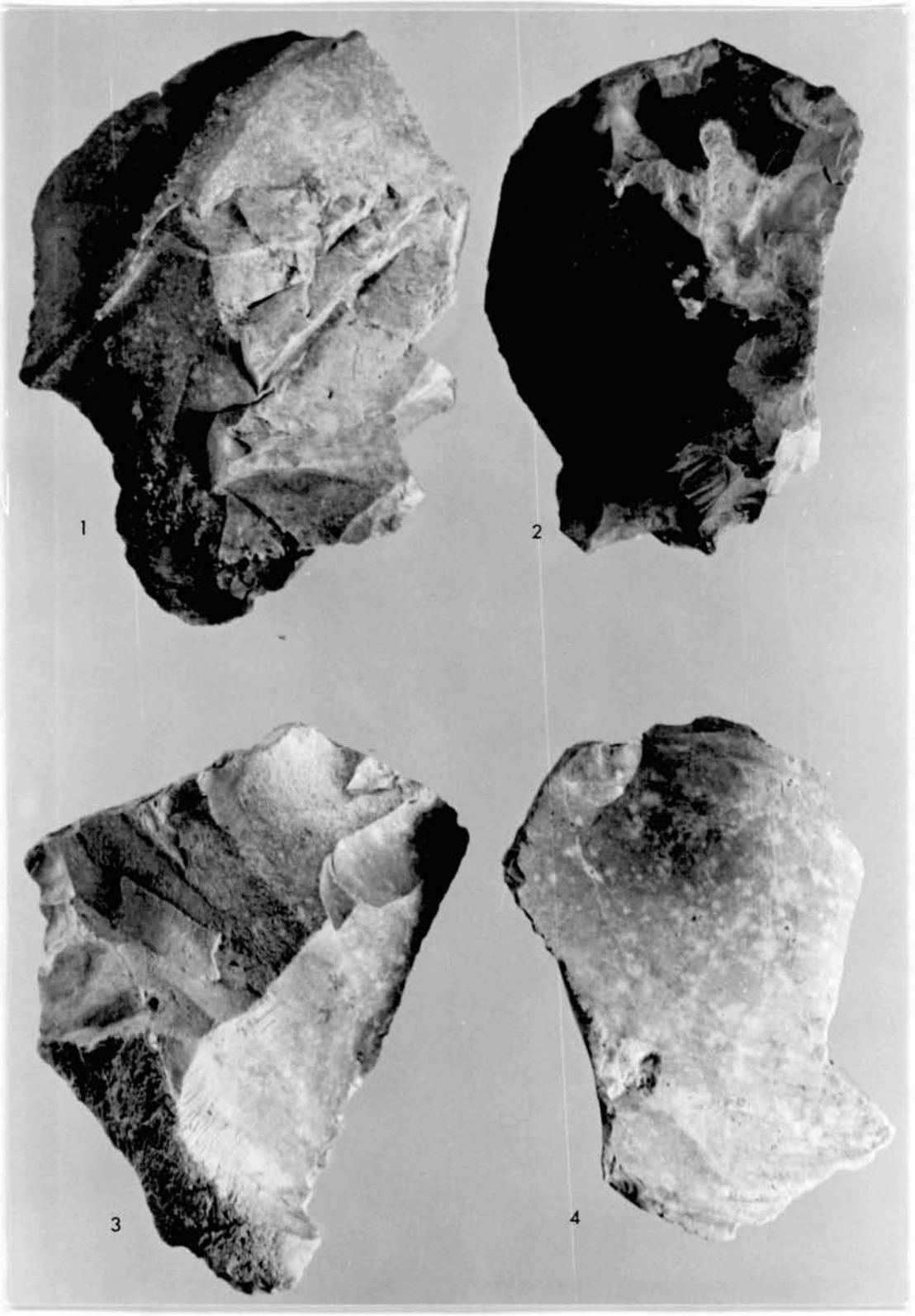

FIGURE 43: Lithic materials from DgOu-29. Scale: Actual size.

Biface specimen Figure 46 number 1 is interpreted as a preform intended for further reduction into finished tools. Biface specimen Figure 42 number 1 may also be a preform or alternately a finished tool.

DATING

Four obsidian specimens were submitted to Dr. Leslie B. Davis for obsidian hydration dating. Data on sampled specimens is presented in Table 8. Hydration ages for the four specimens ranged from 425 to 735 years before present, with a mean age of 575 years B.P. (A.D. 1405). All four dates fall into the time span for Old Women's phase sites within southern Alberta and are considered acceptable.

DISCUSSION

The Gilchrist site, DgOu-29, is interpreted as representing an aboriginal lithic cache of imported raw materials intended for subsequent reduction into finished stone tools. Evidence of from limited to extensive use retouch on almost all specimens is interpreted as being an artifact of transport.

Two lithic raw materials are represented in the sample: a semi-transparent black obsidian presumably derived from the Yellowstone Park area approximately 480 km south and a white to light grey or brown chert probably derived from the Avon quarry area of west central Montana, 280 km southwest of the site.

No temporally or culturally diagnostic materials were recovered from the site. However, based on the results of obsidian hydration dating of 4 specimens from the site, a mean age of 575 years ago is indicated. This date would indicate the site probably reflects activities by Old Women's phase peoples.

Yellowstone Park obsidian is a non-local lithic material in southern Alberta used throughout the known prehistoric cultural sequence (Davis 1972: 164). However, obsidian usage is most common during the Old Women's phase dating from ca A.D. 700 to A.D. 1750. The second most common use period for obsidian in southern Alberta is during the Pelican Lake phase estimated to date from ca 1600 to 1 B.C. (Davis 1972:164).

Data for utilization of Avon chert has not been thoroughly analyzed for southern Alberta. However, Avon chert is present in limited to extensive amounts throughout most of the prehistoric sequence. Reeves (1970:82) notes that in the Waterton Park area, Avon chert comprises almost 50% of finished stone tools in his Blue Slate Canyon Subphase of the Pelican Lake phase. The writer's own observation of cultural materials from southern Alberta and northern Montana would also suggest greatest utilization of Avon chert during the Pelican Lake phase time period.

The material from the Gilchrist cache is significant in attempting to understand the nature and role of aboriginal trade and transport mechanisms.

The relative size-shape uniformity exhibited by both obsidian and chert specimens suggest definite selection criteria were operative. Similar technological/functional parameters of production or intended use may be the reason for items from these two widely separated quarries being relatively uniform. Alternately, materials from both quarries could have been produced by a single individual. Finally, a well developed systematic trade system may have been operating with both quarries controlled by a single cultural group producing a uniform product for export and trade.

Even allowing for loss of some specimens from the cache, the total weight (2.7 kg) of the recovered specimens suggests a sample easily trans-

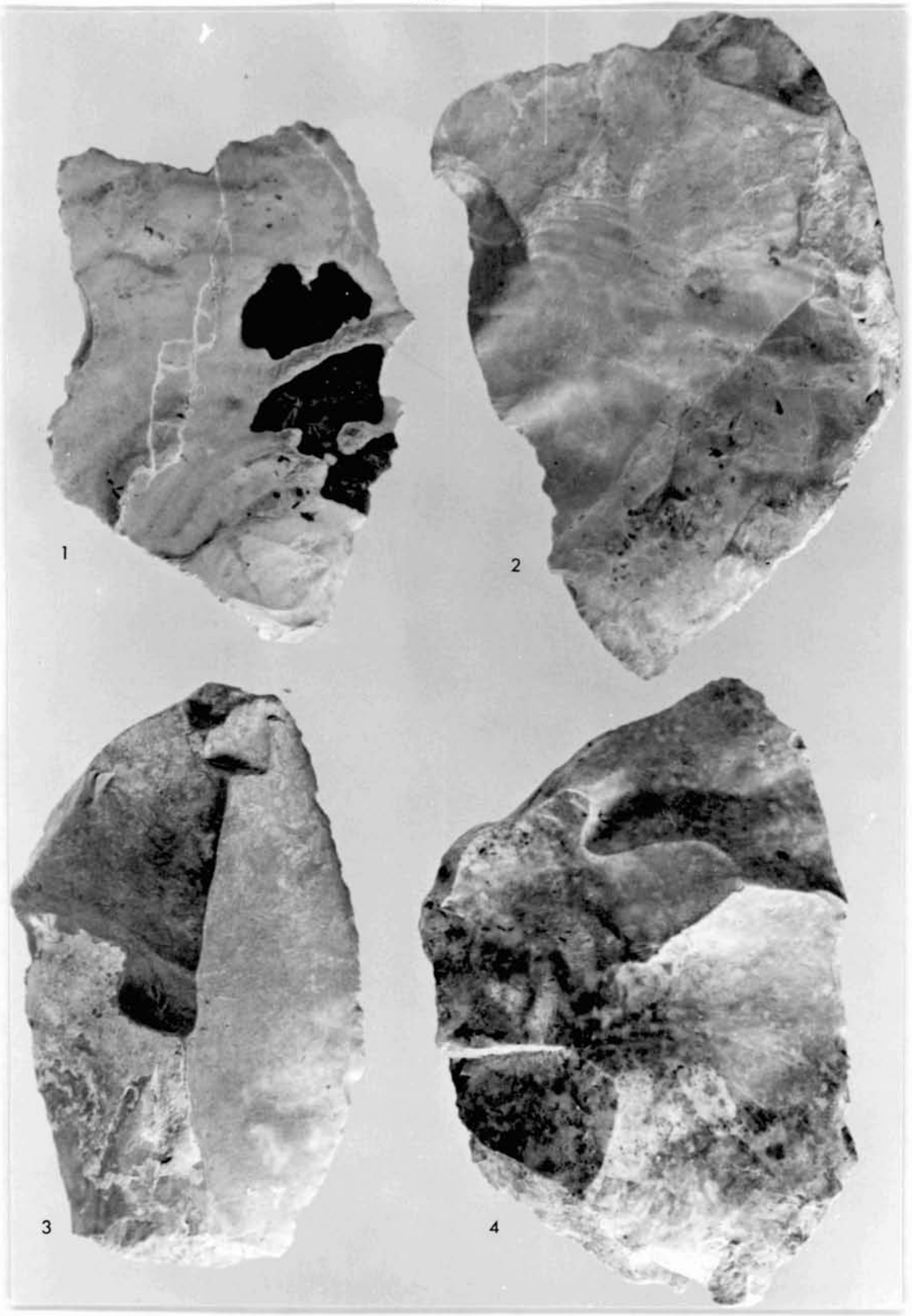

FIGURE 44: Lithic materials from DgOu-29. Scale: Actual size.

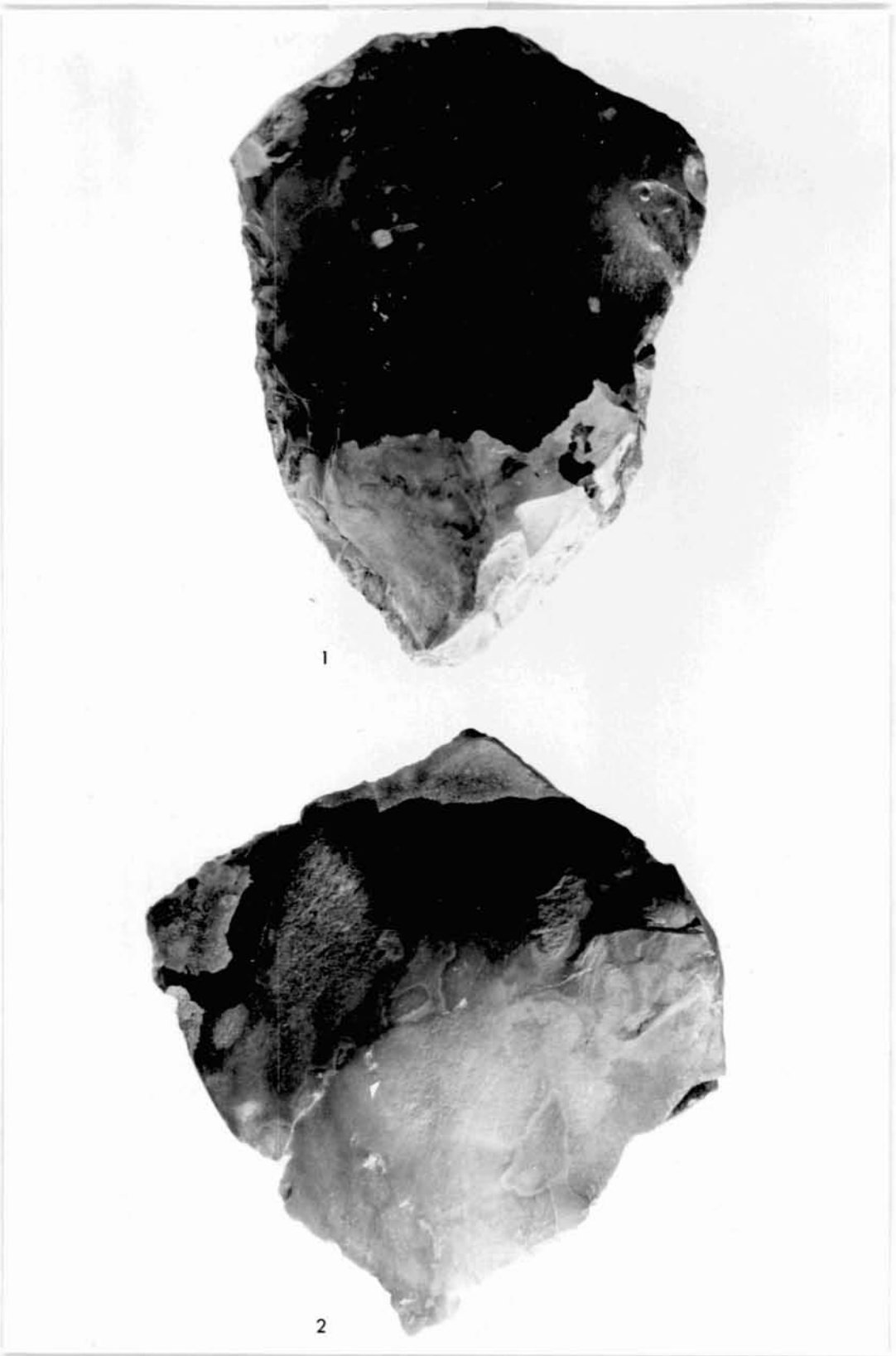

FIGURE 45: Lithic materials from DgOu-29. Scale: Actual size.

ported by a single person along with other gear. Extensive evidence of use retouch on most specimens is interpreted as a result of battering of specimens together during transport and indicates the specimens were transported as a unit.

The effort expended in producing and transporting the lithic material to the cache site indicate the material represents a valuable commodity. The fact that it was not subsequently recovered and utilized suggests few persons knew of its location and that they were unable to return and remove the material. One probable scenario would be that of a single individual procuring or acquiring the materials, transporting it to southern Alberta, caching it for some reason, and not being able to return to it possibly due to death.

ACKNOWLEDGEMENTS

My appreciation goes to Roger Moore for bringing the DgOu-29 materials to my attention and in particular I would like to thank the Gilchrist and Bowen families for their courtesy and generosity in allowing me to examine and record the site locality and the cultural materials recovered from it.

Stanley Saylor assisted me in recording the DgOu-29 materials and took the photographic record of the materials. Janice Andreas drafted Figure 1 and Donna Thane typed this report.

Rod Vickers reviewed the first draft of this report, making a number of perceptive comments on the possible implications of this lithic cache in relation to aboriginal trade mechanisims. Many of these comments have been incorporated here.

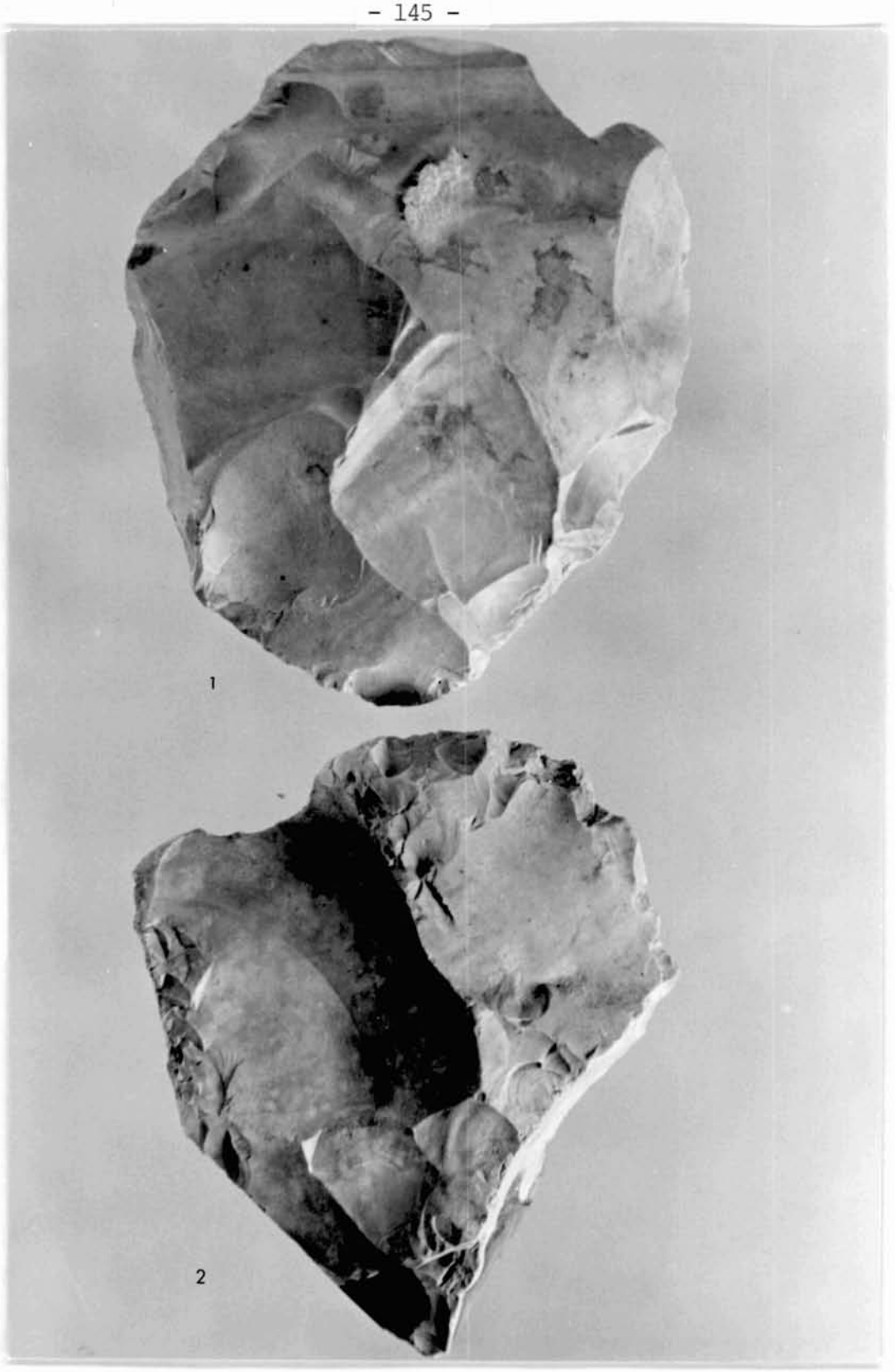

FIGURE 46: Lithic materials from DgOu-29. Scale: Actual size.

Table 7: Summary of Metric and Non-Metric Data, Specimens from DgOu-29

SPECIMEN	LENGTH	WIDTH	THICK.	WEIGHT	PRE.	RED.	GENERAL SHAPE	MATERIAL	PLATFORM ANGLE
FIG 38 NO 1	128.6	74.2	13.0	127.9	FL	TR	IR PL	OBSIDIAN	IND
	Platform partially collapsed.								
FIG 38 NO 2	80.9	65.2	14.3	65.6	FL	SC or TR	IR	OBSIDIAN	MEDIUM
	Platform unmodified flake surface or smooth cortex. No platform trimming.								
FIG 38 NO 3	87.0	69.8	17.9	63.5	FL	SC or TR	IR	OBSIDIAN	MEDIUM
	Platform unmodified flake surface or smooth cortex. No platform trimming.								
FIG 38 NO 4	115.0	80.3	17.7	143.8	FL	TR	IR	OBSIDIAN	MEDIUM
	Platform unmodified flake surface or smooth cortex. Platform trimming present.								
FIG 39 NO 1	109.9	91.0	15.0	119.4	FL	SC	IR	OBSIDIAN	MEDIUM
	Platform unmodified flake surface or smooth cortex. No platform trimming.								
FIG 39 NO 2	142.9	81.1	20.6	174.2	FL	TR	IR SC	OBSIDIAN	IND
	Platform collapsed; flake split medially.								
FIG 40 NO 1	72.9	48.8	10.6	32.2	FL	TR	PL	OBSIDIAN	IND
	Platform absent; ripple marks present.								
FIG 40 NO 2	78.5	47.3	13.3	36.6	FL	SC	SC	OBSIDIAN	IND
	Prominent positive bulb. Platform surface absent.								
FIG 40 NO 3	83.9	51.3	14.5	46.5	FL	SC	PL to IR	OBSIDIAN	IND
	Proximal end absent. Prominent ripple marks.								
FIG 40 NO 4	72.6	44.2	12.8	35.2	FL	SC	IR	OBSIDIAN	IND
	Platform may or may not be absent. Prominent ripple marks present.								
FIG 40 NO 5	56.6	39.9	17.8	29.4	SH	SC	PL	OBSIDIAN	IND

Table 7: Continued

SPECIMEN	LENGTH	WIDTH	THICK.	WEIGHT	PRE.	RED.	GENERAL SHAPE	MATERIAL	PLATFORM ANGLE
FIG 42 NO 4	107.7	34.5	15.5	50.5	FL	TR	IR PL	OBSIDIAN	IND
	Flake fragment with noncortical platform surface. Platform trimming present.								
FIG 43 NO 1	102.9	72.5	15.5	97.9	SH	SC	IR	CHERT	IND
	Probably a flake but no clear evidence.								
FIG 43 NO 2	87.2	55.9	18.7	87.4	FL	TR	IR	CHERT	IND
	Cortex platform; no platform trimming.								
FIG 43 NO 3	92.9	66.5	20.2	91.8	FL	SC	IR PL	CHERT	STEEP
	Cortex platform; very limited platform trimming.								
FIG 43 NO 4	83.6	59.1	19.5	85.9	FL	SC	IR	CHERT	MEDIUM
	Cortex platform.								
FIG 44 NO 1	91.2	59.7	17.4	54.6	FL	SC or TR	IR PL	CHERT	STEEP
	Cortex platform; no platform trimming.								
FIG 44 NO 2	113.7	74.4	22.7	131.7	FL	PR or SC	IR PL	CHERT	MEDIUM
	Cortex platform; no platform trimming.								
FIG 44 NO 3	97.8	56.0	19.1	101.5	FL	SC	IR PL	CHERT	STEEP
	Unprepared flake surface platform.								
FIG 44 NO 4	106.7	71.4	21.0	145.9	FL	TR	IR TC	CHERT	IND
	Cortex platform; moderate to extensive platform trimming.								
FIG 45 NO 1	111.6	93.0	28.1	234.1	FL	TR	IR TR	CHERT	IND
	Cortex platform.								
FIG 45 NO 2	100.8	88.5	17.8	126.8	FL	SC	IR PL	CHERT	MEDIUM
	Flaked surface used as platform; limited platform trimming.								

Table 7: Continued

SPECIMEN	LENGTH	WIDTH	THICK.	WEIGHT	PRE.	RED.	GENERAL SHAPE	MATERIAL	PLATFORM ANGLE
FIG 46 NO 1	102.3 Biface.	75.6	19.9	114.8	IND		IR OV	CHERT	
FIG 46 NO 2	97.3 Platform collapsed.	96.0	16.6	98.4	FL	SC	IR	CHERT	IND

Table 8: Obsidian Hydration Dates from DgOu-29

Specimen	Hydration Rim Thickness (microns)	Hydration
Figure 41 No. 4 21-3B	2.1	735 B.P.
Figure 38 No. 2 1-1B	1.8	540 B.P.
Figure 41 No. 4 21-2B	1.6	425 B.P.
Figure 41 No. 8 21-3C	1.9	600 B.P.

* Based on rate of 6 microns squared per 1000 years

CONSERVATION EXCAVATIONS AT CARSON PEGASUS PARK
GbPv-1 and GbPv-2

Brian M. Ronaghan
Lifeways of Canada Ltd.

INTRODUCTION

In fall 1980, under the terms of a contract with the Archaeological Survey of Alberta (ASA) and the Provincial Department of Recreation and Parks, the author conducted an Historical Resources Impact Assessment (HRIA) within the boundaries of the proposed Carson-Pegasus Provincial Park (Ronaghan 1981). Twenty seven historical resource sites were identified and a previously discovered site was subject to assessment. Initial park facility construction was scheduled to seriously impact two of these sites: GbPv-1 and GbPv-2. During August 1981 the author returned to undertake a program of conservation excavations at these two sites prior to their planned impairment. The intent of this report is to summarize the conduct and initial findings of the 1981 studies at GbPv-1 and GbPv-2 (Figure 47).

STUDY AREA

A major provincial park is being developed in the Whitecourt area around the shores of Carson and Pegasus lakes (Figure 47). These lakes lie at the base of the southern margin of the Swan Hills uplands in the drainage basin of the middle course of the Athabasca River. The lakes themselves appear to be the result of the disintegration of major ice blocks after the last Pleistocene advance in the area. They are quite deep and are ringed by a series of high razor back and plateau-like ridges.

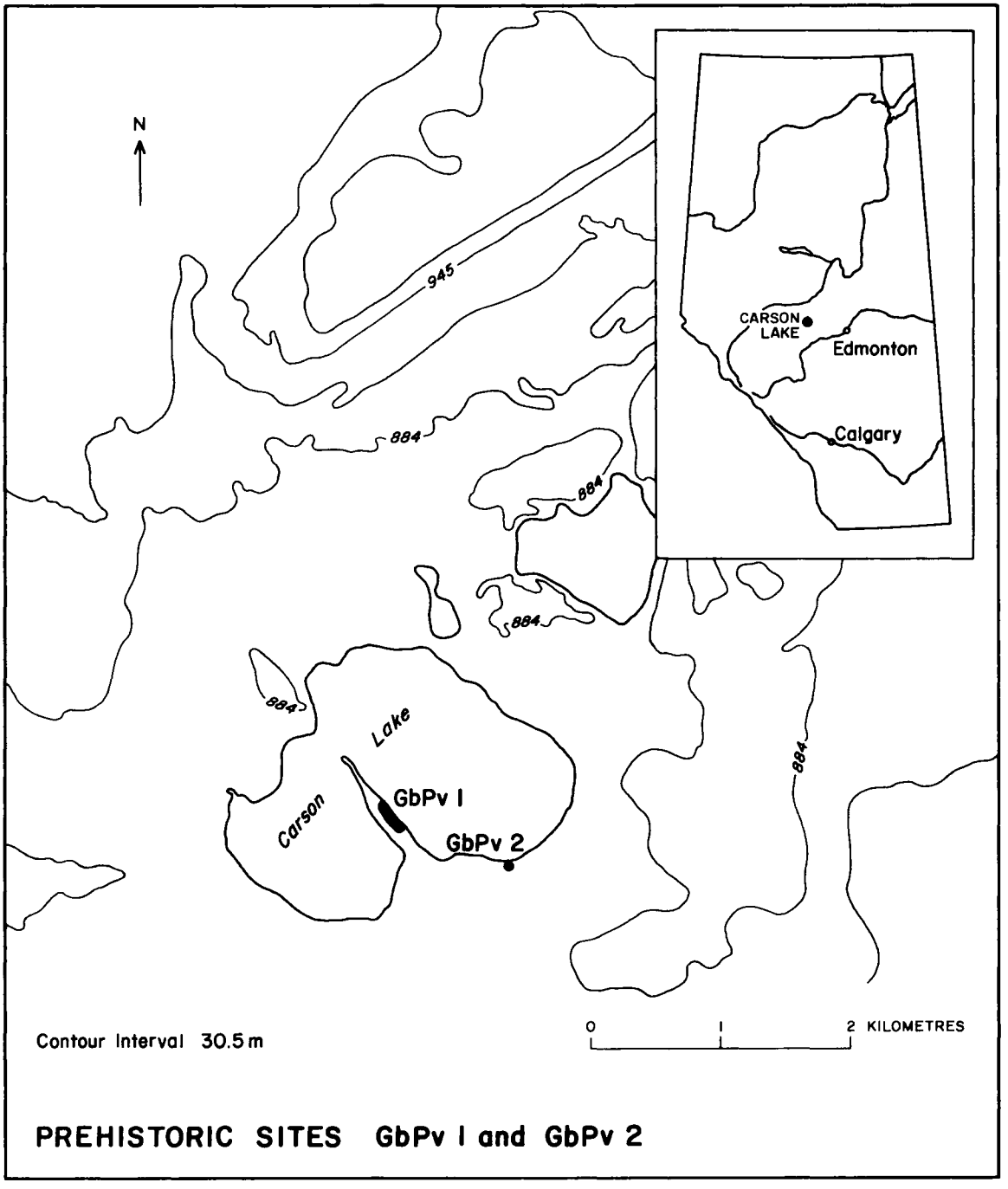

FIGURE 47: Prehistoric sites on Carson Lake.

The area is currently densely forested and has been subject to fairly intensive logging activities since the turn of the century. The Carson-Pegasus lakes area may have existed as an ecotone between expanded grasslands in the Athabasca River valley and forested uplands during the Altithermal period (5500-3000 B.C.).

GbPv-1: INITIAL ASSESSMENT

The site is located along the central spine of a 600 m long gravel spit which almost bisects Carson Lake. It currently contains campground facilities. 1980 assessment consisted of the excavations of 84 shovel tests in four transects along the long axis of the spit and the excavation of seven 1 x 1 m tests adjacent to productive shovel holes. It was estimated that approximately 200 x 80 m of undisturbed site area exist.

Artifacts appeared concentrated in the A/B horizon to a depth of 25-30 cm below surface. The C horizon appeared essentially sterile and rounded beach cobbles were identified in one 1 x 1 m test. No stratigraphic separation was noted and no time diagnostic artifacts were recovered.

Initial impressions were that the site was rather sparse and discontinuous, representing small occupational clusters, possibly separated temporarily in a horizontal plane. Additionally, it was thought that natural disturbance (tree throws, frost heaving) precluded the opportunity of recognizing any vertical stratigraphic separation. Artifacts suggested tool production was likely the major site activity.

CONSERVATION EXCAVATIONS

GbPv-1 was scheduled to be further impacted by construction of new campground facilities and conservation excavations were required by the

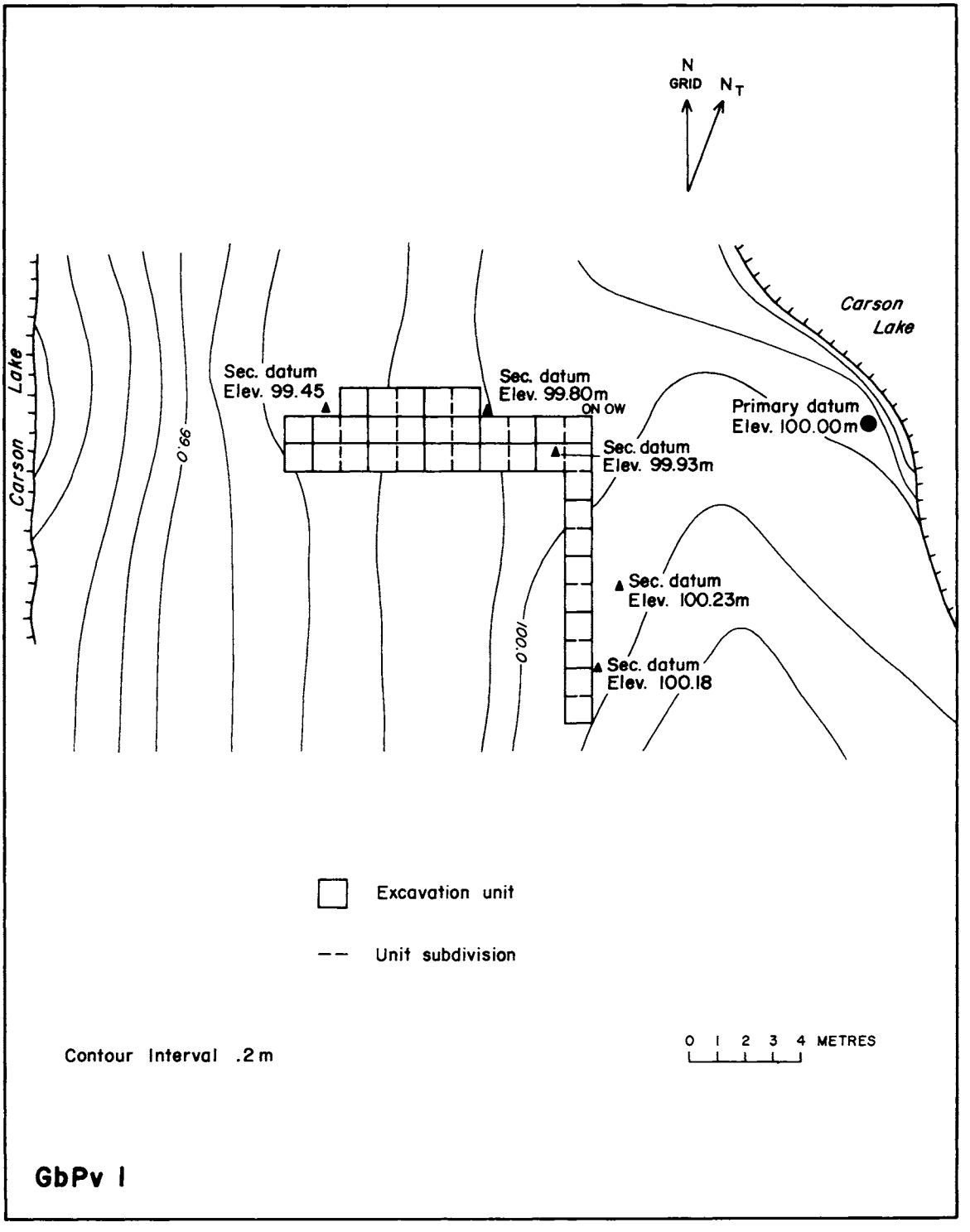

FIGURE 48: GbPv-1 Excavation plan. Carson-Pegasus Park.

FIGURE 49:

Excavations in progress at GbPv-1.

FIGURE 50:

North wall profile, ONOW, GbPv-1.

ASA. Budgetary restrictions resulted in the adoption of dual objectives for this research. Research objectives were to investigate the voracity of initial impressions about the nature of artifactual distribution and to interpret the cultural patterning on the site. An equally important objective was the conservation of a maximum amount of cultural information from this large site given time and cost restrictions.

Excavations were placed in the area previously determined to have the greatest artifact concentration. Twenty square metres were excavated in the form of an "L" shaped trench with additional units used to expand upon concentrations when these were encountered (Figure 36). The 30 square metres excavated consisted of approximately .2% of the potential undisturbed site area.

Because it was believed extensive natural mixing had occurred and time effective methods were necessary, excavation was conducted in standard 10 cm arbitrary levels. Trowels were used and piece plotting was undertaken when concentrations were revealed but generally, shovel shaving was the primary excavation technique. All sediments were passed through a 3/16" mesh motorized screen.

Excavations were completed to a depth of 40 cm below surface where sterile deposits were encountered. The possibility of deeper deposits were investigated by excavating a portion of one of the central units to a depth of 90 cm below surface.

RESULTS

Geological Stratigraphy

Geological stratigraphy natural deposits indicate a lengthy period of stability in the depositional history of the spit. The profile

represents a typical orthic grey luvisol as found throughout the region (Wynnyk et al 1969): 10-15 cm of forest litter overlies a thin (5-10 cm) grey A horizon, a thin (10-15 cm) B horizon consisting of fine yellow silts, grades into a basal C horizon of yellow clay with mixed gravels (till) (Figure 51).

The lack of beach cobbles suggests lake levels were not substantially higher than present but could have been slightly higher or considerably lower at various times in the past. Substantial numbers of roots, particularly aspen were present throughout the A and B horizon making the retention of exact provenience on cultural materials quite difficult.

Cultural Stratigraphy

The impression given by the data obtained in 1980 was that it was highly unlikely that any super-position of cultural materials existed or could be recognizable at GbPv-1. The 1981 excavations verified the latter proposition in that no vertical separation in artifacts was recognized, although it was one of the goals of the project that excavation by cultural levels be undertaken if possible. Excavations were conducted in 10 cm arbitrary levels.

While analysis of the artifacts is not totally complete at this time, initial results are that although mixing does occur, three temporarily distinct cultural components can be recognized within the arbitrary levels. The term component used here refers to a techno-cultural complex which may or may not represent a single event. It is our opinion that the materials within each component represent more than one visit to GbPv-1.

The upper component which corresponds at a gross level with excavation Level 1 is characterized by a single small notched arrow point and by less time diagnostic artifacts including one biface, one scraper and several flake tools. Formed and utilized artifacts were

recovered in limited quantities and, as such, no definite processing areas could be identified. However, sufficient clustering was recognized in flake and core types that three discrete areas of stone tool production were identifiable primarily in the west half of the excavation. It is believed this component is Late Prehistoric in age.

The middle component is affiliated with early post Altithermal occupations in the area and grossly corresponds with excavation Level 2. Diagnostic artifacts include several Middle Prehistoric period atlatl point styles (four McKean lanceolate, one Hanna stemmed, an Oxbow side notched, one undiagnostic triangular, and one Bitteroot side notched) (Figure 54). Association with the McKean complex (3500-1000 B.C.) is further borne out by the presence of a single conical undirectional core. Other tools include 11 bifaces, 15 scrapers, nine retouched flakes, 29 utilized flakes, one stone axe and two core choppers.

Because of the spatial distribution of tools and lithic debitage, five discrete processing areas and four lithic production areas were recognized. Some overlap and association can be seen in the production and use of artifacts.

The middle component represents the most intensive use of the site in areas excavated, and occurs in a time period when it is believed that there were expansive areas of grassland in the Athabasca River valley.

The lower component is grossly associated with excavation Levels 3 and 4 and has been related to the Early Prehistoric period on the basis of the occurrence of a single Plainview lanceolate spear point (ca. 7000 B.C.). The association in these levels of several blade like flakes, some retouched or utilized, may also indicate a different technology being employed during this period. Although some mixing is likely to have occurred, other tools placed in this component include: one

biface, three scrapers, two retouched flakes, and 15 utilized flakes.

Artifacts recovered from these levels were relatively sparse and dispersed such that no production or processing areas were recognized for the early component.

GbPv-2: INITIAL ASSESSMENT

GbPv-2 was identified in the 1981 HRIA of the park (Ronaghan 1981). It is located along the south shore of Carson Lake on a relatively high lake terrace (Figure 47). The site was discovered in undisturbed contexts in judgementally placed shovel tests. Three of the eight shovel tests dug on the terrace produced artifacts. Two of these tests revealed a buried A horizon approximately 20 cm below surface in which artifacts were identified. Artifacts were also associated with natural deposits above this soil.

Initial impressions were that the site was limited in size (ca. 40 x 15 m) and contained two stratigraphically separated prehistoric occupations. No time diagnostic artifacts were recovered in the initial shovel testing, consequently no age could be assigned to the site occupation.

CONSERVATION EXCAVATIONS

Precise definition of areas to be impacted by construction of campground facilities resulted in the ASA requirement for conservation excavations. Twenty square metres were excavated enbloc in the area presumed to exhibit vertical separation of cultural materials. It was hoped that excavations in cultural levels would assist in defining a secure portion of the culture history of the Carson Lake area.

Problems were encountered in the course of excavations, in that no buried soil or stratigraphic separation in artifacts was identified.

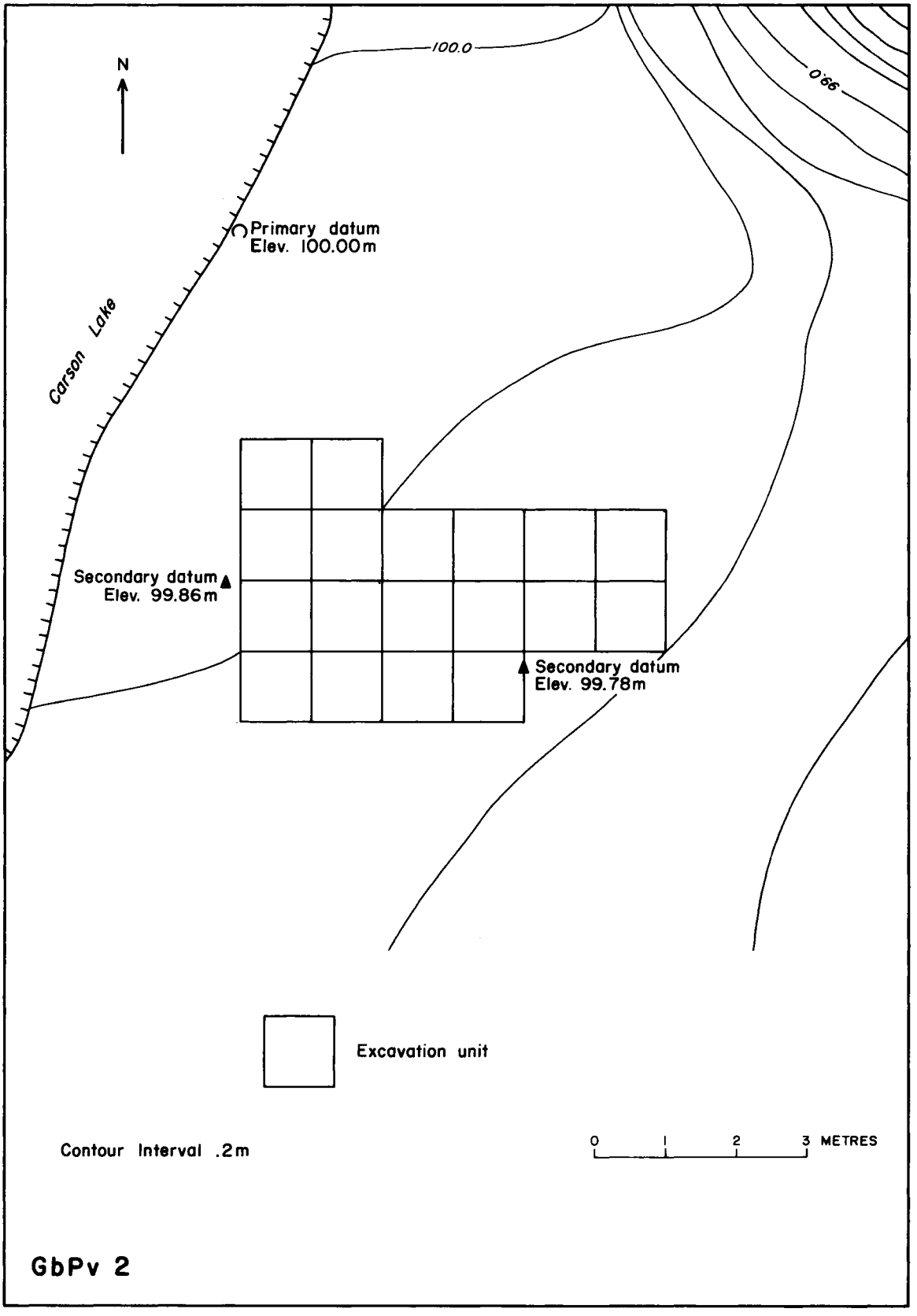

FIGURE 51: GbPv-2 Excavation plan. Carson-Pegasus Park.

FIGURE 52: Excavations at GbPv-2 facing north.

FIGURE 53: Discontinuous buried A horizon as a a result of natural disturbance, dark band in wall profile, GbPv-2.

A possible reason for this anomolous situation was seen in presence of noncontinuous buried A horizon lens in one of the excavation walls, likely as a result of root disturbance or tree fall (Figure 53). Excavation was completed in four arbitrary 10cm levels in the same manner as that used at GbPv-1. Subsequent to the completion of the required work the use of the park backhoe was elicited to acess the possibility of deeply buried cultural materials.

RESULTS

Geological Stratigraphy

Geological stratigraphy, the natural depositional history of GbPv-2, is identical to that described for GbPv-1 and will not be repeated here.

Cultural Stratigraphy

Unlike GbPv-1, there was no stratigraphy separation noted in the excavation nor in the subsequent laboratory analysis. One cultural component was identified and it is felt to be related to the Middle Prehistoric component at GbPv-1. A single diagnostic artifact was recovered, a Hanna stemmed atlatl point. Other tools include: one triangular point fragment, ten bifaces, six scrapers, eight retouched flakes and eight utilized flakes (Figure 55).

Similarities between this site and the middle prehistoric component at GbPv-1 are very strong both in terms of technology and patterns of material used for tool classes.

CONCLUSIONS AND RECOMMENDATIONS

GbPv-1

Initial impressions of the site were that it was sparse, scattered, essentially tool production oriented and that no stratigraphic separation of cultural materials was present. Most of these impressions were demonstrated to have been inaccurate. Thirty six square metres were excavated to a depth of 40 cm below surface. A total of 977 lithic artifacts were recovered in the equivalent of nine 2 x 2 m excavation units indicating a substantially dense and concentrated cultural occupation. Formed and utilized tools composed 12% of the assemblages suggesting resource production formed a major portion of on-site activities.

Finally, and probably most importantly, laboratory analysis was able to reveal somewhat mixed but largely discrete cultural stratigraphy suggesting a lengthy period of prehistoric occupation of the Carson Lake area. Although the Middle Prehistoric McKean complex occupation appears to be more intense than the Late and Early Prehistoric occupations, this may not be true of the whole site.

The identification of an Early Prehistoric Plainview occupation makes this site one of the oldest yet excavated in the province and makes it a significant provincial historic resource.

It is believed that excavation of only .2% of the potential undisturbed site area is not sufficient compensation for its eventual destruction over the long term. It is, therefore, recommended that damage to undisturbed portions of the site as a result of further park facilities construction be avoided as much as is practicable. It is also recommended that additional conservation excavations be undertaken to recover further historical information. The problems we encountered in attempting to separate the temporal components may be lessened with the use of

smaller arbitrary levels. Consequently, it is recommended that a 5 cm level or smaller be employed in any further work.

GbPv-2

This site is quite small but gave initial indications of containing two stratigraphically separate occupations. Excavations of 20 square metres to a depth of 40 cm below surface failed to reveal this separation. It is believed initial identification of a buried soil on this site was the result of natural tree fall or root disturbance.

A single cultural component showing a high correspondence with the middle component at GbPv-1 was recognized in analysis. Initial interpretation would suggest that the Middle Prehistoric occupation of Carson Lake was fairly intense and dispersed in different localities around the lake.

The sample recovered from this site is believed adequate to compensate for site destruction through construction of campground facilities, no further work is deemed necessary.

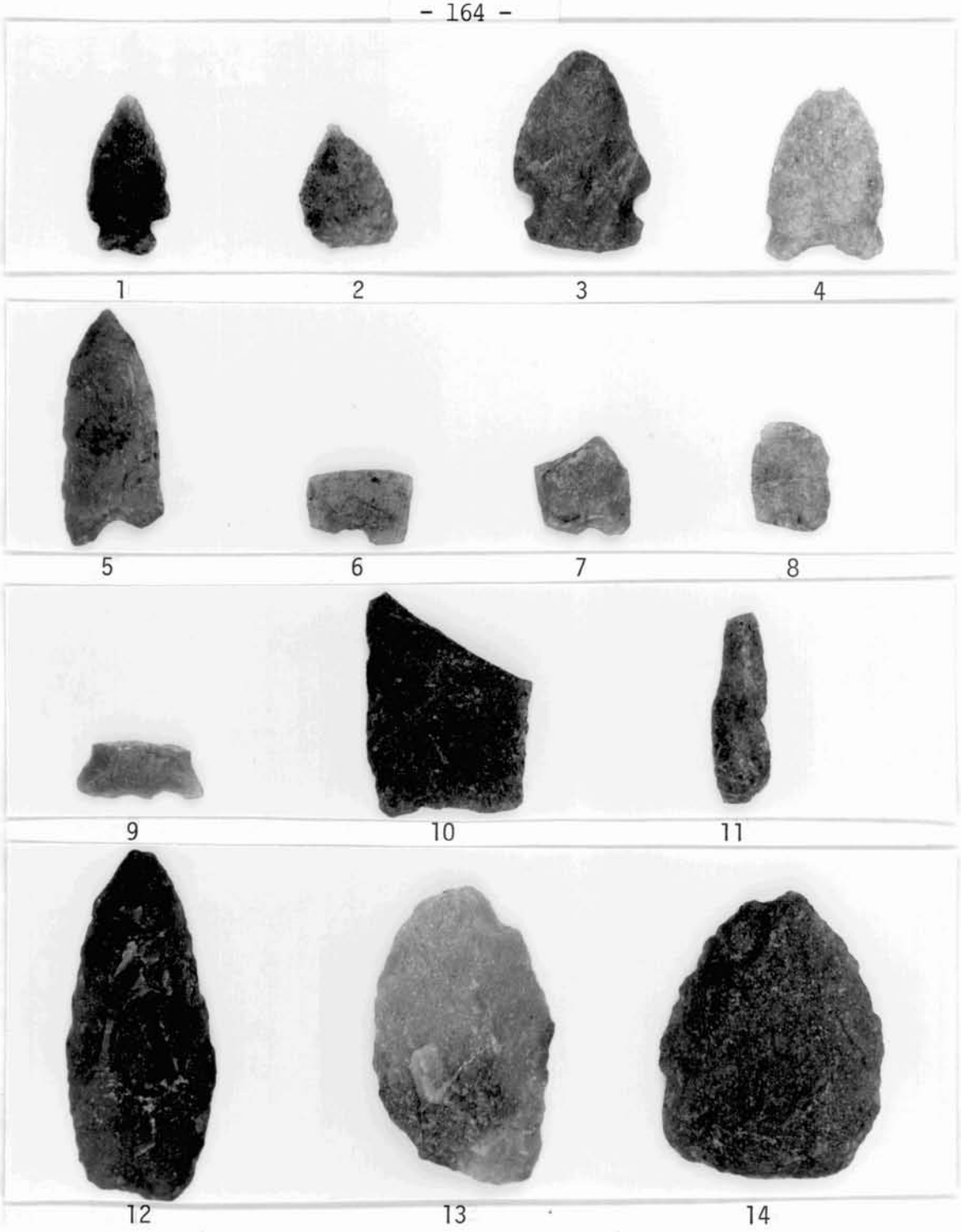

FIGURE 54: Artifacts From GbPv-1: 1. tri-notched late projectile point; 2. Triangular lightly notched projectile point; 3. Bitteroot side-notched projectile point; 4. Oxbow side notched projectile point; 5. McKean lanceolate point; 6, 7, 8. McKean lanceolate incomplete projectile points; 9. Incomplete Hanna stemmed projectile point; 10. Planview lanceolate projectile point; 11. Incomplete drill/awl; 12. Lanceolate biface; 13. Asymetric ovate biface; 14. Triangular biface.

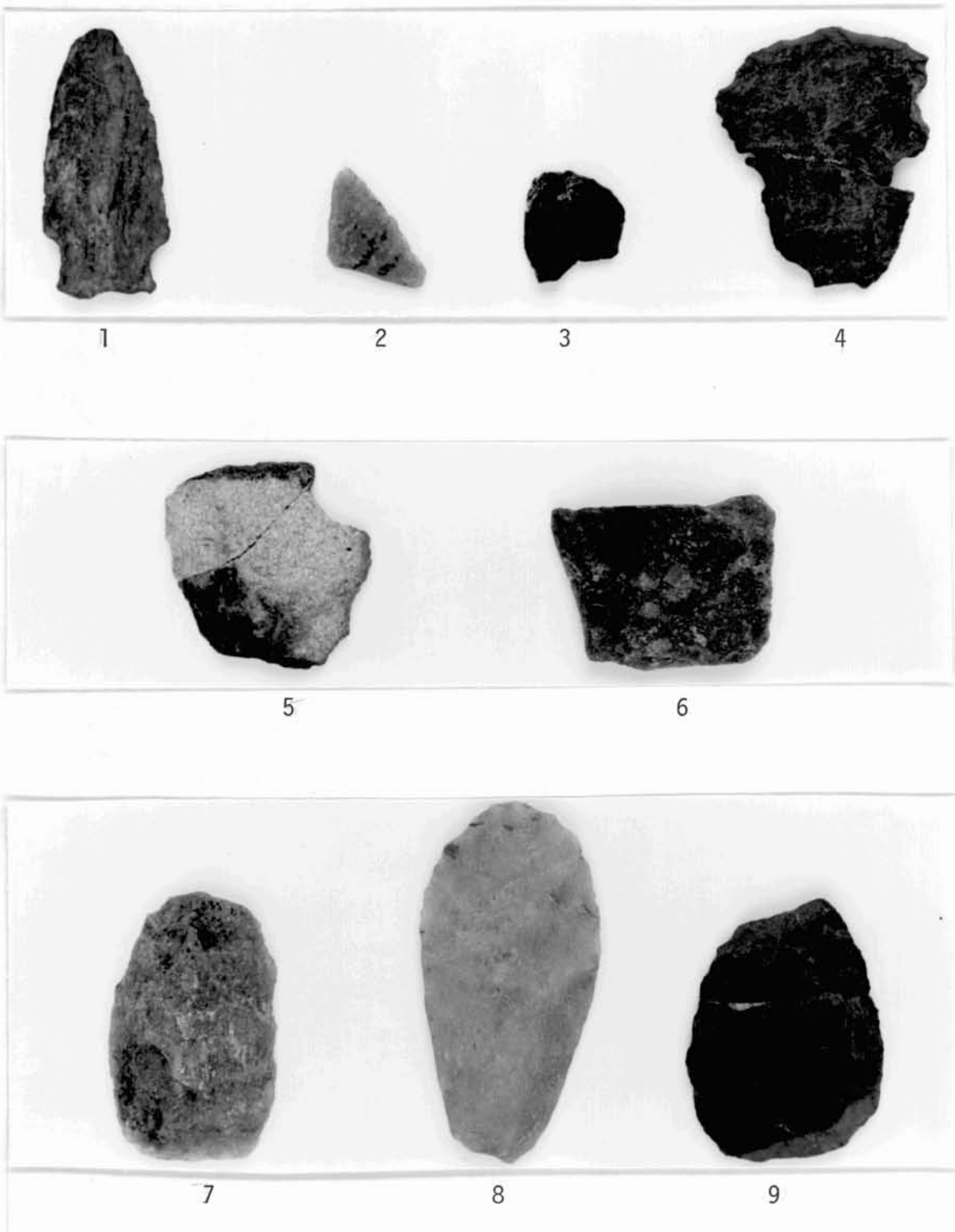

FIGURE 55: Artifacts From GbPy-2: 1. Hanna stemmed projectile point; 2. Incomplete triangular projectile point; 3-5. Small end scrapers; 6. Bifacially worked piece esquillee; 7. Small rectangular biface; 8. Sub-lanceolate biface; 9. Triangular biface.

PRELIMINARY OBSERVATIONS ON THE GEOLOGICAL ORIGINS OF BEAVER RIVER SANDSTONE

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INTRODUCTION

In the early 1970's, archaeological investigations on the Syncrude lease led to the discovery of a prehistoric stone quarry, the "Beaver Creek Quarry" (HgOv-29) (Anonymous 1974). Subsequent research at nearly 300 other sites in the Fort MacKay region has revealed that lithics similar to those recovered at HgOv-29 (now named Beaver River Quarry) were the overwhelming choice for tool manufacture by the prehistoric inhabitants of the area (Figures 56 and 57). The nature of the source of this raw material could obviously be a vital element in explaining prehistoric site positioning strategies and interassemblage variability in the oil sands area. While the significance of this raw material may have been recognised in the past, archaeologists have not made a coherent effort to identify its source. Instead, a series of weakly justified source assignments can be found in the archaeological literature for the area.

To remedy this situation, the authors undertook research on this problem beginning in March of 1981. In June of 1981, the Beaver River

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Alberta Research Council Contribution No. 1110.

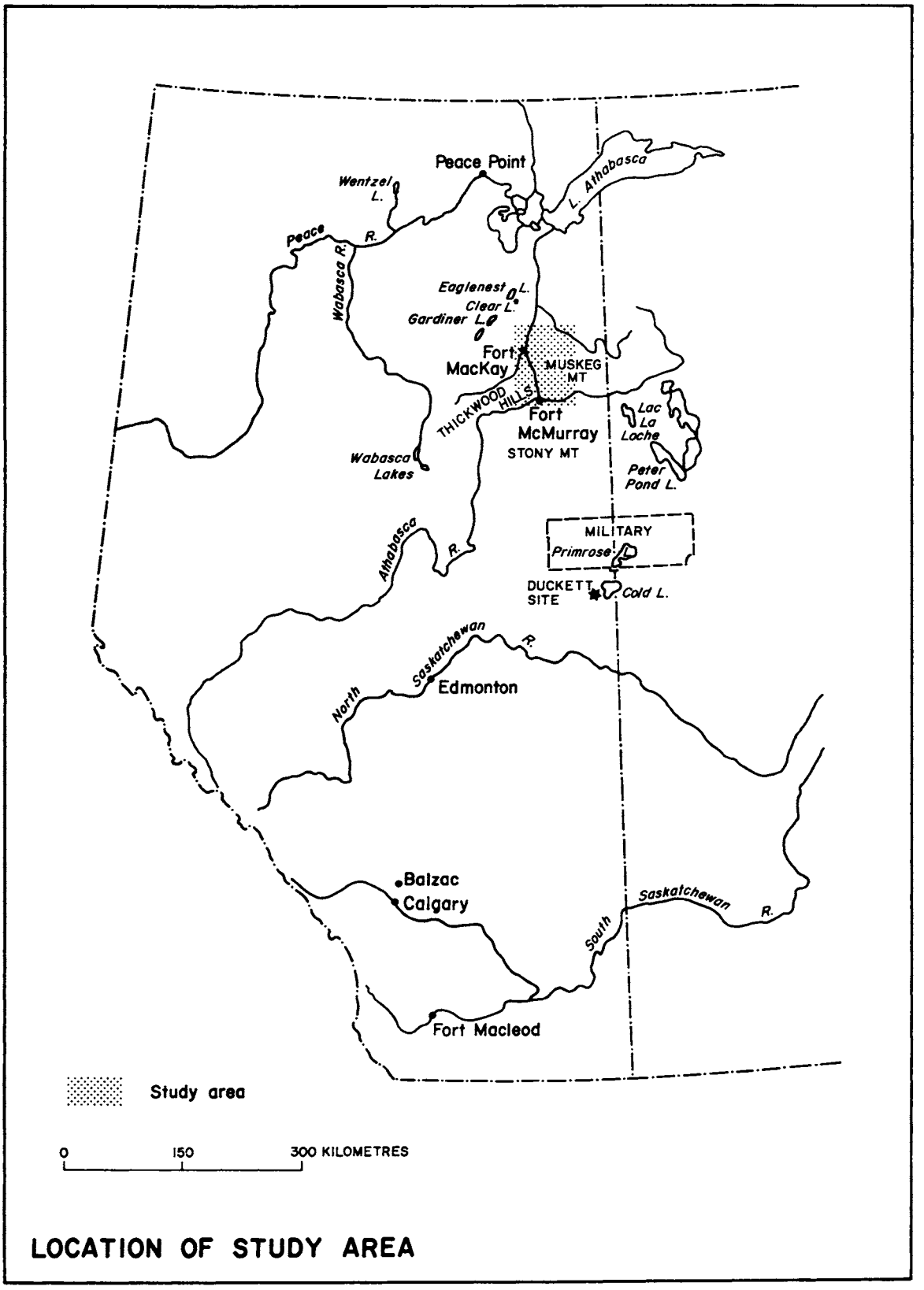

FIGURE 56: Situation of the study area within Alberta, with locations in Alberta and Saskatchewan referred to in the text.

Quarry was visited, as was a gravel pit on the Syncrude lease. The objective of this study was to assess the geological context in which the raw material occurred. This information was to be used in identifying the sources of Beaver River lithics which might have been exploited by prehistoric natives. Research of this type is essential in formulating hypotheses concerning the use of raw lithic material in the oil sands area.

PREVIOUS SOURCE ASSIGNMENTS

From the original research at the site, it was tentatively indicated that:

> The Beaver Creek quartzite was derived from a three to five foot bed of this material which occurs on top of Devonian Age deposits on the site. Presently the quartzite is of unknown age and origin ... it is probably a pre-McMurray formation, Cretaceous Age deposit (Syncrude 1974:47).

The authors of the Syncrude report observed that the bed was clearly a non-marine formation and would probably be post-Devonian in age (ibid.). Since the bed was situated above Devonian deposits, it was regarded as pre-McMurray Formation in origin and was considered early Cretaceous in age. Reardon (1976) made much the same argument, although he predicted sources of higher quality on the east side of the Athabasca.

Mallory departed from this interpretation by suggesting a considerably younger origin for the source of similar stone artifacts on the east side of the Athabasca: "The observations made during this study indicate that the raw material source was the terminal or post-McMurray Formation Sandstones rather than the pre-McMurray Cretaceous Age deposits postulated at Beaver Creek" (Mallory 1980:24). These observations were not detailed. Similarly, Ronaghan (1981) noted in a personal communication that Reeves had attributed lithics similar to Beaver River materials on the east side of the Athabasca River to a

source in the basal member (Wabaskaw) of the Cretaceous Clearwater Formation. In his more recent work at the site, Losey suggested another interpretation of the source. He implied that artifacts at Beaver River Quarry were manufactured from an outcrop of a quartzite member of a Devonian formation (c.f. Losey 1980:15). No justification for this position was given.

In summary, an extraordinarily broad range of geological ages and origins have been suggested. Little or no supporting data accompanied each of the above citations, and there is seldom a clearcut distinction between the geological age of Beaver River lithics and the geological context of potential sources. It would appear that the source is generally regarded as a bedrock outcrop of the specified age. Lithic artifacts are the most abundant portion of the archaeological record in the boreal forest, and the circumstances described above are of little help in understanding the prehistory of the area.

SITE AND COLLECTION DESCRIPTIONS

Beaver River Quarry Borrow Pit

This pit is located about 100 metres east of the highway to Fort MacKay in LSD's 1, 2, 7 and 8, Sec. 1, Twp. 94, Rge. 11, W4M (Figure 58). The pit was examined on 24 June, 1981 (Figure 59). At this time two geologic units were recognized. Unit 2 (Figure 60) was well exposed and Unit 1 was partially concealed by slumping. Unit 1 consists of fine grained bituminous sand, subunit 1a, and at least two layers of clay, subunit 1b. The entire unit is about 6 metres thick and extends downward to below the pond at the base of the pit. Both the oil sand and the clay subunits had been locally disturbed by small rotational slumps.

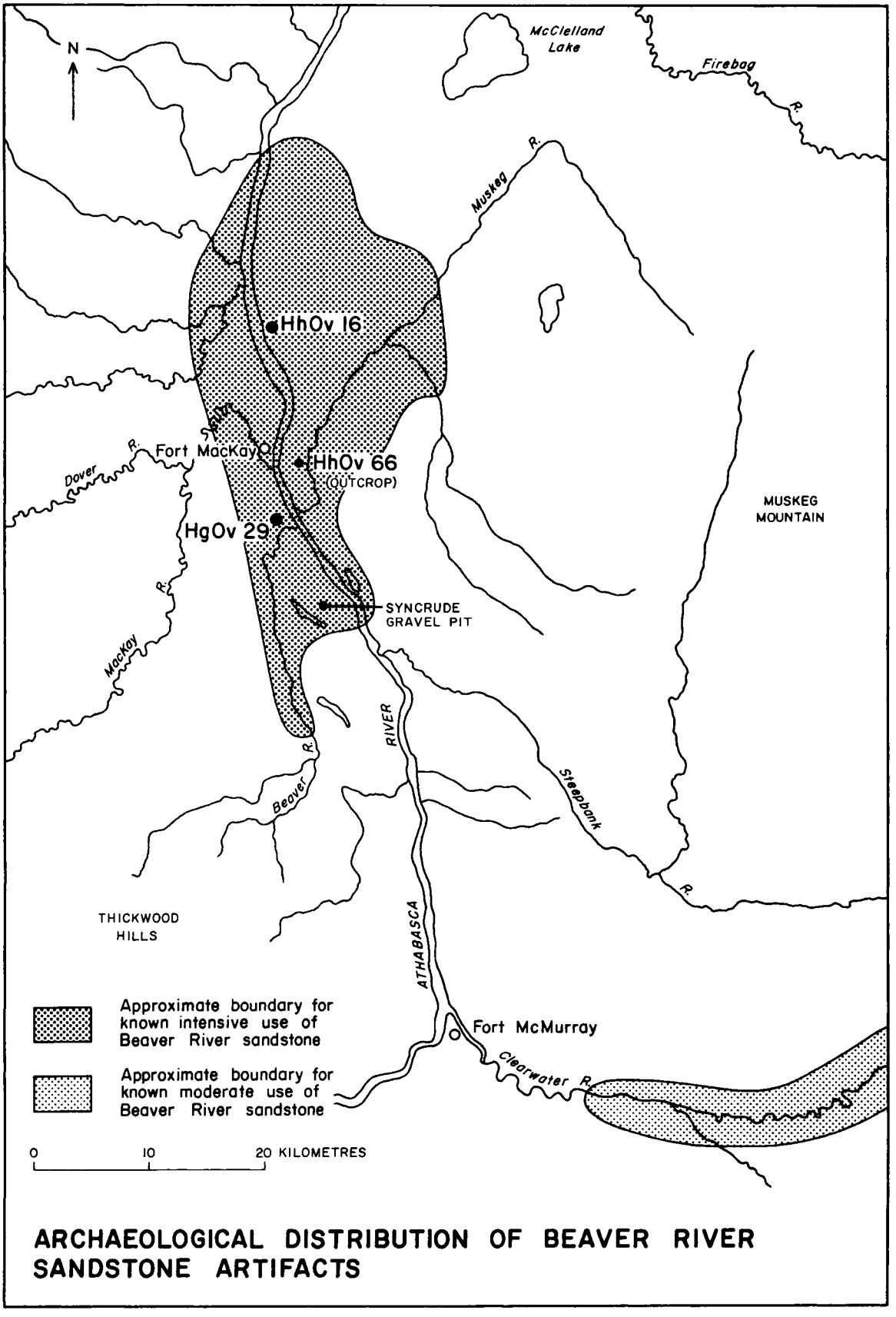

FIGURE 57: Intensive use refers to assemblages with near total reliance on Beaver River Sandstone, while moderate use indicates sporadic instances with somewhat lower percentages.

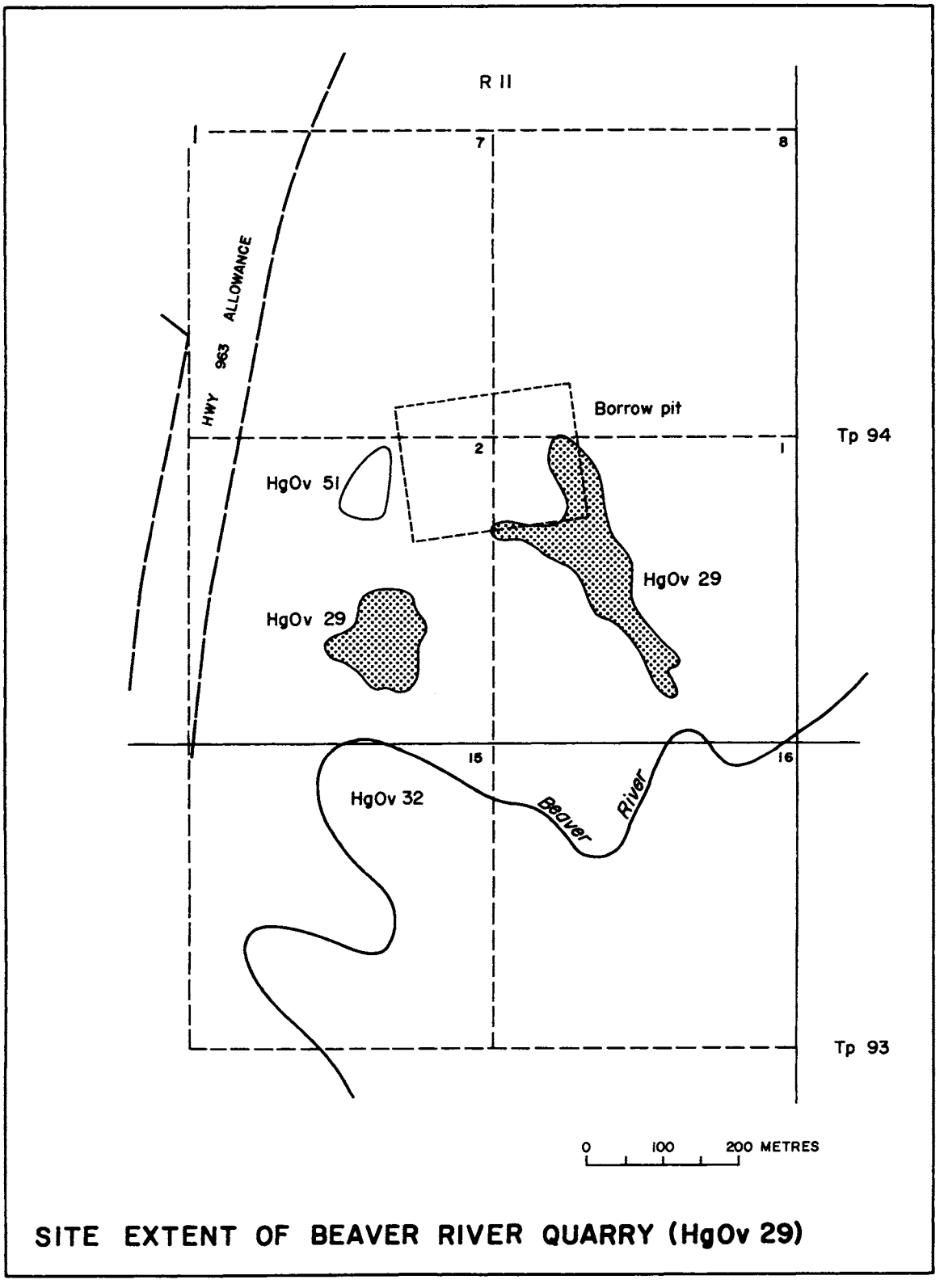

FIGURE 58: Map showing Beaver River Quarry (HgOv-29), the Big Bend Site (HgOv-32), HgOv-51 and the borrow pit in which the Beaver River Sandstone outcrop is exposed.

Subunit 1b: In outcrop this is a light grey, slightly sandy, silty clay. Sand forms about 20% of the unit and varies from coarse to fine grained. The matrix is composed of silt and clay. Thin sections reveal the silt to be composed almost entirely of quartz. Whole sample x-ray analyses show quartz, illite and kaolinite. The subunit layers are 3 to 6 centimeters thick.

Subunit 1a: This unit was examined only in outcrop. The sediment consists of fine grained bitumen sand. The contact between the two subunits is sharp.

Unit 2: (This is the unit from which the Beaver River Quarry artifacts were made.) This unit was closely examined in only a few places in the pit. The rock is a bimodal, silica cemented, quartz sandstone. The texture is usually medium to fine grained sand floating in a matrix of very fine sand and silt. Locally isolated pebbles or small lenses of very coarse to medium grained sandstone are present within the unit. The matrix comprises 85% to 95% of the rock. Microscopic examination of hand specimens shows the rock to be composed of quartz and a few fine black grains. Thin sections and x-ray diffraction analysis show the rock to be composed of quartz. None of the black grains were seen in thin sections.

The colour is generally light grey (10 YR 7/1) on a fresh dry surface, but ranges through 10 YR 5/1 to 5 Y 7/2-3. A colour banding consisting of 1 to 5 millimetre streaks of light grey and grey (10 YR 5/1) is present in places, especially where the matrix exceeds 90%. No reddish iron staining was observed on the sandstone.

Tubes of possible organic origin were present in some parts of the unit. They are 1 to 5 millimetres in diameter and lined with subparallel, longitudinal crenulations. Some tubes are more than 20 centimetres long.

Their original orientation is uncertain because this unit has been fractured and disturbed during excavation of the pit.

Unit 2 has a uniform thickness, 1 metre, and forms a sharp contact with unit 1. This unit forms the land surface around the pit.

Gravel Pit, Syncrude Lease, South of Beaver River Quarry

This pit was visited with Mr. N. O'Donnell (Figure 57). The large piles of boulders left from gravel extraction were examined. The majority of boulders are composed of crystalline rocks (granites, gneisses, and related rock types), Athabasca Sandstone, or limestone. No boulders similar to the Beaver River Sandstone were found. During casual observation, no specimens were noted of Beaver River Sandstone in the size range of 1 to 10 centimetres in diameter.

Artifacts from Beaver River Quarry Site

A number of specimens were examined with a binocular microscope. In general they are all similar: a light grey, bimodal, silica cemented sandstone. They contain 3 to 15% medium to fine grained sand in a very fine grained to silt sized matrix. One specimen contained a 5 millimetre quartz pebble, while another had lenses containing about 20% medium to coarse grained sand. Light grey and grey (10 YR 6-7/1-2) streaks or mottling are present in many of the specimens. Almost all of the samples contain a few fine black grains. Two of the specimens, chunks of rock 10 x 10 x 5 centemetres in size, appear to have undergone post glacial weathering; one or two sides are dull and show a brown (7.5 YR 5/4) mottling. One specimen, 5 x 2 x 1/2 centimetres, is a weak red colour (10 R 4/3) near one corner. This is the result of iron staining along the grain boundaries. This colouring is distinctly different from that on the two weathered specimens. Hollow tubes (fossils?) were present in some samples.

All these specimens, with the exception of the weak red one, are similar to the siliceous quartz sandstone, Unit 2, exposed in the nearby Beaver River Quarry borrow pit.

Artifacts Collected In The Birch Mountains

These collections are dominated by artifacts of chert and grey, translucent quartzite which are distinctly different from the Beaver River material.

A few of the specimens are the light grey, bimodal, silica cemented sandstone similar to the material from the Beaver River Quarry Site. Some of these show the light grey and grey mottling (10 YR 6-7/1-2). Other samples show the weak red iron staining similar to the single specimen from the Beaver River Quarry. One flake, however, is stained a dusky red (10 R 3/4) on one surface.

Subjectively, some of the Birch Mountain material may contain slightly more fine dark grains than those from Beaver River, but this observation may prove incorrect as more samples are collected from the Beaver River borrow pit.

Artifacts Collected From The Alsands Lease

About a dozen specimens from various sites were examined. The majority of specimens are light grey, bimodal, silica cemented sandstone. Some show the light grey and grey (10 YR 6-7/3-8) mottling and others the reddish (10 R 4-6/3-8) iron staining. They appear similar to the material from the Beaver River area except that some of the specimens contain fine pink garnet grains which have not yet been observed in the Beaver River samples.

One of the specimens examined is a quartz sandstone containing about 15% matrix and having a yellowish brown staining around all the grains. This is different from the Beaver River material and is likely a fragment of Athabasca sandstone.

Definition of Beaver River Sandstone

Because rock which is similar to the Beaver River Sandstone has been recognized in other areas, it is essential to define a type source and a type area for the material. This will help prevent future confusion about the identity of Beaver River Sandstone. The type source of the Beaver River Sandstone is defined as the siliceous cemented sandstone found at the Beaver River Quarry site and the subjacent Beaver River borrow pit. The type area is defined as the area around these sites, about a township in size, where Carrigy (1966) stated the stratigraphically equivalent siliceous cemented sandstone outcrops.

This material was originally described under the term "Beaver Creek Quartzite" (Anonymous 1974). Elsewhere, it has occasionally been referred to as "Beaver River quartzite". Both appellations are discarded in favour of Beaver River Sandstone. The official geographical name for the watercourse adjacent to the site is Beaver River, not "Beaver Creek". While the material under discussion resembles quartzite in hand specimen, the stone is not of metamorphic origin. It is more accurately described as a sandstone. The term Beaver River Sandstone is intended for archaeological use and should be restricted to lithics which are believed to come from the geological unit, or layer, called the Beaver River Sandstone. The term Beaver River Sandstone carries both a compositional implication and a geographical implication.

DISTRIBUTION OF BEAVER RIVER SANDSTONE ARTIFACTS

Raw materials related to Beaver River Sandstone are by far the predominant raw lithic material within the area actively being considered for surface mining of oil sands (Figure 57). Consulting reports commonly note that 99% to 100% of artifact assemblages from the Fort MacKay region consist of Beaver River Sandstone (e.g. Gryba 1978; Head 1979; Ronaghan 1981b). While it logically follows that this material is dominant at Beaver River Quarry, it should be emphasized that major quantities of the raw material were also collected at the Cree Burn Lake Site (HhOv-16) (Figure 57). This site was once regarded as a cluster of many small sites, although it is now taken to be a huge complex of workshops and perhaps campsites. Moving northward on the Athabasca River, Beaver River Sandstone is dominant as far as the Fort Hills on the east bank (Figure 57). This situation is not duplicated for the Fort Hills kame complex on the west side of the river. Initial indications are that Beaver River Sandstone is a minority raw material in assemblages from this location. It is exceeded by a "salt-and-pepper" vitreous grey quartzite (McCullough, pers. comm.). Moving southward, Donahue (1976:11) recorded a figure of 87.8% for lithics similar to Beaver River Sandstone for his combined Athabasca and Clearwater River surveys. This somewhat lower figure can be attributed to lower percentages of specimens resembling Beaver River Sandstone at sites on the Clearwater River (Figure 57). Pollock (1978) did not report raw material percentages for his Clearwater survey. From a review of Donahue's and Pollock's assemblages, it would appear that a raw material similar to Beaver River Sandstone was important on the Clearwater, although of lesser significance than in the oil sands area.

Outside the Athabasca River valley, Beaver River Sandstone proportions drop dramatically. For his Birch Mountains survey of 49 sites, Donahue (1976) indicated that 2.41% of the assemblages consist of lithics

likely related to Beaver River Sandstone. Further work by Ives (1981) bore out this general tendency for 40 sites located on the Eaglenest and Clear Lake drainage. A larger sample of artifacts from the Eaglenest Portage Site (HkPa-4) yielded 4.5% Beaver River Sandstone (Ives 1977a). In the Birch Mountains, various vitreous and translucent quartzites make up roughly 75% of the assemblages, supplemented by black and other cherts. Some of these cherts appear to come from limestone outcrops at Peace Point on the Peace River (Stevenson, pers. comm.). The extensive assemblage excavated by Sims from the Gardiner Lake Narrows Site (HjPd-1) conforms to these figures.

While the status of research is too early to be conclusive, Beaver River Sandstone and similar raw materials do not appear in collections from the Peace River basin below Fort Vermilion. Donahue (1976) and Ives (1981a) did not observe this raw material, and it has not been recovered in work thus far at Peace Point (Stevenson, pers. comm.). A few small flakes of similar material were observed, however, in a Caribou Mountains collection from Wentzel Lake (IfPo-1) (Conaty 1977). While the proportion of Beaver River Sandstone in the Birch Mountains may be termed consistent but low, its occurrence on the Peace River drainage will apparently be sporadic at best.

To this point in the discussion, the authors have had the opportunity to make personal observations of the specimens. Moving farther afield, David Meyer (pers. comm.) has kindly provided information on assemblages from northwestern Saskatchewan. It would appear that similar lithics are relatively common in the vicinity of Peter Pond Lake and Lac La Loche. For instance, roughly 16% of the collection from the Saleski Lake Site (HcOi-2) was classed as Beaver River Sandstone. This was based on an identification of the raw material made by Pollock (Meyer, pers. comm.). Meyer reported occasional similar specimens from the Primrose Air Weapons Range in Saskatchewan.

FIGURE 59: Examination of the outcrop exposure in the borrow pit north of Beaver River Quarry. Blocks of raw material only slightly coarser than artifacts are visible at the feet of observers.

Wilson and McCullough (McCullough Consulting Limited 1981:127) drew attention to a fluted projectile point at the Duckett Site (GdOo-16) in the Cold Lake area of Alberta. They felt there were strong raw material similarities between this specimen and Beaver River Sandstone. Pollock (1976) reported instances of Beaver River Sandstone from Gregoire Lake (examined by authors). A few specimens of Beaver River Sandstone were reported by Sims (1981) for the Wabasca Lake and central Wabasca River areas (examined by authors). Much farther to the south at Balzac (IhPm-34) and Fort MacLeod (DkPi-2), occurrences of Beaver River Sandstone have been reported (Ronaghan 1981a). The authors examined the Balzac specimen and suggest that its clasts have an entirely different mineralogy than is typical of Beaver River Sandstone. In the present state of knowledge, a range of sources other than the Beaver River area are feasible. Caution is urged in the interpretation of specimens so distant from that region.

STRATIGRAPHIC POSITION AND KNOWN DISTRIBUTION OF BEAVER RIVER SANDSTONE OUTCROPS

The silica cemented sandstone from the Beaver River Quarry Site and the Beaver River borrow pit are from the same stratigraphic unit because the borrow pit was excavated through part of the quarry site. Carrigy (1966), in a bulletin on the Lithology of the Athabasca Oil Sands, described a unit which he named the "Pre-McMurray? sands and sandstones". One component of this unit is "a thin bed of quartz-cemented sandstone" which "in thin section ... is found to consist of large angular and rounded grains of quartzite of clastic origin with an interstitial matrix composed of fine grained clastic quartz cemented in places by chert" (Carrigy, 1966: 6-7). This sandstone is believed to be the same sediment as that at the Beaver River Quarry site. Carrigy also described within the "Pre-McMurray?" unit a coarse grained sandstone with a clay matrix which is partially cemented by iron oxide (goethite). This sandstone is likely different from the rock at Beaver River Quarry.

The silica cemented sandstone is exposed along the Muskeg River and extensively between the Muskeg and Athabasca Rivers to the east of Fort MacKay (Twp. 94, Rge. 10; Carrigy, 1966). The goethite cemented sandstone outcrops: (1) on the east side of the Athabasca between the mouth of the Muskeg and the Steepbank Rivers about one mile north of La Saline, (2) at the base of the oil sand outcrop on the west side of the Athabasca one half mile south of Tar Island (Sec. 12, Twp. 92, Rge. 10), (3) south of the boat landing at Fort MacKay and (4) at the base of the outcrops in the Indian Reservations on the Christina River (Twp. 88, Rge. 7; Carrigy, 1966).

The above shows that the known distribution of the silica cemented sandstone is confined to the Beaver River sites and the township east of Fort MacKay. The potential distribution becomes larger if the possibility of the sandstone being present, but covered, at the outcrops of the goethite cemented sandstone is accepted. In general, the distribution of the silica cemented sandstone is rare because it is part of the residual sediment lying on the Devonian erosion surface. The sandstone is "a remnant of a once continuous body of ..." sediment (Carrigy, 1966)

POTENTIAL DISTRIBUTION OF BEAVER RIVER SANDSTONE SOURCES

From the foregoing, two questions arise simultaneously. Archaeologists could benefit greatly by knowing if Beaver River Quarry is the only source of the material. If it is not, they could also benefit by knowing where other sources might be predicted to occur. Carrigy (1966) has described a number of outcrops of the "Pre-McMurray?" unit. Not all of these locations would necessarily have produced lithologies having textural and cementation characteristics amenable to tool manufacture. This proposition must be empirically demonstrated in order to separate potential sources from known sources.

A broader approach to the problem of source prediction is appropriate. The outcrops under study may be regarded as a phenomenon of the Devonian-Mesozoic contact. That is, the "Pre-McMurray?" unit Carrigy described is a thin and discontinuous remnant lying on the erosion surface of the Devonian. To delimit potential target areas for a source of the Beaver River Sandstone, a systematic search of the literature for exposures of the Devonian-Mesozoic contact was undertaken. Bedrock geology maps, geologic cross-sections, a Devonian Waterways Structure contour map and 1:50,000 NTS topographic maps were employed. The first procedure followed was to delimit Devonian Waterways Formation exposures from the map for the "Bedrock Geology of Northern Alberta" (Green, Mellon and Carrigy 1970). To acquire a glimpse of somewhat smaller potential exposures, we next examined 4 east-west and 5 north-south geological cross-sections prepared by MacPherson and Kathol (1977) for that section of the Athabasca River valley given by the co-ordinates of 112^{o} 00'00" longitude x 57^{o} 30'00" latitude, 111^{o}00'00" longitude x 57^{o}30'00" latitude, 111^{o}00'00" longitude x 56^{o}51'30" latitude and 112^{o}00'00" longitude x 56^{o}51'30" latitude. Finally, elevations of downcutting streams were compared with elevations for topographic prominences on the Devonian Waterways Formation structure contour map MacPherson and Kathol (1977: Figure 6) prepared for the area just described.

The bedrock geology map reveals continuous exposures of the Devonian Waterways Formation from the mouth of the Clearwater to a point roughly 35 kilometres into Saskatchewan (Figure 61). Similar exposures are present on the Athabasca River from a point 37 kilometres upstream of the Clearwater confluence to a point 96 kilometres downstream of the Clearwater confluence (Figure 61; cf. Norris 1963). This same map shows Devonian exposures on the lower reaches of the Muskeg, Beaver and MacKay Rivers (Figure 61). Information from the geologic cross-sections and from the intersection of rivers and streams with Devonian topographic prominences added to this list the lower reaches of Steep-

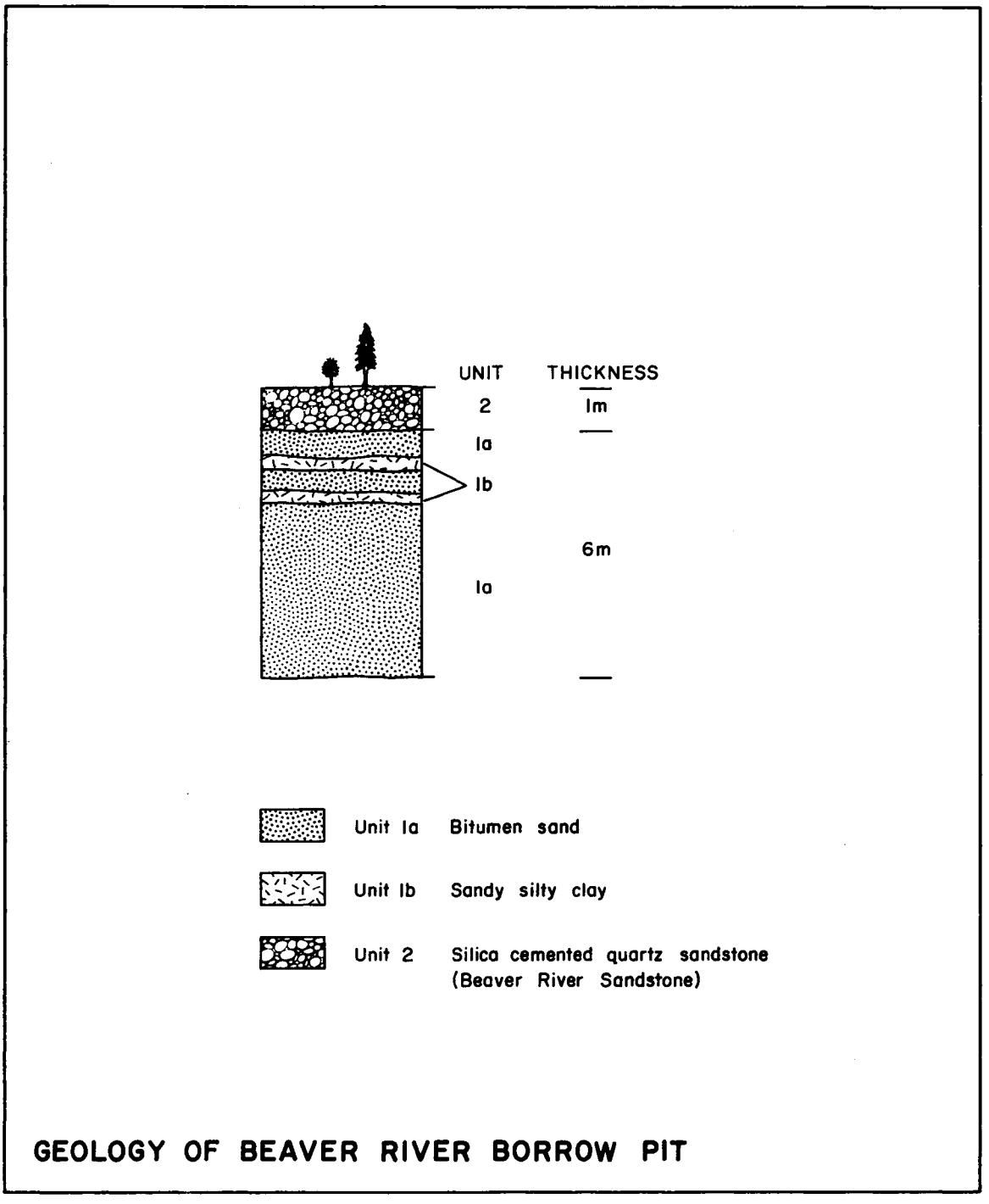

Figure 60: Geologic section at Beaver River Quarry, borrow pit.

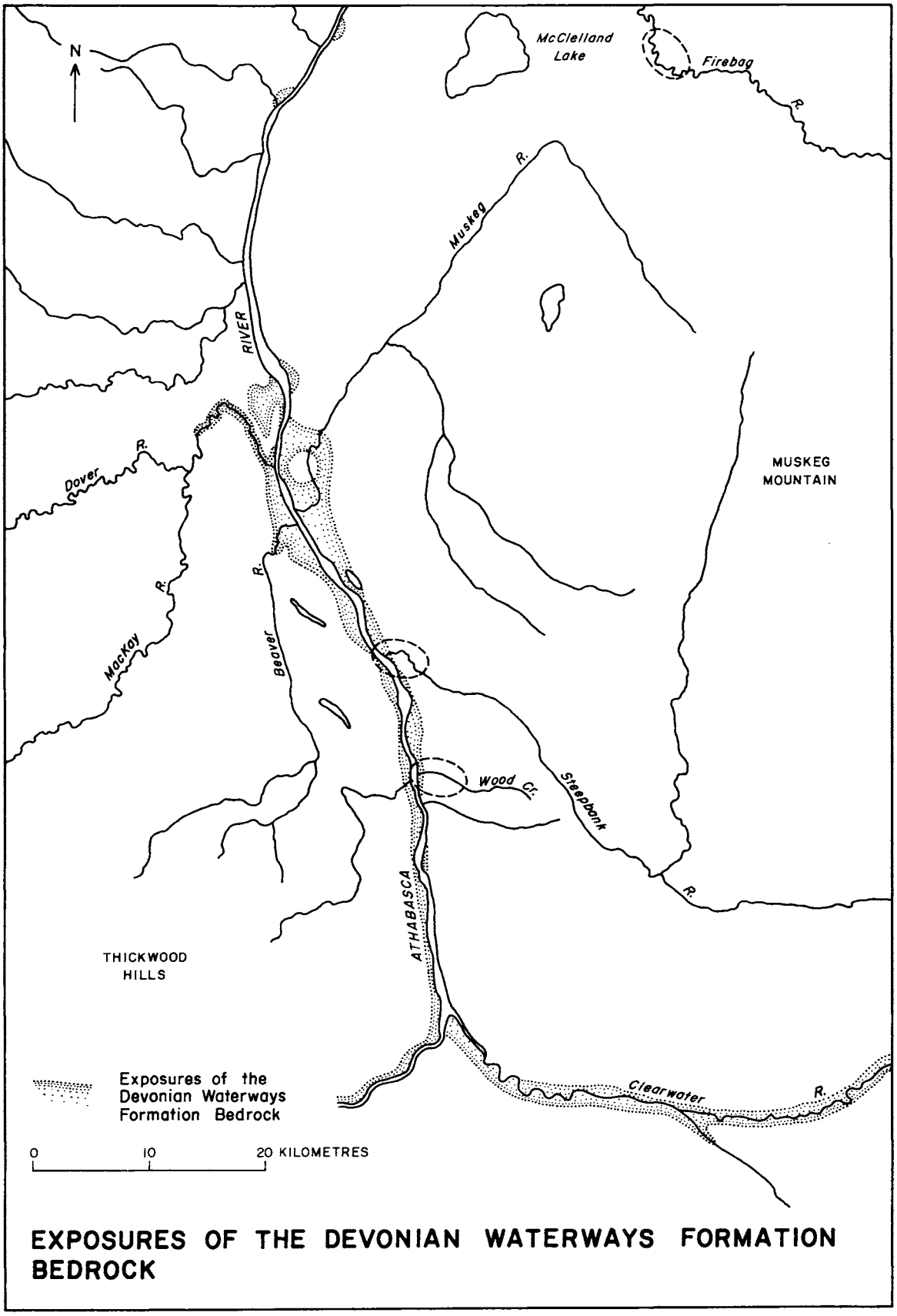

FIGURE 61: Target areas for any additional sources of Beaver River Sandstone and similar raw materials situated at the Devonian-Mesozoic contact.

bank River and Wood Creek. Possible exposures may occur near the mouth of the Dover River and along the lower reaches of the Firebag River.

It would thus appear that a narrow corridor about the Athabasca defined by Ranges 9, 10 and parts of 11 (west of the 4th meridian, in all cases) is the only zone in which potential sources might be found. West of Range 11, and moving toward the Birch Mountains, there are no opportunities for the contact to be exposed. Rivers and streams have not downcut sufficiently. The same case can be made moving east of Range 9 and toward Muskeg Mountain (with the single exception of the Firebag River). While a range of source locations have been predicted here, the reader is reminded that silicification of appropriate sediments might have occurred over a much more restricted area. Again, potential sources require field verification.

At Beaver River Quarry, the raw material outcrop is close to the surface. It is possible that small quarry sources of the material could occur as blocks or concentrations in the glacial till. Our preliminary indications do not favour this interpretation. No specimens of the raw material were observed in a large gravel pit located south of Beaver River Quarry (Figure 57). Till exposures at the Eaglenest Portage Site (HkPa-4) and the Landing Beach Site (HkPa-16) in the Birch Mountains have been examined in detail, with negative results. Glacial fluting in this area strongly suggests that at least the most recent glaciation could not have brought the raw material into the Birch Mountains; flow was from a point north of the Beaver River area. We do note that Kupsch (1954) suggested that blocks of bituminous sands may have been transported by earlier glacial activity into the Peter Pond Lake area of northwestern Saskatchewan from points to the northwest. This may have had a bearing upon the distribution of possible Beaver River Sandstone artifacts in northwestern Saskatchewan.

ARCHAEOLOGICAL IMPLICATIONS

These findings have several ramifications. Certainly for the Birch Mountains it would seem reasonable to postulate that Beaver River Sandstone artifacts appear in the uplands for cultural reasons only. With future archaeological research, it might also be possible to apply this reasoning for the Muskeg Mountain, Stoney Mountain and Thickwood Hills uplands as well. In such cases, the archaeological record will permit observations about prehistoric behaviour towards a relatively distant resource.

Within the Athabasca corridor, fairly precise spatial relationships might be elaborated between Beaver River Quarry and surrounding sites if Beaver River Quarry remains the only documented source. Cultural dispersal of the raw material within the Fort MacKay region would undoubtedly be a complex matter if more than one source existed in the past. Raw material selection, fabrication and use would presumably be influenced by intricate relationships between grades of material and situational socio-economic contingencies.

Donahue (1976) argued that the prehistoric inhabitants of this segment of the Athabasca River valley found Beaver River Sandstone to be adequate for their needs locally, but of insufficient value to be transported elsewhere in quantity. This type of statement is exceedingly difficult to verify, and requires detailed knowledge of prehistoric environmental and cultural conditions. Why did prehistoric natives rely virtually exclusively on this raw material? From a purely environmental perspective, two answers seem feasible. Beaver River Sandstone may have existed in sufficient quantities to satisfy effectively a complete range of lithic technological needs, or, Beaver River Sandstone was so tractable for prehistoric artisans that its physical qualities completely outweighed those of other raw materials. These are not mutually ex-

clusive answers. In the first case, sheer quantity might be expected to limit pursuit of sources for other raw materials. In the second case, the desirability of the material might create the conditions for extensive exploitation. The question of quantity can be answered by determining the number and size of quarries which might have been available. The question of quality requires assessment of lithological variability within and between sources. For the time being, it must be stressed that we do not possess evidence to contradict statements to the effect that the Beaver River Quarry source embodies the full range of lithological variability for artifacts in this region. In fact, Reardon's (1976) data is best construed as evidence that extensive testing and selection went on during quarrying activities. The assemblage is completely dominated by low quality shatter, while the few more finished pieces are of higher quality. Nevertheless, the geological evidence and extremely high quality artifacts from elsewhere within the region lead to the suspicion that at least one alternate source existed. Discovery and description of other sources would bring us to the threshold of explaining the purely geological variables in any equation for understanding the local dominance of this raw material.

East of Fort McMurray, we still have rather limited archaeological information about the Clearwater River valley. In spite of this deficit, the pattern of use suggests that some type of source for materials similar to Beaver River Sandstone may have existed on the Clearwater as well. Alternatively, this river was a well known transportation corridor during the historic period. If this were true in prehistory, extensive travel and trade on this route might also underlie the distribution of lithic types.

Chronological uncertainties in the archaeological record make it difficult to control for the temporal dimension of raw material use. Onset of exploitation may have begun at an early date. If the fluted

point specimen identified by McCullough and Wilson (McCullough Consulting Limited 1980) at the Duckett Site (GdOo-16) in the Cold Lake area is in fact made of Beaver River Sandstone, or a closely related material, it might be inferred that Paleo-Indian penetration at least as far north as the Clearwater took place fairly early in the prehistory of northeastern Alberta. Other sources for the material, such as glacial and fluvial gravels, and other archaeological explanations should not be ruled out at this early stage of research. It is also conceivable that the truly huge, facetted flakes Ives (in press) recovered at HhOu-27 on the Alsands lease may represent profligate use of more abundant raw material, a situation which might be expected earlier in prehistory. More numerous and better exposed bedrock outcrops may have been available in the early post-glacial period. Far more evidence than these two points is required before any temporal patterning in Beaver River Sandstone use is apt to emerge. It is likely, however, that source configuration changed through time as a result of factors such as post-glacial revegetation, loss of vegetation and exposure through forest fires, terrace development on the Athabasca River, meandering of tributary streams and rivers, and processes of mass movement on exposed slopes.

CONCLUDING REMARKS

These preliminary observations are offerred as the product of limited field and laboratory studies. Several avenues of research can be explored to affirm and clarify results reported here. Further thin section analysis is in progress, in addition to pollen analysis of the raw material. An attempt is being made to verify the presence or absence of fossils or fossil traces in the raw material. More thorough efforts to document the range of lithological variability at Beaver River Quarry will be undertaken. Field visits to Devonian-Mesozoic contact exposures, particularly on the lower Muskeg River, are planned. We also draw

attention to similar research conducted by Wilson and McCullough (pers. comm.), which we understand has led to broadly comparable results.

In the interim, several solutions are proposed for the specific geological problem of the origin of Beaver River Sandstone:

1. The lithology and stratigraphic position of the Beaver River Quarry outcrop suggest that it belongs to the "Pre-McMurray?" unit identified by Carrigy (1966).
2. A significant range of lithological variability is evident in hand specimens and artifacts recovered from Beaver River Quarry. There may be sufficient variability at this one site to explain the range of lithological variability in Beaver River Sandstone artifacts throughout the Fort MacKay region.
3. Inasmuch as Carrigy has described other outcrops of similar lithology, there is a possibility that other sources for the raw material exist in the Athabasca and Clearwater River valleys. Additional sources would have to be sought at exposures of the Devonian-Mesozoic contact.
4. Should other sources exist in the Fort MacKay region, their configuration might appropriately be described as diffuse, with a tendency towards linear exposure by watercourses.
5. This material does not appear to have occurred naturally on the uplands of this portion of the province.

We are optimistic that with increased knowledge of the natural distribution of this raw material, archaeologists may define more precisely those parameters important in the cultural dispersal of Beaver River Sandstone. To begin defining the cultural context in which this stone resource was used, archaeological research may now proceed with two premises in mind. Locally diffuse sources would probably have made for complex local lithic procurement strategies. From the perspective of surrounding uplands, this resource could likely be exploited as a point source. The apparent shift to low frequency use of Beaver River Sandstone in the western portion of the Fort Hills kame complex is of considerable interest in our attempts to understand the pronounced dependence upon Beaver River Sandstone in other parts of the Athabasca River valley.

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ARCHAEOLOGY IN 1984

Paul F. Donahue

ARCHAEOLOGICAL SURVEY OF ALBERTA

Contract archaeology in Alberta is well on its way to involving a sizeable expenditure of funds each year and of creating opportunities for well-paying permanent and temporary positions. Concomitantly, archaeological resource management on the part of the Archaeological Survey of Alberta is getting increasingly complicated and legalistic. Lines are being drawn and distinctions made that were never previously thought of. Also, because archaeology is becoming a big business, a big expense or a big responsibility depending on what end an individual or company is involved in, it is increasingly obvious that many weaknesses have to be corrected. A major problem is research return on monies and expertise invested. From a pure research perspective, what has the field of archaeology gained? What has been gained from a resource management perspective, and what have development proponents and the public gained? My admittedly cynical response is that while archaeological resources are being better managed all the time, we, the archaeologists, still have major tasks to accomplish.

The Archaeological Survey of Alberta sieved through some 10,000 proposed development projects, reviewed 850 in detail, and awarded 200 excavation permits to certified archaeologists in 1980 so that they might carry out impact assessments and mitigative excavations of everything from small subdivisions to massive tar sands developments. In the process, approximately 120 people were employed and over 2 million dollars spent by development proponents looking for clearance so that their projects might proceed. The return to the Archaeological Survey and, by extension, all Albertans, consists of recording some 800 previously unknown sites,

30,000 collected artifacts, 200 project reports and miscellaneous other items. Conversely, many of the 800 sites investigated have or will be destroyed, as will untold other development projects that were not reviewed.

Under the Alberta Historical Resources Act the Minister of Culture is responsible for the orderly development, preservation, study and interpretation and promotion of appreciation of Alberta's historic resources. Further, the title to all archaeological and palaeontological resources within Alberta is vested in the Crown in Right of Alberta. In this province, the development proponent funds mitigative archaeology as a form of compensation to the Crown.

The Alberta Historical Resources Act was assented to by the Alberta legislature in 1973. Since then, the Archaeological Survey of Alberta was established and put on a sound footing. Some 13,000 sites have been put on record, a number of referral systems and sieve mechanisms for management purposes have come into effect, developers have been educated about historical resources, a number of sites have been designated under the Act, and one has been fully interpreted for the public, standards for archaeological consultants have been raised, report criteria established, and a position of respect within the private sector and among other government departments has been achieved. We have also produced 17 Occasional Papers, contracted for some regional studies, curated 10's of 1,000's of artifacts, accessioned 700 archaeological reports, and developed a centralized repository for archaeological data. No mean accomplishment in only 8 years.

In the same period, few scholarly publications have resulted from the vast amount of archaeology accomplished, and only four public information brochures have been produced. Further, we have developed little ability to adequately and quickly assess and manipulate the existing data

base, can not consistently predict site locations, have a minimum number and range of sieve mechanisms in place, and have accessioned numerous low caliber reports of questionable utility.

Why the deficiencies? Part of the problem is simply one of growing pains. No agency has all its dollar and manager requirements satisfied, but sometimes they are so successful that the work overload bogs the operation down. Also, many provincial archaeologists have gone from a purely academic research orientation to one of business management or bureaucratic rule writing. We are learning and making both contributions and errors. Most agencies have laid the greatest emphasis on setting and clarifying rules, regulations, limits, profit margins and report criteria, while forgetting about or avoiding the larger question of why archaeological resource management, that is, to what end are we conserving the resource. In many cases, too, they have simply taken on or been assigned a large responsibility without being given the mandate or the resources to do the job.

From the perspective of consultant archaeologists, they first and foremost have an obligation to stay in business, i.e., show a profit. They must then be able to compete with each other on the open market. A healthy situation in terms of pricing, but not in terms of archaeological resources, for it generally translates into consultants doing the minimum necessary to satisfy provincial and client requirements. Every shovel hole takes time and costs money. Those consultants who may be altruistic place themselves in a difficult position everytime they appeal to the development proponent to do something that goes beyond the provincial requirements--especially when the client really does not see any return on the expenditure, a public information brochure, an accolade, etc. The natural outcome of this are <u>ad hoc</u> research contributions that are primarily of interest to the individual, Historical Resources Impact Assessments and mitigative excavations that make minimum contributions and

most important, wasted archaeological resources. To paraphrase Lipe:

"The consultant archaeologist is in the position of having to make a research contribution on the basis of a site or sites selected by circumstance, of having to record and reflect in such a way as to provide suitable data for unknown future research problems, and of having to do so on the basis of only some fraction of the data." (Lipe: 1977:32) Clearly an unrealistic situation.

The onus is upon provincial archaeological agencies to correct this situation and to manage the resources more effectively by taking into consideration limitations of the resources, the archaeologists, the public patience, costs and the developer--often miscast as the bad guy. Proper management of the archaeological resources means management by objectives. We simply cannot inventory, excavate or save all sites, we cannot record all data collected (nor could we effectively manage it if we did), and we cannot address all research and resource management problems. Given that there are limits to what we as archaeological resource managers and archaeologists can do, there must be priorities, objectives and reasons for what we will do. Should, for example, the primary objective be to inventory and assess representative samples of heritage resources; to preserve all archaeological sites; to identify problems and accomplish research that contributes to the body of archaeological and anthropological knowledge and to the resolution of specific problems; or to interpret the past to the public? Clearly, one is not necessarily better or more significant than the other but, again, archaeologists must recognize that they cannot and should not attempt to be Renaissance men. Archaeological resource managers must limit themselves to specific priorized objectives and associated research questions which all archaeological projects can contribute to. To do otherwise is quixotic. Provincial archaeological agencies, because of their legislation, are in the pivotal position to resolve major research

and resource management issues, and must face this responsibility. Quite simply, the problems to be addressed should transcend individuals and agencies, none of which have the necessary mandate or resources to begin with.

I propose that all archaeological investigations should minimally address a few specific problems that have been discussed, evaluated and recommended by the professional archaeological community to the provincial archaeological agency and subsequently approved by it. The problems selected would necessarily be basic and of merit from an archaeological/ anthropological/and resource management perspective. They might necessarily also be in a hierarchy of provincial, regional, and perhaps, sub-regional interests. Problems having the widest application to both research and resource management concerns would, to my mind, have precedence over those of narrow application or interest. Given that 95% of the archaeology accomplished in Alberta is by consultants working for clients, research should be such that it can readily be accomplished by consultant archaeologists at no extra costs to development proponents.

In order to accomplish this, it is necessary to:

1. decide upon and clearly state the objectives and why they should be accomplished;
2. decide upon the specific problems to be investigated;
3. formulate explicit explanatory hypotheses;
4. identify the knowledge gaps;
5. determine the appropriate research designs and methodologies;
6. decide what tests of the data will be utilized;
7. ascertain precisely what data will be recorded and in what fashion;
8. determine long range data management requirements;
9. structure analysis and reporting processes and time frames;

10. put the necessary administrative mechanisms in place, e.g. referral and sieve systems.

The first steps in accomplishing these goals have been taken in Alberta. Two meetings have been held at which all professional archaeologists in the province were invited to discuss the matter and put forth their priorities in terms of objectives and problems that should be addressed. Thus far the outcome has been a realization of the immense task ahead, the establishment of a three-person steering committee to oversee the direction of this undertaking, a commitment by many to proceed on a volunteer basis as part of individual task groups having specific duties, and the initial identification of ten problems for consideration. By way of example, one of the more generally agreed upon problems is 'the ascertainment of why sites are located where they are'. This is an extremely basic question, but it has far reaching ramifications in terms of culture history, cultural processes and archaeological resource management. It involves the investigation and understanding of site types and associated activities, intra and inter-site variability, chronology, identification of cultural complexes, spatial dimensions of sites and the past cultural and natural environments. Some would say that we are always trying to answer this question and perhaps we are, but not in a systematic fashion that is producing a comparable predictive data base that is readily managed. We do not have that anywhere in Canada today. Directing the foci of all archaeologists toward a few basic problems and the recording of standardized data requires changes in attitude and expectations on the part of archaeologists, government and industry. Archaeologists would, in <u>all</u> cases, be required to record specific data in a set fashion and file it in both report and catalogue format to the provincial agency. As the variables recorded would address only certain problems, they would be specific and limited in nature. This should decrease the cost and increase the efficiency of recording data, while at the same time making it much more usable. If an archaeologist

desires to do more research they would be welcome to do so but it would be in addition to meeting the requirements. The government agency and its staff would be responsible for ensuring that all data meets the standards set before accepting it, develop the proper storage and analytical facilities, seeing that all areas of the province are effectively investigated, and be responsible for undertaking the final analysis and reporting. The government agency would also have to work with development proponents, ensure that the public is made aware of all positive results and develop the administrative mechanisms to facilitate the processing of projects and endproducts. Development proponents would have to be assured that they and the public are receiving a better product even though research is being accomplished at the same time.

One might well ask if the bureaucratization of research will make it inflexible and self-perpetuating. This is a possibility, but not inevitable. Guidelines, cross-checks, reassessments, termination dates, etc., have to be built into any such system from the start, but as with any individual's thesis or dissertation, these must be a thesis, research design, methodology and dead line. I see provincial research no differently, only of a larger scale. Finally, some might cringe at the thought of data and sites being lost because they do not contribute to the resolution of short term, selected problems. In part, this is a separate question; that of significance, however, it is inevitable that some sites and data will be lost. It happens now. In contrast to the present situation, though, there would be very tangible end-products that constitute major contributions to our knowledge, based on data gathered in a consistent and comparable manner, and analyzed with the resolution of specific problems in mind.

Shades of 1984 and big-brother? Perhaps. The end of laissez-faire economics and a caveat-emptor attitude? Perhaps. Solid, independent scholarship is, however, always expected, welcome, and fostered. The

results of a properly executed provincial resource management plan would be substantial contributions to knowledge, improved resource management techniques, cost effective and competitive impact assessments and mitigative studies, more public interpretation programmes and a conserved resource.

* A slightly different version of this paper was presented at the 14th Annual Canadian Archaeological Association meeting held in Edmonton, Alberta in April 1981.

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