THE RESILIENCE OF DENE GENERATIVE GEOGRAPHY, CONSIDERING "THE *NEN' YESE*' ENSEMBLE"

James Kari
Alaska Native Language Center, University of Alaska Fairbanks, P.O. Box 757680, Fairbanks, Alaska 99775-7680;
james.kari@alaska.edu

ABSTRACT

The Proto-Dene *Lex Loci* ('word/law of location') is a theory of Dene prehistory that is a composite of geographic information (in Dene place names networks) and Dene lexicographic-etymological information. To investigate Dene prehistory in the Copper River and circum–Glacial Lake Atna (GLA) region, I present a selection of 67 Dene place names from seven Dene languages in four Alaska river basins. The names are in three diachronic tables and marked with a battery of *time perspective traits*. A bipartite SIGN(+GENERIC) generative geographic formula underlies the Dene place names networks in our study area. Dene geolinguistic data are information-rich. Especially noticeable are various *watershed tenure devices* (hydronymic districts, patterned duplications, geoduplicates) that reflect Dene vernacular collaborations to facilitate landscape recognition.

In Table 2B we present 15 names termed the "*Nen' Yese'* Ensemble" (NYE) that seem to have been coined collaboratively from the vantage point of *Nen' Yese'* or 'land ridge,' a former island near the Tyone Spillway of GLA. In the summary I identify nine names that plausibly were coined prior to, during, and after the names of the NYE, in the time frame when the GLA drainage pattern shifted from the Susitna River to the Copper River (9000 to 11,000 years ago). As paleo-environmental and archaeological work on GLA advances, some approximate geotemporal benchmarks may be attainable.

This study provides support for the Dene Geolinguistic Conservatism Hypothesis (Kari 2010a). Protracted language change and a slow chronology for Na-Dene and Dene-Yeniseian are stimulating hypotheses for comparative Dene-Yeniseian and for interdisciplinary prehistory. Whether the names presented in Tables 1–3 were coined 12,000, 7000, or as recently as 1000 years ago, this may be the earliest historical linguistic demonstration of resilient place names from one language family that are fully etymologizable and transparent in their meanings.

INTRODUCTION

I have long been fascinated by a dozen or more Ahtna place names around the Tyone River that were first published in *Ahtna Place Names Lists* (Kari 1983). These names are analyzable in structure and are meaningful to Ahtna experts. Some have hydrologic meaning; for example, *Nilben Na'* or 'water level surges river', the name for the Tyone River (2.14, table reference number). Some imply environmental change; for example, *Tandzaey Dghilaaye'* 'island mountain' (2.17), on the south side of the Tyone River 10 miles downstream from Tyone Lake. Several hill and mountain names in the viewshed at the outlet of Tyone Lake stand out as duplicated names (patterned duplications). The Tyone River area names seem to have been coined collaboratively as one or more early Dene bands coalesced at

the island (now a ridge) called *Nen' Yese'* or 'land ridge'. Informative Ahtna place names have persisted over time, though the geologic conditions have changed. I refer to this group of names as the *Nen' Yese'* Ensemble.

For the past decade, my research on Dene[1] prehistory was stimulated by the 2008 Dene Yeniseian Symposium and Edward Vajda's (2010) publication on the historical linguistic connections between Siberian Yeniseian and Na-Dene in North America. My article in the Dene-Yeniseian volume (Kari 2010a) has useful background for readers of this article. Since the 1970s, I have been assembling lists of place names for Ahtna and Dena'ina and identifying various *time perspective traits* by applying the logic of Edward Sapir's (1916) masterful study "Time Perspective in Aboriginal North America." I call this theory the Proto-Dene *Lex Loci* ('word/law of location'). The theory and its terminology have developed around two types of filing systems devised over 40 or more years for 10 Alaska Dene languages, one geographic (cumulative place names lists) and one lexicographic (computerized root-morpheme dictionary files).

The abundant geological and archaeological literature on Glacial Lake Atna (GLA) and Glacial Lake Susitna (GLS) has been summarized by Gerad Smith (this volume). The language study area in Fig. 1 consists of four major river basins: north of the Alaska Range, the Tanana River basin, and south of the Alaska Range, where the two large proglacial lakes formed long before the Last Glacial Maximum, the Copper, Susitna, and Matanuska Rivers, and Knik Arm.

There are seven Dene languages within the study area: Ahtna in Copper River basin and the upper Susitna Valley, four Tanana Valley Dene languages (Lower Tanana, Middle Tanana, Tanacross, and Upper Tanana), a dialect of Koyukon (Upper Koyukon) on the lower section of the Tanana River, and the Upper Inlet dialect of Dena'ina from the middle to lower Susitna River as well as the Matanuska River and Knik Arm.

A condensed introduction to the Proto-Dene *Lex Loci* appeared in *Shem Pete's Alaska* (Kari and Fall 2016:144–147, in passim).[2] My opinion in 2016 was that the Ahtna names at the Tyone River area—based upon the internal Dene geolinguistic evidence—could have been coined during the 11th millennium BP at stages of the major drainage shift from the Susitna River to the Copper River. As colleague Ben Potter (pers. comm. October 2018) points out, opinions differ about when and where the early Dene or Proto-Dene entered Alaska.

This article is the first extended presentation of the Proto-Dene *Lex Loci* theory. The theory has been inspired by the Dene citations and logic of Sapir (1916, 1921, 1936) and the interdisciplinary methods outlined in A. Richard Diebold's (1987) "Linguistic Ways to Prehistory." Diebold encourages the use of comparative historical linguistic materials in interdisciplinary prehistory studies.[3] The concepts for the Proto-Dene *Lex Loci* are a composite of Dene geographic information found in Dene place name networks and Dene lexicographic-etymological information. The Proto-Dene *Lex Loci* functions as a lens to discuss a selection of Dene geolinguistic data. The data are 67 Dene place names from five languages (Ahtna, Lower Tanana, Middle Tanana, Tanacross, and Upper Tanana; no Den'aina or Koyukon names were selected). These are grouped in three regional-diachronic tables. Some names are marked with three or four time perspective traits. The supplemental data table (Table S1) outlines three information types among 38 time perspective traits: 2.1, overt or implied information in the SIGN(+GENERIC) name; 2.2, watershed tenure information; and 2.3, aberrant Dene historical linguistic information.

The discussions for the names on each table introduce traits and concepts of the Proto-Dene *Lex Loci* and multilayered features of Dene generative geography. A bipartite SIGN(+GENERIC) generative geographic formula underlies the Dene place names networks in our study area. The name etymologies are informative. They reflect Dene naming priorities, such as lithic prospecting, biology, hydrology, trail corridors, or linguistic archaisms (not found in other Dene languages). Our time perspective traits can feature overt, implied, or aberrant information. Some names in Tables 1–3 are marked for three or four time perspective traits. Especially important for considerations about Dene prehistory are identifiable pragmatic *watershed tenure devices* (WT).

Several spatial-diachronic trajectories are noted. The Dene appear to have entered the Tanana Valley from farther to the east beyond this study area, in the upper Yukon–MacKenzie headwaters area. The Dene occupation of the Tanana River preceded entry into the Copper River basin. Several patterned duplications trace Dene band movements into the Delta River, then south into the Copper River uplands. The ensemble-like character of Ahtna names around the ridge *Nen' Yese'* and Tyone River have become more interesting upon closer examination. I am proposing that a group of 10 or 11 names were coined during the first season of the *Nen' Yese'* Ensemble. I

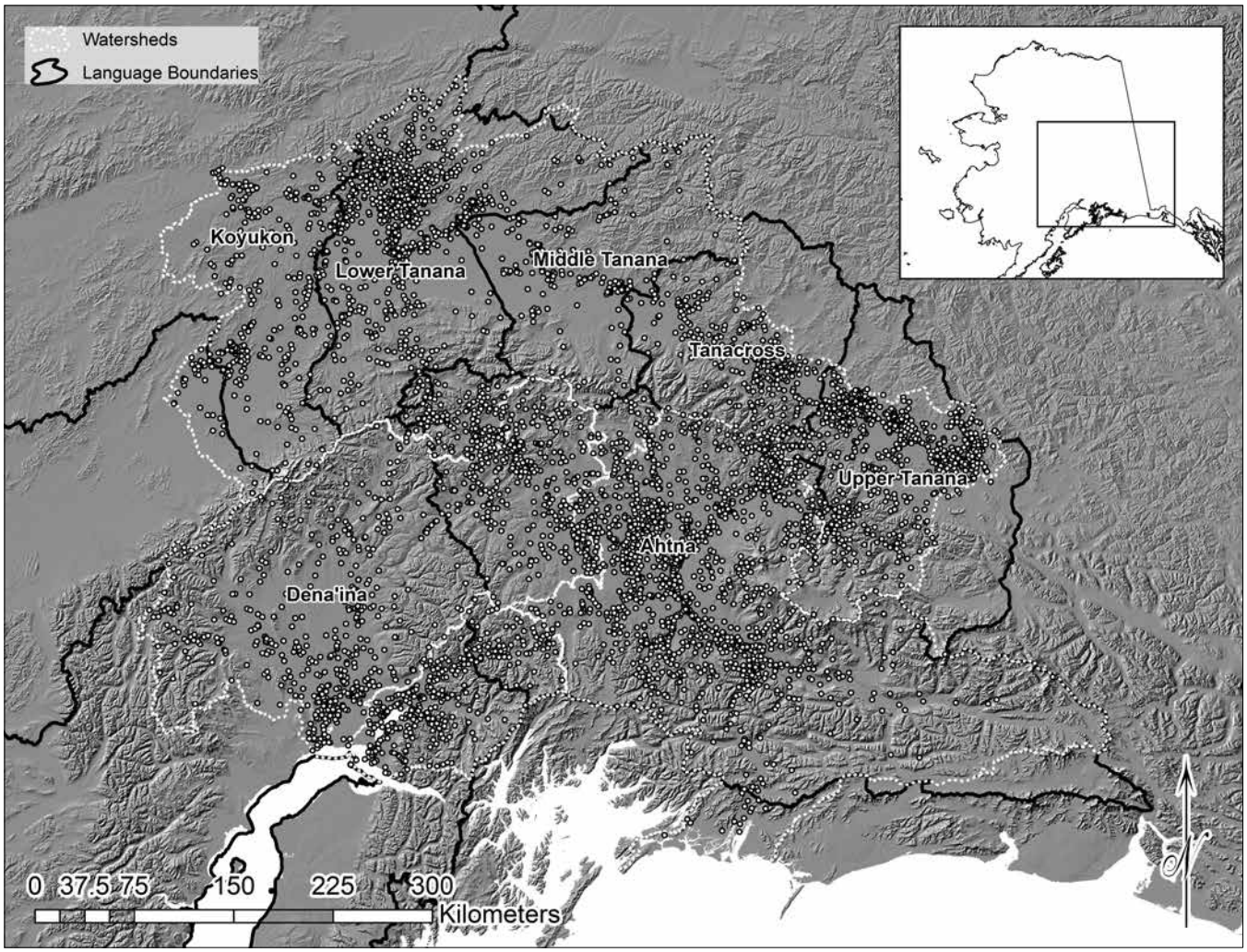

Figure 1. Major drainages, Dene language boundaries, and recorded place names. The size of the adjacent river basins is 249,746.7 km². For this study, there are 6276 place names on file in seven adjacent Dene languages (3029 in the Tanana River basin and 3479 for the Copper-Susitna-Matanuska basins, each dot being one or more recorded place name—salient features can have bilingual or trilingual names. Map by Gerad Smith after Kari and Smith (2017).

identify a group of nine names that plausibly were coined prior to, during, and after the first season of the NYE. As GLA geological and paleoecological research becomes refined, geotemporal benchmarks may be attainable. Several patterned duplications for some lake features may lead us to some empirical geotemporal benchmarks when the geological research on GLA becomes more fine-grained.

I also suggest Dene generative geography and watershed tenure devices have cognitive, logistical, and demographic implications. Vanguard place names set in place by pioneering Dene bands would anticipate the entry of other Dene bands. This expanding Dene place name network in the Tanana–Copper River basins may be correlated with the expanding Northern Archaic archaeological tradition.

This article provides support for the Dene Geolinguistic Conservatism Hypothesis (Kari 2010a). In both the Tanana and Copper River basins, the most salient Dene place names have been retained since the times they were coined and have remained fully analyzable and functional for orientation during the 20th century. Whether names presented here were coined 11,000 or 6000 years ago, or as even recently as AD 1000, this may be the earliest historical linguistic demonstration of resilient place names from one language family that are fully etymologizable and transparent in their meaning.

SUMMARY OF SOURCES, METHODS, AND DATA

Edward Sapir's research and influence on the field of Dene and Na-Dene linguistics was chronicled by Krauss (1973, 1986). The research program at the Alaska Native Language Center (founded in 1972) has been Sapirian in scope, striving for breadth of documentation on Alaska's Native languages. The Dene languages of North America are the world's premier verb-prefixing languages. Several of Sapir's publications (1916, 1921, 1936) note the typological uniqueness and geographical distribution of the Dene language family. At times of historic contact, there were 55 Na-Dene languages in Alaska, Northwest Canada, the Pacific Northwest Coast, and the American Southwest. The estimated geographic size of the Na-Dene language family is approximately 4,177,000 km^2 (1,621,000 mi^2) (Kari and Potter 2010:10).

Krauss and Golla (1981:68) note that the Northern Dene languages remained as a large block of contiguous languages until about 2500 years ago. There are some widely divergent estimates for the tenure of the Na-Dene or Dene language family in Alaska and North America. Often cited is Krauss's summary based on lexicostatistic studies and comparisons with various historic linguistic dates of divergence (Krauss 1973:50): "Estimated dates of divergence for Na-Dene languages are 2400 ± 500 years for Athabascan, 3400 ± 500 years between Athabascan and Eyak, and about 4500 years for Tlingit." Kari (2010a:207–209, Figure 3), in response to the Dene-Yenisiean Hypothesis, outlined a geolinguistic model of Dene prehistory with a "slow chronology" whereby Na-Dene entered North America 13,000 to 14,000 years ago. The Tlingit and Eyak separated from the rest of Dene perhaps 10,000 years ago. Northern Dene bands gradually annexed largely unoccupied territories within and beyond the historical distribution of Northern Dene languages. The Dene (Athabascan) Geolinguistic Conservatism Hypothesis makes note of such patterns as:

- The 50 Dene language areas are in three continental groups (Northern, Pacific, and Southwest) that have shared boundaries with other Dene languages.
- There is strong retention of the complicated Dene verb prefix morphology and elaborate rules of templatic word formation throughout the family.
- When there is extensive place name documentation, the Northern Dene languages share a rule-driven generative geography; geographic names throughout Dene languages are striking for their analyzability.

Several recent articles that synthesize genetic analysis of human remains, archaeology, and paleoecology (Potter et al. 2018; Scheib et al. 2018) place Na-Dene and Athabascan and Algonkian populations in the "First American" Northern North America DNA pool prior to 13,000 years ago. "The American Paleoarctic tradition represents ancestors of multiple language groups that dispersed throughout the Americas" (Potter 2010:153). Citing both archaeological and DNA evidence, Potter (2010) and others (Moreno-Mayar et al. 2018) suggest the Dene may have moved into Alaska from the south perhaps 6000 years ago and can be identified by the Northern Archaic tradition throughout much of northern Alaska. Two articles—Flegontov et al. (2016), a genomic study of Ket, and Flegontov et al. (2019), a summary of ancient DNA records for Siberia, North and South America—offer a contrasting proposal. They suggest that if Ket and Na-Dene are genetically closer to Paleo-Eskimo groups, that the Na-Dene branch of Dene-Yenisiean may have entered western Alaska around the same time as Paleo-Eskimo, c. 5000 to 6000 years ago. Vajda (2018, 2019a) endorses this scenario, positing that Dene-Yenisiean was a central-eastern Siberian language stock that could have separated ~5,900-6,700 ya based on his lexicostatistic estimates.

The potential of the ProtoDene *Lex Loci* theory depends upon two well-researched comparative data sets—one geographic and one lexicographic. The verb theme remains the seminal lexicographic concept in Dene languages (Kari 1979). Productive verb themes can yield hundreds to thousands of derived verb forms. When I compile verb themes for two languages, for example, Ahtna (1386 in Kari 1990) and Lower Tanana (currently 1115, Kari 2019b), about 90 percent are identical at the level of abstract notation.

As a Dene language specialist at the Alaska Native Language Center, I have approached language work as a lexicographer. By the 1980s, I began to assemble computerized dictionaries for various Alaska Dene languages in the Lexware format using congruent Dene band label conventions. These alphabetized integrated root-morpheme files served as scripts that fostered advanced lexical work on various Alaska Dene languages. Two published Lexware dictionaries are Ahtna (Kari 1990) and Koyukon (Jetté and Jones 2000). Since 2017, I have been expanding the three root-morpheme files for Dena'ina, Middle Tanana, and Lower Tanana (Kari

2019a, 2019b, 2019c). The Dene root-morpheme dictionary files promote consistent etymologies for place names and other vocabulary domains as well as comparisons between the languages. Rare archaisms and opaque forms can be detected.

The Jesuit scholar Jules Jetté (1863–1927) was the first person to extensively document Alaska Dene place names (Jetté 1910; Jetté and Jones 2000). By 1915, Jetté had recorded names and generic terms for over 1200 features (mainly in Koyukon). Jetté's work informed my ethnogeographic research methods (Kari 2008, 2017; Kari and Fall 2016:30–35). Ahtna place names have been maintained in 22 drainage subsections (Kari 1983, 2008, 2013, 2014). The 2014 viable Ahtna place name database has 2528 records. Readers are referred to Kari (2008, 2011) and Kari et al. (2012) for summaries of Ahtna and Lower Tanana geography (e.g., generic terms for feature types, semantic types, degree of analyzability, distribution patterns, the riverine directional system, multilingual naming across Dene language boundaries, and reconfirmations of a shared geographic name network). The book *Ahtna Travel Narratives* (Kari 2010b) presents elite travel narratives by five Ahtna speakers, with historic maps, sketch maps, and an analysis of the riverine directional system. With text mark-up and mapping, the Ahtna travel narratives show the interplay of geographic names and the nine-point riverine directional system. The best Ahtna travel narratives (Jake Tansy and Jim Tyone texts in Hays et al. 2014) show Dene landscape cognition in action (also see Kari 2010b, 2017; Kari and Fall 2016:231–234).

Supplemental Fig. 1 (Fig. S1) is a portion of the 1987 Williams and Galloway geologic map of GLA, with about 675 Ahtna place names displayed on a GIS layer. The bipartite SIGN(+GENERIC) formula of Alaska Dene geography can be seen among sets of two to four generated names with a shared SIGN(+GENERIC) structure as feature types. For example, the stream 2.15 *Tanaaxi Na'* 'moving water stream' on the north side of Tyone River has two lakes with the SIGN *Tanaaxi,* literally 'moving water'. For Ahtna speakers, the names in the network are easy to memorize and are instructional for regional travel. Virtually all of the stems and affixes in the 675 names in SFig. 1 can be analyzed using the main Ahtna dictionary file (Kari 1990).

The more detailed Alaska Dene geographic name networks reflect the brilliance of Dene landscape semiotics and cosmography. Dene geographic name networks were/are a true public information domain that has been widely shared across Dene languages. Robust multilingual naming and repeated reconfirmations across Alaska Dene language and dialect boundaries are some of the arguments for the retention and relative antiquity of Dene place names. It appears that Dene names for *salient landforms and streams* were fixed in place as names and then retained. One element that often contributes to the recognition of relative chronologies among sets of names are Dene *watershed tenure devices.* These are identifiable pragmatic variations of the canonical SIGN(+GENERIC) Dene naming system that enhance name recognition, memorization, and orienteering. See the current list of watershed tenure devices on Table S1, section 2.2. For more background see Kari (2010a, 2010b, 2011) and Kari and Fall (2016:144–147).

In the 1990s, I first noted the seven mutually exclusive *hydronymic districts* among Northern Dene languages (Kari 1996a, 1996b). Kari and Fall (2016:39) introduced the hydronymic districts and some Proto-Dene *Lex Loci* terms such as reverse hydronyms as well as watershed tenure. Proto-Dene at its earliest areas of occupation had the bipartite formula SIGN(+GENERIC) found in contemporary Northern Dene languages. The grouping of first, second, and third order streams into regional hydronymic districts must have been the first overtly pragmatic Dene watershed tenure device.

Krauss and Golla (1981:68) and Greenberg (1996:530–531) have placed the Proto-Dene homeland in western Canada. Boraas (2007:35–37), citing Kari (1996a) and the seven hydronymic districts, suggests that *tu'* headwaters area in the Cordilleran Range (Southern Tutchone, Northern Tutchone, and Kaska language areas) may be the oldest area occupied by Dene bands, possibly by 13,000 years ago. In Fig. 2, I circle this watershed hub as the "most central Proto-Dene headwaters." This may have been the first Dene hydronymic district.

ALASKA DENE PRACTICAL WRITING SYSTEMS

The names cited in Tables 1–3 are morphophonemic transcriptions in the practical orthographies for each language. Tanana Valley languages have five to seven consonant series that can be plain, aspirated, and glottalized. Lower Tanana (Minto-Nenana dialect) is important for Proto-Dene reconstructions, having seven stop series with conservative syllable structure. Lower Tanana glottalized stops front to back are *t', tl', tth', ts', tr', ch'*, and *k'*. Ahtna, by way of comparison, has five glottalized stops*: t', tl', ts',*

Figure 2. Hydronymic districts and Alaska Dene web map summary. Seven mutually exclusive hydronymic districts in 32 contiguous Northern Dene languages appear to have been stable for a long time. The two Alaska Dene hydronymic districts, west* -na' *and east* -niq'ə*, are circled with red dots. The location of terminal Pleistocene GLA is noted. The arrow-circle points to the* *tu' *hydronymic district at the headwaters of the Yukon-Mackenzie-Stikine River in northern British Columbia. On our experimental web map for 12 Alaska Dene languages, there are 12,261 named features and 13,178 names (counting multilingual names). Map from Kari (1996a) and Kari and Fall (2016:39).

c', and *k'*. Ahtna has the original Proto-Dene front and back velar consonants (*k, q*). Ahtna's six front and back velar consonants are *g, c, c' :: gg, k, k'*, where *gg* is for the plain back velar *ɢ*. The vowel systems are similar for Ahtna, Middle Tanana, Tanacross, and Upper Tanana with ten vowels. Long vowels are written with double letters, short vowels with single letters, *ii* vs. *i*. Middle Tanana, Tanacross, and Upper Tanana also have nasalized vowels, which are marked by nasal hooks, į, ǫ, etc. Tones are marked for the Tanacross names. Upper Tanana (UT) has some exotic diphthongs, as in the UT name *Nihxįǫ* (e.g., Table 1:1.8). On the other hand, Lower Tanana has a six-vowel system that is written with single letters; full vowels are *a, i, o, u*, and reduced vowels are *e* and *w* (upsilon ʊ).

In the languages cited in the article, *e* represents schwa (*ə*). It is possible to designate every underlying affix and stem in all 67 of the selected names. The literal translations in this article are in the style of the various Alaska Dene place names lists and *Lexware* dictionary files (i.e., full morphemic markup is done selectively).

Our geolinguistic analysis draws upon the well-understood Proto-Dene sound system and extensive comparative Dene citations and reconstructions (Leer 1979; Krauss and Leer 1981). Proto-Dene forms are cited after an asterisk (**naʔ*, **niˑqʼə* 'stream'), using a practical comparative Dene orthography similar to those by Vajda (2010) and Leer (2010). Kari (2010c:356–358) summarizes several alternative orthographies that have been used for comparative Dene. The apostrophe (') that is used for glottal stop in Dene practical alphabets is *ʔ* in Proto-Dene forms. In this article and in current dictionary files for Dena'ina, Lower Tanana, and Middle Tanana, I reconstruct the Proto-Dene alveolar affricate series **ts* (or **c* in Krauss and Golla 1981:72) as an interdental, theta, or thibilant series, using *ddh, tth, tth', dh*, and *th.* Recognition of the theta series in Proto-Dene facilitates the identification of cognates and archaisms and sharpens reconstructions for Na-Dene languages.

Supplemental Table S1 has several purposes. It is an outline of ProtoDene *Lex Loci* concepts and the time perspective traits, and it also serves as a glossary of terms, symbols, and abbreviations used in Tables 1–3. References are provided to the primary place names or to previous citations of specific names.

While writing this article, I had identified a growing list of >30 time perspective traits. The concepts for the Proto-Dene *Lex Loci* (Table S1, Levels 1 and 2) are a composite of Dene geographic information found in the Dene place names network and Dene lexicographic-etymological information that is based upon my long-term dictionary

work on these adjacent languages. Supplemental Table S1, at Level 1 SIGN(+GENERIC) + FEATURE LOCATION geographic name template conveys multiple layers of information. Ten geographic topics or themes are identified at Level 1.

Supplemental Table S1 Level 2 of the Proto-Dene *Lex Loci* currently identifies 38 time perspective traits that are grouped into three *information types*: 2.1, overt or implied in a SIGN(+GENERIC) name; 2.2, watershed tenure information; and 2.3, aberrant Dene historical linguistic information. Watershed tenure is defined as pragmatic vernacular variations upon the regular SIGN(+GENERIC) name formula that foster name recognition and landscape orientation. The Dene generative geographic system and vernacular watershed tenure can be traced back to Proto-Dene through the analysis of highly conservative place names.

This level of markup for features and policies of Dene geographic naming combined with dictionary-based etymologies allows us to translate place names consistently (biota, or geologic and hydrologic verb derivatives) or to discern distant patterns among Dene place name networks. Also, the selection of extended Unicode characters for symbols for time perspective traits (as on Table S1, or Kari and Fall 2016:144–147) contributes to trait definitions and cartographic display. Note as well that these time perspective hypotheses about the Dene geolinguistic data are independent of archaeological, geological, or genetic information, and as such can benefit research in allied fields of prehistory.

SOME CLARIFICATIONS AND QUALIFICATIONS

The Proto-Dene *Lex Loci* could be applied to other Alaska Dene language areas, such as Dena'ina or Koyukon, where diffusional patterns go in many directions reflecting fish, birds, house types, lithics, and so forth. However, the Proto-Dene *Lex Loci* theory and time perspective analysis cannot be applied to Dene languages to the north (Han and Gwich'in) and to the east (Northern Tutchone, Southern Tutchone), because none of these languages have cumulative root-morpheme dictionaries, and place name research materials are not fully consolidated.

The time perspective inferences about Dene presence in the Tanana and Copper River basins are based entirely upon geolinguistic evidence for Ahtna and the Tanana Valley Dene languages. Inferences are not based upon Native narrative testimony. Over the years I have asked many Ahtna or Upper Tanana storytellers about story references to a large glacial lake or flooding events. There are no stories specific to GLA on record (e.g., in audio collections at Alaska Native Language Center or the Alaska Native Language Archive).[4]

Here are other generalizations for readers based upon my familiarity with the more detailed Alaska Dene place names networks and our online Dene Place Name Atlas (Fig. 2; Kari and Smith 2017).[5] There are numerous landform names that are descriptive of geologic change, but there are virtually no names that refer to volcanic events, tephra falls, or earthquakes. There are occasional names that can be marked as overt or implied environmental change [๓]. Other than the Ahtna names of the *Nen' Yese'* Ensemble, I have not detected any distinctive batches of Alaska Dene place names that can plausibly be linked to geologic or environmental change or drainage shifts.

DISCUSSION OF SELECTED DENE GEOLINGUISTIC DATA

As noted on Fig. 2, I hypothesize that the **tu'* district at the Yukon-MacKenzie-Stikine River headwaters region was occupied by Dene bands prior to the *na'-niq'ə* districts in Alaska to the northwest. Our discussion of Table 1 begins at the headwaters of the Tanana River.

1.1 *Ddhał Chin* (Upper Tanana) and *Dzeł Cene* (Ahtna) 'mountain base'

Ddhał Chin (Upper Tanana) and *Dzeł Cene* (Ahtna) 'mountain base' is a well-known regional name for the Nutzotin Mountains and headwaters of the Nabesna River, Chisana River, and White River region and its interconnected trail system. The name *Ddhał Chin* is emblematic of early Dene prehistory. The Nabesna dialect of Upper Tanana spoken by Jack John Justin was very distinctive (my notes and audio of JJJ remain unpublished). Justin had numerous unique lexemes that do not occur elsewhere in Upper Tanana or Ahtna. Justin reported a detailed set of place names along the *Ddhał Chin Tąy* 'mountain base trail' between the Nabesna River, Chisana River, Beaver Creek, and White River (Kari 1986:153–154, 208–211).

Table 1 has three cognate long-distant patterned duplications (≡) between the Upper Tanana area and the southern Alaska Range that were first noted in the 1970s (Kari 1988; Kari and Kari 1982; Kari and Fall 2016:146–147). These are Upper Tanana *Ddhał Chin* (1.1) and *Dzeł Ken* (Dena'ina) southern Alaska Range;

Table 1. Early Tanana Valley place names

Map #	Lang	Dene name	Location, official name	Literal translation	a-s	S-type	F-type	TPT or ʷ	References
1.1	UT, At	*Ddhał Chin, Dzeł Cene*	Nutzotin Mts. pass system	'base of the mountains'	1-2	geol	region	x≡ʷ	Kari 1986:2808–211, Kari 1990:172, Kari 2014:13, Kari & Fall 2016
1.2	UT, At	*K'ełt'iin, K'ełt'aeni*	Wrangell Mountains	¿ (multiple meanings)	5-1	sign	mt grp	¿ʷ φ ‡	Kari 1997, Kari 2014:236, Kari & Tuttle 2018:81
1.3	UT	*Taatthee Ndiign*	Beaver Creek	'stream cobble str.'	1-2	lithic	stream	g≡ʷ ≍ʷ ⮜	Kari 1997:770
1.4	UT	*Taatthee Ndiign*	Stuver Creek	'stream cobble str.'	1-2	lithic	stream	g≡ʷ, ≍ʷ, ⮜	Kari 1997:494
1.5	At, UT	*Tsetsaan' Na', Ttheetsąą' Ndiig*	Chisana River	'copper (rock excrement) river'	-3	lithic	stream	⮜≍	Kari 1997, Kari 2014:1259
1.6	UT	*Sįįł Ddhal'*	mt 8014' at Chavolda Creek	Ω "some kind of animal track" JJJ	1-2	Ω	landform	Ā, Ω	Kari 1997:682
1.7	At, UT	*Nabaes Na', Nabiah Niign*	Nabesna River	'stone (type) str.	1-2	lithic	stream	⮜	Kari 1997, Kari 2014:1243
1.8	UT	*Nihxįą*	Orange Hill	'white powdered granite'	3-1	lithic	landform	Ā, ⮜	Kari 1997:426, Kari 2014:1252.2
1.9	UT	*Xaal Männ'*	Lake west of Scottie Creek site	'least cisco lake'	1-2	fish	lake	Ā, ₱	Kari 1997:599
1.10	UT	*Xaal Männ'*	Halthmund Lake	'least cisco lake'	1-2	fish	lake	Ā, ₱	Kari 1997:139
1.11	UT	*Xaal Niign*	Kalukna River, Bear Creek	'least cisco stream'	-2	fish	stream	Ā, ₱	Kari 1997:54
1.12	MT	*Nghaal Menn'*	Lake George	'least cisco lake'	2-2	fish	lake	Ā,₱	Kari & Thoman 2005
1.13	At, Tc, UT	*Ts'itey Na', Tth'itey Nda', Tsay Na' Ndiig*	Tok River	ATc 'straight strong stream' UT 'grandfather stream stream'	1-2 1-3	hydro kin	stream	!!ʷ‖ʷ	Kari 2014, Kari & Thoman 2005, Kari 1997
1.14	Tc	*Hwtthàayh Nénn'*	Ketchumstock uplands	'dwarf tree land'	2-2	veg	region	⁞, x≡ʷ	Kari & Thoman 2005
1.15	Tc	*Tseyh Tl'íig*	mt NW of Ketchumstock	'shiny ochre'	1-2	lithic	landform	⁞, x≡ʷ, ⮜Ā	Kari & Thoman 2005
1.16	Tc	*Menh Dèes Ménn'*	Healy Lake	'lake shallows lake'	1-3	hydro	lake	x₱ [a]	Kari & Thoman 2005
1.17	LT, MT, Tc	*Juzra No', Jiiz (Cheege) Na', Jiiz Ndiíg*	Goodpaster River	'grey jay, camprobber river'	-2	bird	stream	↔ʷ	Kari 2018b:113 Kari 2018c:71
1.18	MTTc	*Hwteth Cheeg Na', Hwteth Cheeg Ndiíg*	Delta River	'pass mouth river'	1-3	trail	stream	↔ʷ ≍ʷ	Kari 2018c:65 Kari & Thoman 2008
1.19	MT	*Xwdegaayh Niige*	McDonald Creek	'newborn calves stream'	3-2		stream	↕ʷ	Kari 1996a, Kari 2015
1.20	MT	*Xaasaa Na'*	Little Delta River	'upward sun river'	1-2	sky	stream	[a]	Kari 2015
1.21	LT, MT, At	*Xosrotl'odi, Basatl'aadi, Xasatl'aadi*	Mount Hayes	'upward sun at headwaters' (LT) 'edge of sun at headwaters' (MT)	3-2	geol	landform	→	Kari 2018a:136 Kari 2018c:136, Kari 2014:1067
1.22	MT, At	*Łuu Tadzeey', Łuu Tahwdzaeye'*	Donnelly Dome	'heart among glaciers'	3-2	geol	landform	☼,₪ ≍ʷ, ≈ʷ	Kari 2018c:51, Kari 2014:923

Notes: Names listed from upstream to downstream. Bilingual, trilingual names are noted with language abbreviations. Literal translations are within single quotes.
The column *a-s* is a count of affixes vs. stems in the place name to indicate simplex names vs. complex names. *S-type* refers to semantic type (see examples in Kari 2008, 2011 and Kari et al. 2012 for S-type categories), *F-type* refers to feature type, *TPT* refers to time perspective trait, and ʷ refers to watershed tenure device.
UT = Upper Tanana, At = Ahtna, MT = Middle Tanana, TC = Tanancross, LT = Lower Tanana

this triple cognate *Xwtthàay Nénn'* (1.14), Ketchumstock uplands, *Hwtsaay Nene'* Susitna–Gulkana River uplands (2.2), and *Htsay Nenq'* Stony River/Mulchatna River plateau; also *Men Dèes (Chèeg) Ménn'* (1.16) Healy Lake and *Ven Dash Vena* Tundra Lake (south of Stony River). This set of seven distant patterned duplication (x≡) cognates at opposite ends of the horseshoe-shaped Alaska Range is striking (Kari and Fall 2016:146–147). Thirteen early southern Alaska Range Dene names are noted in Kari and Fall (2016:146–147). When did vanguard Dene bands establish the founding place names in the southern Alaska Range? When was the trail system across *Ddhał Chin* on the east flank of the Wrangell Mountains established? Does the Dene trail system correlate with the initial deglaciation of the passes? Distant cognate Dene place names prompt fascinating questions.

1.2 *K'ełt'aeni* (Ahtna) and *K'ełt'iin* (Upper Tanana) multiple meanings, ¿

Kari and Tuttle (2018:81) state:

> The Wrangell Mountains are the dominant feature of the [. . .] Tanana and Copper River basins. The name for the Wrangell Mountains, *K'ełt'aeni* in Ahtna or *K'ełt'iin* in Upper Tanana, is profound but ambiguous with multiple meanings '¿'. It is a nominalized verb that uses a versatile highly productive root, that is in all Dene languages. In Ahtna, Upper Tanana, Koyukon, and Navajo, there are dozens of verb themes that cover a range of meanings: 'act, use, do; have, possess; seem like, take place; look at, see; sense the presence of.' Verb themes in Ahtna can have forms such as: Ø+'aen, ł+aen, or D+'aen⟶ t'aen with all four classifier prefixes (Ø, ł, l, or D), but there is never one as in this place name with *łt'aen*. All of the morphemes in the names are common in all Dene languages, but this place name is unique and rare, with a double classifier* (ł+D) before the root 'aen.
>
> k'e + ł + D + 'aen + i
>
> upon + classifier + classifier + do, happen, act + the one that
>
> This is one of a few well-known Dene place names that is so highly ambiguous (¿). This Ahtna and Upper Tanana place name is an ancient riddle. The *double classifiers* pose the riddle. One English approximation might be 'the one that causes activity.' We think that the name *K'ełtaeni* was intended to be enigmatic.

It is also interesting that the name *K'ełtaeni* puns on *nek'eltaeni,* literally 'animate figure above us', the aboriginal term for the Dene full-sky constellation of stars that in the historic period is used for the Christian concept of God in Ahtna, Dena'ina, Tanacross, and Upper Tanana (Cannon and Holton 2014; Cannon et al. 2019, in press). *K'ełt'aeni* for the Wrangell Mountains is a conspicuous founding place name (φ). Ahtna, Tanacross, and Upper Tanana speakers call the Mount Wrangell volcanic caldera *Uk'ełedi* 'the one with smoke upon it', noting that it is a fire being maintained by the ancient ancestors.

1.3 *Taatthee Niign* (Upper Tanana) 'stream cobble stream' Beaver Creek

1.4 *Taatthee Niign* (Upper Tanana) 'stream cobble stream' Stuver Creek

Within the Dene place names networks, on occasion we find pairs of names that direct the attention of Dene travelers to trail routes or to homologies in nearby landforms. This is the noticeable watershed tenure device termed *geoduplication* (*g*≡). *Taatthee Niign* (1.3 and 1.4) are third-order streams with the same name for Stuver Creek on the Tanana River and Beaver Creek in the White and Yukon watersheds (Table 1). Beaver Creek is on the eastern end of *Ddhał Chin Tąy*. According to Nabesna expert Jack John Justin, Stuver Creek leads to the trail junction at the Chisana Mine area via a high pass to Star Creek. The noun *taatthee* means 'water-rock' or 'stream cobble'. This geoduplicate is instructional at multiple levels; it identifies a copper source, a pass route, and the watershed divide between the Tanana and Yukon River basins.

The Wiki Peak obsidian source (Reuther et al. 2011:274) on upper Beaver Creek emits obsidian stream cobbles into *Taatthee Niign* (1.3). The Wiki Peak obsidian source represents one of the earliest sources utilized in the region—at least 13,300 years ago. The Dene knew about the Wiki Peak obsidian when they coined the duplicated *taatthee* stream names. *Taatthee Niign* (1.3 and 1.4) are noted on Figure 5B as two of the 19 most probative names. Both Wiki Peak and Batza Téna obsidian (middle Koyukuk River) were transported widely in Alaska between 13,000 and 9000 years ago (Reuther et al. 2011:276–277). When did the Dene coin this instructive geoduplicate? With the invention of the advanced snowshoe, vanguard Dene bands could have rapidly expanded the Dene place names network between the upper Tanana River and the upper Koyukuk River, where the

famous obsidian source is named *Baats'e Tene* (Koyukon), 'obsidian trail'.

1.5 *Tsetsaan' Na'* (Ahtna) and *Ttheetsąą' Ndiig* (Upper Tanana) 'copper stream'

1.6 *Sįįł Ddhal'* (Upper Tanana) 'Ω mountain'

1.7 *Nabaes Na'* (Ahtna) *Nabiah Niign* (Upper Tanana) 'stone type stream'

1.8 *Nihxįǫ* (Upper Tanana) 'white powdered stone'

In the Tanana Valley there are many place names that reflect early Dene lithic prospecting. The name for Nabesna River uses a stem with the Proto-Dene noun **be·shʳ*, which in Proto-Dene likely meant 'portable stone'.[6] The name for Chisana River, *Tsetsaan' Na'* (1.5), in Ahtna has the Proto-Dene term for 'copper' literally translated as 'rock excrement'. But contrast with *Tsedi Na'* 3.15, where the Ahtna name for Chitina River refers to cold-hammered copper, 'that which is hammered, pounded'.

When *Sįįł Ddhal'* (1.6) was reported by Jack John Justin in 1981 for the mountains on the upper Nabesna and upper Chisana Rivers, it stood out as a conspicuous Dene archaism (Ā). Justin also stated that *nihxįǫ* (1.8) 'white powdered stone', the name for Orange Hill, refers to pulverized granite used in various ways as a medicine. The Proto-Dene reconstructed verb theme for *nihxįǫ* would be **n+ɬ+ghų·dh.* The term is unique to Upper Tanana; this term was not known to Ahtna experts. Justin did not know exactly what *sįįł* in 1.8 means, saying it might refer to the track of an animal. The omega symbol Ω is used in Ahtna and Koyukon and other Dene dictionaries for opaque stems that do not have clear meanings. Some archaisms like 1.8 (Ā) have clear meanings, and others like 1.6 are opaque archaisms (ΩĀ).

All of the Nabesna and Chisana River sites surveyed by Lynch et al. (2018) are within the fully analyzable Upper Tanana place names network first documented in Kari (1997) and presented in Kari and Smith (2017). The Tenmile Hill, Gardiner Creek, and Scottie Creek area is a focal subregion for Upper Tanana. It is plausible that the incipient Dene place names network in the upper Tanana Valley was in place more than 10,000 years ago. Over time layers of place names were established by Dene–Northern Archaic bands.

1.9 *Xaal Männ'* (Upper Tanana) 'least cisco lake'

1.10 *Xaal Männ'* (Upper Tanana) 'least cisco lake'

1.11 *Xaal Ndiig* (Upper Tanana) 'least cisco stream'

1.12 *Nghaal Menn'* (Tanacross) 'least cisco lake'

A distinctive Tanana River *archaism* (Ā) for 'least cisco whitefish' appears in names for three large lakes and one stream on the mid-upper Tanana River only in Middle Tanana, Tanacross, and Upper Tanana. In Upper Tanana, the lake west of the Scottie Creek site and Halthmund Lake are both *Xaal Männ'* (1.9 and 1.10), Kalukna River and Bear Creek are *Xaal Ndiig* in Upper Tanana (1.11), and Lake George is *Nghaal Menn'* in Tanacross (1.12). The lexeme 'least cisco' is from the Proto-Dene root **ghəl, gho·l* 'single animate falls'. The four-way duplication is noticeable, but we treat these as popular names (₱) rather than as distinctive patterned duplications (≡).

1.13 *Ts'itiy Na'* (Ahtna, Tanacross) 'straight strong stream'

1.13 *Tsay Na' Ndiig* (Upper Tanana) 'grandfather stream stream'

The names for Tok River, *Ts'itiy Na'*, *Tth'iitey Nda'*, and *Tsay Na' Ndiig* (1.13), are a rare case of *disjunct hydronyms* (!!) where Ahtna and Tanacross have a cognate name but Upper Tanana has a separate name. Also, the Upper Tanana name uses both *na'* and *ndiig* hydronyms, which is unusual or even iconic (‡). The Tok River names have served as a long-term boundary marker (‖) between Ahtna, Tanacross, and Upper Tanana. Boundary marking names can be noted in the more detailed Alaska Dene place name networks. The Ahtna-Tanacross compound 'straight-strong' is a fitting description of water currents of the Tok River as an early spillway of Glacial Lake Ahtna. The GLA Ice Dam on the Tok and Little Tok Rivers is shown on Figures 4A, 5A, and 5B.

1.14 *Hwtthàayh Nénn'* (Tanacross) 'dwarf tree country'

In Kari (1988), I discussed three cognate upland ecoregion names with a term for 'dwarf trees', Proto-Dene **hʷttha·xʸ*: Ketchumstock uplands (1.14), the Gulkana River and Susitna River uplands (2.1), and the Stony River and Mulchatna River uplands (Kari and Fall 2016:146–147, 222). Vegetation (🌿) is well represented in all of the Alaska Dene place names networks. In Ahtna and Tanacross these names mean 'dwarf tree country', referring to undersized birch or spruce common in Alaska uplands. To the Dena'ina from Nondalton and Lime Village, the name *Htsay Nenq'* (Stony–Mulchatna River uplands) is central to their cosmology (Balluta 2008). However, *htsay* is ambiguous in Dena'ina; it does not mean 'dwarf

tree'; *tsay* rhymes with Dena'ina words for 'rock' and 'first'. According to Dena'ina sound shifts from Proto-Dene vowels, the Dena'ina word would have been *htsuy.* The irregular sound correspondence in *htsay* preserves the vowel of the name at the time it was first coined. (Irregular sound correspondences are marked with symbol ≠.) These are distant patterned duplications x≡; two (or perhaps three) were *founding place names* (φ).

Cognates of this ecoregion name apparently have not been recorded in other Northern Dene languages. Noting Diebold's (1987:31) concept of name *seriation,* here are two possible *diachronic trajectories* (⁝) for early Dene expansions: (1) first Ketchumstock River uplands, second Gulkana and Susitna uplands, third Stony–Mulchatna River uplands; or (2) first Ketchumstock River uplands, second Stony–Mulchatna River uplands, third Gulkana–Susitna uplands.

1.15 *Tseyh Tl'íig* (Tanacross) 'shiny ochre'

Lithic or mineral prospecting (⅄) is evident in many names in Tanacross, Upper Tanana, and Ahtna. The mountain northwest of Ketchumstock *Tseyh Tl'íig* (1.15) in Tanacross is one of three distant patterned duplications (x≡), three cognate names for a type of ochre. See the discussion of this *diachronic trajectory* (⁝) below at names 2.4 and 2.5. The Proto-Dene term for 'ochre' **tsiˑxʸ* is common in all Dene languages. The second stem Proto-Dene **tl'iˑk'* for a type of shiny ochre is a rare archaism (Ā).

1.16 *Menh Dèes Ménn'* (Tanacross) 'lake shallows lake'

One of the more noticeable widely repeated names is associated with eight or more shallow lakes with fisheries that have a cognate name: *Menh Dèes Ménn'* (1.16) Healy Lake, *Men Daes Menn*' (3.5) Mentasta Lake, and *Ben Daes Bene'* (3.6) Old Man Lake near Eureka (also names for Cooper Lake near New Minto, Fish Lake east of Tanana, and Tundra Lake near Lime Village). This seems to be a *popular* Dene name (₱). High-frequency names abound in the Tanana and Copper River basin Dene place name network. For the Proto-Dene *Lex Loci* theory, I add this time perspective trait, *popular name* (₱). Popular names are not watershed tenure devices. The archaeology at Healy Lake is well known (Cook 1996), but little is known about sites at these other lakes. I assign [a] to indicate that this place name and some of the Healy Lake sites have archaeolinguistic overlap. Also see the discussion of the cognate names Mentasta Lake (3.5) and Old Man Lake (3.6).

Proto-Dene **deˑshʳ* means 'shoal, shallows, low island' in many Alaska Dene languages. It appears that a Proto-Dene term **deˑshʳ* originally meant 'shoal, low island' and then shifted its meaning to designate 'large stream' in six large Canadian Dene language areas: Mountain, Bear Lake, Slave, Dogrib, Yellowknife, Chipewyan (Kari 1996a, 1996b). The modeling of Dene expansion into the Canadian Shield must make note of "the **deˑshʳ* problem" (shoal vs. stream). See also endnote 10 regarding a possible Yeniseian cognate in Siberia, noted by Edward Vajda. Diebold (1987:52) refers to such meaning contrasts in cognate lexemes as "semasiological scatter."

1.17 *Xwteth Cheeg Na'* (Middle Tanana)

1.17 *Xwteth Cheeg Ndíig* (Tanacross) 'pass mouth stream'

1.18 *Jiiz Cheeg Na'* (Middle Tanana) and *Jiiz Cheeg Ndíig* (Tanacross) 'gray jay mouth stream'

This pair serves as a hydronymic district boundary (↕) with downstream or western **na'* and the upstream or eastern Alaska **niˑqʼə*, *ndiign* district. "The transition along the Tanana River is evident when comparing figures for streams in Lower Tanana (200 streams with *no'* vs. 11 with *nik'a*), Middle Tanana (50 with *na',* vs. 6 with *niige*, and 8 with both), and Tanacross (102 with *ndiig* vs. 13 with *nda'*)" (Kari 1996b:451). Literally, **niˑqʼə*, means 'on the upstream'. The west Alaska hydronym **naʔ* seems to be from the Proto-Dene root **naˑʷ (neˑ)* 'to nomadize'. The scoring of hydronymic districts (as in Fig. 2) was the original and the most significant Dene watershed tenure device. I highlight 1.17 and 1.18 on Figure 5B to emphasize that the concept of hydronymic districts was in place when the early Tanana Valley Dene stream names were being coined.

1.19 *Xwdegaayh Niige* (Middle Tanana) 'new-born stream'

A *reverse hydronym* (↕) is the use of a secondary stream term that alternates with the common term (like "avenues" among "streets"). This noticeable reverse hydronym with *niige* marks the McDonald Creek drainage as a shortcut trail route between the Tanana River and the cross-drainage trail along the north piedmont of the central Alaska Range. Middle Tanana has six reverse hydronyms; Lower Tanana has 12 (Kari 1996a, 1996b; Kari et a)l. 2012:87). Ahtna has no reverse hydronyms with **niˑqʼə.* McDonald Creek, *Xwdegaayh Niige* (1.19),

is Middle Tanana for 'new-born stream'. The dense cluster of McDonald Creek and Blair Lakes sites noted by Graf et al. (2019) would have been approximate starting and ending points for Dene bands that used the piedmont trails system on the north side of the central Alaska Range.

1.20 *Xaasaa Na'* (Middle Tanana) 'upward sun river'

In Middle Tanana the verb form *xasaghin'ąą* means 'the sun came up'. The name for Little Delta River has the first two syllables of this verb form with full vowels, thus, *Xaasaa Na'* (1.20) literally 'upward sun river.' The important archaeological discoveries near the mouth of Little Delta River at the Upward Sun site date to 11,500 years ago. The Upward River Sun 1 (URS1) genome is recognized as an Ancient Beringian population (Moreno-Mayar et al. 2018; Potter et al. 2018; Tackney et al. 2015). Potter et al. (2018) notes the USR1 Ancient Beringian population split from its parent population by 20,000 years ago. Our survey of names in Tables 1 and 2A indicates that Tanana Valley Dene names preceded those in the Copper River basin. While sites thousands of years older than USR1 have been found in the Tanana Valley, note that there is no linguistic substrate evidence of non-Dene languages in the assembled linguistic documentation (dictionary files, texts, primary data sources) for Lower Tanana, Middle Tanana, Tanacross, Upper Tanana, or Ahtna.

Halffmann et al. (2015) report on evidence for chum salmon being consumed at the Upward Sun site at 11,500 years ago. The Middle Tanana term for 'late run chum salmon' *thiyi* (Kari 2007:20, 2019c:48), is relevant. Cognates for 'late run chum' have been attested only in Middle Tanana, Tanacross, Upper Inlet Dena'ina (*seyi*), and Gwich'in (*khyii*), which occur in the name *Khyii Njik* Sheenjik River. It appears that Middle Tanana *thiyi* 'chum salmon' is related to words for 'crystalized bottom snow' in Tanacross *theyh,* Upper Tanana *thay*, and Ahtna *sesi*. Adeline Peter-Raboff (pers. comm. 2014) points out that late run chum salmon on Sheenjik River are harvested as the stream ices up to the point the chum become trapped in pockets of open water at freeze-up. This interpretive etymology of Middle Tanana *thiyi* is one "linguistic way to prehistory" (Diebold 1987:52–55) and illustrates how Dene biological nomenclature can complement other types of information.[7]

1.21 *Xosrotl'odi* (Lower Tanana) and *Xasatl'aadi* (Ahtna) 'the one with upward sun at headwaters'

1.21 *Basatl'aadi* (Middle Tanana) 'one at edge of sun at headwaters'

Today, residents of interior Alaska gauge the sun's current position by the fang-shaped peak of Mount Hayes (1.21) in the central Alaska Range, especially from the perspective of the central Tanana Valley. The peak is visible over a very large radius (over 300 km) in the Tanana and Copper River basins. The names for Mount Hayes have an implied *name provenance* (→); the name appears to have been coined from the vantage point of the mid-Tanana Valley. The Ahtna in the Copper River region use the same name as in Lower Tanana, even though the sun rises to the south over the Chugach Mountains. Also, the provenances of the Lower Tanana and Middle Tanana names are distinct (Lower Tanana *xo-* 'up' implies mid-Tanana basin vantage point (Fairbanks, Nenana, or Minto), whereas Middle Tanana and Tanacross names with *ba* 'edge' indicate a partial view closer to Mount Hayes (as from Salcha to Big Delta on the Tanana River).

1.22 *Łuu Tadzeey'* (Middle Tanana) and *Łuu Tahwdzaeye'* (Ahtna) 'heart among glaciers'

In ancient times, outlier mountains proximate to major passes through the Alaska Range would have been known by every Dene foot traveler as important landmarks. If a Dene traveler were walking north or south through Isabel Pass in the Alaska Range (Fig. 3), the isolated mountain Donnelly Dome (1.22), *Łuu Tahwdzeey'* (Middle Tanana) and *Łuu Tahwdzaeye'* (Ahtna) for 'heart among glaciers', would be a foremark or backmark (terms from Gatty 1999) walking north or south between the Tanana and Copper River drainages. The feature *Łuu Tadzeey'* also functions as a pass marker (≍), and cf. 2.10 *Łay'dzaeye'* (Ahtna) for Round Top Mountain on upper Gakona River marked as a *partial duplication* (≈).

This name is an *overtly informative* (☼) name, telling us that the Delta River glacier system was proximate to this dome when the name was coined. Black Rapids Glacier is the only prominent north-facing glacier of the central Alaska Range.[8] On occasion contemporary Dene place names indicate implied environmental change (marked with ₪). In most Alaska Dene languages, **łu·* refers to 'detached blocks or slabs of ice' (as in Jetté and Jones 2000:418). The Ahtna–Middle Tanana name for Donnelly Dome shows the semantic extension of **łu·*

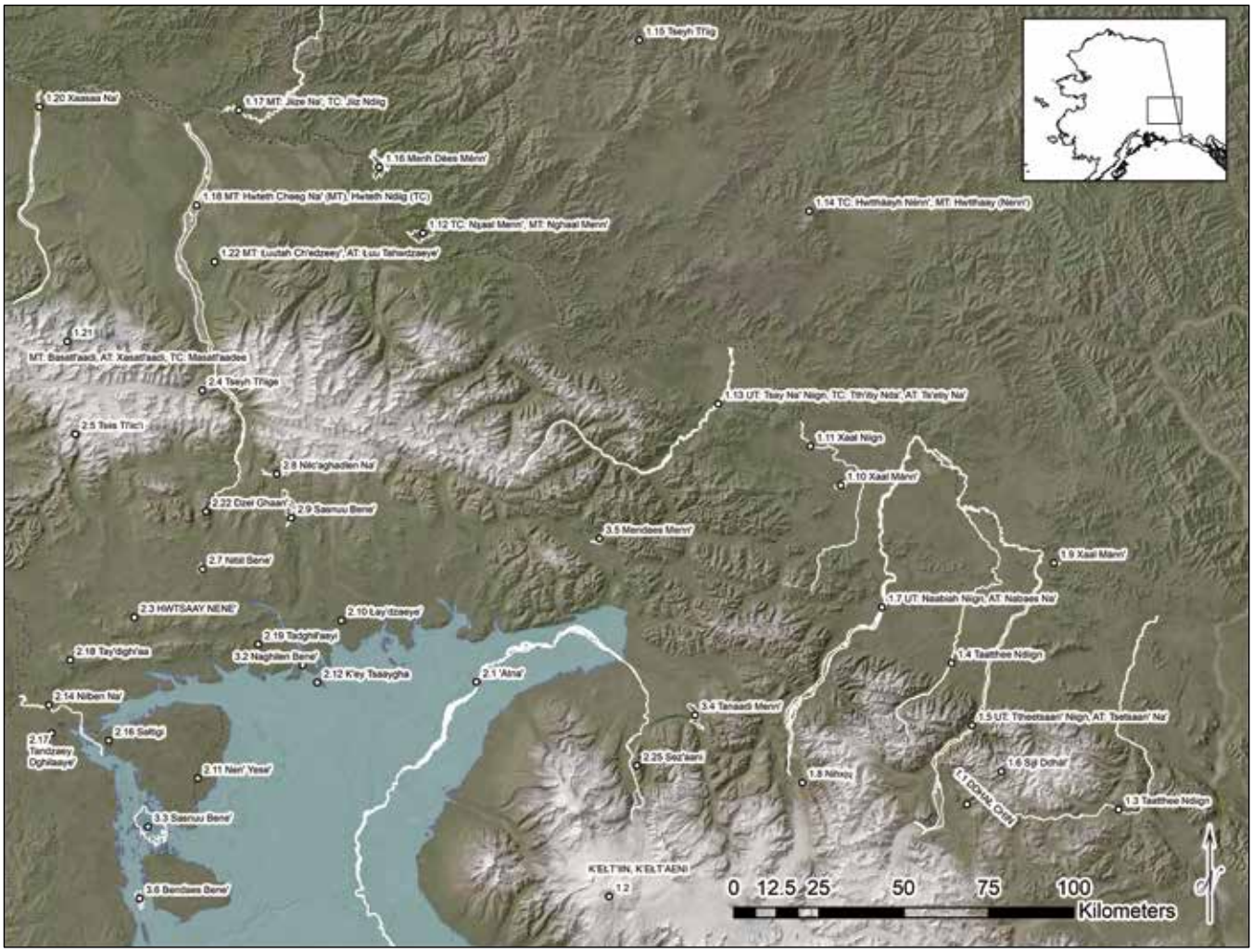

Figure 3. East-central Alaska Dene place names with Glacial Lake Atna. The 752 m shoreline (>10,740 cal BP) is from Shimer (2009), the shore line for Canyon Lake (3.2). Table 1 names are displayed along with a selection of Table 2 and Table 3 names. The Tanana River basin, the Yukon-Tanana uplands, and the Nutzotin Mountains are an intriguing region for Dene prehistory. Map by Gerad M. Smith.

to 'glacier'. Ahtna has at least 63 named glaciers where the stream name adds *łuu, -luu'*. Dena'ina has at least 30 named glaciers. North of the central Alaska Range, there are only a few named glaciers in these Dene languages, for example, Upper Kuskokwim (5), Koyukon (1), Lower Tanana (1), Middle Tanana (2), Tanacross (2), and Upper Tanana (7).

EARLY DENE NAMES SOUTH OF THE CENTRAL ALASKA RANGE

The 10 names in Table 2A show Dene entry into the uplands of the central Alaska Range via the Delta River. We posit that most of these names were coined prior to the *Nen' Yese'* Ensemble names presented in Table 2B.

2.1 *'Atna'* (Ahtna) 'beyond (barrier) river'

"For years [I] treated the syllable *'at-* in *'Atna'* as unanalyzable. But it is clear that *'at-* is from the directional root with several allomorphs *'ane', 'aat, 'aax* 'beyond, over, outside'" (Kari and Fall 2016:228). Ahtna terms *ba'aaxe* 'outside' and *ba'aadi* 'door' are formed with this directional. I had overlooked the obvious, that *'aat* shortens to *'at-* when compounded with *na'* 'stream'. The stream name *'Atna'* 'beyond (barrier)' is an iconic name (‡) with an *overt provenance* (→, from Tanana Valley) similar to the name *Xosrotl'odi* (1.21) for Mount Hayes. *'Atna'* appears to be a founding place name (φ) and may be the oldest Dene name on Table 2A. It is also highlighted on Fig. 5B as one of the 19 most probative names.

2.2 *Nataghił'aade* (Ahtna) 'torrential current flows down'

Devils Canyon is the treacherous 20-mile stretch of massive boulders on the Susitna River at the northwest edge of the Ahtna language area. The Ahtna call this place *Nataghił'aade* (2.2) or 'torrential current flows down'. *Nataghił'aade* for Devils Canyon (Kari 1983:76) was reported by Cantwell speakers Jake Tansy and Henry Peters. Shem Pete confirmed the Dena'ina name as *Nutughił'ut* (Kari and Kari 1982:39). I also obtained the name *Nataghił'aade* (3.19) from Andy Brown and Jim McKinley for Baird Canyon (Kari 1983:3), the canyon and rapids on the lower Copper River. However, I never noticed the duplication of these names until the 1990s. Fred Ewan (now age 102) is the only speaker who knows both names. Given the distance and treacherous hydrology of both features, it seems that few Ahtna experts have given much attention to this pair of duplicated names (also noted in Kari and Fall 2016:217).

The Proto-Dene verb theme *Ø+ləŋ 'current flows' is common in all Dene languages. Kari (1990:77) has an entry for an innovated Ahtna verb theme that is found in over 60 Ahtna place names: *ł'aa*°. (Dena'ina and Shem Pete do not employ this verb theme.) In the current Ahtna place names database (Kari 2014), 57 Ahtna place names have been noted with the verb theme *ł'aa*°. Most of these are in the Gulkana River or the upper Susitna River region. It appears that early Ahtna names with *ł'aa*° on the upper Susitna River or in the Alphabet Hills denoted 'massive, torrential current flows'. *Nataghił'aade* is certainly a founding place name at the west edge of the Ahtna place name network. This is an innovated verb theme only in Ahtna, so the name *Nataghił'aade* may be the earliest name that is uniquely in the Ahtna language. The duplicated names for Devils Canyon and Baird Canyon are noted on Figure 5B.

The Ahtna place name network never expanded down the Susitna River beyond Tsusena Creek. The middle and upper Susitna River Dena'ina or Ahtna names (Chaps. 10 and 11 of Kari and Fall 2016) were a distant periphery with a thin layer of names for both the Ahtna and Dena'ina. The Trapper Creek site in the Middle Susitna (Wygal and Goebel 2012; Wygal and Krasinski, this vol-

Table 2A. Early names south of central Alaska Range

Map #	Lang	Dene Name	Location, official name	Literal	a-s	S-type	F-type	TPT, ^{w}	References
2.1	At	*'Atna'*	Copper River	'beyond (barrier) river'	1-2	dir	stream	φ ǂ^{w} →	Kari 2014:4, Kari & Fall 2016:145, 228
2.2	At	*Nataghił'aaden*	Devils Canyon	'torrential current flows down place'	6-1	hydro	landfor	≡^{w}, ₪ *ł'aa*, φ	Kari 2014:1660, Kari & Fall 2016:145
2.3	At	*Hwtsaay Nene'*	Gulkana R–Susitna R plateau	'dwarf tree land'	2-2	veg	region	⸙, x≡^{w}, ⋮, φ	Kari 2014:9, Kari & Fall 2016:145
2.4	MT	*Tseyh Tl'iige*	mt. E of Black Rapids Glacier	'shiny ochre'	1-2	lith	landform	x≡^{w}, ⋮, ⋏ Ā	Kari 2015
2.5	At	*Tsiis Tl'iic'i*	mt. head of W Fork McLaren R	'shiny ochre'	1-2	lith	landform	x≡^{w} ⋮ Ā ⋏	Kari 1990:362, Kari 2014:1437
2.6	At	*Tl'azii Na'*	Middle Fork Susitna River	'rear ? stream'	1-2	hydro	stream	Ω	Kari 2014:1427
2.7	At	*Nititil Bene'*	South Tangle Lake	'current to place lake' *origin of Caribou Clan*	4-1	hydro	lake	[c] m≠	Kari 2014:900, Kari & Tuttle 2005:20
2.8	At	*Nił'aghadlen Na'*	Phelan Creek	'one that flows in either direction'	4-2	hydro	stream	₪ ☼	Kari 2014:914
2.9	At	*Sasnuu Bene'*	Summit Lake	'sand island lake'	1-3	lith	lake	≡^{w}, ⋮	Kari 2014:1545, Kari & Fall 2016:145, 227
2.10	At	*Łay'dzaeye'*	Round Top Mt.	'hand heart'	2-2	geol	landform	≍^{w}, ≈^{w}	Kari 2014:961

Table 2B. The Nen' Yese' *Ensemble*

Map #	Lang	Dene name	Location, official name	Literal	a-s	S-type	F-type	all ✋, ^{w}	References
2.11	At	*Nen' Yese'*	*Nen' Yese'* Ridge	'land ridge'	1-2	geol	landform	φ ‡^{w} ≫^{w}	Kari 2014:809, 850.2 Kari & Fall 2016:145, 228
2.12	At	*K'ey Tsaaygha*	Hogan Hill, 2641'	'by the small birch'	1-2	veg	landform	✋ φ^{w} ≡^{w}	Kari 2014:707, Kari & Fall 2016:145
2.13	At	*K'ey Tsaaygha*	hill 3000' E of Tyone R mouth	'by the small birch'	1-2	veg	landform	✋ φ^{w} ≡^{w}	Kari 2014:1545
2.14	At	*Nilben Na'*	Tyone River	'lake level surges stream'	2-2	hydro	stream	o₪^{w}	Kari 2014:1543, Kari & Fall 2016:222
2.15	At	*Tanaaxi Na'*	stream into Tyone R	'moving water stream'	2-2	hydro	s-trail	φ^{w} o₪^{w}	Kari 2014:1563.2
2.16	At	*Saltigi*	mt 3537' "Tyone"	'sun protrusion'	2-2	geol	landform	φ^{w} ≡^{w}	Irving 1957, Kari 2014:863, Kari & Fall 2016:222
2.17	At	*Tandzaey Dghilaaye'*	mt 3105'–2905' at Tyone L	'island mountain'	6-2	geol	landform	φ^{w} o₪^{w}	Kari 2014:1566
2.18	At	*Tay'dighi'aa*	mt. "Laren" 5275'	'linear object by water'	6-1	geol	landform	☼ ₪	Kari 2014:1549
2.19	At	*Tadghił'aayi*	mt 3662' (Alphabet Hills)	'one that is at torr. flowing water'		hydro	landform	ł'aa, ☼, ≡^{w}	Kari 2014:724
2.20	At	*Tadghił'aayi*	ridge upper West Fork	'one that is at torr. flowing water'	6-1	hydro	landform	ł'aa, ≡^{w} ☼	Kari 2014:847
2.21	At	*Banazdleni*	mt. 4503' "Big Bend"	'one that current flows by'	6-1	hydro	landform	φ^{w} ☼	Kari 2014:1604
2.22	At	*Dzeł Ghaan'*	mt W of Lower Tangle Lake	'half mountain'	-2	geol	landform	≡^{w}	Kari 2014:514, Kari & Fall 2016:309
2.23	At	*Dzeł Ghaan'*	mt 6449' "Chug," W of Powell Glacier	'half mountain'	-2	geol	landform	≡^{w}	Kari 2014:905, Kari & Fall 2016:309
2.24	At	*Siz'aani*	Gunsight Mountain	'heart' or 'inside me'	4-1	geol	landform	≡^{w}	Kari 2014:513, Kari & Fall 2016:309
2.25	At	*Sez'aann*	mt 6340' at Copper Glacier	'heart' or 'inside me'	4-1	geol	landform	≡^{w}	Kari 2014:1209, Kari & Fall 2016:309

Notes: Names coined at *Nen' Yese'* and the Tyone River (*n* = 15). Names coined during the "first season of the Nen' Yese' Ensemble" are marked with φ and marked in Figures 5B and 6A. The column a-s is a count of affixes vs. stems in the place name to indicate simplex names vs. complex names. S-type refers to semantic type (see examples in Kari 2008, 2011, and Kari et al. 2012 for S-type categories), F-type refers to feature type, TPT refers to time perspective trait, ^{w} refers to watershed tenure device, *ł'aa* refers to 'torrential currrent flows' verb theme.

ume) is a likely candidate for a non-Dene, non–Northern Archaic presence in the early Holocene.

2.3 *Hwtsaay Nene'* (Ahtna) 'dwarf timber country'

The duplicated name *Hwtsaay Nene'* (2.3) is the Ahtna name for the general ecoregion at the divide between the upper Susitna and upper Gulkana Rivers. The name translates to 'dwarf timber country, small trees'. This is another founding place name that refers to vegetation (φ ⸙) and must be one of the first Dene names coined on the south side of the Alaska Range. As noted above, this is also cognate with *Htsay Nenq',* the Dena'ina name for the southern Alaska Range, as well as with the Tanacross name *Hwtthàayh Nénn'* (1.14) to describe the Ketchumstock uplands.

2.4 *Tseyh Tl'iige* (Middle Tanana) 'shiny ochre'

2.5 *Tsiis Tl'iic'i* (Ahtna) 'shiny ochre'

The Middle Tanana and Ahtna names for 'shiny ochre' are *Tseyh Tl'iige* (2.4) and *Tsiis Tl'iic'i* (2.5). The final *-c'* and *tl'iic'* in the Ahtna form is a true Dene archaism (Ā), but only in these cognates (noted in Kari 1990:392). It is not found in ochre terms in other Alaska Dene languages. *Tseyh Tl'iige* (2.4) was identified by Abraham Luke as a mountain east of Black Rapids Glacier in a 1986 audio recording. *Tsiis Tl'iic'i* (2.5) is also an Ahtna name for a mountain at the head of the West Fork McLaren River. Similarly, *Tseyh Tl'ííg* (1.15) in Tanacross refers to the mountain northwest of Ketchumstock. This set of three names has four time perspective traits (lithic ⅄, archaism Ā, trajectory ⁞, and distant patterned duplication x≡).

2.6 *Tl'azii Na'* (Ahtna) 'rear Ω stream'

Some early Dene hydronyms are ambiguous and imply that a multilingual Dene band coined the name. A stem *zii* in Ahtna or in Tanana Valley Dene is ambiguous and puns on several different roots that could be distinct Dene stems such as **dhi˙, *zhi˙, *zhʳi˙*. In Table 3, I cite the Ahtna name for Nizina River, *Nizii Na'* (3.16), as a possible *partial patterned duplication* (≈) with *Tl'azii* (2.6) referring to the Middle Fork Susitna River. The stem *tl'a* is 'rear, headwaters'. These are the only two Ahtna place names with this opaque verb stem *zii.*

2.7 *Nitiil Bene'* (Ahtna) 'current flows to a place lake'

"Clan-origin locations imply long-term occupation of the Copper River basin by ancestral Ahtna people. . . . *Nitiil Bene'* [2.7], South Tangle Lake at the head of the Delta River was the site of the origin of the Caribou Clan where a human baby was found among caribou" (Kari and Tuttle 2005:27–28). The location of South Tangle Lake is notable, the most upstream lake of the north-flowing Delta River drainage. As the origin place of the Caribou Clan, I mark it as *contextually informative* [c]. *Nitiil Bene'* is a likely founding place name on the south side of the central Alaska Range.

2.8 *Niłc'aghadlen Na'* (Ahtna) 'stream that flows in either direction'

This name for Phelan Creek was reported by Jim Tyone in June 1981. Jim noted that *Niłc'aghadlen Na'* (2.8) has at times flowed into upper Summit Lake (in the Gulkana drainage) or into the upper Delta River. Local residents, hydrologists, and the Dene know that Phelan Creek is/was at the divide. This Dene name *overtly* describes environmental change (o๒). In 2013, Ben Neely noted that Gunn Creek is also called *Niłc'aghadlen Na'* (Kari 2014:754.3). Thus, Phelan Creek and Gunn Creek seem to be another geoduplicate.

2.9 *Sasnuu Bene'* (Ahtna) 'sand island lake'

"Note that the uppermost lake in the Gulkana River drainage, Summit Lake, is also named *Sasnuu' Bene'* (2.9). This duplication of names for the largest lakes at the heads of Gulkana and Susitna rivers appears to have been intentional and reflects Dene planning of the name system at the time these names were coined" (Kari and Fall 2016:227). The patterned duplication of *Sasnuu Bene'* for Summit Lake (2.9) and Lake Louise (3.3) has a clear diachronic trajectory (≡, ⁞). Summit Lake was never part of GLA. R. VanderHoek (pers. comm., March 2019) notes that the Lake Louise–Susitna Lake–Tyone Lake group remained separate from GLA in the Susitna drainage.

2.10 *Łay'dzaeye'* (Ahtna) 'limb heart'

The outlier Round Top Mountain on the upper Gakona River is called *Łay'dzaeye'* (2.10) or 'limb heart'. This is a visible landmark, trail junction, and pass marker toward Isabel Pass. I mark Round Top Mountain as a *partial duplication* with Donnelly Dome (1.22), since 'heart' appears in both names. These partial patterned duplicates stand out as foremarks or backmarks of a set of memorized Dene names. Therefore, 1.22 and 2.10 are double pass markers (⪥ʷ), and these reflect watershed tenure.

Table 3. Diminishing Glacial Lake Athna place names

Map#	Lang	Dene name	Location, official name	Literal translation	a-s	S-type	F-type	TPT, ^{w}	References
3.1	At	*Nen' Yese' Ggaay*	90 km GLA paleo-shoreline	'little land ridge'	1-3	geol	land-form	☼^{w}, ≫^{w}	Kari 2013:650, Kari & Fall 2016:228
3.2	At	*Naghilen Bene'*	Canyon Lake	'water flows down lake'	3-2	hydro	lake		Shimer 2009, Kari 2014:730.2
3.3	At	*Sasnuu Bene'*	Lake Louise, "Susitna Lake"	'sand island lake'	1-3	lithic	lake	≡^{w} ⁞φ^{w}	Kari 2014:1594, Kari & Fall 2016:145, 227
3.4	At	*Tanaadi Menn'*	Tanada Lake	'moving water lake'	4-2	hydro	lake		Kari 2014:1218, Kari 1986
3.5	At	*Mendaes Menn'*	Mentasta Lake	'shallows lake lake'	1-3	hydro	lake	≡^{w} , ⁞ ≍^{w}	Kari 2014:111, Kari 1986
3.6	At	*Bendaes Bene'*	Old Man Lake	'shallows lake lake'	1-3	hydro	lake	≡^{w},⁞ ≍^{w}	Kari 2014:494, Kari & Fall 2016:28
3.7	At	*Hwniidi Ben*	Butte Lake	'upriver lake'	3-2	dir	lake	[a]	Kari 2014:1481, Kari & Fall 2016:28–229
3.8	At	*Nac'elcuut Nelyaade*	ridge 5493' west of Jay Creek	'food is stored again- ridges extend'	7-2	activity	land-form	[a]	Kari 2014:1618
3.9	At	*Ts'inahwnet'aaden*	bluff on Tazlina R below Tulsona Cr mouth	'place that protrudes out'	6-1	geol	land-form	g≡^{w}	Kari 2014:436.2, 2010b:49, 2011:249
3.10	At	*Ts'inahwnet'aaden*	bluff on Klutina R, 3 mi. up	'place that protrudes out'	6-1	geol	land-form	g≡^{w}	Kari 2014:332, 2010b:49, 2011:249
3.11	At	*Tahwghi'aayi*	mt on East shore of Tazlina Lake	'one extending into water'	6-1	geol	land-form	g≡^{w}	Kari2013:462, 2010b:36, 49
3.12	At	*Tahwghi'aayi*	Marshall Mt. & South summit	'one extending into water'	6-1	geol	land-form	g≡^{w}	Kari2013:367, 2010b:36, 49
3.13	At	*Saltigi*	mt 4500' West of upper Mahlo River	'sun protrusion'	3-1	geol	land-form	≡^{w}	Kari 2013:361
3.14	At	*Tsedi Kulaenden*	Copper Village, east bank below Dadina River	'where there is copper (hammered)'	4-2	lithic	site	‡^{w} ⮝ [c]	Kari 2014:247, Kari & Tuttle 2005:15
3.15	At	*Tsedi Na'*	Chitina River	'copper (hammered) river'	1-2	lithic	stream	‡^{w}, ⮝	Kari 2014:92
3.16	At	*Nizii Na'*	Nizina River	'Ω terminates river	1-2	—	stream	Ω	Kari 2014:128.1
3.17	At	*Uti'sneldziits'i*	The Peninsula	'one we dance out to' *origin of Canyon Clan*	6-1	event	land-form	[c]	Kari 2014:53, Kari & Tuttle 2005:20
3.18	At	*Deyighil'aaden*	Wood Canyon	'where torrential current flows inside'	6-1	hydro	locale	*ł'aa*	Kari 2014:69
3.19	At	*Nataghil'aaden*	Baird Canyon, Abercrombie Rapids	'torrential current flows down place'	6-1	hydro	locale	*ł'aa*, ≡^{w} ₪	Kari 2014:47

Note: Literal translations are within single quotes. The column a-s is a count of affixes vs. stems in the place name to indicate simplex names vs. complex names. S-type refers to semantic type (see examples in Kari 2008, 2011; Kari et al. 2012), F-type referes to feature type, TPT refers to time perspective trait, and ^{w} refers to watershed tenure device, ł'aa refers to 'torrential currrent flows' verb theme.

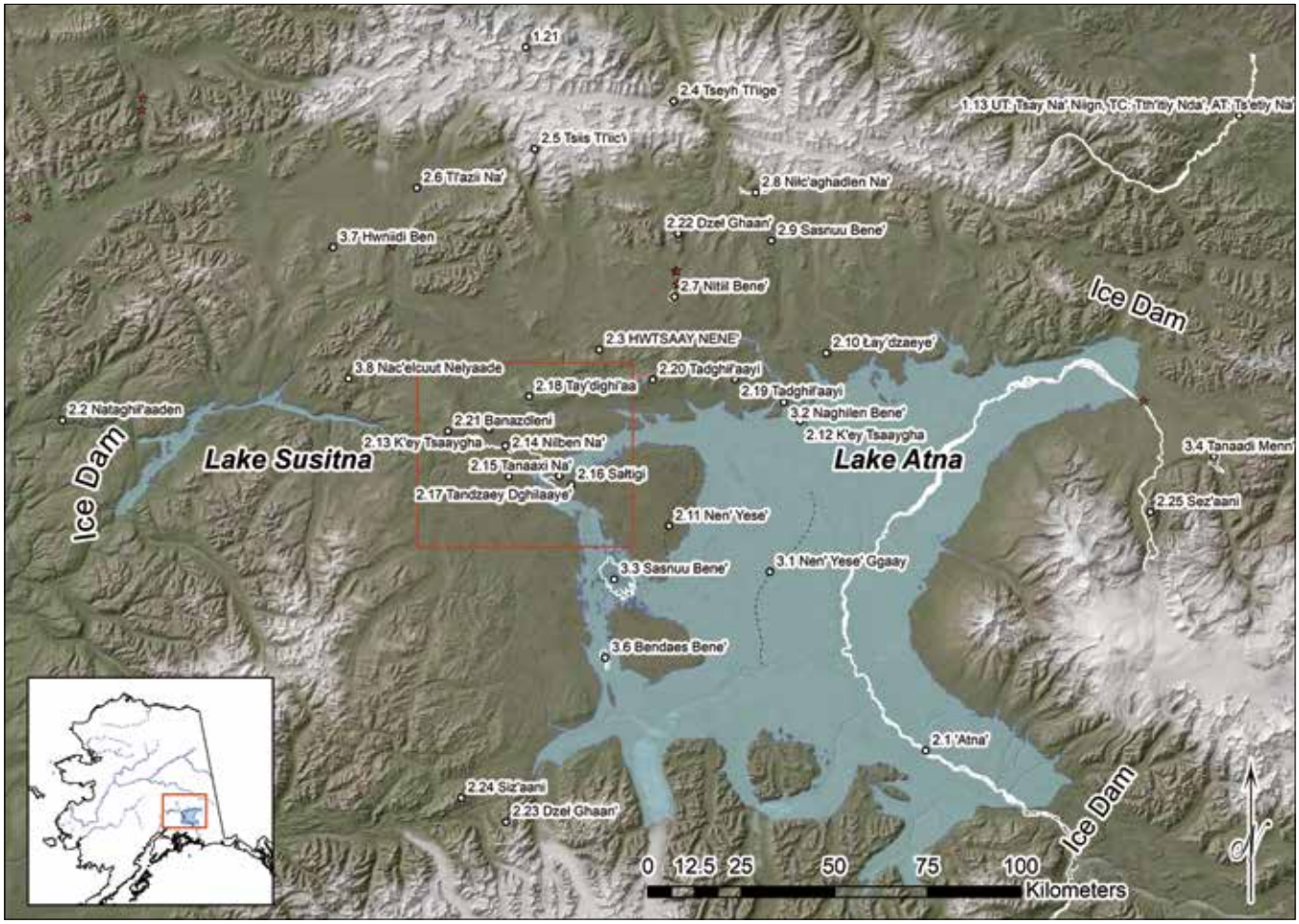

Figure 4A. West-central Alaska Dene place names with Glacial Lake Atna. These names are from Tables 1–3. Red stars mark the oldest known archaeological sites. Glacial Lake Susitna is depicted as a long and narrow late Pleistocene/early Holocene lake with a water level of < 700 m. The Prairie Creek ice dam is shown on Figures 4A, 5A, and 5B. The Tyone River area is within the red rectangle; see Figures 4B and 5A. Map by Gerad Smith.

The ancient Dene had a penchant for naming outlier mountains with the anatomical stem 'heart'; for example, the iconic Egypt Mountain on the west end of the pass system leading to Yentna River in Upper Kuskokwim is named *Toy'draya'* or 'water heart'.

Since the 1990s, I have been thinking about possible *place name ensembles* in various Dene place name networks. There seem to be thematic names, such as five or so "tree" themed ridges on tributaries of the Tolovana River. In Kari and Fall (2016:113, 147) two place name ensembles are suggested. However, both are speculative and would not obviously stand out to expert speakers as collaboratively named ensembles. The hydrologic imagery of the Tyone River area names in Kari (1983:71–73; 2008:149–153) is meaningful and provocative to expert speakers such as Jake Tansy, Fred Ewan, Frank Stickwan, Jim Tyone, and Jack Tyone. A very colorful ensemble of names (marked as ✋) were coined collaboratively when Ahtna or Dene speakers coalesced around the Tyone River area. As we examine the *Nen' Yese'* Ensemble (NYE) names more closely, I can discern about 10 names that plausibly were coined during the "first season of the *Nen' Yese'* Ensemble." Then at later times the high landforms at *Nen' Yese'* were the center point for three pairs of intervisible cross-basin names. We also have a few leads for geotemporal benchmarks for some of the names in and around the Tyone River area.

2.11 *Nen' Yese'* (Ahtna) 'land ridge'

The official name Nen' Yese' Ridge was put into the Geographic Names Information System in 2011 (USGS 2018). GNIS notes: "The name is of Ahtna origin and literally means 'land ridge' or 'earth ridge'; 20 miles long and 33 miles northwest of the community of Glennallen."

Around 11,000 years ago, *Nen' Yese'* (2.11) was possibly a large island at the outlet of GLA when it decanted west into the Susitna River. By about 10,250 years ago, it may have been a *west shoreline* of Glacial Lake Atna (BLM 2004) as it decanted down the Copper River in stages.

Fred Ewan explained that the trail along *Nen' Yese'* starts northwest of *Hwdaani K'ay' Ses Na'* (Kari 2014:828); it extends south ~25 km to the hill *C'ezaeni* (Kari 2014:808) west of Crosswind Lake. This seems to follow the western GLA shoreline noted by Williams and Galloway (1987). The island stage of *Nen' Yese'* as depicted on Figures 4A and 4B was approximately 30 km east to west and 35 km north to south. Modern *Nen' Yese'* is a moraine-studded lake region at the Susitna and Copper River divide with elevation contours that range between 760 and 890 m. Also see *Nen' Yese' Ggaay* (3.1) or 'little land ridge', a former GLA shoreline running north and south of Sourdough to Tazlina River.

The name *Nen' Yese'* is simple, iconic, and informative at several levels (ease of travel, centrality, antiquity). The Proto-Dene form of the name is **ŋənʔ ɣʸəthəʔ.* This ridge is salient in the Ahtna trail system between the Susitna and Copper River basins. I place its paired name *Nen' Yese' Ggaay*, meaning 'little land ridge', a former shoreline of GLA, as the first name (3.1) on Table 3. Both 2.11 and 3.1 are highlighted on Fig. 5B.[9]

2.12 *K'ey Tsaaygha* (Ahtna) 'by dwarf birch' Hogan Hill

2.13 *K'ey Tsaaygha* (Ahtna) 'by dwarf birch' hill north of Tyone River mouth

Williams and Galloway (1987) show present-day Hogan Hill, *K'ey Tsaaygha* (2.12), in Ahtna, as a spur extending into GLA. This is also the name for the hill just east of the mouth of Tyone River (2.13), first reported by Jack Tyone in 1981. The names have the same stem, *tsaay*, and the vegetation theme (🌿) as in 1.14 and 2.3 referencing the 'dwarf timber country'. These two hills are visible from *Sałtigi* (2.16). I assume *K'ey Tsaaygha* (2.12) for Hogan Hill was the first hill so named, and that the hill with the same Ahtna name (2.13) north of Tyone River mouth was the second. Hogan Hill would have served as a start mark or backmark during the first season of Dene exploration of the *Nen' Yese'* or Tyone River area. Collaboration in the coining of names must have commenced at this time.

When the Dene entered the Copper River basin, identification of birch would have been critical for snowshoes, handles, or containers. However, VanderHoek (pers. comm., March 2019) noted that modern-day birch groves in Copper River basin are on landforms that were above the water level of GLA and at a maximum elevation zone of about 730 to 769 m. Very little birch was able to recolonize in GLA basin due to muck and silt. Thus, the locations of Ahtna place names that refer to birch add another dimension to the GLA problem. I count 26 Ahtna names that refer to birch. On the Susitna River, *K'ey Tsaaygha* (2.13) is the most upstream name that refers to birch. The upper Susitna River is too high in elevation for birch.

2.14 *Nilben Na'* (Ahtna) 'lake level surges stream'

2.15 *Tanaaxi Na'* (Ahtna) 'moving water stream'

Since the 1980s, my suggestion has been that the name *Nilben Na'* (2.14) for the Tyone River is a graphically descriptive name for what could have been the main outlet for GLA until ca. 11,000 years ago. Literally, *nilben* describes a rising water level that reaches a point and then surges. Apparently, fluctuating GLA water levels of 760 to 754 m would have prompted discharge through the *Nilben Na'*. The verb theme *l+ben* is common in Ahtna and many Dene languages (including Navajo) and refers to rising/falling water levels in a lake or in a container. Reviewing my databases, *Nilben Na'* is the only Ahtna place name with this verb theme. Also, there are no other place names with this verb theme among 2000+ Koyukon names or among 2675 Dena'ina names.

The officially unnamed tributary called *Tanaaxi Na'* (2.15) by Ahtna is on the north side of Tyone River and appears to be on the course of the GLA Tyone Spillway (Williams and Galloway 1987). The stream and two lakes are called *tanaaxi* 'moving water' (see Fig. 4B). At the northeast edge of the Copper River basin, there is a partial duplication (≈) for Tanada Lake or *Tanaade Menn'* (3.4) 'moving water lake'. Both (2.14 and 2.15) are marked to indicate overt environmental change (o🌊). In fact, if the name for Tanada Lake (3.4) *preceded* the naming of 2.15 *Tanaaxi Na',* this could imply early 11th millennia dates for the initial naming of the NYE.

2.16 *Sałtigi* (Ahtna) 'sun protrusion'

2.17 *Tandzaey Dghilaaye'* (Ahtna) 'island mountain'

These two mountains over 1100 m in elevation are informative of the landscape from the vantage point of *Nen' Yese'*. *Sałtigi* (2.16), the highest point (hill "Tyone," 1078 m) on the ridge island *Nen' Yese'*, is noted in Williams and Galloway (1987). Irving (1957) summarizes western

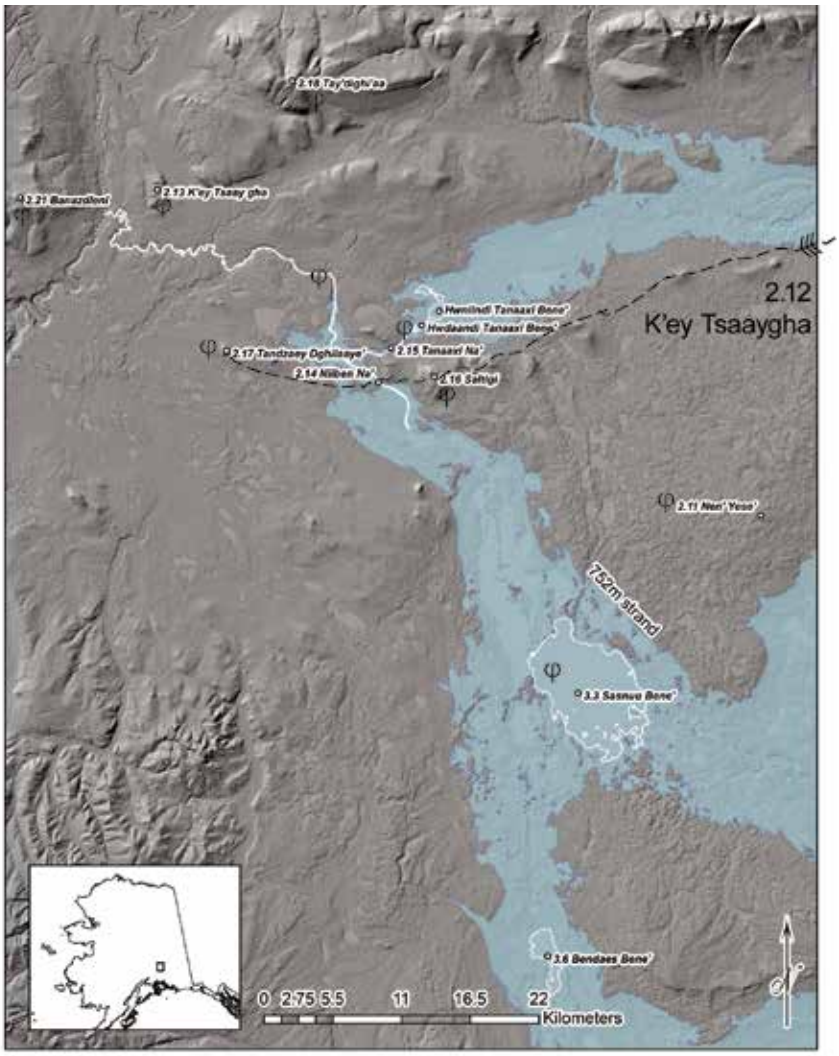

Figure 4B.* Nen' Yese' *and Tyone River place names. This large-scale projection depicts the relief and stream conditions on Tyone River at about 10,700* BP *(12,600 cal* BP*) with* Nen' Yese' *(2.15) shown as a large island in the Tyone Spillway. We mark nine names with φ as being among "the first season of* Nen' Yese' *Ensemble names.' This figure also refers to a callout box for Tyone River on Figures 5A and 5B. Map by Gerad Smith.

Ahtna land use and artifacts found on *Saltigi* and other areas near Tyone Village. The Ahtna chief of Tyone Village was called *Saltigi Ghaxen* (Kari and Tuttle 2005:16–17). *Saltigi* (2.16) or 'sun protrusion' and its location as the highest landform at the nexus of the Tyone Spillway suggest it was among the initial names of the *Nen' Yese'* Ensemble. See also 3.13 *Saltigi*, a mountain 1372 m in elevation west of upper Mahlo River.

The name and location of *Tandzaey Dghilaaye'* (2.17) are informative for a couple of reasons. This 960 m mountain on the south side of the Tyone River (16 km below Tyone Lake, upstream of Tyone Creek, and opposite the mouth of *Tanaaxi Na',* 2.15). See "The First Season of *Nen' Yese'* Ensemble Names" discussed below. This is also the only name among the 67 selected names with the common Ahtna generic term for 'mountain' *dghilaay, -dghilaaye'*. Kari (1996b) notes that four Dene languages south and west of the Alaska Range (Ahtna, Dena'ina, Upper Kuskokwim, Deg Hit'an) use cognate terms that are based on the verb theme 'plural objects extend' to mark a Dene *oronymic district* (analogous to the seven *hydronymic districts,* marked as either/or (↔). In Lower Tanana *Deghiloyi*, literally 'objects that are up, suspended', refers to the high mountains of the Alaska Range, but it is not used as a generic for 'mountain'. The spread of variant forms of Lower Tanana *deghiloyi* for mountain names can be tracked in four Dene languages (Ahtna, Dena'ina, Upper Kuskokwim, Deg Hit'an) and is useful for modelling the spread of Dene occupations.

2.18 *Tay'dighi'aa* (Ahtna) 'linear object at water'

2.19 *Tadghił'aayi* (Ahtna) 'one that is at torrential flowing water'

2.20 *Tadghił'aayi* (Ahtna) 'one that is at torrential flowing water'

2.21 *Banazdleni* (Ahtna) 'the one current flows around'

The ridge "Laren" south of McLaren River is called *Tay'dighi'aa* (2.18) 'linear object at water' in Ahtna and it has an associated set of lake, stream, and pass names. The stream *Tay'dighi'aa Na'* flows into Tyone River just below Tyone Creek. The hill *Tadghił'aayi* (2.20) is south of the West Fork Gulkana River and may have been an island in GLA as noted in Williams and Galloway (1987), whereas *Tadighił'aayi* (2.19) is a taller mountain (1025 m) in the central Alphabet Hills. Both names use the innovated Ahtna verb theme *ł'aa*° 'torrential current flows'. *Banazdleni* (2.21) is the dome at "Big Bend" on the Susitna River, and it has a hydrologic description with the common verb theme 'current flows'. This dome was never part of GLA or GLS.

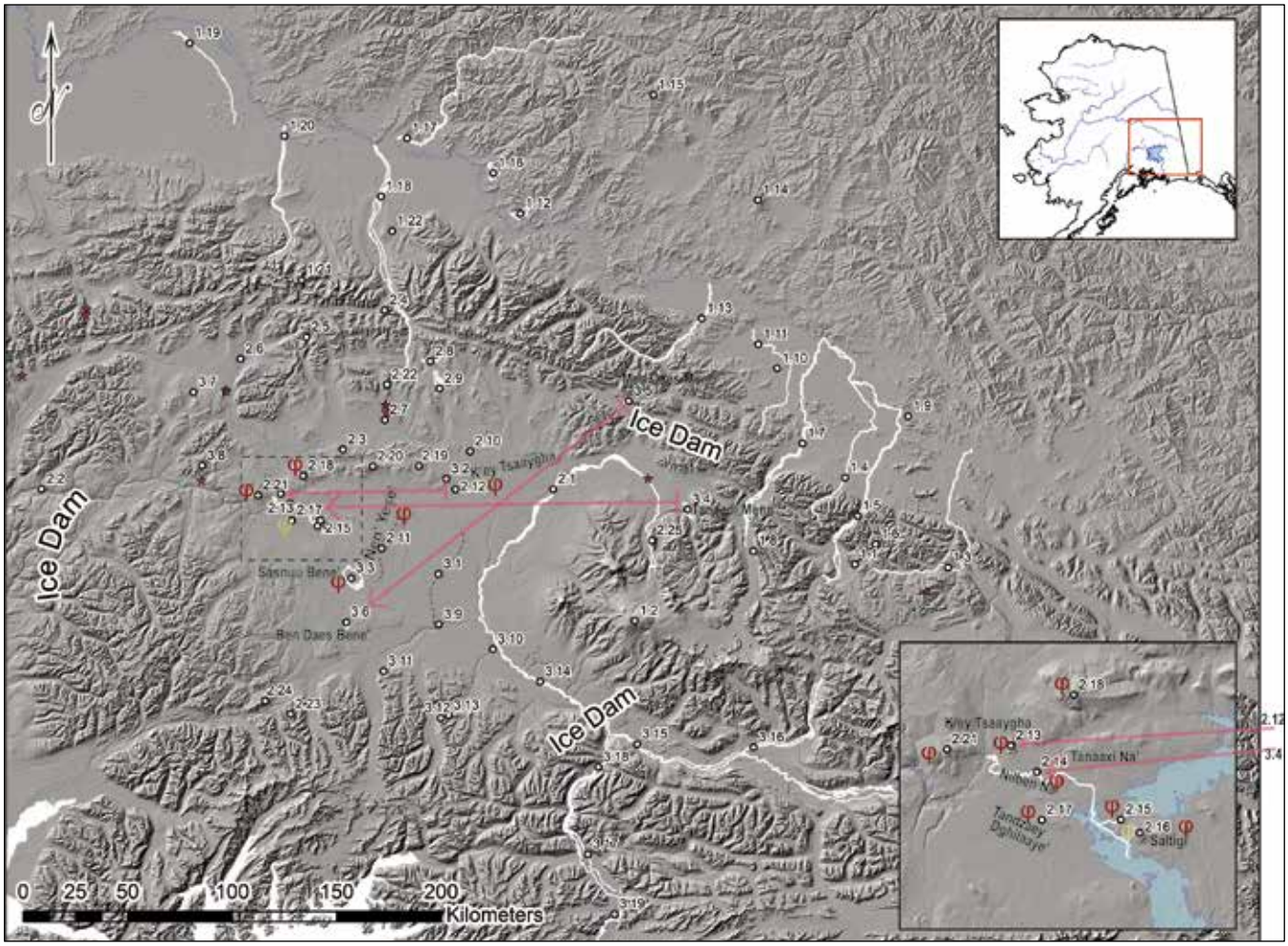

Figure 5A. Spatial-temporal context for the **Nen' Yese'** *Ensemble. All 67 names in the tables are numbered on 5A. The names with φ are part of the first season of the NYE. Arrows mark four pairs of names: 2.9–3.3 (Summit Lake–Lake Louise), 2.12–2.13 (Hogan Hill–hill at Tyone River mouth), 3.4–2.14 (Tanada Lake to* **Tanaaxi Na'***), 3.5–3.6 (Mentasta Lake–Old Man Lake). These four pairs offer leads toward potential geotemporal benchmarks. Map by Gerad Smith, text by James Kari.*

2.22 *Dzeł Ghaan'* (Ahtna) 'half mountain'

2.23 *Dzeł Ghaan'* (Ahtna) 'half mountain'

2.24 *Siz'aani,* (Ahtna) 'inside me, or my heart'

2.25 *Sez'aann* (Ahtna, Mentasta dialect) 'inside me, or my heart'

Surveyors and topographers can take note of these two pairs of intervisible names on Figures 4A or 5B. Three of the mountains would be visible from the ridge *Nen' Yese'* (2.11). The two 'half mountain' *Dzeł Ghaan'* (2.22 and 2.23) names are *outside* of Copper River basin. One is a mountain west of Lower Tangle Lake west of the upper Delta River (2.22), and the other is a mountain west of Powell Glacier along the South Fork of Matanuska River (2.23). The patterned duplication marks the edges of the Delta River and Matanuska River watersheds. Ahtna experts Frank Stickwan, Katie John, Fred Ewan, and others were fascinated by these four names. From *Nen' Yese'* (2.15) or from *Saltigi* (2.16), a person can view two *Dzeł Ghaan'* and one *Siz'aani* mountain and might acknowledge but not actually see the mountain *Sez'aann* (2.25) at an elevation of 2006 m and north of Copper Glacier at the head of the Copper River. Gunsight Mountain, *Siz'aani* (2.24), can be seen from a large radius, but the mountain *Sez'aann* (2.25) at Copper Glacier can only be seen from nearby to the north, from the Slana area, for example (Kari and Fall 2016:309, Fig. 190). These four names show pragmatic Dene collaboration and the centrality of *Nen' Yese'* for cross-basin landscape orientation.

THE FIRST SEASON OF THE *NEN' YESE'* ENSEMBLE (NYE)

As we grouped names in Table 2B and marked time perspective traits, it is interesting to apply auto-instructional features of the Ahtna place names. It is possible to model how a set of 10 or 11 names (marked with the symbol φ) plausibly were coined during the first season on the *Nen' Yese'* Ensemble. Figures 4B and 5A show these at different scales.

Perhaps in the month of March Dene bands coming from the Delta River and Tok River/Mentasta Pass coalesced at the trail junction at 2.10 *Łay'dzaeye'* Round Top Mountain. The name *K'ey Tsaaygha* (2.12, Hogan Hill) was set. The profile of the ridge (and former GLA island) is given the iconic name *Nen' Yese'* (2.11). It would have been about a 110 km walk to the mountain *Sałtigi* (2.16), the high point from which more names could be collaboratively coined, including the overtly descriptive but rare verb derivative *Nilben Na'* (2.14) or 'water level rises-surges stream' (Tyone River) and the watershed-defining name for Susitna Lake, *Sasnuu' Bene'* (3.3). An island seems to have been in place on the north end of the Tyone-Susitna-Louise group, as indicated by the name *Tandzaey Dghilaaye'* (2.17) or 'island mountain'. Crossing the river ice, the band may have walked ca. 20 km up the stream *Tandzaey Dghilaaye' Na'* to the summit of 2.17. From here they would have a central view of the 50 km long course of the Tyone River. The duplication of *K'ey Tsaaygha* (2.13) as a foremark integrates this colorful hydrologic-vegetation ensemble of names. Its lake and stream meet the watershed of *Tay'dighi'aa* (2.18); these join *Nilben Na'* just below. To the west *Banazdleni* (2.21), the dome at the confluence of the Tyone and Susitna Rivers, would conclude this initial batch of names. In addition, further name seriation may be detectable among four pairs of duplicated names, as noted on Fig. 5A and Tables 2–3 with an east-west trajectory: Tanada Lake *Tanaade Menn'* (3.4), the stream on Tyone spillway course *Tanaaxi Na'* (2.14), Mentasta Lake (3.4), and Old Man Lake (3.5). In addition, as noted in Fig. 5A, four pairs of patterned/partial duplications suggest spatial-temporal seriation among specific naming events. We model how certain names were coined prior to, during, and after the first season of the NYE. See discussion below.

NAMES AT DIMINISHING STAGES OF GLACIAL LAKE ATNA

The Ahtna coined layers of rule-driven names throughout the Copper River basin (mainly above Wood Canyon) and the upper Susitna River basin as they became familiar with the region; for example, in the Gulkana River drainage and then farther downstream. I am interested in the names 3.1, 3.2, and 3.3 in relation to GLA but also other names from Table 3 that indicate a cross-basin awareness, including several overlapping geoduplications. However, some of these names may be as recent as 1000 to 2000 years old.

3.1 *Nen Yese' Ggaay* (Ahtna) 'little land ridge'

Nen' Yese Ggaay (3.1) is 20 to 24 km to the east of the ridgeline of *Nen' Yese'* (2.11) and its topographic contour line is scored on the Gulkana USGS quadrangle. 'Little land ridge' between Gulkana and Tazlina Rivers was the paleo shoreline of GLA for some unknown span of time. The landform is scored with dashes on Figs. 4A, 5A, and 5B. It has an average elevation of 600 m and extends about 90 km north to south. The north end is a terrace with a lake (west of Sourdough Roadhouse) called *Tadaa'a Dełtaani*, literally 'pond on terrace'. It terminates south of a bluff called *Ts'inahwnet'aaden* (see 3.9 below), about 20 km up the Tazlina River just below the mouth of Talsona Creek. This has been the main Ahtna foot trail between the Sourdough area and the Tazlina River.

I mark *Nen' Yese' Ggaay* (3.1) with the following three symbols: resemblent pair (≫), overtly informative (☼), implied environmental change (๛). When the iconic name *Nen' Yese'* (2.11) was coined, it was an island-lake district. *Nen' Yese' Ggaay* (3.1) would have been a traversable west shoreline of GLA after it decanted down the Copper River. Time perspective questions abound for this pair of names 2.11 and 3.1. This Dene geolinguistic information can prompt lithological and archaeological research. Some questions for paleoecologists or archaeologists include how long was this a beach of GLA? Is there evidence of shoreline use, such as bonfires?

3.2 *Naghilen Bene'* (Ahtna) 'current flows down lake'

The Ahtna word for Canyon Lake is *Naghilen Bene'* (3.2), meaning 'current flows down lake'. This name is not distinctive, but I include it on Table 3 because the lake

core analysis presented by Shimer (2009) indicates that the elevation of Canyon Lake became isolated from GLA with a maximum age of 10,750 years ago. There is no archaeological data for the immediate locale of Canyon Lake despite it being a natal lake for sockeye salmon. VanderHoek (pers. comm., March 2019) offers the striking hypothesis that sockeye salmon entered ancient GLA via the Susitina River. This has broad implications for GLA prehistory.

3.3 *Sasnuu Bene'* (Ahtna) 'sand island lake'

Lake Louise or *Sasnuu Bene'* (3.3) in Ahtna is marked for three time perspective traits, and initially we depicted it as a submerged feature of GLA. However, VanderHoek (pers. comm, March 2019) reports that the lakes Louise, Susitna, and Tyone were beyond the watershed divide, separate from GLA, and about 6–9 m lower in elevation. Thus, Summit Lake (2.13) and Lake Louise (3.3) are a patterned duplication (≡) with a diachronic trajectory (⋮). This patterned duplication (≡) that recognizes the Gulkana-Susitna drainage divide is the exemplar of Dene *watershed tenure*. Also, we suggest that 3.3 was named during the first season of the NYE), so the name could have been placed in Table 2B (since it was *not* submerged under GLA).

3.4 *Tanaade Menn'* (Ahtna) 'moving water lake'

Smith (this volume) suggests that the GLA ice dams at Mentasta Pass and outflows from *Tanaade Menn'* (3.4) to the Tok River date to the late Pleistocene but occurred prior to human arrival. The overt hydrologic name for Tanada Lake is a *partial duplication* (≈) with *Tanaaxi Na'* (2.15) on the Tyone River. This shows attention to torrential currents as well as cross-basin awareness of the distant arms of GLA. Moreover, the recent discovery of a GLA shoreline site on Tanada Creek, NAB-533 by Reininghaus (this volume), dated to about 10,000 years ago could be very relevant. I draw an arrow on Figure 5A between 3.4 and 2.15, suggesting that the name *Tanaade Menn'* preceded *Tanaaxi Na'.*

3.5 *Men Daes Menn'* (Ahtna) 'lake shallows lake'

3.6 *Ben Daes Bene'* (Ahtna) 'lake shallows lake'

Men Daes Menn' (3.5) or Mentasta Lake and *Ben Daes Bene'* (3.6) Old Man Lake translate as 'lake shallows lake' and are among this set of distant popular names (x₱) that include Healy Lake, which in Tanacross is *Menh Dèes (Chèeg) Ménn'* (1.7). VanderHoek (pers. comm. March 2019) points out that Old Man Lake was submerged in GLA whereas Lake Louise–Susitna Lake–Tyone Lake was not. The name for 3.5 for Mentasta Lake placed a familiar name at Mentasta Pass on the Slana River. By marking Old Man Lake with the same name, the pair of names are noticeable double pass markers (≍ʷ), Old Man Lake being the portage between the Tyone Lake area and the Tazlina watershed. Old Man Lake (3.6) drains south into Tazlina Lake (Figures 4A, 4B, and 5A) and was a submerged feature of GLA. A date for the emergence of the shore of Old Man Lake could tell us when its Ahtna name was coined.

3.7 *Hwniidi Ben* (Ahtna) 'upstream lake'

Hwniidi Ben (3.7) is Ahtna for Butte Lake, situated on a direct foot trail between the upper Susitna and Nenana Rivers. Jake Tansy (1907–2003) was the strongest speaker on record for the Ahtna language (Kari 2010b; Kari and Fall 2016:231–234), and *Hwniidi Ben* was the central hub of Jake's trail network. *Hwniidi Ben* is also mentioned on the 1839 Wrangell map (Kari and Fall 2016:85–86) and is the earliest historically documented name presented in this article. This is an instance where a riverine directional term 'upstream place' is the sign for the name.

The site Butte Lake Northeast has evidence for continuous Dene land use on the south side of the central Alaska Range. Kari and Fall (2016:229) note "[t]he multi-component site Butte Lake Northeast was first described by Bob Betts (1987) and recently by Michael Wendt (2013). Four components (Northern Archaic to Ahtna) date from 4500 years ago (B. Potter, pers. comm. October 2018) until historic times and prompt discussions of site use, technology and climate change. Jake Tansy was Bob Betts' source for information on Ahtna use of the area." Assigning [a] to this name indicates that the name system informs the archaeology and that the archaeology informs the name system. The name *Hwniidi Ben* certainly spans the time frame of the sites here.

3.8 *Nac'elcuut Nelyaade* (Ahtna) 'food is stored again—ridges extend'

West of Jay Creek, a 1674 m ridge called *Nac'elcuut Nelyaade* (3.8) in Ahtna is at Jake Tansy's intersecting trail routes to the middle Susitna River via the Brushkana River. Figures 4A and 5A note the Jay Creek Ridge site on an elevation of 850 m that Dixon (1993) has dated to approximately 9500 BP (ca. 10,855 cal BP). The Jay Creek

Ridge site was near the north shore of GLS. Recognizing Jake Tansy's skilled, articulate travel narratives (Kari 2010b; Kari and Fall 2016:231–234), I assign [a] to 3.8 as an archaeolinguistic marker. It is plausible that this place name and the network of surrounding Ahtna names span the archaeological record.

3.9 *Ts'inahwnet'aaden* (Ahtna) 'one that protrudes outward'

3.10 *Ts'inahwnet'aaden* (Ahtna) 'one that protrudes outward'

A bluff on the north side of Tazlina River (3.9) and another bluff on the north side of Klutina River have the same name, *Ts'inahwnet'aaden* (3.10). Both are noted in Kari (2010b:49; 2011:249) as geoduplicates. *Ts'inahwnet'aaden* (3.9) is at the south terminus of the former shoreline and trail *Nen' Yese' Ggaay* (3.1). The name for the bluff along the Tazlina River (3.9) would have directed attention to the bluff along the Klutina (3.8). These auto-instructional aspects of Dene geography deserve closer study.

3.11 *Tahwghi'aayi* (Ahtna) 'the one extending into water'

3.12 *Tahwghi'aayi* (Ahtna) 'the one extending into water'

This colorful pair of names on the two large L-shaped glacial lakes was the first *geoduplicate* that I recognized (Kari 2010b:38; 2011:249). *Tahwghi'aayi* refers both to the mountain on the south corner of Tazlina Lake (3.11) and to Marshall Mountain, the ridge on the south corner of Klutina Lake (3.12). When Gerad Smith scored the GLA waterline on a draft of Figure 5, we noted that both 3.11 and 3.12 were potential shoreline features on GLA. This may imply that some Ahtna names in Table 3 date to the higher GLA water levels. From the summits of 3.11, 3.12, or 3.13, one would readily see mountains in the *Nen' Yese'* Ensemble, such as *Dzeł Ghaan'* (2.23), *Siz'aani* (2.24), and *Sałtigi* (2.16).

3.13 *Sałtigi* (Ahtna) 'sun protrusion'

A name recorded in the 1980s called *Sałtigi* (3.13) as the 1372 m mountain west of upper Mahlo River never prompted discussion among Ahtna elders. *Sałtigi* (3.13) is a distinctive duplication with 2.16 (the mountain north of Tyone Village). However, as we prepared the maps for this article, we added a 67th name, "the 2nd *Sałtigi*." The previous five names (3.9, 3.10, 3.11, 3.12, and 3.13) enhance name memorization in the dense Ahtna place name network and Ahtna trail system on the west side of the Copper River.

3.14 *Tsedi Kulaenden* (Ahtna) 'where there is copper'

Tsedi Kulaenden (3.14) is said to be "Copper Village" and the place where *tsedi* was first found. It was also the first center for Ahtna copper trade and manufacturing. An Ahtna narrative on aspects of copper trade and manufacturing by Jim McKinley in 1981 appears in Kari and Tuttle (2018:84–106). The Upper Tanana name for copper is *ttheetsąą'* 'rock excrement', the Proto-Dene term for copper. The Ahtna term *tsedi* 'that which is pounded' refers to cold-hammering and is based on the verb theme 'to pound, to hammer' (Kari 1990:375). The name is marked as iconic and as contextually informative. No archaeological evidence for "Copper Village" has been discovered.

Cooper (2012) reviews the literature on copper in northwest North America, summarizing geological sources as well as archaeological sites and the dating of manufactured copper. The major sources were in the Wrangell Mountains. The best-known and oldest-dated site for Native copper use is just across the river from modern Gulkana Village (GUL-077), or *Cuuy Ak'ae* 'home of least weasel'. *Cuuy* was the famous dwarf chief who traded copper and acquired many wives (Kari and Tuttle 2018:86–92). The Gulkana Village site has abundant copper at various stages of production in workshop areas. Radiocarbon dates here associated with the copper industry begin around AD 1000. Cooper (2012) states that copper innovation and manufacturing in the Wrangell Mountains area must have begun earlier than the manufactured copper at various dated sites, sometime in the first millennium AD.

3.15 *Tsedi Na'* (Ahtna) 'copper (hammered) river'

The name *Tsedi Na'* (3.15) refers to Chitina River and is an iconic lithic/mineral name. It is notable that the two streams with the largest deposits of stream copper, Chitina River and Chisana River, use the distinct Dene terms for copper. The Alaska and Canada Dene had macroregional awareness through names for large streams, ecoregions, and ethnonyms. The naming of *Tsedi Na'* can be viewed as aboriginal product branding. Several other notable names with *tsedi* are *Tsedi Tu'* Chitistone River 'copper water' and *Tsedi Ts'ese' Na'* Chitistone Creek 'copper rock stream'. The Chitina River's named reference to copper manufacture likely predates the copper artifact record. Was it previously

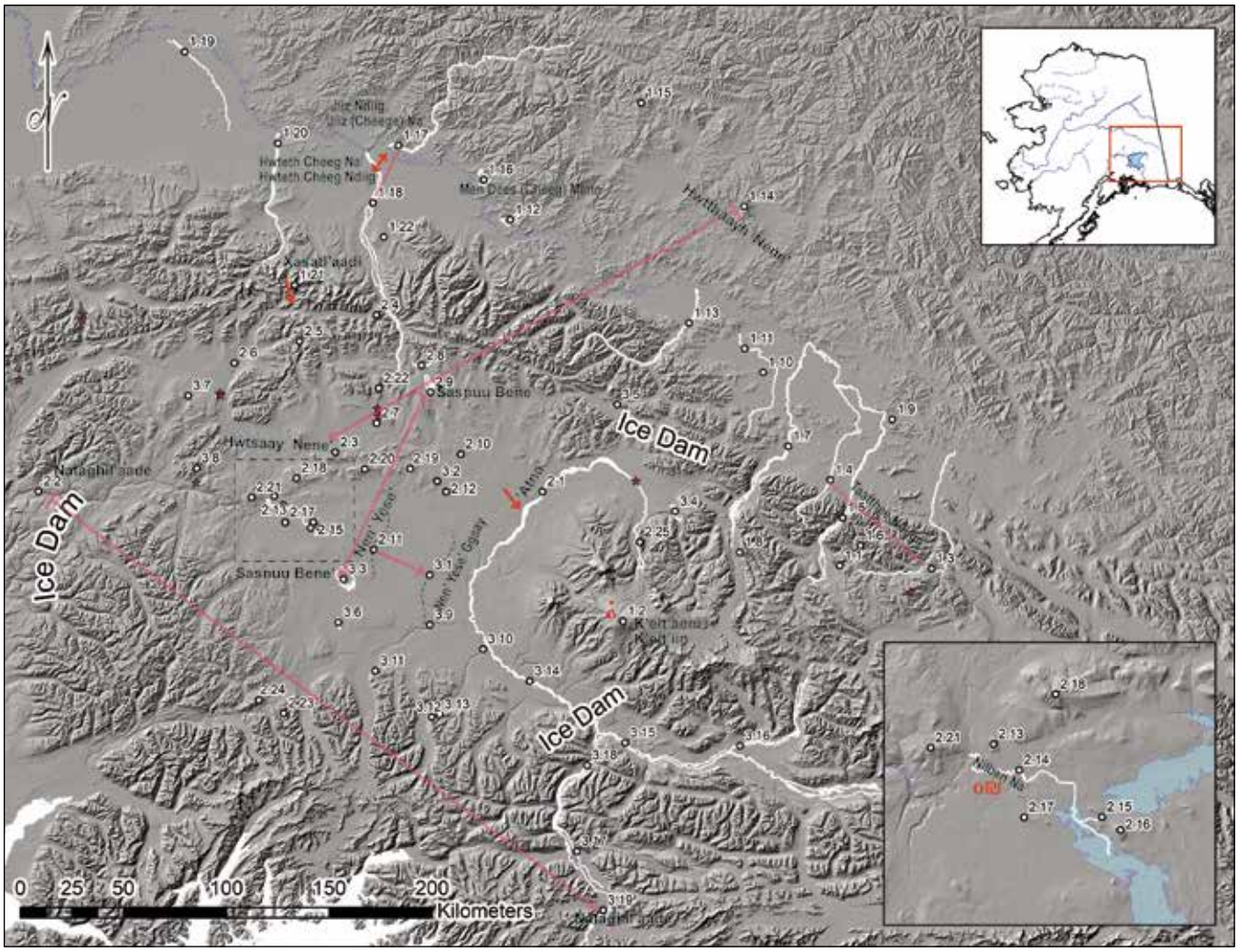

Figure 5B. Probative place names from the Tanana and Copper basins. This projection presents all 67 names in Tables 1–3 by numbers on a grayscale lidar base map. The shorelines of GLA and GLS are not scored, but four ice dams are noted. Red stars indicate the oldest archaeological sites south of the Alaska Range between 10,000 and 12,000 cal BP. This map facilitates review of the figures, tables, etymologies, and time perspective traits. The 19 Dene names that are labeled are featured in the Summary of Geolinguistic Evidence. Map by Gerad Smith, text by James Kari.

named *Tsetsaan' Na'*? Also see Chisana River (1.5) *Ttheetsąą' Na'* (Upper Tanana) or 'copper (excrement rock) river'.

3.16 *Nizii Na'* (Ahtna) 'Ω terminates stream'

Another opaque or ambiguous hydronym, this is one of two Ahtna names with the stem *zii.* Cf. the Middle Fork of the Susitna River, *Tl'azii Na'* (2.6). Marking these as partial duplications (≈) suggests that the early name on the upper Susitna River may have prompted *Nizii Na'* (3.16). Smith (this volume) notes that by 10,000 to 11,000 cal BP, Skolai Pass from Nizina River to the White River was deglaciated and would have been available for use by early colonizers, although archaeological evidence in these mountain passes is limited. Also see *Tl'azii Na'* (2.6) Middle Fork Susitna River meaning 'rear Ω stream'.

3.17 *Uti'snedziits'i* (Ahtna) 'the one we dance out to'

It is my assumption that the Ahtna coined names on the lower Copper River as they entered these areas for the first time. The name *Uti'snedziits'i* (3.17) is contextually informative [c]; I call this semantic type "incident." Kari and Tuttle (2005:20) stated, "*Uti'sneldziits'i*, The Peninsula, opposite the mouth of Tasnuna River, means 'the one we dance out to'. Here the *Naltsiine* clan descended from the sky and created the *Dits'i'iltsiine* or Canyon Clan." The founding of the *Dits'i'iltsiine* at The Peninsula commemorates Ahtna ceremonial investigation of the lower

Copper River. The *Dits'i'iltsiine* Canyon clan is unique to Ahtna among the Alaska Dene. We assume that 3.17 is a clan name that was coined relatively recently.

3.18 *Deyighił'aaden* (Ahtna) 'where torrential current flows in (canyon)'

I include this name, *Deyighił'aaden* (3.18), for Wood Canyon because it makes use of the innovated verb theme *ł'aa°* that I assume originally designated torrential stream flow. This canyon has the second name ascending the Copper River with this verb theme *ł'aa°*.

3.19 *Nataghił'aade* (Ahtna) 'where torrential current flows down'

We conclude this survey with this patterned duplication with the innovated Ahtna verb theme *ł'aa°* 'torrential current flows' for Devils Canyon 2.1 and Baird Canyon 3.19. Baird Canyon/Abercrombie Rapids was one GLA breeching point on the lower Copper River possibly after ca. 10,250 cal BP (VanderHoek, pers. comm., March 2019). Given the distance and remoteness of Devils Canyon and Baird Canyon, the duplication of these names is highly remarkable. How many millennia separated these two naming events?

SUMMARY OF GEOLINGUISTIC EVIDENCE

We have brought features of a theory of Dene prehistory and Sapirian time perspective argumentation to selected Dene geolinguistic data from four Alaska river drainages. The data for the GLA discussion are from cumulative Dene geographic name files with 6276 features in seven adjacent Dene languages (Fig. 1). The Proto-Dene *Lex Loci* theory and its outline of time perspective traits (Supplemental Table S1) combine features of Dene geographic naming and lexicographic-etymological analyses from seven dictionaries for adjacent Dene languages. For the selected names, I have presented a matrix of etymological facts. Using dictionary files for five languages, and referring to the column "a-s" in Tables 1–3, where I count affixes or stems in each place name, we can note that almost every affix or stem that occurs in the 67 names has cognates shared among all five languages (two exceptions being the archaisms in 1.6 and 1.8).

Figure 5B labels 19 names, with lines drawn between six pairs of names. The Tanana Valley names (Table 1; Figs. 3, 5B) are the oldest names under discussion. Watershed tenure devices in the names are evident. *K'ełt'aeni, K'ełtiin* (1.2) for the Wrangell Mountains stands out as iconic and enigmatic (¿). The 'stream cobble' geoduplicates for 1.3 and 1.4 are signs for a trail to obsidian. The names for Goodpaster River (1.17) and Delta River (1.18) mark the west-to-east hydronymic districts of Alaska. Three names that indicate that early Tanana Valley Dene names preceded those of Copper River (rather than the reverse) are 1.21 *Xosrotl'odi* (Lower Tanana) Mount Hayes, 2.1 *'Atna'* (Ahtna) Copper River, and 1.22 *Łuu Tadzeey'* (Middle Tanana) Donnelly Dome. The patterned duplication ecoregion names 1.14 and 2.3 'dwarf tree country' signal Dene expansion into the Copper and Susitna uplands via the Delta River, which is further traced by three duplications (1.15–2.5 and 2.6) of mountain names with 'shiny ochre'. *Sasnuu' Bene'* (2.9) Summit Lake seems to have been coined about when South Tangle Lake (2.7) was named but prior to the names of the *Nen' Yese'* Ensemble.

The NYE names center around the iconic name *Nen' Yese'*. The names in the ensemble are engaging for time perspective reasoning. The pair of hills *K'ey Tsaaygha* (2.12 and 2.13) have a traceable east-to-west trajectory that signals a plausible "first season of *Nen' Yese'* Ensemble" when perhaps 10 founding place names were set in place (on Figs. 4B, 5A). The duplication of *Sasnuu' Bene'* Summit Lake and Susitna Lake is striking, being the exemplar of Dene hydrologic awareness (termed watershed tenure).

Names in Table 3 were coined over many millennia, after the Copper River decanted into the Pacific (10,250 cal BP and later events). Names in Table 3 show collaborations and watershed tenure devices, the onset of copper manufacturing, and the arrival of a new *Dits'iltsiine* clan.

Based on the discovery of site NAB-533, the 10,000+BP GLA shoreline on Tanada Creek (Reininghaus, this volume), the affinity between the name *Tanaade Menn'* (3.4) for Tanada Lake and *Tanaaxi Na'* (2.15) indicates Dene presence along the entire north shoreline of GLA at high water levels early in the 11th millennium BP. Also, I am suggesting that the names for Mentasta Lake (3.5) and Old Man Lake (3.6) were coined when GLA water levels were dropping rapidly. A maximum shoreline date for 3.6 *Ben Daes Bene'* would be about when that name was coined. Therefore, a plausible approximate chronology among nine names on Fig. 5B is:

before NYE	2.9 *Sasnuu' Bene'* Summit Lake
	3.4 *Tanaade Menn'* Tanada Lake
during NYE	2.12 *K'ey Tsaagha* Hogan Hill
	2.14 *Tanaaxi Na'* stream into Tyone River

2.15 *Nilben Na'* Tyone R
3.3 *Sasnuu' Bene'* Lake Louise
2.12 K'ey Tsaagha hill at Tyone R mouth
after NYE 3.5 Men Daes Menn' Mentasta L.
3.6 *Ben Daes Bene'* Old Man Lake

These names may span 1000-2000 years during 11th to 9th millennia BP during the period that the GLA drainage pattern shifted from the Susitna R to the Copper R. It may be possible to clarify this naming scenario with geological and paleo-ecological research

Also relevant for broader time perspective on Alaska Dene band expansions is the set of Dene founding place names to the west in the Kuskokwim River drainage of the southern Alaska Range. Kari and Fall (2016:146–147) present a group of 13 founding Dene place names in a north-to-south trajectory, including seven reverse hydronyms; three of those have cognates in the Tanana Valley (Table 1; 1.2, 1.14, 1.16). I have been assuming that the *Nen' Yese'* Ensemble names preceded the southern Alaska Range founding Dene names (but perhaps it was the reverse!).

If the oldest name in this article is the Tanacross ecoregion name *Hwtthàayh Nénn'* (1.14) 'dwarf tree country' in the Yukon-Tanana uplands, and the most recent name is the Ahtna name for Baird Canyon *Nataghił'aade* (3.19), that time interval could be from 12,000 to 1000 years. The duplication of Devils Canyon (2.2) and Baird Canyon (3.19) with the Ahtna verb theme *ɬ+'aa°* 'torrential current flows' is thought-provoking.

CONCLUSION

Dene geolinguistic data and Sapirian time perspective argumentation can broaden interdisciplinary discussions of Alaska and Beringian prehistory. This article has advanced features of the Proto-Dene *Lex Loci* theory. We have not had the space in this article to give a thorough overview of Dene generative geography. See Supplemental Table S1, Section 1, for 10 themes of the multilayered Dene generative geography. The outline of time perspective traits (Table S1, Sections 2, 2.1, 2.2, 2.3) allows for us to distinguish overt and implied information, archaisms and aberrancies, and especially the pragmatic watershed tenure devices (13 watershed tenure devices are noted in Table S1, 2.2). Several components of Dene generative geography seem to be reconstructable to Proto-Dene: the selection of salient and functional names for foot travel, a battery of identifiable feature types, several clever watershed tenure devices, and the nine-point polyhedral Dene riverine directional system (Kari 2010b: chapter 6).

The interdisciplinary potential of the Proto-Dene *Lex Loci* derives from having high-quality root-morpheme dictionary files for adjacent Alaska Dene languages. The geolinguistic information in adjacent Dene dictionaries, e.g., mappable cognate vocabulary, is cosmographic in scope. The material and natural world, the conscious and the subconscious, the lexical and the grammatical can be viewed as distillations of Dene cosmography in alphabetized outlines. All Dene languages have highly productive verb themes for hydrologic and geologic description; Ahtna innovated a verb theme *ɬ+'aa°* 'torrential current flows' when they coined the name for Devils Canyon.

Several of Ben Potter's (2010:153) observations remain valid: "In Alaska, the American Paleoarctic tradition is succeeded by the Northern Archaic tradition at ~6000 cal BP . . . the extended dichotomy between interior-focused Northern Archaic and various coastal groups (related to Arctic Small Tool and/or Norton tradition) from ~5000 cal BP to recent times." "The American Paleoarctic to Northern Archaic transition (6000 cal BP) is not well understood" (Potter 2010:158). A relatively recent entry of Na-Dene languages into western Alaska, as suggested in Flegontov et al. (2016), Flegontov et al. (2019), and Vajda (2019a), is not tenable.[10]

In this study area, the links seem obvious between the Dene geolinguistic information and numerous Alaska Northern Archaic sites at 6000–8000 years ago. As noted (Kari 2010a:210–211, 216–217), the advanced Dene snowshoe and documented Dene biota terms can be applied to the Dene–Northern Archaic expansions throughout Alaska. Dene generative geography as seen in the Dene place name networks has various cognitive, logistical, and demographic implications. When we detect possible founding place names or trajectories between two, three, or four cognate names, it is likely that these names were set in place by vanguard Dene bands. These names anticipated the spread of Dene–Northern Archaic occupations and would have preceded the archaeological records, for example, in the upper Tanana River area (Lynch et al. 2018). It also appears from the cumulative Dene linguistic records that in most of interior Alaska between 11,000 and 5000 years ago the Dene evidently had no non-Dene-speaking neighbors occupying nearby lands. Especially interesting is the distribution of Dene–Northern Archaic that occurred between 5000 and 6000 years ago, for example, at

Onion Portage in the northwest, at Agiak Lake in the far north, or in our study area.

This article provides support for the Dene Geolinguistic Conservatism Hypothesis (Kari 2010a). Whether names in Tables 1–3 were coined in the 11th millennium BP, or perhaps 6000 to 7000 years ago, or as recently as 1000 years ago, the place name data presented in this article may be the earliest historical linguistic demonstration of place names from one language family that are fully etymologizable and transparent in their meanings. The resilience and durability of the Dene names are due in part to (a) unique typological features of Dene grammar (simplex nouns and postpositions and complex verbs with templatic word formation [Kari 2010a]) and (b) the vital orienteering, logistical, and auto-instructional features of Proto-Dene generative geography.

Analyzable place names that are both simplex and complex are found throughout the Dene language family, including the Southwest (Apachean) and Pacific Coast languages (such as Hupa), as well as in 32 nearly contiguous Northern Dene languages. Dene place names may look new and recent, whether they date from 500–700 years (in Navajo), ca. 1500–2000 years (in Hupa in California), or 3000–12,000 years old in the 32 contiguous Northern Dene languages. Vajda (2019b) discusses the distribution of Yeniseian hydronyms and substrate Yeniseian hydronyms in other Siberian languages, a topic that adds other spatial-temporal dimensions to the Dene-Yeniseian Hypothesis.[11]

The Dene-Yeniseian Hypothesis introduced by Edward Vajda (2010) is exceptional for its potential antiquity and territorial extent in Siberia and North America. Vajda continues to refine and advance the roster of Dene-Yeniseian cognates, including removing a few 2010 proposed cognates due to counterevidence (Vajda 2013, 2017, 2018). Recently, Vajda has written (2017:363–364):

> the [Dene-Yeniseian] templatic verb structure…shows evidence of great persistence over time. The most striking changes, however, arose from metathesis and reanalysis, which affected even the most ancient morphological layers. Because these processes rearranged and reinterpreted inherited morphemes without eliminating them or adding anything completely new, archaic features of Dene-Yeniseian verb structure have persisted through millennia of divergent evolution.

Protracted linguistic change and a slow chronology for Na-Dene and Dene-Yeniseian are stimulating hypotheses for Dene-Yeniseian comparative-historical research, for theoretical models of linguistic change, and for interdisciplinary prehistory.

NOTES

Supplemental tables and figures for this article are available online via the Publications tab at https://www.alaskaanthropology.org/.

1. In this article I use Dene, Proto-Dene, Deneist in place of Athabascan, Proto-Athabascan, Athabascanist, etc. The hypothesis in my 2010a article is now the Dene Geolinguistic Conservatism Hypothesis. The term "Deneology" has potential as well.
2. Also Athabascan indexed pages: xii, 14, 39, 141, 154, 214–215, 217, 221–222, 227–229, 244, and 309.
3. Diebold 1(987:21): "a catalogue of techniques with pan-chronic/cross-language applicability"; Diebold (1987:43): "Geolinguistics, an historical linguistic term for the study of the geographical distribution of cognates within a language."
4. Hanks (1997) is a discussion of Glacial Lake MacKenzie and Bear Rock, a small peak in the southern Norman Range. The name translates as 'beaver lodge' and the mountain is featured in widely known *Yamoria* stories as an island in Glacial Lake MacKenzie. In the Tanana-Copper River basins there are no stories on record that are counterpart to Bear Rock and GLM as noted by Hanks. Thanks to Chris Cannon for noting this source.
5. Since 2016 Gerad Smith and I have used an experimental multilingual web map for reviewing name inventories and locations. Our 2017 Alaska Dene web map has over 12,000 features on file for 12 Alaska Dene languages. This Alaska Dene multilingual web map has been done without grant funding specific to this purpose. Names in several Alaska Dene languages are being expanded and refined, but those changes are not being updated on the 2017 Alaska Dene web map. Viable consolidated place names data are best circulated by invitation or selectively for several reasons. CRM firms in Alaska pay people to harvest Native language place name data for mega-projects.
6. Note these two-syllable compounds for 'obsidian': Koy. *baats'e,* UT *mbehts'eh*, LT *basrts'a, bahtr'a*, At *bests'ae.* I reconstruct Proto-Dene obsidian as **be·shɾ-tr'e?* to mean 'female stone'. We usually gloss the verb theme

O+ɬ+batr in LT (also MT, Tc, UT) 'cook O by boiling.' But the connection between the noun 'portable stone' and the verb theme implies the ancient meaning was 'cook, stew O (broth, meat, bones) by rotating hot stones in fire'.

7. Fish terms in Dene languages provide insights into Dene band seriation in Alaska and Canada as well as the Pacific Coast. Kari (2002) is a preliminary study of Dene fish terms, especially the Dene salmon problem. Biota terms are well researched for several Alaska Dene languages but remain underutilized in Alaska natural history or prehistory research.
8. The Ahtna–Middle Tanana name for Black Rapids Glacier, *Dałuunidaekden*, is literally 'where ice entered'. A recent poster by Wilson and Buzard (2019) discusses the potential of lichenometery to date surges of Black Rapids Glacier that were prior to the famous 1937 ice surge. It seems that one previous surge can be dated to ca. 2300 years BP by measuring lichen on large glacial erratics. However, the name *Dałuunidaekden* likely was coined when the Dene first assigned names along the Delta River.
9. The distribution of Proto-Dene 'ridge, linear landform', or Proto-Dene **səth, -ɣʸiˑtthˀəʔ~-ɣʸəthəʔ* is highly interesting. In my databases it is attested only in 10 western Alaska languages and seems to be absent in Gwich'in and Han. In Dena'ina, ca. 15 ridge names with *ses, -yits'a* are in Upper Inlet or on the Kenai Peninsula. However, no *ses, -yits'a* names are in West Cook Inlet or the dense name works for Inland and Iliamna dialects. These are time perspective clues. The broader distribution of Proto-Dene *səth, -ɣʸiˑtthˀəʔ* is important for Dene prehistory and is relevant to Dene-Yeniseian Hypothesis.
10. The *Nature* article with 35 co-authors makes questionable claims based on DNA patterns that have emanated from Eskimo and Dene (aka Athabaskan) language areas mainly over the past 5000 years. The linguistic/typological and environmental contrasts and disparities are well known between the precursor languages of Paleo-Eskimo (Proto-Eskimo Aleut) vs. Proto-Na-Dene or for Vajda's Dene-Yenisiean hypothesis. The Dene geolinguistic information in this article reflects a downstream east-west diachronic trajectory down the Yukon River and across Interior Alaska.
11. Vajda (2019b:192): "River names with the final combining form *–tes ~ tas ~ tiš ~ des ~ das* appear in large areas of south and western Siberia. . . . This would make the earliest Yeniseian word for 'river' resemble Proto-Athapaskan **deˑšʷ* and Eyak *dehž.* [cf. 1.16, Healy Lake] and PD **deˑshʳ* 'shoal, river'." Vajda notes that the most common hydronym in Yeniseian, **sēs* 'river', may be related to Proto-Dene 'sand' **thaˑxʸ* or **thəxʸ* 'small particles, crumbs' Adding to this discussion, we note also a possible cognate, Ahtna *ses, -yese'* 'ridge, linear landform', or Proto-Dene **səth, -ɣʸiˑtthˀəʔ~-ɣʸəthəʔ.*

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THE RESILIENCE OF DENE GENERATIVE GEOGRAPHY, CONSIDERING "THE *NEN' YESE'* ENSEMBLE"

James Kari

Alaska Native Language Center, University of Alaska Fairbanks, P.O. Box 757680, Fairbanks, Alaska 99775-7680;
james.kari@alaska.edu

SUPPLEMENTAL TABLES AND FIGURES

Table S1. Outline of Proto-Dene **Lex Loci** *terms and time perspective traits*

Term	Description/Comments	Sym/ Abbrv	Table/Fig. Citation	References
1. RULE-DRIVEN DENE GEOLINGUISTIC INFORMATION				
SIGN(+GENERIC) + FEATURE LOCATION	bipartite template S+G analyzable, functional, reinforces memorization, name retention		all 67 p.n.	Kari 2008, 2010a, 2011
name-feature salience	founding names φ, vanguard names		Table 2B	new in 2018
simplex vs. complex signs	Nouns, N+PP vs. verbal derivations; affix-stem counts	a-s	all, new	Kari 2010a, 2011
generative geography name sets	sets of names with shared sign; (35% of 2522 Ahtna names have shared sign), 11 LT names with *troth*		Fig. S1 name sets	Kari 2008, 2011, 2013, Kari et al. 2012:18
toponymic generics	inventory of feature types, regional innovations in generic terms, *t'aa* 'torrential currrent flows'	Ftype, *t'aa*	2.2 disc.	Kari 1989, 2011, 2008
semantic types	SIGN content (20–24 categories), etymologies, analyzability, 89% Ahtna p.n. analyzable, SIGN without GENERIC	Styp	all	Kari 2008, 2011, Kari & Fall 2016
feature geometry	linear (streams), polygons (landforms, lakes), points			Kari 2008, 2011
bioregional names and ethnonyms	recurrent bioregions and ethnonyms (headwaters people)		2.2	Kari 1989, Kari 2008
riverine directional template:	PF+DIR+SF (5PFX-9ROOTS-4SFX) complements place names as GPS system (not discussed)	DIR	3.7	Kari 2010b: chap. 6
name networks	shared multiling. names+locations, landscape-name distribution patterns; trail networks; name reconfirmation (in sources, by experts)		Fig. S1	Kari 1989, Kari & Smith 2017
personal names::place names dichotomy	pers. n. (spiritual, unique, name avoidance) :: p.n. (shared, functional, vital, nonfiction)	none		Kari 2010b:55–58, Kari & Tuttle 2018:x-xi

(continued on next page)

Table S1. Outline of Proto-Dene **Lex Loci** *terms and time perspective traits (continued)*

Term	Description/Comments	Sym/ Abbrv	Table/Fig. Citation	References
2.0 TIME PERSPECTIVE TRAITS (or HYPOTHESES)		**TPT, TPQ**		
2.1 overt or implied SIGN(+GENERIC)	canonical Dene place names, auto-instructional, informative, most not WT devices		all	Kari 2008, 2010a, 2011
overtly informative signs	the etymology speaks for itself	☼	1.22, 2.8, 3.1	
founding place names	useful for modelling band movements, name seriation (also vanguard, pioneering p.n.)	φ	1.2, 2.1, 2.3, Figs 4B, 5A	Kari & Fall 2016:146–147 new
detectable name provenance	vantage point where name was coined	→	1.21, 2.1, 2.17	Kari 2011:248–249
implied diachronic trajectory	seriation, direction for 2, 3 cognate names	⋮	1.15–2.4–2.5, Fig 4B	Kari 2010a:202
implied environmental change	GLA decants, receding glaciers, emerging lake shores, paleo-shorelines	₪	1.22, 3.1, 3.3, 3.19	Kari & Fall 2016:144–147
overt environmental change	Phelan Creek, Tyone River	o₪	2.8, 2.14, 2.15	Kari & Tuttle 2005:27–28
contextually (culturally) informative names	clan origin places, mythic names, event names	[c]	2.7, 3.14, 3.17	
archaeo-linguistic marker	name/name network + site/site complex associations, TPQ	[a]	1.16, 1.20, 3.7, 3.8	
popular names, (swan, beaver)	frequent repetitions, four least cisco names	₱	1.9–12, 1.16, 3.5, 3.6	
thematic names	vegetation (🌿) , lithic-mineral ⮜, anatomy, colors (only veg., lith. noted)	⮜, 🌿	1.5, 1.7, 3.15, 1.14, 2.1, 2.13	
paired names	upstream/downstream, small-large some WT	≫	2.11+3.1	Kari & Tuttle 2005:27–28
2.2 Watershed tenure devices	pragmatic variations of SIGN+GENERIC, vernacular collaborations	WT,^{w}		
hydronymic districts	seven mutually exclusive 'stream' terms in 32 Northern Dene langs., Fig. 2	↔	Fig. 2, 1.17+1.18	Kari 1996a, 1996b
reverse hydronyms	minor stream name **niq'ə* vs. **na'* (street vs. avenue), 7 in southern Alaska Range; most notable in AK Dene: Highpower Ck & Middle Fork Koyukuk River	↕	1.19	Kari 1996a, 1996b, Kari & Fall 2016:145–146
iconic	distinctive, noticeable names, usually WT	‡	1.2, 2.1, 2.11, 3.14	
boundary marking names	important for Proto-Dene *Lex Loci* theory, also overt boundary markers	‖,o‖	1.13	Kari & Fall 2016:145
patterned duplications, distant patterned duplications	WT unique, distinctive pairs	≡; x≡	2.9+2.10, 3.3+, 3.4 1.14+ 2.3	Kari & Fall 2016:144–147
partial duplications	distinctive pairs with shared SIGN	≈, x≈	1.22+2.10, 2.6+3.16	
very distant pattern duplications	*Nts'ezi* in At, UK	x≡1	none	Kari & Fall 2016:144–147
intensive duplications	intraregional collaboration, 5 *Taltsogh Na'* names (At)	≡x	none	Kari 2010b:49

(continued on next page)

Term	Description/Comments	Sym/ Abbrv	Table/Fig. Citation	References
geoduplicates	noticeable feature name duplications, marking trails, homologous features	g≡	1.3+1.4 3.9+3.10	Kari 2010b:49
salient features	pass markers, central landmarks, useable river bluffs (only pass markers noted)	≍	1.18, 1.22, 2.10, 3.5, 3.6	Kari 2008, 2011
place name ensemble	collaboratively coined set, Table 4B *Nen' Yese'*– Tyone River names	✋	2.11–2.25	Kari & Fall 2016:113
distinct hydronyms for same stream	Tok River names	!!	1.13	Kari & Fall 2016:144
double reverse hydronym	rare WT, Dn *Vazh'atnu* N Babel River, UK *Mazr'a Nek'* Xhuchaynik Ck	≫↕	none	see Kari & Fall 2016:145
oronynmic districts	Ahtna: *dghelaay* LT: *ddheł*	OR↔	2.17	Kari 1996b
2.3 aberrant, irregular	comparative Dene irregularities noted by editor from Dene data, many not cited			
Proto-Dene archaisms on file	'least cisco' lakes in Tc, UT	Ā	1.9–12, 1.8	Kari 2010b:49
opaque, not translatable,	*Sįįł Ddhal* (1.20) UT archaism on file	Ω	1.6, 2.6, 3.16	
ambiguous, homophonous	multiple meanings, enigmatic, possible WT	¿^{w}	1.2	Kari 2010b:49
irreg. phonology (mergers, V shifts)	Disc. of 1.14	≠	1.14 disc.	Kari & Fall 2016:113
reanalyzed morphology	ellipsis, synchope, *len* > *l* 'current flows'	m≠	2.7	Kari 1996a, 1996b
reinterpreted analysis	LT *Beyada Tena* 'jaw trail'⟶ At *Yidateni* 'frozen inside', Reindeer Mt. (Cantwell)	✋	none	Kari 1996a, 1996b
no substrate non-Dene langs.	Tanana Valley, Copper River			
substrate non-Dene place name	non-Dene word in Dene place name network, Den: *Ggasilatnu* Kasilof River	∞	none	Kari & Fall 2016:147
rejection of substrate	Dena'ina tabooistic innovations, esoteric innovations (pre-Eskimo contact)	ⓓ	none	new
early Dena'ina spread, *-tnu* 'stream'	Den. names in Ahtna (*-tna'*) or Koyukon (*-tno'*)	Dnu	none	Kari & Fall 2016:146
substrate blend	Susitna River: Den. *Suyitnu* 'sand r.' At *Sasutna'*, UK *Sosrutno'*; Den. as literal, At. UK *not* fully analyzable	CV∞		Kari & Fall 2016:82
borrowed place name	*Bayliisde* < Valdez (2 in Ahtna)	⇦	none	Kari 2008:15
blurred name	historic reanalysis *Salcheege* (MT) Salcha site, *sal-* no concensus among Dene langs.	Ω?	none	Kari 2018

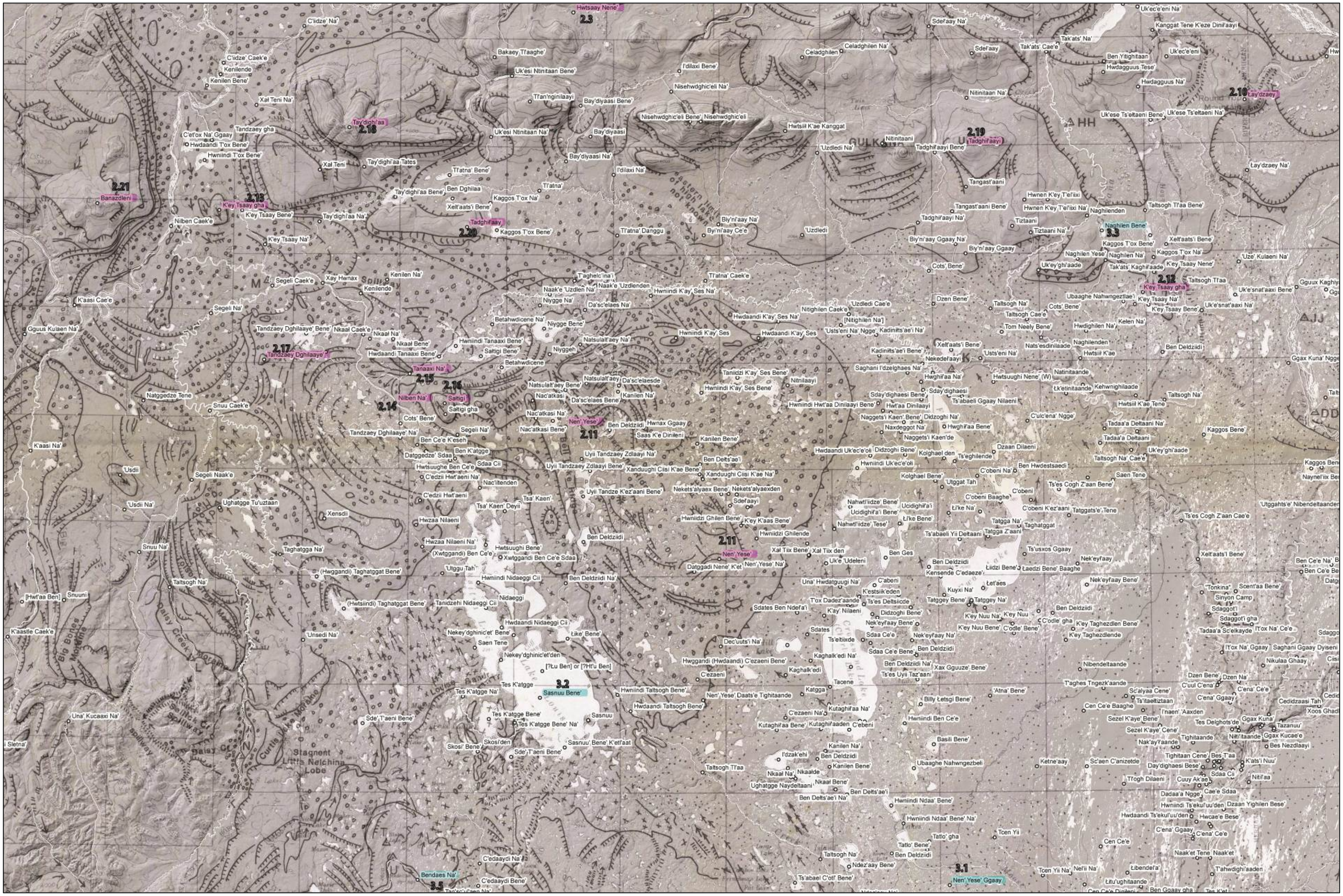

Figure S1. Ahtna place names on GLA geologic map. Williams and Galloway (1987) geologic map displaying Ahtna place names from Kari (2014). On the full-size 36"x36" 1:250,000 map there are 1216 Ahtna place names displayed on a GIS layer. This figure represents a cropped subsection centered on the West Fork of the Gulkana River and Tyone River reduced about 30%. In about 51,502 km² (32,002 mi².) about 675 Ahtna place names are displayed. The names with numbers highlighted in pink are from Table 2 and names with numbers in cyan are from Table 3. Map by Gerad M. Smith.