2022 ARCTIC STRATEGIC TRANSPORTATION AND RESOURCES (ASTAR) PROJECT FIELD STATION LOCATION DATA AND DESCRIPTIONS: UTQIAGVIK REGION (BARROW TRIANGLE), NORTH SLOPE, ALASKA

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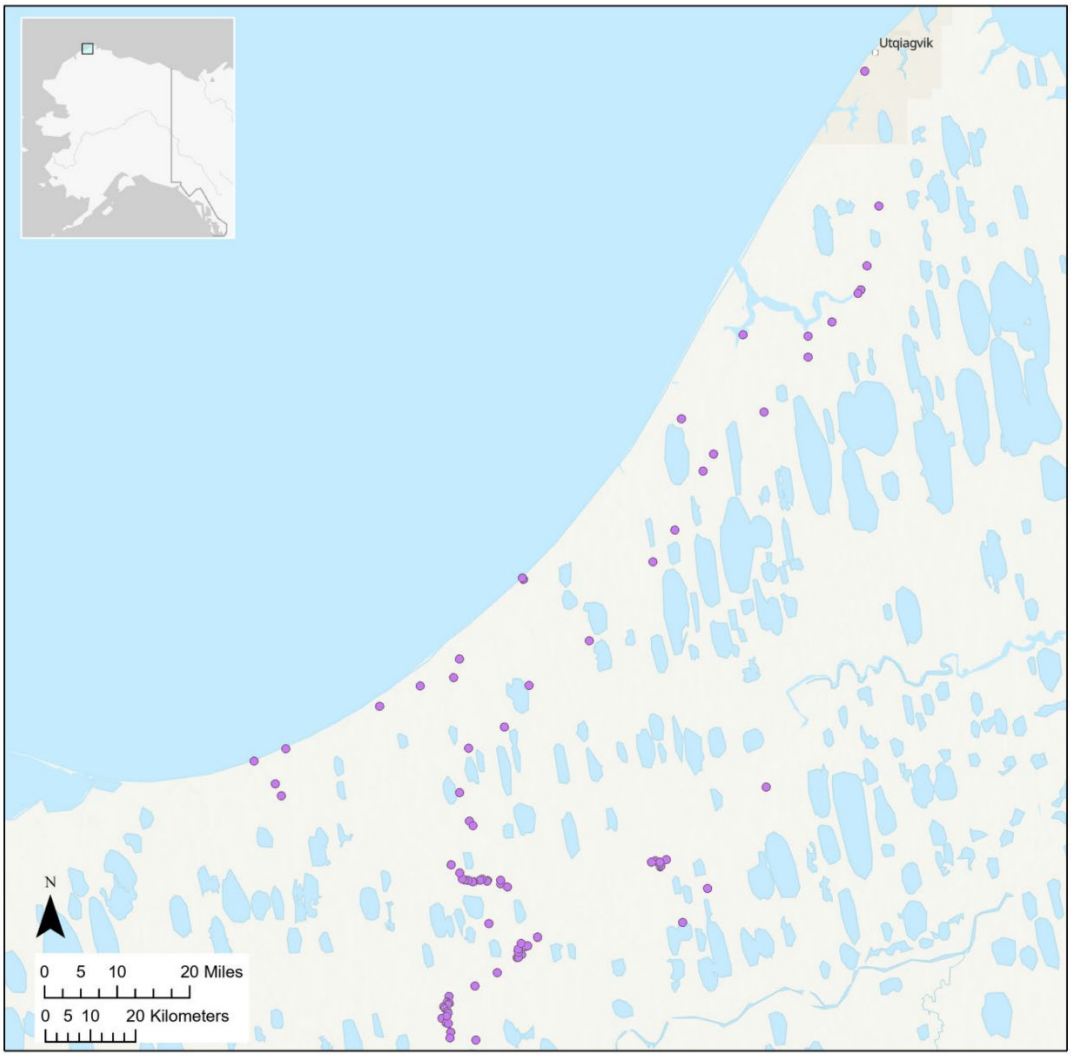
Raw Data File 2023-12



2023
STATE OF ALASKA
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2022 ARCTIC STRATEGIC TRANSPORTATION AND RESOURCES PROJECT (ASTAR) FIELD STATION LOCATION DATA AND DESCRIPTIONS: UTQIAĠVIK REGION (BARROW TRIANGLE), NORTH SLOPE, ALASKA

Marlee D. Haralson[1], Trent D. Hubbard[1], Hans A. Hoffman[2], and Simone Montayne[1]

ABSTRACT

During the summer of 2022, geologists from the Alaska Division of Geological & Geophysical Surveys (DGGS) and ASRC Consulting & Environmental Services, LLC (ACES) conducted fieldwork in an area of approximately 12,000 km^2 in northwestern Alaska between the communities Utqiaġvik, Atqasuk, and Wainwright in support of a sand and gravel resource assessment for the Arctic Strategic Transportation and Resources (ASTAR) Project. This report includes the locations and descriptions of 92 power-auger holes, outcrops, test pits, and surface exposures. Digital data is available as comma-separated value (.csv) files from the DGGS website https://doi.org/10.14509/31010.

BACKGROUND

The ASTAR Project is a collaborative effort initiated by the Alaska Department of Natural Resources (DNR) in partnership with the North Slope Borough to identify, evaluate, and advance opportunities to enhance the quality of life and economic opportunities in North Slope communities through responsible infrastructure development. The ASTAR team worked with communities and regional stakeholders to identify which projects and project areas may benefit most by prioritizing community and cultural connectivity, regional support, reduced cost of living, increased safety, and responsible infrastructure development.

During the summer of 2022, DGGS made observations and collected field data from 92 sites in the Barrow and Meade River 1:250:000-scale quadrangles on the North Slope (fig. 1). This work provides descriptions of surface material resources to support construction-grade material studies. These studies are needed to remedy the lack of information on construction-grade sand and gravel resources. Our detailed sedimentological descriptions are essential to better understand material quality, quantity and distribution. This report is one of two data publications from the 2022 field season. It includes information collected from outcrop and surface exposure observations, test pit (trench) observations, and observations of material from shallow holes (less than 3.5 meters deep) drilled with a Tanaka power-auger. In addition to the data published in this report, geotechnical information for 83 samples collected in the field is available in Haralson and others (2023). Data reported herein and in Haralson and others (2023) will be added to a sand and gravel resource database we are developing, providing critical information for planning and further resource assessment. These data provide valuable information for land-use management and planning decisions.

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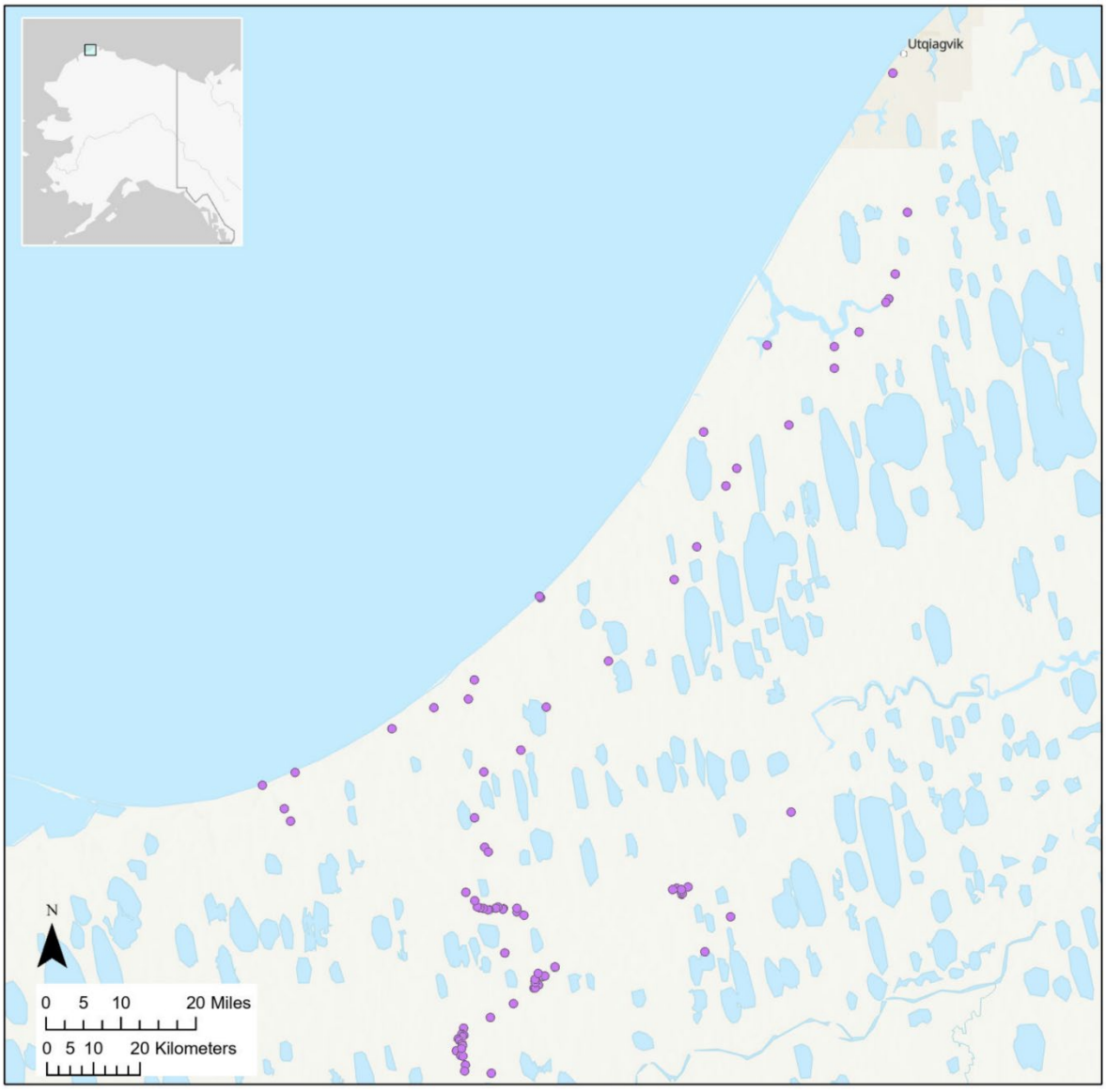

Figure 1. Map showing field station locations (purple circles) where field data were collected during the 2022 field season.

METHODS

Sample Collection

Field station location data and sediment samples were collected between July 28 and August 7, 2022, using GPS-enabled tablets running the ESRI ArcGIS Collector app, with a reported horizontal error of approximately 10 m. Latitude and longitude are reported in the WGS84 datum. Our field data includes field location information and material descriptions. Where appropriate, we followed conventions in the Alaska Geotechnical Field Manual (Alaska Department of Transportation and Public Facilities, 2007). Attribute

information includes the following descriptions for field station sites: station identification value, geographic location, geologic description, weather sky conditions (Manley and McIntyre, 2004), temperature (Celsius), vegetation, ice probe refusal depth, and data collection sampling method. Surface materials and interval descriptions (if appropriate) are assigned Unified Soil Classification System (USCS) group symbol, interval number, and depth (cm). Interval descriptions include the following attributes: color based on six standard Munsell colors (light brown, yellowish-orange, greenish-gray, olive-gray, light gray, and dark gray; Munsell, 1994), USCS soil type (American Society for Testing and Materials, 2000), ice content, maximum grain (clast) size, presence/absence of gravel clasts (e.g., clasts greater than 2mm), clast composition or lithology, coarse-grained particle angularity, and the presence or absence of organics (Schoeneberger and others, 2012).

Data Collection Field Methods

The data in this report includes field station descriptions made by geologists while drilling Tanaka power-auger test holes, data collected while examining outcrops, data collected from test pits, and data collected while observing surface materials. Additionally, we took photos before and after data collection and added these photos to the DGGS photo database (https://dggs.alaska.gov/photodb; Athey and others, 2017). The following sampling methods used in this study are described below.

Auger Sites

Data from drilled test holes were collected by field geologists using a Tanaka power-auger to drill on favorable terrain such as a flat, dry surface, often on a raised tundra polygon. We used the average of three ice probe refusals (cm) to determine the active layer depth of ice, frozen soils, bedrock, or clay-rich materials that limited auger performance. Two geologists operated the Tanaka power-auger while one geologist described sediment churned from the auger flight and carried to the surface. Each auger flight is approximately 132 cm long and 7 cm in diameter. During drilling, geologists looked for any visible changes in sediment character. Geologists recorded observations using tablets running the ESRI Arc Collector app, and sediment samples were retrieved if appropriate.

Outcrops

We cleaned surfaces at soil profiles exposed along bluff, river, and lake margins, allowing us to describe soil and sediment stratigraphy on freshly exposed vertical surfaces. When appropriate, we described sedimentary and pedogenic features using U.S. Department of Agriculture Natural Resources Conservation Service terminology (Schoeneberger, 2012). We collected serial bulk and oriented samples from documented soil horizons for laboratory geotechnical analyses. After data collection, we replaced sediment to restore the outcrop to the fullest extent possible.

Test Pits

At sites unsuitable for drilling auger test holes or collecting profile descriptions, we dug a test pit to collect subsurface data. We used a hand shovel to expose subsurface sediment and dig test pits to depths of

approximately 30 cm. We used trowels to clean freshly exposed surfaces to describe stratigraphy and collect samples. After data collection, we replaced the sediment.

Surface Observations

We collected data and made observations about the surface material. The surface was generally left undisturbed; however, we sometimes collected representative rock samples, using a hand trowel when necessary.

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The State of Alaska funded this work as part of the ASTAR Project and through a National Petroleum Reserve–Alaska (NPR-A) Impact Mitigation Grant. The Bureau of Land Management provided additional funding and support through an Alaska NPR-A Resource Inventory and Database Development Grant (L18AC00019-03).

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