

Barrow Environmental Observatory: the Formative Years

Jerry Brown, Past Chair, BASC BEO Committee



Ukpeagvik Iñupiat Corporation

Land owner



North Slope Borough
Scientific Research District



Barrow Arctic Science Consortium

BEO manager



National Science Foundation

Principal sponsor



Special Tribute - 50th NARL Heroes



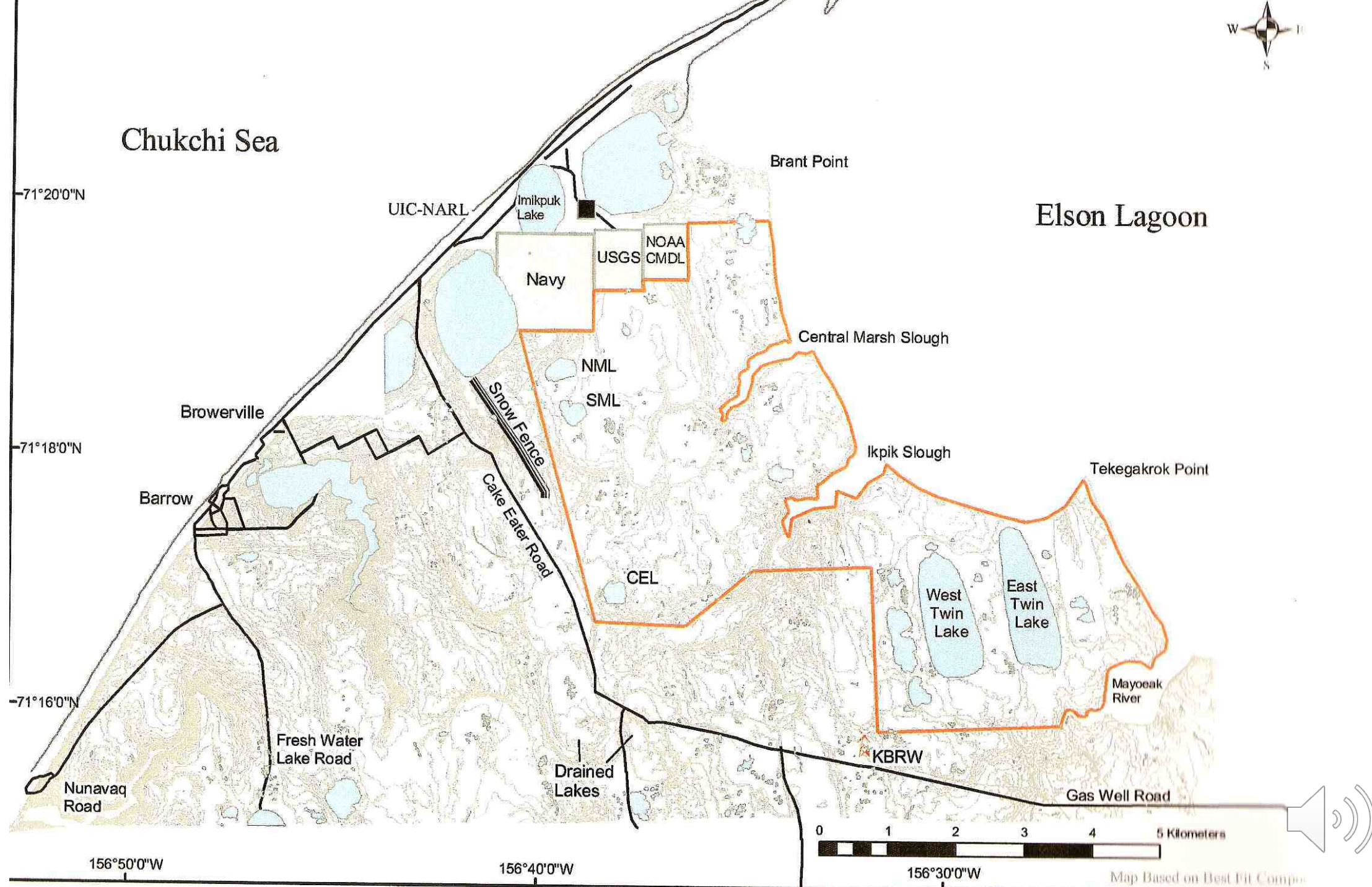
| | | |
|----|-------------------|------|
| 1 | Jessie Walker | 2015 |
| 16 | Arnold Brower Sr. | 2008 |
| 21 | Frankie Akpik | 2002 |
| 30 | Max Brewer | 2012 |
| 35 | Max Britton | 2004 |
| 36 | Kenny Toovak | 2009 |
| 40 | John Schindler | 2014 |
| 42 | John Kelley | 2022 |



Barrow Environmental Observatory : Window on the Future

(Charles Etok Edwardsen Barrow Environmental Observatory (1944-2015))





Federal observatories north of the BEO

- USGS: Magnetic Observatory (1949)
- NOAA: Global Monitoring Laboratory, Atmospheric Chemistry (1973)
- DoE ARM: Atmospheric Radiation Measurements (1997)



BEO Vision: A Window on the Future

- *Improve our understanding of past, present and future changes and interactions among people, land, atmosphere, and coastal environments of the region, and to convey this information and knowledge to interested stakeholders and organizations.*



Appendix A: UIC Board Establishment of BEO

REGULAR BOARD MEETING
AUGUST 25, 1992

BARROW ENVIRON-
MENTAL OBSERVATORY

Dr. Thomas Albert of the North Slope Borough Department of Wildlife said he is here to talk a little bit of establishing a study site around Barrow. One is to set up a site of land around NARL with a long history of study and they are here because UIC owns the land. He advised the Board that there is a lot of interest from the scientific arena to establish a study site with the objectives being: year-round access to designated and protected land sate, availability of long-term data sets, location for contaminant baseline monitoring, Arctic residents' involvement in research and education, and graduate fellowship program.

After thorough review of the scientific sites, the area the scientists have selected is south of the NOAA Observatory as the principle protected area for the BEO. It includes the area west of the gas line from North Meadow Lake through Central Marsh and the Beach Ridge and across to Elson Lagoon and south to Ikpik Lagoon; an area approximately 2 by 3 miles. The northern portion of the site includes lands already held by the federal government. In addition to this site, the BEO includes the adjacent ocean, lagoon and overlying atmosphere.

MOTION

Delbert Rexford moved to approve the propose Barrow Environmental Observatory site and to include the two other sites which are the Britton Manor, Voth Creek and adjacent IBP study areas. Seconded by Charles Brower. Question called for. Motion carried.

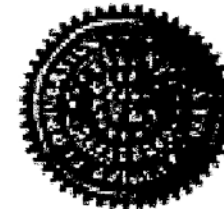
ADJOURNMENT

Max Ahgeak moved to adjourn the meeting. Seconded by Charles Brower. Question called. Motion carried.

Delbert Rexford
CHAIRMAN, BOARD OF ADMINISTRATORS, UIC

ATTEST:

James Brown
CORPORATE SECRETARY, ASBA JAMES



BEO Chronology (1992-2009 and beyond)

- August 25, 1992 - Ukpeaġvik Iñupiat Corporation (UIC) Board approves BEO
- December 1995 - BEO boundaries surveyed and staked (LCMF)
- **August 1997 - 50th NARL Anniversary**
- January 16, 1998 - BASC BEO Management Committee
- December 2000 - Draft BEO Science and Implementation Plan
- September 2002 - Master Plan completed
- July 1, 2003 - **NSB Assembly rezones land to Scientific Research District (SRD)**
- December 10, 2003 - BEO Subcommittee designated
 - 2004 - 2009 BEO Annual Reports
 - Post 2009 activities



Examples of Pre-BEO Observations/Research (see 50th NARL publication)

- Coastal Erosion: MacCarthy 1940s; Lewellen 1960s
- Permafrost temperatures: Brewer 1940s -1950s
- Active layer- 1960s: Brown, CRREL
- Atmospheric Chemistry: Univ. of Wash., late 1950s; NOAA (1973)
- Small mammals (lemmings): 1950 onward, Pitelka
- Birds- 1950s onward: Pitelka, Holmes and FWS
- Vegetation and landscapes: Britton, Korando, Carson others
- Ecosystem function: IBP U.S. Tundra Biome 1969-1974



The BEO provides protection for sites in international networks

- International Tundra Experiment (ITEX): since 1994
- Thermal State of Permafrost (TSP): sites re-established in 2001
- Circumpolar Active Layer Monitoring (CALM): reestablished in the early 1990s
- Arctic Coastal Dynamics (ACD) since 2001 (and now LTER)
- SnowNet
- SCANNET: A Circumarctic Network of Terrestrial Field Bases



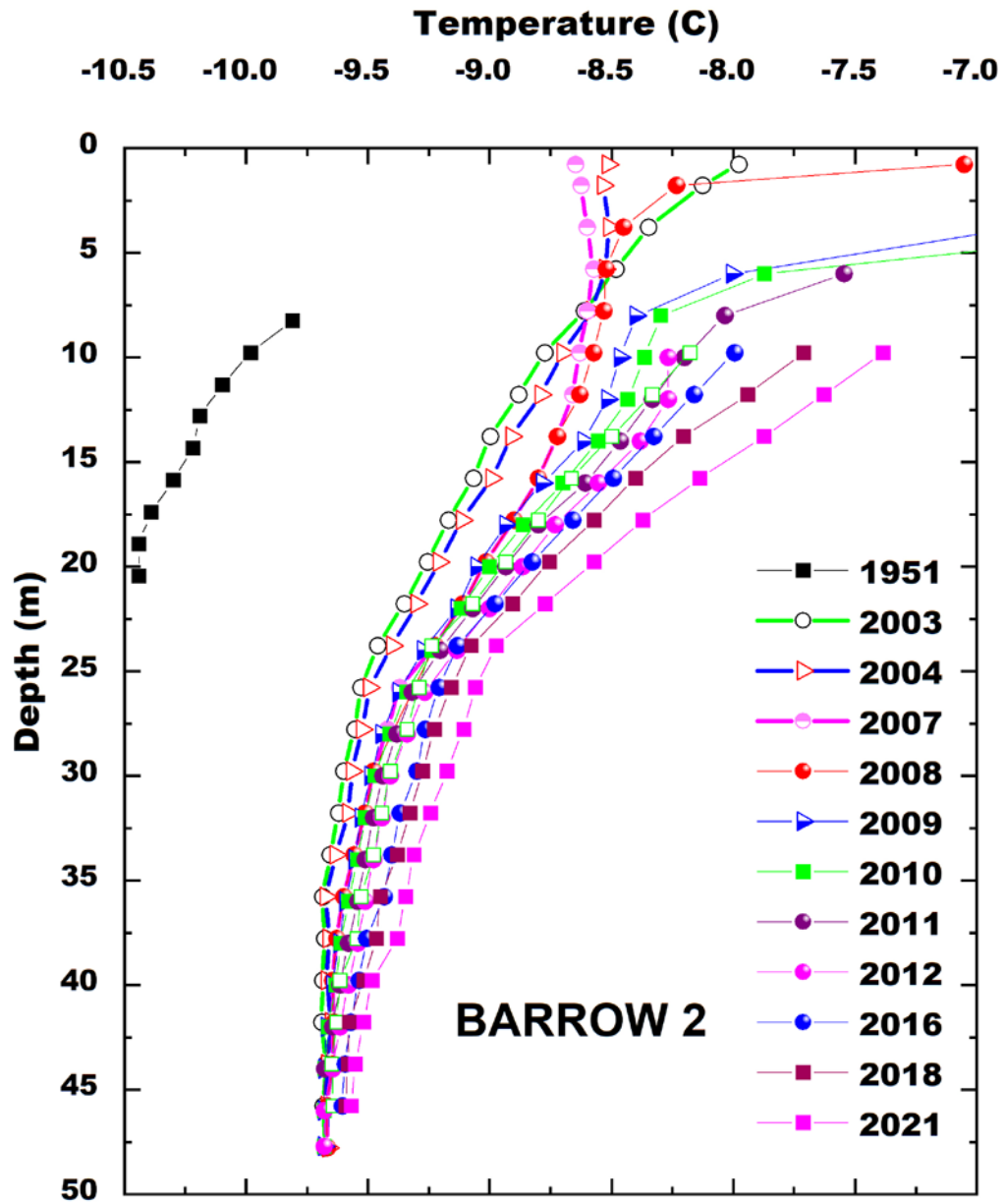
Thermal State of Permafrost (TSP)

New UAF borehole 2002



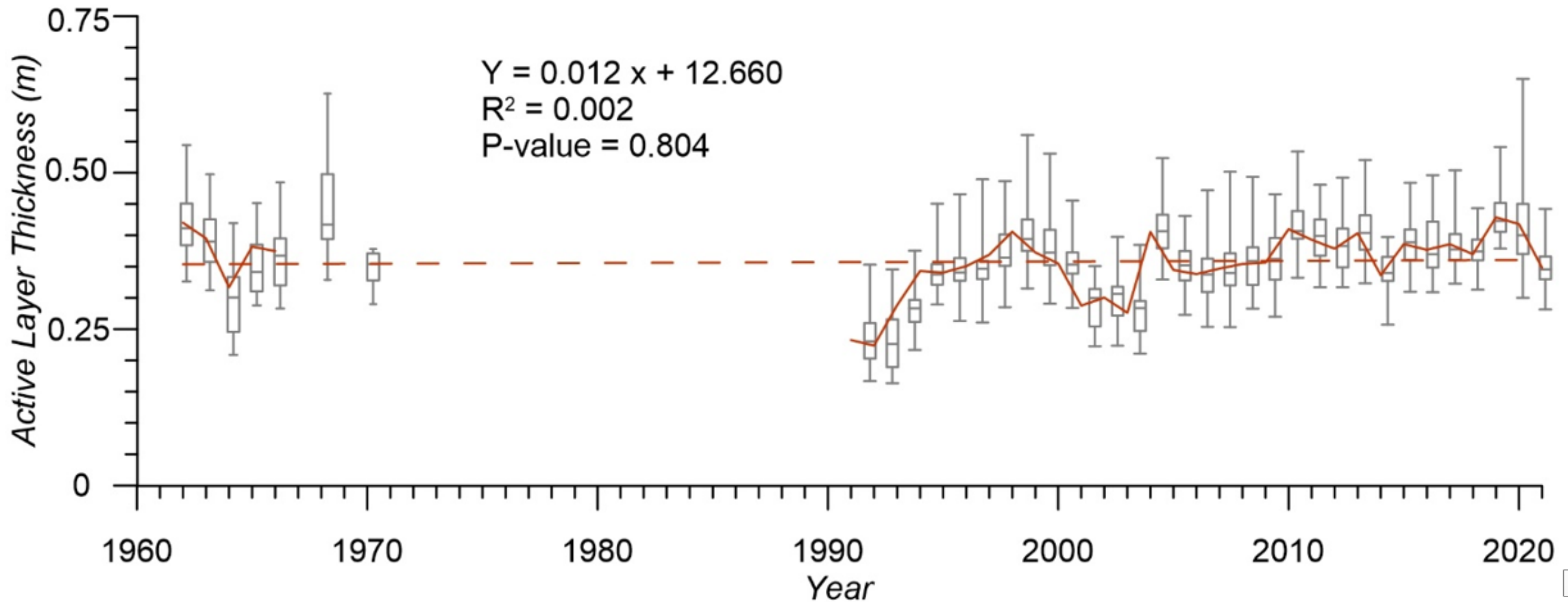
Summer 2001
USGS 1950s site
Brewer, Brown, Romanovsly





Circumarctic Active Layer Monitoring (CALM)

CRREL transect, Barrow 1962-present
compiled by Rachel Spiegel, GWU



http://ael.msu.edu/Website/baid_ims/viewer.htm - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://ael.msu.edu/Website/baid_ims/viewer.htm

B A I D - I M S

barrow area info database internet map server

Help....?

North Slope Alaska

Copyright (C) BASC 2008

Site Updates
***Many layers are "Scale Dependent" and within the BEO Science Research District. You may need to zoom in to view and analyze a dataset.

LAYERS

- Imagery
 - Airborne
 - Satellite
 - SAR Sea Ice
 - Aster (15m)
 - vNIR 2002
 - Landsat
 - Military (2m)
 - Ikonos
 - QuickBird
- Themes
 - Base Maps
 - Boundaries
 - Infrastructure
 - Research
 - Ground Control Points
 - All Research Sites
 - Research Sites by Project
 - ACD
 - AmeriFlux
 - ARCSS Grid
 - BigFoot
 - Biocomplexity
 - CRREL
 - GTN-P
 - IBP
 - Independent
 - ITEX
 - LTER Schoolyard
 - RATE
 - SpecNet
 - UIC
 - USFWS
 - Landcover and Soils
 - Fauna
 - Hydrography
 - Topography
 - Shoreline
 - Real-Time Weather

Redraw Map

Map: 593398.67 , 7907386.77 -- Image: 703 , 605 -- ScaleFactor: 16.69788170391902





Three major types of research will utilize the BEO Science Research District



- * Process and Experimentation
- * Population Biology and Biodiversity
- * Environmental Monitoring



North Slope Borough Ordinance No. 75-6-44

Rezoned from Conservation District to Scientific Research District (July 1, 2003)
Provides for a single, multi- year land-use permit)

NORTH SLOPE BOROUGH ORDINANCE SERIAL NO. 75-6-44

AN ORDINANCE AMENDING THE "OFFICIAL ZONING MAP" OF THE NORTH SLOPE BOROUGH TO REZONE THE AREA KNOWN AS THE BARROW ENVIRONMENTAL OBSERVATORY (BEO) FROM THE CONSERVATION DISTRICT TO THE SCIENTIFIC RESEARCH DISTRICT

WHEREAS, the Barrow Arctic Science Consortium (BASC), acting as an authorized agent of the landowner, Ukepeagvik Inupiat Corporation (UIC), has requested the North Slope Borough Assembly to rezone the area generally known as the Barrow Environmental Observatory (BEO) to be rezoned from Conservation District to Scientific Research District;

WHEREAS, the North Slope Borough Planning Commission reviewed and approved the Master Plan prepared by the Barrow Arctic Science Consortium (BASC) to rezone the area generally known as the Barrow Environmental Observatory (BEO) from Conservation District to Scientific Research District; and

WHEREAS, the BEO consists of approximately 7,466 acres of arctic tundra that has been used by researchers at the Naval Arctic Research Laboratory (NARL) since the 1940's and was set aside by UIC in 1992 for the purpose of scientific research; and

WHEREAS, the purpose of the Scientific Research District designation is to conserve areas that have scientific value or have been used for scientific research for 20 years; and

WHEREAS, the approved Master Plan for this area is a reasonable approach to preserving and encouraging present and future scientific research as well as creating future economic and educational opportunities within the North Slope Borough; and

WHEREAS, the Master Plan is consistent with NSBMC 19.40.075 which requires that a scientific research area accommodate customary and traditional subsistence uses of the land by North Slope residents while discouraging other uses of the land that have a potential to disturb the long term scientific uses of the land; and

WHEREAS, upon review of the rezone request, the Master Plan, the staff recommendation, and following the public hearing, the Planning Commission recommended that the Assembly approve the rezone, making the following findings, as required by NSBMC 19.60.060(E):

(1) The proposed rezoning complies with the applicable policies set out in NSBMC Chapter 19.70; and

(2) The proposed rezoning is in an area with adequate services, including roads, parking, boardwalks, water, sewer, garbage collection, gas, electricity, drainage, police and fire protection for the area; and

(3) The comments from reviewing parties on the proposed rezoning have been adequately addressed; and

(4) There is a demonstrated need for this land to be rezoned as the zoning district requested; and

(5) The resulting district will be a logical, integrated area and will not constitute spot zoning; and

(6) The proposed master plan for this area was approved pursuant to NSBMC 19.60.070 and as part of the Planning Commission's recommendation; and

WHEREAS, the legal description for the area to be rezoned to Scientific Research District is as follows:

See attached Exhibit "A" - L.C.M.F Metes and
Bounds Legal Description for the BEO (4 pages).

NOW THEREFORE, BE IT ENACTED:

SECTION 1. Classification. This ordinance is a non-code ordinance.

SECTION 2. Severability. If any provision of this ordinance, or any application thereof to any person or circumstance is held invalid, the remainder of this ordinance and application to other persons or circumstances shall not be affected thereby.

SECTION 3. Effectiveness. This ordinance shall become effective upon adoption.

SECTION 4. Approval. The North Slope Borough Assembly amends the "Official Zoning Map" by rezoning the above legally described area of the BEO from Conservation District to Scientific Research District subject to the conditions, general stipulations and advisory language set forth in Planning Commission Resolution 2003-02, the staff recommendation and the approved Master Plan. The "Official Zoning Map" and the master digital copy of such shall be updated by the Borough Planning Department to reflect this amendment.

INTRODUCED: June 3, 2003

ADOPTED: July 1, 2003



ATTEST:

Beth L. King
BOROUGH CLERK
Date: July 1, 2003

Charlotte Brower
CHARLOTTE BROWER
PRESIDENT OF THE ASSEMBLY
Date: 7-1-03

Date: _____

George N. Ahmaogak, Sr.
GEORGE N. AHMAOGAK, SR.
BOROUGH MAYOR
2 July 2003





**2007 Annual Report
Barrow Environmental Observatory**


Prepared for the
Ukpeagvik Inupiat Corporation
and
North Slope Borough
by the
BEO Subcommittee, Barrow Arctic Science Consortium

www.arcticscience.org

February 2008

**2008 Barrow
Environmental Observatory**

FIFTH ANNUAL REPORT



Prepared by the
BEO Subcommittee, Barrow Arctic
Science Consortium

for the
Ukpeagvik Inupiat Corporation
and North Slope Borough

JANUARY 2009



2009 Barrow Environmental Observatory

SIXTH ANNUAL REPORT



Prepared by the
BEO Subcommittee, Barrow Arctic Science Consortium
for the
Ukpeaġvik Iñupiat Corporation
and North Slope Borough



JANUARY 2010



Kenneth Toovak, Sr., 1923-2009



BEO designated an IPY legacy

First International Polar Year 1881-1883

125th Anniversary 2007-2009



Ray Expedition
Barrow



LEGACIES



Post BASC-BEO Activities: 2009 onward

New BEO Related Programs

- Next-Generation Ecosystem Experiments (DoE NGEE Arctic- 2012-24)
- NEON: National Ecological Observatory Network (NSF 2017)
<https://www.neonscience.org/field-sites/barr>
- Beaufort Lagoon Ecosystems LTER (NSF 2019)
<https://ble.lternet.edu/about.html>

Continuing

- NSF: CALM, ITEX, TSP, ACD (LTER), SCANNET
- NOAA, DoE-ARM, USGS-Geomagnetic
- Science Outreach: North Slope Schools



Next-Generation Ecosystem Experiments (NGEE Arctic)

Deliver a process-rich ecosystem model in which the response of tundra ecosystems to a changing climate can be represented in the Department of Energy's Energy Exascale Earth System Model (E3SM)

Topics of interest include permafrost thaw, thermokarst formation, shrub expansion, and water flow and distribution across changing landscapes

Phase 1-3 (2012-2024)

>140 NGEE Arctic team members

273 publications with >1,750 co-authors

207 data and metadata records in data portal

7 Ph.D. dissertation theses completed

>12 postdocs now in university faculty positions

Field safety manuals and best practices for physical, emotional, and psychological safety benefit all members of the project



Field sites, facilities, and instrumentation on the Barrow Environmental Observatory (BEO) and support of UIC Science are critical to our success



Beaufort Lagoon Ecosystem LTER

Site Review Progress Report
Beaufort Lagoon Ecosystems LTER I
Virtual Program: 7-9 September 2021



Photo credit: K. Dunton, N. McTigue



2006 Annual Report

Barrow Environmental Observatory



Prepared by
BEO Subcommittee
Barrow Arctic Science Consortium
Barrow, Alaska
www.arcticscience.org

March 2007





North Slope Borough School District

September 6, 2018 · 🌐



<https://www.facebook.com/watch/?v=308262016421000>



BEO Field Trip



Field trip with the Barrow Environmental Observatory and fourth grade students at Ipalook Elementary School in Utqiagvik.