Boreal Forest Fire History in Alaska: Review, Synthesis and Data Compilation

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Compiling, Synthesizing and Analyzing Existing Boreal Forest Fire History Data in Alaska

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GOAL: Compile and synthesize existing Alaska boreal-forest fire-history literature and datasets

Three primary objectives:

- Publish a literature review and synthesis: **Fire Regimes of the Alaskan Boreal Forest**

- Compile tree-ring based fire history data into the **Alaska Fire History Database**

- Improve the **Alaska Large Fire Database** (reported fire locations since 1939 and fire perimeters since 1942)

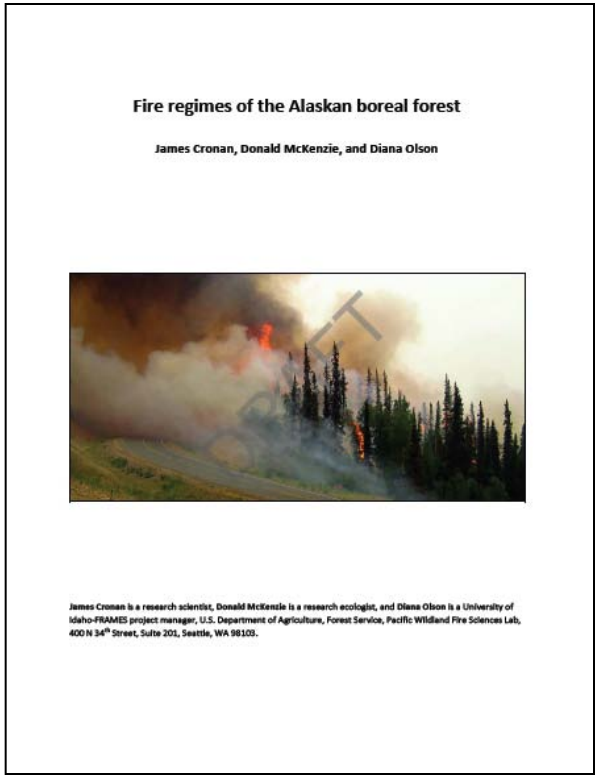
Fire Regimes of the Alaskan Boreal Forest

Literature review and synthesis

Includes:

- **Review and synthesis of existing literature**: 378 references relating to fire regimes of Alaskan and related boreal forests, organized by:
  - fire regime components
  - spatial distribution of regimes by vegetation type
  - temporal variability of fire regimes across multiple scales

- **Compendium of fire history studies conducted in Alaska**: 28 individual summaries



Fire regimes of the Alaskan boreal forest

James Cronan, Donald McKenzie, and Diana Olson

DRAFT

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Download DRAFT from: http://frames.nbii.gov/alaska/borealfirehistory

Alaska Fire History Database

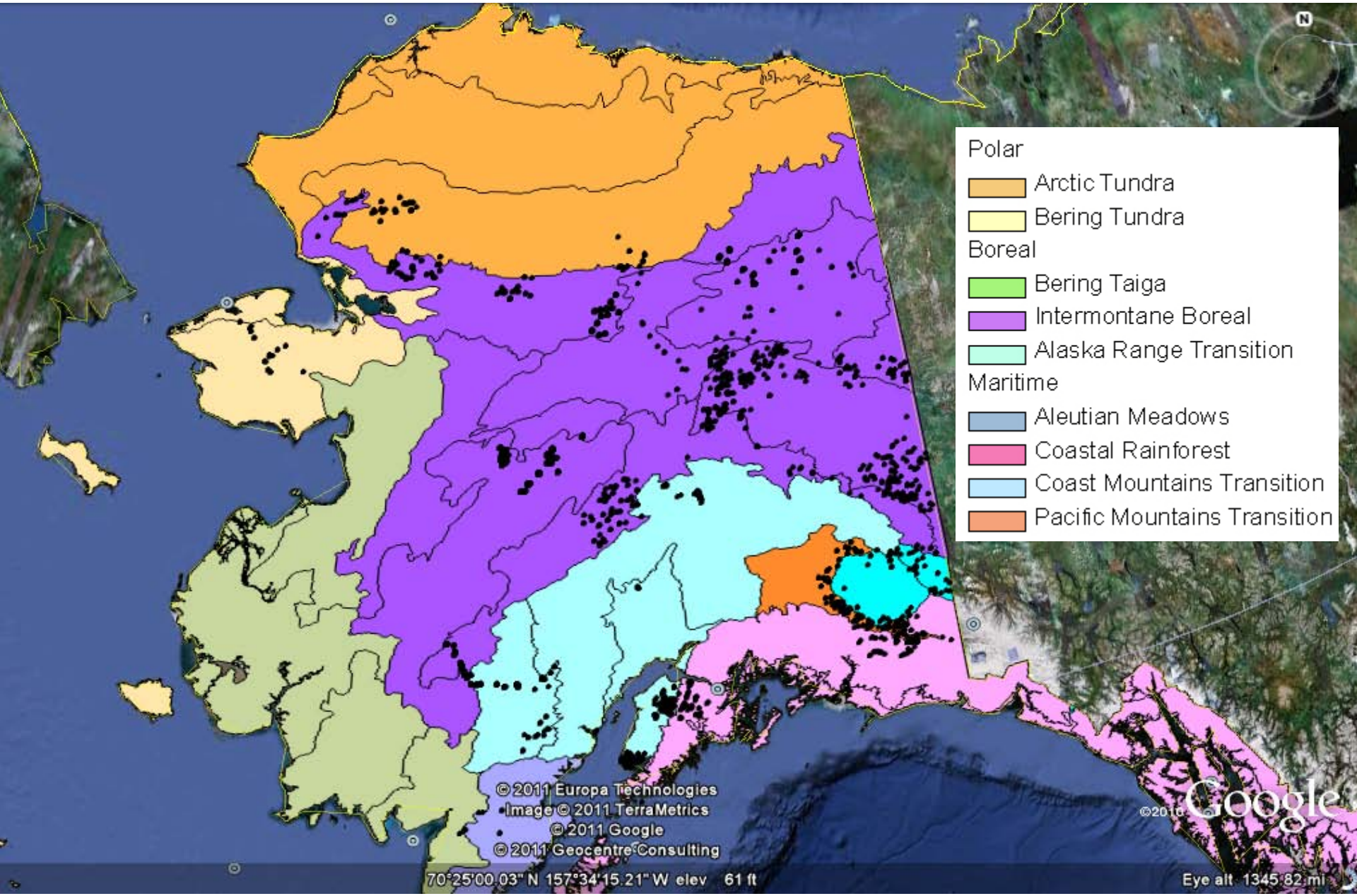
Database of fire scars and tree ages

Includes **14 existing datasets** (published and unpublished):

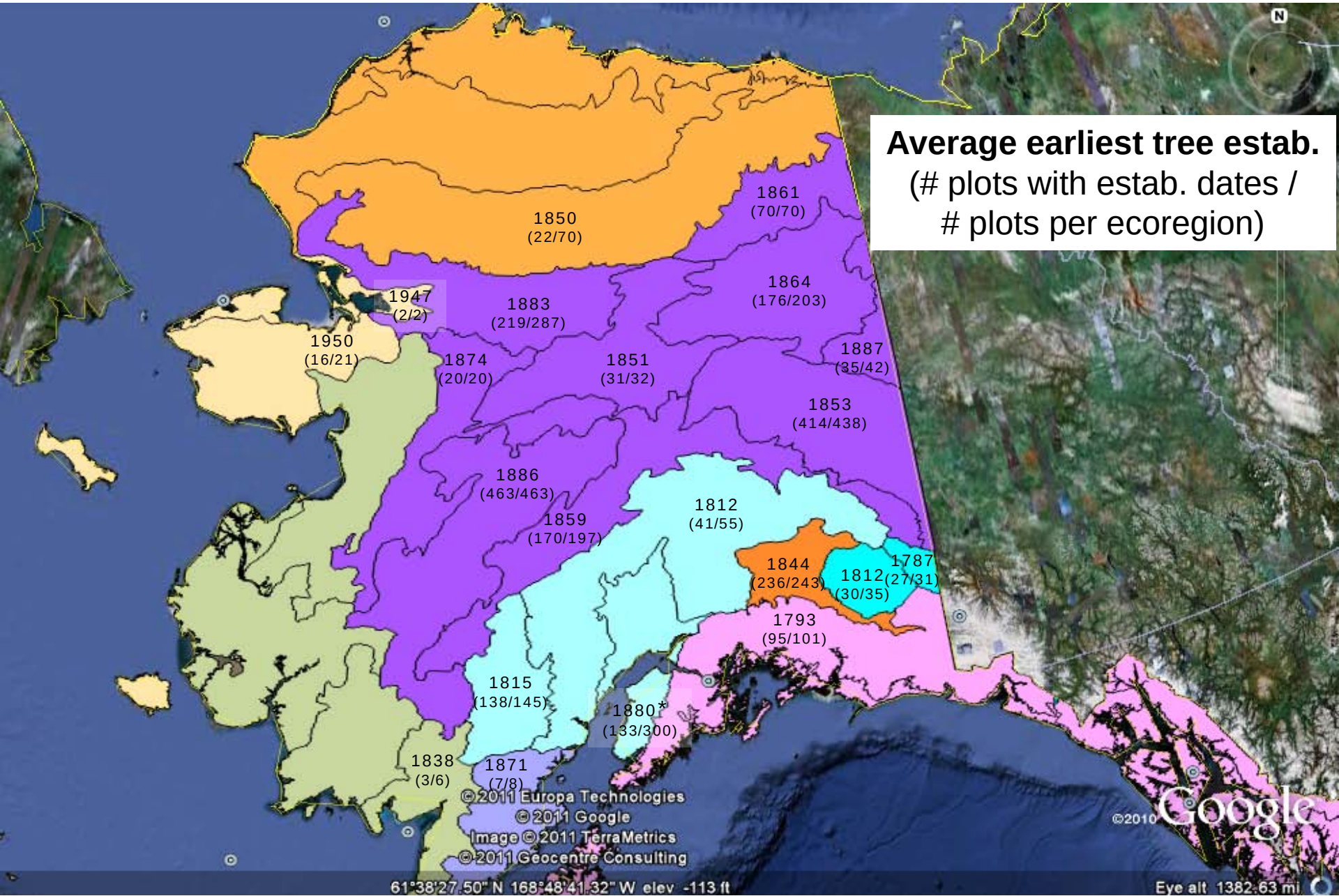
- 5 already processed
- 9 needed processing or re-processing (using standard dendrochronological techniques)
- total of 2,786 plots and 13,585 samples
- summarized fire dates, possible fire dates, and estimated tree establishment dates
- plots were assigned a Nowacki et al (2001) ecoregion, and a Stafford et al. (2000) climatic zone

Download database from: http://frames.nbii.gov/alaska/borealfirehistory

Alaska Fire History Database plot locations (over Nowacki et al 2001 ecoregions)



Average Earliest Estimated Tree Establishment Dates



Alaska Large Fire Database

Database of reported fire locations and perimeters

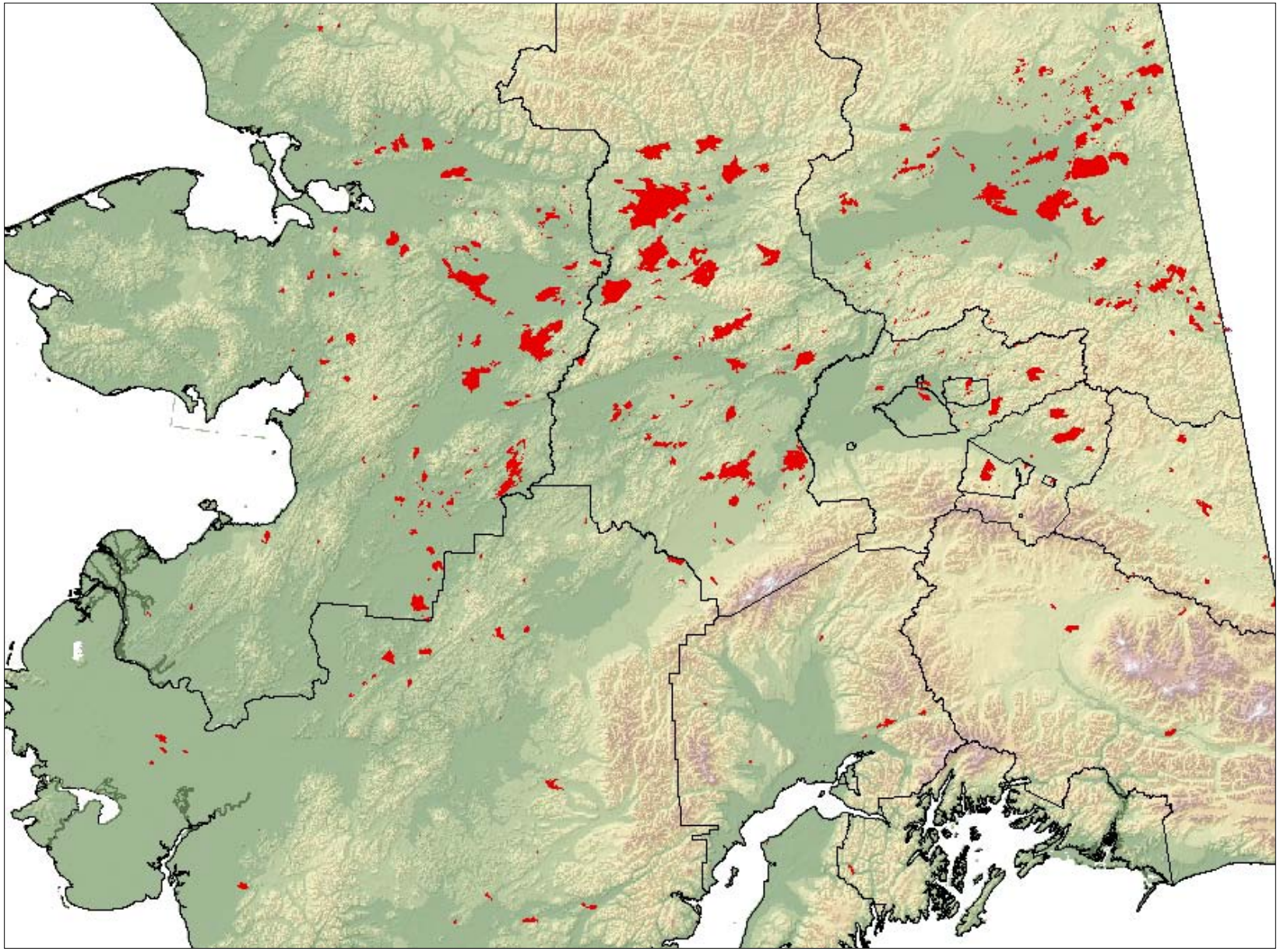
Improvements included:

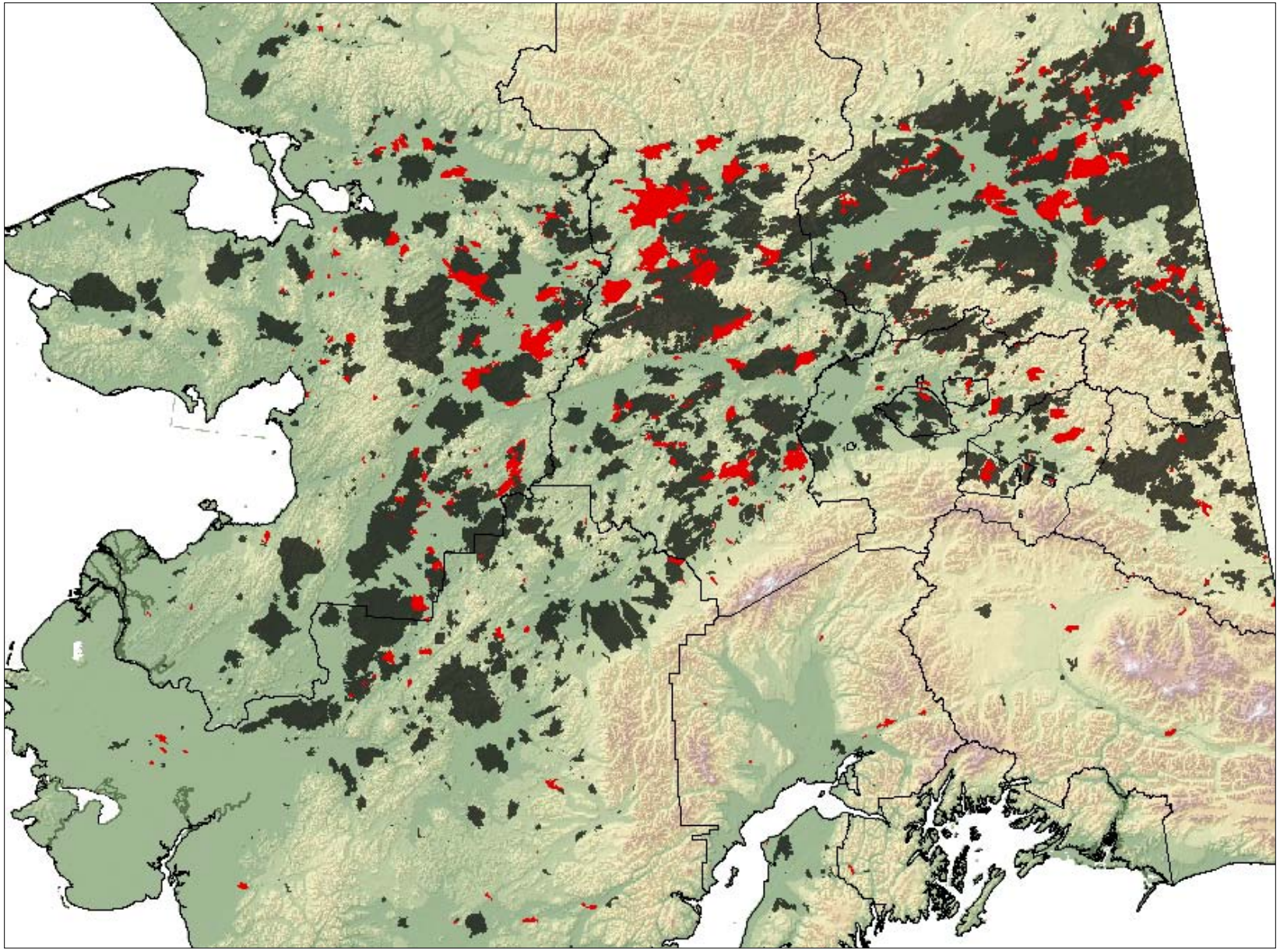
- extending perimeters back to 1942
- identifying and digitizing missing fire perimeters from remotely sensed imagery in conjunction with historical maps
- updating existing fire perimeters
- adding missing attribute information

Resulting in:

- 417 missing fire perimeters identified and digitized
- 5.8 million additional acres of burned area represented
- additional attributes: fire name, mgmt office, mgmt option, lat, long, origin owner, origin admin unit, start date, out date, est. acres, cause, origin township, origin range, origin section, origin meridian, AFS fire number, State fire number, USFS fire number, and import notes/comments

Database accessible through: http://frames.nbii.gov/alaska/borealfirehistory





Both the

Alaska Fire History Database
(tree-ring database) plot summary data

and the

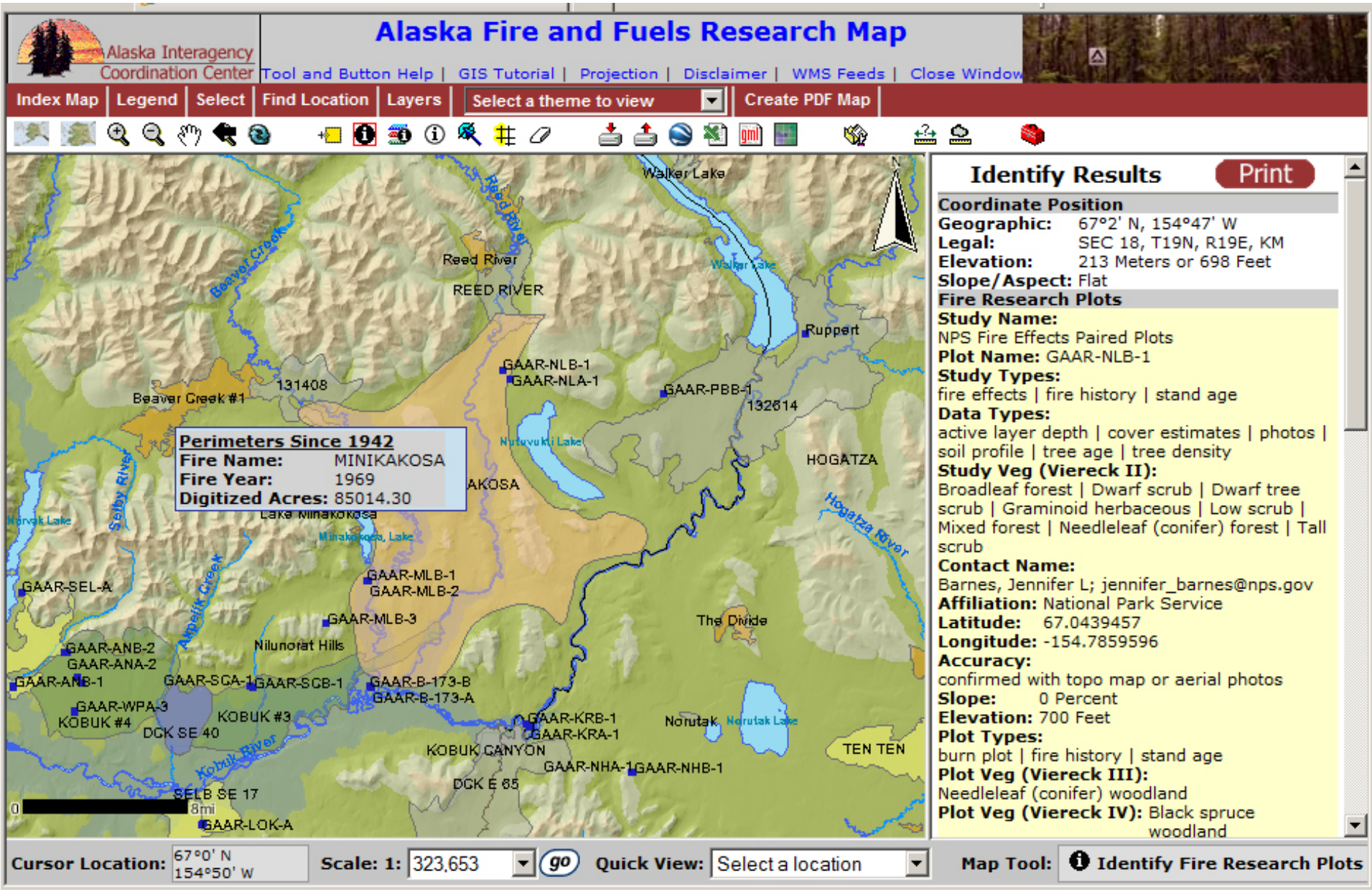
Alaska Large Fire Database
(fire locations and perimeters) data

are accessible through the

Alaska Fire and Fuels Research Map

at the AICC ArcIMS mapping website:

http://afsmaps.blm.gov/imf/imf.jsp?site=firehouse



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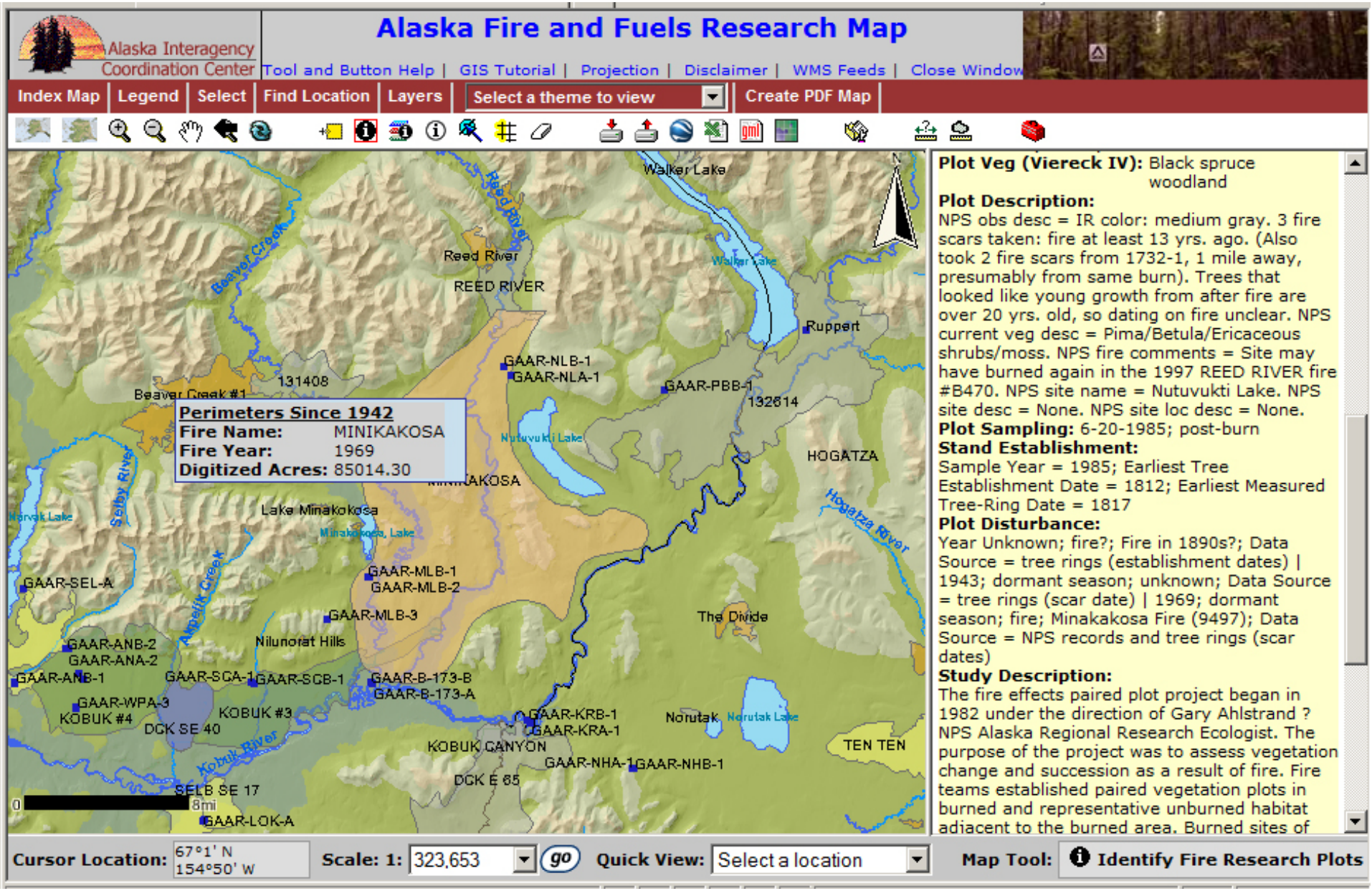

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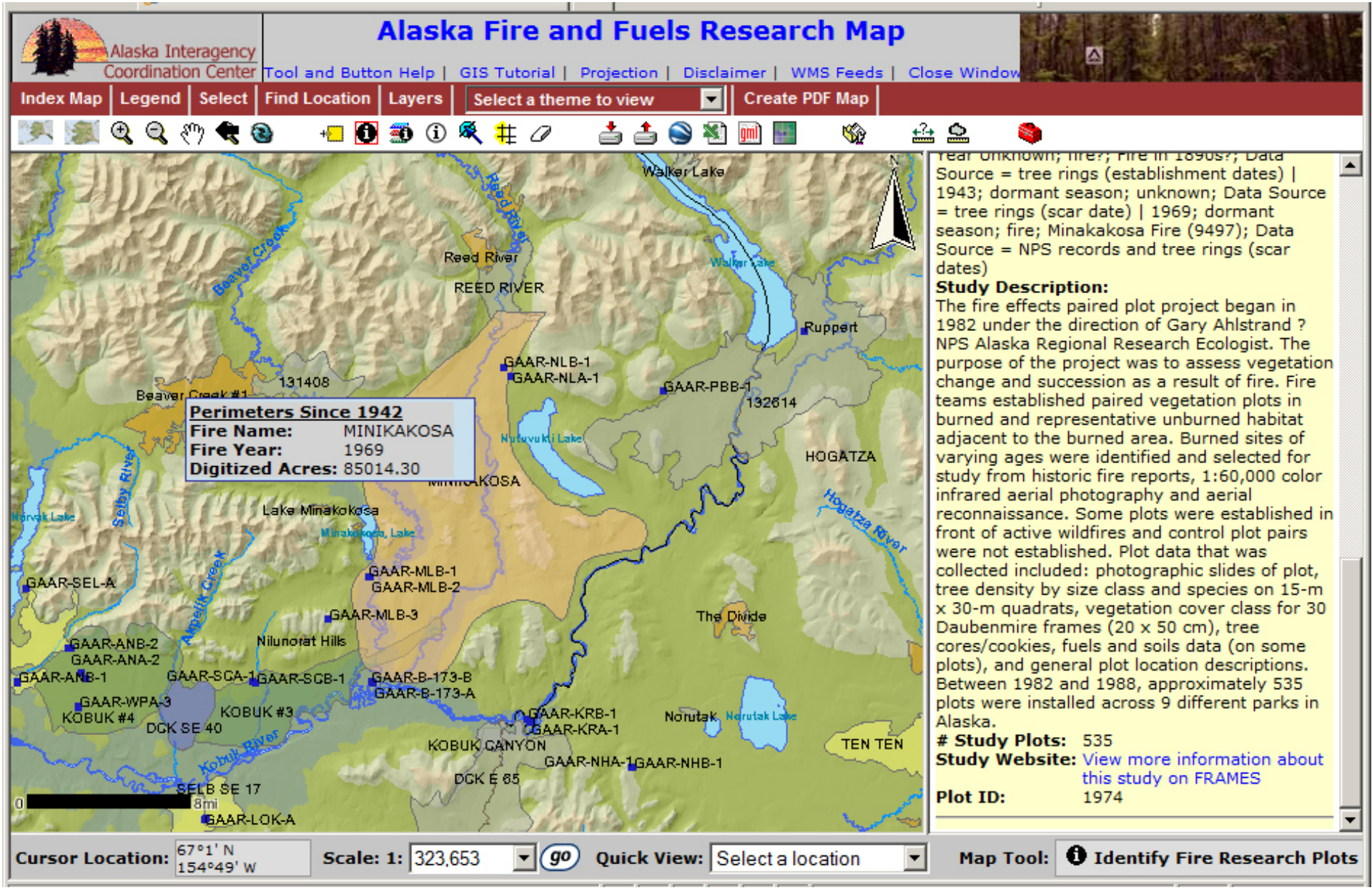

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Alaska Large Fire Database

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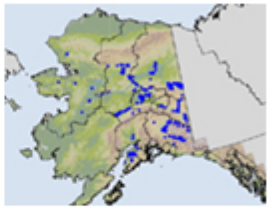
Welcome to the Alaska Boreal Fire History Project

http://frames.nbii.gov/alaska/borealfirehistory

Wildland fires play a critical role in maintaining the ecological integrity of boreal forests in Alaska. Identifying and maintaining natural fire regimes is an important component of fire management. There are numerous research projects that directly or indirectly address historical fire regimes in the Alaskan boreal forest, however, many are either unpublished, have an extensive amount of unprocessed dendrochronological (tree age and fire scar) samples, or their data were used for other purposes. Furthermore, there has not been a compilation and comprehensive assessment of these data to provide a more complete understanding of how fire has historically impacted the boreal forest ecosystems of Alaska.

The goal of this project was to compile and synthesize existing Alaska boreal forest fire history literature and datasets. This includes a literature review and synthesis of publications related to fire regimes in boreal forests in Alaska (the pending general technical report "Fire Regimes of the Alaskan Boreal Forest"), and incorporation of the reference information into the Alaska Fire Effects Reference Database. Fourteen existing published and unpublished fire history (or stand age) datasets were compiled (and as necessary, processed) into the standardized Alaska Fire History Database, and data summarized by plot are available through a dynamic map interface (within the Alaska Fire and Fuels Research Map). Data compiled in the Alaska Fire History Database has also been submitted to the International Multiproxy Paleofire Database (IMPD). Finally, some of the project funds were used to clean up and improve data within the Alaska Large Fire Database, a database started in the early 1990s that includes reported fire locations since 1939 and fire perimeters since 1942.

Download the draft literature review and synthesis. Click here to get more information about the fire history studies included in the Alaska Fire History Database and the "Fire Regimes of the Alaskan Boreal Forest" literature review and synthesis. Download the final report to the JFSP.



Plot fire history summaries from the Alaska Fire History Database are available through the Alaska Fire and Fuels Research Map (hosted through the AICC ArcIMS mapping website).

Alaska Fire Effects Reference Database

Reference information for "Fire Regimes of the Alaskan Boreal Forest" has been added to the Alaska Fire Effects Reference Database.

Current and historical reported fire locations and fire perimeters (since 1939 and 1942, respectively) can be accessed through the Alaska Large Fire Database (hosted through the AICC ArcIMS mapping website).

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Related Studies

The Alaska Fire History Database consists of 14 existing published and unpublished fire history (or stand age) tree-ring datasets, collected in conjunction with the following studies:

Name	Person (Last Name)
Alaska NPS Fire Effects Paired Plots Study	Barnes
Anchor River Watershed Spruce Bark Beetle Project	Boggs
Chena Lakes F-Unit and Remote Arm Burn Severity and Forest Succession Projects	Jandt
Fire and Climate History of Lowland Black Spruce Forests, Kenai NWR	De Volder
Fire History and Lichen Study in Eastern Alaska	Collins, Joly
Fire History Disturbance Study of the Kenai Peninsula Mountainous Portion of the Chugach National Forest	DeVelice
How Succession Affects Fire Behavior in Boreal Black Spruce Forests of Interior Alaska	Cronan, Huffman, Camp, Omi
Interactions Among Climate, Fire and Vegetation in the Alaskan Boreal Forest	Duffy
Kanuti National Wildlife Refuge Fire History Study	Saperstein
Quantifying Variability in the Alaskan Black Spruce Ecosystem: Linking Vegetation, Carbon, and Fire History	Hollingsworth
White Mountains Fire History Study	Herriges
Wrangell-St. Elias National Park and Preserve Ground Truth Study	Barnes
Wrangell-St. Elias National Park and Preserve Spruce Bark Beetle Study	Barnes
Yukon Flats National Wildlife Refuge Fire History Study	Drury

Related Publications

The "Fire Regimes of the Alaskan Boreal Forest" literature review and synthesis focuses on publications that describe the fire regime of the Alaskan boreal forest. Considerable effort was spent to include work that falls outside of peer-reviewed literature databases, such as government reports and graduate thesis work. The literature review covers more than 350 references; some of the publications are

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Questions?

http://frames.nbii.gov/alaska/borealfirehistory