

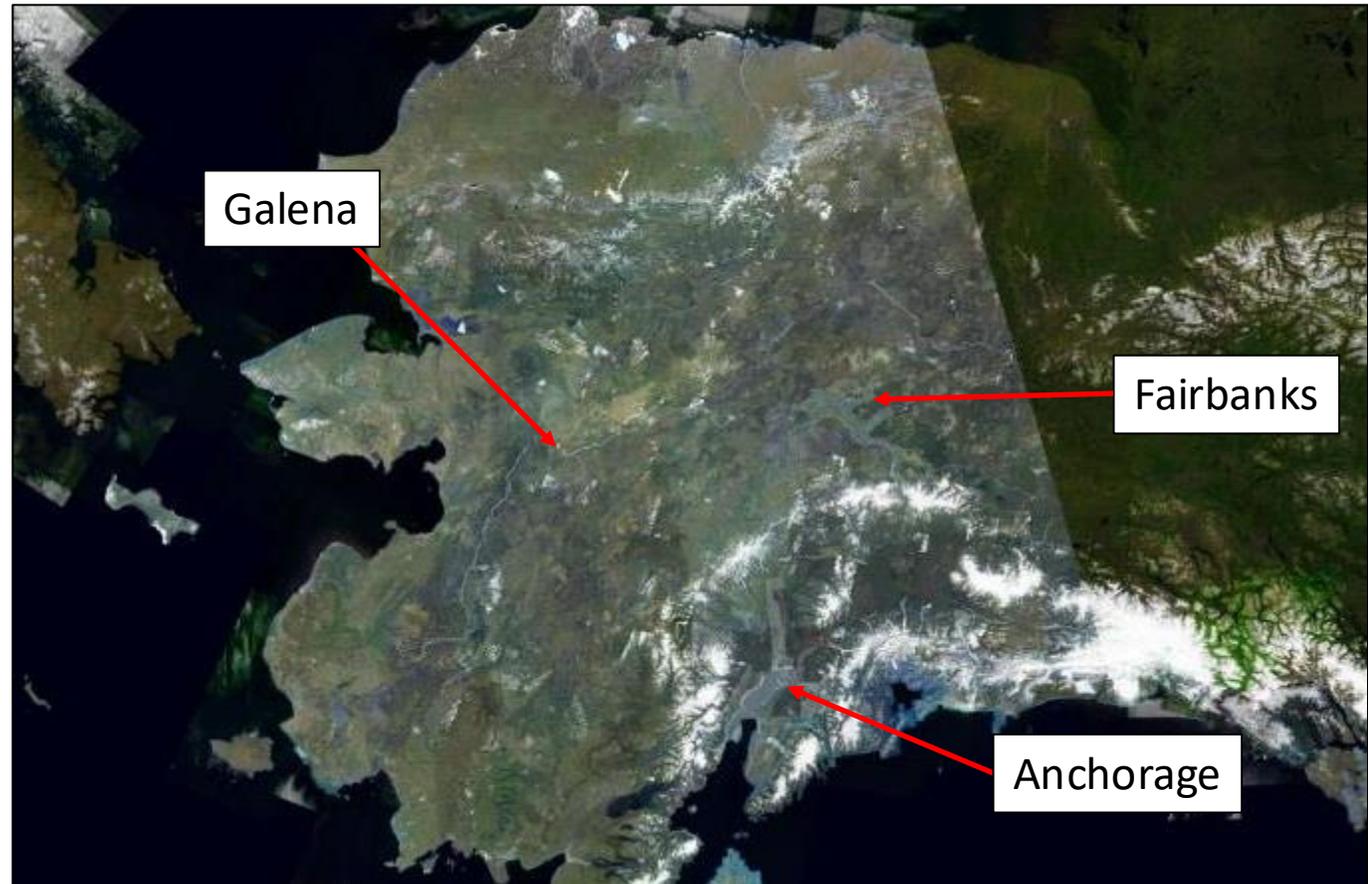
Galena Biomass Project



TIM KALKE
GENERAL MANAGER

Presentation Agenda

- Project History
- Wood Fuel Supply
- Heating System



Project History

Former Galena Air Base

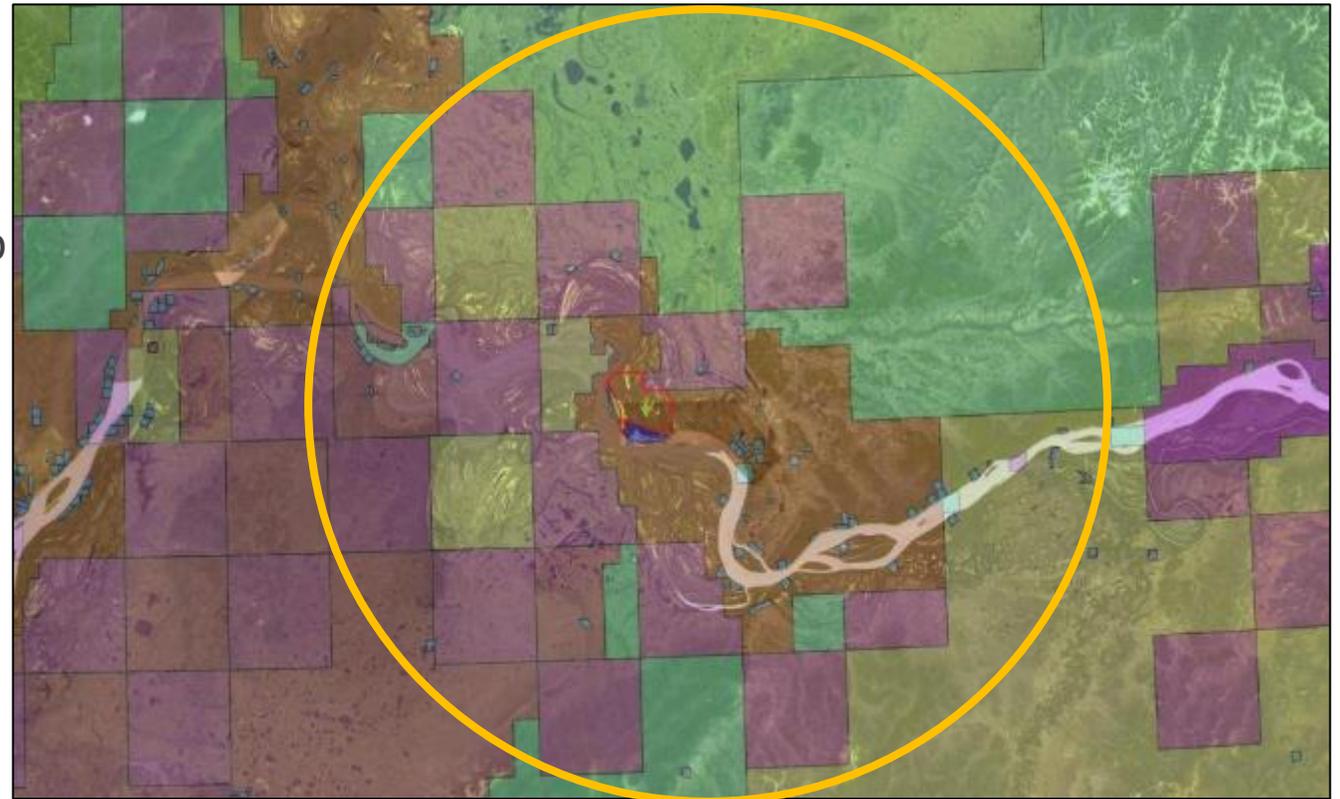
- Ownership transition to City of Galena
- Rural Energy Issues
 - Inefficient and aging infrastructure
 - Old steam distribution system consumed ~230,000 gallons annually
 - Expensive diesel fuel
- Alaska Energy Authority – Renewable Energy Fund Grant

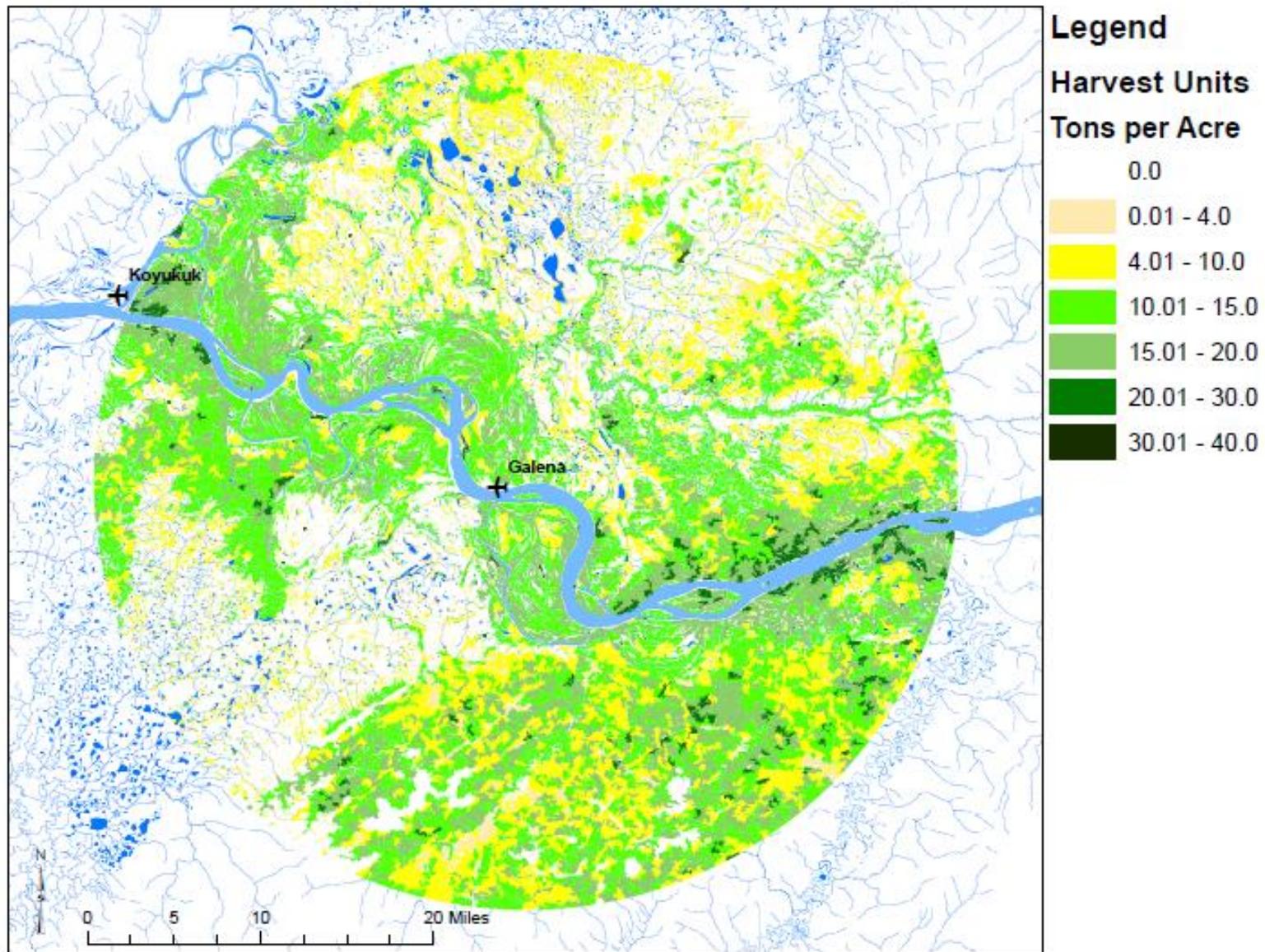


Project History

Former Galena Air Base

- Project Feasibility Studies
- Gana-A 'Yoo, Limited Forest Stewardship Plan
- ★ Steam Utilidor Assessment
- Forest Inventory of Galena Working Circle
- Engineering Design





Project History

Timber Harvest Entity

- The City of Galena, Galena City School District (GCSD) and Louden Tribal Council (LTC) created a local non-profit organization, **Sustainable Energy for Galena, Alaska** (SEGA) tasked with providing wood fuel supply
- Gana-A 'Yoo, Limited, the City of Galena and SEGA entered into a 20-year Timber Sale Agreement

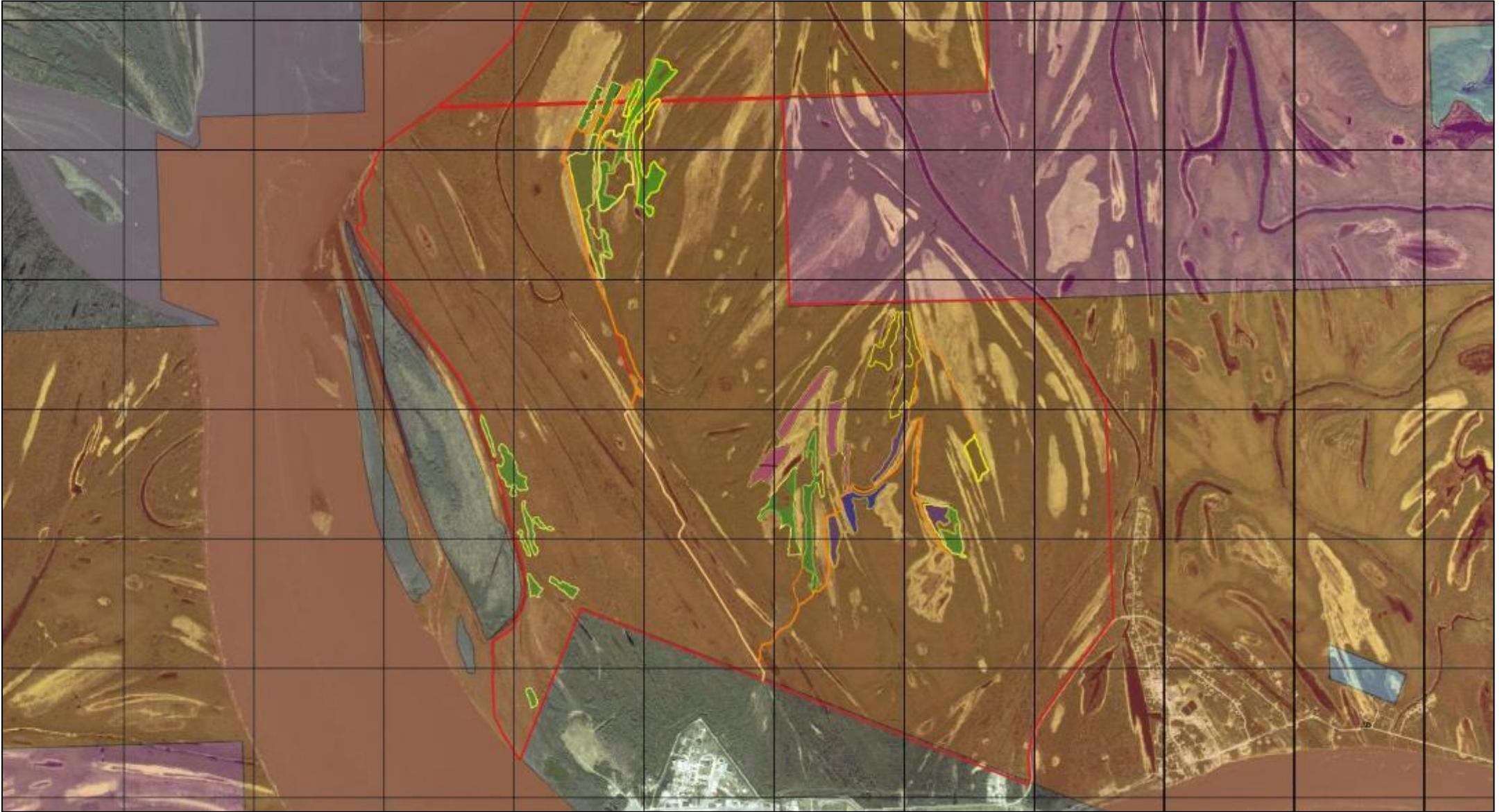


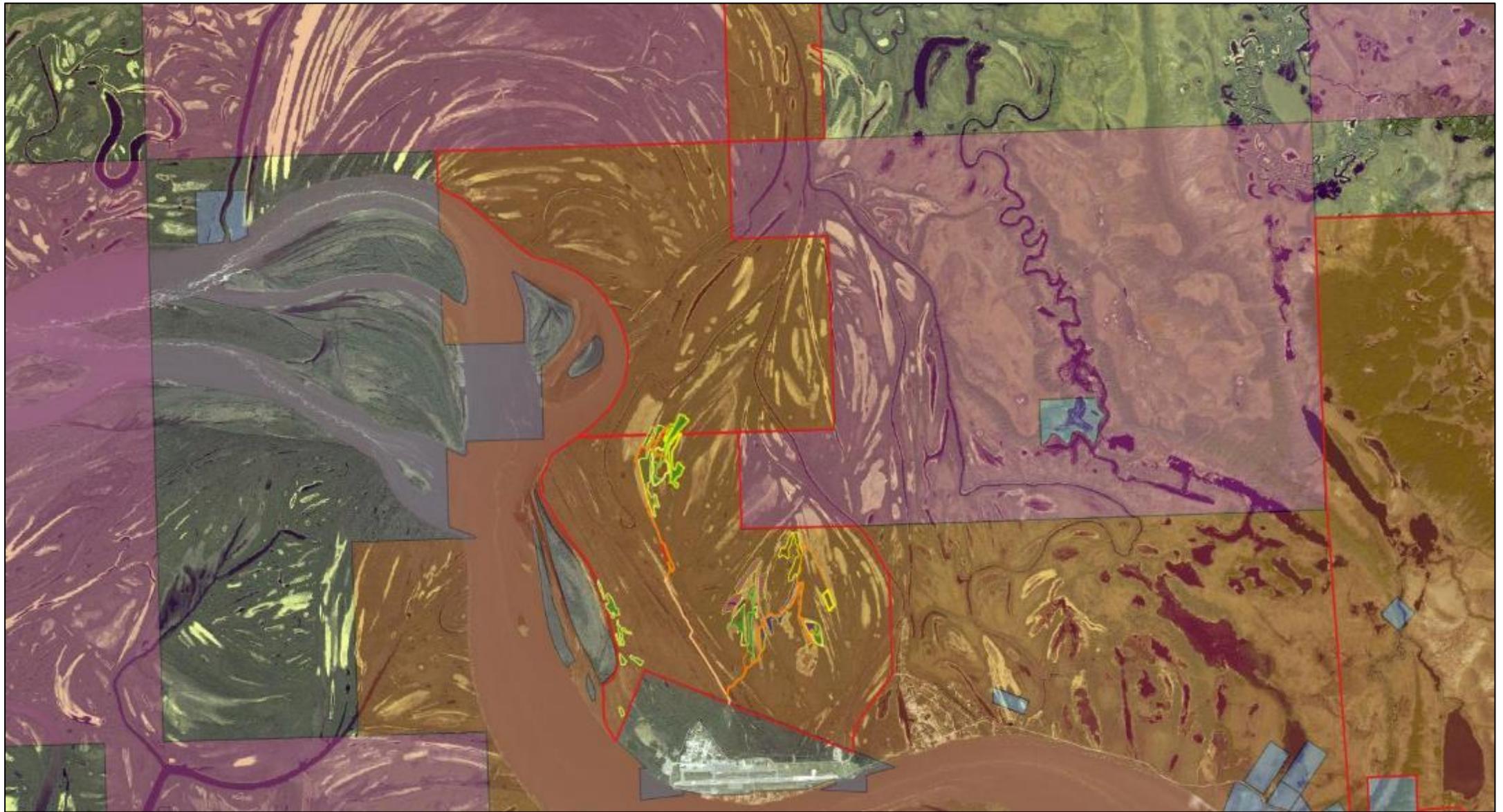
Wood Fuel Supply

SEGA – Organized in Fall 2014

- 20-year contract
- 4720 acres
- Predominantly deciduous species
- Mixed conifer and hardwood
- Winter Timber Harvest & Chip Processing
 - (10 successful seasons)
 - Harvest 25 acres/year









Wood Fuel Supply

Hitachi ZX200 with Waratah 622B processor



Wood Fuel Supply

Log bunks positioned in harvest unit area, ~2-3 cords per bunk



Wood Fuel Supply

John Deere 748G-III Skidder



Wood Fuel Supply

Log-landings positioned on temporary trail



Wood Fuel Supply

Peterbilt self-loading log truck



Wood Fuel Supply

One season of passive drying has resulted in an average of 32% Moisture Content (MC_{wb})



Wood Fuel Supply

Bandit M1400 knife-chipper



Wood Fuel Supply

Bulk Chip Storage, 2-3 weeks of fuel when full



Heating System

Day-bin, 4-5 days worth of fuel when full



Heating System

Automated auger, conveyor belt and metering-bin feed system



Heating System

Burn-box rear feed system and front access door



Heating System

Former Galena Air Base

- 2016 Summer Construction Season
- Installed heat distribution and new domestic water line
- Converted existing diesel boilers for hot-water/glycol, installed 4.5 MMBtu Messersmith burn-box with Hurst Boiler and performed several additional support tasks



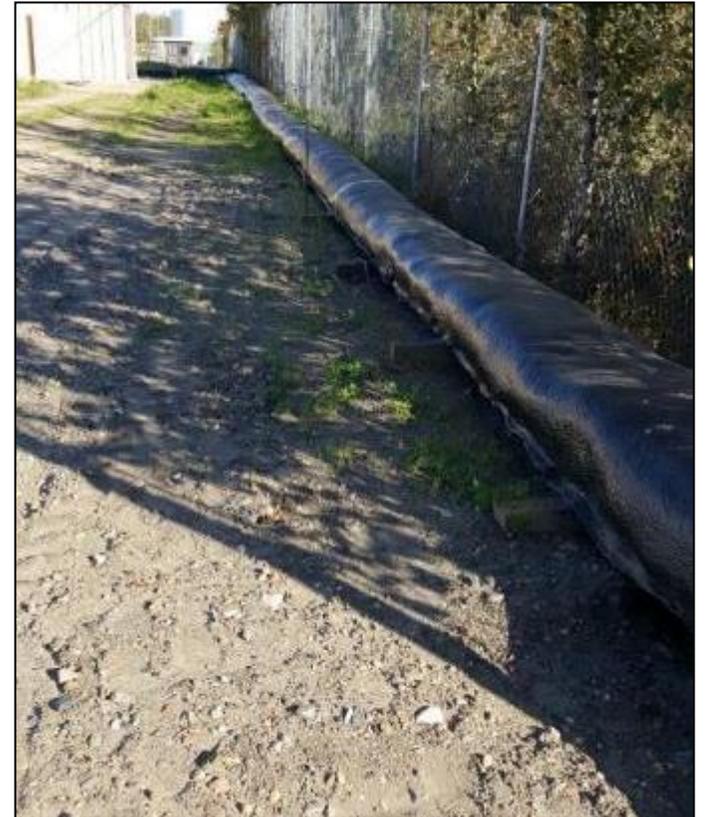
Heating System

Convert from a steam to hot water heat distribution system



Heating System

Above-grade segment of distribution lines, some segments are below-grade



Avg. Estimated Results

Est. 16.5 billion Btu Heat Requirement

Annual averages:

- Oil used – 25,000 gallons (g) (94k liters)
- Wood used - 60,000 cubic feet (cf) / 1700 cubic meters
**Solid Wood Estimate*
- Oil displaced - 200,000 g / (757,000 liters)
- Oil displaced **due to biomass** – 100,000 g (378,500 liters)



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Sustainable Energy for Galena, Alaska



THANK YOU!