

Drill Rig 1-hr NO₂ Impacts Study

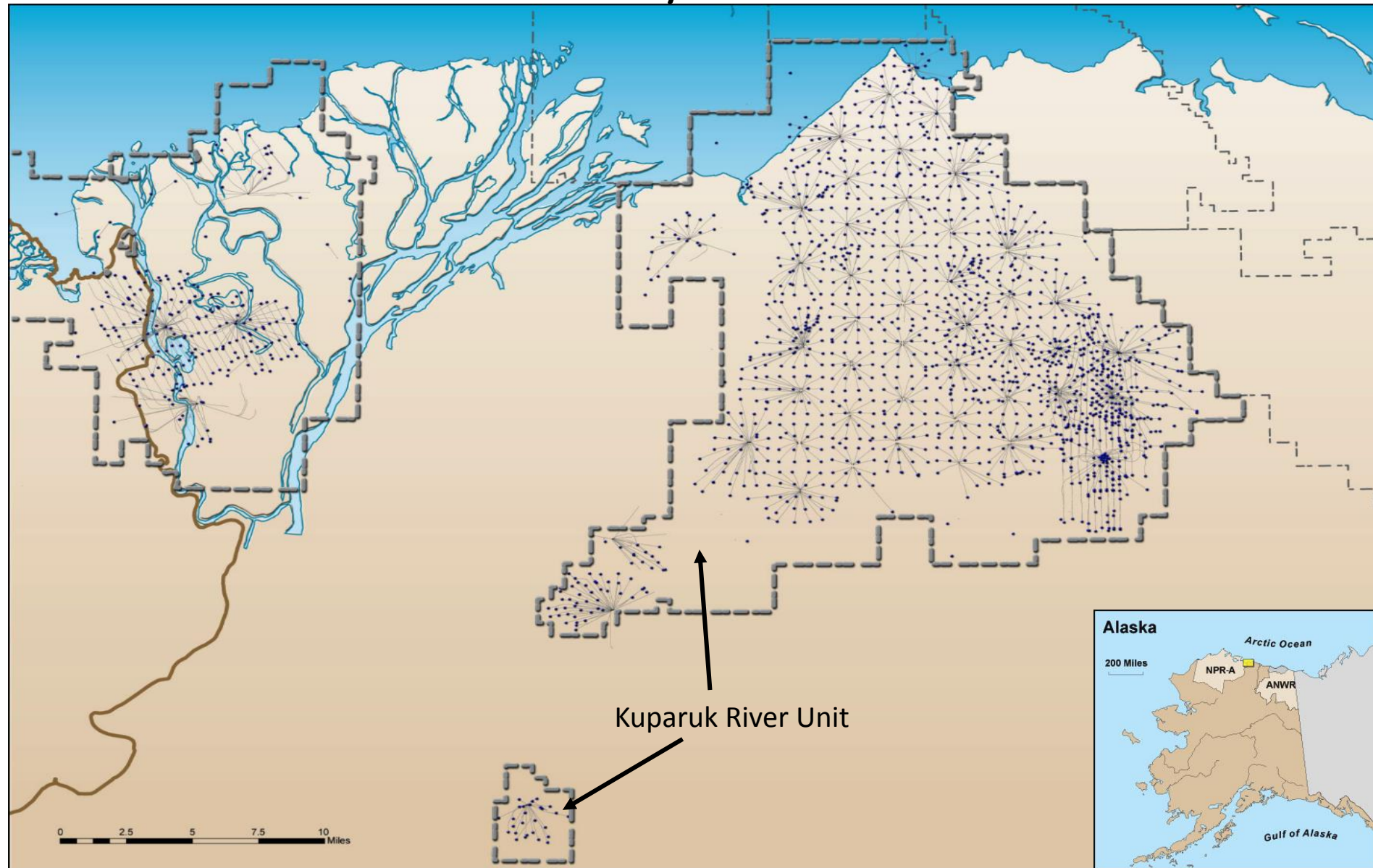
Study Purpose

- To collect emissions and ambient data near drill rigs to evaluate 1-hr NO₂ impacts from drilling operations
- To use the emissions and ambient data to evaluate AERMOD w.r.t. drilling operations

Alaska Field Study

- Alaska North Slope
- August – December 2014
- Continuous Emissions Monitoring (NO, NO_x, NO₂, O₂)
- Air Quality Monitoring (NO, NO_x, NO₂, O₃, CO, SO₂, PM)
- Meteorological Monitoring (wind speed/direction, temp., relative humidity, etc.)

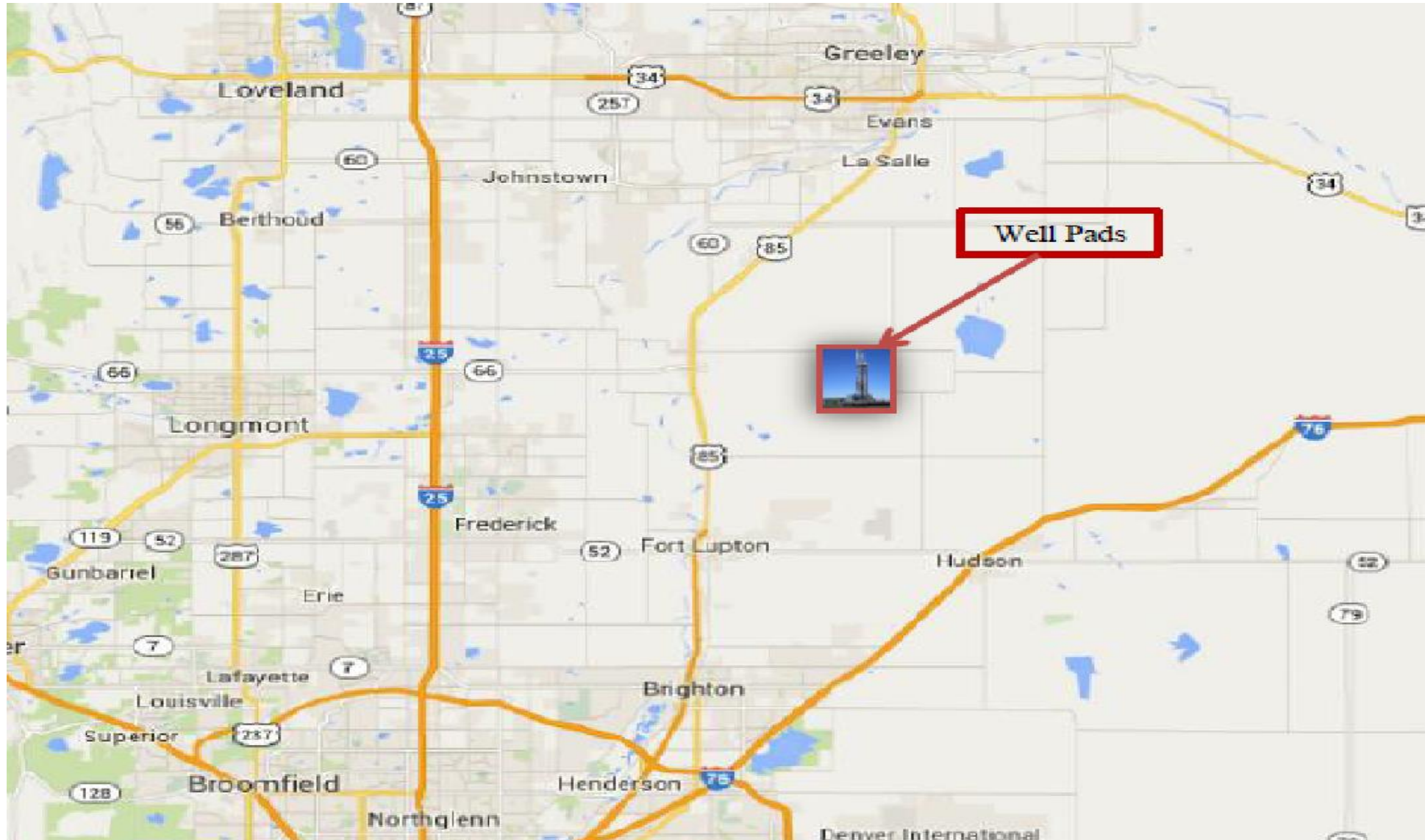
Alaska Field Study General Location



Colorado Field Study

- Denver-Julesburg Basin
- October – November 2014
- 2 adjacent well pads
- 12 Ambient air quality monitors at each site
- Continuous Emissions Monitoring (NO, NO_x, NO₂, O₂, CO₂, stack gas temp/pressure)
- Air Quality Monitoring-- (NO, NO_x, NO₂, O₃, CO, SO₂, PM)
- Meteorological Monitoring (wind speed/direction, temp., relative humidity, rainfall, etc.)

Colorado Field Study General Location



Study Management

- Collaborative effort
- Separate work groups for AK and CO
 - Review and process respective field study data
 - Participants include representatives of:
 - EPA, BLM, WESTAR, City of Denver, API, AECOM, ERM
- Study Management Team
 - Provides direction and guidance to work groups
 - Participants include representatives of:
 - EPA, BLM, WESTAR, State of Wyoming, API

Alaska Workgroup—Findings/Current Status

- Data review and analysis is ongoing
- Modeling results dramatically under-predict monitored concentrations
- Unmonitored emissions from “transient sources” (i.e., trucks, mobile heaters, other equipment) appear to significantly influence monitored concentrations
- Identified 25 “good” hours of monitored NO_x data (not significantly impacted by transient sources; likely impacted directly by the drill rig emissions) that warrant further analysis
- Building downwash effect is significant
- Study results will be published in a journal article (in preparation)
- Work expected to be completed in Fall 2018

Colorado Work Group-Findings/Current Status

- Team Objectives
 - Review and evaluate the dataset for completeness and quality;
 - Compile a public data archive for evaluating different air quality dispersion models; and
 - Utilize EPA's AERMOD air quality dispersion model to determine the most appropriate configuration (emissions, meteorology, chemistry, surface characteristics, etc.) to simulate the drill rig emissions
- Data review and analysis is ongoing
- Conducting modeling simulations to compare results to collected data
- Evaluating NO_x chemistry and how that affects results
- Preliminary Results
 - QA efforts have identified several time periods with valid and complete data (over 80% of data)
 - Data will be categorized into different levels of utilities for future analyses
- Study results will be published in journal articles
 - Paper 1—describe database development (in preparation)
 - Paper 2—discuss model sensitivity and performance under different chemistry schemes
- Work expected to be completed in Winter 2018