

# Baseline Data Collection in Support of Habitat Restoration and Mine Reclamation: Chuitna Coal Project, Alaska

Russell Kirkham, ADNR  
Terry Brown, MEI



"Putting a New Face on Mining Reclamation"  
A National Interactive Forum on Geomorphic Reclamation  
September 12-14, 2006

# Agenda

- ▶ Brief overview of the project
- ▶ Timeline relative to the SMCRA permitting process
- ▶ Objectives
- ▶ Baseline Programs
- ▶ Projected Outcome



# Chuitna Coal Project



Applicant: Pac Rim Coal

Est. Production:  
12million tons/year

Location: 70 km west of  
Anchorage

# Permitting Timeline

- ▶ Currently collecting baseline data to support a SMCRA permit application.
- ▶ SMCRA application is expected sometime late 2006 to early 2007.
- ▶ The project has applied for a COE 404 permit and an EPA NPDES permit.
- ▶ A supplemental EIS is being prepared by ENSR and should be ready for public comment by early to mid 2007.

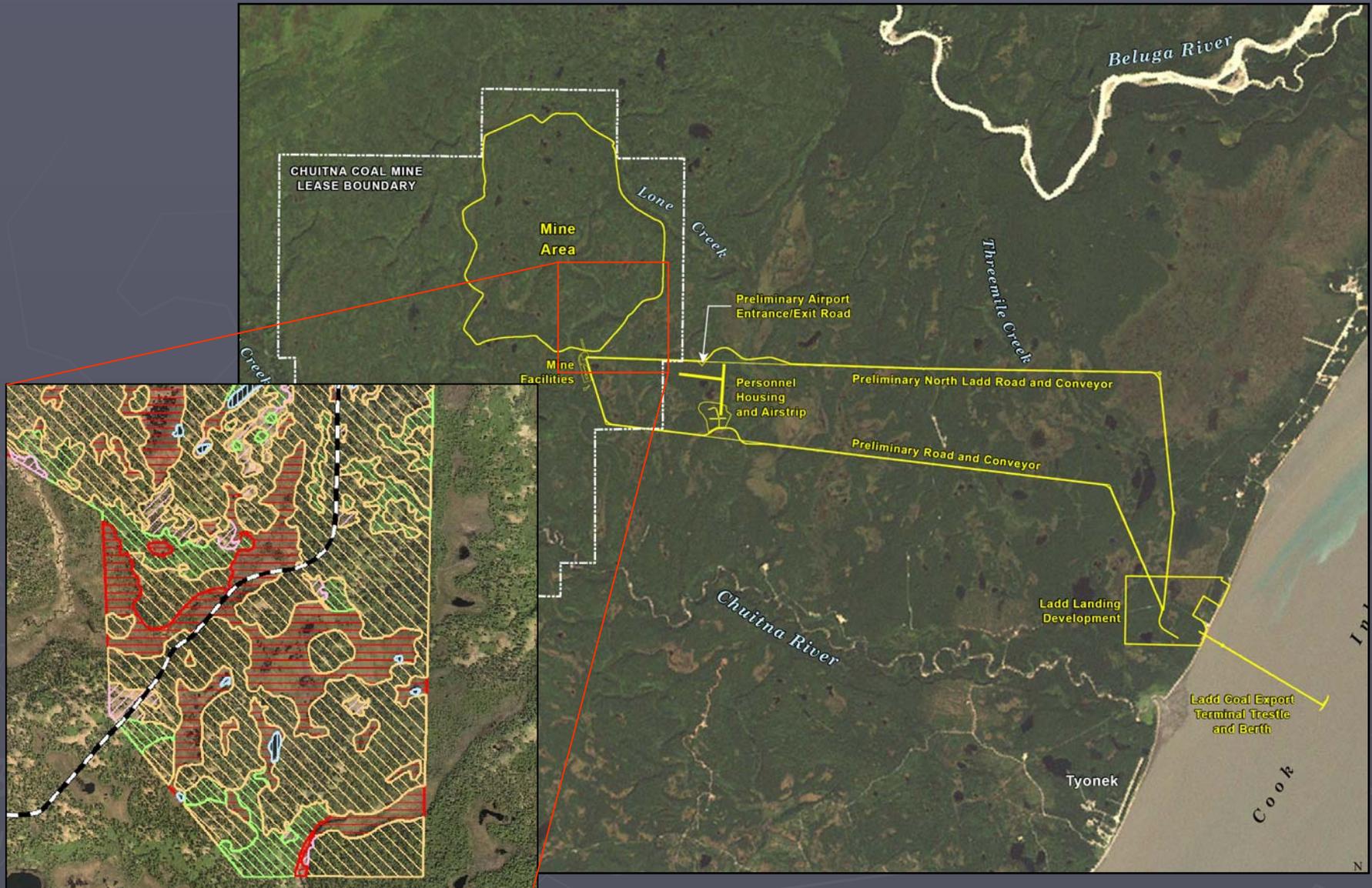
# Objective

To develop baseline data collection requirements to accommodate design and construction of adronomous fish streams and terrestrial habitat at the Chuitna Coal Project, Alaska.

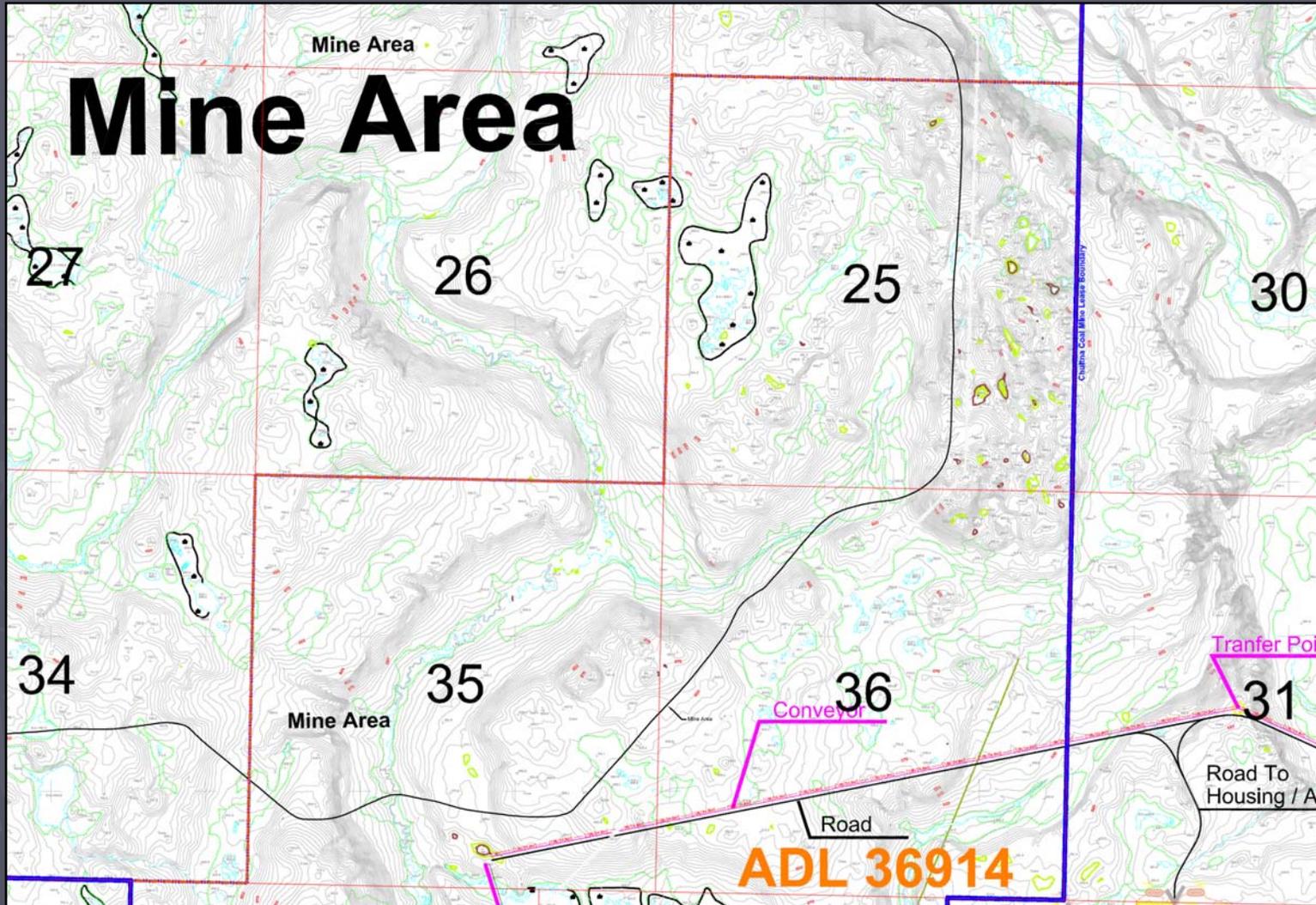
# Baseline Study Components

- ▶ High Resolution Aerial Photography and DEM
- ▶ Hydrology
  - surface water – quantity and quality
  - ground water – flow characteristics and quality
- ▶ Fish habitat
  - configuration
  - biological components
- ▶ Channel morphology
  - Channel type
  - Depth, Velocity, substrate
- ▶ Wetlands delineation
- ▶ Vegetation, Land Use, Geology, Wildlife

# High Resolution Aerial Photography



# Topography-Derived from high resolution DEM



# Hydrology – Surface Water

## ► Flow regime

- origin of water- surface and ground water contributions
- maintenance of water flow

## ► Water quality

- suspended solids
- turbidity
- temperature
- elements – Al, Fe, etc.



# Hydrology – Ground Water

## ► Flow regime

- direction
- hydraulic conductivity
- contribution to surface water flow

## ► Water quality

- constituents
- temperature



# Fresh Water Fisheries

- ▶ Fisheries
  - Preferred habitats/ Distribution
  - Types
- ▶ Benthic macroinvertebrates
- ▶ Zooplankton
- ▶ Periphyton (benthic algae)
- ▶ Channel morphology
  - Depth
  - Velocity of water
  - substrate



# Stream Channel Morphology/ Coarse Habitat Survey

- ▶ Water shed area
- ▶ Sinuosity
- ▶ Valley Slope
- ▶ Water Temperature
- ▶ Stream Barriers
- ▶ Rosgen Channel Type
- ▶ Spawning Record

# Stream Channel Morphology/ Detailed Habitat Survey

- ▶ Channel type
- ▶ Depth characteristics
- ▶ Velocity characteristics
- ▶ Substrate
- ▶ Channel Cross-section
- ▶ Longitudinal Profile





# Wetland Evaluations

- ▶ Soils Characterization
- ▶ Vegetation Characterization
- ▶ Wetland function
  - Recharge
  - Discharge
  - Other
- ▶ Wetland delineation
  - Classification
  - Extent



# Baseline Study Components

- ▶ High Resolution Aerial Photography and DEM
- ▶ Hydrology
  - surface water – quantity and quality
  - ground water – flow characteristics and quality
- ▶ Fish habitat
  - configuration
  - biological components
- ▶ Channel morphology
  - Channel type
  - Depth, Velocity, substrate
- ▶ Wetlands delineation
- ▶ Vegetation, Land Use, Geology, Wildlife

Baseline Programs will provide the information required to establish reclamation plans that will result in the construction of stable land forms and stream channels that support the reestablishment of the diverse pre-mining habitat.

# Post Mining Land use and Reclamation plans

The focus of the reclamation plan is to create:

- Drainage areas and density
- Stable Stream Channel design and Channel types that support post mining autonomous fish habitats and are stable.
- Creating complex slopes and landforms in the regraded areas to increase stability, reestablish a diverse habitat for vegetation, wetlands and wildlife, and establish infiltration to restore the hydrologic system.

# Combining Fluvial Geomorphic Principles with Land Use Requirements:

- ▶ Establish stable stream channel
- ▶ Establishment of the Hydrologic regime required to support stream flow
- ▶ Wetland mitigation
- ▶ Fisheries habitat development
- ▶ Enhancement of Wildlife habitat

# Summary

- ▶ Data Collection Requirement
- ▶ Defining Post-Mining land use
- ▶ Goals:
  - Complex landforms
  - Appropriate stream channels
  - Sustainable Post-mining habitat

# Questions?

