

# Winter Off-Road Travel

*Observations, Impacts and Management Considerations*

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# STEIGER and TRAILER



# ROLLIGON



# D-7 TRACTOR



# SLED-MOUNTED CAMP



# SEISMIC VIBRATORS





# Tundra Areas and Management Standards

## Coastal Areas

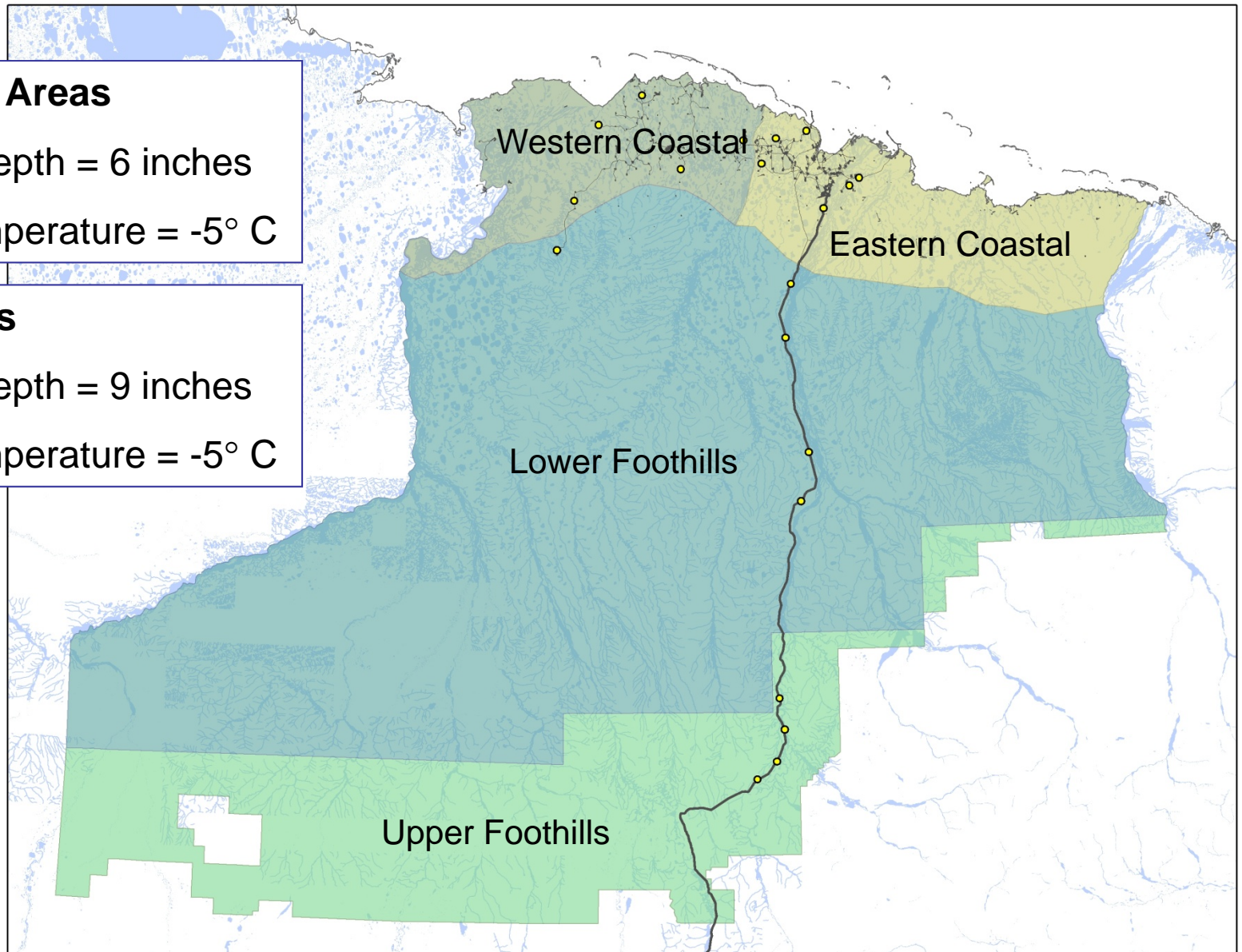
Snow Depth = 6 inches

Soil Temperature =  $-5^{\circ}\text{C}$

## Foothills

Snow Depth = 9 inches

Soil Temperature =  $-5^{\circ}\text{C}$





# Soil Temperature and Snow Data Collection

20 snow depth measurements

2 snow characterization pits

2 snow core samples



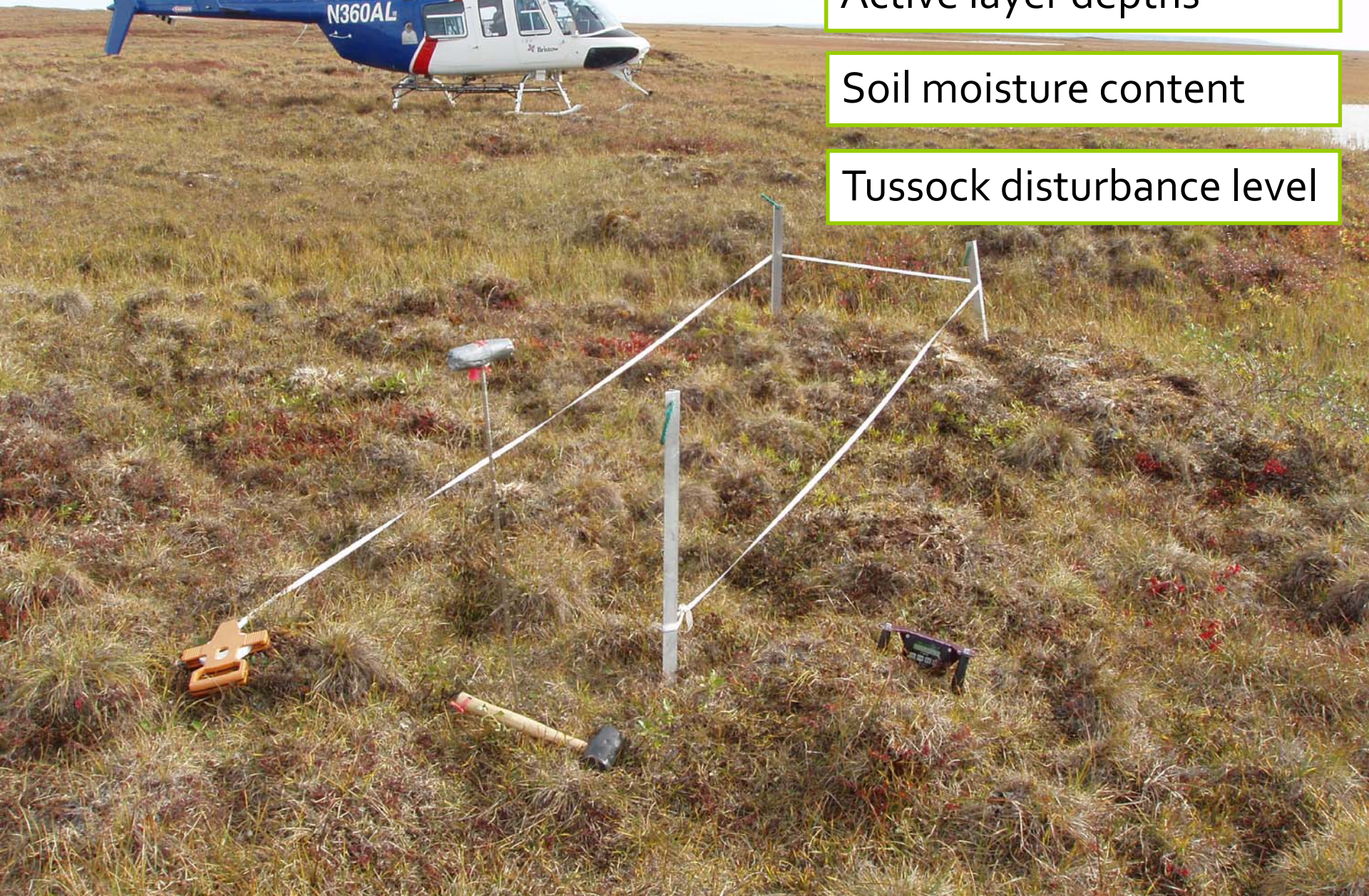


# Summer Data Collection

Active layer depths

Soil moisture content

Tussock disturbance level





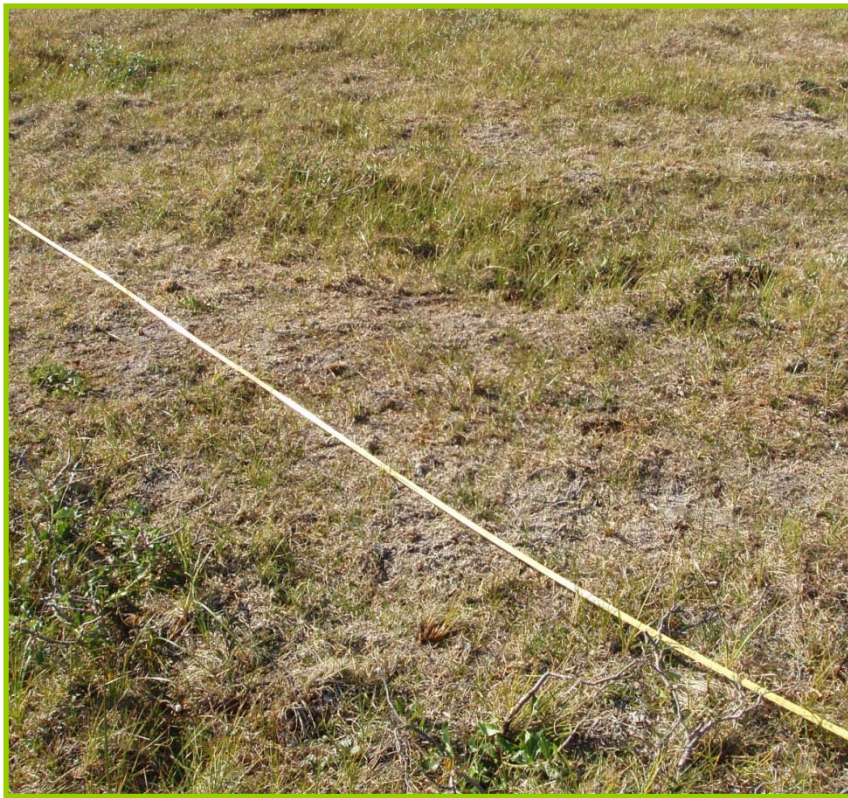
# Studies and Impact Analyses

- Seismic Trails
  - 2004/2005 Winter Validation Study
  - 2007 Seismic Camp Move Trail
  - Umiat Trails
- Snow/Winter Trails
  - Renaissance Winter Trail





- Mean Snow Depth – 9.4"
- "High degree of scuffing"



- Mean Snow Depth – 11.0"
- "Very low disturbance level"
- "Some scuffing present on elevated areas."





# Seismic Operations- *General Observations*

- Vibrators and smaller vehicles have negligible impact on sedge vegetation.
- Significant impacts can result from camp moves in both sedge and tussock tundra.
  - Increased active layer depth
  - Surface scuffing
  - Tussock damage
  - Impacts are greater than impacts from ice road construction





# Renaissance Winter Trail (Winter 2007-2008)

- Trail from MP 359 Dalton to Umiat
  - 108 miles (70 miles of state land)
  - 42 crossings needing ice bridges
  - 1 pre-pack Jan 10; Steigers Jan 16
- Vehicles
  - Tucker SnoCats (prepacking and snow bridges)
  - Steigers (haul tracked and skid-mounted loads)
- 104 passes by Steiger trains between Jan 16 and Feb 14



# Renaissance Winter Trail- Damage

- **Damage**
  - Highest level of damage on dry tussock tundra
  - Stream bank crossings had up to 90% woody veg removal
  - Approx 20-30% of surveyed trail had unacceptable levels (levels 2 & 3) of tussock disturbance
- **Snow Quality (data from CRREL)**
  - Ave depth: 5.2 in (s.d. 2.4); 1.84 in - 21.06 in
  - Snow-water equivalence: ave 1.3 (s.d. 0.7);  
 $0.35 \leq \text{SWE} \leq 5.61$

**Poor snow + Many passes + Poor prepack = High levels of damage**







# DNR Response to Trail Damage

Issued Notice of Default that required:

- Complete damage assessment
- Prepare restoration plan
- Complete restoration project
- Monitor for 10 years
- Provide travel funds to DNR for monitoring

**Reexamining 6" / 9" snow requirement to see if variables other than snow depth should be considered.**





## 2007 vs. 2008 Umiat Trails

**2007**

9" light snow

5.2" later

SWE = 1.3"

**High damage**

**2008**

17" heavy snow

19" later

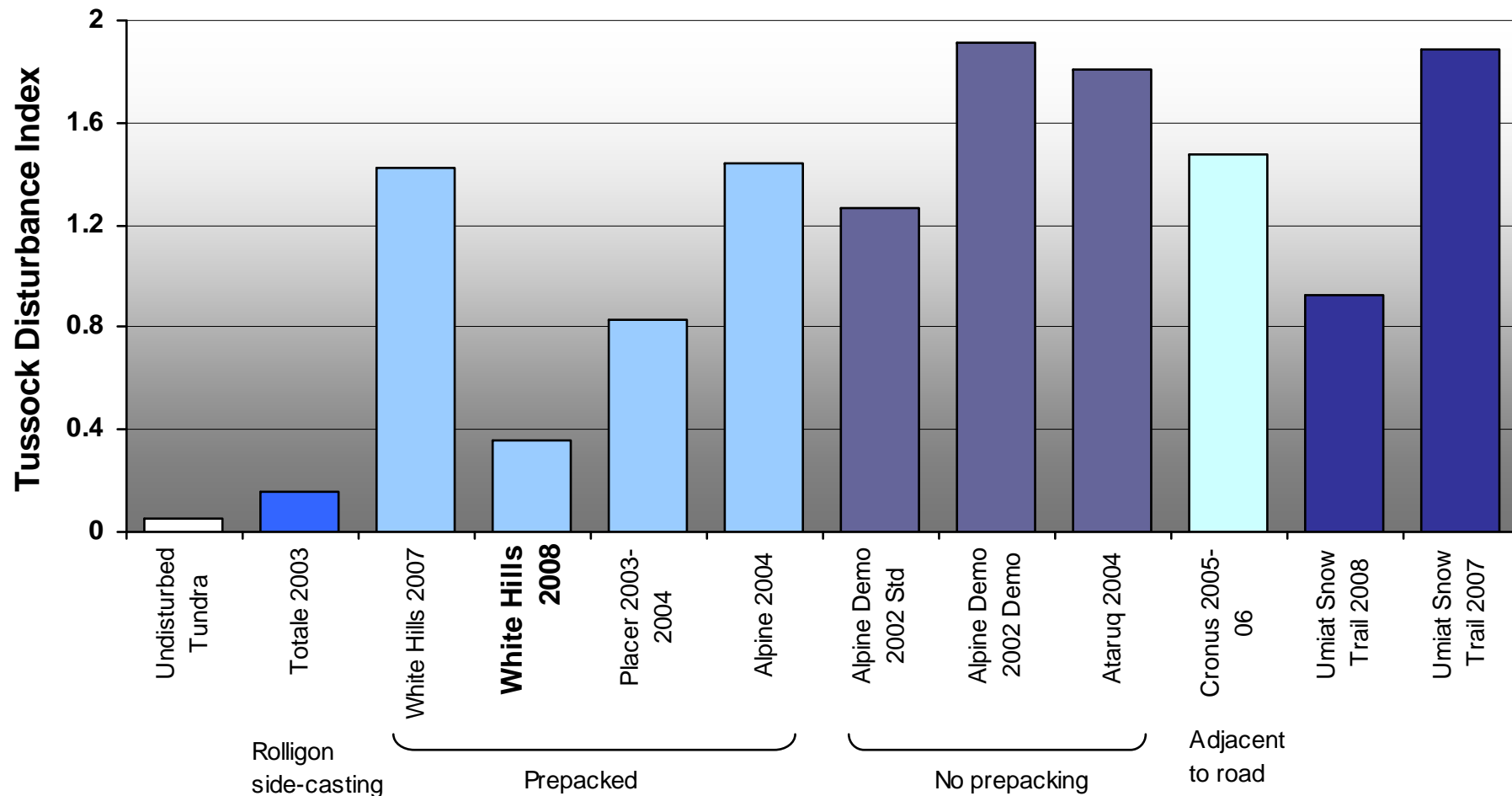
SWE = 5.0"

**Lower damage**





## Tussock Disturbance Index Various Ice Roads and Trails 2002-2008





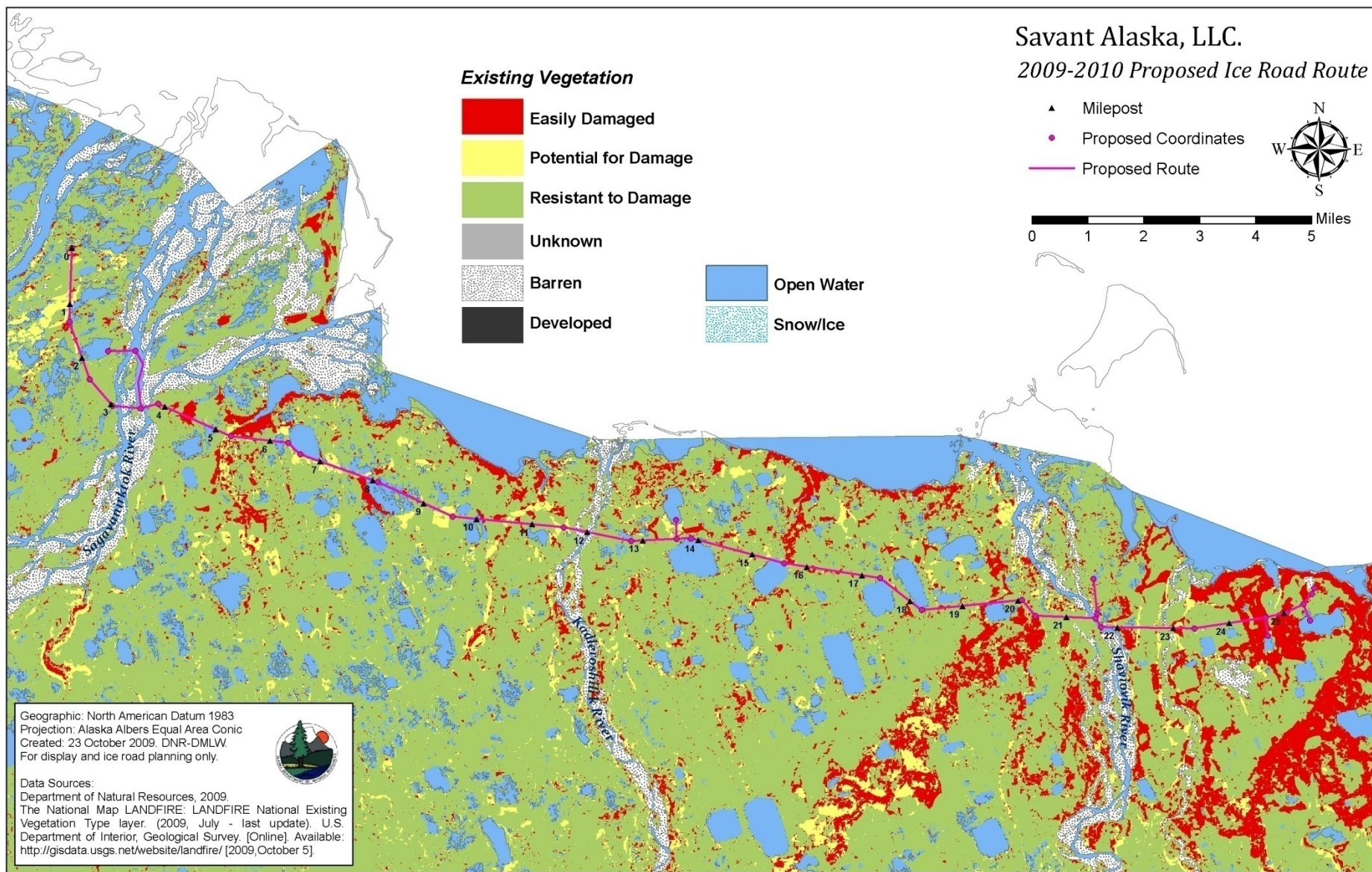
# DNR Management Guidelines

- Continue to open tundra using snow depth criterion (6" in coastal, 9" in foothills) and soil temperature ( $-5^{\circ}\text{C}$ ).
- For multiple pass projects:
  - If SWE  $\geq 3.0$  inches, approve project.
  - If SWE  $< 3.0$  inches, approve project with increased DNR oversight.
- DNR will continue to monitor snow conditions and impacts of off-road travel projects to determine the most appropriate management standards.





# Vegetation Mapping for Route Selection





# General Observations and Recommendations

- Lack of snow can limit industry and long off-road travel projects.
- Pre-packing may aid in snow capture.
- Define routes during snow-free months.
- Sleds/sleighs are not preferred when snow is lacking.
- Limited snow does not necessarily limit travel.



*March 25, 2010- Near Dalton Highway MP 380*

# Questions?

