

CREATING AND DELIVERING BETTER SOLUTIONS

The Use of Remote Sensing Technology to Delineate Hydrocarbon Contamination in the Arctic. by Michelle Blade & Herb Ziervogel (Presented by Brian Adeney)



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Site: Resolute Bay, Cornwallis Island, NU







Legacy Sites in the Canadian Arctic







Upper Base Area – Environmental Site Assessment

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Petroleum Hydrocarbon and Carbon Dioxide

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Total Petroleum Hydrocarbons

Carbon Dioxide in Water



Surface Expression of Plume







Surface Expression of Petroleum Hydrocarbons

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Diatoms (10,000 mg/L)



Microbial Mats (>1,000 mg/L)



Bryophytes (<1,000 mg/L)



Native Grasses (low to no tolerance)



Groundwater Seepage from Plume Area







Down-Gradient Microbial Mats









Down-Gradient Microbial Mats









Quickbird Satellite Imagery



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Unique Value Intensity Ranges

Classification	Red	Green	Blue	Near Infrared
Ice and Snow	>429	>653	>498	>550
Water	<313	<433	<275	<232 ¹
Microbial Mats	291-359	424-543	341-454	416-455
Bryophytes	<280	<423	<305	265-388
Native Grasses	<280	<423	<305	388-500

¹Only the near infrared intensity value was used in the raster classification calculation for water.



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Land Surface Classification Using GIS



MICROBIAL MAT Si ICE LEGEND: NATIVE GRASS ICE BRYOPHYTES BRYOPHYTES MICROBIAL MAT Scale: 1: 25 000 (metres



Land Surface Classification Using GIS

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Summary



• History of legacy sites in the North (diesel)

 Geochemical changes result from PHC degradation in subsurface

- Microbial mat growth with types depending on PHC concentrations
- Use of raster spacial analysis to isolate wavelengths and colour related to vegetation
- Broad applicability for scoping at remote sites and crude delineation



In memory of co-author Herb Ziervogel









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