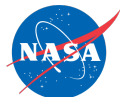


Overview of ABoVE's Implementation Plan and Future Activities

Joint POLAR/ABoVE/GNWT Workshop

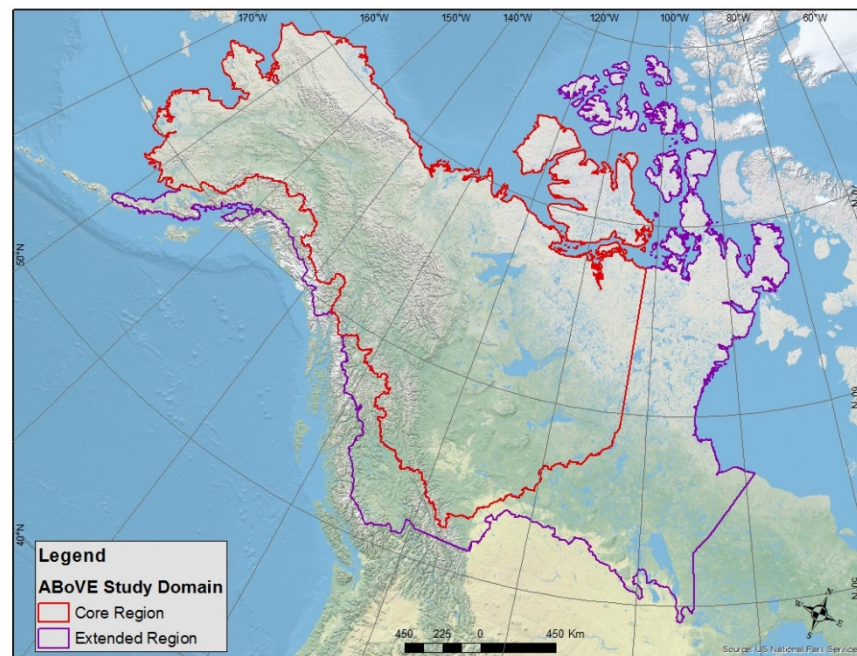
10 May 2016

E. Kasischke, C. Miller, P. Griffith, L. Larson



ABoVE seeks a better understanding of the vulnerability and resilience of ecosystems and society to the changing environment in the Arctic **and boreal regions of western North America**

- **6 Thematic Areas for Research:**
 - Societal Impacts
 - Disturbance
 - Permafrost
 - Hydrology
 - Flora and Fauna
 - Carbon Biogeochemistry



ABoVE Study Domain

	Phase I Focus on Ecosystem Dynamics Objectives			Phase II Focus on Ecosystem Services Objectives			Phase III Focus on Analysis and Synthesis			
	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9	
	Intensive Study Period	[Dark Gray]			[Dark Gray]			[Light Gray]		
Research Activity Focus (4.2)										
<i>Field-based research (4.2.1)</i>										
Collection of field observations	[Dark Gray]			[Dark Gray]			[Dark Gray]			
Synthesis, integration and scaling of field-based research			[Light Gray]	[Dark Gray]						
<i>Societal Drivers, Consequences & Responses Research (4.2.2)</i>										
Societal drivers, consequences and responses to change		[Light Gray]	[Dark Gray]				[Light Gray]			
Decision support information product development						[Light Gray]	[Dark Gray]			
<i>Remote Sensing Research (4.2.3)</i>										
Airborne data collection		[Dark Gray]	[Light Gray]	[Dark Gray]	[Light Gray]	[Dark Gray]				
Data product development - Ecosystem Dynamics	[Dark Gray]			[Dark Gray]	[Light Gray]					
Data product development - Ecosystem Services			[Light Gray]	[Dark Gray]						[Light Gray]
<i>Modeling Research (4.2.4)</i>										
Initial benchmarking with existing data	[Dark Gray]									
Refinement & assessment with ABoVE data			[Light Gray]	[Dark Gray]				[Light Gray]		
Integrated modeling - diagnosis and prediction						[Light Gray]	[Dark Gray]			
<i>Integration & Scaling Research (4.2.5)</i>										
Integration of existing data and identification of gaps	[Dark Gray]			[Light Gray]						
Spatial-temporal integration across individual studies			[Light Gray]	[Dark Gray]				[Light Gray]		
Cross-activity, cross-disciplinary synthesis						[Light Gray]	[Dark Gray]			

Key Activities Supported By NASA

- Research Projects from NRAs for ABoVE
- Research Projects from other NRAs that contribute to ABoVE Goals/Objectives
- Carbon Cycle and Ecosystem personnel to support ABoVE
- Airborne Campaign
- ABoVE Science Cloud
- Field infrastructure and key data sets
- Workshops
- Coordination with ABoVE Partners

Current Status

- Initial NASA projects for ABoVE selected in late summer 2015
- Additional projects have been identified and project members have become part of the ABoVE Science Team (44 total ABoVE Projects)
- ABoVE Science Team is developing ABoVE Science Implementation Plan and the Airborne Remote Sensing Science Plan
- NASA is actively seeking and developing partnerships with organizations in Canada and the US

ABOVE Project Types

NASA/Partner/Affiliated	Count
NASA	40
Partner (CHARS & DOE NGEE-Arctic)	2
Affiliated (NSF and USGS)	2
	44 Total

Science Team Member Organizations

Organization Type	Country	Count
University	USA	44
University	Canada	8
University	Sweden	1
University	UK	1
Federal Agency	USA	8
Federal Agency	Canada	5
Federal Agency	Germany	3
Federal Agency	Japan	1

Organization Type	Country	Count
Independent Non-profit	USA	2
Independent Non-profit	Canada	2
State Agency	USA	1
Provincial Agency	Canada	1
Territorial Agency	Canada	3
Native Organization	USA	2
Native Organization	Canada	1

Agencies

US FEDERAL

USDA Forest Service

Fish & Wildlife Service

US Geological Survey

National Park Service

NASA

NOAA

US Dept. of Energy

Bureau of Land Mgmt.

CANADA FEDERAL

Natural Resources Canada
—Canadian Forest Service

Natural Resources Canada
—Geological Survey

Environment and Climate
Change Canada

Parks Canada

Polar Knowledge Canada

GERMANY

Alfred Wegener Institute
Helmholtz Centre for
Polar and Marine
Research

GFZ German Research
Centre for Geosciences

Max-Planck-Institute for
Ornithology

JAPAN

National Institute for
Environmental Studies

Agencies (cont'd)

CANADIAN PROVINCIAL AND TERRITORIAL

Alberta Government - Environment and Sustainable Resource Department

Government of the Northwest Territories

Yukon Department of Environment

Yukon Government Wildland Fire Management

US STATE

Alaska Department of Fish and Game

NGOs & COMPANIES

Senckenberg Gesellschaft fuer Naturforschung

Alaska Biological and Research, Inc. (ABR, Inc.)

Alaska Ecoscience

Atmospheric and Environmental Research

H. T. Harvey & Associates

US – Woods Hole Research Center

Canada – Lesser Slave Lake Bird Observatory

Canada – Royal Alberta Museum

US – Yellowstone Ecological Research Center

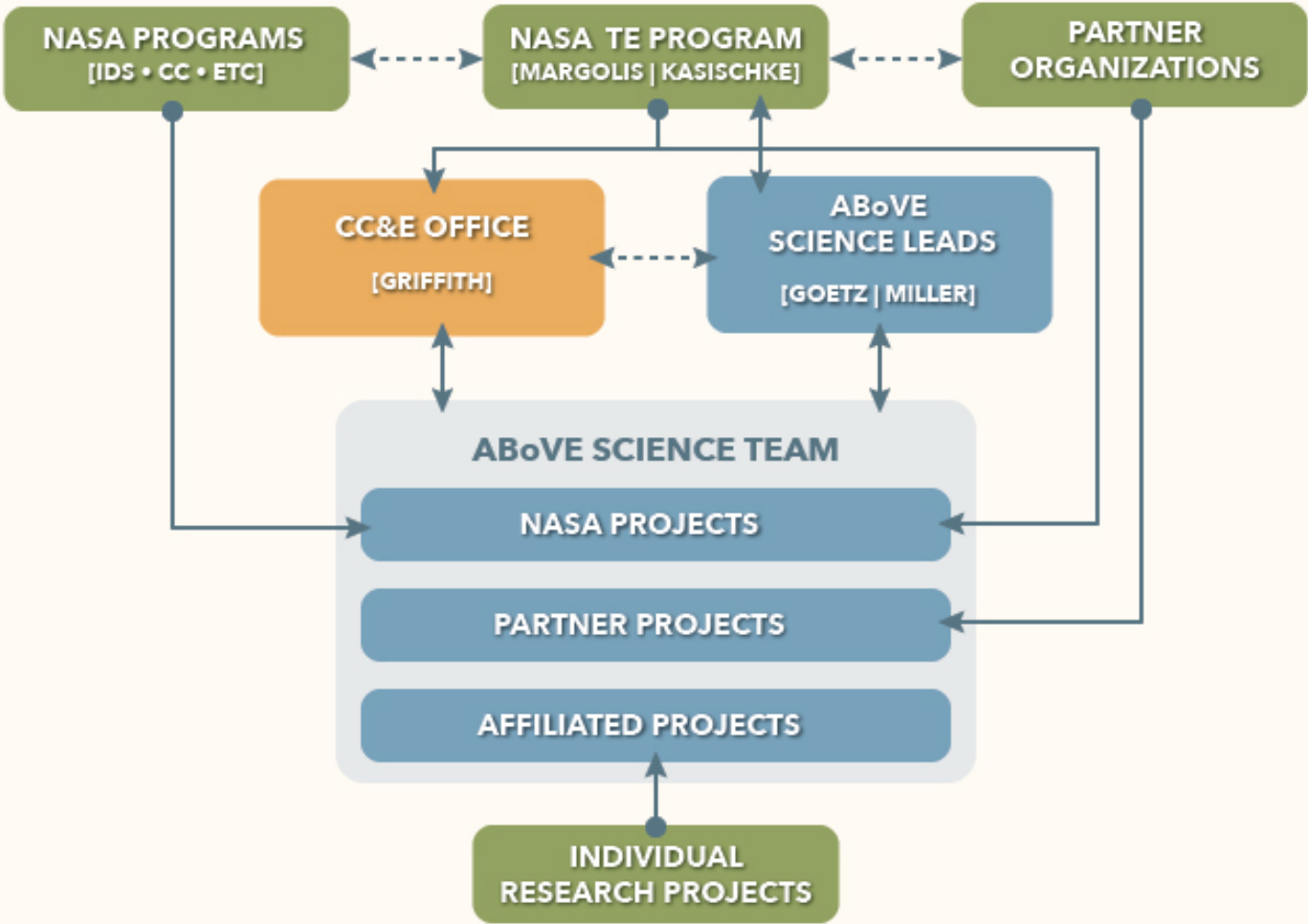
NATIVE ORGANIZATIONS

US – Calista Education and Culture, Inc.

US – Calista Elders Council (Non-Profit)

Canada – Gwich'in Renewable Resources Board

ORGANIZATIONAL STRUCTURE



Key Canadian Partners

- Federal
 - CFS, CSA, ECCC, CCMEQ, Parks Canada, GSC
- Territorial/Provincial
 - Governments of NT, Yukon
- Aboriginal Organizations
- Non-Government
 - Ducks Unlimited
- University (M. Turetsky)
 - Aurora College
 - Yukon College

NASA ROSES16

- **Solicits research proposals for use of airborne remote sensing data during the ABoVE Airborne Campaign**
- **Seeks research on using airborne data in key ABoVE research areas**
 - Impacts of variations in permafrost on ecosystems
 - Characterize the type, structure, and function of vegetation, especially in relationship to disturbance
 - Understand the drivers and impacts of variations in surface hydrology

Building for the Future

- In the very near future, both CSA and NASA will launch new satellite SARs – Radarsat Constellation Mission (RCM) and NISAR
- Coordination of research by NASA and Canadian partners can help build the foundation for exploitation of these future missions (mapping biomass, wetland monitoring, permafrost monitoring)

1. How are environmental changes affecting critical **ecosystem services** and how are human societies responding?
2. What processes are contributing to changes in **disturbance regimes** and what are the impacts of these changes?
3. What processes are controlling changes in.. **permafrost** and what are the impacts of these changes?
4. What are the causes and consequences of changes in the **hydrologic system**?
5. How are **flora and fauna** responding to changes in biotic and abiotic conditions, and what are the impacts on ecosystem function?
6. How are the magnitudes, fates, and land-atmosphere exchanges of **carbon pools** responding to environmental change, and how are **biogeochemical** mechanisms driving these changes?

1. Determine how interactions among vegetation, hydrology & disturbances **mediate permafrost vulnerability and resilience** to climate change.
2. Determine how **biological controls** influence ecosystem responses to climate change and disturbances.
3. Understand how **vegetation** attributes and **hydrologic** conditions interact and **influence disturbance**.
4. Quantify how changes in the spatial and temporal distribution of **snow properties** impact ecosystem structure and function.
5. Determine the causes of **vegetation productivity changes** and their **impacts** on ecosystem form and function.
6. Elucidate how climate change and disturbances interact.. to alter **carbon biogeochemistry**
7. Determine how.. **fish and wildlife habitat** co-vary across gradients of **climate and disturbance**.

1. Assess how climate warming is likely to affect **infrastructure and transportation** networks.
2. Determine how changes to disturbance regimes, flora and fauna, permafrost and/or hydrology influence **human health outcomes**.
3. Evaluate how changes to ecosystems will influence **subsistence** opportunities
4. Analyze how changes to natural and cultural resources will impact local communities & influence **land management**.
5. Determine the sources of variations in climate feedbacks and assess potential for changes to **climate regulating** services across scales.
6. Determine the degree to which changing environment and altered human activities result in synergistic or antagonistic **changes in ecosystem services**.

	Phase I Focus on Ecosystem Dynamics Objectives			Phase II Focus on Ecosystem Services Objectives			Phase III Focus on Analysis and Synthesis		
	Yr1	Yr2	Yr3	Yr4	Yr5	Yr6	Yr7	Yr8	Yr9
	Intensive Study Period	■	■	■	■	■	■	■	
Research Activity Focus (4.2)									
<i>Field-based research (4.2.1)</i>									
Collection of field observations	■	■	■	■	■	■	■	■	
Synthesis, integration and scaling of field-based research			■	■	■	■	■	■	■
<i>Societal Drivers, Consequences & Responses Research (4.2.2)</i>									
Societal drivers, consequences and responses to change		■	■	■	■	■	■	■	
Decision support information product development						■	■	■	■
<i>Remote Sensing Research (4.2.3)</i>									
Airborne data collection		■	■	■	■	■			
Data product development - Ecosystem Dynamics	■	■	■	■	■	■			
Data product development - Ecosystem Services			■	■	■	■	■	■	■
<i>Modeling Research (4.2.4)</i>									
Initial benchmarking with existing data	■	■	■						
Refinement & assessment with ABoVE data			■	■	■	■	■	■	
Integrated modeling - diagnosis and prediction						■	■	■	■
<i>Integration & Scaling Research (4.2.5)</i>									
Integration of existing data and identification of gaps	■	■	■	■					
Spatial-temporal integration across individual studies			■	■	■	■	■	■	
Cross-activity, cross-disciplinary synthesis						■	■	■	■

Current Ecosystem Services Projects

- **Brinkman-01:** Biophysical Characteristics and Mechanisms of Environmental Disturbances Influencing Human Access to Ecosystem Services in Boreal Alaska
- **Frost-01:** Biophysical drivers and socio-ecological impacts of environmental change in the Yukon-Kuskokwim Delta region, western Alaska

Stakeholder Engagement Working Group (SEWG) & Carbon Cycle & Ecosystems Office

- Project Teams and Working Groups collaborating with researchers at agency and organizations
- Collaborate with ongoing activities (e.g., NWT/WLU)
- Connections with research networks (e.g. CCRN, SEARCH)
- SEWG and CCE Office help Project Teams and Working Groups:
 - Identification of stakeholders
 - Planning of engagement activities
 - Guidance on contacting stakeholders, navigating institutional networks and interactions, and designing and implementation of engagement activities
- The CCE Office will maintain a master calendar of both field and engagement activities, potentially suggesting modifying of combining activities in order to avoid duplication of effort and “research(er)” fatigue