

# SnowEx Site Selection Overview



*Photo Credit: D.K. Hall, Montana near  
Glacier National Park in early 1990s*

Christopher J. Crawford, Noah P. Molotch, and SnowEx Team

# Candidate North American SnowEx Sites



**Data Source:** Sturm, M., Holmgren, J., & Liston, G. E. (1995). A seasonal snow cover classification system for local to global applications. *Journal of Climate*, 8(5), 1261-1283.



## 3 Primary Mechanisms:

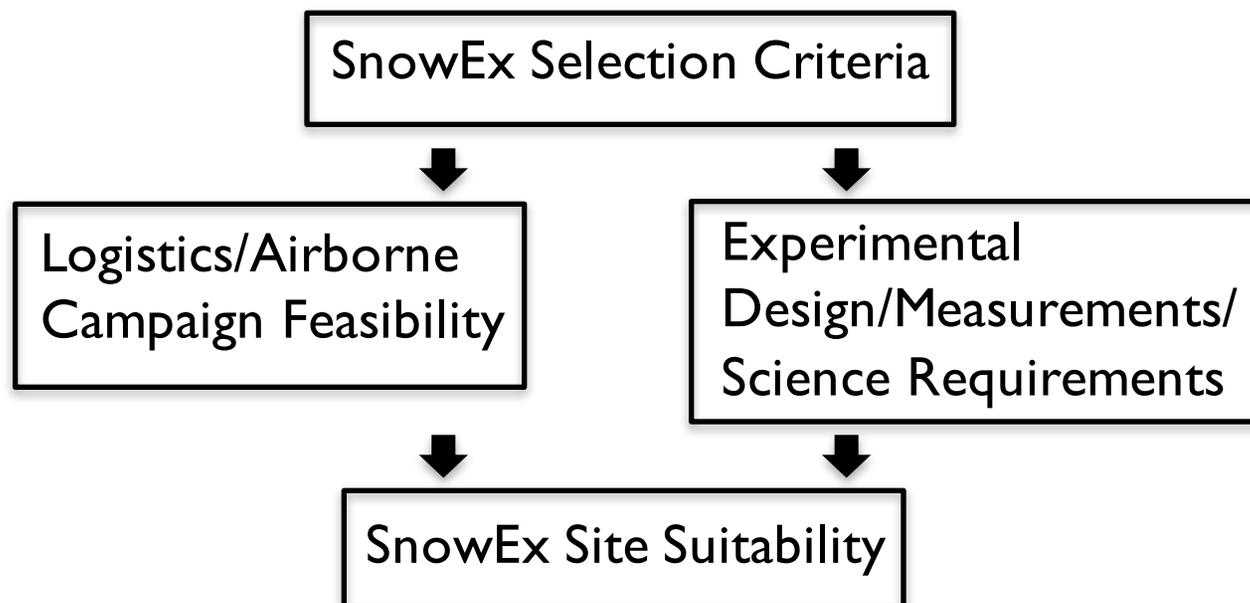
1. Original site list was compiled by Noah Molotch from prior iSWGR forums
2. Columbia MD May 2015 SnowEx workshop
3. Informal lines of communication with SnowEx organizing team, Crawford, and Molotch as POCs

## Two-Step SnowEx Site Selection Process

**Step One** (information gathering): Proposed SnowEx site

Jan.-Mar. Snowpack ➡ Site Characteristics ➡ SnowEx Site Database

**Step Two** (objective site evaluation): Apply filters to proposed SnowEx sites



## **Must have a persistent seasonal snowpack from January to March?**

1. Does the site have in-situ meteorological, hydrological, and snow measurements?
2. Does the site have infrastructure to support a field/airborne campaign?
3. Does the site have housing for a large group (~25-50) of investigators?

## **Logistics/Airborne Campaign Feasibility**

1. Aviation Restrictions (No/Yes)
2. Airbase Operations (NASA/Commercial)
3. Power Source for Field Instrumentation (No/Yes)
4. Field Crew Accessible (Easy/Moderate/Difficult)
5. Housing/Amenities (Number of People)
6. Proximity to Major Airport (Distance)

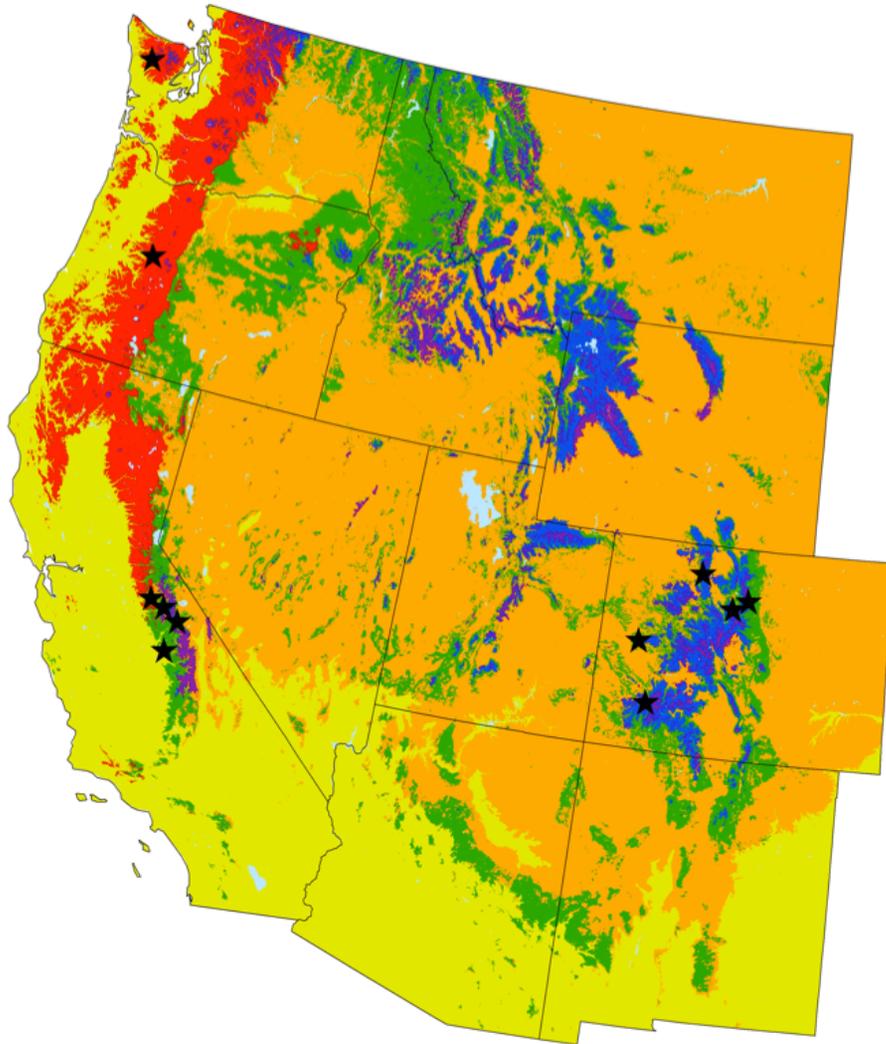
## **Experimental Design/Measurements /Science Requirements**

1. Sturm et al. Snow Classes (Tu, Ta, M, E, P, WF, Ice)
2. Snow Type (Primary/Secondary)
3. Prior Field/Airborne Snow Measurements (No/Yes)
4. Real-time Snow Measurements (Snowfall/Depth/SWE)
5. Snow Records (No/Yes, Timescale)
6. Meteorological Records (No/Yes, Timescale)
7. Stream Discharge Gauge (No/Yes, Timescale)
8. Topographic Setting (Steep/Gradual/Flat)
9. Elevation Range (meters)
10. Vegetation (Forest/Shrub/Grass)
11. Vegetation Density (High/Medium/Low)
12. Bare Rock (No/Yes)
13. Inland Water (No/Yes)

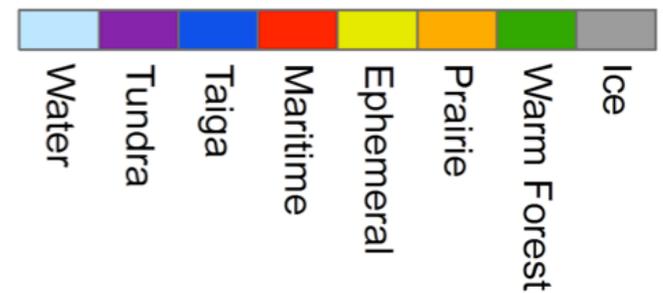
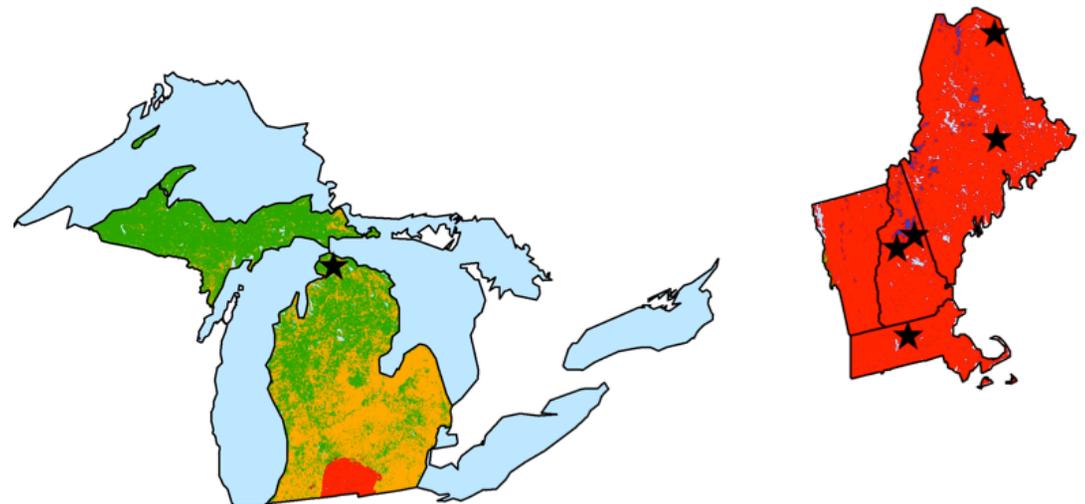
# SnowEx Geography



## Western US



## Eastern US



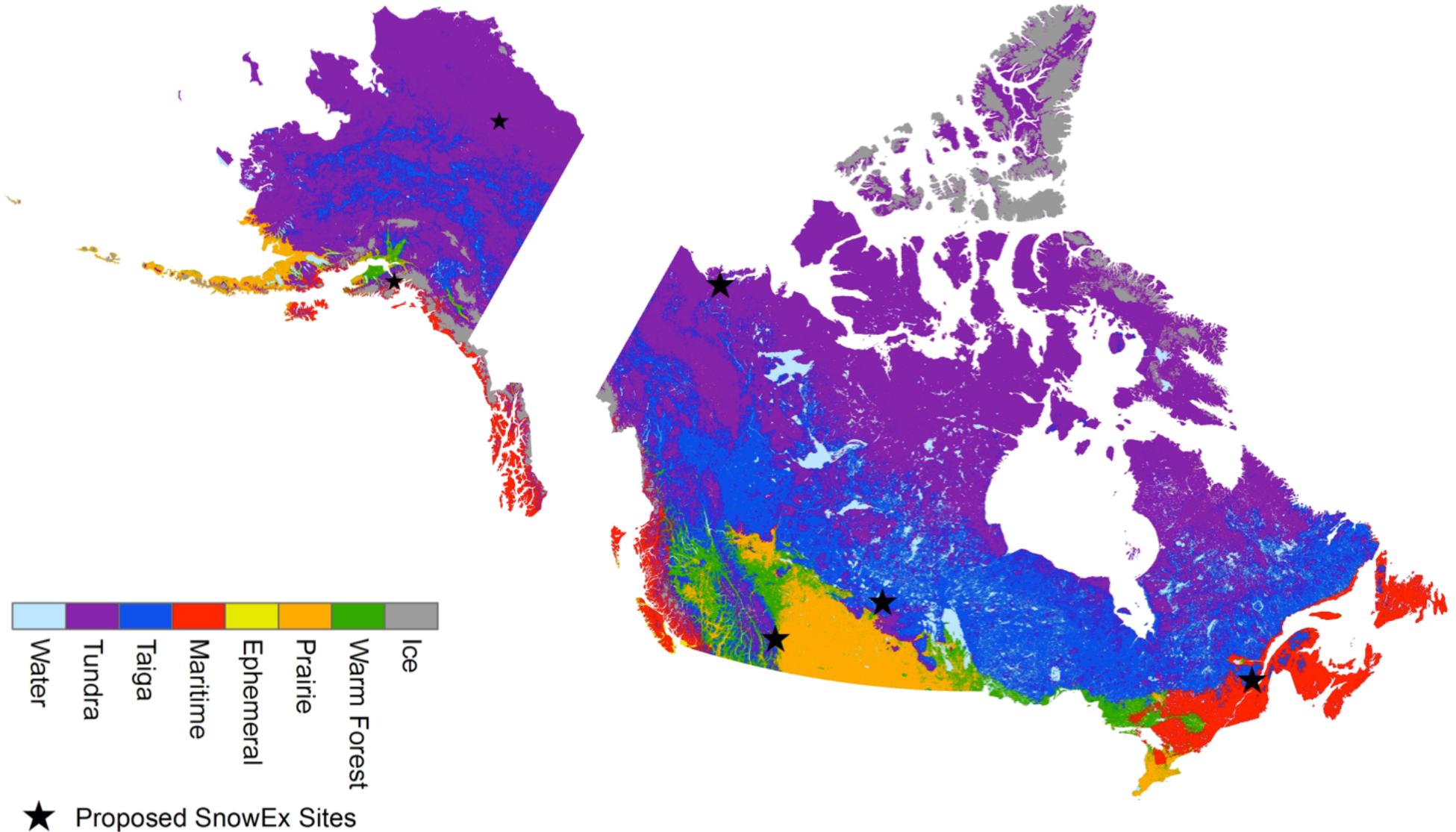
★ Proposed SnowEx Sites

# SnowEx Geography



## Alaska

## Canada



# SnowEx Site Information Example



Site selection information (in table form) can be found for North American SnowEx regions at [snow.nasa.gov](http://snow.nasa.gov)

<b>SnowEx Site Criteria</b>	<b>Colorado</b>								
<b>Logistics/Airborne Campaign Feasibility</b>	Cache la Poudre	Conejos Basin	Frasier Exp. Forest	Grand Mesa	Niwot Ridge	Senator Beck Basin	Storm Peak Laboratory	Uncom-pahgre Basin	Upper Rio Grande
1. Aviation Restrictions (No/Yes)	?	?	?	No	?	?	?	?	?
2. Airbase Operations (NASA/Commercial)	?	?	?	Com	?	?	?	?	?
3. Power Source for Field Instrumentation (No/Yes)	No	No	Yes	Yes	Yes	No	Yes	No	No
4. Field Crew Accessible (Easy/Moderate/Difficult)	Moderate	Moderate	Easy	Moderate	Moderate	Moderate	Easy	Moderate	Moderate
5. Housing/Amenities (Number of People)	Yes	N/A	Yes	No	Yes	No	Yes	No	No
6. Proximity to Major Airport (Distance)	60 (Den)	242 (Den)	90 (Den)	55 (GJT)	66 (Den)	50 (MTJ)	25 (HDN)	50 (MTJ)	242 (Den)
<b>Experimental Design/Measurements/Science Requirements</b>									
1. Sturm et al. Snow Classes	Tu,Ta,WF,P	Tu,Ta,W,F,P	Tu,Ta, P	Tu, WF, P	Tu,Ta,W,F,P	Tu,Ta	Tu,WF,P	Tu,Ta,WF,P	Tu,Ta,WF,P
2. Snow Type (Primary/Secondary)	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet	Dry/Wet
3. Existing Field/Airborne Campaign Snow Measurements (No/Yes)	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
4. Real-time Snow Measurements (Snowfall/Depth/SWE)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
5. Snow Records (No/Yes, Timescale)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
6. Meteorological Records (No/Yes, Timescale)	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No
7. Stream Discharge Gauge (No/Yes, Timescale)	No	No	Yes	?	Yes	Yes	Yes	Yes	No
8. Topographic Setting (Steep/Gradual/Flat)	S,G,F	S,G,F	S,G,F	S,G,E	S,G,F	S,G,F	S,G,F	S,G,F	S,G,F
9. Elevation Range (meters)	2500	1700	1400	?	2600	700	1232	2422	1600
10. Vegetation Type(s) (Forest/Shrub/Grass)	Forest	Forest	Alpine/Forest	Alpine / Forest	Alpine / Forest	Alpine/Forest	Forest	Alpine/Forest	Alpine/Forest
11. Vegetation Density (High/Medium/Low)	Medium	Medium	Medium	Med/Low	Med/Low	Low	Medium	Medium	Medium
12. Bare Rock (No/Yes)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes
13. Inland Water (No/Yes)	?	?	?	Yes	?	?	?	?	?

# Site Selection Objectives for this WebEx

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1. Provide an up-to-date status on the SnowEx site selection process
2. Provide an opportunity for the snow community to offer feedback on the current site selection process
3. Obtain more information for sites on the current SnowEx site list
4. Work towards snow community consensus on the SnowEx site selection process prior to the 4<sup>th</sup> iSWGR workshop