The Living Arctic:
How do plants and animals of the tundra respond to and shape global change?

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Arctic Tundra
zone of continually frozen ground

https://myweb.rollins.edu/
#1: Greening of the Arctic trend from 1982-2010

Guay et al. 2014, GC
Arctic greening

http://polarfield.com/blog/tag/tundra/
Present Day

$\text{CO}_2$

$\text{CH}_4$
Earlier Start to Spring + Later Start to Fall = Longer Growing Season

Zeng, Jia and Epstein, 2011, Environmental Research Letters
#3: Tundra is Burning

William W. Shilts, Geologic Image Gallery
Arctic Ocean

Arctic Tundra

Toolik Field Station

Barrow

Wainwright

Atqasuk

Point Lay

1977

1993

Umt

Nulqsut

Prudhoe Bay

Alaska, U.S.A.

Canada
July 2008

Unburned

Mack et al. 2011
Rocha & Shaver 2011
Jones et al. 2009

Burned
Greening of the Arctic

Lapland longspur

Gambel’s white-crowned sparrow

Arctic greening
Lapland longspur

Gambel’s white-crowned sparrow

Present day

2050

N. Boelman et al. 2014, Global Change Biology
American tree sparrow
Fox sparrow
Dark-eyed junco
American robin
Lapland longspur
Savannah sparrow
Horned lark
Agricultural Pest Control

Rodent Control

Ecotourism & Nature Appreciation

Cultural Value

Promote Forest Growth
Post & Pederson 2008, *PNAS*
Cahoon et al. 2011, *GCB*
Olofsson et al. 2009, *GCB*
Falk et al. 2015, *ERL*
Waste deposition

Winter nests & hay pile

Tunneling

Waste deposition
adapted from Olofsson et al. 2012, Nature Climate Change