Climate Change in the Pacific Northwest

A brief overview
PNW Climatic Change: 1920-2000

**Temperature**

Blue = cooler
Red = warmer

- 2.0°C
- 1.5°C
- 1.0°C
- 0.5°C

**Precipitation**

Blue = wetter
Red = drier

- 100% / century
- 75% / century
- 50% / century
- 25% / century

Size of the dot = magnitude of change

UW Climate Impacts Group
# PNW Future Projected Change

<table>
<thead>
<tr>
<th>Year</th>
<th>Temperature Change °C</th>
<th>Precipitation Change %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020s</td>
<td>+1.1</td>
<td>+1.3</td>
</tr>
<tr>
<td>2040s</td>
<td>+1.8</td>
<td>+2.3</td>
</tr>
<tr>
<td>2080s</td>
<td>+3.0</td>
<td>+3.8</td>
</tr>
</tbody>
</table>
GCM Performance

-source: Mote & Salathe 2010
Precipitation as Snow

Historical

2080

A2 scenario, CCCMA GCCM 3.1 run 1

Blue is high, yellow is low
Frost free period (number of days)

Historical

2080

A2 scenario, CCCMA GCCM 3.1 run 1

Red is high, blue is low
Area burned is projected to double by 2040 and triple by 2080.

Probability of more than 2M acres burning in a single year:

<p>| | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>historic</td>
<td>5%</td>
</tr>
<tr>
<td>2080</td>
<td>33%</td>
</tr>
</tbody>
</table>

UW Climate Impacts Group, Littell 2009
Ecological effects of climate change
Earlier spring events
Spending winter farther north

As the temperature across the U.S. has gotten warmer from 1966 to 2005, many bird species are spending their winters farther north.

Change in winter destination, 20 species with the most movement

Winter 1966-67 → Winter 2005-06

- Marbled Murrelet
- Varied Thrush
- Pine Siskin
- Spruce Grouse
- Boreal Chickadee
- Steller's Jay
- Pygmy Nuthatch
- Fox Sparrow
- Virginia Rail
- Ring-necked Duck
- American Robin
- Rufous-sided Towhee
- Snow Goose
- Wild Turkey
- Purple Finch
- Red-breasted Nuthatch
- Red-breasted Merganser
- American Goldfinch
- Ring-billed Gull

Sources: Audubon Society; NOAA
Salmon
August Mean Surface Air Temperature and Maximum Stream Temperature
UW Climate Impacts Group

Historical (1970-1999)  2040s medium (A1B)

* Projections are compared with 1970-1999 average
Climate Change Vulnerability Assessment for the Pacific Northwest

UW, TNC, USGS, NWF, UW-CIG, WDFW, ODFW, IDFG, MTFWP, WYGF, NPS, USFWS...
Vulnerability = sensitivity + exposure
Study Objectives

1. Assess inherent sensitivity to climate-change of species and systems

2. Project exposure and potential impacts

3. Facilitate adaptation planning
Sensitivity
Climate Sensitivity Databases
Welcome to the Sensitivity Database.

Climate changes pose a daunting challenge to natural resource managers and in response the University of Washington has partnered with key collaborators to conduct a climate change sensitivity assessment. This assessment is designed to evaluate the sensitivity of the species and ecological systems of the Pacific Northwest to climate change.

This digital database summarizes the inherent climate-change sensitivities for species and habitats of concern throughout the Pacific Northwest and will provide resource managers and decision makers with some of the most basic and most important information about how species and systems will likely respond to climate change.

Please come take a look!

Recent Science Updates

Rapid Range Shifts of Species Associated with High Levels of Climate Warming

Submitted by Michael Case on Tue, 2011-08-30 14:45

Science 19 August 2011: Vol. 333 no. 6045 pp. 1024-1026 DOI: 10.1126/science.1208432
Lynx canadensis -

Common Name:
Canada Lynx

Is this Species completed: *
Yes

Taxonomy

Dispersal Ability
Disturbance Regimes
Generalist/Specialist
Physiology
Life History
Sensitive Habitats
Ecological Relationships
Interacting non-climatic stressors
Other Sensitivities
Overall User Ranking

Scientific Name: *
Lynx canadensis

Genus and species. (the Scientific Name will also be used as the Species title in all site listings)

Geography: *
Idaho

For what geographic extent is this sensitivity information relevant for? You may list its entire range, one or multiple states, provinces, or regions, such as the Pacific Northwest.

Realm:
- Terrestrial
- Freshwater
- Marine
- Estuary

http://courses.washington.edu/ccdb/drupal
Ecological System (Habitat) Sensitivities to Climate Change

Forest systems
Grassland systems
Marine systems
Freshwater systems
Sensitivity Analysis of select Birds

Almost completed in database

Sensitivity Score
Confidence Score
Overall User Ranking

* Almost completed in database
Sensitivity Analysis of select Amphibians

* Almost completed in database
Exposure
Exposure and Impacts Projections

1. Downscaled changes in climate
2. Projected changes in vegetation
3. Simulated shifts in focal species distributions
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