Vermont & Agricultural Surface Water Withdrawals

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Senate Committee on Natural Resources & Energy
March 25, 2021

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Vermont is Getting Warmer and Wetter: Climate Change Study

The Green Mountain State has warmed nearly 2°F, with a 21% jump in precipitation

Key findings

Climate change is here – and impacting communities across Vermont.

Vermont is getting warmer. Winters are warming more quickly. Snow season is getting shorter.

Vermont is getting wetter. Heavy rain events happen more often, contributing to more flooding and water quality problems.

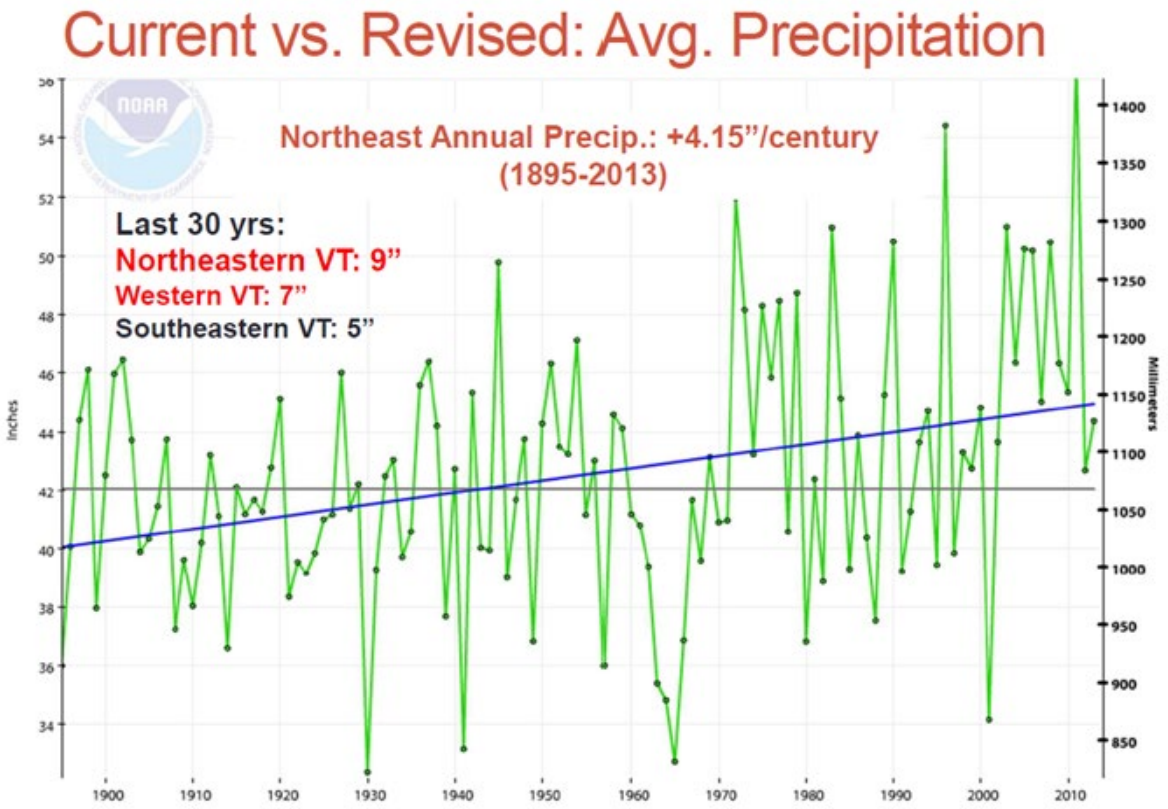
Multiple, complex impacts could lead to surprises.

Climate impacts and risks will increase without action.

Dig in to learn more...

Source: The Vermont Climate Assessment 2021. Burlington, Vermont: Gund Institute for Environment at the University of Vermont. On the web: https://vtclimate.org

Precipitation trends in Vermont



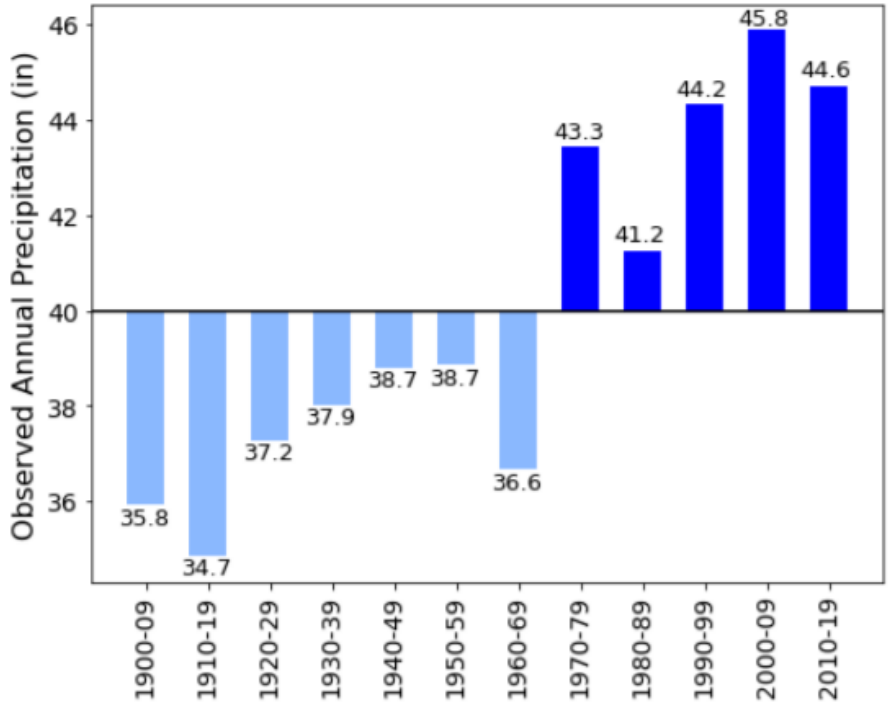
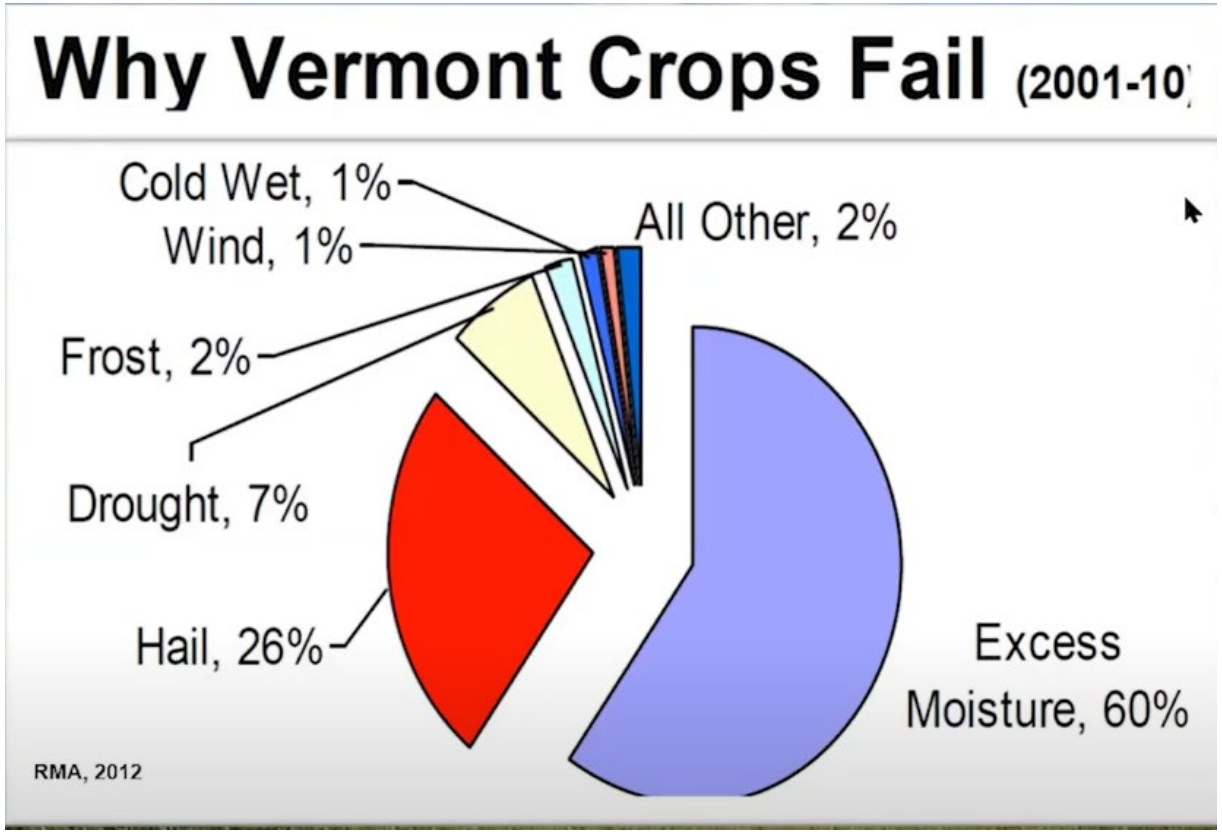
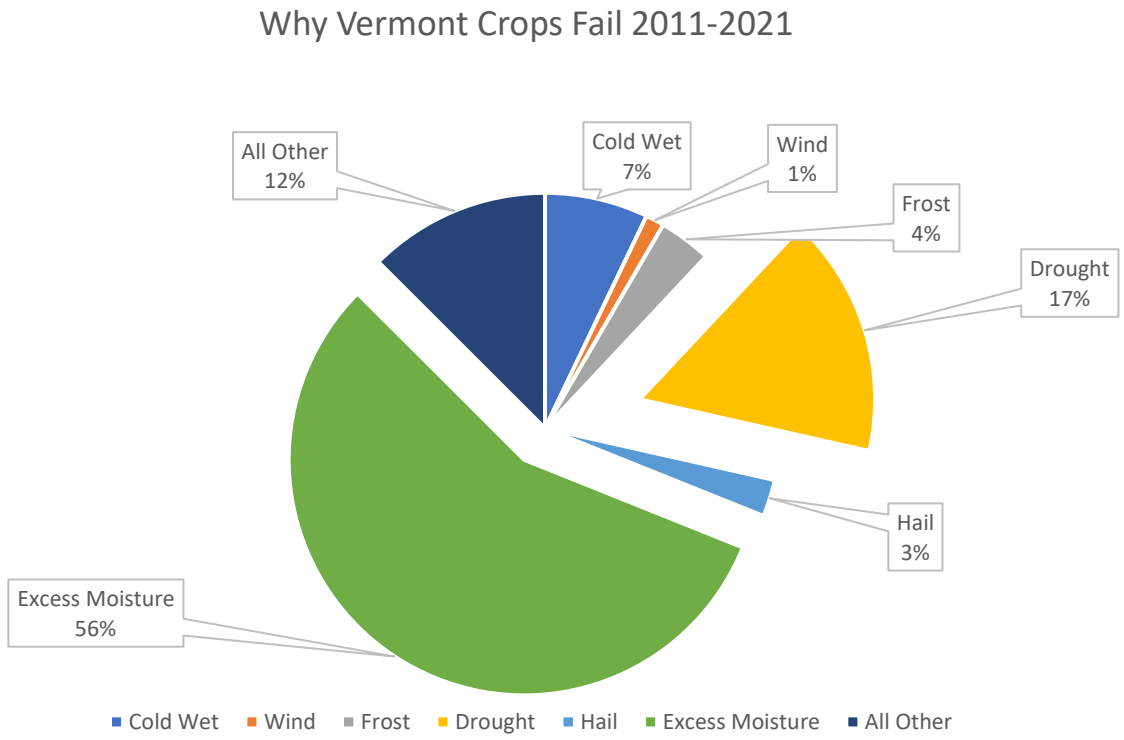


Figure 1-8: Decadal averages of observed annual precipitation in Vermont

Source: Joshua Faulkner: Agriculture, Climate Change & Water Quality Presentation. Gund Institute for Environment at UVM. https://www.youtube.com/watch?v=9uIzxc57n4w
Source: The Vermont Climate Assessment 2021. Burlington, Vermont: Gund Institute for Environment at the University of Vermont. On the web: https://vtclimate.org

Why Vermont Crops Fail; 2001 - 2021





Source: Joshua Faulkner: Agriculture, Climate Change & Water Quality Presentation. Gund Institute for Environment at UVM. https://www.youtube.com/watch?v=9uIzxc57n4w
Source: USDA RMA, Cause of Loss Historical Data Files. Avaliable at: https://www.rma.usda.gov/Information-Tools/Summary-of-Business/Cause-of-Loss

VT Precipitation Projection

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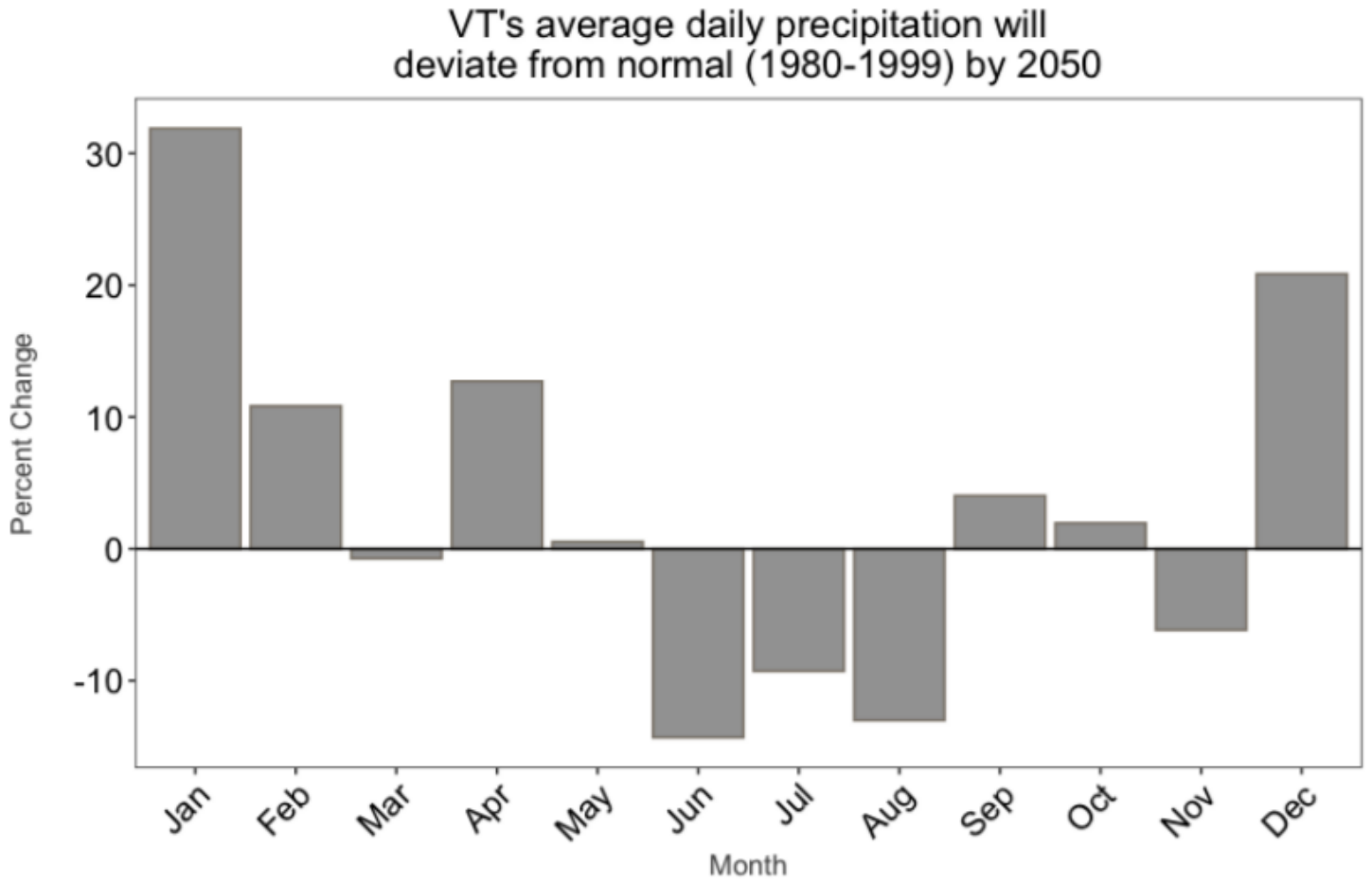
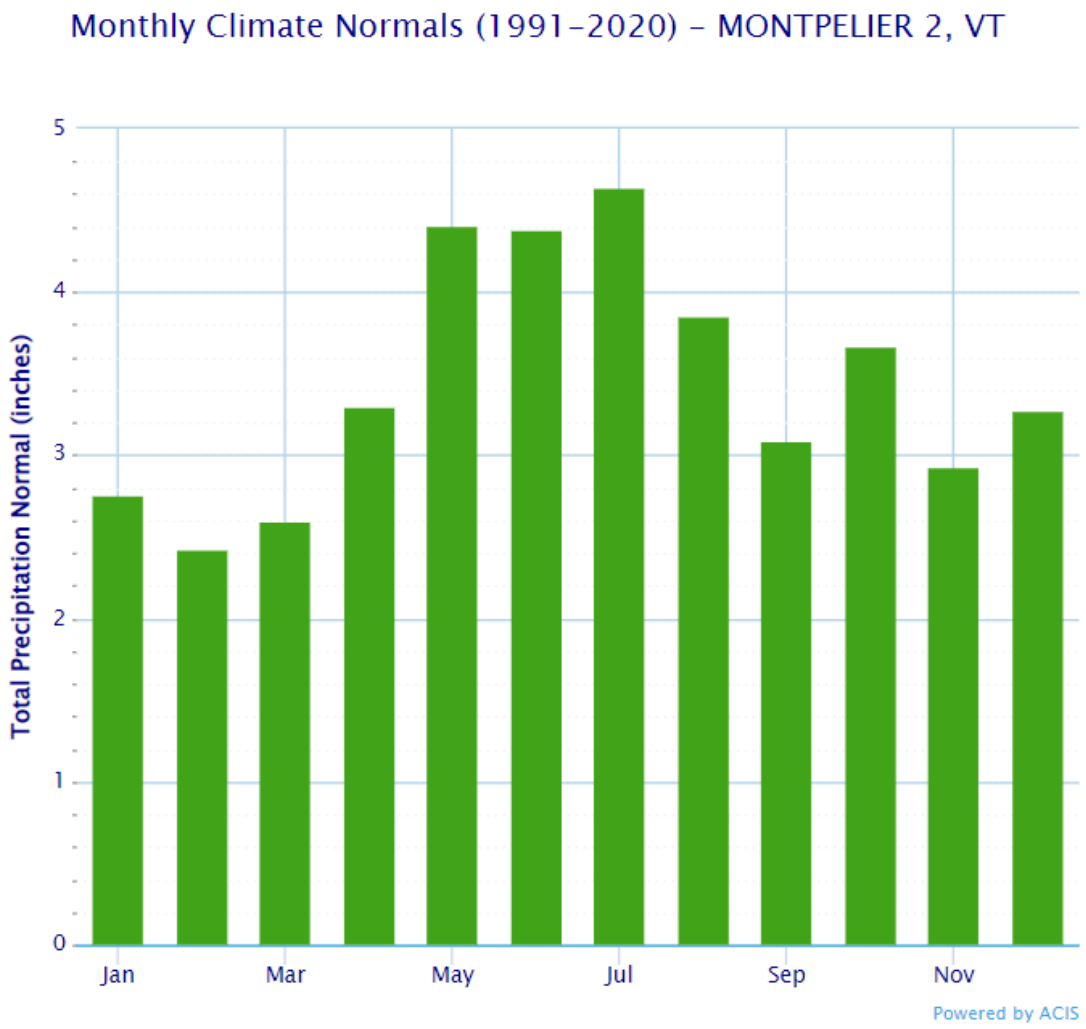


Figure 5-5: Projected daily mean precipitation in 2050 as percent deviation relative to 1980s–1990s shows lower summer growing season precipitation (USGS, 2021a)

Source: Claro, J., Faulkner, J., Isbell, C., Ruggiero, R., White, A., 2021. Agriculture and Food Systems. In Galford, G.L., Faulkner, J. et al. (Eds), The Vermont Climate Assessment 2021. Burlington, Vermont: Gund Institute for Environment at the University of Vermont. On the web: https://vtclimate.org

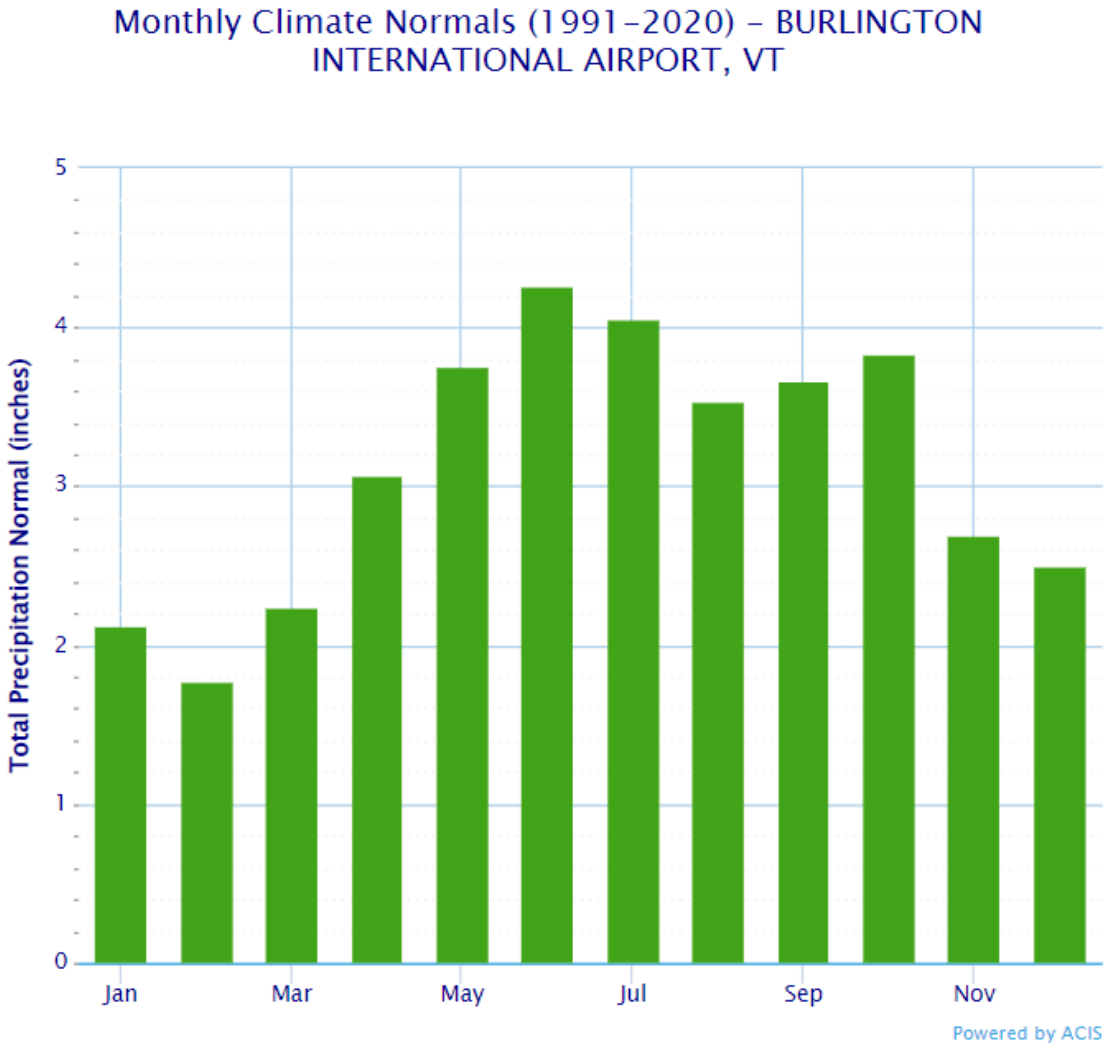
VT Precipitation Observed



Month	Total Precipitation Normal (inches)
January	2.76
February	2.43
March	2.60
April	3.30
May	4.41
June	4.39
July	4.64
August	3.86
September	3.09
October	3.67
November	2.93
December	3.27
Annual	41.35

Source: NOWData - NOAA Online Weather Data. *Monthly Total Precipitation Climate Normals (1991 – 2020)* https://www.weather.gov/wrh/Climate?wfo=btv

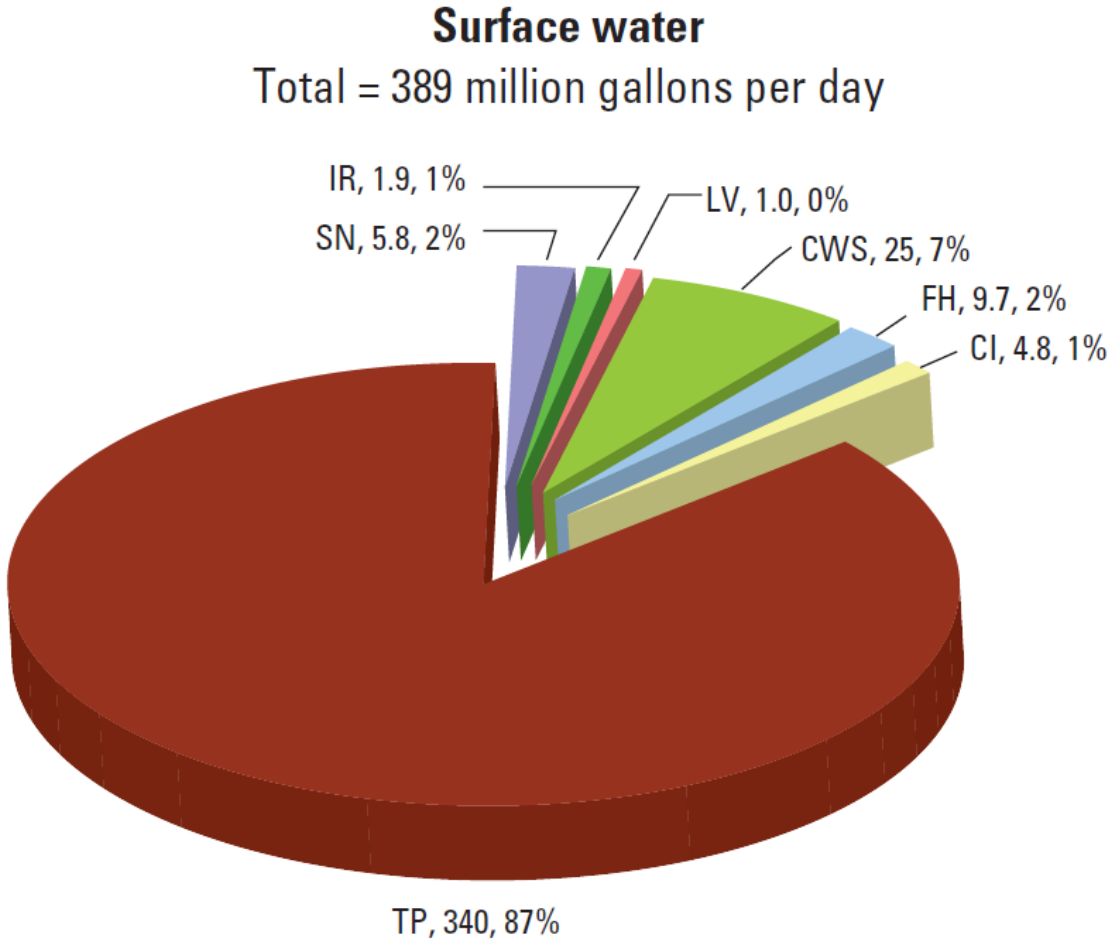
VT Precipitation Observed



Month	Total Precipitation Normal (inches)
January	2.13
February	1.77
March	2.24
April	3.07
May	3.76
June	4.26
July	4.06
August	3.54
September	3.67
October	3.83
November	2.70
December	2.50
Annual	37.53

Source: NOWData - NOAA Online Weather Data. *Monthly Total Precipitation Climate Normals (1991 – 2020)* https://www.weather.gov/wrh/Climate?wfo=btv

Water withdrawals in Vermont by category of use and source in 2005



EXPLANATION

LV, 4.2, 1% Category of water withdrawal, volume withdrawn by users in the category, in million gallons per day, percent of total for the pie chart contributed by withdrawals within this category.

TP	Thermoelectric power
FH	Fish hatcheries
DO	Domestic
LV	Livestock
CI	Commercial and industrial
IR	Irrigation
SN	Snowmaking
CWS	Public supply, community water system

Source: USGS, Estimated water withdrawals and return flows in Vermont in 2005 and 2020; Scientific Investigations Report 2010-5053; Prepared in cooperation with the Vermont Department of Environmental Conservation: Vermont Geological Survey; https://pubs.er.usgs.gov/publication/sir20105053

Vermont Surface Water Withdrawal Estimation, 2005

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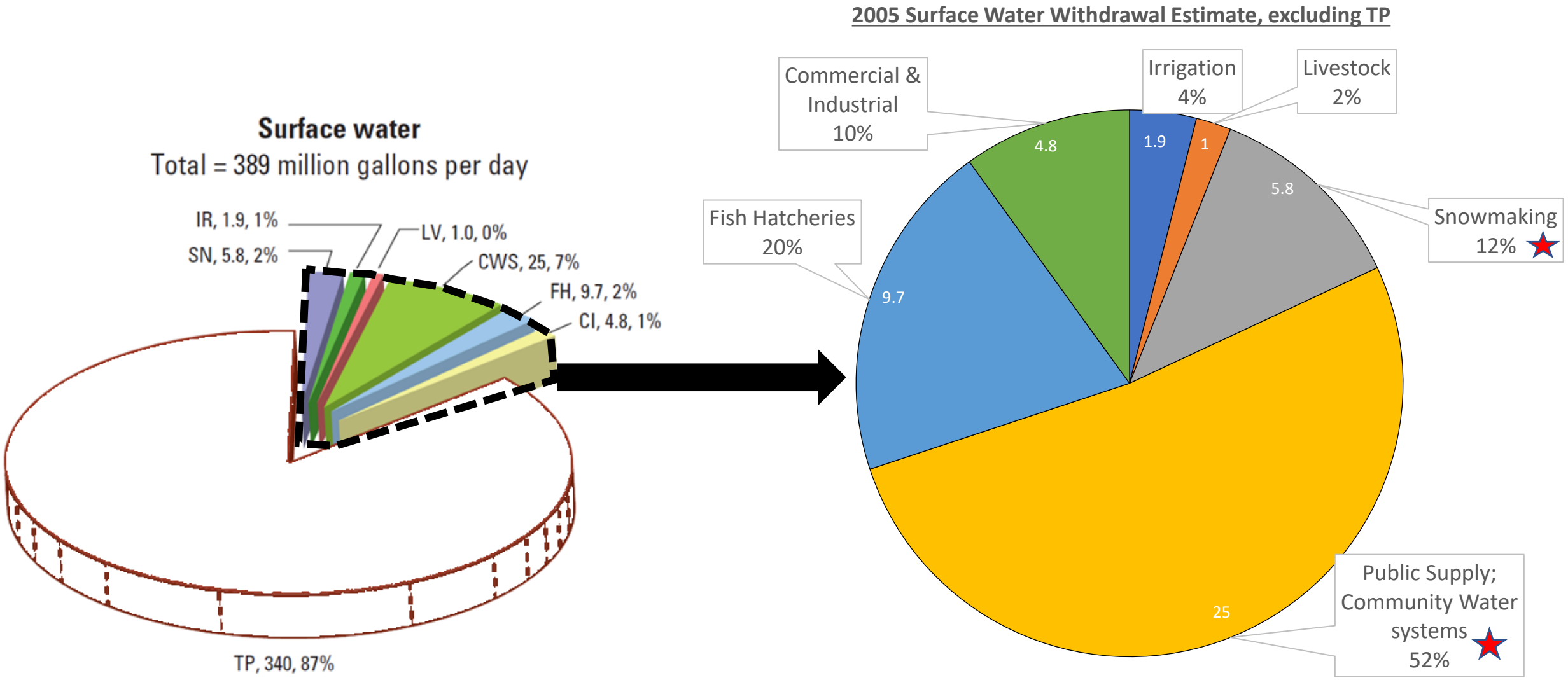

Source: USGS, Estimated water withdrawals and return flows in Vermont in 2005 and 2020; Scientific Investigations Report 2010-5053; Prepared in cooperation with the Vermont Department of Environmental Conservation: Vermont Geological Survey; https://pubs.er.usgs.gov/publication/sir20105053

RAPs, Irrigation, Surface Water Withdrawal

- **RAPs Section 3.2(d)-(e):** The agricultural practices on farms meeting the minimum threshold criteria set forth in Section 3.1 that are governed by this rule include:

  (d) the preparation, tilling, fertilization, planting, protection, irrigation, and harvesting of crops;

  (e) the ditching and subsurface drainage of farm fields and the construction of farm ponds;

- **Surface Water Withdrawal in RAPs**: "Farm operations utilizing surface waters for irrigation purposes are advised that water withdrawals above a *de minimis* rate are required to obtain a permit / permission from DEC consistent with their *Procedure for Determining Acceptable Minimum Stream Flows*."

- **Groundwater Withdrawal in RAPs:** Farms are exempt from groundwater registration and reporting requirements per 10 V.S.A. § 1417(b)(4) & 10 V.S.A. § 1418(b)(3)

USDA Ag Census and Survey of farming and irrigation

2017 USDA NASS Census of Agriculture:

- The 2017 Census of Agriculture is the 29th Federal census of agriculture and the fifth conducted by the U.S. Department of Agriculture (USDA), National Agricultural Statistics Service (NASS).
- https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/Vermont/

2018 USDA Irrigation and Water Management Survey:

- Is the ninth survey devoted entirely to collecting on farm irrigation data for the U.S.
- https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/Farm_and_Ranch_Irrigation_Survey/intro.pdf

2017 USDA NASS Ag Census - Vermont

- **627 Farms in Vermont (9% of farms) report withdrawing either surface or groundwater for irrigation purposes.**
- **36% of farms that are withdrawing water for irrigaiton are withdrawing from surface water for irrigation – the rest are withdrawing from groundwater, which wass not the subject of the study committee.**
- **3,017 acres of land in 2017 were irrigated (0.57% of all cropland and pasture acres in Vermont).**
- **93% of farms withdrawing from surface or groundwater are managing between 1 to 9 acres of irrigated cropland.**

Source: 2017 USDA NASS Ag Census Vermont, Table 10: irrigation 2017 & 2012, Available at:
https://www.nass.usda.gov/Publications/AgCensus/2017/Full_Report/Volume_1,_Chapter_1_State_Level/Vermont/st50_1_0009_0010.pdf

2018 USDA IWMS Survey - Vermont

- **244 Vermont farms reported withdrawing surface water for irrigation purposes on 785 acres of cropland in 2018. (0.15% of all crop and pastureland)**
- **The 244 farms withdrawing surface water reported withdrawing an estimated 355,036,699 gallons across the entire state of Vermont.**
- **This amount of surface water withdrawal across all agriculture in Vermont– 355 million gallons – is equivalent to the lower range of the annual surface water withdrawal by Okemo Resorts in Ludlow, Vermont.**

Source: 2018 Irrigation and Water Management Survey – USDA NASS, Table 4: Estimated Quantity of Water Applied By Source: 2018 and 2013, Available at: https://www.nass.usda.gov/Publications/AgCensus/2017/Online_Resources/Farm_and_Ranch_Irrigation_Survey/fris_1_0004_0004.pdf
Source: Uncertainty and Unpredictability, Vermont Law School, 2021, https://issuu.com/vermontlawschool/docs/eac_surface_waters?fr=sZDRkNDMxNTAxOTk

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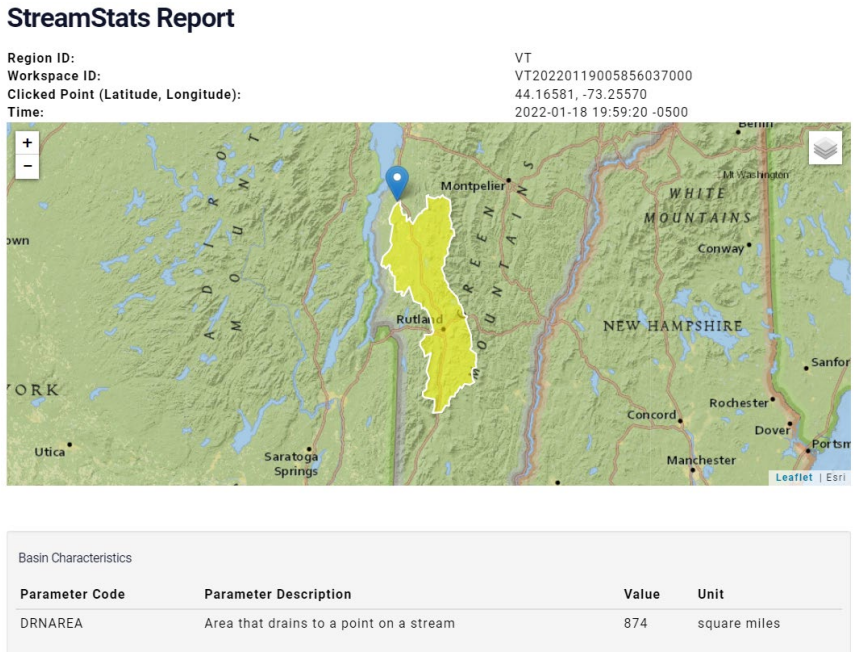
De minimis surface water withdrawals

Vermont De Minimis Surface Water Withdrawals:

- It is recognized that certain withdrawals are so small in relation to the stream flow even during periods of drought, that the resultant impact on the natural stream values is negligible. In such cases, it is the Agency's policy to permit such withdrawals of water regardless of the natural instantaneous stream flow. For the purposes of this procedure, a withdrawal rate equal to or less than .005 cubic feet per second times the drainage area in square miles at the proposed withdrawal site, or 5% of the 7Q10 stream flow is considered a *de minimis* impact on the stream flow.
  - Seven-day low flow, ten-year return period (7Q10) means a drought flow equal to the lowest mean flow for seven consecutive days, adjusted to nullify any effects of artificial flow regulation, that has a 10% chance of occurring in any given year.



StreamStats Report

Region ID:	VT
Workspace ID:	VT20220119005856037000
Clicked Point (Latitude, Longitude):	44.16581, -73.25570
Time:	2022-01-18 19:59:20 -0500

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	874	square miles

Otter Creek at point above: 2,824,405 gallons/day *de minimis* withdrawal or 104 acre inches.

Source: Agency Procedure for Determining Acceptable Minimum Stream Flows, July 14, 1993, Vermont DEC. https://dec.vermont.gov/sites/dec/files/documents/wsmd-stream-flow-procedure-1993-07-14.pdf
Source: https://streamstats.usgs.gov/ss/

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H.466 As Passed by House: AAFM Comments

A. 10 V.S.A. § 1002(20)(D)

A. Clarify the current proposed ag exclusion definition to ensure clear exclusion of 'constructed farm ponds used for irrigation or watering of livestock'.

B. 10 V.S.A. § 1042 Registration & Reporting; Exceptions

A. Metering data as a negative economic impact for *de minimis* ag use.

C. 10 V.S.A. § 1043 Permit Requirement; Program Development

A. Continue current policy where *de minimis* withdrawals of surface water are allowed uses – do not require *de minimis* withdrawals to be permitted.