



Building Climate Change Resilience in the Outdoor Industry

Wilderness Risk Management Conference 2024

Wilderness Climate Action Lab

01

Brendan Madden
Outward Bound Canada

02

Shana Tarter
University of Colorado
Climate & Health Program

03

Jeff Jackson
Algonquin College

04

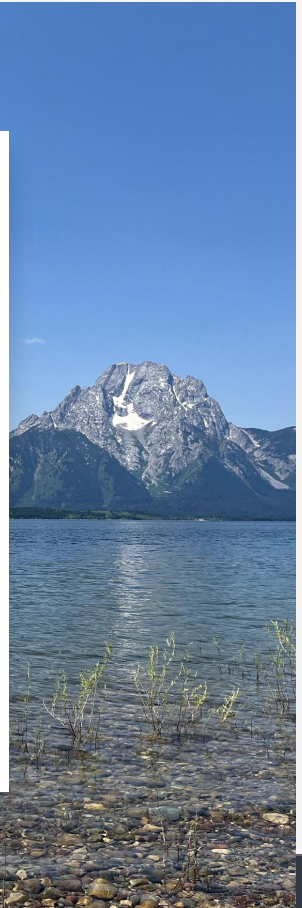
Stuart Slay
SCA, Slay Risk Solutions

05

Sam Daume
Fred C. Church Insurance

06

Jon Heshka
Thompson Rivers
University



Learning goals



Share

Learn about the impact of climate change on outdoor programs and industry preparedness levels.

Translate

Prepare to utilize risk reduction tools, strategies, and decision-making changes to build a climate resilience plan.

Activate

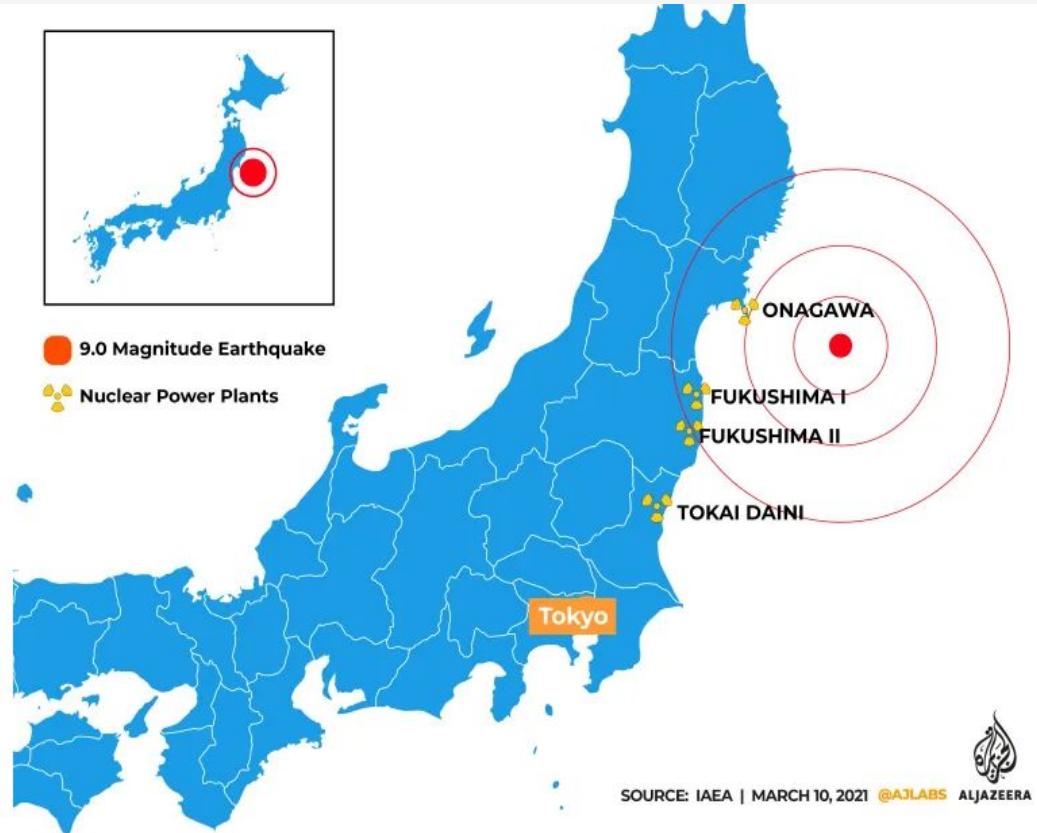
Inspire collective action to improve industry preparedness and collaboration.





Onagawa Non-Disaster 2011

Plan for the possible not
the probable



Graphic by Sebastien Billard-Arbelaez

The Survey Spring 2024



Research Questions

- What is the impact of climate change on outdoor organizations at present?
- How are outdoor organizations making decisions regarding extreme weather and a changing climate?
- What is the level of readiness of outdoor organizations for a future with extreme weather and a changing climate?

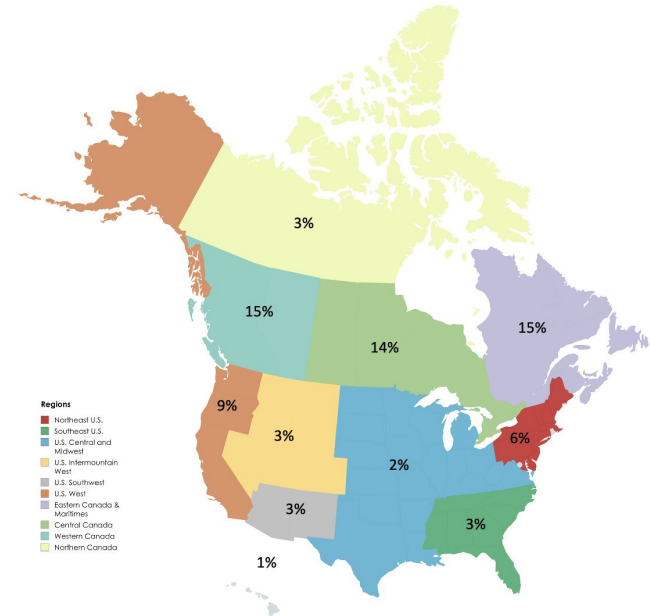


Climate Change Impacts Upon
Outdoor Education and Recreation
Providers



Respondent Demographics

Education	42
Guide Services	30
Facilities (Ski, OE Center, Climb Gym)	11
Youth Programs	11
Summer Residential Camps	9
Parks & Land Management	8
Expedition Education	8
Conservation Groups	8
Total Organization	127



* Plus an additional 14% from outside North America

50% of respondents have worked in the outdoor education or recreation sector for 21+ years

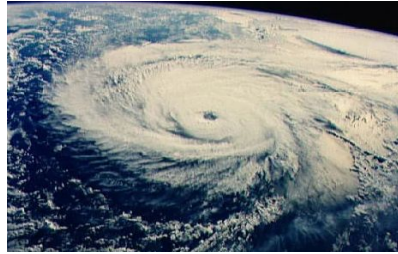


Adverse climate events

Wildfires



Tropical Storms



Extreme Heat



Drought

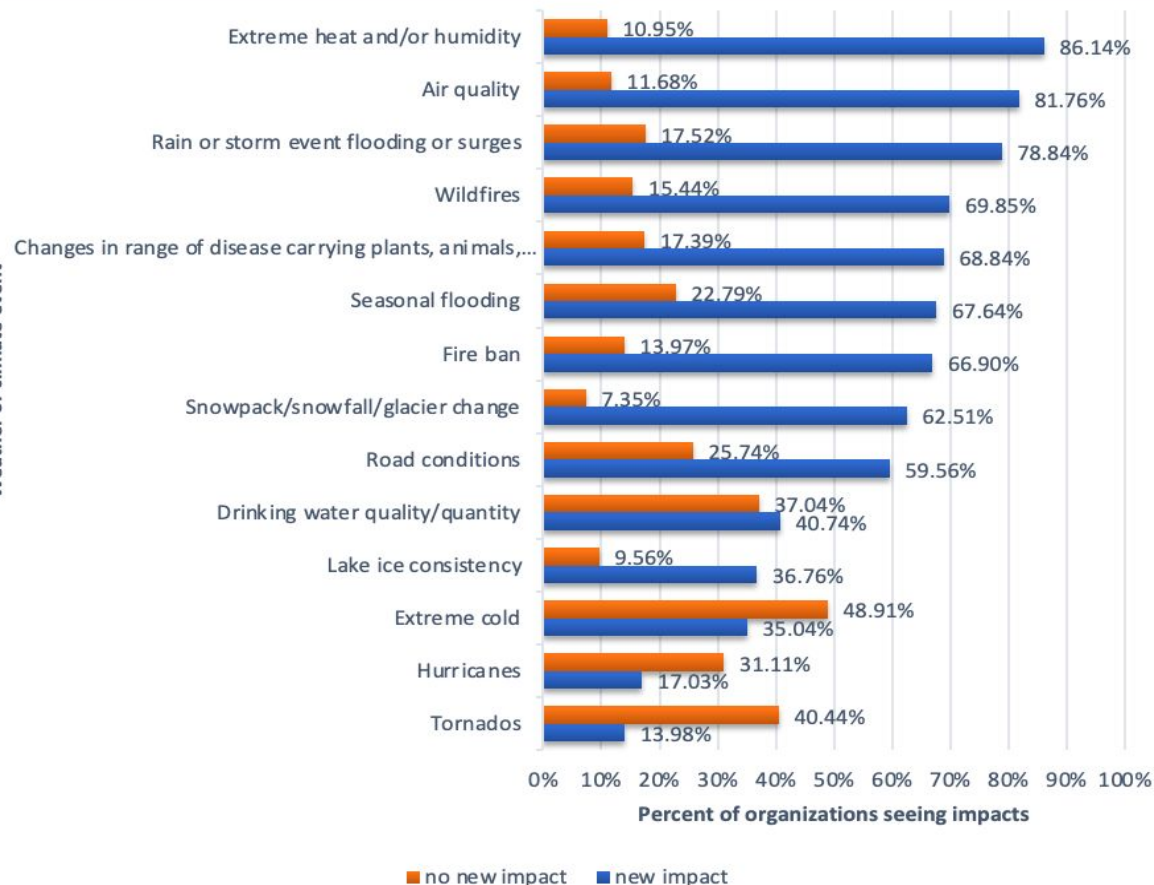


Sea Level Rise



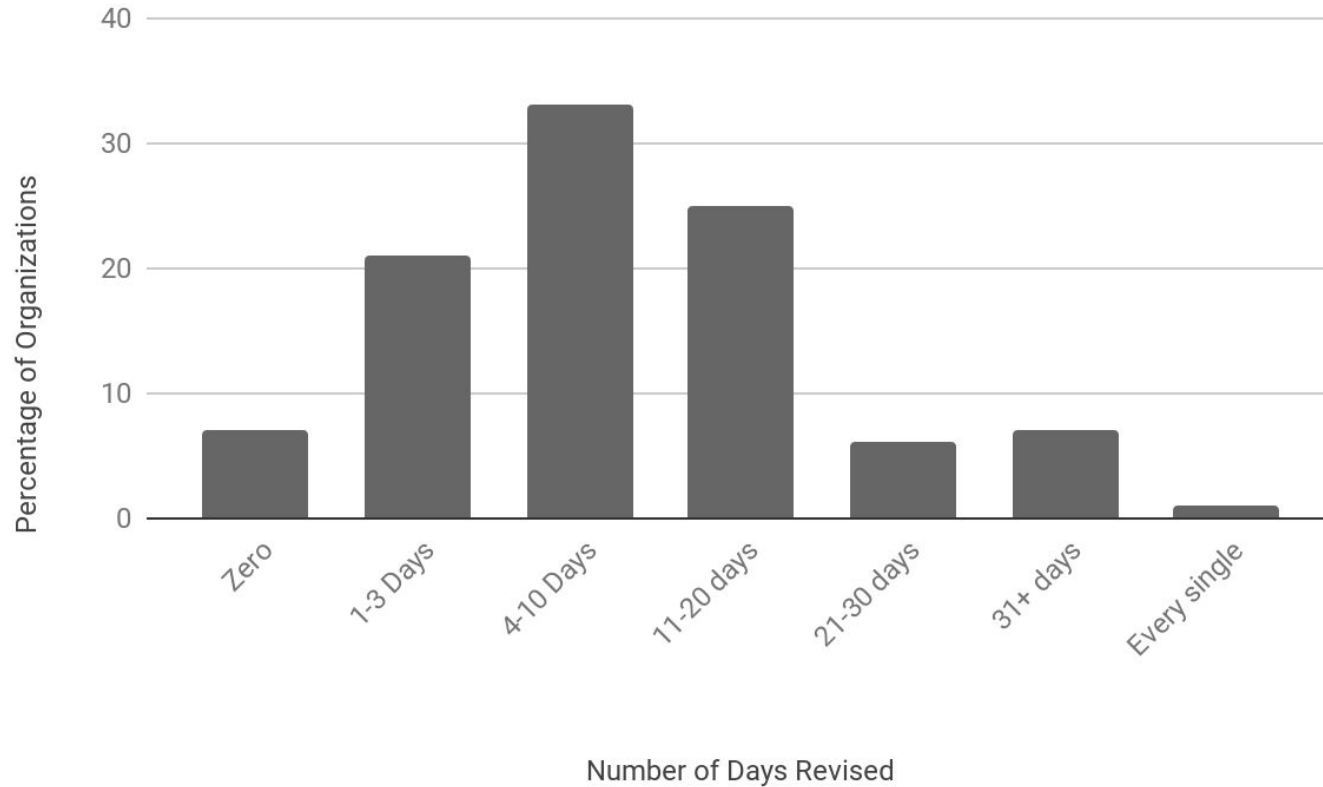
Floods



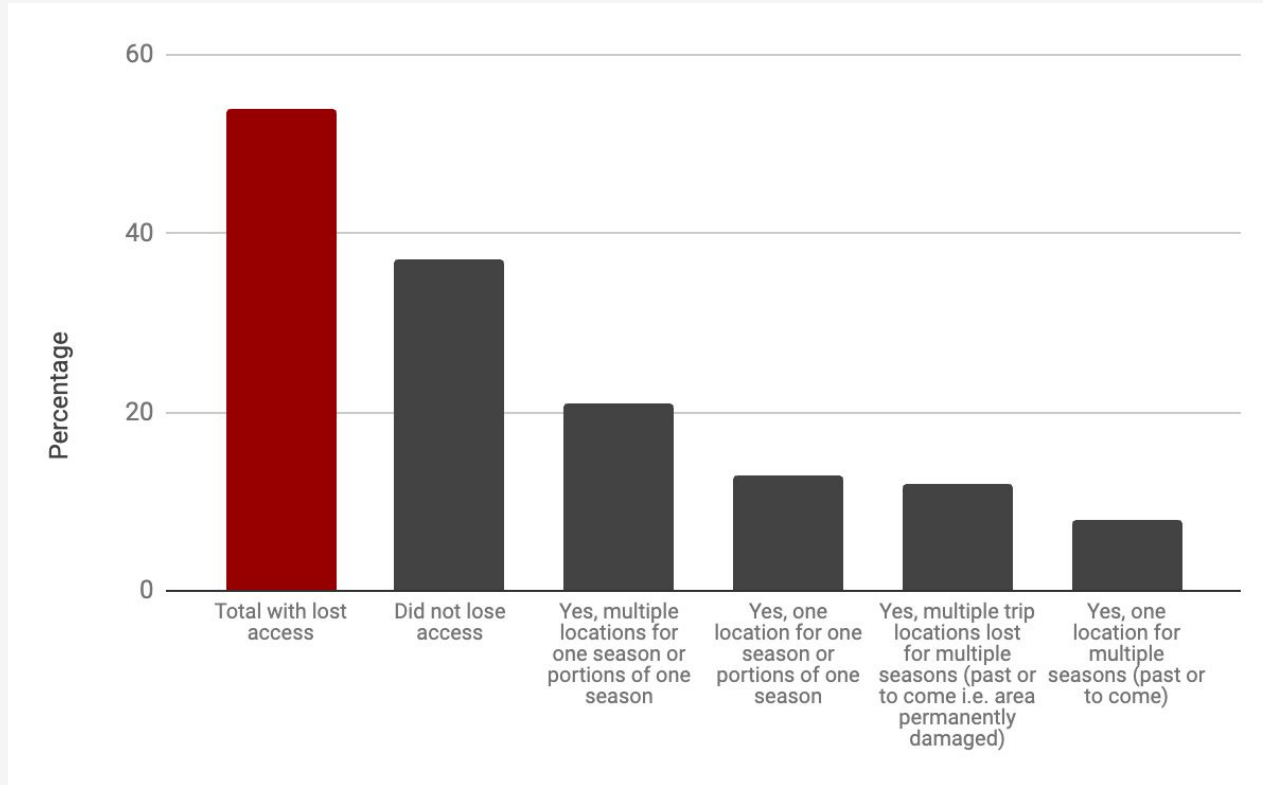


Percent of organizations seeing impacts from weather or climate events in 2023 compared to previous three years

Number of days in 2023 plans had to be revised due to severe weather



Lost Access to Operating Areas in 2023 due to Natural Disasters





Greatest Knowledge Gap in Climate Resilience

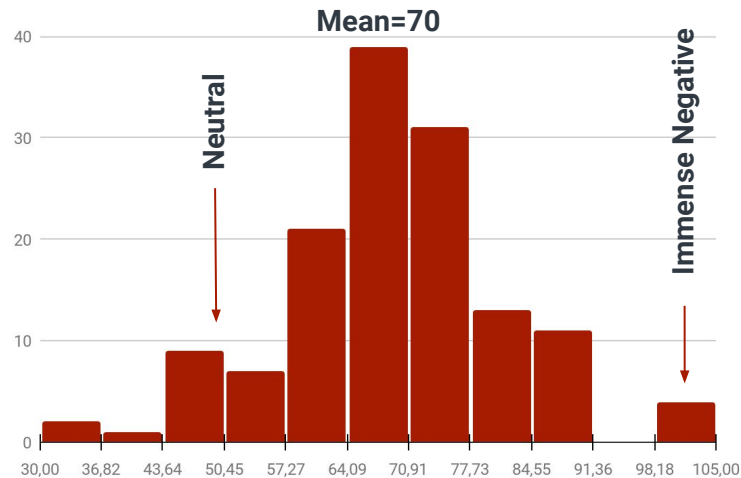
- Forecasting the impacts of climate change
- Is leadership prioritizing climate preparedness
- Staff competencies with new realities
- Identifying trusted information sources
- Managing participants
- Financing
- Alternatives when programming is disrupted
- Don't know what we don't know
- New legal exposures

"The health and medical implications of short- and long-term exposure to the above hazards appeared repeatedly as uncertainty that undermined decision-making confidence."

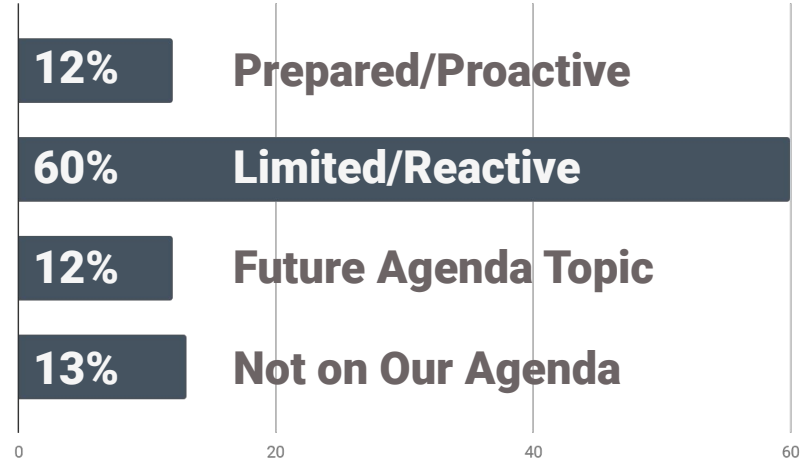


Organization impact & preparedness

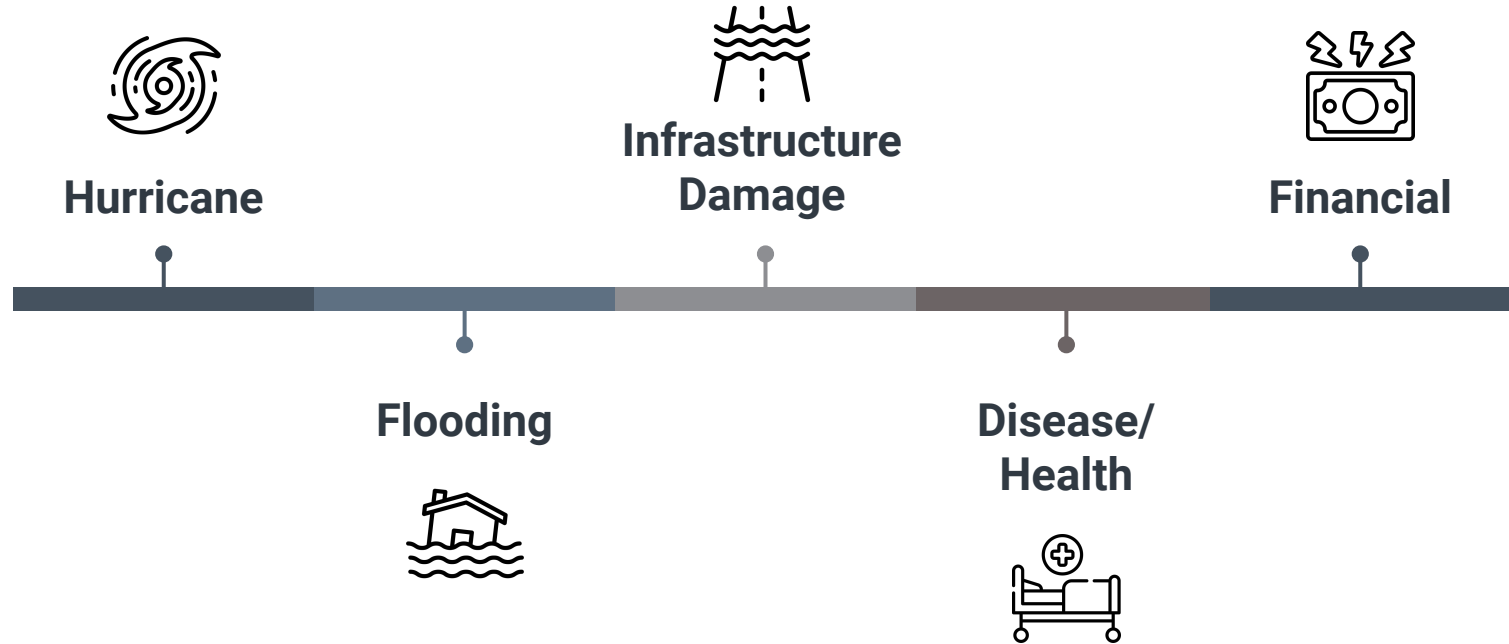
How much is the changing climate impacting your operations?



How prepared is your organization to adapt to changing climate realities and more frequent severe weather?



Cascading Crises a disaster within a disaster





A New Tool

01

**Emergency Response
Plan**

02

Crisis Plan

03

**Climate Resilience
Plan**





Sendai Framework for Disaster Risk Reduction 2015 - 2030



Climate Resilience Plan

01

Risk Assessment

02

Operational
Resilience

03

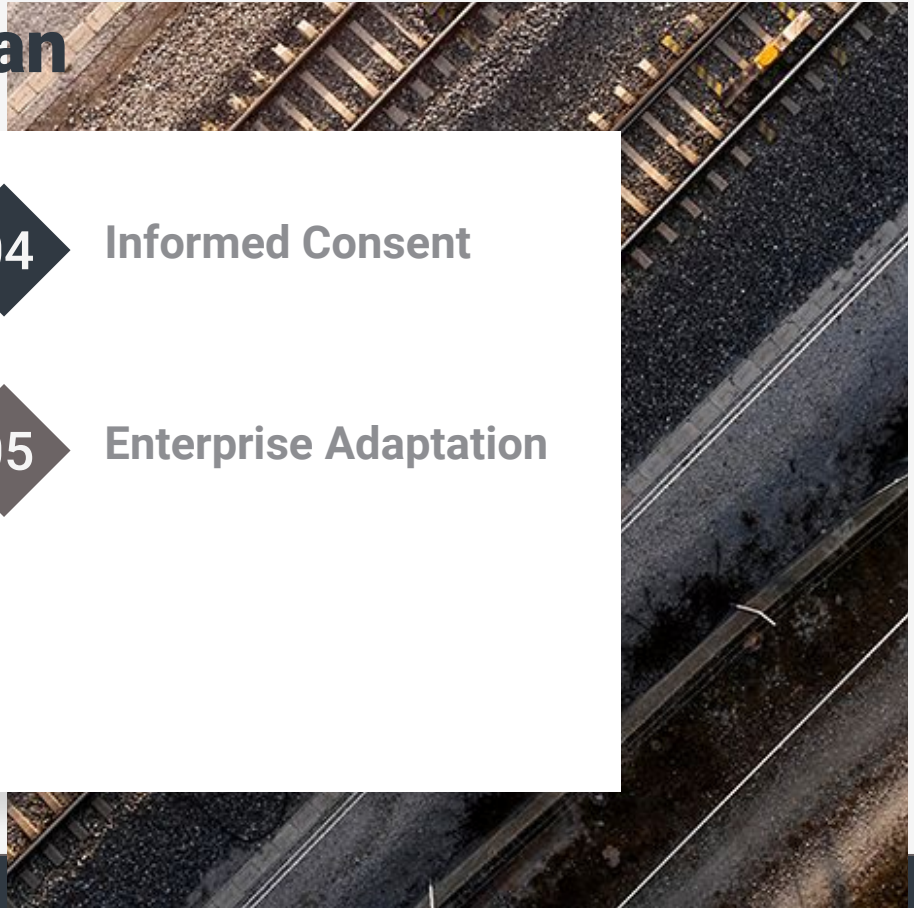
Emergency Planning
& Response

04

Informed Consent

05

Enterprise Adaptation



Definitions



Adaptation

The process of adjusting to new climate conditions in order to reduce risks.

Resilience

The capacity of a community, business, or natural environment to prevent, withstand, respond to, and recover from a disruption.

From the U.S. Climate Resilience Toolkit



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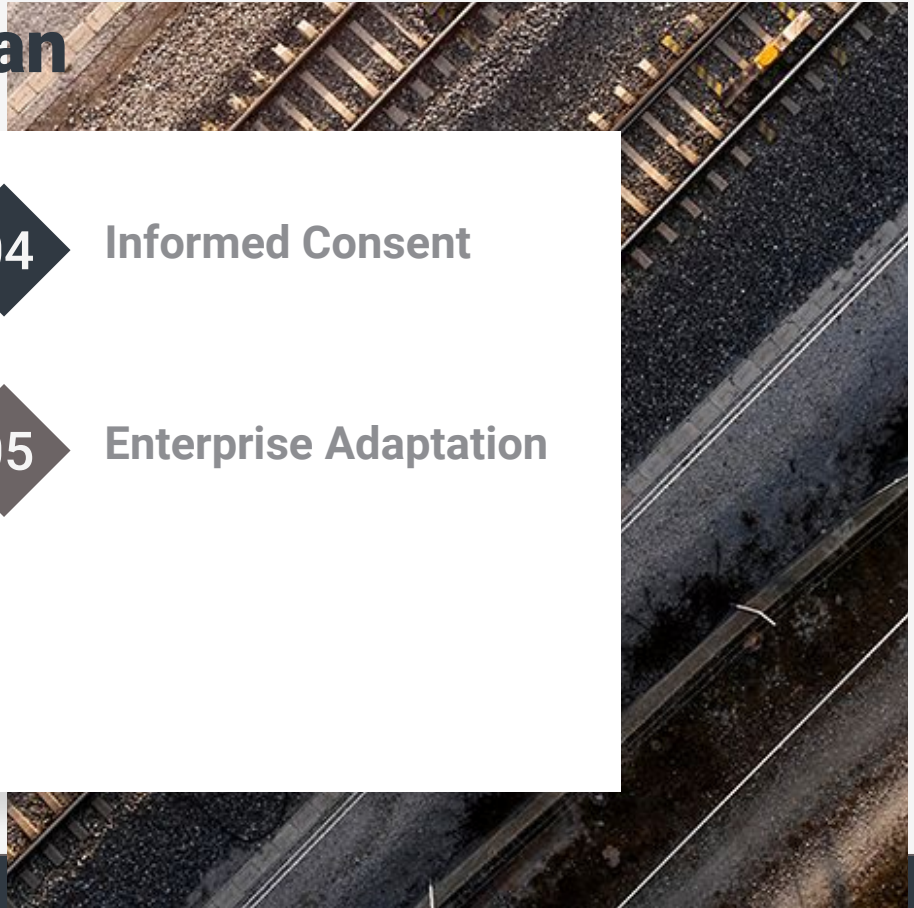
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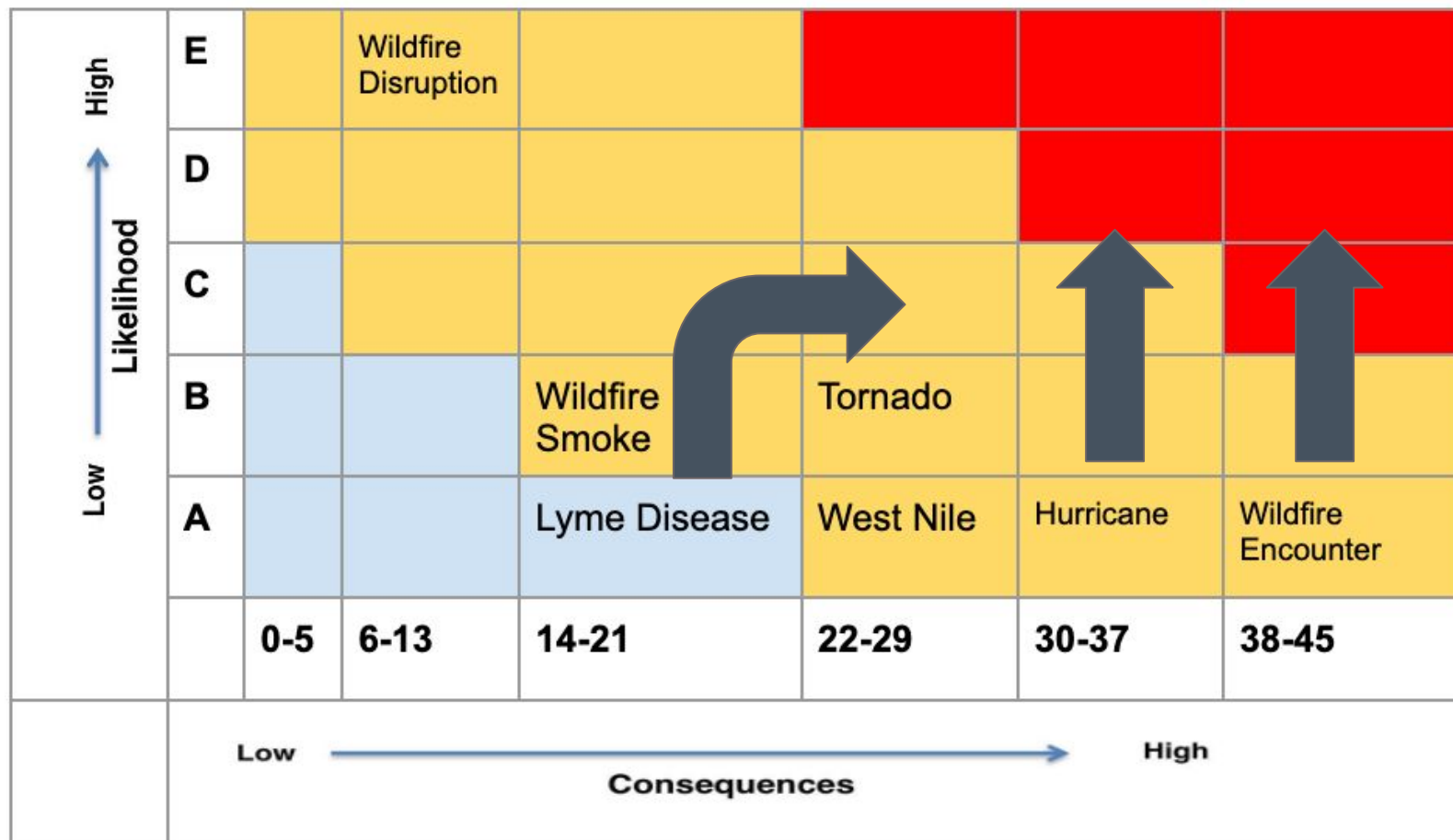




Risk Assessment

- Hazard list/model
 - What's new?
 - What's old but changing?
- Consider
 - Scenario modelling +
 - "Live action" scenario-based crisis drills
- Partnerships with official agencies
- Government/Municipal/Parks Risk Assessments

Risk Matrix



Climate Resilience Plan

01

Risk Assessment

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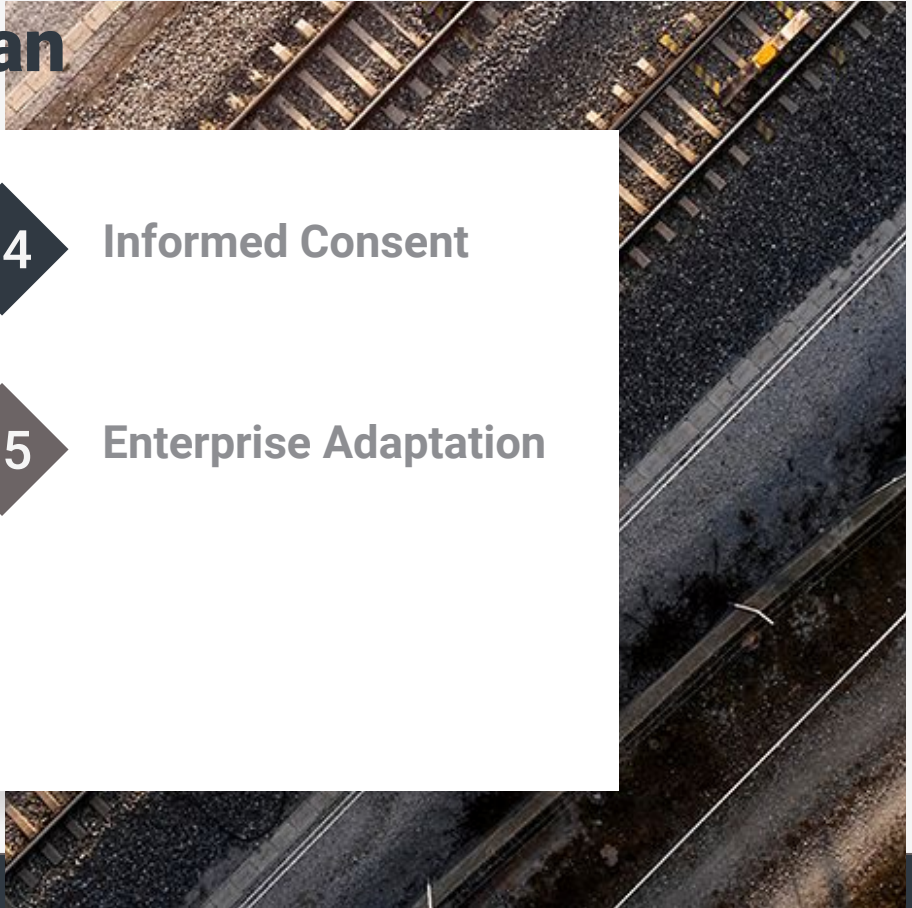
Emergency Planning
& Response

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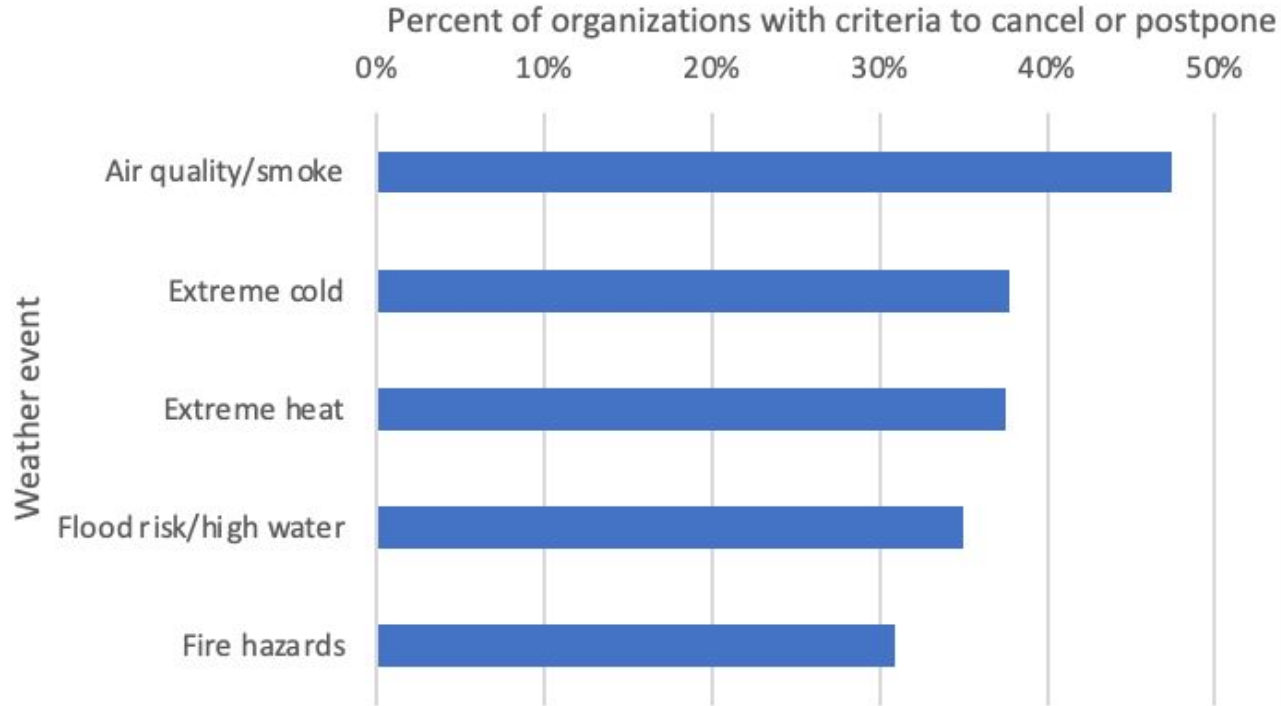
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Enterprise Adaptation



Organizations with established criteria to cancel or postpone field activities due to extreme weather



"We had to cancel over 20 days last summer because of weather conditions and we only operate about 80 days."



Operational Resilience

- *Past patterns are no longer a reliable predictor of future risks -UNDRR*
- Capacity building
- Education and training
- Redundancies
- Program delivery alternatives
- Check out NatCORR!

Resilient Program Planning

- Predetermined decision-making thresholds for air quality, heat, wildfire risk, etc
- Route plans cross-referenced with hazard forecasts
- Backup route options
- Consider
 - Multiple ground evac options
 - Air evac options
- Prepare to re-evaluate in dynamic situations

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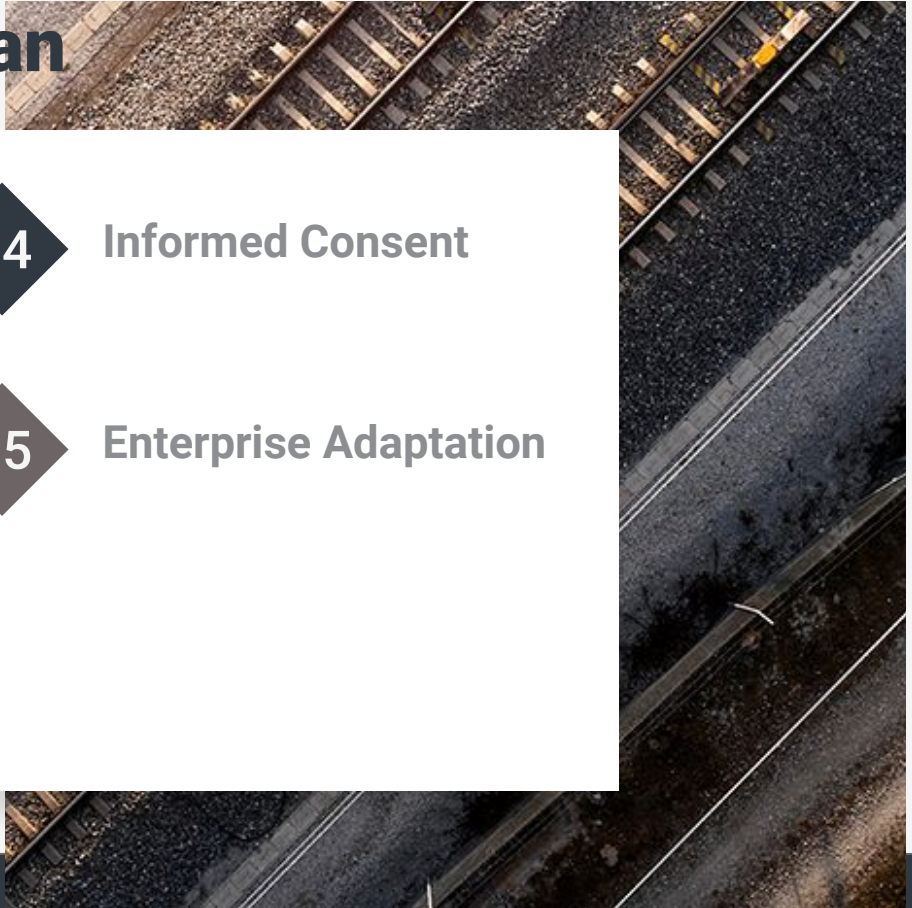
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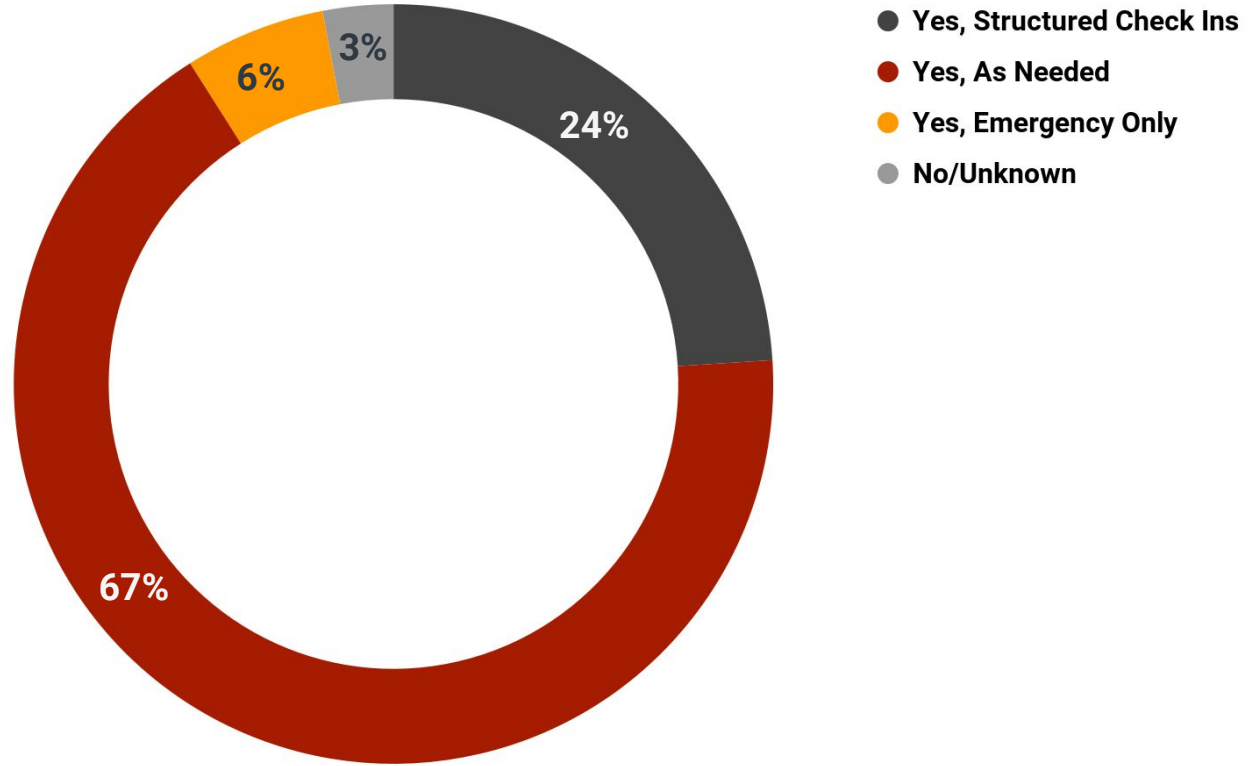
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Enterprise Adaptation



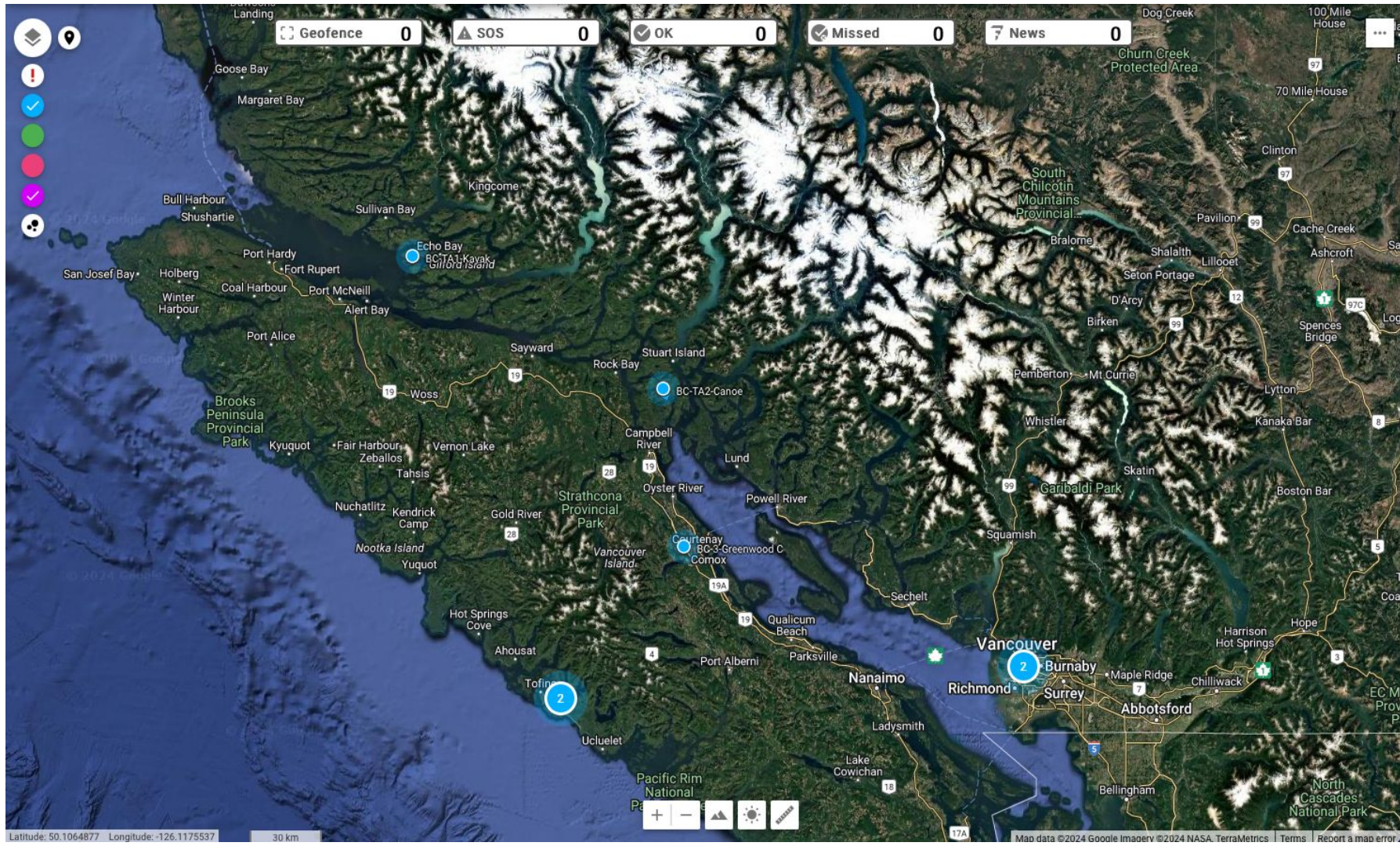
Do your trips or activities have some means to communicate between field groups and home base regarding weather forecasts or changing conditions?

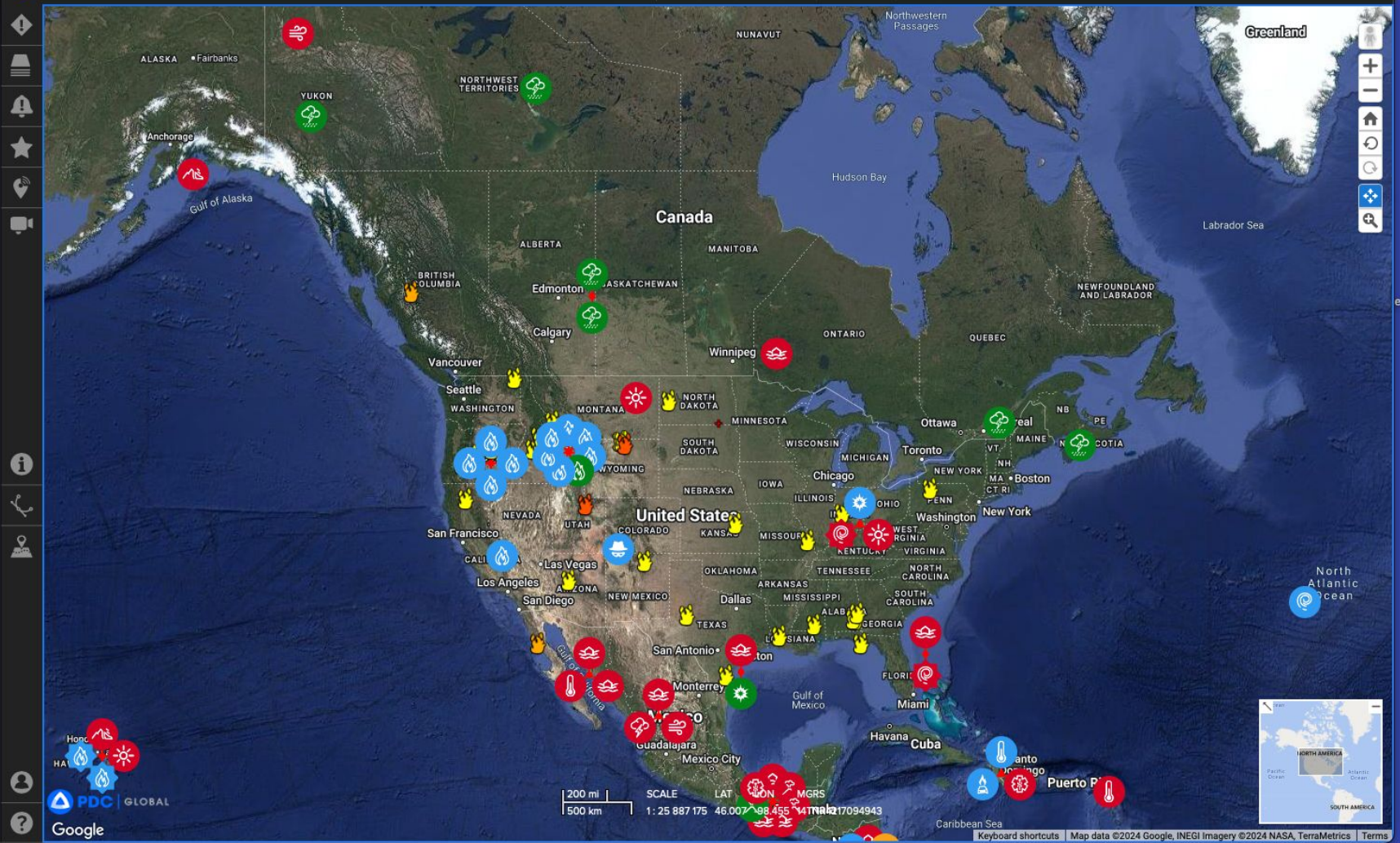




Emergency Planning & Response

- Hazard Monitoring System & Frequency
- Data Triggers & Thresholds
- Field + In-Town Monitoring Harmonized
- Evac, Safe Zone, Shelter-in-Place Plans
- Robust Comms Systems & Frequency
- “Always On” Comms?
- Group Location Tracking System
- Know Incident Command System





Dashboard

Map View

List View

Saved

Resources

Report a Fire

Contact Us

Legend

List

Wildfires

- Out of Control
- Being Held
- Under Control
- Fire Perimeter

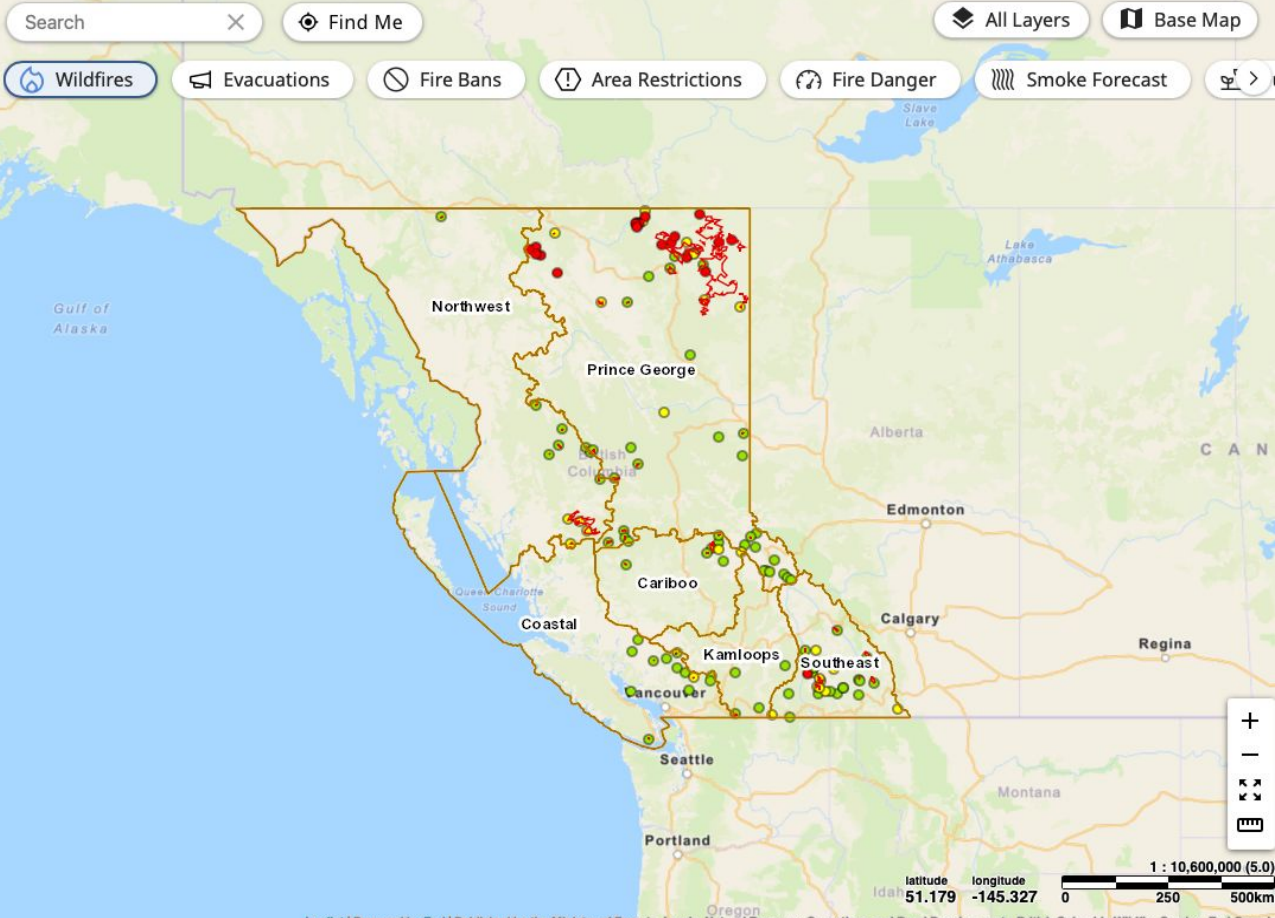
Map

- Fire Centre

More Information

Wildfire Stages of Control

Plan, Prepare, Stay Informed



Dubois

PA 98559

PurpleAir Air Sensor

PM2.5 AQI: 155

Unhealthy

Everyone should take precautions by reducing outdoor activity; go inside to cleaner air if you have symptoms.

[View Full Recommendation](#)

CURRENT AQI



PM2.5



Trend

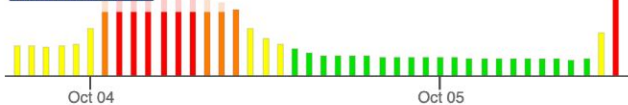


Around

HISTORY

NowCast PM2.5 AQI

[View More Charts](#)



FIRES

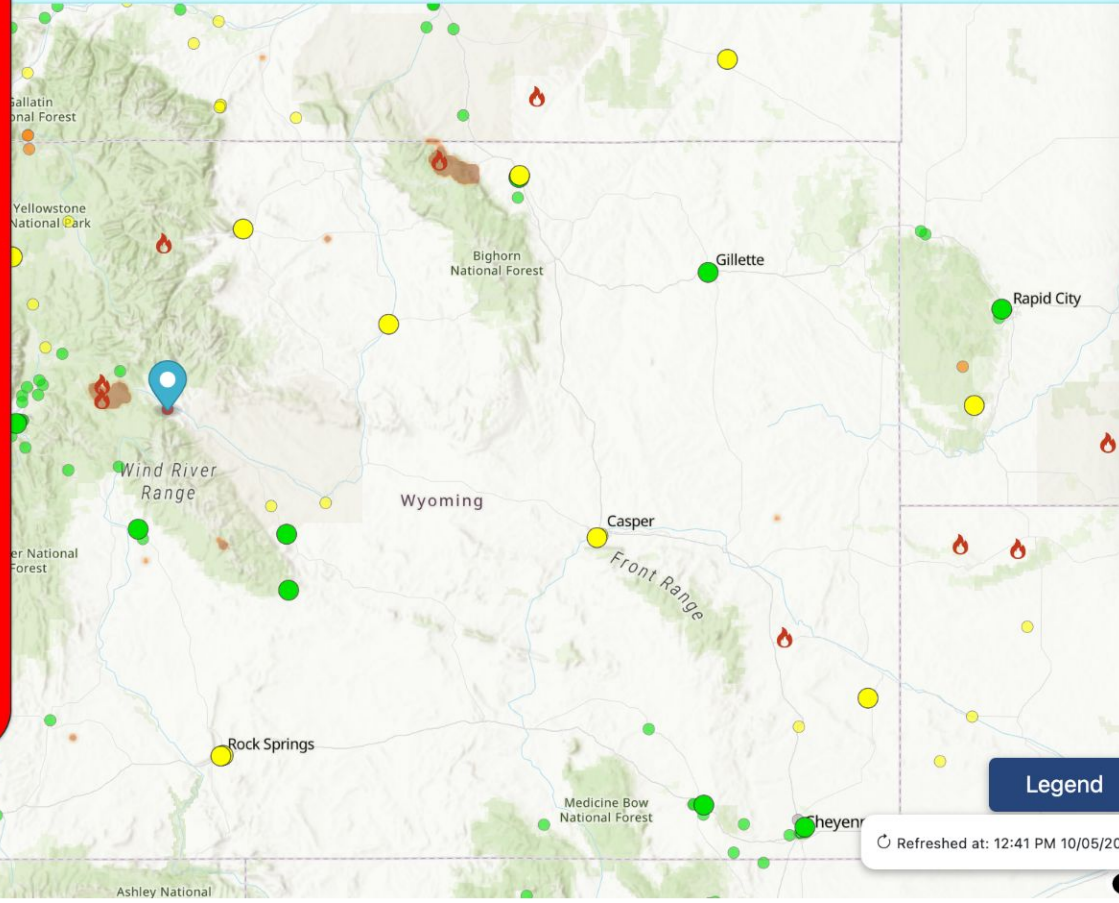


[Fires to the WNW](#)

[Smoke Plume Detected](#)

COLLAPSE

CLOSE



Legend

Refreshed at: 12:41 PM 10/05/20

Search location...



Windy.com

Go Premium

Login

Menu

Weather radar

Satellite

Radar+

Wind

Rain, thunder

Temperature

City heatmaps

Clouds

Waves

Rain accumul...

More layers...

Altitude

particles animation

pressure

Saturday 12 - 3 PM

Saturday 12

Sunday 13

Monday 14

Tuesday 15

Wednesday 16

Thursday 17

Friday 18

Saturday 19

Sunday 20

Monday 21

ECMWF 9km

GFS 22km

HRDPS 2.5km

NAM 8km

ICON 13km

kt 0

5

10

20

30

40

60

Kansas City

24°

Search location...



Windy.com

Go Premium

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Menu

Weather radar

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Rain, thunder

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City heatmaps

Clouds

Waves

Rain accumulat...

More layers...

...

OpenCircus
Europe's eyes on Earth

particles animation
Kansas City

pressure

3D

Still

CAMS

ug/m³ 0 10 20 100 1000

Saturday 12 - 3 PM

Saturday 24°

Sunday 13°

Monday 14°

Tuesday 15°

Wednesday 16°

Thursday 17°

Friday 18°

Saturday 19°

Sunday 20°

Monday 21°

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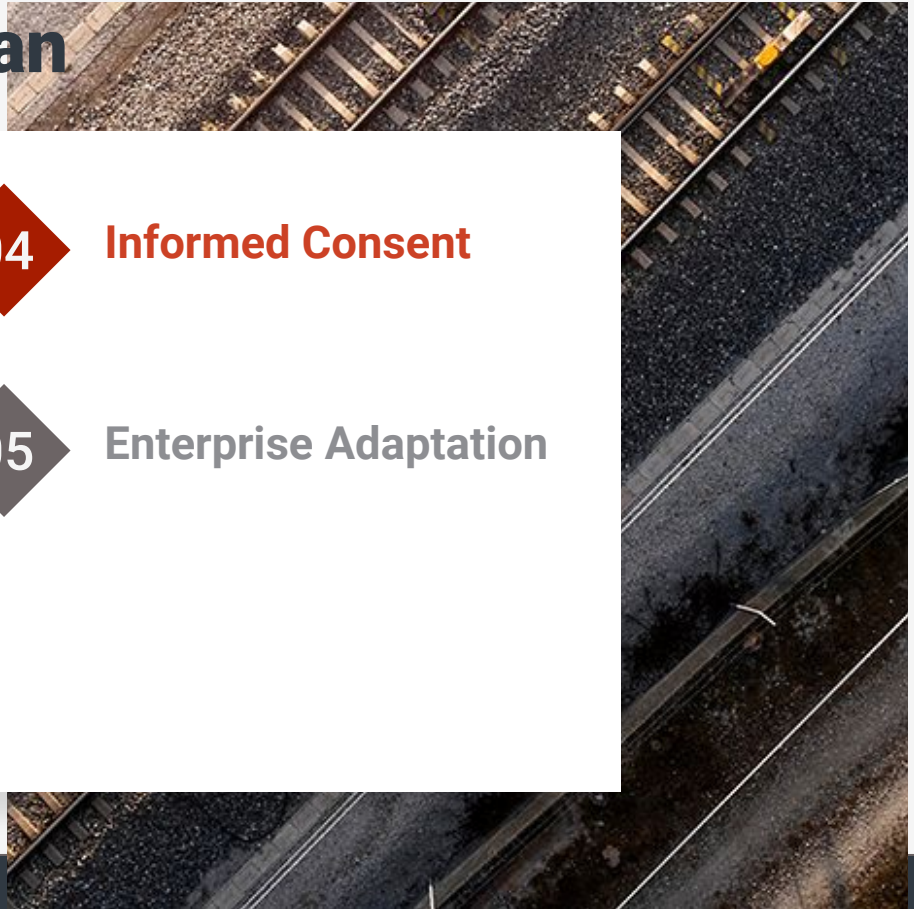
Emergency Planning
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Enterprise Adaptation



Do your participant pre trip or pre visit materials include information regarding severe weather, trip alterations, or cancellations (specific to weather events)?

Fewer than 50% of respondents replied Yes.

If you ask for participant or visitor information before they arrive (i.e. medical conditions, preparedness) have you changed your questions/profile to account for changing climate conditions?

Fewer than 10% of respondents replied Yes.



Adapt what you already have

Essential Eligibility Criteria

COVID-19 Course Operations

TRIP AND TUITION RELATED INSURANCE

WILDFIRE SMOKE PROTECTION

SAFETY & HEALTH

YOUR SAFETY AND HEALTH IS OUR FIRST PRIORITY.

UNDERSTANDING OUR RISK MANAGEMENT SYSTEMS

HEALTH FORM

**RELEASE OF LIABILITY,
ASSUMPTION OF RISK, AND
INDEMNIFICATION AGREEMENT**



Informed Consent

- Include updated hazards in relevant customer facing materials and paperwork
- Create flexibility in trip descriptions to include contingency planning
- Review screening, cancellation, and other relevant policies
- Encourage trip interruption/trip cancellation insurance from providers covering key risks
- Define communication channels and expectations
- Balance transparency of your internal decision-making policies with a self imposed standard
- Articulate the dynamic nature of risk management and indicate your policies will change and more information becomes available

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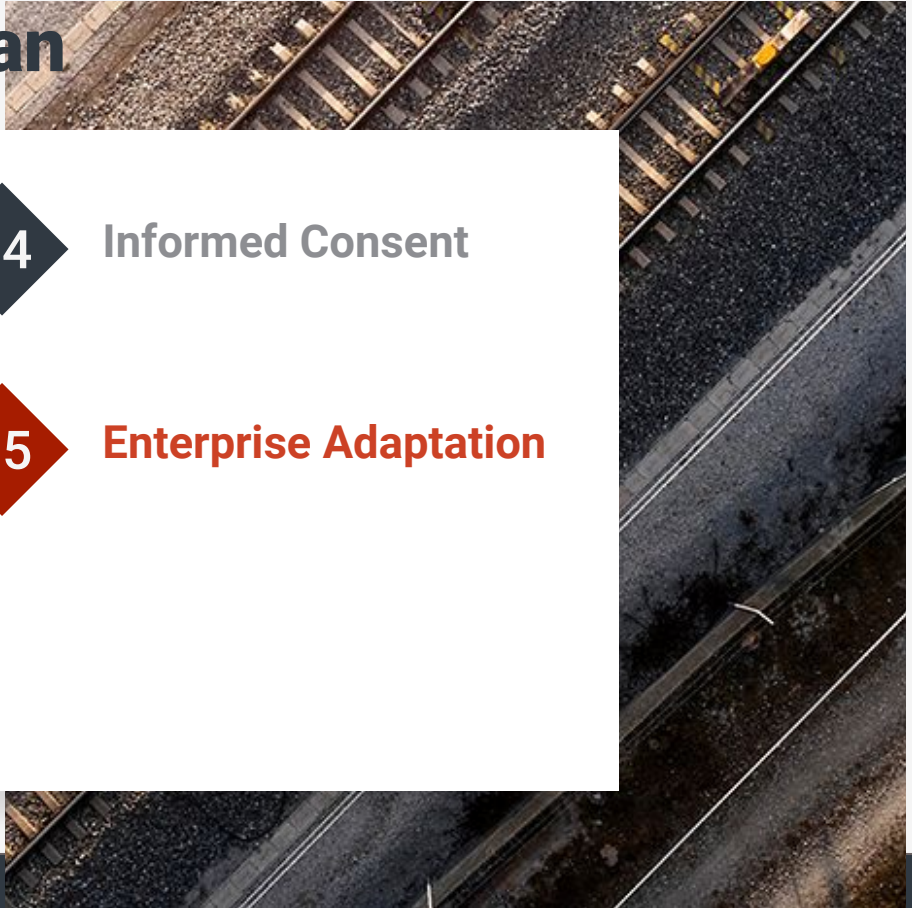
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Enterprise Adaptation





Enterprise Adaptation

- Diversity ways to deliver your mission, adjust staffing models for consistency
- Review insurance coverage
- Set a goal for days of operating cash in reserve consistent with an extended crisis
- Invest in facility/infrastructure hardening, greening, and electrification
- Take advantage of local, regional, federal funding support
- Advocate for local and regional policies that help the organization adapt and support planetary health
- Identify your role in the community, build partnerships
- Actively reduce your GHG emissions

Most respondents (64%) did not know if their organization's insurance covered severe weather, climate impacts, or business interruption, but 12% did confirm that they were covered for these losses, and 7% confirmed that their coverage excluded these losses.

[View All News →](#)

Zillow introduces First Street's comprehensive climate risk data on for-sale listings across the US

September 26, 2024

For-sale listings on Zillow will now feature detailed climate risk information for five key categories — flood, wildfire, wind, heat and air quality — along with insurance recommendations

SEATTLE, Sept. 26, 2024 /PRNewswire/ -- Zillow® is introducing climate risk data, provided by First Street, the standard for climate risk financial modeling, on for-sale property listings across the U.S. Home shoppers will gain insights into five key risks—flood, wildfire, wind, heat and air quality—directly from listing pages, complete with risk scores, interactive maps and insurance requirements.

GHG reduction strategies



Perform an energy audit	May qualify for a 30% tax credit in the U.S.
Electrify vehicles and appliances	May qualify for federal or state/provincial tax credits
Shift to non-fossil fuel energy sources	Consider solar, wind, geothermal with battery storage
Promote a plant forward diet	Greatest impact is from reducing or eliminating beef and beef products
Measure and track emissions	Set a goal and monitor your progress
Advocate for climate-smart policies	Monitor state and local initiatives, engage with advocacy organizations

Triple bottom line: People, Profit, Planet.

Inflation Reduction Act

Clean Energy Overview and Highlights

The Inflation Reduction Act (IRA) is the largest climate bill in U.S. history. A main policy focus of the IRA is supporting tax credits and rebates for **clean energy**, **electric vehicles**, and **efficiency updates**. Below are some highlights of how this bill can benefit you and/or your business.



RESIDENTIAL CLEAN ENERGY CREDIT

30% Tax Credit

for residential installations of clean energy (including solar, storage, etc.), offered through the end of 2034

HIGH-EFFICIENCY ELECTRIC HOME REBATE PROGRAM

Allocates **\$4.5B** for state-level rebates for home electrification investments, specifically for low- and moderate-income households

HOMES REBATE PROGRAM

Allocates **\$4.3B** for state-level rebates for energy-saving residential retrofits offered through the end of 2031

ENERGY EFFICIENT HOME IMPROVEMENT CREDIT

30% Tax Credit for residential efficiency investments (including home energy audits, windows, energy efficient appliances, etc.) offered through the end of 2032

CLEAN-VEHICLE CREDIT

\$7,500 Tax Credit

for the purchase of new electric vehicles offered through the end of 2032

PREVIOUSLY-OWNED CLEAN-VEHICLE CREDIT

\$4,000 Tax Credit

for the purchase of used electric vehicles

All of these policy incentives are projected to increase the deployment of clean energy, electric vehicles, and energy efficiency investments. This is an unprecedented level of policy support from the U.S. federal government.

Please note that not all households are eligible for all credits and rebates. Consult with state-specific program specialists, tax accountants, and energy professionals about potential savings for your household.

For more information, please see [By the Numbers: The Inflation Reduction Act](#), [press release from the White House](#) and [What the Inflation Reduction Act does for green energy](#) article by PBS.

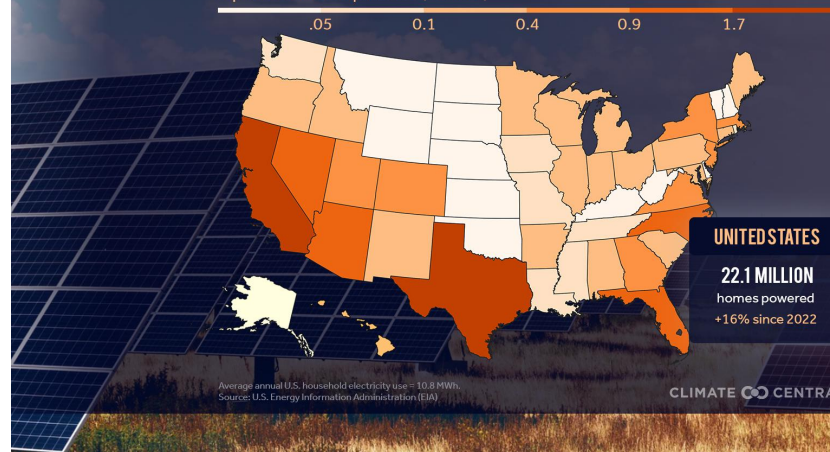
For further questions, please post on the Ask a Renewable Energy Expert forum at community.ases.org.



AMERICAN
SOLAR
ENERGY SOCIETY

SOLAR GENERATION IN 2023

Equivalent homes powered (millions)



U.S. ELECTRIC SCHOOL BUSES

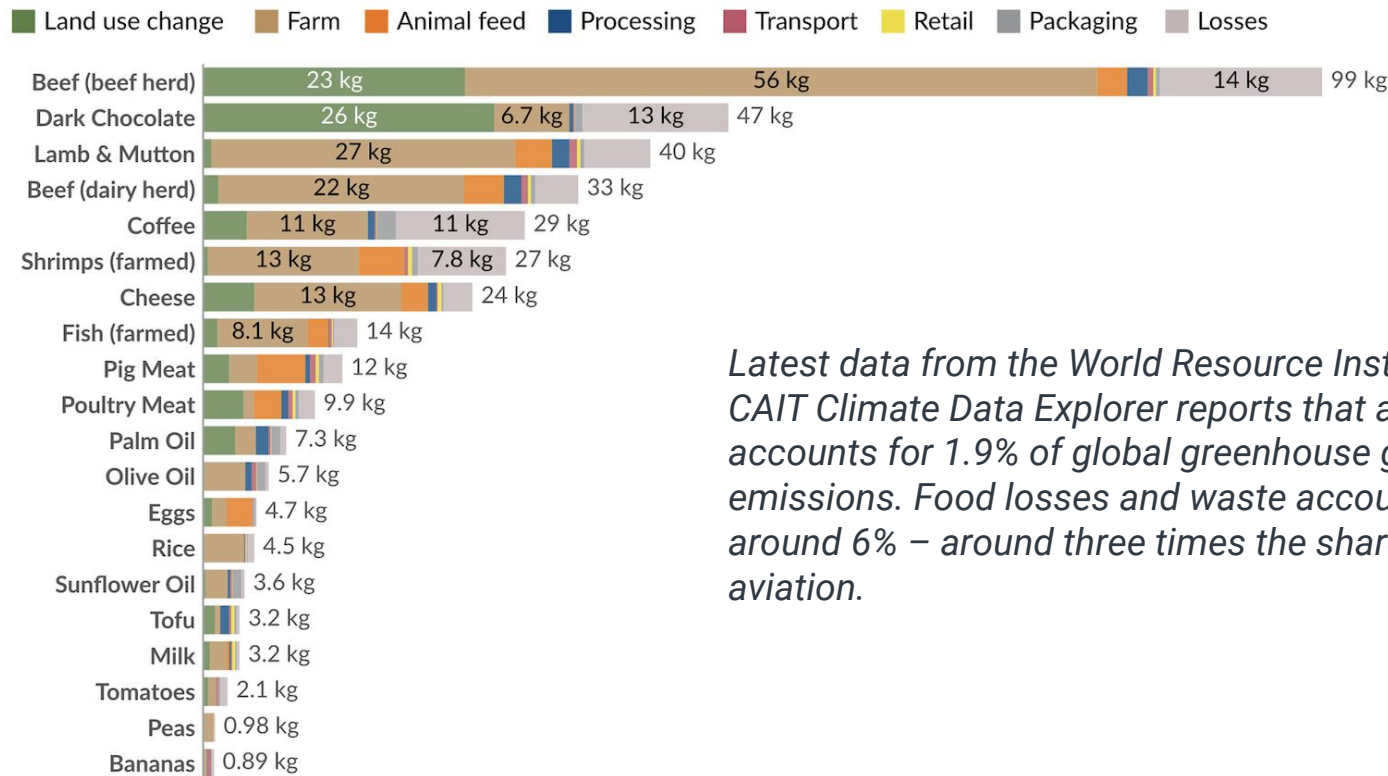


Quarterly cumulative total number of electric school buses committed (awarded, ordered, delivered, or in operation) in the U.S. through June 2024.
Source: WBH Database of U.S. Electric School Bus Adoption, Version 4.1, June 2024.

CLIMATE CENTRAL

Food: greenhouse gas emissions across the supply chain

Greenhouse gas emissions¹ are measured in kilograms of carbon dioxide-equivalents (CO₂eq)² per kilogram of food.



Latest data from the World Resource Institute's CAIT Climate Data Explorer reports that aviation accounts for 1.9% of global greenhouse gas emissions. Food losses and waste accounts for around 6% – around three times the share from aviation.

Failed resilience planning

How the North Carolina Legislature Left Homes Vulnerable to

Helene: “Over the past 15 years, North Carolina lawmakers have rejected limits on construction on steep slopes, which might have reduced the number of homes lost to landslides; blocked a rule requiring homes to be elevated above the height of an expected flood; weakened protections for wetlands, increasing the risk of dangerous storm water runoff; and slowed the adoption of updated building codes, making it harder for the state to qualify for federal climate-resilience grants.” — *Christopher Flavelle*



ACTION ALERT

**YOU CAN MAKE A DIFFERENCE
FOR WYOMING**

Dear Shana,

Decisions made in legislative meetings and state agency hearings may feel far out of our sphere of influence. But trust us when we say **you can make a difference for Wyoming in just a few clicks.**

Healthy People 2030 Seeks Public Input on Proposed New Objectives

🕒 Posted on October 8, 2024 by ODPHP

HHS is seeking written comments on 12 proposed new objectives for Healthy People 2030. HHS invites members of the public — both individuals and organizations — to provide comments about the new objectives for HHS to consider. HHS previously added four new objectives to Healthy People 2030 to reflect feedback from public comments received in January 2022 and changed the status of an additional objective reflecting comments solicited in October 2022.



Public comments informed the development of Healthy People 2030. Continuing to solicit and receive periodic public input throughout the decade will ensure the initiative reflects current public health priorities and areas of public interest.

HHS will accept written comments through 11:59 p.m. ET, October 31, 2024. All written comments must be submitted by email to HP2030Comment@hhs.gov. For complete details about this request for comments, please review the full [Federal Register Notice \(FRN\)](#).



Your Trust Matters to Us

Tell Congress: Protect Conservation Funding



TELL YOUR FRIENDS  

17,850
SUPPORTERS

82,150
REMAINING

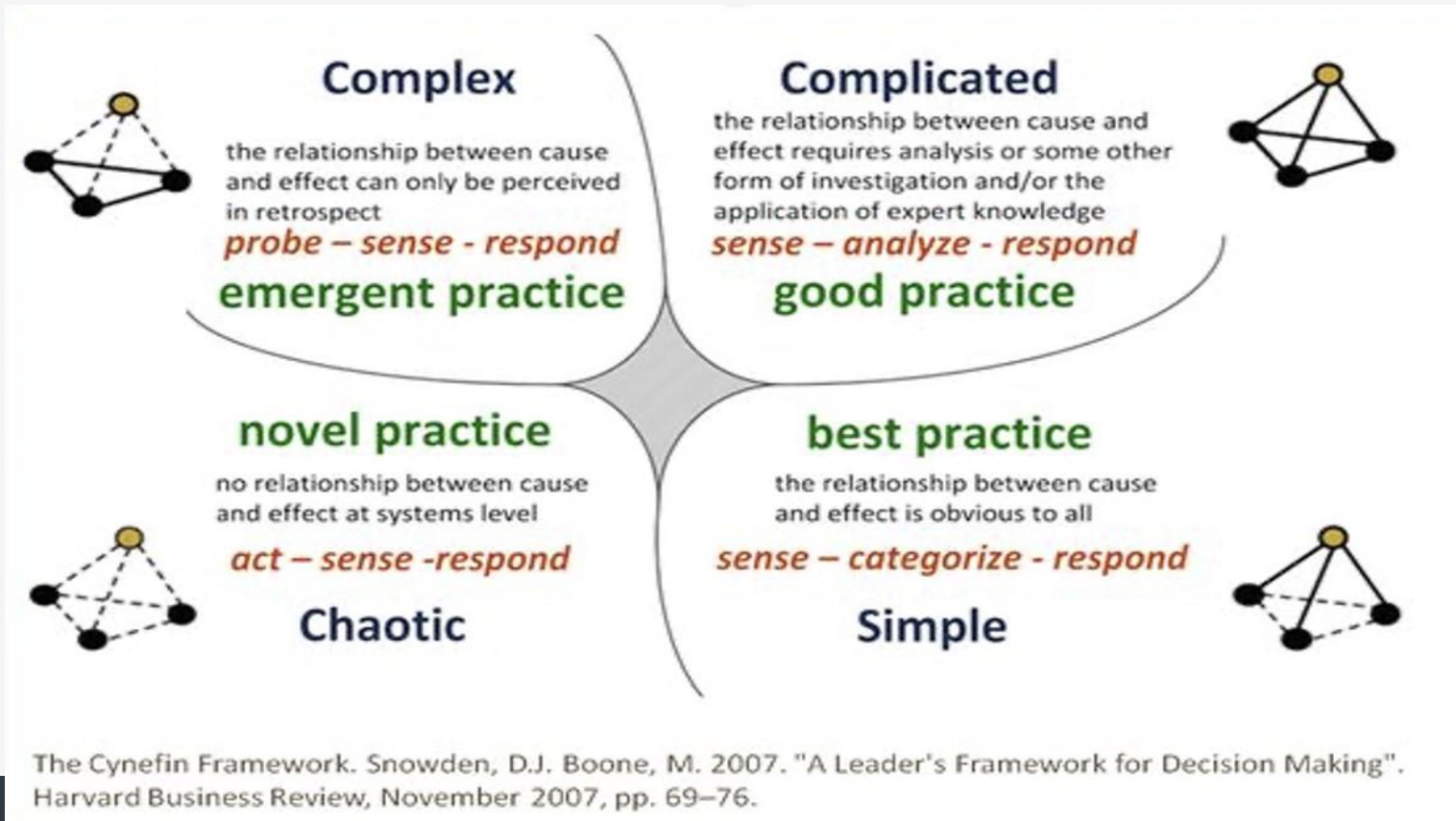
Your message will be delivered to:

YOUR U.S. SENATORS
YOUR U.S. REPRESENTATIVE

Please stand up for nature by preserving conservation and climate funding

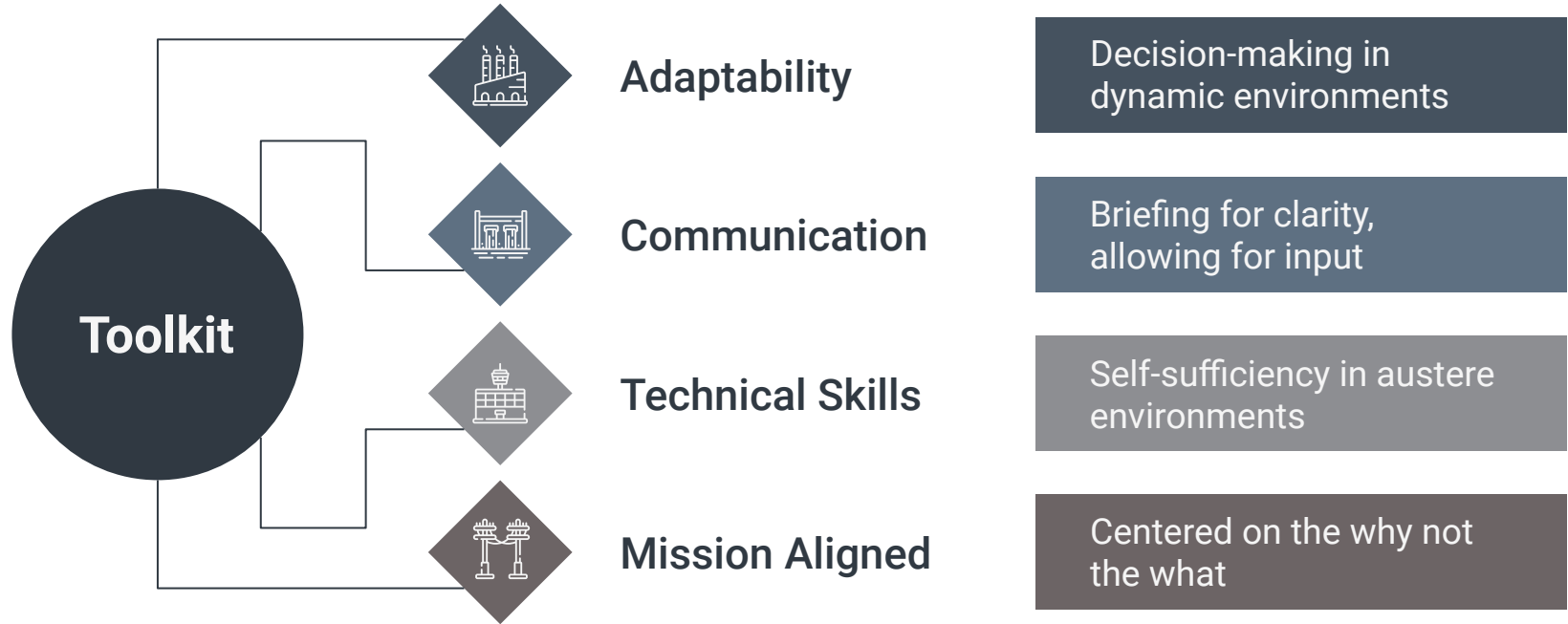


Navigating Complexity - Cynefin





Our Capabilities (aka Superpowers)





Yanosuke Hirai

1902-1986

“Unusual foresight and a deep sense of responsibility”

Research the Risk

Believe the Research

Build Systems that Consider the Worst Case Scenario

Build a Proactive Safety Culture



Action Steps

01

At your next leadership meeting, spend time discussing the question, “If we had to shut down for one month in the next five years, have we built sufficient resilience to stay in business?”

02

Update your public facing materials and participant paperwork to include references to climate change, extreme weather, and disasters and strive for transparency in explaining how you will respond in the face of these events.

03

Complete a Climate Hazard Risk Assessment for your organization.

Watch for the next round of the Climate Change Impacts Upon Outdoor Sector survey!

Resources

Forecasting Tools

AirNow: <https://www.airnow.gov/>

Windy: <https://www.windy.com/>

Environment Canada EQHI: https://weather.gc.ca/airquality/pages/index_e.html

CDC Heat Risk: <https://ephtracking.cdc.gov/Applications/HeatRisk/>

OCCHE Climate & Health Outlook Portal:

<https://storymaps.arcgis.com/stories/93ea47545cc944139e3fcefa919cb42b>

NOAA Heat Index: <https://www.weather.gov/ama/heatindex>

National Weather Service: <https://www.weather.gov/>

Monitoring Tools

Watchduty: <https://app.watchduty.org/>

DisasterAwarePro: <https://disasteraware.pdc.org/>

InciWeb: <https://inciweb.wildfire.gov/>

Air Quality Decision Making Tools

University of California AQI-Based Decision-Making Matrix for Wildfire Smoke Events:

https://www.ucop.edu/enterprise-risk-and-resilience/_files/uc_aqi_based_decision_matrix.pdf

Resources (continued)

Climate Change and Adaptation

U.S. Climate Resilience Toolkit: <https://toolkit.climate.gov/>

Climate Adaptation: <https://www.nrdc.org/stories/climate-adaptation-101>

Free Visual Resources for Climate Change Education: <https://www.climatecentral.org/resources>

National Centre for Outdoor Risk & Readiness: <https://natcorr.org.au/>

Sendai Framework: <https://www.undrr.org/implementing-sendai-framework/what-sendai-framework>

British Columbia Risk Assessment Template:

<https://www2.gov.bc.ca/gov/content/governments/services-for-government/information-management-technology/information-security/defensible-security/security-prerequisites/risk-assessment>

U.S. Inflation Reduction Act

Direct Pay US Tax Credit Details:

<https://www.eesi.org/articles/view/direct-pay-nonprofits-can-now-benefit-from-clean-energy-tax-credits>

THANKS!

Do you have any questions?

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shana.tarter@gmail.com

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