
SHORT TALK SERIES
WRMC
WILDERNESS RISK
MANAGEMENT
CONFERENCE

Online Evaluation of Remote Environmental Hazards to Avoid Incidents

Google Earth Windy.com sentinel-2 GAIA USGS science for a changing world CALTOPO

Online Evaluation of Remote Environmental Hazards to Avoid Incidents

https://courses.thingstolucat.com/wrmc-2023

Recent Weather History
Near-real-time Satellite Imagery

Google Earth Windy.com sentinel-2 GAIA USGS science for a changing world CALTOPO

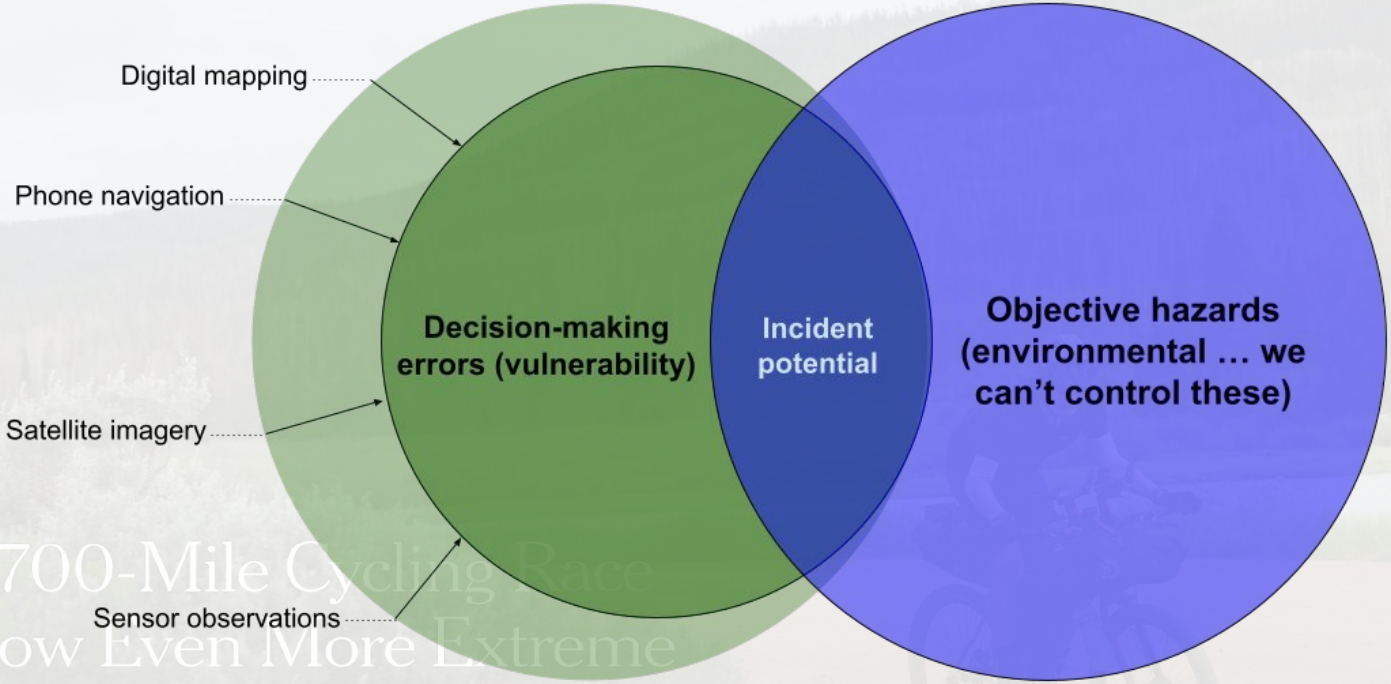
The New York Times

2022: Fifteen bikers evacuated due to unexpected winter conditions

2021: Twenty-one fatalities, Baiyin Ultramarathon

A 2,700-Mile Cycling Race Is Now Even More Extreme

The Tour Divide, a bikepacking race from the Canadian Rockies to the U.S. border with Mexico, has always been a test of fortitude. But extreme weather is making it much more dangerous.



A 2,700-Mile Cycling Race Is Now Even More Extreme

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I'd really want to know:

- **What is the recent weather history?**
- **What are the current surface conditions?**
- **What is coming?**


The New York Times
A 2,700-Mile Cycling Race
Is Now Even More E
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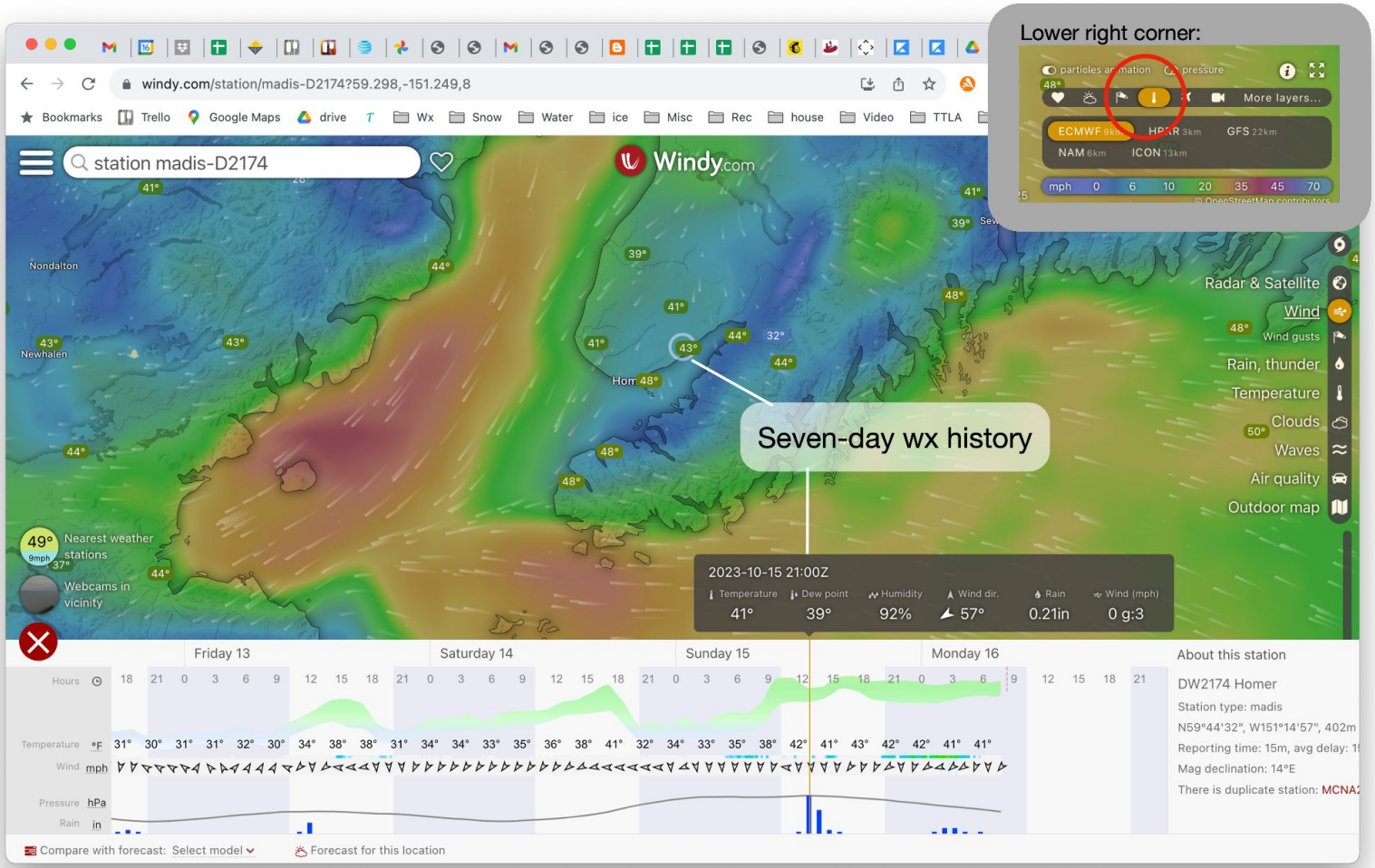
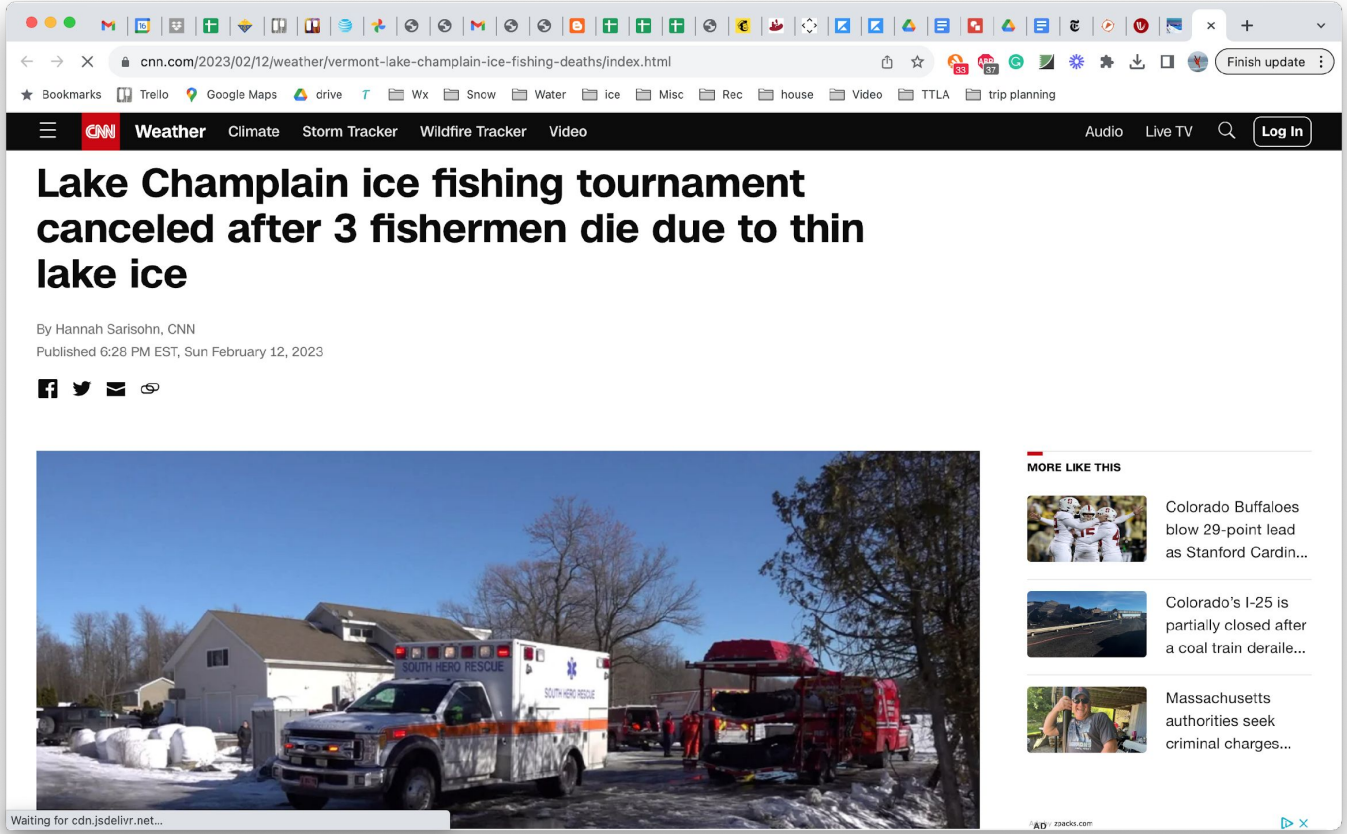
What is the recent weather history?
Windy.com
visualcrossing
What are the current surface conditions?
USGS
science for a changing world
CALTOPO
sentinel-2
What is coming?
Windy.com

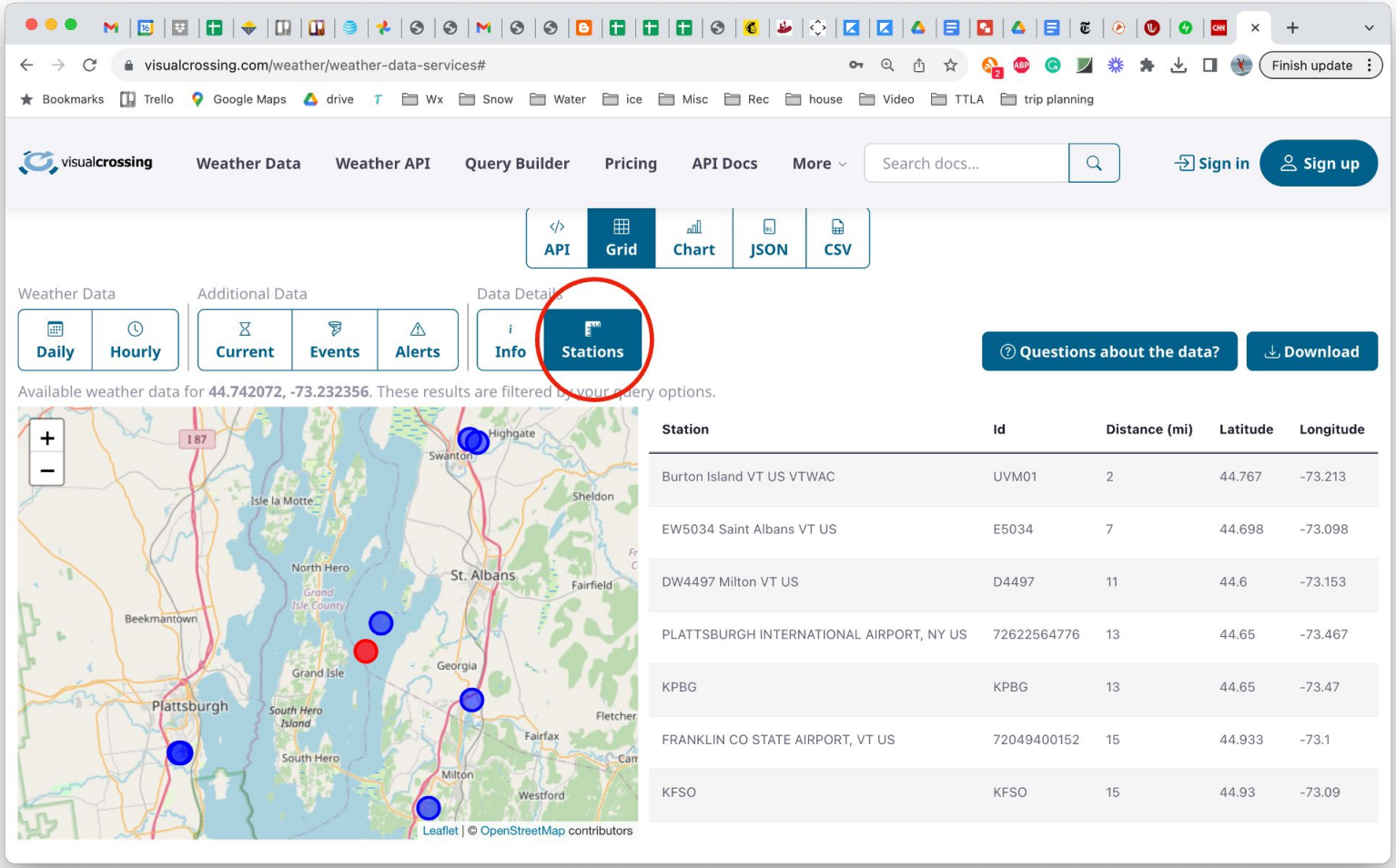
Recent weather history: Easy



Recent weather history: Advanced

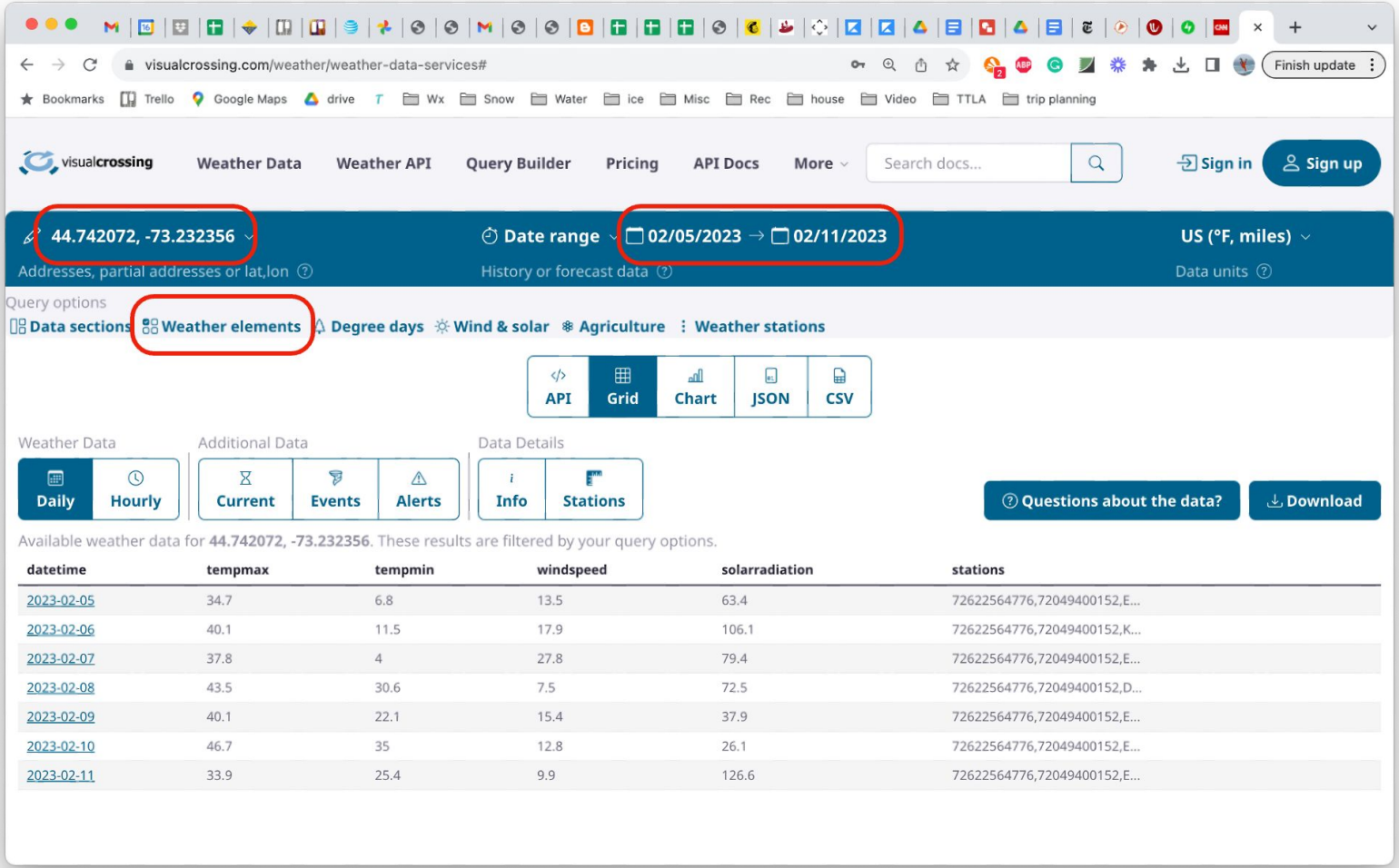


Recent weather history: Advanced



Station	Id	Distance (mi)	Latitude	Longitude
Burton Island VT US VTWAC	UVM01	2	44.767	-73.213
EW5034 Saint Albans VT US	E5034	7	44.698	-73.098
DW4497 Milton VT US	D4497	11	44.6	-73.153
PLATTSBURGH INTERNATIONAL AIRPORT, NY US	72622564776	13	44.65	-73.467
KPBG	KPBG	13	44.65	-73.47
FRANKLIN CO STATE AIRPORT, VT US	72049400152	15	44.933	-73.1
KFSO	KFSO	15	44.93	-73.09

Recent weather history: Advanced



datetime	tempmax	tempmin	windspeed	solarradiation	stations
2023-02-05	34.7	6.8	13.5	63.4	72622564776,72049400152,E...
2023-02-06	40.1	11.5	17.9	106.1	72622564776,72049400152,K...
2023-02-07	37.8	4	27.8	79.4	72622564776,72049400152,E...
2023-02-08	43.5	30.6	7.5	72.5	72622564776,72049400152,D...
2023-02-09	40.1	22.1	15.4	37.9	72622564776,72049400152,E...
2023-02-10	46.7	35	12.8	26.1	72622564776,72049400152,E...
2023-02-11	33.9	25.4	9.9	126.6	72622564776,72049400152,E...

Recent weather history: Advanced

datetime	tempmax	tempmin	windspeed	solarradiation
2023-02-05	34.7	6.8	13.5	63.4
2023-02-06	40.1	11.5	17.9	106.1
2023-02-07	37.8	4	27.8	79.4
2023-02-08	43.5	30.6	7.5	72.5
2023-02-09	40.1	22.1	15.4	37.9
2023-02-10	46.7	35	12.8	26.1
2023-02-11	33.9	25.4	9.9	126.6

fatality

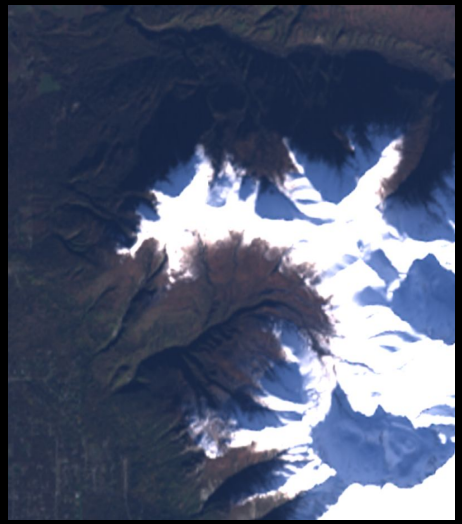
fatalities

Current surface conditions: Easy

Near-real-time satellite imagery

MODIS

- Most frequent (daily)
- 250 m resolution



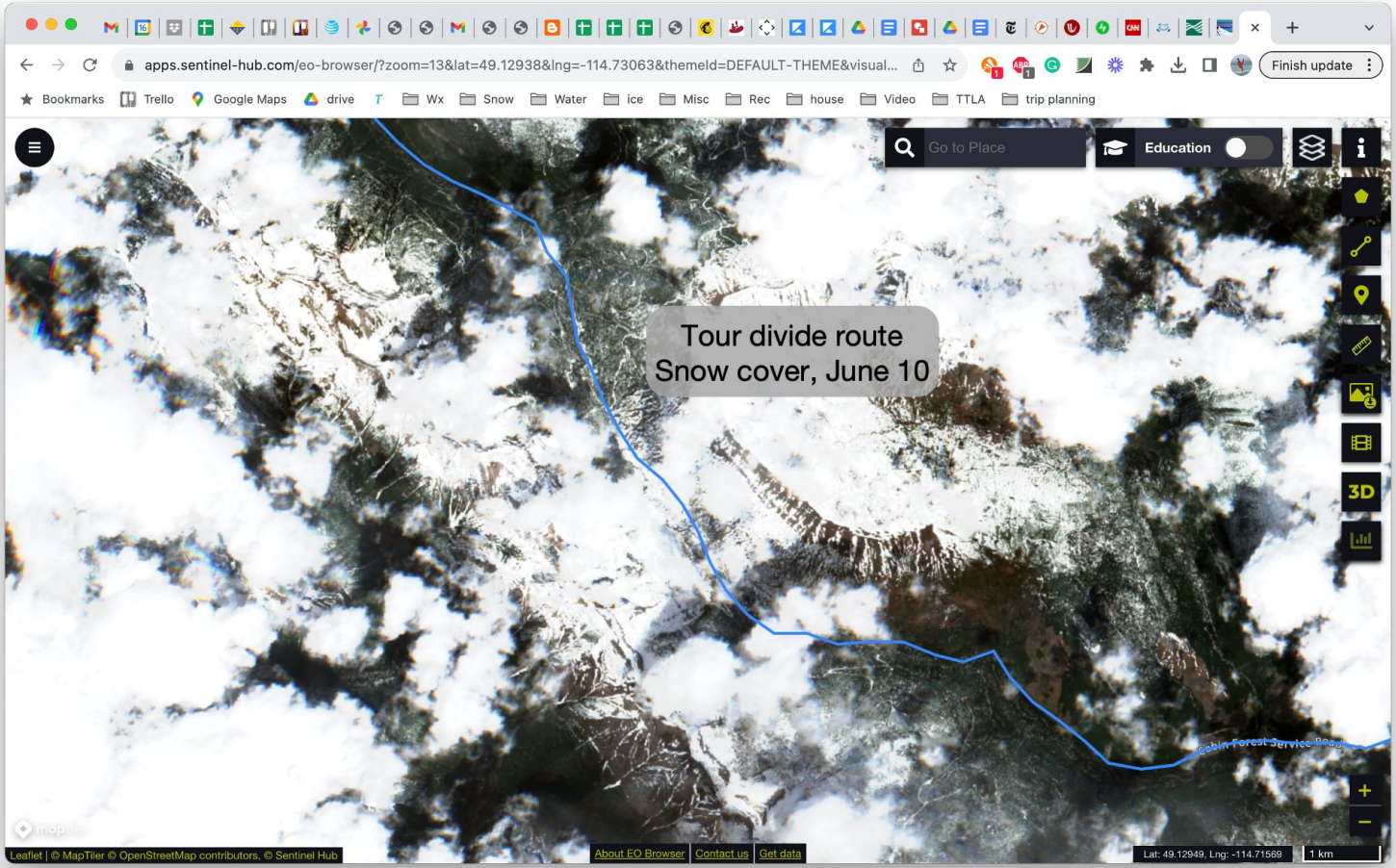
Landsat 8-9

- Least frequent (~2/wk)
- 30 m resolution

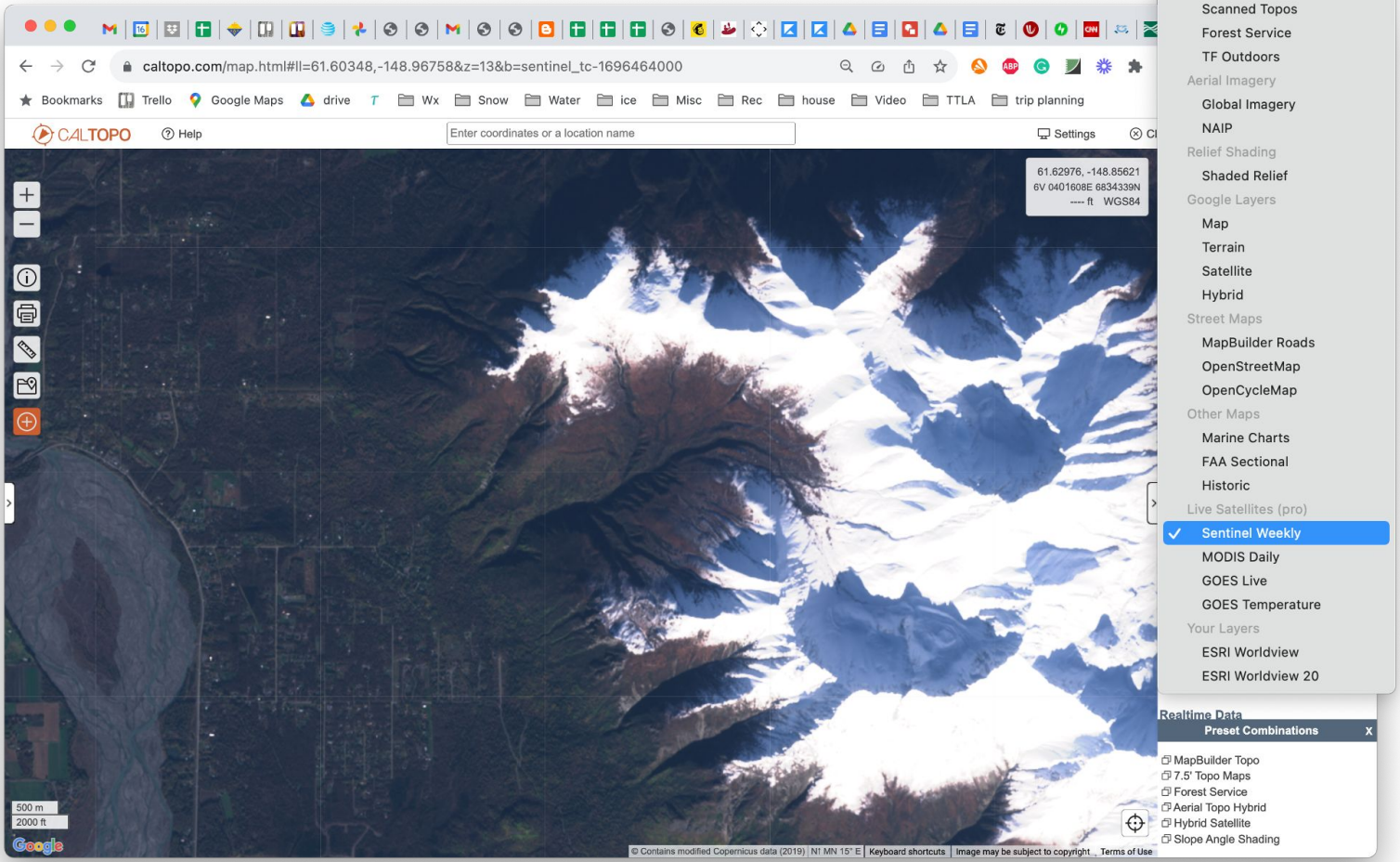
Sentinel 2 L2A

- Less frequent (~4/wk)
- 10 m resolution

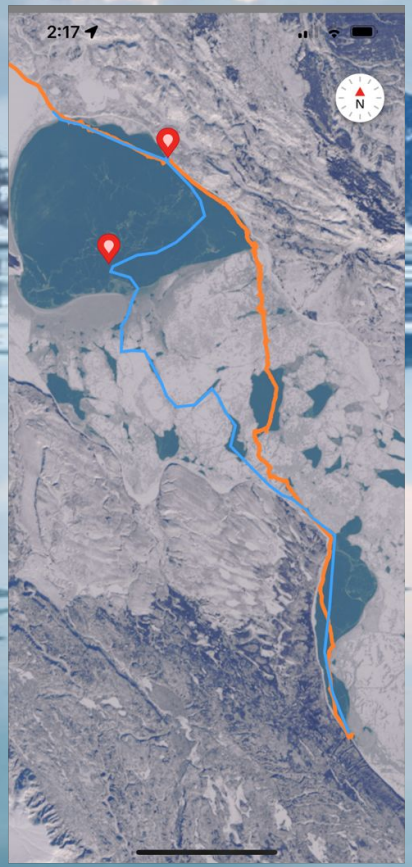
Current surface conditions: Easy



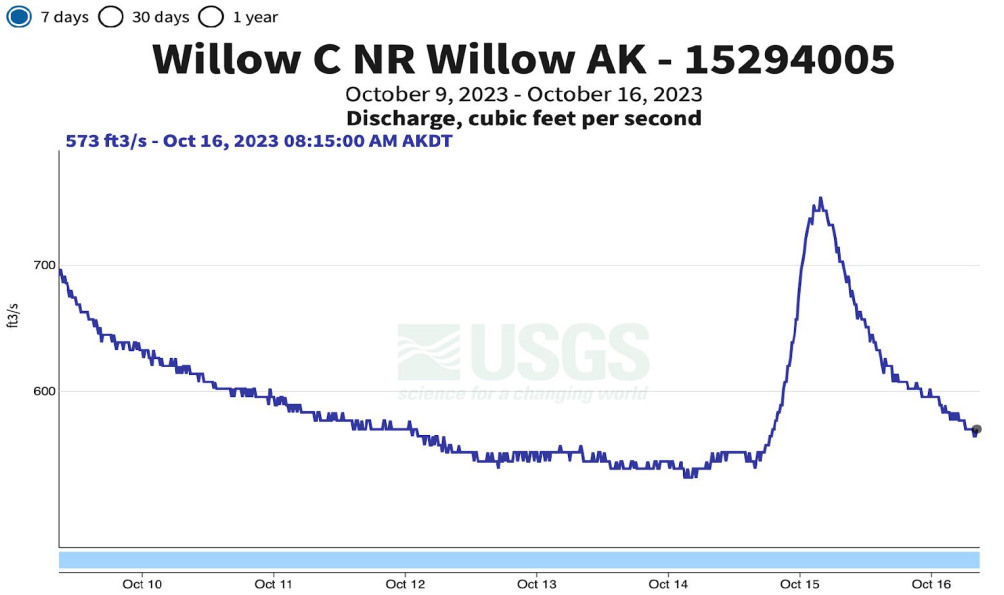
Current surface conditions: Easy (but not free)



Current surface conditions: Smartphone navigation



Current surface conditions: Easy

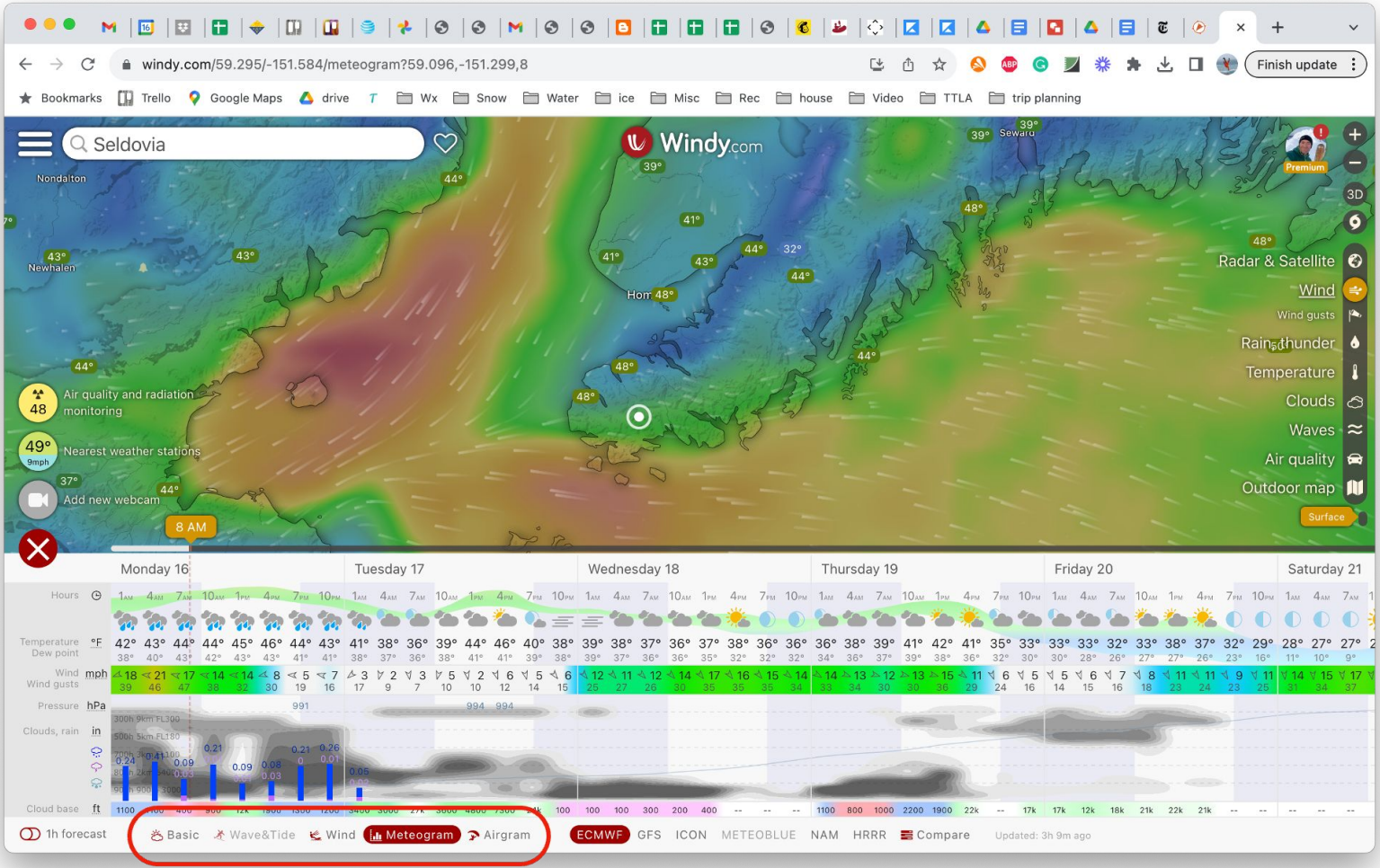


Current surface conditions: Advanced

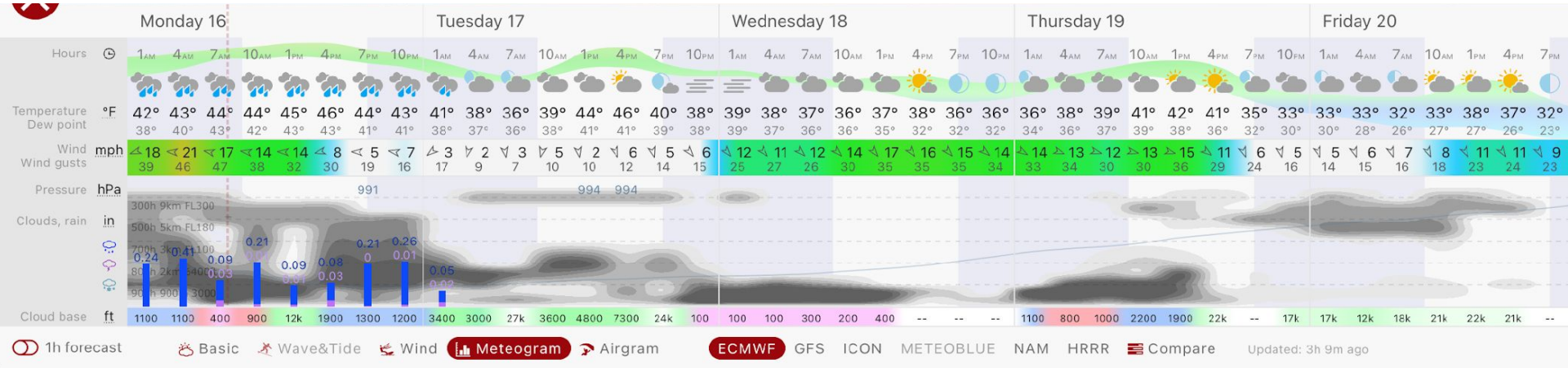
2		Inputs		Target Flows at Gauge		Latest Flow
3	Region	Run Name	Gauge Tab Title	Low	High	Discharge
4	HWY 2	Tumwater	Wenatchee_Peshastin	1000	4000	594
5	HWY 2	Leavenworth to Cashmere	Wenatchee_Peshastin	2500	20000	594
6	HWY 2	Boulder Drop	Skykomish_Gold Bar	2000	10000	2121
7	HWY 2	Top Tye	Skykomish_Gold Bar	5000	7500	2121
8	HWY 2	Nason Creek	Wenatchee_Peshastin	5000	10000	594
9	HWY 2	Little Wenatchee	Wenatchee_Peshastin	6000	9000	594
10	HWY 2	Chiwawa River	Chiwawa	1100	3500	101
11	HWY 2	Icicle Creek	Wenatchee_Peshastin	4545	13636	594
12	HWY 20	Thunder Creek	Thunder Creek_Newhalem	900	1500	301
13	HWY 20	Bridge Creek	Stehekin	2000	4000	359
14	Eastside	Entiat	Entiat	600	2000	70
15	I-90	NF Snoqualmie near Falls	NF Snoqualmie	500	900	506
16	Olympics	South Fork Calawah	Calawah	2000	4000	150
17	Olympics	Sitkum	Calawah	2000	4000	150
18	Olympics	SF of Sol Duc	Calawah	3000	6000	150
19	Olympics	Grand Canyon Elwha	Elwha	800	2000	501
20	Olympics	SF Skokomish	SF_Skokomish	650	2000	286
21	Olympics	Dungeness	Dungeness	800	2000	197
22	Mtn Loop Hwy	Robe Canyon	SF_Stillaguamish	861	1500	797
23	Olympics	NF Skok	NF_Skokomish	1000	1500	354

Jon Strahl, Basecamp Cascadia

Forecast: Easy



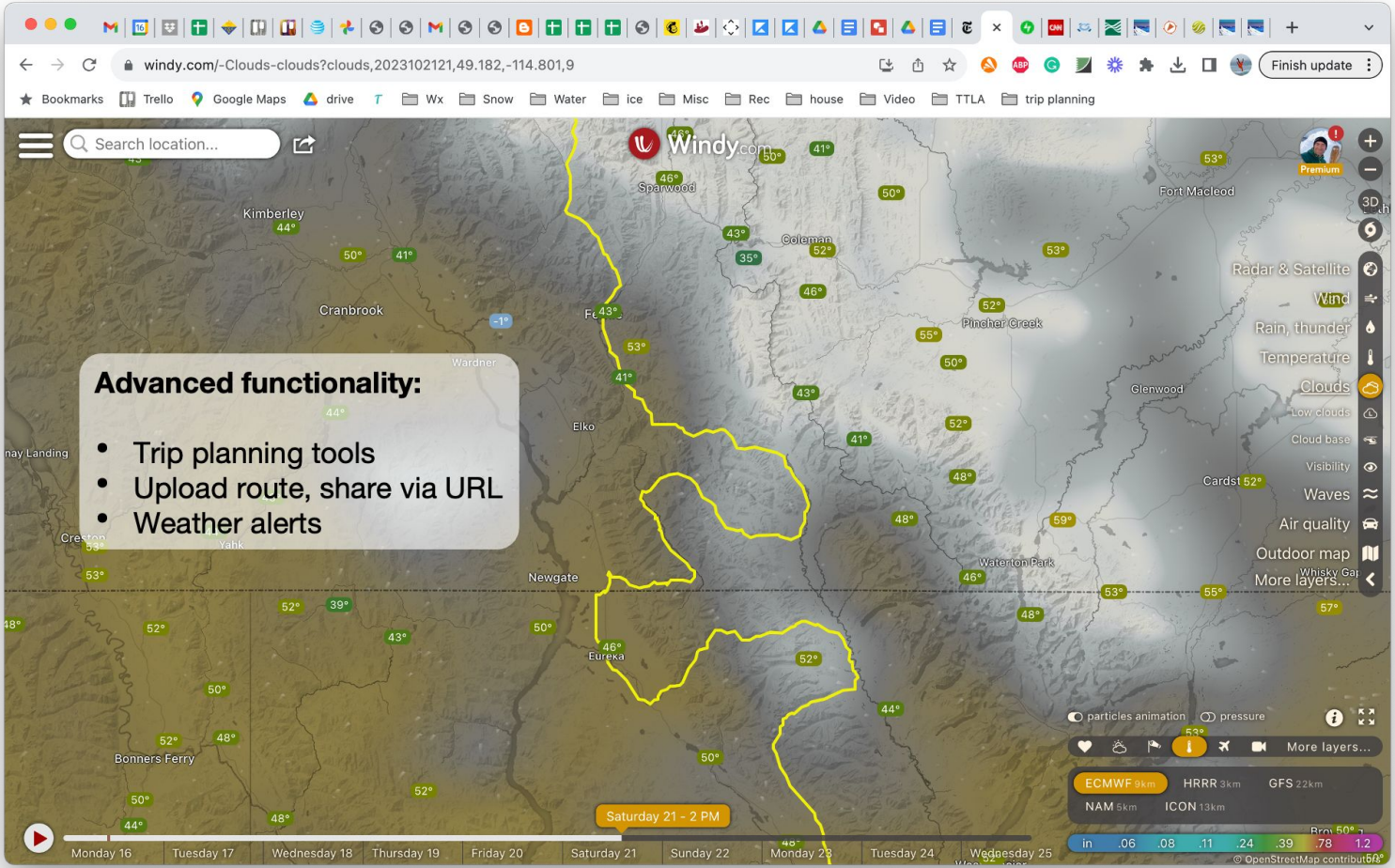
Forecast: Easy



Meteogram view:

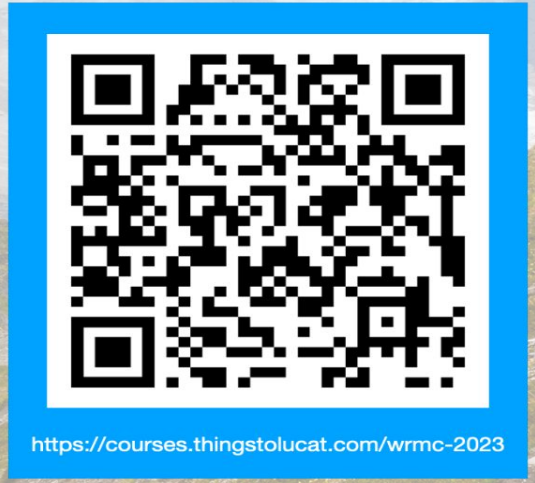
- Precipitation: When and how much
- Cloud cover: Elevation, density, windows
- Wind: Direction and intensity

Forecast: Advanced



Action items

1. Recognize that mapping, sensor, and weather applications can be used to anticipate and avoid environmental hazards.
2. Use windy.com to evaluate recent and forecast conditions (meteogram).
3. Use near-real-time satellite imagery to evaluate current surface conditions.

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Adaptive Climbers Fest 2023
Red River Gorge, KY


PARADOX
SPORTS

Ouray Ice Park, CO
Kitty Calhoun

OUR MISSION

To transform lives and communities through adaptive climbing opportunities that defy convention.

OUR VISION

Paradox Sports envisions a world with access to adaptive opportunities, which empowers individuals, builds communities, and honors the fact that ability does not prevent opportunity.

OUR VALUES

Paradox Sports recognizes the power of community engagement, personal growth, compassion, dignity, authenticity, and irreverence for those who say we can't.

FY 23 IMPACT

PARADOX SPORTS

ADAPTIVE CLIMBING THAT DEFIES CONVENTION

600+ People Impacted via **1,600+** Experiences

EXPANDING the Paradox Sports COMMUNITY

We welcomed **33%** NEW Volunteers and Participants, on **53** programs across **17** states and **2** countries

We provided **225+** hours of training to **200+** Volunteers and Climbing Facilitators

We delivered **19** Adaptive Climbing Initiative Courses

5 National Rock + Ice Trips

- Shelf Road, CO
- Yosemite, CA
- Gunks, NY
- North Conway, NH
- Ouray, CO

We completed **13** Paradox Miles with over **350** climbers


PARADOX
SPORTS


PARADOX
SPORTS


drive
PARADOX
SPORTS


PARADOX
SPORTS


PARADOX
SPORTS


PART 2: TECHNICAL SESSION


5.9
5.7


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Safety Governance & Risk Management Architecture

LIM JUN PING

Meet the presenter

Lim Jun Ping

Jun Ping, a safety and risk management professional, joined Outward Bound Singapore (OBS) in 2016. His role transformed OBS's safety culture, emphasizing safety, risk management, and compliance. With expertise in High Angle Rope Rescue and Working Rope Access, he trained thousands at ExxonMobil. Certified in Fall Protection, he's affiliated with Institute Engineer of Singapore (IES) and Singapore Institute of Safety Officer (SISO). Beyond work, Jun Ping's passion lies in kayaking, exploring waters from Asia to Scandinavia

Introduction

This presentation delves into Outward Bound Singapore's ongoing journey towards Safety Excellence, offering valuable insights, learning experiences, and a glimpse into our future direction. Additionally, we aim to demystify complex corporate safety jargons.

My Mandate

To develop a Risk Management Framework that is fitting to the organisation

This framework should be both credible and scalable, striving for sustainability and adaptability over time whenever feasible

About Standards

First Published 1999

First Published 2009

First Published 2018

Understanding These Terminologies




"*Refers to the structure framework, processes and practices established within an organisation. It centre on the actions taken by the* ***Leaders and Policymakers*** *to safeguard the well-being of individuals, enhances working environment and ultimately improve overall business performance*"

DEFINING SAFETY GOVERNANCE

*"Refers to the systematic approach an organisation employs to identify, assess and manage risks throughout its operations. In an ideal scenario, it fosters a **risk-aware culture**, supports **informed decision-making** and bolsters the organisation's ability to anticipate and response to risk effectively."*

DEFINING RISK MANAGEMENT ARCHITECTURE

Safety Governance

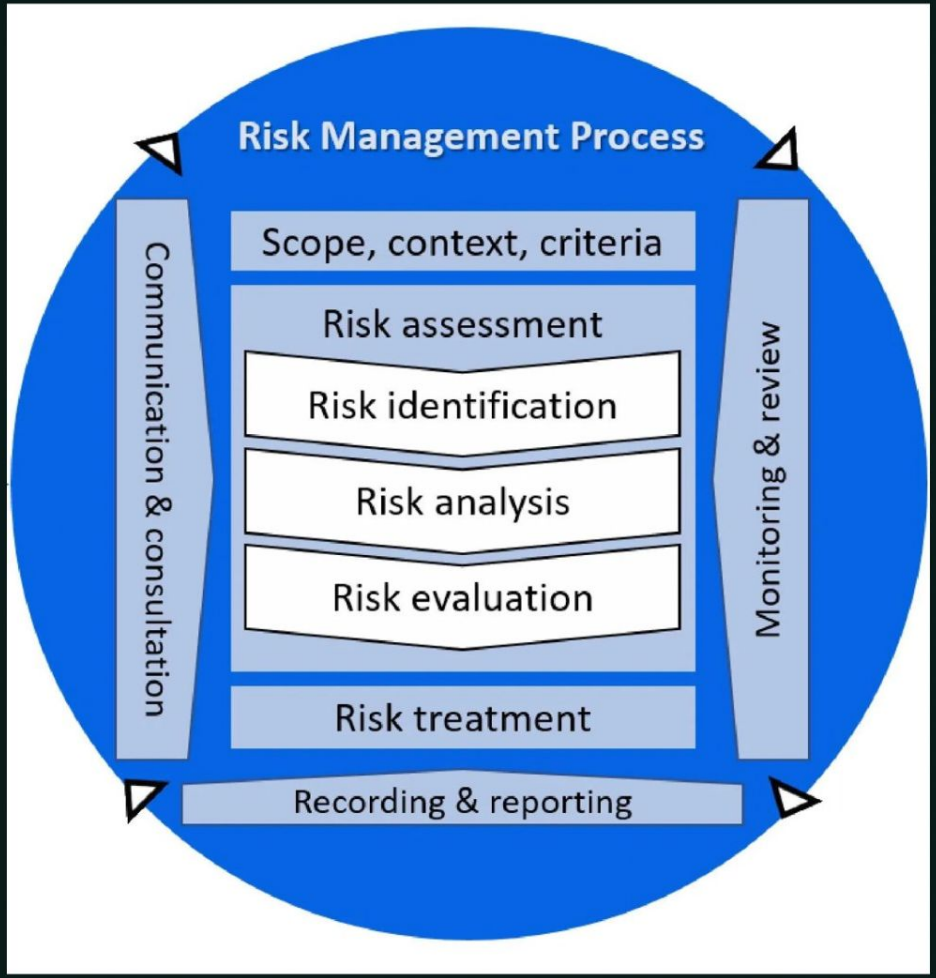
About 10 components have been identified, and while this number may vary in different literature sources, these 10 components are likely at the core

Drawing insights from Safety Governance and recognizing time constraints, I'll focus on **three** key aspects that organisations can prioritise. These aspects are universally applicable to all management approaches when it comes to safety.

1. Understand and improve Safety Culture
2. Incident Classification (Communication)
3. Finding out what are we learning from the incident

Risk Management Architecture

A simplified diagram to illustrate the relationships among components in Risk Management Architecture.



Source: www.iso.org/iso-31000-risk-management.html

Integration

- Closely related concepts that work together to ensure the safety and well-being of individuals, organisation and the environment.

  The interrelated elements are often integrated to form a holistic approach to risk management and safety assurance.

Leadership and Oversight

Effective leadership establishes a safety culture, sets strategic objectives, and drives continuous improvement, while oversight ensures compliance, manages risks, monitors performance, and allocates necessary resources.

Communication and Culture

A strong safety culture, coupled with clear and consistent communication, helps organizations proactively identify and mitigate risks, ensures that safety is a shared responsibility, and ultimately enhances the well-being of employees and the overall success of the organization.

Legal and Regulatory Compliance

Organizations must not only be aware of the safety-related laws and regulations applicable to their operations but also actively integrate compliance measures into their safety management systems to protect their employees, reputation, and overall business operations.

Continuous Improvement

It's a dynamic and proactive approach to safety that involves ongoing assessment, learning from experiences, adapting to changing conditions, and leveraging advancements in technology and best practices to create safer workplaces and reduce risks

Priority 1

Understand and improve Safety Culture




Importance of creating Strong Safety Culture

Cultivating a Strong Safety Culture in Your Organization With a Culture Safe Survey

Outward Bound Singapore

Outward Bound Singapore presenters Ms. Elaida Gacad (Safety & Quality Audit unit) and Mr. Loh Khee Meng (Operations Management)

What is a Culture Safe Survey?

It is a study which looks deeper into the Workplace Safety & Health (**WSH**) **beliefs, values and practices** of an organization, beyond general WSH infrastructure and competency. Adapting a survey to evaluate your organization should be **contextualized to your business and operating functions to**:

1. Get a sensing of Current WSH Culture
2. Identify Strengths and Gaps
3. Develop Action Plans to Improve Overall WSH

This survey is designed to measure the current state of an organization's safety culture and **underlying components** contributing to the culture which has an **impact to business functions**.

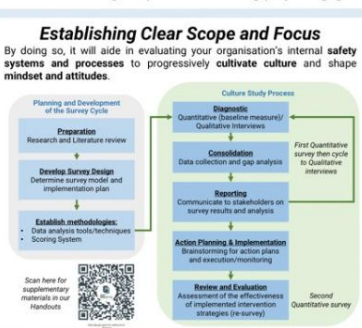
Intervention strategies are then established and implemented (in consultation and collaboratively with staff and management) to **address identified gaps** by **leveraging on identified strengths**.

How Can Organizations Benefit?

- Understand the importance of safety culture in **providing quality service**
- Appreciate that safety culture needs to be **invested in, nurtured and cultivated**
- Improve the **psychological health** of staff, **increase engagement** and **satisfaction** at work
- Create **positive experiences** for both **staff and stakeholders**
- Acknowledge **strengths and weaknesses** and work together to **bridge gaps in the system**

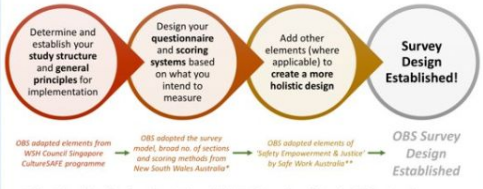
Establishing Clear Scope and Focus

By doing so, it will aide in evaluating your organisation's internal **safety systems and processes** to progressively **cultivate culture** and shape **mindset and attitudes**.



Designing Your Survey

In Outward Bound Singapore (OBS), we shaped our survey design by conducting a thorough literature review and horizon scan of available **culture study models, analysis tools and techniques** available in the industry. The key is in identifying what is suitable to **adopt** and **adapt** in your organisation:



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Cultivating a Strong Safety Culture in Your Organization With a Culture Safe Survey

Outward Bound Singapore

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OBS Assessment Methodology

Quantitative (during Diagnostic phase):
- Data collected through measurement
- Data analysed through metrics and statistics
- Data reported through statistical analysis and data visualisation

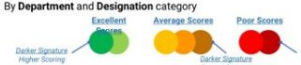
Qualitative (post Consolidation phase):
- Data collected through ground observation or interviews (latter selected)
- Data analysed from descriptors by interviewee
- Data reported in the language and expression of the interviewee

A culture study is voluntary; therefore, it is important that staff are encouraged to participate across various designation categories or rank. In OBS, we broadly sampled staff from '**Management**', '**Supervisors**' and '**All other staff**' respectively:

- Guided by recommended sampling table by Workplace Safety & Health Council SG
- Minimum sample of 152 staff to be statistically representative of the organization

We worked towards the minimum sampling size to achieve **optimal efficacy** of 95% confidence level with a 5% margin for error. It is crucial to have enough responses to be **representative** of the entire population and the various business units. We sampled **218 staff** (93% of 235 total staff) through a digital form (FormSG) and using a 3-point Likert scale per question i.e., score of 2, 1 or 0 (polar positive, neutral, polar negative).

Cumulative averages were calculated, with the collective scoring data analyzed and reported using visual bar graphs and heatmaps:
- By **Main Section** and **Each Question**
- By **Department** and **Designation** category



The heat map colour scheme follows the traffic light design where darker heat signatures of each colour will indicate the culture maturity level, importance and notability of specific safety aspect/domain to be addressed.

Heat Colour	Scoring	Score Interpretation ©
Excellent	80 to 100	This is a strength and groups should consider how to leverage their strengths in other areas
Average	50 to 79	**High average (70-79):** This is nearly a strength and may only require fine tuning to turn this into excellent. Groups should ask themselves 'what is required to go from good to excellent?' **Medium average (60-69):** This is a neutral result. Groups should explore what underpins this result in facilitated discussions or staff debriefs to better understand what is needed to improve in this area. **Low average (50-59):** Bordering to become a poor score; should be considered as an area of concern
Poor	0 to 49	Identified as a priority area of critical gap(s) and requires strategic planning and discussion for improvement

Scoring table above © - Copyright – Clinical Excellence Commission for and on behalf of the Crown in right of the State of New South Wales

Qualitative Interviews

Evidence-based interviews allows the survey team to **interpret and explain** the **phenomena** being investigated i.e., staff safety mindset and attitudes translating into work behavior and culture.

A small sample size (range of 10-40 samples) is ideal to **avoid data saturation** i.e., point where further data collection from interviews would not yield new or useful insights.

Qualitative interviews (unstructured data) can be analyzed using Sentiment Analysis (or opinion mining) to determine if the feedback is positive, negative or neutral, as well as the extent of it.

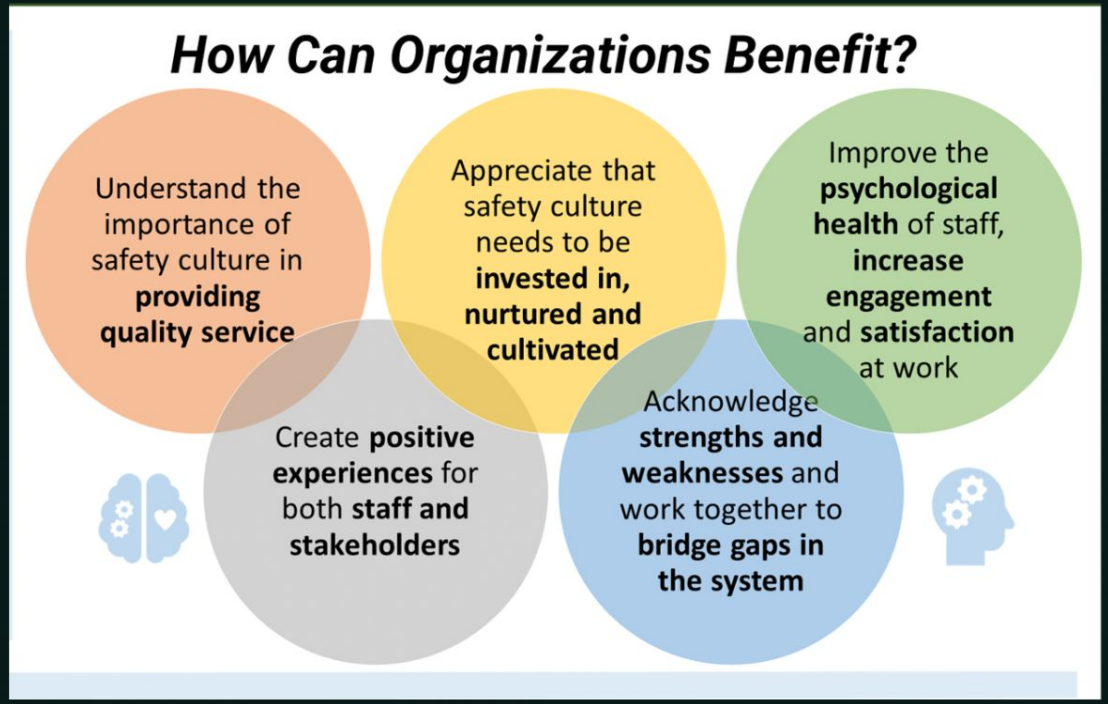
Reporting and Action Planning

Review and Evaluation

The final step is to review and conduct another round of quantitative evaluation to assess the effectiveness of implemented intervention strategies and measures through **culture-building initiatives and process changes.**

This re-survey (similar to the first preliminary survey) and evaluation can determine **the current degree of change** in the organization's WSH culture from the beginning of the project to the junction where intervention strategies are employed and implemented.

Scan here for supplementary materials in our Handouts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Priority 2

Incident Classification (Communication)

- Are we rating the incident the same way?
- Are we responding correctly?




Incident Categorisation

Organizations must respond appropriately to incident severity for swift and effective management. Threshold levels align with four-tier incident categories. Incidents with shared features are grouped into seven categories for quick and accurate assessment

Types	No.	Incident	Thresholds			
			4	3	2	1
(B) Medical	01.	Repetitive use injury *(e.g., tendonitis)*				
	02.	Minor cuts, abrasions or rash				
	03.	Slip, trip and fall injury not amounting to medical evacuation				
	04.	Participants or staff with medical condition that interferes with ability to do job or duties				
	05.	Previously undisclosed and unrevealed medical condition or medication				
	06.	Sent out to polyclinic/ GP clinic for assessment *(including OBS Medical Centre)*				
	07.	Sent out to hospital /Urgent Care Centre (UCC) *(due to closing hours of polyclinic / GP clinic)* for assessment				
	08.	Sent out to hospital/Urgent Care Centre (UCC) *(referral of a participant from a clinic to a hospital/UCC for further assessment)*				
	09.	Evacuated due to heat injuries *(e.g. heat cramp, heat exhaustion)* or systemic reaction *(e.g. anaphylaxis)*				
	10.	Tested positive for infectious respiratory illness *(e.g. COVID-19, SARS, MERS)* upon testing in OBS Medical Centre or any medical facility, with or without symptoms				
	11.	Helicopter or any other form of evacuation for life threatening condition				
	12.	Heat stroke, other life-threatening conditions or potentially permanent disability				
	13.	Fatality *(i.e., 1)*				
	14.	Food-borne incidents *(i.e., more than 10 affected individual)*				
	15.	Infectious disease outbreak *(e.g. Hand-Foot Mouth Disease (HFMD), Flu pandemic)*				
	16.	Fatality *(i.e., more than 1)*				

Incident Category	Types	No.	Incident	Thresholds			
				4	3	2	1
Level 1 (Extreme)	(B) Medical	01.	Repetitive use injury *(e.g., tendonitis)*				
		02.	Minor cuts, abrasions or rash				
		03.	Slip, trip and fall injury not amounting to medical evacuation				
		04.	Participants or staff with medical condition that interferes with ability to do job or duties				
		05.	Previously undisclosed and unrevealed medical condition or medication				
Level 2 (Critical)		06.	Sent out to polyclinic/ GP clinic for assessment *(including OBS Medical Centre)*				
		07.	Sent out to hospital /Urgent Care Centre (UCC) *(due to closing hours of polyclinic / GP clinic)* for assessment				
		08.	Sent out to hospital/Urgent Care Centre (UCC) *(referral of a participant from a clinic to a hospital/UCC for further assessment)*				
		09.	Evacuated due to heat injuries *(e.g. heat cramp, heat exhaustion)* or systemic reaction *(e.g. anaphylaxis)*				
Level 3 (Moderate)		10.	Tested positive for infectious respiratory illness *(e.g. COVID-19, SARS, MERS)* upon testing in OBS Medical Centre or any medical facility, with or without symptoms				
		11.	Helicopter or any other form of evacuation for life threatening condition				
		12.	Heat stroke, other life-threatening conditions or potentially permanent disability				
		13.	Fatality *(i.e., 1)*				
		14.	Food-borne incidents *(i.e., more than 10 affected individual)*				
Level 4 (Marginal)		15.	Infectious disease outbreak *(e.g. Hand-Foot Mouth Disease (HFMD), Flu pandemic)*				
		16.	Fatality *(i.e., more than 1)*				

Priority 3

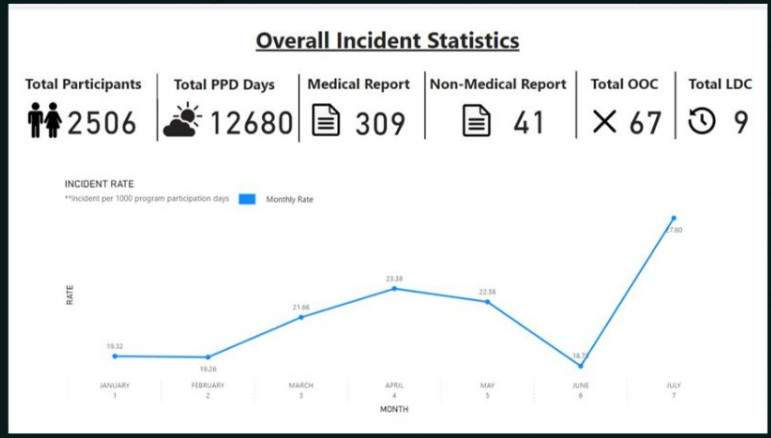
All about Data

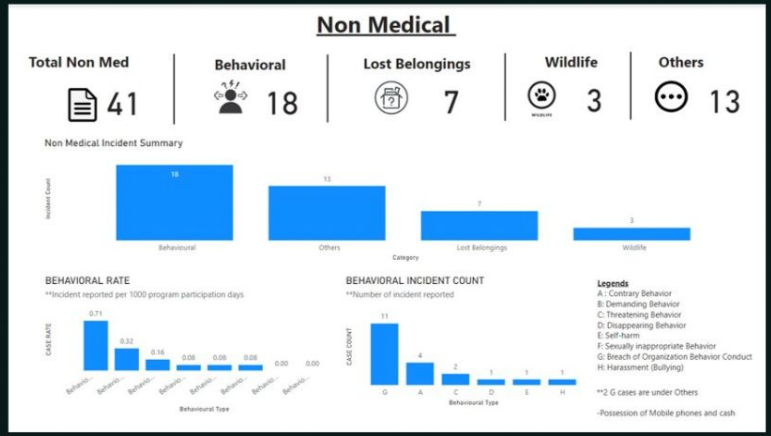
- Finding out what are we learning from the incident




All about Data

Each organisation operates uniquely, even within the same industry. The data you capture can significantly influence your planning and activity design.



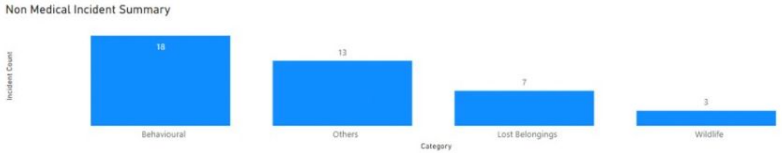


Overall Incident Statistics

Total Participants	Total PPD Days	Medical Report	Non-Medical Report	Total OOC	Total LDC
2506	12680	309	41	67	9

Non Medical

Total Non Med	Behavioral	Lost Belongings	Wildlife	Others
41	18	7	3	13



Legends
A : Contrary Behavior
B: Demanding Behavior
C: Threatening Behavior
D: Disappearing Behavior
E: Self-harm
F: Sexually inappropriate Behavior
G: Breach of Organization Behavior Conduct
H: Harassment (Bullying)

**2 G cases are under Others

-Possession of Mobile phones and cash

Going forward

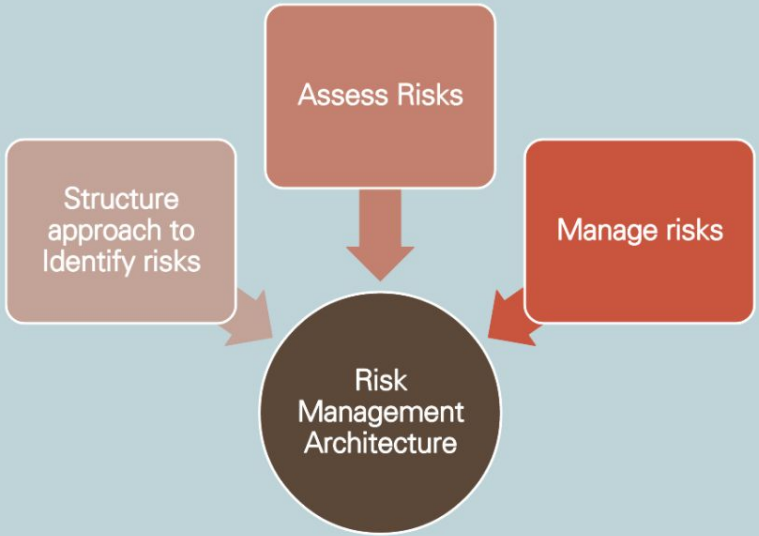
The OBS Risk Management Framework was introduced in 2017 and has been a valuable asset for the past five years. Concurrently, ISO 45001 has established itself as a globally recognised Safety Management System. In 2023, we began our ISO 45001 certification journey. Notably, all the groundwork laid for the OBS Risk Management Framework seamlessly integrated into our certification process, simplifying this important endeavour.

Thank you

Lim Jun Ping

Leadership and Commitment

Foster a risk-aware culture




Safety Governance
Leadership Commitment
Safety Policies and Procedures
Risk Assessment and Management
Compliance and Regulations
Training and Education
Emergency Preparedness and Response
Reporting and Incident Management
Communication and Engagement
Measurement and Metric
Continuous Improvement

SHORT TALK SERIES

Crisis Exposed: Intersection of Mental Health with Emerging Technologies and the Effects on Experiential Education and Educators

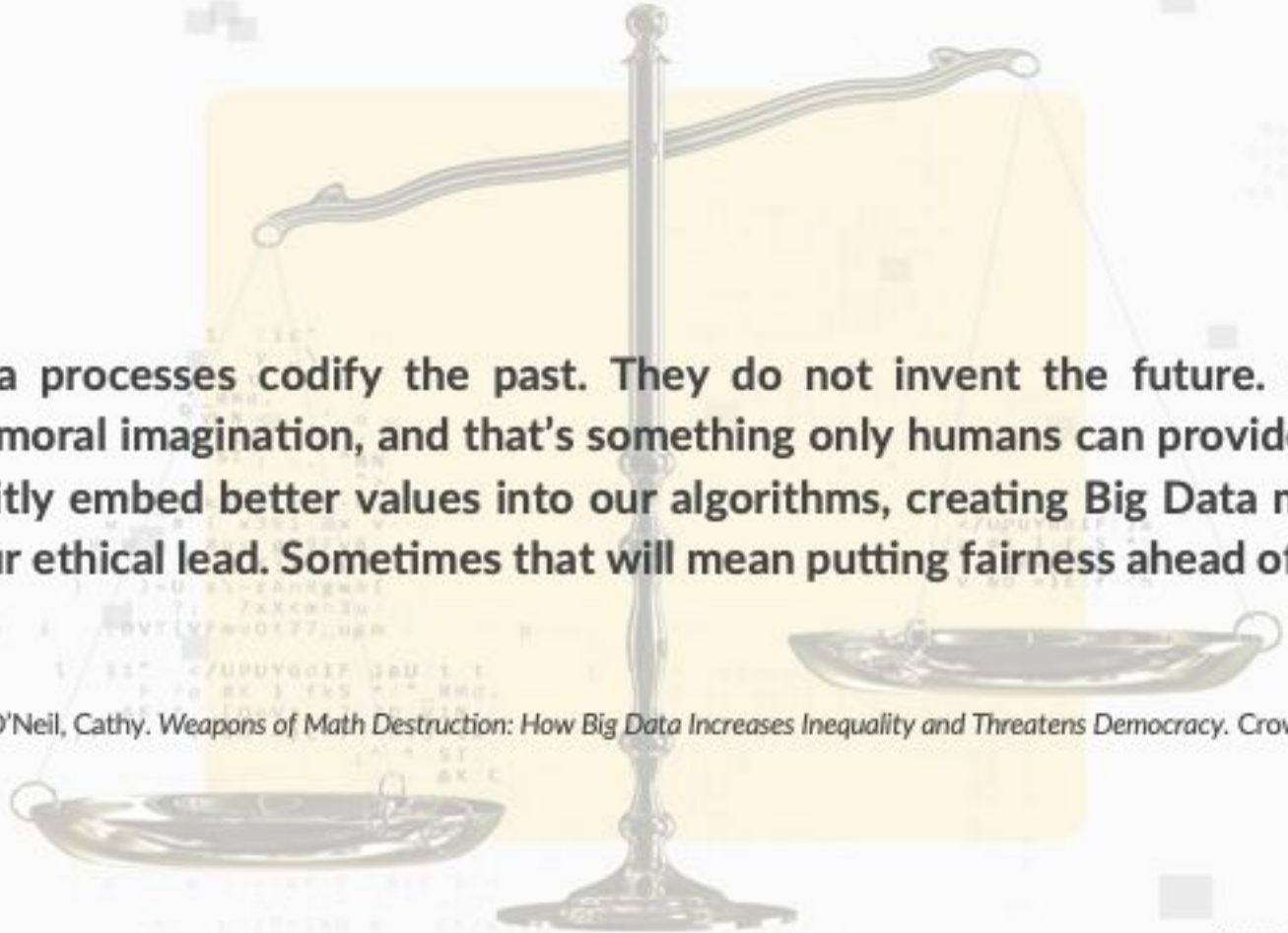
Larisa Castille (Larisa), Unaffiliated (CA/USA), 2023 NOLS Wilderness Risk Management Conference

Source: freepik.com

Source: bbc.co.uk

$$\frac{a+b}{a} = \frac{a}{b} = \varphi \approx 1{,}61803$$

Source: rare-gallery.com



"Big Data processes codify the past. They do not invent the future. Doing that requires moral imagination, and that's something only humans can provide. We have to explicitly embed better values into our algorithms, creating Big Data models that follow our ethical lead. Sometimes that will mean putting fairness ahead of profit."

Excerpt from O'Neil, Cathy. *Weapons of Math Destruction: How Big Data Increases Inequality and Threatens Democracy.* Crown, 2016

Source: Christina Animashaun/Vox

Source: cutewallpaper.org/Foster Timothy

HUMANS ARE THE PRIORITY

Medium versus source

Conversations + how the content makes you feel

Learn about Mis-, Dis-, and Mal-Information **(MDM)**

Access to validated health care

TECHNOLOGY RESPONSIBILITY

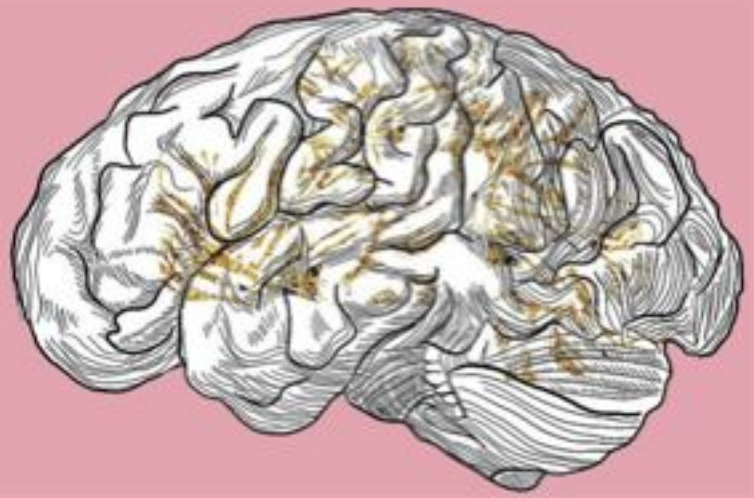
Prevention, Deterrence, and Innovation

Help Us Help You

360 Degree Risk Management

Freedom of speech does not equal the freedom to exploit humans with your algorithm.

Source: stock.adobe.com



Kintsugi (金継ぎ): “golden joinery”

Source: redbubble.com

Dedicated to:

Dad, (USN, Ret.), *b.* March 15, 1939 - *d.* October 2, 1991 …

Fellow C-PTSD, PTSD, & domestic violence survivors of any level of abuse …

Fellow public servants and loved ones serving in the light and in the shadow …

And my Doc, a woman dedicated to healing equally through science and faith …

Source: wallpaperaccess.com


SHORT TALK SERIES
WRMC
WILDERNESS RISK
MANAGEMENT
CONFERENCE