An underwater photograph of a woman with long, reddish-brown hair swimming over a rocky reef covered in green algae. She is wearing a dark bikini and has her arms outstretched. The water is clear and blue, with sunlight filtering through from above. The overall scene is serene and natural.

SMART BUOY PROJECT

GOAL OF GETTING REAL-TIME
WATER TEMPERATURE ON
TORONTO'S COASTLINE



Steve Hulford

A serial entrepreneur. Currently the CEO of Underknown, the producers of the most popular Science themed video channel on the internet (Webby award winning What If). This is my 5th startup company that I have created. My passions are my work.

I am passionate about our lake and water, and want to swim safely in Lake Ontario. Co-Founder of Toronto Island Lake Swim. Steve is also a member of the Friends of Cherry Beach, a group advocating for an Aquatic park at Cherry Beach and Smart Buoys.



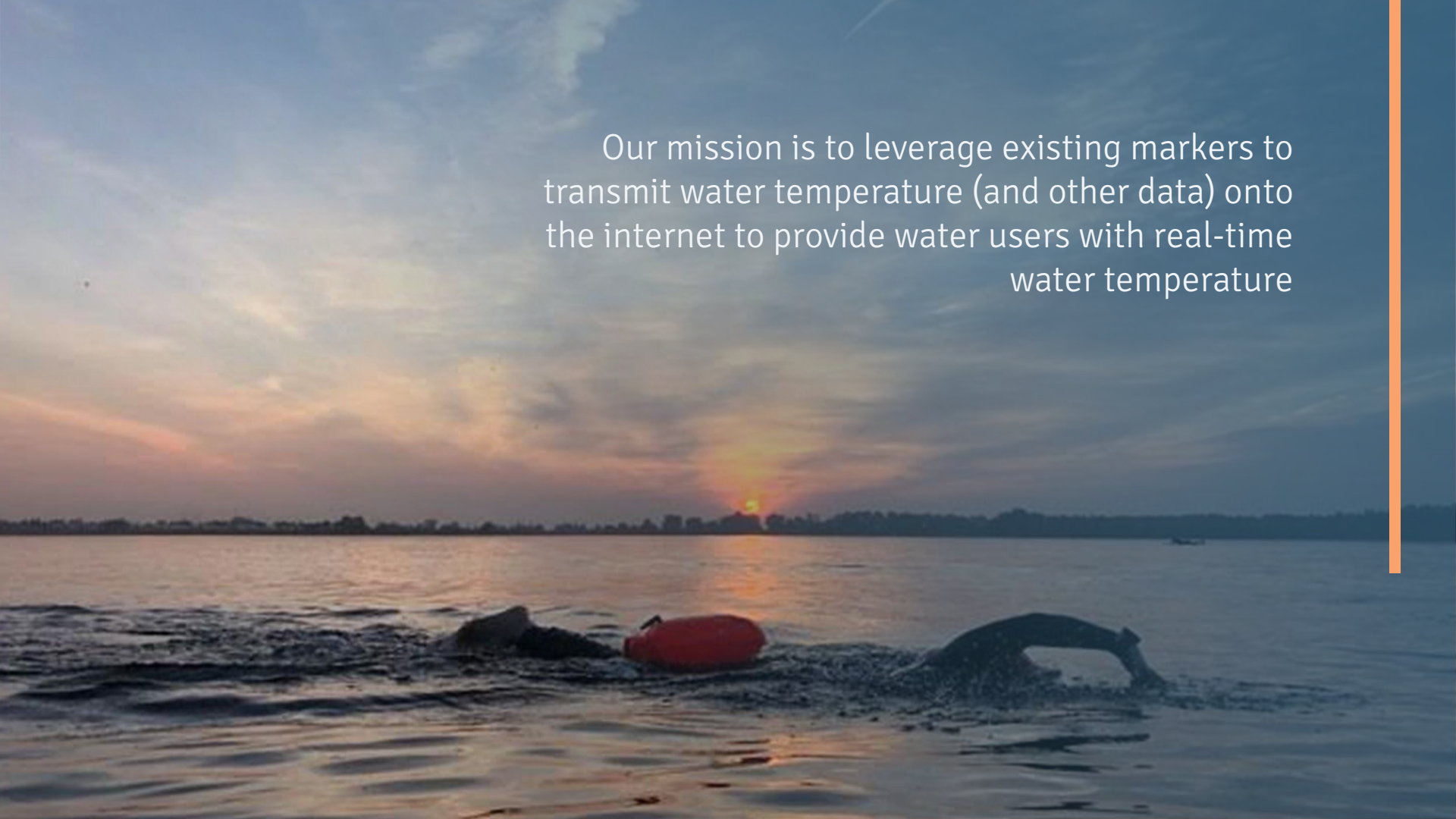
Steve Mann

Is a graduate of MIT where he founded the MIT Wearable Computing Project and was involved with the TTT (Things That Think) project that was the predecessor of what is now known as IoT (Internet of Things). Mann is also a Full Professor at University of Toronto, Founding Member of the IEEE Council on Extended Intelligence. Mann Invented, designed, and built the world's first smartwatch in 1998. He was named "The father of the wearable computer". He is also the Inventor of HDR imaging, used in more than 2 billion smartphones. Additionally, he has founded companies with valuation in excess of \$1 billion, including InteraXon, makers of the brain-sensing headband, and two successful aquatics companies.

ABOUT US

BOTH AVID SWIMMERS
IN LAKE ONTARIO YEAR-ROUND

Our mission is to leverage existing markers to transmit water temperature (and other data) onto the internet to provide water users with real-time water temperature



POSSIBLE USERS

Beach fun swimming, Long Distance Swimming, Competitive Swim Training, Stand-up paddle boarding, Kayaking, Canoeing, Windsurfing, Kite Surfing. Dog park water play activity.

These are year-round activities!

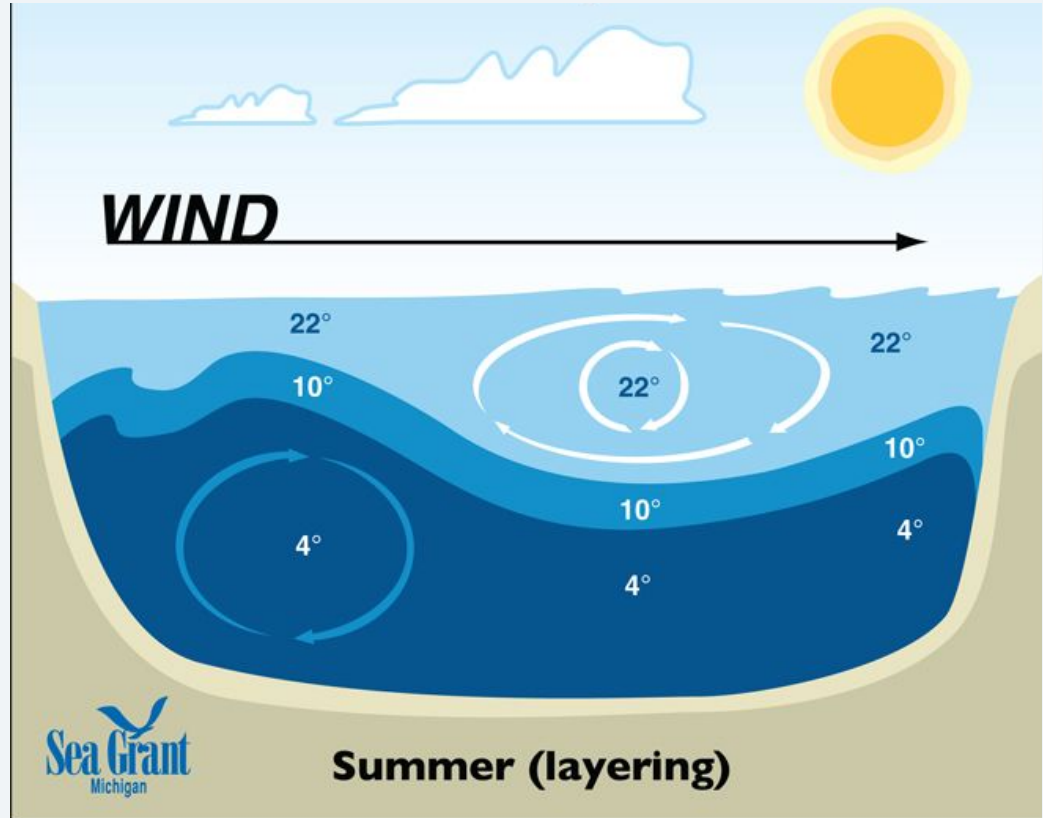


PROBLEMS

Lake Turnover



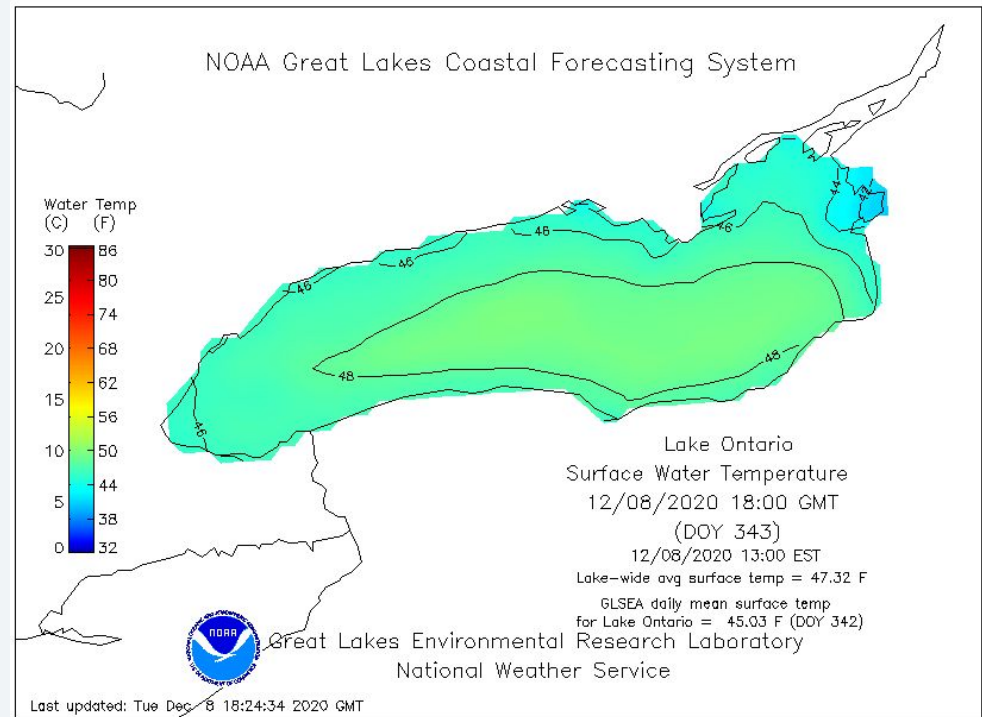
WIND can turn the lake over
bringing cold water (6C) to the surface.
This can change the lake water from
22c to 6C overnight.



PROBLEMS

Unreliable Data:

NOAA often gives one temperature for all of Toronto when in fact the temperature can range by 5-10C



PROBLEMS

Unreliable data:

Lifeguards & Swimmers take it at the water's edge and that can be off by 2-3C from where you are actually swimming.



SAFETY

- **Lifeguards & Swimmers are not safe**
- **Lifeguards would benefit from knowing water temperature so as to be well equipped to alert, monitor and rescue water users**
- **Smart Buoy will let us know how to swim safe**



Solution: SMART BUOYS



How it Works:

- Uses LOWARAN (Low Power, Wide Area Network).
- The internet of things. (Sensors for Refrigerator Trucks).
- Inexpensive (sensor + processor) \$200 USD.
- Device sends tiny amounts of data (4.2C) then goes back to sleep every 30 min.
- Battery can last for 2-3 years.
- Sends data to our database.
- Database can provide information to internet connected devices through an API. eg) like Swim Drink Fish's swim guide.



Solution: SMART BUOYS

We can track:

- Water temperature - PHASE #1
- PH & Dissolved Oxygen - Phase #1b
- Wave Intensity - Phase #2
- Air temperature
- If water is warming or cooling
- Current speed
- How many swimmers pass the buoy

Solution: SMART BUOYS



Summer Beta

Internal Housing for Sensor - We need to gain access through the top of the buoy and mount or housing, and be able to take the Simple Hardware sensor, in and out. It needs to be fixed into the inside of the housing. It needs to be secure.

External Water Sensor - We are running the cable outside of the buoy so that we do not have to alter the buoy in anyway.

Data:

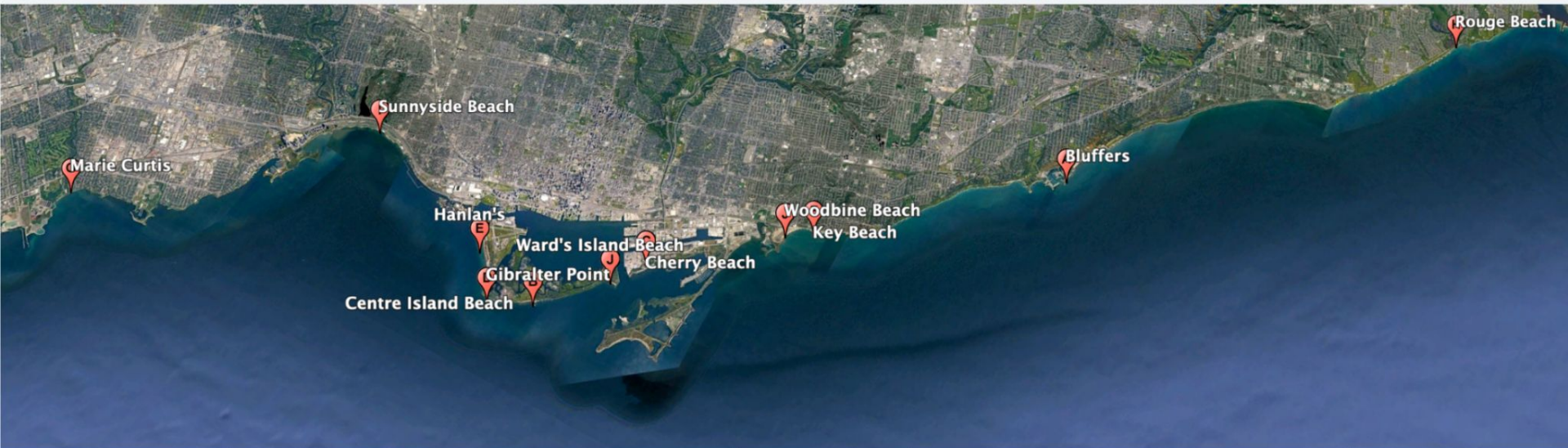
Water temperature - All buoys can have this. Every 30 min

Dissolved Oxygen & PH - 2 buoys to start

Accelerometer - Once the buoy is in the water we can start to get readings and determine possibly wave intensity.



Locations



A	Bluffer's Beach	G	Marie Curtis Park East Beach
B	Centre Island Beach	H	Rouge Beach
C	Cherry/Clarke Beach	I	Sunnyside Beach
D	Gibraltar Point Beach	J	Ward's Island Beach
E	Hanlan's Point Beach	K	Woodbine Beach
F	Kew-Balmy Beach		

Our Ask

- We would like to borrow 2 buoys to test implementing our smart buoy system.
- Sensor would be mounted inside the top.
- Buoy would need a small modification to pass the cable through the center and out the bottom.
- We will test two this winter in a Lab.
- Connect Lab Buoys to mobile app.
- Put in six buoys in May, 2021



TOP DOWN:





QUESTIONS / DISCUSSION

