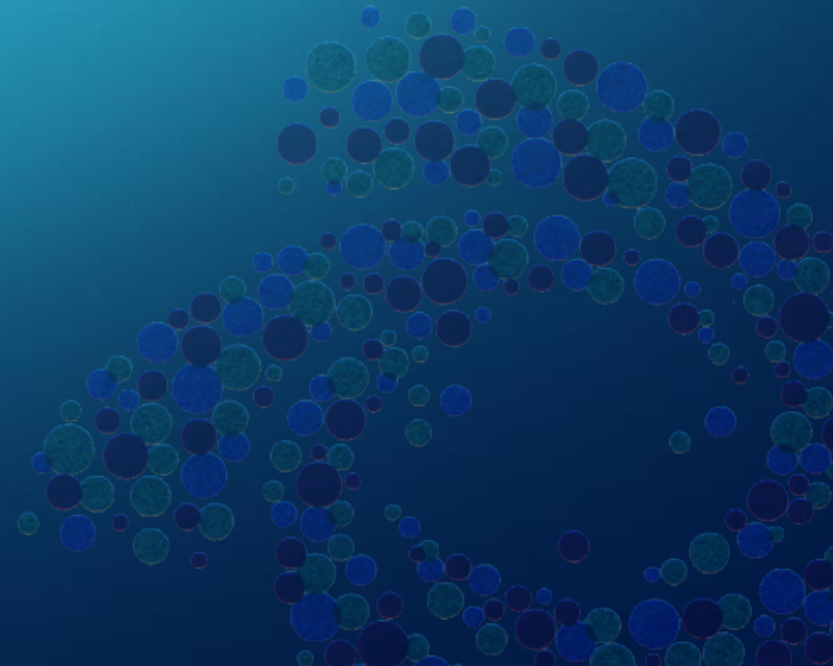


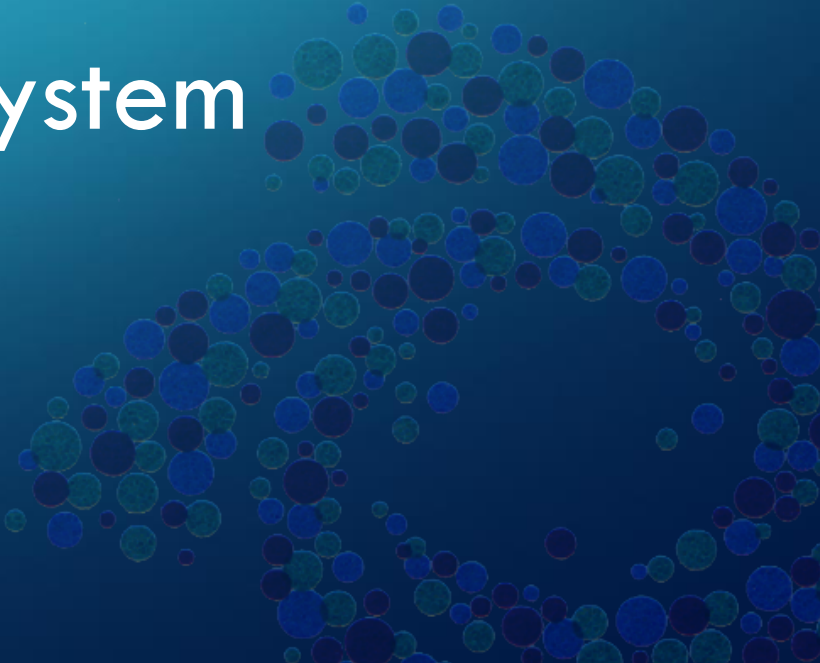
*"The prevalence of allergic airway diseases such as asthma and rhinitis has increased dramatically to epidemic proportions worldwide." WAO (2015)*



# PRESENTATION FOR THE CDC AND CSTE POLLEN SUMMIT ATLANTA GEORGIA 2016

## Introduction to Aerobiology Research and the Canadian Network System

Established 1994

A decorative graphic in the bottom right corner consisting of a cluster of blue dots of varying sizes, arranged in a roughly circular pattern.

# Overview

- ⌚ Weather Network Pollen Report started in 1994
- ⌚ Allergists use our data to relate allergen levels to patient reactions
- ⌚ Pharmaceuticals companies use our data reports for product branding
- ⌚ Clinical trials a major component of our business mix
- ⌚ Research institutions and Government use data for research & publications

# Overview

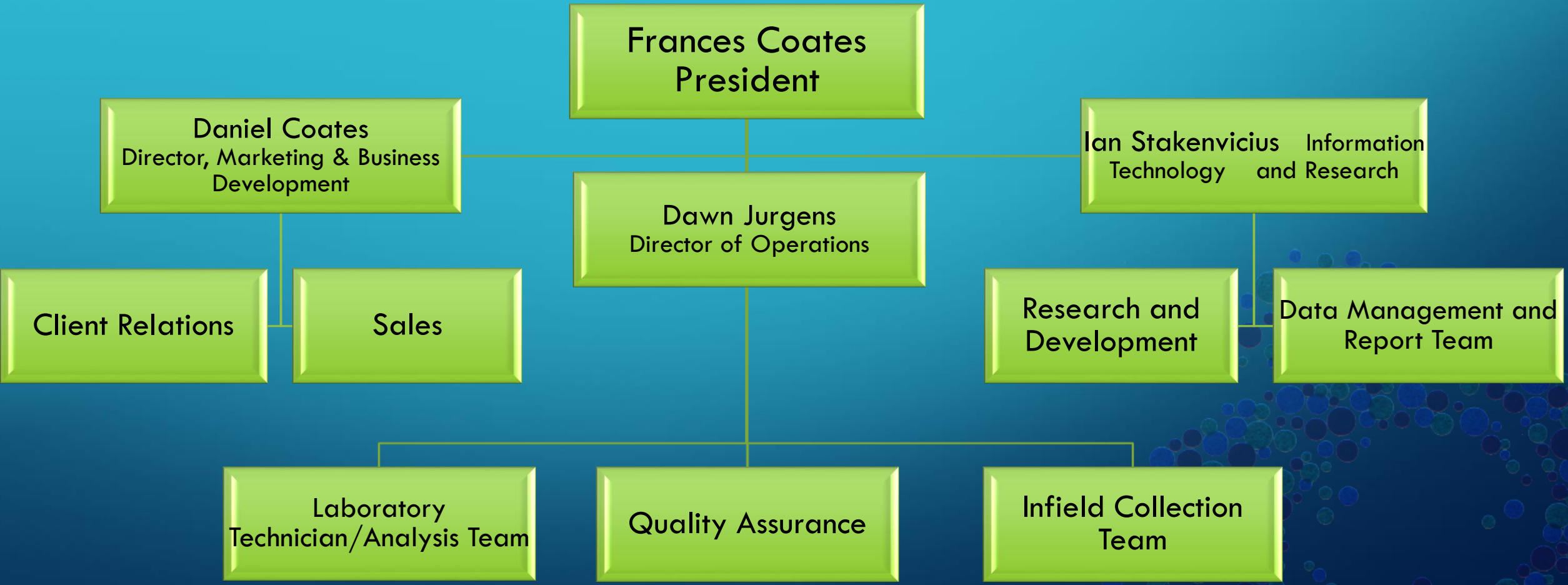
- ARL equipment, monitoring, data and consulting services are all utilized to service many industries
- Analysis of fungal spores adds value
- Research publications developed using our database
- Consistency of data allows us to be involved in innovative research
- Allows us to work with Environment and Health Canada for creating an air quality alert system which includes outdoor allergens

# Sources of Income

 Sources of income as a privately funded company include;

- Data sales & consulting
- Laboratory supplies and equipment sales
- Clinical trials and pharmaceutical testing
- Research and development
- Consulting and training services
- Agriculture, Allergists etc.
- Pharmaceutical and media reports

# Corporate Structure



# How Our System Works

-  30 Stations across Canada
-  Samples are collected daily and sent by courier to our laboratory for analysis
-  Data is then stored in a secure database and various reports are created
-  Volunteers are not used - crucial to data integrity
-  The number of sites we have increases as the need for data is required
-  Data is always under ARL control and integrity is vital

# ARL and Data Integrity

-  Training of staff, data integrity and controls important
-  Technicians are post-secondary graduates
-  All technicians are trained and certified with our in-house Aerobiology course
-  6 month intensive training program that includes;
  - Quality assurance checks of over 100 samples
  - Identify over 100 different species of pollen and spores
  - Training is continuous

# Process

GRIPST  
Sampler  
collects  
pollen

Station  
Operators  
gather  
samples

Courier  
to our  
labs in  
Ottawa

Lab  
technician  
team  
identify  
pollen and  
spores

Data  
entered  
into our  
modelling  
system

Reports used for  
marketing,  
research,  
documentation and  
education

Data  
delivered to  
clients based  
on requirement

# Rotation Impaction Samplers

## Benefits of the ARL samplers

- Easily accessible and reliable
- Easy to use and cost effective
- Provide consistent data across all sites
- Assembled, maintained in-house
- Allows us to have reliable quality collections for accurate data analysis



# Rotation Impaction Samplers

## Benefits of the ARL samplers

- 🌀 Based on sound proven technology
- 🌀 Less expensive to maintain and repair
- 🌀 All maintenance and repairs done in-house
- 🌀 Less chance of human error
- 🌀 24 hour sampling only



## Samplers Comparison Chart

| Feature              | ARL GRIPST Rotation Impaction Sampler | Burkard Volumetric Spore Traps (vacuum)       | Benefits ARL sampler                                                                                                                                                                             |
|----------------------|---------------------------------------|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sampling period      | 24 hours                              | 7 day                                         | <ul style="list-style-type: none"><li>• Daily reports instead of waiting 7 days</li><li>• Able to get data in a more responsive timeframe</li><li>• Does not allow for hourly sampling</li></ul> |
| Cost                 | CA\$1700 = US\$1200                   | £2800 = US\$4220                              | 72% Less expensive                                                                                                                                                                               |
| Ease of analysis     | Simple analysis methodology           | Multiple conflicting incompatible methods     | Standard data analysis specific to analyzing pollen and spores samples.                                                                                                                          |
| Maintenance          | Easy & inexpensive                    | More complex & expensive                      | Less costly and more localized                                                                                                                                                                   |
| Ease of use          | Less complex                          | complex                                       | Burkhart needs constant air pressure monitoring                                                                                                                                                  |
| Inventory & Shipping | In stock and easy to ship             | Cumbersome & long shipping process, expensive | Easily available with lower shipping costs                                                                                                                                                       |
| Data                 | Standardized                          | Not standardized                              | Specialized focused data that is industry specific and preferred in clinical trials, scientific publications                                                                                     |

# Data Integrity allows for our Research

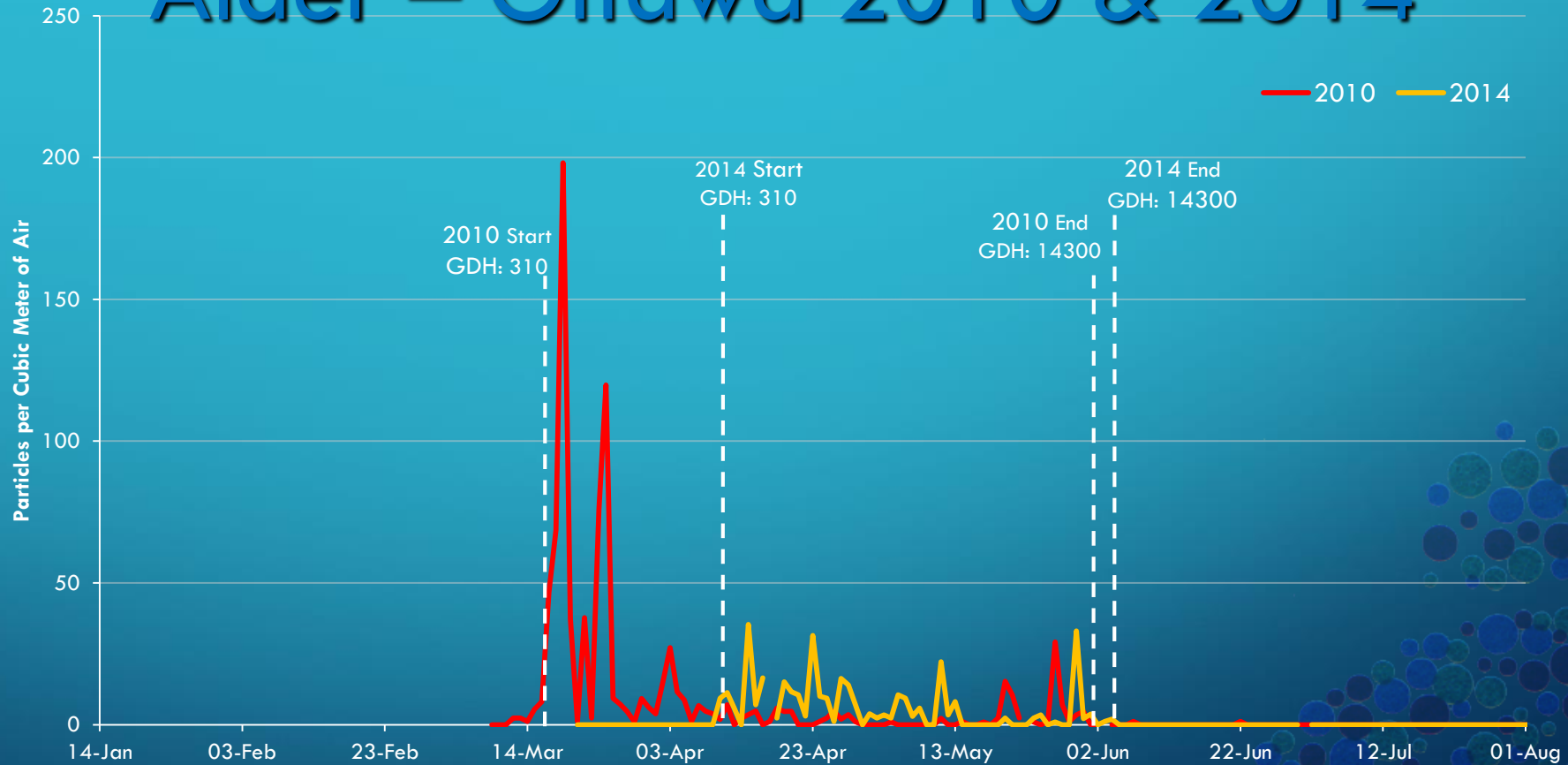
## Research

- 🌀 GDH- ability to predict the start of the season was crucial due to variation in season starts
- 🌀 Predictive models using traditional statistics & Neural Network to get correlations for daily predictions
- 🌀 Models were created for daily forecasting and compared (3 years of data necessary)
- 🌀 Created tools to be able to predict weekly pollen levels (Weather accuracy is an issue)
- 🌀 Current research involves digital imaging so samples can be scanned anywhere and analyzed
- 🌀 This cuts down on the cost of the courier

# Annual Seasonal Differences

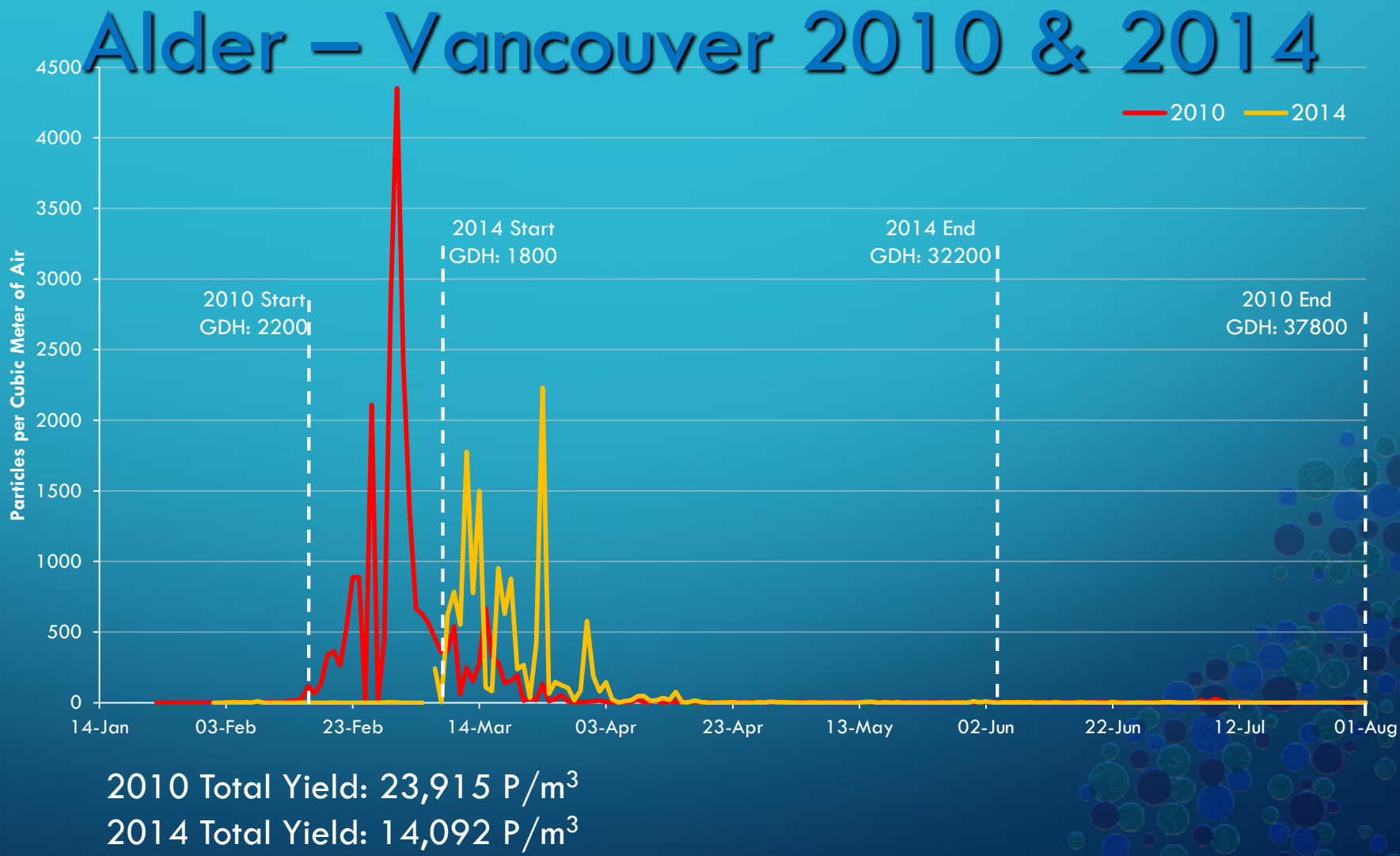
- The following slides show the differences in the season start and end periods.
- They also show the differences in yield.
- Ottawa and Vancouver were used since their winters are very different but annual seasonal variations are observed at both sites.

# Alder – Ottawa 2010 & 2014

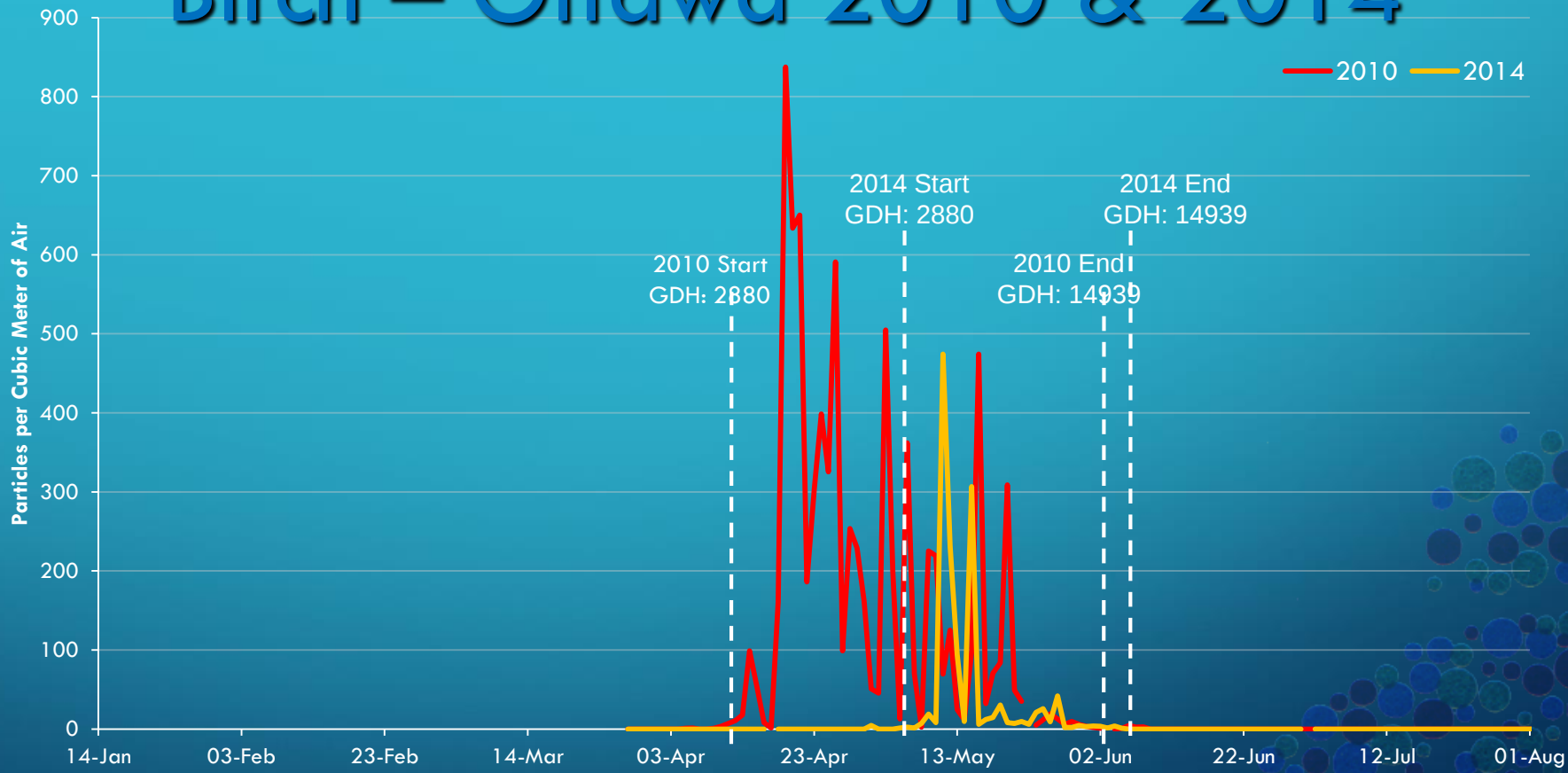


2010 Total Yield: 864 P/m<sup>3</sup>

2014 Total Yield: 343 P/m<sup>3</sup>

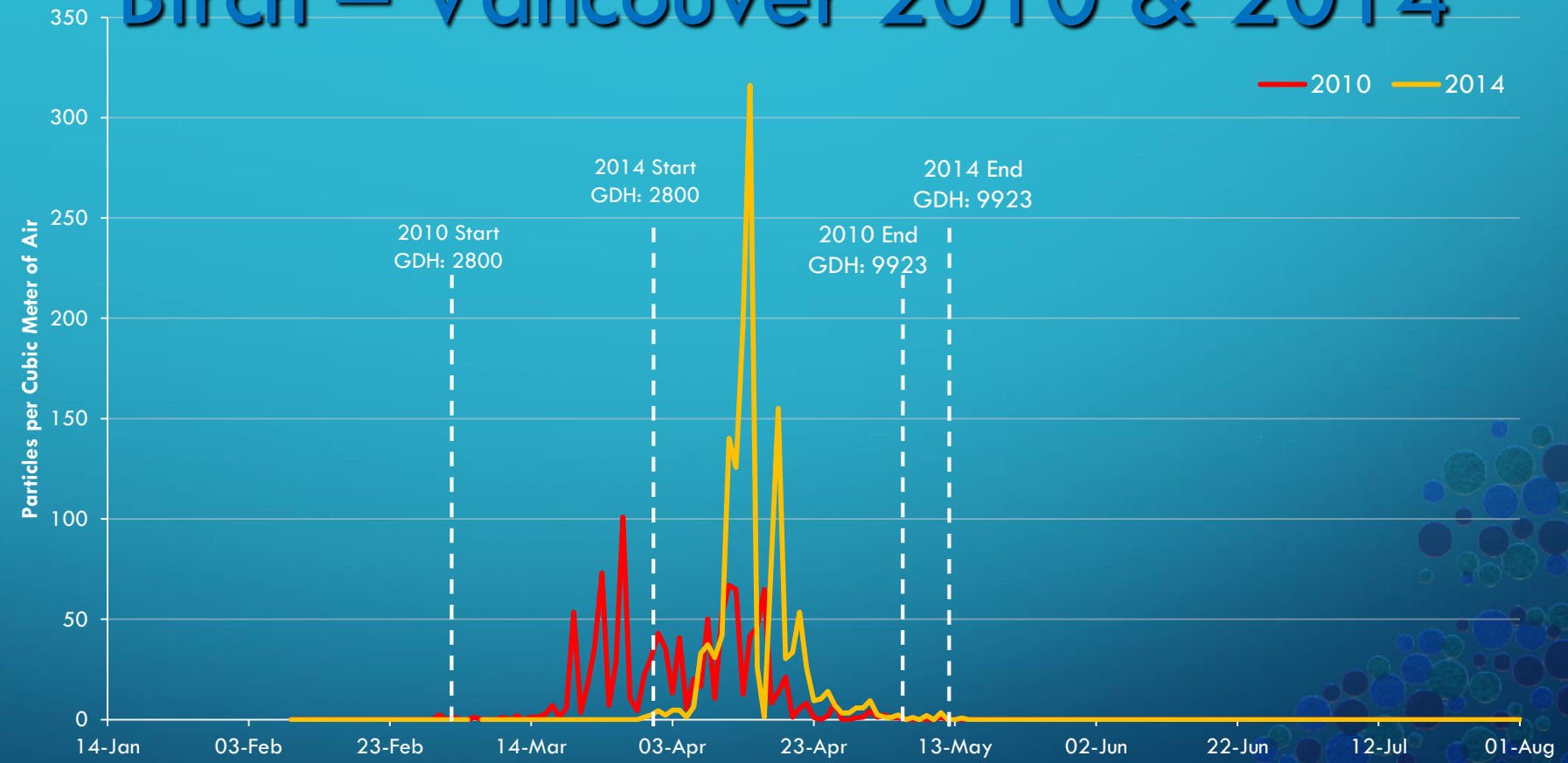


# Birch – Ottawa 2010 & 2014



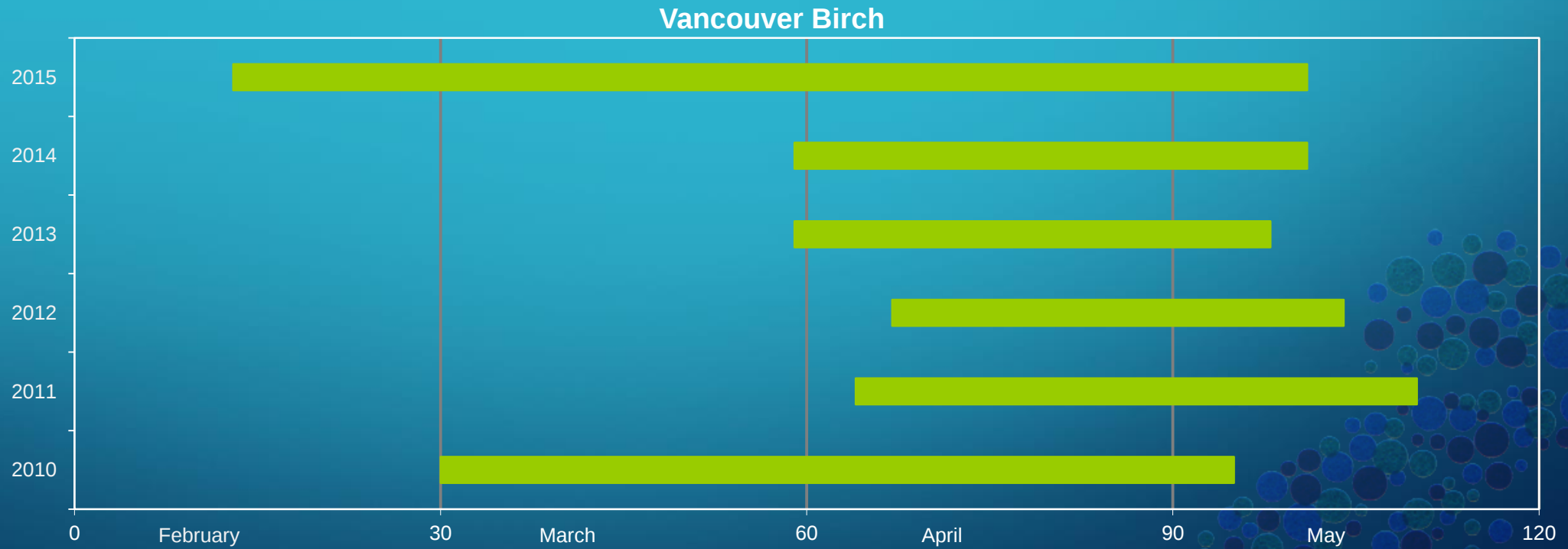
2010 Total Yield: 8195 P/m<sup>3</sup>  
2014 Total Yield: 1377 P/m<sup>3</sup>

# Birch – Vancouver 2010 & 2014



2010 Total Yield: 873 P/m<sup>3</sup>  
2014 Total Yield: 1205 P/m<sup>3</sup>

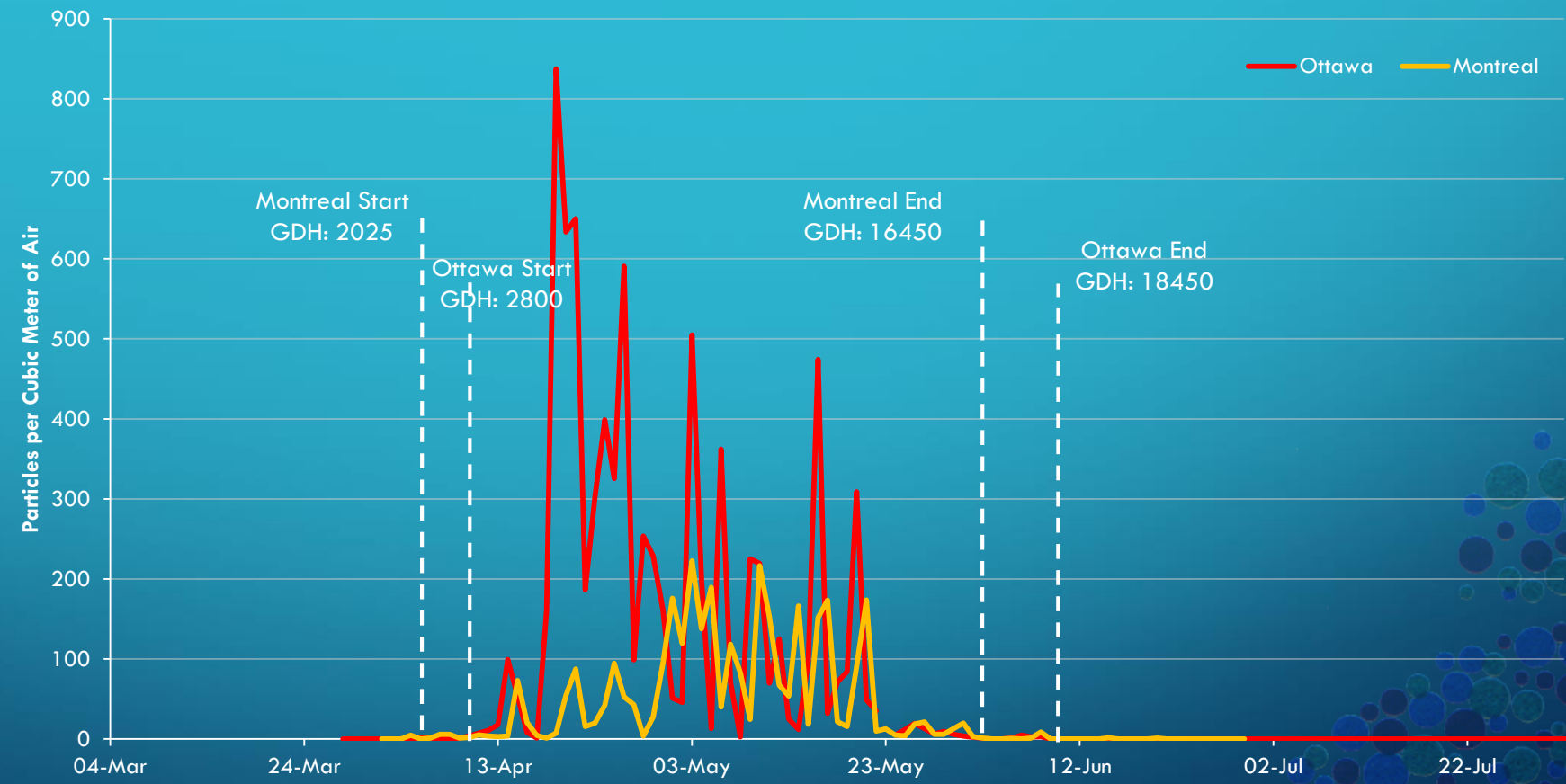
# Birch Seasons – Vancouver



# Difference Between Cities

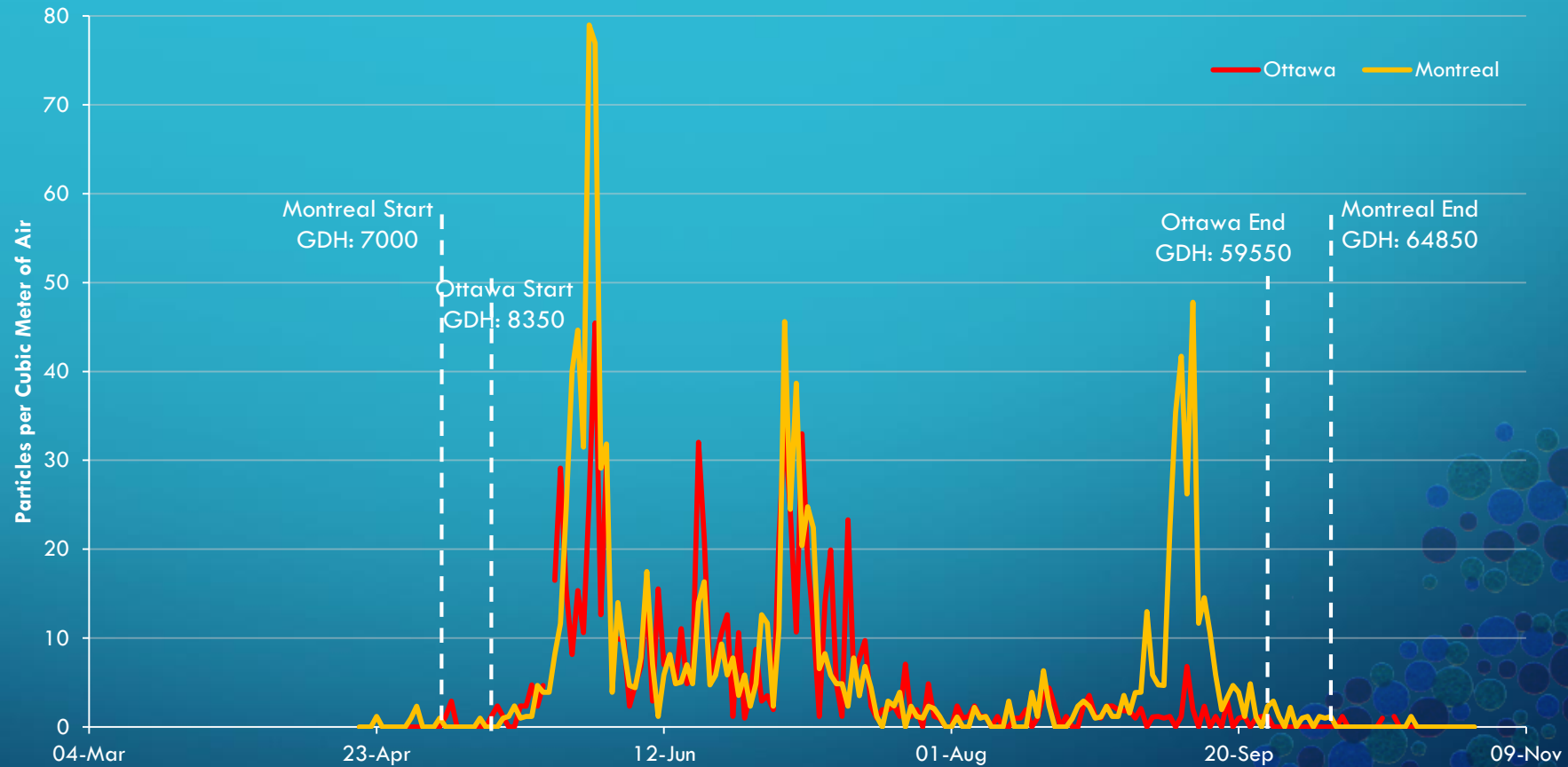
- ✿ Montreal and Ottawa have similar weather patterns and biota
- ✿ Distance between the two sites is 168 Km or 104 miles
- ✿ The following graphs will show why it is important to have data for any sites where accurate reports are being produced.
- ✿ Season profiles are similar but daily variations in pollen are observed

# Birch in 2010



Total Yield: Ottawa 8195 P/m³ Montreal 5868 P/m³

# Grasses in 2010



Total Yield: Ottawa 837 P/m<sup>3</sup> Montreal 1204 P/m<sup>3</sup>

# Partnering to Establish a U.S. Network

## How ARL could help set up a U.S. Network

- Need to modify current system that will provide uniformity and accuracy of data
- Work with Allergists across the Country for their involvement in the new system
- Work with NAB & AAAAI with the goal of an organized, accurate & professional network
- Government funding would speed up the process

# Partnering to Establish a U.S. Network

## How ARL could help set up a U.S. Network

- Create jobs in the U.S.
- Aerobiology Research would like to work in developing this process and expand its resources, operations and expertise into the United States
- A new system needs to be set up to suit the future needs for reliable data
- Ability to work with participants in current system to meet future goals

*"THE PREVALENCE OF ALLERGIC AIRWAY DISEASES SUCH AS ASTHMA AND RHINITIS HAS INCREASED DRAMATICALLY TO EPIDEMIC PROPORTIONS WORLDWIDE." WAO (2015)*

- ❁ Increases urgency for access to reliable data
- ❁ Better understanding of relationships between climate, human health and outdoor allergens
- ❁ Better able to provide information to allergy sufferers and physicians
- ❁ Better positioned to increase our resilience and to deal with negative health affects due to climate change

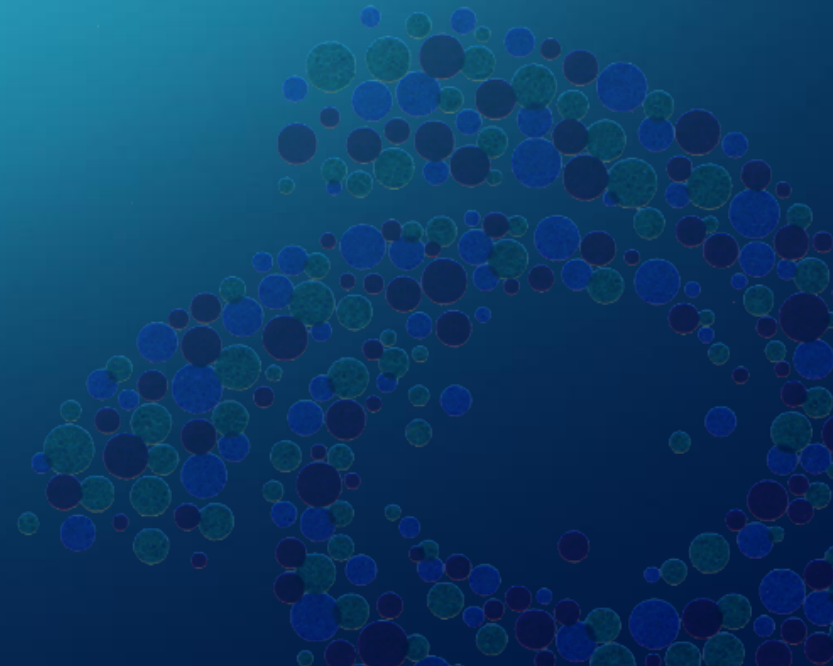
## GOALS OF QUALITY CONSISTENT DATA

- IMPROVE QUALITY OF LIFE FOR ALLERGY SUFFERERS.
- ABILITY TO DEAL WITH CLIMATE CHANGE AND ITS IMPACT
- RESEARCH TO IMPROVE KNOWLEDGE

# Conclusion

- Need for a reliable and dependable database in the United States
- Sampling locations can be set up where required
- Integrated system that provides data suitable for statistical analysis
- System has to provide data integrity and consistency
- Experience in Canada can accomplish this - Save money and time

# DATA AND PRESENTATION PROVIDED BY



# Thank You

FRANCES COATES  
CEO

[WWW.AEROBIOLOGY.CA](http://WWW.AEROBIOLOGY.CA)

## **American College of Allergy, Asthma & Immunology**

Allergic rhinitis ... affect approximately 50 million people in the United States, and its prevalence is increasing affecting as many as 30 percent of adults and up to 40 percent of children.

"17.6 million adults and 6.6 million children were diagnosed with hay fever in 2012"

This includes seasonal and perennial allergic rhinitis.

## **Canadian statistics (2014 stats)**

The Canadian Allergy, Asthma and Immunology Foundation estimates that 20-25% of Canadians have allergic rhinitis (also referred to as "hay fever").