USER GUIDE FOR ALBERTA WILDFIRES PROJECT

A comprehensive user guide for Power BI dashboard

Saad Usmani
Saadusmani1993@gmail.com

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Introduction & Purpose

This guide has been developed for any new user of the wildfires project dashboard and user interface. It will help familiarize the user to objectives of the project and each page addressed those objectives.

This document will guide the user through every page individually, explaining the purpose of the pages, its elements, filters, and more.

Structure & Organization

The Power BI dashboard is divided into 6 parts:

1) The project introduction and insights interface are integral to any new user attempting to understand and utilize the project.

    a) The Overview page introduces the user to the projects overarching agenda and goal. It gives a quick overview of what it is about.
    b) The Insights page tells the user what the major findings of the study turned out to be. These are facts and figures discovered during analysis. Insights can be edited to include new data that arrives overtime.

2) The One Glance Overview and One-window Navigation page is included to provide high-level information about the current dataset.

    a) The One Glance Overview page gives a preliminary understanding of the dataset and the kind of information the suer should expect, before they dive deeper into the analysis.
    b) The One-window navigation page is a map of all the wildfires in Alberta and lets a user quickly find a particular fire/s that they are searching for using multiple filters.

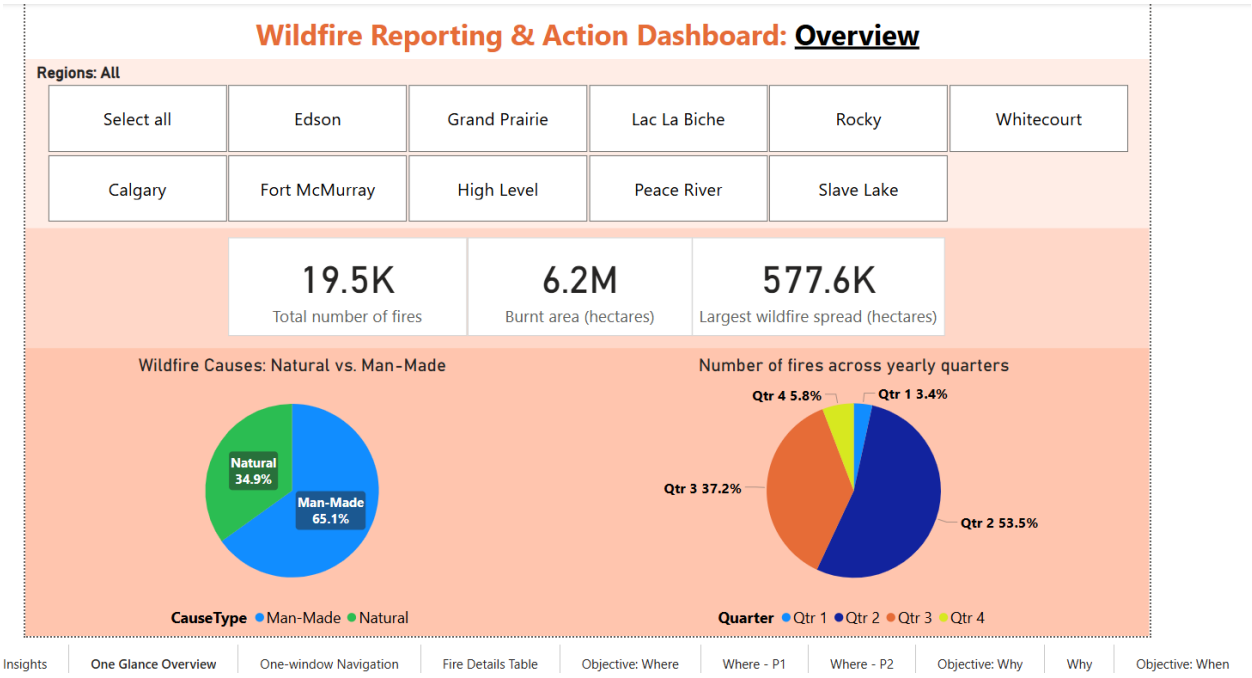
3) The rest of the 3 parts address the objective questions of where, why, and when wildfires occur.

    a) ‘Where P1’ begins to address the objective question of where wildfires occur the most.
        - ‘Where P2’ takes this objective a step further and shows meaningful data to narrow down the geolocation of wildfires using features from the dataset like forest lookout locations and names.
    b) The ‘Why’ page addresses the objective question of why wildfires occur. It looks into the various causes of wildfires and allows the use of filters to compare causes against each other.
    c) The ‘When’ page addresses the objective question of when wildfire occur the most. It looks at time series data and provides seasonality figures and graphs that can be used to detect surges in wildfires at certain dates and times.

Step-by-Step Navigation

This section of the guide will take the user through all the pages in the dashboard and explain the different visuals and interactions.

One Glance Overview



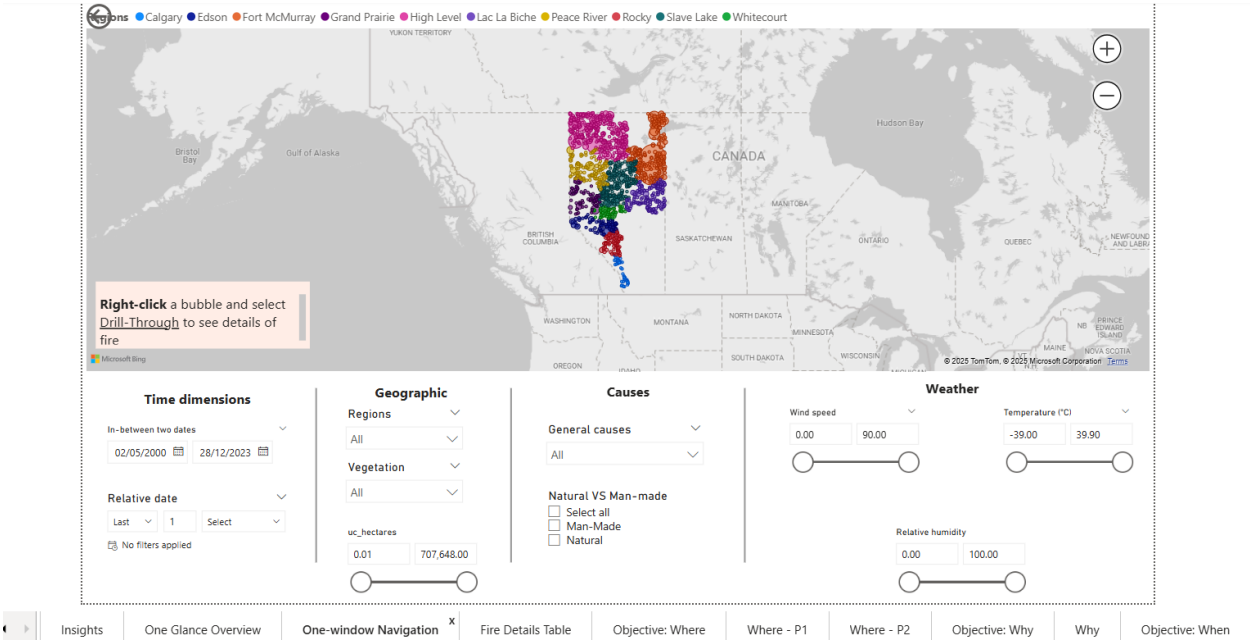
The One Glance Overview page gives a preliminary understanding of the dataset and the kind of information the user should expect, before they dive deeper into the analysis.

- **Exploring Main Sections**:
  - The body of this page provides 3 KPIs in box card visuals that change with each selected filter.
  - It also offers two pie charts:
    - A chart that distributes the causes of wildfires between natural and man-made.
    - A chart that distributes the proportion of wildfires across 4 quarters in the year.
- **Utilizing Filters**:
  - The regions filter at the top includes all the regions for which data is available.
  - This is 10 regions in total.
  - Clicking on one of the regions will change the KPI visuals, as well as the pie charts to show data for that specific region.
  - Hitting the Select All button will include data for all regions.

Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on the Causes pie chart will give a count of the wildfires according to cause type.
    - Hovering on the yearly quarters pie chart will give a count of the wildfires.

One-window Navigation



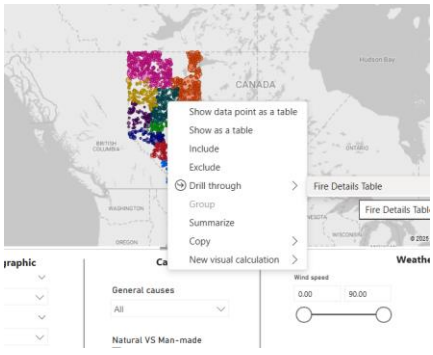
The One-window navigation page is a map of all the wildfires in Alberta and lets a user quickly find a particular fire/s that they are searching for using multiple filters.

- **Exploring Main Sections**:
    - This page shows a large map with bubbles depicting unique wildfires in different colors for different regions.
    - The legend for the regions is at the top.
- **Utilizing Filters**:
    - Time dimensions filters:
        - Use the in-between filter to change date between which wildfires can be viewed on the map.
        - Use the relative date filter to see wildfires in the last year, week, month, etc.
    - Geographic filters:
        - Regions drop-down filter

        - Vegetation filter that the user can use to see wildfires in areas with a specific kind of trees/vegetation.
        - A wildfire size filter with a scroller to see wildfires within a specific size range (hectares).
    - Causes filters:
        - A General Causes filter to see wildfires that happened due to a specific cause.
        - A natural vs man-made filter to see wildfires that were natural and those that were man-made.
    - Weather filters:
        - Wind speed filter
        - Temperature filter to see wildfires that happened under certain temperatures.
        - Relative humidity filter

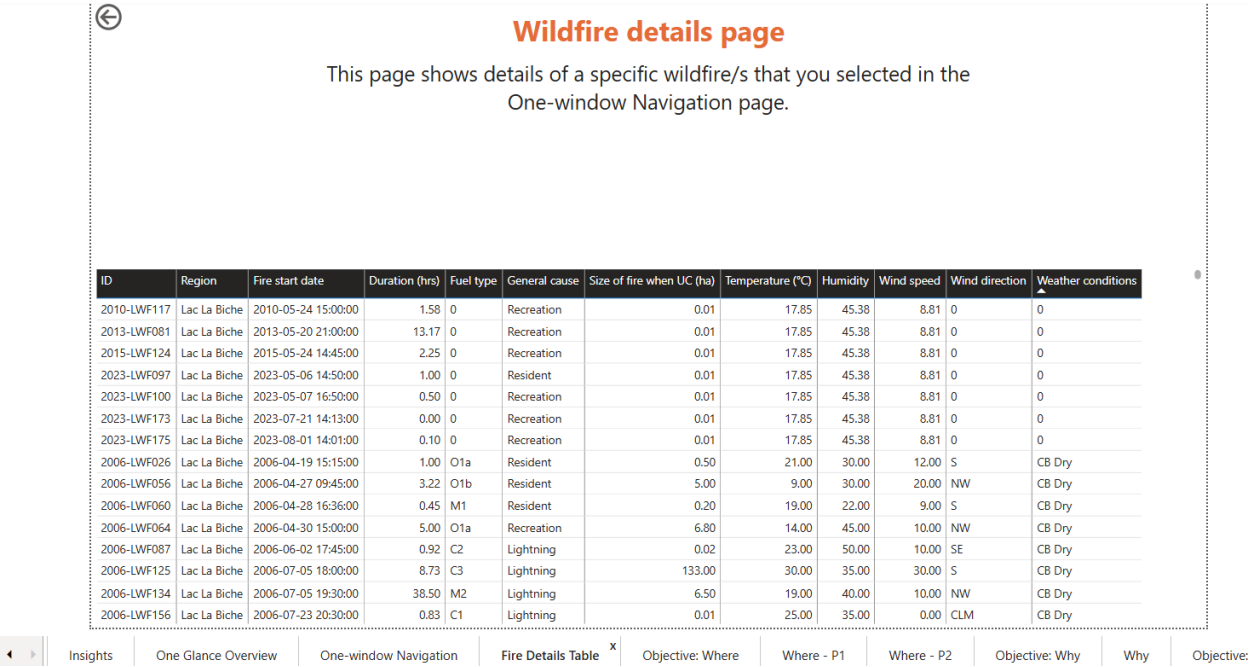
Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on any of the bubbles that represent a wildfire will show the following:
        - Region name
        - Latitude and longitude of the wildfire
        - Size of fires in hectares when it was/is under control
- **Drill-down functions:**
    - Right clicking on a bubble/wildfire will open a menu.
        - Find the option that says drill-through with an arrow.
        - Hover on it and click on Fire Details Table.
        - This will take the user to the next page with details of the fire the user selected.



- **Buttons:**
    - The map can be zoomed in or out using the buttons at the top-right of the map.

Fire Details Table



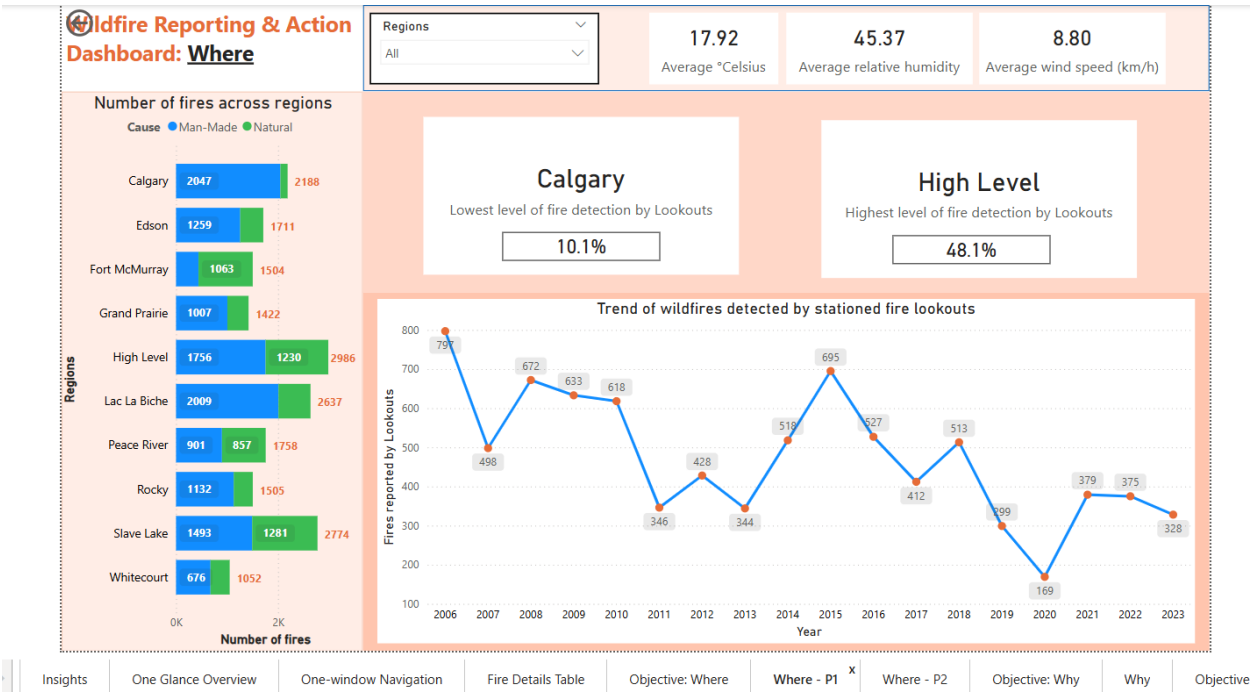
ID	Region	Fire start date	Duration (hrs)	Fuel type	General cause	Size of fire when UC (ha)	Temperature (°C)	Humidity	Wind speed	Wind direction	Weather conditions
2010-LWF117	Lac La Biche	2010-05-24 15:00:00	1.58	0	Recreation	0.01	17.85	45.38	8.81	0	0
2013-LWF081	Lac La Biche	2013-05-20 21:00:00	13.17	0	Recreation	0.01	17.85	45.38	8.81	0	0
2015-LWF124	Lac La Biche	2015-05-24 14:45:00	2.25	0	Recreation	0.01	17.85	45.38	8.81	0	0
2023-LWF097	Lac La Biche	2023-05-06 14:50:00	1.00	0	Resident	0.01	17.85	45.38	8.81	0	0
2023-LWF100	Lac La Biche	2023-05-07 16:50:00	0.50	0	Recreation	0.01	17.85	45.38	8.81	0	0
2023-LWF173	Lac La Biche	2023-07-21 14:13:00	0.00	0	Recreation	0.01	17.85	45.38	8.81	0	0
2023-LWF175	Lac La Biche	2023-08-01 14:01:00	0.10	0	Recreation	0.01	17.85	45.38	8.81	0	0
2006-LWF026	Lac La Biche	2006-04-19 15:15:00	1.00	O1a	Resident	0.50	21.00	30.00	12.00	S	CB Dry
2006-LWF056	Lac La Biche	2006-04-27 09:45:00	3.22	O1b	Resident	5.00	9.00	30.00	20.00	NW	CB Dry
2006-LWF060	Lac La Biche	2006-04-28 16:36:00	0.45	M1	Resident	0.20	19.00	22.00	9.00	S	CB Dry
2006-LWF064	Lac La Biche	2006-04-30 15:00:00	5.00	O1a	Recreation	6.80	14.00	45.00	10.00	NW	CB Dry
2006-LWF087	Lac La Biche	2006-06-02 17:45:00	0.92	C2	Lightning	0.02	23.00	50.00	10.00	SE	CB Dry
2006-LWF125	Lac La Biche	2006-07-05 18:00:00	8.73	C3	Lightning	133.00	30.00	35.00	30.00	S	CB Dry
2006-LWF134	Lac La Biche	2006-07-05 19:30:00	38.50	M2	Lightning	6.50	19.00	40.00	10.00	NW	CB Dry
2006-LWF156	Lac La Biche	2006-07-23 20:30:00	0.83	C1	Lightning	0.01	25.00	35.00	0.00	CLM	CB Dry

The Fire Details Table page provides details of the wildfire the user selected on the previous page (One-window Navigation).

- **Exploring Main Sections**:
    - This page shows a table with the following details of a wildfire:
        - ID
        - Region
        - Fire start date
        - Duration in hours
        - Fuel type
        - General cause of wildfire
        - Size of the fire when it was under control
        - Temperature of location
        - Humidity
        - Wind speed
        - Wind direction

- Weather conditions over the fire

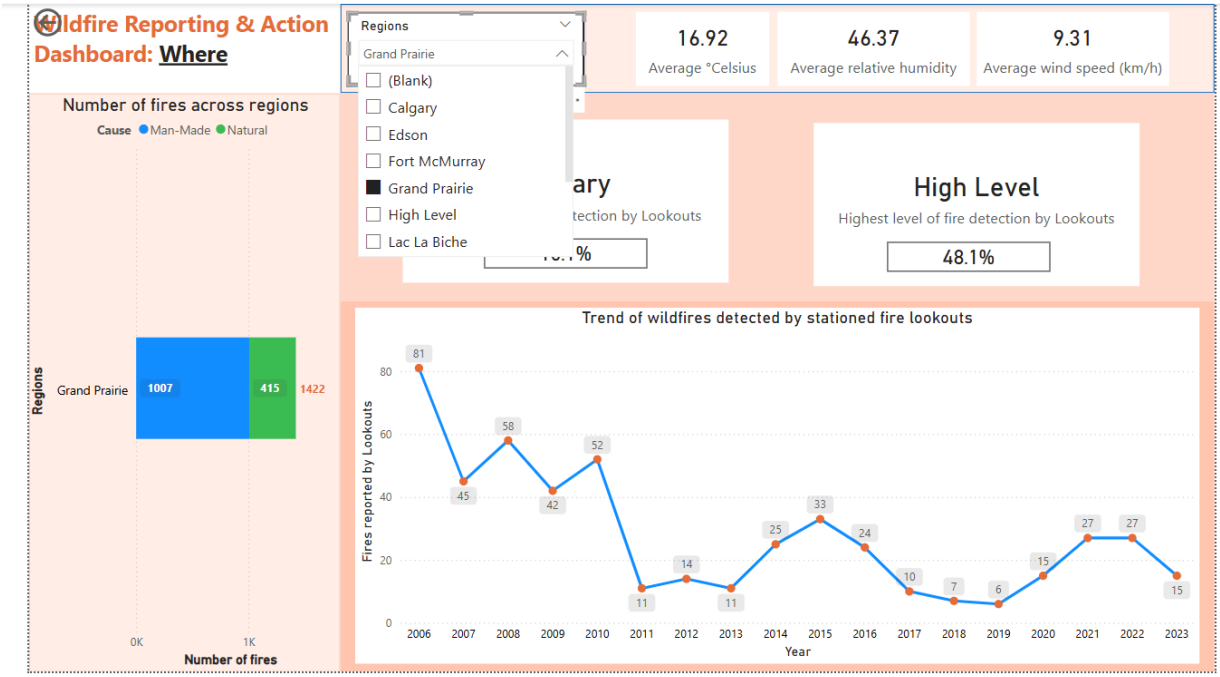
Where – P1



The 'Where P1' page begins to address the objective question of where wildfires occur the most. It shows multiple charts and KPIs.

- **Exploring Main Sections**:
    - This page shows a large line chart of how many fires were detected by wildfire lookouts in the forested areas over 17 years.
        - It aims to show the trend of the count of fires detected by lookouts.
        - The x-axis shows the years and y-axis shows the count.
    - The left side displays a stacked bar chart that divides the number of wildfires by natural and man-made, across all regions.
    - The card visuals display the names of the regions where the lookouts detected the lowest and highest number of wildfires, along with percentages.
        - This can be used to keep tabs on regions that need more lookouts
        - These remain unchanged by the filters on the page and only change when more data is added or updated.
    - The 3 card visuals at the top show the following:
        - Average temperature in the region selected
        - Average humidity in the region
        - Average wind speed in the region

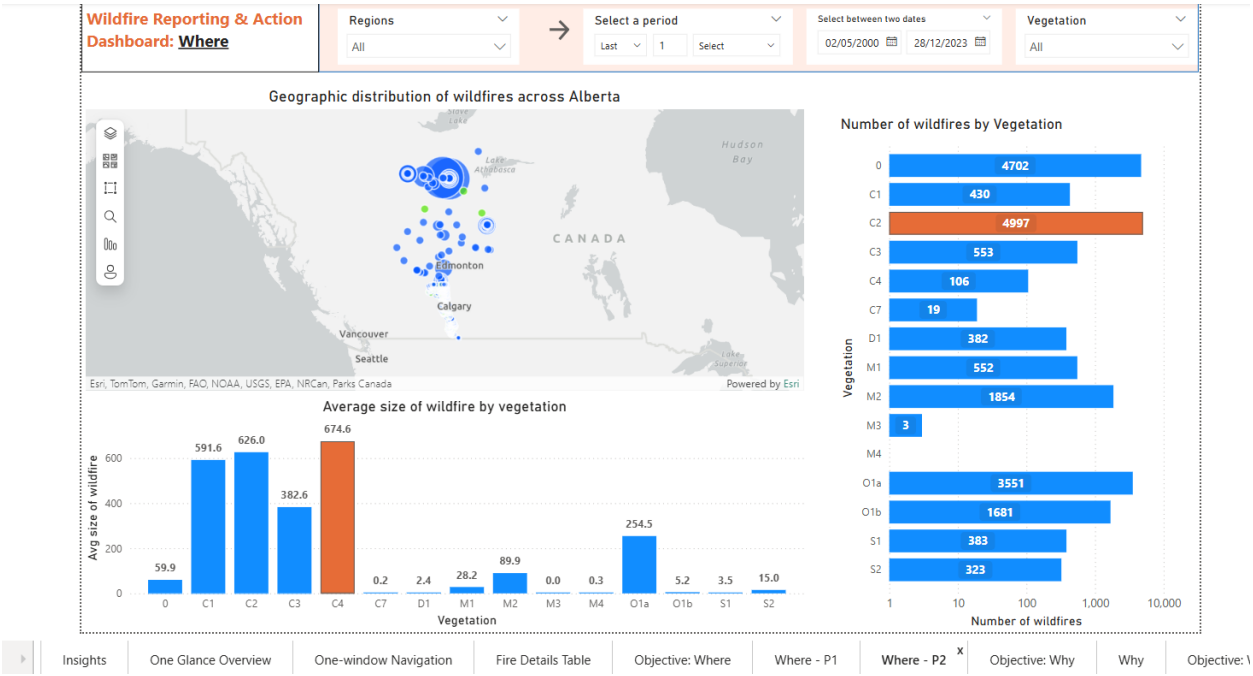
- **Utilizing Filters**:
    - Region filter:
        - Use this filter to change the two charts and the 3 card visuals at the top, according to the region selected.



Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on a point on the line chart shows the number of fires reported by lookouts and the total number of fires. This helps the user compare the two.

Where – P2



Where P2' takes the underlying objective (Where do wildfires occur) a step further and shows meaningful data to narrow down the geolocation of wildfires using features from the dataset like forest lookout locations and names.

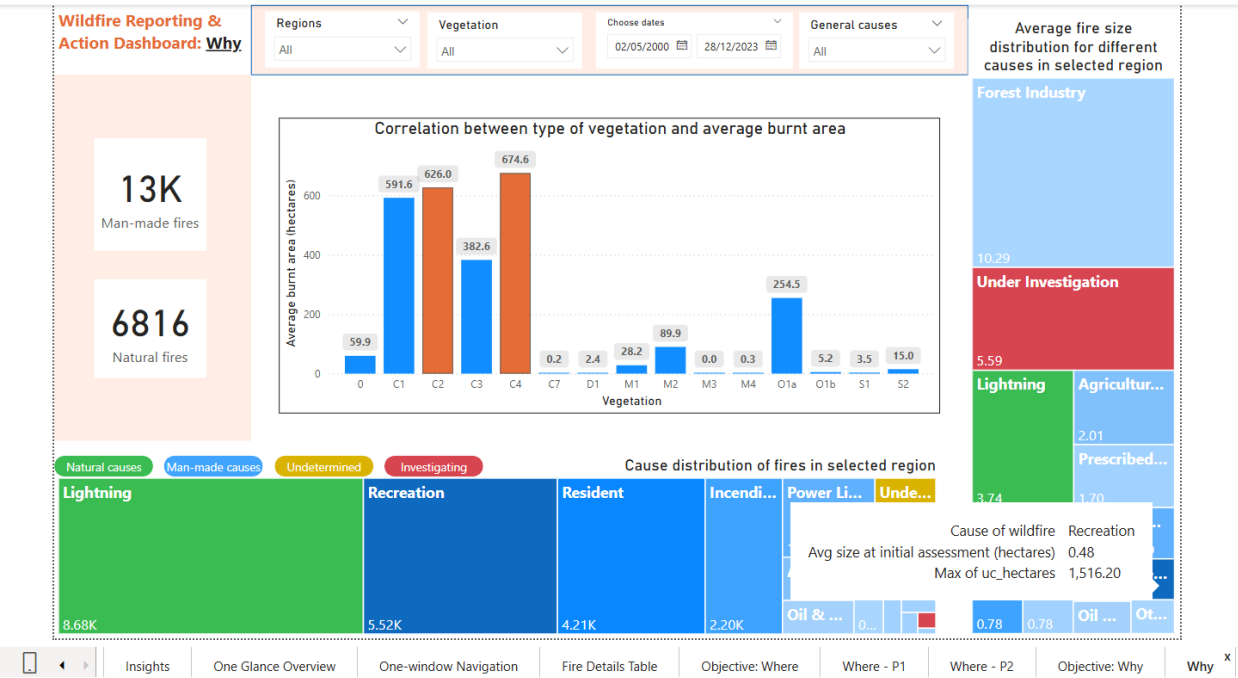
- **Exploring Main Sections**:
    - The center of this page shows a map of the geographic distribution of wildfires across regions and main cause (man-made or natural).
        - Users can use this map to see where most natural or where most man-made fires occur.
        - The map can be zoomed in and out of using the buttons at the bottom right.
    - At the bottom of the page is a bar chart that shows the average size of wildfires in a selected region (or all regions) with certain types of vegetation
        - This helps the user see what kind of vegetation exists in different regions and which type of vegetation causes the largest or smallest fires.
        - The x-axis has the type of vegetation (fuel type in dataset). See Appendix A for details of vegetation. The y-axis shows the average size in hectares.
    - The bar chart on the right shows the count of wildfires by type of vegetation. The count is on the x-axis while the type of vegetation is on the y-axis.
        - This can help the user compare which vegetation causes the most fires.
- **Utilizing Filters**:
    - Time filters:

        - Use the in-between filter to change date between which wildfires can be viewed on the map.
        - Use the time period date filter to see wildfires in the last year, week, month, etc.
    - Regions filter:
        - Regions drop-down filter to see wildfires by vegetation in specific area.
    - Vegetation filter:
        - The user can use this if they want to see where on the map certain types of vegetations exist the most and cause the most fires.

Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on any of the bubbles that represent a wildfire will show the following:
        - Region name
        - Fuel type or vegetation type
        - Unique fire ID
        - The general cause of the wildfire
    - Hovering on the bar chart for average size of wildfire by vegetation at the bottom will show the following:
        - Maximum size of wildfire caused by that vegetation type across the region/s selected.

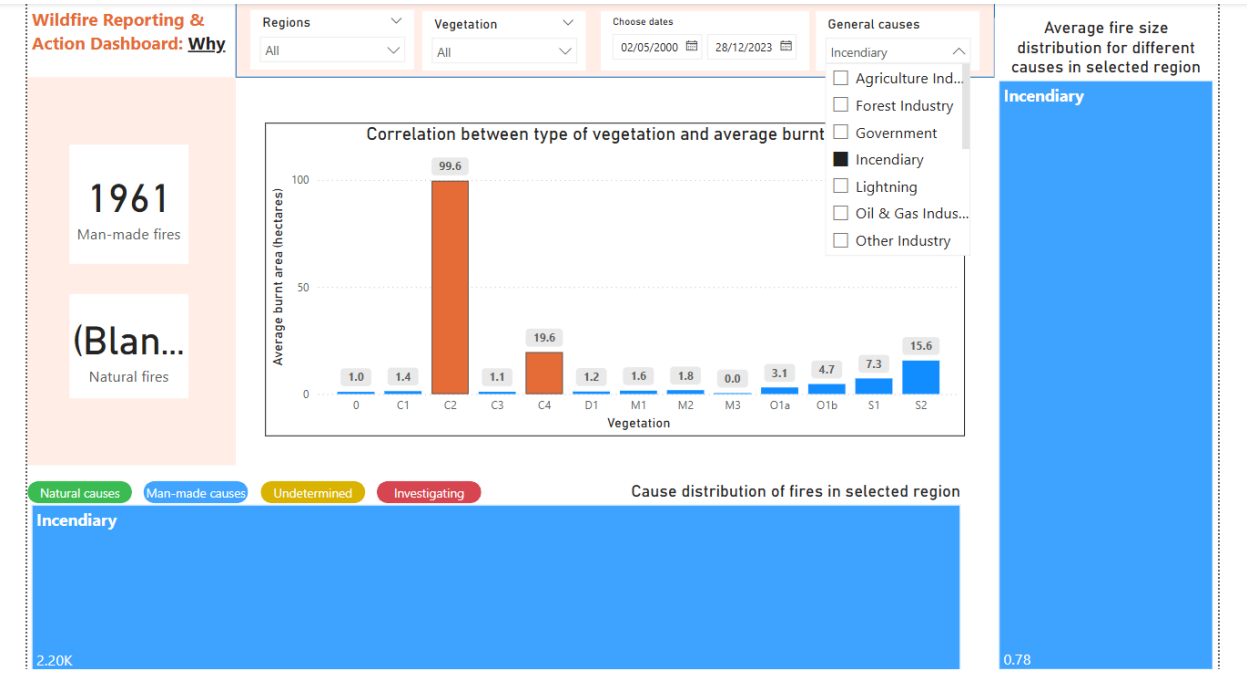
Why



The 'Why' page addresses the objective question of why wildfires occur. It looks into the various causes of wildfires and allows the use of filters to compare causes against each other.

- **Exploring Main Sections**:
    - The center of this page shows a bar chart that studies whether more fires occur with certain vegetation present. The x-axis is the type of vegetation and the y-axis shows the average size of fires.
        - The orange highlighted bars show the top 2 types of vegetation with the largest AVERAGE fire size.
        - '0' on the x-axis means that the teams were not able to determine a specific dominant type of vegetation. This was true for several wildfires.
    - At the bottom of the page is a treemap that visually divides the causes of wildfires against their count.
        - Green color is for natural causes and all the shades of blue suggest a man-made cause. The legend above the treemap explains the distribution.
    - The treemap on the right shows the distribution of average fire size against all causes.
        - The same legend on the top of the treemap at the bottom applies to this one.
    - The visual cards at the right of the page show the following:
        - Number of man-made fires for the selected region, date, and cause.
        - Number of natural fires for the selected region, date, and cause.

        - These change with the filters.
- **Utilizing Filters**:
    - Time filters:
        - Use the in-between filter to change dates between which wildfires can be viewed across the visuals.
    - Regions filter:
        - Regions drop-down filter to see cause distribution in specific area.
    - Causes filter:
        - Can be used to change the bar graph and card visuals to check which vegetation is causing the most wildfires and their sizes.



Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on any of the boxes on the treemap at the bottom shows the following:
        - Number of fires
        - Total area burnt to date by the cause
    - Hovering on the treemap on the right shows the following:
        - Average size of wildfires caused
        - Maximum fire size caused
    - Hovering on any of the bars in the bar chart shows the following:
        - Maximum size of fire caused by the type of vegetation being hovered on.

When

The ‘When’ page addresses the objective question of when wildfire occur the most. It looks at time series data and provides seasonality figures and graphs that can be used to detect surges in wildfires at certain dates and times.

- **Exploring Main Sections**:
    - The line chart at the top shows a trend of wildfires seasonality across all months in a year. It averages them out to detect surges and spikes or depressions. Hovering on the points will be useful to see specific causes of fires at that time or date.
        - It shows two lines – Green for wildfires caused naturally and blue for man-made.
        - It has months on the x-axis and average number of fires on the y-axis.
        - Users can use the points on the lines to compare when changes in average fire count occur.
    - The line chart at the bottom shows the average count of wildfires across a single day by averaging them out. Hovering on the points will be useful to see specific causes of fires at that time or date.
        - It shows two lines – Blue for man-made and green for natural wildfires.
        - The user can use this line chart to detect at what time most wildfires occur.

    - The visual cards on the left change according to the filters and show the following:
        - Peak month for man-made wildfires
        - Peak month for natural wildfires
        - Name of the most frequent cause of wildfires in the selected time period.
        - What caused the largest wildfire across the regions and time period selected.
- **Utilizing Filters**:
    - Time filters:
        - Use the year filter to check if the spikes and depressions in the line charts change.
        - This will also update the card visuals on the left.
    - Regions filter:
        - Regions drop-down filter to see how wildfire dates and times change with each specific region.

Interactivity & User Functionalities

- **Hover Actions**:
    - Hovering on the points on the top line chart shows average and total number of fires in that month according to cause (natural and man-made)

FAQs & Troubleshooting

Here are some questions and answers that may come up while you peruse the dashboard:

- **How and when does the dataset update with the latest incidents?**:
    - Currently, the dataset has to be updated manually via the Jupyter Notebook that was used to transform the initial dataset. The user has to go to the Home tab on Power BI and hit refresh. This will rerun the python script that was used to import the data and make transformations.

      This means that the Jupyter Notebook will first have to be edited with the new dataset CSV and rerun.
- **What if I'm looking for a very specific wildfire?**
    - You can find a specific wildfire on the One-window Navigation page using the filters provided. Change the date, weather, geographic and causes filters to find the fires that match your description.

      You can also search the name of the wildfire using the unique_fire_id format.

Appendix A

Fuel types refer to the type of vegetation found in a particular area:

Coniferous

C-1 Spruce-Lichen Woodland
C-2 Boreal Spruce
C-3 Mature Jack or Lodgepole Pine
C-4 Immature Jack or Lodgepole Pine

Slash

S-1 Jack or Lodgepole Pine slash
S-2 White Spruce-Balsam slash

Mixedwood

M-1 Boreal Mixedwood-Leafless
M-2 Boreal Mixedwood-Green

Deciduous

D-1 Leafless Aspen

Grass

O-1a Matted Grass
O-1b Standing Grass

0 Other fuel type/Unknown