Let's explore the Victoria Fire History dataset produced by DECCA and available on the Vic Data website

In [1]:
```
# Setup

%matplotlib inline
import folium
import geopandas as gpd
import numpy as np
import seaborn as sns
from matplotlib import pyplot as plt
```

In [2]:
```
# Load the data and view first 5 rows

fire_history = gpd.read_file("ll_gda94/esrishape/whole_of_dataset/victoria/FIRE/FI
fire_history.head()
```

Out[2]:

	FIRETYPE	SEASON	FIRE_NO	NAME	START_DATE	STRTDATIT	TREAT_TYPE	FIRE_SVR
0	Burn	2021	GP-TBO-BAI-0092	Calulu - Coxes Road	2020-10-13	20201013	FUEL REDUCTION	BURNT_UNKNOV
1	Burn	2021	GP-TBO-NOW-0294	Kalimna - GLaWAC 1	2021-03-31	20210331	NaN	BURNT_UNKNOV
2	Bushfire	2021	Tambo 9	Clifton Creek - Woods Rd	2020-10-03	20201003	FIRE - NOT A PLANNED BURN ACTIVITY	BURNT_UNKNOV
3	Bushfire	2007	12	NaN	2006-12-01	20061201	FIRE - NOT A PLANNED BURN ACTIVITY	BURNT_
4	Bushfire	2021	TAMBO 47	Omeo – Butchers Creek	2021-02-20	20210220	FIRE - NOT A PLANNED BURN ACTIVITY	BURNT_UNKNOV

In [3]:
```
# How many fires are there of each type?
fire_history['FIRETYPE'].value_counts()
```

Out[3]:
```
Bushfire    624820
Burn         82670
Unknown        279
Other          159
Name: FIRETYPE, dtype: int64
```

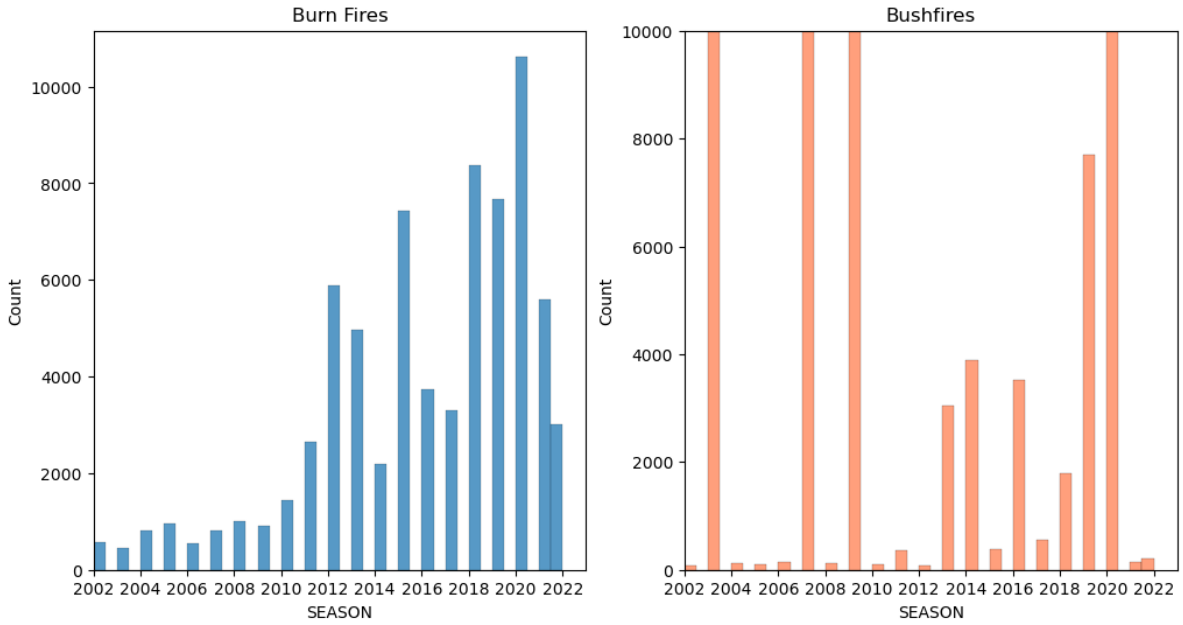
In [4]:
```
# There are many more bushfires than planned burns, but what about their recent fre
# these over the last 20 years
```

```
burn_history = fire_history[fire_history['FIRETYPE'] == 'Burn']
bushfire_history = fire_history[fire_history['FIRETYPE'] == 'Bushfire']

fig ,(ax1,ax2) = plt.subplots(1,2,figsize=(12,6))

ax1.set_title('Burn Fires')
sns.histplot(burn_history['SEASON'],label='Burn',ax=ax1,binwidth=0.5)
ax1.set_xlim(2002,2023)
ax1.set_xticks(np.arange(2002,2023,2))

ax2.set_title('Bushfires')
sns.histplot(bushfire_history['SEASON'],label='Fuel',ax=ax2,binwidth=0.5,color='co
ax2.set_xlim(2002,2023)
ax2.set_ylim(0,10000)
ax2.set_xticks(np.arange(2002,2023,2))
plt.show()
```



So there are many bushfires recorded in bad fire season but few

in other years while the number of recorded burns has been increasing

recently. But is this because there a more, smaller burns? Lets work out the # average area per burn to see.

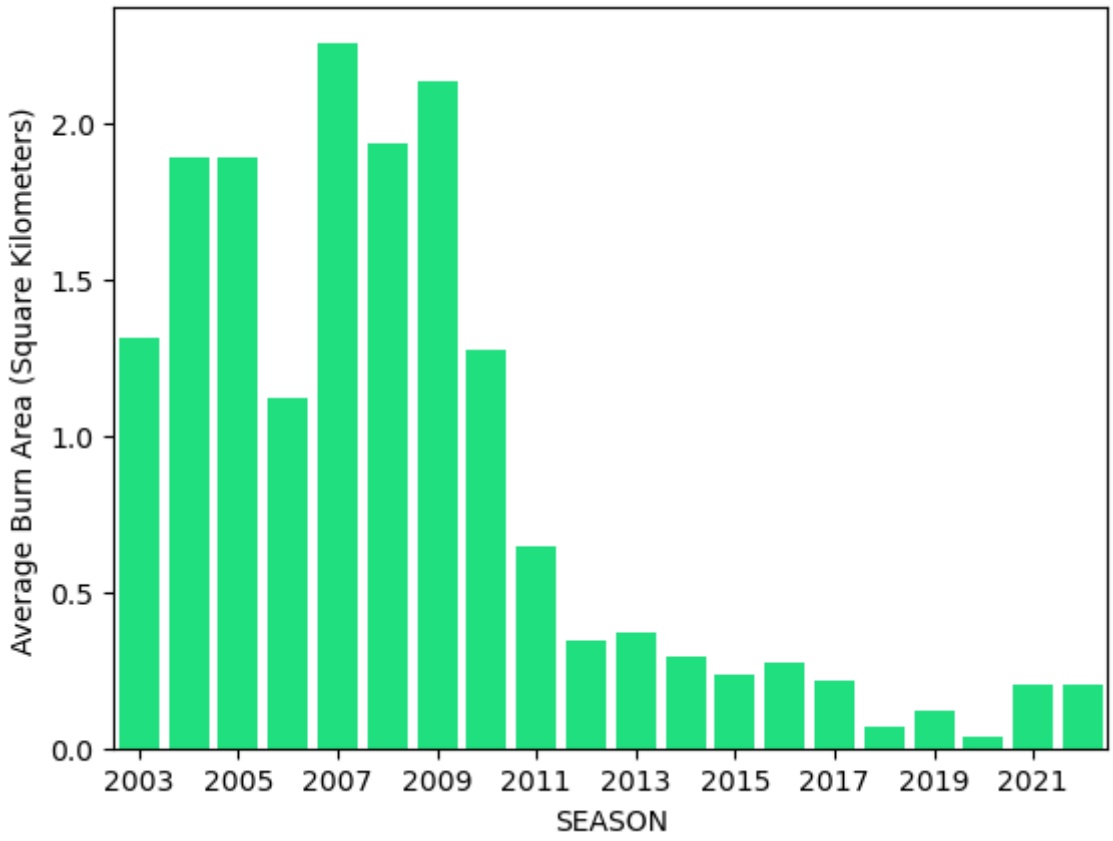
In [5]:
```
# Convert to a projected crs
burn_history_proj = burn_history.to_crs(3857)
burn_history_proj.loc[:,"AREA"] = burn_history_proj.geometry.area

# Find the average area for the burns each season
```

```
burns_by_season = burn_history_proj.groupby('SEASON')['AREA'].mean() / 1e6

# Plot the last 20 years

burns_avg_plot = sns.barplot(x=(burns_by_season.index)[-20:],y=burns_by_season.valu
burns_avg_plot.set_ylabel('Average Burn Area (Square Kilometers)')
xtix = burns_avg_plot.get_xticks()
foo = burns_avg_plot.set_xticks(xtix[::2])
```



In [6]:
```
# So, indeed the average area of each burn has decreased as the number of burns hav
```

In [ ]:
```
# Next, lets make some maps. First, let's plot the bushfires from the 2007 season w
# We'll use a map of Victorian CFA regions are a reference, so let's load those as
```

In [13]:
```
cfa_regions = gpd.read_file("Order_FUP7IO/ll_gda94/esrishape/whole_of_dataset/victo
cfa_regions.head()
```

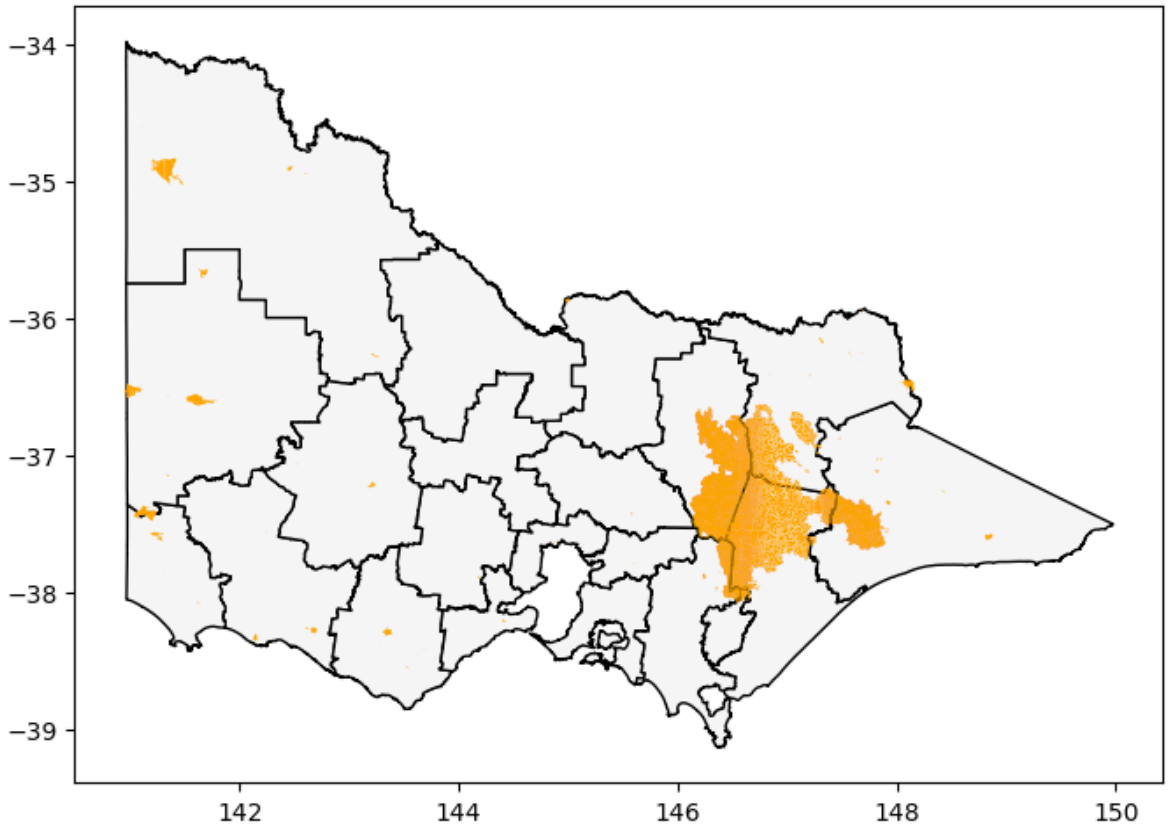
Out[13]:

	UFI	CFA_DIST	UFI_CR	geometry
0	17215569	08	2015-11-18	MULTIPOLYGON (((145.33417 -38.49738, 145.33492...
1	17215571	10	2015-11-18	MULTIPOLYGON (((146.29576 -38.52680, 146.29579...
2	17215564	02	2015-11-18	POLYGON ((144.79479 -36.75072, 144.79480 -36.7...
3	17215581	22	2015-11-18	POLYGON ((146.17687 -36.03356, 146.17688 -36.0...
4	17215566	05	2015-11-18	POLYGON ((142.23505 -37.12818, 142.23514 -37.1...

In [14]:
```
# And now we plot the 2007 bushfires over this map

ax = cfa_regions.plot(figsize=(8,8), color='whitesmoke', edgecolor='black')
fires_2007 = fire_history.loc[(fire_history['SEASON'] == 2007) & (fire_history['FI
fires_2007.plot(ax=ax,color='orange',markersize=1)
```

Out[14]: <Axes: >



In [7]:
```
# Let's also create an interactive map some of our data. What are all the regions p

fire_history['DISTRICTID'].value_counts()
```

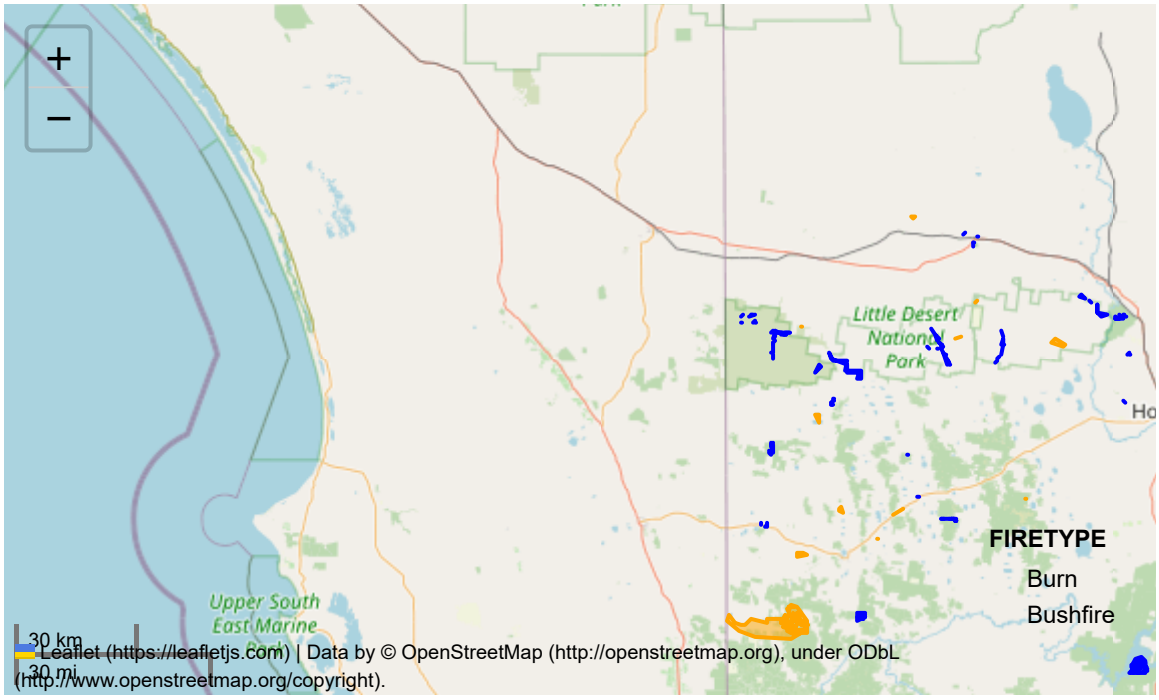
Out[7]:
```
Hume - Ovens                          34173
Hume - Upper Murray                   25700
Loddon Mallee - Mallee                15209
Gippsland - Macalister                 7825
Gippsland - Snowy                      7472
Gippsland - Tambo                      6679
Gippsland - Latrobe                    3694
Barwon South West - Otways             2935
Hume - Goulburn                        2505
Barwon South West - Far South West     2304
Port Phillip - Yarra                   1648
Grampians - Midlands                   1414
Grampians - Wimmera                     676
Hume - Murrindindi                      540
Loddon Mallee - Murray Goldfields       440
Port Phillip - Metropolitan             270
Name: DISTRICTID, dtype: int64
```

In [12]:
```
# Let's choose the Wimmera region of the Grampians and map the location of the dif
# season

grampians_fires_2022 = fire_history.query('(DISTRICTID == \'Grampians - Wimmera\')

#new_cmap = 'BlOrRd'
new_cmap = ['blue','orange']
grampians_fires_2022.explore('FIRETYPE',cmap=new_cmap)
```

Out[12]:


Little Desert National Park
Upper South East Marine
FIRETYPE
Burn
Bushfire
30 km
30 mi
Leaflet (https://leafletjs.com) | Data by © OpenStreetMap (http://openstreetmap.org), under ODbL (http://www.openstreetmap.org/copyright).

In [ ]: