University of South Australia

Course coordinator: Stefan Peters (School of NBE)

GEOE 3019

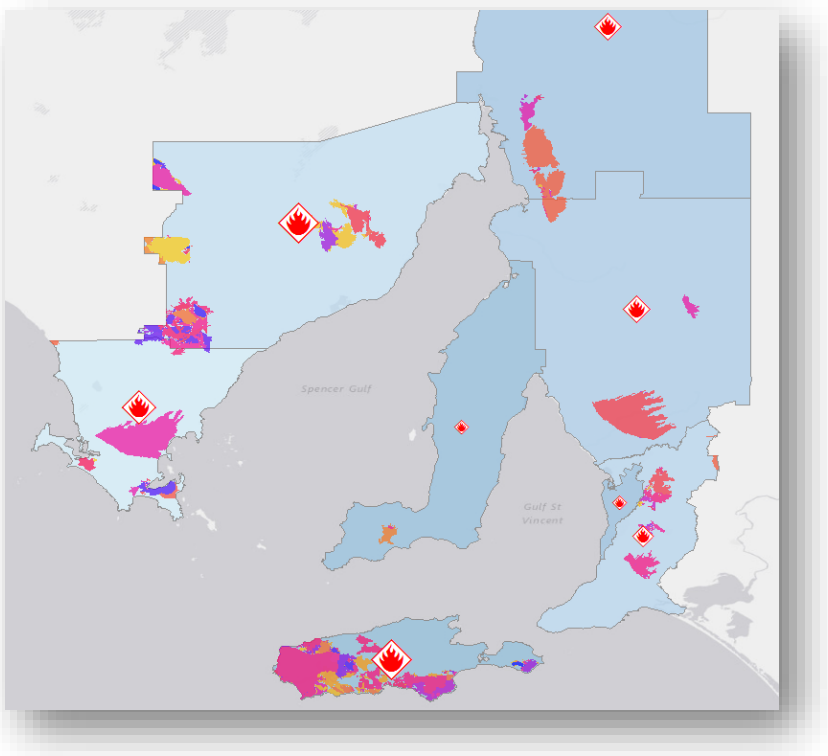
Main part of Assignment 3

Advanced Leaflet JS API web map application

In this assignment you will have to create an advanced Leaflet web map – using all skills learned so far in lectures and practicals – in particular relevant are the Leaflet API lecture and the respective leaflet pracs. Your task is to create an interactive web map aiming to visually investigate fire incidents time series data.

Submission & assessment:

Your final published Leaflet project web map need to be embedded in your "course output"-website together with a short text explanation. Moreover, you need to submit a project report.

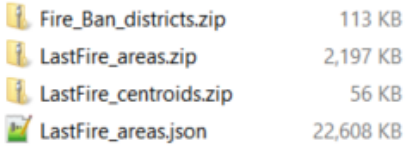


Provided data

Initially 2 data sets were downloaded from data.SA:

- South Australian Fire Ban Districts (source)
- Last Bushfire and Prescribed Burn Boundaries (source, metadata)

Both data sets have been further processed and edited. Only major fire events had been considered (>1ha); shape geometry had been simplified; the Area Of Interest reduced; and attribute tables edited … and all adapted fire data made available for this assignment on our course homepage (A3-data.zip).



The zipped folders contain shapefiles. For one of them (LastFire_areas) the shapefile was already converted into a json file. Please go ahead and explore geometry and attributes of all 3 shapefiles using ArcMap. Moreover, you can find a simple example of hosted LastFire_areas GeoJSON data →here.

Assignment task

Your task is to create a web map application using Leaflet JavaScript API with the following requirements:

Map control functionality:

- Full screen
- Zoom control
- Appropriate initial scale and map extend
- Zoom: Minimum scale = 7, maximum scale = 18
- Scalebar
- UniSA watermark

Basemap layer(s):

Option to choose between 4 basemaps: (! Make sure all are available until the max. zoom level):

- Road map
- Terrain map
- Satellite image map
- Light gray map with labels
- Dark gray map without labels

Thematic overlay:

For the thematic layer, you will need to develop a sophisticated cartographic design and implement interactive tools in order to provide a comprehensive data exploration. The user should be able to investigate the following:

A. **Fire events 1950-2016** *(area layer)*
   hint: time slider

B. **Scale dependent information about fire events** *(point layer)*
   Hint: marker clustering or heat map

C. **Seasonal fire events and incident type information** *(point or/and area layer – up to you)*
   Four sub-layers: Summer / Autumn / Winter / Spring with visual information about incident types for each season (Bushfire / Prescribed Burn)

D. **Decades summaries** *(point or/and area layer – up to you)*
   Seven sub-layers: Fires occurred between 1950-1959
   1960-1969
   1970-1979
   1980-1989
   1990-1999
   2000-2009
   2010-2016

E. **Fire sizes** *(area layer)*
   Four sub-layers: Very large – large – medium – small *(please decide for appropriate classes)*

F. **Fire-Ban-District statistics** about fire counts and burnt area *(area layer)*
   Hint: choropleth map / proportional symbol map
   Additionally, provide click or hover **interaction** with info-window content change displaying the current Fire-Ban District attributes (Name, Count, Burnt_Area)

For at least one of the fire event layers (A - E) enable click-popup **interaction** including all relevant attributive information (e.g. incident name, type, date, season, burnt area).

Carefully draft your cartographic concept first. Bare in mind that the user may enable multiple layers at the same time. Try to allow the best possible readability.

Think about how to render quantitative and qualitative data – choose the appropriate visual variables for your layer symbology. For instance, make use of semi-transparent fill colour to deal with overlapping fire areas.

Challenge – optional extensions

You can earn up to 5 extra points (➔ 105 %) if you manage to:

- Add a legend for the Fire-Ban-District statistics' choropleth map
- implement an animated rendering of time series information
- allow the user to click on or hover over a fire incident point which triggers the respective effected area to be displayed
- develop a well performing web map app using the entire SA dataset instead of a subset
- integrate a side-bar with general information about the project

Marking criteria *(40 % total course grade)*

- Cartographic concept – web map design 10%
  - Chosen thematic map types – and their implementations
  - Layer Symbology
  - Interactive functions
- Readability (Visual contrast, legibility, layer hierarchy, data classification) 10%
  and Usability (easy / intuitive to use?)
- Conformance (Performance and sophistication): 10%
  does the application do what was asked? …how well? …bugs?
- Coding structure, style, clarity and conciseness 10%
  (Html / CSS / JavaScript)