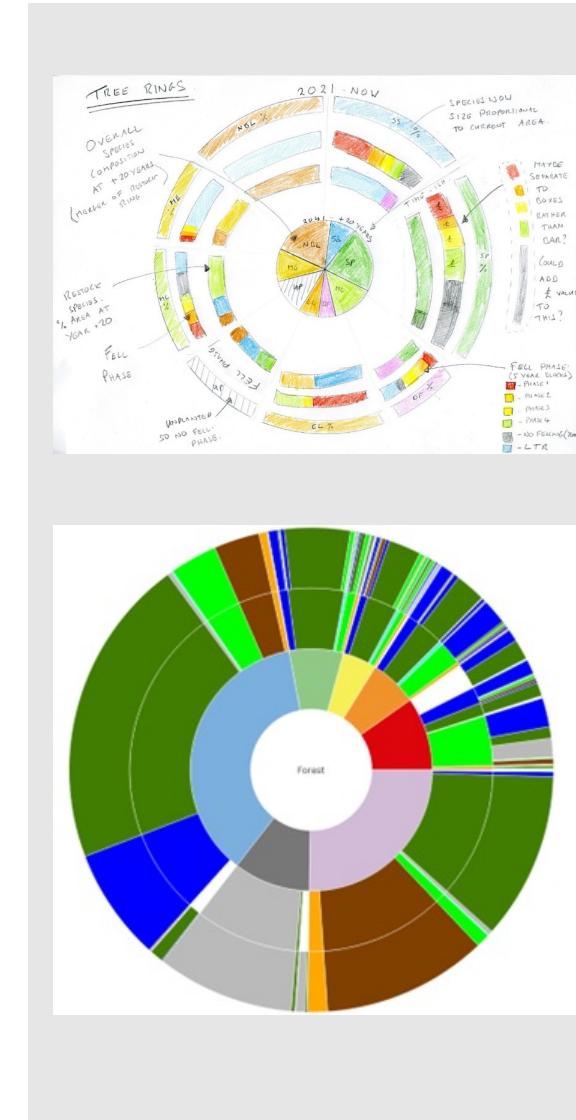




FOSS4GUK 2023

Tree Rings

Visualising forest plan data with R/Plotly





May 2021....

University of Edinburgh:

Data visualisation for professionals

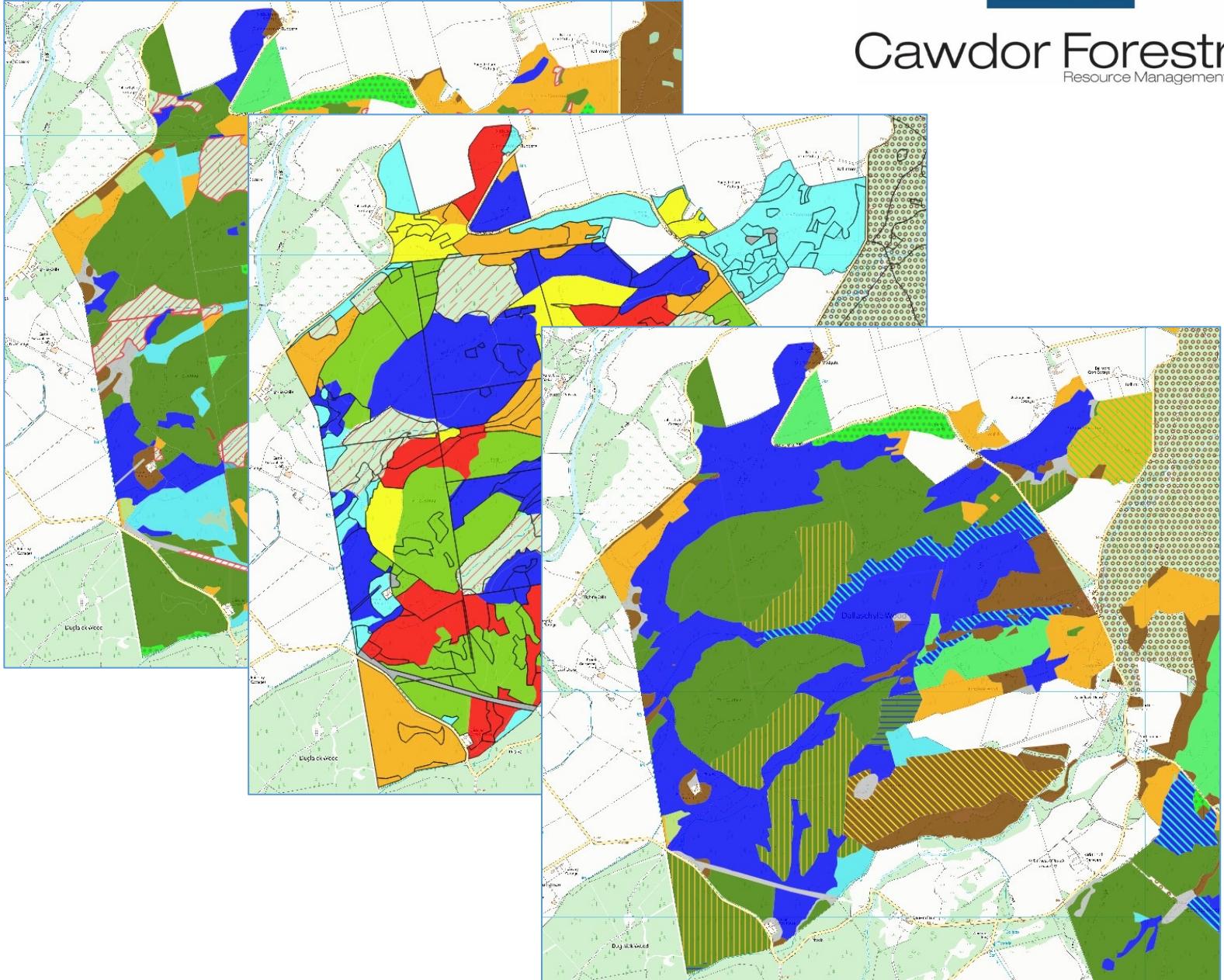
(online 12-week course)

- Opportunity to learn more about data visualisation design process
- Opportunity to use R
- Opportunity to explore how forestry spatial data is presented / used
- Opportunity to dodge bedtime story routine for 12 weeks



Spatial Data

- Long term forest plan (20-year plan)
- Current species distribution of forest
- Planned felling phases, phase = 5 years, long term retentions
- Restocking species distribution

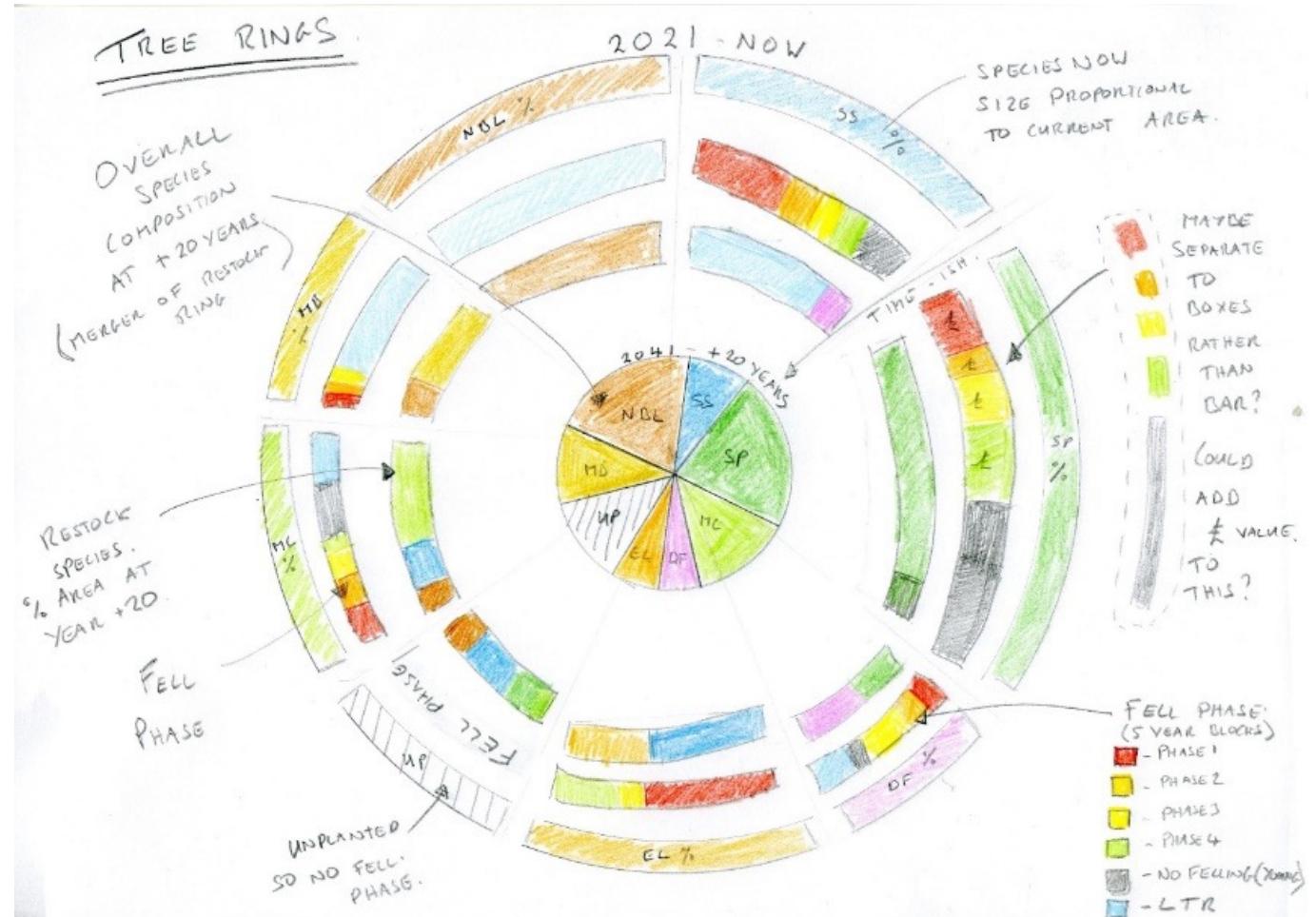




Visualisation Design Concept

Summarise forest inventory
and long term forest plan
(LTFP) data in a concise,
useful and (hopefully)
interactive way

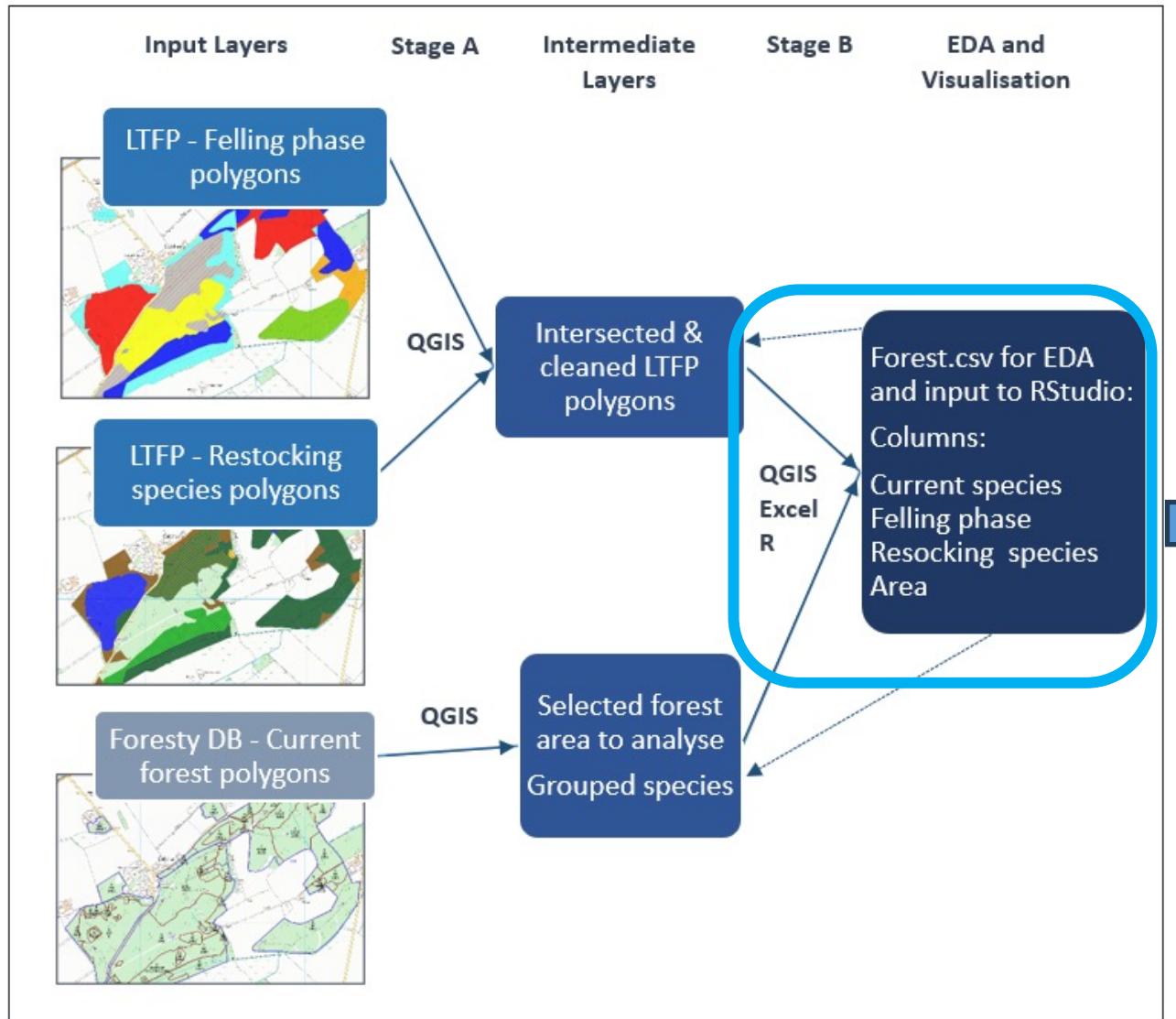
Explore change in forest
composition over 20 years,
and help explain rationale
behind LTFP





Data preparation

Exploratory Data Analysis (EDA)



Visualisation Data

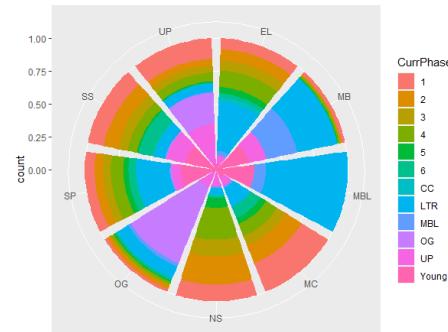
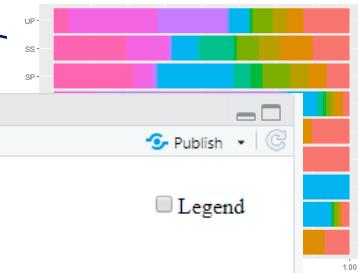
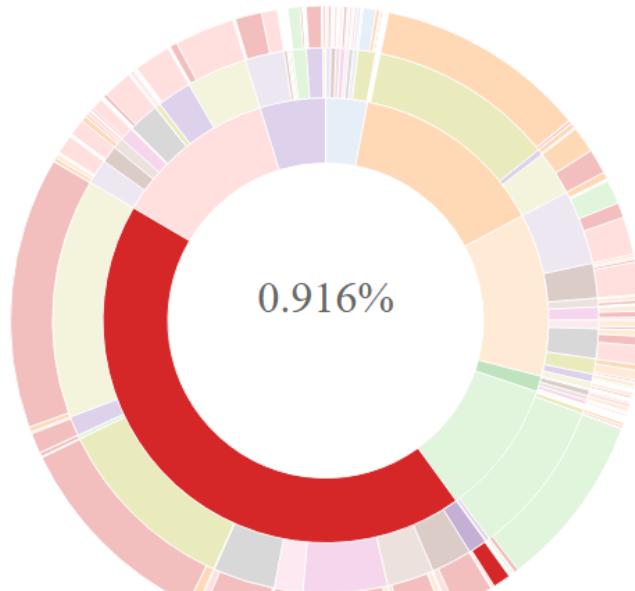
	A	B	C	D	E
1	ID	species	fellphase	restock	ha
4185	1106	UP		1 SS	8.51264
4186	3965	MB	LTR	MB	8.546087
4187	288	SP	DOG	SP	8.552089
4188	234	OG	DOG	OG	8.633533
4189	2861	SP		2 SP	8.686115
4190	3974	MB	LTR	MB	8.754654
4191	1744	SP		4 SP	8.789909
4192	2370	SS		5 SS	8.846679
4193	366	OG	DOG	OG	8.854494

EDA and Initial Design

	A	B	C	D	E
1	ID	species	fellphase	restock	ha
4185	1106	UP		1 SS	8.51264
4186	3965	MB	LTR	MB	8.546087
4187	288	SP	DOG	SP	8.552089
4188	234	OG	DOG	OG	8.633533
4189	2861	SP		2 SP	8.686115



SP > 1 > SP 0.916%



SpsShort

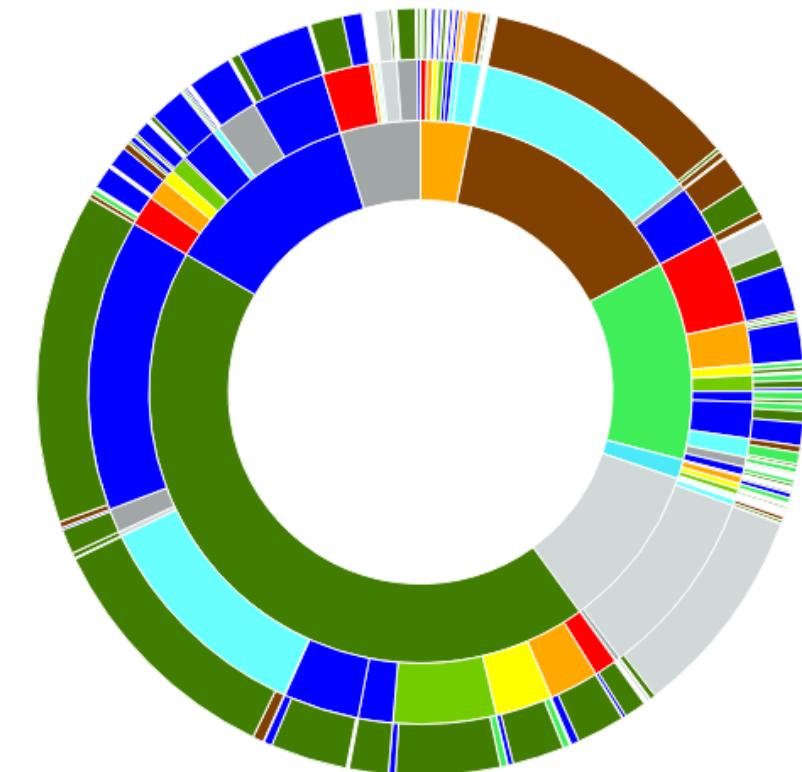
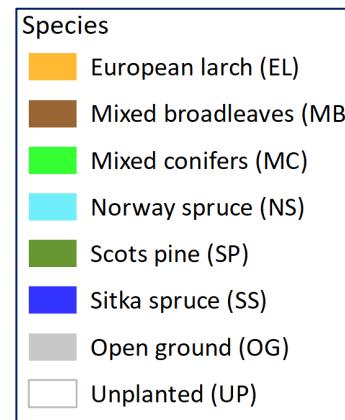
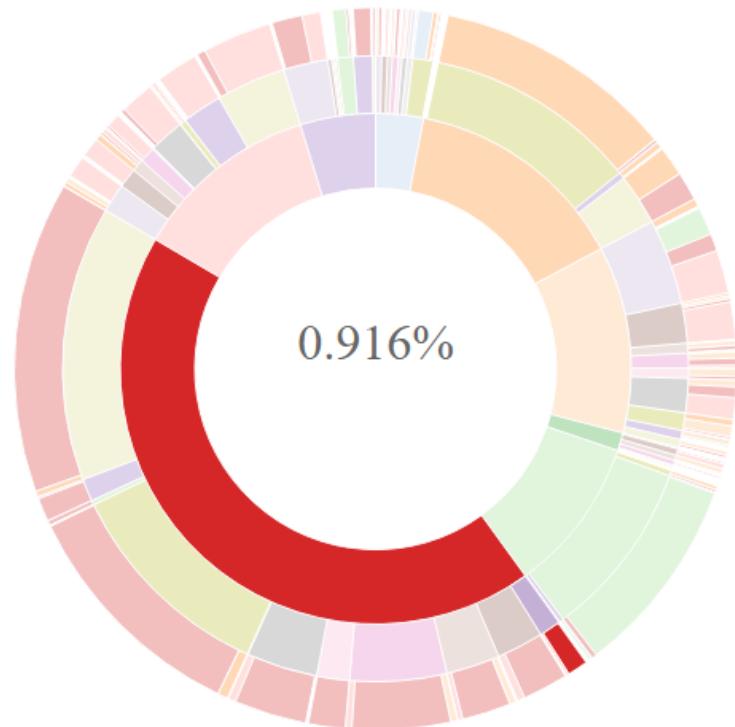
sunburstR

Stackexchange win - User defined segment colours

<https://stackoverflow.com/questions/57064828/how-can-i-change-colors-of-segments-in-trace>

Question: *indigofera suffruticosa*

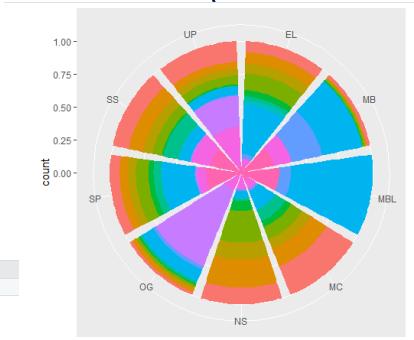
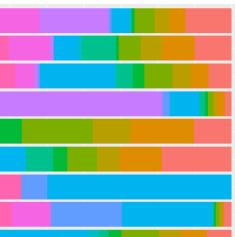
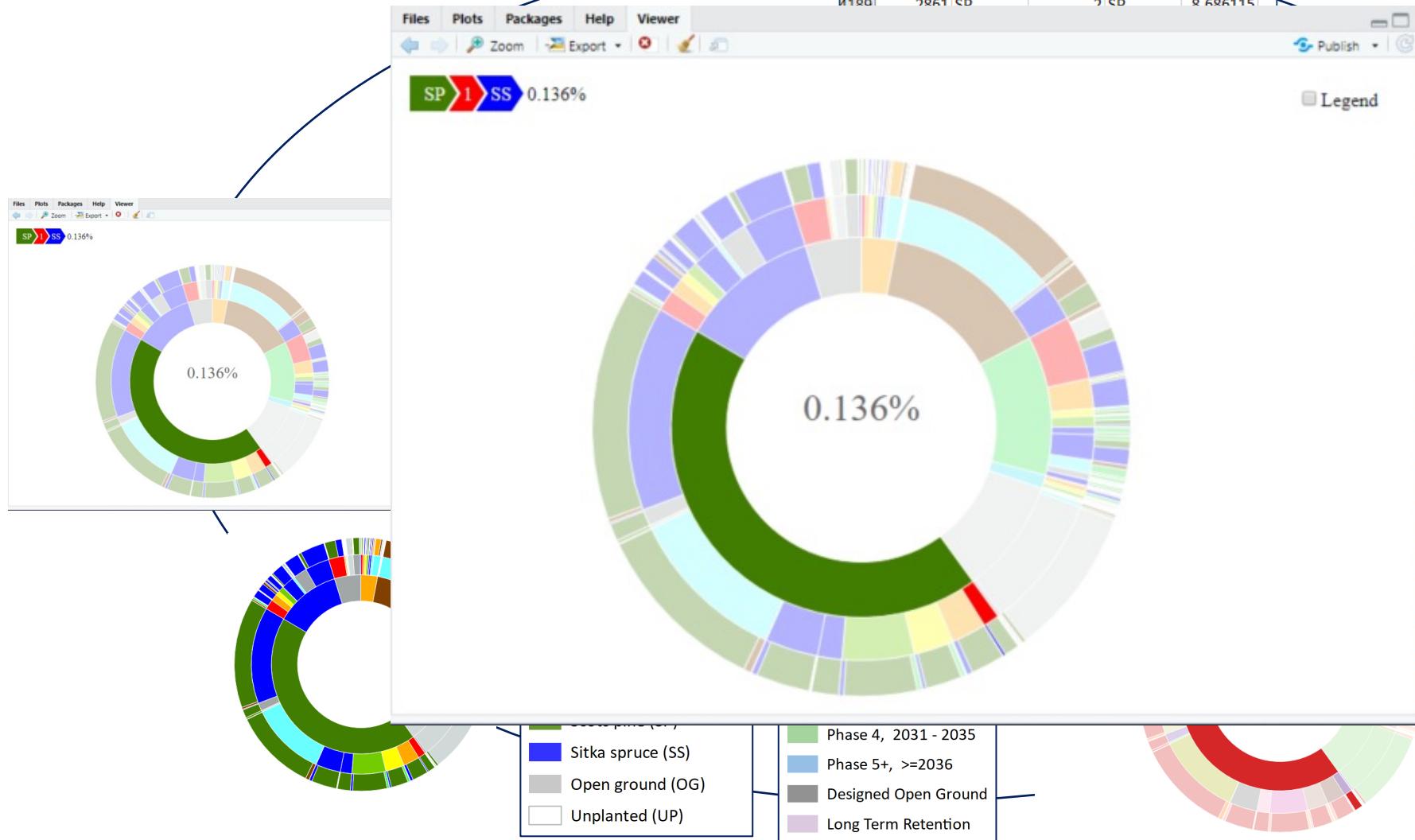
Answer: Gilean0709





Cawdor Forestry
Resource Management

User Evaluation...



sunburstR

Stackexchange win No. 2 – Plotly zoomable sunburst

<https://stackoverflow.com/questions/57395424/how-to-format-data-for-plotly-sunburst-diagram/58481176>

Question: mtreg

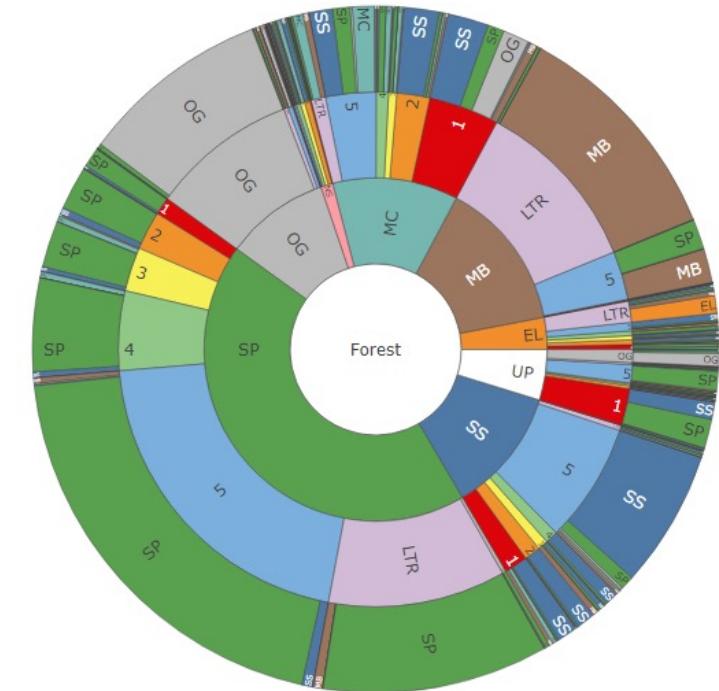
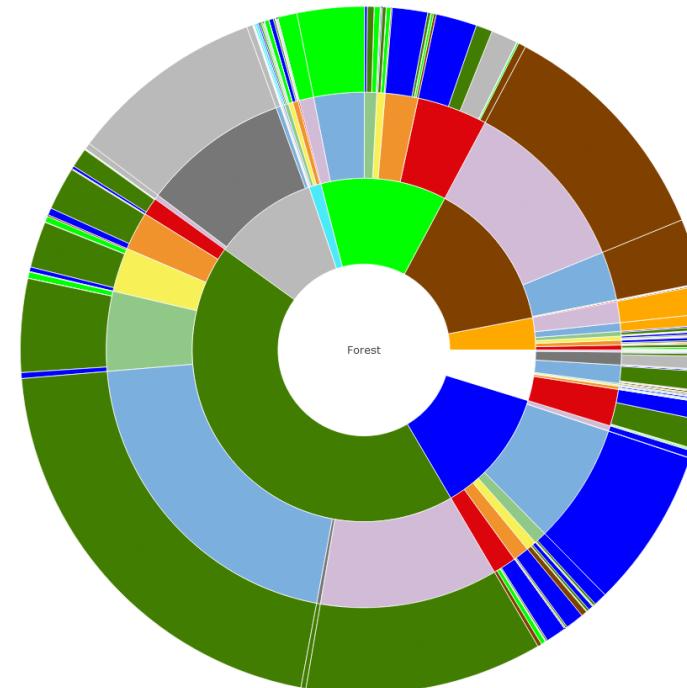
Answer: ismirsehregal

hierarchyDT DF_example sunburstDF sunburstDF DF2

Filter

	labels	values	parents	ids	colour
38	MB	0.68	Forest - 1 - NS	Forest - 1 - NS - MB	#804000
39	MB	0.15	Forest - 1 - OG	Forest - 1 - OG - MB	#804000
40	MB	0.62	Forest - 1 - SP	Forest - 1 - SP - MB	#804000
41	MB	12.12	Forest - 1 - SS	Forest - 1 - SS - MB	#804000
42	MB	2.20	Forest - 1 - UP	Forest - 1 - UP - MB	#804000
43	MB	0.12	Forest - 2 - EL	Forest - 2 - EL - MB	#804000
44	MB	7.76	Forest - 2 - MC	Forest - 2 - MC - MB	#804000

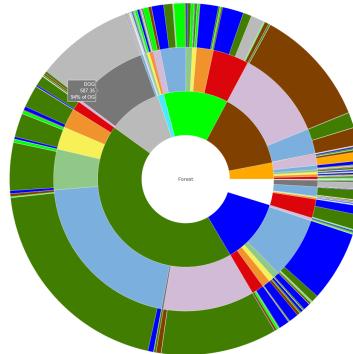
Showing 37 to 45 of 246 entries, 5 total columns



Final Design

HierarchyDT				
	labels	values	parents	ids
38	MB	0.68	Forest - 1 - NS	Forest - 1 - NS - MB #804000
39	MB	0.15	Forest - 1 - OG	Forest - 1 - OG - MB #804000
40	MB	0.62	Forest - 1 - SP	Forest - 1 - SP - MB #804000
41	MB	12.12	Forest - 1 - SS	Forest - 1 - SS - MB #804000
42	MB	2.20	Forest - 1 - UP	Forest - 1 - UP - MB #804000
43	MB	0.12	Forest - 2 - EL	Forest - 2 - EL - MB #804000
44	MB	7.76	Forest - 2 - MC	Forest - 2 - MC - MB #804000

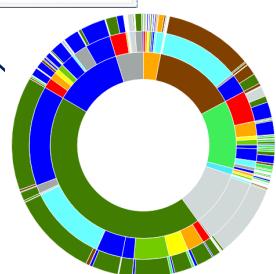
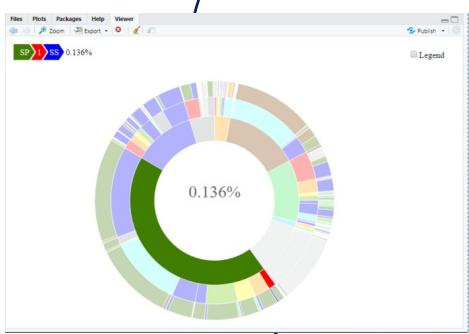
Showing 37 to 45 of 246 entries, 5 total columns



A	B	C	D	E
ID	species	fellphase	restock	ha
4185	1106	UP	1 SS	8.51264
4186	3965	MB	LTR	MB
4187	288	SP	DOG	SP
4188	234	OG	DOG	OG
4189	2861	SP	2 SP	8.686115
4190	3974	MB	LTR	MB
4191	1744	SP	4 SP	8.789909
4192	2370	SS	5 SS	8.846679
4193	366	OG	DOG	OG
				8.854494



Plotly sunburst function



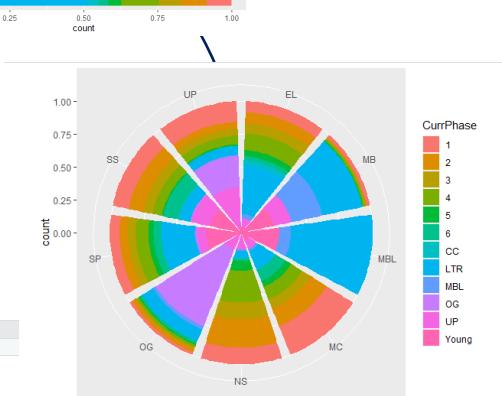
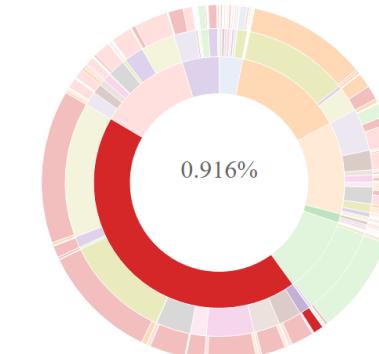
Species

- European larch (EL)
- Mixed broadleaves (MB)
- Mixed conifers (MC)
- Norway spruce (NS)
- Scots pine (SP)
- Sitka spruce (SS)
- Open ground (OG)
- Unplanted (UP)

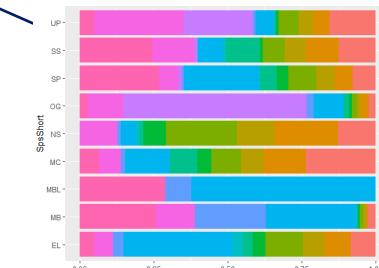
Felling Phase

- Phase 1, 2016 - 2020
- Phase 2, 2021 - 2025
- Phase 3, 2026 - 2030
- Phase 4, 2031 - 2035
- Phase 5+, >=2036
- Designed Open Ground
- Long Term Retention

R Studio, ggplot, sunbursts, user evaluation, legend colours, Plotly, user evaluation, design evolution



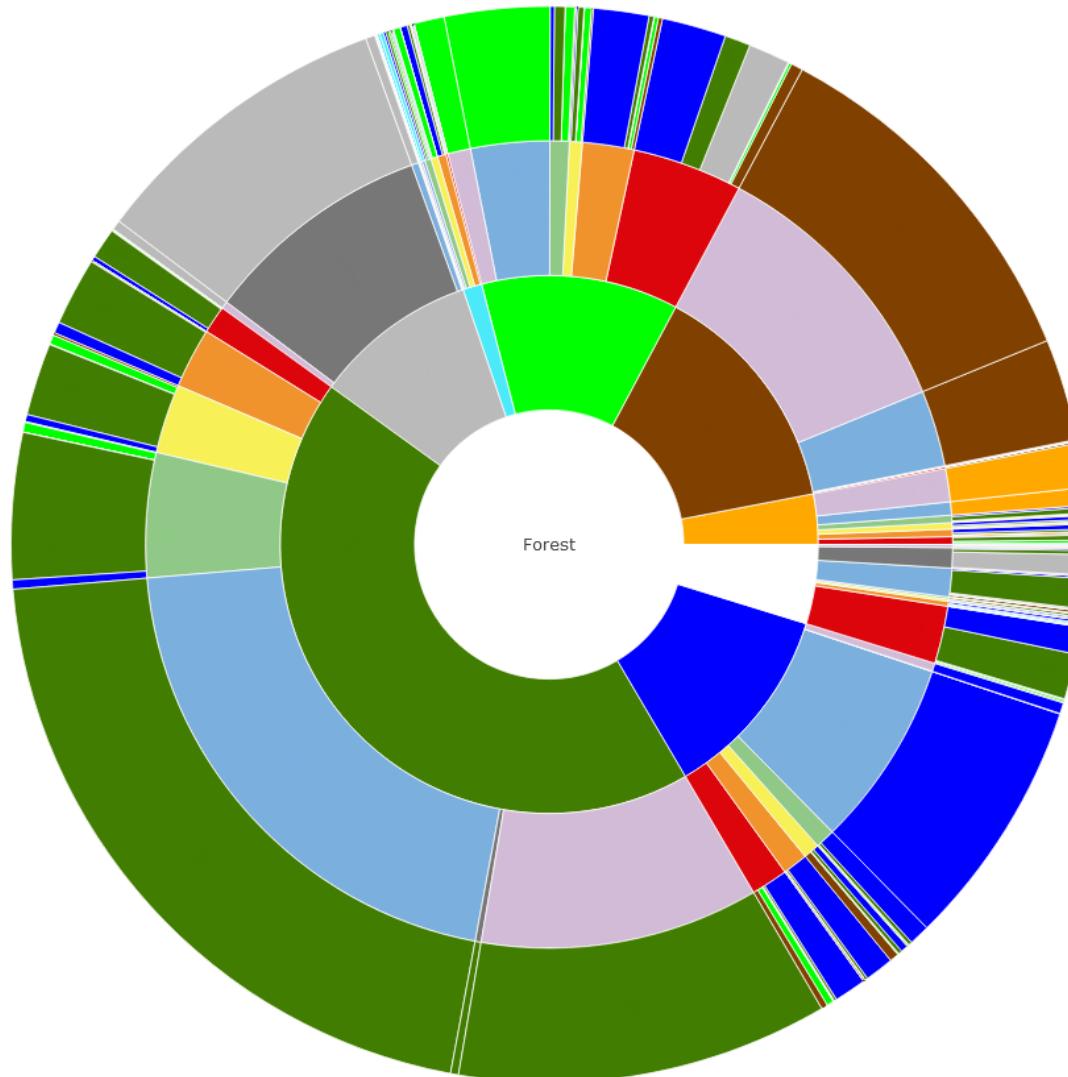
sunburstR



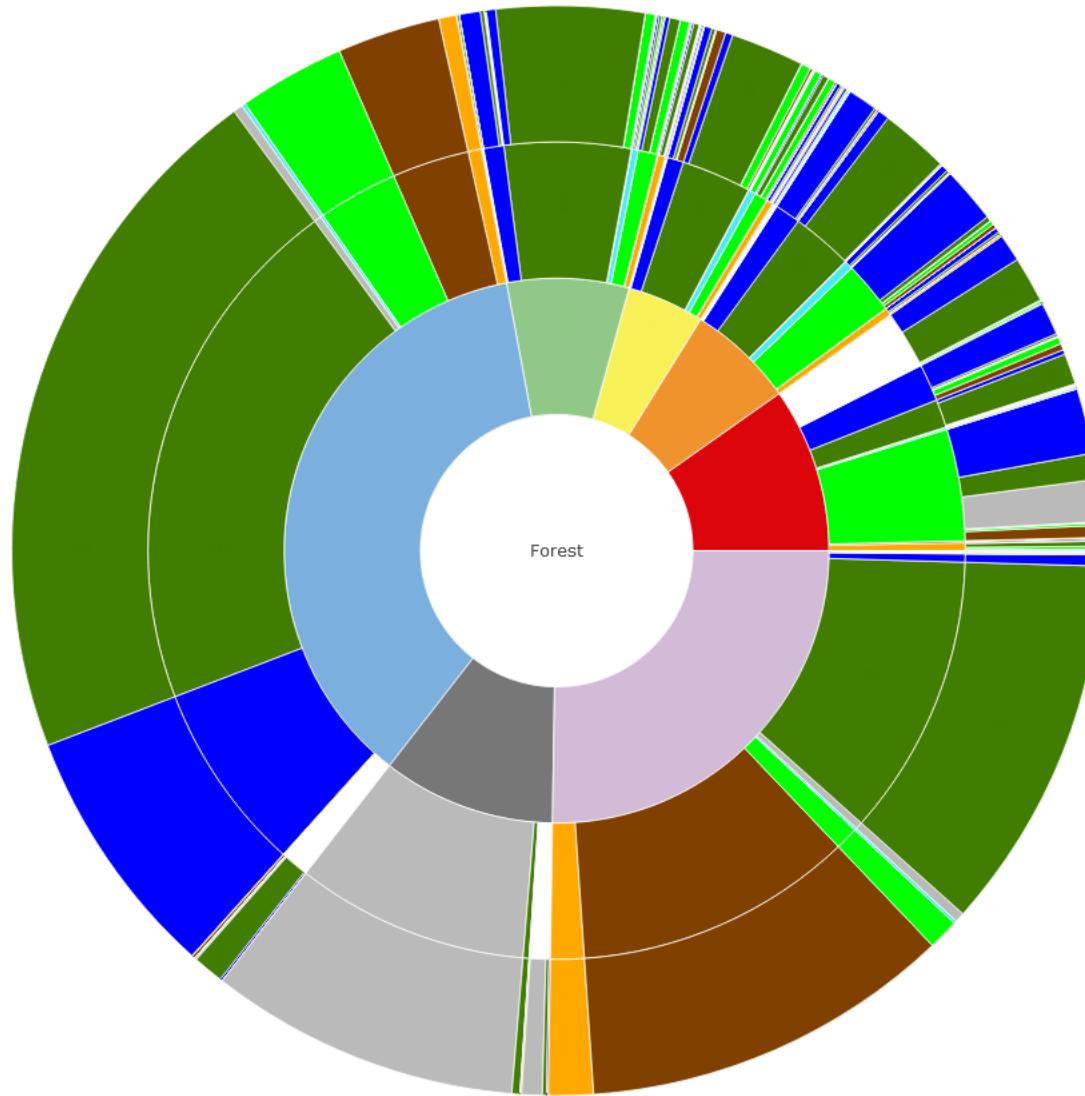
First Tree Ring – User evaluation feedback



Cawdor Forestry
Resource Management



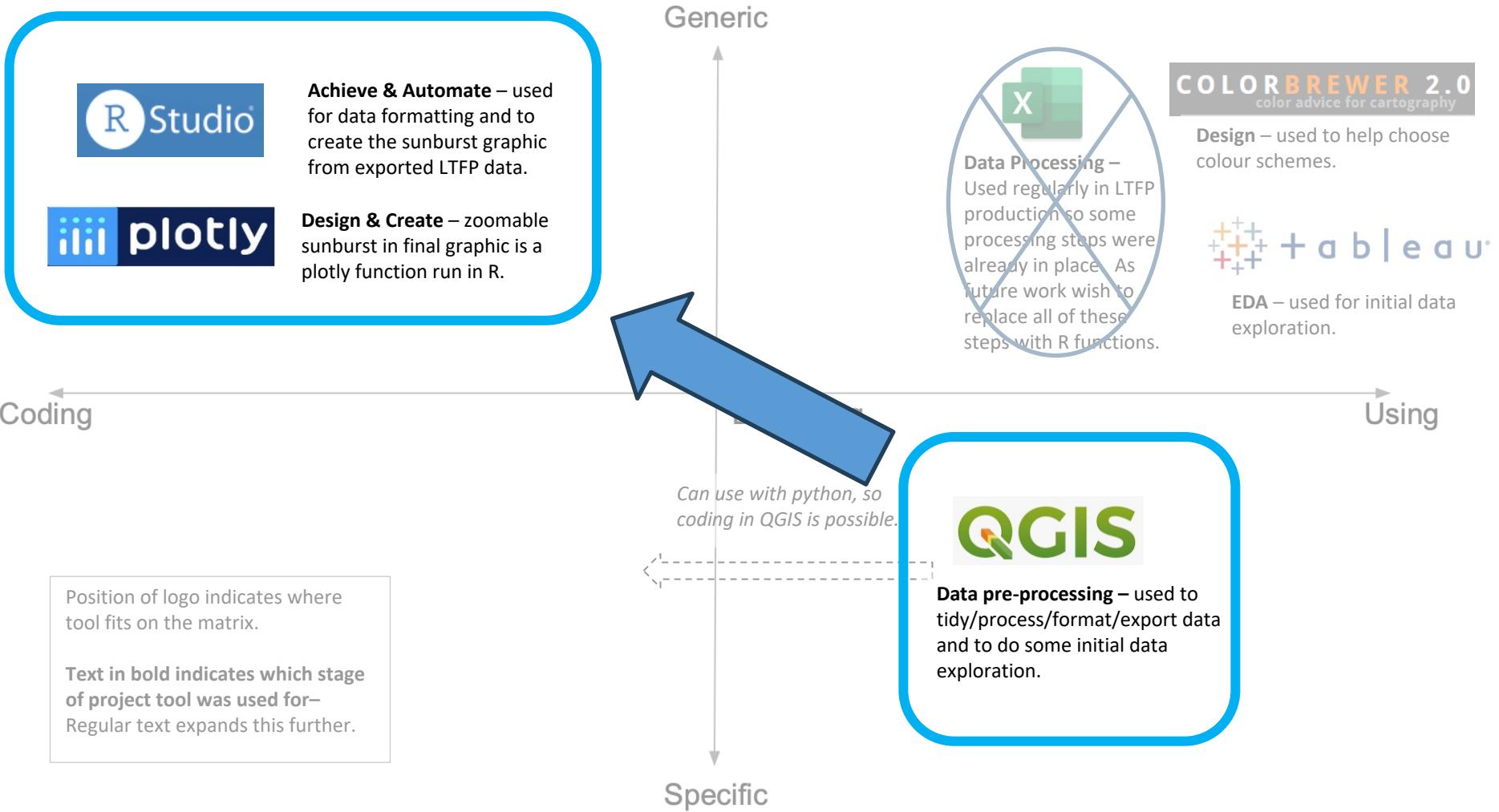
Second Tree Ring – Felling phase focus



Felling phase is focus,
current and restock
species in outer rings.

Future Thoughts...

- Use R for more processing
- Deal with species mixes
- Aggregate outer ring to show species before and after
- Automate extraction from QGIS spatial layer
- Link geom in...?





FOSS4GUK 2023

amy@cawdorforestry.com

Thanks to:

University of Edinburgh: Aba-Sah Dazie, Benjamin Bach

Stackexchange users: ismirsehregal, mtreg, Gilean0709,

indigofera suffruticosa

Cawdor Forestry

Doug Borthwick

