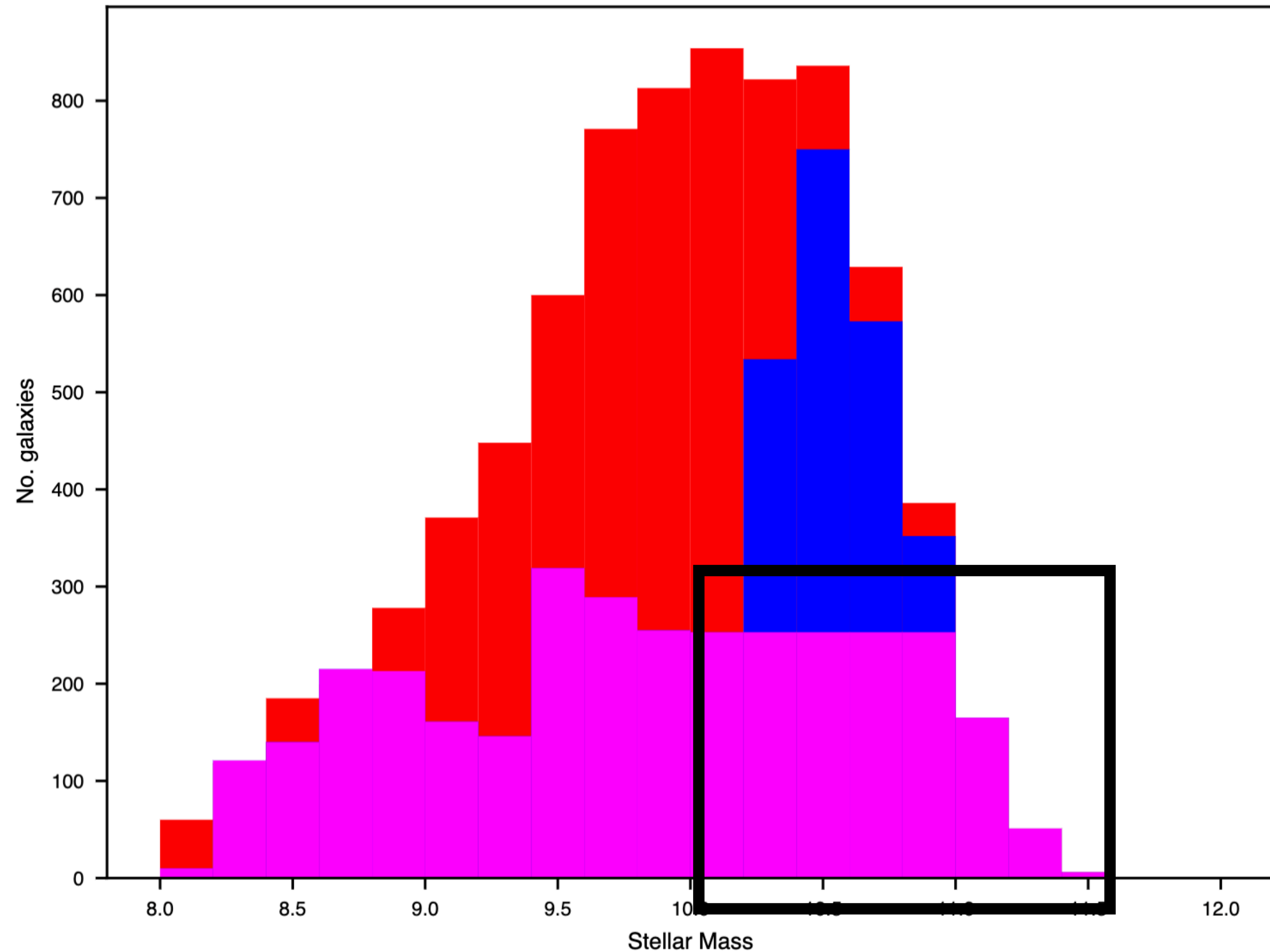# Target Selection Update and Overview

Recap of the Hector Target Selection

- Galaxies for the survey have been chosen to pass a series of steps in the redshift/mass plane.

- These are very similar to the SAMI steps.

- We also require Re > 1.5"

- Galaxies are then sparsely sampled in stellar mass above 10^10.5 solar masses to flatten off the peak of the stellar mass function

Observations by Field

Field	RA (degrees)	DEC (degrees)	Type	% Observed
A0151	17.10920	-15.40920	Cluster	0
A3158	55.77040	-53.65310	Cluster	0
A3266	67.77460	-61.44360	Cluster	0
A3376	90.15290	-40.03260	Cluster	78
A3391	96.58590	-53.69330	Cluster	10
A3395	96.88000	-54.43740	Cluster	10
A3667	303.09170	-56.81520	Cluster	88
A3716	312.8600	-52.70700	Cluster	75
A2399	329.37260	-7.796920	Cluster	82
A0119	14.067150	-1.255370	Cluster	26
A0085	10.460211	-9.303184	Cluster	60
G12	180	0	WAVES-North	29
G15	225	0	WAVES-North	33
G23	345	-32.5	WAVES-South	24
H01	15	-30	WAVES-South	34
H03	45	-30	WAVES-South	53

Summary of Galaxy Statistics for Early Science

Target galaxies	5873
Observed galaxies (incl. commissioning, repeats,wrong IDs)	3078
Unique Observed galaxies	1913
Unique Observed galaxies – Clusters	934
Unique Observed galaxies – WAVES North	400
Unique Observed galaxies – WAVES South	579
Unique Milky Way analogues	136
Unique Edge-on wind candidates	94
Unique Dwarf galaxies	718

Available catalogue of unique observed galaxies (1913) with properties such as redshift, stellar mass, photometry etc:

TS wiki page

DataCube Release v02 page

galaxies_observed_20241212   Download

Observed Galaxy Catalogue vs. Datacubes

Note that there are **1581 unique galaxies with datacubes AND properties from input catalogue**.

The missing 1688(unique galaxies with datacubes from release_catalogue_v0_02.csv + release_skip_v0_02.csv) -1581=107 galaxies

(39 in clusters and 68 in WAVES) are due to:

* 1 cluster galaxy not in the source cluster catalogue

* 38 SAMI cluster galaxies – not in the Hector input catalogue

* 38 WAVES galaxies not in the source WAVES catalogue (commissioning data 221019_221030)

* 30 WAVES galaxies not in the Hector input catalogue (due to random seeding not working correctly)

Issue with the Input Catalogue

Mismatch of Input Catalogue vs. Observed Galaxies: i.e. observed galaxies are NOT in the Input catalogue

>700 galaxies found in April 2024 - due to the seeding not working properly and overwrite of master catalogues not recoverable.

> ⚡ **Danger**
>
> The default choice of sub-sampling method during the target selection is *randomly selecting galaxies above a given stellar mass/colour*. I've tried very hard to ensure that I'm using a set random seed, such that if you ran this pipeline twice you'd get identical catalogues out. I can't guarantee that this will always be the case if you make changes to the code, however! **Please make a back up of the master catalogues for each region before running this code again.** If you overwrite the master catalogues they might not be recoverable, and this would make a huge mess going forward! This has already happened to me once, which is why I'm raising this point again (it's the reason we have a pipeline step to `add_previously_observed_galaxies_back_to_master_catalogue` - see below).

Reduced to **165 observed galaxies NOT in the Input catalogue** - **146 are not in the WAVES and Cluster source catalogues!**

Issue with the Input Catalogue

Mismatch of Input Catalogue vs. Observed Galaxies: i.e. observed galaxies are NOT in the Input catalogue

>700 galaxies found in April 2024 - due to the seeding not working properly and overwrite of master catalogues not recoverable.

- `add_previously_observed_galaxies_back_to_master_catalogue` : this rule adds back in galaxies which were observed in 2023/2023 which then ended up being removed when I updated the catalogues and re-ran the random sampling. The script is `workflow/scripts/add_observed_galaxies_to_master_catalogues.py` .

Reduced to **165 observed galaxies NOT in the Input catalogue** - **146 are not in the WAVES and Cluster source catalogues!**

Issue with the Input Catalogue

Aim to release Hector Input Catalogue in Feb 2025.

- check script "add_previously_observed_galaxies_back_to_master_catalogue"

- manually add missing observed galaxies that are in the source catalogues.

- But what about those ones that are not in the source catalogues?

Issue with Tiles - causing Repeats

1. Observed galaxies where not properly removed.

"CC"/"C" and "WW"/"W" ids treated as unique different galaxies.
Affected fields are **A3667**, **A3716**, A3376, **HO1,** G23, **HO3**.

Most affected field is A3667: 87 repeats
A3716: 26 repeats
HO3: 20 repeats

2. A85 and A119 catalogues used to generate the tiles have repeats (~members+members&foreground)

A85: 60 repeats
A119: 13 repeats

Total observed galaxies from 2024: 915 - out of which 225 (~20%) are repeats

These issues have been found and fixed in Nov 2024 once I run for the first time:
-Input catalogues
-Full Tiling

Issue with Tiles - causing Repeats

1. Minor issues: dwarfs and SNAFU tiles

Dwarfs will be observed 1 time from Nov 2024.

SNAFUs are manually done tiles with constraints on the guide stars configuration.

Repeats in the cubes (from Sree)

Repeats	# galaxies
6	9
5	14
4	25
3	112
2	310
0	1193

470 total repeats

Discussion Points

- Observing strategy for 2025

- TS tasks on the wiki

TS goals for 2025

Release Hector Input Catalogue - consistent with observed galaxies and datacubes

Improvements on tiling

Regular TS meetings