

# Survey Strategy White Papers

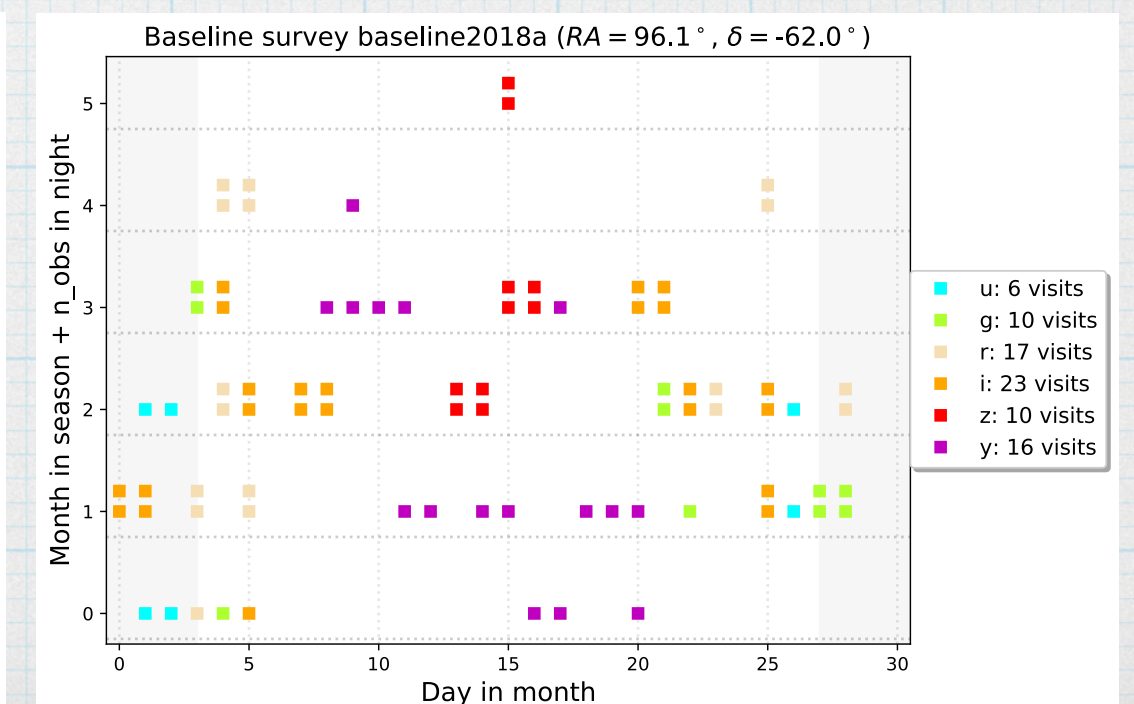
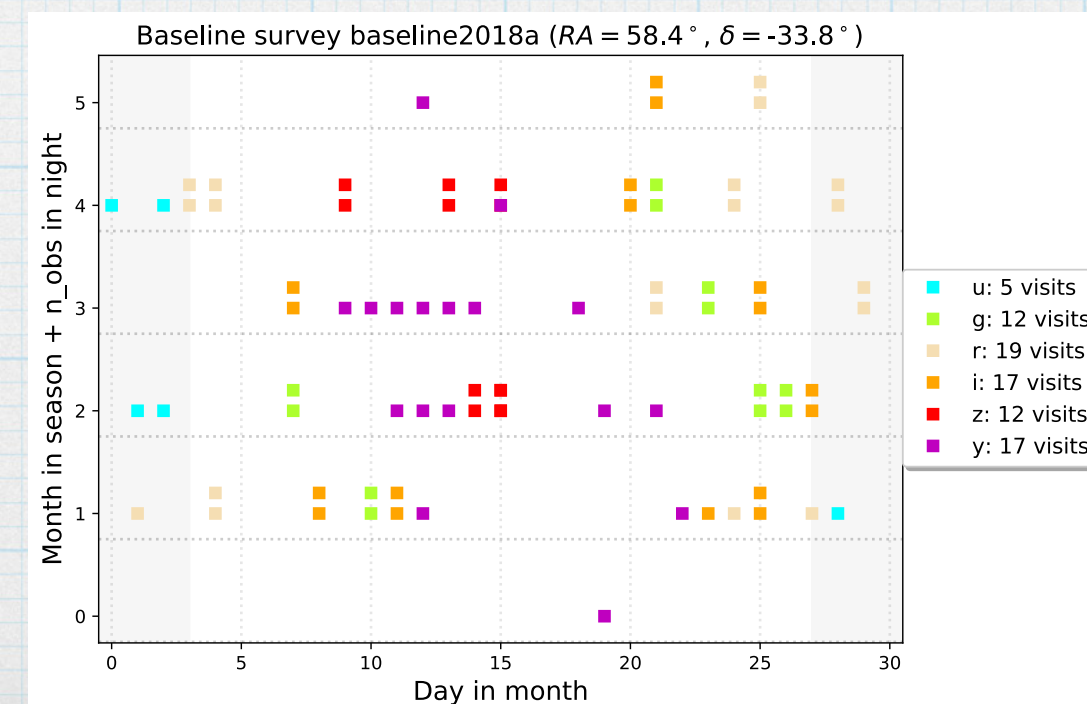
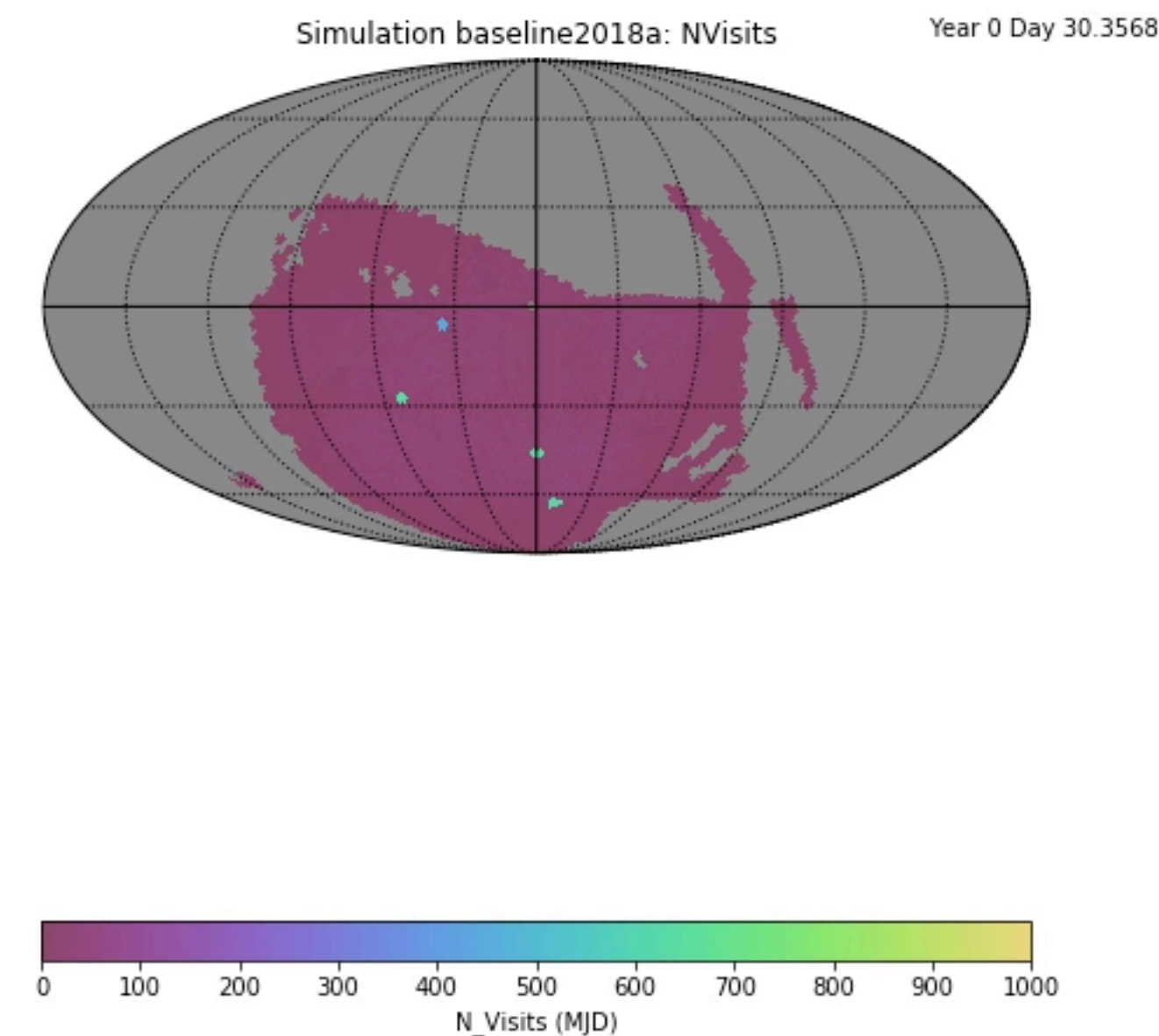
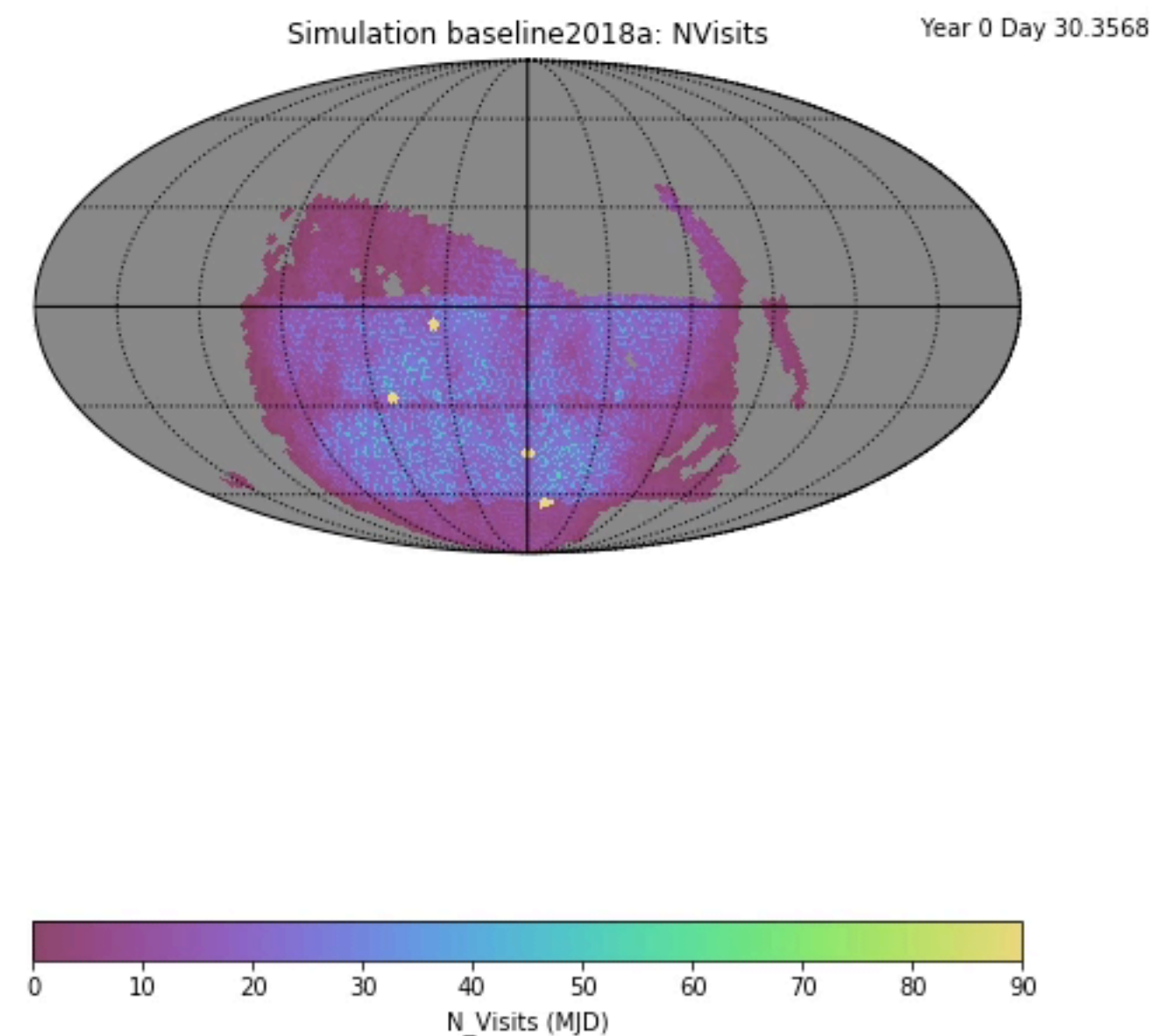
Lynne Jones, Peter Yoachim, Tiago Ribeiro, Zeljko Ivezić

<i>Received 46 white papers</i>	
WFD/All Sky	20 (10 cadence)
Deep Drilling Fields	4
Mini-Surveys	26
ToO	3



# How should LSST survey the sky?

- \* Every night for 10 years (~2.5M visits)
- \* Publish expected observations 1-2 hrs ahead
- \* Bright time, dark time, including non-photometric or bad seeing conditions
- \* Maximize efficiency - slew time AND best image conditions (seeing, sky brightness, filter) - and don't do anything 'obviously wrong'
- \* Optimize science - sky coverage, uniformity, timing/cadence .. science metrics — COMMUNITY HELP





# Survey Strategy Timeline

- \* ~~July 2018: Call issued July 2018~~
- \* ~~Nov 2018: White papers received~~
  - \* ~~<https://www.lsst.org/submitted-whitepaper-2018>~~
- \* Jan 2019: LSST Science Advisory Council (SAC) meeting to review white papers
- \* April 2019: LSST SAC recommendations for OpSim investigations
- \* Early 2020: Project delivers simulations to the "Survey Cadence Optimization Committee (SCOC)"
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- \* Late 2022: LSST Operations start

**+ COSEP ongoing**



# 46 white papers received

- \* ~7 requests for varying WFD footprint - further north (low-extinction footprint) or into galactic plane (galactic variability)
- \* ~10 requests for (different) cadences of visits in WFD
  - \* (lack of) visit gap requirements, rolling cadence
  - \* specify filters for pairs of visits; filters for triplets of visits
- \* 3 requests for WFD/all sky footprint minisurveys
  - \* 1-2 g band high airmass visits for DCR (AGN); short (5s) visits (photometric tie-in with Gaia); trailed (1s-15s) exposures (subsecond variability)



# 46 white papers received

- \* 3 ToO programs
- \* 3 co-observing with EUCLID or WFIRST
- \* 4 white papers on current/standard DD fields
  - \* cadence of observations, u band depth, location of 5th field
- \* ~11 minisurvey suggestions
  - \* follow specific targets for limited (intense) periods of time
- \* 1 paper on NES (solar system), 2 on general 'northern' coverage (DES, Euclid)
  - \* + short exposure, high X, twilight survey along ecliptic +/- 20deg (NEO)
- \* ~6 papers on galactic plane coverage, 1 on GP/SCP (stellar pops, variability, LMC/SMC)



# 46 white papers received

- \* Snap/visit exposure times:
  - \* Many prefer ~30s (1snap/visit) [7% more efficient]
  - \* But some still prefer 2x15s snaps - some in limited area only (white dwarf transits, rapid variability/saturation)
  - \* + 1 request for 2s/28s snaps
  - \* + minisurvey for 5s visits
  - \* + minisurvey for 1s-15s trailed images



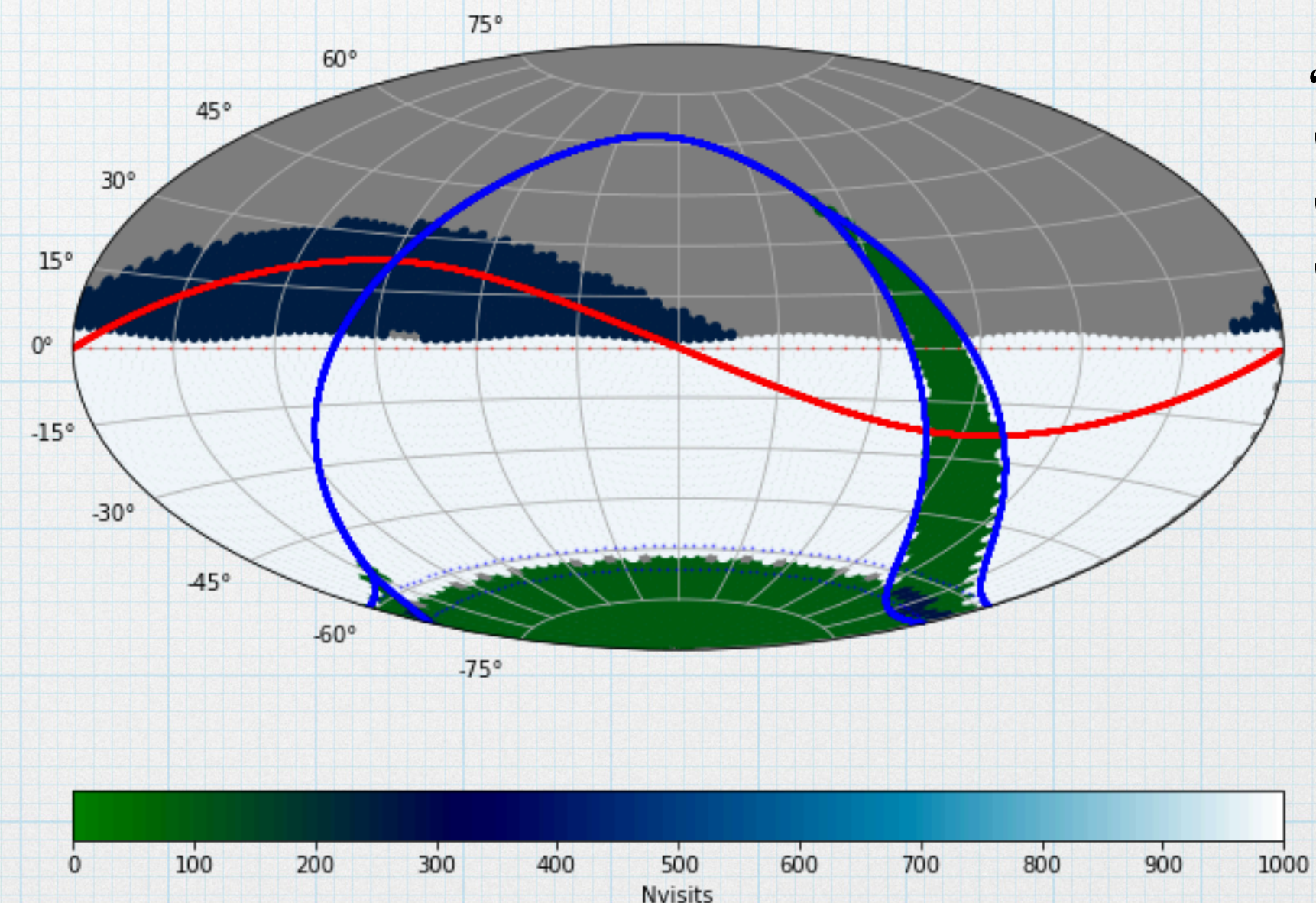
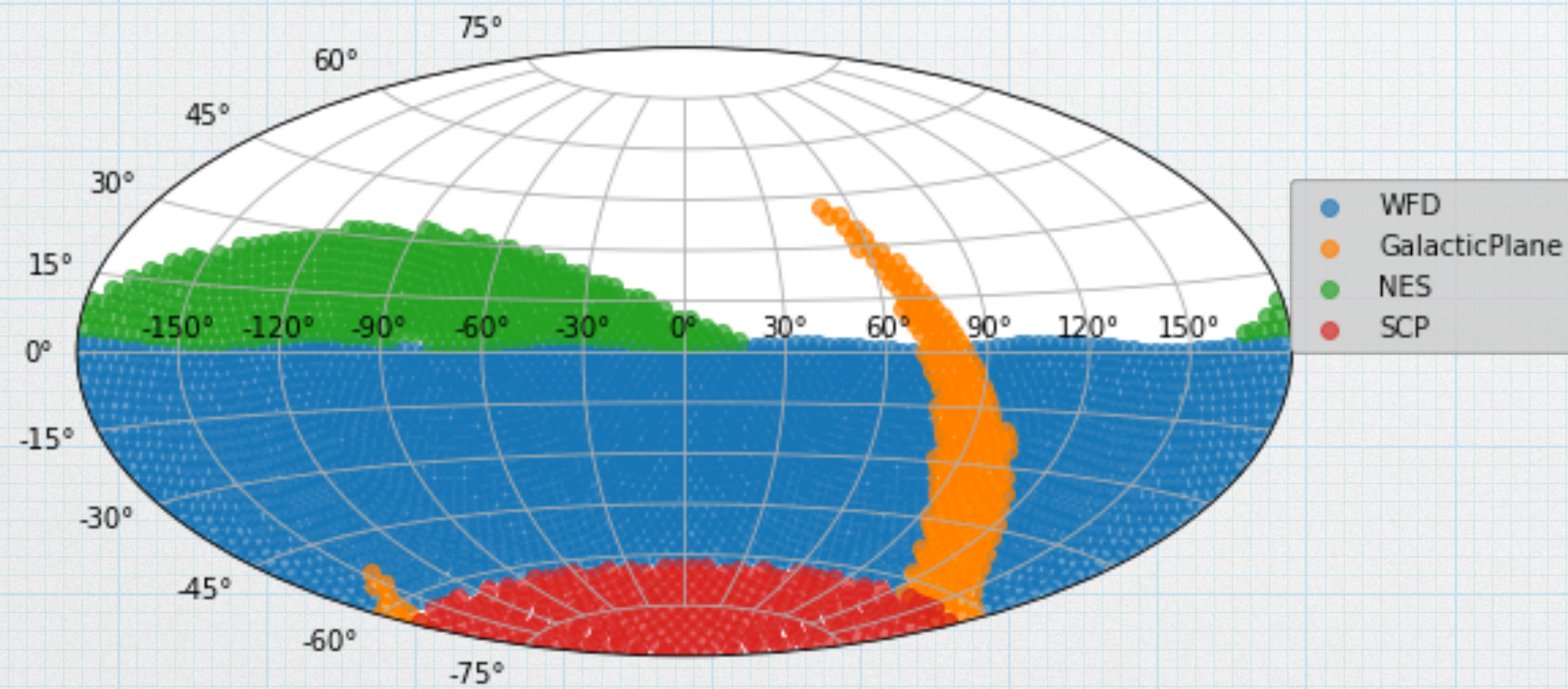
# Identifying 'Families' of simulations

Rough amount of time requested = 115-250%

Area (footprint) & number of visits: "LynneSim" tool

- See [https://github.com/lst-pst/survey\\_strategy\\_wp](https://github.com/lst-pst/survey_strategy_wp) repo

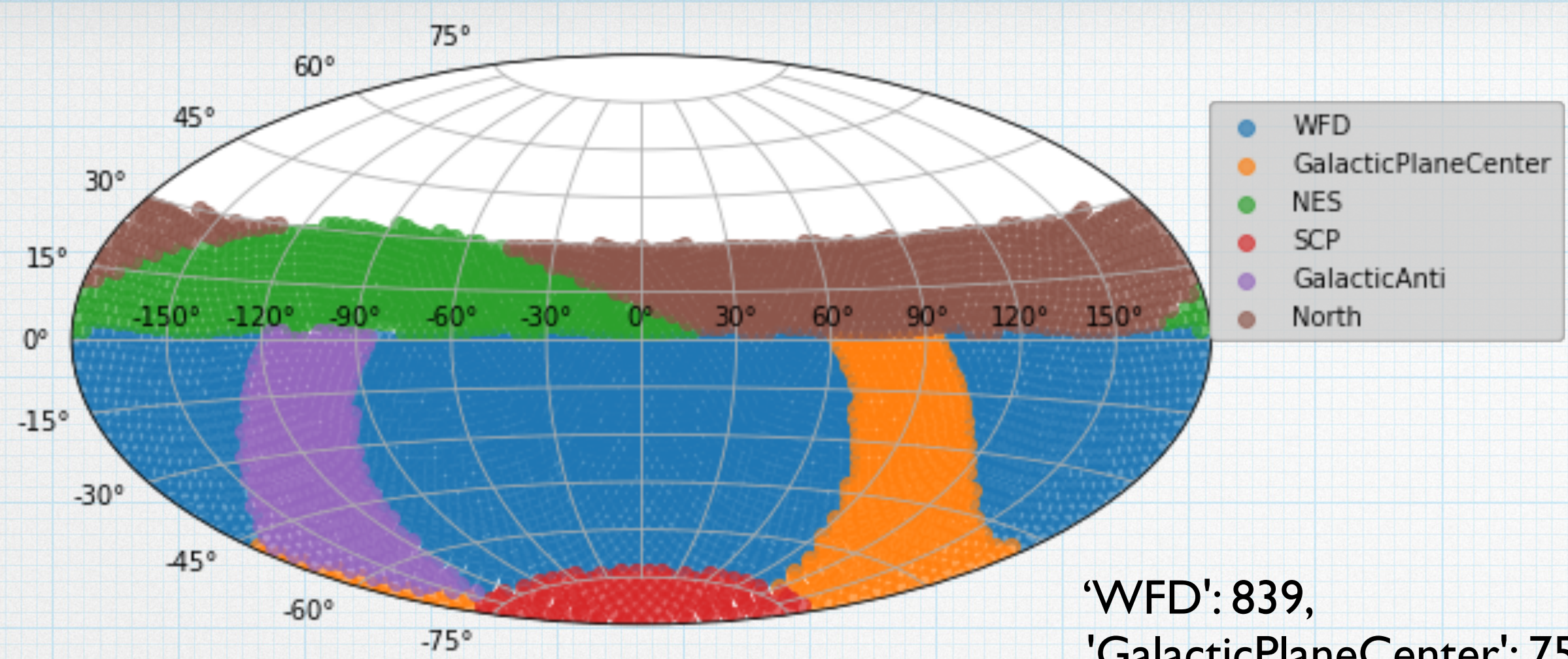
\*\* Blame Phil Marshall.



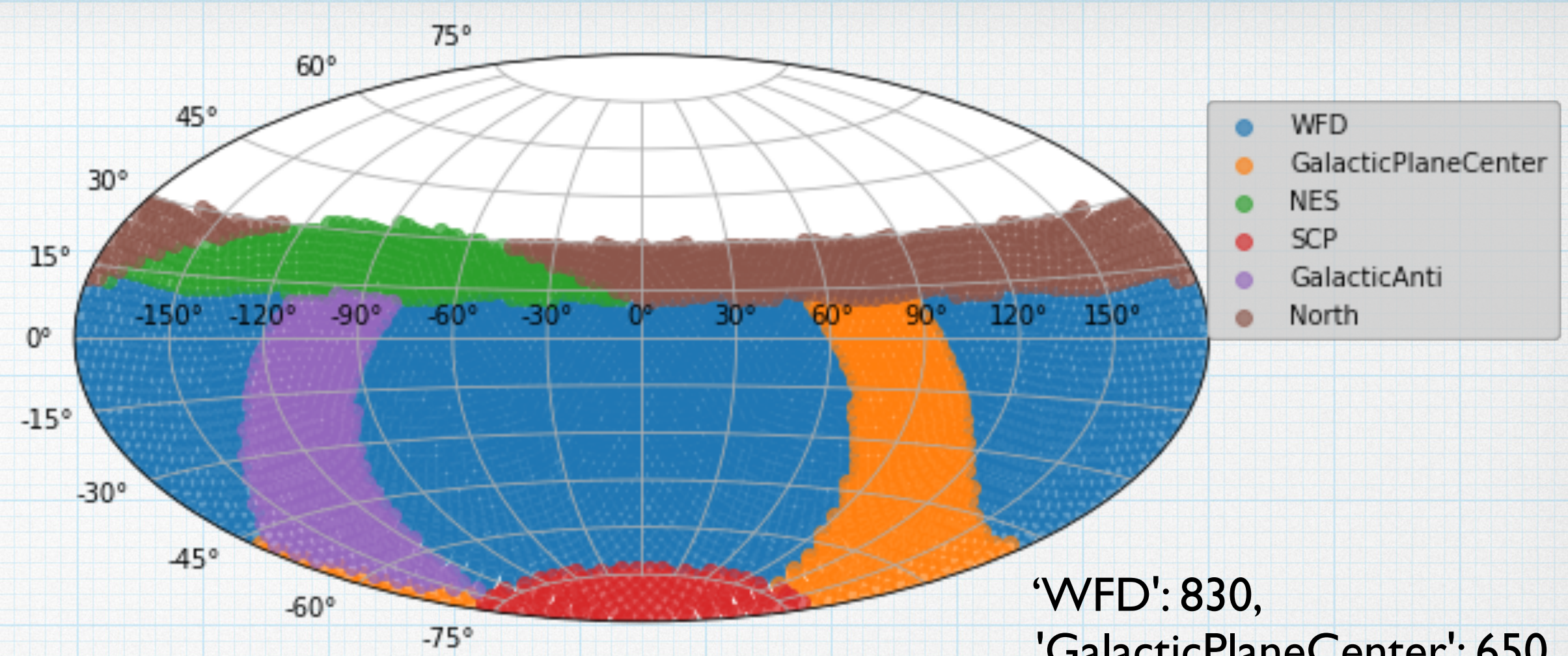
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'GalacticPlane': 90  
'NES': 255,  
'SCP': 90,

Previous baseline: 95% of visits in 2x15s (snaps) simulation

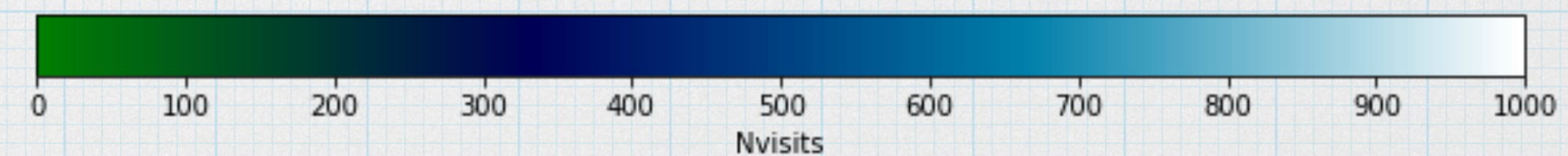
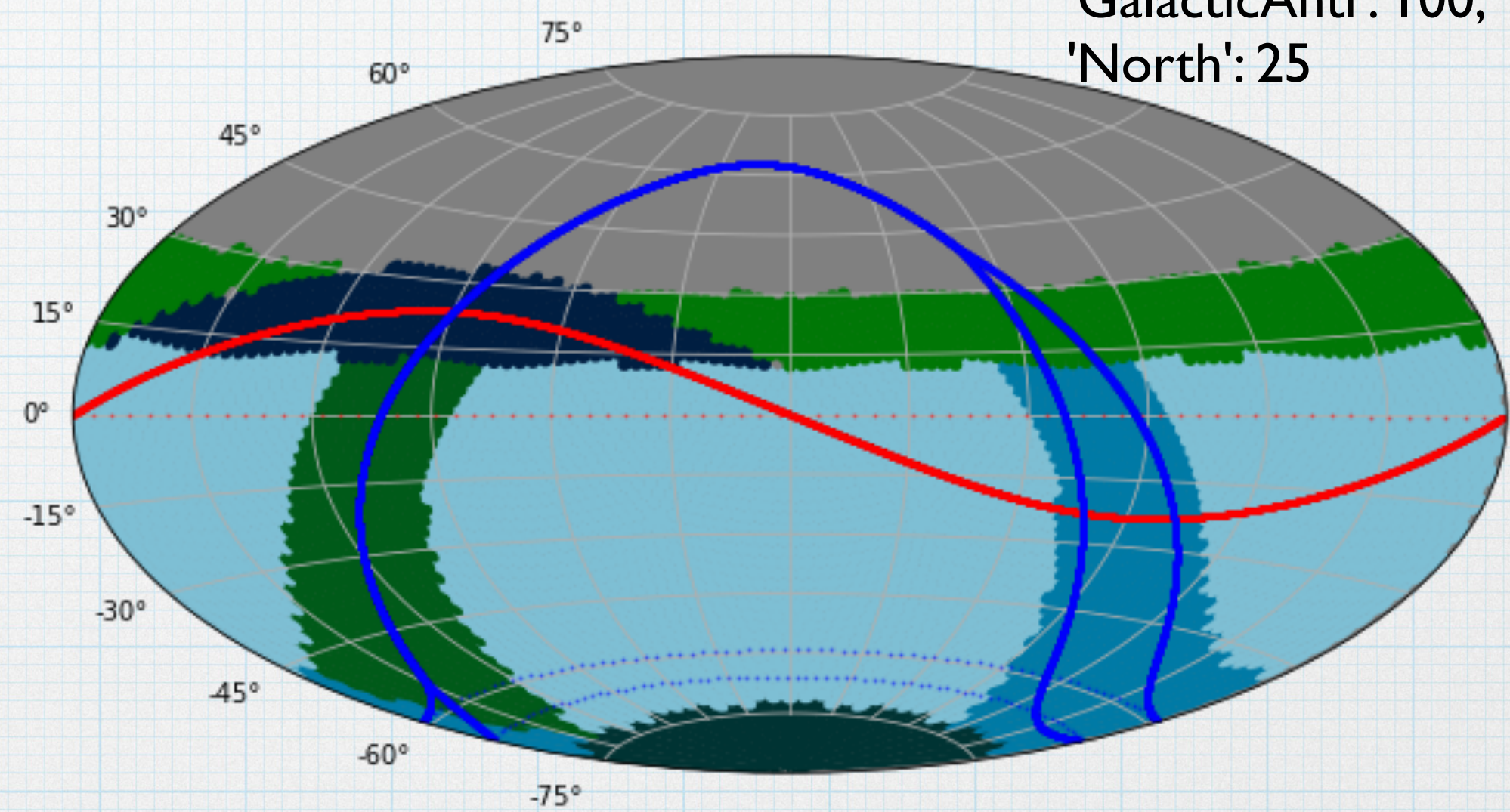
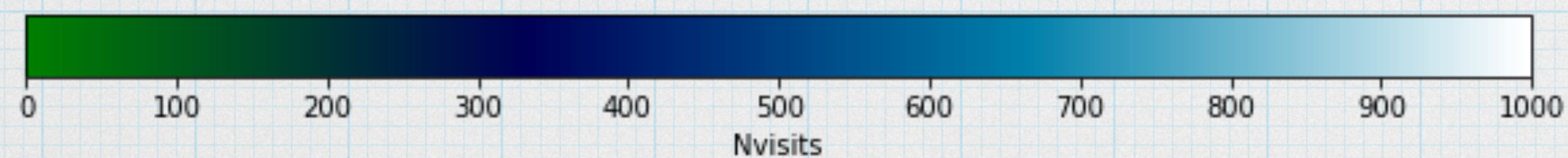
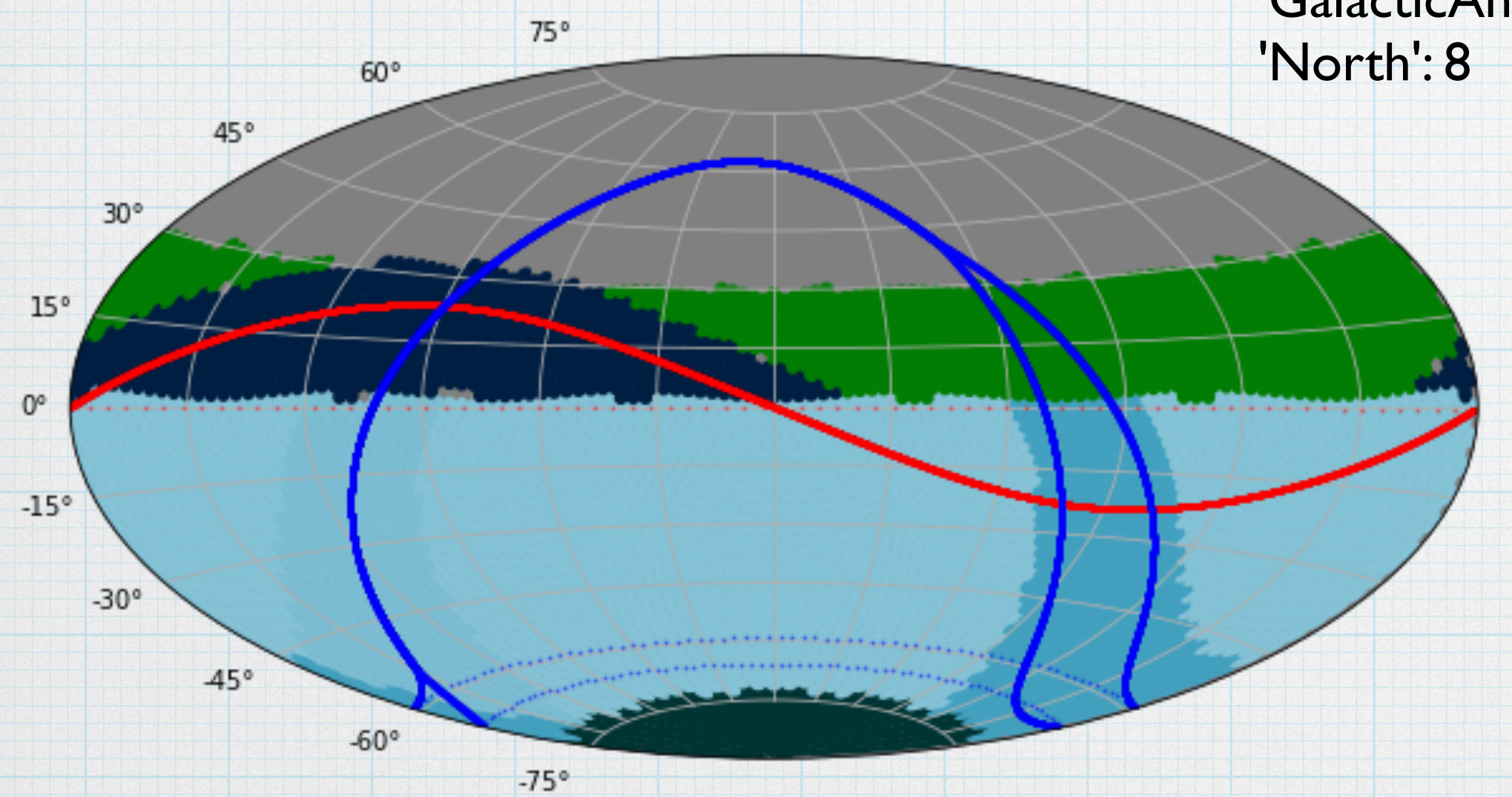




'WFD': 839,  
'GalacticPlaneCenter': 750,  
'NES': 255,  
'SCP': 200,  
'GalacticAnti': 825,  
'North': 8



'WFD': 830,  
'GalacticPlaneCenter': 650,  
'NES': 255,  
'SCP': 200,  
'GalacticAnti': 100,  
'North': 25



Potential new footprints: 95% of visits in 2x15s (snaps) simulation



# OpSim & MAF

- \* OpSim runs will be done with new “Feature Based Scheduler”
- \* More flexible than previous ‘proposal based scheduler’
- \* Runs faster - 10 year simulation in ~7 hrs
- \* MAF will keep previous metrics, plus adopt metrics from white papers & COSEP



# Families of simulations

- \* SRD requirements must be met (including 825 visits/18k sq deg)
- \* Must do snaps/no-snaps simulations
- \* Variations on footprint - add/remove components, vary WFD
- \* Variations on cadence within the footprint
  - \* Rolling cadence, intra-night cadence (pairs/no pairs/filters)
- \* Variations on DD - cadence and 5th field
- \* Attempting to keep transparency in process - intermediate stages of opsim experiments will be released but should be understood as PRELIMINARY
- \* Intermediate feedback via additions to COSEP (science + metrics)



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