Baseline v2.0

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# Baseline v2.0 - comparison to baseline v1.7.1

	Site/ Conditions	Start Date	Total number of visits	Visits	Visit pairs
v1.7.1 **baseline_nexp2_v1.7.1_10yrs.db** **lsst_sims**	Seeing, cloud, skybrightness from lsst_sims	Oct 10, 2022	2,045,493	2x15s in ugrizy	Pairs in mixed filters, delta T 22 minutes
v2.0 **baseline_v2.0_10yrs.db** **rubin_sim**	Same data and code, now in rubin_sim	Oct 10, 2023	2,084,198	2x15s in grizy, 1x30s in u	Pairs in mixed filters, deltaT 33 minutes

Other things that are the same: *u* band swaps with *z* band at +/- 6 days around new moon, the sky tessellation is randomly dithered each night (but not within a night), & there are 5 DDFs allocated 5% of the total survey time.

v1.7.1 to v2.0 Footprint evolution

- General idea of the footprint maintained (WFD area with ~825 visits per pointing; mini-survey regions with 'few 100s' of visits per pointing, 5 DDFs)

baseline_nexp2_v1.7.1_10yrs : Nvisits

baseline_v2.0_10yrs NVisits
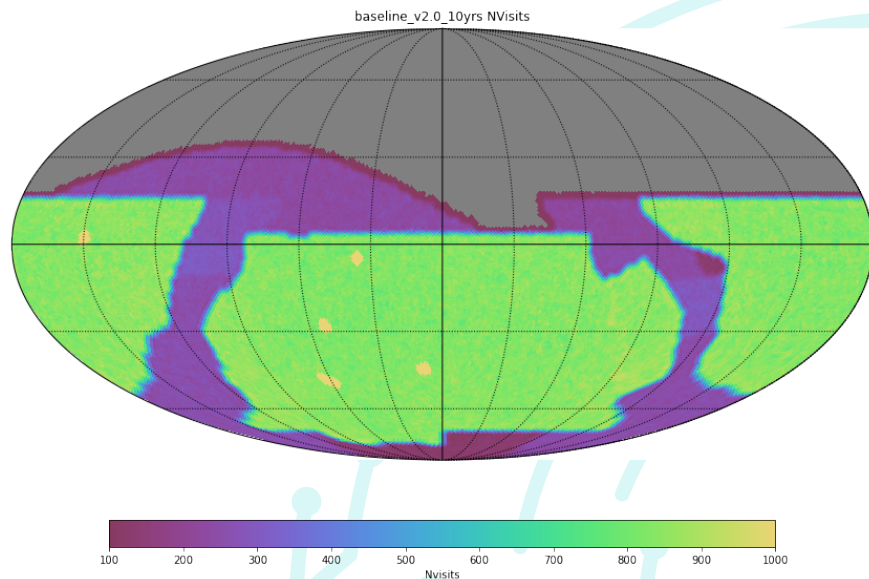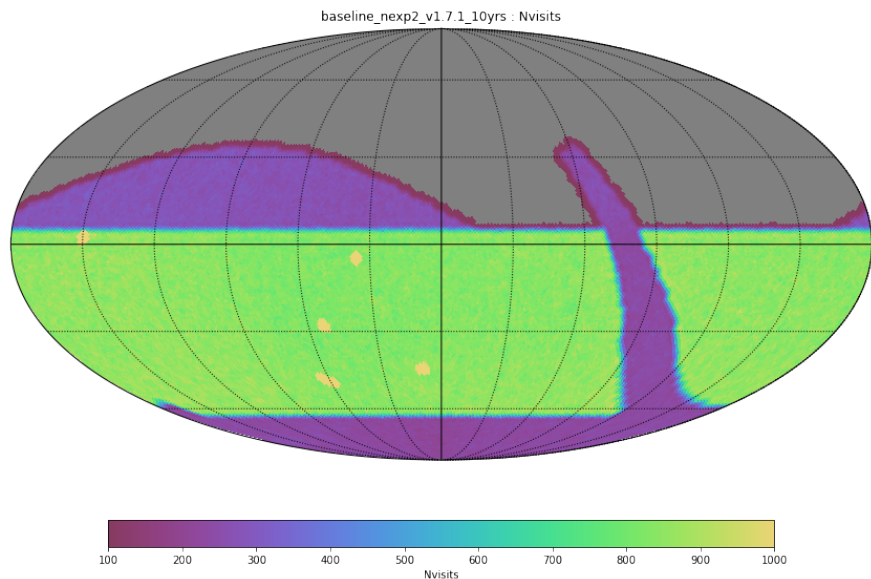
v1.7.1 to v2.0 Footprint evolution

- WFD-level area shifted: includes larger low-dust-extinction area, adds Galactic Bulge and Magellanic Cloud coverage.
- Adds area to the mini-survey regions, especially galactic plane / dusty plane.
- Reduces number of visits per pointing in most regions.

WFD

	baseline_nexp2_v1.7.1_10yrs	baseline_v2.0_10yrs	ratio
Area (750 visits)	18140.492848	18620.568813	1.026464
Area (825 visits)	14469.422443	12893.228978	0.891067
Dust-free area	15108.124907	16711.175770	1.106105
Median Nvisits/pointing	846.000000	839.000000	0.991726

WFD + mini surveys

	v1.7.1	v2.0	ratio
Nvisits wfd	846.00	837.00	0.99
Nvisits nes	277.00	253.00	0.91
Nvisits galactic plane	242.00	260.00	1.07
Area wfd	18196.73	18621.41	1.02
Area nes	3853.20	4302.22	1.12
Area galactic plane	1955.55	4984.56	2.55

Addition of rolling cadence in low-dust WFD

- 2-region (4 separate bands) rolling cadence in low-dust WFD

  - Starts at year 1.5, ends at year 8.5 — 6 'seasons' rolling, 4 non-rolling

baseline_v2.0_10yrs year 1.0 all bands: NVisits
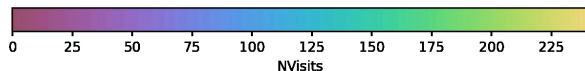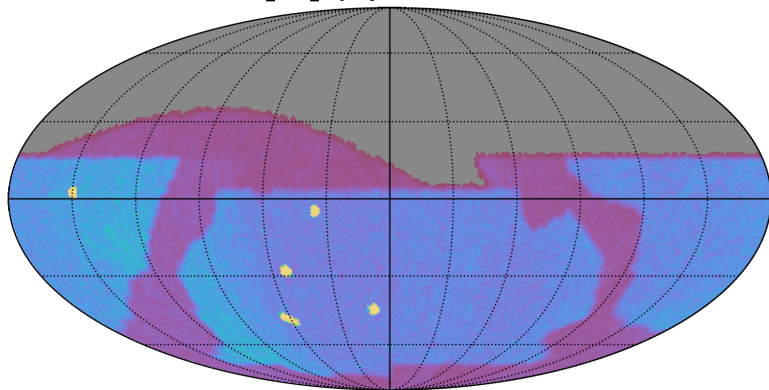
baseline_v2.0_10yrs year 1.0 i band: Exgal_CoaddM5
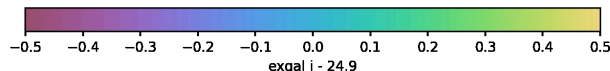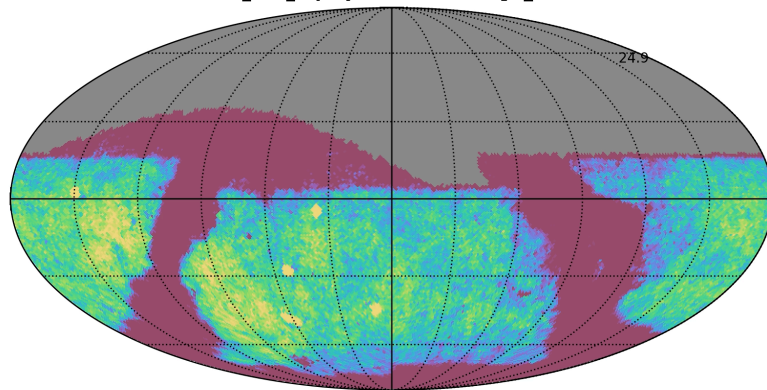
Rolling Cadence Task Force!

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baseline_v2.0_10yrs year 1.0 all bands: NVisits

NVisits

baseline_v2.0_10yrs year 1.0 i band: Exgal_CoaddM5

exgal i - 24.9
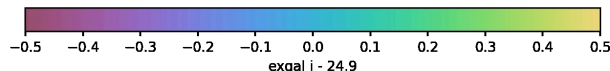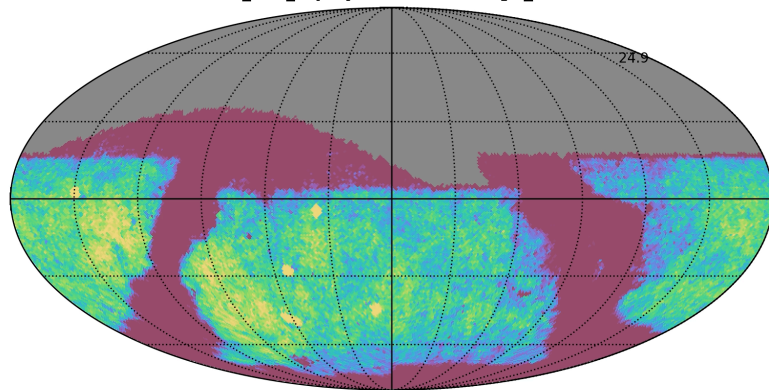
Rolling Cadence Task Force!

Other tweaks

- Twilight visits - now occur in pairs with 15 minute separation (previously were single visits)
- The galactic bulge and Magellanic Clouds get WFD-level visits but with a slightly different filter distribution
- Some code internals
  - Dithering setup

NVisits

Metrics

SRD

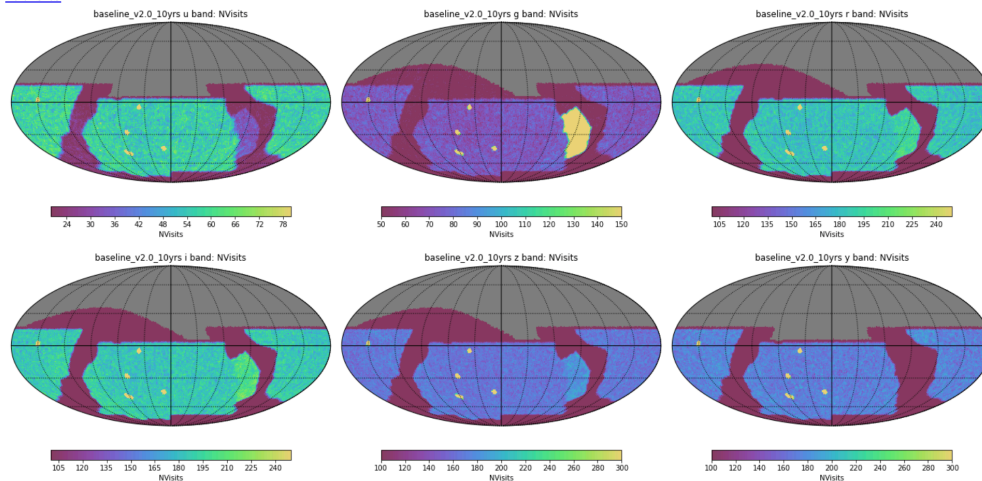|	baseline_nexp2_v1.7.1_10yrs	baseline_v2.0_10yrs	ratio
fONv MedianNvis	846.000000	839.000000	0.991726
Med Parallax Error @22.4	2.324527	2.423048	0.959340
Med Parallax Error @24.0	9.384408	9.831244	0.954549
Med PM Error @20.5	0.184721	0.190588	0.969213
Med PM Error @24.0	2.215858	2.344119	0.945284

SSO

	baseline_nexp2_v1.7.1_10yrs	baseline_v2.0_10yrs	ratio
Completeness PHA H<16.0	0.887400	0.923600	1.040793
Completeness PHA H<22.0	0.569683	0.577204	1.013201
Completeness NEO H<16.0	0.886200	0.908600	1.025276
Completeness NEO H<22.0	0.555529	0.563040	1.013520
Completeness MBA H<16.0	0.989998	0.984797	0.994746
Completeness MBA H<21.0	0.563723	0.526529	0.934021
Completeness Trojan H<14.0	0.988000	0.991000	1.003036
Completeness Trojan H<18.0	0.465999	0.423072	0.907882
Completeness TNO H<6.0	0.669021	0.684212	1.022706
Completeness TNO H<8.0	0.462489	0.464019	1.003309

Cosmology

	baseline_nexp2_v1.7.1_10yrs	baseline_v2.0_10yrs	ratio
Median coaddedM5 i band	2.625684e+01	2.618305e+01	0.997190
RMS coaddedM5 i band	1.132731e-01	1.112236e-01	1.018427
Effective survey area	1.510812e+04	1.671118e+04	1.106105
3x2pt FoM	3.466240e+01	3.790813e+01	1.093638
3x2pt simple FoM	4.228483e+02	4.649389e+02	1.099541
NGal in exgal footprint	4.141440e+09	4.568638e+09	1.103152
Mean NVisits (WL)	1.847301e+02	1.859603e+02	1.006659

TVS

	baseline_nexp2_v1.7.1_10yrs	baseline_v2.0_10yrs	ratio
Mean PeriodDetection P=0.5 days	2.839290	2.964734	1.044182
Microlensing 1-10 days	1538.000000	4739.000000	3.081274
Microlensing 10-30 days	3016.000000	6796.000000	2.253316
Microlensing 30-100 days	6554.000000	9322.000000	1.422338
Microlensing 100-1000 days	9573.000000	9717.000000	1.015042
KNe	997.000000	932.000000	0.934804
TDE	103.000000	100.000000	0.970874
SNIa	19754.919000	25374.969000	1.284489
SLSN	8.562738	8.116086	0.947838

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		100.000000	0.970874

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N_NEO <=22.0, 3 in 15 nights	15119.202284	15329.920774	1.013937
N_NEO <=22.0, 3 in 30 nights	16248.952481	16468.760622	1.013528
N_NEO <=25.0, 3 in 15 nights	59346.635650	56195.223331	0.946898
N_NEO <=25.0, 3 in 30 nights	70124.583405	64516.499093	0.920027

(from overlapping row: 25374.969000 | 1.284489; 8.116086 | 0.947838)

Baseline v2.0 - comparison to baseline v1.7.1

- Baseline v2.0 = 'baseline_v2.0_10yrs.db'
  - Made with scheduler code in rubin_sim
- Baseline v1.7.1 = 'baseline_nexp2_v1.7.1_10yrs.db'
  - Made with scheduler code in sims_featureScheduler

- Pretty much the same code, but we have added some new minor new features
  - (Note that *MAF* code is different in that now we use the camera footprint by default, instead of a circular aperture, so metric results will always be slightly different)
- For extra comparison purposes:
  - baseline_nexp2_v1.7.1_10yrs.db == retro_baseline_v2.0_10yrs.db (these should be very close, and retro_baseline does not use new FBS code features, but was run with rubin_sim)
  - retro_retrofoot_v2.0_10yrs.db == v1.7.1 configuration, but add new code features
  - baseline_v2.0_10yrs.db == new updated baseline

v1.7.1 to v2.0 Footprint evolution

- RA/time balancing of the footprint

baseline_v2.0_10yrs NVisits

Lambert azimuthal equal-area view

Footprint area as function of RA