Control Outputs in ReefMod explained (By Karlo, back in May-June 2020) :

RESULT.COTS_records(t).COTS_criteria,

- `criteria1(:,1)=sorted_indices_all;%reef indices after permutation in order in which they will be visited, first priority list then nonpriority then others`
- `criteria1(:,2)=sorted_COTS_density;%COTS total density per tow that needs to correspond to list of reefs in 1st column (Per tow numbers are reef-level densities adjusted with detectability)`
- `criteria1(:,3)=sorted_ET_density;%COTS ET density per tow that needs to correspond to list of reefs in 1st column`
- `criteria1(:,4)=sorted_pref_coral;%current coral cover of preferred types that needs to correspond to list of reefs in 1st column`
- `criteria1(:,5)=COTS_current_tow_density;%unsorted COTS density per tow per reef to check that the sorting was not broken (i.e. in order from 1 to 3806)`
- `criteria1(:,6)=current_COTS_ET;%unsorted COTS ET density per tow per reef to check that the sorting was not broken`
- `criteria1(:,7)=current_pref_coral;%unsorted current coral cover of preferred types per reef to check that the sorting was not broken; check against coral cover 2D`
- Eighth column `criteria1(:,8)` always contain zeroes

RESULT.COTS_records(t):

- RESULT.COTS_records.betarndN stores distribution (proportion of Cots per site)

- META stores the list of COTS control sites calculated from the perimeter, and whether reef and global triggers are used; check triggers as needed

- COTS_ET (Same values as in 6th column of criteria): COTS densities at ET `unsorted COTS ET density per tow`
- control_record: visited reef in order,
- sites_dives: visited sites on that reef in order and how many team dives were performed on each site. You can then use this to compare it to ET thresholds, and overall COTS per tow on a reef.
- sites_initial: reef-level COTS across 16 size classes redistributed to individual sites that are then checked to see if they were over ET, so this is useful to check whether all sites were hit and how redistribution converts total COTS to sites, e.g. whether there are still reefs with high levels of reef-wide COTS and therefore high damage from COTS but that never get controlled because redistribution to lots of sites means they never get above ET (which would mean that redistribution is not working as intended and is causing us to miss major outbreaks) .
- sites_final: values after control (same time step as sites_initial), so all sites that were over ET should now be below ET and have their population reduced. (this is current_COTS re-distributed)
- COTS_initial: Converting to COTS per tow (using YM's method) should allow you to quickly check that the control is not missing reefs with major COTS populations that it should be treating.

- COTS_final: to see effect of control (at site level) on overall levels of COTS on a reef, which is actually used by ReefMod to calculate the damage to coral cover.

- `control_records(cnt1).size_classes_pre_control=record_site_pre_densities;%record size classes for each site that was controlled prior to actually doing the control; hopefully easier to keep track of pre and post control site densities; the rows here match with sites that were recorded in sites_dives`
- `control_records(cnt1).size_classes_post_control=record_site_post_densities;%record size classes for each site that was controlled after the control; hopefully easier to keep track of pre and post control site densities; again, the rows here match with sites that were recorded in sites_dives`
- `control_records(cnt1).COTS_post_control_densities=(site_ETtow/0.015)*this_cpcp;%record COTS_post_control_proportions i.e what the densities should maximally be for each size class when reef is at ET; if the site is treated, post-control density at specific size classes should be at (if it was higher) or below (stays the same) these values`
- `control_records(cnt1).COTS_post_control_proportions=this_cpcp;%proportions of different size classes in terms of how they contribute to the overall ET; e.g. a value of 0.5 for a size class means that at maximum 50% of the density at ET should be in this size class; size classes below min adult age are not affected and are set to 1`
- `control_records(cnt1).COTS_post_control_overall_ET=site_ETtow;%record overall ET for this reef/site; note that ET is decided at reef level the same as coral cover and is the same for all sites`
- `control_records(cnt1).sites_over_ET; %Records all the sites visited BUT not necessarily treated, because some have 0 CoTS so really is not representative of sites over ET. But checking dive sites, These are not investing any effort so OK`

Explanation of variables downloaded by Caro (From Script: concatenate_control_outputs)

Loaded variables from Control Outputs
RESULT.COTS_records(24:85) Only years from start of control

From COTS_records.COTS_criteria (i.e. before control)

Outbreaks= Data for reefs above 0.22 cots per tow (i.e. from incipient levels of outbreak)
cots= CoTS tow densities (Reef-level) criteria (this should be the same as reftow?)
pfood= Cov of preferred food (criteria)- same as reftaxa?
ET= CoTS densities at ET

From COTS_records.control_record (visited reefs only)
Controlled= The reef ID
Vreefs=No. of visited reefs per time step
Crfid = ID of visited reefs per ts