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*** SAS code to reproduce monte carlo runs for SW Fl Tidal Creeks

data all; set c.wq_hab_strat_analysis_for_R;
      if fixed = "No";
      ltn=log(tn_mgl);
      ltp=log(tp_mgl);
proc sort; by creek;
run;

proc means data=all noprint;
      var tn_mgl tp_mgl ltn ltp;
      output out=nlogs(drop=_type_ _freq_) mean= tn_mgl tp_mgl ln_tn ln_tp   std= std_tn std_tp
lnstd_tn lnstd_tp ;
run;

data pull; set nlogs;
 call symput('std',lnstd_tn);
run;

** set mean between 0.20 and 0.50 by 0.1;
%do vr=20 %to 50;
data three;
   r = &vr. /100;
do i=1 to 10000;
      x=exp(r + &std.*rannor(29584));
     output;
  end;
run;

proc surveyselect noprint data=three method = urs sampsize = 6
       rep=10000 seed=12345 out=four outhits;
  run;

data five; set four;
      ln_x = log(x);
proc sort; by replicate;
run;

proc means data=five noprint; by replicate;
      var ln_x;
      output out=six mean=;
run;

data geo; set six;
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      geo_mean=exp(ln_x);
      cnt65=0;
      cnt54=0;
      if geo_mean > 1.65 then cnt65=1;
      if geo_mean > 1.54 then cnt54=1;
      Log_mean = "&vr.";
      true_geo = exp(&vr./100);
run;


proc means mean data=geo;
      var cnt65 cnt54;
output out=geo_cnt mean=exceed65 exceed54;
run;

*** the 5th percentile is what we are looking for;

data geo_cnt2; length Log_Mean $10.; set geo_cnt;
      Log_mean = "&vr.";
      true_geo = exp(&vr./100);
run;

proc append data=geo_cnt2 base=all_cnts;run;

%end;

%mend main;
%main;run;


data c.all_cnts; set all_cnts;run;

/*
When the true log_mean value is .26 (26 for purposes of loop), the Peninsula threshold is exceeded
4.9% of the time which corresponds to a geometric mean of 1.297 which was rounded to 1.30

When the true log_mean value is .33 (33 for purposes of loop), the West Central threshold is exceeded
slightly more than 5% of the time which corresponds to a geometric mean of 1.39. The iteration lower
resulted in a geomean of 1.37. Therefore 1.38 was chosen as the threshold for the West Central Region
*/
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