library(reshape2) Read in results from original data and original curve N Median IQR_TAV IQR_CPE GR_original_estimates = readRDS("GR_original_estimates.RDS") GR_original_estimates %<>% mutate(Locality = "Guana_River") PC_original_estimates = readRDS("PC_original_estimates.RDS") PC_original_estimates %<>% mutate(Locality = "Pellicer_Creek") GI_EC_R2_original_estimates = readRDS("GI_EC_R2_original_estimates.RDS") GI_EC_R2_original_estimates %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_2") GI EC R4 original estimates = readRDS("GI EC R4 original estimates.RDS") GI_EC_R4_original_estimates %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_4") All_original_estimates = rbind(GR_original_estimates,PC_original_estimates,GI_EC_R2_original_estimates,GI_EC_R4_o riginal_estimates) Read in results of new curve but original data Guana_River_Old_Data_New_Curve_results = readRDS("Guana_River_Old_Data_New_Curve_results.RDS") Guana_River_Old_Data_New_Curve_results %<>% mutate(Locality = "Guana_River") Pellicer_Creek_Old_Data_New_Curve_results = readRDS("Pellicer_Creek_Old_Data_New_Curve_results.RDS") Pellicer_Creek_Old_Data_New_Curve_results %<>% mutate(Locality = "Pellicer_Creek") Goose_Island_East_Cove_R2H3S1_Old_Data_New_Curve_results = readRDS("Goose_Island_East_Cove_R2H3S1_Old_Data_New_Cu rve_results.RDS") Goose_Island_East_Cove_R2H3S1_Old_Data_New_Curve_results %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_2") Goose Island East Cove R4H3S1 Old Data New Curve results = readRDS("Goose Island East Cove R4H3S1 Old Data New Cu rve_results.RDS") Goose_Island_East_Cove_R4H3S1_Old_Data_New_Curve_results %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_4") All_Old_Data_New_Curve_results = rbind(Guana_River_Old_Data_New_Curve_results,Pellicer_Creek_Old_Data_New_Curve_r esults, Goose_Island_East_Cove_R2H3S1_Old_Data_New_Curve_results, Goose_Island_East_Cove_R4H3S1_Old_Data_New_Curve_ results) Read in results of Heaton's Nonparametric method Guana_River = readRDS("GR_All_NP_results.RDS") Guana_River %<>% mutate(Locality = "Guana_River") Pellicer_Creek = readRDS("PC_All_NP_results.RDS") Pellicer_Creek %<>% mutate(Locality = "Pellicer_Creek") Goose_Island_East_Cove_Reef_2 = readRDS("GI_EC_R2_All_NP_results.RDS") Goose_Island_East_Cove_Reef_2 %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_2") Goose_Island_East_Cove_Reef_4 = readRDS("GI_EC_R4_All_NP_results.RDS") Goose_Island_East_Cove_Reef_4 %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_4") All_NP = rbind(Guana_River, Pellicer_Creek, Goose_Island_East_Cove_Reef_2, Goose_Island_East_Cove_Reef_4) Do some summary plots of the nonparametric methods All_NP %>% ggplot(aes(x = n, y = Median)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + facet_wra p(~Locality) + ggtitle("NP Median") NP Median Goose_Island_East_Cove_Reef_4 Goose_Island_East_Cove_Reef_2 2000 -1950 -1900 -Guana_River Pellicer_Creek 2000 -1950 -1900 -1850 **-**10 20 All_NP %>% ggplot(aes(x = n, y = NP_IQR)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + facet_wra p(~Locality) + ggtitle("NP_IQR") NP_IQR Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 125 **-**100 -75 **-**50 **-**Guana_River Pellicer_Creek ₽ 125 -100 -75 **-**50 **-**25 **-**20 15 15 10 10 All_NP %>% ggplot(aes(x = n, y = NP_95)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + facet_wrap (~Locality) + ggtitle("NP_95") NP_95 Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 200 -95 Guana_River Pellicer_Creek 200 -100 -20 15 10 10 n All_NP % ggplot(aes(x = n, y = NP_HDI)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + facet_wra p(~Locality) + ggtitle("NP_HDI") NP_HDI Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 250 **-**200 -150 -100 -Guana_River Pellicer_Creek ₽ 250 -200 -150 **-**100 -50 **-**20 All_NP %>% filter(Locality == "Guana_River") %>% select(-Median, -Locality) %>% reshape2::melt("n") %>% group_by (variable) %>% $ggplot(aes(x = n, y = value)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + facet_w$ rap(~variable) + ggtitle("Guana_River") Guana_River NP_IQR NP_95 NP_HDI 75 value o co 25 -All_NP %>% filter(Locality == "Pellicer_Creek") %>% select(-Median, -Locality) %>% reshape2::melt("n") %>% group _by(variable) %>% ggplot(aes(x = n, y = value)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + face t_wrap(~variable) + ggtitle("Pellicer_Creek") Pellicer_Creek NP_IQR NP_95 NP_HDI 200 -150 value 100 -All_NP %>% filter(Locality == "Goose_Island_East_Cove_Reef_2") %>% select(-Median, -Locality) %>% reshape2::melt $("n") %>% group_by(variable) %>% ggplot(aes(x = n, y = value)) + geom_jitter(width = 0.2) + geom_smooth(color = "$ orange") + facet_wrap(~variable) + ggtitle("Goose_Island_East_Cove_Reef_2") Goose_Island_East_Cove_Reef_2 NP_IQR NP_95 NP_HDI 90 value 00 -10 15 All_NP %>% filter(Locality == "Goose_Island_East_Cove_Reef_4") %>% select(-Median, -Locality) %>% reshape2::melt ("n") %>% group_by(variable) %>% ggplot(aes(x = n, y = value)) + geom_jitter(width = 0.2) + geom_smooth(color = " orange") + facet_wrap(~variable) + ggtitle("Goose_Island_East_Cove_Reef_4") Goose_Island_East_Cove_Reef_4 NP_IQR NP_95 NP_HDI 200 value Read in the ad hoc results Guana_River_R3H1S1_results = readRDS("Guana_River_R3H1S1_results.RDS") Guana_River_R3H1S1_results %<>% mutate(Locality = "Guana_River") Pellicer_Creek_R3H2S2_results = readRDS("Pellicer_Creek_R3H2S2_results.RDS") Pellicer_Creek_R3H2S2_results %<>% mutate(Locality = "Pellicer_Creek") Goose_Island_East_Cove_R2H3S1_results = readRDS("Goose_Island_East_Cove_R2H3S1_results.RDS") Goose_Island_East_Cove_R2H3S1_results %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_2") Goose_Island_East_Cove_R4H3S1_results = readRDS("Goose_Island_East_Cove_R4H3S1_results.RDS") Goose_Island_East_Cove_R4H3S1_results %<>% mutate(Locality = "Goose_Island_East_Cove_Reef_4") All_ad_hoc_results = rbind(Guana_River_R3H1S1_results,Pellicer_Creek_R3H2S2_results,Goose_Island_East_Cove_R2H3S1 _results,Goose_Island_East_Cove_R4H3S1_results) All_ad_hoc_results %>% filter(Median <= 2023) %>% ggplot(aes(x = n, y = Median)) + geom_jitter(width = 0.2) + geo m_smooth(color = "orange") + $geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = Median, color = "Original Data New Curve"),$ size = 2) + $geom_point(data = All_original_estimates, aes(x = N, y = Median, color = "Original Data Original Curve"), siz$ e = 2) +facet_wrap(~Locality) + ggtitle("TAV Median") **TAV Median** Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 2000 1900 -1800 colour Original Data New Curve Pellicer_Creek Guana_River Original Data Original Curve 1900 -1800 -15 25 20 All_ad_hoc_results %% ggplot(aes(x = n, y = cpe)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") + geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = cpe, color = "Original Data New Curve"), s $geom_point(data = All_original_estimates, aes(x = N, y = IQR_CPE, color = "Original Data Original Curve"), si$ ze = 2) +facet_wrap(~Locality) + ggtitle("CPE") CPE Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 333 4 1500 **-**1000 -500 colour cbe Original Data New Curve Guana_River Pellicer_Creek Original Data Original Curve 1500 **-**1000 -500 -15 10 20 All_ad_hoc_results %>% ggplot(aes(x = n, y = tav_iqr)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = tav_iqr, color = "Original Data New Curve"), size = 2) + $geom_point(data = All_original_estimates, aes(x = N, y = IQR_TAV, color = "Original Data Original Curve"), si$ ze = 2) +facet_wrap(~Locality) + ggtitle("TAV IQR") TAV IQR Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 2000 -3:: 1 1500 -1000 -500 colour tav_iqr - 0000 - Original Data New Curve Guana_River Pellicer_Creek Original Data Original Curve * 1500 -1000 -500 -15 All_ad_hoc_results % ggplot(aes(x = n, y = cr_0.95)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange") geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = cr_0.95, color = "Original Data New Curve"), size = 2) + facet_wrap(~Locality) + ggtitle("TAV CR 0.95") **TAV CR 0.95** Goose_Island_East_Cove_Reef_4 Goose_Island_East_Cove_Reef_2 2000 -1500 -1000 -500 cr_0.95 colour Guana_River Pellicer_Creek Original Data New Curve 1500 -1000 -500 - $All_ad_hoc_results %>% ggplot(aes(x = n, y = tav_hdi)) + geom_jitter(width = 0.2) + geom_smooth(color = "orange")$ geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = tav_hdi, color = "Original Data New Curve"), size = 2) + facet_wrap(~Locality) + ggtitle("TAV HDI 0.95") TAV HDI 0.95 Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 2000 -1500 -1000 -500 tav_hdi colour Guana_River Pellicer_Creek Original Data New Curve 2000 -1500 **-**1000 -500 -20 25 15 All_ad_hoc_results %>% ggplot(aes(x = n, y = hdi_of_hdi)) + geom_jitter(width = 0.2) + geom_smooth(color = "orang") geom_point(data = All_Old_Data_New_Curve_results, aes(x = n, y = hdi_of_hdi, color = "Original Data New Cur ve"), size = 2) +facet_wrap(~Locality) + ggtitle("TAV HDI (0.5) of HDI (0.5)") TAV HDI (0.5) of HDI (0.5) Goose_Island_East_Cove_Reef_2 Goose_Island_East_Cove_Reef_4 1000 -500 hdi_of_hdi colour Pellicer_Creek Guana_River Original Data New Curve 1500 -

Summary of methods

library(tidyverse) library(magrittr)

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