# Supplemental Material

Fournier, A.M.V., Wilson, R.R., Lyons, J.E., Gleason, J.S., Adams, E.M., Barnhill, L.M., Brush, J.M., Cooper, R.J.,DeMaso, S.J., Driscoll, M.J.L., Eaton, M.J., Frederick, P.C., Just, M.G., Seymour, M.A., Tirpak, J.M, and Woodrey,M.S., 2021, Structured decision making and optimal bird monitoring in the northern Gulf of Mexico: U.S. GeologicalSurvey Open-File Report 2020-1122, 62 p., <https://doi.org/10.3133/ofr20201122>.

# Code to Generate Monitoring Projects

R code for generate hypothetical monitoring proposals and scores from performance measures.

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title: "Generating the new projects"

output:

 pdf\_document: default

 html\_document: default

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```{r}

# generating scores for 30 projects for portfolio analysis

# 2017-09-19

# Started at Patuxent

# Auriel MV Fournier

# how many projects do we want?

numprojects <- 30

# creates a data frame to put the values in,

# and gives the projects sequential names

dat <- data.frame(names = paste("Project",seq(1:numprojects))

)

# the sample function has R randomly sample, in our case with replacement,

# from the vector of values given in c(),

# for example c(0,1,2), means that are will select from 0,1, or 2

# the prob = c() statement gives the individual probabilities that each of those

# numbers will be selected

# prob = c() does not have to sum to 1

species <- sample(c(1:67), size=numprojects, replace=TRUE,

 prob=c(0.1,0.1,0.1,0.1,

 rep(0.0667,6),

 rep(0.00526,57)))

dat$title <- NA

dat$states <- NA

dat$taxa\_groups <- NA

dat$objhyp <- sample(c(0,1,2), size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4))

dat$response <- sample(c(0,1,2,3), size=numprojects,

 replace=TRUE, prob=c(0.2,0.26,0.26,0.27))

dat$targettaxa <- sample(c(0,1,2,3), size=numprojects,

 replace=TRUE, prob=c(0.2,0.26,0.26, 0.27))

dat$surveydesign <- sample(c(0,1,2,3), size=numprojects, replace=TRUE,

 prob=c(0.2,0.33,0.27, 0.2))

dat$stats <- sample(c(0,1,2), size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4))

dat$datamanagement <- sample(c(0,1,2,3), size=numprojects, replace=TRUE,

 prob=c(0.2,0.33,0.27, 0.2))

dat$budget <- sample(c(0,1,2), size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4))

dat$timeline <- sample(c(0,1,2), size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4))

dat$datasharing <- sample(c(0,1,2,3,4), size=numprojects,

 replace=TRUE, prob=c(0.3,0.3,0.21, 0.14,0.05))

dat$broaderimpacts <- sample(c(0,1,2,3), size=numprojects,

 replace=TRUE, prob=c(0.7,0.12,0.1, 0.08))

dat$exisitingpriorities <- sample(c(0,1,2,3), size=numprojects,

 replace=TRUE, prob=c(0.07,0.03,0.1, 0.8))

dat$partners <- sample(c(0,1,2,3), size=numprojects, replace=TRUE,

 prob=c(0.07,0.03,0.1, 0.8))

# rep means repeat the first value, the number of times

# of the second value

dat$leverage <- sample(c(0,1,2,3,4,5), size=numprojects, replace=TRUE,

 prob=rep(0.1666667,6))

dat$alignment <- sample(c(0,1,2), size=numprojects, replace=TRUE,

 prob=c(0.8,0.1,0.1))

# pop, and later hab, eco and manage

# are a binary 'does this project address these kinds of questions

# it is then multiplied against the distribution for the objective

# to 'turn off' the objective, if that project does not answer those

# kinds of questions

pop <- sample(c(0,1), size=numprojects, replace=TRUE,

 prob=c(0.7,0.3))

dat$pop\_conservationneed <- sample(c(0,1,2), size=numprojects,

 replace=TRUE, prob=c(0.3,0.3,0.3)) \* species \* pop

dat$pop\_spatialscope <- sample(c(0:100), size=numprojects,

 replace=TRUE, prob=c(rep(0.0115,51), rep(0.008,50))) \* pop

dat$pop\_temporalscope <- sample(c(1:20), size=numprojects,

 replace=TRUE, prob=c(0.1,0.1,0.1,0.1,

 rep(0.042,16))) \* pop

hab <- sample(c(0,1), size=numprojects, replace=TRUE,

 prob=c(0.3,0.7))

dat$hab\_temporal <- dat$pop\_temporalscope \* hab

dat$hab\_quality <- dat$pop\_spatialscope \* hab

# in this one we are first looking at how much veg was surveyed,

# then how much water, and adding those two values together

dat$hab\_quantity <- sample(c(1,2,3,4), size=numprojects, replace=TRUE,

 prob=c(0.07,0.43,0.2, 0.3)) +

 sample(c(1,2,3,4), size=numprojects, replace=TRUE,

 prob=c(0.07,0.43,0.2, 0.3))\* hab

eco <- sample(c(0,1),size=numprojects, replace=TRUE, prob=c(0.7,0.3))

dat$ecoprocess\_spp <- species \* eco

dat$ecoprocess\_uncertainty <- sample(c(0,1,2,3,4), size=numprojects, replace=TRUE, prob=c(0.3,0.3,0.21, 0.14,0.05)) \* eco

manage <- sample(c(0,1), size=numprojects, replace=TRUE,

 prob=c(0.3,0.7))

dat$manage\_species <- species \* manage

dat$manage\_spatial <- sample(c(15.6,12.5,15.6,3.125,9.4,18.8,

 6.25,18.8),size=numprojects, replace=TRUE,

 prob=c(15.6,12.5,15.6,3.125,

 9.4,18.8,6.25,18.8)) \* manage

dat$manage\_uncertainty <- sample(c(0,1,2),

 size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4))\* manage

dat$manage\_currentpractices <- sample(c(0,1,2),

 size=numprojects, replace=TRUE,

 prob=c(0.2,0.4,0.4)) \* manage

dat$manage\_adaptivemanagement <- sample(c(0,1),

 size=numprojects, replace=TRUE,

 prob=c(0.8,0.2)) \* manage

dat$cost <- rnorm(30, 950000, 300000)

# writes out the file, with todays date in the file name

write.csv(dat, file=paste0("NewProjects\_",Sys.Date(),".csv"), row.names = FALSE)

```