Compare ArcMap and akgfmaps grids in the EBS and NBS

3/16/2022

## Compare ArcMap and akgfmaps grids in the EBS and NBS

The purpose of this analysis is to compare EBS and NBS grids generated using the fishnet tool and area calculator in ArcMap to grids generated using the akgfmaps::make\_2d\_grid function. The goal for the akgfmaps::make\_2d\_grid function is to reproduce results of grid production methods in ArcMap.

Grids are used as interpolation grids in VAST.

# Load Jason's csv output  
arcmap\_ebs <- read.csv(file = here::here("data", "VAST\_raster\_EBS\_2022.csv"), stringsAsFactors = FALSE)  
arcmap\_nbs <- read.csv(file = here::here("data", "VAST\_raster\_NBS\_2022.csv"), stringsAsFactors = FALSE)  
  
# Setup connection to spatial products gdb  
dsn <- here::here("C:/Users/sean.rohan/Work/afsc/WIP", "Bering\_Sea\_Spatial\_Products\_2022.gdb")  
  
# Setup grid using dimensions from Jason's template  
vast\_bbox = c(xmin = -2846314.206900,  
 ymin = 251495.775400,  
 xmax = 2128157.793100,  
 ymax = 2859111.775400)  
  
res <- c(3704, 3704)

## Make grids using akgfmaps::make\_2d\_grid

ebs\_grid <- akgfmaps:::make\_2d\_grid(obj = sf::st\_read(dsn = dsn,  
 layer = "EBS\_strata\_Conner2022"),  
 resolution = res,  
 bbox = vast\_bbox,  
 output\_type = "point")

## Reading layer `EBS\_strata\_Conner2022' from data source   
## `C:\Users\sean.rohan\Work\afsc\WIP\Bering\_Sea\_Spatial\_Products\_2022.gdb'   
## using driver `OpenFileGDB'  
## Simple feature collection with 12 features and 4 fields  
## Geometry type: MULTIPOLYGON  
## Dimension: XY  
## Bounding box: xmin: -1361509 ymin: 557292.9 xmax: -231542 ymax: 1543802  
## Projected CRS: NAD83 / Alaska Albers

nbs\_grid <- akgfmaps:::make\_2d\_grid(obj = sf::st\_read(dsn = dsn,  
 layer = "NBS\_strata\_Conner2022"),  
 resolution = res,  
 bbox = vast\_bbox,  
 output\_type = "point")

## Reading layer `NBS\_strata\_Conner2022' from data source   
## `C:\Users\sean.rohan\Work\afsc\WIP\Bering\_Sea\_Spatial\_Products\_2022.gdb'   
## using driver `OpenFileGDB'  
## Simple feature collection with 3 features and 4 fields  
## Geometry type: MULTIPOLYGON  
## Dimension: XY  
## Bounding box: xmin: -1127943 ymin: 1230743 xmax: -344667.7 ymax: 1804888  
## Projected CRS: NAD83 / Alaska Albers

## Total stratum areas

Calculate total stratum areas from ArcMap and akgfmaps for the EBS and NBS.

## Check for differences in number of cells

nrow(ebs\_grid)

## [1] 38284

nrow(arcmap\_ebs)

## [1] 38284

table(ebs\_grid$Stratum)

##   
## 10 20 31 32 41 42 43 50 61 62 82 90   
## 6140 3189 7213 729 4854 1875 1653 2983 6772 542 1403 931

table(arcmap\_ebs$Stratum)

##   
## 10 20 31 32 41 42 43 50 61 62 82 90   
## 6140 3189 7213 729 4854 1875 1653 2983 6772 542 1403 931

nrow(nbs\_grid)

## [1] 15180

nrow(arcmap\_nbs)

## [1] 15180

table(nbs\_grid$Stratum)

##   
## 70 71 81   
## 6002 6191 2987

table(arcmap\_nbs$Stratum)

##   
## 70 71 81   
## 6002 6191 2987

EBS and NBS grids from akgfmaps and ArcMap have the same number of cells.

## Check for differences in total stratum area

(stratum\_total\_arcmap\_ebs$Stratum\_Area - stratum\_total\_akgfmaps\_ebs$Stratum\_Area)

## [1] -1.359014e-05 1.703186e-05 1.976245e-05 -4.118659e-05 -4.176276e-05  
## [6] 4.884498e-05 1.396873e-05 -1.178276e-06 2.862624e-06 9.031086e-06  
## [11] -6.353155e-06 -1.646756e-05

stratum\_total\_arcmap\_nbs$Stratum\_Area - stratum\_total\_akgfmaps\_nbs$Stratum\_Area

## [1] 0 0 0

EBS differences in total stratum area on the order of 1.2-48.8 m^2. NBS has no differences in total stratum area.

## Example: Transform to WGS84

Transforming the grid points to WGS84 (EPSG:4326)

sf::st\_transform(ebs\_grid, crs = "EPSG:4326")

## Simple feature collection with 38284 features and 6 fields  
## Geometry type: POINT  
## Dimension: XY  
## Bounding box: xmin: -178.942 ymin: 54.50102 xmax: -157.9798 ymax: 62.17101  
## Geodetic CRS: WGS 84  
## First 10 features:  
## CELL\_ID Stratum Shape\_Length Shape\_Area Area\_KM2  
## 50822 50822 32 504770.2 8846729256 8846.729  
## 50823 50823 32 504770.2 8846729256 8846.729  
## 51129 51129 32 504770.2 8846729256 8846.729  
## 51130 51130 32 504770.2 8846729256 8846.729  
## 51131 51131 32 504770.2 8846729256 8846.729  
## 51132 51132 32 504770.2 8846729256 8846.729  
## 51437 51437 32 504770.2 8846729256 8846.729  
## 51438 51438 32 504770.2 8846729256 8846.729  
## 51439 51439 32 504770.2 8846729256 8846.729  
## 51440 51440 32 504770.2 8846729256 8846.729  
## geometry AREA  
## 50822 POINT (-168.0306 57.6817) 2244613.6 [m^2]  
## 50823 POINT (-168.0017 57.69155) 4503933.1 [m^2]  
## 51129 POINT (-168.1277 57.63291) 194665.5 [m^2]  
## 51130 POINT (-168.089 57.64511) 6442216.0 [m^2]  
## 51131 POINT (-168.0373 57.65825) 13314099.2 [m^2]  
## 51132 POINT (-167.9967 57.66449) 5133204.7 [m^2]  
## 51437 POINT (-168.187 57.59592) 2308030.0 [m^2]  
## 51438 POINT (-168.1418 57.60985) 10850669.8 [m^2]  
## 51439 POINT (-168.086 57.61919) 13719616.0 [m^2]  
## 51440 POINT (-168.0252 57.62616) 13719616.0 [m^2]