THE PROGRESSION OF CONFIRMED COVID19 CASES IN THE UNITED STATES BY COUNTY

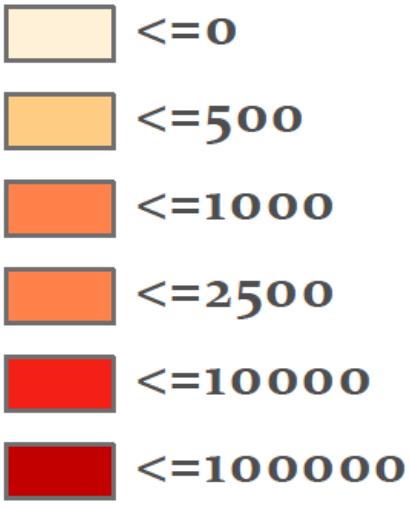
By Micah Dittmar

This document is an original map production tracking the confirmed cases of Covid-19 produced from a Python script I wrote. This document was created using ArcGIS Pro and ArcPy. One of the best features of the script is its automatic extraction of data from the daily updated URL.

In the creation of the production of this Mapbook, I used a CSV file containing recent Covid-19 data within the US. The free data I used was from USAFacts.org.
https://usafacts.org/visualizations/coronavirus-covid-19-spread-map/

The majority of the Mapbook has been shortened to portray the stark change month to month since the virus has arrived in the US and for simplicity.

The number of cases are represented by the color values in this legend:

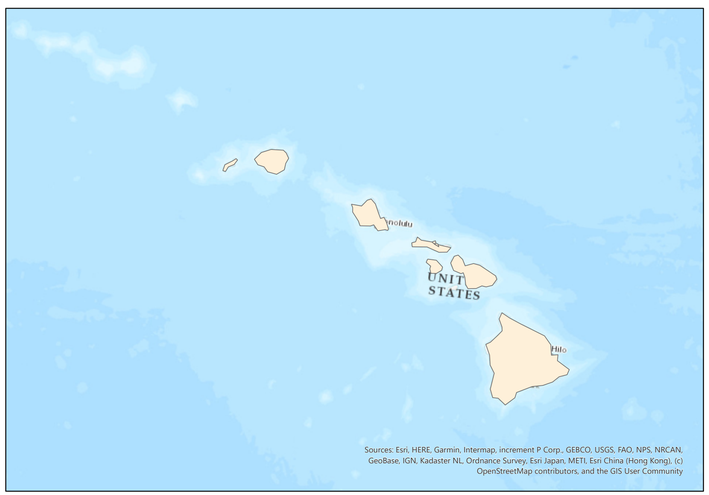


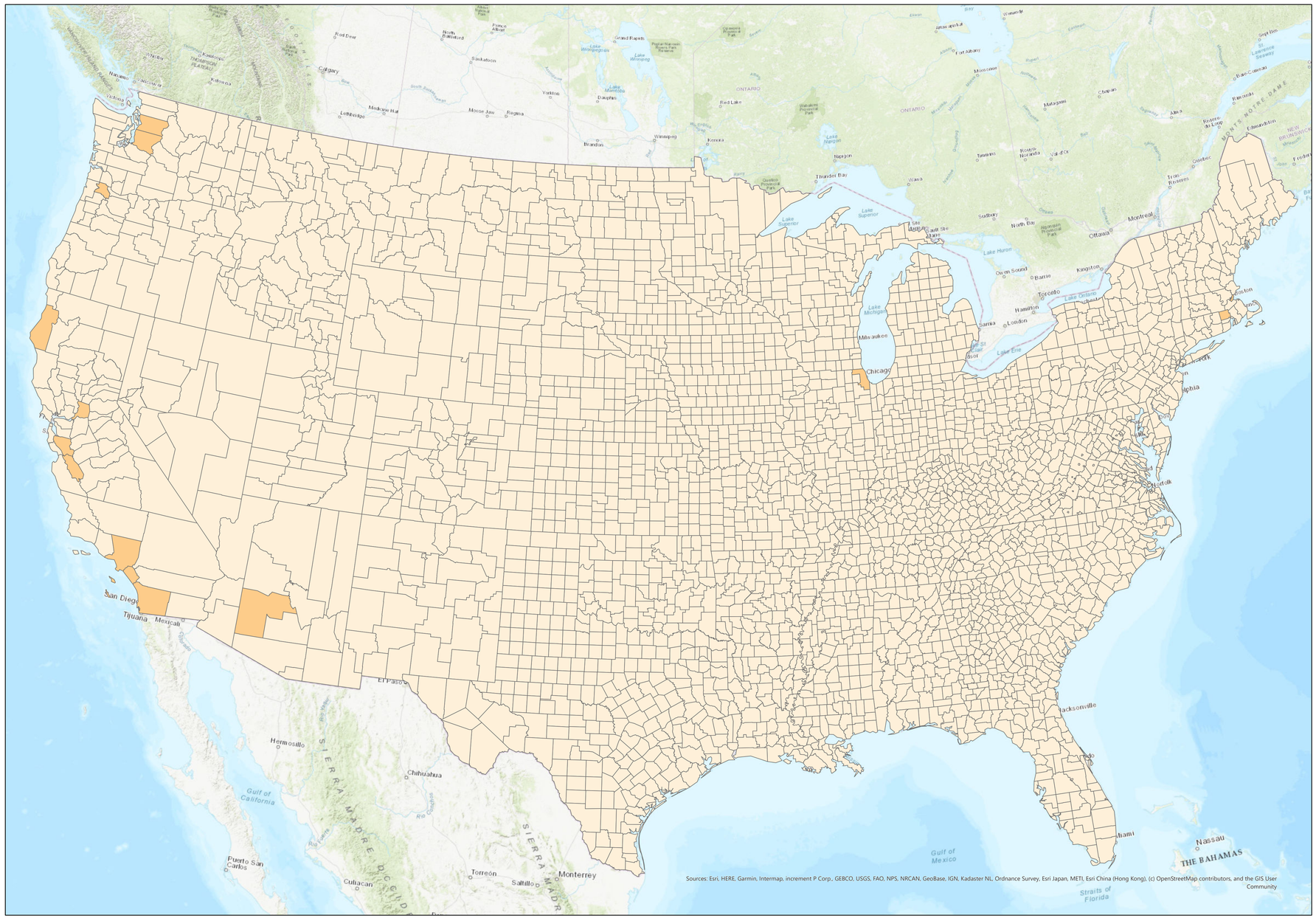
THE PROGRESSION OF COVID19 IN THE UNITED STATES BY COUNTY

DATE: 3/1/2020

CASES

- <=0
- <=500
- <=1000
- <=2500
- <=10000
- <=100000



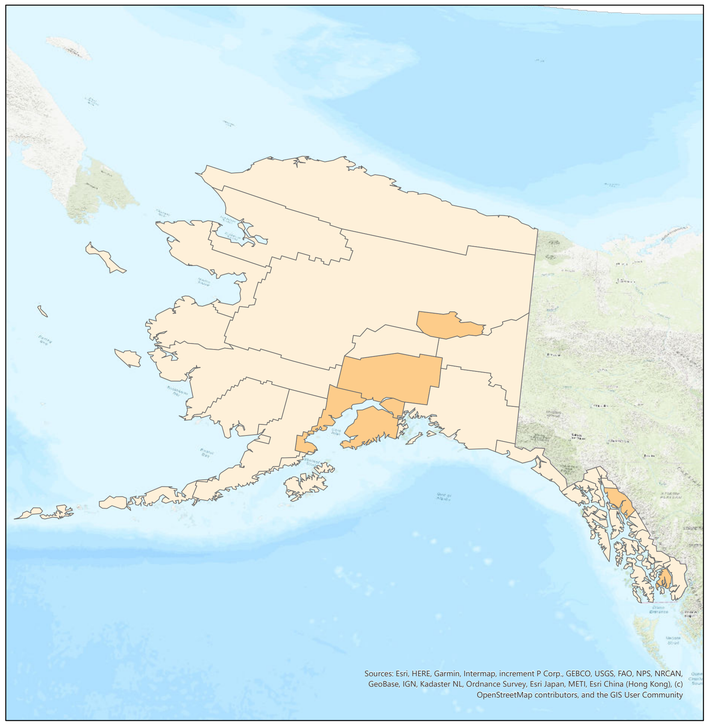


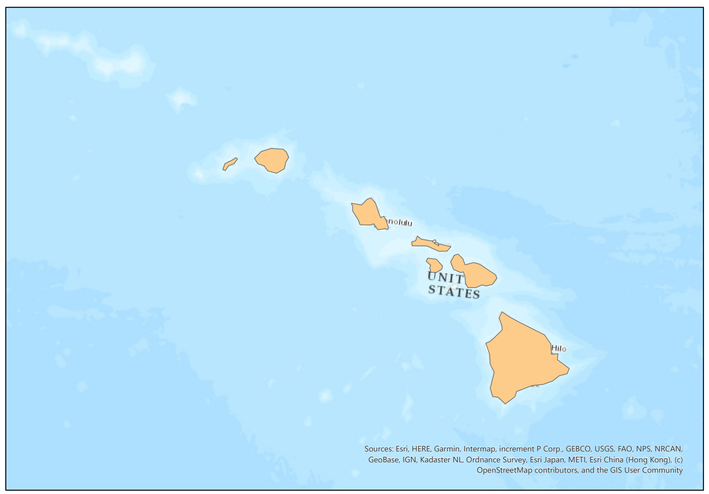
THE PROGRESSION OF COVID19 IN THE UNITED STATES BY COUNTY

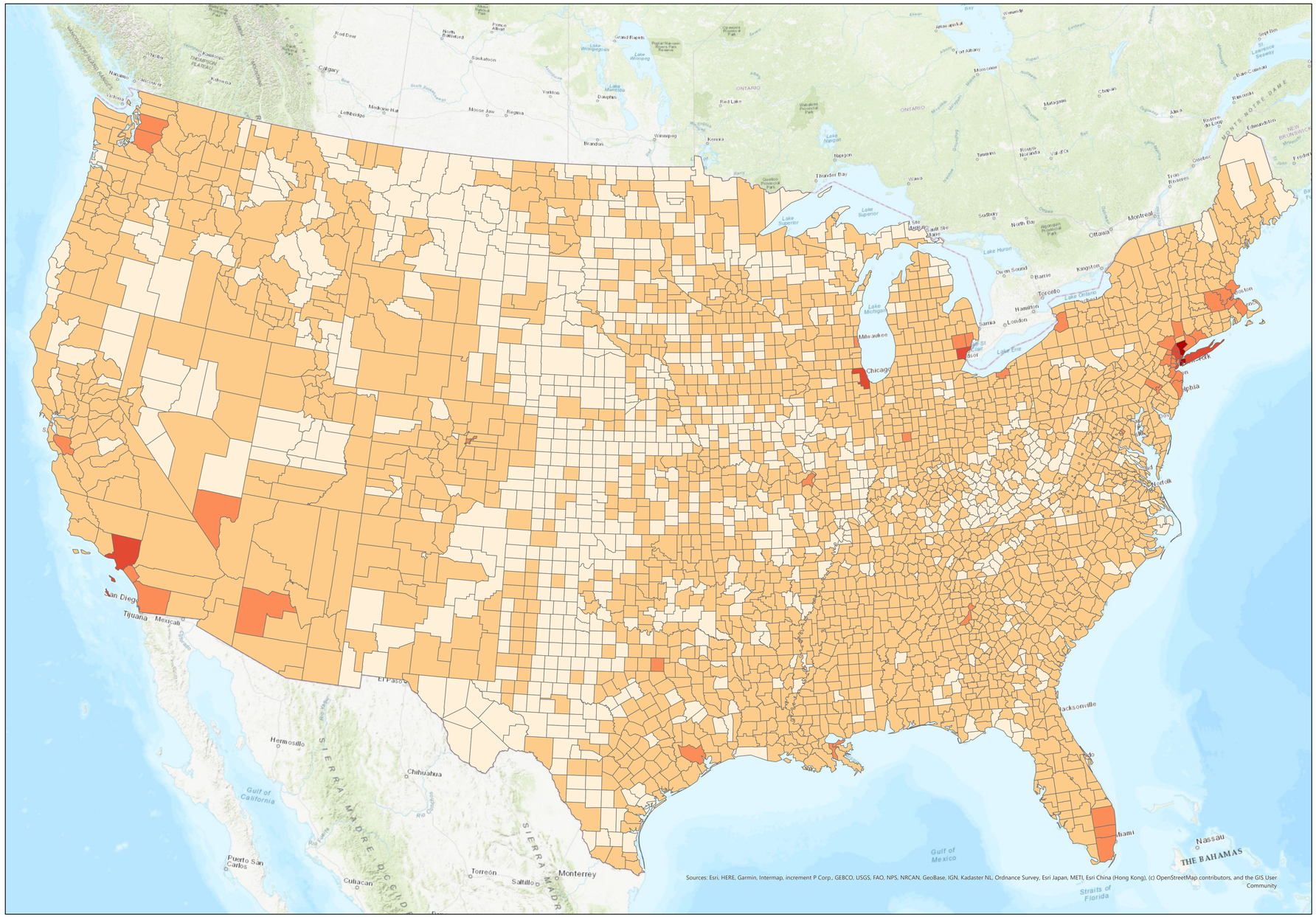
DATE: 4/1/2020

CASES

- <=0
- <=500
- <=1000
- <=2500
- <=10000
- <=100000





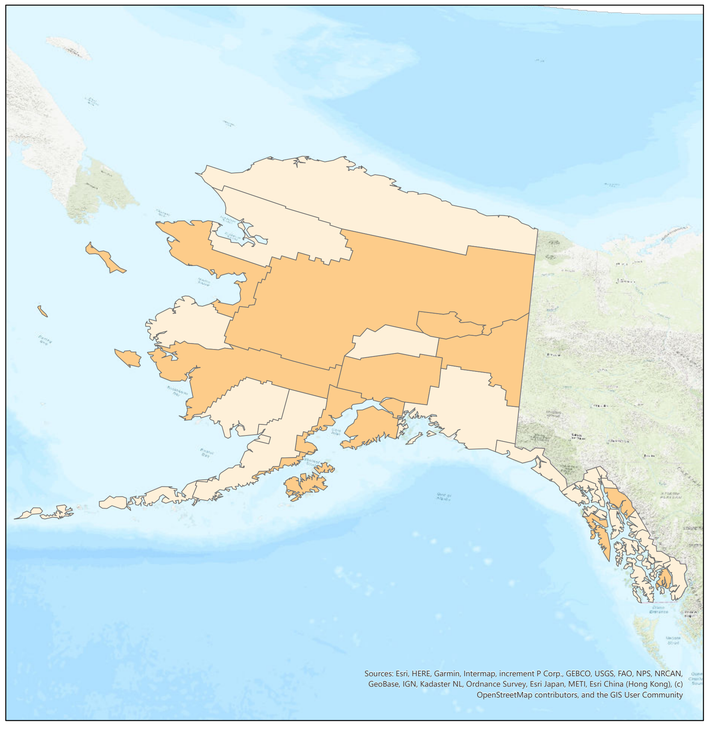


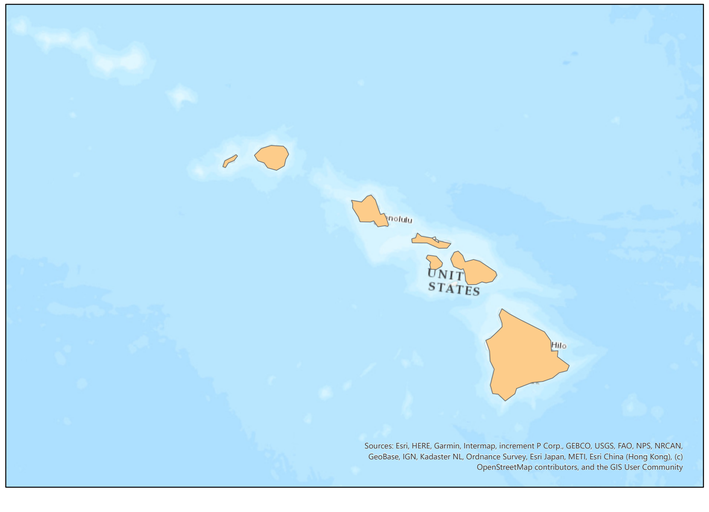
THE PROGRESSION OF COVID19 IN THE UNITED STATES BY COUNTY

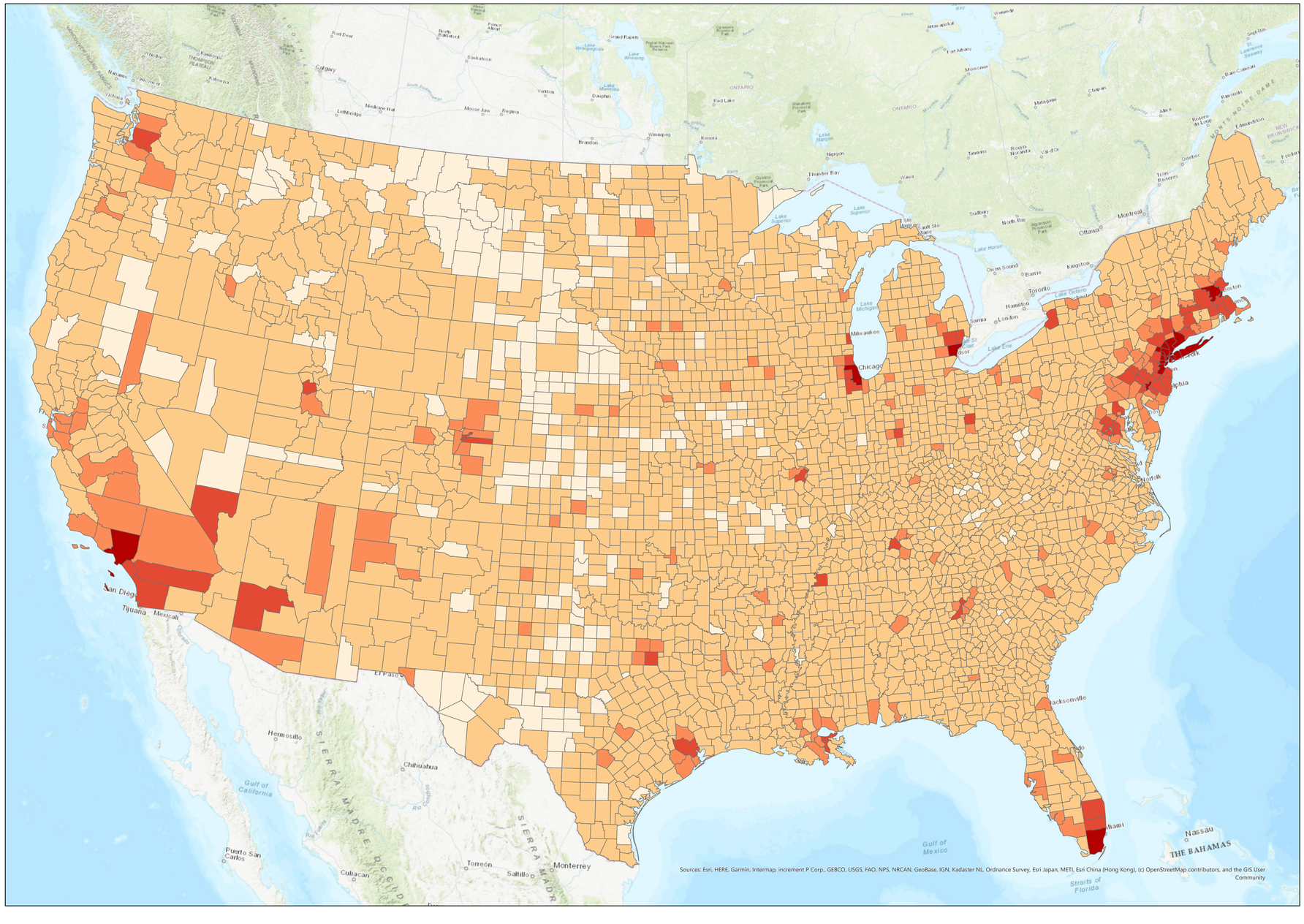
DATE: 5/1/2020

CASES

- <=0
- <=500
- <=1000
- <=2500
- <=10000
- <=100000





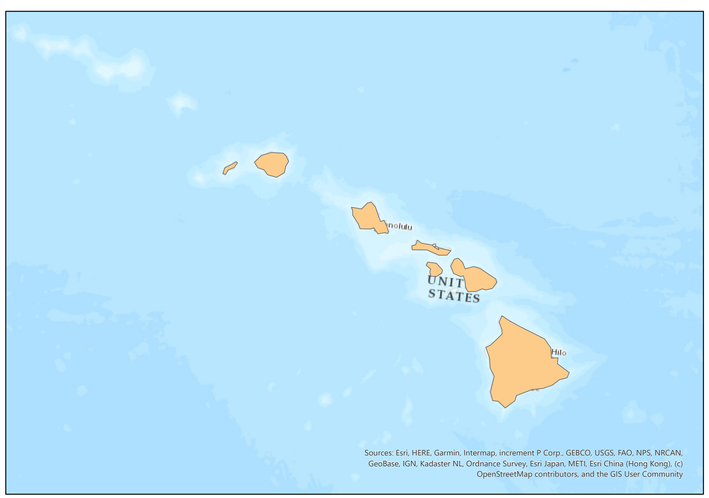


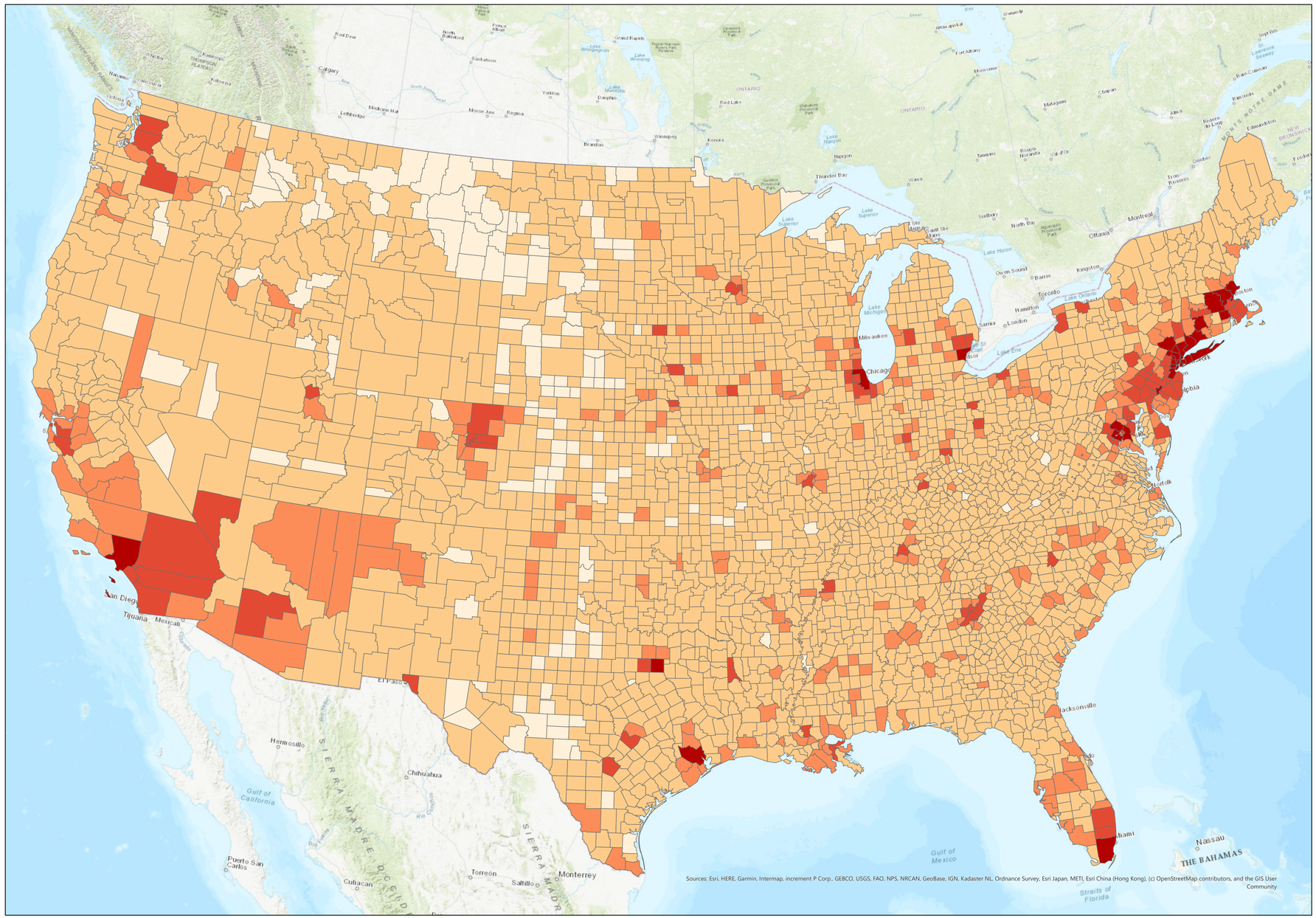
THE PROGRESSION OF COVID19 IN THE UNITED STATES BY COUNTY

DATE: 6/1/2020

CASES

- <=0
- <=500
- <=1000
- <=2500
- <=10000
- <=100000





Python Source Code:
Pt. 1

```python
#Author: Micah Dittmar
#GEOG 485 Final Project
#Creation of COVID19 in America Mapbook

import arcpy
import urllib
import csv
import io
import os

#Set variables
basePath = r"C:\Users\Administrator\Desktop\GEOG Proj\L4\FinalProj"
arcpy.env.workspace = basePath
url = "https://usafactsstatic.blob.core.windows.net/public/data/covid-19/covid_confirmed_usafacts.csv"
outFilePath = arcpy.env.workspace + r"\covid\covid_confirmed_usafacts_arcgis.csv"
gdb = "CovidGDB.gdb"
countiesShp = "C:/Users/Administrator/Desktop/GEOG Proj/L4/FinalProj/countiesUS/UScounties.shp"
permanentJoinFC = "join.shp"

#Set environment presets
arcpy.env.qualifiedFieldNames = False
arcpy.env.overwriteOutput = True

#Setup URL andcsv reader
response = urllib.request.urlopen(url)
csvReader = csv.reader(io.TextIOWrapper(response))
header = next(csvReader)

#Skip first 4 columns
countCols = header[4:]
#Set up ArcGIS PRO friendly col fields
countColsNew = []

#Populate ArcGIS PRO friendly col fields
for col in countCols:
    parts = col.split('/')
    if len(parts[2]) == 2:
        parts[2] = "20" + parts[2]
    countColsNew.append('F' + parts[0] + '_' + parts[1] + '_' + parts[2])

headerNew = header[0:4] + countColsNew

#For COUNTY Analysis
with open(outFilePath, 'w', newline='') as outFile:
    csvWriter = csv.writer(outFile)
    csvWriter.writerow(headerNew)
    for row in csvReader:
        if len(row[0]) == 4:
            #Fix FIPS vals that have the leading 0 left off
            row[0] = '0' + row[0]
        if row[0] != '0':
            #Omit Statewide Unallocated rows
            csvWriter.writerow(row)

#Join CSV and County Shapefile
layer = arcpy.AddJoin_management(countiesShp, "FIPS", outFilePath, "countyFIPS")
arcpy.CopyFeatures_management(layer, permanentJoinFC)

```

Python Source Code: Pt. 2

```
58
59 #Project Reference
60 project = arcpy.mp.ArcGISProject(r"C:/Users/Administrator/Documents/ArcGIS/Projects/MappingCovid/MappingCovid2.aprx")
61 layerMap = project.listMaps()[0]
62 countLayer = layerMap.addDataFromPath(r"C:\Users\Administrator\Desktop\GEOG Proj\L4\FinalProj\join.shp")
63 countLayer.name = "Cases"
64
65 #Take layer Symbology from Data Layer
66 lyrSym = countLayer.symbology
67
68 #Set local pdf var
69 pdfPath = basePath + "\covid.pdf"
70
71 #Remove
72 if os.path.exists(pdfPath):
73     os.remove(pdfPath)
74
75 #Create Master PDF
76 pdfDoc = arcpy.mp.PDFDocumentCreate(pdfPath)
77
78 #Set up bounds and labels for Legend and Layer symbology
79 bounds = {0:0, 1:500, 2:1000, 3:2500, 4:10000, 5:100000}
80 labels = {0:'<=0', 1:'<=500', 2:'<=1000', 3:'<=2500', 4:'<=10000', 5:'<=100000'}
81 clrRamp = project.listColorRamps('Orange-Red (5 classes)')[0]
82
83 #CHANGE v
84 countColsNew = ['F3_1_2020','F4_1_2020','F5_1_2020']
85
86 #Loop through each column to create each PDF
87 for field in countColsNew:
88     print(field)
89
90     #Setup Layer Symbology Settings
91     lyrSym.updateRenderer('GraduatedColorsRenderer')
92     lyrSym.renderer.classificationMethod = 'EqualInterval'
93     lyrSym.renderer.classificationField = field
94     lyrSym.renderer.colorRamp = clrRamp
95     lyrSym.renderer.breakCount = 6
96     breaks = lyrSym.renderer.classBreaks
97     for i in bounds:
98         breaks[i].upperBound = bounds[i]
99         breaks[i].label = labels[i]
100    countLayer.symbology = lyrSym
101
102    #Select Layout
103    layoutList = project.listLayouts()
104    layout = layoutList[0]
105
106    #Set and format Title
107    title = layout.listElements('TEXT_ELEMENT', 'dateLabel')[0]
108    title.text = field.replace('_','/')[1:]
109
110    #Setup PDF names
111    pdf = basePath + "\D" + field + ".pdf"
112    layout.exportToPDF(pdf)
113    arcpy.AddMessage('Exporting ' + field)
114
115    pdfDoc.appendPages(pdf)
117
118 #Commit changes to Master PDF
119 pdfDoc.saveAndClose()
```