Soil Curve Numbers

This is code to generate soil curve numbers for each subcatchment in Wailupe.

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Code Setup

```
#load necessary packages

library(tidyverse)
```

Load soil hydrologic groups data

```
soil_union <- read_csv("soil_land_union_maunalua.csv") %>%
  select(OBJECTID_1, hydgrpdcd, Class_Name, Shape_Length, Shape_Area) %>%
  filter(hydgrpdcd != "NA")

unique(soil_union$Class_Name) # get all the class names
```

See methodology for further explanation as to how we found the curve number for each land class, but here is the table for ease of coding:

Land Cover	Hydrologic group A	Hydrologic group B	Hydrologic group C	Hydrologic group D
Grassland: poor condition	68	79	86	89
Unconsolidated shore	0	0	0	0
Bare Land/Bare soil	77	86	91	94
Open Space Developed- good	39	61	74	80
Evergreen forest- fair	36	60	73	79
Scrub Shrub	36	42	55	62
Open Water	0	0	0	0
Impervious surface- like shrubland	36	42	55	62
Palustrine Scrub Shrub wetland (woody wetland)	86	86	86	86
Palustrine Forested wetland (woody wetland)	86	86	86	86
Palustrine Aquatic Bed	NA	NA	NA	NA
Estuarine Emergent wetland	80	80	80	80
Palustrine emergent wetland	80	80	80	80
Pasture/Hay	40	61	73	79
Unclassified - here: open water	0	0	0	0
Cultivated Land	62	74	82	86

Assign curve numbers to each group

```r
curve_numbers_maunalua <- soil_union %>%
  mutate(CN=
           case_when(Class_Name =="Grassland" & hydgrpdcd== "A" ~ 68,
                     Class_Name =="Grassland" & hydgrpdcd== "B" ~ 79,
                     Class_Name =="Grassland" & hydgrpdcd== "C" ~ 86,
                     Class_Name =="Grassland" & hydgrpdcd== "D" ~ 89,
                     Class_Name =="Unconsolidated Shore"~ 0,
                     Class_Name =="Bare Land" & hydgrpdcd== "A" ~ 77,
                     Class_Name =="Bare Land" & hydgrpdcd== "B" ~ 86,
                     Class_Name =="Bare Land" & hydgrpdcd== "C" ~ 91,
                     Class_Name =="Bare Land" & hydgrpdcd== "D" ~ 94,
                     Class_Name =="Open Space Developed" & hydgrpdcd== "A" ~ 39,
                     Class_Name =="Open Space Developed" & hydgrpdcd== "B" ~ 61,
                     Class_Name =="Open Space Developed" & hydgrpdcd== "C" ~ 74,
                     Class_Name =="Open Space Developed" & hydgrpdcd== "D" ~ 80,
                     Class_Name =="Evergreen" & hydgrpdcd== "A" ~ 36,
                     Class_Name =="Evergreen" & hydgrpdcd== "B" ~ 60,
                     Class_Name =="Evergreen" & hydgrpdcd== "C" ~ 73,
                     Class_Name =="Evergreen" & hydgrpdcd== "D" ~ 79,
                     Class_Name =="Scrub Shrub" & hydgrpdcd== "A" ~ 39,
                     Class_Name =="Scrub Shrub" & hydgrpdcd== "B" ~ 42,
                     Class_Name =="Scrub Shrub" & hydgrpdcd== "C" ~ 55,
                     Class_Name =="Scrub Shrub" & hydgrpdcd== "D" ~ 62,
                     Class_Name =="Open Water" ~ 0,
                     Class_Name =="Impervious Surface" & hydgrpdcd== "A" ~ 39,
                     Class_Name =="Impervious Surface" & hydgrpdcd== "B" ~ 42,
                     Class_Name =="Impervious Surface" & hydgrpdcd== "C" ~ 55,
                     Class_Name =="Impervious Surface" & hydgrpdcd== "D" ~ 62,
                     Class_Name =="Estuarine Emergent Wetland" ~ 80,
                     Class_Name =="Estuarine Scrub Shrub Wetland" ~ 86,
                     Class_Name =="Estuarine Forested Wetland" ~ 86,
                     Class_Name =="Cultivated Land" & hydgrpdcd== "A" ~ 62,
                     Class_Name =="Cultivated Land" & hydgrpdcd== "B" ~ 74,
                     Class_Name =="Cultivated Land" & hydgrpdcd== "C" ~ 82,
                     Class_Name =="Cultivated Land" & hydgrpdcd== "D" ~ 86

           ))
```

Then export this file to a csv and merge back the CN column to your attribute file for your union land uses/soil type. Double check that you are joining by the right column, here OBJECTID_1.