

## Week #4 GIS Problems 2018

### 2018 Wildfire Polygons

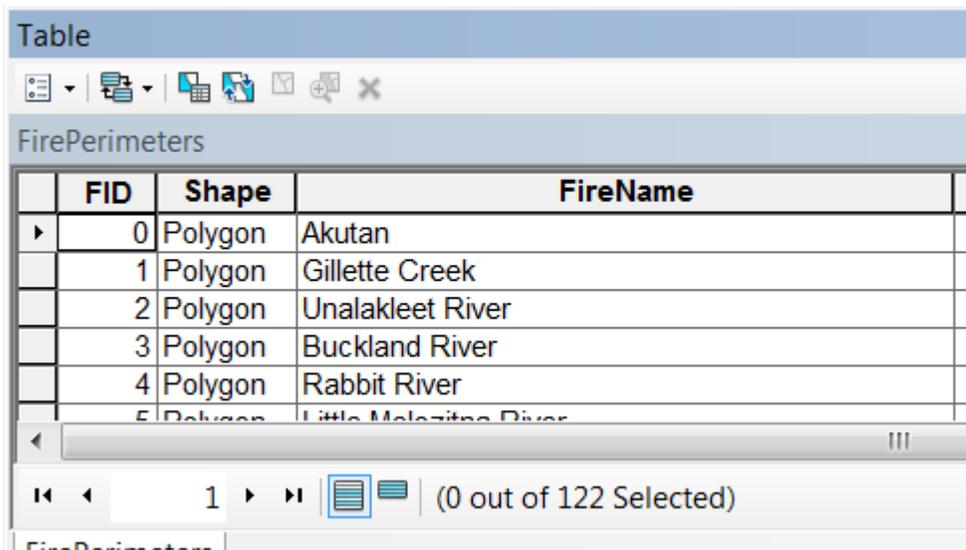
Download the **Fire Perimeter Shape File** from

<http://fire.ak.blm.gov/predsvcs/maps.php>

**AICC ArcIMS Mapping Products** [requires JavaScript]

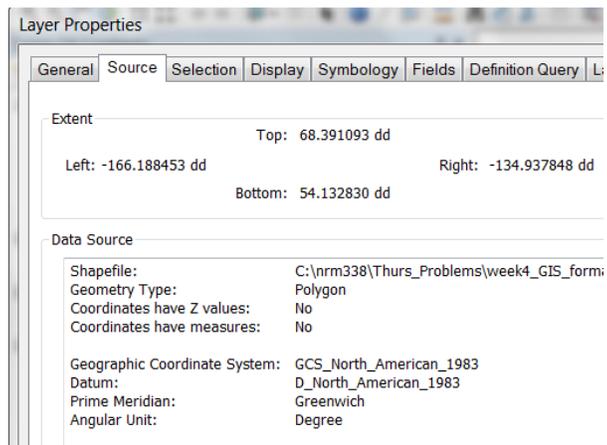
Active Fires on Google Earth  [Updated on Demand]

Fire Perimeter Shape File Download  [Updated on Demand]



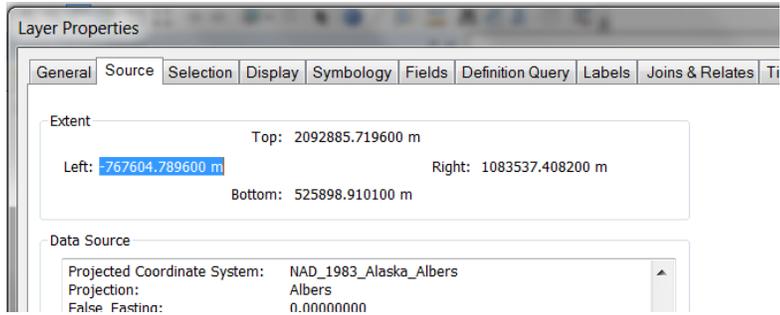
FID	Shape	FireName
0	Polygon	Akutan
1	Polygon	Gillette Creek
2	Polygon	Unalakleet River
3	Polygon	Buckland River
4	Polygon	Rabbit River
5	Polygon	Little Malaspina River

What was the area in Hectares of the largest fire perimeter in 2018?



Layer Properties	
General	
Extent	
Top:	68.391093 dd
Left:	-166.188453 dd
Right:	-134.937848 dd
Bottom:	54.132830 dd
Data Source	
Shapefile:	C:\nrm338\Thurs_Problems\week4_GIS_form
Geometry Type:	Polygon
Coordinates have Z values:	No
Coordinates have measures:	No
Geographic Coordinate System:	GCS_North_American_1983
Datum:	D_North_American_1983
Prime Meridian:	Greenwich
Angular Unit:	Degree

Step 1) Project from longitude/latitude



to Alaska Albers NAD83

Step 2) Add a field, and compute area in Hectares for each polygon

FireName	Date	Hectares
Akutan	2/19/2018	
Andrew Creek	8/1/2018	
Aniak River 1	6/8/2018	
Aniak River 2	6/8/2018	
ANTLER	6/1/2018	
Applevun	7/8/2018	
Bear Paw	6/20/2018	
Bella Creek	6/15/2018	
Bismark	6/8/2018	
Buckland River	6/8/2018	
Buckstock River 2	6/8/2018	
Buckstock River 3	6/8/2018	
Camp Creek	6/13/2018	
Cassiope Cone	6/12/2018	
Chandalar River	6/7/2018	

Sept 3) Sort descending

FireName	Date	Hectares
Zitziana River	8/1/2018	28,057.8
Mooseheart	7/24/2018	22,120.4
Dulby Hot Springs	7/3/2018	17,953.3
White Mountain Creek	8/10/2018	12,025.0
Kevinjik	8/13/2018	11,595.3
Little Melozita River	8/21/2018	11,228.5

## Alaska Anadromous Fish

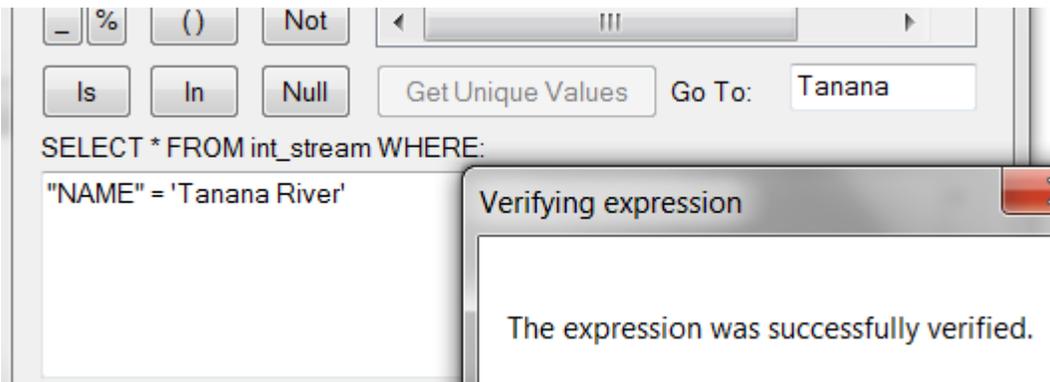
Download the Alaska Fish and Game Anadromous Waters GIS data for interior Alaska from

<https://www.adfg.alaska.gov/sf/SARR/AWC/index.cfm?adfg=data.GIS>

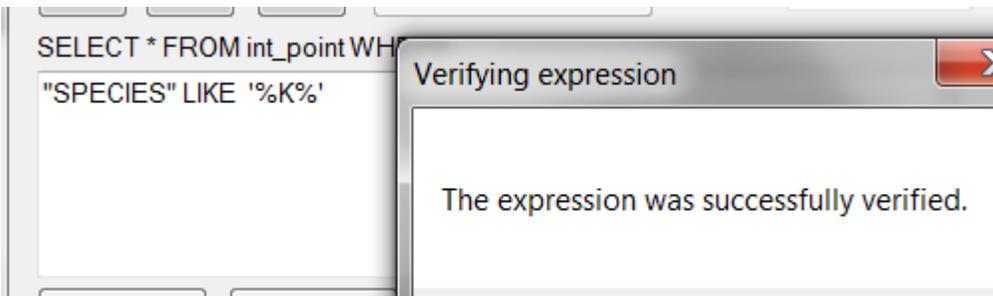
	AWC for the Interior Region	This data layer contains the AWC point and polyline data used to create the AWC atlas for the Interior Region.	<a href="#">Shapefile</a> , <a href="#">KMZ</a>
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***Find all locations that have reports of King salmon within 100m of the Tanana River.***

***Step 1) Definition Query to create Tanana River layer***



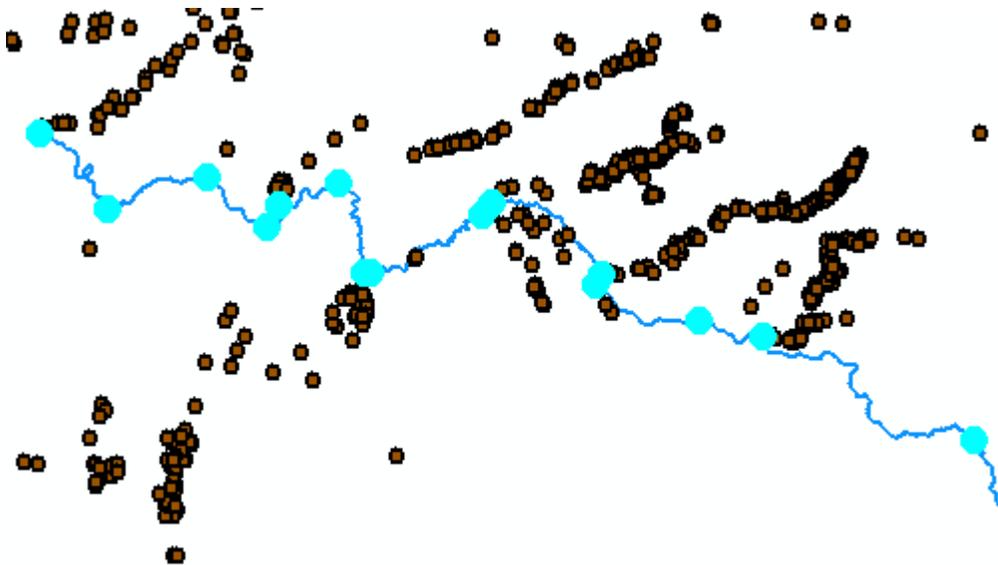
***Step 2) Definition Query to create King Salmon layer***



### King Salmon Locations

Shape *	SPECIES
Point	CO <sub>r</sub> ,Kr,W <sub>r</sub>
Point	CO <sub>r</sub> ,Kr
Point	Kr
Point	CO <sub>s</sub> ,K <sub>s</sub>
Point	K <sub>p</sub>
Point	K <sub>p</sub>
Point	CO <sub>s</sub> <sub>r</sub> ,K <sub>p</sub>
Point	CH <sub>s</sub> ,CO <sub>p</sub> ,K <sub>s</sub>
Point	K <sub>r</sub>

**Step 3) Select by Location (returns 16 locations ☺)**



SPECIES	TYPE	NAME
K <sub>p</sub>	MIDE	Tanana River
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub>	LOWER	Nenana River
CO <sub>r</sub> ,K <sub>p</sub>	LOWER	
K <sub>s</sub>	LOWER	Cosna River
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub> ,Sp	LOWER	Kantishna River
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub>	LOWER	Tolovana River
CH <sub>s</sub> ,K <sub>p</sub>	LOWER	Baker Creek
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub>	LOWER	Swanneck Slough
CH <sub>p</sub> ,K <sub>p</sub>	LOWER	Chena River
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub> ,Sp	LOWER	Tanana River
CH <sub>s</sub> ,K <sub>s</sub> <sub>r</sub>	LOWER	Goodpaster River
CH <sub>s</sub> ,K <sub>s</sub> <sub>r</sub>	LOWER	Salcha River
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub>	LOWER	Salchaket Slough
CH <sub>p</sub> ,CO <sub>p</sub> ,K <sub>p</sub>	LOWER	Shaw Creek
CH <sub>r</sub> ,CO <sub>r</sub> ,K <sub>r</sub>	MIDB	Tanana River
CH <sub>r</sub> ,CO <sub>r</sub> ,K <sub>r</sub>	MIDE	Tanana River

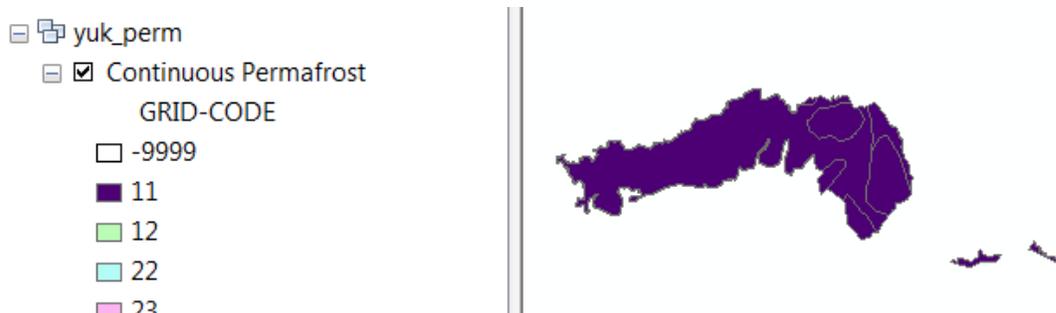
## Polygon in Polygon Analysis

<http://agdc.usgs.gov/data/usgs/water/yukon.html>

<b>Major Drainage Basins</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (662 KB)
<b>Permafrost</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (109 KB)
<b>Physiography</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (93 KB)
<b>Precipitation</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (118 KB)
<b>Roads</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (29KB)
<b>Soils</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (1.37M)
<b>Towns</b>	<a href="#">Metadata</a>	<a href="#">Download Files</a> (8 KB)

**Develop a table showing the percent continuous permafrost (grid code = 11) within each major drainage basin.**

**Step 1) Definition Query continuous permafrost (grid code = 11)**



**Step 2) Compute the area in hectares of each major drainage basin**

yuk\_da polygon

	Shape	SUBBASIN	BASIN_HA
	Polygon	Porcupine River	
	Polygon	Chandalar River	
	Polygon	Koyukuk River	
	Polygon	Stewart River	
	Polygon	Tanana River	
	Polygon	Upper Yukon	
	Polygon	Pelly River	
	Polygon	White River	
	Polygon	Teslin River	
	Polygon	Yukon Headwaters	
	Polygon	East Central Yukon	
	Polygon	West Central Yukon	
	Polygon	Lower Yukon	
	Polygon	Lower Yukon	
	Polygon	Lower Yukon	
	Polygon	Lower Yukon	

**Calculate Geometry**

Property:

Coordinate System

Use coordinate system of the data source:

Use coordinate system of the data frame:

Units:

**Step 3) Intersect continuous permafrost and drainage basin polygons**

Intersect\_Output

	Shape *	SUBBASIN	BASIN_HA	GRID_CODE
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Porcupine River	11,640,081.3	11
	Polygon	Chandalar River	3,551,452.9	11
	Polygon	Koyukuk River	8,132,715.3	11
	Polygon	Stewart River	5,213,620.2	11
	Polygon	Stewart River	5,213,620.2	11

**Step 4) Dissolve by SubBasin field**

Dissolve\_Output

	Shape *	SUBBASIN	FIRST_BASI
	Polygon	Chandalar River	3,551,452.9
	Polygon	Koyukuk River	8,132,715.3
	Polygon	Porcupine River	11,640,081.3
	Polygon	Stewart River	5,213,620.2

◀ ◁ 0 ▷ ▶  | (0 out of 4 Selected)

Dissolve\_Output

Intersect\_Output

	Shape *	SUBBASIN	BASIN_HA	GRID
▶	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Porcupine River	11,640,081.3	
	Polygon	Chandalar River	3,551,452.9	
	Polygon	Koyukuk River	8,132,715.3	
	Polygon	Stewart River	5,213,620.2	
	Polygon	Stewart River	5,213,620.2	

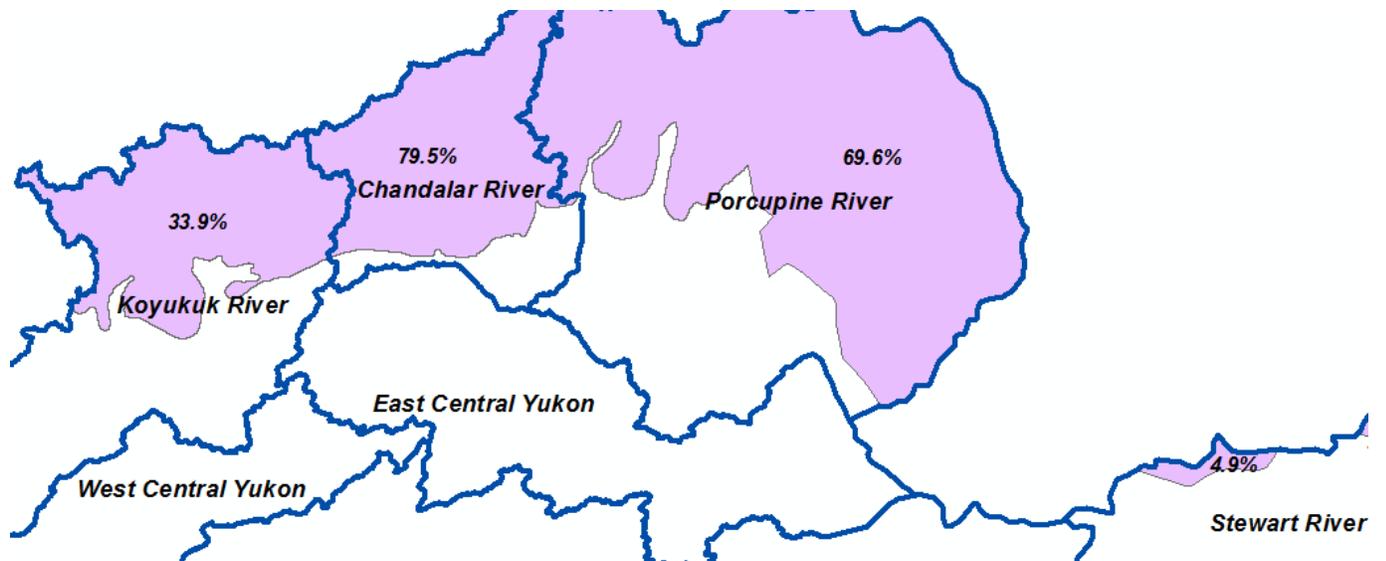
**Step 5) Compute the area in Hectares of each dissolved polygon**

SUBBASIN	FIRST_BASI	Perm_HA
Chandalar River	3,551,452.9	2,821,653.1
Koyukuk River	8,132,715.3	2,759,675.4
Porcupine River	11,640,081.3	8,099,940.1
Stewart River	5,213,620.2	254,336.7

**Step 6) Compute percentage of permafrost in each basin**

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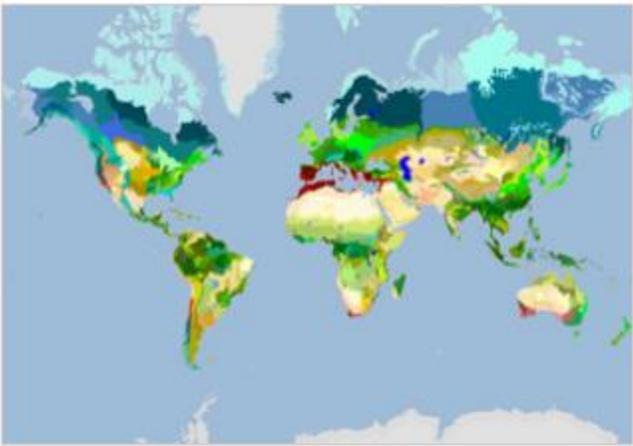
SUBBASIN	FIRST_BASI	Perm_HA	Percent
Chandalar River	3,551,452.9	2,821,653.1	79.5%
Koyukuk River	8,132,715.3	2,759,675.4	33.9%
Porcupine River	11,640,081.3	8,099,940.1	69.6%
Stewart River	5,213,620.2	254,336.7	4.9%



## Ecoregions of Alaska

Download the Terrestrial Ecoregions of the World shapefile from:

[http://maps.tnc.org/gis\\_data.html](http://maps.tnc.org/gis_data.html)



**Terrestrial Ecoregions**

This is the master spatial data layer for TNC's *terrestrial ecoregions of the world*, exported from the geodatabase listed above. Note that it includes Mangroves, Inland Water, and Rock and Ice MHTs, although they are not being handled by terrestrial assessments. This layer is based on WWF's ecoregions outside the United States, and loosely based on Bailey's ecoregions (from the USDA Forest Service) within the United States.

[View Metadata](#)

**Download:** [Gif Data](#)

Download the Alaska boundary from the national map website:

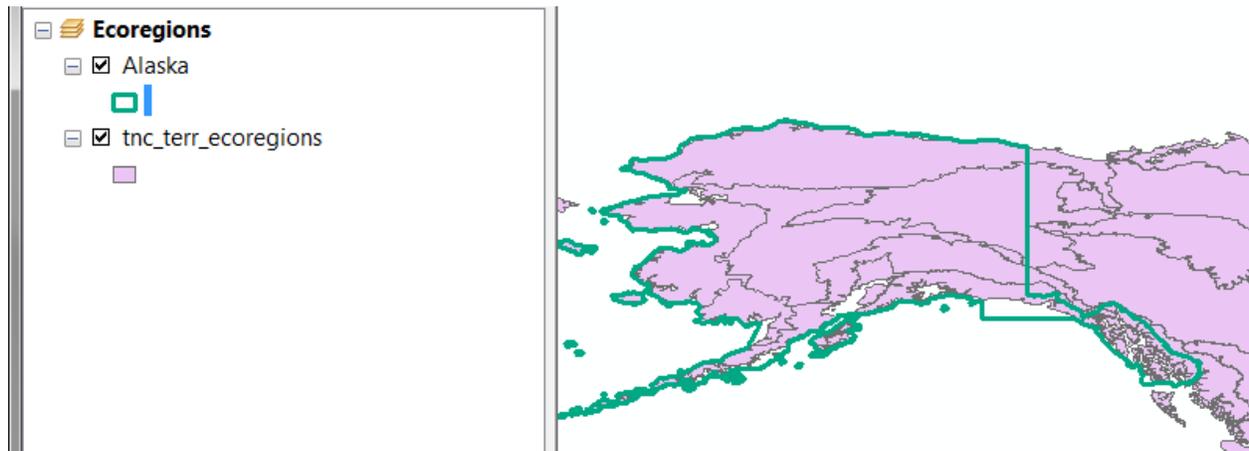
<http://viewer.nationalmap.gov/basic/>

1

Preview	Product
Actions for all displayed products: <a href="#">Show Footprints</a> / <a href="#">Show Thumbnails</a>	
	USGS National Boundary Dataset (NBD) for Alaska 20180911 State or Territory FileGDB 10.1 <b>Published Date:</b> 2018-09-11 <b>Metadata Updated:</b> 2018-09-12 <b>Format:</b> FileGDB 10.1 (138.70 MB), <b>Extent:</b> State

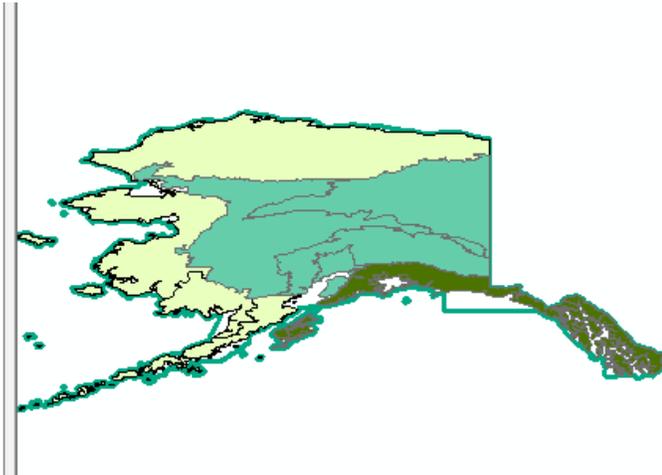
*Estimate the percentage of tundra, boreal forest, and temperate conifer forest in Alaska*

*Step 1) Definition Query for Alaska*



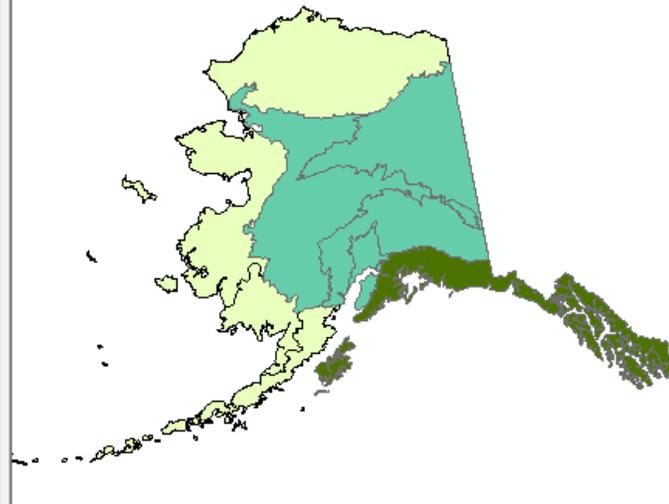
**Step 2) Clip out ecoregions within Alaska**

- Ecoregions**
  - tnc\_terr\_ecoregions\_AK
    - WWF\_MHTNAM
      - Boreal Forests/Taiga
      - Temperate Conifer Forests
      - Tundra
  - Alaska
    -
  - tnc\_terr\_ecoregions
    -



**Step 3) Project to statewide planar coordinate system in meters**

- New Data Frame**
  - tnc\_terr\_ecoregions\_AK\_Albers
    - WWF\_MHTNAM
      - Boreal Forests/Taiga
      - Temperate Conifer Forests
      - Tundra



**Step 4) Dissolve to the 3 biomes**

biomes	
Shape *	WWF_MHTNAM
Polygon	Boreal Forests/Taiga
Polygon	Temperate Conifer Forests
Polygon	Tundra

**Step 5) Compute area and percentage of each biome.**

WWF_MHTNAM	KM2	Percent
Boreal Forests/Taiga	679,669.2	45.1%
Temperate Conifer Forests	177,703.3	11.8%
Tundra	648,117.4	43.1%

#### Statistics of biomes

Field

Percent

Statistics:

Count: 3  
Minimum: 11.803688  
Maximum: 45.146046  
Sum: 100