Using Python to automagically resize fonts in label expressions

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make the **LEAP** **GIS**

OKSCAUG 2016

Who am I?

- GIS Specialist at OSU Cartography Services
  - Producing digital products for the American Association of Petroleum Geologists
  - Funded by the Boone Pickens Digital Geography Fund
- MS in Geography 2015, OSU
  - Remote Sensing of Water Quality

What was I trying to do?

- **Create a printed highway map of Texas**

- **With consistent road markers**

- **Which is problematic since the highway numbers are of varying lengths**
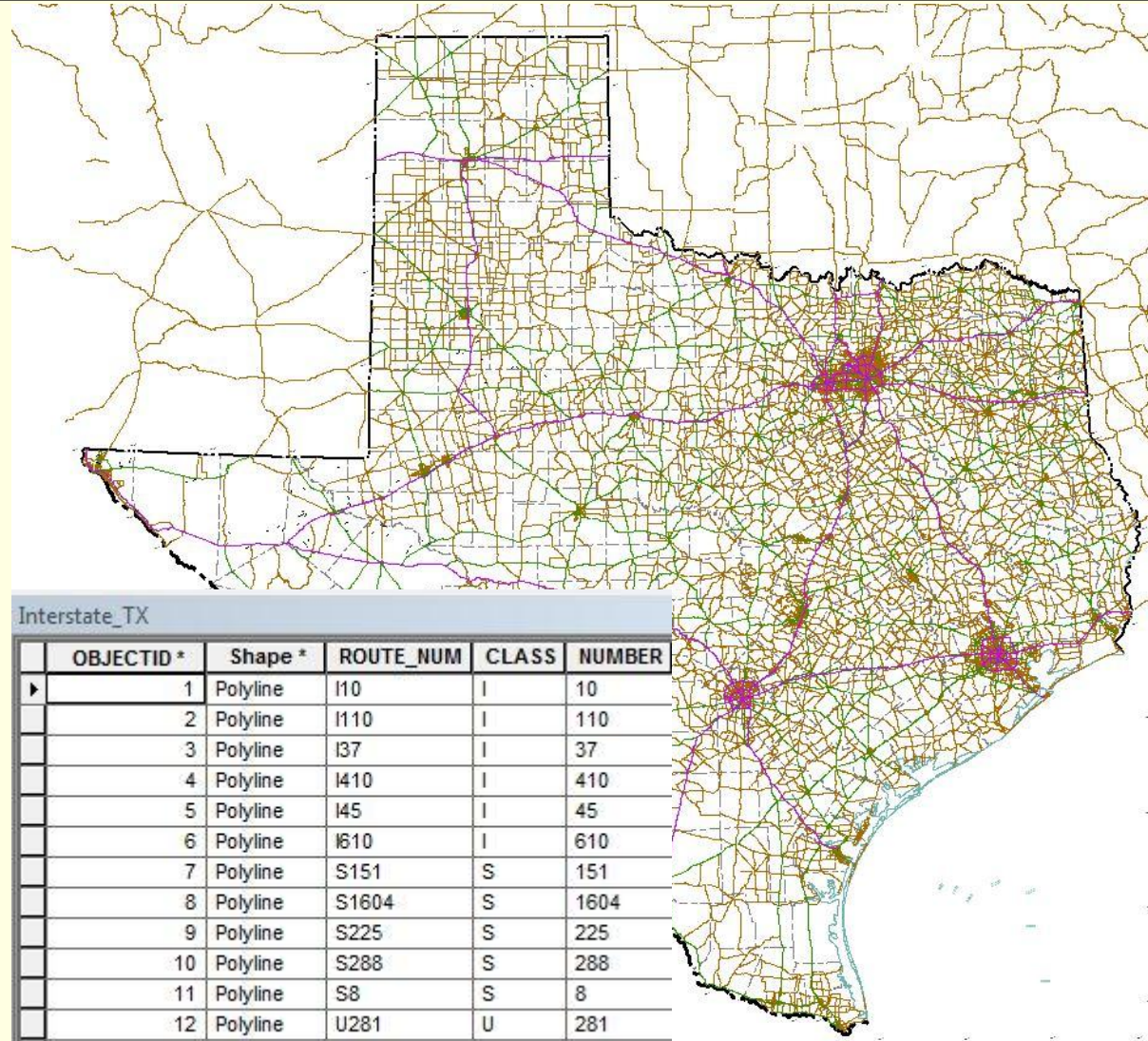
- **Work smarter, not longer!**
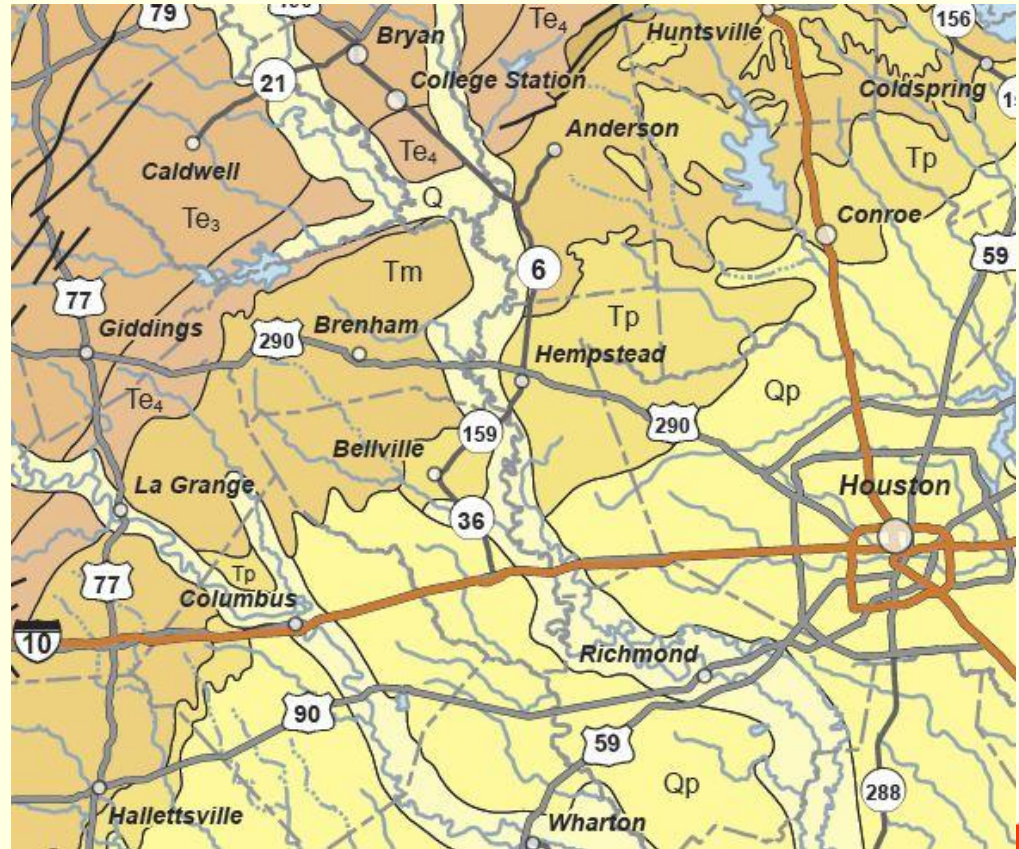
Picking the right tool

- **Manually in the Symbology tab**
- **Set "Scale Marker to fit text"**
- **Use Label Manager**
- **Label Expressions**

What do I have to work with?

- **Three road network shapefiles**

- **Nationwide**

- **Too many**

- **Overlapping**

- **Has highway number already Attribute Table**

Interstate_TX

| OBJECTID *	Shape *	ROUTE_NUM	CLASS	NUMBER
1	Polyline	I10	I	10
2	Polyline	I110	I	110
3	Polyline	I37	I	37
4	Polyline	I410	I	410
5	Polyline	I45	I	45
6	Polyline	I610	I	610
7	Polyline	S151	S	151
8	Polyline	S1604	S	1604
9	Polyline	S225	S	225
10	Polyline	S288	S	288
11	Polyline	S8	S	8
12	Polyline	U281	U	281

Example

- Here is a subset of roads without any expression

- The font size is set for those with a length of 1

- Want the font size to drop one point for every increase in length
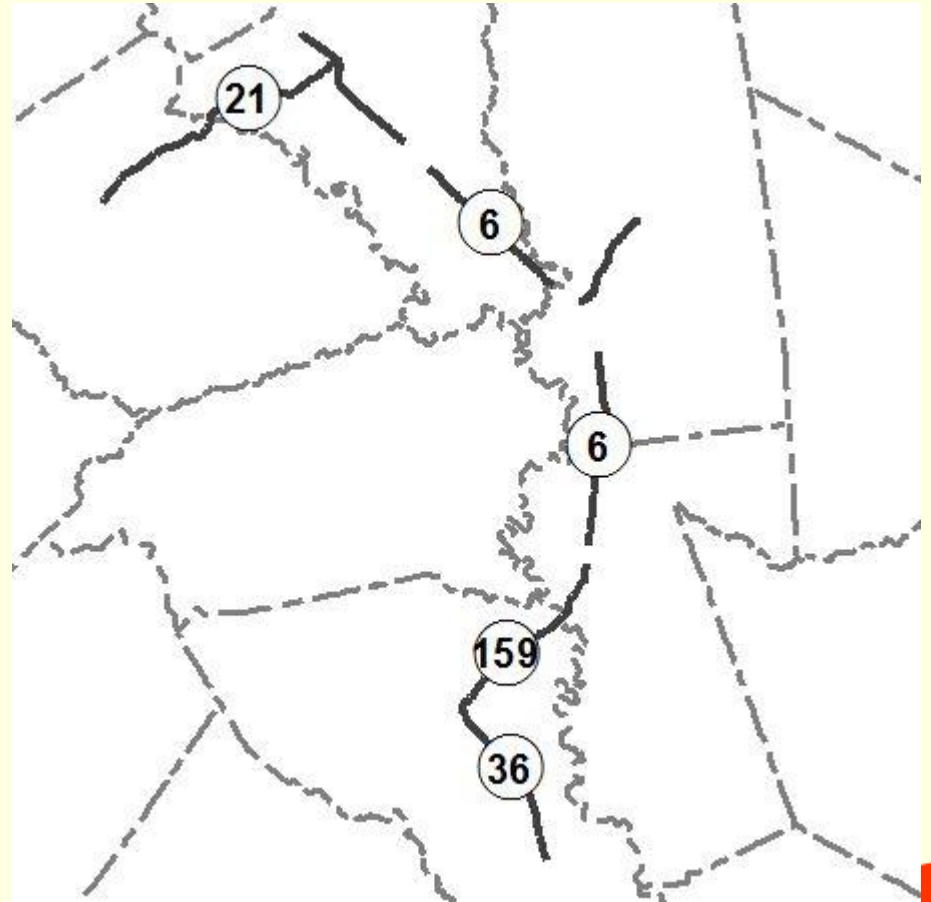
Setup for Expression

- **In the Label tab of the Layer Properties**
- **Click Expression**
- **Change the Parser to Python and then check Advanced**
- **Ready to code!**
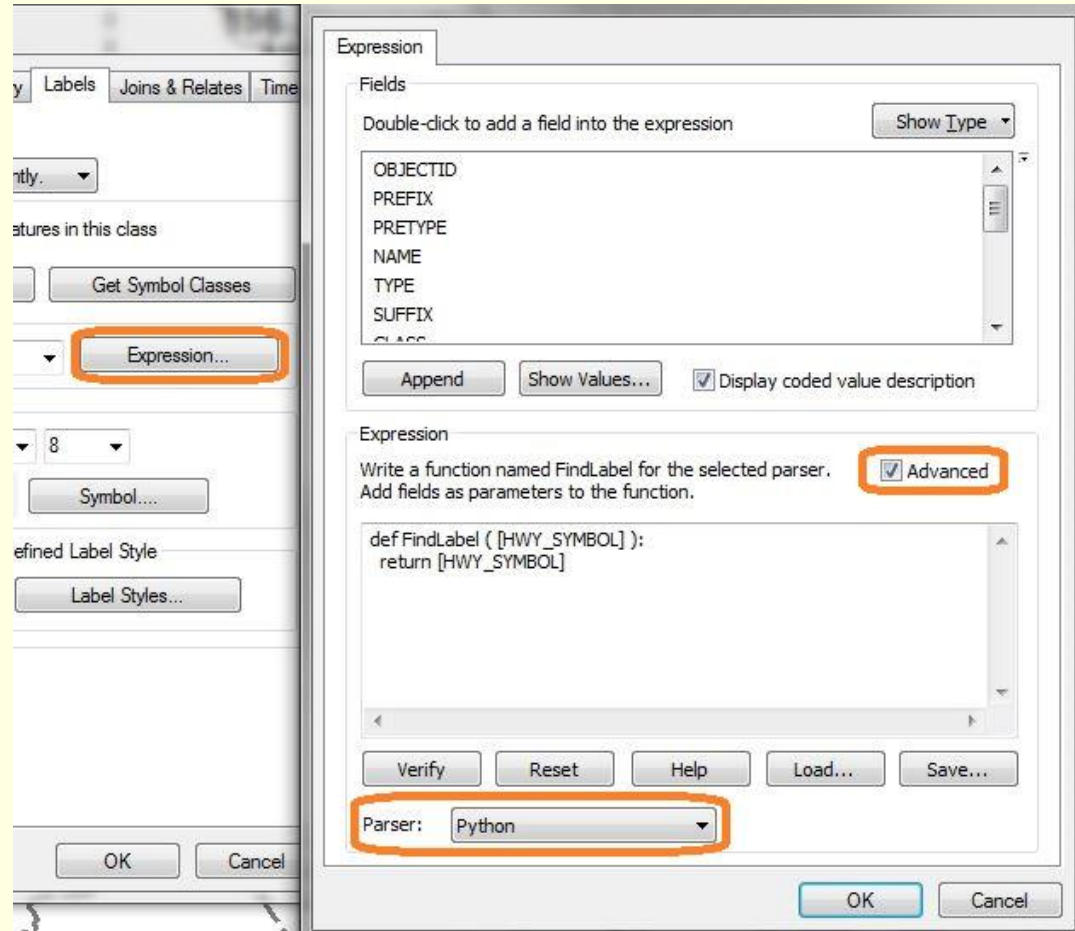
About Syntax

- **Parameters: your attribute table values as your variables**

- **Can only use them if you define them here!**

- **Return statement: the formatted string used to modify our label's font**

- **Double space for each level indentation**

- **In between: all the magic**

Expression

Write a function named FindLabel for the select
Add fields as parameters to the function.

```
def FindLabel ( [HWY_SYMBOL] ):
    return [HWY_SYMBOL]
```

Coding Concept

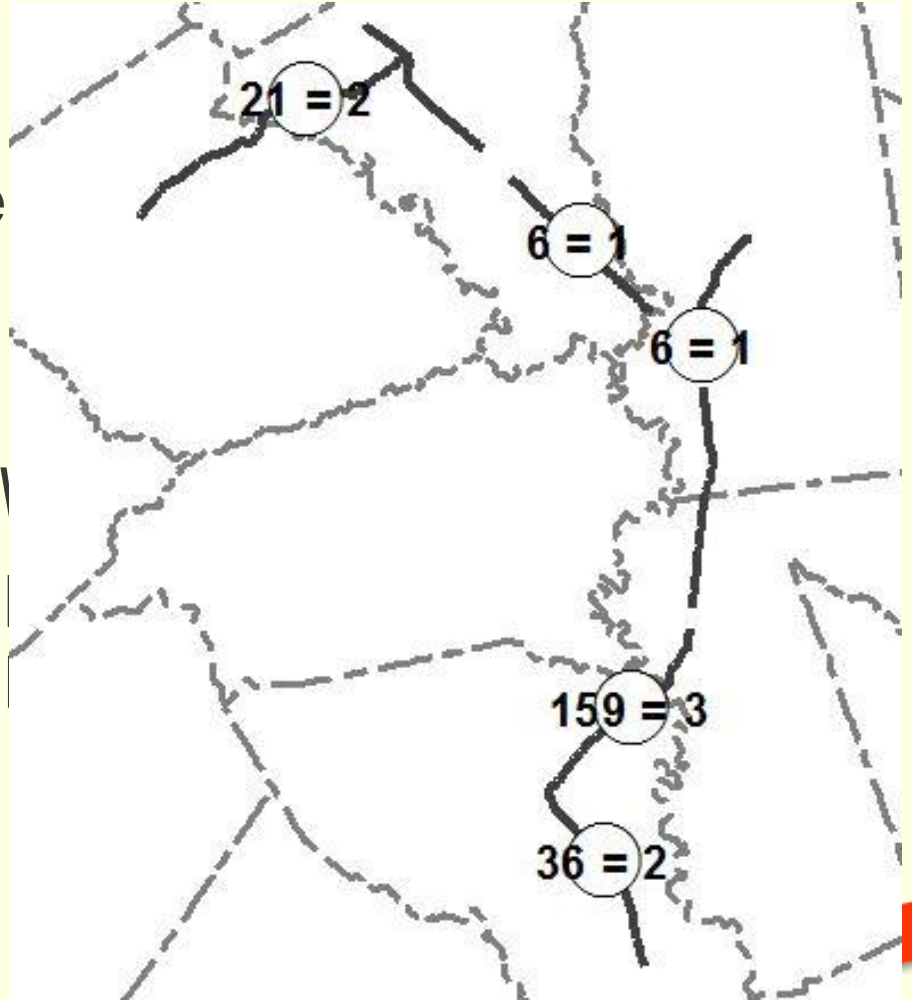- Logic: use length of the field to decrease the font size

HWY_SYMBOL	Length	Font Size
6	1	8
36	2	7
159	3	6

- How? Using XML formatting tags
- Specifically the <FNT> tag's size parameter
  - Ex: "<FNT size='6'>[HWY_SYMBOL]</FNT>"

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Making the magic

- **Step 1: Test evaluator**

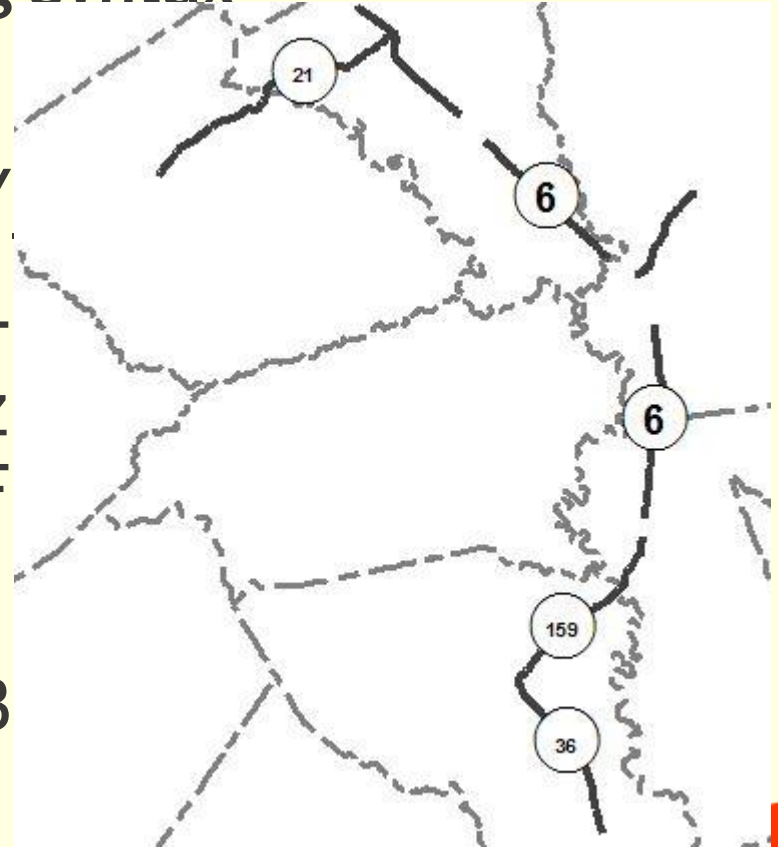- **Just check testing the le**
  works as expected

```
def FindLabel ( [HW
  x =  ([HWY_SYMBO
str(len([HWY_SYMBO
  return x
```
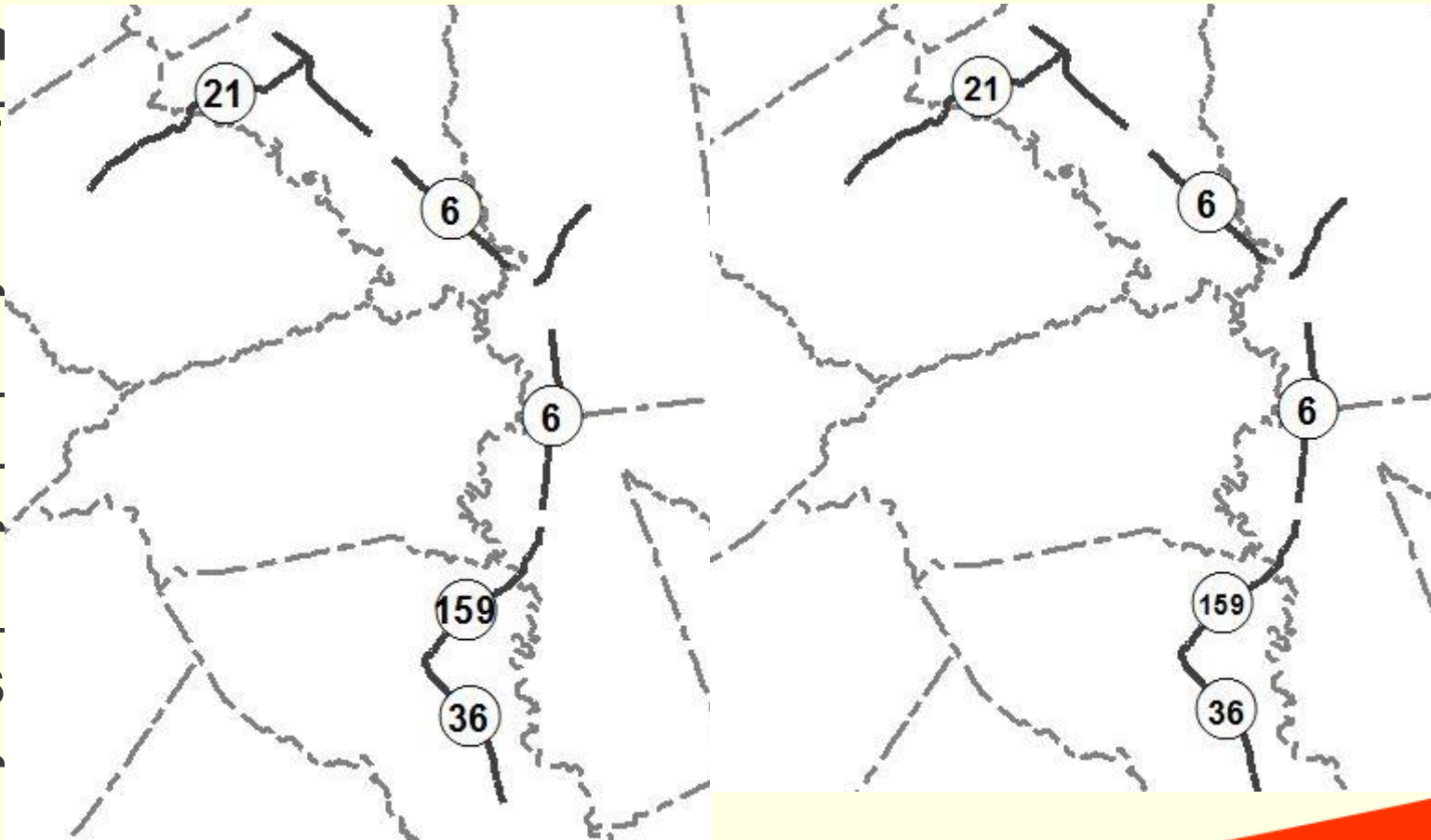
Making the magic

- **Step 2: Test formatting tag syntax**

```
def FindLabel ( [HWY
  if len([HWY_SYMBOL
    return "<FNT siz
[HWY_SYMBOL]  + "</F
  else:
    return [HWY_SYMB
```
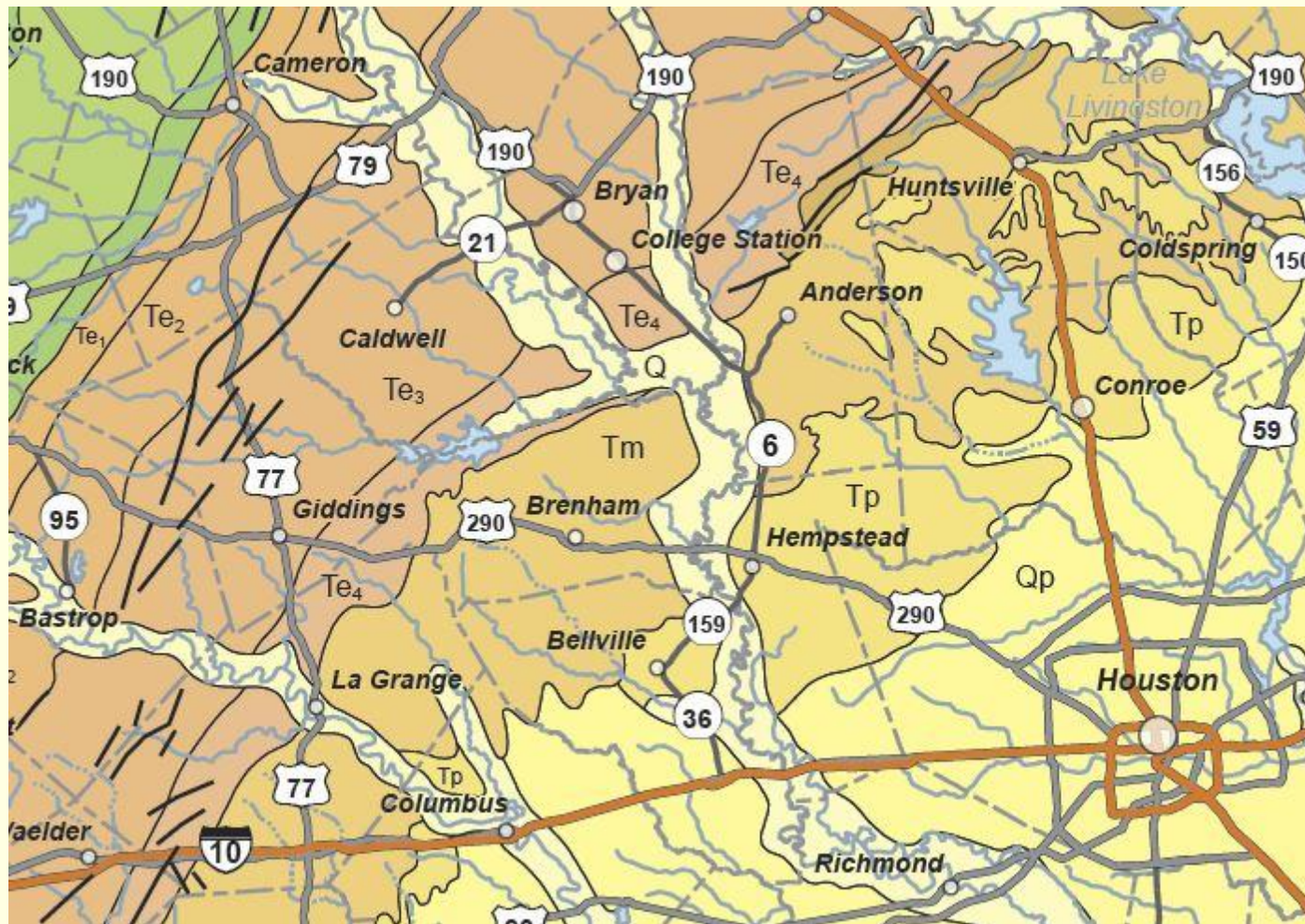
Making the magic

- Exten...

```
def F
   if
      r
[HWY_
   eli
      r
[HWY_
   els
      r
```

Final Version

Summary

- Another tool in your toolbox

- Faster than regenerating additional table values

- Easy to copy/paste into other layers

- Can be done with any existing or calculated table values

- Works with multiple values

Resources

- [Basic Python Syntax](#)

- [Arcpy Formatting Tags](#)

- [To Buy a Geological Highway Map of Texas](#)