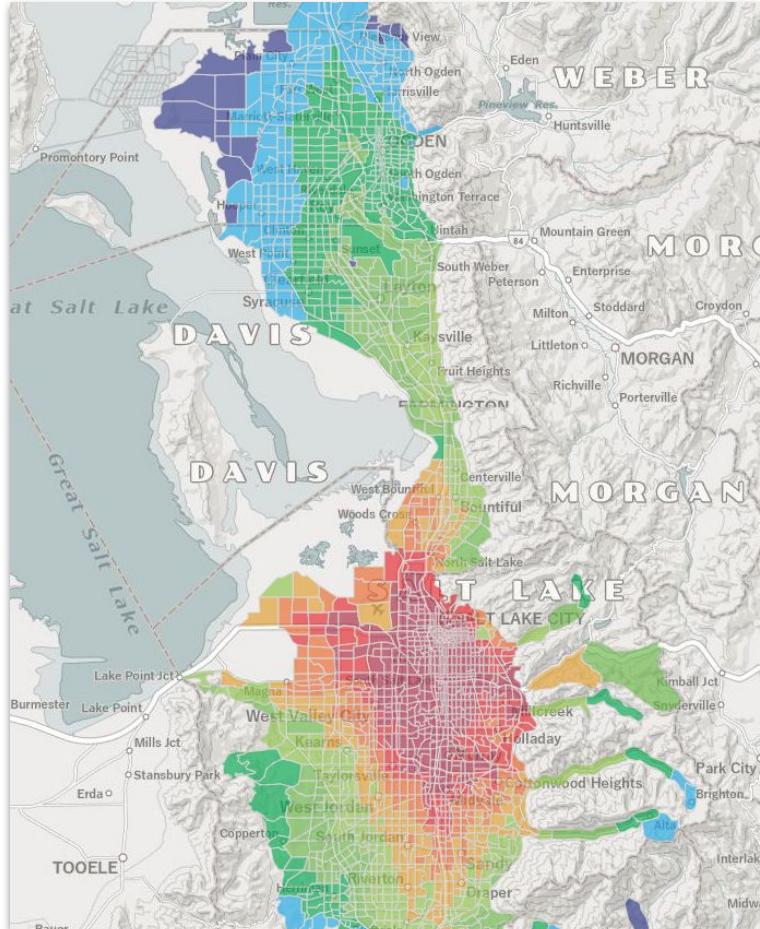
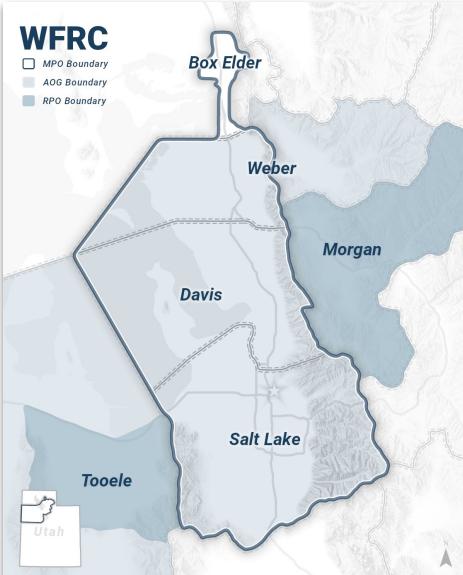


A Data-Driven Tool for Evaluating the Accessibility of Planned Transportation Projects

Josh Reynolds
MoMo 9-16-2025



About the Wasatch Front Regional Council (WFRC)



Est. 2 million persons within WFRC Region in 2025

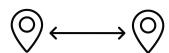
What is Access to Opportunities?



Access to opportunities (ATO)



How far people can get within a travel time



How many things they can get to in that area

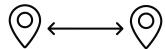


Access to opportunities

Access to opportunities (ATO)



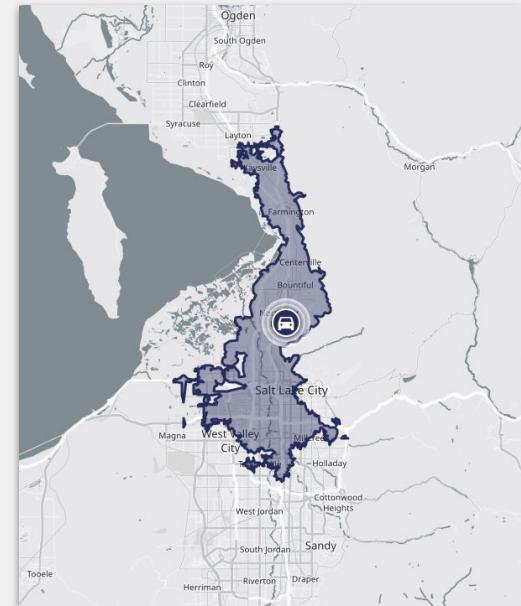
20-minute travelshed



200,000 jobs that can
be reached



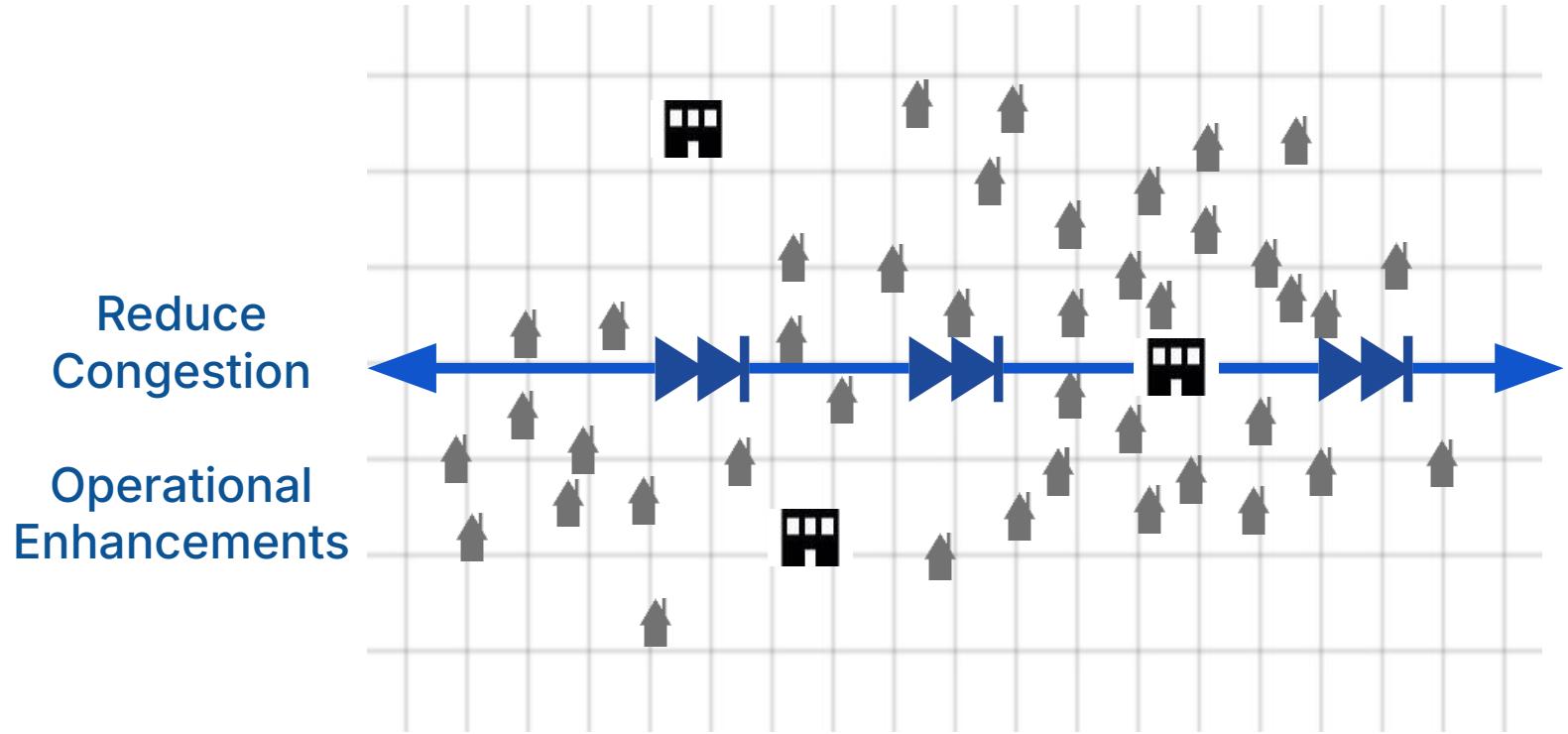
Both matter



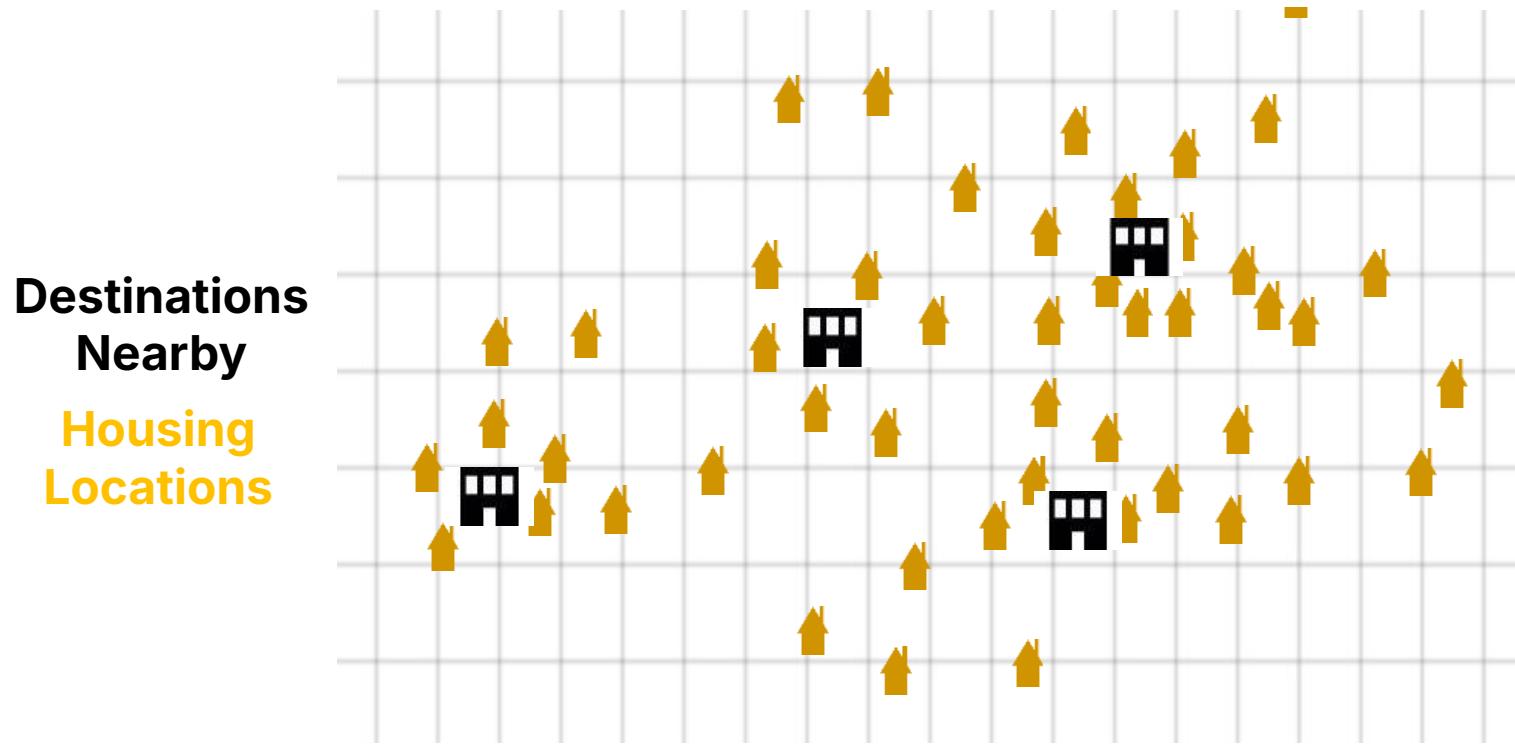
How can we improve ATO?



Increasing Travel Speeds on Roadways

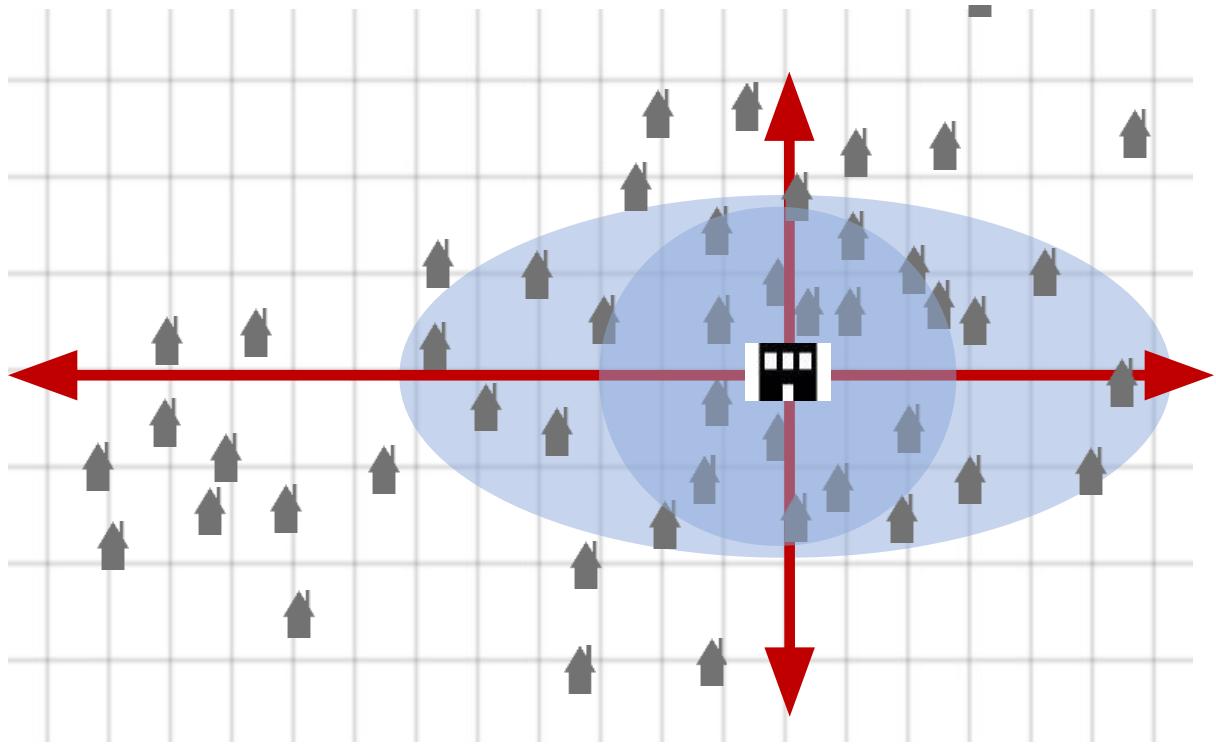


Linking Destinations Near Housing



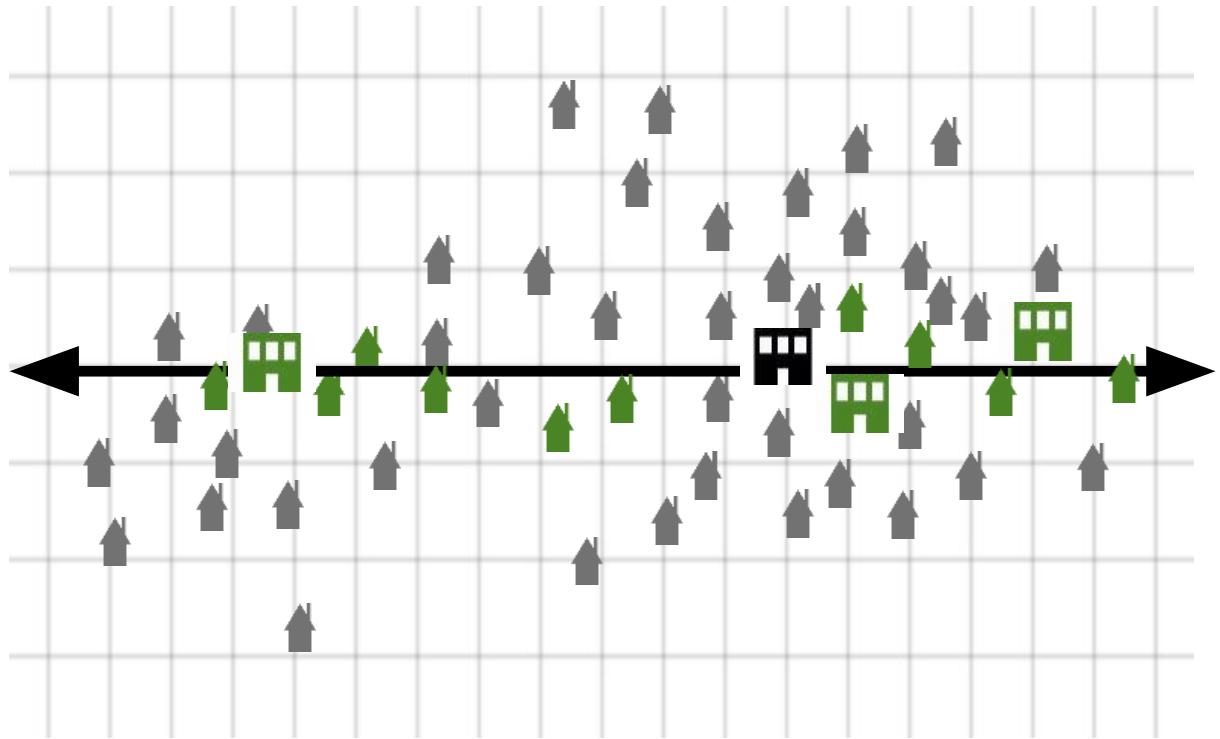
Improving transportation connections

Transportation
Improvement



Infill Near Transportation

Development
Decisions



How do we measure a specific project's impact on ATO?



ATO Impact Tool

Developed by High Street and WFRC

Desktop application that runs using Python and ArcGIS Pro - Network Analyst

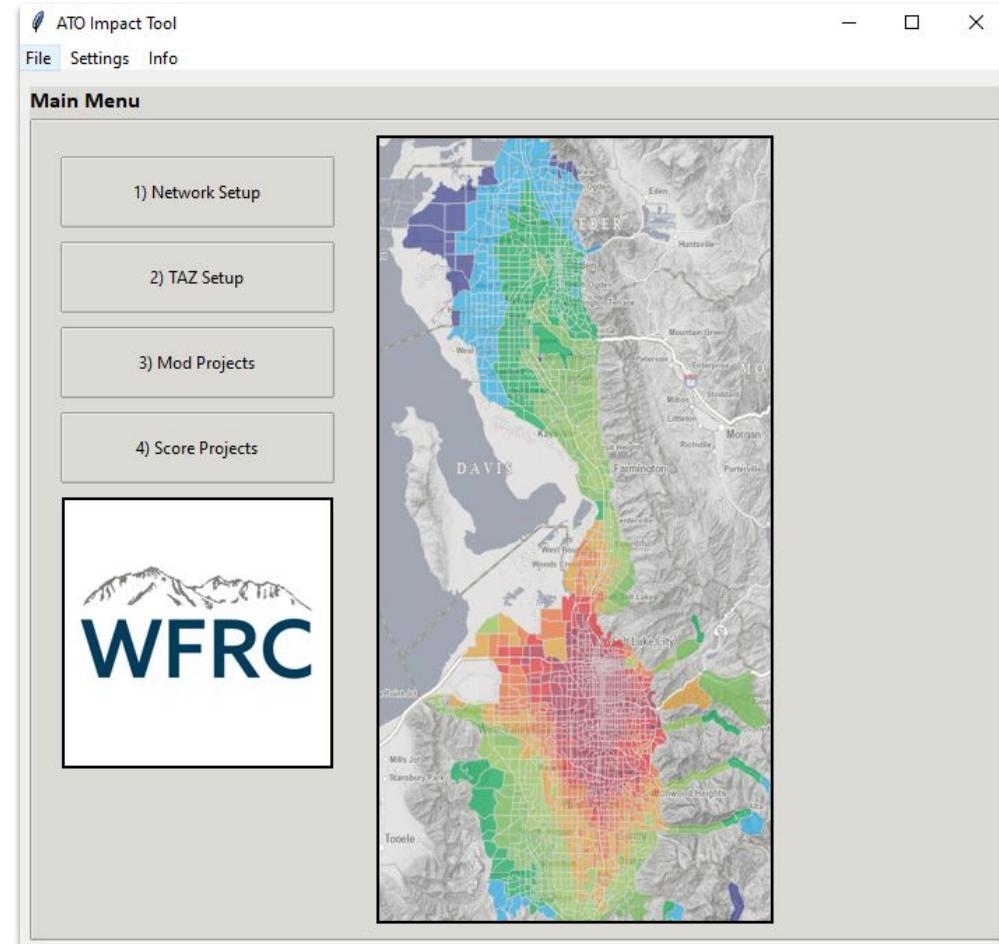
Hosted in Github

Designed for use by Planners with some GIS training

Jupyter Notebook → Tkinter



ArcGIS



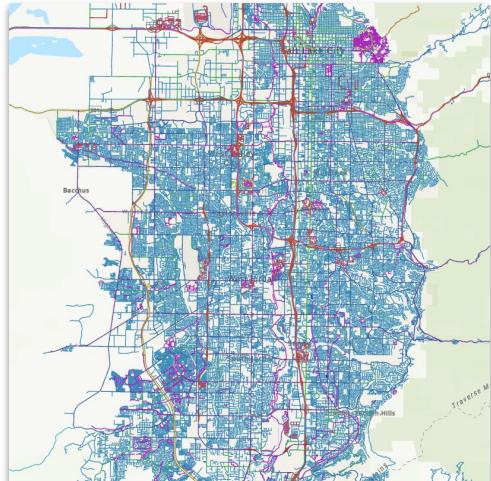
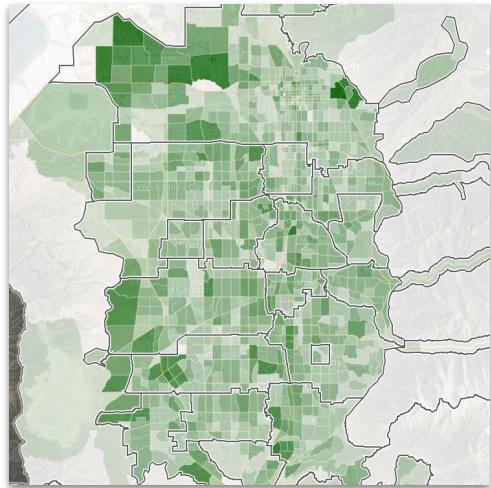
Key Input Datasets

Household and Job Forecast

- Traffic Analysis Zone (TAZ) GIS layer
- Annual Household and Job Forecast (2019 - 2050)

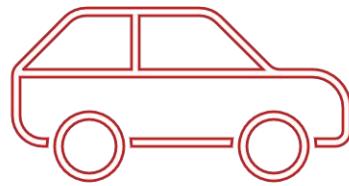
Multi-modal GIS Network

- Funded by UDOT
- Maintained by Utah Geospatial Resource Center (UGRC)
- Updated monthly
- Travel costs for auto, transit, bike, and pedestrian travel

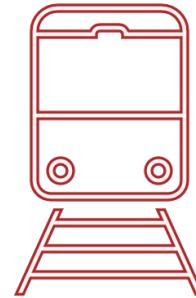


ATO Analysis Modes

Auto



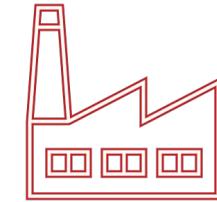
Transit



Cycling



Land Use



Baseline Network and Zone Setup

ATO Impact Tool

File Settings Info

1) Network Setup

Estimated run time: ~3 minutes

This script prepares the baseline and template Network Datasets feature classes.

1) IMPORTANT: Please ensure that the 'source_network_dataset' and 'source_tdm' files have been downloaded and that their paths in the config file are correct before running the script.

2) Run the script, then proceed to Script #2. This step need only be run once per analysis.

Run Script ➔

```
--begin network setup  
--deleting existing base gdb  
--copying gdb (50 seconds)  
--deleting network dataset  
--deleting non road bpa features (50 seconds)
```

Go Back

ATO Impact Tool

File Settings Info

2) TAZ Setup

Estimated run time: ~25 minutes

This script uses the included TAZ file with SE variables to calculate baseline ATO values for the region.

1) IMPORTANT: Please ensure that the 'source_taz' file has been downloaded and that its path in the config file is correct before running the script.

2) You may also select the forecast year of households and jobs in the config file.

3) Run the script, then proceed to Script #3. This step need only be run once per analysis.

Run Script ➔

```
File  
"E:\\Projects\\ATO-Impact-Tool-DEV2\\src\\ato_tools\\ato.py", line 201, in skim  
    raise FileNotFoundError(errno.ENOENT,  
os.strerror(errno.ENOENT), nd)  
FileNotFoundError: [Errno 2] No such file or  
directory:  
'E:\\Projects\\ATO-Impact-Tool-DEV2\\baseline.gdb\\  
\\NetworkDataset\\NetworkDataset_ND'
```

Go Back

Project Setup

3C] Mod Bike

Estimated run time: ~5 minutes per scenario
Modify a copy of the baseline NetworkDataset with a bicycle infrastructure improvement.

1) Input the scenario name and select the modification type below before running the script.

2) Run the script, ArcGIS Pro will launch. Add your edits to the network.

3) IMPORTANT: When you are done making your edits, leave the edited feature selected. Remember to save your edits and the project.

4) Once finished, close down ArcGIS Pro, the ATO tool will resume processing.

Please visit "Info" -> "Help" for more details.

Scenario Name:
Bike Facility Type:
Run Script ➔

ArcGIS Pro interface showing the 'Map' tab selected. The map view displays a detailed street network in a suburban area with green shaded regions representing parks or protected areas. A specific road segment is highlighted in blue, indicating it has been selected for modification. The 'Drawing Order' panel shows the 'BikePedAuto' layer is currently active. The 'BikePedAuto' table in the bottom right corner lists four features (OBJECTID 1-4) with their properties:

OBJECTID	Shape	Name	Oneway	Speed	BIKE_L	AutoNetork	BikeNetwork	PedNetwork	Source
1	Polyline		B	25	1A	Y	Y	Y	RoadCe
2	Polyline		B	25	1A	Y	Y	Y	RoadCe
3	Polyline		B	25	1C	Y	Y	Y	RoadCe
4	Polyline		B	25		Y	Y	Y	RoadCe

Scenario Calculation

ATO Impact Tool

File Settings Info

4) Score Projects

Estimated run time: ~15-25 minutes per scenario

This script recalculates ATO for any configured scenarios, then calculates the difference in total ATO from the baseline. Any unscored scenarios will be scored. To re-score a scenario, open its corresponding geodatabase in the scenarios folder, and delete its "scores" and "scores_summary" table.

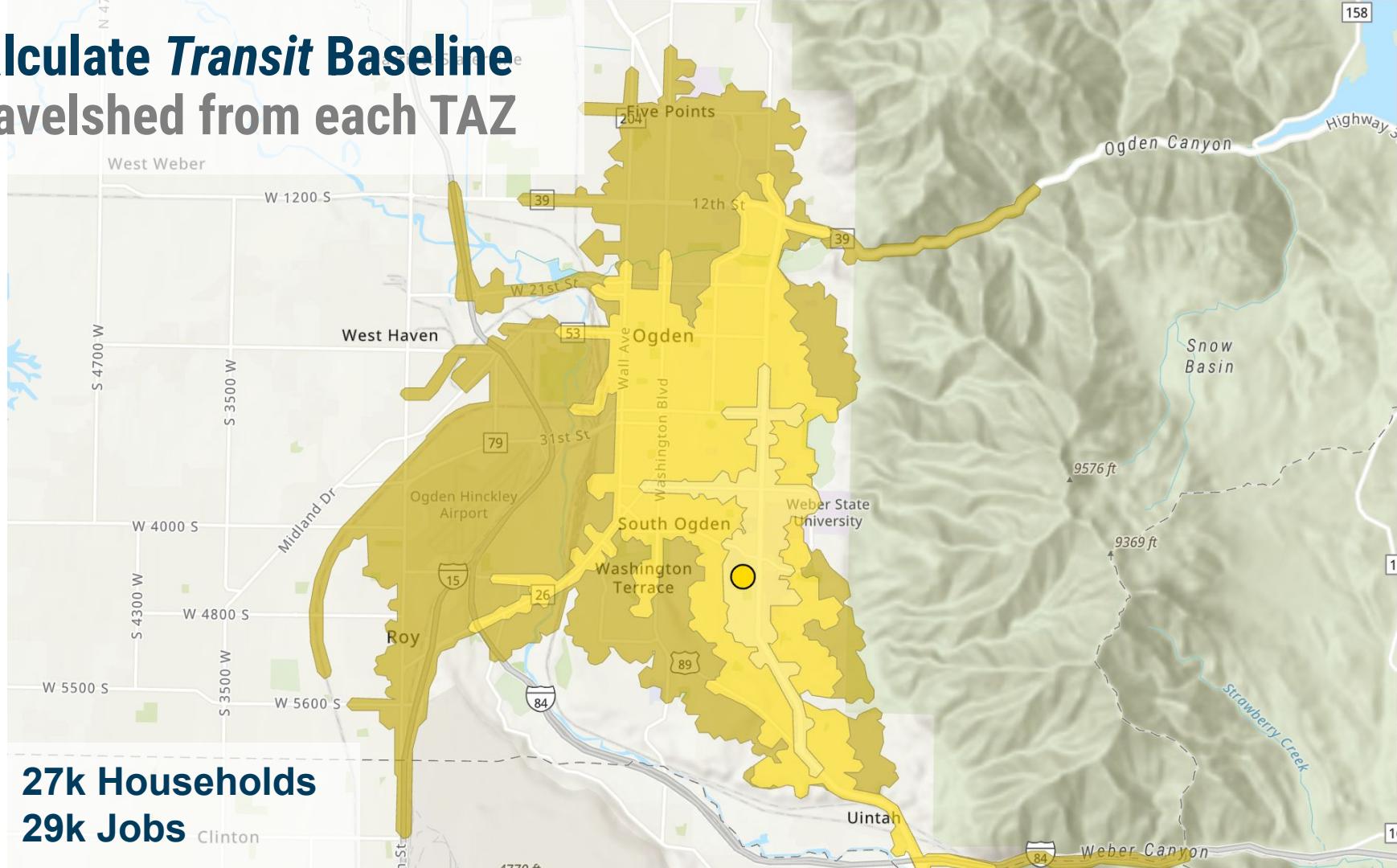
Run Script ➔

```
'Transit'
--scoring {'name': 'US89', 'gdb':
'E:\\Projects\\ATO-Impact-Tool-DEV2\\scenario\\Tra
nsit\\US89.gdb', 'mode': 'Transit'}
--scoring {'name': 'WesternWeb_Bus', 'gdb':
'E:\\Projects\\ATO-Impact-Tool-DEV2\\scenario\\Tra
nsit\\WesternWeb_Bus.gdb', 'mode': 'Transit'}
--tabulating scores
--score complete!
```

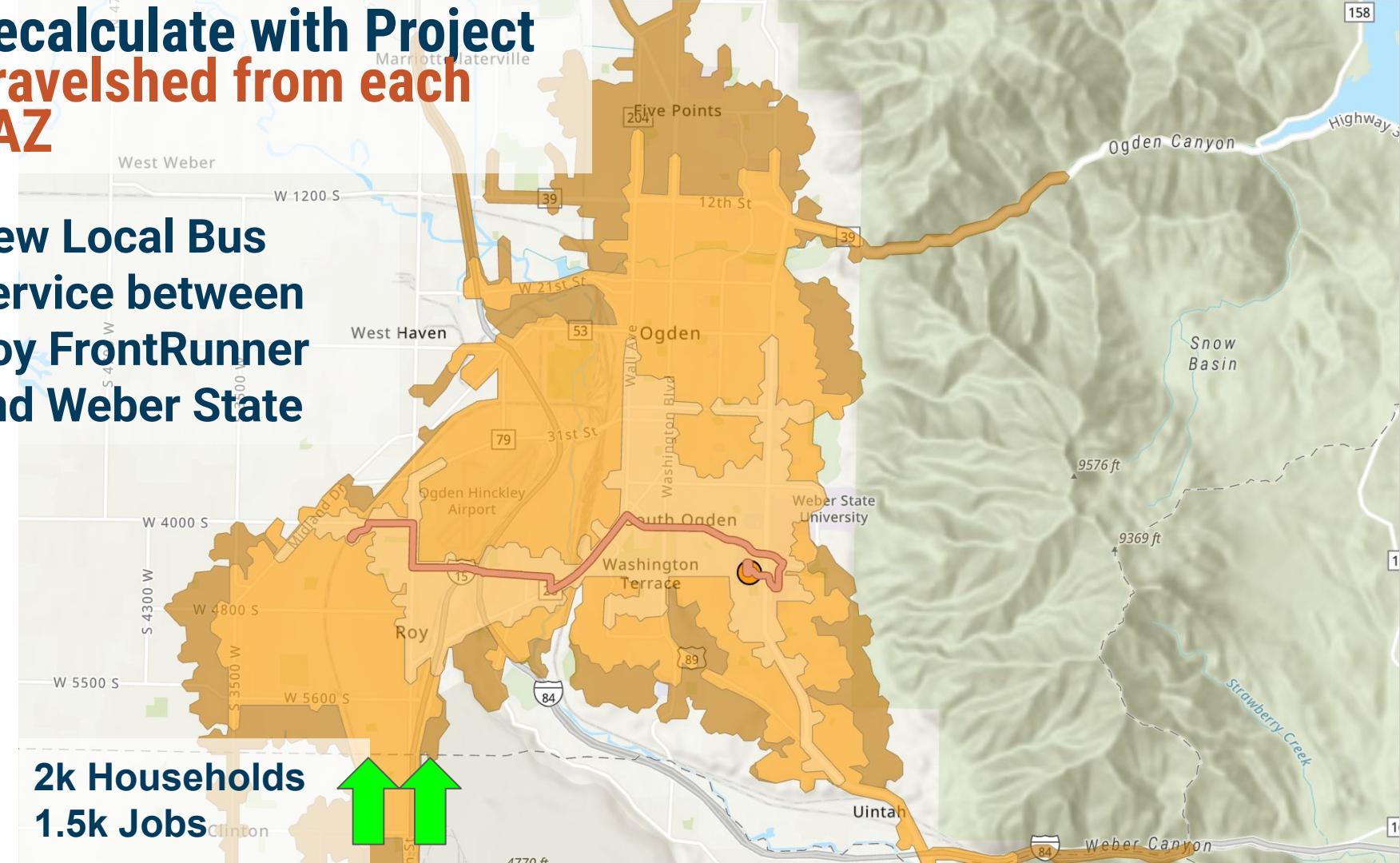
◀ Go Back

	A	B	C	D	E
1	name	mode	hh_access	jobs_access	comp_access
2	PowerDistrict_Navajo	Driving	6.6	8	6.6
3	221_LoganOgden	Transit	1882.5	3017.3	2360.8
4	254_280_3000West	Transit	101.8	163.2	123.6
5	281_SunsetWestPoint	Transit	501.9	804.4	666.7
6	282_HooperLayton	Transit	179.6	287.8	217.4
7	296_WXNSL	Transit	263.5	422.3	327.4
8	328_WVCMagna	Transit	60.1	96.3	72.7
9	336_WestValley	Transit	146.5	234.8	198.5
10	339_OlympiaHills	Transit	15.9	25.4	20
11	457_LCCUofUBus	Transit	50.4	80.8	63.8
12	458_RedLCCBus	Transit	197.7	316.8	254.2
13	462_700EastBus	Transit	257	411.9	326.8
14	463_BlueLineEastBus	Transit	106.5	170.8	130.2
15	6200South_Enhanced	Transit	541.3	867.4	677.4
16	AirnortDR	Transit	927.8	1487.2	1202.3

Calculate Transit Baseline Travelshed from each TAZ



Recalculate with Project Travelshed from each TAZ



How WFRCC Has Used the Tool

Active Transportation Project Phasing Criteria



WASATCH CHOICE GOAL	CRITERIA	DESCRIPTION	WEIGHTING
Safe, user-friendly streets	Improves safety	Project reduces level of traffic stress for an active transportation user	15
	Addresses latent bi		

Roadway Project Phasing Criteria



WEIGHTING*

Access to economic and educational opportunities	Improves access to opportunities	Project improves access to jobs and households that can be accessed in defined travel shed	15
	Improves access to opportunities in Equity Focus Areas	Project Improves access to jobs and households that can be accessed in defined travel shed from Equity Focus Areas	15

Fiscally efficient communities and infrastructure	Improves state of good repair Advances previous investments	Liveable and healthy communities	Improves access to activity-dense areas Improves access to existing amenities	Project is in an area with high jobs and residents per square mile within 1/4 mile of stations Project is proximate to existing amenities (healthcare, schools, grocery stores, government offices, parks)	15 10
Livable and healthy communities	Supports the Wasatch Choice Vision centers	Manageable and reliable traffic conditions	Addresses areas of traffic congestion	Project is on or adjacent to corridor with high levels of vehicular delay	5
Quality transportation choices	Supports transportation choices	Safe, user-friendly streets	Improves access to transit	Project is in an area with high walk network connectivity	8
		Fiscally efficient communities and infrastructure	Advances previous investments	Project is included in a completed environmental or corridor study and/or project right-of-way is preserved	2
					100

Roadway / Transit Projects Evaluated: 423

Hundreds of hours saved

Conclusions

ATO as a metric, effectively captures **network efficiency and destination accessibility**

Our tool is easy to for non-modelers to use and processes scenarios quickly

Some opportunities for improvement:

- Add more robust road attributes (freeflow/peak hour)
- Improve transit realism (headways, transfers)
- Reflect bike rider differences (skill/comfort)

Josh Reynolds
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github.com/WFRCAnalytics/A-TO-Impact-Tool



Steps

- Prepare network, calculate missing attributes
- Calculate baseline skims using search distance
- Add up reachable opportunities (baseline score)
- Draw project using ArcGIS Pro
- Recalculate skims using new network
- Calculate new score
- Compare scores
- Repeat for additional projects