Catch Basin Sediment Analysis Project

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Professional Science Master's Degree Program

Background

- Ecology administers federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) municipal stormwater permits in Washington State.
    - NPDES permits require municipalities to manage stormwater runoff before it discharges to surface and groundwater.
- Olympia started inspecting catch basins (CB)s in 2015 as part of the NPDES requirement.
- Inspections record maintenance issues and sediment levels using the ESRI Field Maps app.
    - Snow route CBs once/year
    - Sediment levels in CBs with no sump were not recorded.
    - All other CBs were cleaned and inspected once/two years.

Background

- The NPDES permit allows CB inspection frequency changes.
  - S5.C.7.c.iii.a (iii.a) The catch basin inspection schedule of every two years may be changed as appropriate to meet the maintenance standards based on maintenance records of double the length of time of the proposed inspection frequency.
- Eight years of CB inspection data has been collected for frequency analysis (2015-2022)
  - Can Olympia's inspection schedule of every 2 years be changed to double the length of time?
    - Snow route CBs every 2 years
    - All other CBs every 4 years
- Expected outcome would be extra time to allocate to current and/or new programs (e.g., Pipe cleaning).

Methods

1) Field Map app data pulled into ArcMap.
2) Excel spreadsheets pulled from the attribute table and separated by CB inspection schedules.
3) Data Organized by:
    - IDN
    - Snow Route (0 = no, 1 = yes)
    - swCBSchedule (1-20)
    - Sump or no sump
    - Inspection years (2015-2022)
    - Removed all other catch basin data (e.g., can't locate, doesn't exist, data missing).

IDN	InSnowRou	swCBSchedu
7538	1	2
7644	1	2
7894	0	2
7992	1	2
8024	1	2
8043	0	2
8290	0	2
8303	0	2
8687	0	2
8752	0	2
8997	0	2

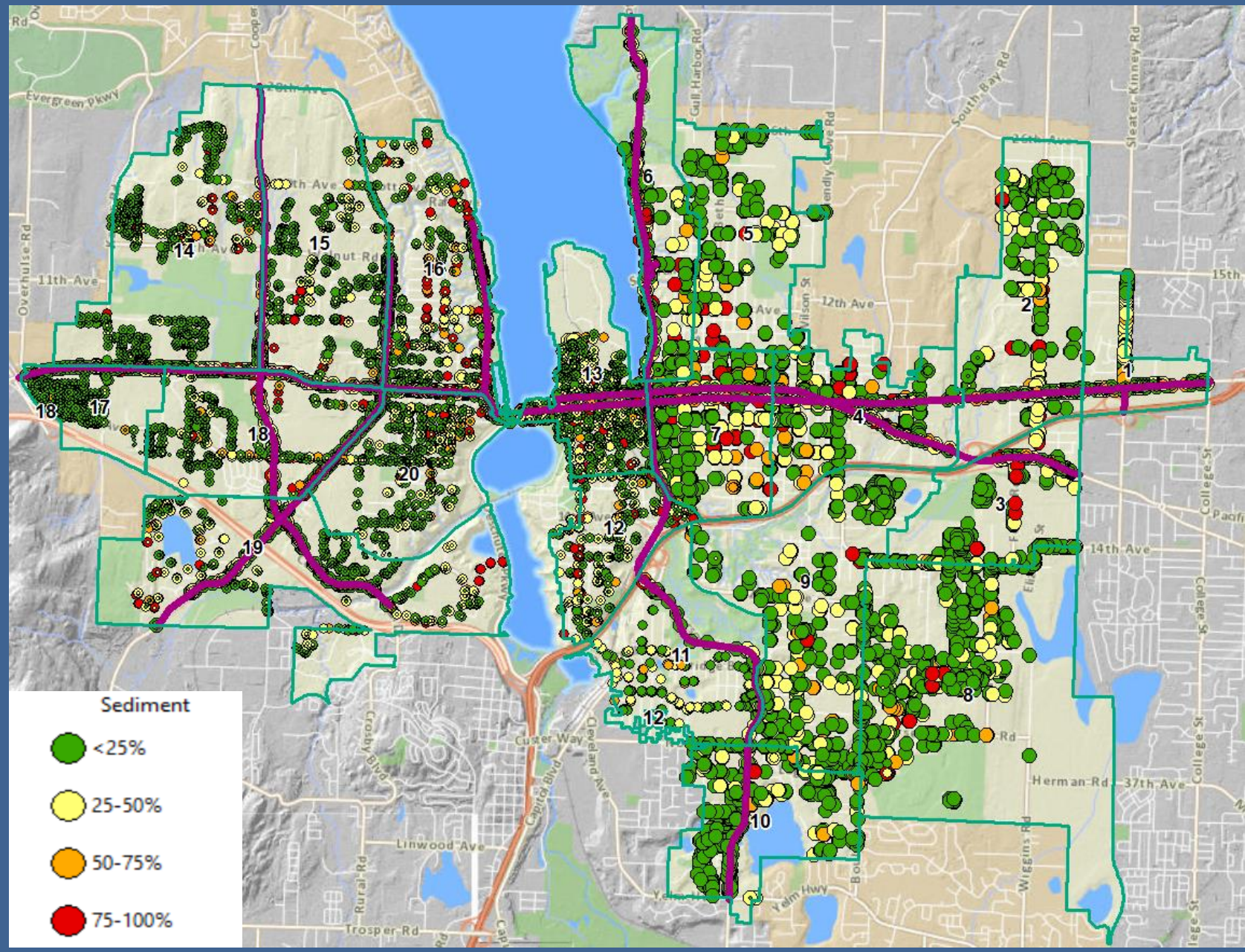
Methods

- Grouped data using Excel for analysis
  - Converted sediment level records of each CB inspection.
    - Original CB sediment = <25%, 25-50%, 50-75%, 75-99%, 100%
  - Averaged all inspections per CB.
  - Average inspection frequency scores:
    - Average below 50% = frequency changed.
      - 1 year to 2 years.
      - 2 years to 4 years.
    - Average 50% and above = frequency remained the same.
  - Note: all no sump and snow route inspection schedules remain the same.

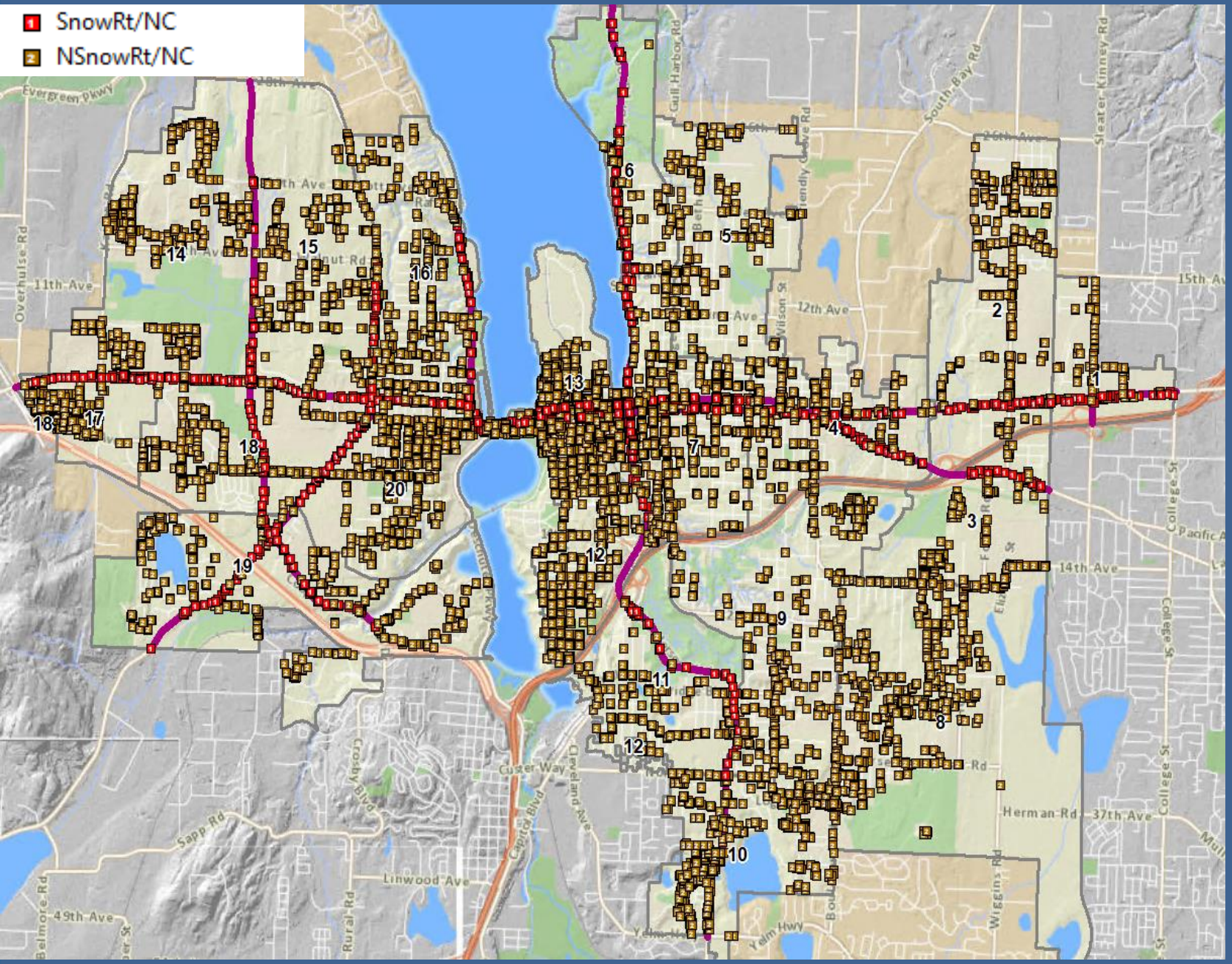
Original levels	Classified Levels
<25%	25%
25-50%	50%
50-75%	75%
75-99%	99%
100%	100%

Current Inspection Data Map

- Symbols showing sediment levels recorded between different years.
- Different sizes correspond to different year inspections.
- At current inspection frequencies:
  - Snow Route = 1 year
  - Non-Snow Route = 2 years



Current Frequency City Limits



The Goals are to:

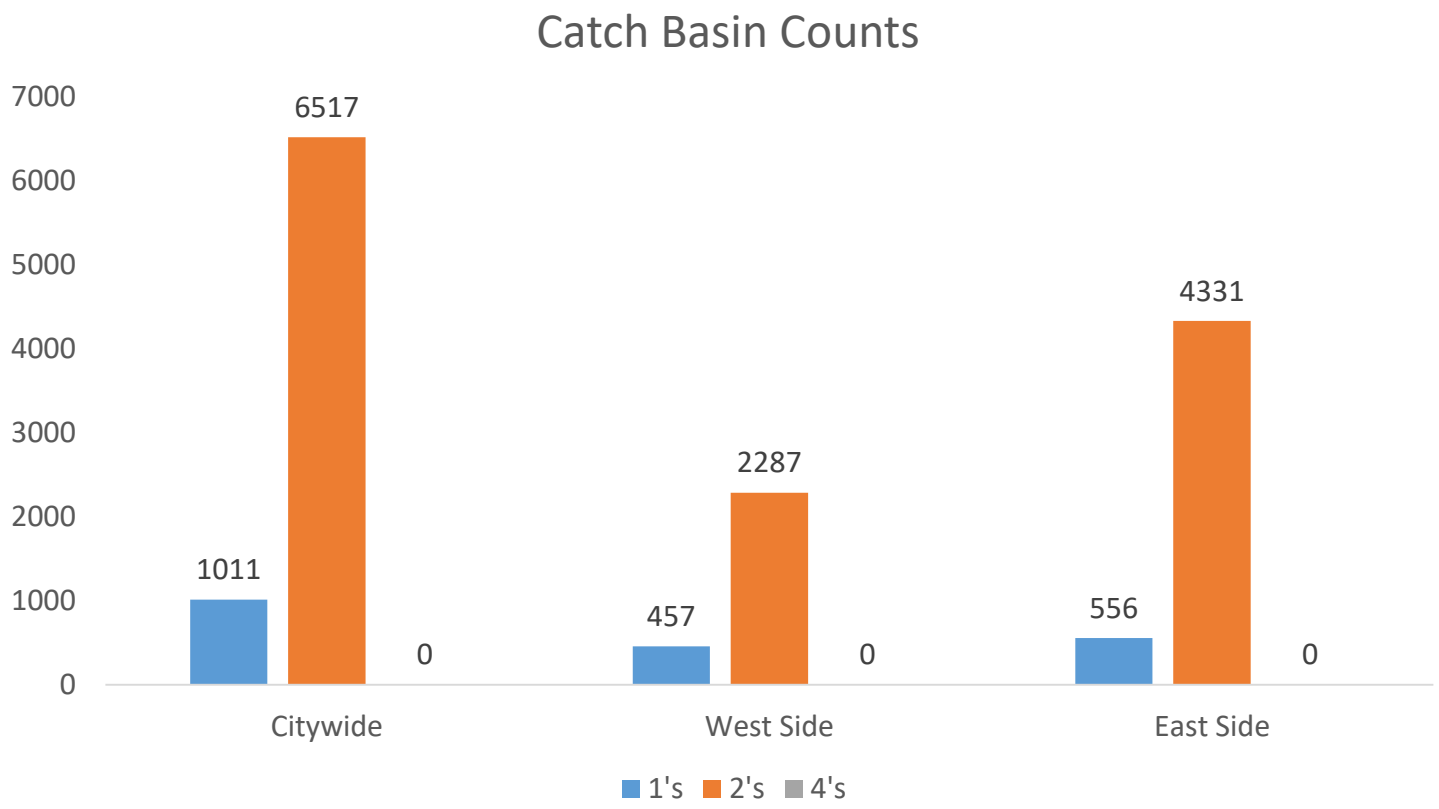
- Change the red 1's into 2's.
- Change the brown 2's into 4's.
- Change as many catch basins as possible based on the inspection data.

Current Catch Basin Counts

City Wide:
1's: 1,011
2's: 6,517
4's: 0

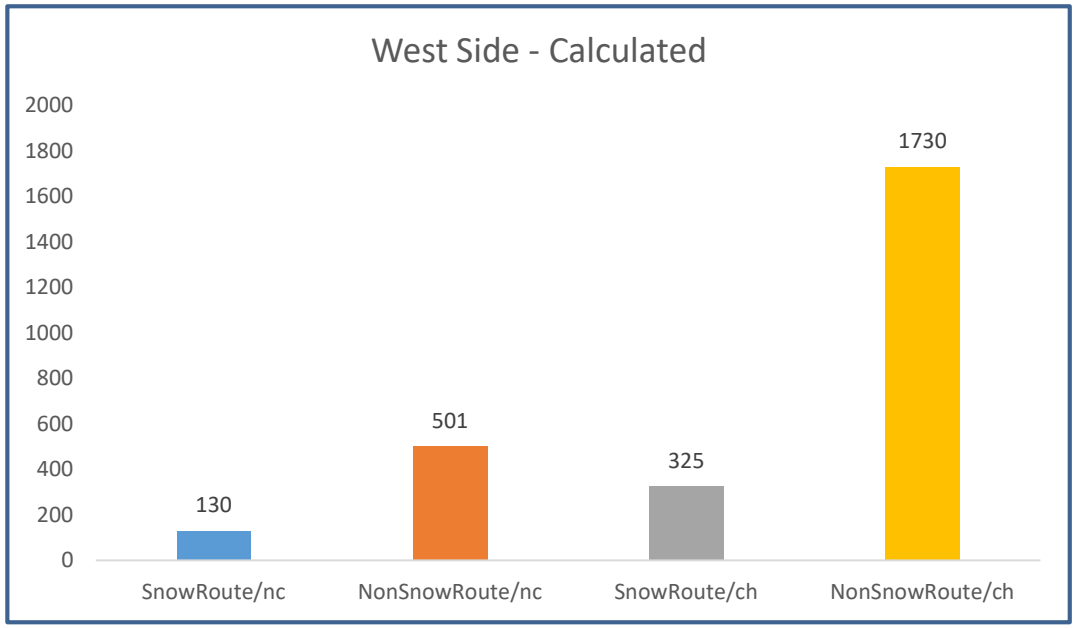
West Side:
1's: 457
2's: 2,287
4's: 0

East Side:
1's: 556
2's: 4,331
4's: 0

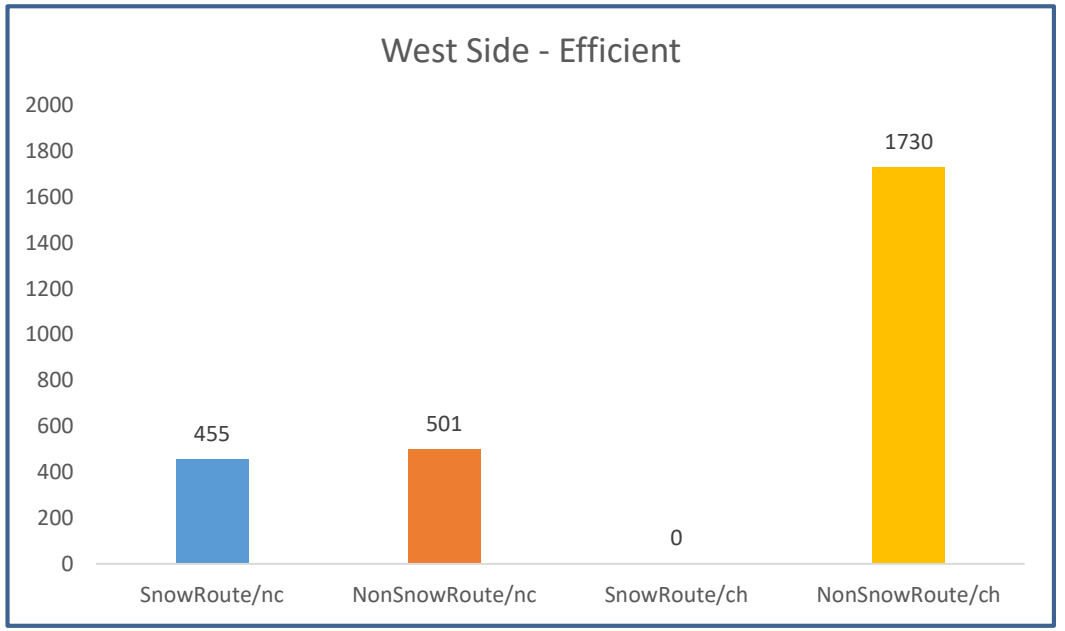


*before removing 'no sumps' and no data

West Side Results - Counts

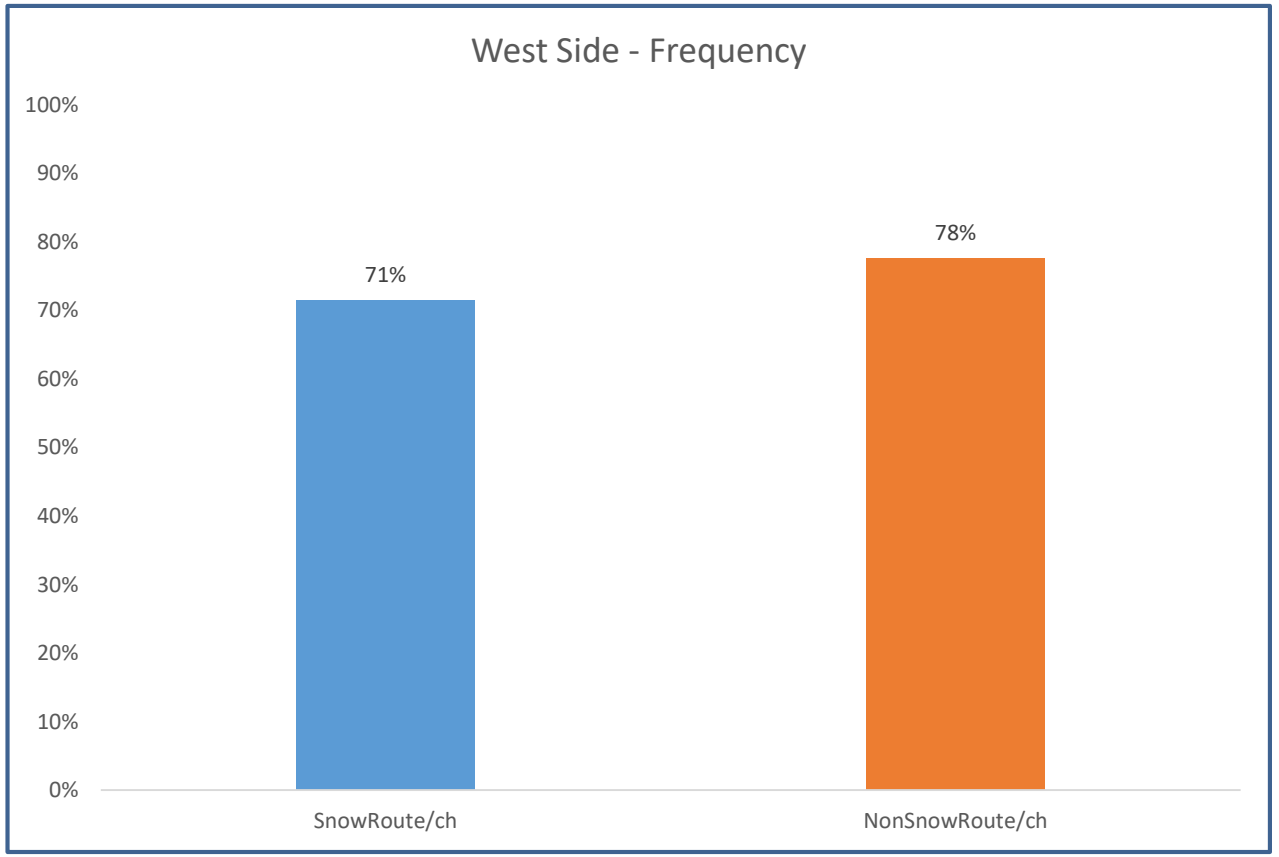


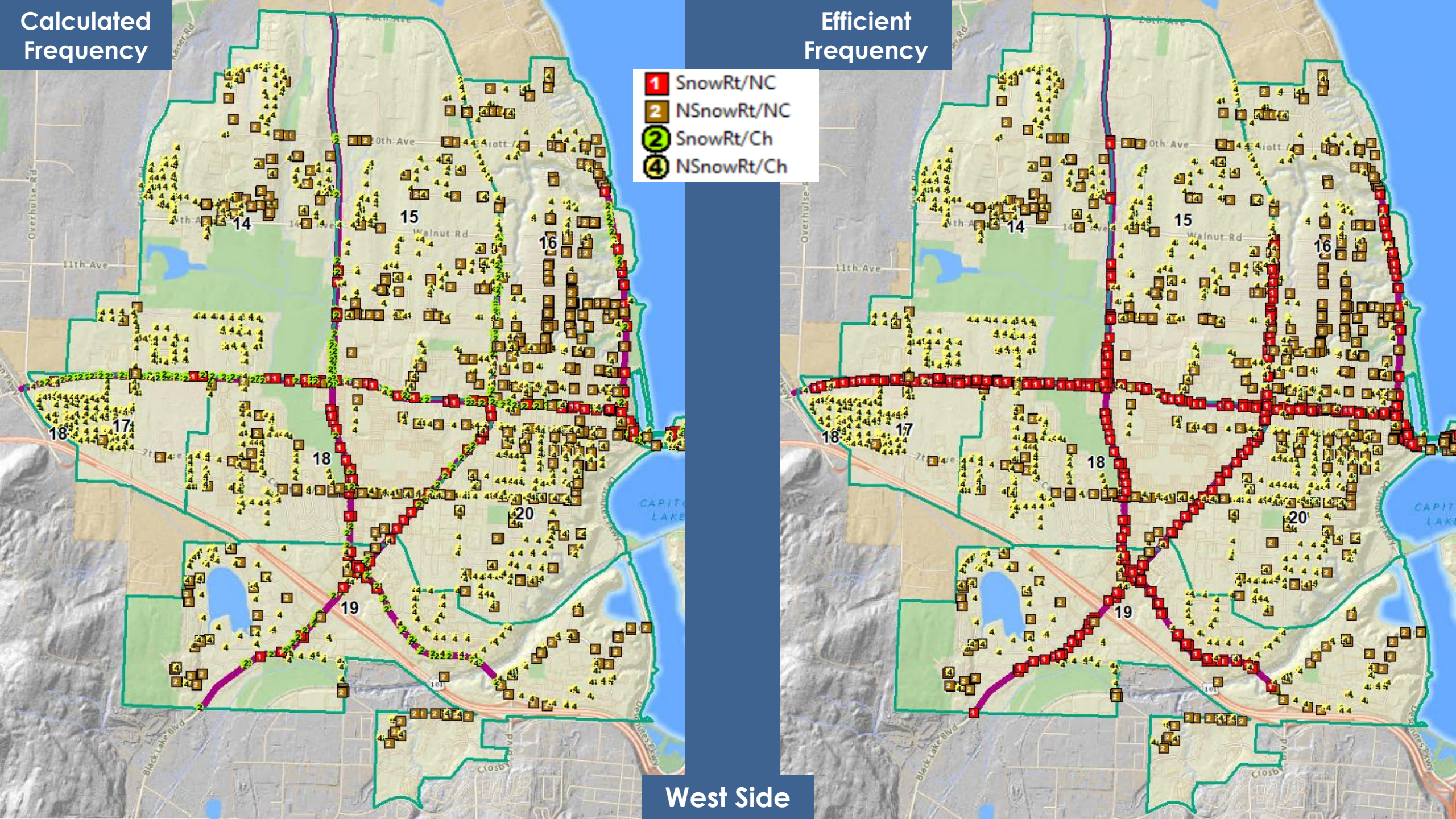
1's 2's 2's 4's



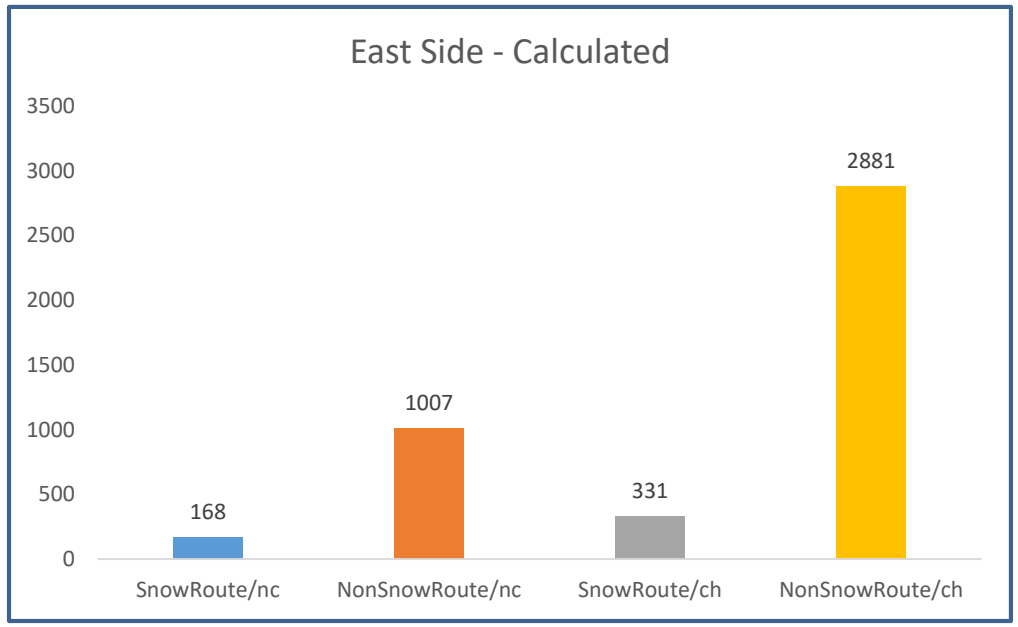
1's 2's 2's 4's

West Side Results - Frequency

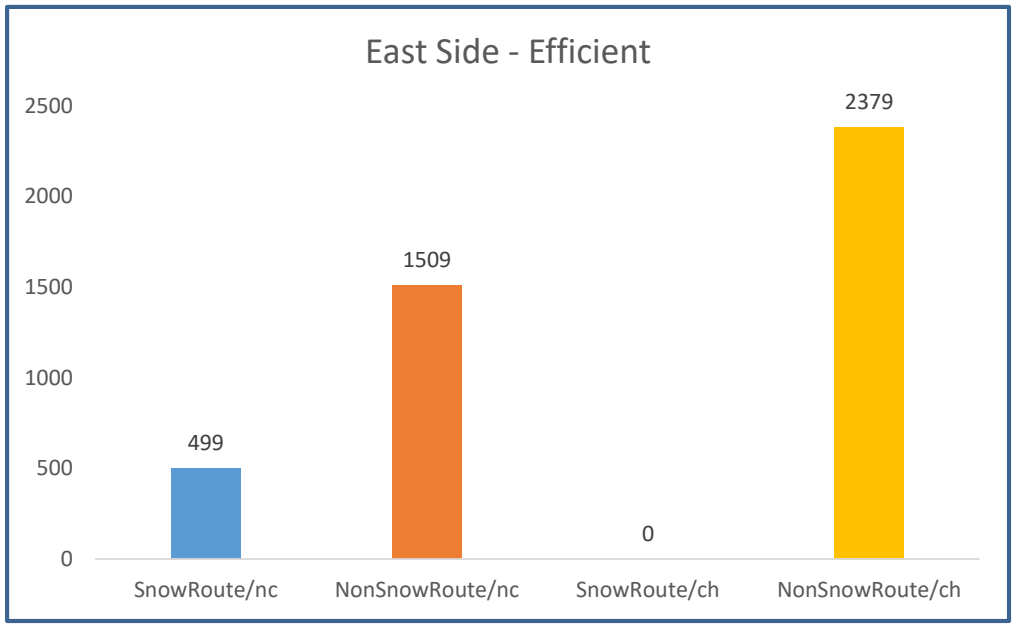



Calculated Frequency
Efficient Frequency
1 SnowRt/NC
2 NSnowRt/NC
2 SnowRt/Ch
4 NSnowRt/Ch
14
15
16
17
18
19
20
Walnut Rd
11th Ave
Overhulse Rd
Black Lake Blvd
Cooper Pt Rd
Capitol Lake
West Side

East Side Results - Counts

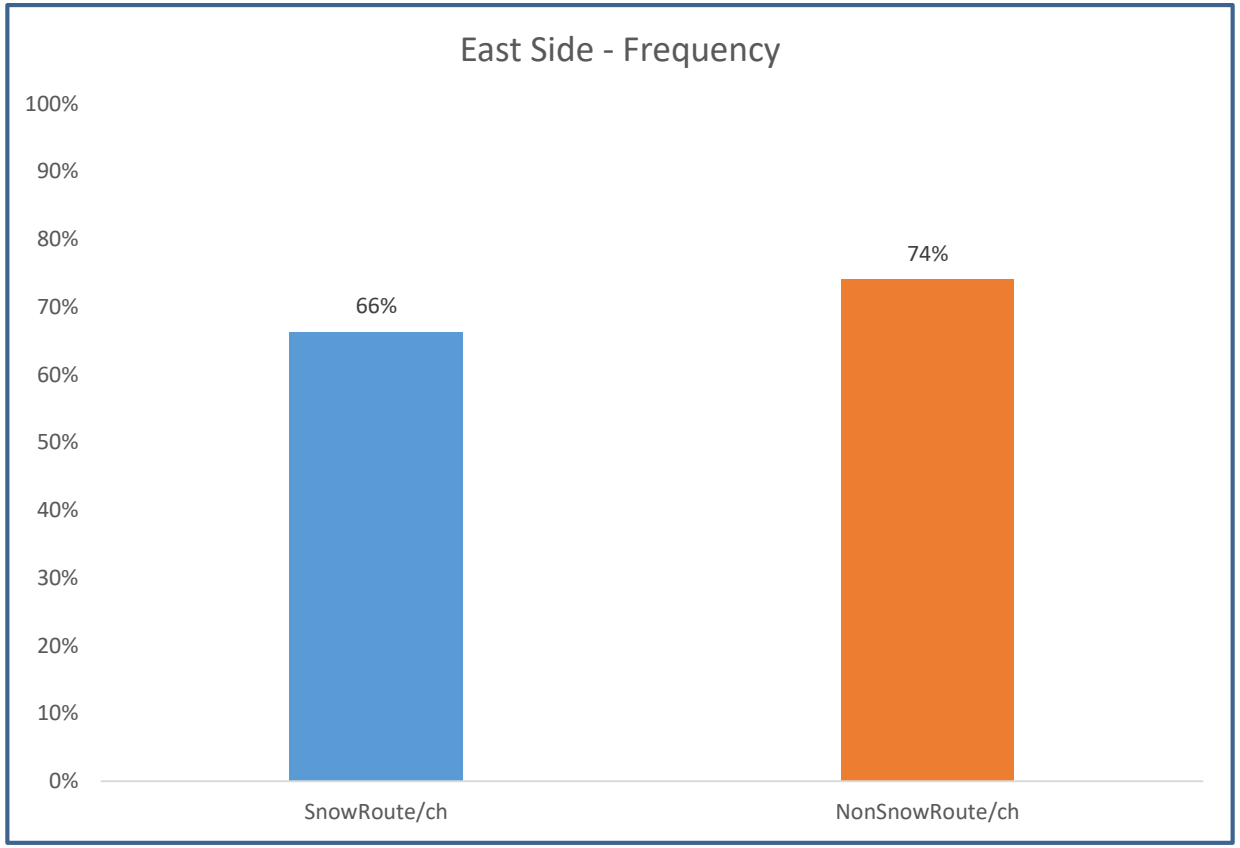


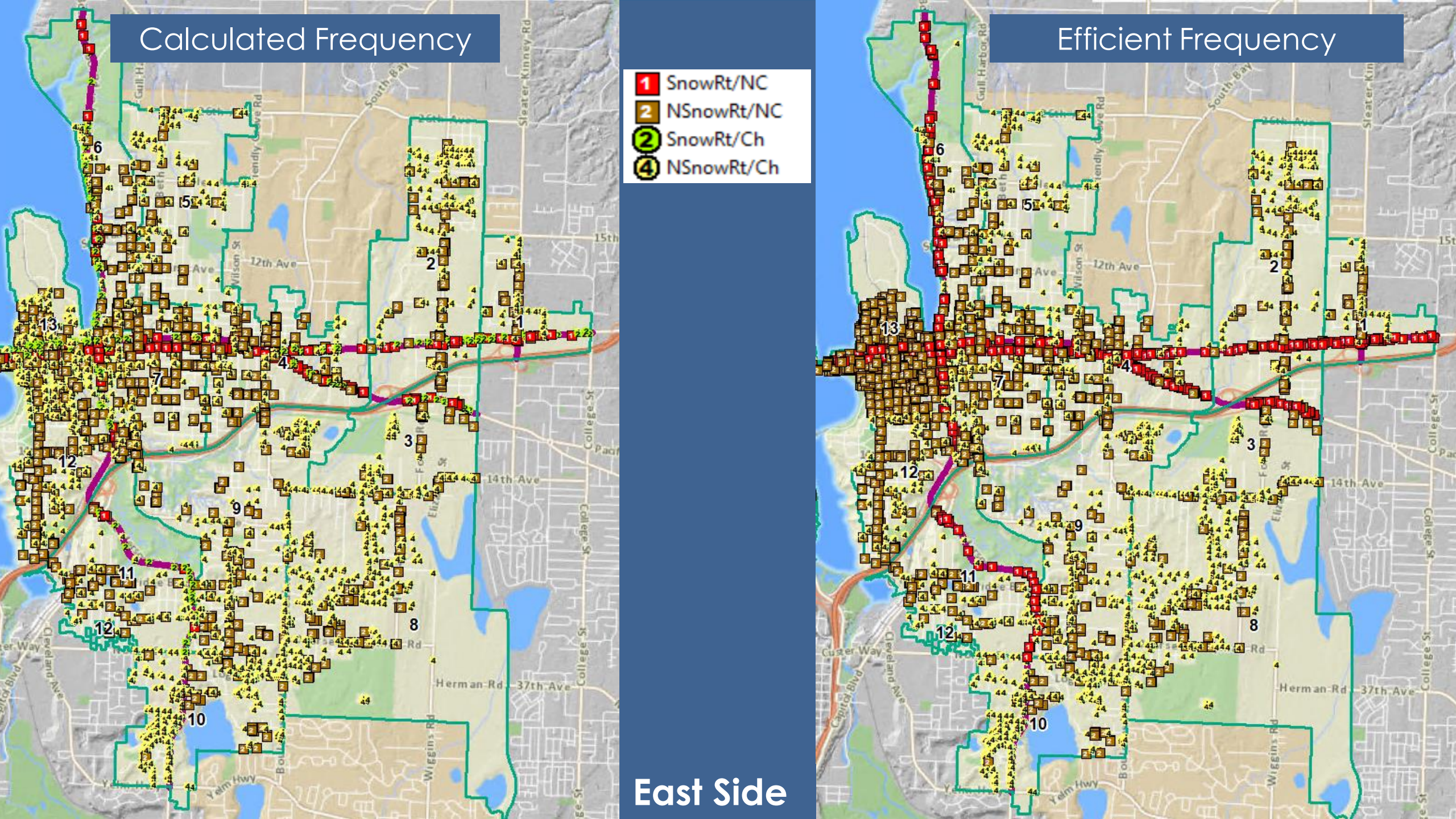
1's 2's 2's 4's



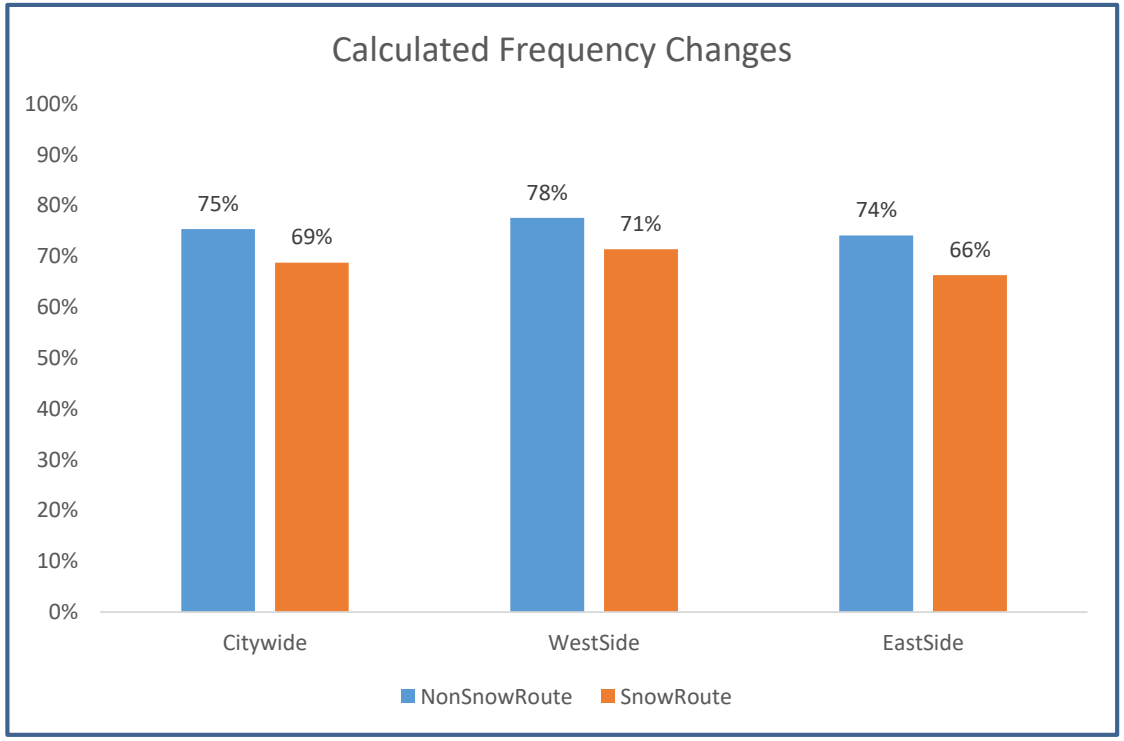
1's 2's 2's 4's

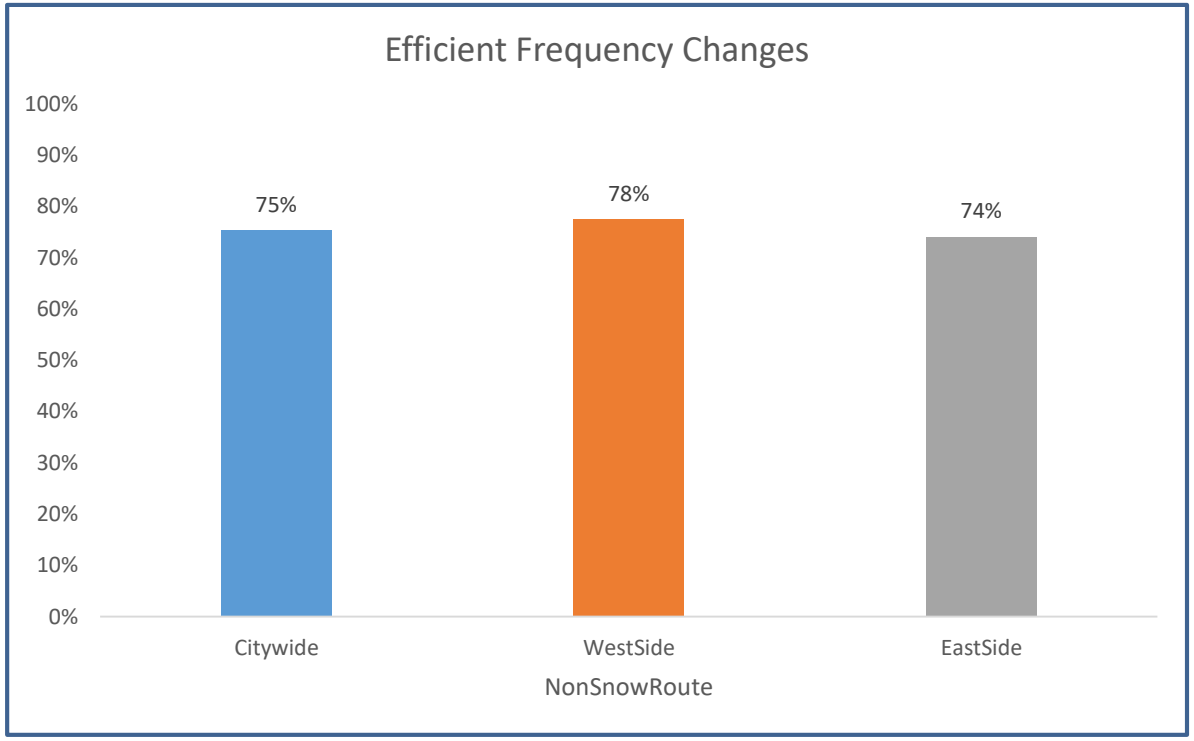
East Side Results - Frequency




Calculated Frequency
Efficient Frequency
1 SnowRt/NC
2 NSnowRt/NC
2 SnowRt/Ch
4 NSnowRt/Ch
East Side
12th Ave
14th Ave
Herman Rd
37th Ave
College St
Wiggins Rd
Yelm Hwy

Citywide Results - Frequency





Summary and Conclusion

- The calculated frequency data shows it's possible to reduce the frequency of CB inspections and cleanings per permit regulations.
- The efficient frequency data shows similar frequency changes are still possible, but a slightly reduced frequency change.
- More analysis could show better assessments for changes in frequencies, based on time data or vehicle monitor logs.

Calculated Frequency	West Side	East Side	City
Non-Snow Route	78%	74%	75%
Snow Route	69%	71%	66%

Efficient Frequency	West Side	East Side	City
Non-Snow Route	78%	74%	75%
Snow Route	0%	0%	0%

Questions?

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