Analysis of Commuter Data in the RTA District

Using ACS Journey to Work Data, through 2013

Disaggregated Municipalities

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The American Community Survey Journey to Work[1] database from the U. S. Census Bureau provides a great deal of useful information on which to base transportation decisions. I have isolated the data for the four Southeast Michigan counties that form the Regional Transit Administration District and analyzed it in order to better determine the degree to which the Regional Master Plan corresponds to surveyed commuter flows.

This analysis uses data at the **municipality** level ("Minor Civil Division" in Census jargon), estimating the number of commuters from each residential municipality to their work municipality. The downloadable census table contains 11,523 origin-destinations pairs involving Southeast Michigan, many of which are quite remote from the RTA region.

Because the size of municipalities varies, the geographic precision of the data is highly variable. Numbers are based on annual surveys done by the Census Bureau, and extrapolated based on population.

The result is a very broad-brush look at commuting flows. The numbers themselves are accurate enough to be useful for regional transportation planning purposes, but further data must be sought for more localized planning.

In this dataset, the City of Detroit is lumped into one statistical category, but it's wide geographical extent makes it very necessary to use more detailed data when planning transportation within the city limits and between neighboring jurisdictions.

Another limitation of this analysis is that it ignores aggregate flows. In other words, if several jurisdictions in proximity produce a commuter flow going in one direction, this analysis doesn't catch it. Further analysis is needed to reveal aggregate flows, which I have begun and hope to disseminate soon.

Useful Information

Data at this level of precision can be useful for planning longer-distance commuter services, such as those expected to be offered by the RTA. Analysis has been done for municipality-pairs in three groups:

1. To city centers, where Detroit and Ann Arbor attract the largest number of commuters
2. Crosstown
3. Internal

Tables are presented with figures for each of these categories, using only the top 100 commuter

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[1] Table 3. Residence MCD/County to Workplace MCD/County Commuting Flows for the United States and Puerto Rico Sorted by Residence Geography: 5-Year ACS, 2009-2013

flows out of the 11,623 in the Census table. Three maps illustrate the flow for a much smaller number of municipality pairs.

Flows Into Major City Centers

Detroit and Ann Arbor are the major city centers to which workers commute. This table lists the flows toward them from among the top 100 commuter flows in the region. Sorted by "Workers in Commuting Flow". The largest flows, shown in bold type, are also illustrated in Map 2.

FROM where	TO where	Workers in Commuting Flow	Margin of Error
Ypsilanti charter township	**Ann Arbor city**	**8,038**	**560**
Southfield city	**Detroit city**	**7,999**	**634**
Pittsfield charter township	**Ann Arbor city**	**7,097**	**443**
Warren city	**Detroit city**	**6,434**	**467**
Dearborn city	**Detroit city**	**5,591**	**434**
Sterling Heights city	**Detroit city**	**5,472**	**510**
Farmington Hills city	Detroit city	4,871	407
Livonia city	Detroit city	4,865	389
St. Clair Shores city	Detroit city	4,643	400
Troy city	Detroit city	4,338	385
Royal Oak city	Detroit city	4,296	446
Canton charter township	Detroit city	4,015	449
Clinton charter township	Detroit city	3,746	404
Scio township	Ann Arbor city	3,608	328
Dearborn Heights city	Detroit city	3,532	349
Redford charter township	Detroit city	3,462	390
Westland city	Detroit city	3,452	385
West Bloomfield charter township	Detroit city	3,327	312
Macomb township	Detroit city	3,104	387
Ypsilanti city	Ann Arbor city	3,046	322
Oak Park city	Detroit city	2,823	376
Eastpointe city	Detroit city	2,810	362

Crosstown Flows

Any trip that originates in one municipality and ends in a regional municipality other than Detroit and Ann Arbor, is classified here as "crosstown". This table lists crosstown commuting flows from among the top 100 flows in the region, sorted by Workers in Commuting Flow. The largest flows, shown in bold type, are displayed graphically on Map 1.

FROM where	TO where	Workers in Commuting Flow	Margin of Error
Detroit city[2]	**Southfield city**	**10,352**	**876**
Detroit city	**Dearborn city**	**9,870**	**673**
Detroit city	**Livonia city**	**7,450**	**599**
Sterling Heights city	**Warren city**	**7,062**	**548**
Detroit city	**Warren city**	**6,858**	**657**
Sterling Heights city	**Troy city**	**6,278**	**467**
Warren city	**Sterling Heights city**	**4,989**	**457**
Westland city	**Livonia city**	**4,905**	**451**
Rochester Hills city	Troy city	4,517	409
Clinton charter township	Warren city	4,424	447
Macomb township	Sterling Heights city	4,168	478
Farmington Hills city	Southfield city	4,100	512
Dearborn Heights city	Dearborn city	4,061	400
Clinton charter township	Sterling Heights city	3,966	443
Detroit city	Troy city	3,840	454
Detroit city	Romulus city	3,716	420
Shelby charter township	Sterling Heights city	3,666	413
Canton charter township	Dearborn city	3,600	388
Warren city	Troy city	3,546	311
Rochester Hills city	Auburn Hills city	3,480	365
Canton charter township	Livonia city	3,433	383
Pontiac city	Auburn Hills city	3,424	497
Macomb township	Warren city	3,326	362
Macomb township	Clinton charter township	3,242	344
Royal Oak city	Troy city	3,239	350

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[2] Commutes out of Detroit City are classified as "crosstown" here, though more properly they are "reverse commutes".

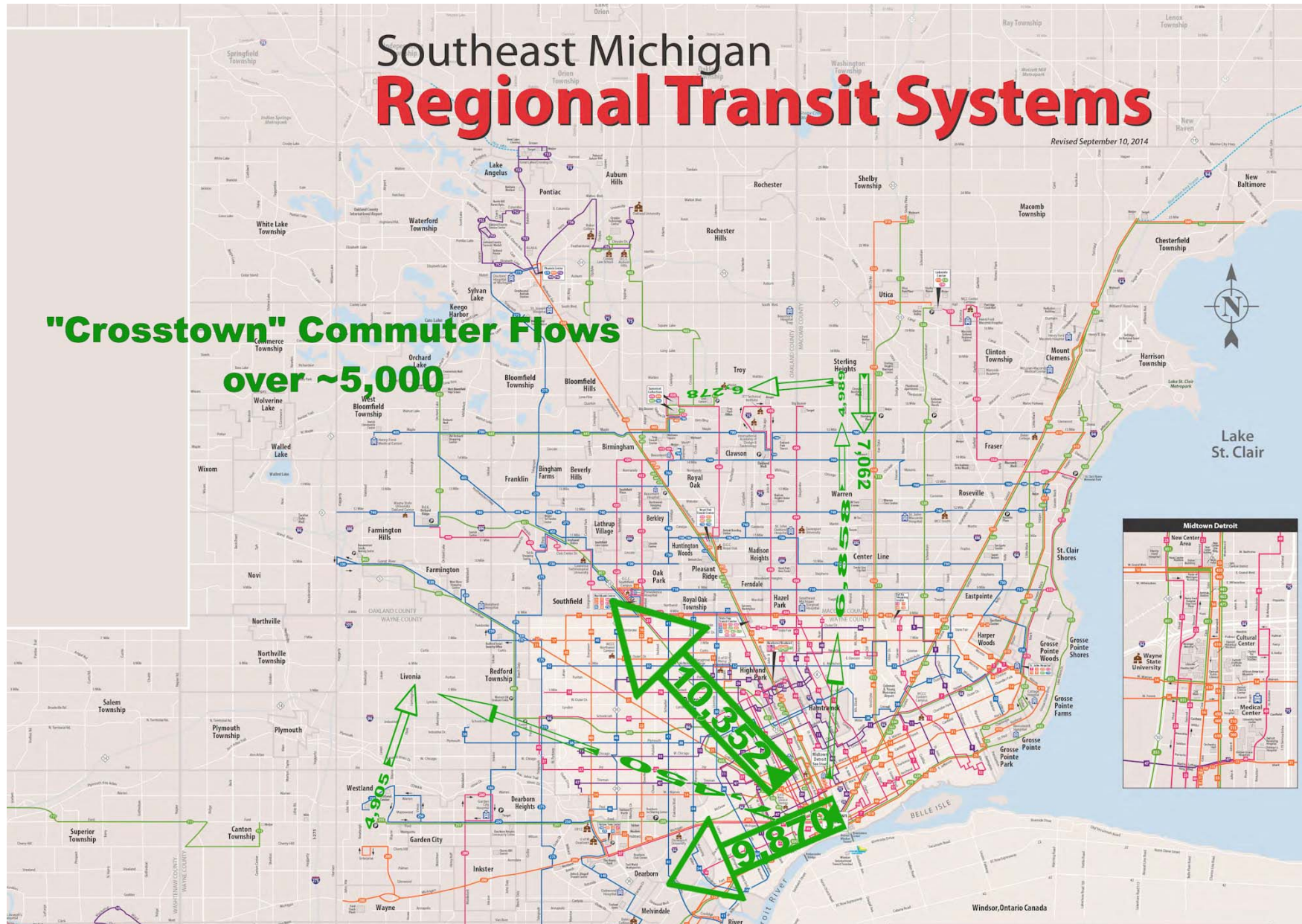| FROM where	TO where	Workers in Commuting Flow	Margin of Error
Detroit city	Farmington Hills city	3,125	408
Redford charter township	Livonia city	3,086	369
Macomb township	Troy city	2,963	367
Shelby charter township	Troy city	2,884	333
Sterling Heights city	Clinton charter township	2,873	339
St. Clair Shores city	Warren city	2,838	321
Livonia city	Farmington Hills city	2,818	343
Waterford charter township	Pontiac city	2,757	316
Roseville city	Warren city	2,746	351
Orion charter township	Auburn Hills city	2,648	270
Royal Oak city	Southfield city	2,597	325
West Bloomfield charter township	Southfield city	2,587	263
Shelby charter township	Warren city	2,585	365
Detroit city	Sterling Heights city	2,576	363
Livonia city	Dearborn city	2,566	254
West Bloomfield charter township	Farmington Hills city	2,562	259
Waterford charter township	Auburn Hills city	2,415	291
Clinton charter township	Troy city	2,370	352

Commutes within a single municipality

This table lists commuter trips that did not cross municipal boundaries, from among the top 100 flows in the region. Sorted by Workers in Commuting Flow. The largest flows, shown in bold type, are displayed graphically on Map 3.

| FROM where	TO where	Workers in Commuting Flow	Margin of Error
Detroit city	**Detroit city**	**101,922**	**2,025**
Ann Arbor city	**Ann Arbor city**	**38,319**	**1,148**
Warren city	**Warren city**	**13,533**	**706**
Dearborn city	**Dearborn city**	**12,037**	**874**
Livonia city	**Livonia city**	**11,964**	**502**
Sterling Heights city	**Sterling Heights city**	**10,487**	**566**
Troy city	**Troy city**	**10,432**	**601**
Farmington Hills city	Farmington Hills city	8,510	636
Clinton charter township	Clinton charter township	8,294	646
Canton charter township	Canton charter township	7,701	563
Waterford charter township	Waterford charter township	7,269	585
Rochester Hills city	Rochester Hills city	6,633	528
Southfield city	Southfield city	6,432	577
Westland city	Westland city	6,246	533
Royal Oak city	Royal Oak city	6,049	480
Pontiac city	Pontiac city	5,655	593
Novi city	Novi city	5,527	463
Shelby charter township	Shelby charter township	5,159	463
Taylor city	Taylor city	5,072	438
West Bloomfield charter township	West Bloomfield charter township	4,596	367
Macomb township	Macomb township	4,541	438
St. Clair Shores city	St. Clair Shores city	4,218	379
Commerce charter township	Commerce charter township	3,497	384
Ypsilanti charter township	Ypsilanti charter township	3,156	320
Auburn Hills city	Auburn Hills city	3,140	397
Orion charter township	Orion charter township	3,134	313
Bloomfield charter township	Bloomfield charter township	3,078	300

FROM where	TO where	Workers in Commuting Flow	Margin of Error
Roseville city	Roseville city	3,027	383
Chesterfield township	Chesterfield township	2,795	288
Pittsfield charter township	Pittsfield charter township	2,733	287
Dearborn Heights city	Dearborn Heights city	2,567	376
Wyandotte city	Wyandotte city	2,518	298
Independence charter township	Independence charter township	2,424	287

Southeast Michigan
Regional Transit Systems

Revised September 10, 2014

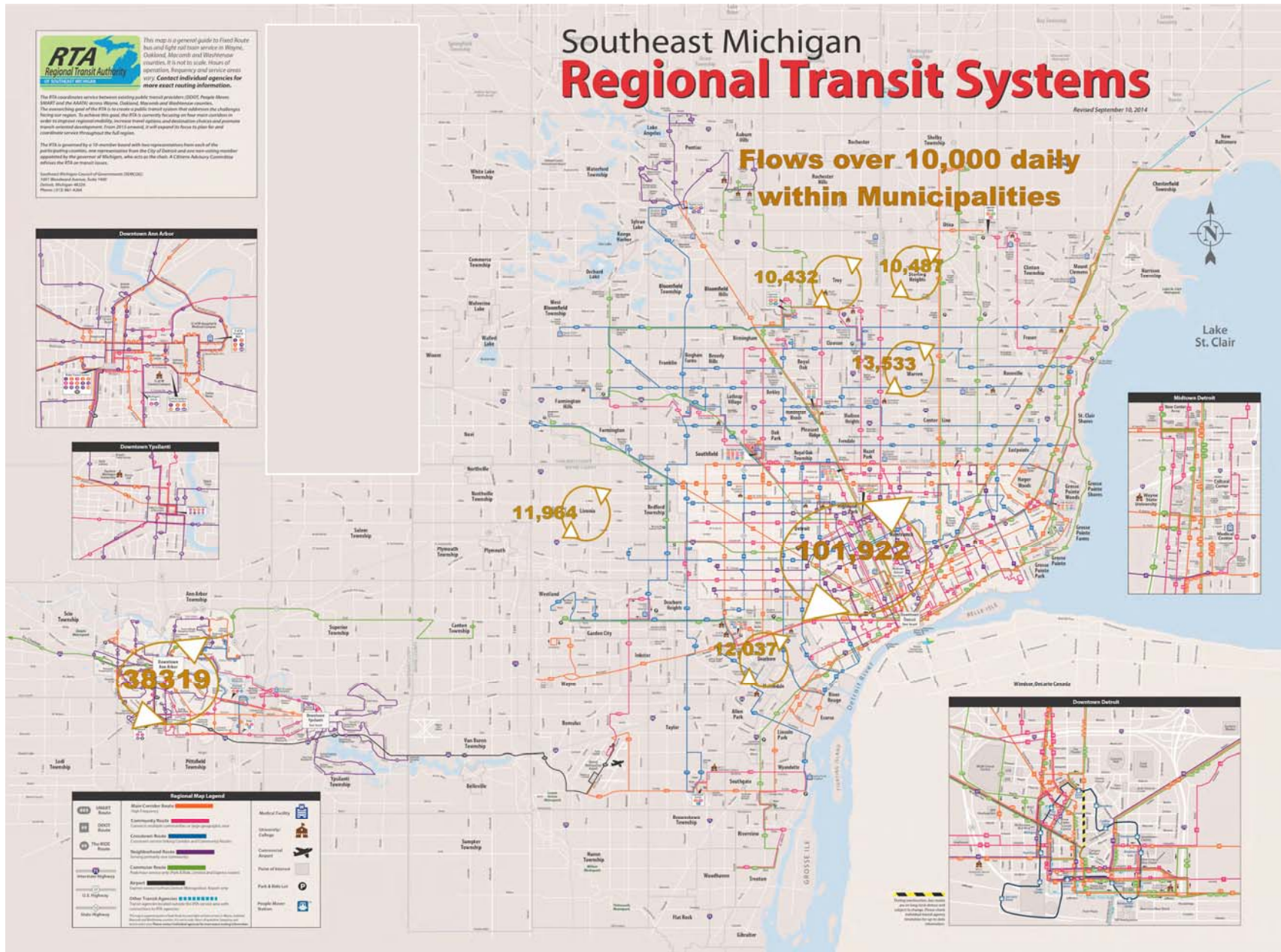"Crosstown" Commuter Flows over ~5,000

Map 1 - Crosstown Commuter Flows over ~5000 per day
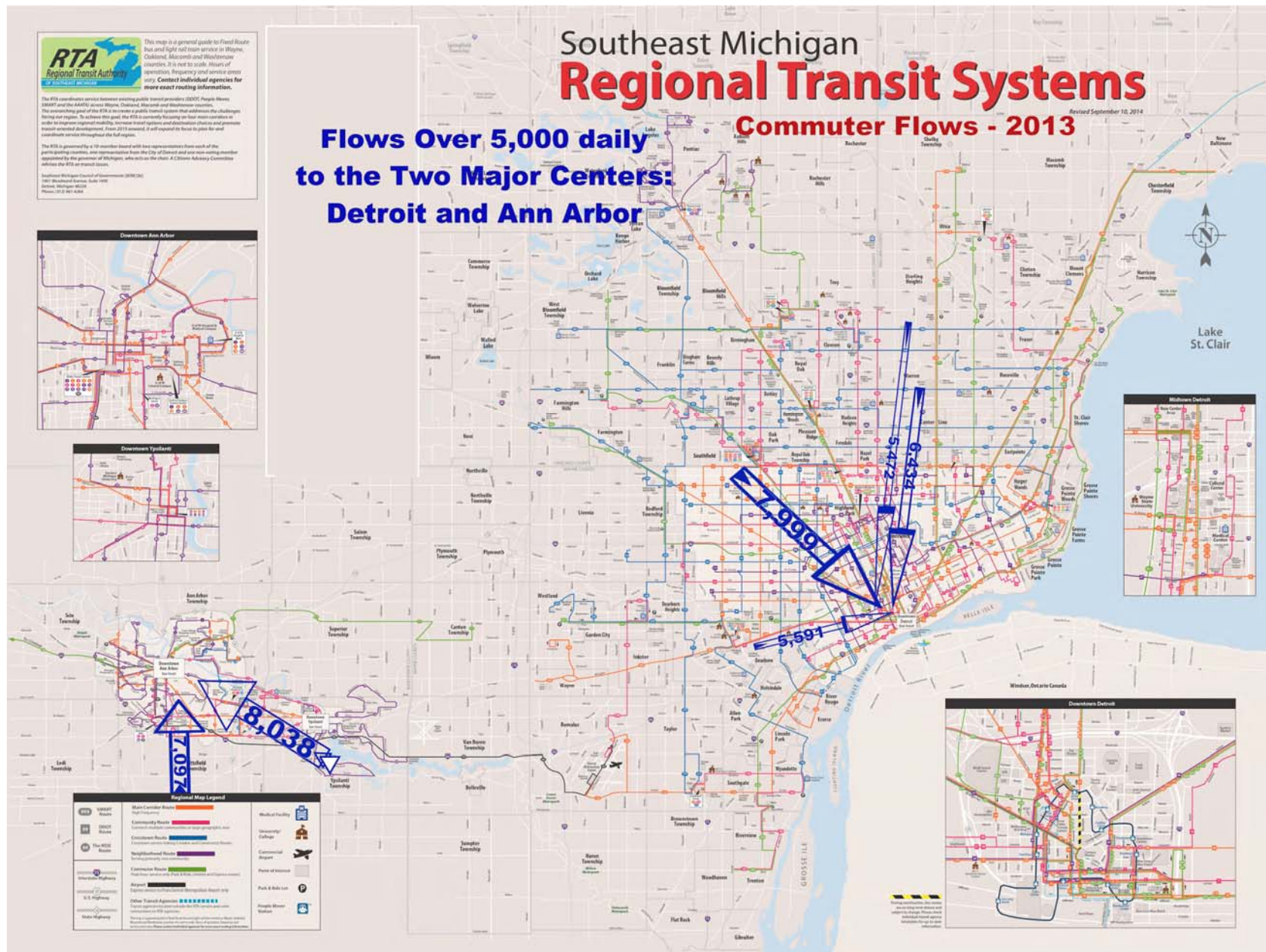
Map 2 - Commuter flows over 5,000 daily to the two major centers: Detroit and Ann Arbor

Map 3 - Commuter flows over 10,000 daily within municipalities

Observations and Recommendations

Here follow some observations and recommendations based on the data presented above.

1. *Observation:* **Internal commuting flows – those that don't cross municipal boundaries – are some of the largest**. Detroit, with more than a hundred thousand internal commutes daily, is by far the largest of any flow in the region. Ann Arbor follows, with close to forty thousand. Warren, Dearborn, Livonia, Sterling Heights, and Troy each boast more than ten thousand daily internal trips to work, and the same again back home. Ann Arbor and Detroit both have active bus systems.
   a. *Recommendation:* **further study** of all the seven cities named above is needed to determine whether existing service (if any) is meeting the needs of commuters.
   b. *Recommendation:* Consideration should be given to forming or strengthening **transit hubs in Livonia** (with nearly 12,000 internal trips) **and Dearborn** (also about 12,000 internal daily trips).
   c. *Recommendation:* **Troy, Warren and Sterling Heights** form a close-knit area north of Detroit, spanning the Macomb-Oakland border, with few existing service routes. Together, they generate over thirty thousand daily internal commutes. Consideration should be given to a **transit hub** serving these three cities and surrounding jurisdictions.
2. *Observation:* The largest movement-pair between municipalities is the **daily exchange between Detroit and Southfield**: 8,000 to the city and 10,000 to the suburban center. Counting workers arriving from within and from other municipalities, Southfield receives 26,000.
   a. *Recommendation:* **Southfield is a good candidate for a transit hub and improved service.**
3. *Observation:* The **City of Livonia** is one of the largest communities in the area that has opted out of the SMART system. Yet it boasts over 30,000 workers coming to its jobs, 12,000 internally and 18,000 from other municipalities.
   a. *Recommendation:* **Livonia is a good candidate for a transit hub and improved service**.
4. *Observation:* Nearly 10,000 commuters travel from Detroit to Dearborn, and about half that number make the reverse trip. Counting Detroit residents, its own residents, and those of other communities (including Dearborn Heights), nearly **35,000 commuters come to Dearborn.**
   a. *Recommendation:* **Dearborn is a good candidate for a transit hub and improved service.** Also, **robust transit should be provided along Michigan Avenue between Dearborn and Detroit.**
5. *Observation:* About 8,000 commuters travel from **Ypsilanti Township to Ann Arbor** daily. Adding the 3,400 from **Ypsilanti City,** there are 11,400 making that trek every day.
   a. *Recommendation:* **Trip time between the eastern parts of Washtenaw County and Ann Arbor employment centers needs to be reduced** to roughly 30 minutes; otherwise, commuters with cars will be unlikely to use transit.
   b. *Recommendation:* In addition to any Ann Arbor to Detroit commuter rail service (initially proposed to offer two morning, one midday, and two evening round trips), serious consideration should be given to **more frequent rail service between Ann Arbor and Ypsilanti**, especially during congested periods.

6. *Observation:* The second-heaviest flow from a single municipality into Ann Arbor is from Pittsfield Township (upwards of 8,000 daily). Yet Pittsfield Township is not a member of the Ann Arbor Area Transportation Authority; rather, it relies on Purchase of Services agreements to provide a measure of public transportation.
    a. *Recommendation:* **Pittsfield Charter Township** should seriously consider a **more robust funding and governance mechanism** for its public transportation needs.
7. The heaviest commuting **north of Detroit** (other than Southfield) is with **Warren** (9,500) and **Sterling Heights** (5,500): 15,000 combined going to Detroit, with nearly 7,000 starting their day going the other way. The most direct connection is via Mound and Van Dyke; thruway I-75 provides an alternative for those on the western side of the region.
    a. *Recommendation*: **provide robust, rapid transit between Detroit, Warren, and Sterling Heights** along Mound, Van Dyke, or the CSX rail line that runs between and parallel to those two arteries.
8. This analysis shows the heaviest commuting traffic likely to be on the Detroit-Livonia, Detroit-Southfield, and Detroit-Warren-Sterling Heights corridors. Aggregating data at higher levels would produce other busy corridors (such as Detroit-Ann Arbor).
    a. *Recommendation:* plan and implement robust rapid transit on the following corridors, in addition to those currently under study (Detroit-Pontiac, Detroit - Mount Clemens, Detroit-Ann Arbor):
        i. Detroit-Dearborn-Livonia (Ford Road) or Detroit-Livonia (Grand River and Plymouth)
        ii. Detroit-Southfield (M-10)
        iii. Detroit-Warren-Sterling Heights (Mound or VanDyke)

Concluding Summary

Establishing heavy rapid transit along the lines required by the RTA's enabling legislation (Woodward, Gratiot, Michigan, and eventually M-59) is important and will serve very useful numbers of commuters. However, **failure to provide good transportation options on the corridors with significant commuter flow would be a serious mistake**.

Several communities in the RTA region have sufficient internal and external commuter flows to warrant establishment of **better local service**, as well as **better regional connectivity**. This study has suggested several that merit the **establishment of transit hubs**.

The patchwork of opt-in and communities in Oakland, Washtenaw, and Wayne Counties that do not participate fully in providing public transportation has resulted in seriously under-serving some major employment and residential centers. **Service based on actual commuter needs must take precedence over the whims of local governments and electorates**. Whether this is done directly by the RTA itself, or indirectly through revision of local provider funding mechanisms, the economic competitiveness of the region and welfare of its people require a change in the *status quo*.

Finally, this study has revealed interesting and actionable commuter flows. **Further study is required to incorporate aggregated flow data.**