Using Geographic Information Systems (GIS) to Identify Challenges in Access to Dental Care

National Oral Health Conference

April 24, 2013

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Today's Presentation

Part I

Provides an overview of activities for defining and mapping dental deserts using GIS at Minnesota Department of Health

Part II

Discusses technical issues involving the use of GIS for dental workforce mapping

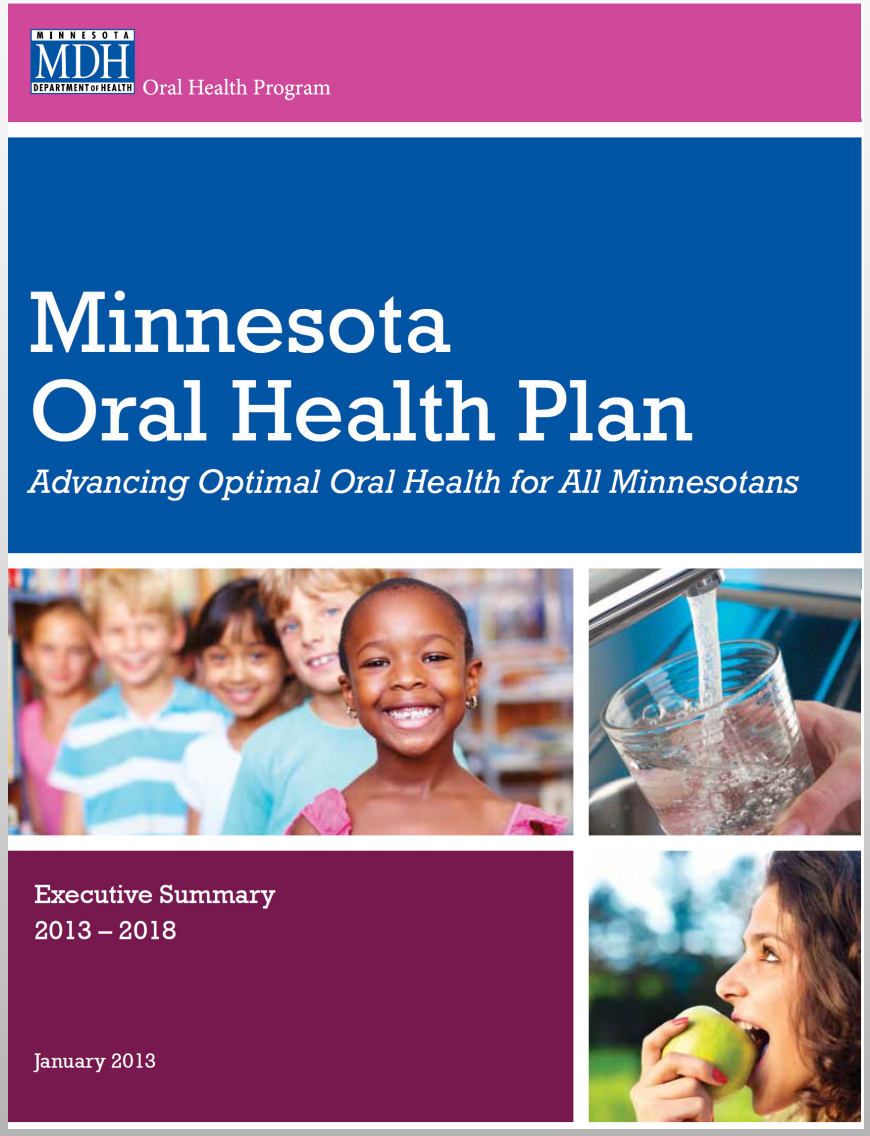
Objectives – Part I

- To understand inequality and spatial distribution of oral health workforce using GIS mapping
- To draw attention to how GIS tools inform development and implementation of policies to address the needs of underserved populations
- To share lessons learned in Minnesota

Oral Health Program

- Funded through CDC Cooperative Agreement and Health Resources & Services Administration (HRSA)
- Infrastructure and capacity building and oral health workforce development
- Focuses on essential public health functions as related to assessment, policy development and assurance

Minnesota's First Oral Health Plan



Minnesota's Underserved Populations:

- 55 percent of 3rd graders experienced dental decay (2010)
- 59 percent of children with Medicaid did not receive any dental services by or under the supervision of a dentist during Federal Fiscal Year 2011.
- Minnesota's poorest adults (<$15K) were three times less likely than the most affluent ($50K+) to visit a dentist in the past year (2010).

Minnesota's Dental Workforce:

- 47 percent of dentists were 55 years or older (2009-2010).
- 26 percent of Minnesota dentists were practicing in a rural area (2010).
- 53 percent of practicing dentists submitted at least one dental claim for patients on public programs (2010).

Office of Rural Health & Primary Care Workforce Analysis Program

- Quantifies Minnesota's health care workforce → Supply
- Identifies current resource and service gaps → Access
- Informs stakeholders of emerging health care workforce issues → Education
- Informs policy decisions that address adequate distribution of health care professionals for the future → Policy

Health Care Workforce Data

In coordination with Minnesota's licensing boards, practice data on the following professions is regularly collected, analyzed and reported:

- Physicians
- Physician Assistants
- Physical Therapists & Physical Therapy Assistants
- Marriage & Family Therapists
- Respiratory Therapists
- Social Workers
- Pharmacists
- Behavioral Health Therapists

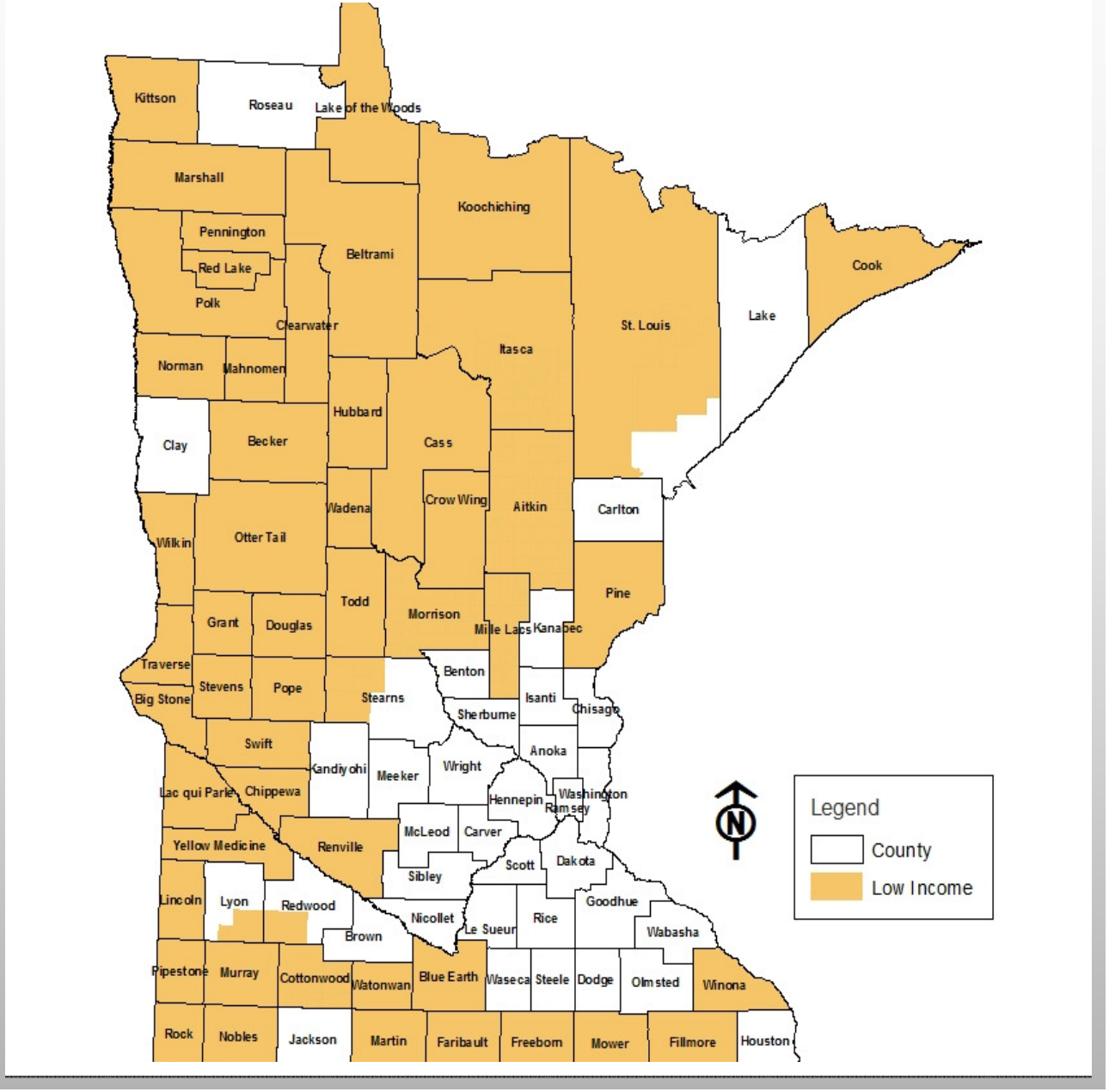
Including the Dental Health Workforce

"Almost one third of the population reports some difficulty in accessing dental care."

- Caswell Evans, Jr., Associate Dean of Prevention and Public Health Sciences at the University of Illinois at Chicago College of Dentistry

Minnesota's Rural Dental Shortage Areas

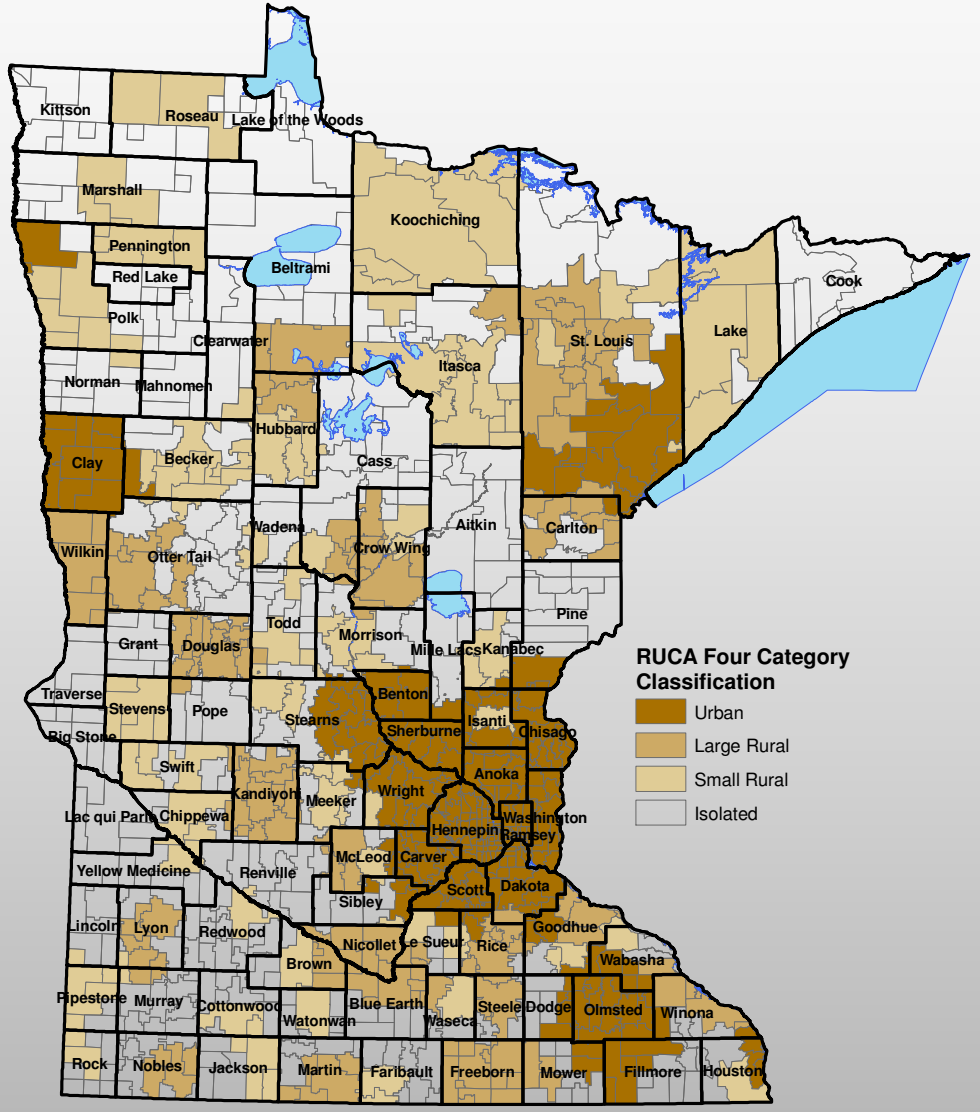
Based on population-to-clinician ratio of 5,000:1



Rural – Urban Commuting Areas (RUCAs)

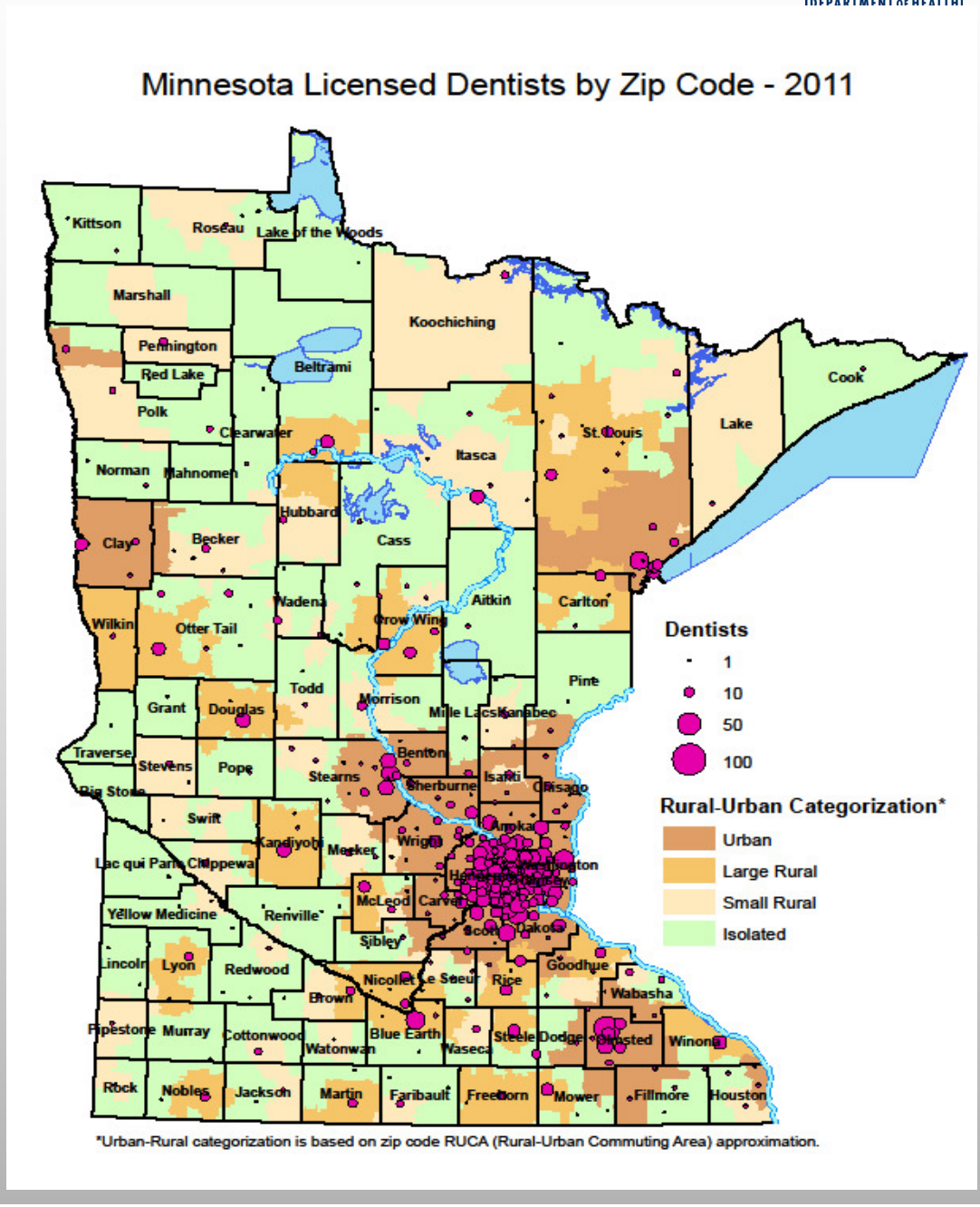
The RUCA categories are a Census tract-based classification scheme to identify urban cores and adjacent territory economically integrated with those cores.

Rural-Urban Commuting Areas Zip Code Approximation - Minnesota

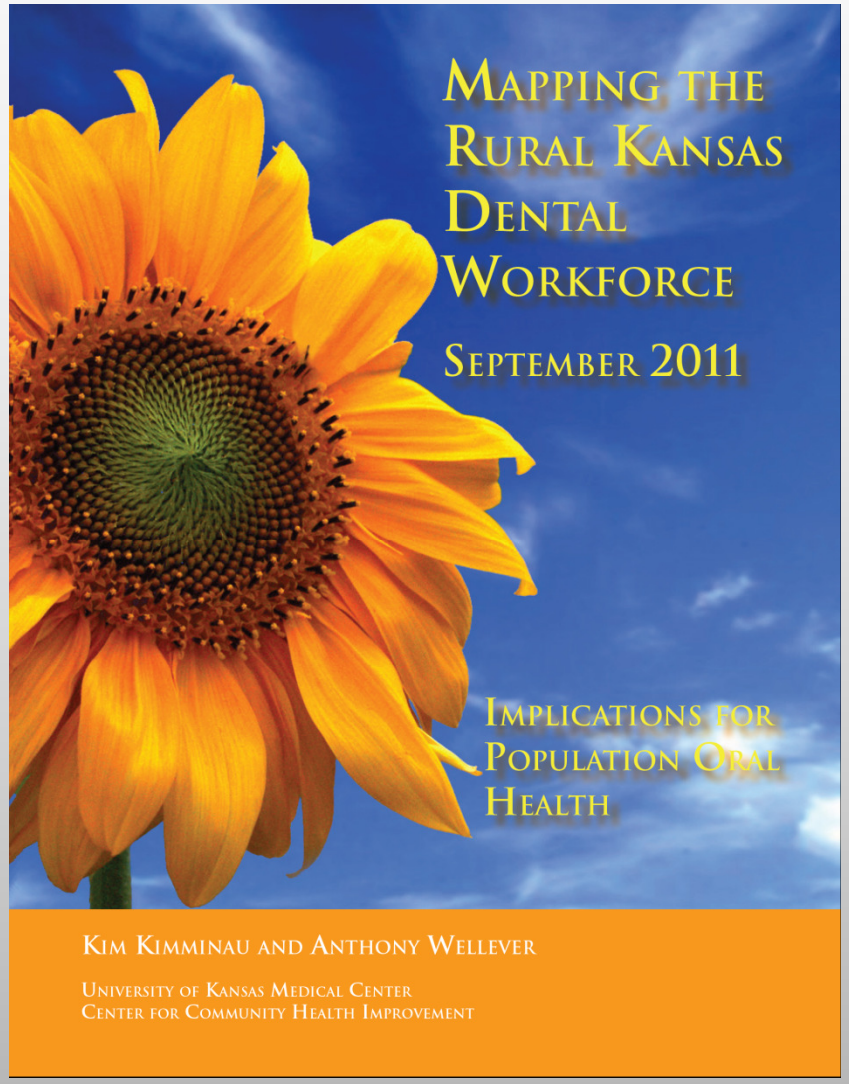


Inequitable Access?

- Maldistribution of existing dental workforce
- Geographic barriers (10,000 lakes)
- Rural = Low population density

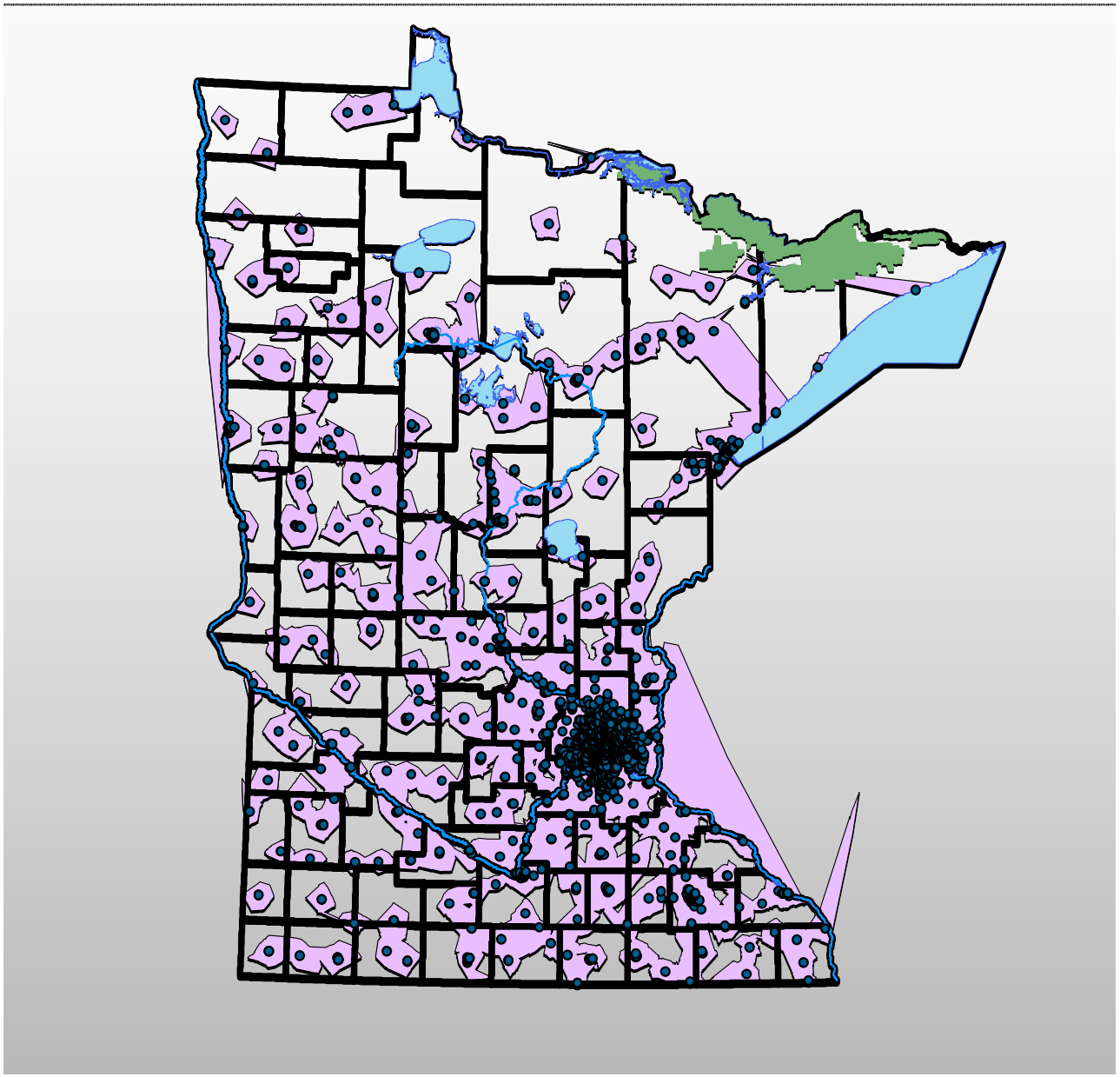


The Kansas Initiative



Dental Clinics:

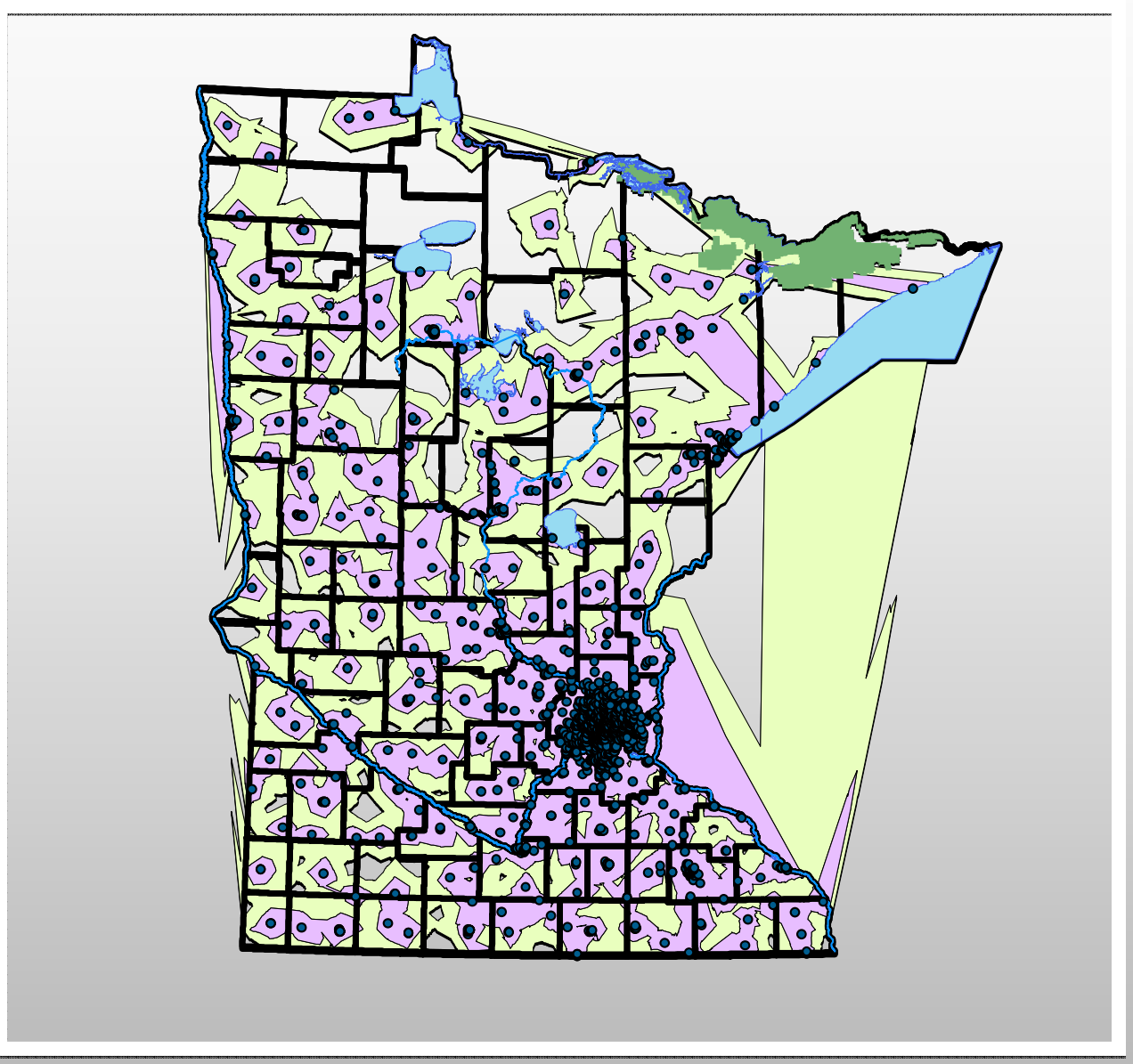
within 10 minute drive



Dental Clinics:

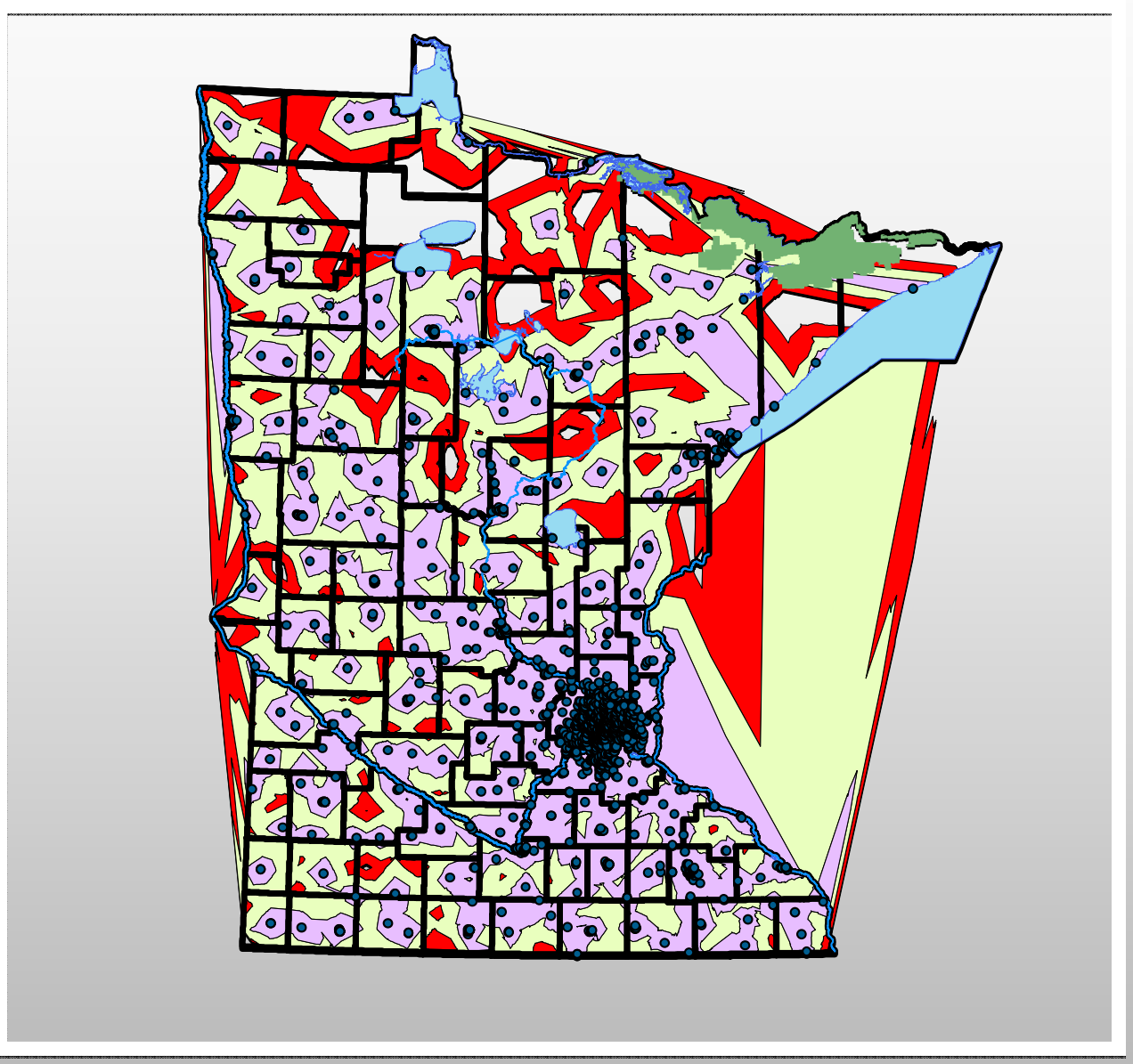
within 10 minute drive

within 20 minute drive



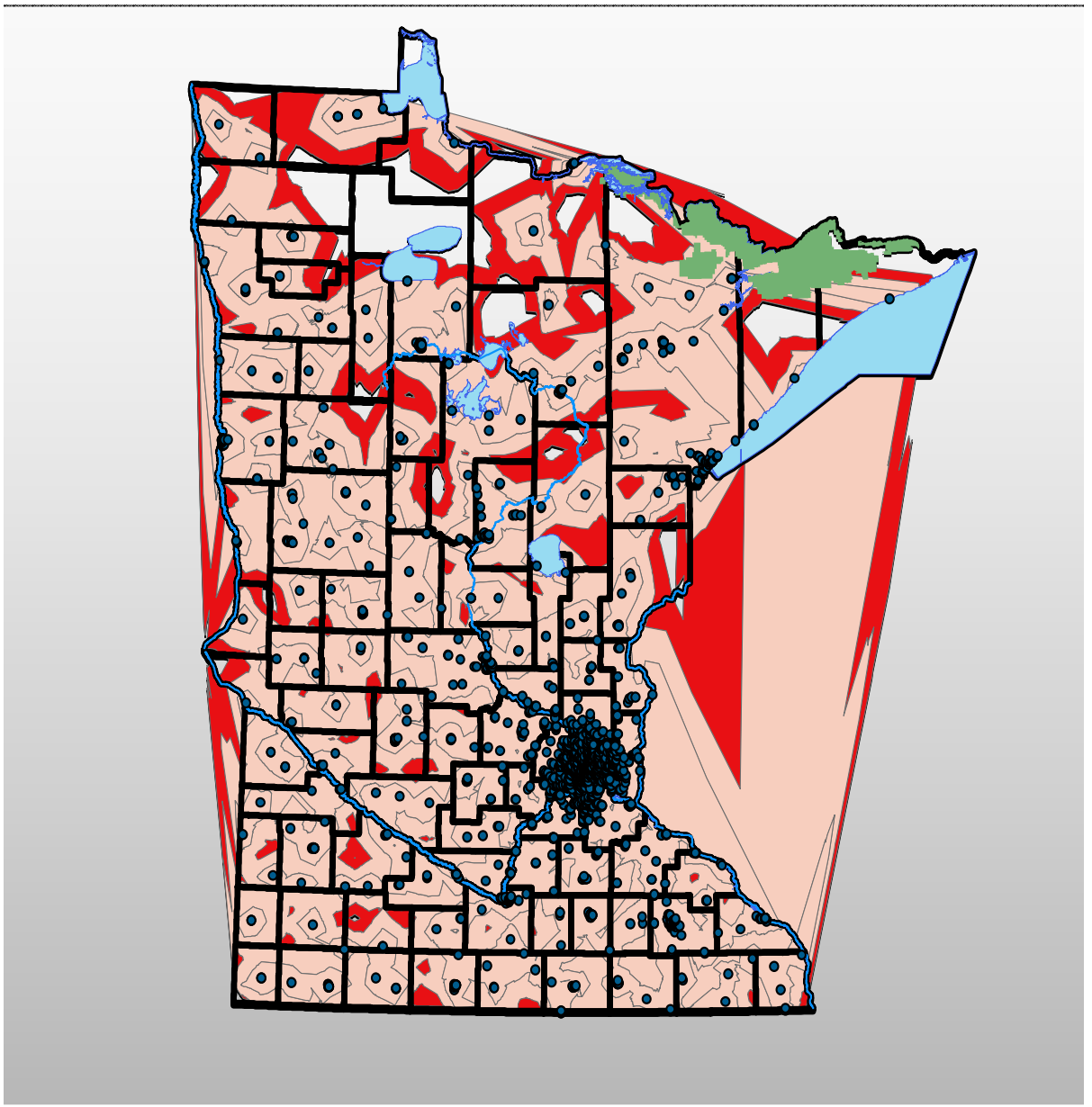
Dental Clinics:

- within 10 minute drive
- within 20 minute drive
- within 30 minute drive



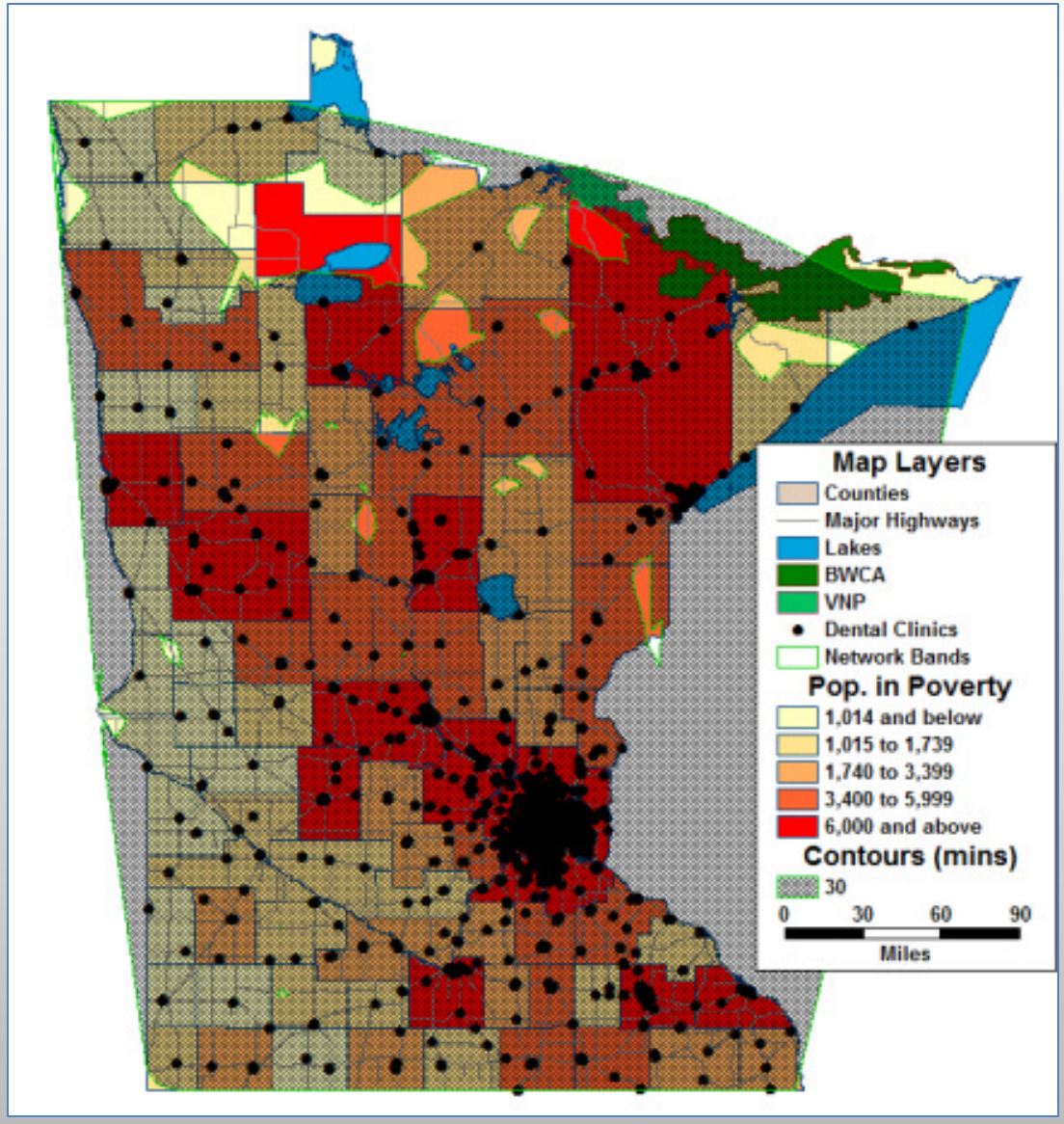
Overall Coverage Results:

Most of Minnesota is within a 30 minute drive to dental services

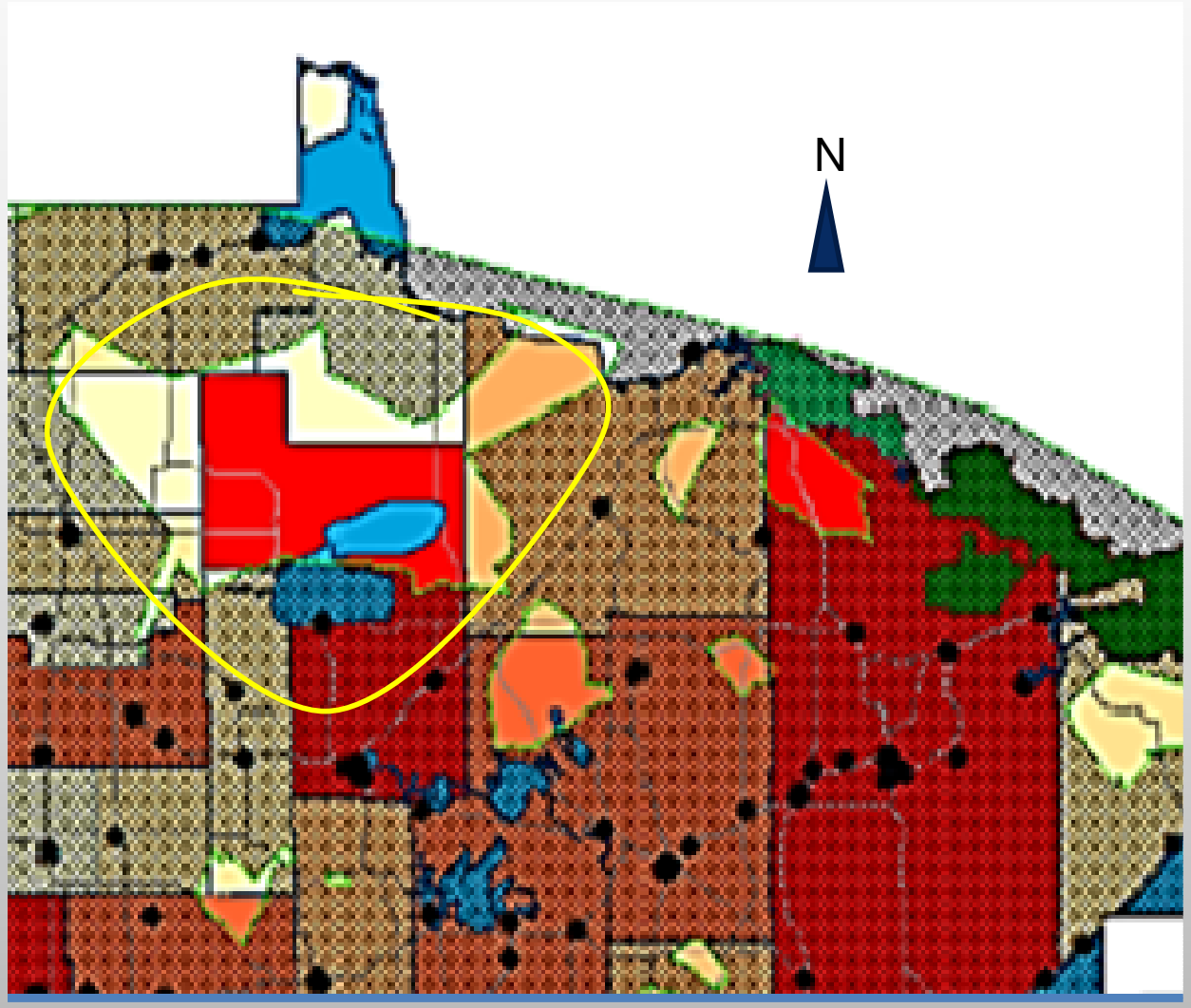


Drive Time & Poverty

30 minute drive time contours with a map showing population in poverty.



Some areas in northern Minnesota have both high concentrations of people living in poverty in addition to being 30 minutes or more from dental services.



So What?

Access requires more than just being within a 30 minute driving distance.

- Aging dentist workforce ➡ median age is 54 years;
- Unwillingness to practice in rural or underserved communities;
- Dental services continue to be under used by children of low-income families;
- Lack of collaborative practice among dental professionals
- Upsurge in people eligible for dental services after full implementation of ACA in 2014;

Next Steps:

- Minnesota's Oral Health Plan

- Continue using GIS spatial analysis for refining Minnesota's "dental dessert" designation by including additional variables into the maps

Lessons Learned:

- Finding a useable statewide road network dataset
- Find a better source of clinic information
- Incorporation of other data (i.e. insurance acceptance)

Thank You

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