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Puget Sound Clean Air Agency

Highly Impacted Communities

PS Clean Air Committee Recommendations

September 15, 2014

Tania Tam Park, et. al.

HIGHLY IMPACTED COMMUNITIES – COMMITTEE RECOMMENDATIONS

September 15, 2014

The Puget Sound Clean Air Agency's mandate includes guidance from the 2014-2020 Strategic Plan. In objective 1.6 of this plan, we articulate the vision for everyone in our region to be able to breathe clean air, regardless of where they live or their socio-economic status. Our goal is to ensure that no community in our region bear disproportionate burdens and exposure from air pollution.

BACKGROUND

In our strategic plan, we define "highly impacted communities" as geographic locations characterized by degraded air quality, whose residents face economic or historic barriers to participation in clean air decisions and solutions. For example, a neighborhood with a high population of people of color located near a major roadway would meet this definition. A predominantly low-income neighborhood with significant wood-burning activity would also be considered highly impacted.

But where are they?
What attributes do they comprise?
What other concerns might the communities have to deal with?
How will we know if air quality is among their greatest concerns?
If we can only dedicate resources to a few concerned communities, how will we judge/decide/justify?

In efforts to move forward with strategic plan elements in Objective 1.6 as well as other objectives involving equity and environmental justice, we recognize the need to clearly define and articulate where the risks and impacts are greatest in our jurisdiction. We want to understand where these communities are and what considerations or challenges might be part of air quality solutions, among other concerns the communities may have.

Additionally, this report and prioritization tool is intended to serve as a *starting point* for conversations with communitiees. The current recommendations are based on limited, existing data and information. As we engage more deeply with various communities, we hope to build on the limitations of what data tells us about a community and its complexities.

PROCESS & CRITERIA

The Agency convened an internal staff committee to help prioritize our region's most highly impacted communities based on criteria that are relevant to air quality, health, and demographic markers. The committee's goal was to identify the top 15-20 cities, neighborhoods, or communities exposed to the greatest cumulative risk of all the criteria. In locating the nexus of multiple impacts, we have initial data and information to begin asking questions and soliciting potential partnerships among community and business members around air quality-related impacts and potential mitigation strategies.

We acknowledge the limitations of the screening tool that was developed, as data is fluid and continues to evolve. The intent of the tool is to serve as an initial step for dialogue, with further analysis to be conducted before decisions are implemented.

Throughout July 2014, the committee convened a three-part session with the following objectives:

- **Session #1**: Explore and brainstorm the universe of considerations that we think are relevant, impactful, and tangible;
- **Session #2**: Begin criteria selection and narrow down the field to agreeable criteria;
- **Session #3**: Apply criteria and determine method for prioritizing/weighting criteria to further winnow down list of communities.

Based on in-depth dialogue and discussion around the Agency's mandate as well as known risks and health impacts, the committee concluded on the following criteria as significant to our work and equity engagement efforts:

- Diesel pollution (onroad and nonroad)
- Household income
- Health sensitivity – i.e. individuals who suffer from asthma, chronic pulmonary obstructive disease (COPD), or cardiac illness
- Industrial density – large and small air pollution sources
- Race
- Limited English proficiency
- Primary wood burning households

SCORING & METHODOLOGY

To identify the areas of highest disproportionate impact, we used the criteria developed by the committee as outlined above. We created scores for each criteria representing the highest impacted quartile (top 25%) through the lowest impacted quartile (bottom 25%). Each quartile was assigned a value (top 25% = 3, 50-75% = 2, 25-50%=1, bottom 25%=0).

The committee opted to identify areas of high impact using an unweighted measure. Therefore, we simply added the quartile scores to assign a final value to compare impacts in different areas. The highest score possible is 21.

Sources of data include census information, WA State Health Department information, EPA modeled air pollution, and Agency records. More detail can be found in *Appendix A*.

VISUAL REPRESENTATION - MAPS

The following map demonstrates areas in our 4-county jurisdiction, broken down by U.S. Census block groups, which have any combination of the criteria. The greater the number of total criteria a given census block has, the deeper the shading becomes. For example, block groups around central and south Seattle appear as dark red, due to many of the blocks that scored in the top 20%, as compared to the rest of our jurisdiction.

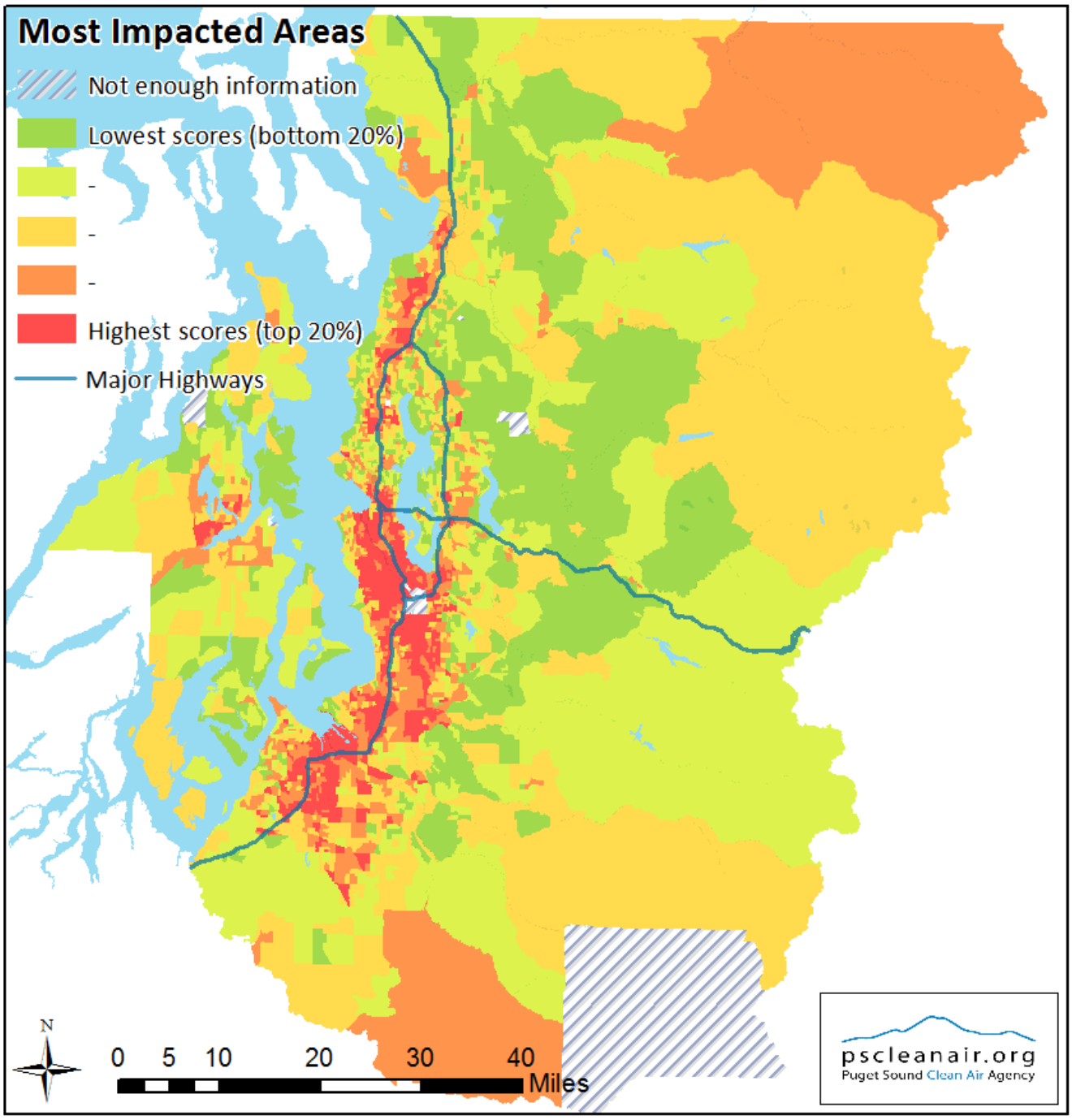

Figure 1 *shows the most impacted areas in the four county jurisdiction with equal weighting given to each criterion. A higher score indicates a larger number of total criteria in the census block group, for example, if a block group has all nine categories then it will show up as more red than an area with only one category (green).*

HIGHLY IMPACTED COMMUNITIES

Based on the critieria and scoring of block groups in our jurisdiction, the following communities demonstrate potential for increased engagement via partnership, programs, and outreach support. They are listed in order of priority based on score. *Note that (*) denotes communities who share the same rank/score with at least one other community.*

HIGHLY IMPACTED COMMUNITIES		
Rank	**Score**	**Community**
1	20.7	Tukwila/Allentown
2	19.5	South Tacoma
3	19.3	Tukwila/Kent (Midway)
4	19.0	Tacoma South End
5	18.7	Greater Duwamish
6	18.5*	Algona/Auburn
6	18.5*	Des Moines
6	18.5*	International District
6	18.5*	SeaTac
10	18.3	South Everett
11	18.2	Southeast Seattle
12	17.7*	Parkland
12	17.7*	Kent
12	17.7*	Central District
15	16.8	Downtown Everett
16	16.3*	Lynnwood
16	16.3*	Northgate

Table 1

We recognize the variation in size and scope of each community listed. Some are smaller neighborhoods, others are towns and cities, some even depict regional areas. We've done our best to relate census block groups that fall along the top 20% percentile in order to best capture the scope of communities being impacted.

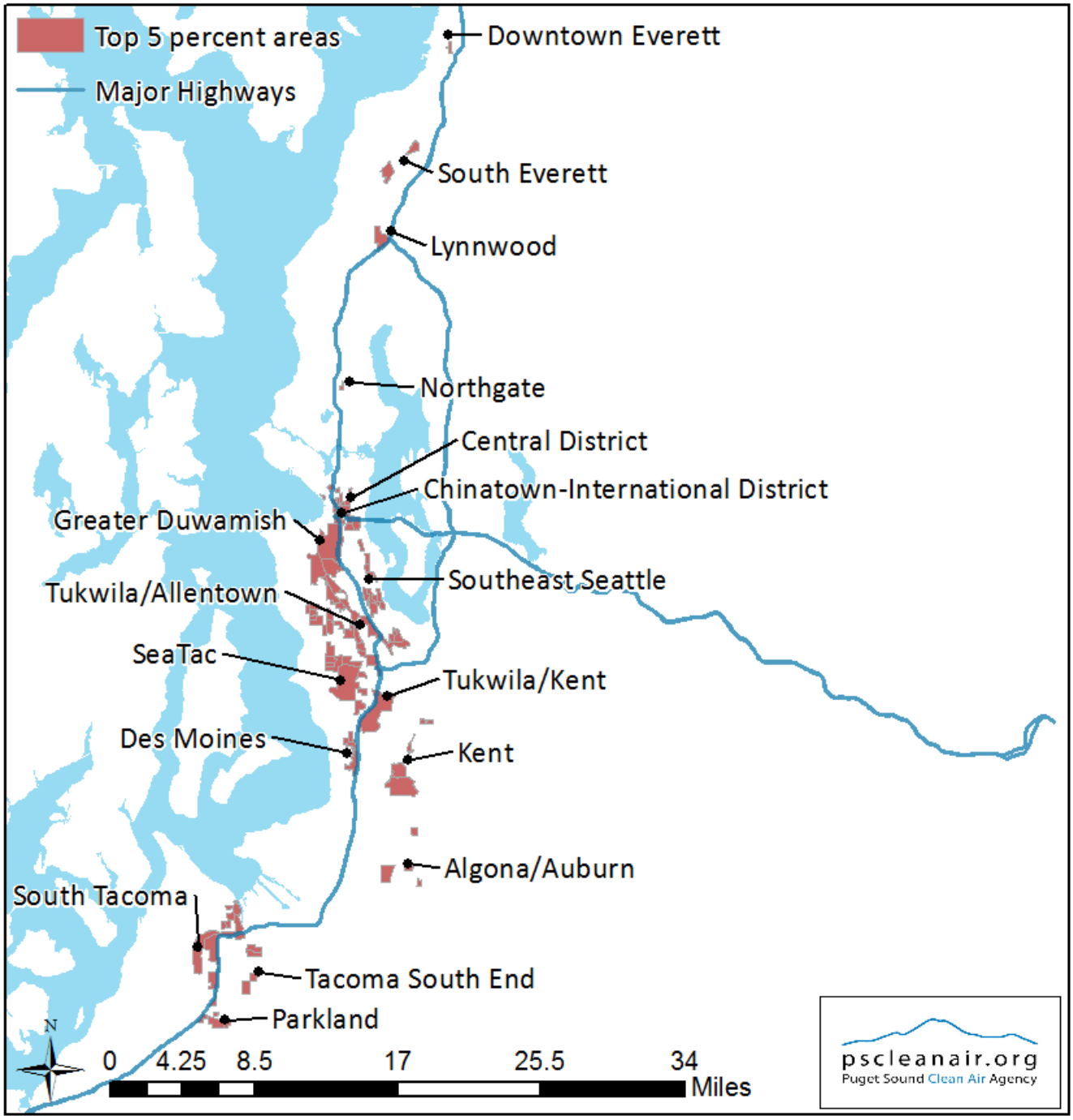

Figure 2 *is the same as Figure 1 above, but highlights areas with the highest 5% of scores.*

Although many of the communities with greatest cumulative impact in our jurisdiction fall within King and Pierce counties, we also consider the top communities within each respective county, as shown in the tables below.

KING COUNTY		
Rank	**Score**	**Community**
1	20.7	Tukwila/Allentown
2	19.3	Tukwila/Kent (Midway)
3	18.7	White Center/Greater Duwamish
4	18.5*	Algona/Auburn
4	18.5*	International District
4	18.5*	Des Moines
4	18.5*	SeaTac
8	18.3	Southeast Seattle
9	17.7*	Kent
9	17.7*	Central District
11	16.3	Northgate
12	15.7	Factoria
13	15.2	Renton
14	14.5	Federal Way
15	13.7	Wilburton
16	13.2	Kingsgate

Table 2

PIERCE COUNTY		
Rank	**Score**	**Community**
1	19.5	South Tacoma
2	19.0	Tacoma South End
3	17.7	Parkland/Midland
4	15.7	Clover Creek/Summit View
5	15.5	Sumner
6	14.7*	Spanaway
6	14.7*	Lakewood
8	14.2	Puyallup/Fife/Waller
9	12.8	Frederickson

Table 3

SNOHOMISH COUNTY		
Rank	**Score**	**Community**
1	18.3	South Everett
2	16.8	Downtown Everett
3	16.3	Lynnwood
4	11.7	Monroe
5	11.5	Arlington
6	11.2	Darrington
7	11.0	Tulalip

Table 4

KITSAP COUNTY		
Rank	**Score**	**Community**
1	14.5	East Bremerton
2	14.0	Navy Yard City
3	12.3	Port Orchard
4	12.2	Chico/Erlands Point
5	11.2	Silverdale
6	11.0	Port Gamble S'Klallam Tribe/ Little Boston
7	10.3	Gorst/Sunnyslope

Table 5

NEXT STEPS

The immediate first step is for committee members to work internally with their respective teams to ensure that staff broadly have a solid understanding of our Hi-C process and candidate list. The next step involves verifying our data with community perspective on what they see or experience. Much of this work will occur as work teams address topics in the strategic plan.

We will apply the screening tool of HI-C candidates in two different ways in order to maximize opportunities in our region. As opportunities come up in our work, we will refer to the HI-C candidate list as an initial screen to see if there is potential overlap with communities we haven't established deep relationships with yet. We will then approach communities through our expertise in one of three main issue areas: diesel impacts, wood smoke, and registered sources.

The second approach will apply the candidate list in more broadly. This approach will examine candidate communities and determine areas where we have not had opportunity to engage. We will then inquire among those communities to see if their concerns are consistent with what we're finding in our data, and whether they have interest in partnering to design relevant programs, gathering additional data or information, or collaborating on education opportunities or mitigation approaches.

Based on the Highly Impacted Community candidates (Table 1), and the two different approaches we will use with the screening tool, we intend to engage deeply with at least 4-8 of these communities over the life of the strategic plan (2014-2020). Some of the community relationships and scope of work may cross over several aspects of our agency's work. In that case, we will refer to them as "community hubs," as they will entail investment and resource from multiple areas of the Agency.

For example, we may begin work with "Tinytown" regarding wood smoke exposure and impacts. As we work with them towards mitigation and incentives to reduce related health impacts, constituents may also raise concerns about multiple sources who operate in the same town. To respond to community concerns, we might bring in compliance staff to help address or investigate the concerns, which may also entail support from our Communications team to make sure we are being clear and concise about what might be happening in "Tinytown." This work will support our goal of investing in lasting relationships to ensure air quality improvements are made in partnership with community input.

By mid-FY16, we intend to demonstrate concrete value-added in at least two (2) communities with whom we will begin relationship-building and partnership efforts. We want to thank stakeholders for their investment in our work through concerted programming, education, outreach, and ultimately, air quality improvements that are tangible to community members. Deep engagement in our community hubs may include activities such as:

- Agency participation at local events
- involvement in community gatherings and neighborhood meetings
- air quality improvement programs and initiatives proposed by community partners
- partnerships with schools and/or non-profit organizations towards neighborhood improvements (e.g. Safe Routes to Schools)
- education and outreach on climate change, regulatory requirements, asbestos safety, asthma & air quality, etc.
- community-based monitoring
- campaigns such as *Anti-Idling*
- diesel retrofit projects
- electric vehicle car-sharing pilot

Agency staff represent a range of departments with varying roles in equity and environmental justice efforts. The committee intends for the criteria and accompanying maps in *Appendix B & C* to serve as one of the tools we use in prioritizing and considering communities as a first step in partnering. While there may be valid reasons to work and consider opportunities outside of this framework, these criteria will help us remain consistent among departments. In efforts to build the depth of relationship we believe is necessary for success in our strategic plan goals, consistency with communities on multiple levels of air quality related work will ensure we have a broad network of local partners who are invested in their community's improvements.

Lastly, this report will serve as a living document, which staff will revisit annually. This type of regular review acknowledges that the various data sources that feed into the candidate list are imperfect and may be improved over time. We want to ensure that the criteria remain relevant and applicable to our dynamic work and evolving community needs.

THANK YOU

Many thanks to the committee members who dedicated their time, energy, and thoughtful perspectives:

Beth Carper	Steve Fry	Andrea King	Erik Saganić
Ethan Choi	Matt Harper	Kit McGurn	Kathy Strange
Joanna Cruse	Sara Harrold	Brian Renninger	Amy Warren

Special thanks to Erik Saganić and Sara Harrold for their work on interpreting staff input and helping geographically visualize the criteria onto maps. In short order, their efforts have been instrumental and will help the Agency apply these efforts to concrete next steps.

APPENDIX A – DETAILED METHODOLOGY

The committee concluded on the following criteria as significant to our work and equity engagement efforts:

- Diesel pollution (onroad and nonroad)
- Household income
- Health sensitivity – i.e. individuals that suffer from asthma, chronic pulmonary obstructive disease (COPD), or cardiac illness.
- Industrial density – large and small air pollution sources
- Race
- Limited English proficiency
- Primary wood burning households

The above seven criteria were drawn from a broader conversation among committee members around various other considerations, including:

Truck/diesel	Monitor data	Cancer	Nonattainment status
Income	Traffic volume	Networks	House quality
Sensitive health	Cumulative risk	Homeless	Tribes
Industrial density	Wood smoke	Ignored groups	Crime
Race	Topography/vegetation	Water/soil	Community Air Tool (CAT)
Language	Education	Complaints	Transportation access
Age	Marine		

To identify the areas of highest disproportionate impacts, we used the criteria developed by the committee as outlined above. We created scores for each criteria representing the highest impacted quartile (top 25%) through the lowest impacted quartile (bottom 25%). Each quartile was assigned a value (top 25% = 3, 50-75% = 2, 25-50%=1, bottom 25%=0).

The committee opted to identify areas of high impact using an unweighted measure. Therefore, we simply added the quartile scores to assign a final value to compare impacts in different areas. The highest score possible is 21.

SOURCES OF DATA

American Community Survey (Census Bureau) – 5-year average (2007-2011), block group level

Median income:

- Used "Median household income in the past 12 months (in 2010 inflation-adjusted dollars)", reference code B19013.

Race:

- Used non-"White" population, or the sum of reference codes B02001003 through B02001008, divided by population (reference code B00001001).

Limited English proficiency:

- Used “Household language by households in which no one 14 and over speaks English only or speaks a language other than English at home and speaks English "Very Well"”, reference code B16002. The sum of reference codes B16002004, B16002007, B16002010, and B16002013. Divided by total households (reference code B00002001).

Primary wood burning households:

- Used the reference code B25040007, “Wood”.

Agency records

Industrial density:

- We used the “v_RegListActive” query in the Puget Sound Clean Air Agency’s “Compliance” database to get the addresses of each active registered source (as of April 2012). Sources with gas stations were filtered out. Each address was then geocoded to latitudinal and longitudinal coordinates and mapped.
- Registered sources were mapped as a new point layer which was then joined with the census block groups and the “Count” field was used in the joined shapefile. The quartiles and values were assigned for this group first.
- Then Title V sources were mapped as a new point layer and was then joined with the census block groups and the “Distance” field was used in the joined shapefile. The distance score was then assigned quartile values for this group next.
- The two quartile values were then averaged for a final industrial density score.

EPA’s 2005 National Air Toxics Assessment (NATA)

Diesel pollution:

- EPA’s NATA assigns diesel pollution concentrations (both onroad and nonroad) for each census tract (census tract is a larger geography which contains multiple census block groups). Represented census block groups were then assigned the values within their respective census tract for each block group.

Washington State Department of Health Comprehenisve Hospital Abstract Reporting Sysytem (CHARS) data, 2001-2010

Health sensitivity:

- 10 years of data by ZIP code was downloaded and filtered for our 4-county jurisdiction. Then the data was filtered for DRG codes (215-316 for cardiac related visits, 190-192 for COPD related visits, and 202-203 for asthma related visits). The 10-years of data for each condition was then averaged for each ZIP code. Since some ZIP codes were recently adopted, only the available years were used in the average. The ZIP codes for each health condition was then divided by the population estimate provided from the Washington State Office of Financial Management. The result is a rate of hospitalizations per person. This figure is multiplied by one million to give a result that is per million people per year for each ZIP code.
- To merge the ZIP code result into a census block group, first, the ZIP code data was joined into a block level shapefile (even smaller than census block groups) and the attributes were “averaged”. Then, the block level data was joined into the final census block group level shapefile using the “average” again for the attributes. The advantage of going to block level data first is that census block groups on the boundaries can have the average of the blocks within them, creating a more representative result on ZIP code boundaries.
- The rates for each health condition (i.e. COPD, asthma, cardiac visits) was assigned a quartile value (again 0 to 3) for each census block group. Then the three quartiles for each visit type was averaged together to get a final “health sensitivity” value.

Other considerations: A few census block groups did not have sufficient information (or significant population) to assign a value. These census block groups were ignored from this exercise, and was found in less than 10 of the 2600+ census block groups.

APPENDIX B – HIGHLY IMPACTED COMMUNITIES BY ISSUE

The Agency's strategic plan includes priority issue areas such as diesel pollution, wood smoke impacts, and industrial source pollution. In order to help focus equity and environmental justice efforts in those goal areas, the following maps apply the committee's criteria around equity to the various issue areas. For example, the diesel map is based on the demographic criteria from the list of seven (7) criteria, but excludes woodsmoke and industrial sources to highlight areas that are specifically impacted by diesel. While all data sources have inherent limitations and uncertainty, the air quality surrogate for the wood smoke map has some limitations that bear noting. In particular, the census question upon which the wood smoke data are based is focused on primary source of heat only, and doesn't capture many households/communities heating with wood as a secondary form of heat.

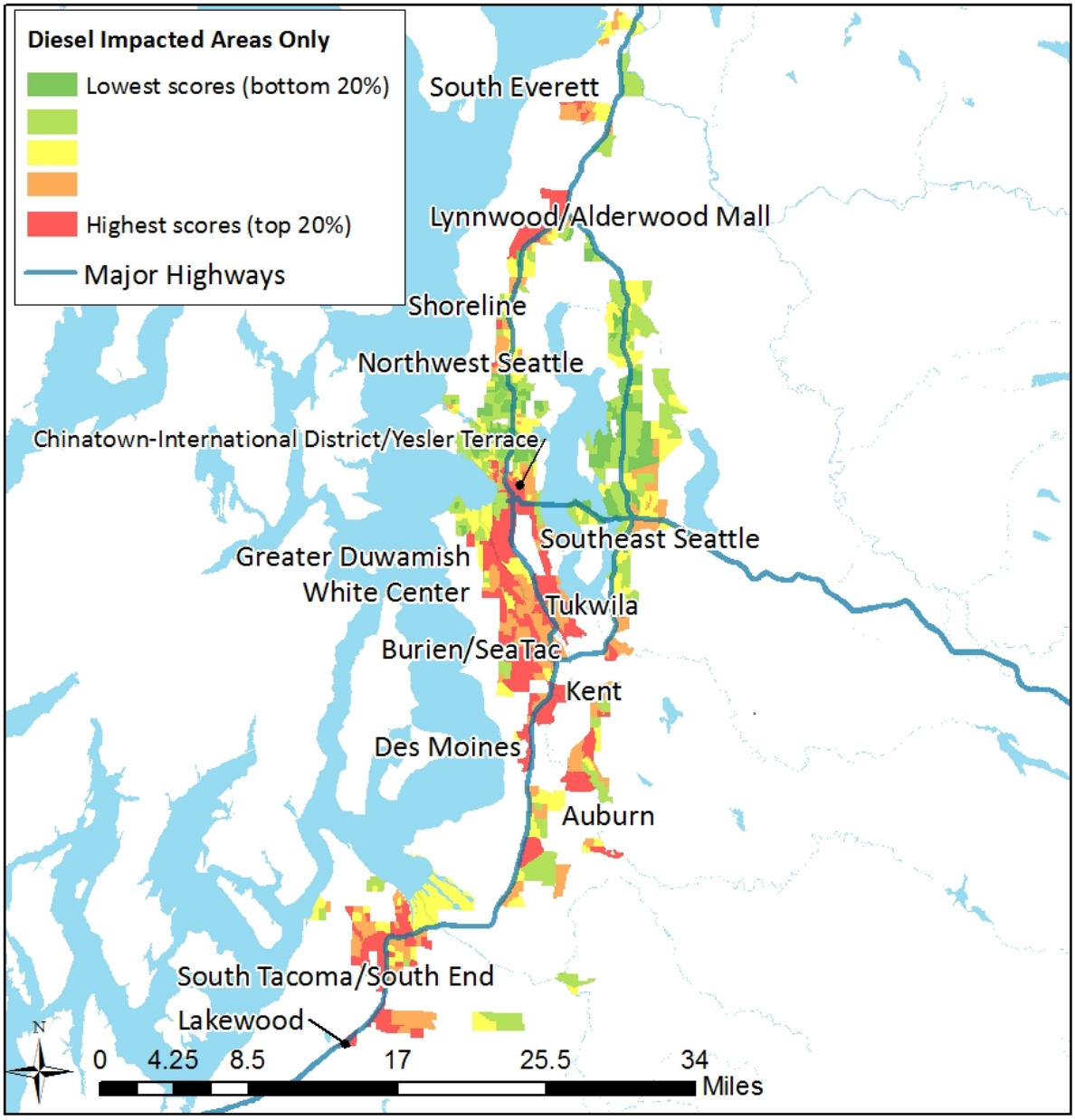

Figure 3

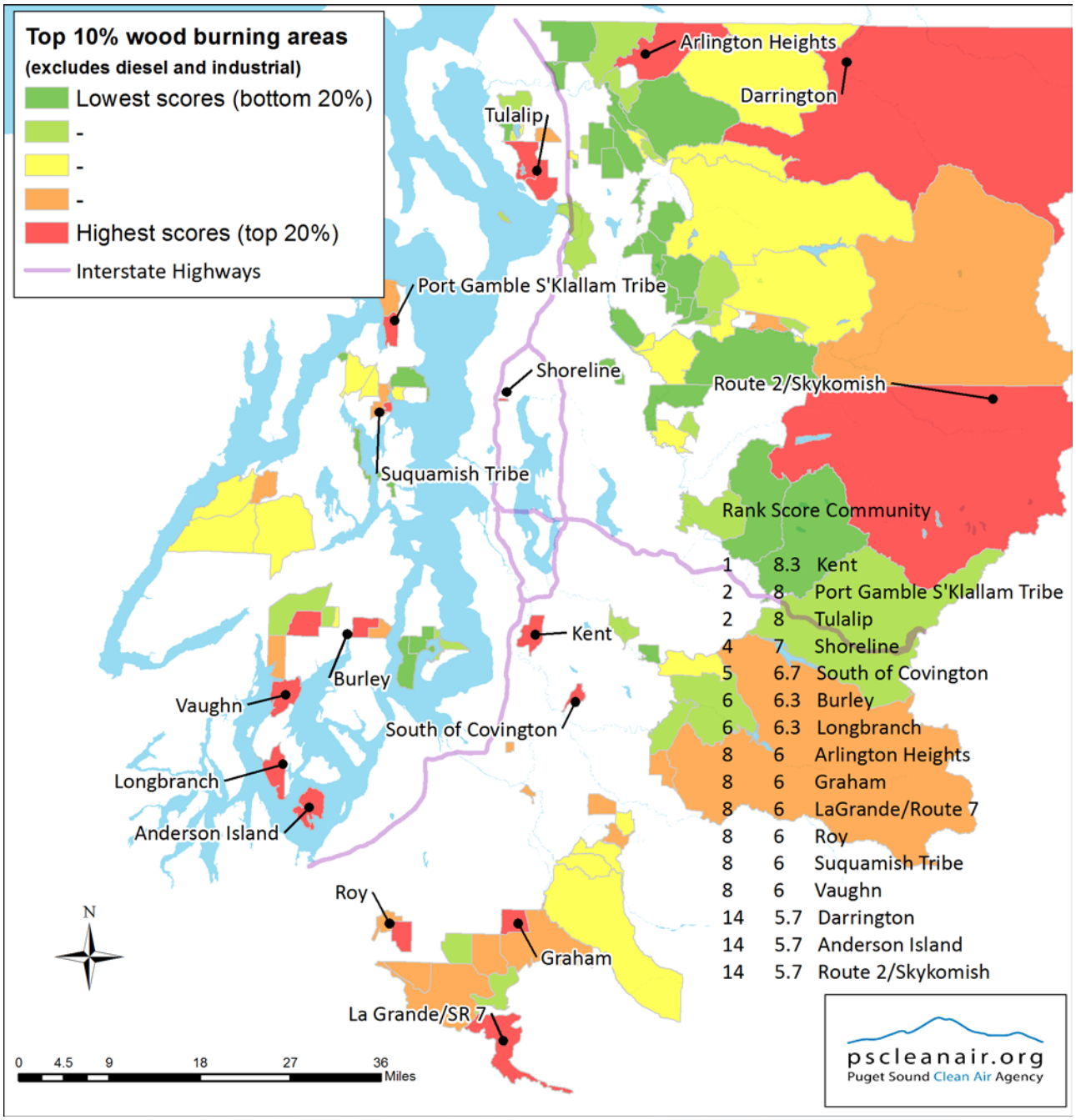
Top 10% wood burning areas
(excludes diesel and industrial)
Lowest scores (bottom 20%)
-
-
-
Highest scores (top 20%)
Interstate Highways
Arlington Heights
Darrington
Tulalip
Port Gamble S'Klallam Tribe
Shoreline
Route 2/Skykomish
Suquamish Tribe
Kent
Burley
Vaughn
South of Covington
Longbranch
Anderson Island
Roy
Graham
La Grande/SR 7
N
0 4.5 9 18 27 36
Miles
Rank Score Community
1 8.3 Kent
2 8 Port Gamble S'Klallam Tribe
2 8 Tulalip
4 7 Shoreline
5 6.7 South of Covington
6 6.3 Burley
6 6.3 Longbranch
8 6 Arlington Heights
8 6 Graham
8 6 LaGrande/Route 7
8 6 Roy
8 6 Suquamish Tribe
8 6 Vaughn
14 5.7 Darrington
14 5.7 Anderson Island
14 5.7 Route 2/Skykomish
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Figure 4

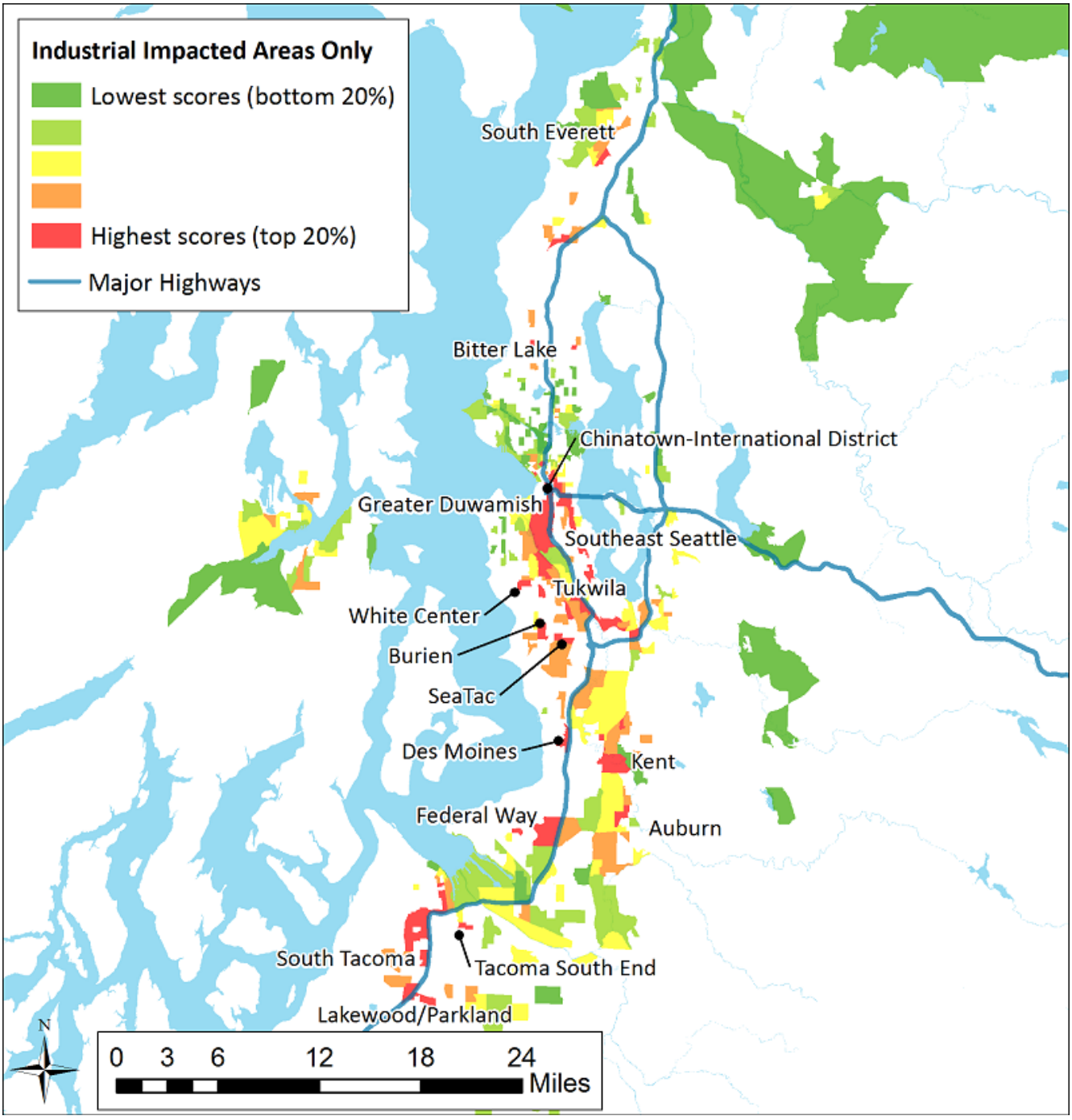
Industrial Impacted Areas Only
Lowest scores (bottom 20%)
Highest scores (top 20%)
Major Highways
South Everett
Bitter Lake
Chinatown-International District
Greater Duwamish
Southeast Seattle
Tukwila
White Center
Burien
SeaTac
Des Moines
Kent
Federal Way
Auburn
South Tacoma
Tacoma South End
Lakewood/Parkland
N
0 3 6 12 18 24
Miles

Figure 5

APPENDIX C – HIGHLY IMPACTED COMMUNITIES BY COUNTY

Another way we can apply our cumulative risk criteria is based on counties in our jurisdiction. These maps show the top 20% of the scores in each county using the same 9 criteria that were used for the 4 county jurisdiction. Additionally, each county's rank/score is relative to its own demographic makeup and air pollution impacts.

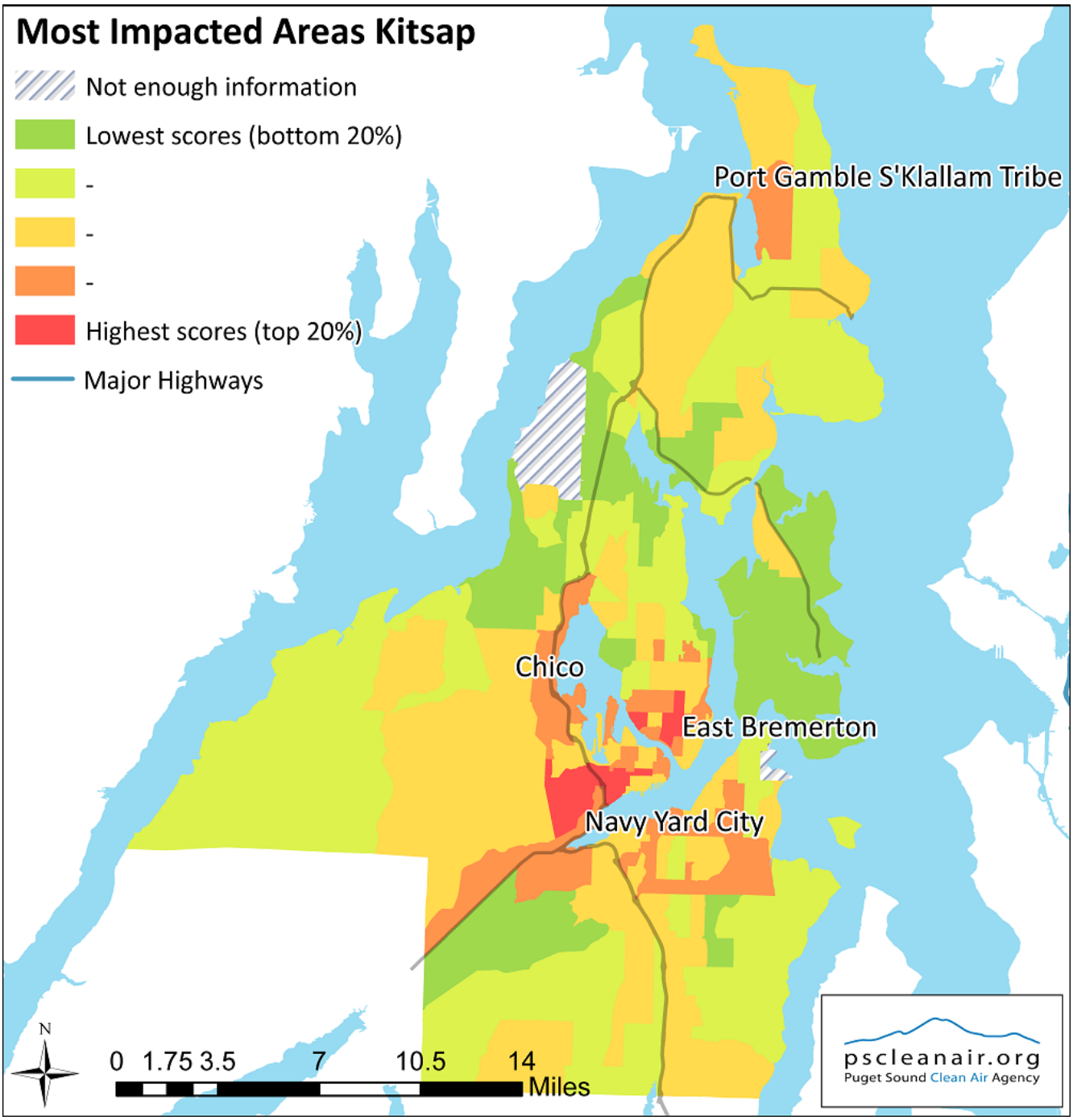

Figure 6

King County

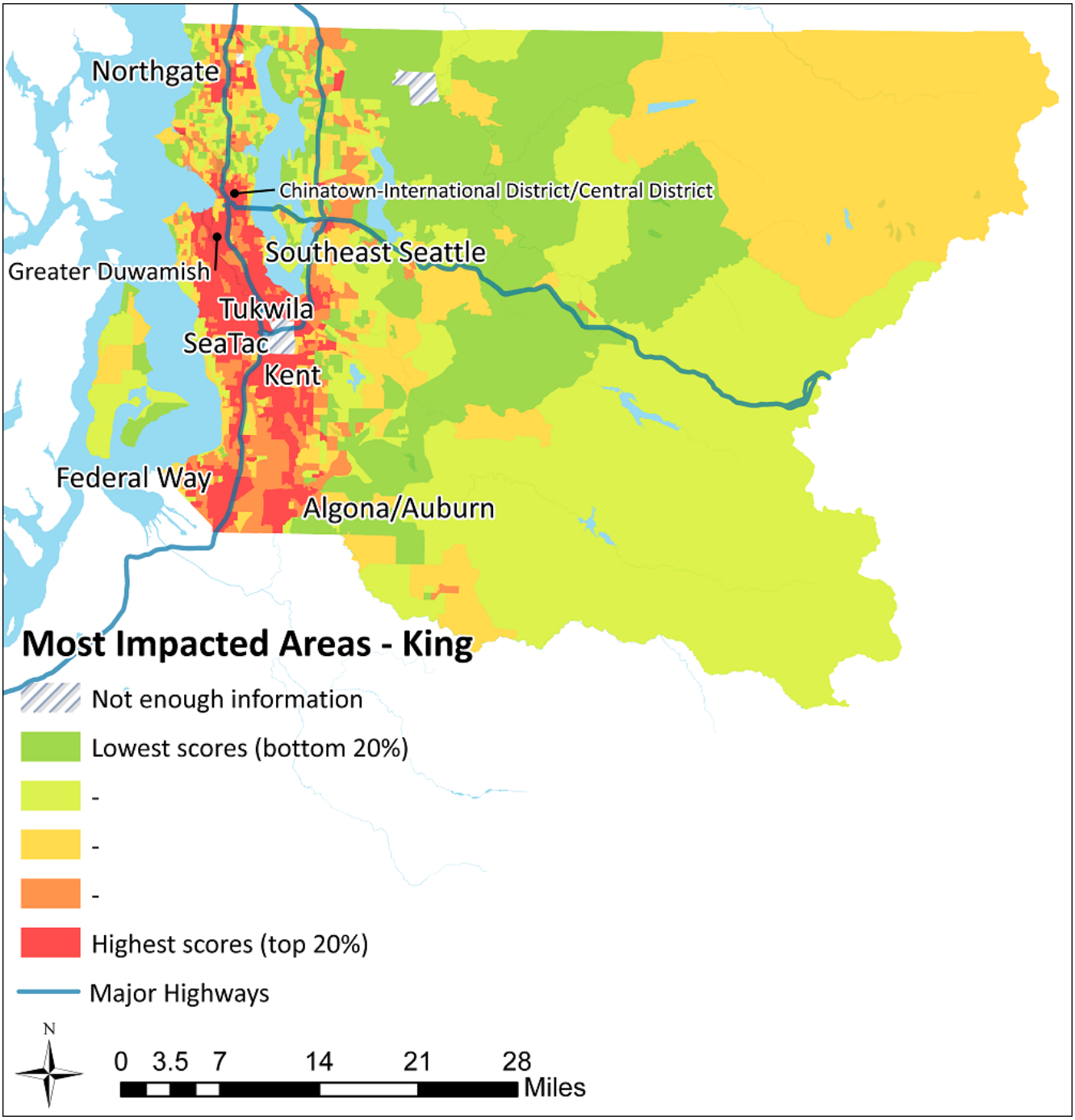

Figure 7

King County – West

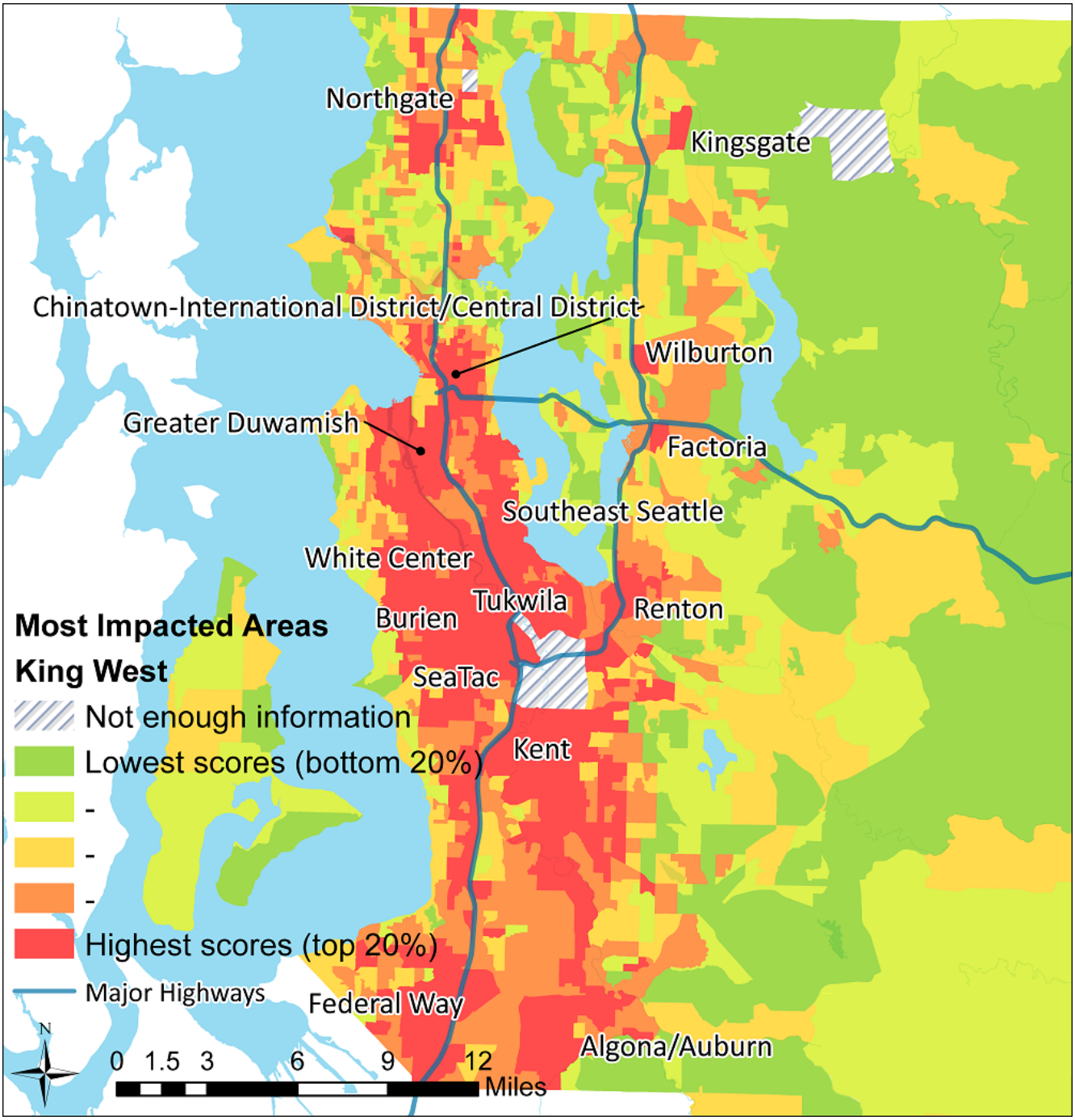

Figure 8

Pierce County

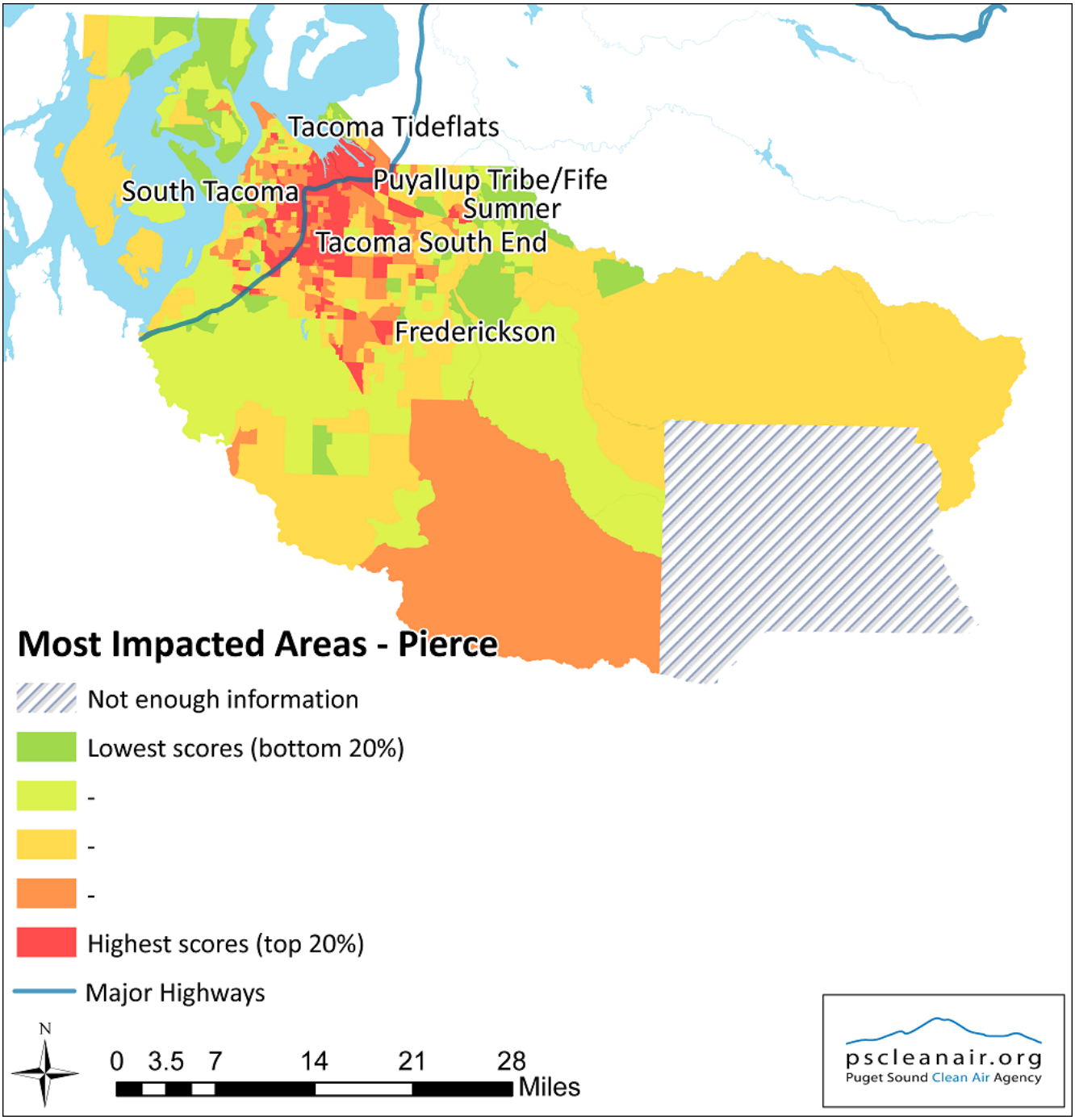

Figure 9

Pierce County – Central

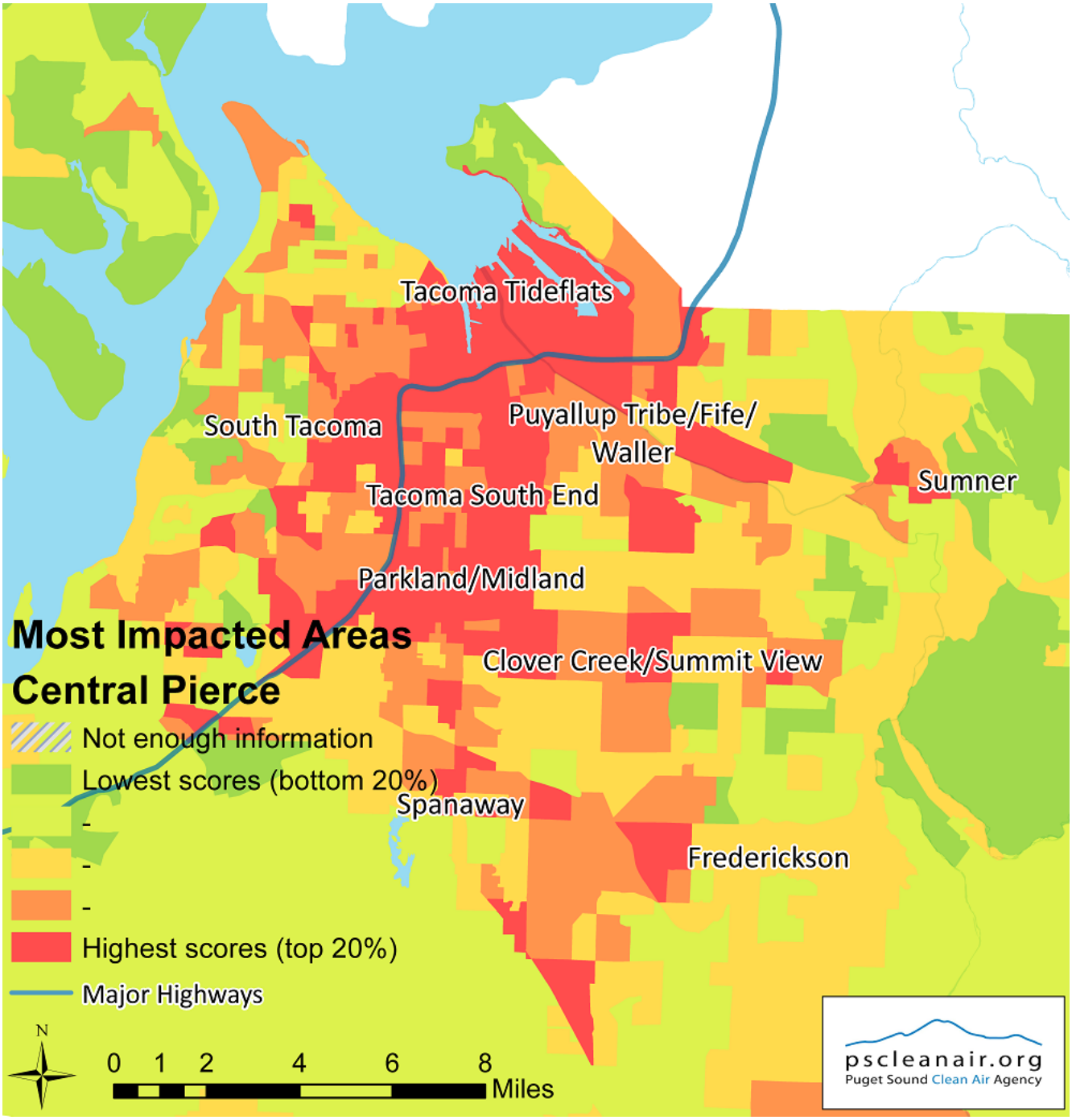

Figure 10

Snohomish County

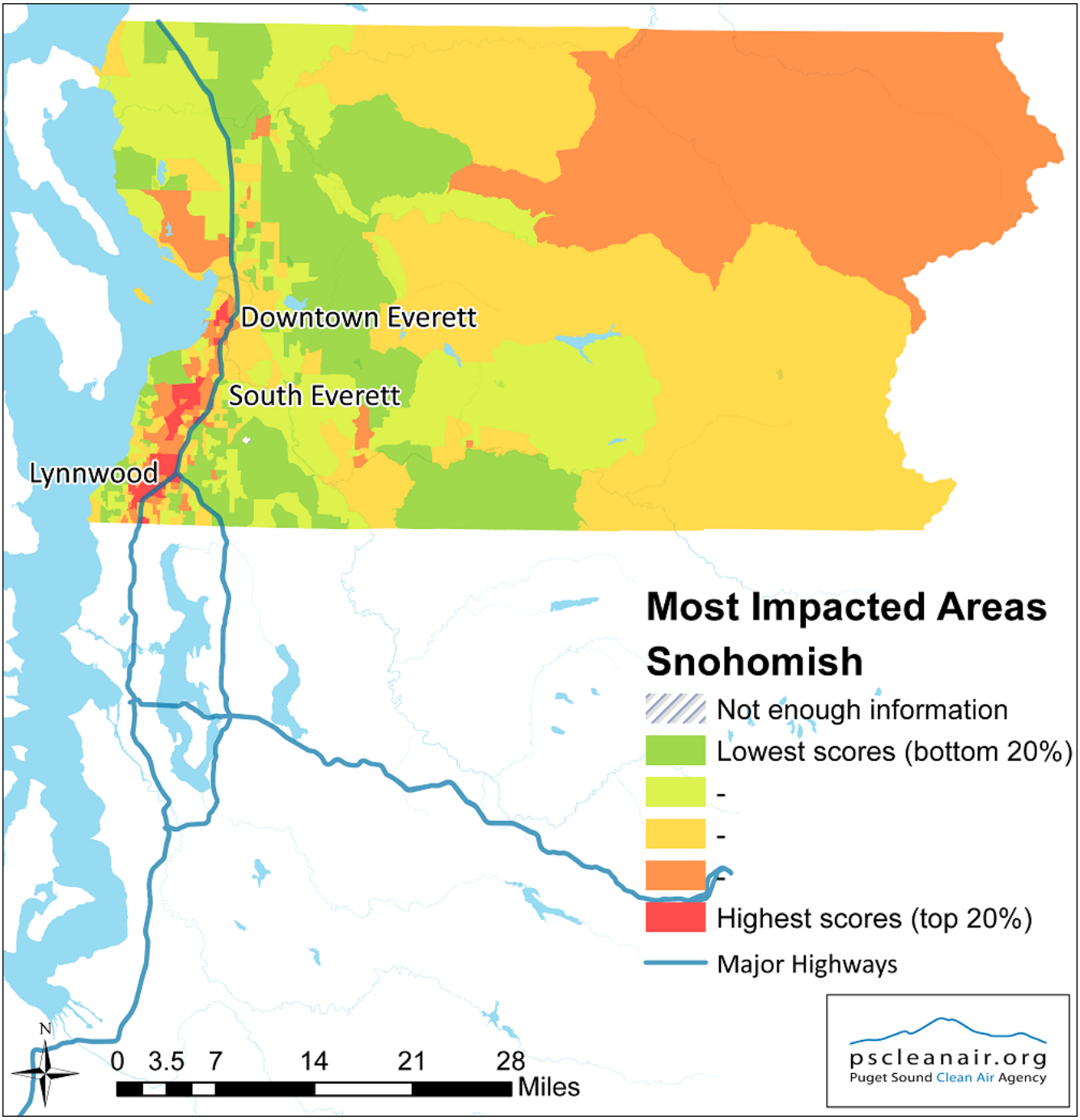

Figure 11

West Snohomish County

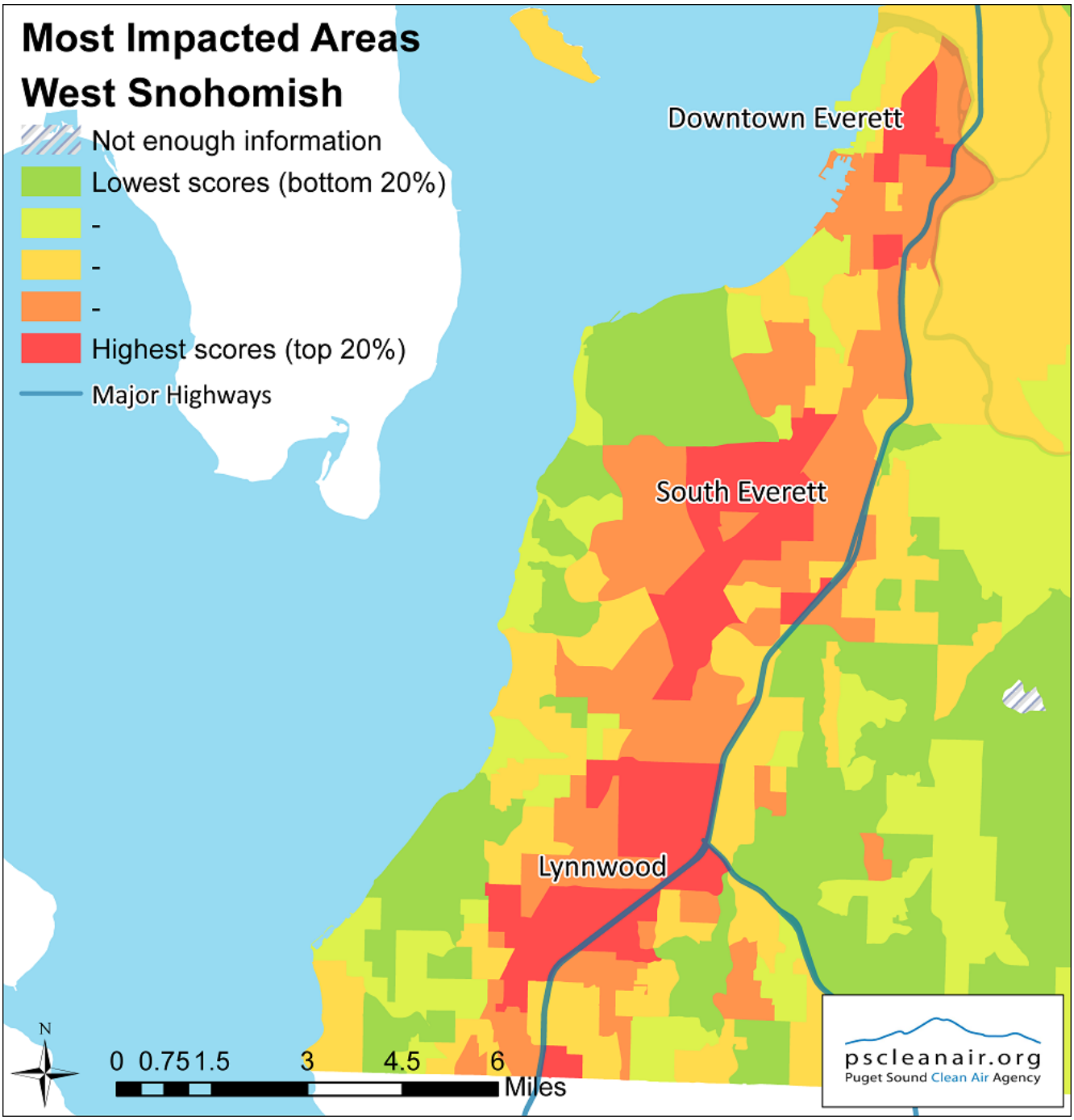

Figure 12