

Fresno Council of Governments

Fresno County Regional Transportation Network Vulnerability Assessment

Draft

Public Outreach Synopsis

Prepared for:

Fresno Council of Governments
Meg Prince, Project Manager
2035 Tulare Street, Suite 201
Fresno, CA 93721
Phone: (559) 233-4148, Ext. 203
Fax: (559) 233-9645
www.fresnocog.org



Prepared by:

WSP USA
Timothy Grose, Consultant Project Manager
1221 Broadway, Suite 800
Oakland, CA 94612
Phone: (415) 243-4733
www.wsp.com



VRPA Technologies, Inc.
Georgiena Vivian, President
4630 W. Jennifer, Suite 105
Fresno, CA 93722
Phone: (559) 259-9257
www.vrpatechnologies.com



August 6, 2019

Table of Contents

INTRODUCTION	1
PUBLIC PARTICIPATION OBJECTIVES	1
PUBLIC OUTREACH PLAN	2
PUBLIC OUTREACH ACTIVITIES	3
Pop-up Events.....	5
Conducting Each Pop-up Event	5
Summary of Individual Pop-up Events.....	6
Kerman Almond Festival	6
Reedley Street Faire.....	6
San Joaquin Carnival	7
Fresno Grizzlies July 4 th Baseball Game	8
Stakeholder Interviews	8
Online Survey	9
Online Survey Findings.....	9
Public Workshop.....	10
APPENDICES	12
Appendix A – Pop-up Event Materials	
Appendix B – Online Survey Materials	
Appendix C – Stakeholder Interview Questionnaire	
Appendix D – Public Workshop Materials	

List of Tables

Table 1 – Completed TNVA Public Outreach Activities	4
--	----------

Introduction

The Fresno Council of Governments (Fresno COG) received grant funding from the California Department of Transportation (Caltrans) under the Senate Bill (SB) 1 Adaptation Planning Grants Program to conduct a Regional Transportation Network Vulnerability Assessment (TNVA) for Fresno County. The Vulnerability Assessment will assist Fresno COG and other local agencies in understanding the potential impacts of climate change on the region's transportation infrastructure, identify specific locations that may be affected, and identify strategies to ensure the stability and resiliency of the infrastructure moving into the future. Fresno COG wants to ensure that the region's multimodal transportation network continues to support the areas' communities and promote positive economic development. Information learned through the Vulnerability Assessment development process will inform the next Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) update, and provide data for local jurisdictions to integrate into their respective plans.



Objectives of the Fresno County Regional TNVA development process are to:

- ✓ Convene regional partners from multiple jurisdictions.
- ✓ Identify climate change impact risks to multi-modal transportation infrastructure in the project area.
- ✓ Identify specific transportation infrastructure vulnerable to climate change impacts.
- ✓ Develop adaptation strategies and specific actions to remedy identified climate-related vulnerabilities.

The development process for the TNVA is guided by a diverse Vulnerability Assessment Working Group (VAWG), which is made up of representatives from local jurisdictions, transit agencies, flood control, CalFire, and public health and environmental justice representatives. The VAWG is responsible for providing both policy and technical guidance and shaping how the TNVA can serve the different communities of Fresno County and adapt to the potential impacts of climate change.

Public Participation Objectives

For the public and stakeholder agencies to effectively evaluate and comment on the TNVA, they should be adequately informed about the planning process and understand the details associated with the analysis. Input from the public and affected agencies lends credibility to key decisions made during the TNVA development process. Making timely, accurate and useful information available to the general public and other community members helped to achieve the following objectives of the outreach process:

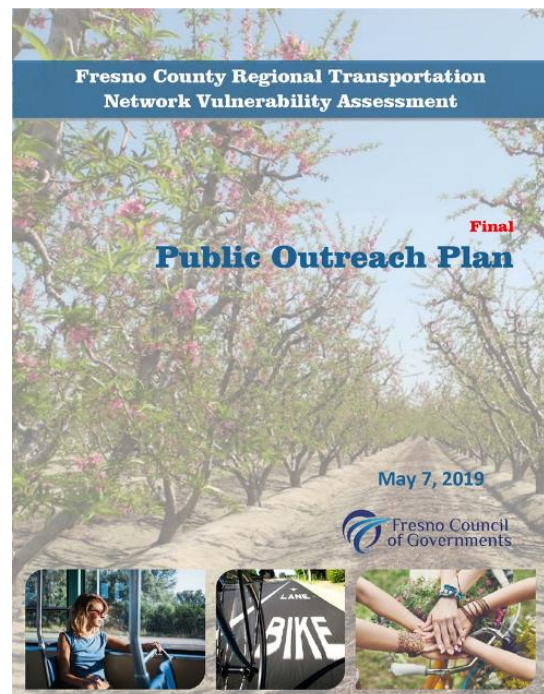
- ✓ Conduct an open and transparent public outreach process that:

- Provides up-to-date, easily accessible information on the TNVA process.
- Provides a wide variety of opportunities for participation and comment.
- Identifies critical issues and problems in need of resolution.
- Incorporates feedback received and identifies potential resolutions.
- ✓ Create and implement a meaningful public outreach and involvement process, and evaluate the process on a regular basis.
- ✓ Provide accurate, timely, and comprehensive documentation of the outreach process.
- ✓ Keep elected officials and local city and county staff informed of the TNVA development process via email notices of upcoming meetings, public workshops, and outreach events.
- ✓ Create public forums and collateral materials that provide clear, concise, and easy-to-understand information to enable the public to make informed decisions.
- ✓ Seek opportunities to involve a broad range of community members, including non-traditional groups, to ensure that the TNVA Team understands the issues from all those who may be impacted.
- ✓ Address social equity and environmental justice issues, to provide information to comply with relevant regulations, Title VI, Executive Order 12898 on Environmental Justice, and Executive Order 13166 on Limited English Proficiency and the Americans with Disabilities Act (ADA).
- ✓ Educate the public by using language that is non-technical and easily understood.
- ✓ Engage the large number of disadvantaged communities found in the region.
- ✓ Provide outreach materials in multiple languages.

Public Outreach Plan

Community engagement is essential to bring together the public and interested parties along with planners to discuss complex issues facing the communities and their residents. Working together to achieve a common goal, this partnership encourages affected parties to bring forward unique ideas and solutions to potential issues. As each interested party is different, so too are their hopes and aspirations and the ways to implement them. By listening to each other, the decisions generated will reflect the greater community at large.

Community engagement is most successful when the process is transparent with access to decisions, services, and information for all interested stakeholders and community members. Active participation of the community ensures that the outcomes are better tuned to meeting the community's needs today and into the future. State and federal transportation laws, regulations, policies and guidance require and encourage public involvement throughout the planning process, particularly regarding environmental justice populations and underserved communities, including low-income and minority populations.





The TNVA Public Outreach Plan (POP) clarifies the outreach program to ensure that interested parties understood how they could become involved and provide input during the TNVA development process. The POP simplified the outreach process by providing a systematic approach, maximizing the use of available resources, and minimizing delays by ensuring that public outreach activities were coordinated with other TNVA tasks and milestones. The POP also identified the specific tasks for the TNVA outreach effort, which included:

- ✓ Providing the public multiple opportunities to learn about the TNVA, while also allowing them to provide feedback on how the transportation network and their transportation related needs are affected by climate change.
- ✓ Creating and distributing public information that is user-friendly and culturally sensitive to communities that may be potentially affected by changes to the region's transportation infrastructure due to climate change.
- ✓ Providing policy makers with information about the public's opinion and values regarding the TNVA, and how to respond to future climate change.

Multiple strategies were used to generate interest and participation from the community. Key among these strategies were pop-up events, community surveys (both online and in person), stakeholder interviews and a public workshop.

Public Outreach Activities

One of the major components of the planning process used to help inform development of the TNVA included receiving comments and input from the public. To collect input, the TNVA Team participated in multiple outreach events throughout Fresno County from May through July 2019. These outreach events included pop-up events, an online community survey, stakeholder interviews and a public workshop. Location and general activities for each event are noted below in Table 1. Summaries of each effort can be found on the following pages.

Public outreach activities were discussed at the initial VAWG meeting. During the discussion, it was noted that residents of rural communities, which are often those identified as disadvantaged communities, are transportation limited and have difficulty attending outreach events outside of their immediate area. This can be especially true if events occur in the evening when fixed-route services are limited or unavailable. With pop-up events, the TNVA Team was aiming to reach members of disadvantaged communities by going to them. For the public workshop the TNVA Team reached out to residents, businesses and local agency partners and staff of the Fresno-Clovis Metropolitan Area. The workshop was held at a venue



accessible to transit users, allowing those with transportation limitations to participate. The online survey was aimed at those stakeholders more comfortable with today's electronic forums, and who may have been unable to participate at the workshop or pop-up events due to time or location restraints. Ultimately, the TNVA Team felt that there would be the greatest participation and diversity in the combination of activities completed.

Surveys collected from pop-up event attendees and online survey participants revealed the following participant

demographics:

- ✓ 73% of pop-up event respondents were from a Fresno County city/unincorporated community outside of the Fresno-Clovis Metropolitan Area.
- ✓ 63% of pop-up event respondents had a household income of less than \$36,000 in the year 2018.
- ✓ While race/ethnicity questions were not asked of pop-up event attendees, 28% of pop-up event surveys were completed in Spanish.
- ✓ 82% of online surveys were completed by respondents who live in the Fresno-Clovis Metropolitan Area.
- ✓ 54% of online survey respondents were between the ages of 45 to 64. 36% were between the ages of 24 to 44.
- ✓ 54% of online surveys were completed by respondents who are White/Caucasian. 26% were completed by those who are Hispanic/Latino.
- ✓ 71% of online survey respondents had a household income of \$50,000 or more in the year 2018.

With limited workshop attendance, polling/surveys were not administered and demographic data was not collected.

Table 1 – Completed TNVA Public Outreach Activities

Type of Outreach Event	Name	Dates	Location	Activities
Pop-up Event	Kerman Almond Festival	Saturday, May 4, 2019	Kerckhoff Park 15061 West G Street Kerman, CA 93630 11:00 AM to 3:00 PM	<ul style="list-style-type: none"> • Bilingual Plan flyers • Surveys • Comment cards • Interactive mapping
Pop-up Event	Reedley Street Faire	Saturday, May 5, 2019	G Street between 11 th Street and 12 th Street Reedley, CA 93654 10:00 AM to 4:00 PM	<ul style="list-style-type: none"> • Bilingual Plan flyers • Surveys • Comment cards • Interactive mapping
Stakeholder Interviews	TNVA Stakeholder Interviews	Wednesday, May 15 th , 2019 to Friday, May 24, 2019	Conference call line	<ul style="list-style-type: none"> • Question and answer stakeholder interviews

Type of Outreach Event	Name	Dates	Location	Activities
Survey	Online Surveys	May to July 2019	SB1 Planning Studies webpage on Fresno COG website	<ul style="list-style-type: none"> Bilingual transportation network vulnerability issues opinions survey
Pop-up Event	San Joaquin Carnival	Friday, June 7, 2019	City of San Joaquin Sports Park 8599 6 th Street San Joaquin, CA 93660 6:00 PM to 9:00 PM	<ul style="list-style-type: none"> Bilingual Plan flyers Surveys Comment cards Interactive mapping
Workshop	Public and Stakeholder Workshop	Wednesday, June 19, 2019	Fresno City College, Staff Dining Room 1101 E. University Avenue Fresno, CA 93741 5:30 PM to 7:30 PM	<ul style="list-style-type: none"> Open house format workshop with interactive activities
Pop-up Event	Fresno Grizzlies July 4 th baseball game	Thursday, July 4, 2019	Chukchansi Park 1800 Tulare Street Fresno, CA 93721 5:45 PM to 8:15 PM	<ul style="list-style-type: none"> Bilingual surveys

Pop-up Events

Pop-up events allowed the TNVA Team to engage with the public at events of interest to them, while ultimately reaching a significantly higher number of residents than traditional public workshops. The TNVA Team worked with Fresno COG staff and the VAWG to identify high-volume community events throughout Fresno County. Such events included the Kerman Almond Festival, Reedley Street Faire, San Joaquin Carnival and the Fresno Grizzlies July 4th baseball game.

Conducting Each Pop-up Event

At the first three pop-up events, the TNVA Team set-up an informational area, which included the use of study informational boards and study area mapping, informational flyers, comments cards and a short survey consisting of seven questions. All pop-up events were staffed with at least one bilingual TNVA Team member. At each pop-up event, at least one TNVA Team member remained at the informational booth to solicit survey and mapping exercise participation, while another TNVA Team member engaged with event goers who were further away from the informational booth. At the final pop-up event, the TNVA Team partnered with the Fresno County Transportation Authority (FCTA) Measure C Roadshow booth and distributed surveys to game day attendees. The TNVA Team also solicited survey responses from attendees who were already seated inside the stadium. A total of 178 surveys were completed by all pop-up event attendees over the course of the four pop-up events.

Comment cards were available for visitors to provide additional thoughts, suggestions, or concerns. Each visitor received a two-sided bilingual informational flyer and were encouraged to visit the Assessment webpage for updates on the TNVA. Additionally, as an incentive for survey participation, respondent's names were entered into a raffle drawing for a gift card.

Materials used for pop-up events, including study information boards, study area mapping, informational flyers, surveys and comment cards, can be found in Appendix A.

Summary of Individual Pop-up Events

Kerman Almond Festival

The first pop-up event was held at the Kerman Almond Festival on Saturday, May 4th, 2019, from 11:00 AM to 3:00 PM at Kerckhoff Park. Three members of the TNVA Team, including the Fresno COG Project Manager and one bilingual outreach specialist, were present at the TNVA informational booth. In addition, four bilingual college students from Reedley College assisted the TNVA Team's bilingual outreach specialist in soliciting survey responses from the public.

Pop-up Event Findings

Significant findings from Kerman Almond Festival pop-up event attendees included the following:

- ✓ 35% of survey respondents said that weather events or conditions have affected their travel or required them to evacuate. Of these respondents:
 - 27% listed heat wave or extreme heat days as the event or condition that they had experienced.
 - 24% said that poor air quality was the event or condition that they had experienced.
- ✓ When asked what impacts from climate change are most concerning to them, respondents provided the following answers:
 - Heat waves and higher temperatures (19%).
 - Longer and more severe droughts (18%).
 - Lower air quality (18%).
- ✓ When asked to identify which transportation improvements are most important for addressing extreme weather and climate change, respondents answered as follows:
 - Tree planting along roadways and sidewalks (21%) ranked highest of all choices.
 - The creation of more comfortable and shaded transit stops (17%) ranked second highest of all choices.



Reedley Street Faire

The second pop-up event was held at the Reedley Street Faire on Sunday, May 5th, 2019, from 10:00 AM to 4:00 PM in downtown Reedley. Three members of the TNVA Team, including the Fresno COG Project Manager and one bilingual outreach specialist, were present at the TNVA informational booth. In addition, four bilingual college students from Reedley College assisted the TNVA Team's bilingual specialist in soliciting survey responses from the public.

Pop-up Event Findings

Significant findings from the Reedley Street Faire pop-up event attendees included the following:

- ✓ 39% of survey respondents said that weather events or conditions have affected their travel or required them to evacuate. Of these respondents:

- 38% listed heat wave or extreme heat days as the event or condition that they had experienced.
- 36% said that poor air quality was the event or condition that they had experienced.
- ✓ When asked what impacts from climate change are most concerning to them, respondents provided the following answers:
 - Heat waves and higher temperatures (18%).
 - Longer and more severe droughts (17%).
 - Lower air quality (17%).
- ✓ When asked to identify which transportation improvements are most important for addressing extreme weather and climate change, respondents answered as follows:
 - Tree planting along roadways and sidewalks (22%) ranked highest of all choices.
 - The creation of more comfortable and shaded transit stops (18%) was ranked second highest of all choices.



San Joaquin Carnival

The third pop-up event was held at the San Joaquin Carnival on Friday, June 7th, 2019, from 6:00 PM to 9:00 PM at the City of San Joaquin Sports Park. Two members of the TNVA Team, including one bilingual specialist, were present at the TNVA informational booth.

Pop-up Event Findings

Significant findings from the San Joaquin Carnival pop-up event attendees included the following:

- ✓ 55% of survey respondents said that weather events or conditions have affected their travel or required them to evacuate. Of these respondents:
 - 50% listed heat wave or extreme heat days as the event or condition that they had experienced.
 - 30% said that poor air quality was the event or condition that they had experienced.
- ✓ When asked what impacts from climate change are most concerning to them, respondents provided the following answers:
 - Longer and more severe droughts (18%).
 - Heat waves and higher temperatures (15%).
 - Heavy rains and flooding (15%).
- ✓ When asked to identify which transportation improvements are most important for addressing extreme weather and climate change, respondents answered as follows:
 - Tree planting along roadways and sidewalks (22%) ranked highest of all choices.
 - The creation of more comfortable and shaded transit stops, expanded service of availability of on-demand transportation, and better management of flammable vegetation near roadways and structures were tied for second highest of all choices with 16%.



Fresno Grizzlies July 4th Baseball Game

The last pop-up event was held at the Fresno Grizzlies July 4th baseball game on Thursday, July 4th, 2019, from 5:45 PM to 8:15 PM at Chukchansi Park. As mentioned previously, the TNVA Team partnered with the FCTA Measure C Roadshow booth during this pop-up event. One bilingual specialist from the TNVA Team was present at the event.



Pop-up Event Findings

Significant findings from the Fresno Grizzlies July 4th baseball game included the following:

- ✓ 83% of survey respondents said that weather events or conditions have affected their travel or required them to evacuate. Of these respondents:
 - 33% listed heat wave or extreme heat days as the event of condition that they had experienced.
 - 33% also said that poor air quality was the event of condition that they had experienced.
- ✓ When asked what impacts from climate change are most concerning to them, respondents provided the following answers:
 - Heat waves and higher temperatures (19%).
 - Lower air quality (19%).
 - Longer and more severe droughts (18%).
- ✓ When asked to identify which transportation improvements are most important for addressing extreme weather and climate change, respondents answered as follows:
 - The creation of more comfortable and shaded transit stops (27%) ranked highest of all choices.
 - Tree planting along roadways and sidewalks (21%) ranked second highest of all choices.

Stakeholder Interviews

The TNVA Team participated in stakeholder interviews to gather project-relevant information and stakeholder suggestions and concerns. Four interviews were conducted by telephone with key stakeholders who provided their knowledge, wisdom and insight to better assist with the TNVA development process. The stakeholder interview questionnaire can be found in Appendix B. Interviewees included representatives from the following agencies or organizations:

- ✓ California Rural Legal Assistance
- ✓ Central California Environmental Justice Network
- ✓ Central Valley Air Quality Coalition
- ✓ City of Fresno Engineering Department
- ✓ City of Reedley Community Development Department
- ✓ Fresno Area Express (FAX)
- ✓ Fresno County Department of Public Works and Planning
- ✓ Fresno County Office of Emergency Services
- ✓ Leadership Counsel for Justice and Accountability

Interviewees provided a wide range of feedback including:

- ✓ Concerns regarding extreme heat and poor air quality, especially for outdoor workers.
- ✓ Difficulty navigating flooding in rural areas that don't have sufficient drainage.
- ✓ The need for shaded areas for active transportation and transit users.
- ✓ Concerns regarding increases in operations and maintenance costs from heavy rain events.
- ✓ The TNVA should identify the highest priority threats that the region can respond to.

Online Survey

The TNVA Team augmented the previously mentioned pop-up event surveys with an online community survey. The Team prepared the surveys to reflect the questions desired for the development of the TNVA, while ensuring that the surveys were in a format and language easily understood by the general public. The survey consisted of a series of sixteen multiple choice, priority ranking and open ended questions, and was available in both English and Spanish. The survey was accessible through the Fresno COG webpage and was available from May through July 2019. A notification concerning the online survey's availability to the public was distributed as follows:

- ✓ By email to the TNVA Stakeholder Database.
- ✓ By email to an expanded Fresno County database.
- ✓ To the Fresno COG newsletter database.
- ✓ Postings to Fresno COG's Facebook and Twitter accounts.
- ✓ Via the California Safe Routes Partnership E-Newsletter.

Online Survey Findings

The online survey form and results from the online survey can be found in Appendix C. Sixty-three completed surveys were submitted by participants. Major survey findings included:

- ✓ 35% of online survey respondents stated that weather events or conditions have affected their travel or required them to evacuate. Of these respondents:
 - 44% listed heat wave or extreme heat day as the event or condition that they experienced.
 - 28% said that poor air quality was the event of condition that they had experienced.
- ✓ 60% of respondents believed that climate change will impact their lives directly. Key impacts listed from survey participants included the following:
 - Increased urban flooding.
 - Less water availability.
 - Limited travel options due to extreme heat or rain.
 - Health issues and poorer air quality.
 - Higher energy costs.
 - Impacts to agriculture.



- ✓ When asked what impacts from climate change are most concerning to them, respondents provided the following answers:
 - Longer and more severe droughts (20%).
 - Heat waves and higher temperatures (19%).
 - Lower air quality (19%).
- ✓ When asked to identify which transportation improvements are most important for addressing extreme weather and climate change, respondents answered as follows:
 - Tree plantings along roads and sidewalks (19%) ranked highest of all choices.
 - The creation of more comfortable and shaded transit stops, and expanded service and availability of on-demand transportation during high heat or other extreme weather events were tied for second highest of all choices with 17%.

Public Workshop

The TNVA workshop was held on Wednesday, July 19th, from 5:30 PM to 7:00 PM at Fresno City College. The workshop was noticed in both English and Spanish and was posted online on the Assessment webpage, distributed via flyer at the first three pop-up events and was emailed out to a Fresno County database, which included well over 400 contacts including stakeholders, elected officials, the general public, and other local government agencies.



The TNVA Team was present at the workshop and available to respond to any questions or comments that attendees had. A Spanish translator was also available to ensure all attendees could comfortably participate in discussions and provide feedback. The workshop followed an open house format and included the following elements:

- ✓ Study area mapping displays.
- ✓ An introductory PowerPoint presentation that provided an overview of the TNVA planning process.
- ✓ An interactive mapping exercise so that attendees could identify areas of the region where the transportation network is vulnerable to climate and weather-related hazards.
- ✓ The use of Turning Point polling software, a tool that allows the TNVA Team to not only educate, but to gather ideas and input simultaneously from everyone attending a workshop through the use of a real-time response keypad.
- ✓ Comment cards for comments and feedback.
- ✓ Translation, which was provided using available translation equipment.
- ✓ Workshop stations for registration, comments, and refreshments.

The introductory PowerPoint, polling question PowerPoint and study area mapping can be found in Appendix D.

Key comments/recommendations from workshop attendees included the following:

- ✓ The need for better storm drainage and road improvements in proximity to disadvantaged and low-income communities.
- ✓ People are less likely to ride their bicycle due to heat, roadways degradation, poor air quality and flooding.
- ✓ Transit users are walking/biking to stations and waiting for buses to arrive, during which they are subject to heat extremes and precipitation events. Adaptation strategies could include improvements to bus shelters, such as benches, walls, shelters, lights and other safety components.
- ✓ Vanpool service that takes residents to cooling centers during heat waves.
- ✓ Plant additional trees to cool down sidewalks.
- ✓ Build more bicycle/pedestrian paths that will encourage active transportation and assist in reducing greenhouse gas (GHG) emissions.

The TNVA workshop was lightly attended, which may be partially attributed to the newness of the subject matter. Therefore, the TNVA Team decided to participate in an additional pop-up event following the workshop, which included the Fresno Grizzlies July 4th baseball game, referenced in the Pop-up Events section above.



Appendices

**Pop-up Event Materials, Online Survey Materials,
Stakeholder Interview Questionnaire, and Public Workshop Materials**

APPENDIX A

Pop-up Event Materials

Fresno Council of Governments

Fresno County Regional Transportation Network Vulnerability Assessment

Plan Overview

The Fresno Council of Governments has begun preparation of the **Fresno County Regional Transportation Network Vulnerability Assessment (TNVA)**. The TNVA will identify areas of the region where the transportation network is vulnerable to climate and weather-related hazards, such as extreme heat, flooding, and wildfire, and identify strategies to remedy those impacts that will positively benefit local communities.



Objectives

Objectives of the Fresno County Regional TNVA development process include:

- Convene regional partners from multiple jurisdictions
- Identify climate and weather-related risks to multi-modal transportation infrastructure in Fresno County
- Identify specific transportation infrastructure vulnerabilities to weather and climate-related impacts
- Develop adaptation strategies and specific actions to remedy identified vulnerabilities

Learn More

Visit our webpage where you can stay up-to-date on the development of the vulnerability assessment and provide your input by completing the TNVA Stakeholder Survey.



www.fresnocog.org/project/sb1-planning-studies/

Plan Development Timeline

Community Engagement

- Stakeholder Survey
- Workshops and Pop-up Events

May 2019 –
September 2019

Plan Development

- Vulnerability Assessment
- Adaptation Strategies
- Prepare Final Report

March 2019 –
February 2020

Questions: Contact Meg Prince at (559) 233-4148 or mprince@fresnocog.org if you have any questions or would like additional information.

**YOUR INPUT
COUNTS!**

***We want to
HEAR from YOU!***

Please attend the upcoming Community Outreach Workshop to learn more about the vulnerability assessment. We are looking for your input and feedback to shape how the assessment can serve the community and keep Fresno County residents safe from climate and weather related impacts.

Wednesday, June 19, 2019

5:30pm – 7:30pm

**Fresno City College,
Staff Dining Room
1101 E. University Ave
Fresno, CA 93741**

*Spanish translation services will be
available. Drop in at any time
to learn more!*



Consejo de Gobiernos de Fresno

Condado Regional de Fresno

Evaluación de la Vulnerabilidad del Transporte

Resumen del Plan

El Consejo de Gobiernos de Fresno ha comenzado preparativos de la **Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno (TNVA)**. La TNVA identificará las áreas de la región en donde la red de transporte es vulnerable al clima y a los peligros asociados con el clima, tal como el calor extremo, inundaciones, incendios forestales, e identificar estrategias para remediar esos impactos que beneficien a las comunidades positivamente.



Objetivos

Los objetivos en el proceso del desarrollo TNVA Regional del Condado de Fresno incluyen:

- Convocar a partidos interesados regionales de múltiples jurisdicciones
- Identificar riesgos asociados con el clima e climáticos a la infraestructura de transportación multimodal en el Condado de Fresno
- Identificar las vulnerabilidades específicas de la infraestructura del transporte a impactos climáticos y relacionados con el clima
- Desarrollar estrategias de adaptación y acciones específicas para remediar las vulnerabilidades identificadas

Aprenda más

Visite nuestra página de internet donde usted puede estar al día con el desarrollo de la evaluación de vulnerabilidad y puede contribuir al completar La Encuesta de los Partidos Interesados TNVA.



www.fresnocog.org/project/sb1-planning-studies/

Cronograma para el Desarrollo del Plan

Participación de la Comunidad

- Encuesta de los Partidos Interesados **May 2019 – September 2019**
- Talleres y Eventos de Carpa

Desarrollo del Plan

- Evaluación de la Vulnerabilidad **March 2019 – February 2020**
- Estrategias de adaptación
- Preparación del Reporte Final

Preguntas: Contactar a Meg Prince al (559) 233-4148 o mprince@fresnocog.org si tiene cualquier pregunta o necesita más información.

SU PARTICIPACIÓN CUENTA!

¡Queremos ESCUCHARLE a USTED!

Por favor asista al próximo Taller de Alcance Comunitario para aprender más sobre la evaluación de vulnerabilidad. Queremos su participación y comentarios para diseñar como la evaluación puede servir a la comunidad y mantener protegidos a los residentes del Condado de Fresno del clima y los impactos climáticos.

Miercoles, 19 de Junio del 2019

5:30pm – 7:30pm

**Fresno City College,
Comedor del Personal
1101 E. University Ave
Fresno, CA 93741**

Servicios de traducción al Español Estarán disponibles. ¡Llegue a cualquier horario del taller para aprender más!



Fresno County Regional Transportation Network Vulnerability Assessment

Fresno COG is preparing a Fresno County Regional Transportation Network Vulnerability Assessment that will identify where the region’s **transportation network** is vulnerable to potential impacts of climate change, such as **increased temperature**, more **extreme heat days, flooding, drought**, and **wildfires**. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region.

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, what transportation improvements you would like to see locally in relation to climate change, and the solutions you think should be implemented to address these hazards to create a resilient regional transportation network.

1) What zip code do you live in? _____

2) Have weather events or conditions ever affected your travel or required you to evacuate?

___ Yes ___ No

If yes to the above, “What type of event or condition?” ___Heat wave or extreme heat day

___Flooding ___Wildfire ___Poor air quality day ___Other (Please describe below)

Place a pin on the map indicating where you dealt with the event or condition. Map pin number:

If yes to the above, “Tell us about the event(s). How did it affect your travel?” (Please describe)

3) What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least the concerning)

___Longer and more severe droughts ___Heat waves and higher temperatures ___Heavy rains and flooding ___Landslides and erosion ___Subsidence (land sinking from groundwater use) ___Wildfires ___Lower air quality

Over



Fresno County Regional Transportation Network Vulnerability Assessment

Fresno COG is preparing a Fresno County Regional Transportation Network Vulnerability Assessment that will identify where the region’s **transportation network** is vulnerable to potential impacts of climate change, such as **increased temperature**, more **extreme heat days, flooding, drought**, and **wildfires**. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region.

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, what transportation improvements you would like to see locally in relation to climate change, and the solutions you think should be implemented to address these hazards to create a resilient regional transportation network.

1) What zip code do you live in? _____

2) Have weather events or conditions ever affected your travel or required you to evacuate?

___ Yes ___ No

If yes to the above, “What type of event or condition?” ___Heat wave or extreme heat day

___Flooding ___Wildfire ___Poor air quality day ___Other (Please describe below)

Place a pin on the map indicating where you dealt with the event or condition. Map pin number:

If yes to the above, “Tell us about the event(s). How did it affect your travel?” (Please describe)

3) What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least the concerning)

___Longer and more severe droughts ___Heat waves and higher temperatures ___Heavy rains and flooding ___Landslides and erosion ___Subsidence (land sinking from groundwater use) ___Wildfires ___Lower air quality

Over



4) Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)

☐ Create more comfortable and shaded transit stops ☐ Tree plantings along roadways and sidewalks ☐ Improved flood control ☐ Better evacuation planning and communications ☐ Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) particularly for elderly or disabled people ☐ Public transit service to cooling centers on high heat days ☐ Better management of flammable vegetation near roadways and structures ☐ Other (Please describe)

5) What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation ? (Please describe)

6) What are your primary modes of transportation? (Check all that apply if you use multiple modes to reach your destination) ☐ Driving alone or with family ☐ Carpooling ☐ Taking a Taxi or rideshare (Uber/Lyft) ☐ Public transit (bus, train) ☐ Biking ☐ Walking

If biking, “How long do you bike to get to your destination or next mode of transportation (like a transit stop)?”

If walking “How long do you walk to get to your destination or next mode of transportation (like a transit stop)? “

7) What was your household income before taxes in 2018?

☐ Less than \$14,000 ☐ \$15,000 to \$24,999 ☐ \$ 25,000 to \$35,999 ☐ \$36,000 to \$49,999 ☐ \$50,000 or more

4) Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)

☐ Create more comfortable and shaded transit stops ☐ Tree plantings along roadways and sidewalks ☐ Improved flood control ☐ Better evacuation planning and communications ☐ Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) particularly for elderly or disabled people ☐ Public transit service to cooling centers on high heat days ☐ Better management of flammable vegetation near roadways and structures ☐ Other (Please describe)

5) What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation ? (Please describe)

6) What are your primary modes of transportation? (Check all that apply if you use multiple modes to reach your destination) ☐ Driving alone or with family ☐ Carpooling ☐ Taking a Taxi or rideshare (Uber/Lyft) ☐ Public transit (bus, train) ☐ Biking ☐ Walking

If biking, “How long do you bike to get to your destination or next mode of transportation (like a transit stop)?”

If walking “How long do you walk to get to your destination or next mode of transportation (like a transit stop)? “

7) What was your household income before taxes in 2018?

☐ Less than \$14,000 ☐ \$15,000 to \$24,999 ☐ \$ 25,000 to \$35,999 ☐ \$36,000 to \$49,999 ☐ \$50,000 or more

Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

COG de Fresno está preparando una Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno la cual identificará el lugar donde la **Red de Transporte** es vulnerable a los posibles impactos de cambios climáticos, como el **aumento de temperatura, más días de calor extremo, inundaciones, sequías, e incendios forestales**. La meta de esta evaluación es encontrar soluciones que beneficiarán a la comunidad entera del Condado de Fresno y mejorar el transporte en la región.

Por favor complete esta encuesta anónima para informarnos cuáles son los impactos del cambio climático que más le preocupan, qué mejoría en el transporte local le gustaría ver con relación al cambio climático, y las soluciones que usted piense que se deben implementar para afrontar estos riesgos y crear una red resistente de transporte regional.

1) ¿Cuál es el código postal donde vive usted?_____

2) ¿Han afectado los eventos climáticos u otras condiciones su habilidad de viajar o que haya tenido que evacuar? __Si __No

En caso de responder Si a lo de arriba, ¿Que tipo de evento o condición?”

__Ola de calor o día de calor extremo __inundación __incendio forestal __día con mala calidad de aire____ Otros (Por favor descríbalo abajo)

Ponga un indicador en el mapa señalando donde fue que confronto este evento o condición.

Numero de indicador en el mapa

En caso de responder Si a lo de arriba, “Cuéntenos sobre el/los evento(s). ¿Cómo afectó su viaje?”
(Favor de describir abajo)

3) ¿Cuales son los impactos por el cambio del clima que más le preocupan?(Favor de clasificar lo siguiente en orden de importancia, en donde el 1 es de más preocupación y el 7 es el que menos le preocupe)

____Sequias más severas y alargadas____ Olas de calos y temperaturas altas ____ Fuertes lluvias e inundaciones ____ Derrumbes y erosión ____ Subsistencia (hundimiento de las tierras debido al uso del agua subterránea) ____Incendios forestales ____ Mala calidad de aire

Dar vuelta



Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno.

COG de Fresno está preparando una Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno la cual identificará el lugar donde la **Red de Transporte** es vulnerable a los posibles impactos de cambios climáticos, como el **aumento de temperatura, más días de calor extremo, inundaciones, sequías, e incendios forestales**. La meta de esta evaluación es encontrar soluciones que beneficiarán a la comunidad entera del Condado de Fresno y mejorar el transporte en la región.

Por favor complete esta encuesta anónima para informarnos cuáles son los impactos del cambio climático que más le preocupan, qué mejoría en el transporte local le gustaría ver con relación al cambio climático, y las soluciones que usted piense que se deben implementar para afrontar estos riesgos y crear una red resistente de transporte regional.

1) ¿Cuál es el código postal donde vive usted?_____

2) ¿Han afectado los eventos climáticos u otras condiciones su habilidad de viajar o que haya tenido que evacuar? __Si __No

En caso de responder Si a lo de arriba, ¿Que tipo de evento o condición?”

__Ola de calor o día de calor extremo __inundación __incendio forestal __día con mala calidad de aire____ Otros (Por favor descríbalo abajo)

Ponga un indicador en el mapa señalando donde fue que confronto este evento o condición.

Numero de indicador en el mapa

En caso de responder Si a lo de arriba, “Cuéntenos sobre el/los evento(s). ¿Cómo afectó su viaje?”
(Favor de describir abajo)

3) ¿Cuales son los impactos por el cambio del clima que más le preocupan?(Favor de clasificar lo siguiente en orden de importancia, en donde el 1 es de más preocupación y el 7 es el que menos le preocupe)

____Sequias más severas y alargadas____ Olas de calos y temperaturas altas ____ Fuertes lluvias e inundaciones ____ Derrumbes y erosión ____ Subsistencia (hundimiento de las tierras debido al uso del agua subterránea) ____Incendios forestales ____ Mala calidad de aire

Dar vuelta



Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno.

4) ¿Cuál de las siguientes mejoras de transporte son de más importancia para combatir el clima extremo y los cambios climáticos? (Marca todas las opciones que aplican)

☐ Crear más paradas de tránsito cómodas y con sombra ☐ Plantar árboles en el camino de las carreteras y las banquetas ☐ Mejorar el control de inundaciones ☐ Mejores planes de planeación y evacuación ☐ Expandir el servicio y la disponibilidad del transporte a pedido (como el viaje en grupo, paratransito, etc.) particularmente para personas de edad avanzada y discapacitadas ☐ Servicio de transporte público a centros de enfriamiento en días muy calurosos ☐ Mejor manejo de la vegetación inflamables cerca de las carreteras y estructuras ☐ Otros (Favor de describir abajo)

5) ¿Que cree usted que la región de Fresno puede hacer para prepararse para los impactos del cambio climático referente al transporte? (Favor de describir abajo)

6) ¿Cuáles son sus medios de transporte primarios? (Marque todas las opciones que aplican si usted utiliza varios medios para llegar a su destino) ☐ Manejando solo o con su familia ☐ Viaje en grupo ☐ Tomando un Taxi o un viajes compartidos (Uber/Lyft) ☐ Transporte público (camión , tren) ☐ Bicicleta ☐ Caminando

Si usa bicicleta, “¿Cuánto le toma para llegar a su destino o a su siguiente forma de transporte (como una parada del autobús)?”

Si es caminando, “¿Cuánto camina para llegar a su destino o a su siguiente forma de transporte (como la parada del autobús)? “

7) ¿Cuál fue su ingreso familiar antes de impuestos en el 2018?

☐ menos de \$14,000 ☐ \$15,000 a \$24,999 ☐ \$ 25,000 a \$35,999

☐ \$36,000 a \$49,999 ☐ \$50,000 o más

Fresno County Transportation Network Vulnerability Assessment

Pop-up Event - Kerman Almond Festival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event - Kerman Almond Festival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Events - Kerman Almond Festival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Events – Kerman Almond Festival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Evento de Carpa - Kerman Almond Festival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Evento de Carpa - Kerman Almond Festival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Evento de Carpa - Kerman Almond Festival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Evento de Carpa - Kerman Almond Festival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event - Reedley Street Faire

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event - Reedley Street Faire

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event - Reedley Street Faire

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Events - Reedley Street Faire

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa - Reedley Street Faire

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa - Reedley Street Faire

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa - Reedley Street Faire

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa - Reedley Street Faire

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event – San Joaquin Carnival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event – San Joaquin Carnival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Event – San Joaquin Carnival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Pop-up Events – San Joaquin Carnival

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa – San Joaquin Carnival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa – San Joaquin Carnival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa – San Joaquin Carnival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Evaluación de Vulnerabilidad de la Red de Transporte del Condado de Fresno

Evento de Carpa – San Joaquin Carnival

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Fresno County Regional Transportation Network Vulnerability Assessment

The **Fresno Council of Governments** is preparing a **Fresno County Regional Transportation Network Vulnerability Assessment (TNVA)**, funded through Senate Bill 1. The TNVA will identify areas of the region where the multi-modal transportation network is vulnerable to climate change hazards and identify strategies to remedy potential impacts. These responses will be designed to provide additional benefits to the broader community through public health, environmental, equitable, and economic improvements.

The main climate hazards that will be assessed as part of the TNVA are **temperature rise and extreme heat, flooding from extreme precipitation events, and wildfire risk**. In general, projected changes are:

- **High and low temperatures are expected to rise** across Fresno County, and there will be more heat waves and extreme heat days.
- Precipitation projections are uncertain and **precipitation will become even more volatile**, but in general it's expected that both droughts and storm events will become more frequent and severe.
- **Wildfire risk is increasing** as soils and vegetation dry out from temperature rise.



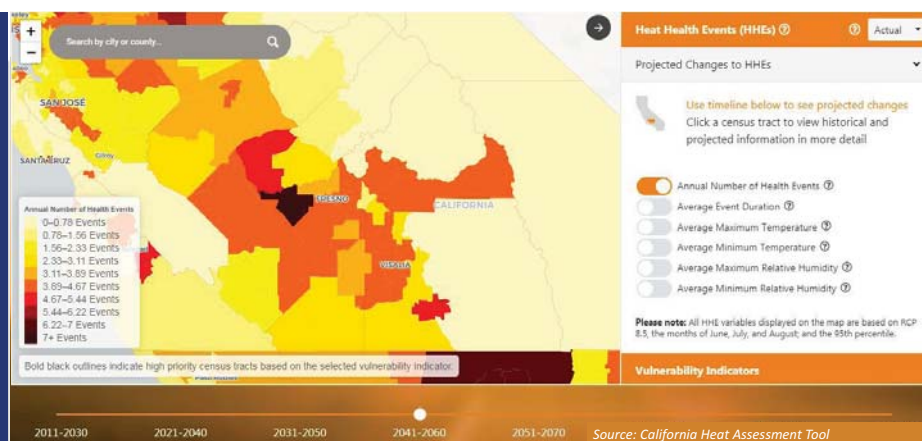
Clovis, CA, photo by David Prosser, Creative Commons License 2.0

Heat Health Events

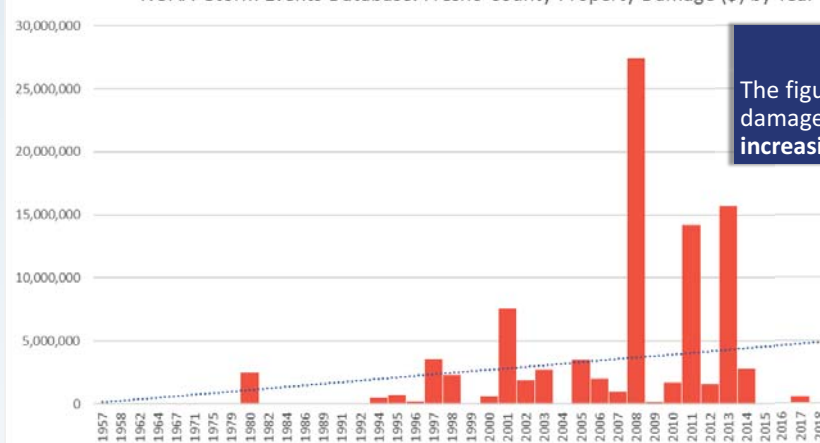
Heat health events are **expected to increase** over the coming century.

A heat health event is any event that results in a **negative public health impact**, such as an emergency room visit.

See the map to the right for the **projected increases in annual heat health events** by mid-century.

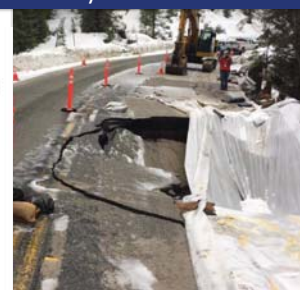


NOAA Storm Events Database: Fresno County Property Damage (\$) by Year



Storm Events

The figure to the left shows how property damage costs due to **storm events** are already **increasing** in Fresno County.



Washout on SR-41, photo courtesy of Caltrans



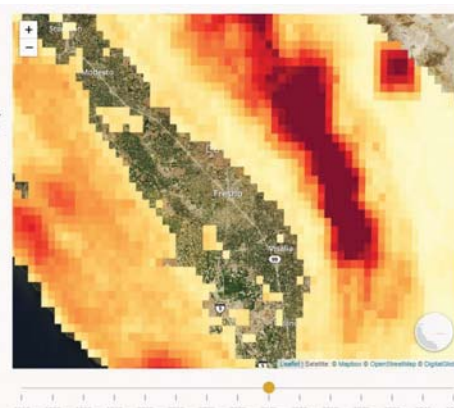
Area Burned

Average annual area burned is **expected to increase by 205%** in Fresno County by the end of the century.

Rim Fire as seen from SR-41, photo by Andrew Adams, Creative Commons License 2.0



Source: Cal-Adapt



Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

El Consejo de Gobiernos de Fresno esta preparando una **Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno (TNVA)**, financiada por la ley del Senado 1. La TNVA identificará las áreas de la región donde la red de transporte multimodal es vulnerable a los peligros por el cambio de clima e identificar estrategias para remediar los posibles impactos. Estas respuestas estarán diseñadas para proveer beneficios adicionales a la amplia comunidad por medio de mejoras a la salud pública, el medio ambiente, equitativas, y económicas.

Los principales peligros climáticos que serán evaluados como parte del TNVA son el **aumento de temperatura y calentamiento extremo, inundaciones debido a eventos de precipitación extremos, y riesgo de incendios forestales**. En general, los cambios que se proyectan son:

- **Las temperaturas altas y bajas se esperan que aumenten** por todo el Condado de Fresno, y habrá más olas de calor y días de calentamiento extremo.
- Las proyecciones de precipitación son inseguras y **la precipitación será aún más inestable**. Pero en general se espera que ambos eventos de sequías y tormentas sean más frecuentes y severos.
- **El incendio forestal esta incrementando** al secarse la tierra y la vegetación por el aumento de la temperatura.

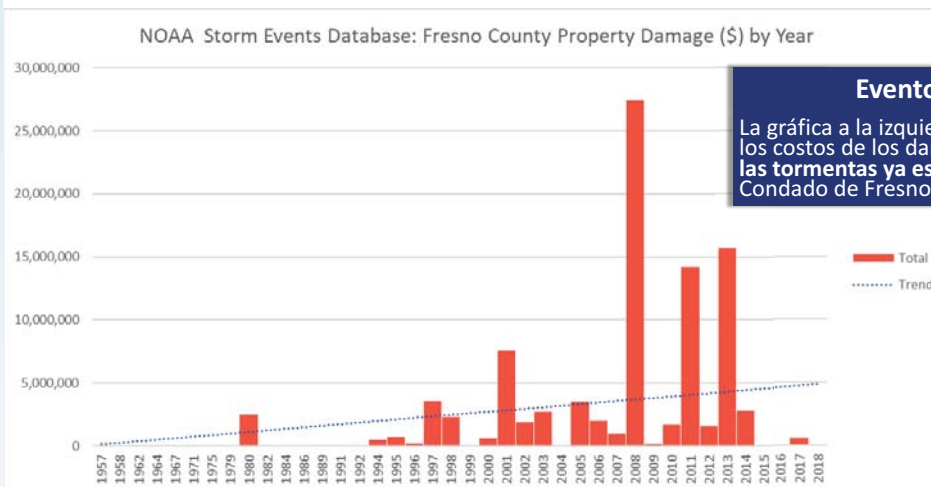
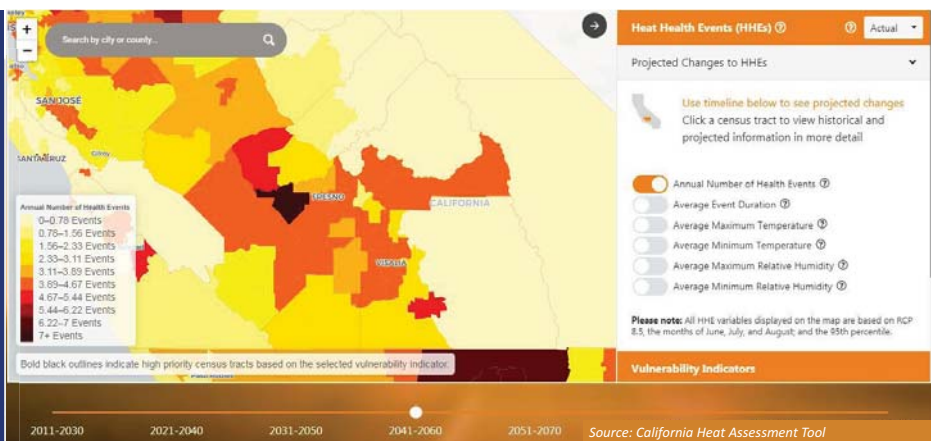


Clovis, CA, photo by David Prosser, Creative Commons License 2.0

Eventos de Salud por Calentamiento
Los eventos de salud por calentamiento se espera que aumenten en el próximo siglo.

Un evento de salud por calentamiento es cualquier evento que resulta en un **impacto de salud pública negativa**, como la visita a la sala de emergencias.

Vea el mapa a la derecha para ver el **aumentos proyectados en los eventos de salud anuales a causa del calentamiento** de aquí a medio siglo.



Eventos de Tormentas
La gráfica a la izquierda nos enseña como es que los costos de los daños de propiedades debido a las tormentas ya están aumentando en el Condado de Fresno.



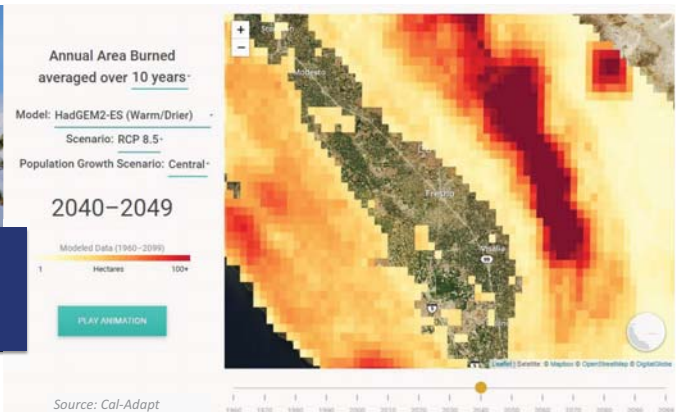
Washout on SR-41, photo courtesy of Caltrans



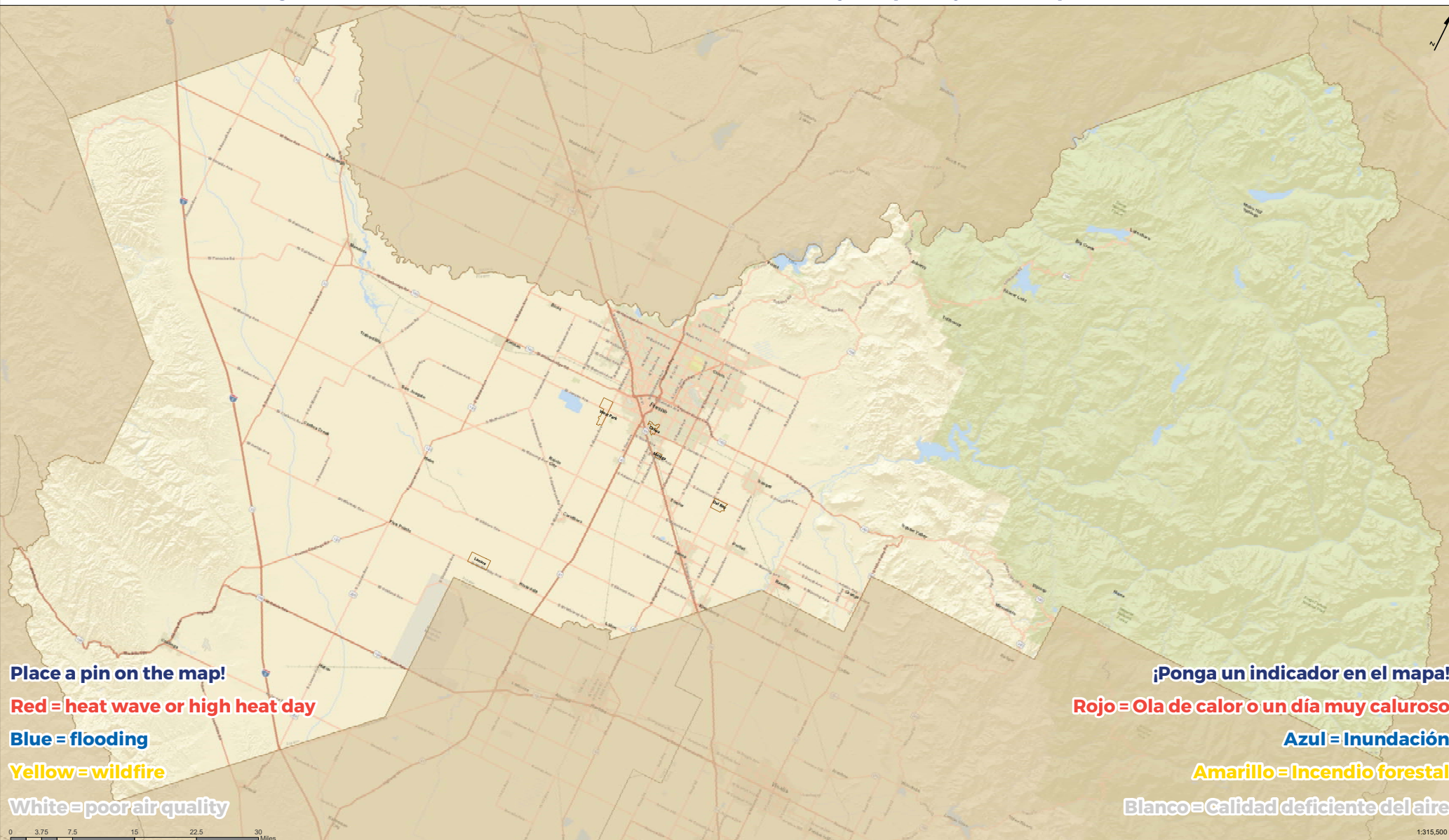
Área Quemada

El Promedio anual de área quemada se espera que **aumente por un 205 %** en el Condado de Fresno para fines del siglo.

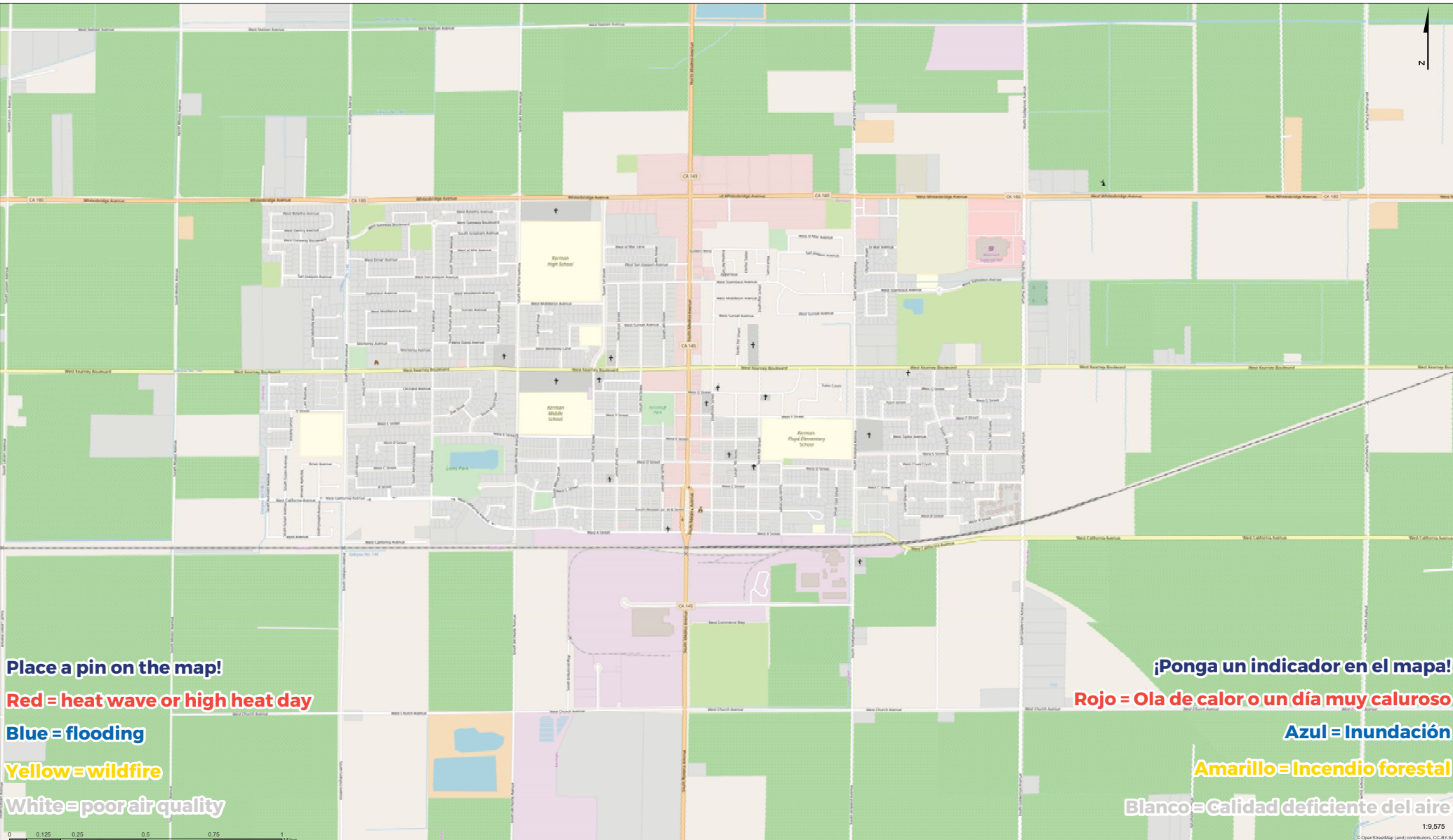
Rim Fire as seen from SR-41, photo by Andrew Adams, Creative Commons License 2.0



Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?

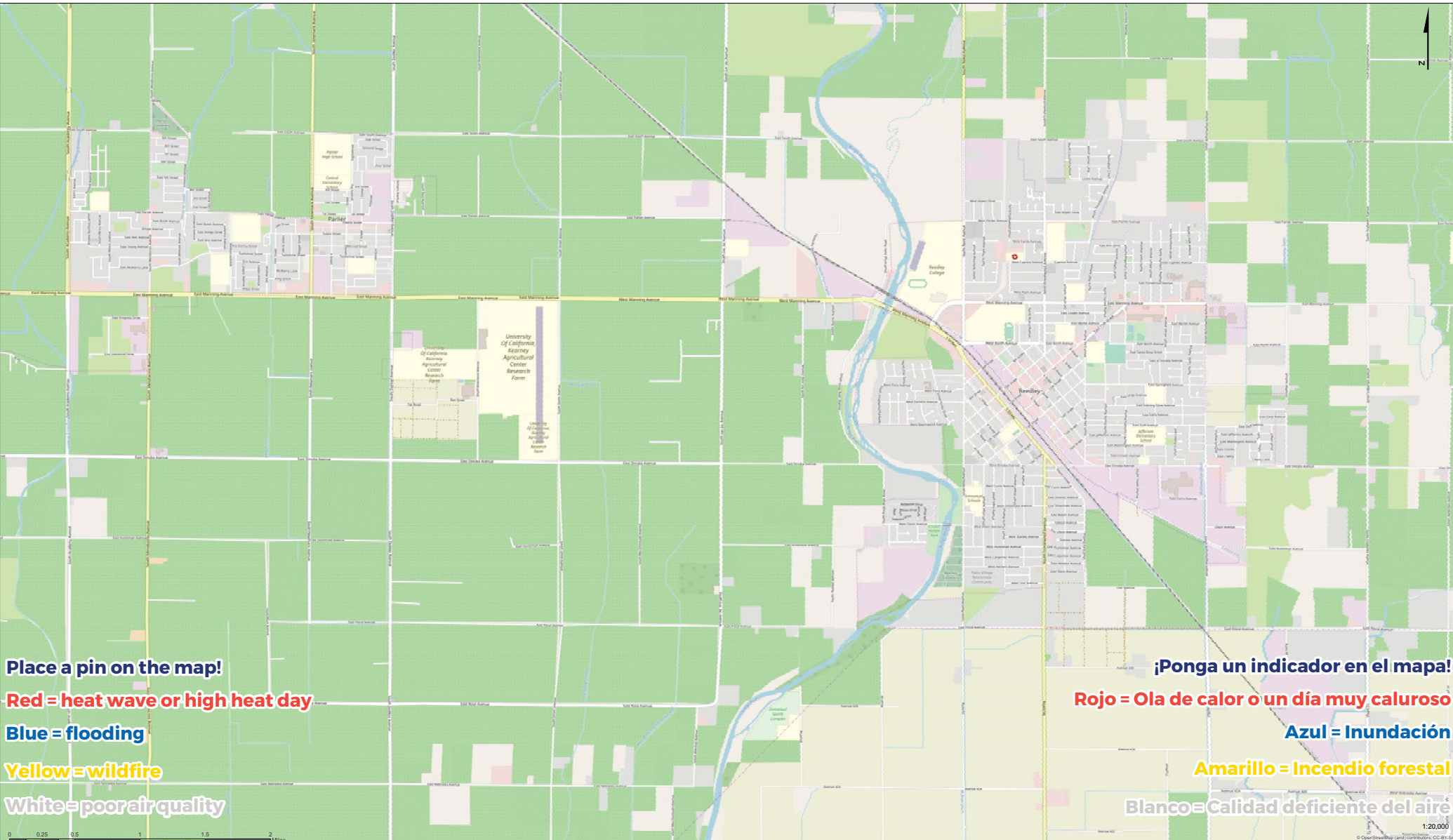


Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?



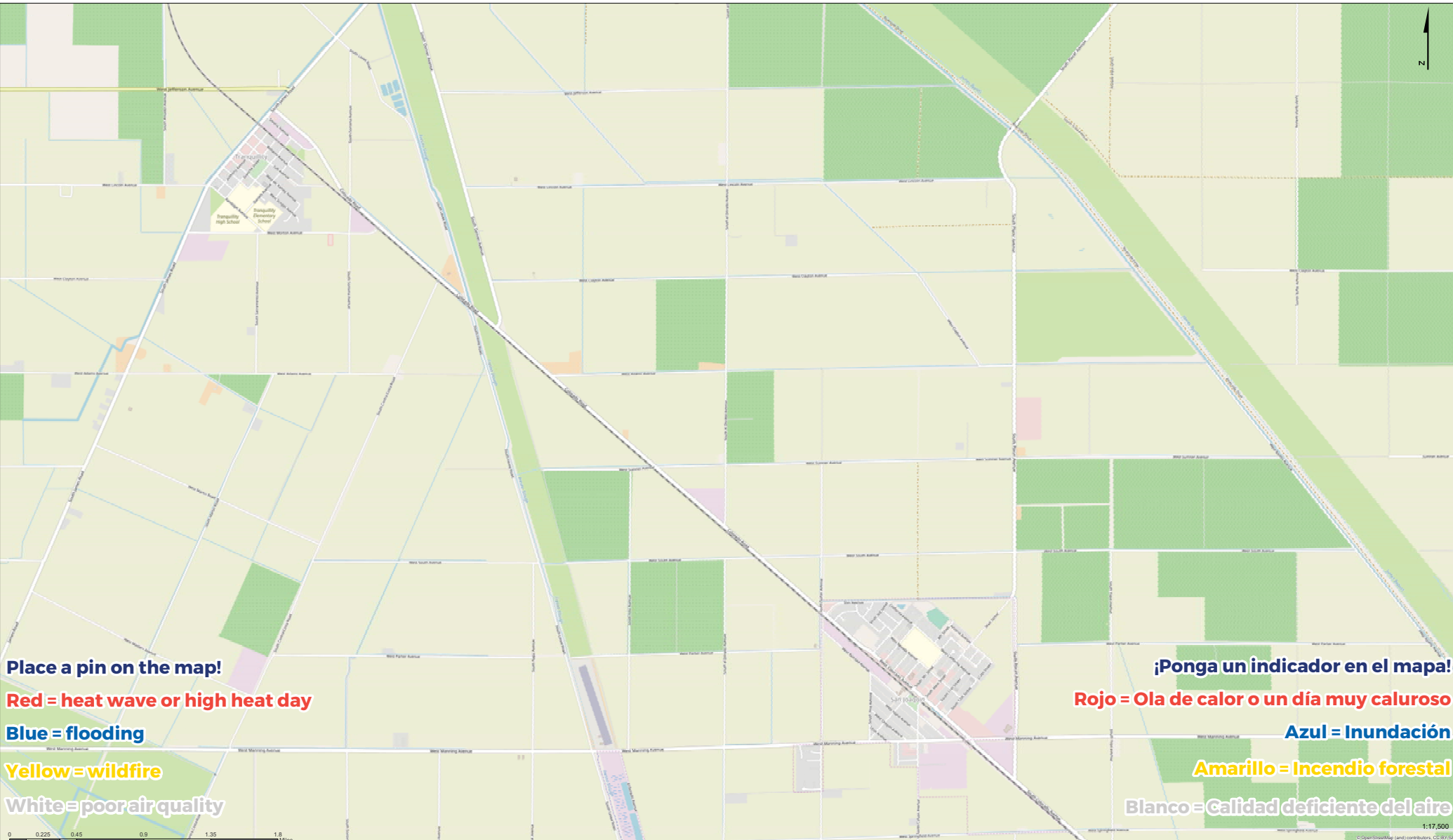
Fresno County Regional Transportation Network Vulnerability Assessment
Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?



Fresno County Regional Transportation Network Vulnerability Assessment
Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?



Pop-up Event Survey Results

Pop-up event surveys were available for dissemination at short, but meaningful interactions with the public that allowed their feedback to be incorporated into the Transportation Network Vulnerability Assessment (TNVA) while ultimately reaching a significantly higher number of residents than a traditional public workshop. Pop-up events allowed the TNVA Project Team to engage with the public at events of interest to them. The TNVA Team worked with Fresno COG staff and the Vulnerability Assessment Working Group (VAWG) to provide materials for dissemination at high-volume events in Fresno County. Such locations included:

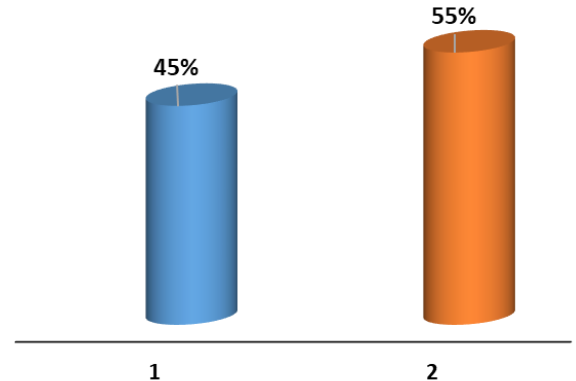
- ✓ Kerman Almond Festival
- ✓ Reedley Street Faire
- ✓ San Joaquin Carnival
- ✓ Fresno Grizzlies July 4th baseball game

The TNVA Team prepared the surveys to reflect the questions desired for the development of the TNVA, while also presented in a format and language easily understood by the general public. The survey consisted of a series of multiple choice, priority ranking and open ended questions, which was available to survey participants in both English and Spanish. Participants were able to provide input on the survey questions by selecting their preferred answer and submitting their completed survey to TNVA Team staff that was present at the pop-up event. Answers from all surveys have been totaled and are graphically displayed below. Numbers in parentheses following each survey question correspond to the total number of responses received for each question. In some cases, survey respondents may have selected more than one answer per question. A total of one hundred seventy-eight (178) surveys were completed by all pop-up event attendees.

1. Have weather events or conditions ever affected your travel or required you to evacuate?

1. Yes
2. No

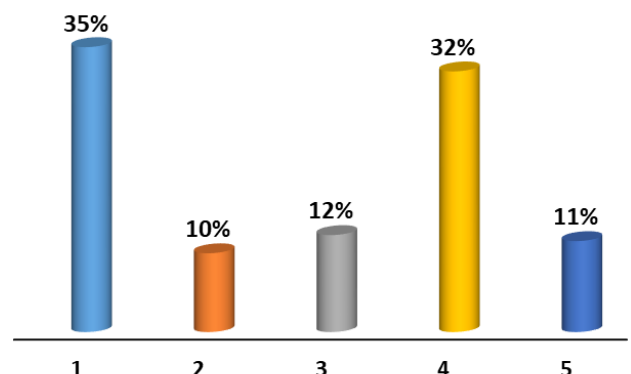
(175 Responses)



2. If yes to the above, "What type of event or condition?"

1. Heat wave or extreme heat day
2. Flooding
3. Wildfire
4. Poor Air Quality
5. Other

(134 Responses)

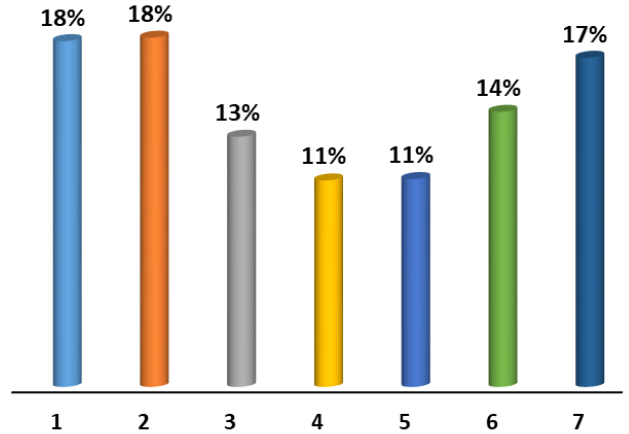


If yes to above, "Tell us about the event(s). How did it affect your travel?" (Please describe below)

- ✓ When it's too hot we avoid running errands usually wait until the night. I have two children with asthma, so the air quality is something really keep an eye on.
- ✓ Know individual affected by wildfire. Lost everything.
- ✓ Bad roads too many potholes, dangerous driving conditions.
- ✓ Not able to take outside due to bad air quality. Extreme heat days- need cooling centers.
- ✓ It's too hot outside, my children have health conditions that prevent them from traveling to far.
- ✓ Flooding affects my commute to work, when the freeway is bad causes traffic jams and detours.
- ✓ The road – Manning Ave. in Reedley has a lot of cracks and potholes. Flooding when it rains.
- ✓ Morning, the fog is too dense and the street signs are not visible; dust waves also block the view.
- ✓ A lot of smoke up SR-41, hard to see.
- ✓ Walks around community , difficult to breathe.
- ✓ Extreme heat affects travel times and destinations.
- ✓ Due to having prior existing health conditions, I am extremely susceptible to major heat/weather changes.
- ✓ It is really hot sometimes and there aren't many places with shade. Places in Reedley need serious remodeling, especially Citizens Park.
- ✓ The bus stop is way to exposed and the heat made me feel sick.
- ✓ Flooding on Manning Ave. Need drainage system.
- ✓ It is too hot at Reedley High School. I believe there should be more trees planted.
- ✓ Poor air quality has required me to stay indoors.
- ✓ The area was blocked off which affected going and coming to work every day.
- ✓ My children were born premature so days with poor air quality we limit our travels.
- ✓ It affected because of the heat wave, the wildfires, the bad air quality.
- ✓ The weather is too hot.
- ✓ The heat has stopped me from walking with my dog to parks. Even at work I don't walk to lunch because of how it is. My allergies have also expanded all while the quality of air has been extremely harmful.
- ✓ I kept stopping every time I walked. It is really hot.
- ✓ Too hot, not enough shade.
- ✓ When driving down Dinuba Ave and Manning Ave, roads get really flooded. Needs a sewage system to drain water and also City needs to plant more trees for shade to combat high heat.
- ✓ Weather too hot to walk, no shade.
- ✓ Less likely to want to travel, or spend time outdoors.
- ✓ The heat made me feel ill.
- ✓ Flooded streets, have transportation buses and shaded bus stop areas.
- ✓ Due to the poor air quality, my twins asthma kicked in, they ended up in the ER to get a breathing treatment.
- ✓ Wildfire- evacuated/couldn't get to work
- ✓ Do not like going out when air quality is bad
- ✓ Street maintenance needed.
- ✓ Family forced to evacuate.
- ✓ Unable to work extended hours/normal shift
- ✓ Heavy traffic, blocked roads, car wreck.

3. What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least concerning)

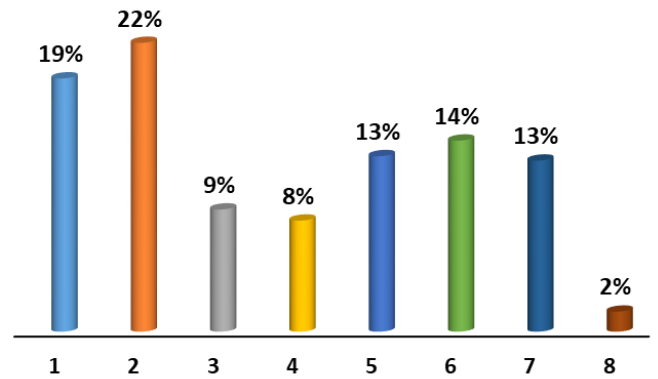
1. Longer and more severe droughts
2. Heat waves and higher temperatures
3. Heavy rains and flooding
4. Landslides and erosions
5. Subsidence (land sinking from groundwater use)
6. Wildfires
7. Lower air quality



(800 Responses)

4. Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)

1. Create more comfortable and shaded transit stops
2. Tree plantings along roadways and sidewalks
3. Improved flood control
4. Better evacuation planning and communications
5. Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) particularly for elderly or disabled people
6. Public transit service to cooling centers on high heat days
7. Better management of flammable vegetation near roadways and structures
8. Others



(600 Responses)

5. What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation? (Please describe)

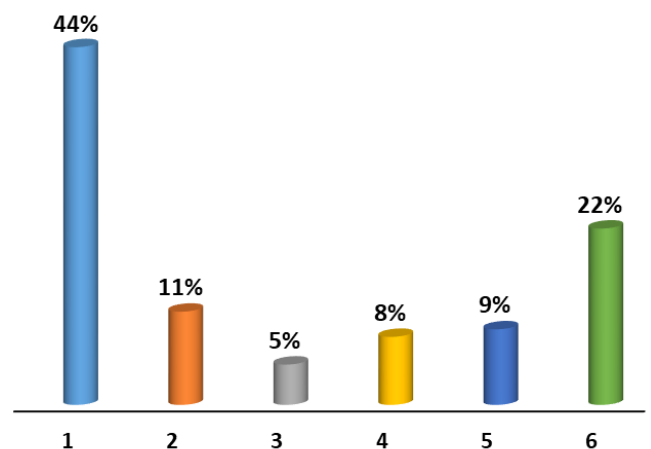
- ✓ Shorter stops per trip.
- ✓ Do research to see how the residents can be helped.
- ✓ More shade, plant more trees.
- ✓ More buses or options provided by the City.
- ✓ Road conditions.
- ✓ More shade at rest stops.
- ✓ More information.
- ✓ More public transportation, van pools.
- ✓ Providing more transportation for families that need it.
- ✓ Bring more buses for transportation.
- ✓ Expand coverage of public transit.
- ✓ Better roads.
- ✓ Cleaner air.
- ✓ Accessible transportation accommodating passenger need access to common needs. Lessens wait time to board or if bus over filled. Common courtesy - how long will next bus coming or shuttle route.
- ✓ Hydrogen cell/electric car.
- ✓ Fix roads instead of constantly patching them.
- ✓ Roads have too many potholes. Dangerous driving conditions.
- ✓ High-Speed rail needs to be continued; avoids pollution. Change school buses to electric.
- ✓ When building/developing new areas "connecting the sidewalks." Leaving dirt spaces between developments makes for children to walk on the road.
- ✓ Transit that moves from city to city.
- ✓ We need to increase lanes of freeway and fix our terrible roads. Fossil fuel is in good supply.
- ✓ A better organized call center for public transportation.
- ✓ Better organization with heat centers in small towns like ours.
- ✓ Having more cooling centers.
- ✓ Cooling centers. Shade.
- ✓ More shade. Provide more transportation so we don't wait so long.
- ✓ More taxis.
- ✓ Better drainage system to clear out water.
- ✓ Increased shaded areas and opportunities for hydration out in the community.
- ✓ More clean air transportation, also more wildfire control since it affects the pollution in the valley.
- ✓ Better road conditions, they are worn down including the lines on them. Can't see the potholes or line in rain.
- ✓ Have free transportation available in serve weather for elderly and those with children.
- ✓ Fresno can improve on offering public transit options.
- ✓ Improved flood control.
- ✓ More cooling shelters.
- ✓ Send people out to bus stops to see what it is like.
- ✓ Sandbags for rain.
- ✓ Somehow, someday, mitigate the impact of asphalt and concrete on the Valley's heat levels.
- ✓ Cut back on idling and fast food drive thru.
- ✓ By putting structures for shade at bus stops.
- ✓ More public transportation to reduce the use of personal vehicles that create pollution.
- ✓ More bus transportation, different times during the day.
- ✓ Implement transportation between central valley towns.
- ✓ Clean up roadsides.

- ✓ Increased shading, popular idea is to install solar panel overhangs in large parking lots to both increase shade for cars and decrease power usage/billing .
- ✓ Making sure that we have lots of shade and cooling areas would be helpful. Provide transportation to those areas. Have more awareness pieces to the population especially for programs that are available to them.
- ✓ Add sewage system/drainage on Dinuba Ave and Manning Ave to not cause flooding. Plant more trees along sidewalk.
- ✓ Sometimes there are flooded areas that make us have to reroute, better street drainage.
- ✓ Make markers on the road more visible. Stop signs need to have LED lights during heavy rain/fog.
- ✓ More water storage. They waste reservoir water to keep the water from overflowing.
- ✓ Increase public transportation.
- ✓ More cooling centers.
- ✓ Shelters/cooling centers. Shade at stops. Water parks.
- ✓ More access to transportation at quicker intervals.
- ✓ Have a cooling system at the community center or build a pool near the community center for all in the community. Fix potholes in the streets.
- ✓ Electric vehicles. Run off – floodwater capture.
- ✓ More indoor facilities to bike or walk.
- ✓ Shorter intervals during extreme heat days.
- ✓ Free transportation during severe heat waves.
- ✓ More shades at bus stops, or any public transportations.
- ✓ Reduce fuel emission.
- ✓ Sustainable option. Bike/walk-ability.
- ✓ More buses, shorter intervals.
- ✓ Invest in repairs on streets.
- ✓ Shorter wait times at bus stops.
- ✓ Grants to fix air conditioning.
- ✓ Stronger air pollution control.
- ✓ More shades and transportation solutions.
- ✓ More awareness- more programs that serve the entire population.
- ✓ Plant trees.
- ✓ More frequent shade in places for public transportation.

6. What are your primary modes of transportation?
(Check all that apply if you use multiple modes to reach your destination?)

1. Drive alone or with family
2. Carpooling
3. Taking a Taxi or rideshare (Uber/Lyft)
4. Public transit (bus, train)
5. Biking
6. Walking

(322 Responses)



If **biking**, “How long do you bike to get to your destination or next mode of transportation (like a transit stop)?”

- | | |
|------------------------------------|---|
| ✓ 2-3 hours/day | ✓ 1 hour for recreation |
| ✓ 10 minutes | ✓ I bike just to exercises and go to the park |
| ✓ 1 mile | ✓ 1 hour |
| ✓ 1 mile | ✓ 3 miles |
| ✓ ½ hour | ✓ 5 miles |
| ✓ 30 minutes | ✓ 3-4 miles |
| ✓ When weather is nice, 30 minutes | |
| ✓ Less than 5 miles | |

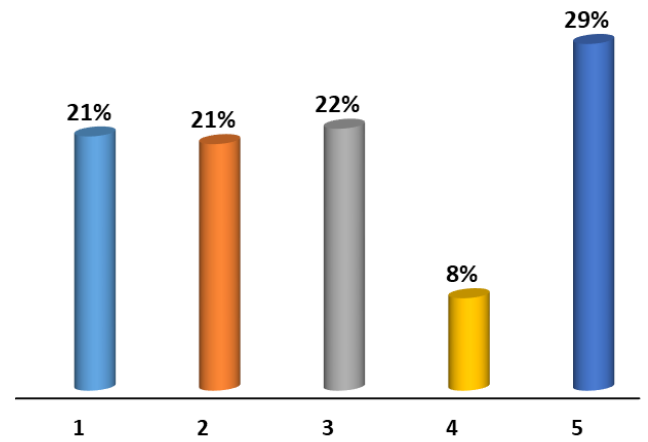
If **walking**, “How long do you walk to get to your destination or next mode of transportation (like a transit stop)?”

- | | |
|---|----------------------------------|
| ✓ Usually up to 1 mile | ✓ Only 15-20 minutes due to heat |
| ✓ ½ mile | ✓ 1 hour for recreation |
| ✓ 1 or 1 ½ mile | ✓ 10 minutes |
| ✓ 30 minutes, not enough shade | ✓ 10 minutes or 15 minutes |
| ✓ 4 hours, every day through town | ✓ 30 minutes |
| ✓ 30-35 minutes | ✓ 30 minutes |
| ✓ 20 minutes | ✓ 4 kilometers |
| ✓ 1 mile a day | ✓ 30 mins |
| ✓ 20-35 minutes | ✓ 30 mins |
| ✓ At least a mile | ✓ 3 miles |
| ✓ 20 minutes in spring and fall. Too hot in summer. Too cold and wet winter’s | ✓ 30-60 mins |
| ✓ 2 miles/day | ✓ ¼ mile |
| ✓ ½ hour | ✓ 1 mile |
| ✓ 25-30 minutes | ✓ ¼ of mile |
| ✓ 1 hour | ✓ 2-3 miles |
| ✓ 25 minutes | ✓ 1-2 miles |
| ✓ When weather is nice, 30 minutes | ✓ 2 miles |
| ✓ If weather permits, 30 minutes | ✓ 1 mile |
| ✓ 30 minutes | ✓ 1 mile |

7. What was your household income before taxes in 2018?

1. Less than \$15,000
2. \$15,000 to \$24,999
3. \$25,000 to \$35,999
4. \$36,000 to \$49,999
5. \$50,000 or more

(156 Responses)



APPENDIX B

Online Survey Materials

Fresno County Regional Transportation Network Vulnerability Assessment (*Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno*)

Community Survey (*Encuesta Comunitaria*)

We need your help shaping the Fresno region's future! (*¡Necesitamos su ayuda para dar forma al futuro de la región de Fresno!*)

The Fresno Council of Governments is identifying where the region's transportation network is vulnerable to potential impacts of climate change. These impacts could include increased temperature, more extreme heat days, flooding, drought, and wildfires. This effort is called the Fresno County Regional Transportation Network Vulnerability Assessment. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region. (*El Consejo de Gobiernos de Fresno está identificando los lugares donde la red de transportación de la región es vulnerable a impactos potenciales a causa del cambio climático. Estos impactos podrían incluir incremento de temperatura, días de calor extremo, hundimiento, sequía, e incendios forestales. Este esfuerzo es conocido como la Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno. La meta de esta evaluación es el encontrar soluciones que beneficiarán a la comunidad entera del Condado de Fresno y mejorar la transportación en la región.)*

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, how you use the transportation system to get around, and what transportation improvements you would like to see locally in response to climate change, to create a resilient regional transportation network. (*Por favor complete esta encuesta anónima para informarnos cuáles son los impactos del cambio climático que más le preocupan, como utiliza el sistema de transporte para navegar, y que tipo de mejoras de transporte le gustaría ver localmente en respuesta al cambio climático, para crear una red sólida de transporte regional.*)

1. What zip code do you live in? (*¿Cuál es el código postal donde vive usted?*)

2. Have weather events or conditions such as high heat, flooding, or wildfire ever affected your travel or required you to evacuate? (*¿Han afectado eventos climáticos o condiciones como temperaturas altas, hundimientos, o incendios forestales su viaje o que haya que tenido que evacuar?*)

☐ Yes (*Si*)

☐ No (*No*)

Fresno County Regional Transportation Network Vulnerability Assessment *(Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno)*

3. If yes, What type of event or condition? *(En caso de responder Si a lo de arriba, ¿Que tipo de evento o condición?)*

- ☐ Heat wave or extreme heat day (Ola de calor o día de calor extremo)
- ☐ Flooding (Inundación)
- ☐ Wildfire (Incendio forestal)
- ☐ Poor air quality day (Día con mala calidad de aire)
- ☐ Other (please specify) (Otros (Por favor describalo abajo)

4. Tell us about the event(s) or conditions noted above in Question 3. How did it affect your travel? *Cuéntenos sobre el/los evento(s) o condiciones mencionada en la pregunta de arriba. ¿Cómo afectó su viaje?)*

5. How could better transportation have helped you? *(¿Cómo le podría haber ayudado un mejor sistema de transporte?)*

Fresno County Regional Transportation Network Vulnerability Assessment (*Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno*)

6. How concerned are you about the impacts of climate change? For example, increases in extreme temperatures, drought, flood risk, and wildfires. (*¿Qué tan preocupado está por los impactos del cambio climático? Por ejemplo, aumentos en temperaturas extremas, sequía, riesgo de inundaciones e incendios forestales.*)

- ☐ Very (*Mucho*)
- ☐ Somewhat (*Un Poco*)
- ☐ Not at All (*Para Nada*)

7. Do you think climate change will impact your life directly? (*¿Crees que el cambio climático afectará tu vida directamente?*)

- ☐ Yes, Please Explain Below (*Si, por favor explique abajo*)
- ☐ No (*No*)
- ☐ Not Sure (*No estoy seguro*)

If Yes, Please Explain (*En caso afirmativo, explíquelo porfavor*)

8. What impacts from climate change are you most concerned about? (Please rank in order of importance where 1 is the most important and 7 is the least.) (*¿Cuáles son los impactos por el cambio del clima que más le preocupan? (Favor de clasificar lo siguiente en orden de importancia, en donde el 1 es de más preocupación y el 7 es el que menos le preocupe)*)

- Longer and more severe droughts (*Sequías más severas y alargadas*)
- Heat waves and higher temperatures (*Olas de calos y temperaturas altas*)
- Heavy rains and flooding (*Fuertes lluvias e inundaciones*)
- Landslides and erosion (*Derrumbes y erosión*)
- Subsidence (land sinking from groundwater use) (*Subsidencia (hundimiento de las tierras debido al uso del agua subterránea)*)
- Wildfires (*Incendios forestales*)
- Lower air quality (*Mala calidad de aire*)

9. Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Choose all that apply) (*¿Cuál de las siguientes mejoras de transporte son de más importancia para combatir el clima extremo y los cambios climáticos? (Marca todas las opciones que aplican)*)

- ☐ Create more comfortable and shaded transit stops (*Crear más paradas de transito cómodas y con sombra*)
- ☐ Tree plantings along roadways and sidewalks (*Plantar árboles en el camino de las carreteras y las banquetas*)
- ☐ Improved flood control (*Mejorar el control de inundaciones*)
- ☐ Better evacuation planning and communication (*Mejores planes de planeación y evacuación*)
- ☐ Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.), during high heat or other extreme weather events, particularly for elderly or disabled people. (*Expandir servicio y disponibilidad de transportación a demanda (tal como el viaje en grupo, paratransito, etc.), durante los días de calor extremo o otro evento de clima extremo, particularmente para mayores de edad o personas discapacitadas.*)
- ☐ Public transit service to cooling centers on high heat days (*Convertir sitios de servicio de transporte público en centros de enfriamiento en días muy calurosos*)
- ☐ Better management of flammable vegetation near roadways and structures (*Mejor manejo de la vegetación inflamables cerca de las carreteras y estructuras*)
- ☐ Other (please specify) (*Otros (especificar)*)

10. What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation? (*¿Que cree usted que la región de Fresno puede hacer para prepararse para los impactos del cambio climático referente al transporte?*)

11. What are your primary modes of transportation? (You can choose more than one if you use multiple modes to reach your destination). (*¿Que son sus modos de transporte primarios? (Puede elegir más de una opción si usted utiliza múltiples modos para llegar a su destino).*)

- ☐ Driving alone or with family (*Manejando solo o con su familia*) ☐ Public transit (bus, train) (*Transporte público (camión, tren)*)
- ☐ Carpooling (*Viaje en grupo*) ☐ Biking (*Bicicleta*)
- ☐ Taking a taxi or ride share (Uber/Lyft) (*Tomando un Taxi o un viaje compartido (Uber/Lyft)*) ☐ Walking (*Caminando*)

If biking or walking, "How long do you bike to get to your destination or next mode of transportation (like a transit stop)?" (Si la respuesta es bicicleta o caminando, "¿Cuánto le toma para llegar a su destino o a su siguiente forma de transporte (como una parada del autobús)?")

12. What is your age? (*¿Cuál es tu edad?*)

- ☐ Under 18 years (*Menores de 18 años*)
- ☐ 18 to 24 years (*18 a 24 años*)
- ☐ 25 to 44 years (*25 a 44 años*)
- ☐ 45 to 64 years (*45 a 64 años*)
- ☐ 65 years and over (*65 años y más*)

13. How many cars does your household have? (*¿Cuántos carros tiene en su hogar?*)

14. What was your household income before taxes in 2018? (*¿Cuál fue el ingreso de su hogar antes de impuestos en el 2018?*)

- ☐ Less than \$14,999 (*Menos de \$14,999*)
- ☐ \$15,000 to \$24,999 (*\$15,000 a \$24,999*)
- ☐ \$25,000 to \$35,999 (*\$25,000 a \$35,999*)
- ☐ \$36,000 to \$49,999 (*\$36,000 a \$49,999*)
- ☐ \$50,000 or more (*\$50,000 o más*)

15. How many people are there in your household? (*¿Cuántas personas hay en su hogar?*)

16. How would you describe yourself? (*¿Cómo te describirías a ti mismo?*)

- | | |
|---|--|
| <input type="radio"/> American Indian or Alaska Native (<i>Indio Americano o Nativo de Alaska</i>) | <input type="radio"/> Middle Eastern or North African (<i>Oriente Medio o Norte de África</i>) |
| <input type="radio"/> Asian (<i>Asiático</i>) | <input type="radio"/> Native Hawaiian or other Pacific Islander (<i>Nativo de Hawái o de otras islas del Pacífico</i>) |
| <input type="radio"/> Black or African American (<i>Negro o Afroamericano</i>) | <input type="radio"/> White or Caucasian (<i>Blanco o Caucásico</i>) |
| <input type="radio"/> Hispanic, Latino, or Spanish origin (<i>Origen Hispano, Latino o Español</i>) | <input type="radio"/> Prefer not to say (<i>Prefiero no decir</i>) |
| <input type="radio"/> Other (please specify) (<i>Otros (especificar)</i>) | |

Online Survey Results

The Transportation Network Vulnerability Assessment (TNVA) Team augmented the pop-up event in-person survey with an online community survey. The survey consisted of a series of multiple choice, priority ranking and open ended questions, which was available to survey participants in both English and Spanish. The survey was accessible through the Fresno Council of Governments (Fresno COG) Senate Bill (SB) 1 Planning Studies webpage and was available from May through July 2019. A notification concerning the online survey's availability to the public was distributed as follows:

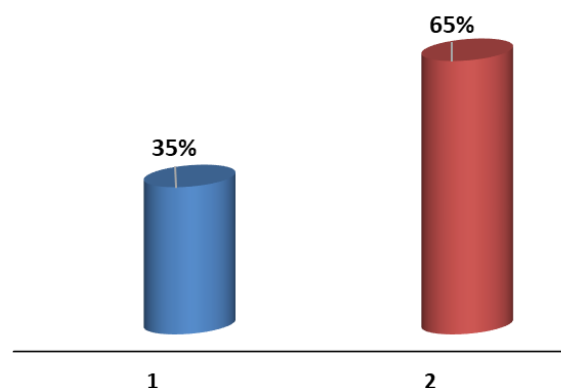
- ✓ By email to the TNVA Stakeholder Database.
- ✓ By email to an expanded Fresno County database.
- ✓ To the Fresno COG newsletter database.
- ✓ Postings to Fresno COG's Facebook and Twitter accounts.
- ✓ Via the California Safe Routes Partnership E-Newsletter.

The Project Team prepared the surveys to reflect the questions desired for the development of the TNVA, while ensuring that the surveys were in a format and language easily understood by the general public. Participants were able to provide input on the survey questions by selecting their preferred answer and submitting their completed surveys online. Answers from all surveys have been totaled and are graphically displayed below. Numbers in parentheses following each survey question correspond to the total number of responses received for each question. In some cases, survey respondents may have selected more than one answer per question. A total of sixty-three online surveys were completed by participants.

1. Have weather events or conditions such as high heat, flooding, or wildfire ever affected your travel or required you to evacuate?

1. Yes
2. No

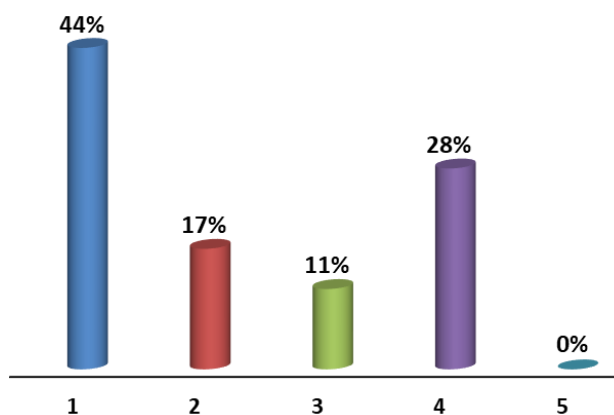
(60 Responses)



2. If yes to the above, "What type of event or condition?"

1. Heat wave or extreme heat day
2. Flooding
3. Wildfire
4. Poor Air Quality
5. Other

(18 Responses)



3. Tells us about the event(s) or conditions noted above in Question 2. How did it affect your travel?"

- ✓ Heat and poor air quality routinely prevents me from riding my bike to work or walking to lunch or dinner.
- ✓ During high heat days I try to avoid travel. This was especially true when I didn't have air conditioning or the air conditioning in my car was not working well. Poor air quality also prohibits travel. I have a young child and try to keep him inside when the air quality is bad for sensitive audiences. I enjoy walking to the store about a mile from my house with him, but when it's too hot or the air is bad I have to use my car instead.
- ✓ Power was reduced to minimum use in the area. A/C and fans weren't available to use to cool off. Older folks suffered from heat stroke.
- ✓ Stayed home because did not feel going outside was good for the kids because of how hot it was.
- ✓ Rough fire evacuation.
- ✓ Can't go outside when it's too hot.
- ✓ I don't want to be outside or go outside when it is hot.
- ✓ Had to seek a different mode of travel.
- ✓ The A/C failed at home. I have a medical condition and had to go to a hotel.
- ✓ Major flooding On Cedar between Tulare Ave and Kings Canyon in the City of Fresno. Flooding at the corner of Chestnut and Olive, cars couldn't get past the flooding.
- ✓ Heavy rain and backed up storm drains caused flooding which in turn kept us from plans to travel. Read reports of other vehicles that stalled due to flooding.
- ✓ Air was so bad my wife had an asthma attack.
- ✓ Decided not to travel.
- ✓ There is times when our health conditions worsen and this occurs during bad air quality days.
- ✓ There was a downpour in Clovis earlier this year that was so heavy that I could not park my car in front of my home. The street was flooded up over the curb. I have lived there for 30 years, and I had never seen so much water on the street.
- ✓ Myself and my children could not breathe. FAX is our only transportation.

4. How could better transportation have helped you?

- ✓ Strategically landscaped trails and bike lanes providing shade to locally decrease temperature and heat absorption by pavement, while also locally increasing photosynthesis.
- ✓ A better tree canopy would help manage walking when the weather is warm. A transportation network that is designed to support improved air quality would also help. If we have better air quality, more people will be inclined to walk, bike or take transit to their destinations.
- ✓ Fresno needs to be a transit district! Cities with less than half of our population have up to 5 times as many buses!
- ✓ Having public transportation closer to my house.
- ✓ An efficient public transportation system could have taken older folks to cooling stations in areas that were not impacted by heat wave.
- ✓ While direct transportation is always desirable above transferring on a bus, I don't think it could have.
- ✓ Better infrastructure for older parts of the City of Fresno.
- ✓ Public transportation should be more frequent (NOT EVERY 1-2 HOURS!) and we should have more accessible routes for low-income communities.

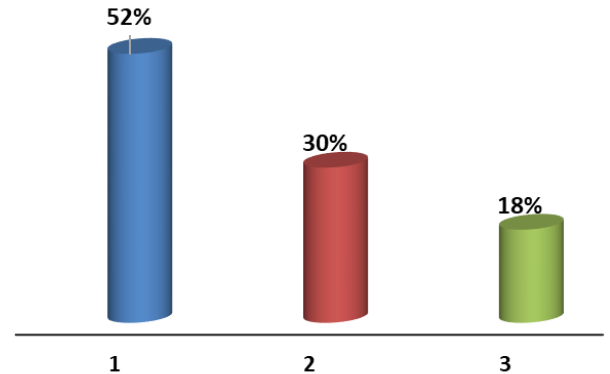
- ✓ Better design of roadways and drainage could have kept the roads safe for travel.
- ✓ Convert all buses, city and county vehicles to electric.

- ✓ Having a choice of affordable transportation with air conditioning.

5. How concerned are you about the impacts of climate change? For example, increase in extreme temperatures, drought, flood risk, and wildfires?

1. Very
2. Somewhat
3. Not at all

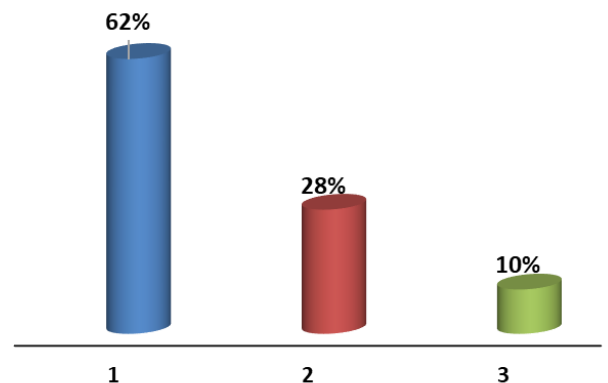
(50 Responses)



6. Do you think climate change will impact your life directly?

1. Yes (Please explain below)
2. No
3. Not sure

(50 Responses)



If yes to the above, please explain.

- ✓ I've already been impacted by higher food costs due to drought, increased urban flooding due to more intense storms which can impact travel routes (good city planning here has limited flood damage), higher utility costs (especially water).
- ✓ Less water availability because storage isn't available at higher elevations where more rain and less snow is falling.
- ✓ I fear that the city will become a desert and unlivable.
- ✓ If climate change results in warming climates and extreme weather, it will impact my quality of life by limiting my

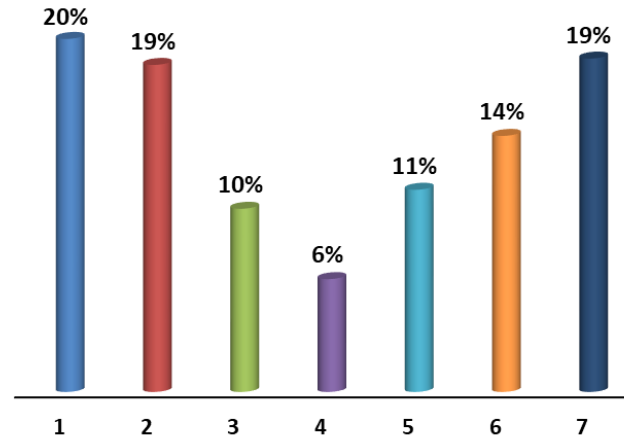
travel options. When it's too hot, we have to stay inside. When it's raining, trees start to fall and roadways flood. Most people think climate change is a distant/future issue, but I think we are starting to see weather patterns change. Our city wasn't designed to accommodate heavy rains, it was built for a mild climate.

- ✓ More hot days in Fresno.
- ✓ Fresno is a dry area that is susceptible to wildfire and the smoke effects my breathing and asthma problem.

- ✓ The higher temperatures affect daily routines and they restrict your resources for cooling down.
- ✓ Economic impact, weather, drought, etc.
- ✓ Disruption is happening all over our world; it would be presumptuous to think it won't impact me or my family in some ways.
- ✓ Extremes in weather events.
- ✓ Climate is one of the greatest attributing factor to our everyday livelihood. The weather is our go-to for the daily routine activities.
- ✓ Poorer air quality which may lead to respiratory diseases.
- ✓ Less efficient travel. Available working hours and days may be limited by extreme weather.
- ✓ It leads ultimately to an ice age. Not that the heat is desirable, or the fresh water shifting.
- ✓ Increased costs, lower quality of life.
- ✓ Drought.
- ✓ I use multiple forms of transportation. flooding impacts my area, can't use my car. Extreme heat impacts when I walk or bike (air pollution, heat). Heat and rain impacts at bus stops with no shelter (heat strokes).
- ✓ Rising temperatures will lead to much higher energy bills.
- ✓ I think everything will get more expensive and my electric bill will go up a lot.
- ✓ It is an existential threat to all living systems and humanity in particular. The viability of human existence is under direct threat.
- ✓ It will affect agriculture, water supply, days spent outdoors in the heat, increased air pollution due to increased temperatures, etc. All this will affect me - but in ways I cannot now predict.
- ✓ We have a higher probability of health issues.
- ✓ Increased ozone in the air from high temperatures. Summers are hotter the past 5 years. Drought has affected loss of trees, both indigenous trees and trees homeowners have allowed to die. The saying, "Don't frown on brown", was very destructive as many people allowed their yards to blight. Instead, they should have kept trees and shrubs alive. Trees and shrubs help clean our air. People must be encouraged to plant and nurture trees in their yards. Fresno let many trees die. Instead, Fresno must plant trees to clean our air.
- ✓ I actually have been impacted by wildfire, bad air quality days, and now extreme storms. Or house had never had hail and this past season or garden for hail 3 times, making it difficult for us to plan to grow our own food. Our family's asthma has gotten worse over the years and so has our health, we used to be able to go walk summer or winter nights, but now the air quality is bad most days we can't take the risk.
- ✓ My family has asthma. Longer and hotter summer season; more ozone and other pollution. impact family with asthma and heart conditions. Won't want to spend time outdoors and minimal activity. Increased PG&E bill.

7. What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most important and 7 is the least)

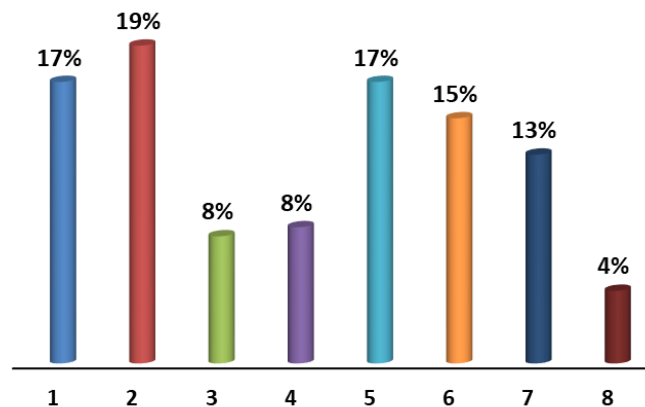
1. Longer and more severe droughts
2. Heat waves and higher temperatures
3. Heavy rains and flooding
4. Landslides and erosions
5. Subsidence (land sinking from groundwater use)
6. Wildfires
7. Lower air quality



(313 Responses)

8. Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)

1. Create more comfortable and shaded transit stops
2. Tree plantings along roadways and sidewalks
3. Improved flood control
4. Better evacuation planning and communications
5. Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) during high heat or other extreme weather events, particularly for elderly or disabled people
6. Public transit service to cooling centers on high heat days
7. Better management of flammable vegetation near roadways and structures
8. Others (Please specify)



(184 Responses)

If others, please specify.

- ✓ Alleviating traffic by creating more inner city highways (timed lights) and educate the public on how and when to use them. Herndon has become a bit of a joke now. What's the point of accelerating to 50 mph just to hit every light? Definitely not countering climate change by burning more fuel.
- ✓ Our freeways (especially SR-41) have waist high dry weeds for most of the summer. I am concerned about the fire risk this presents. I am also concerned about vulnerable residents dying from heat stroke or severe asthma. If there is something we can do to extend quality and length of life, we absolutely should invest in climate change mitigation efforts.
- ✓ Rideshare and carshare programs.
- ✓ Create a transit district! It is ridiculously embarrassing to have Visalia transit running routes in the national parks when it should be FAX!
- ✓ Provide a faster, more efficient transportation system to get between major urban centers and rural outliers.
- ✓ Regulation of heavy transit pollution or more mitigation efforts for the people that live near the freeways because we will all benefit.
- ✓ Electric vehicles for school buses, city buses, short distance delivery/service trucks, more frequent bus schedules.
- ✓ More efficient public transit; technology to tell you when transit will arrive.

9. What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation? (Please describe)

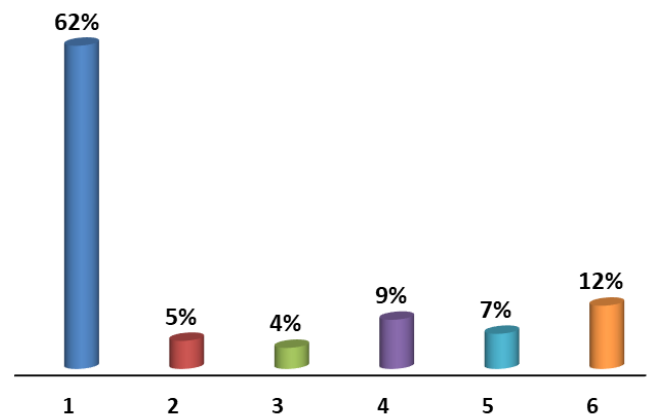
- ✓ Increase service.
- ✓ I believe SGMA (sustainable groundwater management act) nailed this one on the head, however, I think you're asking the wrong question here unless you believe we've passed the point of no return. The greatest effort should be put into prevention and that itself will relieve some of the stress of mitigation. We're not bordered by an ocean that's actively eating our shorelines, so I think we need to be thinking about how we can decrease consumption and lower emissions.
- ✓ Improve the highway system to ensure that there are fewer stop signs and lights where vehicles idle for long periods.
- ✓ Carpool lanes along 99 and 41, more electric charging stations, carshare programs in the urban core.
- ✓ increase water storage for irrigation.
- ✓ More energy efficient transportation.
- ✓ Invest more money in planting trees, maintaining trees and improving irrigation systems. Invest in shade structures at bus stops and benches. There are grants for more trees, but no funding for tree care or major irrigation upgrades. Without the operations and maintenance funding, it is hard to expand the canopy. Fresno could also continue to market bus routes to grow ridership.
- ✓ Plant more and more trees.
- ✓ Consider it in all planning exercises and use real incentives to encourage change.
- ✓ More frequent headways and comfortable stops.
- ✓ Invest in clean vehicle technology and infrastructure.
- ✓ Promote electric and flex fuel "Green" vehicle.
- ✓ Zero Emission Vehicles.

- ✓ Create an app that shows bus locations in real time.
- ✓ Introduce additional green technology. Provide an intercity, high capacity transit system that is 100% zero emissions. Provide faster and more reliable intercity transit so that multi-car ownership is not mandatory.
- ✓ Better weed control and enhanced public transit service.
- ✓ Prevention strategies.
- ✓ Increase number and hours of cooling centers.
- ✓ Invest in an all-electric future. Put community first! Make sure people can get to work no matter what time they need to be there.
- ✓ Implement and apply for money for technology that is zero or low emissions in all of our major economic sectors.
- ✓ Offer more options in travel. More bicycle lanes.
- ✓ Have eco-friendly buses that run every 15-20 minutes and provide more options for different routes across town.
- ✓ Electric vehicles. Strict regulations on large 18-wheel trucks. Air monitors placed at industrial and warehouse sites to record affected air quality from large trucks. Have a warning system for Fresno residents to know when the air quality is dangerous. Sirens going off, TV and other social media alerts.
- ✓ Get expert advice. Conduct regional planning. Do not rely on the County or city governments to come up with reasonable county-wide climate adaptation plans.
- ✓ Contain the growth of cities and promote smart growth and infill development.
- ✓ Make it more attractive for communities to get out of their cars and commute or ride public transit.
- ✓ Build better roads and maintain them.

10. What are your primary modes of transportation?
(You can choose more than one if you use multiple modes to reach your destination?)

1. Drive alone or with family
2. Carpooling
3. Taking a Taxi or rideshare (Uber/Lyft)
4. Public transit (bus, train)
5. Biking
6. Walking

(74 Responses)



If biking or walking, "How long do you bike/walk to get to your destination or next mode of transportation (like a transit stop)?"

- ✓ When I bike to work its 12 miles...part trail, part bike lane, part dangerous road lacking bike lanes. When I walk to my destination I typically don't walk more than 1 mile each direction.
- ✓ Typically, about 1/2 to 3/4 mile. If the weather is nice, I can easily walk up to 1.5 miles one way to reach my destination.
- ✓ 10-20 min
- ✓ 15-30 minutes

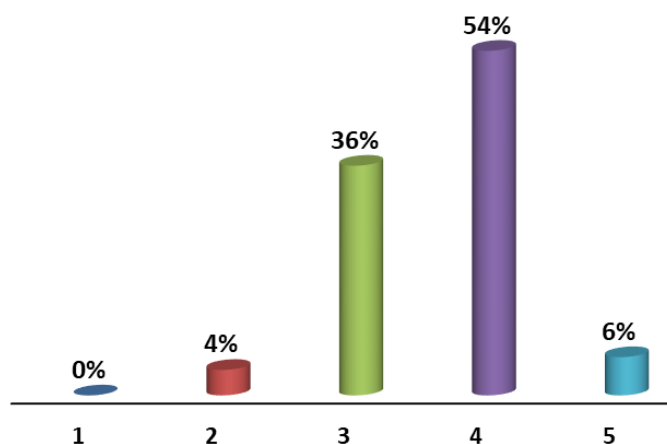
- ✓ 10 minutes
- ✓ 5 min, but the wait in the heat is about 15min
- ✓ Fifteen minutes
- ✓ 6 to 10 blocks

- ✓ We have an electric car we use for in-town transportation. I ride my bike on the rare days the air is good. I have asthma since moving here in 2003.

11. What is your age?

1. Under 18 years
2. 18 to 24 years
3. 25 to 44 years
4. 45 to 64 years
5. 65 years and over

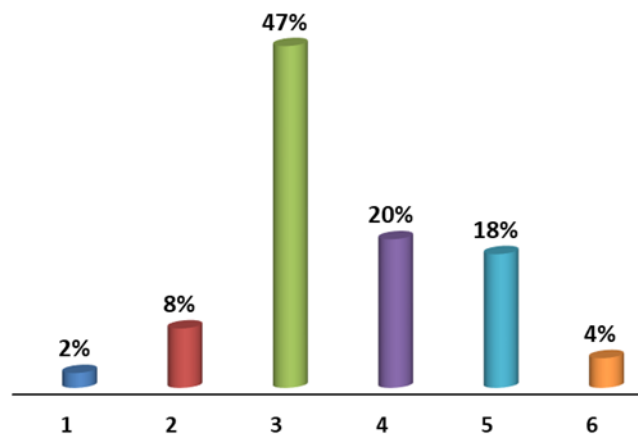
(50 Responses)



12. How many cars does your household have?

1. Zero cars
2. 1 car
3. 2 cars
4. 3 cars
5. 4 cars
6. 5 cars

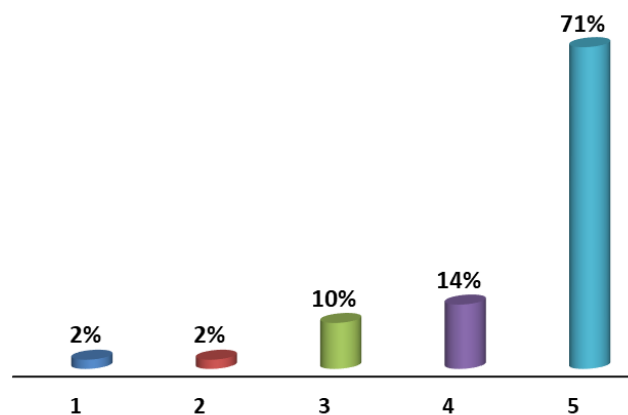
(50 Responses)



13. How many cars does your household have?

1. Less than \$15,000
2. \$15,000 to \$24,999
3. \$25,000 to \$35,999
4. \$36,000 to \$49,999
5. \$50,000 or more

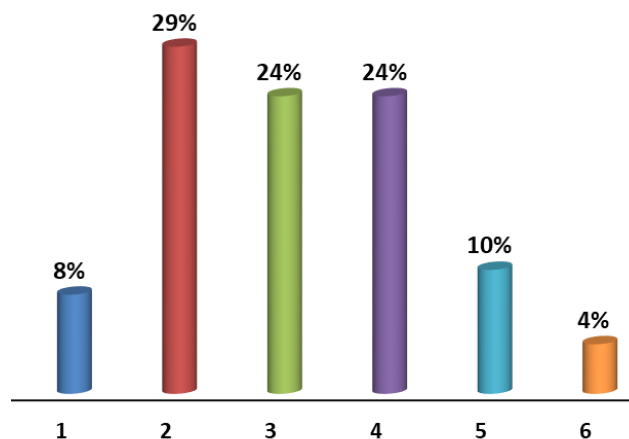
(49 Responses)



14. How many people are there in your household?

1. 1 person
2. 2 people
3. 3 people
4. 4 people
5. 5 people
6. 6 people

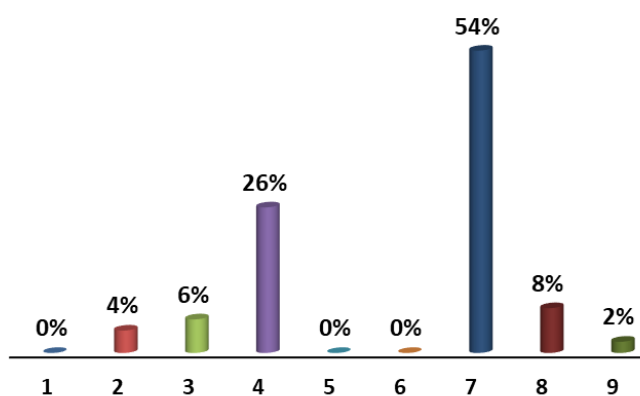
(49 Responses)



15. How would you describe yourself?

1. American Indian or Alaska Native
2. Asian
3. Black or African American
4. Hispanic, Latino, or Spanish origin
5. Middle Eastern or North African
6. Native Hawaiian or other Pacific Islander
7. White or Caucasian
8. Prefer not to say
9. Other (Please specify)

(50 Responses)



APPENDIX C

Stakeholder Interview Questionnaire

FRESNO COG FRESNO COUNTY REGIONAL TRANSPORTATION VULNERABILITY ASSESSMENT: STAKEHOLDER INTERVIEW QUESTIONS

EAST CITIES, WEST CITIES, AND METRO QUESTIONS

1. Describe your role and responsibilities
2. What climate and weather-related impacts currently affect the transportation network or have affected it in the past?
 - a. Do you have data on impacts (such injuries, fatalities, outage lengths, costs, geolocations)?
3. What future climate and weather-related impacts are of most concern in your community?
4. What decisions/actions [in design, maintenance, operations] do you need to make that depend on weather and climate?
 - a. Which of these are long term (and could therefore be affected by shifts in climate)?
5. What design or maintenance specs/guidance documents do you use for:
 - a. For heavy precipitation/heavy streamflow (such as bridges, culverts, and other drainage infrastructure)
 - b. For extreme heat standards (such as electrical equipment, outdoor working time windows, pavement, etc.)
 - c. For wildfire protections (though this won't apply to most of the municipalities)
 - d. Are these documents sufficient, or would it be helpful to have additional resources?
6. Which other agencies/departments do you coordinate with regularly on these matters (e.g., adjacent jurisdictions, county, dam owners, flood control district)? How does that coordination happen?
7. Does your municipality ever have weather-related evacuation events? If so can you briefly describe your agency's role in managing the evacuation and how you coordinate with other agencies?
 - a. How could these practices be improved?
8. What are your most pressing climate concerns for the future?
9. Who are/will be the communities/areas most affected by these impacts and changes? How will they be affected?
10. How can FCOG help prepare the transportation network for future climate conditions?
11. What would you like to learn from the vulnerability assessment?
 - a. Are there tools and information you currently need, but don't have?
 - b. What future time periods that align with planning efforts and/or capital improvement projects?

EJ/CBO QUESTIONS

1. Describe your organization, role and responsibilities
2. Describe the communities your organization serves (socioeconomics, location, etc.)
3. What climate and weather-related impacts are of most concern in your community (or community your organization represents)? Are there any related to travel?
4. Have weather events led to evacuations in the communities you represent (for example, due to wildfire)? If so, can you describe an example?
5. What needs do your communities have in terms of addressing these threats, particularly regarding transportation?
6. What are your most pressing climate concerns for the future?
7. Who are/will be the communities/areas most affected by these impacts and changes? How will they be affected?
8. How can FCOG and other agencies help prepare the transportation system for future climate conditions and serve the populations you work with? What transportation solutions would benefit these populations?
9. What would you like to learn from the vulnerability assessment?
 - a. Are there tools and information you currently need, but don't have?

COUNTY OES QUESTIONS

1. Describe your organization, role and responsibilities
2. Can you briefly outline how emergency response is coordinated between your agency and others agencies/stakeholders?
3. How does the coordination work for transportation-related issues such as road closures, detours, evacuations etc.?
4. What climate and weather-related impacts currently affect the transportation network or have affected it in the past?
 - a. Do you have data on impacts (such injuries, fatalities, outage lengths, costs, geolocations)?
5. What climate and weather-related impacts are of most concern to you in Fresno County? What keeps you up at night from an emergency services perspective?
 - a. How could this be improved?
6. In your view, what are the major vulnerabilities to the transportation system from weather events? What are the specific locations?
7. What longer terms decisions/actions do you need to make that depend on weather and climate (and could therefore be affected by shifts in climate)?
8. What are your most pressing climate concerns for the future?
9. How can FCOG help prepare the transportation network for future climate conditions?
10. What would you like to learn from the vulnerability assessment?
 - a. Are there tools and information you currently need, but don't have?

APPENDIX D

Public Workshop Materials



Fresno COG Transportation Network Vulnerability Assessment Public Workshop

June 19, 2019



Introduction



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Who is Fresno COG?

- An association of local governments – members include Fresno's 15 cities and the County of Fresno
- Fresno COG is one of 38 “Councils of Governments” in California and 500+ nationwide
- Develops and updates a variety of transportation plans and allocates certain federal and state transportation funds
- Formed in 1967



Agenda

- Open House
- Introductory Presentation and Open Questions
- Breakout Session Mapping Exercise
- Interactive Polling
- Conclusion, Next Steps, and Raffle Prize



Fresno Council of
Governments



Project Purpose



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Caltrans SB 1 Adaptation Planning

- FCOG has been awarded a Caltrans Adaptation Planning Grant through Senate Bill 1 to develop a Fresno County Regional Transportation Vulnerability Assessment



Fresno Council of
Governments



Project Summary

- Convene regional partners, stakeholders, and the public - we want your input!
- Assess vulnerabilities of the Fresno County transportation system and how these vulnerabilities affect the systems users
- Develop a range of adaptation strategies
- Compile findings into a final report and recommendations for use by FCOG, stakeholders, and the public



Climate Change Background and Projected Impacts



Fresno Council of
Governments

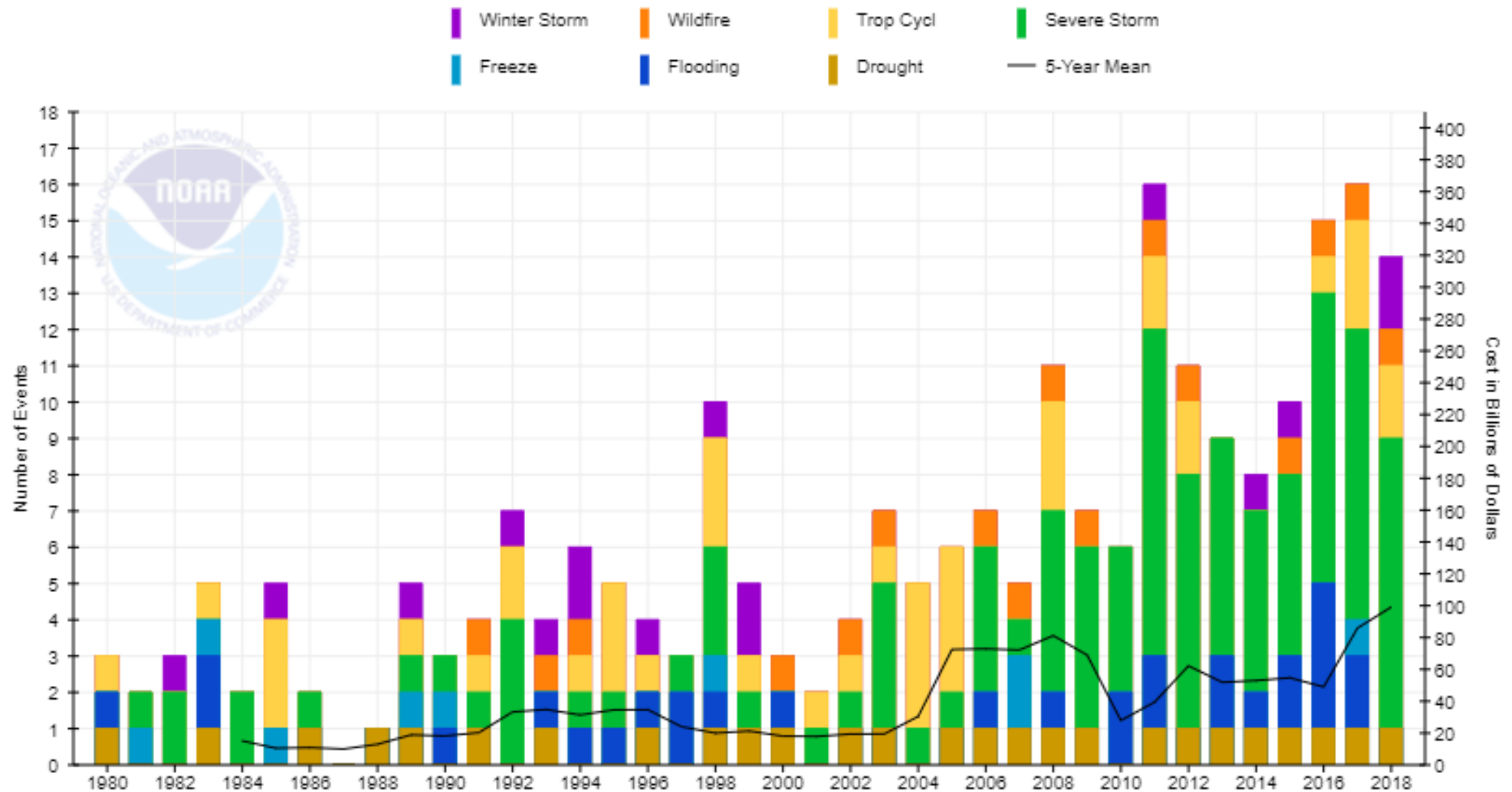


VRPA TECHNOLOGIES, INC.

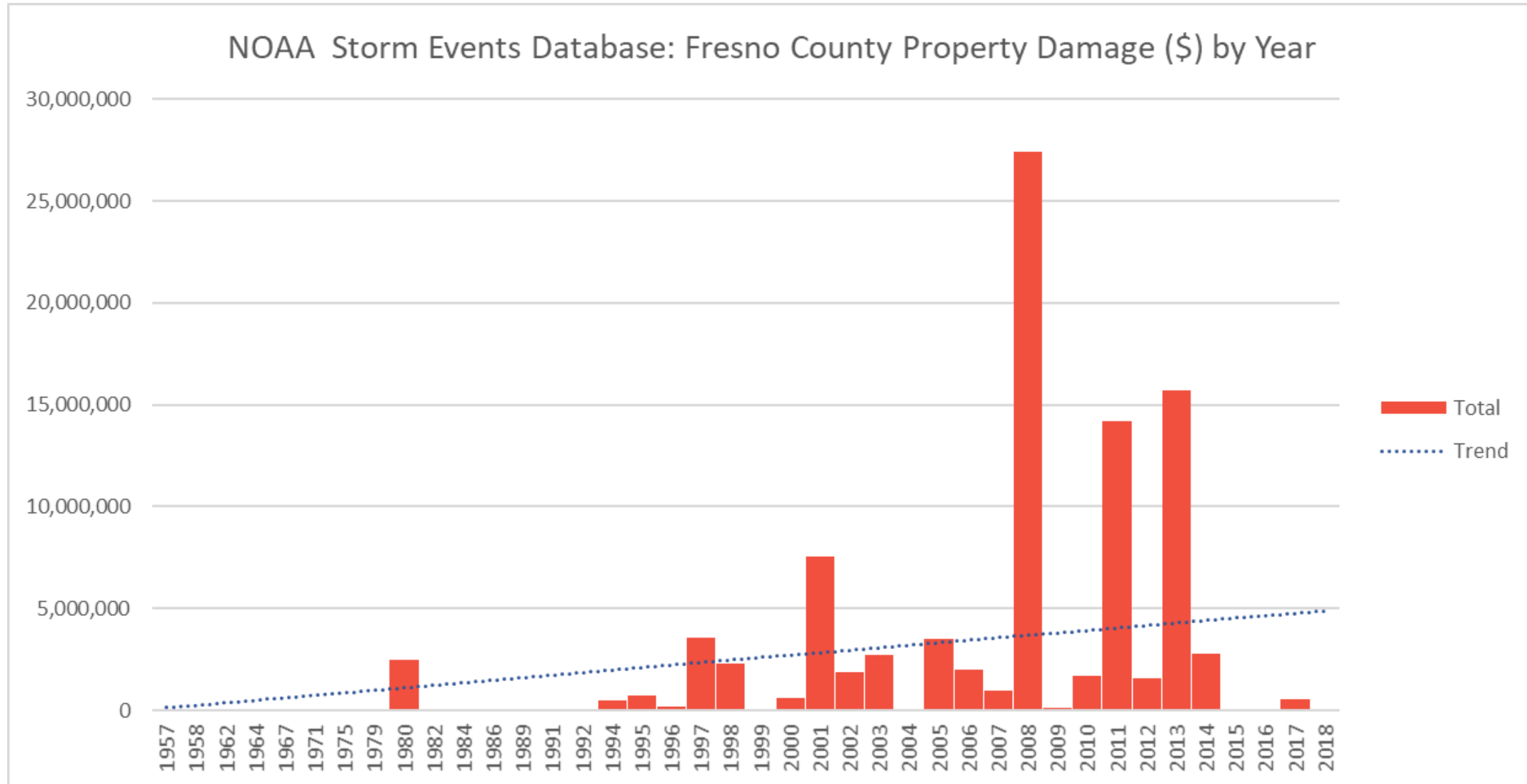


US Billion-Dollar Disasters

Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)



Fresno County Storm Event Property Damage

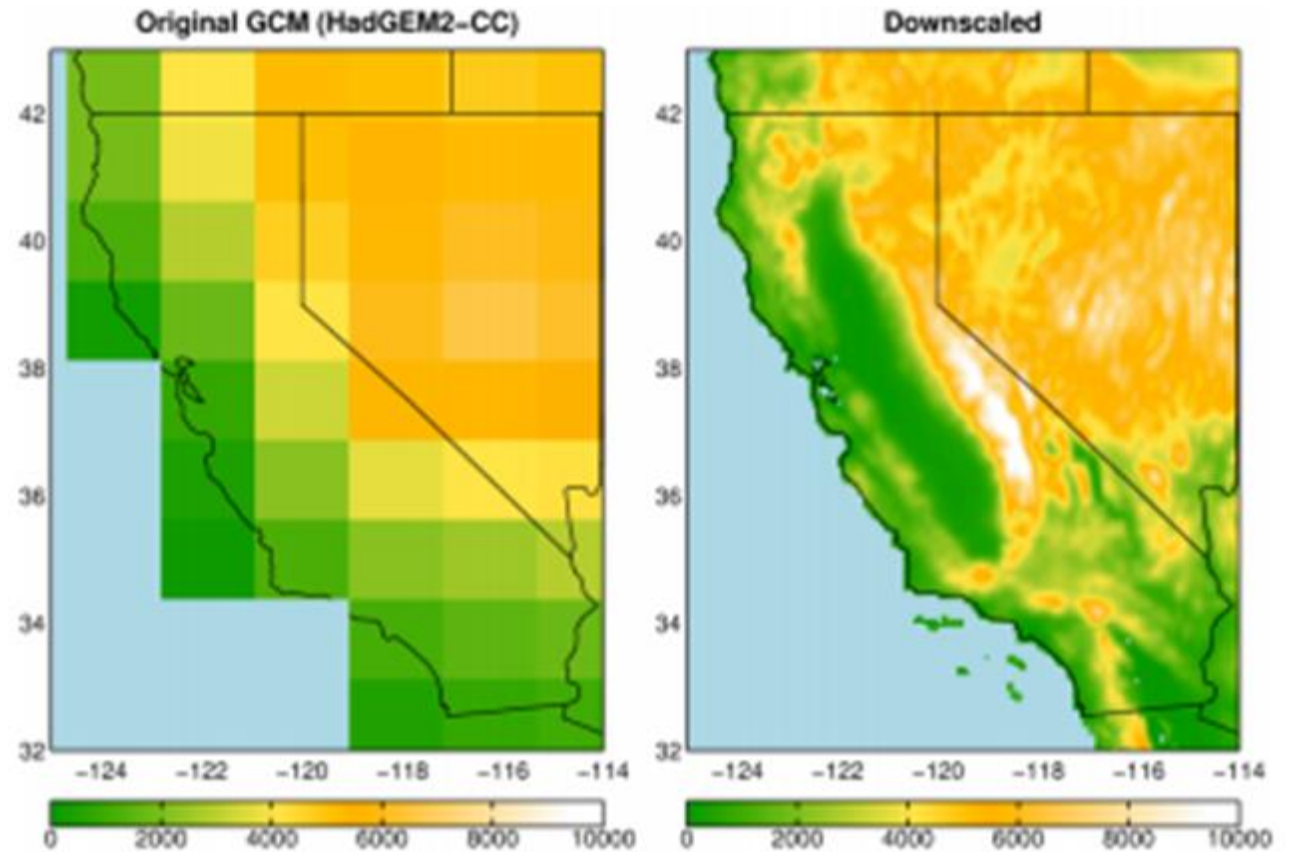


Fresno Council of
Governments



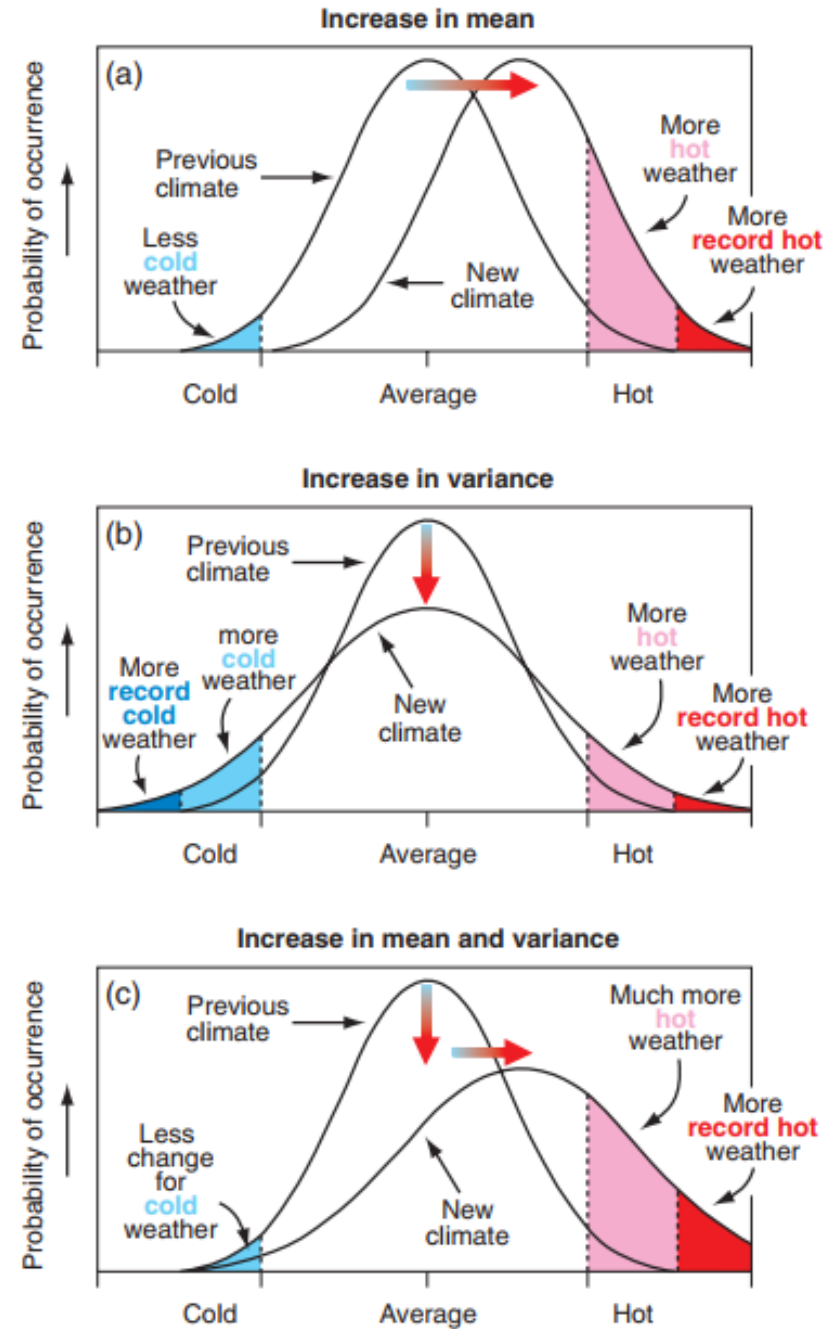
Climate Research and Models

- Intergovernmental Panel on Climate Change (IPCC) is major research institution
- Global Climate Models (GCM) simulate climate over time, drawing on physics, climatology, and historical climate observations
- Downscaling is process by which climate projections are improved to perform at regional level



Change, Uncertainty and Implications for Infrastructure Management

- Directional changes
- Increased variance
- Three principal sources of uncertainty in climate projections:
 - Future emissions – different scenarios
 - Model response to GHG atmospheric concentrations
 - Natural variability
- In transportation, decisions about design, risk, etc. often based on historical data and aren't forward looking



Terminology

- **Climate stressor or hazard:** one element of climate change, like temperature rise or wildfire risk
- **Weather vs. Climate**
 - Weather refers to conditions of atmosphere over short period of time
 - Climate refers to how atmosphere behaves over long period of time (includes averages, variability, and extremes)
 - Climate change refers to shifts in global or regional climate patterns
- **Vulnerability:** the degree to which a system is susceptible to, or unable to cope with, adverse effects
- **Risk:**
 - Potential of gaining or losing something of value
 - Probability x Consequence
 - Consequences can include impacts to communities, infrastructure, and natural systems.
- **Resilience:**
 - Ability to respond and recover from adversity
 - Amount of change a system can undergo without changing state
- **Adaptation:** action to reduce vulnerability or increase resilience



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Temperature

- Max and min temperatures expected to increase across Fresno County
- Average max temperature for Fresno County is expected to increase from ~67 °F to ~77 °F by end of century (RCP 8.5, model average)
- Number of extreme heat (>105 °F) days per year in City of Fresno are expected to increase from 7 to ~66 by end of century (RCP 8.5, model average)

Maximum Temperature

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

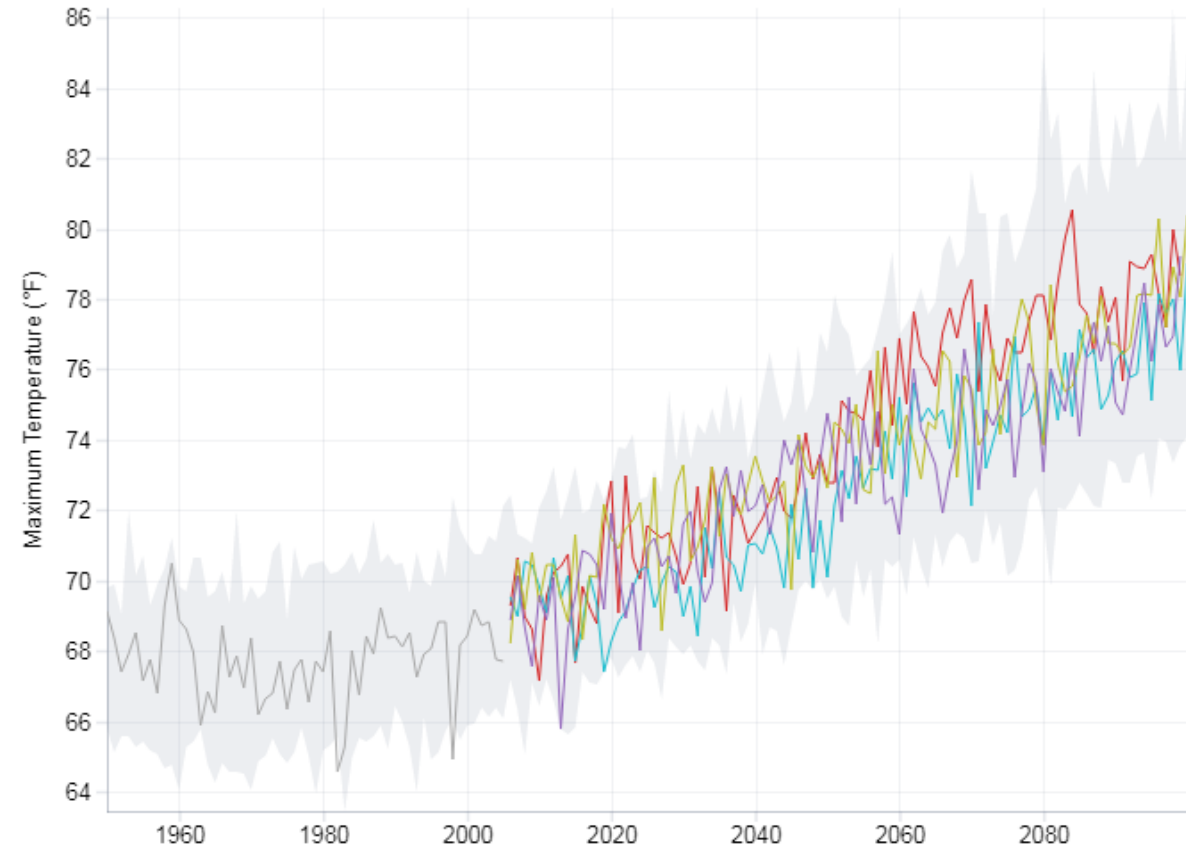
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

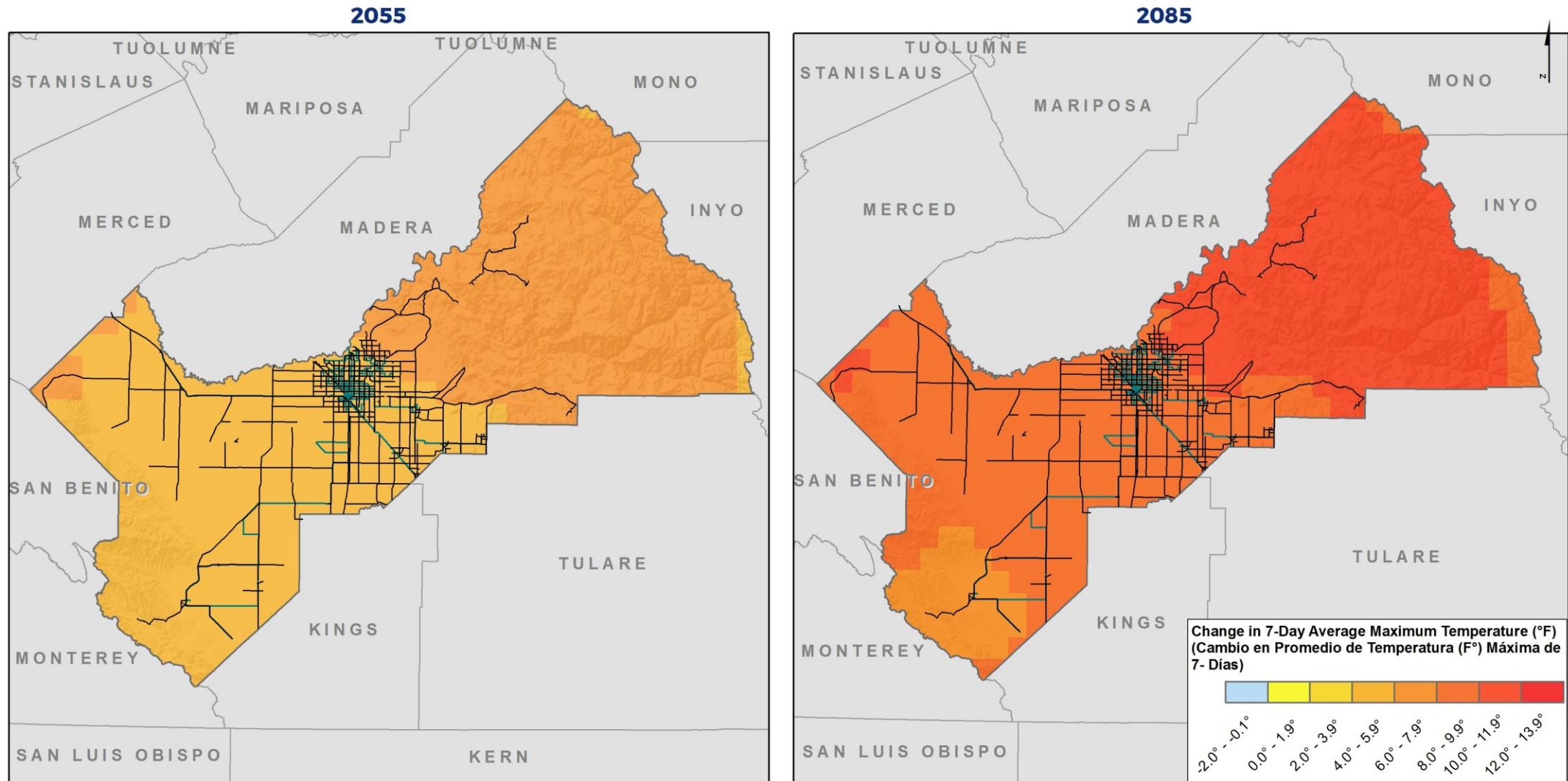
Observed Data (1950–2005)

Modeled Data (2006–2099)

HadGEM2-ES
CNRM-CM5
CanESM2
MIROC5



Increase in Average Maximum Temperature over Seven Consecutive Days



Precipitation

- Precipitation expected to change and become more volatile over the coming century, but projections are uncertain
- Generally, it's expected that both droughts and extreme storm events will become more frequent and severe
- Average precipitation change in Fresno County is expected to increase from ~21 to ~25 inches by end of century

Precipitation

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

Range of annual average values from all 32
LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

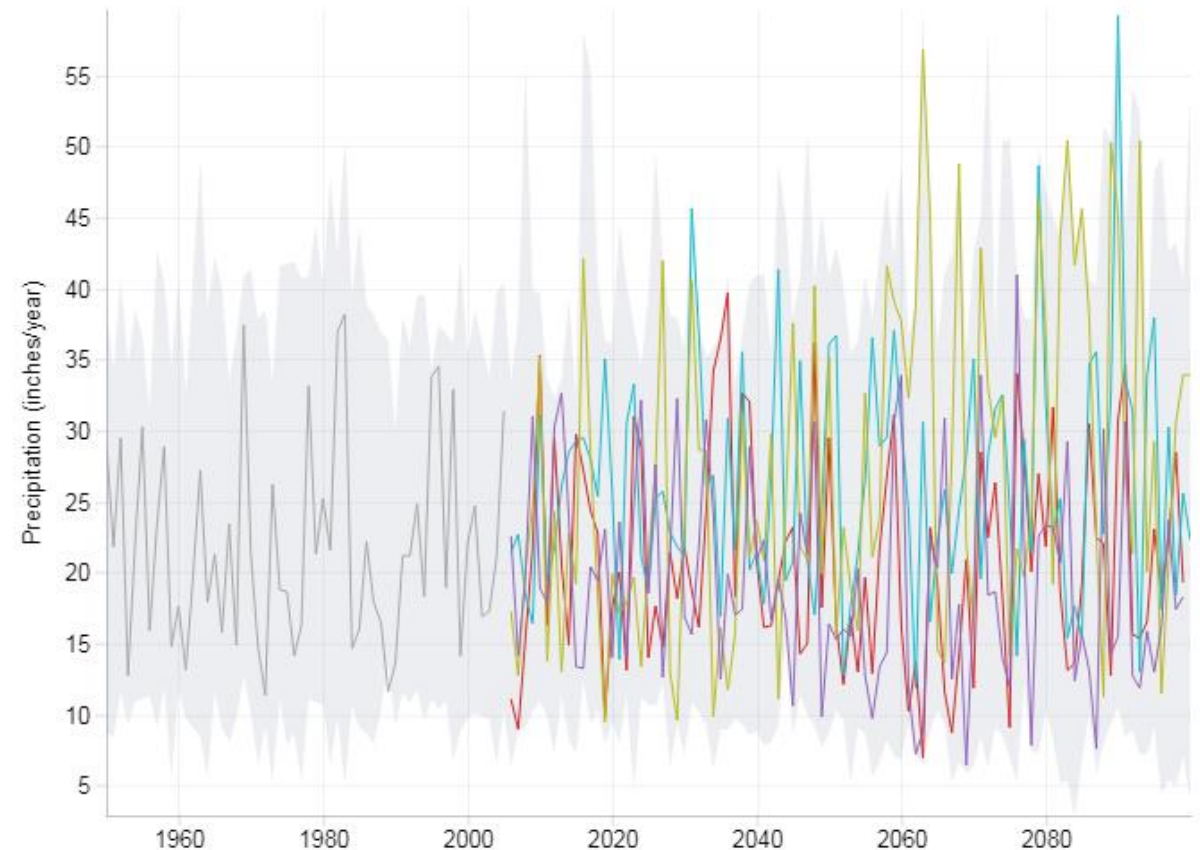
Modeled Data (2006–2099)

HadGEM2-ES

CNRM-CM5

CanESM2

MIROC5

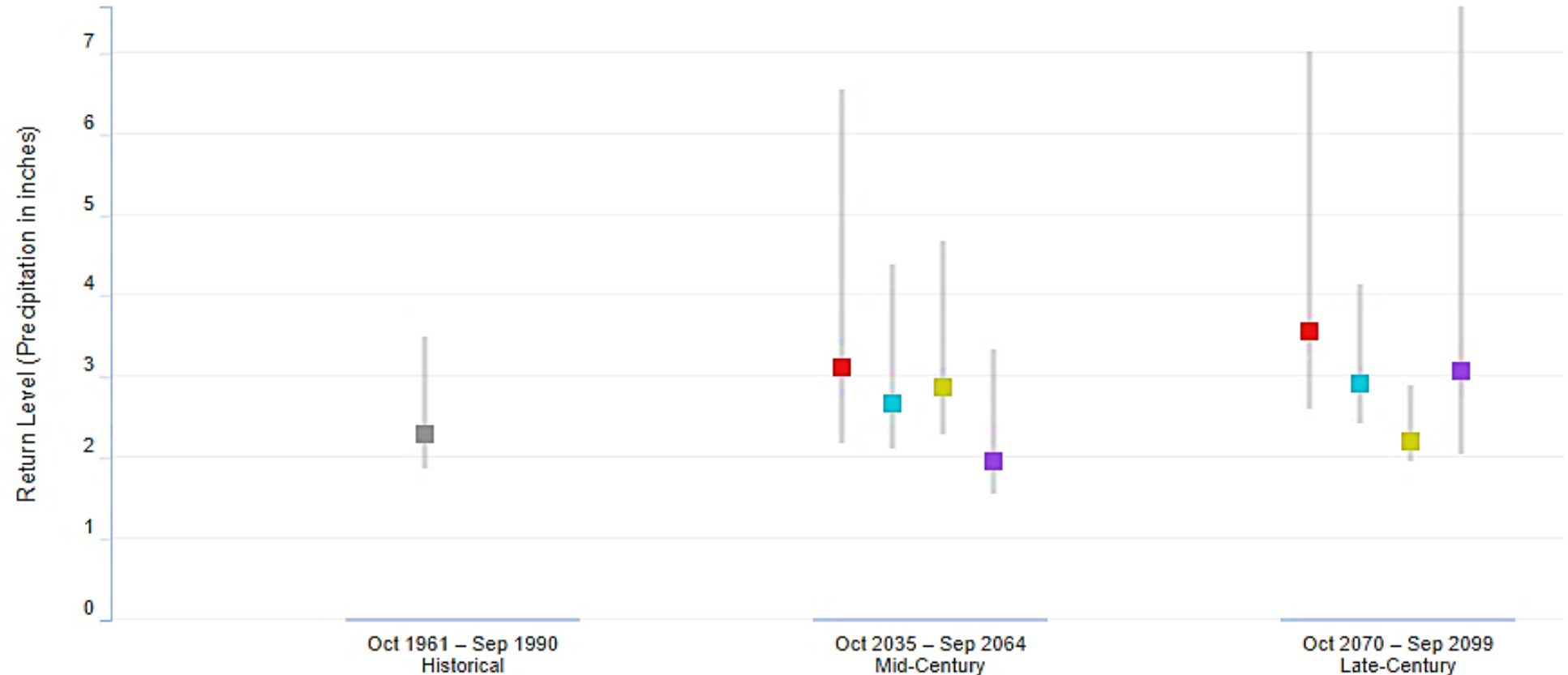


100-Year Precipitation Depth, City of Fresno (RCP 8.5)

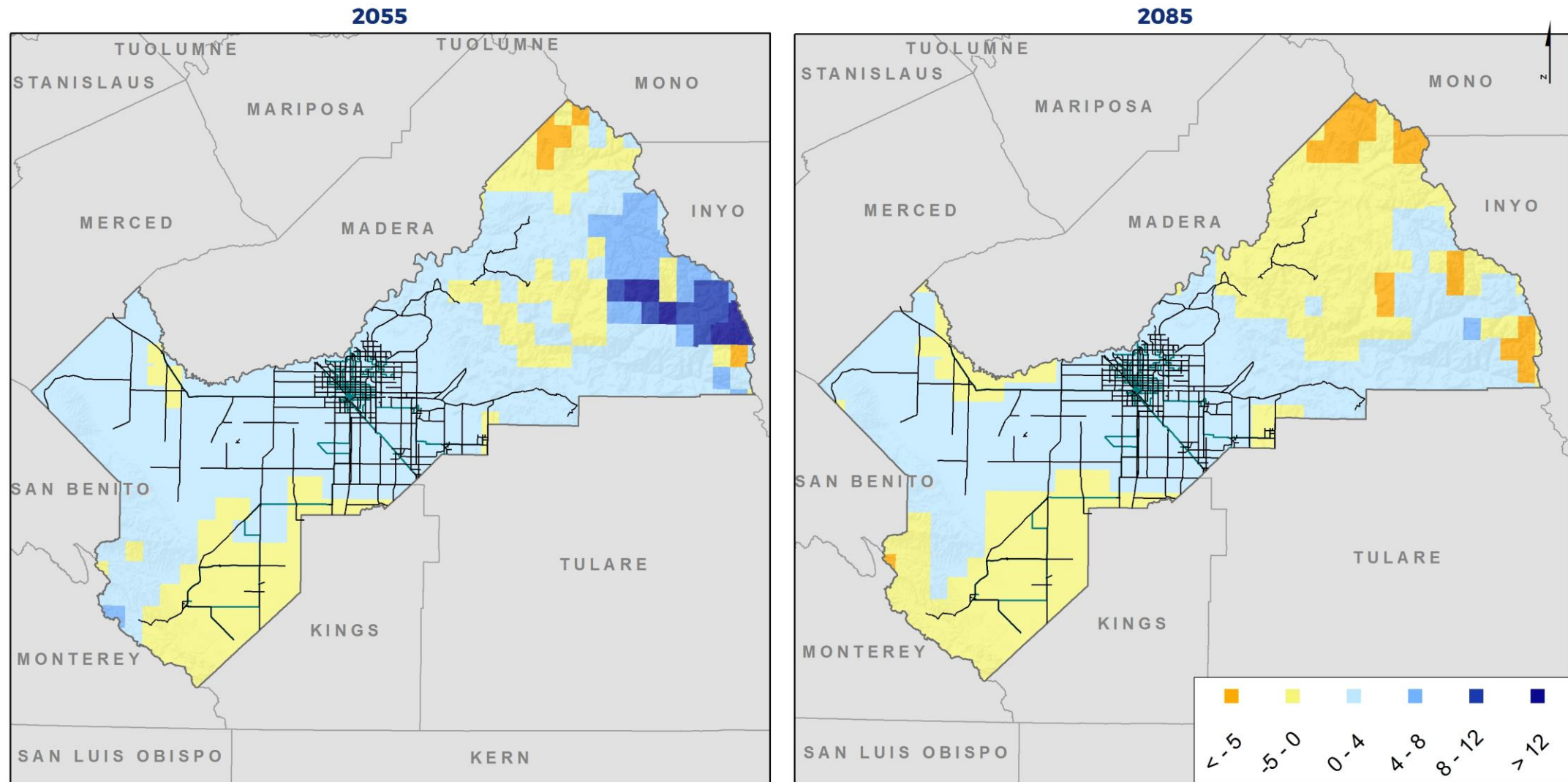
■ Observed ■ HadGEM2-ES (Warm/Drier) ■ CNRM-CM5 (Cooler/Wetter) ■ CanESM2 (Average) ■ MIROC5 (Complement)

— 95% Confidence Intervals

Note: Diminished certainty in return level estimates due to infrequent events ($n < 100$)



Inches Change in 100-Year Storm Depth



Wildfire

- Wildfire risk is increasing across CA as rising temperatures dry out soils and vegetation
- 172 miles of the State Highway System in Fresno County are projected to be exposed to moderate to very high wildfire risk over the coming century
- Average annual area burned in Fresno County is expected to increase from ~15,000 to ~44,000 hectares by end of century

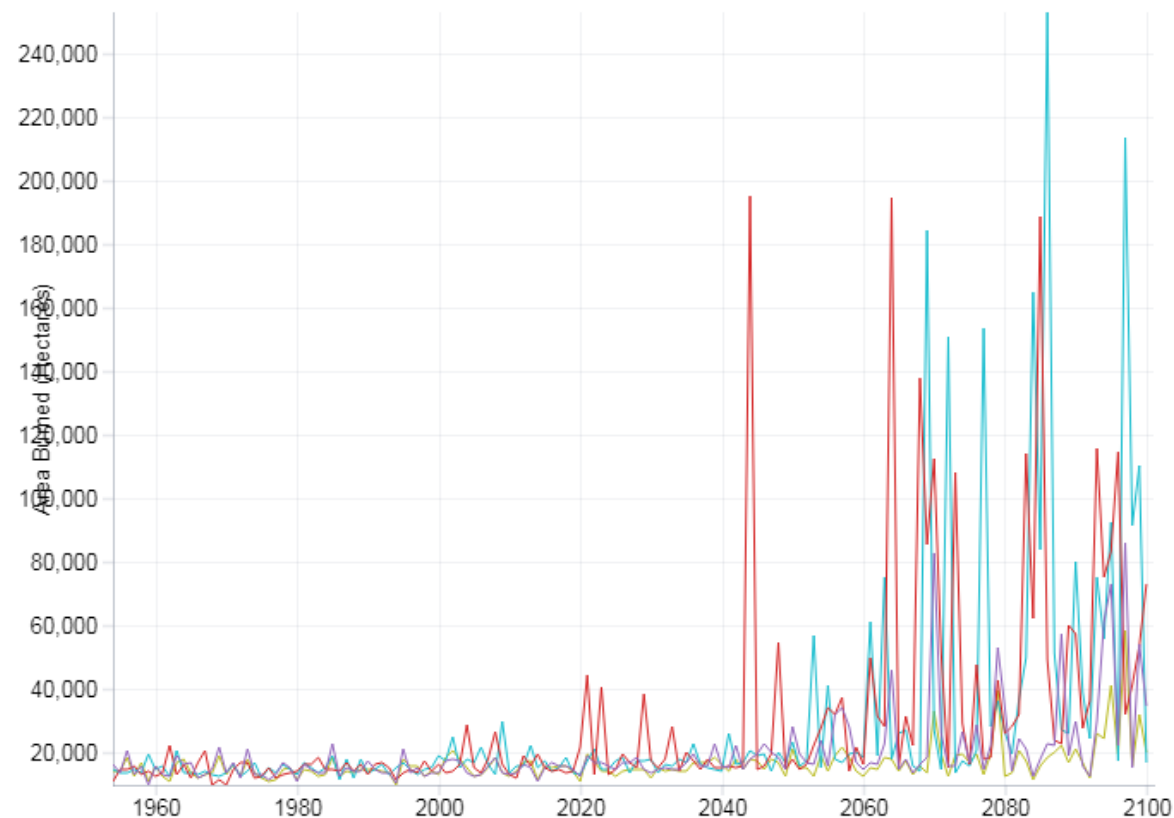
Annual Average of Area Burned

Fresno County, California

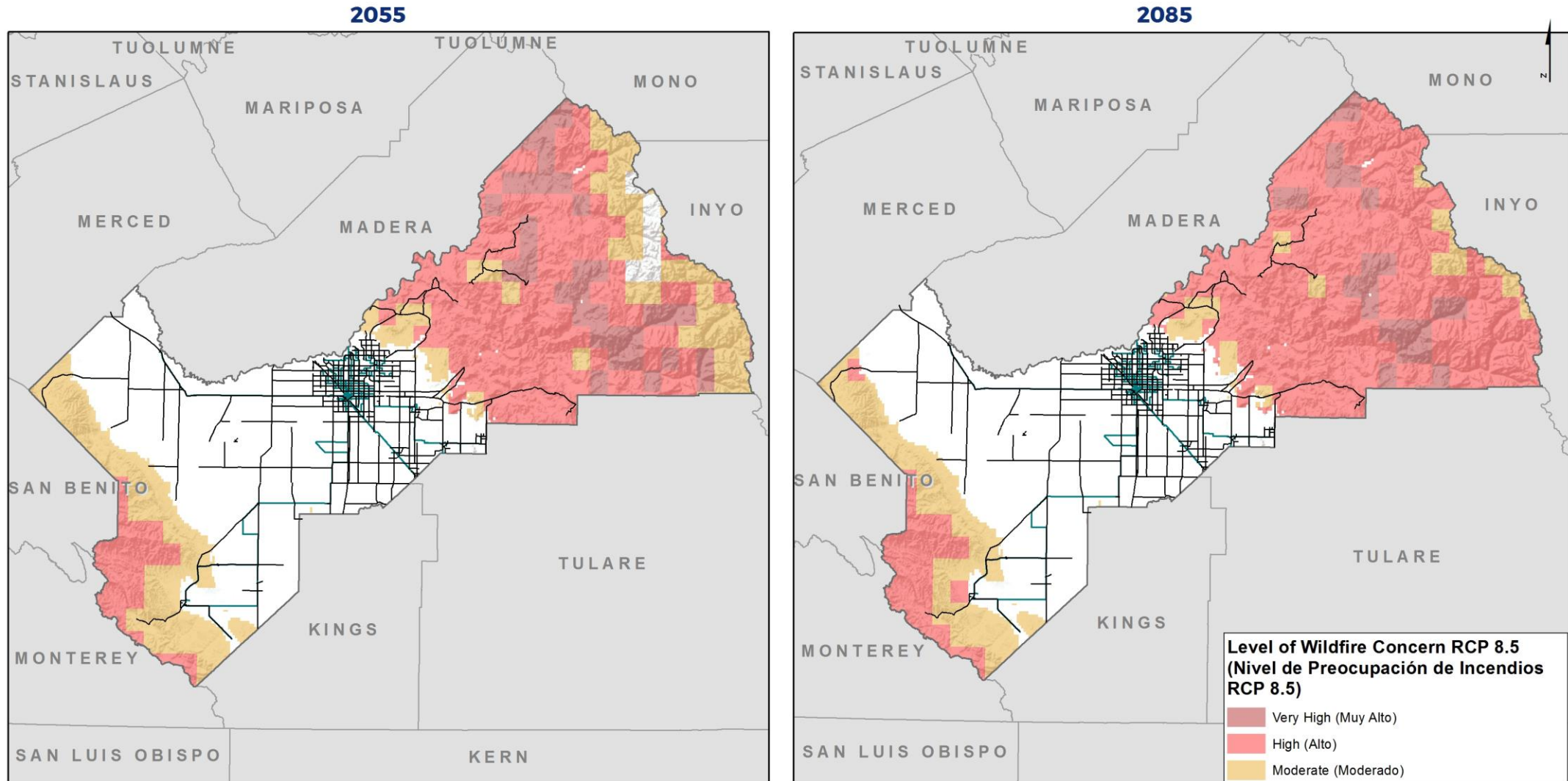
Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5). Central Population Growth Projections.

Modeled Data (2006–2099)

■ CanESM2
■ CNRM-CM5
■ HadGEM2-ES
■ MIROC5



Increase in Wildfire Risk



Example Impacts to the Transportation System and Users

- Pavement cracking and rutting from temperature rise
- Heat related health impacts to users
- Flooding, washouts, and erosion from heavy rain events and runoff
- Damage to roadway infrastructure from wildfire (guardrails, culverts, signage)
- Evacuations and safety threats for users
- Air quality impacts



Transportation System Resiliency

- Can include design, operations and maintenance, emergency response, transit planning, etc.
- Example adaptation strategies for Fresno County transportation system:
 - Change pavement design standards to reflect future climate
 - Increase drainage infrastructure sizing to accommodate larger, more frequent storm events
 - Cooling measures at transit stops
 - Increase bridge heights to accommodate heavier river flows
 - Evacuation planning
 - Use defensible space to reduce wildfire risk to assets



Public Outreach Overview



Fresno Council of
Governments

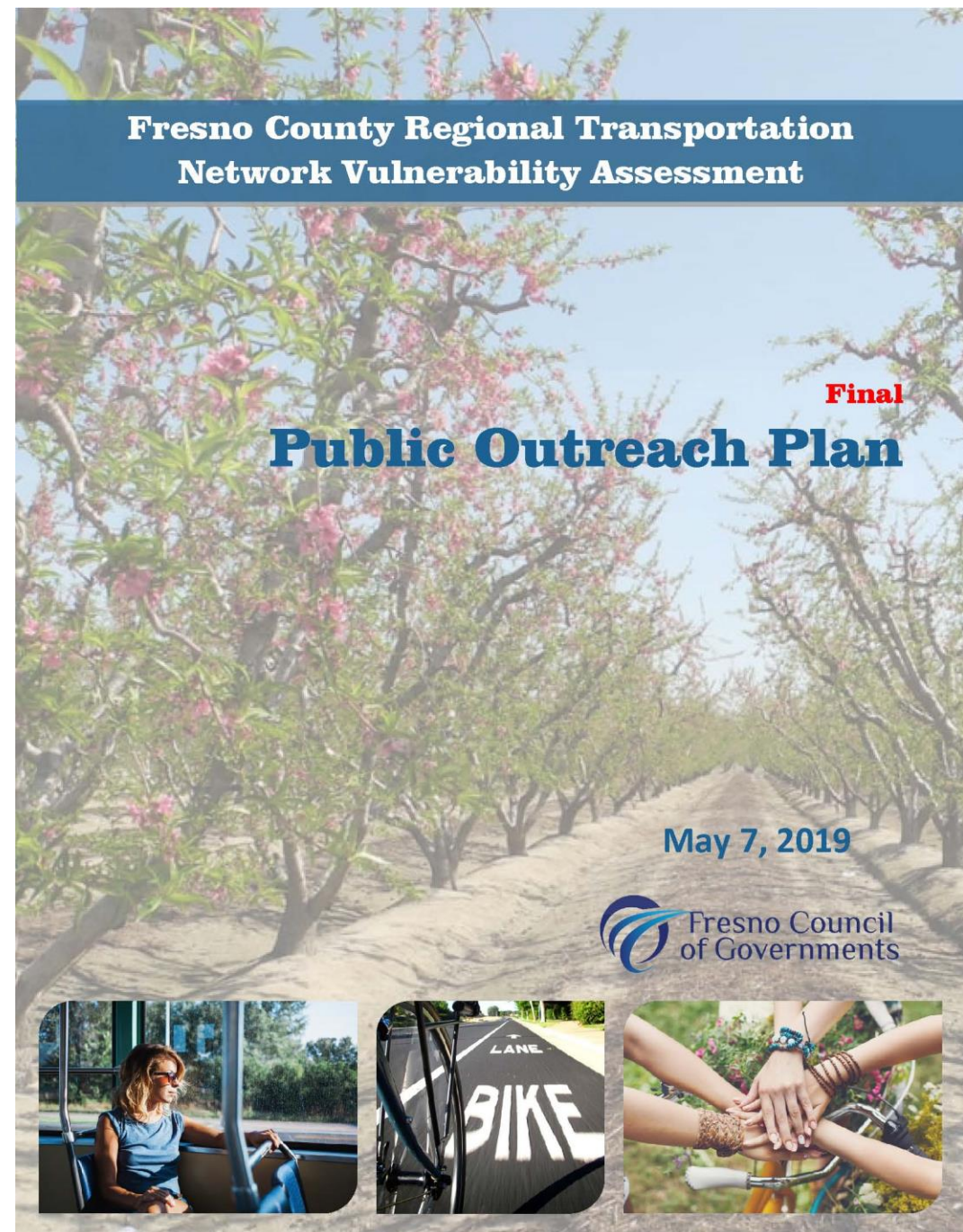


VRPA TECHNOLOGIES, INC.



Public Outreach Plan

- Describes how project partners, stakeholders, community members, and the general public will be engaged during the Transportation Network Vulnerability Assessment planning process
- A guide of community involvement activities to be completed
- A living document, easily adjusted if recommended activities are not providing the input needed



Outreach Activities Completed to Date

- Pop-up Events
- Stakeholder Interviews
- Online Survey



Completed Pop-up Events and Stakeholder Interviews

- Pop-up Events

- Kerman Almond Festival
- Reedley Street Faire
- San Joaquin Carnival

- Stakeholder Interviews

- City and County planning, engineering and transit staff
- Fresno County's Office of Emergency Services
- Community Based Organization representatives

Fresno County Regional Transportation Network Vulnerability Assessment

Fresno COG is preparing a Fresno County Regional Transportation Network Vulnerability Assessment that will identify where the region's **transportation network** is vulnerable to potential impacts of climate change, such as **increased temperature**, more **extreme heat days, flooding, drought, and wildfires**. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region.

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, what transportation improvements you would like to see locally in relation to climate change, and the solutions you think should be implemented to address these hazards to create a resilient regional transportation network.

1) What zip code do you live in? 93630

2) Have weather events or conditions ever affected your travel or required you to evacuate?
___ Yes ___ ☒ No

If yes to the above, "What type of event or condition?" ☒ Heat wave or extreme heat day
___ Flooding ___ Wildfire ___ Poor air quality day ___ Other (Please describe below)

Place a pin on the map indicating where you dealt with the event or condition. Map pin number: 16

Heat sometime impedes us from going places

If yes to the above, "Tell us about the event(s). How did it affect your travel?" (Please describe)
knows individuals affected by wildfire lost everything

3) What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least the concerning)
2 Longer and more severe droughts 1 Heat waves and higher temperatures 5 Heavy rains and flooding 7 Landslides and erosion 7 Subsidence (land sinking from groundwater use)
4 Wildfires 3 Lower air quality

Over →

Fresno County Regional Transportation Network Vulnerability Assessment

4) Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)
☒ Create more comfortable and shaded transit stops ☒ Tree plantings along roadways and sidewalks ___ Improved flood control ___ Better evacuation planning and communications ___ Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) particularly for elderly or disabled people ___ ☒ Public transit service to cooling centers on high heat days ☒ Better management of flammable vegetation near roadways and structures ___ Other (Please describe)

5) What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation? (Please describe)
More buses, or options provided by the city.

6) What are your primary modes of transportation? (Check all that apply if you use multiple modes to reach your destination) ☒ Driving alone or with family ___ Carpooling ___ Taking a Taxi or rideshare (Uber/Lyft) ___ Public transit (bus, train) ___ Biking ___ Walking
If biking, "How long do you bike to get to your destination or next mode of transportation (like a transit stop)?" No due to the heat and lack of shade
If walking "How long do you walk to get to your destination or next mode of transportation (like a transit stop)?" 30-35 mins.

7) What was your household income before taxes in 2018?
___ Less than \$14,000 ☒ \$15,000 to \$24,999 ___ \$25,000 to \$35,999 ___ \$36,000 to \$49,999 ___ \$50,000 or more



Online Survey

- Online survey instrument allows for participants to respond in English and Spanish
- Available on Fresno COG's website or by visiting <https://www.surveymonkey.com/r/FresnoTNVA>
- Addresses what impacts of climate change participants are most concerned about, how they use the transportation system to get around, and what transportation improvements they would like to see locally in response to climate change, to create a resilient regional transportation network.

Fresno County Regional Transportation Network Vulnerability Assessment (*Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno*)

Community Survey (*Encuesta Comunitaria*)

We need your help shaping the Fresno region's future! (*¡Necesitamos su ayuda para dar forma al futuro de la región de Fresno!*)

The Fresno Council of Governments is identifying where the region's transportation network is vulnerable to potential impacts of climate change. These impacts could include increased temperature, more extreme heat days, flooding, drought, and wildfires. This effort is called the Fresno County Regional Transportation Network Vulnerability Assessment. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region. (*El Consejo de Gobiernos de Fresno está identificando los lugares donde la red de transportación de la región es vulnerable a impactos potenciales a causa del cambio climático. Estos impactos podrían incluir incremento de temperatura, días de calor extremo, hundimiento, sequía, e incendios forestales. Este esfuerzo es conocido como la Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno. La meta de esta evaluación es el encontrar soluciones que beneficiarán a la comunidad entera del Condado de Fresno y mejorar la transportación en la región.)*

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, how you use the transportation system to get around, and what transportation improvements you would like to see locally in response to climate change, to create a resilient regional transportation network. (*Por favor complete esta encuesta anónima para informarnos cuáles son los impactos del cambio climático que más le preocupan, como utiliza el sistema de transporte para navegar, y que tipo de mejoras de transporte le gustaría ver localmente en respuesta al cambio climático, para crear una red sólida de transporte regional.*)

OK

0 of 16 answered



Questions



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Breakout Session



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Thank you for your time!

Please feel free to reach out with any questions and comments.



Team Contacts

- **Meg Prince**, FCOG Project Manager, MPrince@fresnocog.org
- **Tim Grose**, Consultant Project Manager, Timothy.Grose@wsp.com
- **Georgiena Vivian**, Collaboration and Community Engagement Lead, gvivian@vrpatechnologies.com



Fresno Council of
Governments





Fresno COG Evaluación de Vulnerabilidad de la Red de Transporte Taller Público

June 19, 2019



Introducción



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



¿Quién es Fresno COG ?

- Una asociación de gobiernos locales - sus miembros incluye 15 ciudades de Fresno y el Condado de Fresno
- Fresno COG es uno de los 38 “Concilios de Gobierno” en California y 500+ en toda la nación
- Desarrolla y actualiza una variedad de programas de transporte y distribuye ciertos fondos de transporte federal y estatal
- Formado en 1967



Agenda

- Casa Abierta
- Presentación de Introducción y Preguntas de Respuesta Abierta
- Sesión en Grupos y Ejercicio de Mapeo
- Votación interactiva
- Conclusión, Pasos a Seguir, y el Premio de la Rifa

Propósito del Proyecto



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Planificación de Adaptación del SB 1 de Caltrans

- FCOG se le ha otorgado un Subsidio de Planificación de Adaptación Caltrans por medio del Proyecto de Ley 1 del Senado para desarrollar una Evaluación de Vulnerabilidad del Transporte Regional en el Condado de Fresno



Fresno Council of
Governments



Resumen del Proyecto

- Reunir partidos regionales, partidos interesados, y el público - ¡Queremos su participación!
- Evaluar las vulnerabilidades del Sistema de Transporte del Condado de Fresno y cómo es que estas vulnerabilidades afectan a los usuarios del sistema
- Desarrollar un rango de estrategias de adaptación
- Reunir resultados en un reporte final tanto como recomendaciones para el uso de FCPG, interesados, y el público



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Contexto de los Cambios Climáticos e Impactos Proyectados



Fresno Council of
Governments

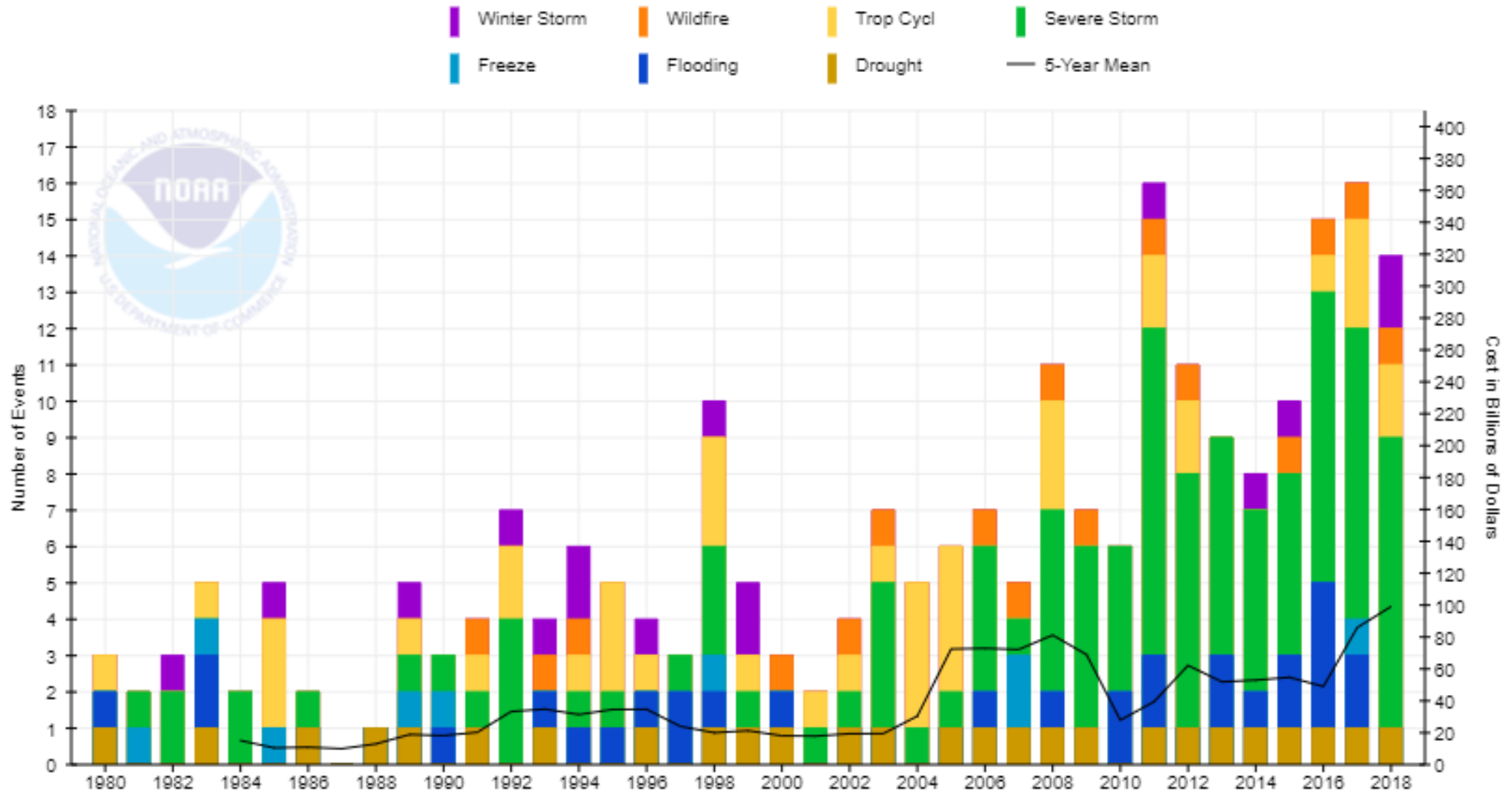


VRPA TECHNOLOGIES, INC.

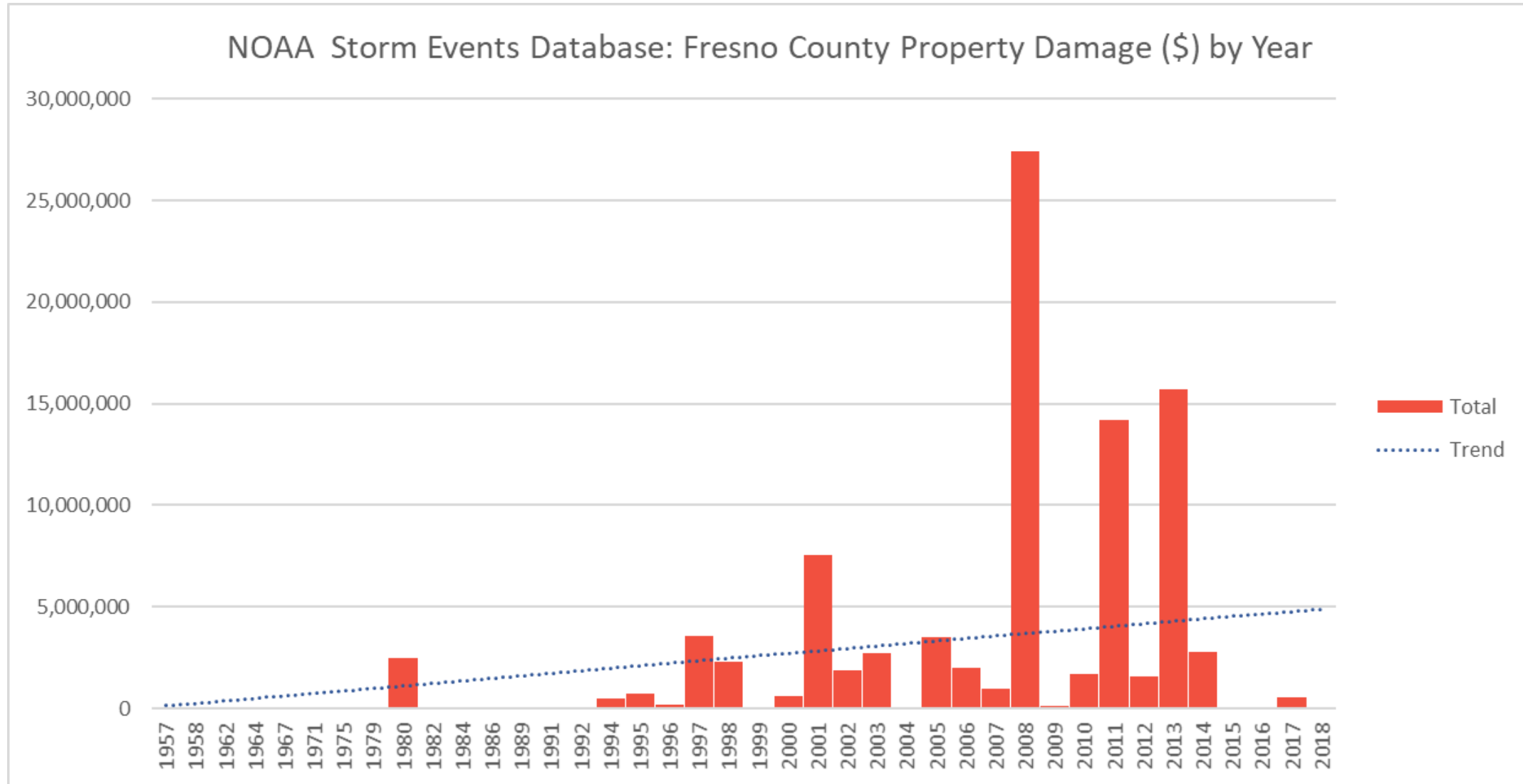


Desastres en Billones de Dólares – en EUA

Billion-Dollar Disaster Event Types by Year (CPI-Adjusted)



Daños de Propiedad por Eventos de Aguas Pluviales en el Condado de Fresno



Fresno Council of
Governments

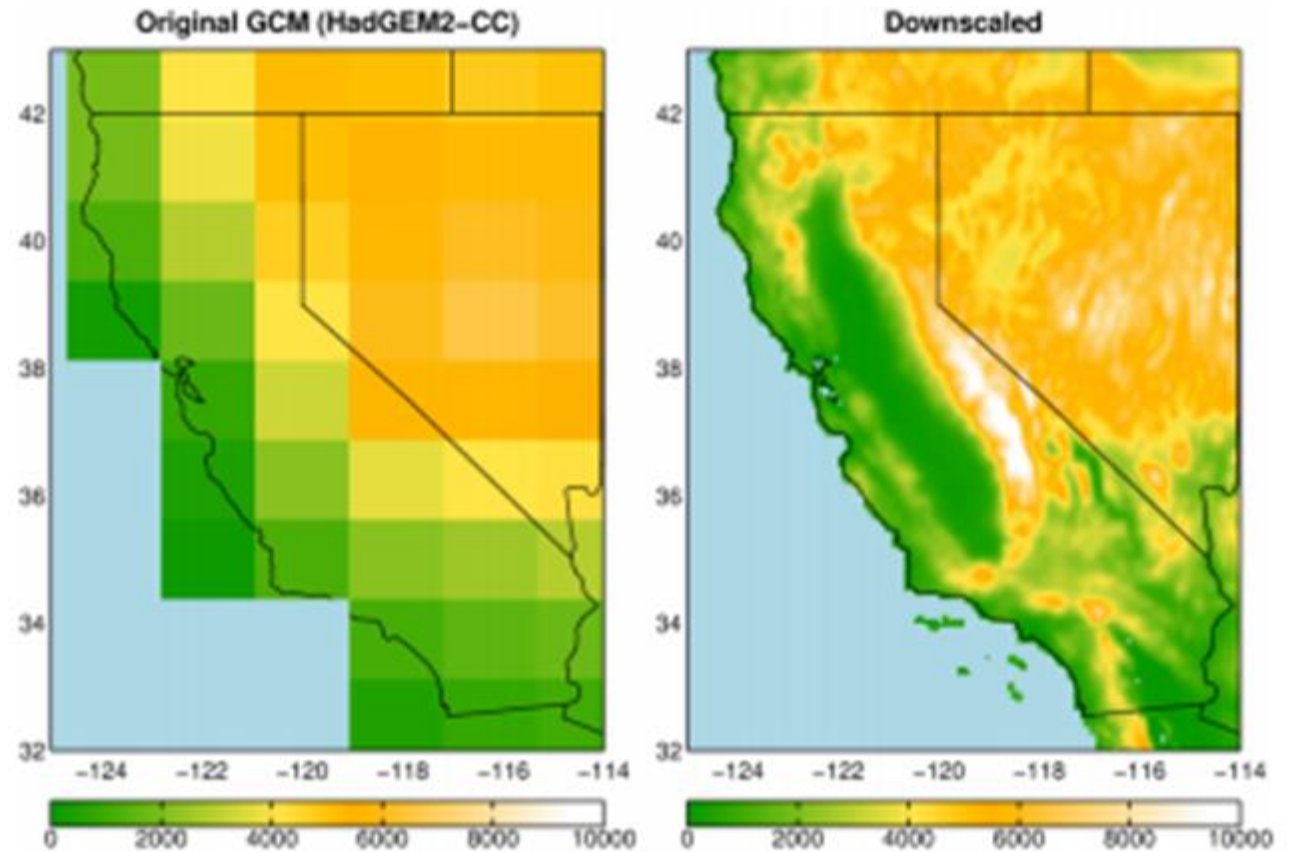


VRPA TECHNOLOGIES, INC.



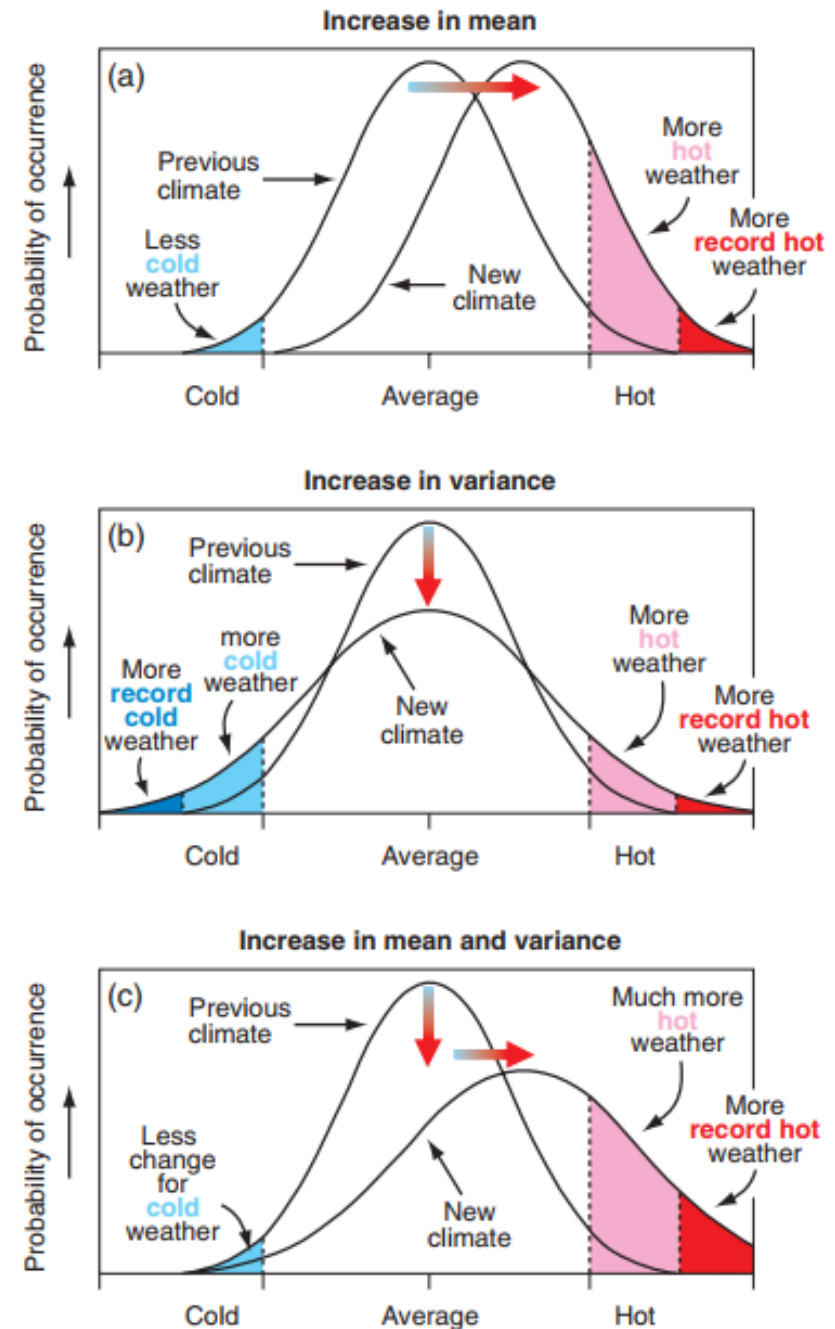
Investigación del Clima y Modelos

- Panel Intergubernamental en el Cambio Climático (IPCC) es una institución de investigación principal
- Modelos Climáticos Globales (GCM) Imitan el clima a lo largo del tiempo, basándose en la física, climatología, y observaciones climáticas históricas
- Reducción de escala es un proceso por el cual las proyecciones climáticas son mejoradas para funcionar a nivel regional



Cambio, Incertidumbre e Implicaciones para el Manejo de Infraestructura

- Cambios direccionales
- Aumentar variación
- Tres fuentes principales de incertidumbre en proyecciones climáticas:
 - Emisiones futuras – diferentes escenarios
 - Respuesta modelo a concentraciones atmosféricas GHG
 - Variabilidad natural
- En transporte, decisiones sobre el diseño, riesgo, etc., muchas veces basadas en datos históricos y no son progresistas



Terminología

- Factor estresante climático o riesgo: Un elemento del cambio climático, como los aumentos de temperatura o los riesgos de incendios forestales
- Condiciones Meteorológicas vs. Clima
 - Condiciones meteorológicas se refiere a las condiciones de la atmósfera en un periodo corto del tiempo
 - Clima se refiere a como se comporta la atmósfera en un periodo largo del tiempo (incluye promedios, variabilidad, y extremos)
 - Cambio climático se refiere a cambios globales o patrones climáticos regionales
- Vulnerabilidad: El grado al cual un sistema es susceptible a, o no puede aguantar a, efectos adversos
- Riesgo:
 - Potencial de ganar o perder algo de valor
 - Probabilidad (x) Consecuencias
 - Consecuencia pueden incluir impactos a las comunidades, infraestructura, y sistemas naturales.
- Resistencia:
 - Habilidad de responder y recuperarse de adversidad
 - Cantidad de cambio un sistema puede soportar sin cambiar su estado
- Adaptación: acción para reducir vulnerabilidad o aumentar resistencia



Fresno Council of
Governments



Temperatura

- Temperaturas máximas y mínimas que se espera que aumenten en todo el Condado de Fresno
- Promedio máximo de temperatura para el Condado de Fresno se espera que aumente de ~67 °F a ~77 °F a finales del siglo (RCP 8.5, Promedio modelo)
- Numero de días de calor extremo (>105 °F) por año en la Ciudad de Fresno se espera que aumenten de 7 a ~66 a finales del siglo (RCP 8.5, Promedio modelo)

Maximum Temperature

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

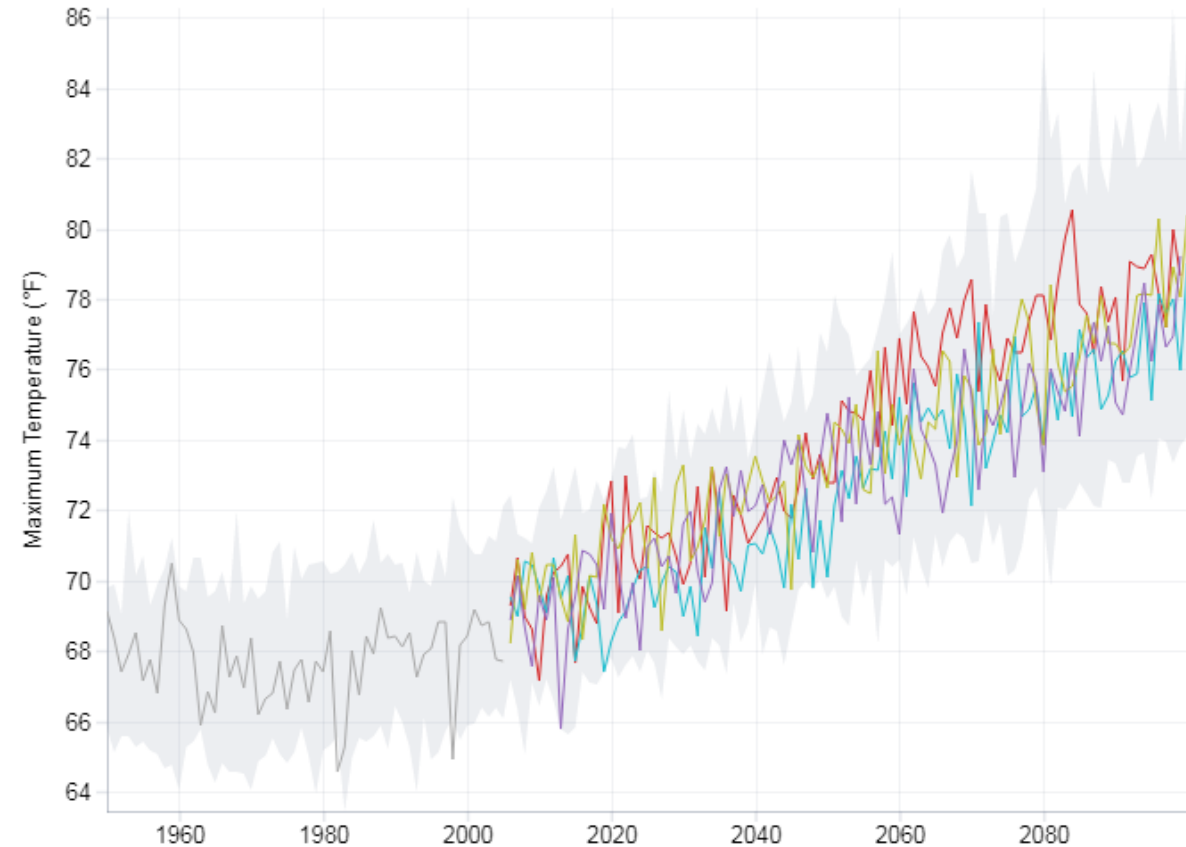
Range of annual average values from all 32 LOCA downscaled climate models

Modeled Variability Envelope

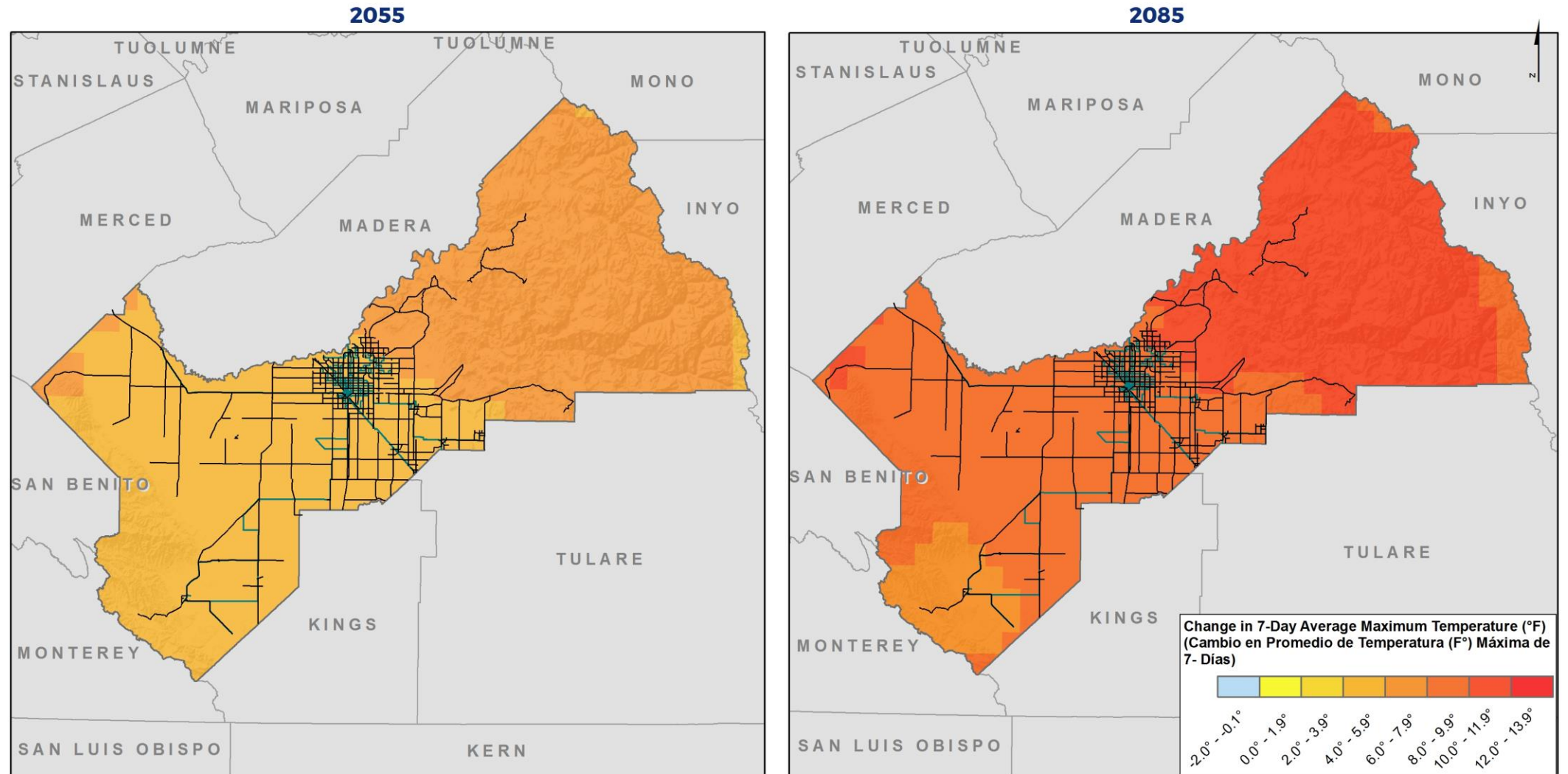
Observed Data (1950–2005)

Modeled Data (2006–2099)

HadGEM2-ES
CNRM-CM5
CanESM2
MIROC5



Incremento en Temperaturas Máximas Promedio atreves de Siete Días Consecutivos



— 2018 Roadway Network - Highways and Arterials (Red de Vías del 2018- Autopistas y Avenidas Principales)
 — Transit Lines (Líneas de Transito)

Source: CMCC-CMS Global Climate Model, downscaled by the Scripps Institution of Oceanography using the Localized Constructed Analogs technique. RCP 8.5 emissions scenario.

0 5 10 20 30 40 Miles

Precipitación

- La precipitación se espera que cambie y llegue a ser más volátil en el siguiente siglo, pero las proyecciones son inciertas
- Generalmente, se espera que ambas, sequia y eventos de aguas pluviales extremas sean más frecuentes y severas
- El promedio de precipitación en el Condado de Fresno se espera que aumente de ~21 a ~25 pulgadas a finales del siglo

Precipitation

Fresno County, California

Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5)

Range of annual average values from all 32
LOCA downscaled climate models

Modeled Variability Envelope

Observed Data (1950–2005)

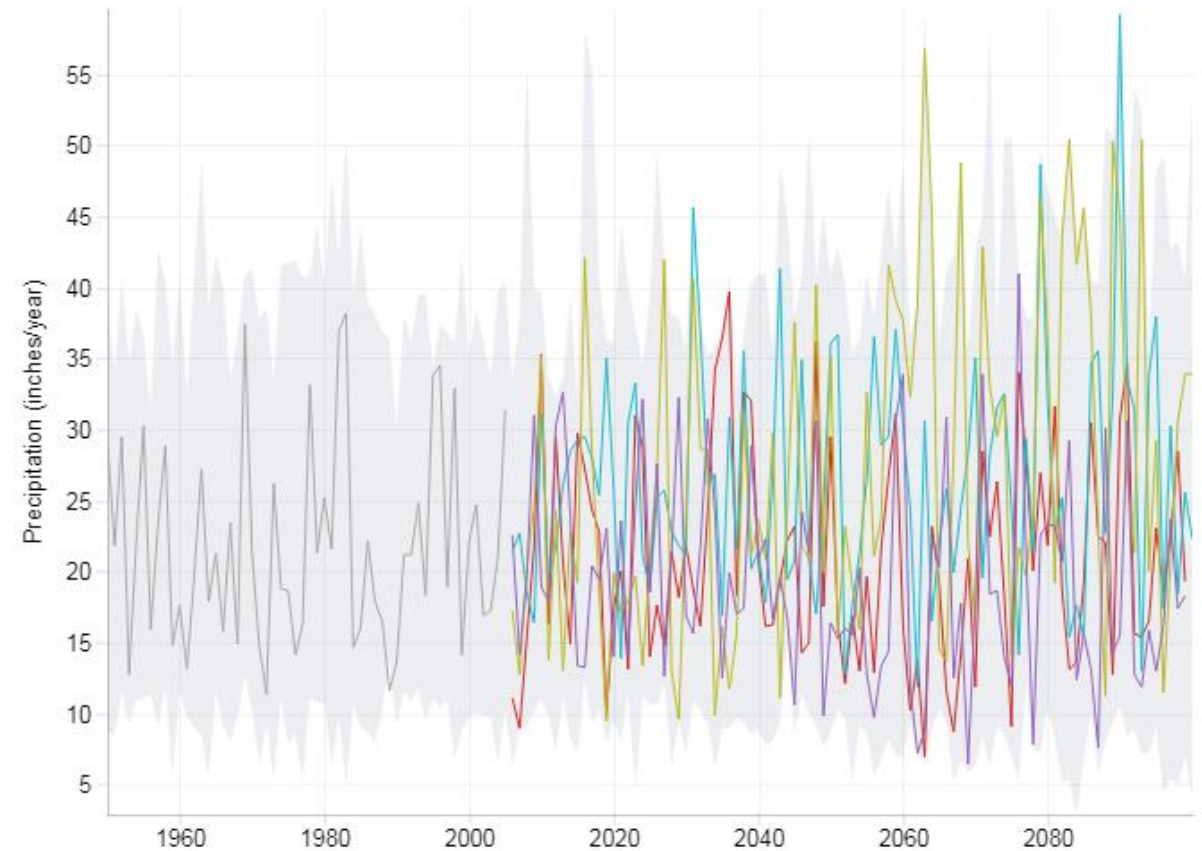
Modeled Data (2006–2099)

HadGEM2-ES

CNRM-CM5

CanESM2

MIROC5

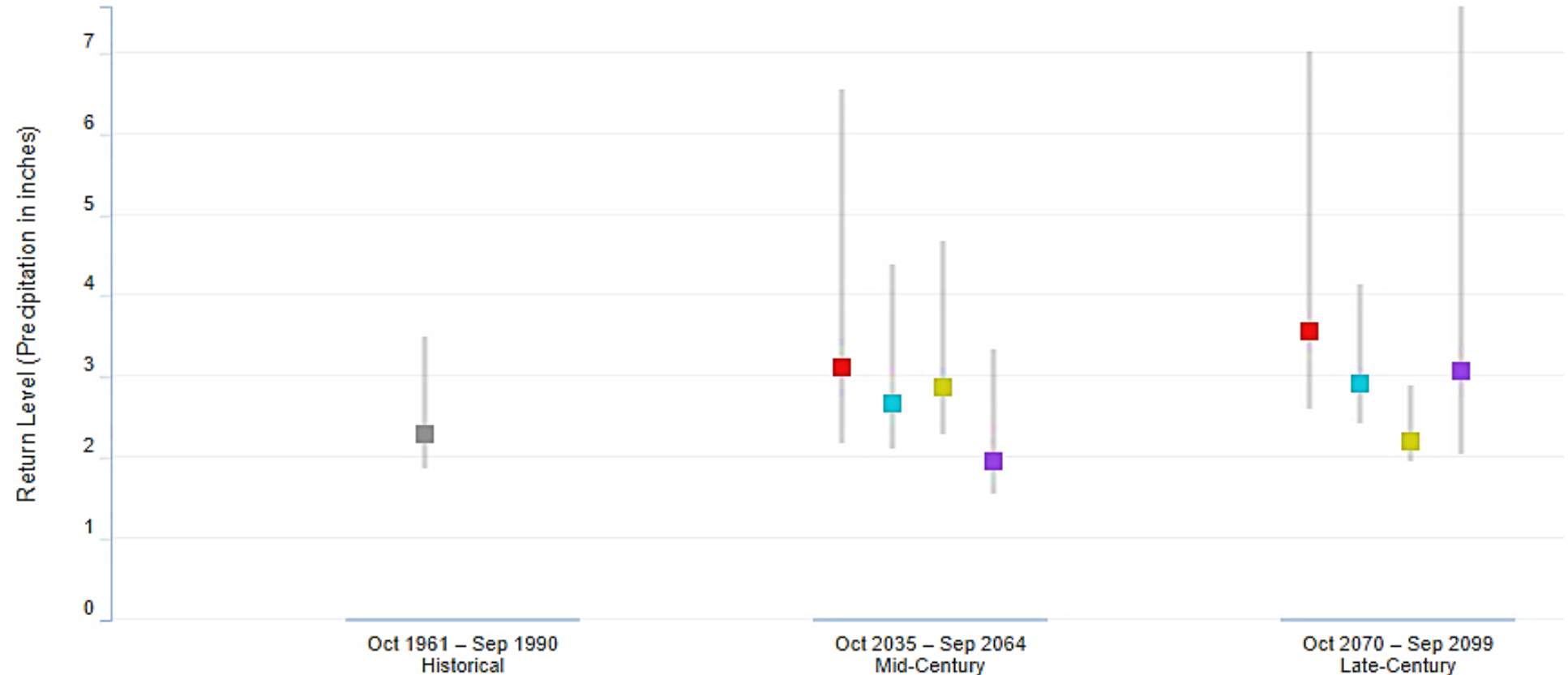


Profundidad de Aguas Pluviales a los 100 años en la Ciudad de Fresno (RCP 8.5)

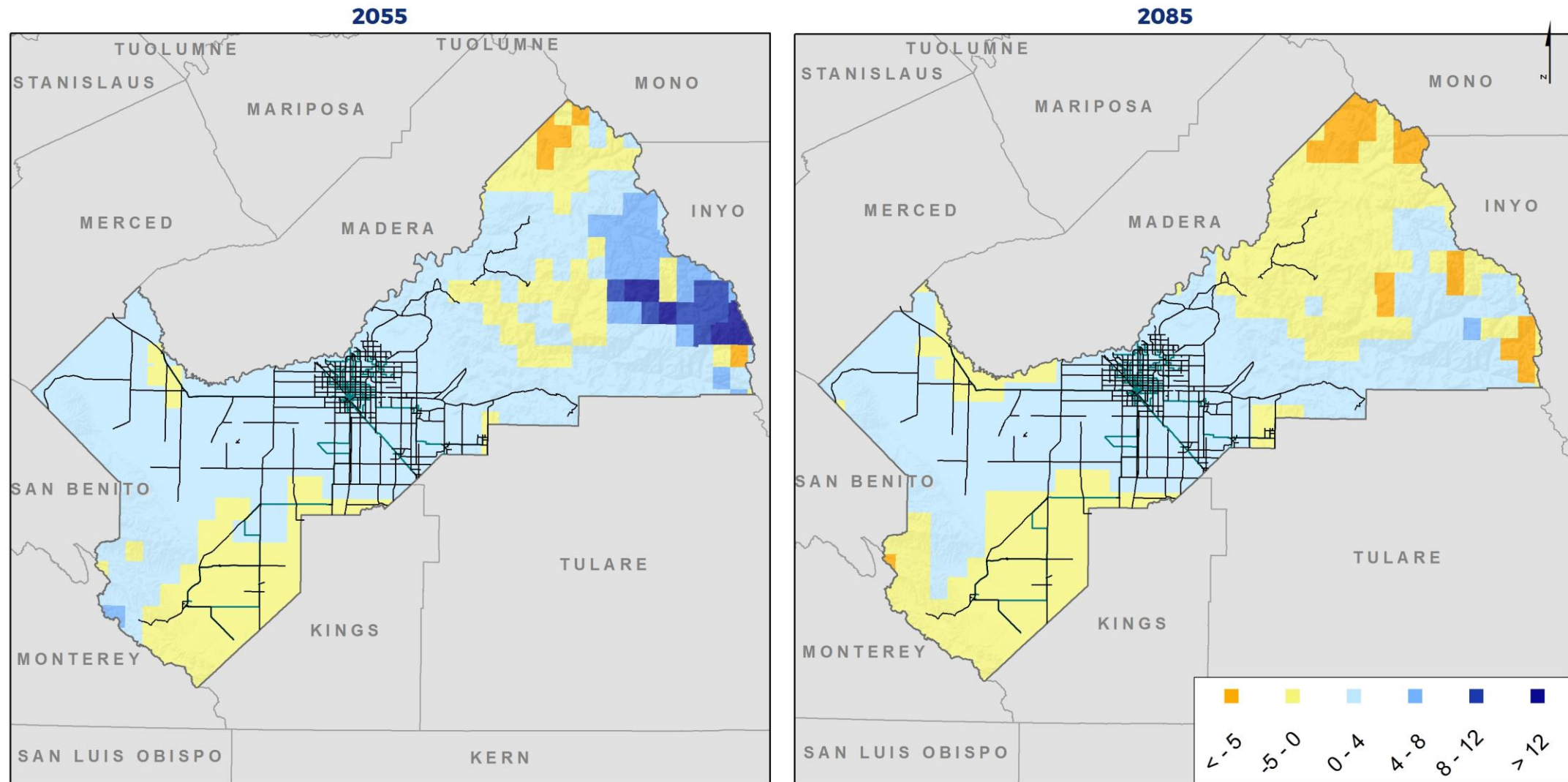
■ Observed ■ HadGEM2-ES (Warm/Drier) ■ CNRM-CM5 (Cooler/Wetter) ■ CanESM2 (Average) ■ MIROC5 (Complement)

— 95% Confidence Intervals

Note: Diminished certainty in return level estimates due to infrequent events ($n < 100$)



Cambio en Pulgadas de 100- Años de la Profundidad de Aguas Pluviales



Fresno Council of Governments

VRPA TECHNOLOGIES, INC.

WSP

Fresno Council of Governments

WSP

VRPA TECHNOLOGIES, INC.

— 2018 Roadway Network - Highways and Arterials (Red de Vías del 2018- Autopistas y Avenidas Principales)
 — Transit Lines (Líneas de Transito)

Source: CanESM2 Global Climate Model, downscaled by the Scripps Institution of Oceanography using the Localized Constructed Analogs technique. RCP 8.5 emissions scenario. Results should be used with caution.

0 5 10 20 30 40 Miles

Incendios Forestales

- El riesgo de incendios forestales está aumentando a través de CA por causa del incremento en temperaturas que están secando las tierras y la vegetación
- 172 millas del Sistema del Autopista Estatal en el Condado de Fresno se proyecta que estarán expuestas a riesgos de incendios forestales moderados y altos en el próximo siglo
- El Promedio de área quemada anualmente en el Condado de Fresno se espera que aumente de ~15,000 a ~44,000 hectáreas a finales del siglo

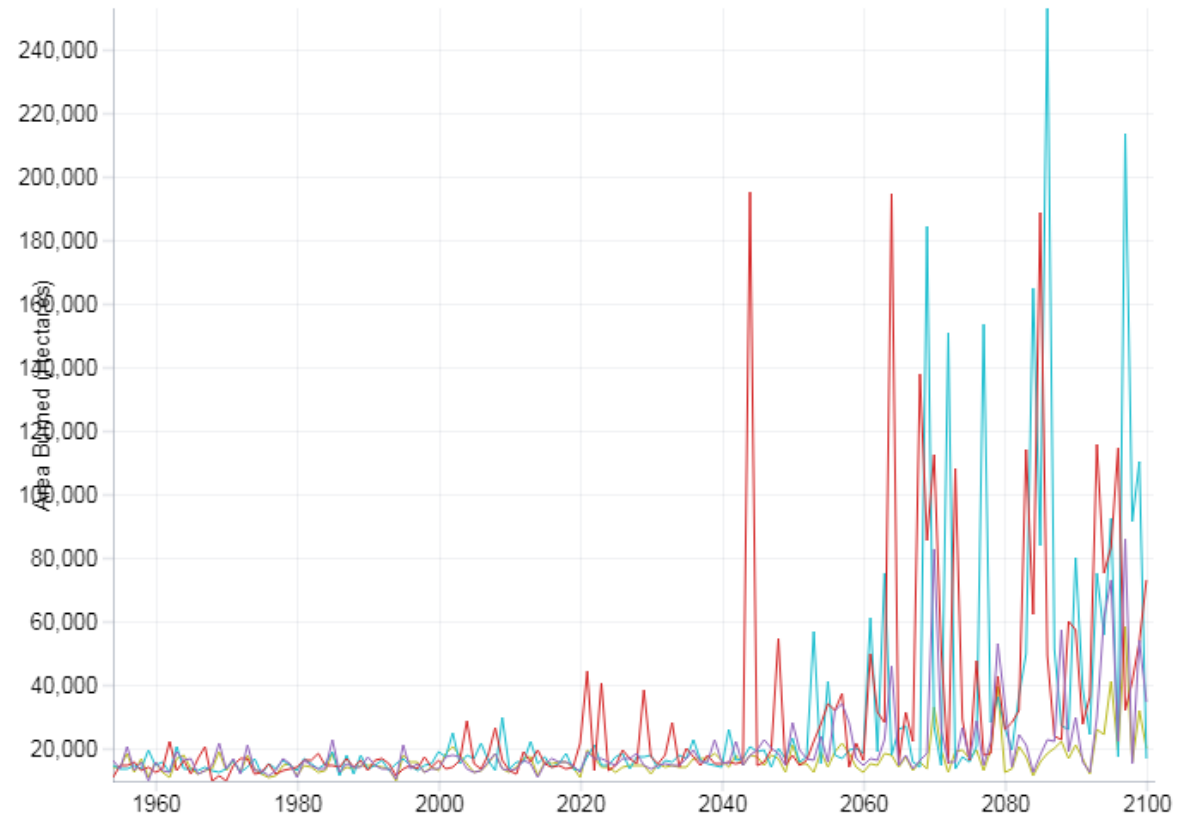
Annual Average of Area Burned

Fresno County, California

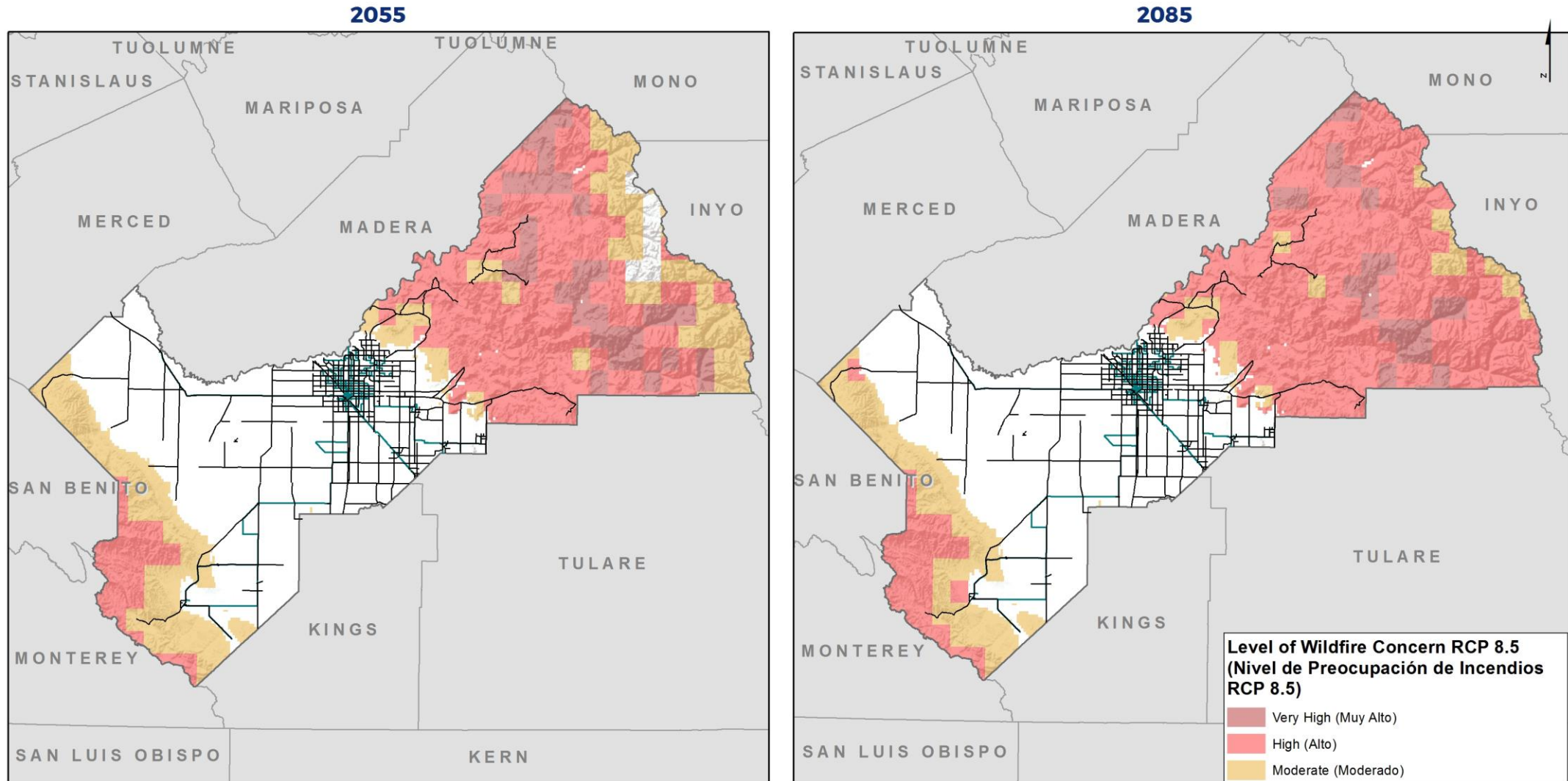
Emissions continue to rise strongly through 2050 and plateau around 2100 (RCP 8.5). Central Population Growth Projections.

Modeled Data (2006–2099)

■ CanESM2
■ CNRM-CM5
■ HadGEM2-ES
■ MIROC5



Incremento en Riesgo por Incendios



Ejemplos de Impactos al Sistema de Transporte y Usuarios

- Agrietamiento del pavimento y irregularidades debido al aumento de temperatura
- Impacto de salud relacionados al calor para los usuarios
- Inundaciones, derrumbes, y erosiones debido a los eventos de fuertes lluvias y escorrentía
- Daño a la infraestructura de las carreteras por los incendios forestales (barandales, alcantarillas, señalización)
- Evacuaciones y amenazas de seguridad para los usuarios
- Impactos a la calidad del aire



Resistencia del Sistema de Transporte

- Puede incluir diseño, operaciones y mantenimiento, respuesta de emergencia, planificación de tráfico, etc.
- Ejemplo de estrategias de adaptación para el sistema de transporte del Condado de Fresno:
 - Cambio del diseño de calidad de pavimento para reflejar clima futuro
 - Aumentar infraestructura del drenaje para anticipar eventos de aguas pluviales más grandes y frecuentes
 - Medidas de enfriamiento en las paradas de tránsito
 - Incrementar la alturas de puentes para anticipar flujo más pesados de ríos
 - Planificación de evacuación
 - Utilizar un espacio justificable para reducir el riesgo de incendios forestales a bienes



Resumen del Alcance Comunitario Público



Fresno Council of
Governments

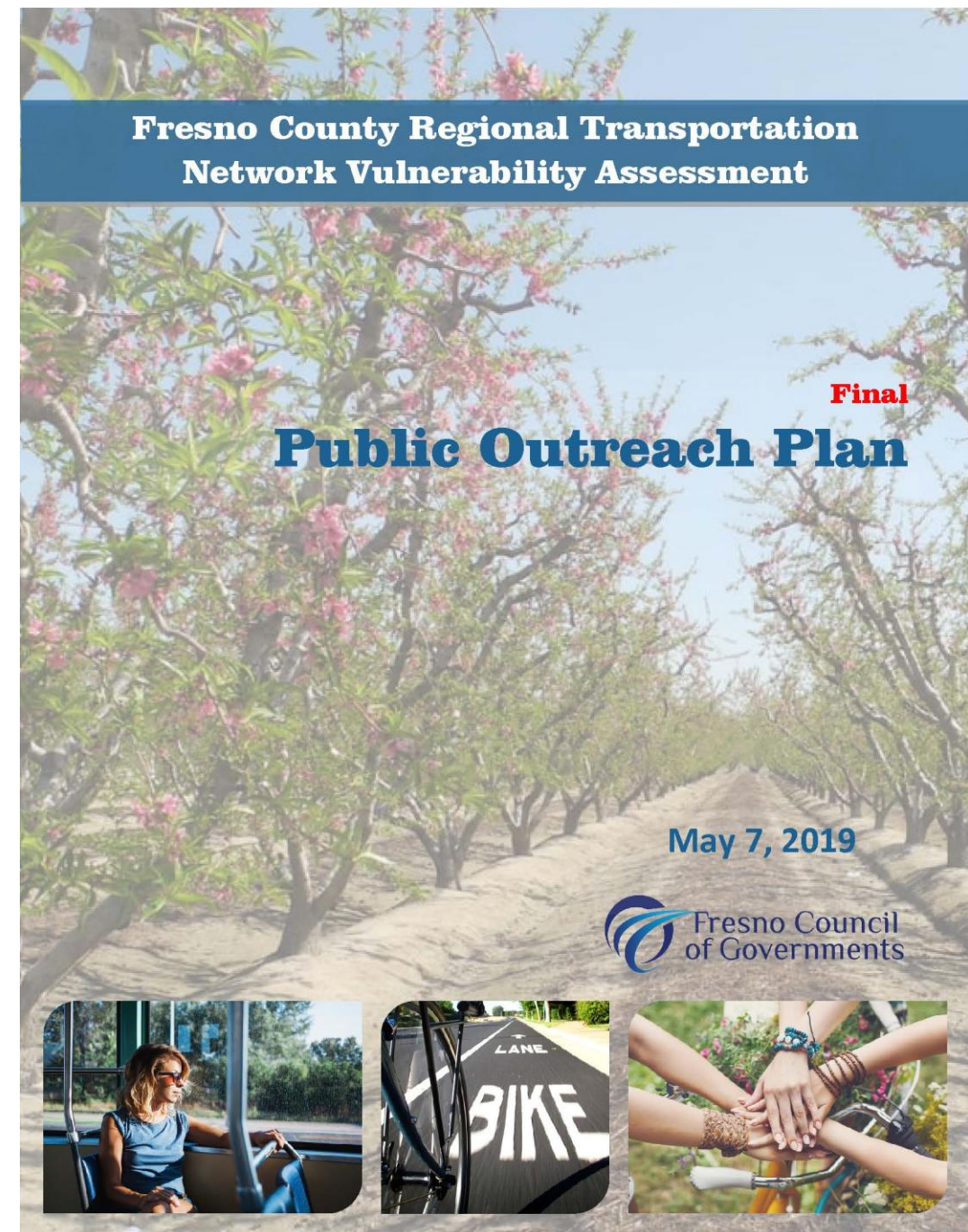


VRPA TECHNOLOGIES, INC.



Plan de Alcance Comunitario Público

- Describe como los socios de proyectos, partidos interesados, miembros de la comunidad, y el público en general estarán involucrados durante el proceso de planeación de la Evaluación de Vulnerabilidad de la Red de Transporte
- Una guía de actividades para involucrar a la comunidad será completada
- Un documento activo, fácil de ajustar si las actividades recomendadas no proveen la información necesaria



Actividades de Alcance Comunitario Completadas Hasta la Fecha

- Eventos de Carpa
- Entrevistas con Partidos Interesados
- Encuesta por Internet



Eventos de Carpa Completados e Entrevistas con Partidos Interesados

- Eventos de Carpa
 - Festival del Almendra de Kerman
 - Feria de Calle en Reedley San Joaquín Carnaval
- Entrevistas con Partidos Interesados
 - Personal del departamento de Planeación de la Ciudad y el Condado, Ingeniería y transito
 - Oficina del Condado de Fresno de Servicios de Emergencia
 - Representantes de Organizaciones Basadas en la Fe

Fresno County Regional Transportation Network Vulnerability Assessment

Fresno COG is preparing a Fresno County Regional Transportation Network Vulnerability Assessment that will identify where the region's **transportation network** is vulnerable to potential impacts of climate change, such as **increased temperature**, more **extreme heat days, flooding, drought, and wildfires**. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region.

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, what transportation improvements you would like to see locally in relation to climate change, and the solutions you think should be implemented to address these hazards to create a resilient regional transportation network.

1) What zip code do you live in? 93630

2) Have weather events or conditions ever affected your travel or required you to evacuate?
Yes ☒ No ☐

If yes to the above, "What type of event or condition?" ☒ Heat wave or extreme heat day
☐ Flooding ☐ Wildfire ☐ Poor air quality day ☐ Other (Please describe below)

Place a pin on the map indicating where you dealt with the event or condition. Map pin number: 16

Heat sometime impedes us from going places

If yes to the above, "Tell us about the event(s). How did it affect your travel?" (Please describe)
knows individuals affected by wildfire lost everything

3) What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least the concerning)
2 Longer and more severe droughts 1 Heat waves and higher temperatures 5 Heavy rains and flooding 7 Landslides and erosion 7 Subsidence (land sinking from groundwater use)
4 Wildfires 3 Lower air quality

Over →

Fresno County Regional Transportation Network Vulnerability Assessment

4) Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check all that apply)
☒ Create more comfortable and shaded transit stops ☒ Tree plantings along roadways and sidewalks ☐ Improved flood control ☐ Better evacuation planning and communications
☐ Expanded service and availability of on-demand transportation (such as vanpool, paratransit, etc.) particularly for elderly or disabled people ☒ Public transit service to cooling centers on high heat days ☒ Better management of flammable vegetation near roadways and structures
☐ Other (Please describe)

5) What do you think the Fresno region can do to prepare for the impacts of climate change with regard to transportation? (Please describe)
More buses, or options provided by the city.

6) What are your primary modes of transportation? (Check all that apply if you use multiple modes to reach your destination) ☒ Driving alone or with family ☐ Carpooling ☐ Taking a Taxi or rideshare (Uber/Lyft) ☐ Public transit (bus, train) ☐ Biking ☐ Walking
If biking, "How long do you bike to get to your destination or next mode of transportation (like a transit stop)?"
No due to the heat and lack of shade

If walking "How long do you walk to get to your destination or next mode of transportation (like a transit stop)?"
30-35 mins.

7) What was your household income before taxes in 2018?
☐ Less than \$14,000 ☒ \$15,000 to \$24,999 ☐ \$25,000 to \$35,999
☐ \$36,000 to \$49,999 ☐ \$50,000 or more



Encuesta en sitio de internet

- Las encuestas en el sitio de internet les permite a los participantes el responder en Inglés o Español
- Disponible en el sitio de internet de Fresno COG o visitando <https://www.surveymonkey.com/r/FresnoTNVA>
- Cubre las mayores preocupaciones que tienen los participantes con el impacto de los cambios climáticos, como usan el sistema de transporte para transportarse, y que mejoras en el transporte les gustaría ver localmente como respuesta a los cambios climáticos, para crear una red de transporte regional resistente .

Fresno County Regional Transportation Network Vulnerability Assessment (*Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno*)

Community Survey (*Encuesta Comunitaria*)

We need your help shaping the Fresno region's future! (*¡Necesitamos su ayuda para dar forma al futuro de la región de Fresno!*)

The Fresno Council of Governments is identifying where the region's transportation network is vulnerable to potential impacts of climate change. These impacts could include increased temperature, more extreme heat days, flooding, drought, and wildfires. This effort is called the Fresno County Regional Transportation Network Vulnerability Assessment. The goal of this assessment is to find solutions that will benefit the entire Fresno County community and improve transportation in the region. (*El Consejo de Gobiernos de Fresno está identificando los lugares donde la red de transportación de la región es vulnerable a impactos potenciales a causa del cambio climático. Estos impactos podrían incluir incremento de temperatura, días de calor extremo, hundimiento, sequía, e incendios forestales. Este esfuerzo es conocido como la Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno. La meta de esta evaluación es el encontrar soluciones que beneficiarán a la comunidad entera del Condado de Fresno y mejorar la transportación en la región.)*

Please complete this anonymous survey to tell us what impacts of climate change you are most concerned about, how you use the transportation system to get around, and what transportation improvements you would like to see locally in response to climate change, to create a resilient regional transportation network. (*Por favor complete esta encuesta anónima para informarnos cuáles son los impactos del cambio climático que más le preocupan, como utiliza el sistema de transporte para navegar, y que tipo de mejoras de transporte le gustaría ver localmente en respuesta al cambio climático, para crear una red sólida de transporte regional.*)

OK

0 of 16 answered



Preguntas



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



Sesión en Grupos



Fresno Council of
Governments



VRPA TECHNOLOGIES, INC.



¡Gracias por su tiempo!

Si tiene cualquier pregunta o comentario, no dude en contactarnos.



Información de Contacto del Equipo

- **Meg Prince**, FCOG Project Manager, MPrince@fresnocog.org
- **Tim Grose**, Consultant Project Manager, Timothy.Grose@wsp.com
- **Georgiena Vivian**, Collaboration and Community Engagement Lead, gvivian@vrpatechnologies.com



Fresno Council of
Governments



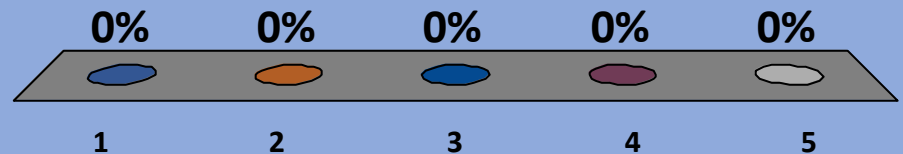
Fresno County Regional Transportation Network Vulnerability Assessment

June 19, 2019



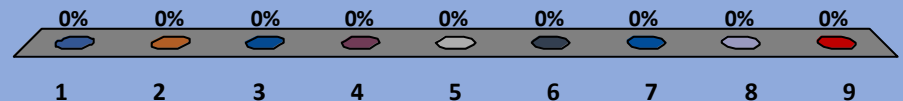
What is your age?

1. Less than 18
2. 18-24
3. 25-44
4. 45-64
5. 65 years and over



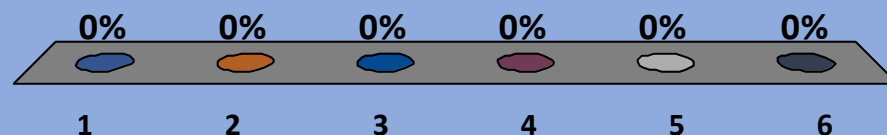
What is your racial or ethnic background?

1. White or Caucasian
2. Hispanic, Latino, or Spanish origin
3. American Indian or Alaska Native
4. Black or African American
5. Asian
6. Middle Eastern or North African
7. Native Hawaiian or other Pacific Islander
8. Other
9. Rather not answer



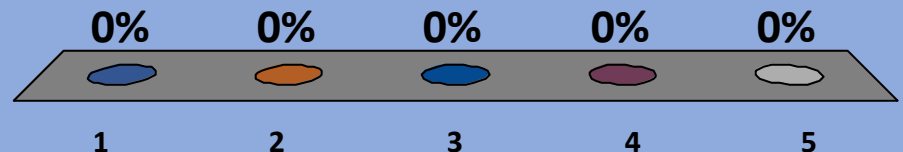
What is your household income?

1. Less than \$15,000
2. \$15,000 - \$24,999
3. \$25,000 - \$35,999
4. \$36,000 - \$49,999
5. \$50,000 or more
6. Rather not say



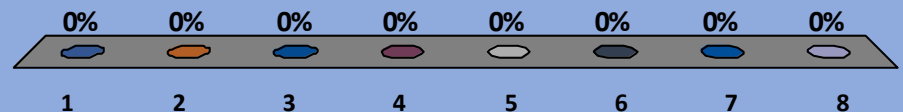
Where do you live?

1. City of Fresno
2. City of Clovis
3. Other City in Fresno County
4. Unincorporated County Area outside of the City of Fresno
5. Outside of Fresno County



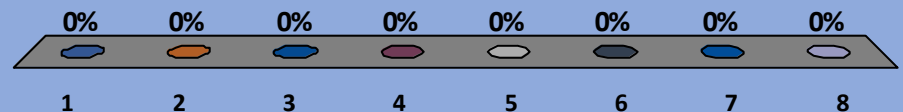
Which of the following subgroups BEST describes you?

1. Elected Official
2. Appointed Official
3. Private Citizen
4. Student
5. Public Agency Staff
6. Community Based Organization/Faith Based Organization
7. Environmental Justice Advocate
8. Other



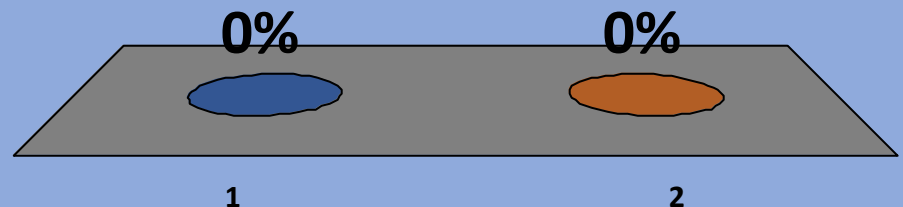
What is your primary mode of transportation?

1. Driving alone or with family
2. Carpooling
3. Taking a taxi or ride share (Uber/Lyft)
4. Public Transit (bus, train)
5. Biking
6. Walking
7. Other
8. I have more than one primary mode of transportation



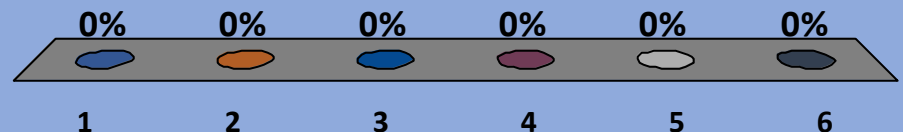
Have weather events or conditions such as high heat, flooding, or wildfire ever affected your travel, or required you to evacuate?

1. Yes
2. No



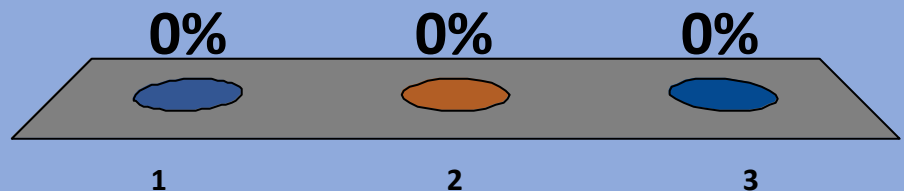
If yes, what type of event or condition?

1. Heat wave or extreme heat day
2. Flooding
3. Wildfire
4. Poor air quality day
5. Other
6. Weather events or conditions have never affected my travel or required me to evacuate



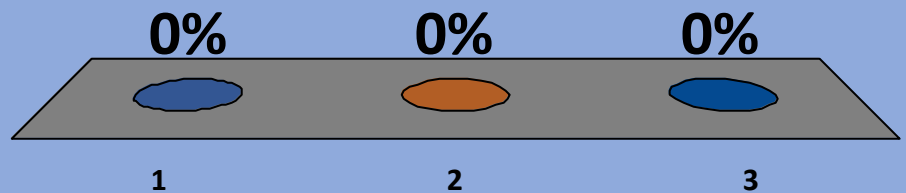
How concerned are you about the impacts of climate change? For example, increases in extreme temperatures, drought, flood risk, and wildfires.

1. Very
2. Somewhat
3. Not at all



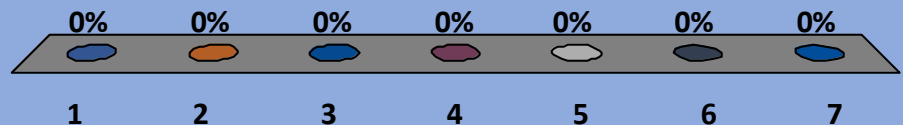
Do you think that climate change will impact your life directly?

1. Yes
2. No
3. Not sure



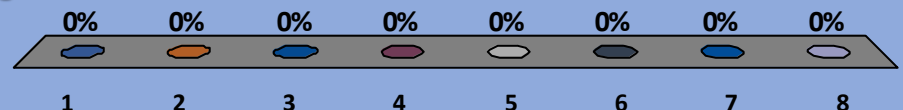
What impacts from climate change are you most concerned about? (Please rank the following in order of importance, where 1 is the most concerning and 7 is the least concerning)

- 1. Longer and more severe droughts**
- 2. Heat waves and higher temperature**
- 3. Heavy rains and flooding**
- 4. Landslides and erosions**
- 5. Subsidence (land sinking from groundwater use)**
- 6. Wildfires**
- 7. Lower air quality**



Which of the following transportation improvements are most important for addressing extreme weather and climate change? (Check All That Apply)

1. Create more comfortable and shaded transit stops
2. Tree planting along roadways and sidewalks
3. Improved flood control
4. Better evacuation planning and communications
5. Expanded service and availability of on-demand transportation during high heat or other extreme weather events, particularly for elderly or disabled people
6. Public transit service to cooling centers on high heat days
7. Better management of flammable vegetation near roadways and structures
8. Other

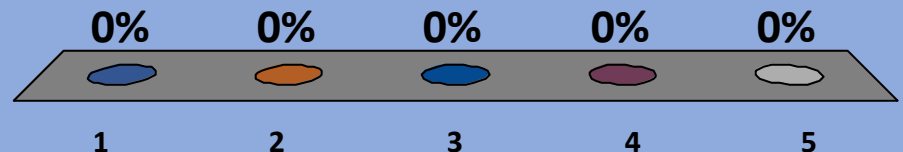


Meeting Evaluation



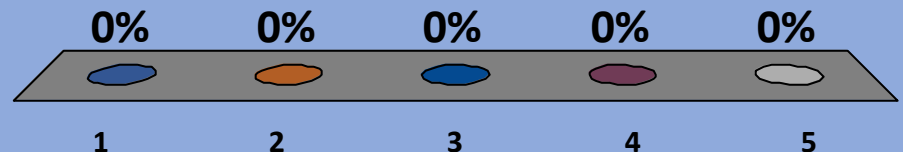
How effective has this meeting been to express your opinions?

1. Not at all effective
2. Not very effective
3. Somewhat effective
4. Effective
5. Very effective



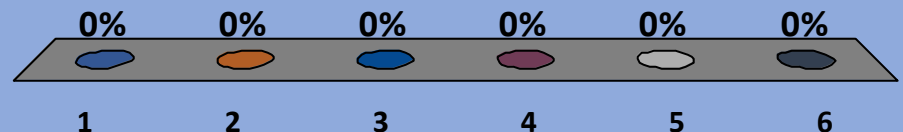
How useful were the clickers to provide your opinion?

1. Not at all effective
2. Not very effective
3. Somewhat effective
4. Effective
5. Very effective



How did you learn about today's workshop?

1. Received a flyer
2. Received an email
3. Newsletter
4. Social Media
5. Word of mouth
6. Other



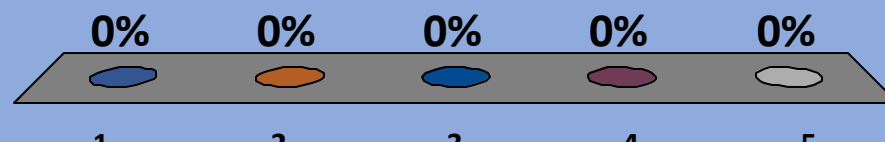
Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

19 de Junio del 2019



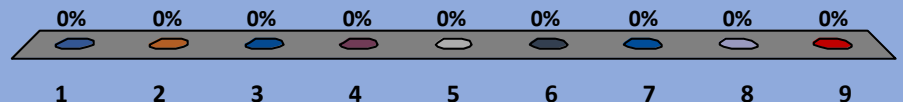
¿Cual es tu edad?

1. Menos de 18
2. 18-24
3. 25-44
4. 45-64
5. Más de 65



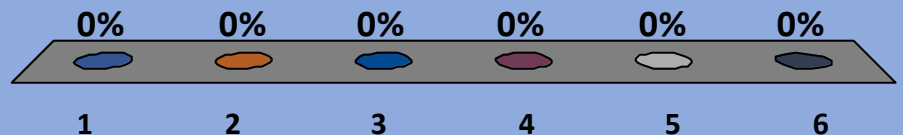
¿Cuál es tu origen racial y étnico?

1. Blanco o Caucásico
2. Origen Hispano, Latino o Español
3. Indio Americano o Nativo del Alaska
4. Negro o Afroamericano
5. Asiático
6. Oriente Medio o Norte de África
7. Nativo de Hawái o de otras islas del Pacífico
8. Otro
9. Prefiero no responder



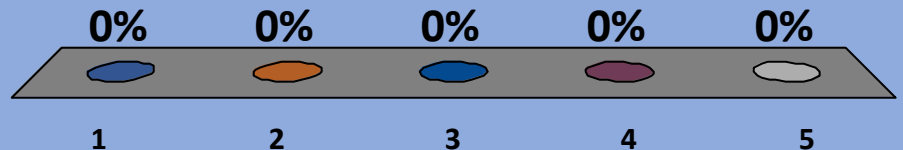
¿Cual es el ingreso de su hogar?

1. Menos de \$15,000
2. \$15,000 - \$24,999
3. \$25,000 - \$35,999
4. \$36,000 - \$49,999
5. Más de \$50,000
6. Prefiero no responder



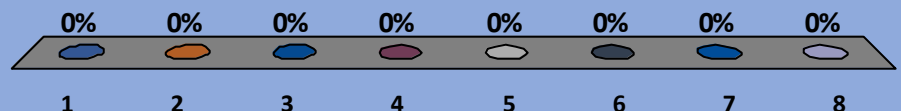
¿Donde vives?

1. Ciudad de Fresno
2. Ciudad de Clovis
3. Otra ciudad del condado de Fresno
4. Área no incorporada del condado fuera de la ciudad de Fresno
5. Fuera del condado de Fresno



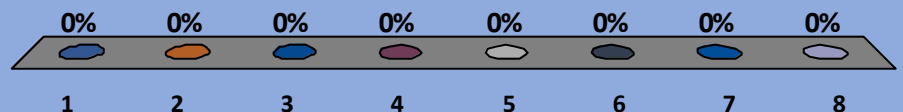
¿Cuál de los siguientes subgrupos te describe MEJOR?

1. Funcionario Oficial
2. Oficial Designado
3. Ciudadano privado
4. Estudiante
5. Personal de la agencia pública
6. Basado en la comunidad
Organización/ Organización
Basada en la Fe
7. Abogacía de Justicia Ambiental
8. Otro



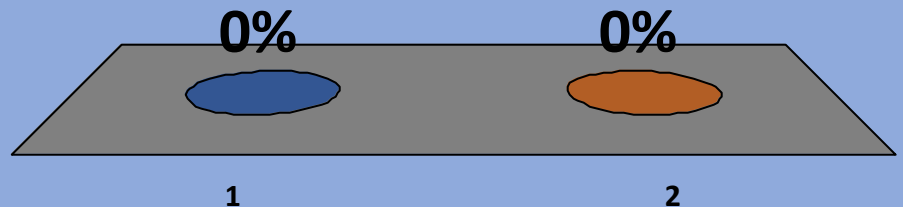
¿Cuáles son sus medios de transporte primarios?

1. Manejando solo o con su familia
2. Viaje en grupo
3. Tomando un Taxi o un viajes compartidos (Uber/Lyft)
4. Transporte público (camión , tren)
5. Bicicleta
6. Caminando
7. Otro
8. Tengo mas de un modo primario de transportación



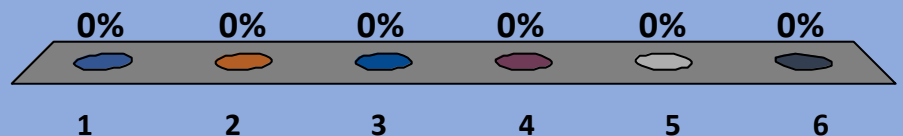
¿Han afectado los eventos climáticos u otras condiciones su habilidad de viajar o que haya tenido que evacuar

1. Si
2. No



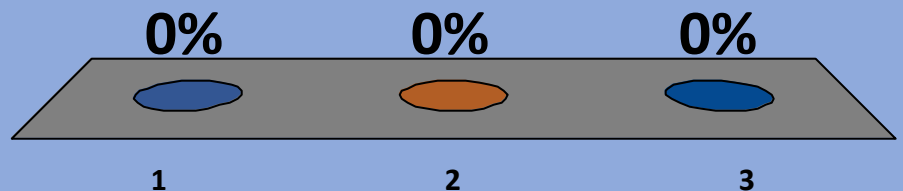
En caso de responder Si , ¿Que tipo de evento o condición?”

1. Ola de calor o día de calor extremo
2. Inundación
3. Incendio forestal
4. Día con mala calidad de aire
5. Otro
6. Eventos meteorológicos o condiciones nunca han afectado mi viaje o me han requerido que evacue



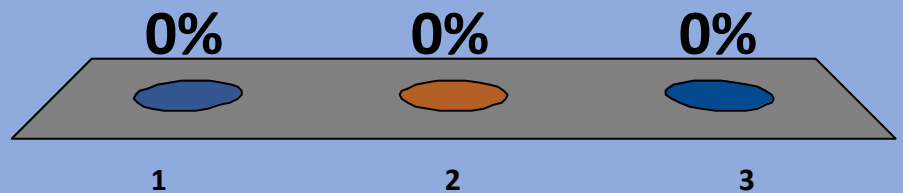
¿Qué tan preocupado está por los impactos del cambio climático? Por ejemplo, aumentos en temperaturas extremas, sequía, riesgo de inundaciones e incendios forestales.

1. Mucho
2. Un Poco
3. Para Nada



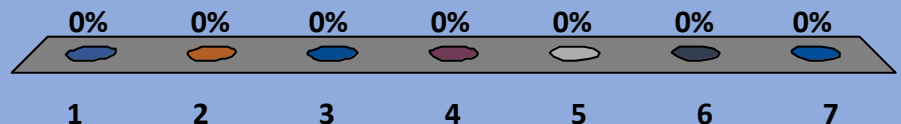
¿Crees que el cambio climático afectará tu vida directamente?

1. Si
2. No
3. No estoy seguro/a



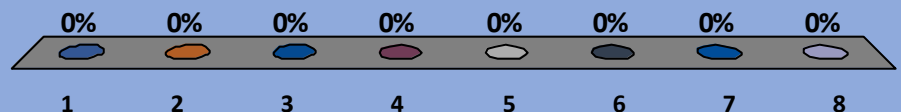
¿Cuales son los impactos por el cambio del clima que más le preocupan? (Favor de clasificar lo siguiente en orden de importancia, en donde el 1 es de más preocupación y el 7 es el que menos le preocupe)

1. Sequias más severas y alargadas
2. Olas de calos y temperaturas altas
3. Fuertes lluvias e inundaciones
4. Derrumbes y erosión
5. Subsistencia (hundimiento de las tierras debido al uso del agua subterránea)
6. Incendios forestales
7. Reduccion de calidad del aire



¿Cuál de las siguientes mejoras de transporte son de más importancia para combatir el clima extremo y los cambios climáticos? (Marca todas las opciones que aplican)

1. Crear más paradas de transito cómodas y con sombra
2. Plantar árboles en el camino de las carreteras y las banquetas
3. Mejorar el control de inundaciones
4. Better evacuation planning and communications
5. Expandir servicio y disponibilidad de transportación a demanda durante los días de calor extremo o otro evento de clima extremo, particularmente para mayores de edad o personas discapacitadas
6. Servicio de transporte público a centros de enfriamiento en días muy calurosos
7. Mejor manejo de la vegetación inflamables cerca de los carreteras y estructuras
8. Otros

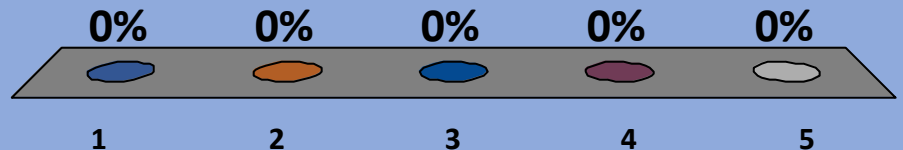


Evaluación de la Junta



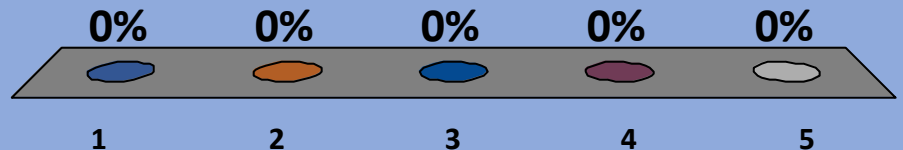
¿Qué tan efectiva ha sido esta reunión para expresar sus opiniones?

1. Nada efectiva
2. No muy efectiva
3. Algo efectiva
4. Efectiva
5. Muy efectiva



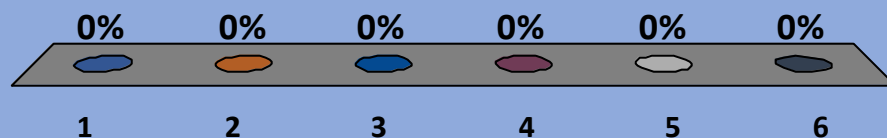
¿Qué tan útiles fueron los aparatos electrónicos para dar tu opinión?

1. Nada efectivo
2. No muy efectivo
3. Algo efectivo
4. Efectivo
5. Muy efectivo



¿Cómo aprendiste sobre el taller de hoy?

1. Recibió un volante
2. Recibe un correo electrónico
3. Boletín
4. Media Social
5. De boca en boca
6. Otro



Fresno County Transportation Network Vulnerability Assessment

Fresno City College Workshop – June 19, 2019

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Fresno City College Workshop – June 19, 2019

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Fresno City College Workshop – June 19, 2019

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



Fresno County Transportation Network Vulnerability Assessment

Fresno City College Workshop – June 19, 2019

Name: _____

Email: _____

Comments: _____

Visit www.fresnocog.org/project/sb1-planning-studies/
for additional information



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Fresno City College Workshop – June 19, 2019

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Fresno City College Workshop – June 19, 2019

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Fresno City College Workshop – June 19, 2019

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



**Evaluación de Vulnerabilidad de la Red de
Transporte del Condado de Fresno**
Fresno City College Workshop – June 19, 2019

Nombre: _____

Correo electrónico: _____

Comentarios: _____

Visite www.fresnocog.org/project/sbl-planning-studies/
Para más información



Fresno County Regional Transportation Network Vulnerability Assessment

The **Fresno Council of Governments** is preparing a **Fresno County Regional Transportation Network Vulnerability Assessment (TNVA)**, funded through Senate Bill 1. The TNVA will identify areas of the region where the multi-modal transportation network is vulnerable to climate change hazards and identify strategies to remedy potential impacts. These responses will be designed to provide additional benefits to the broader community through public health, environmental, equitable, and economic improvements.

The main climate hazards that will be assessed as part of the TNVA are **temperature rise and extreme heat, flooding from extreme precipitation events, and wildfire risk**. In general, projected changes are:

- **High and low temperatures are expected to rise** across Fresno County, and there will be more heat waves and extreme heat days.
- Precipitation projections are uncertain and **precipitation will become even more volatile**, but in general it's expected that both droughts and storm events will become more frequent and severe.
- **Wildfire risk is increasing** as soils and vegetation dry out from temperature rise.



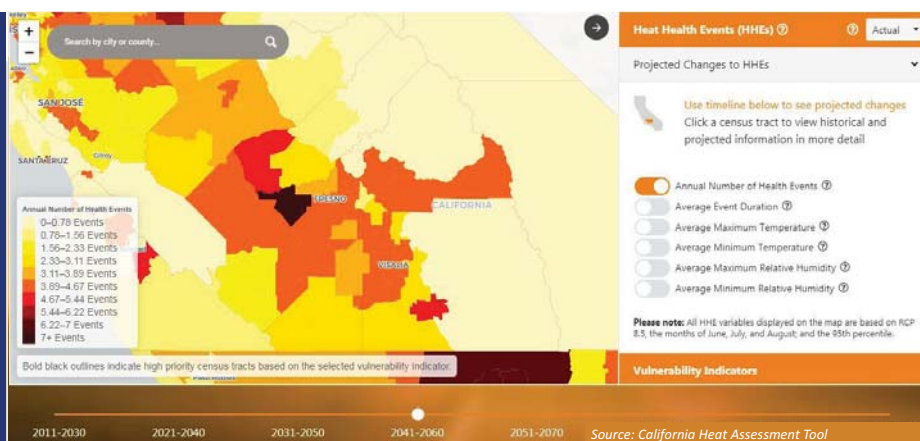
Clovis, CA, photo by David Prosser, Creative Commons License 2.0

Heat Health Events

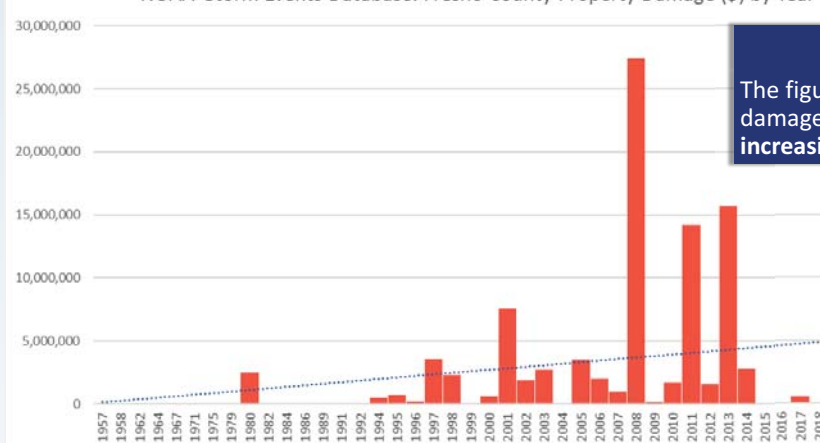
Heat health events are **expected to increase** over the coming century.

A heat health event is any event that results in a **negative public health impact**, such as an emergency room visit.

See the map to the right for the **projected increases in annual heat health events** by mid-century.



NOAA Storm Events Database: Fresno County Property Damage (\$) by Year



Storm Events

The figure to the left shows how property damage costs due to **storm events** are already **increasing** in Fresno County.



Washout on SR-41, photo courtesy of Caltrans



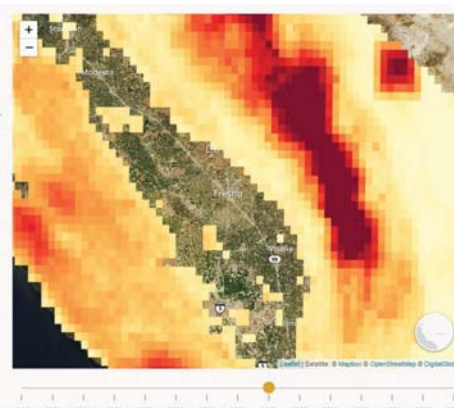
Area Burned

Average annual area burned is **expected to increase by 205%** in Fresno County by the end of the century.

Rim Fire as seen from SR-41, photo by Andrew Adams, Creative Commons License 2.0



Source: Cal-Adapt



Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

El Consejo de Gobiernos de Fresno esta preparando una **Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno (TNVA)**, financiada por la ley del Senado 1. La TNVA identificará las áreas de la región donde la red de transporte multimodal es vulnerable a los peligros por el cambio de clima e identificar estrategias para remediar los posibles impactos. Estas respuestas estarán diseñadas para proveer beneficios adicionales a la amplia comunidad por medio de mejoras a la salud pública, el medio ambiente, equitativas, y económicas.

Los principales peligros climáticos que serán evaluados como parte del TNVA son el **aumento de temperatura y calentamiento extremo, inundaciones debido a eventos de precipitación extremos, y riesgo de incendios forestales**. En general, los cambios que se proyectan son:

- **Las temperaturas altas y bajas se esperan que aumenten** por todo el Condado de Fresno, y habrá más olas de calor y días de calentamiento extremo.
- Las proyecciones de precipitación son inseguras y **la precipitación será aún más inestable**. Pero en general se espera que ambos eventos de sequías y tormentas sean más frecuentes y severos.
- **El incendio forestal esta incrementando** al secarse la tierra y la vegetación por el aumento de la temperatura.

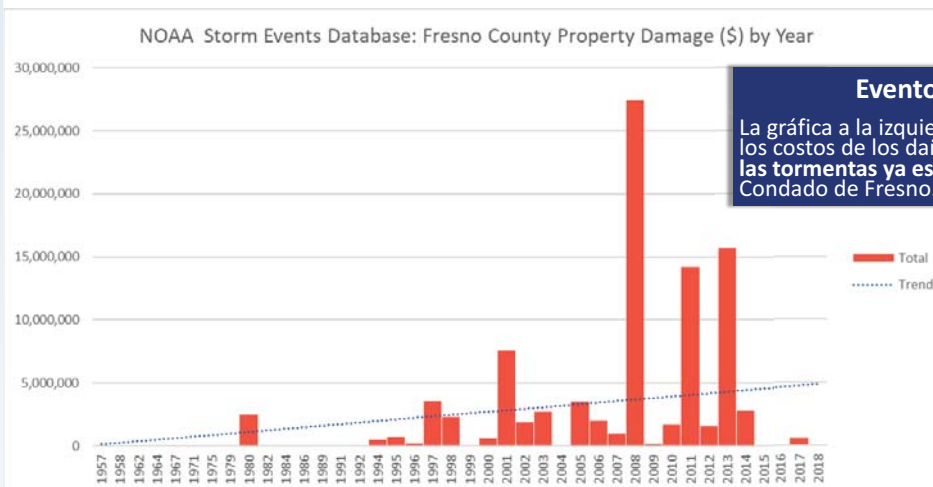
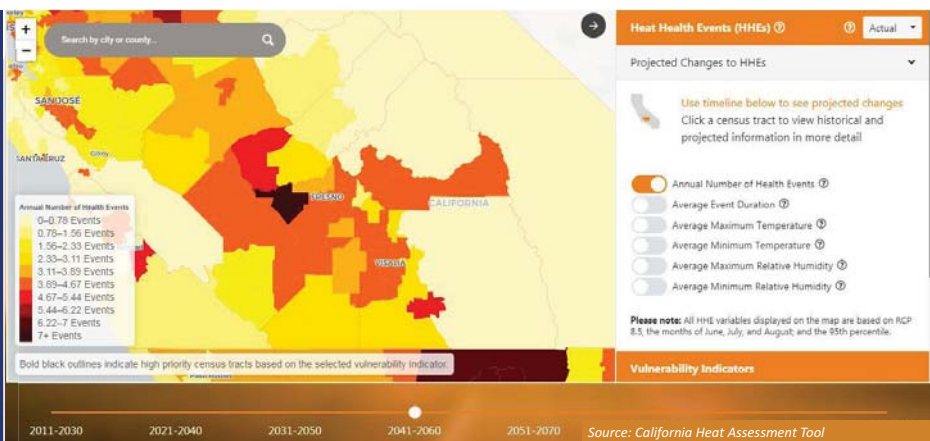


Clovis, CA, photo by David Prosser, Creative Commons License 2.0

Eventos de Salud por Calentamiento
Los eventos de salud por calentamiento se espera que aumenten en el próximo siglo.

Un evento de salud por calentamiento es cualquier evento que resulta en un **impacto de salud pública negativa**, como la visita a la sala de emergencias.

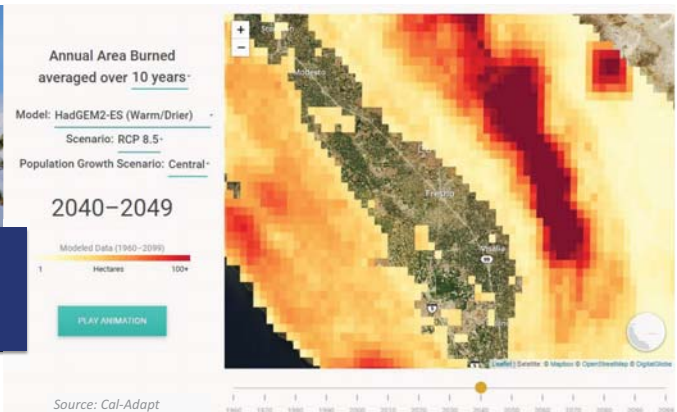
Vea el mapa a la derecha para ver el **aumentos proyectados en los eventos de salud anuales a causa del calentamiento** de aquí a medio siglo.



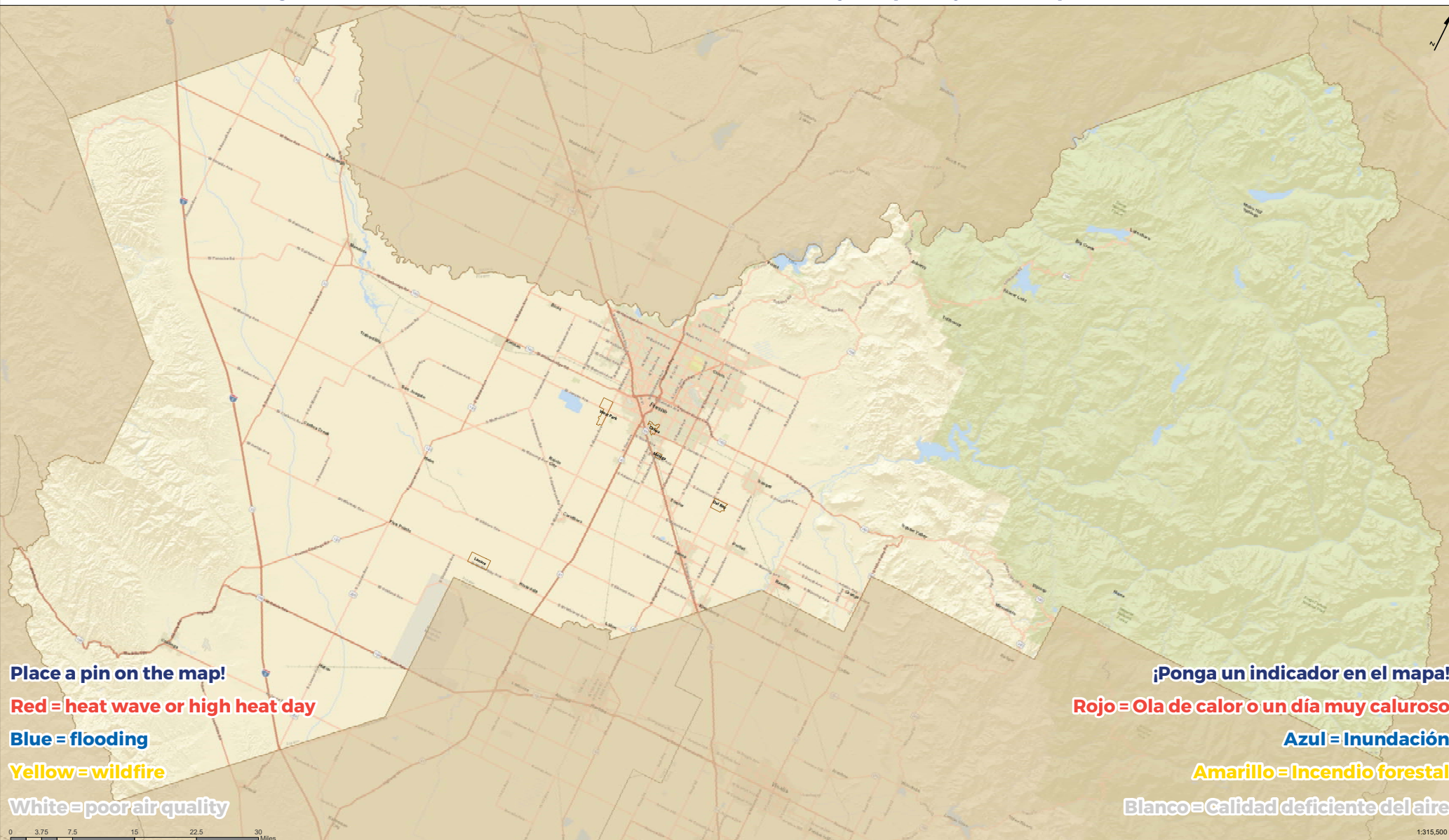
Área Quemada

El Promedio anual de área quemada se espera que **aumente por un 205 %** en el Condado de Fresno para fines del siglo.

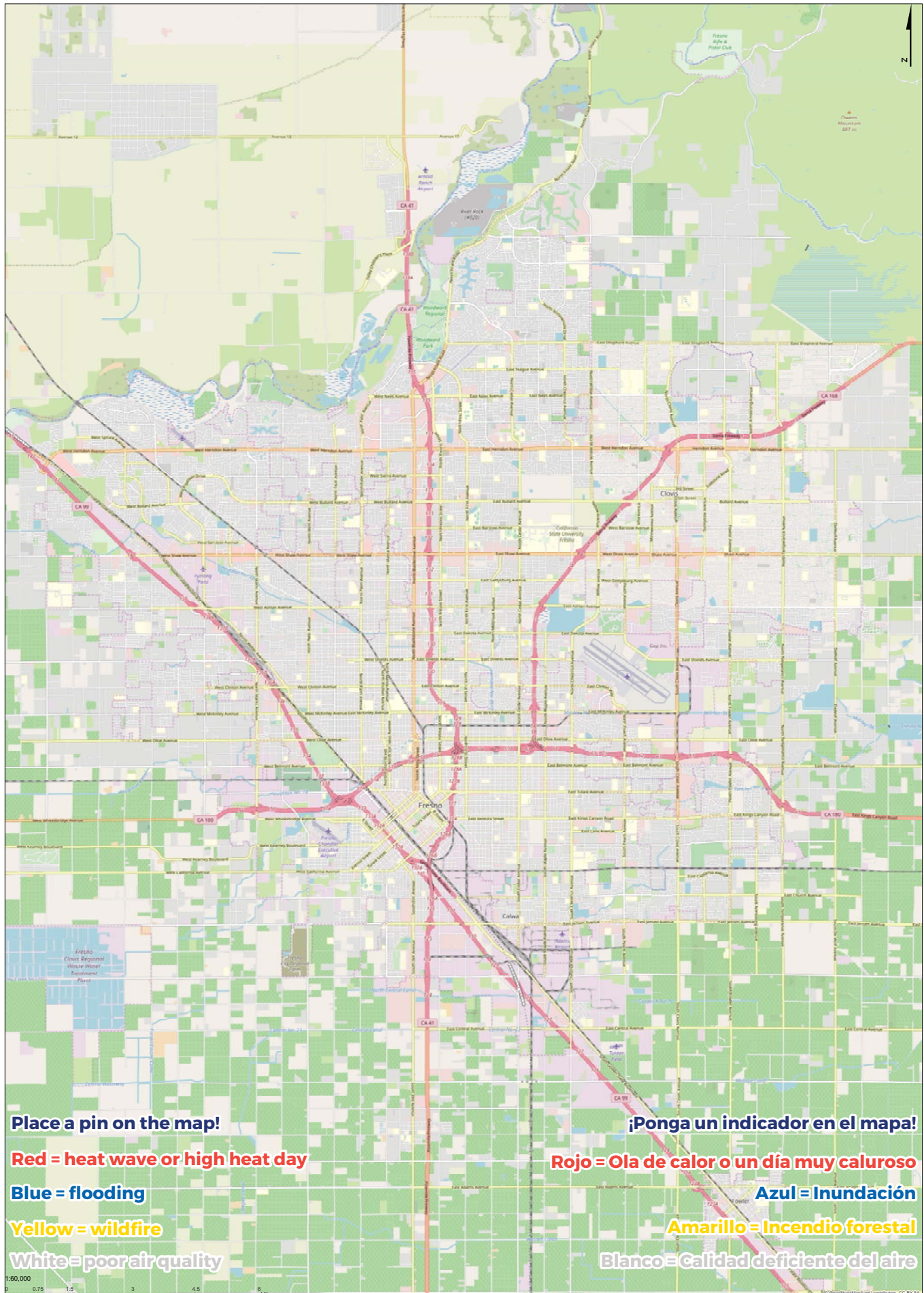
Rim Fire as seen from SR-41, photo by Andrew Adams, Creative Commons License 2.0



Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?

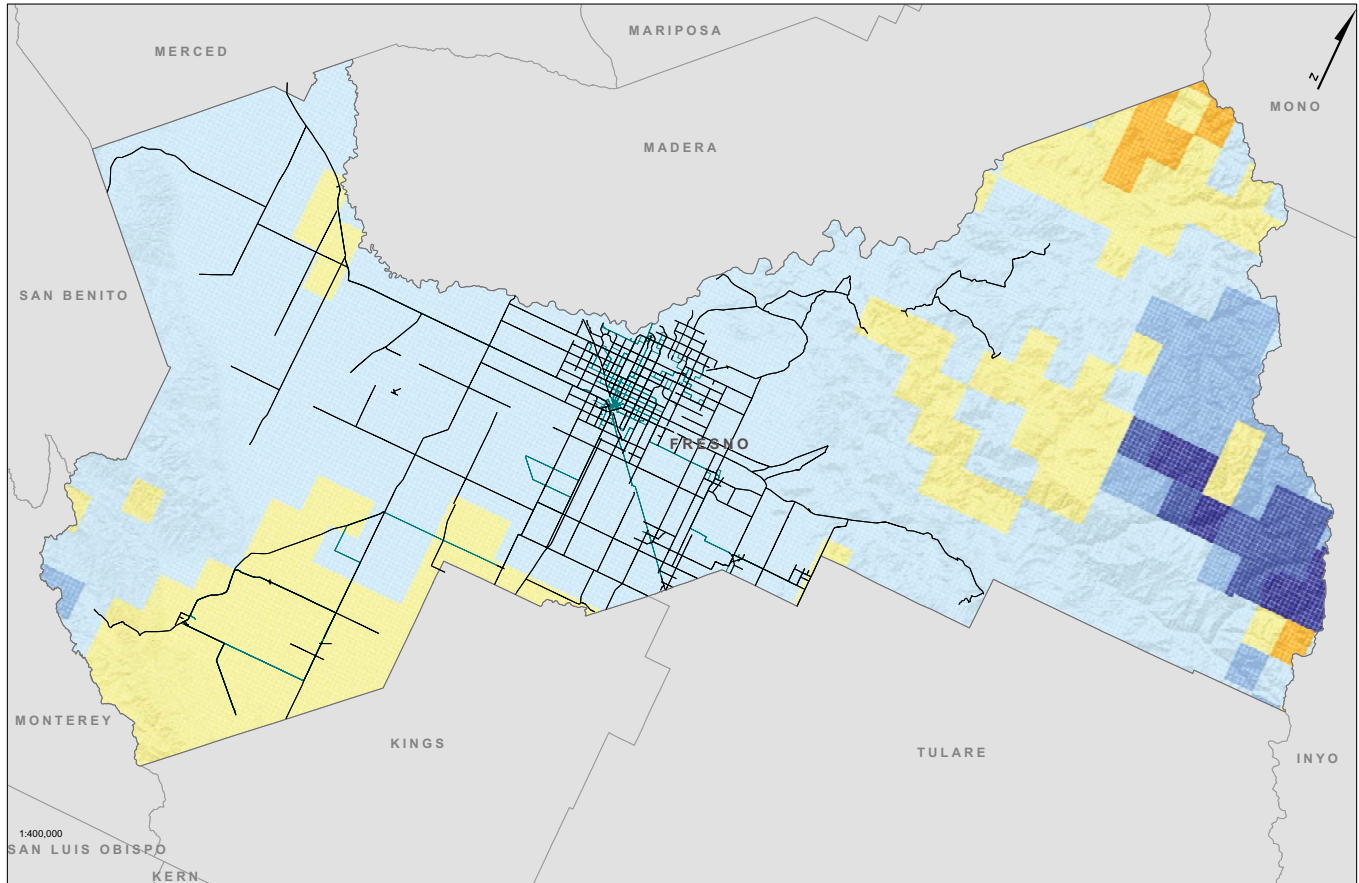


Has a weather event or other condition ever affected your ability to travel or required you to evacuate? Where?
¿Ha afectado algún evento climático u otra condición su habilidad de viajar o que haya tenido que evacuar? ¿En dónde?



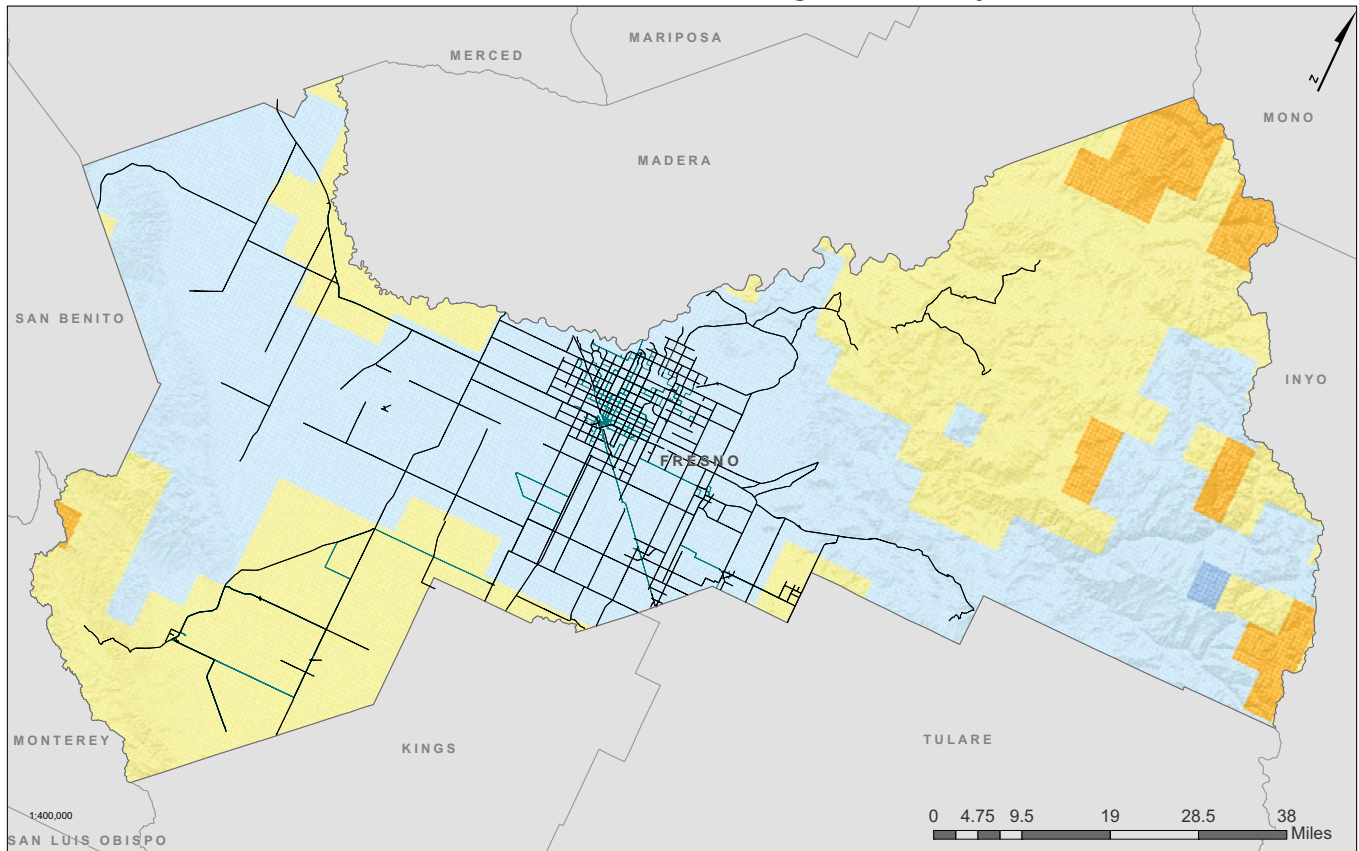
Change in 100-Year Storm Depth by 2055

Cambio en 100- Años de la Profundidad de Aguas Pluviales para el 2055



Change in 100-Year Storm Depth by 2085

Cambio en 100- Años de la Profundidad de Aguas Pluviales para el 2085



Transit Lines (Líneas de Transito)

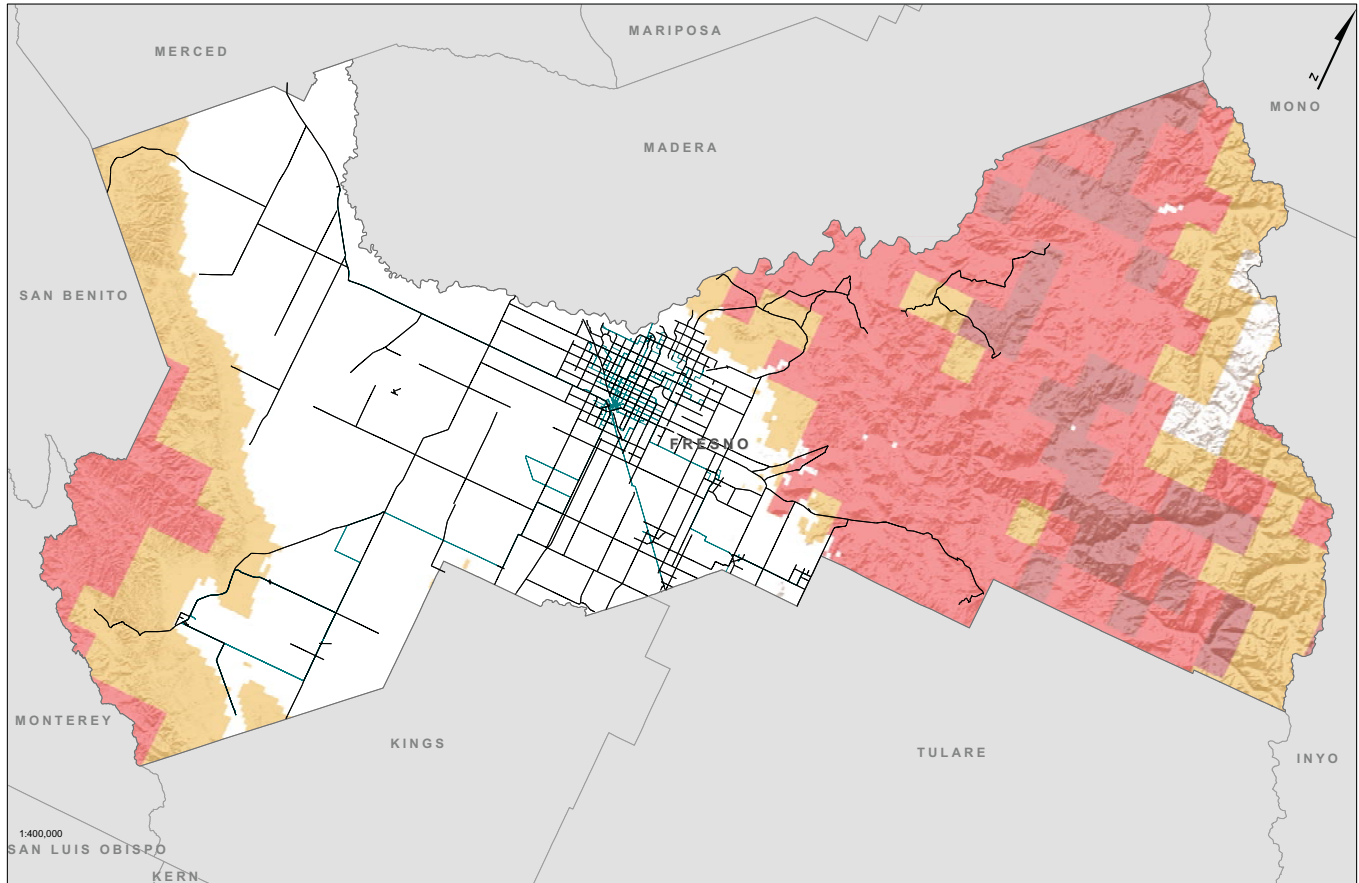
2018 Roadway Network - Highways and Arterials (Red de Vías del 2018-Autopistas y Avenidas Principales)

Inches Change in 100-Year Storm Depth - Historical to 2085 (Cambio en Pulgadas de 100- Años de la Profundidad de Aguas Pluviales - Historico hasta el 2085)

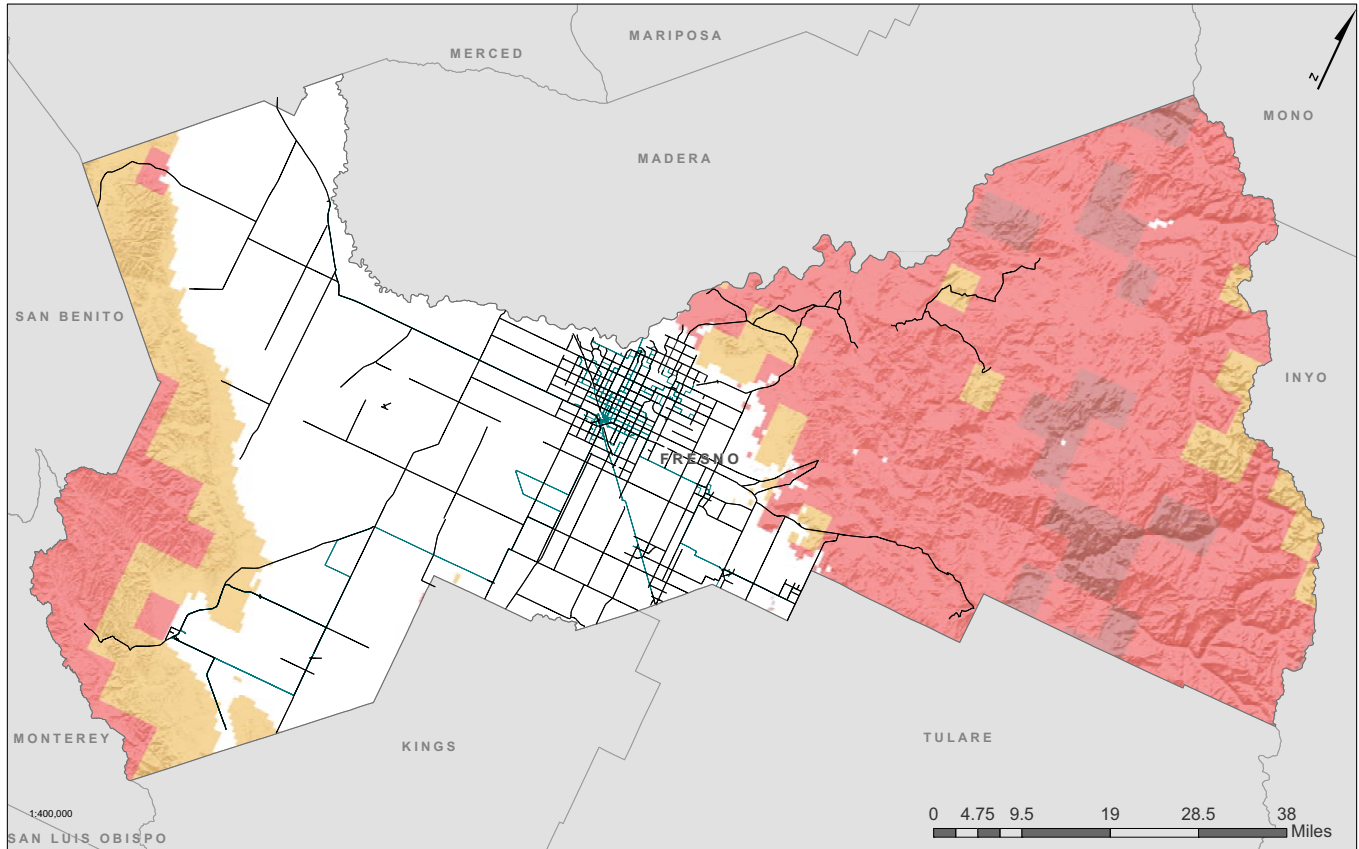


Source: CanESM2 Global Climate Model, downscaled by the Scripps Institution of Oceanography using the Localized Constructed Analogs technique. RCP 8.5 emissions scenario. Results should be used with caution.

Increase in Wildfire Risk by 2055 Incremento en Riesgo por Incendios para el 2055



Increase in Wildfire Risk by 2085 Incremento en Riesgo por Incendios para el 2085



— Transit Lines (Líneas de Transito)

— 2018 Roadway Network - Highways and Arterials (Red de Vías del 2018-Autopistas y Avenidas Principales)

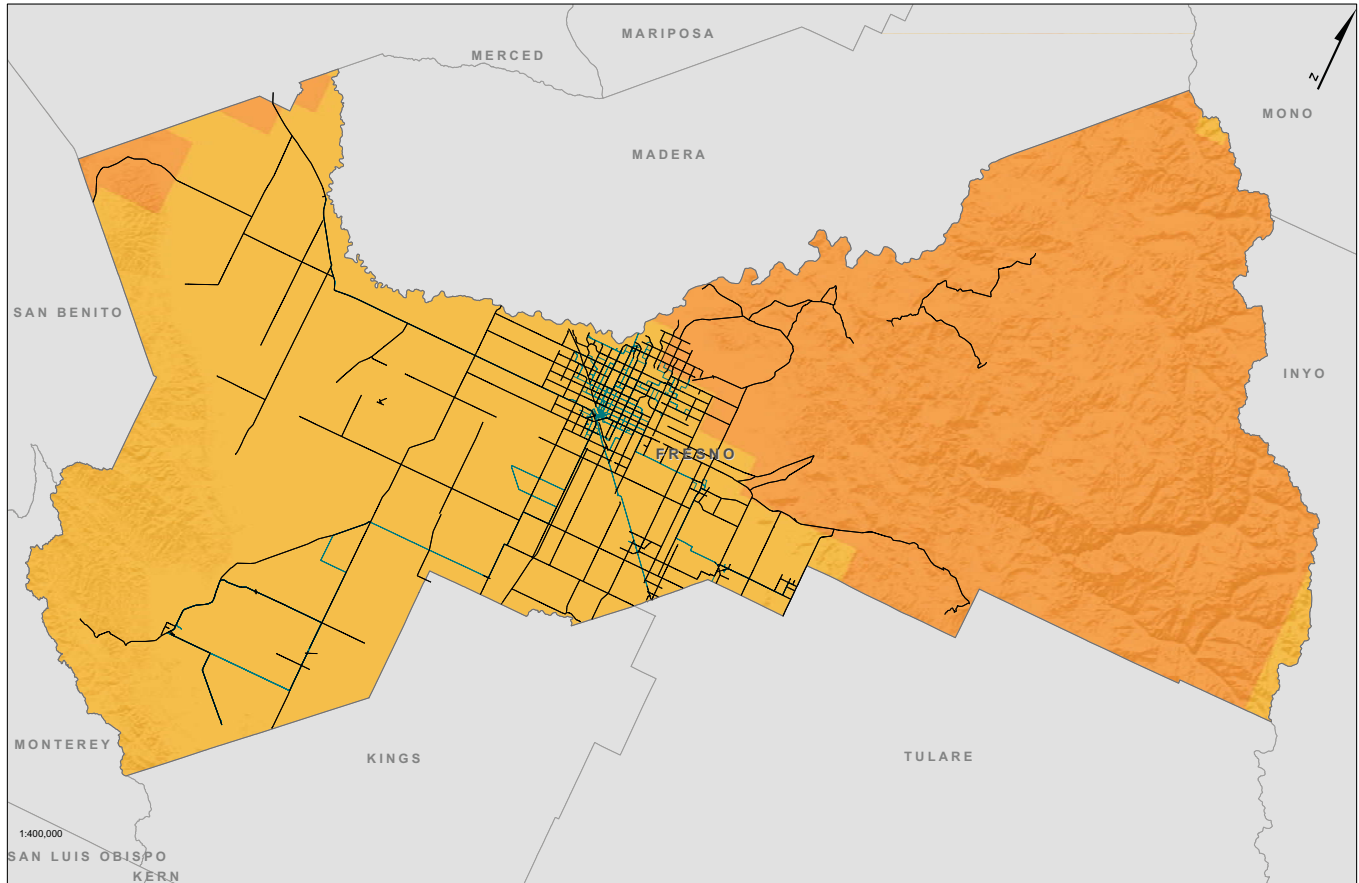
Level of Wildfire Concern RCP 8.5 (Nivel de Preocupación de Incendios RCP 8.5)

Very High (Muy Alto)
High (Alto)
Moderate (Moderado)

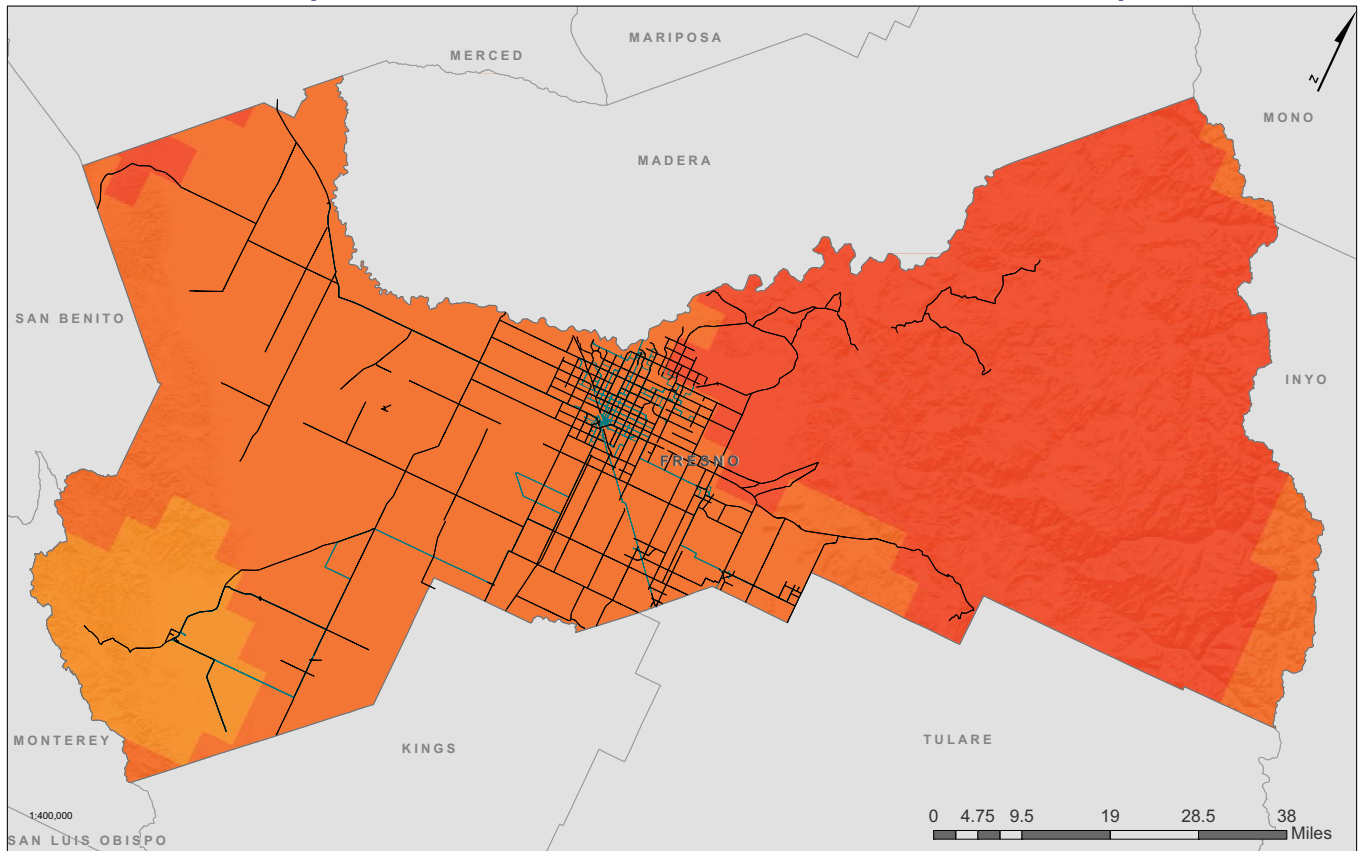
Fresno County Regional Transportation Network Vulnerability Assessment
Evaluación de Vulnerabilidad de la Red de Transporte Regional del Condado de Fresno

Source: Amalgamation of three fire models: 1) MC2-EPA Climate Impacts Risk Assessment, USFS, 2) MC2-Applied Climate Science Lab at the University of Idaho, 3) University of California Merced model.

Increase in Average Maximum Temperature over Seven Consecutive Days by 2055
Incremento en Temperaturas Máximas Promedio a través de Siete Días Consecutivos para el 2055



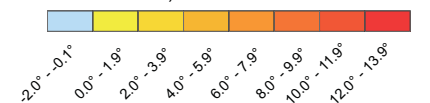
Increase in Average Maximum Temperature over Seven Consecutive Days by 2085
Incremento en Temperaturas Máximas Promedio a través de Siete Días Consecutivos para el 2085



— Transit Lines (Líneas de Transito)

— 2018 Roadway Network - Highways and Arterials (Red de Vías del 2018-Autopistas y Avenidas Principales)

Change in 7-Day Average Maximum Temperature (°F) (Cambio en Promedio de Temperatura (°F) Máxima de 7- Días)



Source: CMCC-CMS Global Climate Model, downscaled by the Scripps Institution of Oceanography using the Localized Constructed Analogs technique. RCP 8.5 emissions scenario.