CALTRANS
Adaptation Priorities
REPORT






DISTRICT 2

March
2020

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1. INTRODUCTION

California's climate is changing. Temperatures are warming, sea levels are rising, wet years are becoming wetter, dry years are becoming drier, and wildfires are becoming more intense. Most scientists attribute these changes to the unprecedented amounts of greenhouse gases in the atmosphere. Given that global emissions of these gases continue at record rates, further changes in California's climate are, unfortunately, very likely.

The hazards brought on by climate change pose a serious threat to California's transportation infrastructure. Higher than anticipated sea levels can regularly inundate roadways, extreme floods can severely damage bridges and culverts, rapidly moving wildfires present profound challenges to timely evacuations, and higher than anticipated temperatures can cause expensive pavement damage over a broad area. As Caltrans' assets such as bridges and culverts age, they will be forced to weather increasingly severe conditions that they were not designed to handle, adding to agency expenses and putting the safety and economic vitality of California communities at risk.

Recognizing this, Caltrans has initiated a major agency-wide effort to adapt their infrastructure so that it can withstand future conditions. The effort began by determining which assets are most likely to be adversely impacted by climate change in each Caltrans district. That assessment, described in the Caltrans Climate Change Vulnerability Assessment Report for District 2, identified stretches of the State Highway System within the district that are potentially at risk. This Adaptation Priorities Report picks up where the vulnerability assessment left off and considers the implications of those impacts on Caltrans and the traveling public, so that facilities with the greatest potential risk receive the highest priority for adaptation. District 2 anticipates that planning for, and adapting to, climate change will continue to evolve subsequent to this report's release as more data and experience is gained.

1.1. Purpose of Report

The purpose of this report is to prioritize the order in which assets found to be exposed to climate hazards will undergo detailed asset-level climate assessments. Since there are many potentially exposed assets in the district, detailed assessments will need to be done sequentially according to their priority level. The prioritization considers, amongst other things, the timing of the climate impacts, their severity and extensiveness, the condition of each asset (a measure of the sensitivity of the asset to damage), the number of system users affected, and the level of network redundancy in the area. Prioritization scores are generated for each potentially exposed asset based on these factors and used to rank them.

1.2. Report Organization

The main feature of this report is the prioritized list of potentially exposed assets within District 2. Per above, this information will inform the timing of the detailed adaptation assessments of each asset, which is the next phase of Caltrans' adaptation work. The final prioritized list of assets for District 2 can be found in Chapter 4 of this document. The interim chapters provide important background information on the prioritization process. For example, those interested in learning more about Caltrans' overall adaptation efforts, and how the prioritization fits into that, should refer to Chapter 2. Likewise, those who are interested in learning more about how the prioritization was determined should refer to Chapter 3.

2. CALTRANS' CLIMATE ADAPTATION FRAMEWORK

Enhancing Caltrans' capability to consider adaptation in all its activities requires an agency-wide perspective and a multi-step process to make Caltrans more resilient to future climate changes. The process for doing so will take place over many years and will, undoubtedly, evolve over time as everyone learns more about climate hazards, better data is collected, and experience shows which techniques are most effective. Researchers have just started examining what steps an overarching adaptation framework for a department of transportation should entail. Figure 1 provides a graphical illustration of one such path called the Framework for Enhancing Agency Resiliency to Natural and Anthropogenic Hazards and Threats (FEAR-NAHT).[1] This framework, developed through the National Cooperative Highway Research program (NCHRP), has been adopted by Caltrans as part of its long-term plan for incorporating adaptation into its activities (hereafter referred to as the Caltrans Climate Adaptation Framework or "Framework").

Steps 1 through 4 of the Framework represent activities that are currently underway at Caltrans Headquarters to effectively manage its new climate adaptation program and develop policies that will help jumpstart adaptation actions throughout the organization. Step 1, *Assess Current Practice*, and Step 4, *Implement Early Wins*, are both addressed within a document called the Caltrans Climate Adaptation Strategy Report. The Adaptation Strategy Report undertook a comprehensive review of all climate adaptation policies and activities currently in place or underway at Caltrans. The report also includes numerous no-regrets adaptation actions ("early wins") that can be taken in the near-term to enhance agency resiliency. Several of these strategies also touch on elements of Step 2, *Organize for Success*, and Step 3, *Develop an External Communications Strategy and Plan*. In addition to this, a comprehensive adaptation communications strategy and plan for climate change is being developed as part of a Caltrans pilot project with the Federal Highway Administration.

COVER OF THE CALTRANS
CLIMATE CHANGE VULNERABILITY ASSESSMENT
REPORT FOR DISTRICT 2

Step 5, *Understand the Hazards and Threats*, is the first step where detailed technical analyses are performed, and in this case, identify assets potentially exposed to various climate stressors. This step has been completed for a subset of the assets and hazards in District 2 and the results are presented in the Caltrans Climate Change Vulnerability Assessment Report for District 2. The exposure information generated in the Vulnerability Assessment Report is used as an input to this study.

[1] This framework and related guidance for state DOTs is being developed as part of NCHRP 20-117, Deploying Transportation Resilience Practices in State DOTs (expected completion in 2020).

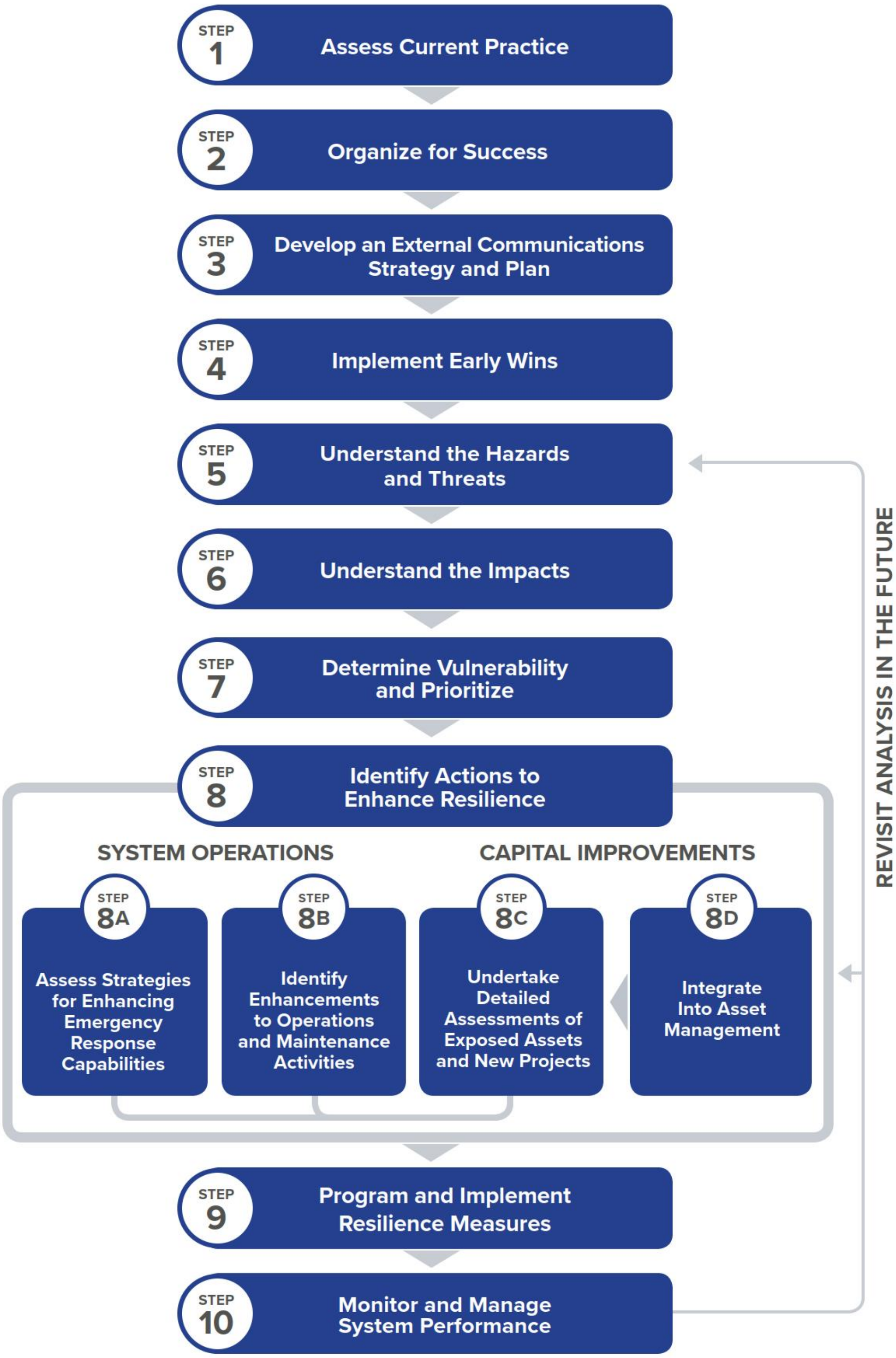

FIGURE 1: CALTRANS' CLIMATE ADAPTATION FRAMEWORK

The work undertaken for this study, the District 2 Adaptation Priorities Report, covers both Steps 6 and 7 in the Framework. Step 6, *Understand the Impacts*, is focused on the implications of the exposure identified in Step 5. This includes understanding the sensitivity of the asset to damage from the climate stressor(s) it is potentially exposed to and understanding the criticality of the asset to the functioning of the transportation network and the communities it serves. Developing an understanding of these considerations is part of the prioritization methodology described in the next chapter.

Step 7, *Determine Vulnerability and Prioritize*, focuses on creating and implementing a prioritization approach that considers both the nature of the exposure identified in Step 5 (its severity, extensiveness, and timing) and the consequence information developed in Step 6. The goal of the prioritization is to identify which assets should undergo detailed adaptation assessments first, because resource constraints will prevent all assets from undergoing detailed study simultaneously.

After Step 7, the Framework divides into two parallel tracks, one focused on operational measures to enhance resiliency and the consideration of adaptation (Steps 8A and 8B) and the other on identifying adaptation-enhancing capital improvement projects (Steps 8C and 8D). Collectively, these represent the next steps that should be undertaken using the information from this report. On the operations track, the results of this assessment should be reviewed for opportunities to enhance emergency response (Step 8A) and operations and maintenance (Step 8C). Caltrans' next step on the capital improvement track should be to undertake detailed assessments of the exposed facilities (Step 8C). The prioritization information generated as part of this assessment should also be integrated into the state's asset management system (Step 8D). All projects recommended through the asset management process should also undergo detailed adaptation assessments (hence the arrow from Step 8D to 8C).

Thus, there will be two parallel pathways for existing assets to get to detailed facility level adaptation assessments. The first is through this prioritization analysis which is driven primarily by the exposure to climate hazards with asset condition as a secondary consideration. The second is through the existing asset management process which is driven primarily by asset condition and will have vulnerability to climate hazards as a secondary consideration.

The detailed adaptation assessments in Step 8C will involve engineering-based analyses to verify asset exposure to pertinent climate hazards (some exposed assets featured in this report will not be exposed after closer inspection). Then, if exposure is verified, Step 8C includes the development and evaluation of adaptive measures to mitigate the risk. The highest priority assets from this study will be evaluated first and lower priority assets will be evaluated later. Once specific adaptation measures have been identified, be they operational measures or capital improvements, these projects can then be programmed (Step 9). Step 10 then focuses on continuous monitoring of system performance to track progress towards enhancing resiliency. Note the feedback loops from Step 10 to Steps 5 and 8. The arrow back to Step 5 indicates that the exposure analysis should be revisited in the future as new climate projections are developed. The arrow back to Step 8 indicates how one can learn from the performance indicators and use this data to modify the actions being undertaken to enhance resilience

3. PRIORITIZATION METHODOLOGY

3.1. General Description of the Methodology

The methodology used to prioritize assets exposed to climate hazards draws upon both technical analyses and the on-the-ground knowledge of District 2 staff. The technical analysis component was undertaken first to provide an initial indication of adaptation priorities. These initial priorities were then reviewed with district staff at a workshop and adjusted to reflect local knowledge and recommendations. These adjustments are embedded in the final priorities shown in Chapter 4.

With respect to the technical analysis, there are a few different approaches for prioritizing assets based on their vulnerability to climate hazards. The approach selected for this study is known as the indicators approach. The indicators approach involves collecting data on a variety of variables that are determined to be important factors for prioritization. These are then put on a common scale, weighted, and used to create a score for each asset. The scores collectively account for all the variables of interest and can be ranked to determine priorities.

It is important to note that, since the prioritization process is focused on determining the order in which detailed adaptation assessments are conducted, only assets determined to be potentially exposed to a climate hazard are included in this analysis. Assets that were determined to have no exposure to the hazards studied are not included in this study.

The remainder of this chapter describes the prioritization methodology in detail. Section 3.2 begins by describing the asset types and hazards studied. Next, Section 3.3 discusses the individual prioritization metrics (factors) that were used in the technical analysis. Following this, Section 3.4 describes how those individual factors were brought together into an initial prioritization score for each asset. Lastly, Section 3.5 describes how the initial prioritization was adjusted with input from district staff.

3.2. Asset Types and Hazards Studied

Caltrans is responsible for maintaining dozens of different asset types (bridges, culverts, roadway pavement, buildings, etc.). Each of these asset types is uniquely vulnerable to a different set of climate stressors. Resource constraints only allowed this study to investigate a subset of the asset types owned by Caltrans in District 2 and, for those, only a subset of the climate stressors that could impact them. Additional exposure and prioritization analyses are needed in the future to gain a fuller understanding of Caltrans' adaptation needs.

ANTLER'S BRIDGE, SHASTA COUNTY

The subset of asset types and hazards included in this study generally mirror those that were included in the District 2 Climate Change Vulnerability Assessment Report. That said, exposure to two additional hazards was included as part of this study: (1) riverine flooding impacts to bridges and culverts and (2) temperature impacts to pavement binder grade. Table 1 shows all the asset types included in this study for District 2 and marks with an "X" the hazards that were evaluated for each in the exposure analysis.

TABLE 1: ASSET-HAZARD COMBINATIONS STUDIED

	Wildfire	Temperature	Riverine Flooding
Pavement Binder Grade		X	
Bridges			X
Large Culverts[2]			X
Small Culverts[3]	X		X

The various asset-hazard combinations include:

- **Pavement binder grade exposure to temperature changes:** Binder can be thought of as the glue that holds the various aggregate materials in asphalt together. Binder is sensitive to temperature. If temperatures become too hot, the binder can become pliable and deform under the weight of traffic. On the other hand, if temperatures are too cold, the binder can shrink causing cracking of the pavement. There are various types (grades) of binder, each suited to a different temperature regime. This study considered how climate change will influence high and low temperatures and how this, in turn, could affect pavement binder grade performance.

  Assumptions were made that (1) all roadways are currently (or could be in the future) asphalt and (2) the binder grade currently in place on each segment of roadway matches the specifications in the Caltrans Highway Design Manual. From here, the allowable temperature ranges of each binder grade were compared to projected temperatures in 2040, 2070, and 2100. If the temperature parameters exceeded the design tolerance of the assumed binder grade, that segment of roadway was deemed to be potentially exposed.

PAVEMENT CRACKING, PLUMAS COUNTY

- **Bridge exposure to riverine flooding:** Bridges are sensitive to higher flood levels and river flows. With climate change, precipitation is generally expected to become more intense in District 2 leading to increased flooding on rivers and streams. These higher flows could exceed the design tolerances of bridges. In addition, wildfires are also expected to become more prevalent in District 2 with climate change. After a wildfire burns, the ground can become hard and less

[2] Culverts 20 feet or greater in width.
[3] Culverts less than 20 feet in width.

capable of absorbing water. As a result, flood flows can increase substantially in the aftermath of a fire which could further exacerbate the risks to bridges. To better understand the threat posed to bridges in District 2, a flood exposure index was developed and calculated for each bridge that crosses a river or stream. The index considered both the changes in precipitation and wildfire likelihood in the area draining to the bridge in the early, mid, and late century timeframes. The index also considers the capacity of the bridge to handle higher flows using waterway adequacy information from the National Bridge Inventory (NBI). A higher score on the index indicates bridges at relatively greater risk due to a combination of higher projected flows and lower capacity.

- **Large culvert exposure to riverine flooding:** A distinction is made in the analysis between large and small culverts due to different data being available for each. Large culverts are included in the NBI and are generally 20 feet or greater in width. Small culverts are generally shorter than 20 feet in width and covered through a different inventory/inspection program. Large culverts, like bridges, are sensitive to increased flood flows. Thus, a flood exposure index was calculated for each large culvert in the same manner as was done for bridges.

- **Small culvert exposure to riverine flooding:** Small culverts (those less than 20 feet in width) are, like bridges and large culverts, also sensitive to higher flood flows. Hence, a flood exposure index like the one for bridges and large culverts was calculated for this asset type. The one difference is that the capacity component of the index for small culverts used the actual dimensions of the culvert, information that was not available for bridges and large culverts. Although the actual dimensions of small culverts were available, due to resource and data constraints, no hydraulic analyses were performed to determine overtopping potential. Instead, the size was simply used as a factor in the riverine flood exposure index.

- **Small culvert exposure to wildfire:** In addition to the higher post-fire flood flows captured in the flood exposure analysis, culverts can also be sensitive to the direct impacts of fire on the structure. Certain culvert materials (e.g. wood and plastic) can easily burn or be deformed during a fire. Thus, an assessment was made to determine the likelihood of a wildfire directly impacting each small culvert in the early, mid, and late century timeframes. This analysis was only conducted for small culverts because information on culvert construction materials was not available for large culverts.

CULVERT AND WILDLIFE CROSSING

3.3. Prioritization Metrics

Metrics are the individual variables used to calculate a prioritization score for each asset. These can be thought of as the individual factors that, collectively, help determine the asset's priority for adaptation. Each of the asset-hazard combinations described in the previous section has its own unique set of factors that are used in the prioritization. The metrics were selected based on their relevancy to each asset-hazard combination and data availability. For example, the condition rating of a culvert is a very relevant metric for prioritizing culverts exposed to riverine flooding, however, it is not at all relevant to prioritizing bridges exposed to the same hazard. Table 2 provides an overview of all the metrics included in this study and denotes with an "X" their application to the various asset-hazard combinations studied.

TABLE 2: METRICS INCLUDED FOR EACH ASSET-HAZARD COMBINATION STUDIED

	Wildfire	Tempera-ture	Riverine Flooding		
Metrics	**Small Culverts**	**Pavement Binder Grade**	**Bridges**	**Large Culverts**	**Small Culverts**
Exposure					
Past natural hazard impacts	X		X	X	X
Initial timeframe for elevated level of concern for wildfire	X				
Highest projected wildfire level of concern	X				
Initial timeframe when asphalt binder grade needs to change		X			
Maximum riverine flooding exposure score for the 2010-2039 timeframe			X	X	X
Maximum riverine flooding exposure score			X	X	X
Consequences					
Bridge substructure condition rating			X		
Channel and channel protection condition rating			X	X	
Culvert condition rating				X	X
Culvert material	X				
Scour rating			X		
Average annual daily traffic (AADT)	X	X	X	X	X
Average annual daily truck traffic (AADTT)	X	X	X	X	X
Incremental travel distance to detour around the asset	X		X	X	X

The metrics included in this study fall into two categories: exposure metrics and consequence metrics. Exposure metrics capture the extensiveness, severity, and timing of a hazard's projected impact on an asset. Assets that have more extensive, more severe, and sooner exposure are given a higher priority. Consequence metrics provide an indication of how sensitive an exposed asset is to damage using information on the asset's condition. Consequence metrics also indicate how sensitive the overall transportation network may be to the loss of that asset should it be taken out of service by a hazard. The poorer the initial condition of the potentially exposed asset and the more critical it is to the functioning of the transportation network, the higher the priority given. The specific metrics that are included within each of these categories are described in the sections that follow.

3.3.1. Exposure Metrics

The following metrics were used to assess asset exposure in District 2:

- **Past natural hazard impacts:** Assets that have experienced weather or fire-related impacts in the past are likely to experience more issues in the future as climate changes and should be prioritized. To obtain information on past impacts, District 2 maintenance staff were surveyed and asked to identify any bridges, large culverts, or small culverts that had experienced riverine flooding-related impacts over the last 20 years. Care was taken to ensure that these impacts occurred on assets that had not been replaced with a more resilient design after the flood event occurred. In addition, staff were also asked if any small culverts were damaged directly by fire and replaced with culverts of the same material. Any asset that was identified as previously impacted by either flooding or fire was flagged and that asset was given a higher priority for adaptation.

- **Initial timeframe for elevated level of concern from wildfire:** Assets that are more likely to be impacted by wildfire sooner should be prioritized first. Using the future wildfire projections developed for the District 2 Climate Change Vulnerability Assessment Report, the initial timeframe (2010-2039, 2040-2069, 2070-2099, or Beyond 2099) for heightened wildfire risk was determined for each small culvert. The most recent timeframe across the range of available climate scenarios was chosen. Assets that were impacted sooner were given a higher priority for adaptation.

- **Highest projected wildfire level of concern:** Assets that are exposed to a greater wildfire risk should be prioritized. The wildfire modeling conducted for the District 2 Climate Change Vulnerability Assessment Report classified fire risk into five levels of concern (very low, low, moderate, high, and very high) at various future time periods. Using this data, the highest level of concern was determined for each small culvert between now and 2100 and across all climate scenarios. Assets with higher levels of concern were given a higher priority for adaptation.

- **Initial timeframe when asphalt binder grade needs to change:** Roadway segments that are more likely to need binder grade changes sooner should be prioritized. Using the assumptions and data from the pavement binder grade exposure analysis described above, the initial timeframe (prior to 2010, 2010-2039, 2040-2069, or 2070-2099) for binder grade change was determined. Roadway segments that were found to need binder grade changes sooner were given a higher priority for detailed adaptation assessments.

- **Maximum riverine flooding exposure score for the 2010-2039 timeframe**: Assets that have relatively higher exposure to riverine flooding in the near-term should be prioritized. Using the riverine flood exposure index values calculated using the process described above, the highest score for the near-term (2010-2039) period was determined for each bridge, large culvert, and small culvert considering all climate scenarios and the range of outputs from all climate and wildfire models. Assets with the highest overall riverine flooding scores in this initial period received a higher priority for adaptation.

LITTLE INDIAN CREEK FLOODING, PLUMAS COUNTY SR-70

- **Maximum riverine flooding exposure score:** In addition to understanding the most pressing near-term needs for dealing with riverine flooding, assets that have relatively higher exposure to riverine flooding at any point over their lifespans should also be prioritized. To calculate this metric, the highest riverine flooding exposure score was determined for each asset considering all time periods (from now through 2100), all climate scenarios, and all climate and wildfire models. Assets with the highest overall riverine flooding scores received a higher priority for adaptation.

3.3.2. Consequence Metrics

The following metrics were used to understand the consequences of each asset's exposure, considering both asset sensitivity to damage and network sensitivity to loss of the asset:

- **Bridge substructure condition rating:** Poor bridge substructure condition can contribute to failure during riverine flooding events. The NBI assigns a substructure condition rating to each bridge. Values range from nine to two with lower values indicating poorer condition. Bridges with poor substructure condition ratings were given higher priority for adaptation assessments.

- **Channel and channel protection condition rating:** Poor channel conditions or inadequate channel protection measures can contribute to failure during riverine flooding events. The NBI assigns a channel and channel protection condition rating to each bridge and large culvert. Values range from nine to two with lower values indicating poorer condition. Bridges and large culverts with poor channel or channel protection ratings were given higher priority for adaptation assessments.

- **Culvert condition rating:** Poor culvert condition can contribute to failure during riverine flooding events. The NBI assigns a culvert condition rating to each large culvert. Values range from nine to two with lower values indicating poorer condition. Caltrans has developed their own culvert condition rating system for small culverts. Possible ratings in the Caltrans system include good, fair, critical, and poor. Large and small culverts with poorer condition ratings in either system were prioritized.

- **Culvert material:** Culvert material determines the sensitivity of culverts to direct damage from wildfires. Caltrans includes material data in its databases on small culverts (no equivalent information exists for large culverts). Possible culvert materials include HDPE (high density polyethylene [plastic]), PVC (polyvinyl chloride [plastic]), corrugated steel pipe, composite, wood, masonry, and concrete. HDPE, PVC, corrugated steel pipe, composite, and wood culverts are all more sensitive to wildfire and any small culverts made from these materials that are exposed to an elevated risk from wildfire were prioritized for adaptation.

- **Scour rating:** Scour is a condition where water has eroded the soil around bridge piers and abutments. Excessive scour of bridge foundations makes bridges more prone to failure, especially during riverine flooding events. The NBI assigns a scour condition rating to each bridge. Values range from eight to two with lower values indicating greater scour concern. Bridges with lower scour values (higher scour concern) were given higher priority for adaptation assessments.

- **Average annual daily traffic (AADT):** AADT is a measure of the average traffic volume on a roadway. The consequences of weather-related failures/disruptions/maintenance are greater for assets that convey a higher volume of traffic. Disruptions on higher volume roads affect a greater proportion of the traveling public and there is a greater chance of congestion ripple effects throughout the network because alternate routes are less likely to be able to absorb the diverted traffic. AADT data was obtained from Caltrans databases and assigned to all the asset types included in this study. Exposed assets with higher AADT values were given greater priority for adaptation.

- **Average annual daily truck traffic (AADTT):** AADTT is a measure of the average truck volumes on a roadway. Efficient goods movement is important for maintaining economic resiliency and for providing relief supplies after a disaster. The consequences of weather-related failures/disruptions/maintenance are greater for assets that are a critical link in supply chains. AADTT data was obtained from Caltrans databases and assigned to all the asset types included in this study. Potentially exposed assets with higher AADTT values were given greater priority for adaptation.

- **Incremental travel distance to detour around the asset:** This metric measures the degree of network redundancy around each asset. A detour routing tool was developed for this project that can find the shortest path detour around a bridge, large culvert, or small culvert and calculate the additional travel distance that would be required to take that detour. The tool was run for each of the assets studied. Assets that had very long detour routes were given greater priority for adaptation.

SNOWSTORM AND TRUCK ACCIDENT ON INTERSTATE 5, SHASTA COUNTY

3.4. Calculation of Initial Prioritization Scores

Once all of the metrics had been gathered/developed, the next step was to combine them and calculate an initial prioritization score for each asset. Calculating prioritization scores is a multi-step process that was conducted using Microsoft Excel. The primary steps are as follows:

1. **Scale the raw metrics:** Several of the metrics described in the previous section have different units of measurement. For example, the AADT metric is measured in vehicles per day whereas the incremental travel time to detour around the asset is measured in minutes. There is a need to put each metric on a common scale to be able to integrate them into one scoring system. For this study, it was decided to use a scale ranging from zero to 100 with zero indicating a value for a metric that would result in the lowest possible priority level and 100 indicating a value for a metric that would result in the highest possible priority level. The districtwide minimum and maximum values for each metric were used to set that metric's zero and 100 values. The past weather/fire impacts metric (which had binary values) was assigned a zero if the condition was false (i.e., there were no previous weather/fire impacts reported) and 100 if the condition was true. Categorized values, like the various condition rating metrics, were generally parsed out evenly between zero and 100 (i.e., if there were seven condition rating

values, the minimum and maximum values were coded as zero and 100, respectively, with the five remaining categories assigned values at intervals of 20). The remaining metrics with continuous values were allowed to fall at their proportional location within the re-scaled zero to 100 range.

2. **Apply weights:** Some metrics have been determined by Caltrans to be more important than others for determining priorities. Therefore, the relative importance of each metric was adjusted by multiplying the scaled score by a weighting factor. Metrics deemed more important to prioritization were multiplied by a larger weight. For consistency, Caltrans Headquarters staff harmonized the weights to be used in all districts based on national best practices and input from the districts. Table 3 shows the weighting schema applied to the asset-hazard combinations in District 2. The weights are percentage based and add to 100% for all the metrics within a given asset-hazard combination (column).

TABLE 3: WEIGHTS BY METRIC FOR EACH ASSET-HAZARD COMBINATION STUDIED

	Percentage Weights by Asset Type				
	Wildfire	Temperature	Riverine Flooding		
Metrics	**Small Culverts**	**Pavement Binder Grade**	**Bridges**	**Large Culverts**	**Small Culverts**
Exposure					
Past natural hazard impacts	20%	-	20%	20%	20%
Initial timeframe for elevated level of concern for wildfire	17.5%	-	-	-	-
Highest projected wildfire level of concern	17.5%	-	-	-	-
Initial timeframe when asphalt binder grade needs to change	-	60%	-	-	-
Maximum riverine flooding exposure score for the 2010-2039 timeframe	-	-	22.5%	22.5%	22.5%
Maximum riverine flooding exposure score	-	-	22.5%	22.5%	22.5%
Consequences					
Bridge substructure condition rating	-	-	1%	-	-
Channel and channel protection condition rating	-	-	2.5%	2.5%	-
Culvert condition rating	-	-	-	2.5%	5%
Culvert material	20%	-	-	-	-
Scour rating	-	-	6.5%	-	-
Average annual daily traffic (AADT)	7%	13%	7%	10%	10%
Average annual daily truck traffic (AADTT)	3%	27%	3%	5%	5%
Incremental travel distance to detour around the asset	15%	-	15%	15%	15%
TOTAL	100%	100%	100%	100%	100%

In general, higher weights were assigned to the future exposure metrics (including those considering both the hazard timing and severity) as they are the primary drivers of adaptation need. This helps ensure adaptations are considered proactively before the hazards affect the assets. It also focuses the first detailed assessments on those assets that are projected to be most severely affected by climate change.

Amongst the consequence metrics, more weight is given to the AADT and detour route variables relative to the condition rating related variables (bridge substructure condition rating, channel and channel protection condition rating, culvert condition rating, and scour rating). The logic for this is as follows. First, except for the scour rating, the connection between asset condition and asset failure during a hazard event is not always straightforward. Where there is less confidence in a metric, it is weighted less.[4] Second, other prioritization systems used by Caltrans, namely the asset management system, focus on condition to prioritize assets. Thus, poor condition assets will already be prioritized through that program and, per Caltrans' Climate Adaptation Framework shown in Figure 1 will also undergo detailed adaptation assessments before upgrades are made. There is little value in duplicating that prioritization system for this report; instead this effort puts more priority on assets based on their exposure to climate change-related hazards. Lastly, the traffic volume and detour length variables are the primary measures by which impacts to users of the system are captured and, given the importance of mobility to the functioning of the state, were weighted higher.[5]

An exception to some of the logic noted above can be found with small culvert exposure to wildfire. For these assets, nearly as much weight is given to the culvert material variable as to the AADT and detour route variables collectively. This is because the very nature of the threat to small culverts from wildfire is highly related to the material of the culvert. If the culvert is plastic or wood, it is much more susceptible to fire damage than, say, a concrete culvert. Since they are less likely to be adversely affected by fire in the first place, one would not want to give high priority to concrete culverts for wildfire just because they convey a high AADT or have long detour routes. That is why more weight is placed on the material metric for this particular asset-hazard combination.

3. **Calculate prioritization scores for each hazard**: After the weights were applied, the next step was to calculate prioritization scores for each individual hazard. This was done by first summing the products of the weights and scaled values for all the metrics relevant to the particular asset-hazard combination being studied (i.e., summing up the products for each column in Table 3). Since there are different numbers of metrics used to calculate the score for each asset-hazard combination, these values were then re-scaled to range from zero to 100 with zero representing the lowest priority asset and 100 the highest priority asset. These interim scores provide useful information for understanding asset vulnerability to each specific hazard.

[4] Note that the scour rating metric is weighted somewhat higher than the other condition related assets because of its more direct connection to asset failure.

[5] Within the traffic volume related metrics, note that slightly more weight is given to AADT as opposed to truck AADT given that the majority of traffic on a roadway is non-truck. Thus, it was reasoned that the total volume should factor in somewhat more heavily than the truck volume. One exception to this was for temperature impacts to pavement. This asset-hazard combination is unique in that the traffic volume information is not just an indicator of how many users may be affected by necessary pavement repairs but also an indicator of how much damage may occur to the pavement should temperatures exceed binder grade design thresholds. Given that, for this asset-hazard combination, more weight is given to truck volumes since trucks do disproportionately more damage to temperature-weakened pavement.

4. **Calculate cross-hazard prioritization scores:** While the prioritization scores for each hazard provide useful information, they do not provide the full picture on the threats posed to each asset. It was decided that the final scores used as the basis for prioritization need to look holistically across all the hazards analyzed. This cross-hazard perspective provides a better view of the collective threats faced by each asset and a better basis for prioritization. To calculate the cross-hazard scores, the scores for each hazard analyzed for the asset were summed. These were then re-scaled yet again to a zero to 100 scale since different asset types have different numbers of hazards. As before, the higher the score, the higher the adaptation priority of that asset. These cross-hazard scores represent the final scores calculated for each asset during the technical assessment portion of the methodology.

5. **Assign priority levels**: The final step in the technical assessment was to group together assets into different priority levels based on their cross-hazard scores. This was done to make the outputs more oriented to future actions, decrease the tendency to read too much into minor differences in the cross-hazard scores, and better facilitate dialogue at the workshop with District 2 staff. Five priority levels were developed (Priority 1, 2, 3, 4, and 5) and assets were assigned to those groups on a districtwide basis. An equal number of assets were assigned to each priority level to help facilitate administration of the facility-level adaptation assessments that will follow this study.

3.5. Adjustments to Prioritization

After the initial prioritization scores were calculated, a workshop was held with the district to explain the scoring methodology and go over the preliminary results. District 2 staff were then given the opportunity to make recommendations on adjusting asset priorities. Adjustments to the prioritization may be needed for a variety of reasons. First, there could be errors in the databases themselves; rarely are large databases entirely free of errors. Second, errors may have been introduced during the GIS processing of some of the datasets. For example, a small culvert may have been inadvertently associated with the wrong stream during the geoprocessing step, leading to it receiving an inaccurate riverine flooding exposure score. Lastly, district staff, who possess an intimate knowledge of their assets, may have knowledge about the assets or their environmental context that is not easily captured in an indicator-based scoring methodology. That said, after review, district staff accepted the prioritization as-is and no adjustments to the rankings were made.

4. DISTRICT ADAPTATION PRIORITIES

This chapter presents Caltrans' priorities for undertaking detailed adaptation assessments of assets exposed to climate change in District 2. The material presented in this chapter reflects the results of the technical analysis and the coordination with District 2 staff described in the previous chapter. The information is broken out by asset type with priorities for bridges discussed in the first section, followed by those for large culverts, small culverts, and roadways.

4.1. Bridges

A total of 284 bridges were assessed for vulnerability to enhanced riverine flooding associated with climate change. All these bridges should eventually undergo detailed adaptation assessments. However, due to resource limitations, this will not be possible to do all at once. Instead, the bridges will be analyzed over time according to the priorities presented here.

Figure 2 provides a map of all the bridges assessed for riverine flooding in the district. The color of the points corresponds to the priority assigned to each bridge; darker red colors indicate higher priority assets. The map shows that high priority bridges are scattered throughout the district. That said, there are a few clusters of areas that have several high priority bridges. These are along State Route 70 in western Plumas County, Interstate 5 in northern Siskiyou County, and State Route 3 in northern Trinity County. The bridges along these areas of State Routes 3 and 70 are higher priority because of high riverine flood exposure scores coupled with long detour routes. The Interstate 5 bridges are given high priority because of high riverine flood exposure scores coupled with high traffic volumes (including truck traffic volumes).

Table 4 presents a summary of all the Priority 1 bridges in District 2 sorted by their cross-hazard prioritization scores. A complete listing of all bridges ranked by their prioritization scores appears in Table 8 in the appendix.

ANTLER'S BRIDGE RECONSTRUCTION, SHASTA COUNTY

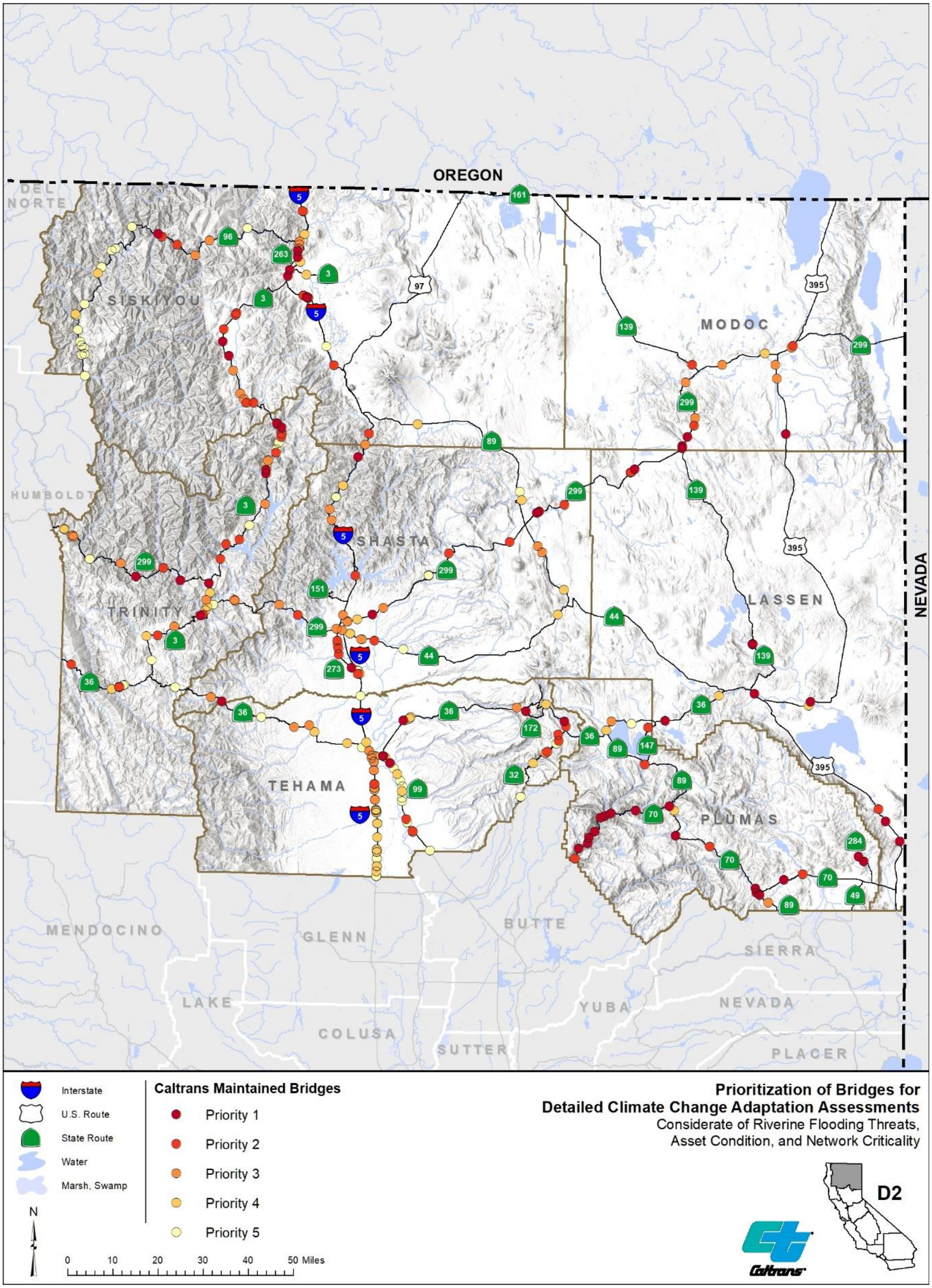

FIGURE 2: PRIORITIZATION OF BRIDGES FOR DETAILED ADAPTATION ASSESSMENTS

TABLE 4: PRIORITY 1 BRIDGES

Priority	Bridge Number	County[6]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	09 0025	PLU	STATE ROUTE 70	CHIPPS CREEK	13.56	100.00
1	05 0009	TRI	STATE ROUTE 299	MANZANITA CREEK	28.99	95.80
1	02 0072	SIS	STATE ROUTE 96	SEIAD CREEK	60.17	86.41
1	09 0063	PLU	STATE ROUTE 89	MIDDLE FORK FEATHER RIVER	8.23	82.61
1	07 0061	LAS	STATE ROUTE 139	MEADOW CHANNEL	16.92	77.39
1	09 0028	PLU	STATE ROUTE 89	FRAZIER CREEK	6.29	71.28
1	09 0070	PLU	STATE ROUTE 284	LITTLE LAST CHANCE CREEK	5.6	71.06
1	08 0059	TEH	STATE ROUTE 172	BATTLE CREEK	0.85	69.79
1	06 0067	SHA	STATE ROUTE 299	PIT RIVER	84.48	69.61
1	05 0069	TRI	STATE ROUTE 3	SCOTT MOUNTAIN CREEK	T81.23	68.99
1	08 0019	TEH	STATE ROUTE 99	SALT CREEK	24.84	68.87
1	09 0002	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	3.07	67.92
1	09 0026	PLU	STATE ROUTE 70	RUSH CREEK	23.67	67.85
1	05 0060	TRI	STATE ROUTE 3	COFFEE CREEK	67.7	67.56
1	08 0018	TEH	STATE ROUTE 99	SALT CREEK OVERFLOW	24.78	66.92
1	08 0052	TEH	STATE ROUTE 36	PALMER GULCH	53.25	66.58
1	09 0029	PLU	STATE ROUTE 89	GRAEAGLE CREEK	7.29	66.38
1	02 0169	SIS	STATE ROUTE 3	ETNA CREEK	20.44	66.26
1	07 0062	LAS	STATE ROUTE 139	WILLOW CREEK	17.02	64.78
1	07 0023	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	15.87	63.58
1	03 0001	MOD	STATE ROUTE 299	BUTTE CREEK	0.51	62.54
1	07 0008	LAS	STATE ROUTE 36	ROBBERS CREEK	3.15	61.86
1	03 0060	MOD	STATE ROUTE 299	NORTH FORK ASH CREEK	3.38	61.69
1	09 0004	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	6.99	61.08
1	05 0015	TRI	STATE ROUTE 299	EAST WEAVER CREEK	52.13	59.48
1	09 0022	PLU	STATE ROUTE 70	HUMBUG CREEK	73.99	59.40
1	02 0151	SIS	STATE ROUTE 3	YREKA CREEK	L49.99	59.15
1	05 0065	TRI	STATE ROUTE 3	TANGLE BLUE CREEK	79.39	58.76
1	09 0072	PLU	STATE ROUTE 284	LITTLE LAST CHANCE CREEK	7.31	58.74
1	08 0061	TEH	STATE ROUTE 36	GURNSEY CREEK	97.67	58.45
1	02 0038	SIS	STATE ROUTE 3	PATTERSON CREEK	24.26	58.22
1	06 0066	SHA	STATE ROUTE 299	HAT CREEK	84.02	57.71
1	07 0052	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK OVRFLOW	R21.34	57.44
1	09 0016	PLU	STATE ROUTE 70	CHAMBERS CREEK	9.04	57.18
1	02 0012	SIS	STATE ROUTE 263	DRY GULCH	54.51	56.55
1	09 0008	PLU	STATE ROUTE 70	YELLOW CREEK	14.9	55.80

[6] LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity

Priority	Bridge Number	County[6]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	02 0145L	SIS	INTERSTATE 5	GUYS GULCH	R39.27	55.77
1	05 0028	TRI	STATE ROUTE 3	TRINITY RIVER	68.5	55.68
1	05 0036	TRI	STATE ROUTE 3	LITTLE CREEK	25.55	55.52
1	07 0007	LAS	STATE ROUTE 299	PIT RIVER	14.06	55.32
1	09 0003	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	5.58	54.99
1	06 0006	SHA	STATE ROUTE 273	SPRING GULCH	7.1	54.59
1	07 0033	LAS	STATE ROUTE 36	SUSAN RIVER	R26.72	54.07
1	03 0019	MOD	U.S. HIGHWAY 395	SOUTH FORK PIT RIVER	3.73	53.65
1	09 0009	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	16.54	53.42
1	03 0002	MOD	STATE ROUTE 299	ASH CREEK	1.02	52.89
1	08 0015	TEH	STATE ROUTE 99	NEW CREEK	22.54	52.04
1	07 0034	LAS	U.S. HIGHWAY 395	SUSAN RIVER	72.29	51.98
1	06 0046	SHA	STATE ROUTE 299	DRY CREEK	31.5	51.55
1	05 0012	TRI	STATE ROUTE 299	CANYON CREEK	43.36	51.23
1	06 0116	SHA	INTERSTATE 5	CASTLE CREEK	63.31	51.20
1	06 0057	SHA	STATE ROUTE 36	BEEGUM CREEK	11.91	50.81
1	02 0011	SIS	STATE ROUTE 263	SHASTA RIVER	52.62	50.72
1	09 0018	PLU	STATE ROUTE 70	SPANISH CREEK	42.45	50.29
1	09 0014	PLU	STATE ROUTE 70	INDIAN CREEK	33.07	49.68
1	02 0143	SIS	INTERSTATE 5	YREKA CREEK	R46.79	49.60

4.2. Large Culverts

A total of 39 large culverts were assessed for vulnerability to more severe riverine flooding associated with climate change. Figure 3 provides a map of all the large culverts potentially exposed to enhanced riverine flooding in the district and colored by their priority level. Given the limited number of large culverts in District 2, it is hard to draw spatial patterns to the vulnerabilities. That said, it is worth nothing that Interstate 5, the primary north-south artery in the district, has two Priority 1 large culverts along it. This is due to these assets having high riverine flooding exposure scores coupled with high traffic volumes (including high truck traffic volumes).

Table 5 presents a summary of all the Priority 1 large culverts in District 2 sorted by their cross-hazard prioritization scores. A complete listing of all large culverts ranked by their prioritization scores appears in Table 9 in the appendix.

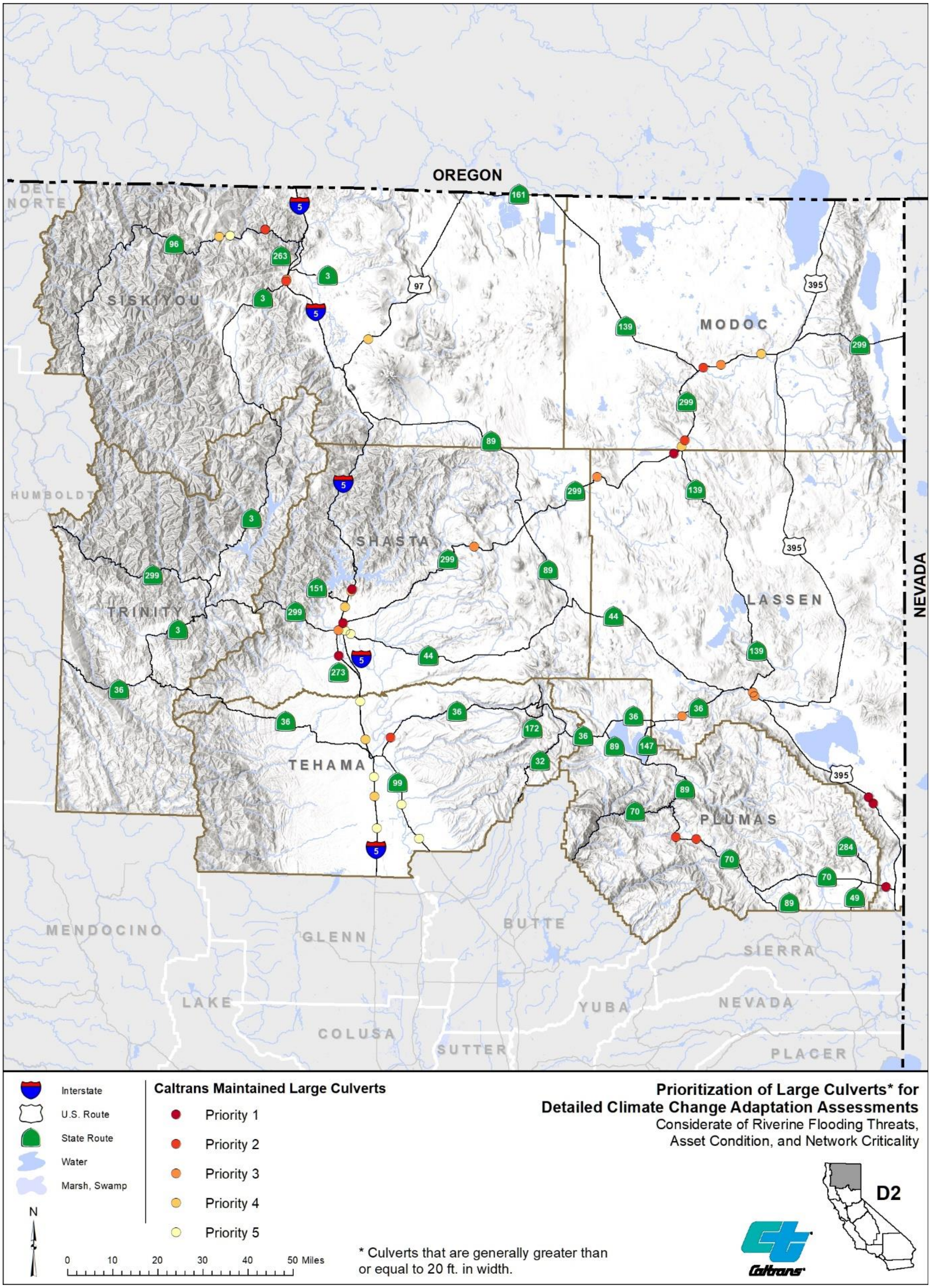

FIGURE 3: PRIORITIZATION OF LARGE CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

TABLE 5: PRIORITY 1 LARGE CULVERTS

Priority	Bridge Number	County[7]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	07 0058	LAS	STATE ROUTE 70	LONG VALLEY CREEK	1.97	100.00
1	07 0056	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	28	99.69
1	07 0051	LAS	STATE ROUTE 299	WILLOW CREEK	24.01	97.99
1	07 0057	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	26.19	95.33
1	06 0007	SHA	STATE ROUTE 273	CHINA GULCH	10.97	75.90
1	06 0110	SHA	INTERSTATE 5	WEST FORK STILLWATER CREEK	R25.05	69.80
1	06 0167	SHA	INTERSTATE 5	BOULDER CREEK	R17.13	67.71

4.3. Small Culverts

A total of 470 small culverts were assessed for vulnerability to more severe riverine flooding and wildfire associated with climate change. Figure 4 provides a map of all the small culverts potentially exposed to more severe riverine flooding and wildfire in the district. The small culverts are colored by their priority level.

The map indicates several clusters of high priority small culverts. Notable clusters can be found along several different roadways in southern Lassen County, along State Route 70 in central Plumas County, along State Routes 3 and 299 in northern Trinity County, and along Interstate 5 in northern Shasta and southern Siskiyou Counties. All the Priority 1 small culverts in these clusters have both high riverine flood and fire exposure. In addition, the State Route 70 small culverts are rated as being in poor condition, contributing to their high priority level. The State Route 3 and 299 small culverts are also rated as being in poor condition and, further contributing to their priority level, have long detour routes. Finally, the Priority 1 small culverts along Interstate 5, in addition to being highly exposed to riverine flooding and wildfire, convey high traffic volumes (including truck volumes). Several of these assets also entail long detour routes.

Table 6 presents a summary of all the Priority 1 small culverts in District 2 sorted by their cross-hazard prioritization scores. A complete listing of all small culverts ranked by their prioritization scores appears in Table 10 in the appendix.

[7] LAS = Lassen; SHA = Shasta; SIS = Siskiyou

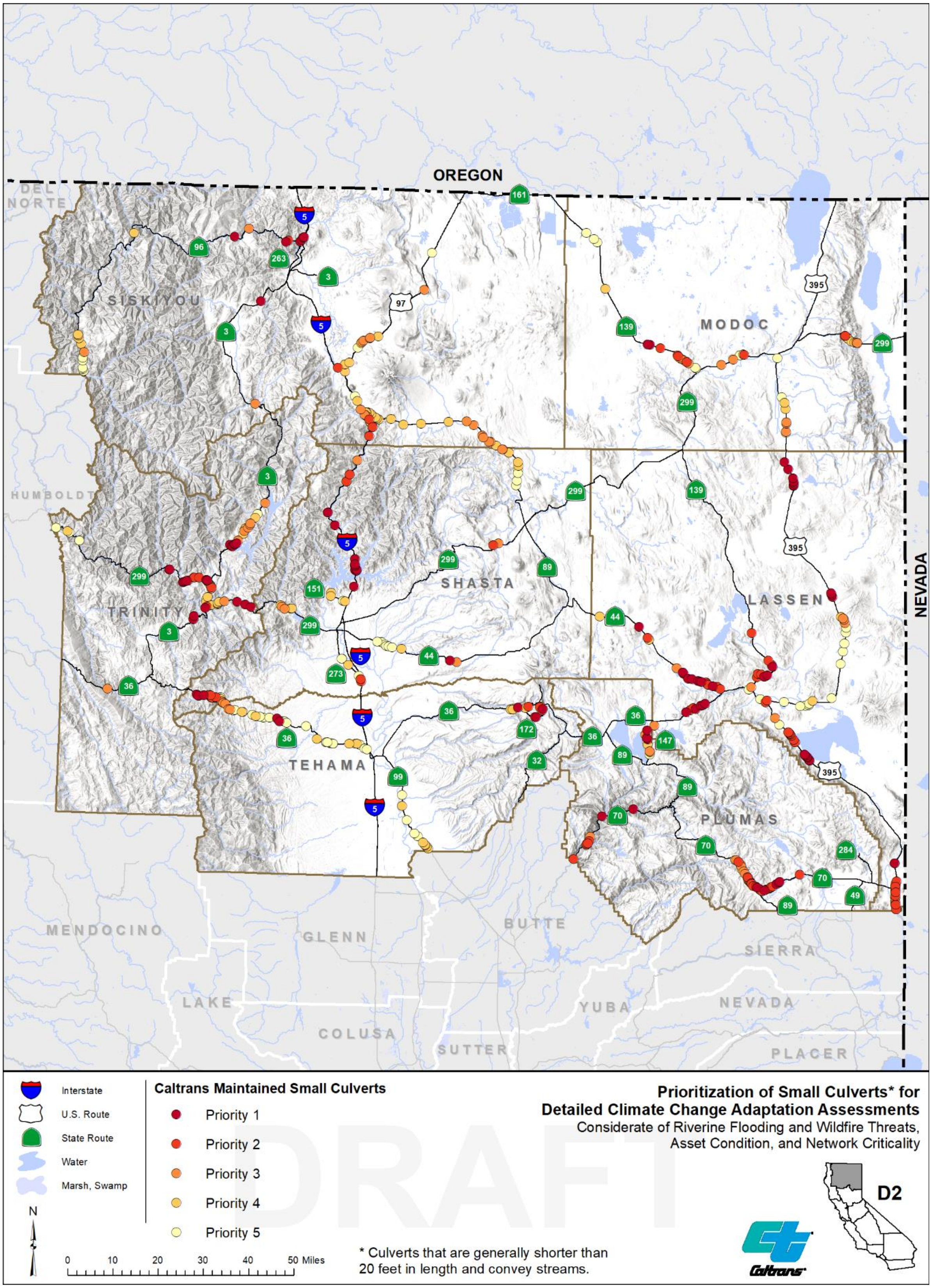

FIGURE 4: PRIORITIZATION OF SMALL CULVERTS FOR DETAILED ADAPTATION ASSESSMENTS

TABLE 6: PRIORITY 1 SMALL CULVERTS

Priority	Culvert System Number	County[8]	Route	Postmile	Cross-Hazard Prioritization Score
1	52994007000	TRI	299	70	100.00
1	20034003853	SIS	3	38.53	85.72
1	52994004427	TRI	299	44.27	81.19
1	52994004512	TRI	299	45.12	81.17
1	60052003280	SHA	5	32.8	80.81
1	90704001416	PLU	70	14.16	80.29
1	52994004483	TRI	299	44.83	79.16
1	80360001421	TEH	36	14.21	79.09
1	73950010189	LAS	395	101.89	78.75
1	73950010235	LAS	395	102.35	78.73
1	90704002288	PLU	70	22.88	78.01
1	60364000415	SHA	36	4.15	77.20
1	60364000379	SHA	36	3.79	77.20
1	52990005111	TRI	299	51.11	76.49
1	73954013046	LAS	395	130.46	75.30
1	73954013059	LAS	395	130.59	75.27
1	70440001212	LAS	44	12.12	74.81
1	73950010276	LAS	395	102.76	74.81
1	73954004525	LAS	395	45.25	74.59
1	73954004551	LAS	395	45.51	74.57
1	20964010412	SIS	96	104.12	74.03
1	91470000602	PLU	147	6.02	73.97
1	52994004453	TRI	299	44.53	73.79
1	60052003004	SHA	5	30.04	73.64
1	50034004721	TRI	3	47.21	73.49
1	50034004581	TRI	3	45.81	73.46
1	50034004549	TRI	3	45.49	73.46
1	50034004651	TRI	3	46.51	73.39
1	50034004666	TRI	3	46.66	73.39
1	80360001514	TEH	36	15.14	73.21
1	60054004393	SHA	5	43.93	73.08
1	50034002101	TRI	3	21.01	72.94
1	52994006866	TRI	299	68.66	72.37
1	73954004385	LAS	395	43.85	72.10
1	60364000564	SHA	36	5.64	71.63
1	50034004486	TRI	3	44.86	71.40
1	73954013223	LAS	395	132.23	71.35

[8] LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity

Priority	Culvert System Number	County[8]	Route	Postmile	Cross-Hazard Prioritization Score
1	60054102997	SHA	5	29.97	70.90
1	70360000851	LAS	36	8.51	70.70
1	52994003835	TRI	299	38.35	70.41
1	60054103141	SHA	5	31.41	70.25
1	50034002271	TRI	3	22.71	70.24
1	20964010358	SIS	96	103.58	70.12
1	60054103168	SHA	5	31.68	69.95
1	73950001058	LAS	395	10.58	69.95
1	73954013638	LAS	395	136.38	69.92
1	73954013449	LAS	395	134.49	69.80
1	60054004785	SHA	5	47.85	69.73
1	73954004463	LAS	395	44.63	69.69
1	70360001109	LAS	36	11.09	69.50
1	20964008370	SIS	96	83.7	69.14
1	81724000439	TEH	172	4.39	69.02
1	73954013149	LAS	395	131.49	68.81
1	20964009949	SIS	96	99.49	68.72
1	20964010464	SIS	96	104.64	68.65
1	20964010491	SIS	96	104.91	68.61
1	73954004368	LAS	395	43.68	68.56
1	71394001014	LAS	139	10.14	68.42
1	70364001250	LAS	36	12.5	67.57
1	70364001300	LAS	36	13	67.55
1	70364001374	LAS	36	13.74	67.49
1	90704007201	PLU	70	72.01	67.27
1	52994005133	TRI	299	51.33	67.20
1	52994005141	TRI	299	51.41	66.92
1	70440002683	LAS	44	26.83	66.74
1	50030003038	TRI	3	30.38	66.70
1	91470000826	PLU	147	8.26	66.69
1	90704007294	PLU	70	72.94	66.64
1	31390001408	MOD	139	14.08	66.64
1	90704007264	PLU	70	72.64	66.62
1	70444003098	LAS	44	30.98	66.54
1	91470000643	PLU	147	6.43	66.53
1	81724000777	TEH	172	7.77	66.48
1	73954013101	LAS	395	131.01	66.46
1	31390001360	MOD	139	13.6	66.42
1	70444002815	LAS	44	28.15	66.41
1	70444002910	LAS	44	29.1	66.33

Priority	Culvert System Number	County[8]	Route	Postmile	Cross-Hazard Prioritization Score
1	60054103133	SHA	5	31.33	66.30
1	71394000692	LAS	139	6.92	66.10
1	71394000564	LAS	139	5.64	66.07
1	60054102976	SHA	5	29.76	66.04
1	60444002635	SHA	44	26.35	65.88
1	90704006693	PLU	70	66.93	65.70
1	52994006637	TRI	299	66.37	65.58
1	60050002584	SHA	5	25.84	65.36
1	60054102992	SHA	5	29.92	65.30
1	80364008168	TEH	36	81.68	65.28
1	73954004479	LAS	395	44.79	65.18
1	90704006897	PLU	70	68.97	65.05
1	70444002634	LAS	44	26.34	65.02
1	70444003123	LAS	44	31.23	64.63
1	70444003049	LAS	44	30.49	64.61
1	70444003413	LAS	44	34.13	64.59
1	52994003842	TRI	299	38.42	64.53

4.4. Roadways

A total of 2,847 roadway segments were assessed for vulnerability to temperature changes that affect pavement performance. All these segments are potentially exposed to temperature changes that could result in the need to change pavement binder grades from current specifications. To make the analysis as detailed as possible, the original segments were short with beginning and end points at intersections with other streets (including smaller local streets) in the roadway network. Once the processing of vulnerability scores was complete, smaller segments sharing the same priority score as their neighbors on the same route were consolidated into longer segments to simplify the presentation of the results. This reduced the number of segments to those presented here.

Figure 5 provides a map of all the consolidated roadway segments potentially exposed to pavement degrading temperature changes in the district. Each segment is colored by its priority level. The map shows that roadways in California's Central Valley within Shasta and Tahoma Counties are particularly vulnerable to temperature changes and should receive the highest priority for detailed assessments of pavement binder grade.

Table 7 presents a summary of all the Priority 1 roadways in District 2 sorted by their cross-hazard prioritization scores. A complete listing of all roadways ranked by their prioritization scores appears in Table 11 in the appendix.

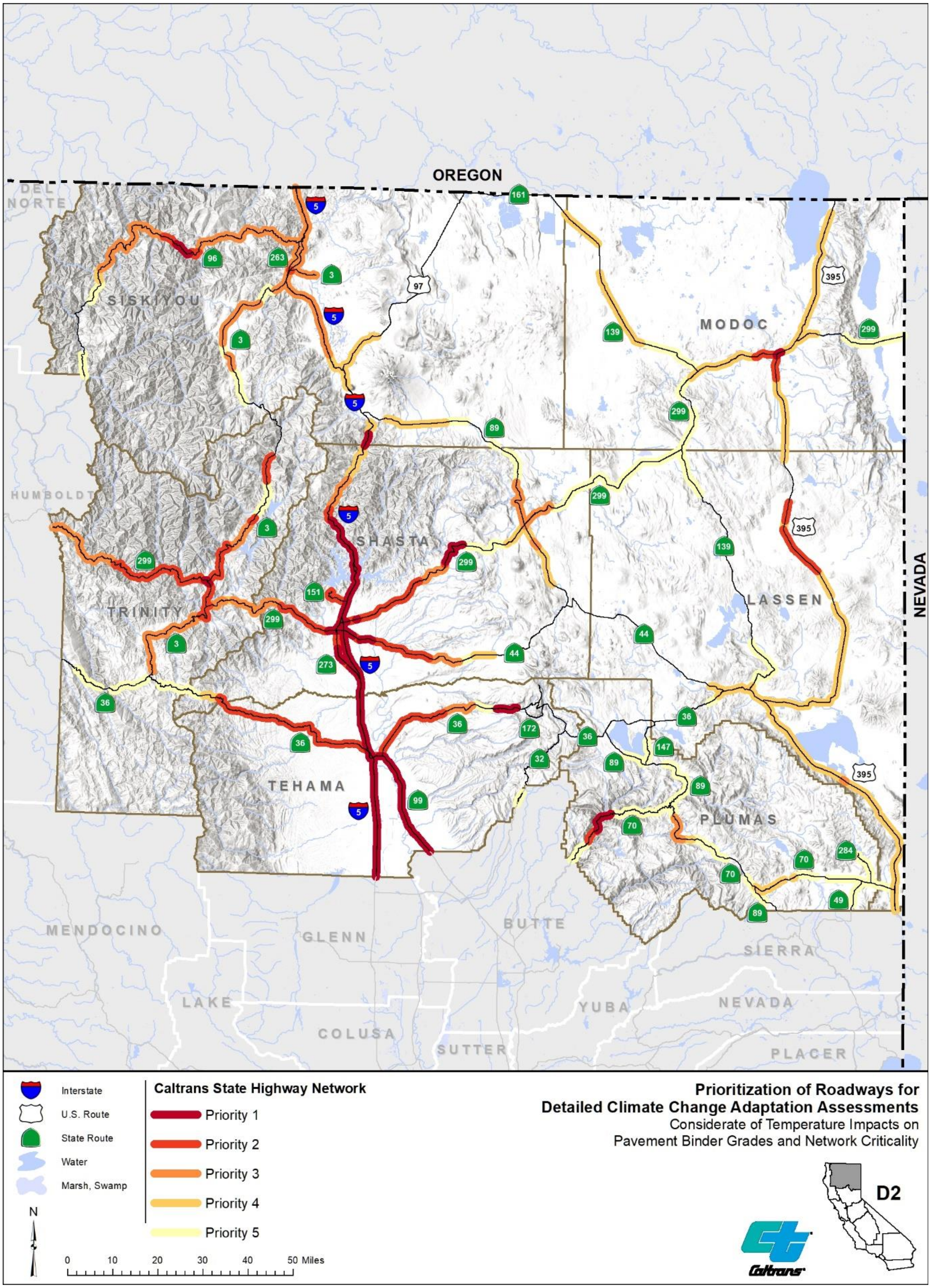

FIGURE 5: PRIORITIZATION OF ROADWAYS FOR DETAILED ADAPTATION ASSESSMENTS

TABLE 7: PRIORITY 1 ROADWAYS

Priority	Route	Carriageway[9]	From County & Postmile / To County & Postmile[10]	Average Cross-Hazard Prioritization Score[11]
1	70	P	PLU 70 9.899 / PLU 70 16.592	98.44
1	96	P	SIS 96 65.052 / SIS 96 69.293	98.21
1	5	S	GLE 5 R28.814 / SHA 5 45.608	81.50
1	5	S	SIS 5 0.006 / SIS 5 2.731	81.50
1	5	P	GLE 5 R28.82 / SHA 5 45.586	81.46
1	5	P	SHA 5 66.856 / SIS 5 2.73	81.46
1	299	P	SHA 299 22.224 / SHA 299 23.742	76.48
1	299	P	SHA 299 24.001 / SHA 299 24.087	76.48
1	299	P	SHA 299 27.76 / SHA 299 28.038	76.48
1	299	P	SHA 299 54.768 / SHA 299 62.323	76.48
1	299	P	SHA 299 G24.087 / SHA 299 25.548	76.48
1	299	P	TRI 299 50.817 / TRI 299 51.426	76.48
1	299	P	TRI 299 51.845 / TRI 299 52.36	76.48
1	36	P	TEH 36 43.282 / TEH 36 44.007	75.45
1	36	P	TEH 36 76.732 / TEH 36 81.565	75.45
1	36	P	TEH 36 R41.207 / TEH 36 41.89	75.45
1	299	S	SHA 299 22.223 / SHA 299 23.741	69.89
1	299	S	SHA 299 24.45 / SHA 299 25.546	69.89
1	299	S	SHA 299 60.404 / SHA 299 60.679	69.89
1	299	S	TRI 299 50.817 / TRI 299 51.426	69.89
1	44	S	SHA 44 L0L / SHA 44 R2.358	68.91
1	44	P	SHA 44 L0.237R / SHA 44 R2.407	68.54
1	44	P	SHA 44 L0R / SHA 44 L0.161R	68.54
1	44	P	SHA 44 R4.218 / SHA 44 R4.708	68.54
1	44	P	SHA 44 R5.162 / SHA 44 R5.788	68.54
1	44	P	SHA 44 R6.068 / SHA 44 R7.011	68.54
1	99	P	TEH 99 0.001 / TEH 99 11.782	67.59
1	99	P	TEH 99 12.321 / TEH 99 13.322	67.59
1	99	P	TEH 99 13.389 / TEH 99 13.693	67.59
1	99	P	TEH 99 13.798 / TEH 99 R17.655	67.59
1	99	P	TEH 99 19.867 / TEH 99 24.943	67.59
1	99	P	TEH 99 R18.266 / TEH 99 19.327	67.59
1	273	S	SHA 273 11.816 / SHA 273 12.674	66.82
1	273	S	SHA 273 16.834 / SHA 273 17.381	66.82
1	273	S	SHA 273 17.385 / SHA 273 17.809	66.82

[9] Caltrans' alignment codes designate the carriageway on divided roadways: "P" always represents northbound or eastbound carriageways whereas "S" always represents southbound or westbound carriageways. Undivided roadways are always indicated with a "P".
[10] GLE = Glenn; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity
[11] These values represent the average of the cross-hazard prioritization scores amongst all the abutting small segments on the same route sharing a common priority level that were aggregated to form the longer segments listed in this table.

Priority	Route	Carriageway[9]	From County & Postmile / To County & Postmile[10]	Average Cross-Hazard Prioritization Score[11]
1	273	S	SHA 273 3.825 / SHA 273 4.493	66.82
1	273	S	SHA 273 5.053 / SHA 273 5.441	66.82
1	273	S	SHA 273 6.398 / SHA 273 7.419	66.82
1	273	S	SHA 273 9.427 / SHA 273 11.096	66.82
1	395	P	MOD 395 22.541 / MOD 395 23.982	66.42
1	36	S	TEH 36 43.221 / TEH 36 44.007	66.10
1	36	S	TEH 36 R41.207 / TEH 36 41.786	66.10
1	273	P	SHA 273 11.819 / SHA 273 12.671	65.88
1	273	P	SHA 273 16.834 / SHA 273 17.382	65.88
1	273	P	SHA 273 17.561 / SHA 273 17.819	65.88
1	273	P	SHA 273 3.812 / SHA 273 4.589	65.88
1	273	P	SHA 273 5.052 / SHA 273 5.439	65.88
1	273	P	SHA 273 6.395 / SHA 273 7.458	65.88
1	273	P	SHA 273 9.424 / SHA 273 11.095	65.88
1	273	P	SHA 273 R16.659R / SHA 273 R16.73R	65.88

5. NEXT STEPS

This report has identified the bridge, large culvert, small culvert, and roadway assets exposed to a variety of climate hazards in District 2 and assigned them priority levels for detailed assessments based on their vulnerability rating. Caltrans' next step will be to begin undertaking these detailed adaptation assessments for the identified assets starting with the highest priority (priority 1) assets first and then proceeding to lower priority assets thereafter. These detailed adaptation assessments will take a closer look at the exposure to each asset using more localized climate projections and more detailed engineering analyses. If impacts are verified, Caltrans will develop and evaluate adaptation options for the asset to ensure that it is able to withstand future climate changes. Importantly, the detailed adaptation assessments will include coordination with key stakeholder groups whose actions affect or are affected by the asset and its adaptation.

ANTLERS BRIDGE MURAL, SHASTA COUNTY

As part of this project, a pilot facility level adaptation assessment will be conducted for small culvert number 90704001416. This Priority 1 small culvert on SR 70 in Plumas County spans Little Indian Creek and has a history of past impacts from riverine flooding. The pilot study is currently underway, and the results will be published in a separate document.

Another next step will be to integrate the prioritization measures into the asset management system used in the district. This will ensure that climate change is a consideration in the identification of future projects alongside traditional asset condition metrics. As noted previously, assets identified for capital investments, especially those flagged as being a high priority for climate change, should then undergo detailed climate change assessments prior to project programming.

Finally, at the district workshop, district staff noted that the results of this study will be a useful starting point to begin discussions with various important stakeholders in the district about addressing climate change and its impacts. This includes state and federal environmental agencies, the National Forest Service, forest product companies (major landowners in the district whose actions directly affect the road network), and others. Multi-agency stakeholder coordination and involvement of the private sector are essential because the impacts from climate change, and ability to effectively address those impacts, cross both jurisdictional and ownership boundaries. For example, Caltrans could increase the size of a culvert to accommodate higher stormwater and debris flows while the more cost-effective solution may be better land management in the adjacent drainage area. The approach to climate change cannot just be Caltrans-centric. A common framework across all state agencies must be established for truly effective long-term solutions to be achieved.

6. APPENDIX

TABLE 8: PRIORITIZATION OF BRIDGES FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	09 0025	PLU	STATE ROUTE 70	CHIPPS CREEK	13.56	100.00
1	05 0009	TRI	STATE ROUTE 299	MANZANITA CREEK	28.99	95.80
1	02 0072	SIS	STATE ROUTE 96	SEIAD CREEK	60.17	86.41
1	09 0063	PLU	STATE ROUTE 89	MIDDLE FORK FEATHER RIVER	8.23	82.61
1	07 0061	LAS	STATE ROUTE 139	MEADOW CHANNEL	16.92	77.39
1	09 0028	PLU	STATE ROUTE 89	FRAZIER CREEK	6.29	71.28
1	09 0070	PLU	STATE ROUTE 284	LITTLE LAST CHANCE CREEK	5.6	71.06
1	08 0059	TEH	STATE ROUTE 172	BATTLE CREEK	0.85	69.79
1	06 0067	SHA	STATE ROUTE 299	PIT RIVER	84.48	69.61
1	05 0069	TRI	STATE ROUTE 3	SCOTT MOUNTAIN CREEK	T81.23	68.99
1	08 0019	TEH	STATE ROUTE 99	SALT CREEK	24.84	68.87
1	09 0002	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	3.07	67.92
1	09 0026	PLU	STATE ROUTE 70	RUSH CREEK	23.67	67.85
1	05 0060	TRI	STATE ROUTE 3	COFFEE CREEK	67.7	67.56
1	08 0018	TEH	STATE ROUTE 99	SALT CREEK OVERFLOW	24.78	66.92
1	08 0052	TEH	STATE ROUTE 36	PALMER GULCH	53.25	66.58
1	09 0029	PLU	STATE ROUTE 89	GRAEAGLE CREEK	7.29	66.38
1	02 0169	SIS	STATE ROUTE 3	ETNA CREEK	20.44	66.26
1	07 0062	LAS	STATE ROUTE 139	WILLOW CREEK	17.02	64.78
1	07 0023	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	15.87	63.58
1	03 0001	MOD	STATE ROUTE 299	BUTTE CREEK	0.51	62.54
1	07 0008	LAS	STATE ROUTE 36	ROBBERS CREEK	3.15	61.86
1	03 0060	MOD	STATE ROUTE 299	NORTH FORK ASH CREEK	3.38	61.69
1	09 0004	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	6.99	61.08
1	05 0015	TRI	STATE ROUTE 299	EAST WEAVER CREEK	52.13	59.48
1	09 0022	PLU	STATE ROUTE 70	HUMBUG CREEK	73.99	59.40
1	02 0151	SIS	STATE ROUTE 3	YREKA CREEK	L49.99	59.15
1	05 0065	TRI	STATE ROUTE 3	TANGLE BLUE CREEK	79.39	58.76
1	09 0072	PLU	STATE ROUTE 284	LITTLE LAST CHANCE CREEK	7.31	58.74
1	08 0061	TEH	STATE ROUTE 36	GURNSEY CREEK	97.67	58.45
1	02 0038	SIS	STATE ROUTE 3	PATTERSON CREEK	24.26	58.22
1	06 0066	SHA	STATE ROUTE 299	HAT CREEK	84.02	57.71
1	07 0052	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK OVRFLOW	R21.34	57.44
1	09 0016	PLU	STATE ROUTE 70	CHAMBERS CREEK	9.04	57.18

[12] LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	02 0012	SIS	STATE ROUTE 263	DRY GULCH	54.51	56.55
1	09 0008	PLU	STATE ROUTE 70	YELLOW CREEK	14.9	55.80
1	02 0145L	SIS	INTERSTATE 5	GUYS GULCH	R39.27	55.77
1	05 0028	TRI	STATE ROUTE 3	TRINITY RIVER	68.5	55.68
1	05 0036	TRI	STATE ROUTE 3	LITTLE CREEK	25.55	55.52
1	07 0007	LAS	STATE ROUTE 299	PIT RIVER	14.06	55.32
1	09 0003	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	5.58	54.99
1	06 0006	SHA	STATE ROUTE 273	SPRING GULCH	7.1	54.59
1	07 0033	LAS	STATE ROUTE 36	SUSAN RIVER	R26.72	54.07
1	03 0019	MOD	U.S. HIGHWAY 395	SOUTH FORK PIT RIVER	3.73	53.65
1	09 0009	PLU	STATE ROUTE 70	NORTH FORK FEATHER RIVER	16.54	53.42
1	03 0002	MOD	STATE ROUTE 299	ASH CREEK	1.02	52.89
1	08 0015	TEH	STATE ROUTE 99	NEW CREEK	22.54	52.04
1	07 0034	LAS	U.S. HIGHWAY 395	SUSAN RIVER	72.29	51.98
1	06 0046	SHA	STATE ROUTE 299	DRY CREEK	31.5	51.55
1	05 0012	TRI	STATE ROUTE 299	CANYON CREEK	43.36	51.23
1	06 0116	SHA	INTERSTATE 5	CASTLE CREEK	63.31	51.20
1	06 0057	SHA	STATE ROUTE 36	BEEGUM CREEK	11.91	50.81
1	02 0011	SIS	STATE ROUTE 263	SHASTA RIVER	52.62	50.72
1	09 0018	PLU	STATE ROUTE 70	SPANISH CREEK	42.45	50.29
1	09 0014	PLU	STATE ROUTE 70	INDIAN CREEK	33.07	49.68
1	02 0143	SIS	INTERSTATE 5	YREKA CREEK	R46.79	49.60
2	05 0037	TRI	STATE ROUTE 3	BROWNS CREEK	R26.3	49.48
2	06 0058	SHA	STATE ROUTE 299	MONTGOMERY CREEK	56.74	49.19
2	02 0144L	SIS	INTERSTATE 5	CRAM GULCH	R39.02	48.95
2	07 0004	LAS	STATE ROUTE 299	PIT RIVER OVERFLOW	13.12	48.93
2	09 0065	PLU	STATE ROUTE 147	HAMILTON BRANCH	8.98	48.84
2	06 0203	SHA	STATE ROUTE 273	CLEAR CREEK	11.23	48.63
2	08 0164	TEH	STATE ROUTE 99	DEER CREEK	5.99	48.62
2	02 0145R	SIS	INTERSTATE 5	GUYS GULCH	R39.27	48.61
2	02 0146R	SIS	INTERSTATE 5	JULIEN CREEK	R40.12	48.58
2	02 0144R	SIS	INTERSTATE 5	CRAM GULCH	R39.02	48.53
2	02 0057	SIS	STATE ROUTE 3	SCOTT RIVER	31.68	48.48
2	08 0062	TEH	STATE ROUTE 36	NORTH FORK DEER CREEK	R98.92	48.33
2	02 0146L	SIS	INTERSTATE 5	JULIEN CREEK	R40.12	48.30
2	03 0010	MOD	U.S. HIGHWAY 395	PARKER CREEK	26.71	47.63
2	05 0049	TRI	STATE ROUTE 3	RAMSHORN CREEK	73.47	47.01
2	05 0034	TRI	STATE ROUTE 36	MAD RIVER	R2.73	46.85
2	06 0068	SHA	STATE ROUTE 299	FALL RIVER	91.39	46.71

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
2	05 0055	TRI	STATE ROUTE 3	STUART FORK	43.93	46.54
2	06 0012	SHA	STATE ROUTE 273	CANYON CREEK	14.31	46.10
2	02 0002	SIS	INTERSTATE 5	SACRAMENTO RIVER BOH	2.65	46.01
2	05 0068	TRI	STATE ROUTE 3	SCOTT MOUNTAIN CREEK	T80.67	45.97
2	05 0027	TRI	STATE ROUTE 3	SUNFLOWER CREEK	77.93	45.92
2	02 0184	SIS	STATE ROUTE 3	EAST FORK SCOTT RIVER	6.9	45.43
2	09 0007	PLU	STATE ROUTE 70	GRIZZLY CREEK	0.67	45.16
2	03 0003	MOD	STATE ROUTE 299	RUSH CREEK	6.32	44.84
2	02 0175L	SIS	INTERSTATE 5 SB	COTTONWOOD CREEK	R63.77L	44.78
2	02 0052	SIS	STATE ROUTE 3	KIDDER CREEK	27.09	44.74
2	06 0009	SHA	STATE ROUTE 273	OLNEY CREEK	12.58	44.61
2	02 0185	SIS	STATE ROUTE 3	EAST FORK SCOTT RIVER	8.66	44.10
2	06 0152	SHA	STATE ROUTE 44	COW CREEK	R7.4	44.08
2	05 0075	TRI	STATE ROUTE 36	RATTLESNAKE CREEK	19.11	43.84
2	05 0074	TRI	STATE ROUTE 36	RATTLESNAKE CREEK	19.06	43.79
2	02 0197	SIS	HIGHWAY 96	O'NEIL CREEK	65.38	43.29
2	08 0071	TEH	STATE ROUTE 32	DEER CREEK	21.45	43.17
2	06 0096	SHA	STATE ROUTE 299	WHISKEY CREEK	14.17	43.07
2	07 0003	LAS	STATE ROUTE 299	PIT RIVER OVERFLOW	12.82	42.99
2	05 0063	TRI	STATE ROUTE 3	GRAVES CREEK	77.17	42.89
2	05 0011	TRI	STATE ROUTE 299	NORTH FORK TRINITY RIVER	36.89	42.75
2	02 0119	SIS	STATE ROUTE 96	KLAMATH RIVER	61.14	42.59
2	05 0022	TRI	STATE ROUTE 3	BIG CREEK	9.24	41.91
2	06 0062	SHA	STATE ROUTE 299	BURNEY CREEK	74.85	41.89
2	03 0011	MOD	STATE ROUTE 139	HOWARDS GULCH	R2.23	41.63
2	07 0053	LAS	U.S. HIGHWAY 395	WILLOW RANCH CREEK	R24.69	41.53
2	05 0056	TRI	STATE ROUTE 3	MULE CREEK	48.53	41.50
2	09 0055	PLU	STATE ROUTE 70	BIG GRIZZLY CREEK	R78.64	41.15
2	08 0111R	TEH	INTERSTATE 5	COYOTE CREEK	R20.52	41.10
2	08 0072	TEH	STATE ROUTE 32	DEER CREEK	22.89	41.05
2	02 0123R	SIS	INTERSTATE 5	SHASTA RIVER	R22.62	41.04
2	02 0056	SIS	STATE ROUTE 3	KIDDER CREEK	31.23	41.02
2	08 0111L	TEH	INTERSTATE 5	COYOTE CREEK	R20.5	40.69
2	08 0006	TEH	STATE ROUTE 99	CHAMPLIN SLOUGH	9.14	40.39
2	09 0044	PLU	STATE ROUTE 89	LAKE ALMANOR SPILLWAY	29.97	40.35
2	06 0021	SHA	INTERSTATE 5	SHASTA LAKE - PIT RIVER BOH	R28.14	39.96
2	05 0054	TRI	STATE ROUTE 3	RUSH CREEK	38.73	39.33
2	06 0005	SHA	STATE ROUTE 273	ANDERSON CREEK	5.1	39.32
2	09 0062	PLU	STATE ROUTE 70	SPRING GARDEN BOH	51.21	39.31

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
2	08 0070	TEH	STATE ROUTE 32	DEER CREEK	17.45	39.23
3	02 0167	SIS	STATE ROUTE 3	SUGAR CREEK	11.29	39.13
3	08 0069	TEH	STATE ROUTE 32	DEER CREEK	16.85	39.04
3	05 0045	TRI	STATE ROUTE 299	WEAVER CREEK	56.5	38.95
3	02 0175R	SIS	INTERSTATE 5 NB	COTTONWOOD CREEK	R63.65R	38.91
3	06 0049	SHA	STATE ROUTE 299	SALT CREEK	34.56	38.44
3	06 0209	SHA	SR 36	MIDDLE FORK COTTONWOOD CREEK	7.58	38.40
3	05 0059	TRI	STATE ROUTE 3	SWIFT CREEK	60.03	38.36
3	03 0004	MOD	STATE ROUTE 299	RUSH CREEK	8.07	38.34
3	08 0117L	TEH	INTERSTATE 5	OAT CREEK	R19.67	38.02
3	06 0010	SHA	STATE ROUTE 273	A.C.I.D. CANAL	13.31	37.90
3	06 0086	SHA	STATE ROUTE 89	HAT CREEK	14.37	37.90
3	02 0079	SIS	STATE ROUTE 96	SCOTT RIVER	71.23	37.81
3	08 0084L	TEH	INTERSTATE 5	ELDER CREEK	R16.99	37.79
3	08 0084R	TEH	INTERSTATE 5	ELDER CREEK	R16.99	37.79
3	03 0052	MOD	U.S. HIGHWAY 395	SOUTH FORK PIT RIVER	R16.52	37.09
3	06 0142L	SHA	INTERSTATE 5	ANDERSON CREEK	R5.04	37.06
3	05 0010	TRI	STATE ROUTE 299	GRASS VALLEY CREEK	65.8	36.83
3	05 0013	TRI	STATE ROUTE 299	GRASS VALLEY CREEK	65.45	36.82
3	02 0168	SIS	STATE ROUTE 3	FRENCH CREEK	16.87	36.76
3	03 0053	MOD	U.S. HIGHWAY 395	SOUTH FORK PIT RIVER	R19.64	36.76
3	08 0117R	TEH	INTERSTATE 5	OAT CREEK	R19.67	36.75
3	02 0117	SIS	STATE ROUTE 96	KLAMATH RIVER	77.15	36.29
3	03 0005	MOD	STATE ROUTE 299	PIT RIVER	17.95	35.72
3	08 0003	TEH	STATE ROUTE 99	DEER CREEK OVERFLOW	5.82	35.42
3	06 0206	SHA	STATE ROUTE 44	SACRAMENTO RIVER	L1.34	35.40
3	05 0035	TRI	STATE ROUTE 3	CARR CREEK	13.96	35.38
3	06 0087	SHA	STATE ROUTE 89	HAT CREEK	16.09	35.29
3	06 0107	SHA	INTERSTATE 5	CHURN CREEK	R19	35.03
3	06 0014	SHA	STATE ROUTE 273	SACRAMENTO RIVER	17.08	34.99
3	09 0027	PLU	S.R. 89	SULPHUR CREEK	3.4	34.93
3	02 0014	SIS	STATE ROUTE 263	SHASTA RIVER	56.35	34.90
3	06 0150	SHA	STATE ROUTE 44	STILLWATER CREEK	R4.31	34.78
3	05 0043	TRI	STATE ROUTE 299	PONY BAR CREEK	5.94	34.29
3	03 0006	MOD	STATE ROUTE 299	CLOVERSWALE CREEK	27.43	34.09
3	02 0015	SIS	STATE ROUTE 263	KLAMATH RIVER	57.07	33.88
3	06 0027	SHA	INTERSTATE 5	DOG CREEK	45.54	33.71
3	06 0036	SHA	STATE ROUTE 299	CLEAR CREEK	8.73	33.60

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
3	06 0043R	SHA	STATE ROUTE 299	CHURN CREEK	25.71	33.56
3	05 0008	TRI	STATE ROUTE 299	BIG FRENCH CREEK	23.29	33.53
3	06 0028	SHA	INTERSTATE 5	SLATE CREEK	R48.83	33.52
3	02 0166	SIS	STATE ROUTE 3	WILDCAT CREEK	9.75	33.49
3	08 0095R	TEH	INTERSTATE 5	SACRAMENTO RIVER	R25.4	32.89
3	05 0044	TRI	STATE ROUTE 299	GRAY CREEK	6.33	32.81
3	08 0095L	TEH	INTERSTATE 5	SACRAMENTO RIVER	R25.4	32.74
3	08 0096R	TEH	INTERSTATE 5	SACRAMENTO RIVER	R26.96	32.61
3	08 0108R	TEH	INTERSTATE 5	RED BANK CREEK	R23.61	32.52
3	08 0108L	TEH	INTERSTATE 5	RED BANK CREEK	R23.61	32.11
3	05 0089	TRI	STATE ROUTE 3	MINNEHAHA CREEK	70.7	31.89
3	08 0023	TEH	STATE ROUTE 36	SACRAMENTO RIVER	41.4	31.23
3	08 0050	TEH	STATE ROUTE 36	LONG GULCH	23.05	30.23
3	02 0045	SIS	INTERSTATE 5	LITTLE CASTLE CREEK	0.04	30.21
3	09 0010	PLU	STATE ROUTE 36	NORTH FORK FEATHER RIVER	8.84	30.10
3	08 0030	TEH	STATE ROUTE 36	SALT CREEK	19.17	29.96
3	08 0094	TEH	STATE ROUTE 36	BATTLE CREEK	81.48	29.90
3	03 0009	MOD	U.S. HIGHWAY 395	NORTH FORK PIT RIVER	26.23	29.47
3	08 0028L	TEH	INTERSTATE 5	DIBBLE CREEK	R28.16	29.38
3	02 0013	SIS	STATE ROUTE 263	SHASTA RIVER	55.03	29.28
4	02 0035	SIS	STATE ROUTE 96	DILLON CREEK	R16.13	29.13
4	08 0016	TEH	STATE ROUTE 99	MILL RACE CREEK	24.13	29.06
4	08 0028R	TEH	INTERSTATE 5	DIBBLE CREEK	R28.16	29.04
4	08 0110L	TEH	INTERSTATE 5	WILLOW CREEK	R19.28	28.96
4	08 0110R	TEH	INTERSTATE 5	WILLOW CREEK	R19.28	28.78
4	06 0084	SHA	STATE ROUTE 44	HAT CREEK	59.62	28.74
4	08 0010	TEH	STATE ROUTE 99	SUNSET CANAL	15.55	28.71
4	03 0008	MOD	STATE ROUTE 299	RATTLESNAKE CREEK	37.8	28.66
4	08 0026L	TEH	INTERSTATE 5	SOUTH FORK BLUE TENT CREEK	31.75	28.47
4	05 0018	TRI	STATE ROUTE 299	TRINITY RIVER	R58	28.12
4	08 0074L	TEH	INTERSTATE 5	NORTH FORK MCCLURE CREEK	R14.63	28.11
4	05 0086	TRI	STATE ROUTE 299	LITTLE BROWNS CREEK	54.54	27.96
4	08 0074R	TEH	INTERSTATE 5	NORTH FORK MCCLURE CREEK	R14.63	27.94
4	08 0021	TEH	STATE ROUTE 36	SOUTH FORK COTTONWOOD CREEK	R25.54	27.90
4	02 0046	SIS	STATE ROUTE 89	MUD CREEK	21.08	27.86
4	05 0041	TRI	STATE ROUTE 3	READING CREEK	29.74	27.74
4	08 0020L	TEH	INTERSTATE 5	TRUCKEE CREEK	R14.85	27.69
4	08 0054	TEH	STATE ROUTE 36	SHEEP GULCH	54.84	27.56

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
4	08 0020R	TEH	INTERSTATE 5	TRUCKEE CREEK	R14.85	27.52
4	06 0052	SHA	STATE ROUTE 89	LAKE BRITTON	29.19	27.44
4	08 0068	TEH	STATE ROUTE 32	DEER CREEK	12.91	27.41
4	02 0134R	SIS	I 5 NB	KLAMATH RIVER BRIDGE & SEPARATION	R58.18R	27.06
4	06 0044	SHA	STATE ROUTE 299	STILLWATER CREEK	27.94	26.81
4	08 0107R	TEH	INTERSTATE 5	THOMES CREEK OVERFLOW	R11.78	26.72
4	07 0080	LAS	U.S. HIGHWAY 395	DILL SLOUGH	R71.17	26.70
4	08 0107L	TEH	INTERSTATE 5	THOMES CREEK OVERFLOW	R11.78	26.51
4	05 0088	TRI	STATE ROUTE 3	HAYFORK CREEK	6.52	26.44
4	06 0085	SHA	STATE ROUTE 89	HAT CREEK	3.89	26.43
4	05 0026	TRI	STATE ROUTE 36	SOUTH FORK TRINITY RIVER	16.82	26.37
4	08 0013	TEH	STATE ROUTE 99	BUTLER SLOUGH	19.54	25.99
4	07 0046	LAS	STATE ROUTE 36	SUSAN RIVER	R17.38	25.82
4	08 0060	TEH	STATE ROUTE 36	MILL CREEK	91.61	25.73
4	08 0083L	TEH	INTERSTATE 5	SOUTH FORK MCCLURE CREEK	R14.19	25.71
4	08 0083R	TEH	INTERSTATE 5	SOUTH FORK MCCLURE CREEK	R14.19	25.54
4	02 0051	SIS	STATE ROUTE 96	CLEAR CREEK	32.6	25.49
4	08 0086	TEH	STATE ROUTE 36	DIBBLE CREEK	R34.04	25.16
4	08 0130L	TEH	INTERSTATE 5	JEWETT CREEK	R8.75	24.79
4	06 0153L	SHA	STATE ROUTE 44	CHURN CREEK	R1.56	24.69
4	06 0153R	SHA	STATE ROUTE 44	CHURN CREEK	R1.56	24.69
4	08 0119L	TEH	INTERSTATE 5	HALL CREEK	R5.98	24.34
4	08 0119R	TEH	INTERSTATE 5	HALL CREEK	R5.98	24.14
4	08 0125L	TEH	INTERSTATE 5	SOUR GRASS CREEK	R2.27	24.12
4	08 0128R	TEH	INTERSTATE 5	BRANNIN CREEK	R5.5	24.00
4	08 0128L	TEH	INTERSTATE 5	BRANNIN CREEK	R5.5	24.00
4	02 0148L	SIS	INTERSTATE 5	SHASTA RIVER	R51.16	23.74
4	08 0089	TEH	STATE ROUTE 36	SAMSON SLOUGH	42.24	23.65
4	05 0082	TRI	STATE ROUTE 299	TRINITY RIVER	R3.44	23.52
4	05 0081	TRI	STATE ROUTE 299	TRINITY RIVER	R3.16	23.52
4	08 0055	TEH	STATE ROUTE 36	DE HAVEN GULCH	55.2	23.37
4	08 0124L	TEH	INTERSTATE 5	MOORE CREEK	R1.17	23.28
4	09 0074	PLU	STATE ROUTE 36	CHESTER FLOOD CONTROL CHANNEL	6.47	23.28
4	09 0077	PLU	STATE ROUTE 70	SPANISH CREEK	35.32	23.26
4	08 0125R	TEH	INTERSTATE 5	SOUR GRASS CREEK	R2.27	23.25
4	02 0165	SIS	STATE ROUTE 3	SOUTH FORK SCOTT RIVER	8.89	23.24
4	08 0088	TEH	STATE ROUTE 36	PAYNES CREEK SLOUGH	42.5	23.16

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
4	02 0044	SIS	STATE ROUTE 3	SHASTA RIVER	51.76	23.06
4	06 0121	SHA	INTERSTATE 5	SHOTGUN CREEK	R55.59	22.98
5	08 0127R	TEH	INTERSTATE 5	RICE CREEK	R4.02	22.64
5	08 0127L	TEH	INTERSTATE 5	RICE CREEK	R4.02	22.64
5	08 0053	TEH	STATE ROUTE 36	SUPAN GULCH	53.85	22.55
5	08 0029	TEH	STATE ROUTE 36	DRY CREEK	10.35	22.46
5	09 0006	PLU	STATE ROUTE 36	BAILEY CREEK	R13.73	22.29
5	06 0205	SHA	SR 89	CAYTON CREEK	31.21	22.20
5	05 0029	TRI	STATE ROUTE 3	SCORPION CREEK	68.95	21.86
5	05 0072	TRI	STATE ROUTE 36	LOWER RATTLESNAKE CREEK	20.07	21.83
5	05 0073	TRI	STATE ROUTE 36	UPPER RATTLESNAKE CREEK	20.42	21.80
5	05 0019	TRI	STATE ROUTE 299	INDIAN CREEK	59.68	21.74
5	08 0123L	TEH	INTERSTATE 5	GAY CREEK	R.11	21.58
5	08 0123R	TEH	INTERSTATE 5	GAY CREEK	R.11	21.58
5	06 0080	SHA	STATE ROUTE 44	BEAR CREEK	R14.45	21.09
5	02 0141L	SIS	INTERSTATE 5	PARKS CREEK	R27.18	21.01
5	02 0070	SIS	STATE ROUTE 96	SWILLUP CREEK	23.25	20.71
5	08 0067	TEH	STATE ROUTE 32	CHICO CREEK	1.55	20.53
5	02 0142	SIS	STATE ROUTE 96	LITTLE GRIDER CREEK	40.02	20.35
5	06 0043L	SHA	STATE ROUTE 299	CHURN CREEK	25.71	19.58
5	05 0062	TRI	STATE ROUTE 3	TRINITY RIVER	75.82	19.37
5	05 0006	TRI	STATE ROUTE 299	TRINITY RIVER	13.87	19.01
5	08 0154	TEH	STATE ROUTE 32	SLATE CREEK	20.47	18.74
5	02 0081	SIS	STATE ROUTE 96	BEAVER CREEK	88.26	18.64
5	06 0204	SHA	I-5	COTTONWOOD CREEK BOH	0.01	18.63
5	02 0053	SIS	STATE ROUTE 96	OAK FLAT CREEK	34.35	18.55
5	05 0050	TRI	STATE ROUTE 3	TRINITY RIVER	74.12	18.54
5	06 0144L	SHA	INTERSTATE 5	TORMEY DRAIN	R5.89	18.48
5	08 0161	TEH	STATE ROUTE 99	ANTELOPE CREEK	R18.02	18.39
5	06 0144R	SHA	INTERSTATE 5	TORMEY DRAIN	R5.89	18.20
5	06 0151	SHA	STATE ROUTE 44	CLOUGH CREEK	R4.55	17.81
5	05 0007	TRI	STATE ROUTE 36	HAYFORK CREEK	R38.37	17.80
5	05 0042	TRI	STATE ROUTE 3	DOBBINS GULCH	0.54	16.83
5	08 0160	TEH	STATE ROUTE 99	MILL CREEK	13.33	16.64
5	08 0163	TEH	STATE ROUTE 99	TOOMES CREEK	8.38	16.29
5	02 0049	SIS	STATE ROUTE 96	INDIAN CREEK	41.02	15.92
5	05 0087	TRI	SR 3	EAST FORK STUART FORK CREEK	53.69	15.69
5	08 0166	TEH	STATE ROUTE 99	NORTH BRANCH OF NORTH FORK MILL CREEK	14.05	15.67

Priority	Bridge Number	County[12]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
5	02 0157	SIS	STATE ROUTE 96	KLAMATH RIVER	R5.75	15.37
5	02 0024	SIS	STATE ROUTE 96	SANDY BAR CREEK	R9.11	15.15
5	02 0023	SIS	STATE ROUTE 96	STANSHAW CREEK	R8.2	14.83
5	02 0068	SIS	STATE ROUTE 96	THOMPSON CREEK	52.48	14.77
5	06 0011	SHA	STATE ROUTE 273	OREGON GULCH	13.88	13.94
5	08 0156	TEH	STATE ROUTE 99	SINGER CREEK	0.23	13.74
5	05 0047	TRI	STATE ROUTE 3	TRINITY RIVER	70.92	13.51
5	08 0168	TEH	STATE ROUTE 99	CRAIG CREEK	21.13	12.93
5	05 0032	TRI	STATE ROUTE 3	TRINITY RIVER	69.63	12.62
5	08 0158	TEH	STATE ROUTE 36	SOUTH FORK DIBBLE CREEK	R39.14	12.19
5	02 0132	SIS	STATE ROUTE 96	KLAMATH RIVER (BLUE NOSE)	R15.61	12.18
5	02 0022	SIS	STATE ROUTE 96	IRVING CREEK	R7.25	11.65
5	05 0064	TRI	STATE ROUTE 3	TRINITY RIVER	78.11	11.62
5	08 0162	TEH	STATE ROUTE 99	DYE CREEK	16.6	10.98
5	02 0156	SIS	STATE ROUTE 96	KLAMATH RIVER (H. LYLE DAVIS MEMORIAL BRIDGE)	R5.08	8.51
5	06 0202	SHA	STATE ROUTE 299	CEDAR CREEK (EAST)	48.39	6.47
5	06 0193R	SHA	INTERSTATE 5 NB	SACRAMENTO RIVER BOH	R52.11	4.27
5	06 0192L	SHA	INTERSTATE 5 SB	SACRAMENTO RIVER BOH	R51.8	3.79
5	06 0201	SHA	STATE ROUTE 299	CEDAR CREEK (WEST)	48.18	3.37
5	02 0027	SIS	STATE ROUTE 96	TI CREEK	R11.99	0.18
5	02 0177	SIS	STATE ROUTE 96	SALMON RIVER (CARL LANGFORD MEMORIAL BRIDGE)	R.04	0.00

TABLE 9: PRIORITIZATION OF LARGE CULVERTS FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

Priority	Bridge Number	County[13]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
1	07 0058	LAS	STATE ROUTE 70	LONG VALLEY CREEK	1.97	100.00
1	07 0056	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	28	99.69
1	07 0051	LAS	STATE ROUTE 299	WILLOW CREEK	24.01	97.99
1	07 0057	LAS	U.S. HIGHWAY 395	LONG VALLEY CREEK	26.19	95.33
1	06 0007	SHA	STATE ROUTE 273	CHINA GULCH	10.97	75.90
1	06 0110	SHA	INTERSTATE 5	WEST FORK STILLWATER CREEK	R25.05	69.80
1	06 0167	SHA	INTERSTATE 5	BOULDER CREEK	R17.13	67.71
2	02 0160	SIS	INTERSTATE 5	YREKA CREEK	R45.61	66.00
2	09 0020	PLU	STATE ROUTE 70	GREENHORN CREEK	47.74	61.21
2	09 0075	PLU	STATE ROUTE 70	CLEAR STREAM	42.86	60.42
2	03 0056	MOD	ROUTE 299	DUTCH FLAT CREEK	2.45	52.35
2	02 0087	SIS	STATE ROUTE 96	EMPIRE CREEK	93.09	50.51
2	02 0086	SIS	STATE ROUTE 96	LUMGREY CREEK	93.07	49.34
2	08 0051	TEH	STATE ROUTE 36	SEVEN MILE CREEK	48.6	47.18
2	03 0028	MOD	STATE ROUTE 299	CALDWELL CREEK	23.34	45.64
3	07 0048	LAS	STATE ROUTE 36	GOODRICH CREEK	7.28	42.94
3	07 0049	LAS	STATE ROUTE 299	RAINES CREEK	2.45	42.32
3	06 0060	SHA	STATE ROUTE 299	LITTLE HATCHET CREEK	64.99	40.91
3	07 0066	LAS	STATE ROUTE 36	GOLD RUN CREEK	R27.36	40.85
3	02 0010	SIS	INTERSTATE 5	GREENHORN CREEK	R46.05	39.90
3	03 0029	MOD	STATE ROUTE 299	WEST BRANCH CLOVERSWALE CREEK	27.35	39.39
3	07 0065	LAS	STATE ROUTE 36	JENSEN SLOUGH	R26.36	36.42
3	06 0166	SHA	STATE ROUTE 44	A.C.I.D. CANAL	L.7	31.60
4	08 0093	TEH	INTERSTATE 5	BIGGS CREEK	32.36	30.53
4	06 0172	SHA	INTERSTATE 5	SPRING BRANCH CREEK	R24.54	28.44
4	02 0120	SIS	STATE ROUTE 96	KOHL CREEK	80.05	26.31
4	02 0083	SIS	U.S. HIGHWAY 97	WHITNEY CREEK	9.61	23.86
4	03 0007	MOD	STATE ROUTE 299	ROCK CREEK	37.16	21.91
4	03 0012	MOD	STATE ROUTE 299	DRY CREEK	0.93	16.38
4	06 0018	SHA	INTERSTATE 5	SALT CREEK	R20.8	15.75
4	08 0136	TEH	INTERSTATE 5	LAS FLORES CREEK	R17.78	13.05
5	08 0137	TEH	INTERSTATE 5	BRANCH COYOTE CREEK	R22.14	12.81
5	08 0134	TEH	INTERSTATE 5	KOPTA CREEK	R10.68	12.76
5	08 0078	TEH	STATE ROUTE 99	LOS MOLINOS CREEK	12.59	12.53
5	08 0075	TEH	STATE ROUTE 99	SHORT CREEK	3.67	9.08
5	08 0092	TEH	INTERSTATE 5	TAYLORS WASH	40.95	8.83

[13] LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama

Priority	Bridge Number	County[13]	Route	Feature Crossed	Postmile	Cross-Hazard Prioritization Score
5	06 0173	SHA	STATE ROUTE 44	WEST BRANCH CHURN CREEK	R.34	1.27
5	02 0100	SIS	STATE ROUTE 96	DOGGETT CREEK	82.67	1.05
5	06 0174	SHA	STATE ROUTE 44	CLOVER CREEK	R1.8	0.00

TABLE 10: PRIORITIZATION OF SMALL CULVERTS FOR DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
1	52994007000	TRI	299	70	100.00
1	20034003853	SIS	3	38.53	85.72
1	52994004427	TRI	299	44.27	81.19
1	52994004512	TRI	299	45.12	81.17
1	60052003280	SHA	5	32.8	80.81
1	90704001416	PLU	70	14.16	80.29
1	52994004483	TRI	299	44.83	79.16
1	80360001421	TEH	36	14.21	79.09
1	73950010189	LAS	395	101.89	78.75
1	73950010235	LAS	395	102.35	78.73
1	90704002288	PLU	70	22.88	78.01
1	60364000415	SHA	36	4.15	77.20
1	60364000379	SHA	36	3.79	77.20
1	52990005111	TRI	299	51.11	76.49
1	73954013046	LAS	395	130.46	75.30
1	73954013059	LAS	395	130.59	75.27
1	70440001212	LAS	44	12.12	74.81
1	73950010276	LAS	395	102.76	74.81
1	73954004525	LAS	395	45.25	74.59
1	73954004551	LAS	395	45.51	74.57
1	20964010412	SIS	96	104.12	74.03
1	91470000602	PLU	147	6.02	73.97
1	52994004453	TRI	299	44.53	73.79
1	60052003004	SHA	5	30.04	73.64
1	50034004721	TRI	3	47.21	73.49
1	50034004581	TRI	3	45.81	73.46
1	50034004549	TRI	3	45.49	73.46
1	50034004651	TRI	3	46.51	73.39
1	50034004666	TRI	3	46.66	73.39
1	80360001514	TEH	36	15.14	73.21
1	60054004393	SHA	5	43.93	73.08
1	50034002101	TRI	3	21.01	72.94
1	52994006866	TRI	299	68.66	72.37
1	73954004385	LAS	395	43.85	72.10
1	60364000564	SHA	36	5.64	71.63
1	50034004486	TRI	3	44.86	71.40

[14] LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
1	73954013223	LAS	395	132.23	71.35
1	60054102997	SHA	5	29.97	70.90
1	70360000851	LAS	36	8.51	70.70
1	52994003835	TRI	299	38.35	70.41
1	60054103141	SHA	5	31.41	70.25
1	50034002271	TRI	3	22.71	70.24
1	20964010358	SIS	96	103.58	70.12
1	60054103168	SHA	5	31.68	69.95
1	73950001058	LAS	395	10.58	69.95
1	73954013638	LAS	395	136.38	69.92
1	73954013449	LAS	395	134.49	69.80
1	60054004785	SHA	5	47.85	69.73
1	73954004463	LAS	395	44.63	69.69
1	70360001109	LAS	36	11.09	69.50
1	20964008370	SIS	96	83.7	69.14
1	81724000439	TEH	172	4.39	69.02
1	73954013149	LAS	395	131.49	68.81
1	20964009949	SIS	96	99.49	68.72
1	20964010464	SIS	96	104.64	68.65
1	20964010491	SIS	96	104.91	68.61
1	73954004368	LAS	395	43.68	68.56
1	71394001014	LAS	139	10.14	68.42
1	70364001250	LAS	36	12.5	67.57
1	70364001300	LAS	36	13	67.55
1	70364001374	LAS	36	13.74	67.49
1	90704007201	PLU	70	72.01	67.27
1	52994005133	TRI	299	51.33	67.20
1	52994005141	TRI	299	51.41	66.92
1	70440002683	LAS	44	26.83	66.74
1	50030003038	TRI	3	30.38	66.70
1	91470000826	PLU	147	8.26	66.69
1	90704007294	PLU	70	72.94	66.64
1	31390001408	MOD	139	14.08	66.64
1	90704007264	PLU	70	72.64	66.62
1	70444003098	LAS	44	30.98	66.54
1	91470000643	PLU	147	6.43	66.53
1	81724000777	TEH	172	7.77	66.48
1	73954013101	LAS	395	131.01	66.46
1	31390001360	MOD	139	13.6	66.42
1	70444002815	LAS	44	28.15	66.41

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
1	70444002910	LAS	44	29.1	66.33
1	60054103133	SHA	5	31.33	66.30
1	71394000692	LAS	139	6.92	66.10
1	71394000564	LAS	139	5.64	66.07
1	60054102976	SHA	5	29.76	66.04
1	60444002635	SHA	44	26.35	65.88
1	90704006693	PLU	70	66.93	65.70
1	52994006637	TRI	299	66.37	65.58
1	60050002584	SHA	5	25.84	65.36
1	60054102992	SHA	5	29.92	65.30
1	80364008168	TEH	36	81.68	65.28
1	73954004479	LAS	395	44.79	65.18
1	90704006897	PLU	70	68.97	65.05
1	70444002634	LAS	44	26.34	65.02
1	70444003123	LAS	44	31.23	64.63
1	70444003049	LAS	44	30.49	64.61
1	70444003413	LAS	44	34.13	64.59
1	52994003842	TRI	299	38.42	64.53
2	73954006176	LAS	395	61.76	64.50
2	70360000960	LAS	36	9.6	64.48
2	90704007069	PLU	70	70.69	64.41
2	73950000655	LAS	395	6.55	64.39
2	31390100359	MOD	139	3.59	64.33
2	73950000559	LAS	395	5.59	64.30
2	70444003230	LAS	44	32.3	64.28
2	70444003616	LAS	44	36.16	64.25
2	60054005679	SHA	5	56.79	64.21
2	60054100389	SHA	5	3.89	64.10
2	52994004714	TRI	299	47.14	64.07
2	60054005858	SHA	5	58.58	63.82
2	70444003269	LAS	44	32.69	63.79
2	52994005335	TRI	299	53.34	63.69
2	32994005230	MOD	299	52.3	63.68
2	90704006756	PLU	70	67.56	63.66
2	80364008417	TEH	36	84.17	63.59
2	70360001036	LAS	36	10.36	63.55
2	71394001186	LAS	139	11.86	63.49
2	52994004902	TRI	299	49.02	63.37
2	73950100414	LAS	395	4.14	63.23
2	71394001064	LAS	139	10.64	63.04

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
2	90704007005	PLU	70	70.05	62.96
2	70444003300	LAS	44	33	62.95
2	20054102140	SIS	5	21.4	62.93
2	50030003074	TRI	3	30.74	62.79
2	90704005921	PLU	70	59.21	62.63
2	73954004959	LAS	395	49.59	62.59
2	52994004555	TRI	299	45.55	62.57
2	70440001522	LAS	44	15.22	62.48
2	60054100326	SHA	5	3.26	62.46
2	73954004896	LAS	395	48.96	62.44
2	73954004899	LAS	395	48.99	62.44
2	73954005092	LAS	395	50.92	62.43
2	90704006599	PLU	70	65.99	62.31
2	73954005165	LAS	395	51.65	62.29
2	90708007790	PLU	70	77.9	62.29
2	20054000204	SIS	5	2.04	62.17
2	20964010041	SIS	96	100.41	62.17
2	73954005060	LAS	395	50.6	62.16
2	32994003296	MOD	299	32.96	62.15
2	71394000581	LAS	139	5.81	62.13
2	52994004708	TRI	299	47.08	62.10
2	31394100589	MOD	139	5.89	62.04
2	71394000481	LAS	139	4.81	61.96
2	31390100624	MOD	139	6.24	61.92
2	71394001958	LAS	139	19.58	61.79
2	90704007043	PLU	70	70.43	61.78
2	73954005145	LAS	395	51.45	61.72
2	60364000440	SHA	36	4.4	61.56
2	71394000329	LAS	139	3.29	61.48
2	73952100138	LAS	395	1.38	61.42
2	71394000405	LAS	139	4.05	61.41
2	73950100138	LAS	395	1.38	61.37
2	73952100029	LAS	395	0.29	61.28
2	80364008995	TEH	36	89.95	61.16
2	90704006802	PLU	70	68.02	61.11
2	73954005118	LAS	395	51.18	61.10
2	70444003486	LAS	44	34.86	61.05
2	90704006836	PLU	70	68.36	61.03
2	60360000865	SHA	36	8.65	60.98
2	60364000708	SHA	36	7.04	60.94

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
2	60050005858	SHA	5	58.58	60.83
2	81724000743	TEH	172	7.43	60.69
2	90704006948	PLU	70	69.48	60.67
2	70444003507	LAS	44	35.07	60.62
2	60054004785	SHA	5	47.85	60.52
2	20050100647	SIS	5	6.47	60.49
2	31390101066	MOD	139	10.66	60.49
2	62994007038	SHA	299	70.38	60.45
2	73950000598	LAS	395	5.98	60.42
2	73951100533	LAS	395	5.33	60.41
2	81724000419	TEH	172	4.19	60.39
2	73950000543	LAS	395	5.43	60.35
2	20056000435	SIS	5	4.35	60.29
2	60360000776	SHA	36	7.76	60.01
2	90704006524	PLU	70	65.24	60.00
2	90704006534	PLU	70	65.34	59.98
2	52994005122	TRI	299	51.22	59.88
2	90700000611	PLU	70	6.11	59.85
2	90704006658	PLU	70	66.58	59.78
2	60360000772	SHA	36	7.72	59.77
2	60360000749	SHA	36	7.49	59.76
2	32994005244	MOD	299	52.44	59.64
2	90704000546	PLU	70	5.46	59.64
2	90704000531	PLU	70	5.31	59.46
2	90700000031	PLU	70	0.31	59.34
2	73950006057	LAS	395	60.57	59.30
2	90704007111	PLU	70	71.11	59.27
2	73950100324	LAS	395	3.24	59.24
2	90704006335	PLU	70	63.35	59.21
2	73952100414	LAS	395	4.14	59.16
2	90704000504	PLU	70	5.04	59.14
2	73952100324	LAS	395	3.24	59.11
3	90704006323	PLU	70	63.23	59.08
3	73950100278	LAS	395	2.78	59.02
3	20894000477	SIS	89	4.77	59.01
3	73950009533	LAS	395	95.33	58.99
3	20890000524	SIS	89	5.24	58.99
3	80364009020	TEH	36	90.2	58.94
3	20890001019	SIS	89	10.19	58.90
3	73952100278	LAS	395	2.78	58.89

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
3	90704006357	PLU	70	63.57	58.74
3	20890000260	SIS	89	2.6	58.71
3	90704006353	PLU	70	63.53	58.69
3	33950000608	MOD	395	6.08	58.45
3	50034004801	TRI	3	48.01	58.16
3	90704006507	PLU	70	65.07	58.02
3	20050100735	SIS	5	7.35	58.01
3	31390100505	MOD	139	5.05	57.91
3	31390100465	MOD	139	4.65	57.89
3	73950100471	LAS	395	4.71	57.84
3	20890000835	SIS	89	8.35	57.84
3	71394000066	LAS	139	0.66	57.82
3	73950001060	LAS	395	10.6	57.61
3	73952100195	LAS	395	1.95	57.57
3	73950100197	LAS	395	1.97	57.52
3	90704006466	PLU	70	64.66	57.32
3	90704006471	PLU	70	64.71	57.32
3	52994005163	TRI	299	51.63	57.27
3	90704006486	PLU	70	64.86	57.21
3	90704006805	PLU	70	68.05	57.05
3	60054005679	SHA	5	56.79	57.04
3	50034006030	TRI	3	60.3	56.97
3	90704006166	PLU	70	61.66	56.97
3	62994001050	SHA	299	10.5	56.96
3	90704006414	PLU	70	64.14	56.95
3	90704006407	PLU	70	64.07	56.80
3	20034000652	SIS	3	6.52	56.52
3	32994003018	MOD	299	30.18	56.49
3	31390100375	MOD	139	3.75	56.36
3	60054006247	SHA	5	62.47	56.25
3	31390100313	MOD	139	3.13	56.24
3	60360000812	SHA	36	8.12	56.06
3	60360000859	SHA	36	8.59	56.06
3	73950100471	LAS	395	4.71	55.81
3	60894004269	SHA	89	42.69	55.66
3	60894004272	SHA	89	42.72	55.66
3	20890000295	SIS	89	2.95	55.59
3	20970000789	SIS	97	7.89	55.33
3	50034005312	TRI	3	53.12	55.24
3	90704006005	PLU	70	60.05	55.24

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
3	90704000720	PLU	70	7.2	55.22
3	50034005153	TRI	3	51.53	55.21
3	71474000068	LAS	147	0.68	55.13
3	60364000680	SHA	36	6.81	55.04
3	73954005610	LAS	395	56.1	55.00
3	90704006044	PLU	70	60.44	54.98
3	91470000324	PLU	147	3.24	54.96
3	60364000665	SHA	36	6.65	54.93
3	52990006314	TRI	299	63.14	54.83
3	20970001003	SIS	97	10.03	54.78
3	73950009604	LAS	395	96.04	54.75
3	50034005420	TRI	3	54.2	54.26
3	90704006518	PLU	70	65.18	54.07
3	91470000732	PLU	147	7.32	54.04
3	20050100802	SIS	5	8.02	54.03
3	20050100805	SIS	5	8.05	54.02
3	20974002870	SIS	97	28.7	53.93
3	90704006232	PLU	70	62.32	53.86
3	62990007211	SHA	299	72.11	53.77
3	32994005568	MOD	299	55.68	53.72
3	33950000639	MOD	395	6.39	53.65
3	60444102805	SHA	44	28.05	53.61
3	70444002473	LAS	44	24.73	53.59
3	62994000947	SHA	299	9.47	53.54
3	20970000985	SIS	97	9.85	53.49
3	20964008860	SIS	96	88.6	53.47
3	91470000296	PLU	147	2.96	53.33
3	33950000426	MOD	395	4.26	53.33
3	50034005384	TRI	3	53.84	53.03
3	52994005355	TRI	299	53.55	52.84
3	20050000442	SIS	5	4.42	52.82
3	20970000836	SIS	97	8.36	52.75
3	20050100951	SIS	5	9.51	52.71
3	90704005860	PLU	70	58.6	52.68
3	31390100555	MOD	139	5.55	52.34
3	50360001581	TRI	36	15.81	52.31
3	73950009645	LAS	395	96.45	51.93
3	80360000050	TEH	36	0.5	51.92
3	80360000240	TEH	36	2.4	51.91
3	80360000097	TEH	36	0.97	51.90

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
3	32994002721	MOD	299	27.21	51.87
3	80360000270	TEH	36	2.7	51.86
3	32994005544	MOD	299	55.44	51.85
3	80360000018	TEH	36	0.18	51.76
3	20960000635	SIS	96	6.35	51.76
3	73950100030	LAS	395	0.3	51.67
4	80360007993	TEH	36	79.93	51.59
4	80360000036	TEH	36	0.36	51.39
4	50034005079	TRI	3	50.79	51.37
4	32990005573	MOD	299	55.73	51.36
4	80364000105	TEH	36	1.05	51.34
4	31390003026	MOD	139	30.26	51.27
4	90704006120	PLU	70	61.2	51.24
4	80364008353	TEH	36	83.53	51.23
4	50034005226	TRI	3	52.26	51.22
4	50034005243	TRI	3	52.43	51.18
4	62994001212	SHA	299	12.12	51.11
4	33950000934	MOD	395	9.34	51.08
4	32994005329	MOD	299	53.29	51.04
4	32994005337	MOD	299	53.37	51.04
4	62994001187	SHA	299	11.87	51.03
4	32994005322	MOD	299	53.22	51.03
4	32994005434	MOD	299	54.34	50.98
4	32994005513	MOD	299	55.13	50.96
4	70440001582	LAS	44	15.82	50.79
4	33950001077	MOD	395	10.77	50.76
4	20890002762	SIS	89	27.62	50.69
4	32994005271	MOD	299	52.71	50.40
4	20970000140	SIS	97	1.4	50.35
4	52990006175	TRI	299	61.75	50.20
4	91470000491	PLU	147	4.91	50.11
4	20890001415	SIS	89	14.15	50.05
4	60364000977	SHA	36	9.77	50.04
4	70440001555	LAS	44	15.55	49.81
4	70440000200	LAS	44	2	49.76
4	52994005170	TRI	299	51.7	49.70
4	90704006012	PLU	70	60.12	49.48
4	20970000243	SIS	97	2.43	49.45
4	62994000915	SHA	299	9.15	49.13
4	61514000631	SHA	151	6.31	49.06

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
4	20894000104	SIS	89	1.04	49.01
4	20970101198	SIS	97	11.98	48.88
4	60444101385	SHA	44	13.85	48.86
4	61514000260	SHA	151	2.6	48.70
4	20050001161	SIS	5	11.61	48.47
4	20890102441	SIS	89	24.41	48.28
4	60894003817	SHA	89	38.17	48.26
4	20970000762	SIS	97	7.62	48.22
4	52990005906	TRI	299	59.02	48.21
4	52990006089	TRI	299	60.89	48.11
4	50034005595	TRI	3	55.95	48.08
4	80990000270	TEH	99	2.7	48.06
4	20890003059	SIS	89	30.59	47.91
4	73954007280	LAS	395	72.8	47.44
4	20890003320	SIS	89	33.2	47.34
4	52994005308	TRI	299	53.08	47.17
4	60050100381	SHA	5	3.81	47.15
4	80990000077	TEH	99	0.77	47.09
4	73950009627	LAS	395	96.27	47.07
4	52994005287	TRI	299	52.87	47.04
4	73950009697	LAS	395	96.97	46.98
4	20964005088	SIS	96	50.88	46.97
4	61514000078	SHA	151	0.78	46.73
4	20056000542	SIS	5	5.42	46.59
4	80990001237	TEH	99	12.37	46.54
4	20050100683	SIS	5	6.83	46.44
4	80990000198	TEH	99	1.98	46.14
4	52994005570	TRI	299	55.7	46.09
4	20056000592	SIS	5	5.92	46.01
4	80990000132	TEH	99	1.32	45.82
4	20050100782	SIS	5	7.82	45.81
4	80990000172	TEH	99	1.72	45.79
4	90704005842	PLU	70	58.42	45.69
4	20054001903	SIS	5	19.03	45.51
4	80360003732	TEH	36	37.32	45.49
4	80360003766	TEH	36	37.66	45.49
4	80360103455	TEH	36	34.55	45.21
4	80360000896	TEH	36	8.96	45.09
4	20960000857	SIS	96	8.57	45.05
4	20960000998	SIS	96	9.98	44.97

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
4	20890003137	SIS	89	31.37	44.71
4	20890002036	SIS	89	20.36	44.66
4	20890003101	SIS	89	31.01	44.52
4	80360002756	TEH	36	27.56	44.44
4	60894004103	SHA	89	41.03	44.43
4	20890003261	SIS	89	32.61	44.33
4	52990006120	TRI	299	61.2	44.21
4	52990006109	TRI	299	61.09	44.18
4	60894003718	SHA	89	37.18	44.16
4	20890003400	SIS	89	34	44.15
4	20890003386	SIS	89	33.86	44.14
4	62734000808	SHA	273	8.08	44.09
4	20056000592	SIS	5	5.92	44.07
4	20050100782	SIS	5	7.82	44.05
4	20960001064	SIS	96	10.64	43.99
4	20960001088	SIS	96	10.88	43.85
4	52990000444	TRI	299	4.44	43.79
4	52990005702	TRI	299	57.02	43.68
4	80360000557	TEH	36	5.57	43.19
4	80360008040	TEH	36	80.4	43.15
5	20960000436	SIS	96	4.36	43.14
5	20960000165	SIS	96	1.65	43.12
5	52994005272	TRI	299	52.72	43.05
5	20960000376	SIS	96	3.76	43.01
5	52990000820	TRI	299	8.2	42.99
5	20960000206	SIS	96	2.06	42.89
5	60890003636	SHA	89	36.36	42.89
5	80364000822	TEH	36	8.22	42.82
5	50034005691	TRI	3	56.91	42.78
5	20890003199	SIS	89	31.99	42.66
5	20890003164	SIS	89	31.64	42.66
5	20960000129	SIS	96	1.29	42.64
5	80990000532	TEH	99	5.32	42.51
5	80360101649	TEH	36	16.49	42.45
5	80364000392	TEH	36	3.92	42.43
5	20970000635	SIS	97	6.35	42.43
5	52990000489	TRI	299	4.89	42.31
5	80360101698	TEH	36	16.98	42.29
5	80360001213	TEH	36	12.13	41.72
5	31394004105	MOD	139	41.05	41.34

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
5	80360001073	TEH	36	10.73	41.03
5	60364001000	SHA	36	10	41.01
5	80360004045	TEH	36	40.45	40.94
5	60894003281	SHA	89	32.81	40.94
5	80360003977	TEH	36	39.77	40.93
5	80990000444	TEH	99	4.44	40.85
5	20890003356	SIS	89	33.56	40.83
5	20056000542	SIS	5	5.42	40.66
5	60894003564	SHA	89	35.64	40.58
5	20050100683	SIS	5	6.83	40.54
5	60364001003	SHA	36	10.03	40.50
5	20050001279	SIS	5	12.79	40.44
5	60440101092	SHA	44	10.92	39.86
5	20890003228	SIS	89	32.28	39.76
5	52994005640	TRI	299	56.4	39.67
5	60440100891	SHA	44	8.91	39.51
5	80360002213	TEH	36	22.13	39.48
5	60440101176	SHA	44	11.76	39.30
5	80364000578	TEH	36	5.78	39.29
5	60444100804	SHA	44	8.04	39.16
5	80364000355	TEH	36	3.55	38.76
5	80365102928	TEH	36	29.28	38.75
5	60894003394	SHA	89	33.94	38.73
5	60360001183	SHA	36	11.83	38.71
5	91470000240	PLU	147	2.4	38.22
5	52990000083	TRI	299	0.83	38.07
5	91470000553	PLU	147	5.53	36.95
5	80364103034	TEH	36	30.34	36.86
5	80364103073	TEH	36	30.73	36.86
5	80364103084	TEH	36	30.84	36.86
5	80364103026	TEH	36	30.26	36.80
5	31390004414	MOD	139	44.14	36.61
5	80364000998	TEH	36	9.98	36.58
5	80360101576	TEH	36	15.76	36.10
5	80360003799	TEH	36	37.99	36.08
5	73954004418	LAS	395	44.18	36.06
5	80360003842	TEH	36	38.42	35.93
5	60440100998	SHA	44	9.98	35.20
5	60440100908	SHA	44	9.08	35.17
5	60440101044	SHA	44	10.44	35.16

Priority	Culvert System Number	County[14]	Route	Postmile	Cross-Hazard Prioritization Score
5	73950008613	LAS	395	86.13	35.13
5	80365102939	TEH	36	29.39	34.90
5	80365102957	TEH	36	29.57	34.87
5	20890003431	SIS	89	34.31	34.76
5	73950009310	LAS	395	93.1	34.10
5	91470000495	PLU	147	4.95	33.16
5	73950008888	LAS	395	88.88	30.62
5	70364002513	LAS	36	25.13	30.44
5	32994003267	MOD	299	32.67	30.24
5	73954009429	LAS	395	94.29	30.10
5	33950000401	MOD	395	4.01	29.82
5	73950009066	LAS	395	90.66	29.43
5	73950007050	LAS	395	70.5	26.76
5	33950002186	MOD	395	21.86	25.95
5	73954005421	LAS	395	54.21	23.86
5	73954007785	LAS	395	77.85	22.90
5	73950006557	LAS	395	65.57	21.13
5	73950007164	LAS	395	71.64	20.91
5	73950007136	LAS	395	71.36	20.80
5	31394100106	MOD	139	1.06	19.10
5	31394100127	MOD	139	1.27	19.09
5	70360002855	LAS	36	28.55	18.04
5	32994003198	MOD	299	31.98	17.84
5	20970003832	SIS	97	38.32	17.03
5	73954006920	LAS	395	69.2	14.94
5	33950001215	MOD	395	12.15	12.59
5	31394004198	MOD	139	41.98	12.19
5	62730000467	SHA	273	4.67	9.88
5	80990001463	TEH	99	14.63	8.24
5	62734001003	SHA	273	10.03	7.00
5	62734001003	SHA	273	10.03	6.99
5	61514000602	SHA	151	6.02	3.91
5	80990000891	TEH	99	8.91	3.51
5	61512100597	SHA	151	5.97	0.00

TABLE 11: PRIORITIZATION OF ROADWAYS FOR
DETAILED CLIMATE CHANGE ADAPTATION ASSESSMENTS

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
1	70	P	PLU 70 9.899 / PLU 70 16.592	98.44
1	96	P	SIS 96 65.052 / SIS 96 69.293	98.21
1	5	S	GLE 5 R28.814 / SHA 5 45.608	81.50
1	5	S	SIS 5 0.006 / SIS 5 2.731	81.50
1	5	P	GLE 5 R28.82 / SHA 5 45.586	81.46
1	5	P	SHA 5 66.856 / SIS 5 2.73	81.46
1	299	P	SHA 299 22.224 / SHA 299 23.742	76.48
1	299	P	SHA 299 24.001 / SHA 299 24.087	76.48
1	299	P	SHA 299 27.76 / SHA 299 28.038	76.48
1	299	P	SHA 299 54.768 / SHA 299 62.323	76.48
1	299	P	SHA 299 G24.087 / SHA 299 25.548	76.48
1	299	P	TRI 299 50.817 / TRI 299 51.426	76.48
1	299	P	TRI 299 51.845 / TRI 299 52.36	76.48
1	36	P	TEH 36 43.282 / TEH 36 44.007	75.45
1	36	P	TEH 36 76.732 / TEH 36 81.565	75.45
1	36	P	TEH 36 R41.207 / TEH 36 41.89	75.45
1	299	S	SHA 299 22.223 / SHA 299 23.741	69.89
1	299	S	SHA 299 24.45 / SHA 299 25.546	69.89
1	299	S	SHA 299 60.404 / SHA 299 60.679	69.89
1	299	S	TRI 299 50.817 / TRI 299 51.426	69.89
1	44	S	SHA 44 L0L / SHA 44 R2.358	68.91
1	44	P	SHA 44 L0.237R / SHA 44 R2.407	68.54
1	44	P	SHA 44 L0R / SHA 44 L0.161R	68.54
1	44	P	SHA 44 R4.218 / SHA 44 R4.708	68.54
1	44	P	SHA 44 R5.162 / SHA 44 R5.788	68.54
1	44	P	SHA 44 R6.068 / SHA 44 R7.011	68.54
1	99	P	TEH 99 0.001 / TEH 99 11.782	67.59
1	99	P	TEH 99 12.321 / TEH 99 13.322	67.59
1	99	P	TEH 99 13.389 / TEH 99 13.693	67.59
1	99	P	TEH 99 13.798 / TEH 99 R17.655	67.59
1	99	P	TEH 99 19.867 / TEH 99 24.943	67.59
1	99	P	TEH 99 R18.266 / TEH 99 19.327	67.59
1	273	S	SHA 273 11.816 / SHA 273 12.674	66.82

[15] Caltrans' alignment codes designate the carriageway on divided roadways: "P" always represents northbound or eastbound carriageways whereas "S" always represents southbound or westbound carriageways. Undivided roadways are always indicated with a "P".
[16] BUT = Butte; HUM = Humboldt; GLE = Glenn; LAS = Lassen; MOD = Modoc; PLU = Plumas; SHA = Shasta; SIS = Siskiyou; TEH = Tehama; TRI = Trinity
[17] The average of the cross-hazard prioritization scores amongst all the abutting small segments on the same route sharing a common priority level that were aggregated to form the longer segments listed in this table.

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
1	273	S	SHA 273 16.834 / SHA 273 17.381	66.82
1	273	S	SHA 273 17.385 / SHA 273 17.809	66.82
1	273	S	SHA 273 3.825 / SHA 273 4.493	66.82
1	273	S	SHA 273 5.053 / SHA 273 5.441	66.82
1	273	S	SHA 273 6.398 / SHA 273 7.419	66.82
1	273	S	SHA 273 9.427 / SHA 273 11.096	66.82
1	395	P	MOD 395 22.541 / MOD 395 23.982	66.42
1	36	S	TEH 36 43.221 / TEH 36 44.007	66.10
1	36	S	TEH 36 R41.207 / TEH 36 41.786	66.10
1	273	P	SHA 273 11.819 / SHA 273 12.671	65.88
1	273	P	SHA 273 16.834 / SHA 273 17.382	65.88
1	273	P	SHA 273 17.561 / SHA 273 17.819	65.88
1	273	P	SHA 273 3.812 / SHA 273 4.589	65.88
1	273	P	SHA 273 5.052 / SHA 273 5.439	65.88
1	273	P	SHA 273 6.395 / SHA 273 7.458	65.88
1	273	P	SHA 273 9.424 / SHA 273 11.095	65.88
1	273	P	SHA 273 R16.659R / SHA 273 R16.73R	65.88
2	36	S	TEH 36 41.89 / TEH 36 43.221	63.48
2	99	S	TEH 99 11.782 / TEH 99 12.321	63.42
2	99	S	TEH 99 13.322 / TEH 99 13.389	63.42
2	99	S	TEH 99 13.693 / TEH 99 13.798	63.42
2	99	S	TEH 99 19.327 / TEH 99 19.867	63.42
2	99	S	TEH 99 R17.655 / TEH 99 R18.266	63.42
2	99	P	TEH 99 11.782 / TEH 99 12.321	63.41
2	99	P	TEH 99 13.322 / TEH 99 13.389	63.41
2	99	P	TEH 99 13.693 / TEH 99 13.798	63.41
2	99	P	TEH 99 19.327 / TEH 99 19.867	63.41
2	99	P	TEH 99 R17.655 / TEH 99 R18.266	63.41
2	273	P	SHA 273 11.095 / SHA 273 11.819	62.83
2	273	P	SHA 273 12.671 / SHA 273 R16.659R	62.83
2	273	P	SHA 273 17.382 / SHA 273 17.561	62.83
2	273	P	SHA 273 17.819 / SHA 273 20.033	62.83
2	273	P	SHA 273 4.589 / SHA 273 5.052	62.83
2	273	P	SHA 273 5.439 / SHA 273 6.395	62.83
2	273	P	SHA 273 7.458 / SHA 273 9.424	62.83
2	273	S	SHA 273 11.096 / SHA 273 11.816	62.78
2	273	S	SHA 273 12.674 / SHA 273 R16.672L	62.78
2	273	S	SHA 273 17.381 / SHA 273 17.385	62.78
2	273	S	SHA 273 17.809 / SHA 273 19.985	62.78
2	273	S	SHA 273 4.493 / SHA 273 5.053	62.78

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
2	273	S	SHA 273 5.441 / SHA 273 6.398	62.78
2	273	S	SHA 273 7.419 / SHA 273 9.427	62.78
2	44	P	SHA 44 L0.161R / SHA 44 L0.237R	62.52
2	44	P	SHA 44 R2.407 / SHA 44 R4.218	62.52
2	44	P	SHA 44 R4.708 / SHA 44 R5.162	62.52
2	44	P	SHA 44 R5.788 / SHA 44 R6.068	62.52
2	44	P	SHA 44 R7.011 / SHA 44 R21.036	62.52
2	44	S	SHA 44 R16.979 / SHA 44 R17.601	62.44
2	44	S	SHA 44 R2.358 / SHA 44 R4.218	62.44
2	44	S	SHA 44 R4.708 / SHA 44 R5.162	62.44
2	44	S	SHA 44 R5.788 / SHA 44 R6.068	62.44
2	299	P	MOD 299 35.584 / MOD 299 40.63	62.23
2	299	P	SHA 299 23.742 / SHA 299 24.001	62.23
2	299	P	SHA 299 25.548 / SHA 299 27.76	62.23
2	299	P	SHA 299 28.038 / SHA 299 45.551	62.23
2	299	P	SHA 299 54.241 / SHA 299 54.768	62.23
2	299	P	SHA 299 9.281 / SHA 299 22.224	62.23
2	299	P	TRI 299 21.758 / TRI 299 50.817	62.23
2	299	P	TRI 299 51.426 / TRI 299 51.845	62.23
2	299	P	TRI 299 52.36 / TRI 299 58.757	62.23
2	299	S	SHA 299 20.206 / SHA 299 20.488	62.22
2	299	S	SHA 299 22.124 / SHA 299 22.223	62.22
2	299	S	SHA 299 23.741 / SHA 299 24.001	62.22
2	299	S	SHA 299 25.546 / SHA 299 27.76	62.22
2	299	S	TRI 299 51.426 / TRI 299 51.845	62.22
2	299	S	TRI 299 52.36 / TRI 299 53.443	62.22
2	299	S	TRI 299 56.96 / TRI 299 57.035	62.22
2	299	S	TRI 299 57.084 / TRI 299 57.645	62.22
2	151	S	SHA 151 R5.62L / SHA 151 R6.923	61.93
2	395	P	LAS 395 108.412 / LAS 395 120.683	61.43
2	395	P	LAS 395 122.72 / LAS 395 126.916	61.43
2	395	P	MOD 395 R16.645 / MOD 395 22.541	61.43
2	151	P	SHA 151 0.195 / SHA 151 R6.924	60.88
2	36	P	SHA 36 9.491 / TEH 36 R41.207	59.96
2	36	P	TEH 36 41.89 / TEH 36 43.282	59.96
2	36	P	TEH 36 44.007 / TEH 36 63.241	59.96
2	70	P	PLU 70 6.262 / PLU 70 9.899	59.23
2	96	P	SIS 96 61.622 / SIS 96 65.052	59.01
2	96	P	SIS 96 69.293 / SIS 96 72.573	59.01
2	3	P	SIS 3 L50.111 / SIS 3 R47.52	58.73

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
2	3	P	TRI 3 25.676 / TRI 3 L30.89	58.73
2	3	P	TRI 3 30.86 / TRI 3 44.006	58.73
2	3	P	TRI 3 54.727 / TRI 3 55.902	58.73
2	3	P	TRI 3 66.01 / TRI 3 72.244	58.73
2	5	P	SHA 5 45.586 / SHA 5 R48.854	48.29
2	5	S	SHA 5 45.608 / SHA 5 R48.859	48.29
3	5	P	SHA 5 R48.854 / SHA 5 57.42	41.56
3	5	P	SIS 5 R25.246 / SIS 5 R43.927	41.56
3	5	P	SIS 5 R44.312 / SIS 5 R69.293	41.56
3	5	S	SHA 5 R48.859 / SHA 5 57.419	41.12
3	5	S	SIS 5 R25.251 / SIS 5 R69.293	41.12
3	44	P	SHA 44 R21.036 / SHA 44 32.514	34.36
3	3	S	SIS 3 L48.109 / SIS 3 L49.006	33.51
3	3	S	SIS 3 R47.52 / SIS 3 R47.786	33.51
3	3	S	SIS 3 R48.48 / SIS 3 R48.887	33.51
3	3	S	TRI 3 6.85 / TRI 3 7.042	33.51
3	299	P	SHA 299 45.551 / SHA 299 54.241	32.65
3	299	P	SHA 299 79.965 / SHA 299 88.116	32.65
3	299	P	TRI 299 0.003 / TRI 299 5.052	32.65
3	299	P	TRI 299 58.757 / TRI 299 63.264	32.65
3	299	P	TRI 299 6.89 / TRI 299 21.758	32.65
3	299	P	TRI 299 65.321 / SHA 299 9.281	32.65
3	395	S	LAS 395 34.264 / LAS 395 34.853	32.18
3	395	P	LAS 395 34.506 / LAS 395 34.942	32.18
3	44	S	SHA 44 R24.229 / SHA 44 R24.469	32.13
3	3	P	SIS 3 17.532 / SIS 3 20.728	31.47
3	3	P	SIS 3 24.007 / SIS 3 37.975	31.47
3	3	P	SIS 3 44.432 / SIS 3 L50.111	31.47
3	3	P	SIS 3 R47.52 / SIS 3 54.187	31.47
3	3	P	TRI 3 11.175 / TRI 3 18.47	31.47
3	3	P	TRI 3 18.586 / TRI 3 25.676	31.47
3	3	P	TRI 3 44.006 / TRI 3 54.727	31.47
3	3	P	TRI 3 L2.259 / TRI 3 10.366	31.47
3	263	P	SIS 263 49.07 / SIS 263 50.967	31.27
3	263	P	SIS 263 52.317 / SIS 263 57.195	31.27
3	70	P	PLU 70 37.4 / PLU 70 R43.234R	30.56
3	70	P	PLU 70 R43.615R / PLU 70 44.51	30.56
3	299	S	SHA 299 50.942 / SHA 299 R51.525	30.50
3	299	S	SHA 299 79.965 / SHA 299 80.207	30.50
3	299	S	TRI 299 R3.536 / TRI 299 3.67	30.50

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
3	89	P	SHA 89 16.108 / SHA 89 17.469	30.48
3	89	P	SHA 89 21.419 / SHA 89 25.279	30.48
3	89	P	SHA 89 25.932 / SHA 89 33.655	30.48
3	70	S	PLU 70 42.487 / PLU 70 44.51	30.29
3	89	S	SHA 89 21.419 / SHA 89 25.402	30.10
3	96	S	SIS 96 105.702 / SIS 96 105.82	29.87
3	36	P	TEH 36 63.241 / TEH 36 R70.628	29.83
3	96	P	SIS 96 33.963 / SIS 96 61.622	29.64
3	96	P	SIS 96 72.573 / SIS 96 105.823	29.64
4	96	P	SIS 96 30.897 / SIS 96 33.963	29.50
4	263	P	SIS 263 50.967 / SIS 263 52.317	29.48
4	5	P	SHA 5 57.42 / SHA 5 66.856	16.47
4	5	P	SIS 5 2.73 / SIS 5 5.908	16.47
4	5	P	SIS 5 R15.719 / SIS 5 R25.246	16.47
4	5	P	SIS 5 R43.927 / SIS 5 R44.312	16.47
4	5	S	SHA 5 57.419 / SIS 5 0.006	16.15
4	5	S	SIS 5 2.731 / SIS 5 5.645	16.15
4	5	S	SIS 5 R15.352 / SIS 5 R25.251	16.15
4	36	P	LAS 36 R17.415 / LAS 36 R29.394	14.23
4	36	P	SHA 36 5.59 / SHA 36 9.491	14.23
4	97	P	SIS 97 L0 / SIS 97 R11.797	7.51
4	36	S	LAS 36 23.549 / LAS 36 23.92	7.06
4	36	S	LAS 36 25.784 / LAS 36 R26.461	7.06
4	97	S	SIS 97 0.914 / SIS 97 1.424	4.71
4	97	S	SIS 97 2.477 / SIS 97 2.877	4.71
4	395	P	LAS 395 102.368 / LAS 395 108.412	3.69
4	395	P	LAS 395 120.683 / LAS 395 122.72	3.69
4	395	P	LAS 395 137.007 / MOD 395 R16.645	3.69
4	395	P	LAS 395 34.942 / LAS 395 42.281	3.69
4	395	P	LAS 395 43.392 / LAS 395 47.911	3.69
4	395	P	LAS 395 48.828 / LAS 395 100.33	3.69
4	395	P	MOD 395 23.982 / MOD 395 46.733	3.69
4	395	P	MOD 395 47.14 / MOD 395 58.5	3.69
4	395	P	SIE 395 R0R / LAS 395 34.506	3.69
4	89	P	SHA 89 10.416 / SHA 89 16.108	3.66
4	89	P	SHA 89 17.469 / SHA 89 21.419	3.66
4	89	P	SHA 89 25.909 / SHA 89 25.932	3.66
4	89	P	SHA 89 6.655 / SHA 89 9.146	3.66
4	89	P	SIS 89 14.753 / SIS 89 28.61	3.66
4	395	S	LAS 395 34.157 / LAS 395 34.264	3.19

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
4	395	S	LAS 395 34.853 / LAS 395 36.337	3.19
4	395	S	LAS 395 40.173 / LAS 395 41.098	3.19
4	395	S	LAS 395 48.83 / LAS 395 49.661	3.19
4	395	S	LAS 395 50.146 / LAS 395 50.524	3.19
4	395	S	LAS 395 51.752 / LAS 395 52.048	3.19
4	395	S	LAS 395 52.437 / LAS 395 52.793	3.19
4	395	S	LAS 395 52.922 / LAS 395 53.249	3.19
4	395	S	LAS 395 53.85 / LAS 395 55.376	3.19
4	395	S	LAS 395 56.129 / LAS 395 56.48	3.19
4	395	S	LAS 395 57.217 / LAS 395 57.746	3.19
4	395	S	LAS 395 7.813 / LAS 395 9.164	3.19
4	395	S	LAS 395 9.933 / LAS 395 11.559	3.19
4	395	S	LAS 395 R0.016 / LAS 395 T5.317	3.19
4	395	S	LAS 395 R59.959 / LAS 395 R60.498	3.19
4	139	P	LAS 139 0 / LAS 139 1.15	2.81
4	139	P	MOD 139 15.37 / MOD 139 34.054	2.81
4	139	P	MOD 139 40.54 / MOD 139 44.079	2.81
4	139	P	MOD 139 44.819 / MOD 139 50.515	2.81
4	299	P	MOD 299 19.829 / MOD 299 35.584	2.60
4	299	P	MOD 299 40.64 / MOD 299 45.577	2.60
4	299	P	SHA 299 74.219 / SHA 299 74.626	2.60
4	299	P	SHA 299 75.961 / SHA 299 79.965	2.60
4	299	P	TRI 299 5.052 / TRI 299 6.89	2.60
4	299	P	TRI 299 63.264 / TRI 299 65.321	2.60
4	44	P	LAS 44 33.639 / LAS 44 37.246	2.46
4	44	P	SHA 44 36.167 / SHA 44 40.33	2.46
4	70	P	PLU 70 44.51 / PLU 70 45.339	1.83
4	70	P	PLU 70 46.201 / PLU 70 46.685	1.83
4	70	P	PLU 70 76.299 / PLU 70 R76.813	1.83
4	70	P	PLU 70 R66.626 / PLU 70 74.18	1.83
4	299	S	SHA 299 76.098 / SHA 299 76.212	1.64
4	70	S	PLU 70 44.51 / PLU 70 45.339	1.61
5	44	P	SHA 44 32.514 / SHA 44 36.167	1.47
5	70	P	BUT 70 48.074 / PLU 70 6.262	0.96
5	70	P	PLU 70 16.592 / PLU 70 37.4	0.96
5	70	P	PLU 70 45.339 / PLU 70 46.201	0.96
5	70	P	PLU 70 46.685 / PLU 70 56.482	0.96
5	70	P	PLU 70 84.503 / LAS 70 3.889	0.96
5	70	P	PLU 70 R63.269 / PLU 70 R66.626	0.96
5	70	P	PLU 70 R76.813 / PLU 70 82.096	0.96

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
5	299	S	LAS 299 1.411 / LAS 299 1.607	0.93
5	299	S	LAS 299 3.691 / LAS 299 4.107	0.93
5	299	S	SHA 299 71.401 / SHA 299 71.59	0.93
5	299	S	SHA 299 74.032 / SHA 299 74.219	0.93
5	299	S	SHA 299 74.626 / SHA 299 76.098	0.93
5	299	S	SHA 299 95.034 / SHA 299 95.775	0.93
5	299	S	SHA 299 99.176 / LAS 299 0.153	0.93
5	89	S	PLU 89 16.408 / PLU 89 16.744	0.91
5	89	S	SHA 89 25.402 / SHA 89 25.909	0.91
5	70	S	PLU 70 45.339 / PLU 70 46.201	0.81
5	70	S	PLU 70 46.685 / PLU 70 46.837	0.81
5	70	S	PLU 70 47.869 / PLU 70 47.956	0.81
5	70	S	PLU 70 49.755 / PLU 70 49.805	0.81
5	70	S	PLU 70 R78.597 / PLU 70 R79.08	0.81
5	89	P	PLU 89 13.21 / PLU 89 25.41	0.79
5	89	P	PLU 89 30.739 / PLU 89 35.202	0.79
5	89	P	PLU 89 4.059 / PLU 89 8.708	0.79
5	89	P	PLU 89 8.72 / PLU 89 13.189	0.79
5	89	P	SHA 89 25.279 / SHA 89 25.909	0.79
5	89	P	SHA 89 33.655 / SHA 89 41.809	0.79
5	89	P	SIS 89 0.63 / SIS 89 2.239	0.79
5	89	P	SIS 89 10.049 / SIS 89 14.753	0.79
5	299	P	MOD 299 14.592 / MOD 299 19.829	0.58
5	299	P	MOD 299 45.577 / MOD 299 45.933	0.58
5	299	P	MOD 299 52.511 / MOD 299 66.632	0.58
5	299	P	SHA 299 62.323 / SHA 299 68.103	0.58
5	299	P	SHA 299 68.304 / SHA 299 73.981	0.58
5	299	P	SHA 299 74.032 / SHA 299 74.219	0.58
5	299	P	SHA 299 74.626 / SHA 299 75.961	0.58
5	299	P	SHA 299 88.116 / MOD 299 9.852	0.58
5	147	P	PLU 147 0.396 / PLU 147 5.511	0.47
5	139	P	LAS 139 1.15 / LAS 139 1.872	0.46
5	139	P	LAS 139 2.34 / LAS 139 17.388	0.46
5	139	P	LAS 139 55.538 / MOD 139 0.23	0.46
5	139	P	MOD 139 0.23 / MOD 139 15.37	0.46
5	3	P	SIS 3 20.728 / SIS 3 24.007	0.45
5	3	P	SIS 3 37.975 / SIS 3 44.432	0.45
5	3	P	SIS 3 8.881 / SIS 3 17.532	0.45
5	3	P	TRI 3 10.366 / TRI 3 11.175	0.45
5	3	P	TRI 3 18.47 / TRI 3 18.586	0.45

Priority	Route	Carriageway[15]	From County & Postmile / To County & Postmile[16]	Average Cross-Hazard Prioritization Score[17]
5	3	P	TRI 3 55.902 / TRI 3 66.01	0.45
5	32	P	BUT 32 R37.073 / BUT 32 37.493	0.44
5	32	P	TEH 32 0 / TEH 32 2.706	0.44
5	49	P	PLU 49 1.737 / PLU 49 7.5	0.30
5	36	P	LAS 36 14.925 / LAS 36 R17.415	0.27
5	36	P	TEH 36 R70.628 / TEH 36 R75.074	0.27
5	36	P	TRI 36 16.888 / TRI 36 26.465	0.27
5	36	P	TRI 36 R32.515 / SHA 36 5.59	0.27
5	36	P	TRI 36 R4.604 / TRI 36 13.809	0.27
5	96	P	HUM 96 R44.979 / SIS 96 R1.94	0.14
5	96	P	SIS 96 24.826 / SIS 96 30.897	0.14
5	96	P	SIS 96 R2.003 / SIS 96 R5.698	0.14
5	284	P	PLU 284 0 / PLU 284 8.019	0.06
5	265	P	SIS 265 20.328 / SIS 265 19.801	0.06

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