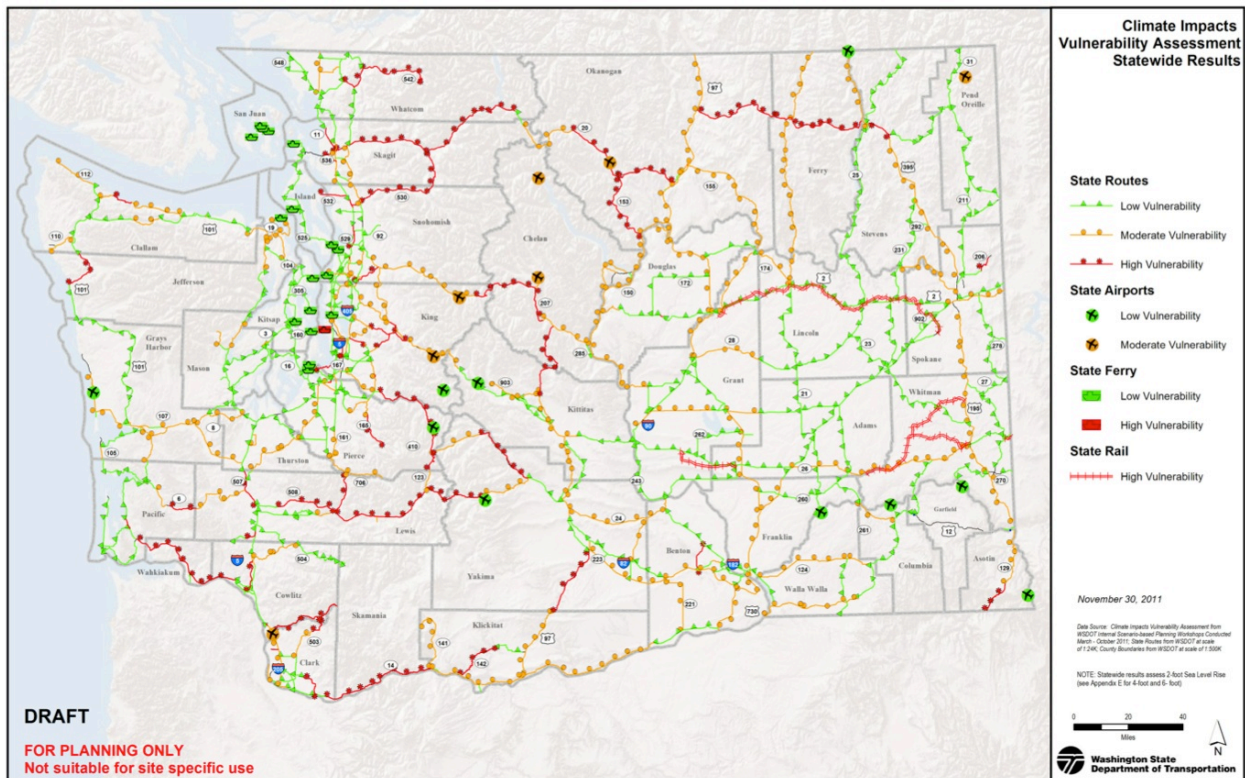


Guidance for NEPA and SEPA Project-Level Climate Change Evaluations



Contact:

Carol Lee Roalkvam

Policy Branch Manager

WSDOT Environmental Services Office

(360) 705-7126, Roalkvc@wsdot.wa.gov

Introduction to the 2017 Version

WSDOT's Environmental Services Office developed the first version of this guidance in 2009 to answer the question: ***How should we address greenhouse gas (GHG) emissions and climate change in our environmental documents?*** We became the first DOT in the nation to consistently incorporate GHG and climate change into our cumulative effects analysis under National and State Environmental Policy Acts (NEPA and SEPA).

This 2017 update is consistent with the Council on Environmental Quality's (CEQ) final guidance for Federal agencies on how to consider the impacts of their actions on global climate change in their National Environmental Policy Act (NEPA) reviews (August 2016).

Prior versions of this guidance combined the topics of greenhouse gases and climate impacts in one guidance document. Based on feedback from our project teams, we now maintain two separate companion documents:

1. *Guidance for Project-Level Greenhouse Gas Evaluations for NEPA and SEPA*, which is housed on the WSDOT Energy webpage at:
<http://www.wsdot.wa.gov/environment/air/energy.htm>
2. *Guidance for Project-Level Climate Change Evaluations for NEPA and SEPA*, which is housed on the WSDOT climate adaptation webpage at:
<http://www.wsdot.wa.gov/sustainabletransportation/adapting.htm>

New in this version: This guidance addresses whether the effects of a proposed project on environmental resources and on vulnerable populations will be exacerbated by climate change related vulnerability. This is consistent with the 2016 CEQ guidance and with WSDOT's emphasis on inclusive community engagement and environmental justice in project delivery.

Guidance

WSDOT prepares environmental documents in compliance with national and state environmental policy acts (NEPA and SEPA) to provide information that is useful for the public and decision makers. WSDOT serves as the SEPA lead agency for our proposed actions, and as the project proponent and/or joint NEPA lead with federal transportation agencies.

This guidance directs how WSDOT's environmental review documents should consider the projected climate change for our region. The basic source of climate information that we rely on is the *Washington Climate Change Impacts Assessment* (University of Washington, June 2009; updated 2013). It provides sufficient information to enable planning-level consideration of our state's forecasted climate impacts. In 2011, WSDOT completed the *Climate Impacts Vulnerability Assessment* (CIVA) to assist project teams and transportation planners (more information below). WSDOT staff maintains close ties with UW researchers to track actionable climate science and information on emerging resilient asset management techniques.

This guidance outlines a standard analytical process and provides template language with the agency's key messages. The guidance is consistent with the technical and policy guidance contained in WSDOT's *Environmental Manual* Chapter 412 (cumulative effects).

Who should use this guidance?

- All WSDOT projects subject to NEPA and SEPA are required to follow this guidance.
- While this guidance satisfies WSDOT's responsibilities for disclosure related to the NEPA and SEPA processes, it does not apply to documents prepared to satisfy the federal Endangered Species Act.

The Environmental Services Office is available to help project teams use this guidance and to answer questions about climate impacts as they relate to our analysis of proposed actions under NEPA and SEPA. Contact WSDOT's Environmental Policy Branch Manager for more information.

Analysis should start with WSDOT's *Climate Impacts Vulnerability Assessment* (CIVA)

WSDOT's Climate Impacts Vulnerability Assessment is a qualitative assessment of risks to our infrastructure from climate change. In 2010 and 2011, WSDOT collected an inventory of department-owned assets and climate change data using GIS. University of Washington climate scientists provided us with climate data. Key points about the CIVA:

- WSDOT leveraged its years of project risk management experience through its signature Cost Estimate Validation Process® and Cost Risk Assessment Workshops to develop an appropriate risk assessment method for the climate change analysis.
- Fourteen workshops engaged experts across all regions, state ferries, rail, and aviation.
- The outcome of each workshop is a qualitative assessment of the vulnerability agreed upon by participants.

In the statewide map (on cover), red shows high likelihood of vulnerability, yellow denotes roads that could experience temporary operational failures at one or more locations, and green indicates roads that could experience reduced capacity somewhere along that roadway segment. Note that roadway segments shown as having a high impact (red) may not be vulnerable for the whole segment—rather one or two areas along that segment may be vulnerable to catastrophic failure. The accuracy of the vulnerability ratings are *generally* suitable for planning purposes.

In general, areas shown with locations having a high impact are:

- In the mountains
- Either above or below steep slopes
- In low-lying areas subject to flooding
- Along rivers that are aggrading due to glaciers melting
- In low-lying coastal areas subject to inundation from sea-level rise

The CIVA is the starting place for Project-Level NEPA discussion of climate change. Project teams and planners should consider the information in the vulnerability assessment in addition to examining existing conditions and other identified risks (such as unstable slopes, seismic, fire, tsunami).

NEPA is not the only stage where the CIVA results are used. WSDOT is committed to the consideration of climate change as part of the long-term management of state transportation assets. Climate and extreme weather preparedness are considered in all program areas, as illustrated in the table below.

Planning	Major emphasis in our strategic plan: Consider climate change and propose ways to improve resilience (corridor studies and plans)
Design & Environmental Review	Evaluate potential risks during the environmental and design phase Project teams follow WSDOT’s NEPA /SEPA guidance (2008 to present) http://www.wsdot.wa.gov/SustainableTransportation/adapting.htm
Construction	Look at potential for new issues: Salt water corrosion, heat or precipitation changes for long-term impacts on materials
Maintenance & Operations	Multi-hazard risk reduction, awareness of maintenance activities that may be affected by heat or extreme weather events

Project teams and planners should consider the information in the vulnerability assessment in addition to examining existing conditions and other identified risks (such as unstable slopes, seismic, fire, tsunami).

How should NEPA/SEPA projects consider future conditions related to climate change?

Project teams are expected to examine available information about climate trends and use the results of WSDOT’s assessment of vulnerable infrastructure (as outlined in this guidance). By doing so, project teams can get a better understanding of how to make their proposed projects more resilient to future climate impacts and severe storm events.

The following table was created with the assistance of the UW Climate Impacts Group to illustrate some potential impacts of particular concern to transportation infrastructure.

<i>Projected Climate Change</i>	<i>Potential Impacts on State Highways, Rail, and Ferries</i>
<ul style="list-style-type: none">• Increase in average winter precipitation and more extreme precipitation• Change in timing of precipitation (more rain, less snow)• Change in storm track with some extreme storms with higher than normal snow accumulation	<ul style="list-style-type: none">• More rock fall, mudslides, sink holes, road bed failure• Increased large-scale river flooding• More localized flooding due to poor drainage or higher groundwater table• Severe wind-related road closures• Blown-down trees, signs• Less snow removal, on average (some extreme snows)
<ul style="list-style-type: none">• Sea-level rise, higher storm surge• More frequent and extensive inundation of low-lying areas (both temporary and permanent)	<ul style="list-style-type: none">• Coastal erosion and landslides weaken roadbed and bridge footings• Damage to stormwater drainage and tide gates• Saltwater corrosion of facilities• Detours around frequently flooded coastlines

WSDOT also expects its NEPA specialists and technical experts to understand that climate science also changes how we describe the “affected environment” in NEPA. That means that project teams need to examine the future affected environment and not just rely on what we know from the past.

Past trends for a specific resource (water, habitat, air) may not be accurate predictions for the future; instead, we need to look at scientifically-based projections of the changing climate as part of our analysis. Our approach to wetland mitigation provides a clear example: WSDOT teams are looking at future issues that may impact the success of environmental mitigation (like saltwater inundation or drought as concerns for long-term wetland viability).

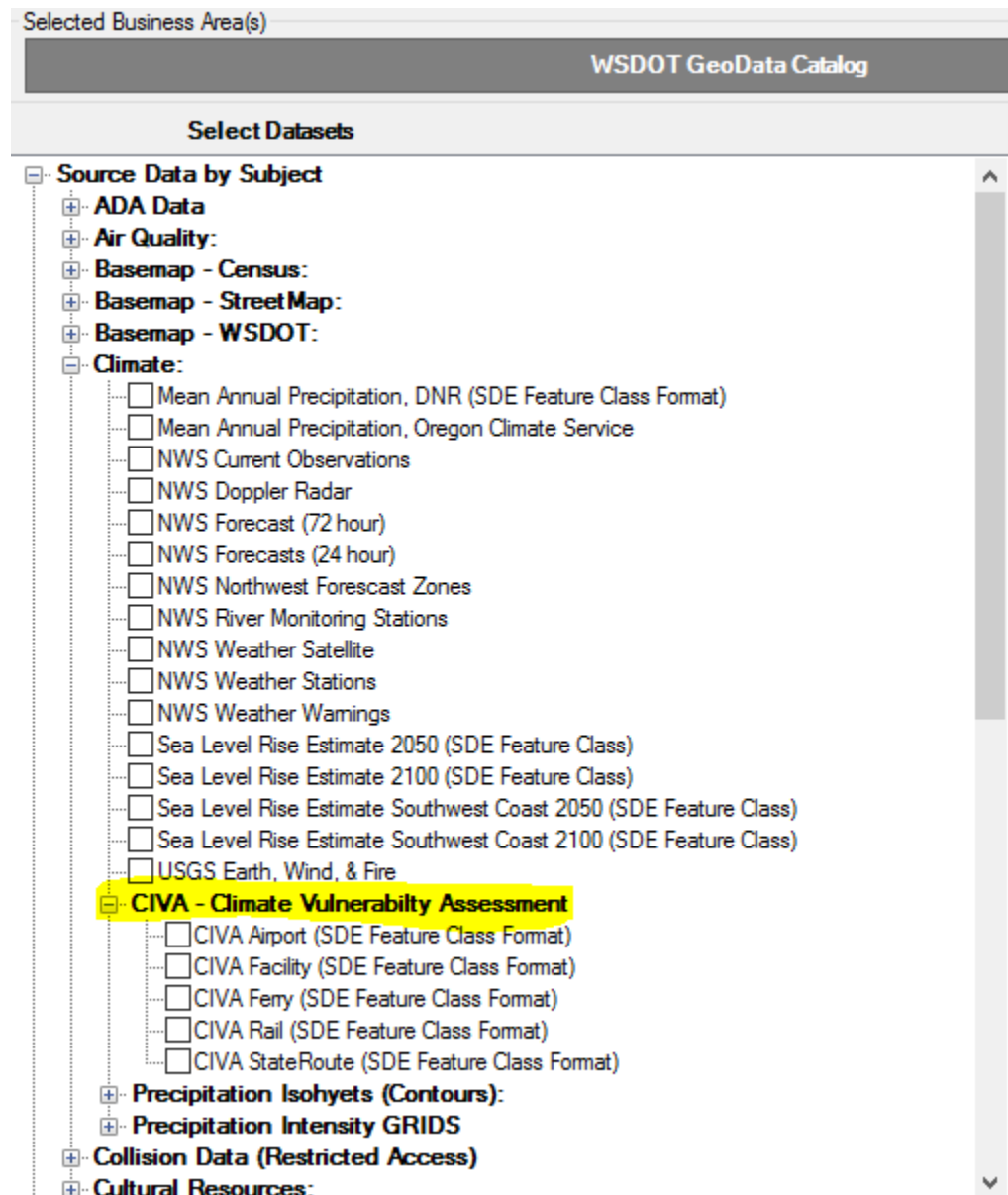
Project teams are expected to ask and answer the question, “**how will my project be affected by climate change?**” Follow these steps:

1. Examine the results of WSDOT’s 2011 *Climate Impacts Vulnerability Assessment (CIVA)* for your project area. This information will alert you to vulnerabilities and/or strengths in the existing WSDOT facilities. (The report is available online at: <http://www.wsdot.wa.gov/sustainabletransportation/adapting.htm>)
2. Contact the WSDOT Environmental Services Policy Branch Manager, (360) 705-7126, for assistance in creating an up-to-date summary of climate threats in your project area. **New** in 2017: In addition to the CIVA, project teams should determine whether there is regional or site specific climate information that would be useful or applicable.
3. Direct project technical specialists to consider the available information (steps 1 and 2) in their NEPA and SEPA analysis, as well as their proposals for mitigating impacts.
4. Document your findings regarding anticipated climate threats in the cumulative effects section (if separate) or in specific discipline sections (Fish and Wildlife, Wetlands, Land Use, etc.). **NEW** in 2017:
 - i. Document whether or not climate change will exacerbate the effects of a proposed project on environmental resources; and
 - ii. Document whether or not climate change will exacerbate the effects on vulnerable populations.
5. Document how the project will be designed to be resilient or resistant to climate threats (such as the use of drilled shafts or site selection to avoid a potential threat). **NEW:** include consideration of ways to address vulnerability of Environmental Justice populations, transit dependent, or residents with special transportation needs.

Step 1 is your starting place. Project teams should look at the WSDOT GIS layer titled: “CIVA - Climate Vulnerability Assessment” available through the GIS Workbench, under the Environmental Business Area (see screen shot on next page). The data contains the results of the statewide qualitative assessment. The internal GIS layer also has the comments from the workshops about the climate threats that lead to the ratings. The information is very easy to access and provides a useful starting place for project teams.

Step 2 requires a check for new regional or site specific climate information that would be useful or applicable. We recommend this because the climate projections used in the CIVA are the best we had in 2010 and 2011 and they were sufficient for the qualitative assessment. However, new information on actual weather events (like stream gage data) and new outputs from climate model results may be available in your project area. WSDOT Environmental Services Office and Hydraulics Office staff can help project teams locate the best available information.

Below is a screen shot from the WSDOT GeoData Catalog.



Is there any template language that Project teams may use in WSDOT documents?

This guidance provides template language and ESO's technical support so that climate change evaluations can be done inhouse. Key messages are contained in the templates below.

NEPA CE (ECS form) and for SEPA Checklist

The design of the proposed project should consider appropriate and available data on climate change and extreme weather events.

NEPA EA and for SEPA/NEPA EIS

Climate change and extreme weather data should be factored into the design of the proposed project. The standard qualitative language template below is recommended for the Cumulative Effects section of environmental documentation. This text should be tailored to your specific project. It is very important that project teams work with the **ESO Policy Branch Manager** (x7126) to tailor language prior to finalizing.

EA and EIS Template Language – Cumulative Effects Section

Project teams should answer the question below. Suggested template language should be tailored to the project specifics.

How did the Project Team consider climate change?

WSDOT acknowledges that the effects of climate change may alter the function, sizing, and operation of our facilities. To ensure our facilities can function as intended for their planned 50-, 70-, or 100-year lifespan, they should be designed to perform under the variable conditions expected as a result of climate change. For example, drainage culverts may need to be resized to accommodate more intense rainfall events or increased flows due to more rapid glacial thawing.

The Pacific NW climate projections are available from the Climate Impacts Group at the University of Washington: <http://cses.washington.edu/cig/fpt/ccscenarios.shtml>.

Washington State is likely to experience the following over the next 50 years:

- Increased temperature (extreme heat events, changes in air quality, glacial melting)
- Changes in volume and timing of precipitation (reduced snow pack, increased erosion, flooding)
- Ecological effects of a changing climate (spread of disease, altered plant and animal habitats, negative impacts on human health and well-being)
- Sea-level rise, coastal erosion, saltwater intrusion

The project team considered the information on climate change with regard to preliminary design as well as the potential for changes in the surrounding natural environment.

The project is designed to last (30, 50, 70 Years) years. As part of its standard design, this project has incorporated features that will provide greater resilience and function with the potential effects brought on by climate change. (Describe the features such as stormwater flow control, bridge height or design, ...)

How is WSDOT incorporating climate into Planning?

Often NEPA documentation is preceded by planning studies. WSDOT's regional planners are considering climate change when completing corridor sketches and more substantively in specific corridor plans. WSDOT is working with other state agencies to develop tips for local planners who are interested in doing their own vulnerability assessments for local roads and public works facilities.

WSDOT's vulnerability assessment is on the WSDOT's Community Planning Portal so locals can use it <http://www.wsdot.wa.gov/planning/community/CommunityPlanningPortal.htm>. To learn more, contact headquarters planning, or your region planning office.

Examples and Supporting Materials

Examples from completed NEPA Documents

We have published more than a dozen environmental documents that describe how the proposed project examined the results of the vulnerability assessment and what elements of the project improve resiliency. These projects provide benefits today and improve the likelihood that they will withstand extreme events in the future.

The first NEPA document to address climate was the 2008 Environmental Assessment for SR 522 US 2 to Cathcart Road Project. The project team integrated several measures in the project that both reduced the project's impact on the environment and increased its resilience to projected climate change impacts. The project improved natural drainage, reduced scour potential, deepened bridge footings.

Mukilteo Multimodal Project – EIS

The project-level Draft EIS and the Final EIS (published in 2013) explain how climate was considered (page 4 of 136):

“The Mukilteo project team considered the potential impacts of climate change during preliminary design and the potential for changes in the surrounding natural environment. The current projected median change in Puget Sound sea level is 13 inches by 2100, with a range of 6 inches to 50 inches (Mote et al. 2008). Overall, recent studies appear to be converging on projected increases in the range of 2 to 4 feet.

With help from PSRC, WSDOT developed maps showing a 2- and 4-foot sea-level rise in the project area. WSDOT then evaluated the potential for projected design measures to withstand the projected sea-level rise and increased storm intensity. Compared to the No-Build and Existing Site Improvements alternatives, the Preferred Alternative and Elliot Point 1 Alternative would provide more opportunities to accommodate sea-level rise by using fill to modify terminal elevation, locating access roads in upland areas, and locating facilities outside the 100-year floodplain. Both the No-Build Alternative and Existing Site Improvements Alternative are located within the 100-year Federal Emergency Management Agency (FEMA) floodplain, as are many of the surrounding land uses and connecting streets. This would make it more difficult to use fill to modify the terminal's elevation to be above floodplain elevation. Other adaptive measures may be needed to address sea-level rise (additional details on floodplains are provided in Section 4.11 Water Resources). Other forecasted climate variables such as temperature and precipitation are within the wide range of climate conditions currently experienced in the project area.”

What state policy or directives support this guidance?

WSDOT's vision is to be the best at providing a sustainable and integrated multimodal transportation system. Sustainability is one of WSDOT's core values. Climate consideration is part of our asset management approach as well as part of our implementation of practical solutions.

The following strategic directives support our role in building a resilient transportation network for the future:

Results Washington

Governor Inslee’s [Results Washington](#) includes indicators of success for five goal areas. WSDOT is directly responsible for indicators related to clean transportation and sustainable and efficient infrastructure. WSDOT also contributes to other goals such as quality of life, vibrant communities, clean and restored habitat, and healthy air and water.



Executive Order 14-04

The Governor’s [Executive Order 14-04](#), “Washington Carbon Pollution Reduction and Clean Energy Action,” directs state agencies to reduce carbon emissions and improve energy independence. WSDOT is directed to encourage electrical vehicle (EV) use, expand the EV network, and improve multimodal planning to chart the path to a “multimodal, coordinated, cost-effective, safe and low-carbon transportation system.”

Washington’s Integrated Climate Response Strategy

Published in 2012, the [response strategy](#) lays out a framework that decision-makers can use to help protect Washington’s communities, natural resources and economy from the impacts of climate change. WSDOT’s vulnerability assessment and the recommendation to consider climate in plans and projects are among the actions contained in the state’s strategy.

Results WSDOT: Moving Washington Forward

WSDOT’s Strategic Plan for 2014–2017, “[Results WSDOT](#),” frames future agency actions to ensure WSDOT is the leader in providing a sustainable, integrated, and multimodal transportation system. Results WSDOT links agency actions to the six goals outlined in the Strategic Plan:

- | | |
|------------------------------|----------------------------|
| 1. Strategic Investments | 4. Organizational Strength |
| 2. Modal Integration | 5. Community Engagement |
| 3. Environmental Stewardship | 6. Smart Technology |

Results WSDOT **Goal 3: Environmental Stewardship**, “Promote sustainable practices to reduce greenhouse gas emissions and protect natural habitat and water quality.” The outcomes, strategies, and actions under this goal tie directly to this guidance:

- Improve environmental conditions: leave it better than before
- Reduce WSDOT’s overall carbon footprint
- Improve energy efficiency of transportation systems and WSDOT operations

The strategic plan makes the following commitment: **WSDOT plans and projects undergoing environmental review (at NEPA EIS and EA level) will document how climate change and extreme weather vulnerability are considered, and propose ways to improve resilience.**

Definitions and Terminology

Except where otherwise noted, these definitions are based on Intergovernmental Panel on Climate Change's (IPCC) *Climate Change 2007: Impacts, Adaptation and Vulnerability Report*¹ and their *Climate Change 2007: Mitigation*.²

Adaptation – Initiatives and measures to reduce the vulnerability of natural and human systems against actual or expected climate change effects.

Adaptive Capacity – The ability of a system to adjust to climate change to moderate potential damages, to take advantage of opportunities or cope with the consequences.³

Climate – The long-term average of conditions in the atmosphere, ocean, and ice sheets and sea ice described by statistics, such as means and extremes.

Climate Change – A significant and persistent change in the mean state of the climate or its variability. Climate change occurs in response to changes in some aspect of Earth's environment: these include regular changes in Earth's orbit about the sun, re-arrangement of continents through plate tectonic motions, or anthropogenic modification of the atmosphere.

Climate Forecasts and/or Projections – A prediction about average or extreme climate conditions for a region in the long-term future (seasons to decades). Pacific NW climate projections are available from the Climate Impacts Group at the University of Washington: <http://ces.washington.edu/cig/fpt/ccscenarios.shtml>.

Climate Variability – Natural changes in climate that fall within the normal range of extremes for a particular region, as measured by temperature, precipitation, and frequency of events. Drivers of climate variability include El Niño.

Weather Forecast – A prediction about the specific atmospheric conditions expected for a location in the short-term future (hours to days).

Global Warming – The observed increase in average temperature near the Earth's surface and in the lowest layer of the atmosphere.

Resilience – The capacity of a system to absorb disturbance and still retain its basic function and structure.

Vulnerability – The degree to which physical, biological, and socio-economic systems are susceptible to and unable to cope with adverse impacts of climate change.⁴

¹ Accessed at <http://www.ipcc.ch/ipccreports/ar4-wg2.htm>, 9/20/2010.

² Accessed at <http://www.ipcc.ch/ipccreports/ar4-wg3.htm>, 9/20/2010.

³ IPCC 2001; also referenced in 2009 California Climate Adaptation Strategy.

⁴ AASHTO, Primer on Transportation and Climate Change, 2008.