

1 Abstract

2 Climate affects the design, construction, safety, operations, and maintenance of transporta-
3 tion infrastructure and systems. The prospect of a changing climate raises critical questions
4 regarding how alterations in temperature, precipitation, storm events, and other aspects of
5 the climate could affect the Nation’s roads, airports, rail, transit systems, pipelines, ports,
6 and waterways. Phase I of this regional assessment of climate change and its potential
7 impacts on transportation systems addresses these questions for the region of the U.S.
8 Central Gulf Coast between Galveston, Texas, and Mobile, Alabama. This region contains
9 multimodal transportation infrastructure that is critical to regional and National transporta-
10 tion services.

11 Historical trends and future climate scenarios were used to establish a context for exam-
12 ining the potential effects of climate change on all major transportation modes within the
13 region. Climate changes anticipated during the next 50-100 years for the Central Gulf
14 Coast include warming temperatures, changes in precipitation patterns, and increased storm
15 intensity. The warming of the oceans and decline of polar ice sheets is expected to
16 accelerate the rate of sea level rise globally. The effects of sea level rise in most Central
17 Gulf Coast counties will be exacerbated by the sinking of the land surface, which is
18 accounted for in this assessment.

19 The significance of these climate factors for transportation systems was assessed. Warming
20 temperatures are likely to increase the costs of transportation construction, maintenance,
21 and operations. More frequent extreme precipitation events may disrupt transportation
22 networks with flooding and visibility problems. Relative sea level rise will make much of
23 the existing infrastructure more prone to frequent or permanent inundation – 25 percent of
24 the major roads, 9 percent of the rail lines, and 72 percent of the ports are built on land at or
25 below 122 centimeters (4 feet) in elevation. Increased storm intensity may lead to increased
26 service disruption and infrastructure damage: More than half of the area’s major highways
27 (64 percent of Interstates; 57 percent of arterials), almost half of the rail miles, 29 airports,
28 and virtually all of the ports are below 7 meters (23 feet) in elevation and subject to
29 flooding and possible damage due to hurricane storm surge. Consideration of these factors
30 in today’s transportation decisions and planning processes should lead to a more robust,
31 resilient and cost-effective transportation network in the coming decades.