This section summarizes the cumulative impacts associated with the proposed project using the same environmental issue areas as Section 4.0. Cumulative impacts are the result of combining the potential effects of the project (i.e. the 2008-2028 General Plan) with other planned and foreseeable development projects.

6.1 INTRODUCTION

The California Environmental Quality Act (CEQA) requires that an Environmental Impact Report (EIR) contain an assessment of the cumulative impacts that could be associated with the proposed project. According to State CEQA Guidelines Section 15130(a), "an EIR shall discuss cumulative impacts of a project when the project's incremental effect is cumulatively considerable." "Cumulatively considerable" means that the incremental effects of an individual project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (as defined by Section 15130). As defined in State CEQA Guidelines Section 15355, a cumulative impact consists of an impact that is created as a result of the combination of the project evaluated in the EIR together with other projects causing related impacts. A cumulative impact occurs from:

> *…the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.*

In addition, Section 15130(b) identifies that the following elements are necessary for an adequate cumulative analysis:

1) *Either:*

   (A) A list of past, present, and probable future projects producing related or cumulative impacts, including, if necessary, those projects outside the control of the agency; or,

   (B) A summary of projections contained in an adopted general plan or related planning document, or in a prior environmental document which has been adopted or certified, which described or evaluated regional or area wide conditions contributing to the cumulative impact. Any such planning document shall be referenced and made available to the public at a location specified by the lead agency.

2) *A definition of the geographic scope of the area affected by the cumulative effect and a reasonable explanation for the geographic limitation used;*

3) *A summary of the expected environmental effects to be produced by those projects with specific reference to additional information stating where that information is available; and*

4) *A reasonable analysis of the cumulative impacts of the relevant projects. An EIR shall examine reasonable, feasible options for mitigating or avoiding the project's contribution to any significant cumulative effects.*

Where a lead agency is examining a project with an incremental effect that is not "cumulatively considerable," a lead agency need not consider that effect significant, but shall briefly describe its basis for concluding that the incremental effect is not cumulatively considerable.

Future growth in the General Plan Planning Area is guided by the land uses identified in the General Plan Land Use Diagram (see **Figure 3.0-3**). In the Draft EIR, impact analysis of both

temporary (i.e. construction-related) and operational effects is based on these proposed land use patterns. The current analysis uses the projections-based approach referenced in Section 15130(b)(1)(B) by incorporating local and regional projections of employment and population. However, because the theoretical buildout of the proposed General Plan land uses is extraordinarily high and virtually unattainable within the planning period (2008-2028) of the General Plan, or by the year 2050 (see Section 3.0 for a full discussion), an analysis of the population and housing growth expected by 2025 and 2050 was completed. These population and employment projections are in turn used to derive projections of future traffic volumes, air emissions, and traffic noise. Where relevant, this section also contains lists of projects as called for in Section 15130(b)(1)(A). These lists are provided to amplify information subsumed in the local/regional projections, and to complement those projections with information regarding planned or ongoing infrastructure, regulatory, or other changes that are not always captured by the projections method.

As noted in Section 4.0, Introduction to the Environmental Analysis/Assumptions Used, it is often necessary in evaluating cumulative impacts to distinguish two related questions: 1) Is the impact that would be caused by cumulative conditions significant? And, 2) Is the project's incremental effect cumulatively considerable? The need for cumulative impact assessment considers the fact that a project may cause an incremental impact that is minor or limited by itself and therefore not significant, but that the incremental impact may be significant when, combined with other projects, the overall result is "cumulatively considerable". Certainly, a project's impacts may also be significant on both an incremental basis and the cumulative basis.

Not all cumulative impacts can be or need to be evaluated on the basis of both questions. For example, it is important in considering the criteria for evaluation of cumulative impacts in the context of an EIR for a general plan to note related comments in the CEQA Guidelines that an incremental contribution to a significant cumulative impact (e.g. on a regional basis) may be rendered less than cumulatively considerable by a project's participation in a previously approved plan or mitigation program that addresses the cumulative issue. The Guidelines state:

> A lead agency may determine that a project's incremental contribution to a cumulative effect is not cumulatively considerable if the project will comply with the requirements in a previously approved plan or mitigation program which provides specific requirements that will avoid or substantially lessen the cumulative problem (e.g., water quality control plan, air quality plan, integrated waste management plan) within the geographic area in which the project is located. Such plans and programs must be specified in law or adopted by the public agency with jurisdiction over the affected resources through a public review process to implement, interpret, or make specific the law enforced or administered by the public agency. (CEQA Guidelines, 15064, subd. (h)(3))

6.2 CUMULATIVE SETTING

As further described below, the general cumulative setting considered as part of the cumulative impact analysis is based on the existing conditions as documented in this DEIR. The cumulative context includes land use and traffic projections (regional and local), approved and known pending plans and projects (city and County plans/projects), transportation and other infrastructure projects. Generally, in the context of an EIR for a county general plan, it is appropriate to consider cumulative impacts in terms of the relationship of the county's proposed general plan with the plans and projects of cities within the county, as well as in nearby areas of adjoining counties.

LAND USE PLANNING AND PROJECTED GROWTH

Table 6.0-1 provides a summary of regional growth projections that encompasses areas that would also be directly and indirectly impacted by implementation of the 2008-2028 General Plan under all alternatives (based on the traffic analysis population/housing provided in Sections 4.13 and 4.11 of this DEIR).

TABLE 6.0-1
REGIONAL GROWTH PROJECTIONS FOR THE YEAR 2030

Jurisdiction	2030 Population
Butte County	334,842
Glenn County	45,181
Mendocino County	111,151
Plumas County	24,530
Shasta County	260,179
Trinity County	22,136

Source: California Department of Finance

URBAN AND RURAL DEVELOPMENT PROJECTS

The cumulative land use projections for this DEIR are presented for each alternative in Section 3.0 (Project Description) and Section 4.3 (Population and Housing). These projections assume the following approved and pending development projects identified at the time of the preparation of this DEIR (see **Table 6.0-2**). It should be noted that **Table 6.0-2** is not intended to be an all-inclusive list of all development activities both in the city and County and surrounding communities. Subsequent requests for increases in development beyond what is identified in this DEIR are outside the scope of the analysis and would require future environmental review.

TABLE 6.0-2
PROPOSED AND APPROVED LARGE-SCALE RESIDENTIAL AND COMMERCIAL PROJECTS

Project Name	Jurisdiction	Residential Acres	Commercial Acres	Residential Units	Current Status
Sun City Tehama Specific Plan	Tehama County	967	279	3,700	Approved
Sunset Hills	Tehama County	4,016		800	Pending/ Approved
Morgan Ranch	Tehama County	1,038	200,000 sq. ft.	3,950	Pending
Rolling Hills	Tehama County	162		80	Pending/ Approved
North Fork Ranch	Shasta County	3,650		440	Pending
Panorama	Shasta County			1,400	Pending
Mountain View Estates	Corning	70		318	Pending
North-Blackburn	Corning	35		134	Approved
Vineyards at Anderson	Anderson	2,442	240,000 sq. ft.	5,288	Pending
Oasis Road Specific	Redding	201	286.1	2,183	Pending

Project Name	Jurisdiction	Residential Acres	Commercial Acres	Residential Units	Current Status
Plan					
Stillwater Business Park	Redding		700		Approved
Shastina Ranch	Redding	220		446	Approved

Source: Cities of Corning, Anderson, Redding, Red Bluff and counties of Tehama and Shasta

6.3 CUMULATIVE IMPACTS ANALYSIS

Identified below is a compilation of the cumulative impacts that would result from the implementation of the project and future development in the vicinity. As described above, cumulative impacts are two or more effects that, when combined, are considerable or which compound other environmental effects.

AESTHETICS

Cumulative Setting

The cumulative setting for visual resources includes the viewshed of existing, proposed, approved and reasonably foreseeable developments in the County and those areas surrounding the County. The cumulative setting also includes full buildout of the land uses proposed in the General Plan.

Cumulative Impacts and Mitigation Measures

Impact 4.1.5 Implementation of the General Plan will encourage new development activities that could degrade the existing visual character or quality of the County and its communities. This impact is **cumulatively considerable**.

The conversion of areas of the County from their current rural visual character to a more urban character, in combination with the potential growth of the incorporated cities of the County and in adjoining areas of Shasta County, will result in a cumulatively considerable change in the visual character of the area.

As noted under Impact 4.1.3, the urbanization of sections of Tehama County, including areas observed by travelers on Interstate 5, will have substantial impacts on the local landscape, even though there are a number of proposed general plan policies and measures to help reduce those impacts. This impact will also be incremental in terms of cumulative regional impacts. The conversion of areas of the County from their current rural visual character to a more urban character, in combination with the potential growth of the incorporated cities of the County, will result in a cumulatively considerable change in the visual character of the area. Similar impacts that contribute to the overall cumulative impact can be observed in Shasta County, including impacts along the Interstate 5 corridor, generally from Cottonwood to Shasta Lake City.

While implementation of the 2008-2028 Tehama County General Plan would result in an increase in population, land use changes are proposed to direct the majority of County growth to occur north of the City of Red Bluff. The change in the visual character of the northern portion of the Sacramento Valley north of Red Bluff from implementation of the General Plan will result in a cumulatively considerable contribution to the overall urbanization of the region. It can not be said, however, that the Tehama County General Plan contributes incrementally to impacts on scenic resources that lie outside its jurisdiction. The impacts of development on viewsheds in

Shasta County, for example, are the consequence of planning policies and development patterns in other jurisdictions that are not affected by planning policies in Tehama County.

Implementation of General Plan policies and implementation measures identified under Impacts 4.1.1 through 4.1.4 would substantially reduce the alteration of visual character and light/glare impacts within the County in relation to the impacts that could occur under the current General Plan without these provisions. However, the change in the visual character of the County, especially in the north-central area between Red Bluff and the Shasta County line, as development progresses pursuant to the General Plan, will result in a cumulatively considerable contribution to the overall urbanization of the region. It is recognized as a **cumulatively considerable and unavoidable** impact, both in terms of cumulative conditions and as an incremental impact, as a consequence of the intensification and direction of development proposed in the General Plan and urban development in cities with Tehama County and in Shasta County, especially along the Interstate 5 corridor.

AGRICULTURAL RESOURCES

Cumulative Setting

The existing and projected future urban development throughout the state is expected to further contribute to the loss of important farmlands. The cumulative impact takes into account planned and proposed development anticipated in Tehama County. (See Section 4.0 for a further description of cumulative growth conditions). However, it is acknowledged that contribution to cumulative conversion of important farmland as a result of the proposed Tehama County 2008-2028 General Plan adds to the regional and statewide concern over this topic.

Cumulative Impacts and Mitigation Measures

Impact 4.2.4 Implementation of the General Plan Land Use Map, along with other proposed development in Tehama County and the cities of Red Bluff, Corning and Tehama, would contribute to the additional conversion of important farmlands to other uses and may increase agriculture/urban interface conflicts. This is a **cumulatively considerable** impact.

As previously discussed, implementation of the 2008-2028 General Plan would result in the conversion of, and/or conflict with, agricultural resources in the County. Changes in farmland and grazing land use designations within the Planning Area would represent an approximate 3.3 percent decrease in farmland and grazing land uses over existing conditions. Between 1992 and 2002 (statistics beyond 2002 are not yet available) Tehama County lost over 15,000 aces of farmland to urban development (see **Table 4.2-7**). Implementation of the General Plan will change land use designations which may result in a net loss of over 35,000 acres of lands currently designated for agricultural land use.

Implementation of General Plan policies and implementation measures identified under Impacts 4.2.1, 4.2.2, and 4.2.3 would substantially support agricultural resources within the County and, in many ways, would install a more accountable system for slowing down the conversion of agricultural lands. The impacts of Tehama County's planning policies will not extend outside the jurisdiction of Tehama County and, therefore, will not have a cumulative effect resulting in the loss of agricultural land in other jurisdictions. However, given the statewide trend in the conversion of important farmland areas, and the extent of conversion in Tehama County anticipated as a result of subsequent development in Tehama County, either under the current General Plan or pursuant to the proposed General Plan, implementation of the 2008-2028 General Plan would contribute substantially to farmland conversion in the region. This loss of agricultural land as a result of the proposed project is considerable as an incremental impact to

the general loss of agricultural land in the region. Therefore, it is a **cumulatively considerable and unavoidable** consequence of the intensification of development proposed in the General Plan.

Mitigation Measures

Implementation of the General Plan policies and implementation measures would reduce the General Plan's contribution to cumulative impacts to agricultural resources. However, implementation of the General Plan Land Use Diagram would still substantially contribute incrementally to cumulative impacts on regional agricultural resources as a result of urban development. This impact is **cumulatively considerable** and is considered a **significant and unavoidable** impact.

AIR QUALITY

Cumulative Setting

The cumulative setting for air quality includes existing, approved, proposed and reasonably foreseeable development within the Northern Sacramento Valley Air Basin (NSVAB), which is a seven-county region. All but two of the counties in the NSVAB are in nonattainment status of state standards for ozone. Glenn and Colusa Counties are in "nonattainment-transitional" status. Butte, Yuba and Sutter Counties are in nonattainment status for federal 1-hour ozone standards, while Butte County and southern Sutter County are in nonattainment status for the federal 8-hour ozone standard. All other counties are in attainment or unclassified status for the federal ozone standards.

All of the seven counties in the NSVAB are in nonattainment status for state standards for PM_{10}. All counties in the NSVAB are in unclassified status for federal PM_{10} standards. All counties also are in unclassified status for state $PM_{2.5}$ standards except for Butte County, which is in nonattainment status. The entire NSVAB is in attainment or unclassified status for all other federal and state criteria pollutants. Because the timing of attainment status for NSVAB is unknown, the cumulative setting for air quality assumes nonattainment status of ozone and PM_{10}.

The Air Districts in the NSVAB have adopted the 2006 Air Quality Attainment Plan. This Plan was developed for the purpose of achieving and maintaining healthful air quality throughout the air basin. Like the previous Plans, the 2006 Plan focused on the adoption and implementation of control measures for stationary sources, area wide sources, indirect sources, and addressed public education and information programs. The 2006 Plan also addressed the effect that pollutant transport has on the NSVAB's ability to meet and attain the State standards.

Ozone trends are variable and unique for each District within the NSVPA. During the past three-year period, Anderson-Shasta County, Sutter Buttes-Sutter County and Paradise-Butte County monitors experienced the highest number of ozone violations in the basin. Ozone concentrations in the NSVPA have remained relatively constant over the past three years, while population and vehicle miles traveled (VMT) increased during the same period. Ozone concentrations increased appreciably in Anderson-Shasta County, largely due to unfavorable meteorological conditions (NSVAB, page 7).

Section 6.0 of this cumulative setting includes consideration of global issues associated greenhouse gas emissions and climate change.

Cumulative Impacts and Mitigation Measures

Impact 4.3.6 Implementation of the proposed General Plan along with potential development of the Planning Area would exacerbate existing regional

problems with ozone and particulate matter. The proposed General Plan's contribution to these conditions is considered **cumulatively considerable**.

In order to reduce the number of vehicle miles traveled in the County, the 2008-2028 General Plan proposes to increase residential densities adjacent to the I-5 corridor in the northern portion of the County. This, along with policies that support mixed-use development, alternative modes of transportation, energy conservation measures, and the retention and replacement of vegetation, would serve to improve air quality in the County. However, over the life of the General Plan some of these same policies may result in substantial new development and increased population that would in turn adversely impact regional air quality. The growth in population and business activity, along with the corresponding increase in vehicle usage, when considered with growth proposed under the General Plan, would contribute to cumulative regional air quality impacts. It also could potentially delay attainment of standards for which counties in the NSVAB currently are in nonattainment status, mainly ozone and PM_{10}.

Air pollutant transport from the Broader Sacramento Area has an affect in the NSVBA by adding to the ozone problem within the NSVAB. Ozone precursors are emitted as part of the exhaust of internal combustion engines in the BSA and are transported northward via the prevailing winds. However, Tehama County or the Tehama County APCD cannot control the growth or emissions from neighboring jurisdictions. Therefore, the emissions from the BSA will continue to impact the NSVAB for the foreseeable future.

Mitigation Measures

Implementation of the proposed General Plan policies, implementation measures and mitigation measures identified under **Impact 4.3.1** through **Impact 4.3.5** would assist in reducing the General Plan's contribution to cumulative regional and local air quality impacts; however, this contribution is still considered **cumulatively considerable** and thus a **significant and unavoidable** impact. No feasible mitigation is available to mitigate this impact.

BIOLOGICAL RESOURCES

Cumulative Setting

The cumulative setting for this section of the EIR is extensive due to the fact that many special-status species are located not only within the Planning Area but also in areas adjacent to the Planning Area. Interconnections due to the system of streams and rivers as well as the mobility of many of the species analyzed in this EIR allow for a greater cumulative area analysis as well. For the purposes of this analysis, the cumulative setting for the General Plan includes the General Plan Planning Area and adjacent areas. The reader is referred to Section 4.0 regarding the extent of the cumulative setting and for information on cumulative analyses.

Cumulative Biological Resources

Impact 4.4.5 Buildout of the 2008-2028 General Plan may result in potential cumulative loss of natural habitats and associated biological resources. This impact is considered **less than cumulatively considerable**.

Implementation of the proposed goals and policies of the General Plan, as outlined in Section 4.4, would reduce impacts to biological resources including loss of special-status species and sensitive biological communities, adverse impacts to jurisdictional waters, fragmentation of wildlife corridors and habitat and tree preservation. In addition, mitigation is proposed that would provide greater protection for sensitive biological resources and provide improved guidelines for project-specific impact avoidance and/or mitigation when development projects

are proposed. Policies included in the 2008-2028 General Plan and mitigation measures included in this EIR would result in a **less than cumulatively considerable** impact on biological resources as a result of the proposed update of the Tehama County General Plan. This conclusion is applicable to both the potential impacts that could be caused by cumulative conditions, as well as the project's incremental effects related to biological resources.

Mitigation Measures

No mitigation beyond the proposed General Plan policies is necessary.

CULTURAL AND PALEONTOLOGICAL RESOURCES

Cumulative Setting

The setting for this cumulative analysis includes existing, proposed, planned and approved projects as well as growth planned under general plans, community plans and specific plans in the cities contained within the County and surrounding counties (see discussion above under sub-section 6.2).

Impact 4.5.4 Adoption of the Tehama County General Plan along with foreseeable development in the region could result in the disturbance of historic and archaeological resources. This contribution is considered **cumulatively considerable**.

As noted under **Impact 4.5.1**, expected development pursuant to the proposed General Plan has the potential to result in significant cultural resource impacts. Implementation of mitigation measure **MM 4.5.1** would assist in reducing significant impacts to cultural resources within Tehama County. Implementation of the General Plan policies and implementation measures cited under **Impact 4.5.1** would assist in reducing significant impacts to known cultural resources, as well as to any unknown cultural resources. Therefore, impacts related to cultural resources would be reduced to **less than significant.** General Plan policies and implementation measures, which will be implemented through the County's development permitting processes and/or state and federal laws will provide sufficient mitigation.

On a cumulative basis, then, the same impacts addressed under **Impact 4.5.1** could presumably contribute to the cumulative loss of historic and cultural resources in the region. Impacts on cultural resources on sites within Tehama County will not typically impact cultural resources on sites outside the county. However, when combined with other past, present and foreseeable development in the region, the potential is presented that any losses of cultural resources within Tehama County could be substantial when considered as a increment of the cumulative loss of cultural resources in the region. This is a speculative proposition, however, because there are no known resources that will be lost as a result of adopting the 2008-2028 General Plan. Instead, there is the potential that, in spite of the protective measures proposed by the County, there will still be inadvertent losses of resources, and that these losses, on a cumulative basis, could ultimately be considerable on a cumulative basis. Although the County is aware of the potential and has addressed it accordingly, since there is no substantial evidence that the project will result in significant impacts on cultural resources within Tehama County, the County is not inclined to presume that there will be cumulatively considerable impacts caused by cumulative conditions or as an incremental effect.

Implementation of Open Space and Conservation Element policies and implementation measures identified under **Impact 4.5.1**, coupled with applicable state and federal laws, will reduce the General Plan's incremental contribution to cumulative impacts on cultural resources to **less than cumulatively considerable**.

Mitigation Measures

None required.

GEOLOGY AND SOILS

Cumulative Setting

The cumulative setting for soil erosion and mineral resources consists of existing, planned, proposed and reasonably foreseeable land use conditions in the region. However, construction constraints are primarily based on specific sites within a proposed development and on the soil characteristics and topography of each site. As previously discussed, all new development within the General Plan Planning Area boundaries must comply with the 2001 California Code of Regulations (CCR), Title 24, also known as the California Building Standards Code (CBSC). Individual development projects must submit a geotechnical report, which contains construction and design guidelines and site-specific recommendations to reduce potential geologic and soil related hazards. Additionally, any new development disturbing one acre of land or more is subject to a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit, and all applicants are required to prepare and comply with an approved Storm Water Pollution Prevention Plan (SWPPP) that serves to reduce soil erosion related impacts.

Cumulative Impacts and Mitigation Measures

Geologic Hazards

Impact 4.6.6 Cumulative development in the County has the potential to locate buildings and persons in areas considered to have geologic hazards. This is considered a **less than cumulatively considerable** impact.

As described under **Impact 4.6.3** additional acres of land designated for residential uses would be available under the implementation of the proposed 2008-2028 General Plan compared with the current general plan. This would add to other potential development activities within Tehama County and adjacent areas, depending on the timing and rate of development. Conversion of acreage from vacant to developed uses could result in development that may occur in areas with seismic sensitivity subject to geologic hazards, including liquefaction. The potential for liquefaction does exist in various areas of Tehama County, primarily in the case of earthquake activity. Areas paralleling the Sacramento River contain clean sand layers with low relative densities coinciding with a relatively high water table. These areas are considered to have generally high liquefaction potential.

In the context of cumulative impacts, the provisions of the General Plan that expand areas designated for development would tend to also expand cumulative conditions that could expose people to geologic hazards. Since the potential for impacts related to seismic hazards already exists in Tehama County (e.g., in areas that are already designated for development in the current General Plan), and such impacts can not be attributed solely to the proposed project, the General Plan's contribution to such hazards are also considered to be incremental to the larger issue of concerns in the County for safety related to potential geologic hazards.

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The following Tehama County General Plan Policies and Implementation Measures contained in the General Plan Safety Element assist in reducing any potential impacts, including cumulative

impacts, associated with seismic activity. (Please refer to the Draft 2008-2028 General Plan for the full text of these provisions.)

Safety Element: SAF-4.2, SAF-4.2a, SAF-4.2b, SAF-4.4a

Policy SAF-4.2 and associated Implementation Measures SAF-4.2a and SAF-4.2b require that all new development projects within the County will be subject to geotechnical evaluation and submission of geotechnical reports and soil reports that evaluate potential geologic hazards and soil limitations, and recommend measures to minimize such hazards. Implementation Measure 4.4a refers all development proposals to the County Planning, Building, and Safety Departments for review and comments on any potential site-specific soil-related hazards. Compliance with adopted California Building Standards Code requirements, as well as implementation of the General Plan Policy SAF 4.2 and Implementation Measures SAF 4.2a and SAF 4.2b, would ensure that impacts relating to expansive or unstable soils are less than cumulatively considerable.

Mitigation Measures

Implementation of the above General Plan policies and implementation measures would ensure that the potential geologic hazards to buildings and persons from liquefaction are minimal. Thus, the General Plan's general and incremental contribution to cumulative geologic hazards impacts would be reduced to **less than cumulatively considerable**.

Potential Cumulative Increase of Erosion and Loss of Topsoil

Impact 4.6.7 Implementation of the 2008-2028 General Plan may result in substantial construction and site preparation activities. These activities increase soil erosion, wind and water erosion, and siltation of local drainages during construction, excavation and grading activities. At the cumulative level, this is considered to be a **less than cumulatively considerable** impact.

As addressed under **Impact 4.6.2**, implementation of the proposed 2008-2028 General Plan would result in the potential construction of new roadways, improvements to existing roadways, potential construction of substantial infrastructure (water and sanitary sewer facilities), and of the potential for additional commercial, residential, and industrial development. The grading and site preparation activities associated with such development would remove topsoil, disturbing and potentially exposing the underlying soils to erosion from a variety of sources, including wind and water. In addition, construction activities may involve the use of water, which may further erode the topsoil as the water moves across the ground.

New development would involve paving and other site improvements, substantially increasing the amount of impervious surfaces (incapable of being penetrated by water). These impervious surfaces generate higher levels of runoff (i.e., erosion from site preparation, sediment deposition from storm water runoff, and automobile fluids). The increased runoff has the potential to adversely affect surface and groundwater quality. If not properly managed, the runoff could greatly affect the quality of wetlands and vernal pools, which are located throughout the General Plan Planning Area. The reader has been referred to Section 4.9, Hydrology and Water Quality, for a further discussion regarding erosion and water quality.

Evaluation of erosion impacts and loss of topsoil consider "downstream" impacts due to the general nature of erosion. Therefore, in the context of cumulative impacts, the County would need to consider if there is a larger area that would be subject to impacts caused by cumulative conditions, and/or by the incremental effects of the project. Because construction and the resulting potential erosion may affect water quality, any development involving clearing, grading, or excavation that causes soil disturbance on one or more acres; or any

project involving less than one acre that is part of a larger development plan and includes clearing, grading, or excavation; is subject to a National Pollutant Discharge Elimination System (NPDES) General Construction Storm Water Permit. Any development of this size would be required to prepare and comply with an approved Storm Water Pollution Prevention Plan (SWPPP). As a consequence of the off-site impacts and concerns that are addressed in these processes, this EIR does not recognize any "cumulative impacts" that are not already considered under **Impact 4.6.2**.

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The following Tehama County 2008-2028 General Plan Policies and Implementation Measures contained in the General Plan Open Space and Conservation Element assist in reducing potential impacts associated with soil erosion: (Please refer to the Draft 2008-2028 General Plan for the full text of these provisions.)

Open Space and Conservation Element: OS-1.3, OS-1.3e, OS-1.3f, OS-1.3g

Implementation Measures OS-1.3e and OS-1.3f require development to incorporate runoff control measures into their site design, or to participate in an area-wide runoff control management effort. Through the requirement of best management practices, Implementation Measure OS-1.3g addresses and reduces impacts to receiving waters from the adverse effects of construction activities, erosion, sediment, and runoff. Through the required NPDES Permit, projects are evaluated for potential soil erosion impacts on a site-by-site basis. As impacts are dependent on the type of development, intensity of development, and amount of lot coverage of a particular project, impacts due to soil erosion can vary. However, compliance with adopted erosion control standards and NPDES and SWPPP requirements, as well as implementation of the General Plan Policy OS-1.3 and Implementation Measures OS-1.3e, OS-1.3f, and OS-1.3g, would ensure that soil erosion impacts related to implementation of the 2008-2028 General Plan are less than significant and that, consequently, cumulative impacts are **less than cumulatively considerable**.

Mitigation Measures:

None required.

Potential Cumulative Wastewater Conflicts

Impact 4.6.8 Implementation of the 2008-2028 General Plan may allow for development in areas where sewers are not available for the disposal of wastewater, or where soils are incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems. At the cumulative level, this is considered to be a **less than cumulatively considerable** impact.

Under the proposed 2008-2028 General Plan, there is the possibility that development will be proposed in areas where sewers are not available for the disposal of wastewater. This impact is addressed under **Impact 4.6.4**. Rural development often lacks the economy of scale and compact development patterns that are needed to make community sewer systems practical and cost effective. However, soil characteristics in areas where development proposes to use septic tank systems are not always conducive to adequately supporting the use of septic tanks and leach fields, or alternative wastewater disposal systems. As experienced in the Antelope area east of Red Bluff, failing septic tank systems are especially a problem when the situation results in the contamination of domestic water wells.

In the context of cumulative impacts, the County should consider 1) if impacts caused by the cumulative conditions as a result of the project are significant, and 2) how might the project's incremental effects be cumulatively considerable?

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The following Tehama County 2008-2028 General Plan Policies and Implementation Measures contained in the General Plan Public Services Element and Safety Element assist in reducing potential impacts associated with sewer and septic tank systems. (Please refer to the Draft 2008-2028 General Plan for the full text of these provisions.)

Public Services Element: PS-5.1, PS-5.1a, PS-5.1b, PS-5.1c

Safety Element: SAF-4.2a

The discussion under **Impact 4.6.4** outlines how Tehama County General Plan Policy PS-5.1 ensures that future development within the Planning Area is located with respect to type and intensity/density of land use in order to ensure the environmentally sound provision of adequate wastewater facilities. The 2008-2028 General Plan policies and implementation measures, including those that require a geotechnical investigation prior to site development, would reduce impacts resulting from soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems, and where sewers are not available for the disposal of wastewater. This impact is considered to be less than significant.

There is no basis to support an assumption that the impacts that would result from the proposed 2008-2028 General Plan, with the proposed mitigating provisions, will have a significant impact caused by related cumulative conditions, or which would result from the project's incremental effects. Therefore, this impact is considered to be **less than cumulatively considerable**.

Mitigation Measures

None required.

Cumulative Loss of Locally Important or Known Mineral Resources

Impact 4.6.7 Cumulative development in the County could result in a reduction of the availability of locally important or known mineral resources. This is considered a less than **cumulatively considerable** impact.

As described under **Impact 4.6.5,** additional acres of land designated for residential uses would be available under the implementation of the proposed 2008-2028 General Plan compared with the current general plan. This would add to other potential development activities within Tehama County and adjacent areas, depending on the timing and rate of development. Conversion of acreage from vacant to developed uses will result could result in a reduction in the availability of locally important or known mineral resources or loss of locally important mineral resource recovery site.

Policy OS-4.3 states the intent to explore the need for the creation of special mining zones in Tehama County. If such zones are determined to be necessary, the County will identify areas of significant mineral, gas, and oil resources, and will develop an overlay zone to protect those resources for future extraction.

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The following 2008-2028 General Plan policies and implementation measures contained in the Open Space and Conservation Element to address mineral resources. (Please refer to Table 3.0-6 (Section 3.0) of this Draft EIR for the full text of these provisions.)

Open Space and Conservation Element: OS-8.1, OS-8.1a, OS-8.1b, OS-8.1c, OS-8.1d, OS-8.1e, OS-8.2, OS-8.2a, OS-8.2b, OS-8.3, and OS-8.3a

Implementing Measure OS-8.1c states that future mineral mining in the more densely populated areas of the County shall be protected through the requirement of mitigation measures and reclamation plans which reduce or eliminate impacts from and upon adjacent land uses. Implementing Measure OS-8.1d requires that mineral extraction operations and accessory uses including, but not be limited to, crushing, screening, asphalt and concrete batching and stock piling, and shall be conditionally permitted in areas inherently compatible with mining.

Implementing Measure OS-8.1e encourages and supports inter-agency cooperation to protect mineral resources in Tehama County. Policy OS-8.2 and Implementing Measure OS-8.2a requires all new gas and mining operations to prepare and implement reclamation plans pursuant to the State Surface Mining and Reclamation Act of 1975 and State Mining and Geology Board regulations for surface mining and reclamation practice. Implementing Measures OS-8.2b requires inactive mined lands to be reclaimed to a usable condition that is readily adaptable to future anticipated land uses. Policy OS-8.3 expresses the intent of the County to explore the need for the creation of special mining zones. Implementing Measure OS-8.3a provides that, if such zones are determined to be necessary, the County should identify areas having significant mineral, gas, and oil resources, and develop an overlay zone to protect these resources for future mining or extraction opportunities.

In the context of potential cumulative impacts, the impact of the 2008-2028 General Plan on the loss of important or known mineral resources is not seen as cumulatively considerable either with, 1) respect to cumulative conditions, or 2) the project's potential incremental effect. This impact is considered to be less than significant, as 2008-2028 General Plan Goals, Policies, and Implementing Measures are provided which emphasize that development of natural gas and mineral resources will be designed and conducted in a manner that minimizes incompatibility with nearby and adjacent land uses.

Mitigation Measures

Implementation of the above 2008-2028 General Plan policies and implementation measures would ensure that the overall cumulative geologic and soil impacts will be reduced. Thus, the General Plan's contribution to cumulative loss of mineral resource impacts would be reduced to **less than cumulatively considerable**.

HAZARDS AND HAZARDOUS MATERIALS

Cumulative Setting

The cumulative setting for hazards and human health risks associated with the 2008-2028 General Plan includes the unincorporated areas of the County of Tehama as well as the cities of Tehama, Corning, and Red Bluff. Hazardous materials, human health, and safety impacts, as described in CEQA Appendix G, are generally site-specific and not cumulative by nature. The potential cumulative impacts due to the increased use of hazardous materials resulting from proposed development under the 2008-2028 General Plan include, but are not limited to: air quality, noise, water quality, flooding, fire, as well as exposure to multiple contaminants. The cumulative impacts associated with affected resources, such as air and water, are analyzed in the applicable technical sections of this EIR. On the subject of wildfire, the cumulative setting

includes Federal and State lands within the County, as well as adjoining areas of counties around Tehama County where there is a shared potential for wildfires.

Cumulative Impacts and Mitigation Measures

Cumulative Hazards and Health Risks

Impact 4.7.9 Implementation of the 2008-2028 General Plan could expose persons to general hazards throughout the life of the General Plan. With the exception of wildland fire hazards, which are discussed below, this is considered, in the cumulative context of cumulative conditions and incremental impacts, to be **less than cumulatively considerable**.

The cumulative effects from land uses proposed in association with the 2008-2028 General Plan could create a risk to public health from exposure to natural hazards (e.g. flooding) and hazardous materials (groundwater contamination, PCB containing transformers, USTs/ASTs,etc.). Natural hazards and hazardous material-related impacts are generally site-specific and each individual development is responsible for mitigating such risks. Exposure to natural hazards can be controlled through proper site design, implementation of Best Management Practices during construction and operation, compliance with established building requirements, and appropriate zoning. Various land uses (commercial, industrial, schools, and even residential properties) will use limited hazardous materials during construction and operational activities.

In consideration of cumulative impacts related to Impacts 4.7.2 through 4.7.8, there are no issues that suggest that the proposed project, as mitigated in the non-cumulative perspective, would have significant impacts caused by cumulative conditions or incremental effects. All new and existing projects are required to comply with all applicable federal, state and local regulations. Consequently, the cumulative impacts related to hazardous materials and threats to public health that may be construed to result from adoption of the 2008-2028 General Plan are considered **less than cumulatively considerable.**

Mitigation Measures:

None required

Cumulative Wildland Fire Hazards

Impact 4.7.10 Implementation of the 2008-2028 General Plan could result in cumulative safety hazards associated with wildland fires in residential areas adjacent to open space and natural areas. This is considered to have **potential cumulatively considerable** impacts.

As addressed under Impact 4.7.1, the Tehama County General Plan Planning Area contains a variety of landscapes including conifer forests, foothills, wetlands, and vast rangelands; areas that support a variety of trees, shrubs, and native grasses. These vegetation types provide a substantial source of fuel and a potential to ignite and pose safety risks to adjacent and surrounding developments. Construction of residential units in any of these areas has the potential to expose people or structures to significant risk of loss, injury, or death involving wildland fires. Furthermore, the development of homes in so-called wildland areas introduces additional potential causes of fire (e.g., refuse burning, use of equipment, children playing with matches).

Wildfires have no regard to jurisdictional boundaries. A wildfire started in one county can burn into another, fires on private land can spread to National Forest Lands, and vice versa. Consequently, there are cumulative issues related to fire hazards.

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The discussion under Impact 4.7.1 identifies the 2008-2028 General Plan policies and implementation measures contained in the Safety Element that will assist in reducing potential impacts associated with wildland fire. Please refer to that discussion. The extent of these policies is considerable and represents a dedicated effort to respond to the issue. However, the impact discussion observes that, while these policies would reduce impacts to residential areas within the County due to wildland fires, it is unlikely that the impact can be reduced to a less than significant level. Many of the measures require maintenance and, given the right conditions, even the best of measures could fail during a wildfire.

Policies in the 2008-2028 General Plan that encourage a compact urban form, greater density of development and, more importantly, the provision of public services (including fire hydrants and fire suppression) will reduce the exposure of people and structures to wildfire. However, no policies or actions can totally remove the potential for wildfires in remote rural areas of the County. As long as people build homes in areas that have high fire hazard conditions, or as conditions change over time so that the potential for fire hazards around existing homes increases, people and property will continued to be endangered. Individually, these impacts are calculated risks taken on the part of the land owner and affect a very small number of people and structures. However, when considered throughout the county, the potential for impact is significant and unavoidable. In the cumulative context, the issue is not just confined to land within the County's planning jurisdiction. Federal and State lands within the County, as well as land in surrounding counties, share the hazard related to cumulative conditions and the project's incremental effect concerning the issue.

Mitigation Measures

Beyond those 2008-2028 General Plan policies and implementation measures described above, no additional mitigation measures are identified that would reduce the cumulative threat presented by wildfires to a level that is less than significant at the local or cumulative level. Therefore, this impact is considered to be **cumulatively considerable** and **significant and unavoidable**.

HYDROLOGY AND WATER QUALITY

Cumulative Setting

Tehama County is located in the central portion of the Sacramento River hydrologic region. The Sacramento River Hydrologic Region covers approximately 17.4 million acres (27,200 square miles) (Bulletin 118). The region includes all or large portions of Modoc, Siskiyou, Lassen, Shasta, Tehama, Glenn, Plumas, Butte, Colusa, Sutter, Yuba, Sierra, Nevada, Placer, Sacramento, El Dorado, Yolo, Solano, Lake, and Napa counties. Geographically, the region extends south from the Modoc Plateau and Cascade Range at the Oregon border, to the Sacramento-San Joaquin Delta. The Sacramento River is the longest river system in the State of California with major tributaries the Pit, Feather, Yuba, Bear and American rivers.

The Sacramento River Hydrologic Region is the main water supply for much of California's urban and agricultural areas. Annual runoff in the Sacramento River Hydrologic Region averages about 22.4 million acre feet, which is nearly one-third of the State's total natural runoff. Major water supplies in the region are provided through surface storage reservoirs. The Shasta Dam

Reservoir is one of the two largest surface water projects in the region. In all, there are more than 40 major surface water reservoirs in the region.

Cumulative Impacts and Mitigation Measures

Cumulative Water Quality Impacts

Impact 4.8.5 Implementation of the proposed 2008-2028 General Plan and potential development of the unincorporated regions of the County would include substantial grading, site preparation, and an increase in urbanized development. Increased development may contribute to cumulative water quality impacts and is considered **potentially cumulatively considerable**.

Additional acres of land designated for residential uses would be available under the implementation of the proposed 2008-2028 General Plan compared with the current general plan (Impact 4.8.1). This would add to other potential development activities within Tehama County and adjacent areas, depending on the timing and rate of development. Conversion of acreage from vacant to developed uses will result in cumulative water quality impacts, which include impacts on surface water and groundwater quality. Water quality impacts may result from pollutants such as silt, chemicals, oils, solvents or from use of septic tanks in areas with soils not suited for septic tanks.

Mitigation Measures

Implementation of the above 2008-2028 General Plan policies and implementation measures and mitigation measures **MM 4.4.3a, MM 4.4.3b** (Section 4.4 Biological Resources) which call for the creation of secondary flood control channels and the preservation of existing meandering alignment of creeks, as well as compliance with NPDES permit requirements would ensure that . the adoption of the 2008-2028 General Plan's contribution to cumulative water quality impacts would be reduced to **less than cumulatively considerable**. This conclusion is applicable to both the impact that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts.

Cumulative Flood Hazards

Impact 4.8.6 Implementation of the 2008-2028 General Plan would increase impervious surfaces and alter drainage conditions and rates in the Planning Area, which could contribute to cumulative flood conditions along the Sacramento River, and other local waterways. However, the 2008-2028 General Plan contains adequate General Plan policies and action items that address drainage and flooding issues. This is considered a **less than cumulatively considerable** impact.

Urban development under the proposed 2008-2028 General Plan would result in an increase in impervious surfaces in the Planning Area that would contribute (in combination with cumulative development in the watershed) to increases in flood conditions for area waterways (Impact 4.8.4). The project would also increase the regional population that could be exposed to flooding as a result of levee failure along the Sacramento River or failure of Shasta Dam. However, such an event has an extremely low probability of occurring and is not considered to be a reasonably foreseeable event.

The 2008-2028 General Plan policies and implementation measures noted in Section 4.8 will aid in the reduction of possible drainage and flooding related impacts by focusing on keeping development out of areas prone to flooding as well as by designing storm drainage systems that

will avoid increases in runoff levels. General Plan Policy SAF-5.1 states that the County shall manage the risk of flooding by discouraging new development from locating in an area that is likely to flood. The associated Implementation Measure SAF-5.1a would deny any project that would result in new or increased flooding impacts on adjoining parcels or upstream and downstream areas. Development is precluded from FEMA-determined Flood Hazard Zones as required by Implementation Measure SAF-5.1b and SAF-5.1c requires the location of actual development to be restricted to areas not subject to flooding. SAF-5.1d states that every residential lot shall have buildable area sufficient to accommodate a residence and associated structures outside the Flood Hazard Zone. Furthermore, General Plan Policy SAF-5.2 ensures that adequate drainage exists for both existing and new development. This would be accomplished through enforcement of Implementation Measure SAF-5.2a, which requires storm water detention facilities be provided to both new developments and redevelopment projects in order to prevent runoff. SAF-5.2b requires all new development projects to either incorporate runoff control measures to minimize peak flows of runoff or otherwise implement Comprehensive Drainage Plans. SAF-5.2c places the maintenance of drainage facilities within the jurisdiction of the County in order to ensure their proper operation during storms.

The County will incorporate flood control mitigation into County ordinances and procedures as directed by General Plan Policy SAF-5.3. This shall be done by regulating all uses and development in areas prone to flooding through land use planning, zoning, and other restrictions (Implementation Measure SAF-5.3a). SAF-5.3c requires that all new developments do not exceed the cumulative rate of peak runoff over pre-development levels. With the adoption of SAF-5.3d, all development proposals will be referred to the County Planning Department, County Building and Safety Department, and Road/Public Works Department to review and comment on any potential flooding impacts or hazards.

Mitigation Measures

Implementation of the Safety Element policies and implementation measures SAF-5.1, SAF-5.1a, SAF-5.1b, SAF-5.1c, SAF-5.1d, SAF-5.1f, SAF-5.1g, SAF-5.2, SAF-5.2a, SAF-5.2b, SAF-5.2c, SAF-5.3, SAF-5.3a, SAF-5.2c, SAF-5.2d, SAF-7.2, SAF-7.2a would ensure the attainment of water quality standards and protection of beneficial uses consistent with applicable water quality requirements.

Implementation of the above 2008-2028 General Plan policies and implementation measures, applicable state and federal required permits, and **MM 4.8.4** would ensure that cumulative impacts to stormwater drainage and the potential for flooding related to the Tehama County 2008-2028 General Plan would be **less than significant**. Implementation of these policies and implementation measures would ensure the attainment of related water quality standards and protection of beneficial uses consistent with applicable water quality requirements. Thus, the General Plan's contribution to the cumulative condition of drainage and flood related impacts in the area, as well as its potential incremental contribution to cumulative impacts, would be reduced to **less than cumulatively considerable**.

Cumulative Water Supply

Impact 4.8.7 Implementation of the proposed 2008-2028 General Plan would potentially increase the demand for water from both surface and groundwater sources throughout Tehama County, which could result in water shortages or reduce recharge to aquifers. This is considered a **cumulatively considerable** impact.

Cumulative impacts to surface water and groundwater supply as a result of the 2008-2028 General Plan may result in water shortages, groundwater table lowering and reduce recharge

rates throughout the County as a result of the conversion of currently vacant lands to residential, commercial, industrial and agricultural land uses. Water sources will need to be expanded to meet the new demands, and sources may include surface water, groundwater and further utilization of reclaimed water.

At full buildout of the 2008-2028 General Plan (an increase in the population of the County to 416,967 residents is expected. This increase in population and conversion of land uses will ultimately increase the water demand of the County by roughly over 50 million gallons per day (please see Impact 4.14.12 for a complete discussion of water demands).

As identified in **Impact 4.8.3** there is sufficient water to meet the needs of the County during normal water years, however, during dry or drought years, the County would need to rely more heavily on groundwater. During dry or drought years, reliance upon groundwater extraction increases on average about 35 percent over net groundwater extraction in a normal water year, and total percolation decreases about eight percent. As concluded in the TCFCWCD Inventory and Analysis the increased groundwater extractions during a dry year and the decreased total percolation result in a net lowering of the groundwater table under the existing General Plan population and land use conditions (TCFWCD, pg. 5-17).

An increase in the County population by 416,967 residents, and an estimated ultimate increase in the water demand by roughly over 50 million gallons per day coupled with the resultant increase in development as a result of the 2008-2028 General Plan, which may result in an increased conversion of surfaces to impervious surfaces (i.e. pavement, rooftops, etc.), will result in a significant impact. During dry or drought years it can be assume that increased groundwater extraction will result in other areas of the Sacramento Valley surrounding Tehama County as a result of decreased surface water supply. When groundwater extraction in surrounding counties is viewed in combination with the impacts as a result of the implementation of the Updated Tehama County 2008-2028 General Plan impacts to the aquifer or a resultant lowering of the groundwater table may occur. This impact is considered to be a **cumulatively considerable impact**.

Proposed General Plan Policies and Implementation Measures that Mitigate Potential Impacts

The following Tehama County 2008-2028 General Plan policies and associated implementation measures contained in the General Plan Open Space and Conservation Element and Public Services Element assist in reducing any potential impacts associated with water supply.

Open Space: OS-1.1, OS-1.1a, OS-1.1b, OS-1.1d, OS-1.1e, OS-1.1 f, OS-1.1h. OS-1.2, OS-1.2a, OS-1.2b, OS-1.2c, OS-1.2d, OS-1.4, OS-1.6, OS-1.6a, OS-1.7, OS-1.7a, OS-1.7b, OS-1.7c

Public Services: PS-3.2, PS-3.2a, PS-3.2b, PS-4.1

Numerous policies in the 2008-2028 General Plan address the issue of water supply, water conservation and groundwater recharge. Policy OS-1.1 ensures protection and conservation of water resources and supply systems through sound watershed management. Associated implementation measures OS-1.1a and OS-1.1b encourage maintenance of ordinances to protect water supplies and ensure the evaluation for the need for a Water Conservation Ordinance. OS-1.1d encourages water conservation by working with local water providers and water conservation agencies to create an incentive program that encourages retrofitting existing development with low-flow water fixtures. Implementation Measure OS-1.1e maintains the Adopted AB3030 Groundwater Management Plans, while OS-1.1f and OS-1.1h encourage water supply plans and regional master plans to be prepared as well as discourage the export of groundwater from the County.

Policy OS-1.2 ensures the County continues to encourage alternative water supplies, including through the encouragement of conservation measures. Implementation Measures OS-1.2a through OS-1.2d encourage water suppliers to develop water supply sources other than groundwater, encourage new development to utilize conservation and water reuse components in design and install groundwater monitoring wells to monitor groundwater supply conditions.

Policy OS-1.4 encourages development of land for the purpose of improving groundwater recharge, while Policy OS-1.6 encourages new water storage projects that are of local benefit to the County. Implementation Measure OS-1.6a investigates potential federal and state funding opportunities related to water infrastructure and seeks funding to establish water storage facilities. Policy OS-1.7 and associated Implementation Measures OS-1.7b and OS-1.7c encourages all new development to incorporate water conservation measures including water reuse, low flow appliances and fixtures, and improved irrigation systems that reduce water consumption. Implementation Measure OS-1.7a requires development project approvals to include a finding that all feasible and cost-effective options for conservation and water reuse are incorporated into project design.

Policies in the Public Services Element of the 2008-2028 General Plan include measures to ensure that water supply and delivery systems are available in time to meet the demand created by new development and that development be located in an area with adequate water supply and distribution systems to ensure adequate water supply and quality, based on land use type and development density/intensity. Implementation Measures require assured water supply and delivery systems be available at the time of project approval and that adequate water supply source and availability for development be identified and verified at the time of tentative map approval.

Implementation of the above 2008-2028 General Plan policies and affiliated implementation measures would significantly reduce impacts to groundwater resources, including a net deficit in the aquifer or a lowering of the groundwater table. However, increased extraction rates during dry or drought years as a result of the updated General Plan buildout combined with impacts in neighboring counties will result in an impact that is considered **cumulatively considerable** and is considered a **significant and unavoidable** impact**.**

LAND USE AND PLANNING

Cumulative Setting

The setting for this cumulative analysis includes local and regional projections which are ample in scope to subsume existing, proposed, planned and approved projects as well as expected growth under general plans, community plans and specific plans in the cities contained within the County and surrounding counties (see discussion above under sub-section 6.2; also Section 3.0 (Project Description) and Section 4.11 (Population and Housing)).

Cumulative Impacts and Mitigation Measures

Impact 4.9.4 Implementation of the 2008-2028 General Plan, in addition to existing, proposed, approved, and reasonably foreseeable development in Tehama County, would contribute to cumulative land use conflicts. This would be a **less than cumulatively considerable** impact.

Under cumulative conditions, the 2008-2028 General Plan and subsequent development would not contribute to land use conflicts beyond those discussed in Impacts 4.9.1 and 4.9.2. Conflicts between planning documents, such as the Tehama County Airport Comprehensive Land Use

Plan and the General Plan land use map, would be specific to the 2008-2028 General Plan and specific development projects, and would not have an increased significance in the aggregate under cumulative conditions. Similarly, land use conflicts, particularly those between urban and agricultural resources that would occur under cumulative development conditions would also be site-specific. There are known development projects in the City of Red Bluff, City of Corning and Tehama County that will contribute to cumulative changes in the landscape and land uses within each planning area. However, these projects are not expected to interact or conflict with the land uses in the County of Tehama Planning Area. This impact, both in the context of impacts caused by cumulative conditions and the project's potential incremental contribution to cumulative impacts, is **less than cumulatively considerable**.

Mitigation Measures

None required.

NOISE

Impact 4.10.7 Implementation of the 2008-2028 General Plan, in combination with development occurring within the incorporated cities of Red Bluff, Corning, and Tehama, would potentially increase traffic levels in the planning area. This is considered to be a **potentially cumulatively considerable** impact.

The anticipated increase in population throughout the planning area will result in an increase in traffic and therefore related noise. Such noise will increase mainly on major transportation routes located in predominantly commercial areas. Freeway generated noise will increase and have an affect on adjacent residential areas, especially where residential uses currently abut Interstate 5 and State Route 99. However, the freeway traffic is primarily through traffic (especially the truck traffic), and will increase over the term of the 2008-2028 General Plan, with or without the General Plan. Residential and other noise-sensitive uses could be exposed to significant traffic noise level increases as a result of 2008-2028 General Plan designations. Therefore, this impact is considered to be potentially significant in the contexts of both the project's effect on cumulative conditions and the incremental factors of the plan that would contribute to potentially considerable cumulative impacts. Therefore, consideration of further mitigation to address cumulative noise impacts is warranted.

Mitigation Measures

MM 4.10.7 The County shall work to develop a County-wide traffic noise abatement program for the express purpose of reducing traffic noise exposure at existing residential uses which are affected by traffic noise levels in excess of the County's noise level standards. The program shall include the following specific aspects for noise abatement consideration where reasonable and feasible:

1. Noise barrier retrofits.
2. Truck usage restrictions.
3. Reduction of speed limits.
4. Use of quieter paving materials.
5. Building façade sound insulation.
6. Traffic calming.
7. Additional enforcement of speed limits and exhaust noise laws.

8. Signal timing.

It is recognized that these measures, used individually or collectively, can result in a reduction of traffic noise levels at affected sensitive receptor locations. The level of increased traffic throughout the County as a result of the 2008-2028 General Plan could be considered significant when located in a residential area, or near other sensitive receptors like hospitals, schools, libraries or churches. Fortunately, almost none of these uses exist along the major thorough fares and streets in Tehama County that could be affected by such an increase in noise. Most of the uses are commercial, industrial, or transportation related and can stand higher noise levels. Given the above mentioned mitigation measure, the goals and criteria of the Noise Element, and the 2008-2028 General Plan policies and implementation measures listed under Impact 4.10.4, the general and incrementally cumulative impacts are expected to be **less than cumulatively considerable.**

POPULATION AND HOUSING

Cumulative Setting

The cumulative setting for population and housing includes existing and future development in Tehama County. Tehama County has three incorporated areas: Red Bluff, Tehama, and Corning. It also has several unincorporated communities—Paskenta, Mill Creek, Gerber, and Los Molinos—among others. Development and growth in unincorporated Tehama County as a result of the implementation of the 2008-2028 General Plan would contribute to cumulative population and housing conditions in the incorporated areas of Tehama County as well as surrounding counties. See **Table 4.11-22** in Section 4.11.

Cumulative Impacts and Mitigation Measures

Impact 4.11.3 Implementation of the 2008-2028 General Plan could result in a cumulative increase in population and housing growth in the incorporated areas of Tehama County as well as surrounding counties and associated environmental impacts. This is a **cumulatively considerable** impact.

As discussed under Impact 4.11.1, development under the 2008-2028 General Plan would lead to a substantial increase in population in the County. Development and growth in unincorporated Tehama County, as a result of the implementation of the 2008-2028 General Plan, would contribute to cumulative population and housing conditions in the incorporated areas of Tehama County as well as surrounding counties. While each jurisdiction will evaluate the environmental effects of future projects on population and housing growth as the individual projects are processed, there have been attempts to review impacts on a regional basis. Programs such as the Fix-5 effort are designed to address regional transportation impacts associated with regional growth. Tehama and Shasta County frequently work together to address impacts for projects on their mutual border.

Buildout is defined as the development of land to its full potential or theoretical capacity as permitted under current or proposed planning or zoning designations. This buildout projection of new residential dwelling units is under theoretical optimum conditions, simply calculated by multiplying the number of acres by the number of units allowed per acre. The buildout does not take into account site-specific constraints, economic factors, market forces, and regulatory restrictions such as general plan policies, County ordinances implementing the general plan, and regulatory requirements imposed by state and federal agencies. Therefore, while the theoretical maximum buildout potential may project dwelling units, the reality is that this number of units will not be built on the identified acreage under the existing and proposed General Plan land use densities.

The buildout potential for the 2008-2028 General Plan land use designations would be approximately 184,499 dwelling units, resulting in a projected population of 416,967. (See **Table 4.11.22**). This represents substantial growth in the area and will have a potentially significant physical effect on the environment. Implementation of the Tehama County General Plan and the associated land use designations would directly cause growth and the 2008-2028 General Plan does not contain any policies which would limit population growth.

In Section 4.0, Introduction to the Environmental Analysis and Assumptions Used, there is a comparison of the theoretical maximum buildout of the 2008-2028 General Plan, with its 2008-2028 timeframe, to the buildout that could theoretically result from the current 1983 General Plan. (See **Table 4.0-1**) Full buildout of the 1983 General Plan could result in a hypothetical population of 321,580 living in an estimated 139,125 housing units. Based on that analysis, the 2008-2028 General Plan could theoretically result in 45,374 more houses and a buildout population of 95,387 more people than the 1983 General Plan buildout.

Mitigation Measures

The EIR contains mitigation measures where appropriate to reduce or eliminate potentially significant impacts associated with population growth in the County.. For instance, as a result of population growth under the 2008-2028 General Plan there are lands that are currently vacant that will be converted to residential uses, which will ultimately increase the water supply needs of the County among other things. The 2008-2028 General Plan Open Space and Conservation Element contains policies that assist in reducing potential impacts to water supply resources (see Section 4.8 of this DEIR). However, even with implementation of 2008-2028 General Plan policies and mitigation measures, population growth will inevitably occur and housing and other services would need to be provided to accommodate this growth. Implementation of the Tehama County 2008-2028 General Plan and the associated land use designations would be a major factor that will contribute to the generation of growth. Furthermore, the 2008-2028 General Plan does not contain policies that significantly discourage growth. New housing and population growth in Tehama County, when added to growth that is occurring in Shasta County and other adjoining counties, will also contribute incrementally to the cumulative population in the region. Related secondary impacts (e.g., traffic) are addressed in the topic-specific sections of this EIR. Overall, impacts related to housing and population growth as proposed in the proposed update of the Tehama County 2008-2028 General Plan would be **cumulatively considerable** and **significant and unavoidable**.

PUBLIC SERVICES AND UTILITIES

Cumulative Setting – Fire Protection and Emergency Medical Response

The cumulative setting for fire protection and emergency medical services includes all of the unincorporated areas of Tehama County. Potential future development of these areas would further increase cumulative demand for fire protection, emergency medical services, and related facilities requiring the necessity of new fire stations which could result in environmental impacts

Cumulative Impacts and Mitigation Measures – Fire Protection and Emergency Medical Response

Impact 4.12.1.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would increase the population within the unincorporated areas of Tehama County contributing to the cumulative demand for fire protection and emergency medical services. As a result additional fire and emergency medical services and related facilities would be required. This is considered a **less than cumulatively considerable impact**.

Implementation of the 2008-2028 General Plan would require additional fire related services, equipment, and facilities to adequately serve the projected development within the unincorporated areas of the County. Funding from property taxes, developer fees, impact fees and other alternative sources of funding would provide sufficient resources to serve the projected needs of the County Fire Department and fire districts. Subsequently, future development proposed in association with the 2008-2028 General Plan would increase revenues for the County Fire Department and fire districts and provide funding to accommodate the additional growth. Individual development projects would be subject to CEQA review on a project-by-project basis, ensuring that impacts would be less than cumulatively considerable.

On a cumulative basis, future development of residential units in natural areas that support a variety of trees, shrubs, and native grasses have the potential to provide a substantial source of fuel and a potential to ignite and pose safety risks to adjacent and surrounding developments. Development in these areas has the potential to expose people or structures to significant risk of loss, injury, or death involving fires.

Implementation of Safety Element policies and implementation measures would reduce the 2008-2028 General Plan's contribution to cumulative impacts on fire protection and emergency medical service related impacts to **less than cumulatively considerable**. This conclusion is applicable to both impacts that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts related to fire protection and medical response services.

Mitigation Measures

None required.

Cumulative Setting – Law Enforcement

The cumulative setting for law enforcement includes all of the unincorporated areas of Tehama County. The development associated with the proposed Tehama County 2008-2028 General Plan and growth in the Tehama County planning area (based on land use projections identified in the Tehama County 2008-2028 General Plan) would result in population increases contributing to incremental cumulative increase in demand for law enforcement resulting in additional environmental impacts associated with the development of new facilities.

Cumulative Impacts and Mitigation Measures – Law Enforcement

Impact 4.12.2.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would increase the population within the unincorporated areas of the County contributing to the cumulative demand for law enforcement services and facilities. As a result additional law enforcement services and related facilities would be required. This is considered a **less than cumulatively considerable impact**.

Implementation of the 2008-2028 General Plan would require additional law enforcement related services, equipment, and facilities to adequately serve the projected development within the unincorporated areas of the County. Funding from property taxes, and other alternative sources of funding would provide sufficient resources to serve the projected needs of the County Sheriff's Office. Subsequently, future development proposed in association with the 2008-2028 General Plan would increase revenues for the County Sheriff's Office and provide funding to accommodate the additional growth. Individual development projects would be

subject to CEQA review on a project-by-project basis, ensuring that impacts would be less than cumulatively considerable.

Implementation of the General Plan Safety Element policies and associated implementation measures listed under **Impact 4.12.2.1** (e.g., SAF 1.2, SAF-1.2a, SAF-2.1, SAF-2.1a, SAF-2.1b, SAF-2.1c, SAF-2.2, SAF-2.3, SAF-2.3a, SAF-2.4) would ensure that the General Plan's cumulative law enforcement related impacts are **less than cumulatively considerable**. This conclusion is applicable to both impacts that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts related to law enforcement.

Mitigation Measures

None required.

Cumulative Setting – Library Resources and Historical Resource Centers

The cumulative setting for library services and historical resource centers includes all of the unincorporated areas of Tehama County. Potential future development of these areas would also result in cumulative demand for library services and historical resource centers.

Cumulative Impacts and Mitigation Measures – Library Resources and Historical Resource Centers

Impact 4.12.3.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would increase the population within the unincorporated areas of Tehama County contributing to the cumulative demand for library services and facilities. As a result, additional library services and historic resource centers would be required. This is considered a less than cumulatively considerable impact.

Implementation of the 2008-2028 General Plan would require additional library services and facilities to adequately serve the projected development within the unincorporated areas of the County. Funding from property taxes, and other alternative sources of funding such as grants, would provide sufficient resources to serve the projected needs of the County libraries and historic resource centers. Implementation of the General Plan Public Services Element policies and associated implementation measures will ensure that the General Plan's policies related to cumulative library service and historic resource center impacts are **less than cumulatively considerable.** This conclusion is applicable to both the potential for impacts that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts.

Mitigation Measures

None required.

Cumulative Setting – Educational Systems

The cumulative setting for the educational system includes all of the unincorporated areas of Tehama County. The development associated with the Tehama County General Plan and growth in the planning area would result in population increases contributing to incremental cumulative increase in demand for schools resulting in additional environmental impacts associated with the development of new facilities.

Cumulative Impacts and Mitigation Measures – Educational Facilities

Impact 4.12.4.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would result in a cumulative increase in student enrollment and require additional schools and related facilities to accommodate the growth. This is a **less than cumulatively considerable** impact.

Implementation of the 2008-2028 General Plan would require additional educational services and facilities to adequately serve the projected development within the unincorporated areas of the County. Funding from property taxes, and other alternative sources of funding such as grants, would provide sufficient resources to serve the projected needs of the County schools.

Implementation of the General Plan Public Services Element policies and associated implementation measures, including those listed under **Impact 4.12.4,** will help ensure that the General Plan's cumulative educational system related impacts are **less than cumulatively considerable.** This conclusion is applicable to both the potential for impacts that may be caused by cumulative conditions concerning educational facilities and the project's incremental contribution to cumulative impacts.

Mitigation Measures

None required.

Cumulative Setting – Parks and Recreation

The cumulative setting for parks and recreation services includes all of the unincorporated areas of Tehama County. Potential future development of these areas would also result in cumulative demand for parks and recreation services.

Cumulative Impacts and Mitigation Measures – Parks and Recreation

Impact 4.12.5.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would require additional park and recreation facilities within the Planning Area boundaries and TCPRD's service area boundaries. This would be a **less than cumulatively considerable** impact.

Implementation of the 2008-2028 General Plan would require additional parks and recreational facilities to adequately serve the projected development within the unincorporated areas of the County. Funding from development in-lieu fees, and other alternative sources of funding such as grants, would provide sufficient resources to serve the projected needs of the County parks and recreational facilities. Further, implementation of the General Plan Public Services Element goals, policies and associated implementation measures, including those listed under **Impact 4.12.5.1,** ensure that the General Plan's cumulative parks and recreation related impacts are **less than cumulatively considerable.** This conclusion is applicable to both the potential for impacts that may be caused by cumulative conditions concerning educational facilities and the project's incremental contribution to cumulative impacts.

Mitigation Measures

None required.

Cumulative Setting – Solid waste

The cumulative setting for solid waste management services includes all of the unincorporated areas of Tehama County. Potential future development of these areas would also result in cumulative demand for landfill services.

Cumulative Impacts and Mitigation Measures – Solid waste

Impact 4.12.6.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development, would generate solid waste that would require expanded collection and disposal services. The project's contribution would be **less than cumulatively considerable**.

Implementation of the 2008-2028 General Plan would require additional solid waste management demands to adequately serve the projected development within the unincorporated areas of the County. Funding from collection, handling, transfer and disposal fees would provide sufficient resources to serve the projected needs of the County solid waste facilities.

Implementation of the General Plan Public Services Element policies and associated implementation measures, including those listed under **Impact 4.12.6.1,** ensure that the General Plan's cumulative solid waste management related impacts are **less than cumulatively considerable.** This conclusion is applicable to both the potential for impacts that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts related to solid waste facilities and management.

Cumulative Setting – County buildings and spaces

The cumulative setting for County buildings and related land includes all such facilities in the unincorporated areas of Tehama County, as well as County buildings that are, or which may in the future be, located in the cities of Red Bluff or Corning. Potential future development would result in cumulative demand for use of County buildings and land, expansion of existing facilities, and/or development of new facilities.

Cumulative Impacts and Mitigation Measures – County buildings and spaces

Impact 4.12.7.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development, would generate increased cumulative demand for use of County facilities and land. The project's contribution would be **less than cumulatively considerable**.

Potential development proposed in association with the 2008-2028 General Plan would require additional County facilities and personnel to accommodate the demand. The staffing and administrative needs for County facilities will increase as a result of the population and additional facilities associated with implementing the Tehama County General Plan. New County buildings would be developed in response to population growth and as funding allows. New County buildings may require land use permits in some case, depending on the anticipated uses and character or adjacent developments.

Implementation of the General Plan Public Services Element policies and associated implementation measures PS-1.1, PS-1.1a, PS-1.1d, PS-2.2, PS-2.2c would ensure that the General Plan's cumulative impacts related to county buildings and land are **less than cumulatively considerable**. This conclusion is applicable to both the potential for impacts that may be caused by cumulative conditions and the project's incremental contribution to cumulative impacts related to County buildings and space.

Mitigation Measures

None required.

TRANSPORTATION AND CIRCULATION

Cumulative Setting

The setting for this cumulative analysis includes existing, proposed, planned and approved projects in the Tehama County General Planning Area. The cumulative setting also assumes anticipated and planned development within the cities of Corning, Red Bluff, Tehama, and Anderson as well as growth projected by general plans, community plans and specific plans for Butte and Shasta counties and the City of Redding. Development in this region (further identified in Section 4.0) would change the intensity of land uses in the region and increase housing, employment, shopping and recreational opportunities. This analysis also accounts for regional traffic volume conditions anticipated for year 2030 for I-5, SR 99, SR 32, and SR 36.

Cumulative Impacts and Mitigation Measures – Local Roadways and State Highways

Impact 4.13.7 When considered with existing, proposed, planned and approved development in the region, implementation of the Tehama County 2008-2028 General Plan would contribute to cumulative traffic volumes in the region that result in significant impacts to level of service and operations. This is considered a **cumulatively considerable** impact.

The traffic impact analyses provided in **Impact 4.13.1** is based on cumulative conditions (Year 2030) that take into account anticipated traffic volumes from development in the region. While the densities provided by the proposed 2008-2028 General Plan land uses would provide for alternative modes of transportation and promote the use of public transportation, the implementation of 2008-2028 General Plan would still result in a substantial increase in traffic volumes on local roadways. As a result of cumulative growth, the County expects that local and state highway facilities would experience a significant increase in traffic within the Planning Area, as well as in adjoining jurisdictions. Improvements to regional transportation facilities associated with cumulative traffic conditions are intended to be addressed through implementation of the RTP and participation by the County in future improvement projects such as the pending FIX FIVE effort.

Mitigation Measures

Implementation of proposed 2008-2028 General Plan policies and implementation measures listed under **Impact 4.13.1** would assist in reducing the County's cumulative contribution to regional traffic effects. However, since the use of public transit, carpooling, bicycles and other alternative means of transportation, are largely personal choices, the County cannot assure that the systems will result in fewer vehicle miles traveled. By concentrating growth along the I-5 corridor and encouraging higher density within the growth areas, the General Plan encourages development that would provide services in proximity to new homes, and allow a density that would increase the potential for residents to use alternative transportation. However, because the County cannot assure that new residents will use alternative transportation, or shop locally, traffic on local and regional roadways will increase as a result of new growth. This impact would be considered **cumulatively considerable** and a **significant and unavoidable** impact for the reasons listed in **Impact 4.13.1.** The County will continue to work with local, state and federal agencies in the pursuit of transportation system improvement funds, however the County cannot ensure that these improvements would be completed and therefore must assume that they

cannot and that the implementation of the 2008-2028 General Plan would result in **significant and unavoidable** impacts.

Cumulative Impacts and Mitigation Measures – Transit System

Impact 4.13.8 Implementation of the 2008-2028 General Plan would contribute to the cumulative demand for public transit service (e.g., bus and light rail service). The 2008-2028 General Plan's contribution is considered **less than cumulatively considerable**.

Implementation of the 2008-2028 General Plan would increase demand for transit services in the Planning Area as well as demands for such services in the region. However, the 2008-2028 General Plan accommodates a mix of residential densities, commercial uses, and pedestrian and bicycle facilities to promote options for movement beyond the use of motor vehicles and includes requires for the enhancement of the transit services in the County (i.e. provision of bus stops, park and ride lots, transit funding, etc.). No conflicts with current transit provisions or plans are expected as a result of implementation of the 2008-2028 General Plan. Thus, implementation of the proposed General Plan would accommodate its increase in transit demand, both in the context of impacts caused by cumulative conditions and the project's incremental effects, and would have a **less than cumulatively considerable** contribution to public transit impacts.

Mitigation Measures

None required.

Cumulative Impacts and Mitigation Measures – Bicycle and Pedestrian System

Impact 4.13.9 Implementation of the 2008-2028 General Plan would contribute to cumulative demands for pedestrian and bicycle infrastructure. The General Plan's contribution is considered **less than cumulatively considerable**.

Implementation of the 2008-2028 General Plan would increase pedestrian and bicycle use in the Planning Area in addition to anticipated growth in pedestrian and bicycle usage in the region. However, the 2008-2028 General Plan accommodates a mix of residential densities, commercial uses, and pedestrian and bicycle facilities to promote options for movement other than the use of motor vehicles. Additionally, the 2008-2028 General Plan provides for the enhancement of existing and future bicycle and pedestrian facilities thus providing new facilities to accommodate its contribution to increased demand (see **Impact 4.13.6**).

The County has in place the Tehama County Bikeways Plan to aid in the identification and implementation of these facilities. Thus, implementation of the 2008-2028 General Plan would accommodate its increase in demand for pedestrian and bicycle infrastructure, both in the context of impacts caused by cumulative conditions and the project's incremental effects, and would have a **less than cumulatively considerable** contribution to pedestrian and bicycle infrastructure.

Mitigation Measures

None required.

UTILITIES AND SERVICE SYSTEMS

Cumulative Setting – Water Service

The cumulative setting for water supply includes all of the unincorporated areas of Tehama County. Potential future development of these areas would also result in cumulative demand for water resources and associated facilities.

Cumulative Impacts and Mitigation Measures – Water Service

Impact 4.14.1.2 Implementation of the 2008-2028 General Plan in combination with other reasonably foreseeable development would increase the population within the County contributing to the cumulative demand for water resources and associated facilities. As a result additional water supply resources would be required. This is considered a **cumulatively considerable** impact.

Buildout of the 2008-2028 General Plan could increase the population of the County by 416,967 residents. The California Water Plan estimates that internal per capita use of water is approximately 80 gallons per person per day which, at full buildout, would increase the water need by 33,357,360 gallons per day for internal (non-irrigation) use. Irrigation needs could increase the water demand by another 40 gallons per person per day or more[1]. This could result in another 16,678,680 gallons per day for a rough total of over 50 million gallons per day. This equates to approximately 154 ac/ft per day, or approximately 56,210 ac/ft per year. Since some or all of the additional buildout development will occur on irrigated farm land, some of the water demand might be off-set by the conversion of irrigated farm land to developed land. However, potable water wells are often deeper than agricultural wells to assure a higher quality of water. If the land develops to very low density, there is a potential for housing to occur with a continued need to irrigate. This would result in no off-set of water usage.

As discussed in Section 3.0 Project Description, full buildout of the 2008-2028 General Plan is a mathematical calculation and very unlikely to occur within the 2028 planning horizon. The California Department of Finance estimates that the 2028 population of Tehama County will be 91,677. Using the above figures, the County will need to provide water for the additional 50,760 residents. Again using the above, this equates to approximately 12 ac/ft per day or 4,549 ac/ft per year for internal use. Irrigation use could add 2,274 ac/ft per year or more for a total of 6,823 ac/ft per year at the 91,677 population buildout.

Generally, the larger the parcel size, the more water that is used for irrigation, and in Tehama County, development within the unincorporated area often involves use of a groundwater well to supply the water. While lot sizes in more urban areas have become smaller, the rural lifestyle in Tehama County is typified by homes on larger, often several acre, parcels of land. These larger parcels often require substantial irrigation that is ornamental, rather than agricultural, purposes.

As noted in the Tehama County Flood Control and Water Conservation District Water Inventory and Analysis, there is sufficient water to meet the needs of the County during normal years. However, during dry or drought years, the County would need to rely more heavily on groundwater, which appears to be adequate, but in some cases lacks the infrastructure needed to convey supply to demand. (TCFCWCD, 2003)

[1] Record and internet search for a per-capita water consumption figure provided a wide range of numbers depending on geographic area, climate, housing type and density. These figures, taken from the California Water Plan were used because they divided the overall 'per capita' figure into internal/external figures.

The 2008-2028 General Plan addresses water needs at several different locations. First is to direct development to areas with existing services. (Policy LU-3.1, Goal PS-4, Policy PS-4-1) Next is the encouragement of infill development within areas that may already have adequate services and establish an inventory of available areas. (Policy LU-1-2 and Implementation Measure LU-1-2a) The 2008-2028 General Plan also allows and encourages increased densities for these infill projects to ensure that maximum advantage is taken of the availability of services. (Policy LU-1.3, Implementation Measure LU-1.3a, LU-3.2a) The General Plan also requires that development demonstrate its ability to provide water service in a timely fashion at project approval. (Implementation Measure PS-3.2a) Finally, the General Plan requires that adequate funding be available, from the development itself, or other identified sources, for all infrastructure prior to approval of the project. (Implementation Measure PS-4.2a)

Implementation of the 2008-2028 General Plan, as well as compliance with current water law, should ensure that new projects not be approved unless a reliable water source is identified, therefore impacts associated with development on water quantity in the County should be less than significant. While the Plan includes numerous goals, policies and implementation measures, these primarily apply to new development. Development within existing general plan designations and zone districts could occur that would be below levels that would trigger local, state and federal laws governing water supplies. These small projects, such as single family homes, small offices or small industrial developments, would typically be exempt from CEQA, and would not trigger the need for water supply analysis. Individually, these types of developments would result in a less than significant impact on water supply, however cumulatively there is the potential for these small projects to have a significant impact on the water supply. Because there is the potential for numerous small development projects to have a cumulative impact on water supply in Tehama County even with implementation of the policies in the 2008-2028 General Plan and implementation of state and federal law, this impact is considered **significant and unavoidable**.

Implementation of Public Services Element policies and implementation measures listed under **Impact 4.14.1.1** would substantially reduce the General Plan's contribution to cumulative impacts on water supply. However, this impact would remain **cumulatively considerable** and is considered a **significant and unavoidable** impact**.**

Cumulative Setting – Wastewater Service

The cumulative setting for wastewater treatment includes all of the unincorporated areas of Tehama County. Potential future development of these areas would also result in cumulative demand for wastewater treatment and associated facilities.

Cumulative Impacts and Mitigation Measures – Wastewater Service

Impact 4.14.2.2 Implementation of the proposed 2008-2028 General Plan, in addition to other reasonably foreseeable development in the Cities of Red Bluff and Corning, would substantially increase in wastewater flows and require additional infrastructure and treatment capacity that would result in a physical effect on the environment. This is considered **cumulatively considerable.**

Potential development constructed as a result of implementation of the General Plan land use designations and other development planned in Tehama County would substantially increase cumulative demands for wastewater services and related facilities. Although the majority of Tehama County utilizes the use of onsite wastewater treatment systems, the contribution of growth under the proposed 2008-2028 General Plan would likely trigger the need for new wastewater conveyance and treatment expansion of the wastewater treatment systems of Rio Alto Water District and Gerber-Las Flores Community Service District. The physical effects of

constructing new trunk systems and treatment facilities will be analyzed by Rio Alto Water District and Gerber-Las Flores Community Service District under separate environmental documents. All new development projects are required to pay connection fees and construct necessary wastewater improvements to ensure adequate financing. Potential environmental effects associated with additional wastewater facility expansion include, but are not limited to, air quality, biological resources, cultural resources (depending on location), hazardous materials, land use, noise, traffic, visual resources, waste management, water and soil resources, and health hazards.

Implementation of the General Plan Land Use Element and Public Services Element policies and associated implementation measures listed under Impact 4.12.2.1 will assist in reducing the General Plan's cumulative wastewater related impacts, however; not to a level that is less than significant. General Plan impacts to wastewater conveyance and treatment are considered to be **cumulatively considerable** and therefore a **significant and unavoidable impact**. This conclusion is applicable to both the potential impacts that could be caused by cumulative conditions and the project's incremental effects.

Cumulative Setting – Electrical, Natural Gas, and Infrastructure

The cumulative setting for electrical, natural gas and cable services encompass the service areas of the each particular service provider (i.e., PG&E, SBC, Comcast, etc.). The cumulative setting for electric service and natural gas also includes Northern California, which is currently experiencing a great amount of growth and a subsequent cumulative demand for these services and related infrastructure.

Cumulative Impacts and Mitigation Measures – Electrical, Natural Gas, and Infrastructure

The cumulative effects associated with energy and communication services are similar to the impacts described in Section 4.14.3.1. Implementation of the General Plan Public Services Element policies and associated implementation measures cited in that section will assist in reducing the General Plan's electrical, natural gas, telephone, and cable related impacts to a level that is less than significant. No specific cumulative impacts associated with these services in the context of potential impacts that could be caused by cumulative conditions or the project's incremental effects were identified.

6.4 CLIMATE CHANGE

CUMULATIVE CLIMATE CHANGE SETTING

Greenhouse Gases and Climate Change

To fully understand global climate change it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases that contribute to this phenomenon. The temperature on Earth is regulated by this "greenhouse effect," which is so named because the Earth's atmosphere acts like a greenhouse, warming the planet in much the same way that an ordinary greenhouse warms the air inside its glass walls. Like glass, the gases in the atmosphere let in light yet prevent heat from escaping.

Greenhouse gases (GHG) are naturally occurring gases such as water vapor, carbon dioxide (CO_2), methane (CH_4) and nitrous oxide (N_2O) that absorb heat radiated from the Earth's surface. Greenhouse gases -- carbon dioxide, methane, nitrous oxide, and others -- are transparent to certain wavelengths of the Sun's radiant energy, allowing them to penetrate deep into the atmosphere or all the way to Earth's surface (NASA, 2007). Clouds, ice caps, and

particles in the air reflect about 30 percent of this radiation, but oceans and land masses absorb the rest (70 percent of the radiation received from the Sun) before releasing it back toward space as infrared radiation. The greenhouse gases and clouds effectively prevent some of the infrared radiation from escaping; they trap the heat near Earth's surface where it warms the lower atmosphere. If this natural barrier of atmospheric gases were not present, the heat would escape into space, and Earth's average global temperatures could be as much as 61 degrees Fahrenheit cooler (NASA, 2007).

In addition to natural sources, human activities are exerting a major and growing influence on climate by changing the composition of the atmosphere and by modifying the land surface. Particularly, the increased consumption of fossil fuels (natural gas, coal, gasoline, etc.) has substantially increased atmospheric levels of greenhouse gases. Measured atmospheric levels of certain greenhouse gases such as carbon dioxide, methane, and nitrous oxide have risen substantially in recent decades (Miller, 2000). This increase in atmospheric levels of greenhouse gases unnaturally enhances the "greenhouse effect" by trapping more infrared radiation as it rebounds from the Earth's surface and thus trapping more heat near the Earth's surface.

According to the U.S. Environmental Protection Agency (EPA), the Earth's average surface temperature has increased by about 1.2º to 1.4º Fahrenheit (ºF) since 1900. The warmest global average temperatures on record have all occurred within the past 15 years, with the warmest two years being 1998 and 2005. Eleven of the last 12 years rank among the hottest years on record (since 1850, when reliable worldwide temperature measurements began) (IPCC, 2007). Most of the warming in recent decades is likely the result of human activities. Other aspects of the climate are also changing such as rainfall patterns, snow and ice cover, and sea level.

Many complex mechanisms interact within Earth's energy budget to establish the global average temperature. For example, a change in ocean temperature would be expected to lead to changes in the circulation of ocean currents, which, in turn would further alter ocean temperatures. There is uncertainty about how some factors could affect global climate change because they have the potential to both enhance and neutralize future climate warming. For instance aerosols, including particulate matter, reflect sunlight back to space. As particulate matter attainment designations are met, and fewer emissions of particulate matter occur, the cooling effect of anthropogenic aerosols would be reduced, and the greenhouse effect would be further enhanced. Similarly, aerosols act as cloud condensation nuclei, aiding in cloud formation and increasing cloud lifetime. Clouds can efficiently reflect solar radiation back to space (see discussion of the cloud effect below). As particulate matter emissions are reduced, the indirect positive effect of aerosols on clouds would be reduced, potentially further amplifying the greenhouse effect.

Another mechanism effecting climate change is cloud cover. As global temperature rises, the ability of the air to hold moisture increases, facilitating cloud formation. If an increase in cloud cover occurs at low or middle altitudes, resulting in clouds with greater liquid water content such as stratus or cumulus clouds, more radiation would be reflected back to space, resulting in a negative feedback mechanism, wherein the side effect of more cloud cover resulting from global warming acts to balance further warming. If clouds form at higher altitudes in the form of cirrus clouds, however, these clouds actually allow more solar radiation to pass through than they reflect, and ultimately they act as a GHG themselves. This results in a positive feedback mechanism in which the side effect of global warming acts to enhance the warming process. This feedback mechanism, known as the "cloud effect" contributes to uncertainties associated with projecting future global climate conditions.

Other mechanisms include permafrost and polar and sea ice. As global temperature continues to rise, CH_4 gas currently trapped in permafrost, would be released into the atmosphere when

areas of permafrost thaw. Thawing of permafrost attributable to global warming would be expected to accelerate and enhance global warming trends. Additionally, as the surface area of polar and sea ice continues to diminish, the Earth's albedo, or reflectivity, is also anticipated to decrease. More incoming solar radiation will likely be absorbed by the Earth rather than being reflected back to space, further enhancing the greenhouse effect. The scientific community is still studying these and other positive and negative feedback mechanisms to better understand their potential effects on global climate change.

IMPACTS OF GLOBAL CLIMATE CHANGE

Global Implications

Recognizing the problem of global climate change, the World Meteorological Organization (WMO) and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC) in 1988. It is open to all members of the United Nations and WMO. The role of the IPCC is to assess on a comprehensive, objective, open and transparent basis the scientific, technical and socio-economic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts and options for adaptation and mitigation. According to climate models, the IPCC projects that the Earth's average surface temperature should rise 1.8 – 6.3 ºF before the year 2100. If the atmospheric concentration of CO_2 doubles from its late 1700's level of 280 parts per million to 560 parts per million, the most likely rise in temperature would be about 3.6 ºF. This may not seem like a significant increase, yet even at the lowest projected increase of 1.8 ºF, the Earth would be warmer than it has been for 10,000 years (Miller, 2000).

. The IPCC Fourth Assessment Report's Working Group I Summary for Policymakers (Report) synthesizes current scientific understanding of global climate change and projects future climate change using the most comprehensive set of well-established global climate models. The Report incorporates findings of the current effects of global climate change. These finding include:

- The intensity of tropical cyclones (hurricanes) in the North Atlantic has increased over the past 30 years, which correlates with increases in tropical sea surface temperatures.
- Droughts have become longer and more intense, and have affected larger areas since the 1970s, especially in the tropics and subtropics.
- Since 1900 the Northern Hemisphere has lost seven percent of the maximum area covered by seasonally frozen ground.
- Mountain glaciers and snow cover have declined worldwide.
- Satellite data since 1978 show that the extent of Arctic sea ice during the summer has shrunk by more than 20 percent.
- Since 1961, the world's oceans have been absorbing more than 80 percent of the heat added to the climate, causing ocean water to expand and contributing to rising sea levels. Between 1993 and 2003 ocean expansion was the largest contributor to sea-level rise.
- Melting glaciers and losses from the Greenland and Antarctic ice sheets have also contributed to recent sea-level rise.

An enhanced greenhouse effect will generate new patterns of microclimate and will have significant impacts on the economy, environment, and transportation infrastructure and operations due to increased temperatures, intensity of storms, sea level rise, and changes in precipitation. Impacts may include flooding of tunnels, coastal highways, runways, and railways; buckling of highways and railroad tracks, submersion of dock facilities, and shift in agriculture to areas that are now cooler. Such prospects will have strategic security as well as transportation implications.

Climate change affects public health and the environment. Increased smog and emissions, respiratory disease, reduction in the State's water supply, extensive coastal damage, and changes in vegetation and crop patterns have been identified as effects of climate change. The impacts of climate change are broad-ranging and interact with other market failures and economic dynamics, giving rise to many complex policy problems. If global greenhouse gas emissions continue rising on their current trajectory, the costs of climate change could eventually total 5 - 20 percent of the annual global gross domestic product (GDP) (Caltrans, page 4). The findings are the latest in a string of reports warning that the rate of carbon dioxide accumulating in the atmosphere is increasing at an alarming pace.

California Implications

Climate change is a global problem, and GHGs are global pollutants, unlike criteria air pollutants and TACs, which are pollutants of regional and local concern. Worldwide, California is the 12th to 16th largest emitter of CO_2, and is responsible for approximately two percent of the world's CO_2 emissions (CEC, 2006a, 2006b). In 2004, California produced 492 million gross metric tons of carbon dioxide-equivalent (CEC, 2006a).

Increased global average temperature increases ocean temperatures and the Pacific Ocean strongly influences the climate within California. If the temperature of the ocean warms, it is anticipated that the winter snow season would be shortened. Snowpack in the Sierra Nevada provides both water supply (runoff) and storage (within the snowpack before melting), which is a major source of supply for the state. According to a California Energy Commission (CEC) report, the snowpack portion of the supply could potentially decline by 70 to 90 percent by the end of the 21st century (CEC, 2006c). This phenomenon could lead to significant challenges securing an adequate water supply for a growing state population.

Further, the increased ocean temperature could result in increased moisture flux into the state; however, since this would most likely come in the form of rain rather than snow in the high elevations, increased precipitation could lead to increased potential and severity of flood events, placing more pressure on California's levee/flood control system. Sea level has risen approximately seven inches during the last century and, according to the CEC report, it is predicted to rise an additional 22-35 inches by 2100, depending on the future GHG emissions levels (CEC 2006c). If this occurs, resultant effects could include increased coastal flooding, saltwater intrusion and disruption of wetlands (CEC, 2006c). As the existing climate throughout California changes over time, mass migration of species, or worse, failure of species to migrate in time to adapt to the changes in climate, could also result.

According to the California Environmental Protection Agency, the climate changes for global warming could affect agriculture, the fishing industry, California's coastline, forests, and ecosystems, increase air pollution, and energy production (CalEPA, 2002).

Agriculture

Potential impacts, such as reduced water supply, more severe droughts, more winter floods, and drier growing seasons will affect California's agriculture. Many farms, especially in the fruit and

nut business require long-term investments making fast adaptation difficult, and could thus experience serious losses if decisions continue to be made with no regard to expected climate changes.

Fishing

Studies found that as a result of changes in ocean conditions, the distribution and abundance of major fish stocks will change substantially. Impacts to fisheries related to El Niño/ Southern Oscillation illustrate how climate directly impacts marine fisheries on short term scales. Higher sea surface temperatures during the 1997-1998 El Niño had a great impact on market squid, California's largest fishery by volume. The California Regional Assessment reports that landings fell to less than 1,000 metric tons in that season, down from 110,000 tons in the 1996-1997 season. Other unusual events also occurred such as poor salmon returns, a series of plankton blooms, and seabird die-offs.

Coastline

With climate change, recreational facilities and developed coastlines will also be more vulnerable to hurricanes, storm surges, and increased flooding. Increasing population growth in coastal areas is a reason for further concern since these areas could be more vulnerable to climate change impacts. Impacts of expected sea level rise and increased storm surges are numerous. Beachfront homes and harbors, as well as wetlands, may flood. Sewage systems may be overwhelmed by storm runoff and high tides. Coastal airports are vulnerable to flooding (e.g., San Francisco, Oakland and Santa Barbara). Jetties and seawalls may have to be raised and strengthened to protect harbors which are used for shipping, recreation, and tourism.

Forests

The California Regional Assessment notes that the increase in number and extent of wildfires in recent years, coupled with the results of climate change modeling, suggest future fires may be hotter, move faster, and be more difficult to contain under future climate conditions. The factors which contribute to the risk of catastrophic fires, including fuel loads, high temperatures, dry conditions, and wind, are typically already present in summer and fall seasons in California, but may also be present at other times of the year, especially during drought conditions. Public safety concerns increase as more residential developments and tourist-based industries locate in areas that are susceptible to catastrophic wildfires, such as the Coast Range and the foothills and higher elevations in the Sierra Nevada.

Ecosystems

The current distribution, abundance, and vitality of species and habitats are strongly dependent on climatic (and microclimatic) conditions. Climate change is expected to result in warmer temperatures year-round, accompanied by substantially wetter winters. Rising sea level will significantly affect coastal wetlands because they are mostly within a few feet of sea level. As the sea rises, these wetlands will move inland. The overall acreage of wetlands will be reduced due to constraints by existing urban development and steeper slopes immediately inland of existing wetlands. Tidal rivers, estuaries, and relatively flat shoreline habitats will be more subject to damage by flooding and erosion. More severe storm surges from the ocean, due to higher sea levels, combined with higher river runoff could significantly increase flood levels by more than the rise in sea level alone. Erosion of beaches would decrease habitat for beach-dependent species, such as seals, shorebirds, and endangered species (for example, snowy plover and least tern). Aquatic habitats are also likely to be significantly affected by climatic changes. Most fish have limits to how hot or cold the water can be before they must either find

more hospitable temperatures or die. As temperatures warm, many fish will have to retreat to cooler waters.

Changes in temperature and precipitation patterns would also shift California's current climate zones, and thus habitats associated with these zones, northward by approximately 100 - 400 miles, as well as upwards in elevation by 500-1500 feet. Global climate change would alter the composition, structure and arrangement of the vegetation cover of the state (forest and wildland). Species distribution would move geographically as the climate changes, with forest stands, woodlands and grassland species predicted to move northward and higher in elevation. The entire vegetative community may be affected if non-native invasive species occupy sites and replace native plants. Outbreaks of insects and diseases could compromise forest health and the capability of the forest stands to reproduce and store carbon on a landscape basis. Forest fires are likely to become more frequent and severe if soils become drier. Changes in pest populations could further increase the stress on forests.

Air Quality

Projected climate changes will impact the quality of California's air, public health, and environment. Higher temperatures increase the formation of ground level ozone and particulate matter, making it more difficult to meet the health-based air quality standards for these pollutants. Ground-level ozone has been shown to aggravate existing respiratory illnesses such as asthma, reduce lung function, and induce respiratory inflammation. Ambient ozone also reduces agricultural crop yields and impairs ecosystem health.

The particulate matter of most concern – PM_{10} – has a diameter smaller than 10 micrometers and can easily pass into the lung, contributing to the development of lung tissue damage. PM_{10} has been implicated in exacerbation of cardiovascular disease, asthma, and other respiratory diseases, and is associated with increased mortality. Air pollution is also made worse by increases in natural hydrocarbon emissions and evaporative emissions of fuels and solvents which lead to higher levels of ozone and PM_{10} during hot weather. Warmer temperatures that cause increased use of air conditioners can cause increased air pollutants from power plants and from vehicle operation. In addition, warming, drying, and increased winds could mean hotter, harder-to-control wildfires. These wildfires could result in increased levels of fine particulate matter that could also exceed State and Federal standards and harm public health.

Electricity Generation

California's electricity generation is currently relatively efficient when it comes to emissions of greenhouse gases. The national average for the electricity generation share of total greenhouse gas emissions is approximately 40 percent, while California electricity accounts for only 16 percent of statewide emissions. This is in part due to California's significant amount of imported electricity, mild climate, and lack of energy-intensive industry. Over the past two decades, California has developed one of the largest and most diverse renewable electricity generation industries in the world. However, changes in climate of the magnitude predicted by the Intergovernmental Panel of Climate Change would substantially affect electricity generation throughout California and the entire Western States grid, particularly for hydroelectric facilities.

Less snowpack would result in lower levels of hydro generation in the summer and fall seasons due to reduced runoff in those seasons. Additional hydropower may be available during the winter and the spring. However, on balance hydropower is more useful and valuable within the grid mix of generation sources when it is available throughout the peak summer and fall seasons. The Natural gas distribution system may also be damaged because of landslides and fires. Flooding could also impact pipelines, wells and related petroleum extraction equipment.

Warmer weather would result in an increased demand for electricity for cooling appliances in homes and businesses.

6.5 REGULATORY FRAMEWORK

STATE

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 required that the California Air Resources Board develop and adopt, by January 1, 2005, regulations that achieve "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty truck and other vehicles determined by the ARB to be vehicles whose primary use is noncommercial personal transportation in the state."

Executive Order S-3-05

Executive Order S-3-05, which was signed by Governor Schwarzenegger in 2005, proclaims that California is vulnerable to the impacts of climate change. It declares that increased temperatures could reduce the Sierra's snowpack, further exacerbate California's air quality problems, and potentially cause a rise in sea levels. To combat those concerns, the Executive Order established total greenhouse gas emission targets. Specifically, emissions are to be reduced to the 2000 level by 2010, the 1990 level by 2020, and to 80 percent below the 1990 level by 2050.

The Executive Order directed the Secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce greenhouse gas emissions to the target levels. The Secretary will also submit biannual reports to the governor and state legislature describing: (1) progress made toward reaching the emission targets; (2) impacts of global warming on California's resources; and (3) mitigation and adaptation plans to combat these impacts. To comply with the Executive Order, the Secretary of the CalEPA created a Climate Act Team (CAT) made up of members from various state agencies and commission. CAT released its first report in March 2006. The report proposed to achieve the targets by building on voluntary actions of California businesses, local government and community actions, as well as through state incentive and regulatory programs.

Assembly Bill 32, the California Climate Solutions Act of 2006

In September 2006, Governor Arnold Schwarzenegger signed AB 32, the California Climate Solutions Act of 2006. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. This reduction will be accomplished through an enforceable statewide cap on GHG emissions that will be phased in starting in 2012. To effectively implement the cap, AB 32 directs ARB to develop and implement regulations to reduce statewide GHG emissions from stationary sources. AB 32 specifies that regulations adopted in response to AB 1493 should be used to address GHG emissions from motor vehicles. However, AB 32 also includes language stating that if the AB 1493 regulations cannot be implemented, then ARB should develop new regulations to control vehicle GHG emissions under the authorization of AB 32.

AB 32 requires that ARB adopt a quantified cap on GHG emissions representing 1990 emissions levels and disclose how it arrives at the cap; institute a schedule to meet the emissions cap; and develop tracking, reporting, and enforcement mechanisms to ensure that the state achieves reductions in GHG emissions necessary to meet the cap. AB 32 also includes guidance to institute emissions reductions in an economically efficient manner and conditions to ensure that businesses and consumers are not unfairly affected by the reductions.

Senate Bill 1368

SB 1368 is the companion bill of AB 32 and was signed by Governor Schwarzenegger in September 2006. SB 1368 requires the California Public Utilities Commission (PUC) to establish a greenhouse gas emission performance standard for baseload generation from investor owned utilities by February 1, 2007. The California Energy Commission (CEC) must establish a similar standard for local publicly owned utilities by June 30, 2007. These standards cannot exceed the greenhouse gas emission rate from a baseload combined-cycle natural gas fired plant. The legislation further requires that all electricity provided to California, including imported electricity, must be generated from plants that meet the standards set by the PUC and CEC.

LOCAL

Tehama County General Plan

The adopted Tehama County General Plan currently is used as the "blueprint" to guide future development within the County Planning Area. The existing General Plan has no policies applicable to global warming and climate change issues. The 2008-2028 General Plan would establish policies and implementing actions associated with air quality, land use, and energy efficiency which would reduce the production of GHGs. Specific proposed policies and implementing actions are discussed in the impact analyses below.

6.6 CUMULATIVE IMPACTS AND MITIGATION MEASURES

STANDARDS OF SIGNIFICANCE

While AB 32 requires ARB to develop thresholds of significance for GHGs by 2008, no air district in California, including the Tehama County Air Pollution Control District, has identified a significance threshold for GHG emissions or a methodology for analyzing air quality impacts related to greenhouse gas emissions at this time. The state has identified 1990 emission levels as a goal through adoption of AB 32. To meet this goal, California would need to generate lower levels of GHG emissions than current levels. However, no standards have yet been adopted quantifying 1990 emission targets. It is recognized that for most projects there is no simple metric available to determine if a single project would help or hinder meeting the AB 32 emission goals. In addition, at this time AB 32 only applies to stationary source emissions. Consumption of fossil fuels in the transportation sector accounted for over 40 percent of the total GHG emissions in California in 2004. Current standards for reducing vehicle emissions considered under AB 1493 call for "the maximum feasible reduction of greenhouse gases emitted by passenger vehicles and light-duty trucks and other vehicles," and do not provide a quantified target for GHG emissions reductions for vehicles.

Emitting CO_2 into the atmosphere is not itself an adverse environmental affect. It is the cumulative increased concentration of CO_2 in the atmosphere resulting in global climate change and the associated consequences of climate change that results in adverse environmental affects (e.g., sea level rise, loss of snowpack, severe weather events). Although it is possible to generally estimate a project's incremental contribution of CO_2 into the atmosphere, it is typically not possible to determine whether or how an individual project's relatively small incremental contribution might translate into physical effects on the environment. Given the complex interactions between various global and regional-scale physical, chemical, atmospheric, terrestrial, and aquatic systems that result in the physical expressions of global climate change, it is impossible to discern whether the presence or absence of CO_2 emitted by the project would result in any altered conditions.

Given the challenges associated with determining project specific significance criteria for GHG emissions when the issue must be viewed on a global scale, quantitative significance criteria are not proposed for the Tehama 2008-2028 General Plan. For the purpose of this analysis, the project's incremental contribution to global climate change would be considered significant if due to the size or nature of the project it would generate a substantial increase in GHG emissions relative to existing conditions.

METHODOLOGY

GHG emissions associated with the Tehama 2008-2028 General Plan were estimated using CO_2 emissions as a proxy for all GHG emissions. This is consistent with the current reporting protocol of the California Climate Action Registry (CCAR). Calculations of GHG emissions typically focus on CO_2 because it is the most commonly produced GHG in terms of both number of sources and volume generated, and because it is among the easiest GHGs to measure. However, it is important to note that other GHGs have a higher global warming potential than CO_2. For example, one pound of methane has an equivalent global warming potential of 21 pounds of CO_2 (California Climate Action Registry 2006).

While there are various methods for determining the potential GHG emissions of a specific project, there is not an approved ARB method at this time. For the Tehama County General Plan project, two different methods were used to ascertain the potential CO_2 emissions at project buildout, both of which are based upon the emission source (i.e., buildings and vehicles). Discussed below are the estimated CO_2 emissions for residential buildings, non-residential buildings, residential vehicles and non-residential vehicles. The methodology used to determine the CO_2 emissions associated with each of these categories is discussed more completely within the analysis below.

CUMULATIVE IMPACTS AND MITIGATION MEASURES FOR THE 2008-2028 GENERAL PLAN

Cumulative Increase in GHG Emissions

Impact 6.0.1 Buildout of the 2008-2028 General Plan would result in the cumulative increase of greenhouse gases, including CO_2, emitted into the atmosphere. This is considered a **significant** impact and the proposed project would have a **cumulatively considerable** contribution.

The amount of GHGs emissions produced from residential and commercial buildings are related to the amount of energy that is used to operate the buildings, such as electricity, natural gas and fuel oil.

GHG emissions from the industrial sector are produced from many industrial activities. For example, CO_2 is produced from fossil fuels, with the major contributions from oil and natural gas extraction; crude oil refining; food processing; stone, clay, glass, and cement manufacturing; chemical manufacturing; and cement production. Other industrial activities produce methane emissions, with the major contributions from petroleum and natural gas supply systems and wastewater treatment. Still other industrial activities produce nitrous oxide emissions with the major contributions from nitric acid production and municipal wastewater treatment.

Table 6.0-3 illustrates the estimated unmitigated CO_2 emissions under the 2008-2028 General Plan planning horizon. Increases in CO_2 emissions were calculated using the Urbemis 2007 (v9.2.4) computer program. The Urbemis 2007 emission report is included as **Appendix 4.3-2**. This program estimates criteria pollutants from area and mobile emission sources associated with development projects, based on the specific types of land uses proposed for development. Based on the worst-case scenario population and housing growth projections, planning horizon

CO_2 emissions are estimated to be 114,117.85 tons of CO_2 per year. However, these projections are estimates only and are not based on actual development in the County over the next 20 years as it is not possible to determine what development may occur at this time.

TABLE 6.0-3
ESTIMATED UNMITIGATED GENERAL PLAN CO_2 EMISSIONS

INPUT ASSUMPTIONS						
PLANNING OR FOCUS AREA (MODEL RUN)[1]	RESIDENTIAL		COMMERCIAL		INDUSTRIAL	
	# UNITS	TRIP GEN RATE[2]	ACRES	TRIP GEN RATE[3]	ACRES	TRIP GEN RATE[4]
2008-2028 General Plan Lifespan[5]						
Single Family Residential	27,668	11.52	439.0	41.29	520.0	4.96
Apartment Low Rise	574	6.90				

TOTAL PROJECTED ANNUAL CO_2 EMISSIONS		
EMISSION SOURCE	TONS PER YEAR	POUNDS PER DAY
	CO_2	CO_2
2008-2028 General Plan Lifespan		
Area Source Emissions (Tons/Yr)	114,177.85	625,632.04
Operational (vehicle) Emissions (Tons/Yr)	431,505.18	2,364,411.8
Total Emissions (Tons/Yr)	**545,683.03**	**2,990,043.8**

Notes: 1) TCAPCD does not provide EMFAC statistics for use with the Urbemis 2007 air emissions program.. Therefore emissions were calculated based on default assumptions provided in the model for California. Model default assumptions for pass-by and double-counting adjustments were included. Actual emissions will vary depending on how development occurs, the specific types of land uses developed, and emission control measures implemented.
2) Single family residential includes Suburban, Rural Small Lot and Rural Large Lot land use designations. Apartment Low rise includes the Urban land use designation.
3) Trip Generation Rate is based on the median for all commercial and retail categories identified in the Urbemis 2007 ver 9.2.4 model.
4) Trip Generation Rate is based on the median for all industrial categories identified in the Urbemis 2007 ver 9.2.4 model.
5) Acreages for Commercial and Industrial were determined using the ratio of Lifespan to Buildout Housing Units (28,215/184,499 = 0.1529) projected over Buildout commercial and industrial acreages.

The analysis methodology used for the emissions estimate assumes that all emissions sources are new sources and that emissions from these sources are 100 percent additive to existing conditions. This is a standard approach taken for air quality analyses. In many cases, such an assumption is appropriate because it is impossible to determine whether emissions sources associated with a project move from outside the air basin and are in effect new emission sources, or whether they are sources that were already in the air basin and just shifted to a new location. However, because the effects of GHGs are global, a project that merely shifts the location of a GHG-emitting activity (e.g., where people live, where vehicles drive, or where companies conduct business) would result in no net change in global GHG emission levels.

For example, if a substantial portion of California's population migrated from the South Coast Air Basin to the Sacramento Valley Air Basin, this would likely result in decreased emissions in the South Coast Air Basin and increased emissions in the Sacramento Valley Air Basin, but little change in overall global GHG emissions. However, if a person moves from one location where the land use pattern requires substantial vehicle use for day-to-day activities (commuting, shopping, etc.) to a new development that promotes shorter and fewer vehicle trips, more walking, and overall less energy usage, then it could be argued that the new development would result in a potential net reduction in global GHG emissions.

It is impossible to know at this time whether residents in Tehama County will have longer or shorter commutes relative to their existing homes; whether they will walk, bike, and use public transportation more or less than under existing circumstances; and whether their overall driving habits will result in higher or lower VMT. Much of the vehicle generated CO_2 emissions attributed to the 2008-2028 General Plan could simply be from vehicles currently emitting CO_2 at an existing location moving to another site in the county, and not from new vehicle emissions sources relative to global climate change. Additionally, buildout of the General Plan is not anticipated to occur for many years, if ever. Future changes in building energy efficiency standards as well as higher production of non-CO_2 emitting energy sources (i.e., wind and solar power) would decrease the amount of CO_2 emissions from buildings beyond than those emissions calculated today. As a result, although it is possible to calculate the estimated contribution of building- and vehicle-generated CO_2 emissions associated with buildout of the 2008-2028 General Plan, the actual CO_2 contribution during the life of the General Plan would likely be much less than the 0.545 million metric tons of CO_2 per year calculated above.

Proposed General Plan Policies and Implementation Programs that Mitigate Potential Impacts

The following proposed General Plan policies and action items provide some mitigation of greenhouse gas emission impacts:

Open Space: OS-2.1, OS-2.1a, OS-2.1b, OS-2.1c, OS-2.1d, OS-2.1e, OS-2.3, OS-2.3a, OS-2.4, OS-2.4a, OS-2.5a, OS-2.6, OS-2.6a, OS-2.6b, OS-2.6c, OS-2.6d, OS-2.6e, OS-2.6f, OS-2.6g, OS-2.6h, OS-2.6i, OS-2.6j, OS-2.6k, OS-2.6l.

Land Use: LU-8.1

General Plan Policy OS-2.1 would require that all new development projects in the County incorporate appropriate measures to reduce impacts to air quality. Implementation Measure OS-2.1a would require that all project proponents coordinate with the Tehama County Air Pollution Control District (TCAPCD) on appropriate methodologies for evaluating project emissions and air quality impacts (e.g., emissions modeling software, TCAPCD's thresholds of significance, etc.). Implementation Measure OS-2.1b would require that all new development projects that exceed TCAPCD's thresholds of significance incorporate design, construction, and/or operational features that will result in a reduction in emissions when compared to an "unmitigated baseline" project. Implementation Measure OS-2.1c would require that the County monitor all new development required air quality mitigations, and if mitigations are not being managed properly, take the appropriate steps to correct the situation. Implementation Measure OS-2.1d would require dust-free, all-weather sealed surface roads in all new subdivisions and new commercial developments. Implementation Measure OS-2.1e would require that all new wood burning fireplaces and stoves meet the requirements of TCAPCD Rule 4:27; Fireplace and Solid Fuel Heating Device Usage.

Policy OS-2.3 promotes a compact and efficient land development pattern. Implementation Measure OS-2.3a encourages mixed-use developments that put residences in close proximity to services, employment, transit, schools, and civic facilities/services.

Policy OS-2.4 encourages the use of alternative modes of transportation by incorporating public transit, bicycle, and pedestrian modes into the County planning processes. Implementation Measure OS-2.4a encourages new developments to provide pedestrian and bicycle facilities, trails, and connections.

Implementation Measure OS-2.5a would require that the County coordinate with TCAPCD through the environmental review process to ensure that proposed projects would not significantly affect the region's ability to meet State and Federal air quality standards.

Policy OS-2.6 promotes improved air quality benefits through energy conservation measures for new and existing development. Implementation Measure OS-2.6a would require energy-conserving features in the design and construction of new development. Implementation Measure OS-2.6b encourages the use of cost-effective and innovative emission-reduction technologies in building components and design. Such technologies may include the use of solar equipment, light-emitting diode (LED) and compact florescent lighting, and the use of external electric outlets to allow for the use of non-gasoline powered lawn equipment. Implementation Measures OS-2.6c and OS-2.6d promote the use of building materials and methods that increase efficiency beyond State Title 24 standards and the use of "EPA Energy Star"-certified appliances. Implementation Measure OS-2.6e and OS-2.6f promote the implementation of sustainable design strategies for "cool communities" and the incorporation of energy-conserving design and construction techniques in all facilities. Implementation Measure OS-2.6g supports vehicle improvements and the use of clean vehicles that reduce emissions and improve air quality. Implementation Measure OS-2.6h would require the replacement of the County's fleet vehicles with new vehicles that utilize the lowest emission technology available. Implementation Measure OS-2.6i would allow for preferential treatment of contractors using reduced emission equipment on County construction projects and for County contracts for services (e.g., garbage collection). Implementation Measure OS-2.6j encourages the use of lowest emission technology buses and vehicles in public transit fleets. Implementation Measure OS-2.6k would require that the County consider adoption of an ordinance that limits the amount of time diesel-powered trucks, buses, and other heavy vehicles may idle. Implementation Measure OS-2.6l encourages the replanting of an equal or greater number of trees upon the removal of trees for construction purposes.

Policy LU-8.1 would require lands for moderate- to large-scale industrial and commercial development be located within or near the Urban Center and Town Center community types, within areas for which Specific Plans or Master Plans have been prepared, and/or within areas that contain infrastructure adequate to support the use of the property for a non-residential purpose. The policy would also require the County to consider the location of such land uses where appropriate in order to reduce travel and commute times and, where appropriate, to minimize the need to utilize highways and interstate roadways for service trips.

These policies and implementing actions will assist in the reduction of GHGs. However, due to the lack of an adopted ARB threshold of significance, it is not possible to determine what level of impact implementation of the 2008-2028 General Plan would have on GHG at this time. It is generally understood that climate change will continue to occur due to the increase in greenhouse gasses worldwide. AB 32 requires that statewide GHG emissions be reduced to 1990 levels by the year 2020. This will require an overall reduction GHGs emitted in the State. Buildout of the General Plan Planning Area would most likely, with present technology, increase the County's contribution to GHG emissions beyond the 1990 levels.

The County can and does require energy efficient design in building construction within the County. This requirement and the General Plan policies and implementing actions listed above can effectively reduce GHG emissions from building design. Whether or not these requirements will reduce emissions effectively enough to mitigate the County's contribution to GHGs is unknown. The only entities which have jurisdiction over vehicle emissions in California are the State and Federal governments. Therefore, until such time that there are thresholds of significance with which to compare the County's GHGs contribution, it must be assumed that any increase in GHGs will lead to a change in climate and impacts could result from cumulative conditions as discussed above. As a result, this impact is considered **significant and unavoidable** and the 2008-2028 General Plan would have a **cumulatively considerable** contribution.

Mitigation Measures

MM 6.0.1 The following mitigation measure shall be added as a new policy under General Plan Goal OS-2:

Tehama County shall work with the Tehama County Air Pollution Control District, California Air Resources Board and/or other agencies to prepare a Climate Action Plan. The Climate Action Plan shall include at a minimum:

- An inventory of current (2008) GHG emissions within the Tehama County Air Pollution Control District consistent with methodologies developed by the International Environmental Agency for Local Governments (ICLEI) and California Air Resources Board (ARB).
- An inventory 1990 GHG emission levels within the Tehama County Air Pollution Control District consistent with methodologies developed by ICLEI and ARB.
- Estimated inventory of 2020 GHG emission levels within the Tehama County Air Pollution Control District consistent with methodologies developed by ICLEI and ARB.
- Specific targets for reductions of the current and projected 2020 GHG emissions inventory from those sources reasonably attributable to the County's discretionary land use decisions and the County's internal government operations.
- Specific and general tools and strategies to reduce the current and projected 2020 GHG inventories and to meet the Plan's target's for GHG reductions by 2020.

The County shall seek funding from the State and/or other sources, including development impact fees, in order to fund the Plan.

6.7 REFERENCES

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