

This section contains all of the cumulative impacts associated with the proposed project for each of the environmental issue areas contained in Sections 4.1 through 4.13. The cumulative impact analysis contained in this section considers all projects that are existing, approved, proposed and reasonably foreseeable in the Planning Area, including Colusa Crossings, Colusa Riverbend, and Brookins Ranch.

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 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 significant when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects (CEQA Guidelines Section 15065(a)(3))." As defined by the CEQA Guidelines, "cumulative impacts" refers to two or more effects that, when combined, are considerable or which compound or increase other environmental impacts (CEQA Guidelines Section 15355). 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 (*CEQA Guidelines Section 15355(b)*).

In addition, CEQA Guidelines Section 15130(b) identifies that the following four 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

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its basis for concluding that the incremental effect is not cumulatively considerable. CEQA Guidelines Section 15130(a).

6.2 CUMULATIVE SETTING, IMPACTS AND MITIGATION MEASURES

The City of Colusa has used both the list and summary of projections approaches ((1)(A) and (1)(B) above) to consider cumulative impacts in this Draft MEIR. The general cumulative setting conditions are based on the existing land use plans in the Colusa area and on consideration of currently known large-scale proposed or approved development projects in the Planning Area (see **Table 4.0-1**). A more detailed description of the buildout conditions that would occur with implementation of the General Plan Update, which is consistent with the cumulative setting in many instances, is contained in Section 4.0 (Introduction to the Environmental Analysis and Assumptions Used).

This cumulative analysis also considers projects in adjacent jurisdictions, which would contribute to cumulative impacts. Staff from the City of Williams, Sutter County, and Colusa County provided lists of projects that would be considered approved, proposed or reasonably foreseeable. There are six approved projects and five proposed/reasonably foreseeable projects in the City of Williams that would result in 2,848 single-family residential units. There are two proposed/reasonably foreseeable projects in Sutter County that would result in a mix of residential, commercial, industrial and 540 RV resort accommodations (e.g., RV slips, park model trailers, cottages, a recreation/entertainment center, RV storage area, maintenance and parking). There are six approved residential projects and three proposed/reasonably foreseeable projects that would add 671 residences to Colusa County. There is also a proposed gas-fired electrical power plant and a proposed ethanol plant in Colusa County. These projects are described in **Table 4.0-1**.

The discussion below provides an analysis of cumulative impacts for each issue area. There are several issue areas that would not result in cumulative impacts that would exceed the buildout impacts addressed in the MEIR (Sections 4.1 through 4.13). In these instances, the reader will be informed that the impacts are the same as the buildout impacts and referred to the relevant section of the MEIR. Each cumulative impact is determined to have one of the following levels of significance: **less than cumulatively considerable**, **cumulatively considerable** and **significant and unavoidable**. The specific cumulative impacts for each environmental issue area are also identified and analyzed in the corresponding technical sections of the Draft MEIR (Sections 4.1 through 4.13).

6.2.1 LAND USE AND AGRICULTURAL RESOURCES

CUMULATIVE SETTING

Land Use

Land use impacts are typically isolated to a jurisdiction, except where land uses may interact or conflict with adjacent jurisdictions. The cumulative setting for land use includes existing, approved, proposed and reasonably foreseeable development within the Planning Area and the unincorporated portion of Colusa County in the vicinity of Colusa. There are known development projects in the City of Williams, Sutter County and Colusa County that will contribute to cumulative changes in the landscape and land uses within each planning area.

Agricultural Resources

The cumulative setting for agricultural resources includes existing, approved, proposed and reasonably foreseeable development within the Planning Area and Colusa County. The City and County contain Prime Farmland and Farmland of Local Importance. An issue of concern in California is the conversion of farmland, especially prime farmland, to non-agricultural land uses. The primary concern is the conversion of farmland to urban uses, such as residential development. Once farmland is used for urban development, it is essentially lost as an agricultural resource. Farmland also may be converted for uses such as open space and habitat conservation. Since the Sacramento Valley is more dependent on agriculture than California as a whole, changes in agricultural production and sales would have a greater economic impact. It also means that the conversion of agricultural lands to other uses would have a greater impact on the economy in the Sacramento Valley (including Colusa) than in California overall. Under cumulative conditions agricultural land will continue to be converted to urban uses as the population increases in Colusa County and the Sacramento Valley.

The reader is referred to Section 4.1, Land Use and Agricultural Resources, for a discussion of the buildout setting for land use and agricultural impacts. The reader is referred to Section 4.2, Population and Housing, and subsection 6.2.2 of this section for a setting discussion of population and housing in Colusa and the surrounding region.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Land Use Conflicts

Impact 6.1 Implementation of the proposed General Plan Update, in addition to existing, proposed, approved, and reasonably foreseeable development in Colusa County, would contribute to cumulative land conflicts. This would be a **less than cumulatively considerable** impact.

The reader is referred to Section 4.1, Land Use and Agricultural Resources, for a discussion of conflicts with planning documents and land use incompatibilities that would occur with implementation of the General Plan Update. Under cumulative conditions, the General Plan Update and subsequent development would not contribute to significant impacts associated with land use conflicts beyond those discussed in Impact 4.1.2 and 4.1.3. Conflicts between planning documents, such as the Colusa County Airport Comprehensive Land Use Plan and the General Plan land use map, would be specific to the General Plan Update 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 Williams, Sutter County and Colusa 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 City of Colusa Planning Area. This impact is **less than cumulatively considerable**.

Mitigation Measures

None required.

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Cumulative Loss of Agricultural Land

Impact 6.2 Implementation of the proposed General Plan Update, in addition to existing, proposed, approved, and reasonably foreseeable development in Colusa County, would contribute to the cumulative loss of Prime Farmland and other valuable farmland in Colusa County, the Sacramento Valley and the State. This impact would be **significant** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

As discussed under Impact 4.1.6 in Section 4.1, Land Use and Agricultural Resources,, implementation of the proposed General Plan Update and development of subsequent projects would lead to the loss of Prime Farmland and Farmland of Local Importance. Most of the larger communities in Colusa County are located in the valley region. Development in these communities also would lead to a loss of important farmland. The City of Williams, in its General Plan, proposes development in areas that are currently agricultural. The Colusa County LAFCo is considering an expansion of the Sphere of Influence of the Arbuckle Public Utility District, which would allow the extension of service onto agricultural lands. The County conducted a feasibility study on an industrial park in the community of Maxwell, which is surrounded by agricultural lands. Future development in these and other parts of the valley would occur on agricultural lands, which essentially would be lost once converted to urban uses. The proposed General Plan Update would contribute to a cumulative loss of agricultural land in the County, the Sacramento Valley and the State.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions identified under Impact 4.1.6 in Section 4.1, Land Use and Agricultural Resources.

Additional Mitigation Measures

Implementation of mitigation measure MM 4.1.6, along with the proposed General Plan policies and implementing actions, would help reduce the project's contribution to the cumulative loss of important farmland in the region by taking steps to protect regional farmlands from conversion to non-agricultural uses. However, implementation of the proposed General Plan Update would still contribute to the cumulative loss of Prime Farmland and Farmland of Local Importance that cannot be fully mitigated. Therefore, this impact is considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

6.2.2 POPULATION AND HOUSING

CUMULATIVE SETTING

The cumulative setting for population and housing includes existing, approved, proposed and reasonably foreseeable developments in both the Planning Area and Colusa County. Colusa County has two incorporated areas: Colusa and Williams. It also has several unincorporated communities, which include Maxwell, Princeton, Grimes and Arbuckle among others. There also is the Colusa Casino area, which is occupied by the Cachil Dehe Band of Wintun. The reader is referred to Section 4.2, Population and Housing, for a discussion of the buildout setting for population and housing impacts associated with this General Plan Update and identification of approved, proposed and reasonably foreseeable projects. Additionally, the projects in Colusa County, Sutter County and the City of Williams would contribute to cumulative population and

housing conditions including: six approved projects and five proposed/reasonably foreseeable projects in the City of Williams that would result in 2,848 single-family residential units; two proposed/reasonably foreseeable projects in Sutter County that would result in a mix of residential, commercial, industrial and 540 RV resort accommodations (e.g., RV slips (152), park model trailers (206), cottages (182) and a recreation/entertainment center, RV storage area and maintenance and parking); and six approved residential projects and three proposed/reasonably foreseeable projects that would add 671 residences to Colusa County.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Population and Housing Growth

Impact 6.3 Implementation of the proposed General Plan Update, in addition to existing, proposed, approved, and reasonably foreseeable development in the area, could result in a cumulative increase in population and housing growth in the County and associated environmental impacts. This is a **significant and unavoidable** impact and the proposed General Plan Update would have a **cumulatively considerable** contribution.

As discussed under Impact 4.2.1 in Section 4.2, Population and Housing,, development under the proposed General Plan would lead to a substantial increase in population and housing in the Colusa area. Subsection 6.2 above mentions potential development in the Williams, Maxwell and Arbuckle that may encourage population growth. The projects in the City of Williams, Colusa County and Sutter County listed in **Table 4.0-1** would create new residences and employment opportunities in the areas surrounding the City of Colusa and contribute to the cumulative impacts on population and housing growth in the region. The environmental effects of the approved projects in Williams, Colusa County and Sutter County have already been considered. The respective jurisdictions will evaluate the environmental effects of the proposed and reasonably foreseeable projects on population and housing growth as the projects are processed. Future expansion of the Colusa Casino would increase employment opportunities, which may lead to more residents moving to the County. These projected expansions would lead to an increase in population that would be cumulatively considerable within Colusa County. As the added population would require housing, this would also lead to a cumulatively considerable increase in housing stock, with the associated environmental impacts discussed under Impacts 4.2.1 and 4.2.2 in Section 4.2 (Population and Housing).

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions listed in Section 4.2 (Population and Housing).

Additional Mitigation Measures

The MEIR contains mitigation measures where appropriate to reduce or eliminate potentially significant impacts associated with employment and population growth in the Planning Area. While the General Plan contains policies that would help offset the effects of population growth, there are no measures that would completely mitigate the environmental effects of population growth under cumulative conditions. Even with implementation of General Plan policies and mitigation measures, environmental impacts would remain significant, as population growth will inevitably occur and housing and other services would need to be provided to accommodate this growth. Therefore, impacts related to population growth would be **significant and unavoidable** and the proposed project would have a **cumulatively considerable** contribution.

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6.2.3 TRANSPORTATION AND CIRCULATION

CUMULATIVE SETTING

The cumulative setting for transportation and circulation includes existing, approved, proposed and reasonably foreseeable development in the proposed Planning Area and Colusa County. Because traffic impacts are regional in nature, the cumulative setting also includes increased traffic on SR 20 and SR 45 resulting from development in the City of Williams and in the Yuba City-Marysville metropolitan area to the east. Projects in Sutter County and Colusa County (see **Table 6.0-1**) could also contribute to traffic impacts under cumulative conditions. Additionally, the cumulative setting includes the roadways and transportation improvements outlined in the 2004 Colusa County Regional Transportation Plan (RTP). The 2004 RTP assessed current and future transportation needs in Colusa County and the cities of Colusa and Williams. It included a prioritized list of short-term and long-term projects, and the funding for those projects, including programmed improvements for State Routes 20 and 45 in and near Colusa. The RTP lists projects for new and continued transit service in Colusa and for bicycle transportation improvements, and improvement projects at the Colusa County Airport. The reader is referred to Section 4.3, Transportation and Circulation, for a discussion of the buildout setting for transportation and circulation impacts.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Impacts to State Highways

Impact 6.4 Implementation of the proposed General Plan Update, in addition to existing, proposed, approved, and reasonably foreseeable development in the area, could result in a cumulative increase in interregional traffic on state highways. This is a **significant** impact and the project would have a **cumulatively considerable** contribution.

Most of the potential cumulative impacts to state highways are similar to the impacts associated with buildout of the proposed General Plan Update as described in Section 4.3 (Transportation and Circulation). One potential cumulative impact would be increased traffic on SR 20 and SR 45 resulting from development outside the Planning Area, particularly in Sutter County, Colusa County, the City of Williams, and in the Yuba City-Marysville metropolitan area to the east. This would affect the level of service of the roadways and intersections connecting to the roadways. The projects listed in **Table 4.0-1** have the potential to contribute to regional transportation and circulation impacts. The increase in housing and employment centers in these adjacent jurisdictions would add more interregional traffic to state highways, and contribute to significant environmental impacts. The environmental effects of the approved projects in Williams, Colusa County and Sutter County have already been considered. The respective jurisdictions will evaluate the environmental effects of the proposed and reasonably foreseeable projects on population and housing growth as the projects are processed.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions listed in Section 4.3 (Transportation and Circulation).

Additional Mitigation Measures

Implementation of mitigation measures **MM 4.3.1a, 4.3.2a and 4.3.2b** along with the General Plan policies and implementing actions, would reduce the proposed project's contribution to impacts on the LOS of state highways in the Planning Area. However, the City does not have a feasible mitigation measure to reduce interregional transportation impacts on SR 20 to a level that is less than significant. Also, it would be difficult to provide a four-lane section of SR 20 in the developed areas along the 10th Street corridor from Market Street south to the fairgrounds and on the Bridge Street corridor from Market Street south to Wescott Avenue. LOS on these SR 20 segments would be below the Caltrans LOS threshold of D. Therefore, while some impacts can be mitigated, the cumulative impact on state highways would be **significant and unavoidable** and the project's contribution to this impact is **cumulatively considerable**.

6.2.4 NOISE

CUMULATIVE SETTING

The cumulative noise conditions would be the same as the buildout conditions for both non-transportation noise because the noise impacts would be limited to the Planning Area and the area immediately surrounding the City. All noise-generating land uses and sources will continue to be located within the Planning Area. Under cumulative conditions, increased regional development would result in additional traffic on SR 20 and 45, as discussed above in 6.2.3, Transportation and Circulation. The related traffic noise may result in increased levels over those anticipated solely with implementation of the General Plan Update and also may extend outside of the Planning Area along state highways. Section 4.4, Noise, contains an analysis of noise impacts associated with all existing and proposed noise generators inside of the Planning Area and outside of the Planning Area that would affect noise levels of noise-sensitive land uses.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Increased Traffic Noise

Impact 6.5 Implementation of the General Plan Update, in combination with existing, approved, proposed, and reasonably foreseeable development, would contribute to a cumulative increase in traffic noise on regional roadways. This is considered a **significant** impact and the proposed project would have a **cumulatively considerable** contribution.

Under cumulative conditions, increases in regional travel, particularly along SR 20 and SR 45, would result in increased transportation noise. It is anticipated that noise levels in excess of those shown in **Table 4.4-5** for state highways would occur under cumulative conditions. Sensitive receptors within the proposed Planning Area as well as sensitive receptors, such as residences, outside the Planning Area would be exposed to increased noise levels.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

Refer to discussion under **Impact 4.4.5** in Section 4.4 (Noise) of the MEIR.

Additional Mitigation Measures

While implementation of mitigation measure MM 4.4.5 in addition to the proposed General Plan policies and implementing actions would result in a reduction of traffic noise levels at affected

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sensitive receptor locations within the proposed Planning Area, it would be infeasible to ensure that all sensitive receptors and residential uses would not be exposed to future traffic noise levels in excess of applicable standards. As a result, this impact is considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

6.2.5 AIR QUALITY

CUMULATIVE SETTING

Air Quality

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 PM₁₀. All counties in the NSVAB are in unclassified status for federal PM₁₀ 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 PM₁₀. The reader is referred to Section 4.5 (Air Quality) for a discussion of the buildout setting for air quality impacts. The projects listed in **Table 4.0-1** would contribute to cumulative air quality impacts.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Regional Air Basin Impacts

Impact 6.6 Implementation of the proposed General Plan Update, in combination with existing, approved, proposed and reasonably foreseeable development, would exacerbate existing NSVAB problems with ozone and particulate matter. This is considered a **significant** impact and the proposed project would have a **cumulatively considerable** contribution.

Implementation of the proposed General Plan would result in an increased population and substantial new development, which would adversely affect regional air quality within the NSVAB. The growth in population, vehicle usage and business activity within the NSVAB, when considered with growth proposed under the General Plan, would contribute to cumulative regional air quality impacts.

The projected population growth rates under the proposed General Plan appear to be inconsistent with those utilized in the current regional air plan. The *Northern Sacramento Valley Air Basin 2003 Air Quality Attainment Plan* (NSVAB, 2004) projects emissions within the northern Sacramento Valley based on California Department of Finance projections. The four-fold increase in population by 2030 envisioned under the proposed General Plan is much greater than that anticipated by the air quality attainment plan. This may make the plan's goal of

bringing the NSVAB into compliance with the PM₁₀ and ozone standards more difficult to attain and may contribute to the area's non-conformance with the standards.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions listed in Section 4.5 (Air Quality).

Additional Mitigation Measures

Implement mitigation measures MM 4.5.1 and MM 4.5.2. Implementation of these mitigation measures, along with the proposed General Plan policies and implementing actions, would assist in reducing emissions contributing to adverse air quality in the NSVAB. However, build-out of the City as proposed in the General Plan Update would still contribute high levels of criteria pollutants, specifically ozone precursors and PM₁₀, that could delay attainment of air quality standards in the NSVAB under the air basin's air quality attainment plan. These emissions would result in a cumulatively considerable net increase in ozone precursors and PM₁₀, for which the region is in non-attainment under state air quality standards. . Therefore, the cumulative impact is considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

6.2.6 GEOLOGY, SEISMICITY, SOILS AND HAZARDOUS MATERIALS

The cumulative geology, seismicity soils and hazardous materials conditions would be the same as the buildout conditions for these environmental issue areas. Generally, impacts related to geology, soils and hazardous materials are site-specific and do not extend to a regional level. As such, the cumulative impacts of the General Plan on geology, soils and hazardous materials would not exceed buildout conditions. Impacts associated with buildout of the General Plan on geology, soils and hazardous materials have been analyzed and mitigation measures recommended where appropriate. The reader is referred to Section 4.6 (Geology, Soils and Hazardous Materials).

6.2.7 HYDROLOGY AND WATER QUALITY

CUMULATIVE SETTING

The cumulative setting for hydrology and water quality includes existing, approved, proposed and reasonably foreseeable developments in the Planning Area. Additionally, because the Planning Area is within the Sacramento-Stone Corral Watershed and draws water from the Colusa Subbasin, these are also part of the cumulative setting for hydrology and water quality. The Sacramento-Stone Corral Watershed contains parts of five counties and encompasses approximately 1,879 square miles. Approximate boundaries of this watershed are Stony Creek in the north, Cache Creek in the south, the Sacramento River in the east, and the Coast Range foothills in the west. The Planning Area is within the Colusa Subbasin of the Sacramento Valley Groundwater Basin. Therefore, the cumulative water supply analysis focuses on the Sacramento-Stone Corral Watershed for surface water issues and the Colusa Subbasin for groundwater issues. Cumulative development throughout the Watershed and Subbasin within would contribute to water quality impacts. As the proposed General Plan Update would result in a reduction in the amount of groundwater used, it would not have a cumulative effect on groundwater supply. The reader is referred to Section 4.7 (Hydrology and Water Quality) for a discussion of the buildout setting for hydrology and water quality impacts.

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CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Water Quality Impacts

Impact 6.7 Implementation of the proposed General Plan Update, in addition to existing, approved, proposed and reasonably foreseeable development in the Sacramento-Stone Corral Watershed and the Colusa Subbasin, could contribute to cumulative effects on water quality of surface waters and groundwater. This is considered a **less than cumulatively considerable** impact.

As described previously, the proposed General Plan Update anticipates development of an additional 2,632 acres within the proposed Planning Area. This includes areas for which development projects have been proposed (see Sections 5.1 through 5.3). Development within the Planning Area, along with anticipated development within the Sacramento-Stone Corral Watershed and the Colusa Subbasin area would result in cumulative water quality impacts, which include impacts on surface water and groundwater quality. The discussion under Impacts 4.7.1, 4.7.2 and 4.7.3 in Section 4.7 (Hydrology and Water Quality) describes potential impacts on water quality. Development elsewhere in the Watershed and Subbasin would have similar effects and would result in an increase in the overall impact under cumulative conditions. In particular, there could be a cumulatively adverse impact on water quality in the Sacramento River, which is already classified as an impaired stream under the Section 303(d) program.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions identified under Impacts 4.7.1, 4.7.2 and 4.7.3.

Additional Mitigation Measures

Implement MM 4.6.1a, MM 4.6.1b in Section 4.6, Geology, Soils and Hazardous Materials,, MM 4.7.3a and MM 4.7.3b in Section 4.7, Hydrology and Water Quality,. Implementation of these mitigation measures, along with compliance with the General Plan policies and implementing actions described in this section, would reduce the City's contributions to cumulative water quality impacts **less than cumulatively considerable**.

Cumulative Flood Hazards

Impact 6.8 Implementation of the proposed General Plan Update, along with existing, approved, proposed and reasonably foreseeable development within the Sacramento-Stone Corral Watershed, would increase impervious surfaces and alter drainage conditions and rates in the Planning Area, which could contribute to cumulative flood conditions in the Sacramento River and area creeks. This is considered a **less than cumulatively considerable** impact.

The majority of the Planning Area is located outside of the 100-year floodplain, as designated by FEMA maps. However, the western portion of the Planning Area, which is proposed for development, is within a 100-year floodplain. This development would also increase impervious surfaces and alter drainage conditions and rates. In addition, future development within the Sacramento-Stone Corral Watershed, such as development in the vicinity of Stony Creek in the north, Cache Creek in the south, the Sacramento River in the east, and the Coast Range foothills in the west, would also increase impacts to drainage and impervious surface coverage. While

there would be an increase in impervious surfaces within the Sacramento-Stone Corral Watershed, it would remain predominantly rural. Therefore, the amount of runoff generated by the new development within the watershed would not significantly increase, and potential flood hazards in the watershed would not noticeably increase. The Colusa Crossing project would provide berm/levee improvements to reduce flooding impacts. It is anticipated that these improvements would benefit areas adjacent to those projects as well and decrease flooding potential of those areas.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions listed under Impact 4.7.4.

Additional Mitigation Measures

Implement mitigation measures MM 4.7.4a and MM 4.7.4b. Implementation of these mitigation measures, along with the proposed General Plan policies and implementing actions identified in this MEIR, would reduce the potential flooding problems associated with implementation of the General Plan Update and subsequent development within the proposed Planning Area. This would reduce the City's cumulative contribution to flooding problems in the watershed to **less than cumulatively considerable**.

6.2.8 BIOLOGICAL RESOURCES

CUMULATIVE SETTING

The cumulative setting for biological resources includes existing, approved, proposed and reasonably foreseeable development in the Planning Area, Colusa County, and areas along the Sacramento River basin to the south of the Planning Area. The cumulative setting for biological resources is extensive due to the fact that these resources occur in the Planning Area, Colusa County, and in a broader regional context. The viability of species populations, as well as quality and functions of habitat, is dependent on the conditions of these resources in a regional and often statewide context. Thus, the cumulative setting takes into account impacts that are locally related to the General Plan (e.g., vernal pool and associated biological resources in the Planning Area) as well as biological resource impacts for the larger region (e.g., oak tree loss and Swainson's hawk impacts). The reader is referred to Section 4.8, Biological Resources, for a discussion of the buildout setting for biological resources impacts.

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Cumulative Biological Resource Impacts

Impact 6.9 Implementation of the proposed General Plan Update, in addition to existing, approved, proposed and reasonably foreseeable development in the Planning Area and larger regional context would result in a cumulative loss of biological resources in the region. This is considered a **significant** impact and the proposed project would have a **cumulatively considerable** contribution.

As identified under Impacts 4.8.1 through 4.8.7 in Section 4.8, Biological Resources, development accommodated by the General Plan Update would result in direct and indirect impacts to listed and non-listed special status species, as well as impacts to jurisdictional waters of the U.S., streams and drainages and non-special status species, trees, habitat, and movement corridors. Additional indirect impacts to the Sacramento River basin to the south of the Planning Area

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could occur. The contribution to these impacts by the General Plan Update combined with cumulative development levels would be cumulatively considerable as many special status species rely on specific cover types found in the proposed Planning Area for movement and forage, while not necessarily using cover types in the Planning Area on a permanent basis. Migrating birds fall within this category, as well as Swainson's hawk and other raptors that have been known to use the southern portions of the Planning Area as foraging habitat while nesting and breeding in areas south of the Planning Area such as within the City of Colusa and along the Sacramento River.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts.

The reader is referred to policies and implementing actions identified in Impacts 4.8.1 through 4.8.7.

Additional Mitigation Measures

Implementation of General Plan policies and implementing actions would reduce the General Plan's contribution to cumulative biological impacts in the region. However, the General Plan's contribution would remain cumulatively considerable, as implementation of the proposed General Plan Update along with cumulative development throughout the region would contribute to special-status plant and wildlife species and habitat loss. The only mitigation for such impacts – restricting the majority of development proposed in the General Plan Update – is not considered feasible, given that it would fundamentally conflict with the goals of the General Plan. Therefore, cumulative biological resource impacts are considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

6.2.9 HISTORIC AND CULTURAL RESOURCES

CUMULATIVE SETTING

The cumulative setting for cultural resources includes existing, approved, proposed and reasonably foreseeable developments in the Planning Area, Colusa County, and the surrounding region. This portion of the State is rich in cultural resources. While many prehistoric and historic sites and resources have been identified in the Planning Area, the probability is high that other resources remain undiscovered. Future development projects in the Planning Area, Colusa County and surrounding region that involve grading, excavation, or construction may encounter cultural resources. The cumulative effect of projects in the Planning Area and Colusa County could result in a net loss of prehistoric and historic resources. These resources include archaeological resources associated with Native American activities and historic resources associated with settlement, farming, and economic development. Similarly, proposed projects in vicinity of the Planning Area and Colusa County could impact undiscovered paleontological resources. The reader is referred to Section 4.9, Historic and Cultural Resources, for a discussion of the buildout setting for historic and cultural resources impacts.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Prehistoric and Historic Resources Impacts

Impact 6.10 Implementation of projects within the Planning Area, along with existing, approved, proposed and reasonably foreseeable development in the vicinity of the Planning Area and Colusa County, could contribute to cumulative

impacts on prehistoric and historic resources in Colusa County and northern California. This is considered a **less than cumulatively considerable** impact.

Implementation of projects within the proposed Planning Area, in combination with cumulative development in Colusa County and the surrounding region, would likely increase the potential to disturb known and undiscovered cultural resources in this part of the State. The proposed Planning Area and surrounding region has a high potential for cultural resources, as discussed under Impact 4.9.2. While the area is not sensitive for paleontological resources, these could occur. Disturbance of these resources could alter or destroy their cultural value, and reduce the overall amount of cultural and paleontological resources in Colusa County and northern California.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions discussed under Impact 4.9.2.

Additional Mitigation Measures

Implement mitigation measure **MM 4.9.2**. Implementation of this mitigation measure, along with the applicable General Plan policies and implementing actions, would reduce potential cumulative impacts to cultural resources. Cumulative impacts after mitigation would be **less than cumulatively considerable**.

6.2.10 VISUAL RESOURCES/LIGHT AND GLARE

The cumulative visual resources and light and glare conditions would be the same as the buildout conditions, which is considered a **less than significant** impact. The Planning Area does not contain any scenic highways or scenic resource areas. The Sutter Buttes are considered a scenic vista; however, development as proposed by the General Plan Update is not anticipated to have significant impacts on this scenic vista as it is visible from most parts of the Planning Area. Additionally, the Planning Area and region do not have light pollution issues or dark sky ordinances. Because the visual resources and light and glare impacts do not extend to a regional level, the cumulative setting for this environmental issue area is the same as the buildout setting. Impacts associated with buildout of the General Plan on visual resources and light and glare have been analyzed and mitigation measures recommended where appropriate. The reader is referred to Section 4.11, Visual Resources/Light and Glare.

6.2.11 COMMUNITY SERVICES

6.2.11.1 FIRE PROTECTION AND EMERGENCY MEDICAL SERVICES

Because fire protection and emergency medical services do not extend to a regional level, the cumulative setting for fire protection and emergency medical services would be the same as buildout conditions. Under buildout conditions, the City of Colusa Fire Department would provide firefighting services within the incorporated area of the City (e.g., fire protection, fire suppression, inspection, plan checking, basic life support, rescue services and public education). The Fire Department would participate in a countywide mutual aid program with seven other fire protection districts in Colusa County. The Sacramento River Fire Protection District would provide fire protection services in the area outside the Colusa city limits. The cumulative impacts of the proposed General Plan Update on fire protection and emergency medical services are the same as those identified under impacts specific to buildout of the General Plan Update and the project is considered to have a **less than cumulatively considerable** impact. The reader is

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referred to Section 4.11, Community Services, subsection 4.11.1 for a discussion of impacts associated with fire protection and emergency services.

6.2.11.2 POLICE PROTECTION

Because police protection services do not extend to a regional level, the cumulative setting for police protection services would be the same as buildout conditions. The Police Department would extend its services to areas beyond the City limits on an as-needed basis, through a mutual aid agreement with the Colusa County Sheriff's Department as required by the Office of Emergency Services. Under buildout conditions, the Colusa Police Department would provide police protection services 24 hour per day to residents of the City of Colusa and the project is considered to have a **less than cumulatively considerable** impact. The reader is referred to Section 4.11, Community Services, subsection 4.11.2 for a discussion of impacts associated with police protection.

6.2.11.3 SCHOOLS

CUMULATIVE SETTING

The cumulative setting for schools includes existing, approved, proposed and reasonably foreseeable development in the Planning Area and the boundaries of the Colusa Unified School District. The boundaries of the Colusa Unified School District encompass most of the east central portion of Colusa County. The projects in Colusa County that would add to cumulative impacts are provided in **Table 6.0-1**. There are six approved residential projects and three proposed/reasonably foreseeable projects that would add 671 residences to Colusa County and contribute to cumulative impacts on schools. Under buildout and cumulative conditions, the Colusa Unified School District would continue to serve the residents of the City of Colusa and Colusa County, within the district boundaries, by providing public education services for children in grades K-12. Because growth is anticipated under the General Plan, the buildout and cumulative setting for schools would likely include school expansions and/or new schools to service the increase in student population and to serve the new growth areas in the southern portion of the City where the majority of growth is occurring. Additionally, the school district may need to provide additional schools to accommodate increases in student population in the unincorporated areas of Colusa County served by the district. The reader is referred to Section 4.11, Community Services, subsection 4.11.3 for a discussion of the setting associated with schools.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Schools Impacts

Impact 6.12 Implementation of the General Plan, in combination with existing, approved, proposed, and reasonably foreseeable development, are not expected to result in an increase in school impacts over buildout conditions. Therefore, the General Plan's contribution to schools. This would be **less than cumulatively considerable**.

While population growth in the City of Colusa and the east central portion of Colusa County would likely increase the student population in the Colusa Unified School District, the impacts are not expected to result in an increase in school impacts over buildout conditions. The cumulative impacts of the proposed General Plan Update on schools are the same as those identified under impacts specific to buildout of the General Plan. School impacts were found to be less

than significant under buildout conditions. Under both buildout and cumulative conditions, the District would attempt to utilize several funding sources to facilitate the construction and maintenance of the additional facilities needed to serve projected growth. Sources include but are not limited to Proposition 47 funds, developer impact fees, and any local general obligation bond funds. The environmental effects of constructing additional school facilities in the City and proposed Planning Area would be similar to other types of development and have been generally have been considered in Sections 4.1 through 4.13. In addition, provisions of SB 50 state that payment of fees provide full and complete school facilities mitigation. The reader is referred to Section 4.11, Community Services, subsection 4.11.3.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions discussed under Impact 4.11.3.1.

Additional Mitigation Measures

None required.

6.2.11.4 PARKS AND RECREATION

Because parks and recreation services and impacts do not extend to a regional level, the cumulative setting for parks and recreation would be the same as buildout conditions. Under buildout conditions, the City's Parks and Community Development Department would operate and maintain the City's parks and recreation facilities. The proposed General Plan Update would add 71 acres of park lands, bringing the total parks and open space land to 225.6 acres at General Plan buildout conditions. With an estimated Planning Area population of 34,731 at General Plan buildout, the ratio of parkland to population would be approximately 6.5 acres per 1,000 persons, which would exceed the NRPA general guideline for parklands. Parks and recreation impacts were also found to be **less than significant** under buildout conditions. The reader is referred to Section 4.11 (Community Services) subsection 4.11.4 for a discussion of the impacts to parks and recreation impacts.

6.2.12 PUBLIC SERVICES AND UTILITIES

6.2.12.1 WATER SERVICE

Because water service does not extend to a regional level, the cumulative conditions would be the same as the buildout conditions. The water service setting includes water distribution and water demand. Under buildout conditions the City of Colusa would provide potable water for residential, commercial and industrial uses within the City limits and the following areas outside the City limits: the Walnut Ranch development, the Lurline Avenue area, the area east of Bridge Street, and restrooms at Moon Bend Road. The City's municipal water would come from deep wells that tap aquifers within underground geological formations. Land uses in the unincorporated portion of the Planning Area not served by City water would rely on individual wells for their water supply. Water distribution and water distribution facilities and water demand impacts were found to be **less than significant** under buildout conditions. The reader is referred to subsection 4.12.1 in Section 4.12, Public Services, for a discussion of the impacts associated with water services. Subsection 6.2.7, Hydrology and Water Quality, in this section defines a broader setting for cumulative impacts regarding water resources.

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6.2.12.2 WASTEWATER SERVICE

Because wastewater service does not extend to a regional level, the cumulative conditions would be the same as the buildout conditions. Under buildout conditions, the City of Colusa would provide wastewater collection and treatment services to all of its residents within the City limits, as well as the Walnut Ranch development outside the City limits. Land uses in other unincorporated portions of the Planning Area not provided with sewer service would rely on individual septic systems for wastewater disposal. The buildout conditions would also include improvements to the wastewater collection and treatment system as outlined in the City's Wastewater Facilities Plan, amended in August 2004. Wastewater treatment capacity and wastewater infrastructure impacts were both found to be **less than significant** under buildout conditions. The reader is referred to subsection 4.12.2 in Section 4.12, Public Services, for a discussion of the impacts associated with wastewater service.

6.2.12.3 STORM WATER DRAINAGE

Because storm water drainage service does not extend to a regional level, the cumulative conditions would be the same as the buildout conditions. Under buildout conditions, the City of Colusa Department of Public Works would manage the storm water drainage system in the City of Colusa. The buildout conditions would include improvements to the City's drainage system such as the proposed 51.9-acre parcel of land on the north side of SR 20, approximately one-half mile west of the Planning Area boundary that may be used as a terminal detention basin to serve as a drainage outfall for new development in the western portion of the Planning Area. If this improvement occurs, storm runoff from new development could utilize this site for storage with metered discharge into the Colusa Drain occurring via the future installation of a pump station by the City. Storm water runoff and localized flooding impacts were both found to be **less than significant** under buildout conditions. The reader is referred to subsection 4.12.3 in Section 4.12, Public Services, for a discussion of impacts associated with storm water drainage.

6.2.12.4 SOLID WASTE SERVICE

CUMULATIVE SETTING

The cumulative setting for solid waste service includes existing, approved, proposed and reasonably foreseeable developments in the Planning Area, as well as Yuba, Sutter, Butte, Nevada, and Colusa Counties. Because the service area of the Ostrom Road Landfill includes Yuba, Sutter, Butte, Nevada, and Colusa Counties, these jurisdictions and their planned and projected growth would be part of the cumulative setting for solid waste. The Ostrom Road Landfill has approximately one-quarter of its total disposal capacity still available. The City has a contract with the landfill that is reviewed and renewed annually. It is anticipated that the City will continue to be served by Ostrom Road Landfill, which is not anticipated to reach capacity until 2066. The City of Colusa would continue to provide solid waste collection service for the City and Planning Area under cumulative conditions. The reader is referred to subsection 4.12.4 in Section 4.12 (Public Services) for a discussion of the buildout setting for solid waste service impacts.

CUMULATIVE IMPACTS AND MITIGATION MEASURES

Cumulative Solid Waste Impacts

Impact 6.13 Implementation of the proposed General Plan, in combination with existing, approved, proposed and reasonably foreseeable development within Yuba,

Sutter, Butte, Nevada, and Colusa Counties, would result in cumulative impacts on the Ostrom Road Landfill. This is considered a **less than cumulatively considerable** impact.

As mentioned in the discussion under **Impact 4.12.4.1** in Section 4.12 (Public Services), the Ostrom Road Landfill currently has approximately one-quarter of its total capacity available to accommodate additional solid waste. With significant residential development anticipated in Yuba, Sutter, Butte, Nevada, and Colusa Counties, along with development proposed in the Colusa General Plan Update, there would be an increased amount of solid waste generated. The additional solid waste may more rapidly take up the remaining capacity at the Ostrom Road Landfill. Therefore, development under the proposed General Plan Update may contribute cumulatively to a limited landfill capacity. This analysis assumes that the City would continue to use the Ostrom Road Landfill for disposal of its solid waste.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

The reader is referred to policies and implementing actions discussed under Impact 4.12.4.1.

Additional Mitigation Measures

Implementation of the General Plan policies and implementing actions would reduce the project's contribution to cumulative effects on landfills receiving the City's solid waste; see discussion under Impact 4.12.4.1. Impacts would be **less than cumulatively considerable**.

6.2.13 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 (CO₂), methane (CH₄) and nitrous oxide (N₂O) 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

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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 1.2 to 1.4°F 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 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, CH₄ 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 °F before the year 2100. If the atmospheric concentration of CO₂ 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 °F. This may not seem like a significant increase, yet even at the lowest projected increase of 1.8 °F, the Earth would be warmer than it has been for 10,000 years (Miller, 2000).

As previously stated, 11 of the last 12 years rank among the hottest years on record. 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 findings 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.

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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 CO₂, and is responsible for approximately two percent of the world's CO₂ 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 likely increasingly 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 perturbations 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 Nino/ Southern Oscillation illustrate how climate directly impacts marine fisheries on short term scales. Higher sea surface temperatures in 1997-1998 during the El Nino 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 changes, recreational facilities and developed coastlines will also be more vulnerable to hurricanes, storm surges, flooding increases. 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 (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 an increase in the number and extent of areas burned by wildfires in recent years, and modeling results under changing climate conditions suggest that 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 (fuel loads, high temperatures, dry conditions, and wind) are typically present already in summer and fall seasons in California, but can exist at other times of the year, especially in drought conditions. Public safety is an issue as more home and tourism developments on coastal hills and mountains and the foothills and higher elevations in the Sierra Nevada are highly susceptible to catastrophic wild fires.

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.

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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 reproduce and to 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 – PM₁₀ – has a diameter smaller than 10 micrometers and can easily pass into the lung, contributing to the development of lung tissue damage. PM₁₀ has been implicated in exacerbation of cardiovascular disease, asthma, other respiratory diseases, and associated with increased mortality. Air pollution is also made worse by increases in natural hydrocarbon emissions and evaporative emissions of fuels and solvents which leads to higher levels of ozone and PM₁₀ 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.

REGULATORY FRAMEWORK

STATE

Assembly Bill 1493

In 2002, then-Governor Gray Davis signed Assembly Bill (AB) 1493. AB 1493 requires that the California Air Resources Board (ARB) 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 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.

6.0 CUMULATIVE IMPACTS

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

Colusa General Plan

The adopted City of Colusa General Plan currently is used as the “blueprint” to guide future development within the City limits and in unincorporated portions of the existing Planning Area. The existing General Plan has no policies applicable to global warming and climate change issues. The proposed General Plan Update would establish policies and implementing actions associated with air quality and energy efficiency which would reduce the production of GHGs. Specific proposed policies and implementing actions are discussed in the impact analyses below.

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 Colusa 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 CO₂ into the atmosphere is not itself an adverse environmental affect. It is the cumulative increased concentration of CO₂ 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 CO₂ 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 CO₂ emitted by the project would result in any altered conditions.

Given the challenges associated with determining a project specific significance criteria for GHG emissions when the issue must be viewed on a global scale, a quantitative significance criteria is not proposed for the Colusa General Plan project. For this analysis, a 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 Colusa General Plan project were estimated using CO₂ 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 CO₂ 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 CO₂. For example, 1 pound of methane has an equivalent global warming potential of 21 pounds of CO₂ (California Climate Action Registry 2006).

While there are various methods for determining the potential GHG emissions of a specific project determining, at this time, there is not an approved ARB method. For the Colusa General Plan project, two different methods were used, based on the emission source (buildings or vehicles) to ascertain the potential CO₂ emissions at project buildout. Discussed below are the estimated CO₂ emissions for residential buildings, non-residential buildings, residential vehicles and non-residential vehicles. The methodology used to determine the CO₂ emissions of each of these categories is discussed within that category analysis.

CUMULATIVE IMPACTS AND MITIGATION MEASURES FOR THE PROPOSED GENERAL PLAN UPDATE

Cumulative Increase in GHG Emissions

Impact 6.14 Buildout of the proposed General Plan Update would result in the cumulative increase of greenhouse gases including CO₂ 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 building such as electricity, natural gas and fuel oil.

GHG emissions from the industrial sector are produced from many industrial activities. For example, CO₂ 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.

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Residential Buildings

Under buildout conditions the implementation of the proposed General Plan Update will result in an estimated total CO₂ emission for residential buildings of 401,009,310 lbs/yr. This is an increase of 247,172,130 lbs/yr over existing conditions.

The method used to determine CO₂ emissions from buildings is based on the EPA Personal GHG Calculator which is available at http://www.epa.gov/climatechange/emissions/ind_calculator.html. The following attributes were inputted into the GHG calculator to determine the amount of CO₂ emissions of single home in Colusa:

- All residential building types were treated the same.
- The CO₂ emissions for residential buildings were produced solely by the EPA Personal Greenhouse Gas (GHG) Calculator Annual Household Estimator and include CO₂-equivalent amounts as well as other sources of emissions other than electricity use.
- Assumptions used in EPA Personal GHG Calculator include:
 - 0 miles vehicle per week traveled (vehicle travel will be analyzed separately) and
 - No recycling.

This emission was then multiplied by the existing and projected number of homes in the City of Colusa under the proposed project's buildout conditions as identified in Section 4.0 **Table 4.0-4** of this EIR. **Table 6.13-1** illustrates the CO₂ emissions under existing and buildout conditions.

**TABLE 6.13-1
RESIDENTIAL BUILDINGS EXISTING AND BUILDOUT CO₂ EMISSIONS**

GHG Calculator Question	Data	Pounds of CO ₂ per year Per Dwelling Unit (lbs/yr/du)
Average Number of Persons per Home	2.85	-
Home heat source	Electric	-
Average monthly gas bill	\$105	10,988 lbs/yr/du
Average monthly electric bill	\$100	16,440 lbs/yr/du
Average monthly fuel oil bill	\$130	14,665 lbs/yr/du
GHG emissions from waste (for 2.85 persons per home)	-	2,036 lbs/yr/du
Total CO ₂ Emissions		44,130 lbs/yr/du
Condition	Housing Units	Total CO ₂ Emissions
Existing	3,486	153,837,180 lbs/yr
Buildout	9,087	401,009,310 lbs/yr
Difference		247,172,130 lbs/yr

Source: EPA Personal GHG Calculator; PMC, 2007

Non-Residential Buildings

The proposed General Plan Update identifies approximately 6,809,996 square feet of non-residential uses under buildout conditions (commercial, office, industrial and county industrial uses). Individual square footages are numerated in **Table 4.0-4** of this EIR. The following

parameters were used to calculate the amount of CO₂ emitted by the non-residential buildings in the Planning Area:

- All non-residential building types were treated the same (i.e. same energy intensity, percentage from coal/natural gas, and emission factors).
- The CO₂ emissions for non-residential buildings are not CO₂-equivalent emissions but only CO₂ emissions.
- CO₂ emissions estimates for non-residential buildings are based solely on electricity use and no other energy source. These estimates are weighted according to coal and natural gas based electricity generation in California.
- Non-residential building annual energy intensity is based on the year 2002 for the PG&E service area as a whole and are estimated to be 12.95 kWh/ft² as identified in Table 9-1 of the California Commercial End-Use Survey report¹.
- CO₂ emissions factors for non-residential uses are based the EPA Power Profiler for commercial uses available at <http://www.epa.gov/cleanenergy/powerprofiler.htm>

Table 6.13-2 illustrates the estimated CO₂ emissions for non-residential uses in Colusa under existing and buildout conditions. This calculation does not include vehicle trips for non-residential uses. It is estimated that buildout of the proposed General Plan Update will result in the production of 77,337,884 lbs/year of CO₂ for non-residential uses. This is an increase of 59,948,536 lbs/year over existing conditions.

**TABLE 6.13-2
NON-RESIDENTIAL BUILDINGS EXISTING AND BUILDOUT CO₂ EMISSIONS**

Condition	Area	CO ₂ Emission
Existing	1,531,221 sq. ft.	17,389,348 lbs/yr
Buildout	6,809,996 sq. ft.	77,337,884 lbs/yr
Difference	5,278,775 sq. ft.	59,948,536 lbs/yr

Source: EPA Power Profiler. The program's output, which is based on a monthly 1 kWh average use, was adjusted to reflect a monthly 1.079 kWh as identified by CEC¹ for commercial PG&E accounts.

Traffic

The traffic analysis conducted for the project (Appendix B) provides data that can be used to estimate CO₂ emissions from project generated residential vehicle trips. Buildout of the project would result in 200,795 residential and non-residential daily vehicle trips per day (see **Table 4.3-6**). Assuming a trip rate of 4.21 miles per trip², the proposed project at full buildout would generate an average of 845,347 vehicle miles traveled (VMT) per day, or approximately 308.50 million VMT annually. Assuming an emissions factor for future CO₂ emissions from vehicles of approximately 366 grams of CO₂ per mile (California Air Resources Board 2002), approximately 124,449 tons (179,878,784 lbs) of CO₂ per year would be generated by residential vehicle trips under buildout

¹ CEC California Commercial End-Use Survey, March 2006. CEC-400-2006-005

² Vehicle miles traveled were calculated by kdAnderson

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conditions. **Table 6.13-3** illustrates the residential vehicle emissions for existing and buildout conditions.

**TABLE 6.13-3
RESIDENTIAL VEHICLE EXISTING AND BUILDOUT CO₂ EMISSIONS**

Source	Daily Vehicle Trips		Daily Vehicle Miles Traveled		CO ₂ Emission	
	Existing	Buildout	Existing	Buildout	Existing	Buildout
Residential	33,120	100,462	139,435	422,945	41,054,235 lbs/yr	124,528,700 lbs/yr
Non-Residential	22,560	100,333	94,978	422,402	27,964,479 lbs/yr	124,368,797 lbs/yr
Total	55,680	200,795	234,413	845,347	69,018,714 lbs/yr	248,897,498 lbs/yr

Source: PMC; kdAnderson Transportation Consultants; ARB; 2007

Note that although this future CO₂ emissions factor does assume certain reductions in vehicle emissions due to future vehicle models operating more efficiently, it does not take into account additional vehicle emission reductions that might take place in response to AB 1493, if mobile source emission reductions are ultimately implemented through this legislation.

Total General Plan Buildout CO₂ Emissions

Table 6.13-4 illustrates the total buildout amount of CO₂ emissions as a result of implementation General Plan Update. According to the methodologies listed previously for the identification of CO₂ emissions, buildout of the General Plan will result in an increase in CO₂ emissions of .298 million metric tons (MMT) annually. In comparison, the amount of CO₂ emitted in California in 2004 was 334.9 MMT (369.2 million tons).

**TABLE 6.13-4
BUILDOUT CO₂ EMISSIONS**

Source	CO ₂ Emission (lbs/yr)	Million Metric Tons (MMT)
Residential Buildings	401,009,310 lbs/yr	0.18 MMT
Non-Residential Buildings	77,337,884 lbs/yr	0.035 MMT
Vehicles	248,897,498 lbs/yr	0.083 MMT
Total	658,225,978 lbs/yr	0.298 MMT
California 2004 total CO ₂ Emissions		334.9 MMT

Source: PMC; CEC 2006a Table 6

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 emissions 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 emissions 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 the City of Colusa 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 CO₂ emissions attributed to the project could simply be from vehicles currently emitting CO₂ at an existing location moving to the project site, 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. Future changes in building energy efficiency standards as well as higher production of non CO₂ emitting energy sources (i.e. wind and solar power) would decrease the amount of CO₂ emissions from buildings than those calculated today. As a result, although it is possible to calculate the estimated contribution of building and vehicle generated CO₂ emissions from buildout of the General Plan Update, the actual CO₂ contribution during the life of the General Plan would likely be much less than the 0.298 million metric tons of CO₂ per year calculated above.

Proposed General Plan Policies and Implementation Programs that Mitigate Potential Impacts

Policy PRC-5.1 The City shall require that site preparation and construction activities incorporate effective measures to minimize dust and pollutant emissions from motorized construction equipment and vehicles.

Implementing Action PRC-5.1.a: Development Review

Projects will be evaluated for their potential impacts to air quality as part of the development review process, applying the California Environmental Act (CEQA) Guidelines and in consultation with Colusa County Air Pollution Control District (APCD).

Implementing Action PRC-5.1.b: Best Management Practices

The City will require that developers use best management practices (BMPs) as recommended by the U.S. Natural Resources Conservation Service (NRCS) and Colusa County APCD. Approaches to design, construction, and maintenance techniques should ensure that development would not cause or worsen air quality.

Policy PRC-5.2 New development shall provide a street design that includes multiple vehicular access points and bicycle/pedestrian pathways within neighborhoods. The circulation system shall increase community connectivity and avoid long, circuitous routes to commercial districts, schools, and other neighborhoods.

Implementing Action PRC-5.2.a: Development Review

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Through the CEQA environmental review process, as part of development review, proposed development projects will be evaluated to determine the extent to which they minimize motor vehicle traffic.

Policy PRC-5.3 The City shall ensure that residents' exposure to post-construction emissions is minimized.

Implementing Action PRC-5.3.a: Development Review

Through the development review process, projects will be required to demonstrate that existing and/or future sensitive receptors are protected from significant air emissions or odors through the use of adequate buffer zones, setbacks, or other site design techniques.

Implementing Action PRC-5.3.b: Interagency Coordination

The City will periodically consult with the Colusa County Air Pollution Control District and Colusa County to ensure compliance with federal and state ambient air quality standards. This may include limiting the use of wood-burning devices, new construction methods, and conversion to natural gas fireplaces in remodeling projects.

Policy PRC-5.4 The City shall ensure that existing trees and vegetation are retained and incorporated into the project design wherever feasible.

Implementing Action PRC-5.4.a: Development Review

Through the development review process, a landscaping plan will be prepared and reviewed for each project to ensure maximum retention and addition of mature trees and other vegetation that will contribute to absorption of carbon emissions.

Policy PRC-5.5 The City shall encourage the use of public transportation as an alternative to the automobile.

Implementation Action PRC 5.5.a: Public Awareness and Education

The City will provide public information describing how well-integrated land use and transportation planning, combined with greater use of public transit, can reduce vehicle miles of travel and motor vehicle emissions that contribute to air pollution, thereby improving the community's air quality.

CCD-1 Community Design Criteria: Specific criteria relevant to this impact are identified below:

15) Encourage siting, design and orientation of buildings that includes optimal solar use, enhances natural ventilation, and reduces overall energy demand.

17) Provide for the use of Green Building materials and practices

Policy PRC-11.1 The City shall seek to minimize energy impacts from new residential and commercial projects.

Implementation Action PRC 11.1.b: Public Awareness and Education

The City will provide information on available energy conservation techniques and products to the public and builders. Resources will include information on programs such as Pacific Gas and Electric's "Savings by Design" program for remodeling residences as a means of reducing energy demands and costs.

Implementation Action PRC 11.1.c: Title 24 Uniform Building Code

The City will require energy efficient siting and building design in all new development projects consistent with the requirements of Title 24 of the California Administrative Code. Measures include building orientation and shading, landscaping, use of active and passive solar heating and hot water systems, etc. The City will also investigate and consider adopting Leadership in Energy and Environmental Design (LEED) sustainability standards for residential and commercial development.

Policy PRC 11.2 The City shall utilize new, environmentally safe energy sources to the maximum extent feasible.

Implementation Action PRC- 11.2.a: Facilities Master Plan

As part of its Facilities Master Plan, the City will evaluate options for use of alternative energy systems when retrofitting or constructing new City facilities or when purchasing new equipment, provided they meet all public, safety, health, and design requirements and are proven to be reliable.

Implementation Action PRC-11.2.b: Capital Improvement Program

The City will consider incorporating into its Capital Improvement Program a green fleet that includes the City's purchase of fuel-efficient and alternative-fuel vehicles.

The above policies and implementing actions will assist in the reduction of GHGs. However, at this time, due to the lack of a threshold of significance, it is not possible to determine at what level of impact the increase in GHGs would occur as a result of implementation of the General Plan Update. It is generally believed that climate changes are now and will continue to occur because of the increase of greenhouse gases throughout the world. 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 City's contribution to GHG emissions beyond the 1990 levels.

The City can and does require energy efficient design in building construction within the City. This requirement and the General Plan policies and implementing actions listed previously can effectively reduce GHG emissions from building operations (energy use). Whether or not these requirements will reduce emissions effectively enough to mitigate the City's contribution to GHGs is unknown. The only entity which has jurisdiction over vehicle emissions in California is the state or federal government. Therefore, until such time that there are thresholds of significance for which to compare the City's GHGs contribution, it must be assumed that any increase in GHGs will lead to a change in climate. Therefore, this impact is considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

Additional Mitigation Measures

None feasible.

6.0 CUMULATIVE IMPACTS

Cumulative Effects of Global Climate Change on the City of Colusa

Impact 6.15 The impacts of global climate change would cumulatively result in the potential decrease in water supply, increase in air pollutants, and increase in health hazards. This is considered a **significant** impact and the proposed project would have a **cumulatively considerable** contribution.

According to a report on the effects of climate change in California by the California Climate Change Center (CCCC), based on state-of-the-art climate models, if global heat-trapping emissions proceed at a medium to high rate, temperatures in California are expected to rise 4.7 to 10.5°F by the end of the century. In contrast, a lower emissions rate would keep the projected warming to 3 to 5.6°F. These temperature increases would have widespread cumulative consequences including substantial loss of snowpack, increased risk of large wildfires, reductions in the quality and quantity of certain agricultural products and health effects. Refer to the Existing Setting section for a description of effects of climate change.

These consequences would potentially affect the residents of the City. For instance, a substantial loss in snowpack may reduce river volumes in the Sacramento River and potentially the amount of groundwater available for use as a water supply. Also, the potential for flooding and drought conditions are increased. Decreasing snowmelt and spring stream flows coupled with increasing demand for water resulting from both a growing population and hotter climate could lead to increasing water shortages. By the end of the century, if temperatures rise to the medium warming range and precipitation decreases, late spring stream flow could decline by up to 30 percent. Agricultural areas could be hard hit, with California farmers losing as much as 25 percent of the water supply they need (CCCC, page 7).

Higher temperatures are expected to increase the frequency, duration, and intensity of conditions conducive to air pollution formation. For example, if temperatures rise to the medium warming range, there will be 75 to 85 percent more days with weather conducive to ozone formation in Los Angeles and the San Joaquin Valley, relative to today's conditions. This is more than twice the increase expected if temperature rises are kept in the lower warming range.

Global warming scenarios provided by CCCC in their report *Our Changing Climate Assessing the Risk to California*, indicate that by 2100, if temperatures rise to the higher warming range, there could be up to 100 more days per year with temperatures above 95°F in Sacramento which means that temperatures in Colusa will certainly rise as well. This is a striking increase over historical patterns. As temperatures rise, residents of Colusa will face greater risk of death from dehydration, heat stroke/exhaustion, heart attack, stroke, and respiratory distress caused by extreme heat.

Proposed General Plan Policies and Implementing Actions that Mitigate Potential Impacts

All policies and implementing actions listed under Impact 6.14 would assist in the reduction of GHGs. Please refer to Impact 6.14 for these policies and implementing actions. Policies and action items discussed in 4.7 would reduce impacts associated with water supply and flooding.

While the General Plan policies and implementing actions would reduce the potential GHG emissions in the City, climate change is a result of global GHG emissions. A complete elimination of GHG emissions in the City would not significantly change GHG emissions on a global scale nor decrease the effects of global climate change on the City's residents. Therefore, this impact is considered **significant and unavoidable** and the proposed General Plan Update would have a **cumulatively considerable** contribution.

Additional Mitigation Measures

None feasible.

6.0 CUMULATIVE IMPACTS

REFERENCES

- California Air Resources Board. 2002. *Proposed Methodology to Model Carbon Dioxide Emissions and Estimate Fuel Economy*.
<http://www.arb.ca.gov/msei/onroad/downloads/pubs/co2final.pdf>. Accessed June 2007.
- California Climate Action Registry. 2006 (June). *California Climate Action Registry General Reporting Protocol: Reporting Entity-Wide Greenhouse Gas Emissions*. Version 2.1. Los Angeles, CA. <http://www.climateregistry.org/docs/PROTOCOLS/GRP%20V2.1.pdf>. Accessed June 2007.
- California Energy Commission. 2006a. *Inventory of California Greenhouse Gas Emissions and Sinks: 1990 to 2004*. Publication CEC-600-2006-013-D.
<http://www.energy.ca.gov/2006publications/CEC-600-2006-013/CEC-600-2006-013-SF.PDF>. Accessed June 2007.
- California Energy Commission. 2006b. Climate Change Portal.
<http://www.climatechange.ca.gov>. Last update December 22, 2006. Accessed January 2007.
- California Energy Commission. 2006c. (July) *Our Changing Climate: Assessing the Risks to California*. Publication CEC-500-2006-077.
- California Environmental Protection Agency. 2007. *FAQS Frequently Asked Questions About Global Climate Change*. Available at:
<http://www.climatechange.ca.gov/background/faqs.html>
- California Department of Transportation (Caltrans). December 2006. *Climate Action Program at Caltrans*. Sacramento, CA. Available at
<http://www.dot.ca.gov/docs/ClimateReport.pdf>
- Intergovernmental Panel of Climate Change. *National Greenhouse Gas Inventories Programme*.
<http://www.ipcc-nggip.iges.or.jp/>. Accessed June 2007.
- kdAnderson. 2007. Email from Ken Anderson June 21, 2007.
- National Aeronautical and Space Administration. 2007. *NASA Facts Online*.
http://www.gsfc.nasa.gov/gsf/service/gallery/facts_sheets/earthsci/green.htm. Accessed June 2007.
- Miller, Tyler G. 2000. *Living In the Environment, 11th Edition*. Thomson Learning.
- U.S. Environmental Protection Agency. 2007. *Greenhouse Gas Emissions*.
<http://www.epa.gov/climatechange/emissions/index.html>. Accessed June 2007.