

Chapter 5

NCR 1.1 Watershed protection

the adoption of Low Impact Development (LID) ordinance language is an easy way to protect our watershed, and prevent pollution. The City, as per the SWMP, also needs to develop and adopt stormwater runoff control regulations.

NCR 1.4 Manage impervious coverage

LID is a tool which can assist the City with managing impervious coverage.

NCR 1.6 Self-treat runoff

Instead of encouraging runoff management, the City needs to require it, as per the SWMP and Clean Water Act (CWA).

NCR 1.7 Clean Water Act compliance

The City should consider CWA compliance when revising regulations

5.2

NCR 2.8 Native vegetation

The City should mandate the preservation of native vegetation to preserve water quality and habitat, and enhance our community.

NCR 2.9 Community education

The City should require (ourselves and/or developers) to install interpretive signs.

NCR 2.3 DFG collaboration

In order to achieve DFG recommendations, the City needs to change our development practices and procedures so that protection of the environment is mandated from day one of any project.

5.5

NCR 5.4 Native plants

Instead of promoting native plant protection and preservation, the City should require this measure which has many positive benefits for people and wildlife.

NCR 5.5 Erosion control measures

The City needs to require vegetated buffers and other LID measures to reduce erosion and runoff.

NCR 5.6 Septic system standards

Perhaps the City should prohibit any further septic systems inside the City in order to prevent pollution. Chapter 13 (section 13.20.070) of the City's Municipal Code seems to suggest that sewer connections are required.

Chapter 6

6.1

PROS 1.16 Riparian corridors

The City should require 100 ft buffers to ensure flood protection, pollution prevention, and habitat conservation.

PROS 1.25 Landscaping

The City should act as a role model to the community in the development, installation, and maintenance of non-irrigated landscapes and native species in new & EXISTING park development.

PROS 1.26 Construction materials

The City should require the use of eco-groovy materials and products when affordable, feasible, and warranted by an LCA.

EXAMPLE: instead of purchasing non-FSC lumber, painting it, sawing it, and constructing picnic tables, the City should purchase recycled plastic picnic tables.

PROS 3.2 Open space dedication

The City should require dedication of open space to enhance our community.

PROS 3.3 Eel River Floodplain

How will the City maintain this area?

PROS 3.4 Common open space requirements

How much open space will be required?

PROS 3.5 Rohner & Strongs Crk improvements

If the City investigates improvements, then what?

PROS 3.6 Retention in natural condition

How will the City cooperate & coordinate with other agencies to make this a reality?

PROS 3.7 Public ed

Does this mean it's a task which will be undertaken by City staff? Who? When?

6.2

CD 1.15 Tree planting

How will the City encourage & support tree planting?

CD 3.4 Landscape buffers

Why doesn't the City require buffers if its so important to increase safety, improve aesthetics, and provide space for trees?

CD 3.5 Street tree planting

Could the City require tree planting along new and existing streets? This may also help with AB 32 compliance.

CD 3.6 Wildflower seeding

When/where/who will this be done?

Chapter 7

7.3

PFS 5.2 Natural drainage

Perhaps the City should require LID measures so that natural features are preserved and enhanced.

PFS 5.3 Runoff quality

Perhaps the City should require oil/water separators for urban development projects to minimize stormwater pollution. The use of permeable paving products can also reduce pollution, and decrease GHGs.

PFS 5.4 Surface drainage

If new development is required to retain their drainage on-site, further pollution is prevented.

PFS 5.5 Future drainage compliance

The City needs to align their development standards with State and Federal NPS discharge requirements.

PFS 5.6 On-Site drainage treatment

In order to reduce the negative impacts of development upon our waterways, the City could require that all City projects retain stormwater on-site.

PFS 5.7 Detention facilities

LID measures can be an affordable replacement to detention facilities, with multiple benefits to various stakeholders.

PFS 5.8 Hillside erosion

The City could require hillside landowners to implement appropriate BMPs to reduce erosion, in partnership with the City.

PFS 5.9 Rainy season

The City should prohibit grading during the rainy season, and define the dates.

PFS 5.12 Storm drain master plan implementation

Could the City enact development standards to ensure that improvements are appropriately sized?

PFS Drainage studies

If a study shows that there's a problem, will the City require mitigation measures?

PFS 5.16 Vegetation control

In order to "...keep excessive brush and vegetation clear from hillside creeks..." the City must obtain a DFG Streambed Alteration permit, ahead of time.

PFS 5.19 Bioswales

Could the City require LID measures to minimize stormwater runoff, GHGs, and pollution?

7.4

PFS 6.1 Waste disposal reduction

Perhaps this should be changed to say that the City will strive for an annual reduction in all waste disposal?

PFS 6.2 Recycled materials

Do we need a formula or standard to determine when recycled products are economically feasible? Folks may not always consider the LCA when making purchasing decisions, which can lead to the procurement of virgin materials.

PFS 6.3 New development

Perhaps this language could mention that new buildings need to allocate space for recycling collection and storage.

PFS 6.4 City-County coordination

How will the City work with the County to eliminate litter & illegal disposal issues?

PFS 6.6 Construction waste recycling

The City does not currently require construction recycling.

Chapter 8

8.1

LU 6.3 Development buffers

Will the buffer width and length be defined?

CD 3.4 Landscape buffers

Will the buffer width and length be defined?

NCR 3.3 Agricultural buffers

Will the buffer width and length be defined?

Climate change

HS 3.6 Restoration for GHG absorption

How will the City foster and restore terrestrial ecosystems?

HS 3.7 GHG reduction from energy use in buildings

Will this apply to all buildings in Fortuna?

HS 3.9 Public info & ed

“Continue to provide info...”

Does this mean the City will educate on energy efficiency & conservation? What about educating on climate change issues?

HS 3.10 Explore energy efficiency standards for existing buildings

Why wouldn't energy efficiency standards for existing buildings be appropriate? What would be the substantial remodel criterion?

8.5

HS 7.6 Stormwater detention facilities

LID measures may reduce or eliminate the need for stormwater detention facilities. What criterion determines "large development" in Fortuna? Stormwater detention facilities are not the only answer to reduce flooding.

Chapter 10

pg 10-13

Policy NCR 6.1 City site design standards

Doesn't it behoove the City to require the incorporation of cost-effective, energy efficient techniques and materials in our projects?

Policy NCR 6.2 New development requirements

Can the City encourage new development to just go ahead & install solar from day one? Retrofitting can be expensive and time-consuming.

Policy NCR 6.5 Solar access

Could the City require that new developments be oriented and designed to maximize and protect solar exposure? Wouldn't that reduce GHGs in the long run?

Policy NCR 6.7 Energy Star Equipment

Gee, I just assumed that Energy Star products are ALWAYS the most cost-effective, especially in a municipal operation. Why not require Energy Star?

http://www.energystar.gov/index.cfm?c=government.bus_government

pg 10-14

Policy HS-3 Circulation/Air Quality

Can the City require systems to reduce indoor air pollution and protect public health?

Policy TC 5.1 Fortuna Bike Plan

Can the City promise to implement the Bike Plan?

pg 10-17

Significant unavoidable adverse impacts – if we can put men on the moon, can't we mitigate our adverse impacts to the maximum extent practicable?

Hydrology & water resources

Can we mandate actions to prevent water quality degradation to the maximum extent practicable?

Ag & timber resources

Can we mandate protection of ag lands?

Air quality

Can we take steps to preserve our air quality?

Flooding

Perhaps we should consider any and all measures which could reduce flood hazards, and mandate the top ten protective actions.

Angie Wood

City of Fortuna

Compliance Division

Comments on Fortuna's Draft PEIR prepared by Arden Henry

p.ii 4.4 Aviation

Although this is listed in the table of contents there is no section 4.4 in my copy of the PEIR. Confirmed; There is no section 4.4. Aviation is mentioned under Fire Hazards on page 8.4-10. Planwest, what is the relationship between these two?

p. 2.10 Annexations

This section lists Riverwalk, Strong's Creek and Carson Woods Road. There is no discussion about the airport area.

Arden, I will address this with you.

p. 4.2-7 TC-1.24 Rohnerville and Drake Hill Road Improvements

As discussed at meetings on the General Plan, this section should include a statement that signs will be added to Drake Hill Road to stop large trucks from using the serpentine section of this road.

I do not recall this interpretation of the discussion. However, proposed *future* improvements to Thelma and Ross Hill Rd. will provide a direct truck route to the Kenmar Rd. interchange with Highway 101. Proposed new access down the bluff to Highway 36 will also serve trucks.

p. 4.3-3 Implications of the Draft Land Use Diagram

There should be a discussion of the impact of the Mill Site development.

The implications of development on the mill site (from a traffic perspective) were based on two divergent possibilities. One possibility is a major retail development of 600,000 square feet and the other the other is a medium density residential community. Each of these will have different traffic impacts (commuter, evening, and weekend) on the City. The City chose to use the two options to assess both sets of impacts as a "worst case" scenario. The Mill District Area Plan outlines how mixed use can be developed on the site but without dictating what the final ratio of residential to commercial must be.

p. 4.3-3 General Plan Policy Response

Add a policy that the city shall request RTS service to any new shopping center similar to the existing service to Bayshore Mall.

This is addressed in Policy TC-3.2 Fixed-Route Transit. Language includes the following line: "The City shall work with ... The HTA...to expand fixed-route transit service to serve new development areas, including direct connections to employment, residential, and commercial areas."

p. 5.1-8 Table 5.1-4 Specific Water Quality Objectives for the North Coast Region

Need words to explain what this table means.

I agree that the table (taken out of context) is not helpful. The table will be expanded to include a definition of the headings (e.g. Specific Conductance) and a line indicating what the figures listed for the Eel River mean. If that information is contained elsewhere, then a reference to that location will be added.

p. 5.4-3 1946-1965 Growing Regional Commercial Center

The last sentence states Alton is within the boundaries of Fortuna. This is not true.

Correct. Alton will be struck from the text in this context.

p. 6.2-8 Computer Models

As written this paragraph does not make sense. It should be the developer's responsibility to show the impact of their development, not the affect of city standards.

The sentence will be corrected to read as follows:

CD-5.7 Computer Models. The City shall encourage applicants of proposed large-scale developments to use computer generated models mixed with existing streetscapes to show how that project standards will affect future views of these areas.”

p. 7.1-2 Ground Water Supply Wells

It is stated here that the maximum diversion rate is 3 cubic feet per second (this is approximately 1500 GPM) and there are 4 pumps capable of 900 GPM. The implication is only one pump can run at a time.

Is this true?

I will seek clarity from our Public Works staff.

p. 7.1-8 Methodology

Assumptions

"It states "... water supply deficiency is not considered a limitation for the City". What about the WRIMS maximum on page 7.1-2?

This question has been raised by John Miller at the County. The City is researching the data.

p. 7.1-9 Methodology (continued)

Assumptions

The sixth paragraph states "Construct a new 2MG Zone 1 reservoir in Rohner Park ...". I don't think it should state where to put this tank.

This project has been recommended as stated. However, in light of CEQA and community input, alternative sites are under review and will be considered for the project.

p. 7.1-10 Second Paragraph

This states "All of the above listed improvements ... should be completed by the summer of 2009". It is not reasonable to expect this to happen.

Completion by the end of summer next year is the objective. Projects that cannot be completed in the current CIP will be rolled into the following year's program.

p. 7.1-10 & 7.1-11 (p. 7.1-12) Impacts and Mitigation

Does not address peak flows.

Need to address limits on annual diversion from the river.

This comment will be reviewed further.

p. 7.1-13 Mitigation

This section is not consistent with p. 7.10 where the denial of a request for additional water is discussed.

The information provided indicates that the 1979 request was excessive given the City's requirements.

The new request would be based on projections. This request may or may not be granted.



FACSIMILE TRANSMISSION
CALIFORNIA DEPARTMENT OF FISH AND GAME
NORTHERN CALIFORNIA-NORTH COAST REGION
601 LOCUST STREET
REDDING, CALIFORNIA 96001
INFORMATION (530) 225-2360
FAX (530) 225-2381

To: Ms. Liz Shorey, City Planner

Date: 08/13/07

Fax #: 707-725-7610

Pages: 18 , including this cover sheet.

From: Gary Stacey, Regional Manager

Telephone: 530-225-2360

Subject: RE:City of Fortuna General Plan Update

ADDITIONAL INSTRUCTIONS:

Please see attached. Hard Copy in Todays Mail.



DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>

NORTHERN REGION
601 Locust Street
Redding, CA 96001
(530) 225-2300



August 10, 2007

Ms. Liz Shorey, City Planner
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Dear Ms. Shorey:

City of Fortuna General Plan Update

On July 6, 2007, the Department of Fish and Game (DFG) received from the City of Fortuna (City) a notice of preparation (NOP) of a draft program environmental impact report (PEIR) for the City of Fortuna General Plan Update (Update). This Update is a long-term policy document with a 25-year planning horizon. Its purpose is to guide the City's public policies and resource conservation goals relative to designated land uses and community development. In a July 17, 2007, e-mail from DFG Staff Environmental Scientist Gordon Leppig to you, DFG requested an extension of our comment period to August 15, 2007. During a July 23, 2007, phone call, City Planner Mr. Stephen Avis told Mr. Leppig this extension was acceptable to the City.

The Update projects that by the year 2030, the City population will increase by more than 6,000 people. The Update projects growth during this period will include 2,800 new dwelling units, almost one million square feet of new retail space and almost one million square feet of new office and industrial space. Two Update alternatives plan for a significant conversion of agricultural lands to industrial uses, such as on the Rohnerville Bluffs.

DFG has reviewed the PEIR NOP, and Public Hearing Draft Background Reports (Background Reports) and Public Hearing Draft Policy Document (Policy Document) and is providing comments on the Update and PEIR as both a trustee and responsible agency pursuant to the California Environmental Quality Act (CEQA). As a trustee for the State's fish and wildlife resources, DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary to sustain their populations. As a responsible agency, DFG administers the California Endangered Species Act (CESA) and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife public trust resources.

Conserving California's Wildlife Since 1870



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DFG's comments focus on the potential direct and indirect impacts this Update will have on aquatic, wetland, and riparian species and their habitats and on the potential conversion, fragmentation, and indirect impacts of urbanization on forest habitat on the northern and eastern edge of the study area.

Importance of Fortuna's Streams and Riparian Habitats

According to the Background Report, the Update study area contains numerous streams and two major river systems, including: Strongs and Rohner creeks, and their named and unnamed tributaries, Palmer and Little Palmer creeks, Wolverton Gulch, and the Eel and Van Duzen rivers. These watercourses are important aquatic resources and have significant fisheries values. They also provide large areas of riparian habitat important to both aquatic and terrestrial species.

The Eel and Van Duzen Rivers, for instance, are habitat for coho salmon (*Oncorhynchus kisutch*) a State- and Federally-threatened species; Chinook salmon (*Oncorhynchus tshawytscha*) a Federally-threatened species; coastal cutthroat trout (*Oncorhynchus clarki clarki*), a California species of special concern; and steelhead trout (*Oncorhynchus mykiss*) a Federally-threatened species and a California species of special concern. Coho salmon and steelhead trout also occur in Palmer, Rohner, and Strongs creeks, and Wolverton Gulch. A breeding population of Willow flycatcher (*Empidonax traillii*) a State-endangered species is documented within the study area along the Van Duzen River.

The anadromous salmonids listed above are iconic species that help define California's North Coast and form an integral part of the region's natural ecosystems, cultural heritage, and local economy. California's commercial salmon fishery is an estimated \$100 million-a-year industry. Yet despite their importance, salmonids are also some of the region's most imperiled species. Most anadromous salmonid stocks on the North Coast have, for multiple reasons, precipitously declined over the past 100 years. Coho salmon, for example, have undergone at least a 70% decline in abundance since the 1960s, and is currently at 6 to 15% of its abundance during the 1940s (DFG 2004). The region's commercial and recreational fishing industry has been severely impacted by this decline. In 2006, the U.S. Department of Commerce declared a commercial fishery failure for coastal Oregon and California, and recently the U.S. Congress approved and President Bush signed, a \$60 million emergency disaster relief package for the Pacific salmon industry.

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Given the regional importance of the City's riparian and aquatic habitats, DFG recommends the PEIR thoroughly evaluate potential direct and indirect impacts to aquatic and riparian habitats and give special attention to impacts to all salmonid life stages. The PEIR should specifically address the impacts from the indirect effects of urbanization and the conversion of agricultural and timberlands on these resources.

Riparian Habitat Protection

Urbanization and increased residential development have had numerous negative effects on Fortuna's streams. A number of the streams and the rivers occurring in the study area are impaired by sedimentation, extensive alterations to bed, bank, and channel, altered hydrologic regimes, stormwater inputs, and loss of riparian habitat. These impairments are described in the DFG Coastal Watershed Planning and Assessment Program, Lower Eel River Basin Assessment (Downie and Gleason 2006) and are included in Attachment 1. To maintain and improve the habitat conditions of Fortuna's streams, DFG, often working collaboratively with the City, has recently undertaken over \$200,000 in stream restoration and fish passage improvement projects in the study area.

While the Policy Document contains much positive intent language regarding the protection and enhancement of Fortuna's streams, DFG finds it and related Update reports include few enforceable standards or ordinances to minimize and mitigate the impacts of future development to these streams. DFG understands the City currently has no riparian or streamside protection ordinance or standard. Furthermore, DFG is aware of projects recently approved by the City with riparian setbacks of as little as 25-feet from the top of bank on coho salmon-bearing streams.

The Policy Document includes a policy (NCR-7) to develop a streamside management/wetland protection ordinance with a timeframe of 2008-2009. DFG is concerned however, that the City is not required to develop this ordinance and, due to staff or budget limitations, it may not get developed, will not be implemented in a timely manner, or may not be effective in mitigating significant impacts to streams and wetlands or avoiding take of listed species. DFG is aware of general plans that include policies to develop habitat protection standards, and that ten years after plan approval, these standards have yet to be developed.

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DFG finds that the proper implementation of effective streamside buffers is one of the single most important mitigation strategies to protect streams from the impacts of urban development. Since 1994, DFG Region 1 has promoted a suite of no-disturbance buffer recommendations to maintain and protect aquatic and riparian habitats from the impacts of adjacent development. Although currently under review and revision, DFG recommends a minimum 150-foot no-disturbance buffer on major rivers such as the Eel and Van Duzen rivers, 100-foot buffers on smaller tributaries that provide habitat for fish, such as on Strongs Creek, and 50-foot buffers on non-fish bearing streams.

Without effective riparian buffers, DFG finds that over the life of the Update, the City is likely to undertake or permit projects pursuant to CEQA that may result in the incidental take of listed salmonids, such as coho salmon and steelhead trout. This take would result from increased water temperatures, loss and degradation of habitat, non-point source pollution inputs, and altered hydrology. These impacts will likely result in cumulatively considerable impacts on riparian and aquatic species, as defined in CEQA §15065(a)(3). Pursuant to CESA, the incidental take of State-listed species requires project proponents obtain an incidental take permit (ITP) from DFG. Given that the issuance of an ITP is typically a long and complicated process, DFG suggests that the City's implementation of effective streamside buffers would be a more timely, economical, and efficient means for projects impacting City streams to avoid the take of listed species.

Consequently, DFG strongly recommends that at a minimum, the City incorporate the DFG Region 1, 1994 no-disturbance riparian buffer recommendations into the Natural and Cultural Resources Element of the City's Update. DFG finds that by adopting effective riparian buffers, such as those in DFG's 1994 riparian habitat recommendations, the Update will be implementing feasible mitigation measures which are likely to avoid take of listed salmonids and minimize impacts to streams and rivers to a less than significant level.

Stormwater Quality and Intensification

Development that results in the covering of permeable soil on vegetated land with impervious surfaces such as structures, streets, sidewalks, and parking lots, tends to intensify storm water runoff volumes and velocities. These effects typically result in higher stream peak flows, increased bank instability, erosion, channel incision, flooding, discharge of fine sediment, and the introduction of pollutants such as hydrocarbons, heavy metals, garbage, pathogens, nutrients, pesticides, and domestic animal feces.

The nonpoint point source pollution found in urban runoff is now a leading threat to the nation's water quality (US EPA 1999). A significant overall reduction in stream and wetland quality indicators occurs when impervious cover in a watershed exceeds 10%, with severe degradation expected beyond 25% impervious cover (Arnold and Gibbons 1996; Watershed Protection Research Monograph No. 1, 2003).

In addition to stormwater pollution, development projects are often designed to rapidly discharge storm and flood water offsite and into natural drainage features such as streams and rivers. Unless intentionally designed to do so, development typically leads to decreases in groundwater and local aquifer recharge. Since on the North Coast, groundwater is the principal summer water source for streams, rivers, and wetlands, increases in impervious surfaces and stormwater facilities designed for rapid drainage of stormwater off-site tend to result in decreased summer low flows, higher stream temperatures, and loss or even elimination of aquatic habitat during the summer. DFG therefore recommends the PEIR thoroughly evaluate potential direct and indirect impacts of increased stormwater runoff and altered hydrology to streams and rivers in the study area.

DFG recommends the City include a clear policy and implementation ordinances or standards that require developments be designed and managed to minimize the introduction of pollutants and increases in runoff to receiving waters. DFG recommends these standards prohibit developments, to the maximum extent practicable, from altering the hydrologic regime of streams by increasing peak flows or decreasing summer low flows.

To accomplish these objectives, DFG recommends the Update include a standard that requires the use of low-impact development (LID) elements such as pervious surface technologies for driveways and walkways, vegetated (green) roofs (Hutchinson et al., 2006, Voelz 2006), disconnected downspouts, water gardens and grassy swales to maximize pervious surfaces and capture and maintain on-site stormwater percolation and treatment, thus maintaining to the greatest extent practicable, post-project pervious surfaces. Utilizing LID elements will benefit aquatic resources by: 1) filtering out pollution and increasing the quality of stormwater runoff, 2) decreasing peak flows and erosion in downstream waters and 3) increasing ground water recharge and therefore helping maintain biologically-important summer low flows. DFG recommends that the Update require projects to the maximum extent practicable, treat all stormwater from at least two-year rain events (Q2) on-site through detention and percolation.

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The City of Portland, Oregon, Bureau of Environmental Services internet site (<http://www.portlandonline.com/bes/index.cfm?c=29323>) provides good examples of LID designs and urban stormwater enhancement policies and technologies, which, given its Pacific Northwest climate, may also be appropriate for the City. Sonoma County, the City of Santa Rosa, and the Russian River Watershed Counsel have also jointly developed a comprehensive set of urban stormwater mitigation guidelines for the Santa Rosa area (Sonoma County 2005).

Riparian and wetland vegetation improves stream and wetland water quality by removing organic and inorganic nutrients and toxic materials (Mitsch and Gosselink 2000). Riparian and wetland vegetation also provide important wildlife habitat values, flood water storage capacity, and bank protection, which help ameliorate bank erosion and the down-stream effects of flooding. Consequently, DFG recommends the Update include standards that allow riparian vegetation removal only in very limited circumstances. In all cases, before the substantial removal of riparian vegetation from the bed, bank, or channel of a stream, the responsible party must notify DFG to obtain a lake or streambed alteration agreement pursuant to Section 1600 *et seq.*, of the Fish and Game Code.

Encroachment and Development within Floodplains

DFG finds the floodplains of wetlands, streams and rivers provide significant biological functions to these waters and that development within floodplains is largely incompatible with the maintenance and enhancement of riparian, wetland, and aquatic habitats.

Development within floodplains is at significant risk from flood damage. Regional climate change models for California and the Pacific Northwest predict wetter winters, increased high runoff events and a higher frequency of flooding (Kim et al. 2002, Snyder et al. 2002, Bell et al. 2004, Kim 2005). The northern California Coast Range and the Sierra Nevada are expected to experience the largest increase in "heavy and extreme precipitation events" and the largest increases in annual precipitation in the region (Kim et al. 2002, Kim 2005). It is therefore reasonable to expect more frequent and more severe flood events over the life of the Update.

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Development within floodplains often results in future flood control measures such as channel dredging, bank armoring, riparian vegetation removal, and berm or dike construction, intended to protect floodplain property, but deleterious for the maintenance of functional riparian and floodplain habitat. To minimize the potential impacts of future projects on streams and rivers, DFG supports Update standards which restrict development in floodplains.

Impacts to Wetlands

The study area includes a diversity of wetland types. Over the past 200 years, the contiguous 48 states have lost an estimated 53% of their original wetlands, with California losing the largest percentage (91%) (Dahl 1990). The Fish and Game Commission (Commission) finds that California's remaining wetlands provide significant and essential habitat for a wide variety of important resident and migratory fish and wildlife species. The Commission also finds that projects that impact wetlands are damaging to fish and wildlife resources if they result in a net loss of wetland acreage or wetland habitat value. Therefore, it is the policy of the Commission to seek to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California.

It is DFG's policy to ensure that proposed projects will result in no net loss of wetland habitat values or acreage. DFG recommends the PEIR analyze the Update's potential impacts to wetlands and sensitive wetland species including an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats. Potential direct and indirect effects from development adjacent to wetlands include, but are not limited to: altered hydrology; diminished water quality from the discharge of pollutants such as sediment, pesticides, petroleum products, pathogens and other toxic substances; vegetation removal; disturbance to wildlife from noise, night lighting, and domestic animals; introduced invasive plant and animal species; altered microclimate; and human intrusion such as off-road vehicle use, homeless encampments, trash dumping, and illegal filling.

To best protect wetland habitat values, DFG recommends the Update include a clear wetland protection ordinance or standard that incorporates no-disturbance wetland buffers where no structures, grading, pavement, vegetation removal, septic systems, stormwater facilities, or other development would be permitted. These wetland buffers must minimize project impacts on wetlands to a less than significant level. Although currently under review and revision, DFG recommends that at a minimum, the City implement the DFG Region 1, 1994 wetland buffer recommendations.

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Habitat Fragmentation and Conversion of Agricultural and Forestlands

Forestlands occur within and adjacent to the eastern and northern edges of the Update study area. These forest stands are habitat for numerous wildlife species. According to the Background Reports, forest stands in close proximity to, or within the study area may be occupied by the northern spotted owl (*Strix occidentalis caurina*), a Federally-listed threatened species and a fully-protected species pursuant to Fish and Game Code Section 3503.5. The project study area also includes large areas of coastal prairie, which are identified in the Background Report as having occurrences of a number of sensitive plant species.

The future development envisioned in this Update is likely to result in the fragmentation and conversion of agricultural and forestlands. Habitat fragmentation from urban development has substantial environmental effects on fish and wildlife habitats. Encroachment effects of roads and structures on undeveloped areas include wildlife road-kill, increased garbage and roadside dumping, light and noise disturbance, the introduction of invasive species, the killing of and disturbance to wildlife by domestic animals, and an increase in predator fauna well adapted to the urban-rural interface, such as jays, crows, and ravens. These affect the long-term sustainability of wildlife populations, e.g., northern spotted owl and marbled murrelet. Furthermore, the placement of residential developments in agricultural and forestlands typically leads to increases in human conflict with wildlife such as black bear, mountain lion, and fox. This conflict often results in depredation of these animals.

DFG therefore recommends the PEIR specifically evaluate the direct and indirect impacts of habitat fragmentation that will result from the Update. To minimize potentially significant development-related impacts to wildlife habitat within and adjacent to the study area, DFG recommends the Update include policies and standards that promote infilling and minimizes development in and conversion of the forested hillsides on the eastern and northern edges of the study area.

Exterior Lighting Standards and Photo-pollution

The adverse ecological effects of artificial night lighting on terrestrial and aquatic resources such as fish, birds, mammals, and plants are well documented (Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive rates, changes in foraging behavior and predator-prey interactions, altered wildlife species richness and community composition, and

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phototaxis (attraction and movement towards light). Much of the future development envisioned in the Update will take place on land in close proximity to resources areas with significant wildlife habitat values. DFG therefore recommends the PEIR evaluate the direct and cumulative effects that photo-pollution from artificial night lighting will have on fish and wildlife species.

To minimize the ecological consequences of artificial night lighting and glare on wildlife species and their habitats, DFG recommends the City adopt a standard that requires exterior lighting fixtures and street standards (both for residential and commercial areas) be fully-shielded and designed and installed to minimize off-site photo-pollution. As an example, DFG recommends the County consider the McKinleyville Community Services District Ordinance 51.07, adopted on June 30, 2000:

"Street lighting fixture standards shall be in accordance with the recommendation of the International Dark-Sky Society [sic], specifically selected and specified to minimize the potential for light pollution, and shall include external glare shields, and/or internal louvers to controlled [sic] direct glare and/or uplight."

Fire Safe Zones, Vegetation Management, and Invasive Species Introductions

Recent changes to Public Recourses Code §4291 expand the defensible space clearance requirement maintained around buildings and structures from 30 feet to a distance of 100 feet. These guidelines also recommend more vegetation (fuels) clearing on lands with steeper terrain and larger and more dense fuels. Defensible space areas, typically require on-going vegetation management to reduce fuel loads. For subdivisions and other development projects proposed in forestlands, defensible space areas increases the ecological footprint and environmental effects of these projects.

DFG is concerned that designating defensible space areas that coincide with steep slopes and requiring periodic fuels-reducing vegetation removal will result in increased surface erosion and gullies and slope instability. Furthermore, areas routinely managed for vegetation removal are prone to infestation by invasive exotic species and noxious weeds. Invasive plant species are widely regarded as one of the most significant global threats to biodiversity. Horticultural plants used for landscaping are a principal cause of invasive plant

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introductions, and a recent estimate puts economic cost of invasive plants in the United States at \$35 billion per year (Mack and Lonsdale 2001; Reichard and White 2001). Ironically, one way invasive plants can affect native ecosystems is by changing fuel properties, which can in turn affect fire behavior and, ultimately, alter fire regime characteristics such as frequency, intensity, extent, type, and seasonality of fire (Brooks et al., 2004).

For the above reasons, DFG recommends the Update incorporate defensible space standards that minimize the risk of erosion, slope instability, and the introduction of invasive plants. DFG recommends the Update include landscaping guidelines or recommendations that assist developers, landscapers, and the public in minimizing the risk of invasive exotic and noxious weed introductions from developments requiring defensible space areas. Because of the need for routine vegetation clearing within defensible space areas, DFG recommends the City develop a standard that requires fire safe zones be placed outside of riparian and wetland buffers.

Specific Recommendations:

- 1) Include in the PEIR an analysis of the Update's potential impacts to streams and riparian areas and an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats.
- 2) Incorporate no-disturbance riparian buffers into the Update which are at least as protective as the DFG Region 1, 1994 riparian habitat recommendations.
- 3) Include in the PEIR a thorough evaluation of potential direct and indirect impacts of increased stormwater runoff and altered hydrology on waters of the State.
- 4) Include Update standards that prohibit projects from altering the hydrologic regimes of streams by increasing peak flows or decreasing summer low flows by treating all stormwater from at least a two-year rain event (Q2) on-site through retention and percolation.
- 5) Include Update standards requiring low-impact design elements that maintain, to the greatest extent feasible, post-project pervious surfaces.

Ms. Liz Shorey
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- 6) Include Update standards that allow riparian vegetation removal only in very limited circumstances.
- 7) Develop and strengthen Update flood hazard policies to restrict development in floodplains.
- 8) Include in the PEIR an analysis of the Update's potential impacts to wetlands and sensitive wetland species including an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats.
- 9) Strengthen the City wetland protection policy and standards to include an effective no-disturbance buffer where grading, vegetation removal and other development shall be prohibited.
- 10) Include in the Update policies that promote infilling and that minimize the fragmentation and conversion of agricultural and forestlands.
- 11) Include in the Update a standard that requires exterior lighting fixtures and street standards (both for residential and commercial areas) be fully-shielded and designed and installed to minimize off-site photo-pollution.
- 12) Incorporate defensible space standards in the Update that minimize the risk of erosion, slope instability, and the introduction of invasive plants.
- 13) Include in the Update landscaping guidelines or recommendations that assist developers, landscapers, and the public in minimizing the risk of invasive exotic and noxious weed introductions.
- 14) Include in the Update a standard that requires fire safe zones be placed outside of riparian and wetland buffers.

By adopting the recommendations set forth in this letter, DFG finds the City will feasibly minimize potentially significant impacts to fish and wildlife resources from the future development and land use changes anticipated in the Update. Furthermore, DFG finds that by implementing the riparian and aquatic protection measures listed above, the City will likely avoid take of listed anadromous salmonids, will actively help bring about their recovery and eventual down-listing, and consequently, spur a revival of the regional commercial and recreational fishing industries.

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If you have any questions or comments regarding this matter, please contact Staff Environmental Scientist Gordon Leppig at 619 Second Street, Eureka, California, 95501 or telephone (707) 441-2062.

Sincerely,


GARY B. STACEY
Regional Manager

Attachment

cc: See Page Fourteen

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Ms. Liz Shorey
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cc: Ms. Irma Lagomarsino
National Marine Fisheries Service
Arcata Area Office
1655 Heindon Road
Arcata, California 95521

Mr. Mike Long
United States Fish and Wildlife Service
1655 Heindon Road
Arcata, California 95521

Mr. Kelley Reid
Army Corps of Engineers
Eureka Project Office
601 Startare Drive
Eureka, California 95501

Ms. Laurie Harnsberger
Department of Fish and Game
619 Second Street
Eureka, California 95501

ec: Messrs. Mark Stopher, William Condon, Ken Moore, Eric Haney,
Scott Downie, Bruce Webb, Scott Bauer, and Gordon Leppig
Mrs. Donna Cobb, Michelle Gilroy, Jane Vorpapel, and Laurie Harnsberger
Dr. Gayle Garman
Department of Fish and Game
mstopher@dfg.ca.gov, wcondon@dfg.ca.gov, kmoore@dfg.ca.gov,
ehaney@dfg.ca.gov, sdownie@dfg.ca.gov, bwebb@dfg.ca.gov,
sbauer@dfg.ca.gov, gleppig@dfg.ca.gov, dcobb@dfg.ca.gov,
mgilroy@dfg.ca.gov, jvorpapel@dfg.ca.gov, lharnsberger@dfg.ca.gov,
ggarman@dfg.ca.gov

Messrs. John Short, Bruce Ho, and Paul Keiran
North Coast Regional Water Quality Control Board
jshort@waterboards.ca.gov, bho@waterboards.gov,
pkeiran@waterboards.gov

**Attachment One
Fortuna General Plan Update
August 9, 2007**

Impacts of urbanization and increased residential development on Fortuna area streams and riparian areas: relevant excerpts from the DFG Coastal Watershed Planning and Assessment Program 2006 Lower Eel River Basin Assessment.

Altered flow regimes

- Low summer flows are exacerbated by land and stream disturbances and result in dry or intermittent reaches on streams, which are stressful to salmonids;
- Fortuna operates five groundwater extraction wells near the Eel River;
- Increased development in Fortuna, especially in the southern and eastern parts of the city, has increased runoff from newly created impervious areas (FEMA 1981 cited in Mintier and Associates 2006);
- Many of the storm drains and culverts in Fortuna are undersized (Winzler and Kelly 2005), increasing the velocity of flows during precipitation events;
- Strongs and Rohner creeks have been modified where they flow through Fortuna to eliminate their floodplains, increasing the volume and velocity of flows during precipitation events;
- Winter floods are increasingly common due to high winter precipitation levels, increased runoff, and undersized storm water drainage structures. Areas with current flooding include the North Fortuna Drainage Area, Rohner Creek, the lower reaches of Strongs Creek, and Jameson Creek at the confluence with Strongs Creek (Winzler and Kelly 2005); and
- Undersized drainage capacity has also been identified in several areas including Rohner Creek and the Mill Creek drainage. Rohner Creek has the highest potential for serious flooding (Winzler and Kelly 2005).

Addition of pollutants

- When flows are sufficiently high, the Eel River floods into treatment ponds of the Fortuna Wastewater Treatment Plant;
- The Fortuna Wastewater Treatment Plant received a cease and desist order in 1997. The issue was resolved and the order was rescinded that same year;
- The treatment plant had three chlorine limit violations - one maximum and two minimum values that violated the permit level in 2004. Sewer overflows that occurred in the system were caused by high flows and collection system stoppages;
- Increased development in Fortuna, especially in the southern and eastern parts of the city, has increased runoff from newly created impervious areas (FEMA 1981 cited in Mintier and Associates 2006). Although no specific tests of chemicals have been conducted in Fortuna's streams, urban runoff in general is known to mobilize chemicals such as trace elements, pesticides, copper, and volatile organic compounds (Hamilton et al., 2004);

**Attachment One
Fortuna General Plan Update
August 9, 2007**

- Livestock grazing likely occurs in 23% of subbasin and has been noted along Strongs and North Fork Strongs creeks. Although no specific tests of nutrients and/or coliform bacteria have been conducted in these creeks, levels of these constituents often exceed water quality standards in areas with extensive livestock use; and
- The Humboldt Creamery located just downstream of Fernbridge on the Eel River has a wastewater discharge permit.

Fish passage barriers where roads cross streams

- A culvert on Mill Creek (RM 1.3) and Rohnerville Road does not meet CDFG and NOAA Fisheries fish passage guidelines; and
- Palmer Creek has problems with fish passage due to a barrier in the 800 foot culvert under Highway 101.

Erosion from roads, construction wastes, and ground disturbance

- Natural erosion rates are high due to:
 - The major rock underlying the subbasin is alluvium, which constitutes 70% of the subbasin. The other bedrock, also sedimentary, is Pliocene marine. Both of these geologic types are highly erodible;
 - Rapid incision rates of the mainstem and its tributaries have left a series of river terrace deposits perched steeply above the current stream channels which contribute fine sediments through slope instability and dry ravel;
 - The Little Salmon fault cuts through this basin, weakening bedrock and increasing the potential for seismic triggering of landslides; and
 - During the winter rainy season, heavily silted water flows through the steep upstream terrain, which affects turbidity and sediment levels in streams.
- Changes in basin due to land use:
 - Sedimentation and in-filling as a result of land development and subdivision activities, gravel mining and timber harvesting practices have resulted in an overall reduction in channel area, and consequently in available salmonid habitat;
 - Fortuna grew from one square mile in 1950 to 4.68 square miles in size in 2006. This represents a change from approximately 4% to 19.5% of the subbasin;
 - The Fortuna annual average population growth rate from 1980 to 2005 was 1.6%. If the city continues to grow at this rate the population will rise from 11,250 to approximately 17,000 in the next 25 years (Mintier and Associates 2006);
 - There were 4,729 housing units in Fortuna in 2005. If current growth rates continue, Fortuna will require 2,298 new housing units by 2030 (Mintier and Associates 2006); and

**Attachment One
Fortuna General Plan Update
August 9, 2007**

- Additionally, it is projected that there will be a need for an additional 852,866 square feet of commercial, retail, and manufacturing space by 2030 (Mintier and Associates 2006).
- Possible effects seen in stream conditions:
 - The Fortuna Creeks Project found that stressful turbidity levels are reached during the rainy winter months. These high levels of turbidity, which are particularly apparent in Strongs and Rohner creeks, occur during spawning season;
 - None of the surveyed streams met target values of pool depth; and
 - Excessive sediment in stream channels has resulted in an overall loss of spawning, rearing and feeding habitat for salmonids. High sediment levels are confirmed by embeddedness measurements in surveyed reaches.

There is concern about unrestricted stream access of livestock in agricultural areas.

- Impacts from livestock grazing have been noted during stream surveys on Strongs and North Fork Strongs creeks; and
- Livestock grazing operations likely occur in 23% of subbasin.

Instream habitat conditions for salmonids are thought to be poor.

- Quality pool structure is generally lacking in Middle Subbasin streams; no surveyed streams met standards for pool shelter. Pool shelter ratings ranged from fully unsuitable to somewhat unsuitable levels;
- None of the surveyed streams met target values of pool depth. However, streams of the Middle Subbasin were composed of more primary pools by length than those of the Upper Subbasin; and
- Spawning gravels in Strongs and North Fork Strongs creeks are found in only a limited number of reaches. Additionally, crowded and superimposed redds have been observed during spawning surveys. None of the CDFG surveyed streams of the Middle Subbasin met target values for cobble embeddedness.



CITY OF EUREKA
COMMUNITY DEVELOPMENT DEPARTMENT
Kevin R. Hamblin, AICP, Director

Sidnie L. Olson, AICP, Principal Planner
531 K Street • Eureka, California 95501-1146
Ph (707) 441-4265 • Fx (707) 441-4202
solson@ci.eureka.ca.gov • www.ci.eureka.ca.gov

July 17, 2008

City of Fortuna
General Plan Update
621 11th Street
Fortuna, CA 95540

Subject: Comments on the DPEIR for the Fortuna General Plan Update

Dear Stephen;

This letter presents comments from the City of Eureka's Community Development Department on the DPEIR for the Fortuna General Plan Update. Of import to these comments are inconsistencies throughout the DPEIR that range from minor to serious. These inconsistencies, once corrected, could result in additional comments from the City of Eureka. The inconsistencies of concern to these comments are the projected acres/square feet of commercial and industrial space in the 2030 plan. If the projected acres/square feet of commercial and industrial space for the 2030 General Plan as presented in Table 3.1-4 are the correct numbers, then the Community Development Department has no comment on the DPEIR.

However, if the area of proposed commercial and industrial acreage/square footage for the 2030 Plan is as described in Chapter 9, Section 9.5, page 9-37, the City of Eureka strongly believes that the analysis in the DPEIR of urban decay is woefully inadequate - to such a degree that it would not allow informed decision making.

Respectfully,



Sidnie L. Olson, AICP
Principal Planner

cc: David W. Tyson, City Manager, City of Eureka

City of Fortuna
Attn: Stephen Avis
621 11th Street
Fortuna, CA 95540

July 15, 2008

Re: City of Fortuna General Plan Draft PEIR

Dear Mr. Avis,



I would like to express my concern in regard to two items in the City of Fortuna's Draft Program Environmental Impact Report which I find inadequately considered, underestimated in level of significance, mitigation and cumulative impacts. Both are found in Chapter 7. Public Facilities and Services; 7.6 Law Enforcement and Fire Protection.

Fire Protection Woven throughout the General Plan document are inferences that the current "Volunteer" department is inadequate in their ability to handle inspections, tax collection, recruitment and emergency response planning. As stated, the impact of implementation of the General Plan "*could increase the demand for fire protection services*" which I find nicely understated.

I don't feel the document adequately addresses the cumulative impact of increased residential, commercial and industrial development and it's affect on fire department structure or operations within the city limits and proposed annexations. I also believe that as the current volunteer department transitions to a "paid" department there will be a very large funding liability inherited by the City. As I understand California law, cities are required to provide fire protection for their citizens. If this is the case, one would have to assume that the conversion of a volunteer department to a paid department would require substantial city resources and funding, either through the establishment of a City Fire Department or through a contract for fire services with the existing Fire District or some other entity.

Law Enforcement The General Plan document states that “*implementation could increase the demand for police services.*” The document seemingly addresses the significance and mitigation of the effects of growth on police services. What I don’t think is adequately addressed is the potential effects of changing demographics on police services under the different alternatives. As an example, if a large retail development were to occur in the “Mill District” what combination of law enforcement services and funding would be required as opposed to an alternative that substantially increases low cost housing? I also think there is a direct correlation between police services and a “paid” fire department. Besides the obvious potential for budget conflicts there is potential for changes in duties and priorities between police and fire services that is not being considered or addressed such as medical aid responses, licensing and inspections.

Thank you for considering my comments!

Sincerely,

A handwritten signature in cursive script that reads "Clifford B. Chapman, Sr." The signature is written in black ink and is positioned above the typed name.

Clifford B. Chapman, Sr.
1087 Stewart Street
Fortuna, CA 95540
(707) 725-6710

July 11, 2008

Del Westman
1055 L Street
Fortuna, Ca. 95540

Mr. Duane Rigge
Fortuna City Manager
621 11th Street
Fortuna, Ca 95540

Re: General Plan Update:

Dear Mr. Rigge:

Chapter four of the general plan, section TC-1.9, states that the city shall maintain designated truck routes on major roadways and discourage non-local and commercial traffic from using and parking on local residential streets.

I would like for the city staff to look at the industrial complex at K and 7th Streets. Large trucks, mostly hauling large equipment, are leaving and reentering this complex traveling West and East on L St and North and South on 12th St.. They are going by a elementary school on L St and a high school on 12th St., which endangers students, faculty and parents entering and leaving school grounds.

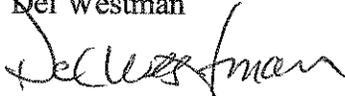
My other concern is L Street. When these heavy rigs go by our house they shake the house. My neighbor next to me on 11th street says the same. This could indicate that there is a weak spot in the street in the area of our house and the street is not suitable for heavy traffic.

If the property at 7th and K is going to remain light industrial, then 7th street from K to Main Street and Main Street North could be an established truck route. To make the turn at Main Street, 7th Street for three parking spaces on each side should be a no parking zone.

Thank you for your consideration on these matters.

Respectfully,

Del Westman



Enclosed: City street map

A | B | C | D | E | F |

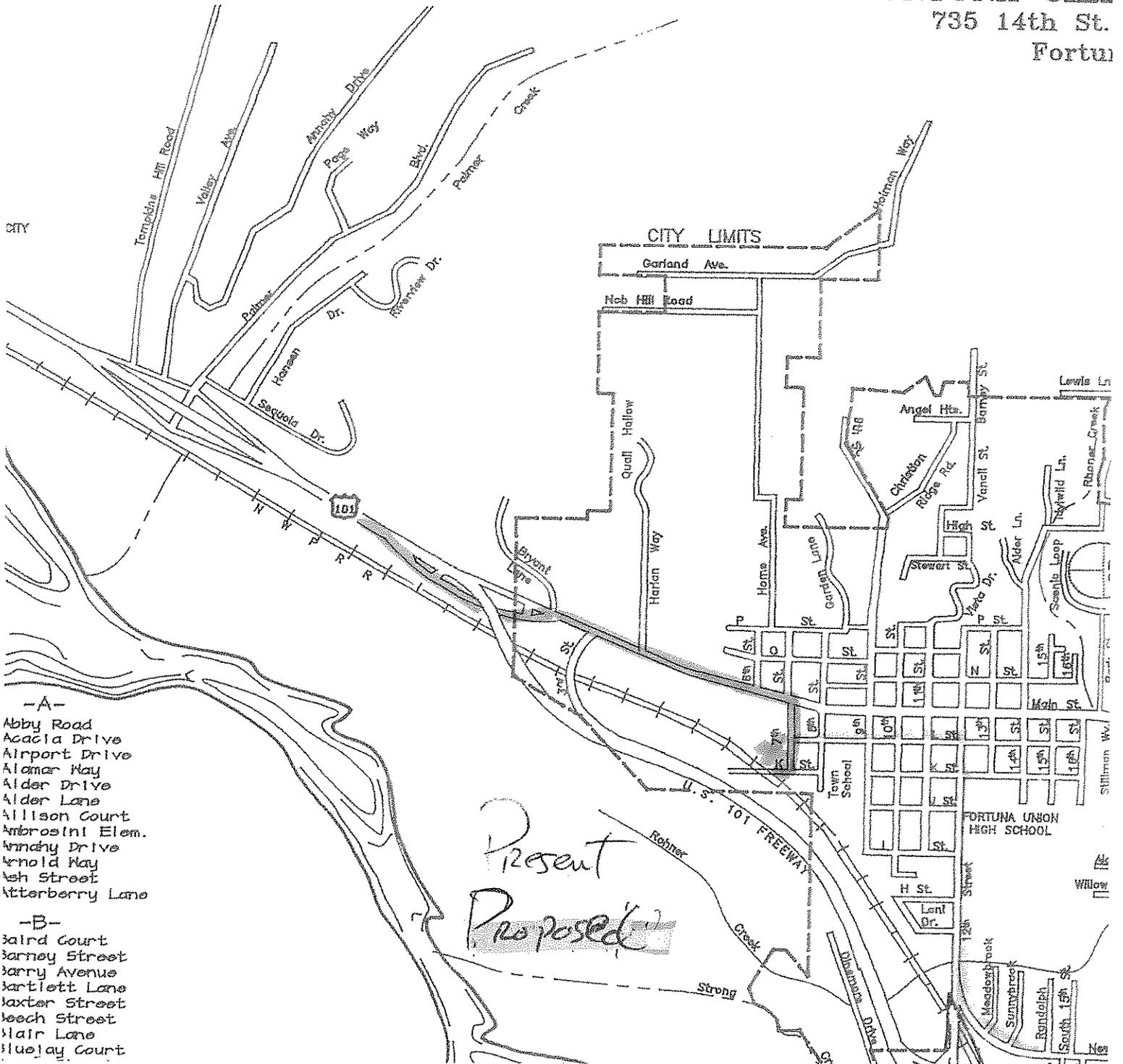


Map drawn by
A.M. BAIRD ENGINEERING
 1100 Main Street Fortuna
 1-800-675-5182 OR (707) 725-5182

CITY OF AND Pr

Development Design Consulting Mobile Home & R.V. Parks Solar

FORTUNA CHA
 735 14th St.
 Fortu



- A-
- Abby Road
- Acacia Drive
- Airport Drive
- Alamar Way
- Alder Drive
- Alder Lane
- Allison Court
- Ambrosini Elem.
- Annahy Drive
- Arnold Way
- Ash Street
- Kitterberry Lane
- B-
- Baird Court
- Barney Street
- Barry Avenue
- Bartlett Lane
- Baxter Street
- Beach Street
- Bair Lane
- Bluejay Court

A | B | C | D | E | F |

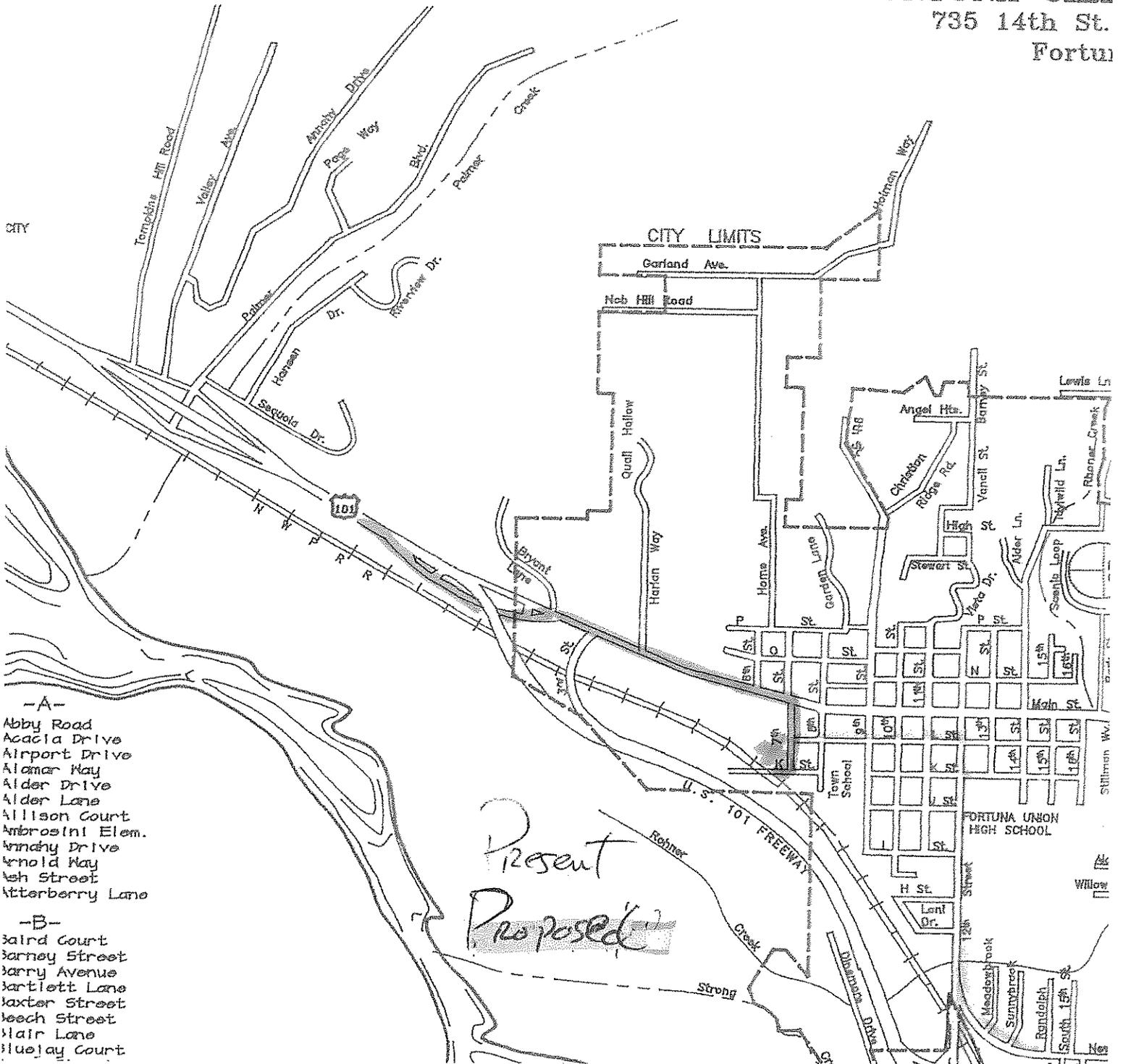


Map drawn by
A.M. BAIRD ENGINEERING
 1100 Main Street Fortuna
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Development Design Consulting Mobile Home & R.V. Parks Solar

FORTUNA CHA
 735 14th St.
 Fortu



- A-
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- Arnold Way
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- B-
- Baird Court
- Barney Street
- Barry Avenue
- Bartlett Lane
- Baxter Street
- Beach Street
- Bair Lane
- Bluejay Court



DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>

NORTHERN REGION
601 Locust Street
Redding, CA 96001
(530) 225-2300



July 15, 2008

Mr. Steven Avis
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Dear Mr. Avis:

**City of Fortuna General Plan Update
Draft Program Environmental Impact Report
State Clearinghouse #2007062106**

The following presents the Department of Fish and Game's (DFG) comments and recommendations on the City of Fortuna draft program environmental impact report (DPEIR) for the City's General Plan Update. DFG has reviewed the DPEIR and the February 2008 Public Hearing Draft Policy Update document (Update), available on the City's website. An environmental impact report is a detailed statement prepared pursuant to the California Environmental Quality Act (CEQA) that describes and analyzes project alternatives, environmental impacts, and ways to mitigate or avoid these impacts, if significant. This Update is a long-term policy document with a 25-year planning horizon. Its purpose is to guide the City's values, public policies, and resource conservation goals relative to designated land uses and community development.

The Update predicts that by the year 2030, the City population will increase by more than 6,000 people. The Update anticipates growth during this period will include 2,800 new dwelling units, almost one million square feet of new retail space and almost one million square feet of new office and industrial space. Two Update alternatives plan for a significant conversion of agricultural lands to industrial uses, such as on the Rohnerville Bluffs. The Update also proposes the annexation of three adjacent areas into the City: Riverwalk (99 acres), Strongs Creek (325 acres), and Carson Woods (264 acres).*

The stated goal of the Update Biological Resources chapter is to protect and maintain riparian corridors, wetlands, and environmentally sensitive habitat areas. DFG and the City share this goal. As a trustee agency for the State's fish and wildlife resources, DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary to sustain their populations. As a responsible agency, DFG administers the

Mr. Steven Avis
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California Endangered Species Act (CESA) and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife public trust resources. DFG offers the following comments and recommendations in our role as a trustee and responsible agency under CEQA.

Previous DFG Comments on the Update

On August 10 and October 29, 2007, DFG submitted written comments on the Update notice of preparation for this DPEIR and on the inadequacy of the City's aquatic habitat conservation measures in relation to the Update. These letters are attached (Attachments One and Two) to provide substantial evidence for the comments included here. These attached letters are an integral component of the comments in this letter and must be included in the DPEIR official record and evaluated accordingly. They provide substantial evidence that future development allowed under the Update is likely to result in significant impacts to aquatic habitats and species unless the Update includes feasible measures to mitigate these impacts to a less than significant level.

DFG presented in these letters mitigation recommendations to assist the City to substantially improve its aquatic habitat protection efforts. DFG also identified potential outcomes if the City does not improve its efforts. The October 29, 2007, letter informed the City that DFG believes the City's current efforts are inadequate to mitigate the impacts of projects on wetland and riparian habitats and to protect and maintain listed salmonid fish populations and avoid their incidental take.

DFG described two principal potentially significant environmental impacts that this Update will have on wetlands, streams, riparian corridors, and the species that depend upon them: 1) aquatic and riparian habitat will be lost or degraded unless substantially improved buffers are enforced to minimize the direct and indirect impacts of the anticipated development and, 2) water quality will degrade by increased non-point source pollution and increased peak flows, and altered hydrologic regimes from urban stormwater runoff unless improved stormwater mitigations are implemented.

These letters emphasized that the City's five named streams provide important habitat for listed salmonid fishes. Fortuna's streams provide habitat for coho salmon (*Oncorhynchus kisutch*), a State- and federally-threatened species; coastal cutthroat trout (*Oncorhynchus clarki clarki*), a California species of

special concern; and steelhead (*Oncorhynchus mykiss*) a federally-threatened species and a California species of special concern. Chinook salmon (*Oncorhynchus tshawytscha*) a federally-threatened species, occurs downstream in the lower Eel River and reliable reports indicate it was historically present in Strongs Creek and its tributaries. Strongs Creek also has one of the southern-most documented populations of coastal cutthroat trout, a species whose range stretches from the Fortuna area to Alaska's Kenai Peninsula. In addition to these salmonids, a breeding population of Willow flycatcher (*Empidonax traillii*) a State-endangered species is documented within the study area along the Van Duzen River. These species, with the exception of coastal cutthroat trout, are listed pursuant to the federal Endangered Species Act and/or the California Endangered Species Act.

The October 29, 2007, DFG letter informed the City that if the Update fails to implement effective stormwater quality mitigations and riparian buffers, then DFG is likely to determine that City-approved projects that impact riparian and wetland habitats will:

- 1) result in the incidental take of State- and federally-threatened species and therefore require the issuance of an incidental take permit (ITP), pursuant to CESA;
- 2) have a significant effect on the environment, and therefore require the preparation of an EIR; and
- 3) result in cumulatively considerable impacts on riparian and aquatic species, as defined in CEQA §15065(a)(3).

Potentially Significant Impacts and Proposed Update Mitigations

General plan update policies are carried out by implementation measures. For an update policy to be useful as a guide to action, it must be clear, unambiguous, and have enforceable implementation measures. According to the Governor's Office of Planning and Research 2003 General Plan Guidelines, "Adopting broadly drawn and vague policies is poor practice. It is better to adopt no policy than to adopt a policy with no backbone" (Governor's Office 2003). DFG can find few implementation measures in the Update. Update Appendix C: Implementation Program Matrix states "Implementation Program matrix to be provided at a later date." Therefore, it is impossible during the DPEIR comment

period to evaluate how Update policies will be implemented and made effective and enforceable. It is ineffective for a general plan update to issue broad and unenforceable policy statements as mitigation measures.

DFG believes the majority of the Update's policies and programs intended to mitigate impacts to aquatic and riparian habitats are either not mitigations at all pursuant to CEQA §15370, or are vague, speculative, unquantifiable and unenforceable. According to CEQA §15370, mitigation includes:

- (a) avoiding the impact altogether by not taking a certain action or parts of an action;
- (b) minimizing impacts by limiting the degree or magnitude of the action and its implementation;
- (c) rectifying the impact by repairing, rehabilitating, or restoring the impacted environment;
- (d) reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action; and
- (e) compensating for the impact by replacing or providing substitute resources or environments.

The Update largely fails to provide measures that meet these mitigation criteria.

Selected Pertinent Update Aquatic Resource Policies and Mitigations and Comments on their Inadequacies

NCR-2.1, Riparian Corridor Protection. The City shall establish riparian buffers to provide terrestrial wildlife and fish movement corridors along fish bearing streams through the Planning Area. Development within these buffers shall be limited to recreational uses and the movement of wildlife.

Intent to develop mitigations in the future is not mitigation. The DPEIR does not specify how these future buffers will be implemented and enforced, i.e., will they be in the form of an ordinance or a recommendation? This policy only addresses fish and wildlife movement, not in situ spawning, nesting, rearing, and foraging habitat. It only addresses fish-bearing streams. The purpose of these buffers is vague, provides no measurable habitat protection standard, and its intent is only for fish and wildlife movement corridors and human recreation, not fish and wildlife habitat protection, restoration, or enhancement. As written, a buffer could include sport and field facilities, mowed lawn picnic area, or

Mr. Steven Avis
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structures and parking areas for indoor fitness facilities. The stated goal of the Update Biological Resources chapter is to protect and maintain riparian corridors, yet this policy has no prescriptive or performance-based protection standards.

According to the Impacts and Mitigation Summary Table 2.11-1, NCR-2.1 will result in potentially significant impacts becoming "less than significant." DFG disagrees with this assertion. Without knowing the width of these buffers, the land use restrictions within them, and if or how they will be enforced, their effectiveness cannot be evaluated. For instance, will these buffers start at the mid-line of the stream channel, the top of bank, or, as DFG recommends, at the edge of riparian habitat? Will roads, parking lots, trails, or structures be permitted in riparian buffers? A "less than significant impacts" determination cannot be supported with the existing level of information.

NCR-2.2 Salmonid Bearing Stream Protection. The City shall consult with, and require developers of projects to consult the California Department of Fish and Game (CDFG) and other regulatory agencies for expertise and guidance prior to any restoration activity within salmonid-bearing streams.

While stream habitat restoration can be mitigation, this policy contains no restoration requirements. Merely consulting with DFG and other agencies is not mitigation.

NCR-2.3 CDFG Collaboration. The City shall work to implement the recommendations put forth in the Recovery Strategy for California Coho Salmon, and other wildlife species, such as the Willow Flycatcher, to benefit salmonid species present within the General Plan Area by enhancing and restoring riparian ecosystems, improving water quality, and reducing flooding.

DFG has previously provided recommendations from the Recovery Strategy for California Coho Salmon to the City in its two previous letters. DFG has previously provided recommendations for enhancing and restoring riparian ecosystems, improving water quality, and reducing flooding. The City has not collaborated with DFG in implementing these recommendations. This policy contains no specific or credible information on when, where, and how Coho Recovery Plan recommendations will be implemented.

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NCR-2.4 Natural Production Streams. The City shall use North Coast Basin Planning Project (BPP) stream inventory reports that characterize applicable habitat components to manage each identified stream tributary as an anadromous fish and natural production streams.

NCR-2.5 Sustainable Salmonid Stocks. The City shall collaborate with the CDFG and National Oceanic and Atmospheric Association Fisheries [sic] to develop sustainable, long-term salmonid stocks, improve quantity and quality of habitat available to salmonids, and accelerate species recovery, as well as enhance opportunities for human enjoyment.

Policies NCR-2.4 and NCR-2.5 are vague and unenforceable as discussed in the (Governor's Office 2003). They are not mitigations.

NCR-2.6 CEQA §15370 Requirements. The City shall require projects that may result in a significant impact to special status species, as defined in CEQA §15380 or other applicable State or local regulations, to meet requirements of CEQA §15370 for avoiding, minimizing, or mitigating the impact to a less-than-significant level as determined by the jurisdictional resource agency(s).

NCR-2.7 Endangered Species. The City, as lead agency, shall require that all projects comply with the requirements of the federal Endangered Species Act, California Endangered Species Act, Clean Water Act, CDFG [sic] code, and CEQA.

Policies NCR-2.6 and NCR-2.7 are not mitigations. The City, as a lead agency pursuant to CEQA, is required to abide by CEQA, as well as all other relevant State and federal statutes and guidelines. Obeying the law is not mitigation.

NCR-2.8 Native Vegetation. The City shall coordinate with resource agencies to encourage the preservation of native vegetation, while managing areas with high concentrations of invasive species and/or noxious weeds and preventing their encroachment into new areas.

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Invasive species and noxious weeds are a significant threat to biodiversity, sensitive species and wetland and riparian habitats. This policy is vague and unenforceable. Coordinating to encourage the preservation of native vegetation is not a mitigation.

NCR 2.9 Biological/Ecological Review. The City, when reviewing projects pursuant to CEQA, shall include an appropriate level of biological and natural resources review, which may include a survey by a qualified biologist/ ecologist/botanist, pursuant to CDFG recommended guidelines and/or existing resource agency survey protocols.

NCR 2.9 is a requirement of CEQA. The City is required to comply with State and federal regulations. This requirement cannot be construed as an Update mitigation.

NCR-1.1 Watershed Protection. The City shall regulate development that could pollute watersheds and condition development to minimize point source and non-point source discharges of pollutants in the local watersheds. The City shall also require adequate mitigation for development that may change runoff quality and/or quantity to ensure pollution will not occur.

Policy NCR-1.1 is vague and unenforceable, as discussed in the 2003 General Plan Guidelines (Governor's Office 2003). It is not a mitigation. How will the City "regulate" development? How will the City "ensure pollution will not occur"?

NCR-1.4 Manage Impervious Coverage. The City shall manage the extent of impervious coverage in the Planning Area to reduce impervious area coverage and to minimize directly connected impervious areas. This will reduce impacts associated with runoff from new development and re-development projects in the Planning Area.

Policy NCR-1.4 is vague, inadequate, and unenforceable, as discussed in the (Governor's Office 2003). What does "manage the extent of impervious coverage" mean? This policy includes no means for implementation or a quantifiable target or threshold on which to measure success. It is not a mitigation. Specifically, how does the City propose to add 2,800 new dwelling units during the life of the Update, and "reduce impervious area coverage" in the planning area?

NCR-1.5 Control Pollutant Sources. The City shall require the integration of best management practices in new development and re-development projects to control pollutant sources and prevent pollutants from contacting runoff during and following development.

Policy NCR-1.5 is vague, inadequate, and unenforceable as discussed in the (Governor's Office 2003). How will the City "integrate" these best management practices (BMPs)? Without describing or including in the DPEIR or the Update what these BMPs are and how they will be enforced, the DPEIR cannot consider this a mitigation or evaluate the policy's effectiveness in avoiding or minimizing potentially significant environmental impacts.

NCR-1.6 Self-Treat Runoff. The City shall encourage the use of basic water quality strategies that self-treat runoff in new development and re-development projects. These strategies may include infiltrating runoff, retaining/detaining runoff, conveying runoff slowly through vegetation, and/or treatment of runoff on a flow-through basis using other standard treatment technologies.

DFG has previously made specific Low Impact Development (LID) recommendations to the City (Attachments One and Two, see also Attachments Three and Four, and below). While "encouragement" to use basic water quality strategies that self-treat runoff might be helpful, it has no enforcement mechanism. Thus the effectiveness of encouragement to mitigate impacts cannot be assessed by the DPEIR. Encouragement to mitigate impacts from development is not mitigation.

NCR-1.7 Clean Water Act Compliance. The City shall comply with the requirements of the Clean Water Act with the intent of minimizing the discharge of pollutants from point and non-point pollutant sources to surface waters.

The City is required to comply with State and federal regulations, including the Federal Clean Water Act and the Porter-Cologne Water Quality Control Act. This compliance requirement cannot be construed as an Update mitigation. Fortuna is subject to the U.S. Environmental Protection Agency Stormwater Phase II Final Rule which requires it to acquire a National Pollution Discharge Elimination System (NPDES) permit. Pursuant to this permit, the City has a Stormwater Management Program (Program) approved in January 2006.

It appears to DFG that the City is currently out of compliance with its Program, and thus, not currently in compliance with the Clean Water Act. For instance, the Public Education and Outreach section of the Program has minimum requirements. According to the Program, the City shall establish a stormwater steering committee and hold regular public meetings. DFG staff attended the first and only stormwater steering committee meeting on September 5, 2007. After that meeting, DFG was informed the City disbanded the steering committee and it would not meet again. While the Program states the City shall hold regular public meetings, and the Program is two and one-half years into a five year permit process, according to City staff, the City has not held one stormwater public meeting.

The Post-Construction Runoff Control Section (5.0) of this Program requires the City to, at a minimum: 1) "Develop, implement and enforce a program to assess stormwater runoff from new development and redevelopment projects that result in the land disturbance of greater than or equal to one acre," and; 2) use an ordinance or other regulatory mechanism to address post-construction runoff from new development and redevelopment to the extent allowable under local law." The City has not developed an enforcement program, ordinance or other regulatory mechanism, to address post-construction runoff.

NCR 2.11 ESHA Inventory. The City shall collect information for a Planning Area ESHA inventory, including but not limited to wetlands, riparian areas, anadromous fish streams, special status species and their essential habitat, and CNDDB Sensitive Natural Communities, to assist with the project review process. This program shall include collaboration with resource agencies, such as CDFG and USFWS, to the extent possible. The inventory shall be updated at least every 10 years.

Collecting information for an inventory of sensitive habitats can be useful in protecting these habitats, but it is not in itself a mitigation without a stated means to conserve these habitats.

NCR 2.12 Wetland Protection. In considering new development projects, the City shall protect wetlands identified in the Planning Area that have the potential to be impacted from new development. Mitigation requirements for this protection may include the use of buffers.

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Policy NCR-1.12 is vague and unenforceable as discussed in (Governor's Office 2003). This policy provides no information on how, or by what process the City will protect wetlands.

Statement of Significant Unavoidable Adverse Impacts

Pursuant to CEQA §15093(b) Statement of Overriding Considerations:

When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.

Based upon the DPEIR Cumulative Impacts analysis, Chapter 10, it appears the DPEIR proposes issuing statements of overriding consideration for what the Update states are unavoidable significant impacts on hydrology and water resources, and on flooding.

Hydrology and Water Resources

The DPEIR states: "Implementation of the General Plan has the potential to degrade water quality or violate water quality implementation standards. This is considered a significant, unavoidable impact."

DFG believes it is highly unlikely that the City can provide the substantial evidence to support a statement of overriding considerations. DFG has provided substantial evidence in the attached letters that this Update is likely to have significant impacts on hydrology, water quality, and consequently, on fish and wildlife habitat and aquatic species. However, DFG also made specific recommendations, such as requiring Low Impact Development (LID) techniques for new development that would have a high likelihood of reducing these impacts to a less than significant level.

LID includes stormwater management techniques to maintain or restore the natural hydrologic functions of a site by detaining water onsite, filtering out pollutants, and facilitating the infiltration of water into the ground. This innovative approach helps meet water quality and water supply objectives and maintain healthy, sustainable watersheds. Regional Water Quality Control

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Boards have already begun to integrate LID and other sustainable water management strategies into compliance documents. DFG recommends the City incorporate the use of LID techniques in its Update stormwater mitigation requirements to minimize the Update's impacts on wetlands and stream habitats. These techniques are tested, currently in use in many areas of California, and are often less expensive than traditional stormwater management strategies.

Two recent state resolutions by the California Ocean Protection Council and the State Water Resources Control Board (Attachments Three and Four) attest to LID's importance and effectiveness in protecting California's water resources. Because LID and other stormwater pollution prevention control techniques are documented as feasible and effective methods to mitigate water quality impacts of development, DFG believes the City cannot make a credible case that the Update's potentially significant impacts to hydrology and water resources are "unavoidable."

Flooding

The DPEIR states: "Implementation of the proposed General Plan has the potential to impede, or redirect, flows in flood hazard areas that cannot be reduced to a less than significant level. This is considered a significant, unavoidable impact."

The DPEIR Cumulative Impacts analysis, Chapter 10, pages 10-11, states, "The proposed General Plan's contribution to impacts related to flooding is cumulatively considerable." The DPEIR appears to provide no analysis of future hydrologic regimes of the City's streams if LID techniques and other effective stormwater management measures are implemented versus without these measures.

DFG's August 10, 2007, comment letter included a number of mitigations to minimize development-related increases in stormwater runoff to streams, thus avoiding project-related increased risk of flooding, bank erosion, and requests to rock armor or channelize streams to protect life and property. These mitigations are included as Specific Recommendations 1, 2, 4, 5, 6, 7, 9 in Attachment One. The Update does not effectively implement any of these recommendations.

A portion of the western edge of the City is within the 100-year flood plain of the Eel River. DFG can understand how certain Eel River flood-related risks to the City might be construed as unavoidable. However, the Update has a

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significant influence on where and how future development occurs within the floodplain of the City's streams, and how hydromodification from future development within the City will increase these stream's flood frequency, duration, and magnitude. Thus, DFG believes the Update's potential to significantly impact the flood hazard of the City's streams cannot be considered unavoidable.

Internal Inconsistency on Flooding and Water Quality Analysis

The DPEIR Cumulative Impacts analysis, Chapter 10, page 10, states, "The proposed General Plan's contribution to impacts related to flooding is cumulatively considerable." The DPEIR page 10-17 states: "Implementation of the proposed General Plan has the potential to impede, or redirect, flows in flood hazard areas that cannot be reduced to a less than significant level. This is considered a significant, unavoidable impact."

DPEIR Impacts and Mitigation Summary Table 2.11-1, directly contradicts this finding of significant impacts on flooding and states:

Impacts to structures in the 100-Year flood area are "Less than Significant" and "No mitigation necessary."

Impacts that "impede or redirect flows in flood hazard areas," are potentially significant, but after mitigation, are "Less than Significant."

Impacts from "flooding- failure of levee or dam," are potentially significant, but after mitigation, are "Less than Significant."

The DPEIR states on pages 10-17: "Implementation of the General Plan has the potential to degrade water quality or violate water quality implementation standards. This is considered a significant, unavoidable impact." Also, DPEIR Flooding Chapter 8, page 8.5-5 states, "As of 2005, significant development was occurring in Mill Creek Drainage, and city staff members have observed a significant increase in the amount of runoff entering the Mill Creek drainage system as a result."

DPEIR Impacts and Mitigation Summary Table 2.11-1, directly contradicts this finding of significant impacts on water quality and states:

Impacts to "Drainage Pattern Alterations," are "Less than Significant" and "No mitigation necessary."

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Impacts to "Stormwater Runoff Quantity Alterations," are "Less than Significant" and "No mitigation necessary."

Impacts to "Storm Drainage Alterations in Existing Runoff Quality leading to Additional Sources of Polluted Runoff," are potentially significant, but after mitigation, are "Less than Significant."

Clearly the DPEIR has internal inconsistencies in its analysis of the Update's impacts on flooding, development-related influences on increased peak flows and the quality and quantity of stormwater runoff, and the need for or effectiveness of mitigations. These internal inconsistencies are substantial and could have potentially significant consequences to fish and wildlife resources.

Conversion of Agricultural Lands to Development

Agricultural lands provide important habitat for wildlife, including black-tailed deer, small mammals, songbirds, raptors, and waterfowl. According to the DPEIR Chapter Five, the 1993 General Plan designates approximately 3,623 acres as zoned for agriculture, while the current Update Land Use Diagram designates approximately 1,865 acres for agricultural use. The DPEIR states the Update will redesignate 1,758 acres of agricultural lands for other uses and that this loss of agricultural lands will result in a "significant, unavoidable impact." It is unclear from the DPEIR what percentage of these redesignated lands will be converted to future development such as industrial and rural residential uses. Despite the DPEIR's designation of this impact as significant and unavoidable, the DPEIR proposes no mitigations to avoid or minimize this impact.

CEQA §15021(a) states "CEQA establishes a duty for public agencies to avoid or minimize environmental damage where feasible." CEQA §15021(a)(2) states:

A public agency should not approve a project as proposed if there are feasible alternatives or mitigation measures available that would substantially lessen any significant effects that the project would have on the environment.

Feasible mitigation measures such as conservation easements, greenbelts, zoning ordinances, open space preservation assessment districts, and cluster developments, are widely used to minimize the fragmentation or conversion of agricultural lands resulting from urban and exurban sprawl. Despite an ultimate determination by a lead agency that an impact may be

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significant and unavoidable, CEQA does not absolve a lead agency's requirement to substantially lessen a significant impact if feasible mitigations exist.

The August 10, 2007, DFG letter discusses the environmental impacts of converting agricultural lands to development and makes the following recommendation: "Include in the Update policies that promote infilling and that minimize the fragmentation and conversion of agricultural and forestlands." While the update includes a number of policies related to agricultural conversion, none of these policies will effectively preserve agricultural lands or mitigate impacts of conversion to other uses. Pursuant to CEQA, the Update must include, and the DPEIR must evaluate feasible mitigation measures (such as those presented above) to minimize the impacts of converting 1,758 acres of agricultural lands to other uses.

Deferred Development of Enforceable Implementation Measures

CEQA §15168(c)(5) states: "A program EIR will be most helpful in dealing with subsequent activities if it deals with the effects of the program as specifically and comprehensively as possible." According to CEQA §15168(b), utilizing a Program EIR for a General Plan Update can be advantageous because it can:

- 1) provide an occasion for a more exhaustive consideration of effects and alternatives than would be practical in an EIR on an individual action;
- 2) ensure consideration of cumulative impacts that might be slighted in a case-by-case analysis;
- 3) avoid duplicative reconsideration of basic policy considerations,
- 4) allow the Lead Agency to consider broad policy alternatives and programwide mitigation measures at an early time when the agency has greater flexibility to deal with basic problems or cumulative impacts; and
- 5) allow reduction in paperwork.

With so many vague and unenforceable policies in the Update, the City will be unable to benefit fully from the above potential advantages of their PEIR.

Furthermore, by deferring to the future the development of specific implementation standards and ordinances, the Update substantially diminishes their effectiveness and their likelihood of ever being utilized. In a number of instances, the City has not properly implemented, or implemented in a timely manner, State statues or components of its own plans and programs.

The DPEIR notes that a number of Hillside Creek drainage facility improvement alternatives were recommended in its 1982 Storm Drainage Master Plan, and that "none of those improvements were successfully implemented." For Mill Creek, the DPEIR states: "Many of the drainage improvements recommended in the 1982 Storm Drainage Master Plan have been implemented. However, most of the installed storm drains have been downsized from those recommendations." As noted above, there are a number of significant minimum requirements of the City's current 2006 Storm Water Management Program (including establishing a steering committee, holding regular public meetings, and developing, implementing, and enforcing a program to address storm water runoff from new development) that thus far have not been met.

Thus DFG has concern that the City will be unable to develop and approve specific mitigation standards or ordinances in a timely fashion, despite its best intentions. The preponderance of evidence indicates that if specific mitigations in the form of enforceable standards or ordinances are not included in this Update, a substantial amount of development allowed by the Update is likely to occur during the intervening years as the City works to prepare them.

Recirculation of the DPEIR Prior to Certification

According to CEQA §15088.5(a) "Recirculation of an EIR Prior to Certification," a lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under CEQA §15087, but before certification.

"Significant new information" requiring recirculation include, a disclosure showing that:

- 1) a new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented;

- 2) a substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance;
- 3) a feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it; and
- 4) the draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

According to CEQA §15088.5(e), a decision not to recirculate an EIR must be supported by substantial evidence in the administrative record. According to CEQA §15384(b), "Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts."

DFG believes the DPEIR must be recirculated for the following reasons:

- 1) The Update, as written, is likely to result in significant environmental impacts to listed salmonids, including coho salmon, and their habitat. The substantial evidence for this determination is included in Attachments One and Two. The DPEIR states the adverse impacts to special status species will be less than significant with the proposed mitigations. Pursuant to CEQA §15088.5(a)(1), this is a new significant environmental impact that would result from the project.
- 2) The DPEIR states: "Because of compromised buffers and associated riparian cover, protecting, enhancing, and increasing remaining riparian corridors is integral to long-term sustainability of wildlife populations. Identification and preservation of existing streams and riparian threads is critical to protecting wildlife habitat and movement corridors through and within the Planning Area." The DPEIR states that "policies NCR-2.1, NCR-2.10, NCR-2.11, NCR-2.6, NCR-2.7, NCR-2.8, NCR-2.9, are adequate to avoid significant impacts to streams and riparian threads which serve or may serve as wildlife habitat and movement corridors through and within the Planning Area."

As stated above, these policies do not meet the CEQA definition of mitigation and DFG does not believe they will be effective. Without the Update including specific, effective, and enforceable implementation measures (such as those recommendations in Attachments One and Two that are analyzed by the DPEIR, the DPEIR lacks substantial evidence to evaluate impacts and make credible impact determinations.

Therefore, pursuant to CEQA §15088.5(a)(2), DFG believes a substantial increase in the severity of impacts to stream and riparian habitat will result from this Update unless mitigation measures are adopted that reduce the impact to a level of insignificance.

- 3) The DPEIR has determined the impact from the redesignation of 1,758 acres of agricultural lands to other uses will be significant and unavoidable. Yet the DPEIR proposes no mitigations to avoid or minimize this impact. Numerous feasible mitigation measures exist to minimize or avoid this impact.

Therefore, pursuant to CEQA §15088.5(a)(3), feasible project alternatives or mitigation measures exist that would clearly lessen the environmental impacts of the Update, but the City has declined to adopt them.

- 4) DFG believes the DPEIR is inadequate because it has substantial internal inconsistencies and because the analysis and determination of impacts to wetland, stream, and riparian habitats and the aquatic species that depend upon them are conclusory, i.e., not justified or supported by all the facts, including those presented in Attachments One-Four. The DPEIR policies intended to act as mitigations for impacts to wetland, stream, and riparian habitat are sufficiently vague, inadequate, and unenforceable to preclude meaningful analysis and public comment, pursuant to CEQA §15088.5(a)(4).

Implications of the Update's Approval Without Effective Mitigations

DFG believes the Update policies regarding potential impacts to aquatic habitats and species, and necessary mitigations, are unclear and poorly defined. This lack of clarity will poorly-serve property owners and City government because the Update cannot serve as a "yardstick" to evaluate proposed projects against the General Plan and provide information on the uses, or restrictions on parcels and what specific development standards are required.

The Update's absence of wetland and riparian habitat protection buffers and stormwater mitigations is also likely to result in a greater amount of State and federal agency environmental review and consultation, longer permitting periods, and a more complicated permitting process than if the Update included clear, simple, and enforceable development and mitigation standards.

CEQA §21002, provides that public agencies should not approve projects if there are feasible alternatives or mitigations. If those alternatives, or mitigation standards are not included in the Update, then they must be developed for each project individually, which likely will increase costs to project proponents and public reviewing agencies.

DFG believes including feasible project alternatives, or mitigation standards, in the Update would greatly simplify its implementation over the next 25 years and provide regulatory certainty and clarity to property owners and future project proponents. Without them, future development in the City is much more likely to have potentially significant impacts on streams and wetlands; result in the take of listed species, including coho salmon; and result in the determination of cumulatively considerable impacts, which would necessitate the preparation of an EIR for each project.

Summary of Comments

- 1) The Update will not achieve the City's stated goal to protect and maintain riparian corridors and wetlands because it includes few specific, effective, and actionable mitigations, which are insufficient to protect and maintain these habitats.
- 2) Specifically, the Update does not include, and the DPEIR does not evaluate, enforceable wetland and riparian habitat buffers and stormwater runoff standards or ordinances that maintain pre-project hydrologic regimes and water quality.
- 3) Two previous DFG comment letters on the Update recommended feasible mitigation measures that have a high likelihood of reducing potentially significant impacts to wetland, stream and riparian habitats, surface water quality, and the species that rely upon them. These recommended mitigations are currently being utilized by numerous counties and municipalities throughout the State, including locally.

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- 4) The City has not adopted these mitigation recommendations, coordinated with DFG on possible means to implement them, or adequately evaluated them in the DPEIR.
- 5) The DPEIR has little substantial evidence on which to base its environmental impact determinations regarding aquatic resources because its analysis primarily evaluates vague, unenforceable policies lacking implementation standards, rather than effective implementable mitigations.
- 6) As stated in DFG's previous letters, the Update's omission of effective mitigation strategies will ill-serve the City as future projects that may impact aquatic resources undergo environmental review and permitting approval.
- 7) Because of the Update's vague and unenforceable mitigations, the City will not fully benefit from the PEIR's ability to: ensure City-wide consideration of cumulative impacts, rather than on a case-by-case analysis; avoid duplicative reconsideration of basic policy considerations; and reduce paperwork.
- 8) As stated in DFG's October 31, 2007, letter (Attachment Two): Where DFG determines the City has approved, or intends to approve, a project adjacent to a stream, particularly a coho salmon-bearing stream, with ineffective riparian buffers and stormwater quality mitigations, DFG may, as appropriate:
 - a) find the project is likely to result in the incidental take of State- and federally-threatened species and therefore require the issuance of an incidental take permit, pursuant to CESA;
 - b) provide substantial evidence, pursuant to CEQA Section 15064(1)(a) that the project will have a significant effect on the environment, and therefore require the preparation of an EIR;
 - c) determine the project will result in cumulatively considerable impacts on riparian and aquatic species, as defined in CEQA §15065(a)(3); and
 - d) appeal the project's approval before the City Council.

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- 9) The Update must include, and the DPEIR must evaluate feasible mitigation measures (such as those listed above) to minimize the impacts of converting 1,758 acres of agricultural lands to other uses.
- 10) The DPEIR has substantial internal inconsistencies in its analysis of the Update's development-related impacts on flooding, increased peak flows and non-point source pollution from stormwater runoff.
- 11) Pursuant to CEQA §15088.5(a), this Draft DPEIR must be recirculated because it must include a substantially revised environmental analysis of impacts to aquatic resources based upon substantial evidence and inclusion of, or an analysis of the specific mitigations recommended by DFG. It must also be recirculated because it has substantial internal inconsistencies in its analysis.

As trustee agency for California's fish and wildlife resources, DFG is mandated to protect, restore, and maintain the State's fish and wildlife populations and to recover the State's anadromous salmonid populations. Their recovery will bring about greater recreational and commercial fishing opportunities and State-wide economic enhancement. To do so, we must first protect, restore, and enhance their habitat. However, DFG cannot work effectively towards this goal without more effective cooperation and partnerships with local governments, such as the City of Fortuna.

This Update represents a significant opportunity for the City to protect, restore, and enhance its wetland and stream habitats, to provide quality open space, and to help recover the region's anadromous salmonid populations for current and future generations. The Update contains many laudable environmental policies, however, only with effective and tangible implementation measures will the Update be likely to meet its stated policy goals.

If you have any questions or comments regarding this matter, please contact Staff Environmental Scientist Gordon Leppig at (707) 441-2062 or Senior Environmental Scientist William Condon, at (707) 441-2064.

Sincerely,


GARY B. STACEY
Regional Manager

Enclosures

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References

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cc: Fortuna City Council
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Fortuna Planning Commission
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Ms. Laurie Harnsberger
Department of Fish and Game
619 Second Street
Eureka, California 95501

ec: Mss. Irma Lagomarsino and Julie Weeder
National Marine Fisheries Service
Arcata Area Office
Irma.lagomarsino@noaa.gov, julie.weeder@noaa.gov

Mr. Mike Long
United States Fish and Wildlife Service
Arcata, California
michael_long@fws.gov

Mr. Kelley Reid
Army Corps of Engineers
Eureka Project Office
Eureka, California
kelley.e.reid@usace.army.mil

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Page Twenty-Two

ec: Messrs. Mark Stopher, Scott Downie, Gary Flosi, William Condon,
Rick Macedo, Bruce Webb, Mark Moore, Richard Lis, Scott Bauer,
Michael van Hattem and Gordon Leppig
Mss. Donna Cobb, Michelle Gilroy, Jane Arnold, and Laurie Harnsberger
Dr. Gayle Garman
Department of Fish and Game
mstopher@dfg.ca.gov, sdownie@dfg.ca.gov, gflosi@dfg.ca.gov,
wcondon@dfg.ca.gov, rmacedo@dfg.ca.gov, b.webb@dfg.ca.gov,
mmoore@dfg.ca.gov, rlis@dfg.ca.gov, sbauer@dfg.ca.gov,
mvanhattem@dfg.ca.gov, gleppig@dfg.ca.gov, dcobb@dfg.ca.gov,
mgilroy@dfg.ca.gov, jarnold@dfg.ca.gov, lharnsberger@dfg.ca.gov,
ggarmen@dfg.ca.gov

Ms. Catherine Kuhlman and Messrs. John Short, and Paul Keiran
North Coast Regional Water Quality Control Board
ckuhlman@waterboards.ca.gov, jshort@waterboards.ca.gov,
pkeiran@waterboards.gov

Ms. Terry Roberts and Mr. Scott Morgan
State Clearinghouse
Governor's Office of Planning and Research
terry.toberts@opr.ca.gov, scott.morgan@opr.ca.gov

ATTACHMENT ONE
(August 10, 2007, Fortuna General Plan Update, NOP Comments)

Department of Fish and Game Comment Letter
City of Fortuna General Plan Update
Draft Program Environmental Impact Report
State Clearinghouse #2007062106
June 2008



DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>

NORTHERN REGION
601 Locust Street
Redding, CA 96001
(530) 225-2300



August 10, 2007

Ms. Liz Shorey, City Planner
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Dear Ms. Shorey:

City of Fortuna General Plan Update

On July 6, 2007, the Department of Fish and Game (DFG) received from the City of Fortuna (City) a notice of preparation (NOP) of a draft program environmental impact report (PEIR) for the City of Fortuna General Plan Update (Update). This Update is a long-term policy document with a 25-year planning horizon. Its purpose is to guide the City's public policies and resource conservation goals relative to designated land uses and community development. In a July 17, 2007, e-mail from DFG Staff Environmental Scientist Gordon Leppig to you, DFG requested an extension of our comment period to August 15, 2007. During a July 23, 2007, phone call, City Planner Mr. Stephen Avis told Mr. Leppig this extension was acceptable to the City.

The Update projects that by the year 2030, the City population will increase by more than 6,000 people. The Update projects growth during this period will include 2,800 new dwelling units, almost one million square feet of new retail space and almost one million square feet of new office and industrial space. Two Update alternatives plan for a significant conversion of agricultural lands to industrial uses, such as on the Rohnerville Bluffs.

DFG has reviewed the PEIR NOP, and Public Hearing Draft Background Reports (Background Reports) and Public Hearing Draft Policy Document (Policy Document) and is providing comments on the Update and PEIR as both a trustee and responsible agency pursuant to the California Environmental Quality Act (CEQA). As a trustee for the State's fish and wildlife resources, DFG has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary to sustain their populations. As a responsible agency, DFG administers the California Endangered Species Act (CESA) and other provisions of the Fish and Game Code that afford protection to the State's fish and wildlife public trust resources.

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DFG's comments focus on the potential direct and indirect impacts this Update will have on aquatic, wetland, and riparian species and their habitats and on the potential conversion, fragmentation, and indirect impacts of urbanization on forest habitat on the northern and eastern edge of the study area.

Importance of Fortuna's Streams and Riparian Habitats

According to the Background Report, the Update study area contains numerous streams and two major river systems, including: Strongs and Rohner creeks, and their named and unnamed tributaries, Palmer and Little Palmer creeks, Wolverton Gulch, and the Eel and Van Duzen rivers. These watercourses are important aquatic resources and have significant fisheries values. They also provide large areas of riparian habitat important to both aquatic and terrestrial species.

The Eel and Van Duzen Rivers, for instance, are habitat for coho salmon (*Oncorhynchus kisutch*) a State- and Federally-threatened species; Chinook salmon (*Oncorhynchus tshawytscha*) a Federally-threatened species; coastal cutthroat trout (*Oncorhynchus clarki clarki*), a California species of special concern; and steelhead trout (*Oncorhynchus mykiss*) a Federally-threatened species and a California species of special concern. Coho salmon and steelhead trout also occur in Palmer, Rohner, and Strongs creeks, and Wolverton Gulch. A breeding population of Willow flycatcher (*Empidonax traillii*) a State-endangered species is documented within the study area along the Van Duzen River.

The anadromous salmonids listed above are iconic species that help define California's North Coast and form an integral part of the region's natural ecosystems, cultural heritage, and local economy. California's commercial salmon fishery is an estimated \$100 million-a-year industry. Yet despite their importance, salmonids are also some of the region's most imperiled species. Most anadromous salmonid stocks on the North Coast have, for multiple reasons, precipitously declined over the past 100 years. Coho salmon, for example, have undergone at least a 70% decline in abundance since the 1960s, and is currently at 6 to 15% of its abundance during the 1940s (DFG 2004). The region's commercial and recreational fishing industry has been severely impacted by this decline. In 2006, the U.S. Department of Commerce declared a commercial fishery failure for coastal Oregon and California, and recently the U.S. Congress approved and President Bush signed, a \$60 million emergency disaster relief package for the Pacific salmon Industry.

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Given the regional importance of the City's riparian and aquatic habitats, DFG recommends the PEIR thoroughly evaluate potential direct and indirect impacts to aquatic and riparian habitats and give special attention to impacts to all salmonid life stages. The PEIR should specifically address the impacts from the indirect effects of urbanization and the conversion of agricultural and timberlands on these resources.

Riparian Habitat Protection

Urbanization and increased residential development have had numerous negative effects on Fortuna's streams. A number of the streams and the rivers occurring in the study area are impaired by sedimentation, extensive alterations to bed, bank, and channel, altered hydrologic regimes, stormwater inputs, and loss of riparian habitat. These impairments are described in the DFG Coastal Watershed Planning and Assessment Program, Lower Eel River Basin Assessment (Downie and Gleason 2006) and are included in Attachment 1. To maintain and improve the habitat conditions of Fortuna's streams, DFG, often working collaboratively with the City, has recently undertaken over \$200,000 in stream restoration and fish passage improvement projects in the study area.

While the Policy Document contains much positive intent language regarding the protection and enhancement of Fortuna's streams, DFG finds it and related Update reports include few enforceable standards or ordinances to minimize and mitigate the impacts of future development to these streams. DFG understands the City currently has no riparian or streamside protection ordinance or standard. Furthermore, DFG is aware of projects recently approved by the City with riparian setbacks of as little as 25-feet from the top of bank on coho salmon-bearing streams.

The Policy Document includes a policy (NCR-7) to develop a streamside management/wetland protection ordinance with a timeframe of 2008-2009. DFG is concerned however, that the City is not required to develop this ordinance and, due to staff or budget limitations, it may not get developed, will not be implemented in a timely manner, or may not be effective in mitigating significant impacts to streams and wetlands or avoiding take of listed species. DFG is aware of general plans that include policies to develop habitat protection standards, and that ten years after plan approval, these standards have yet to be developed.

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DFG finds that the proper implementation of effective streamside buffers is one of the single most important mitigation strategies to protect streams from the impacts of urban development. Since 1994, DFG Region 1 has promoted a suite of no-disturbance buffer recommendations to maintain and protect aquatic and riparian habitats from the impacts of adjacent development. Although currently under review and revision, DFG recommends a minimum 150-foot no-disturbance buffer on major rivers such as the Eel and Van Duzen rivers, 100-foot buffers on smaller tributaries that provide habitat for fish, such as on Strongs Creek, and 50-foot buffers on non-fish bearing streams.

Without effective riparian buffers, DFG finds that over the life of the Update, the City is likely to undertake or permit projects pursuant to CEQA that may result in the incidental take of listed salmonids, such as coho salmon and steelhead trout. This take would result from increased water temperatures, loss and degradation of habitat, non-point source pollution inputs, and altered hydrology. These impacts will likely result in cumulatively considerable impacts on riparian and aquatic species, as defined in CEQA §15065(a)(3). Pursuant to CESA, the incidental take of State-listed species requires project proponents obtain an incidental take permit (ITP) from DFG. Given that the issuance of an ITP is typically a long and complicated process, DFG suggests that the City's implementation of effective streamside buffers would be a more timely, economical, and efficient means for projects impacting City streams to avoid the take of listed species.

Consequently, DFG strongly recommends that at a minimum, the City incorporate the DFG Region 1, 1994 no-disturbance riparian buffer recommendations into the Natural and Cultural Resources Element of the City's Update. DFG finds that by adopting effective riparian buffers, such as those in DFG's 1994 riparian habitat recommendations, the Update will be implementing feasible mitigation measures which are likely to avoid take of listed salmonids and minimize impacts to streams and rivers to a less than significant level.

Stormwater Quality and Intensification

Development that results in the covering of permeable soil on vegetated land with impervious surfaces such as structures, streets, sidewalks, and parking lots, tends to intensify storm water runoff volumes and velocities. These effects typically result in higher stream peak flows, increased bank instability, erosion, channel incision, flooding, discharge of fine sediment, and the introduction of pollutants such as hydrocarbons, heavy metals, garbage, pathogens, nutrients, pesticides, and domestic animal feces.

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The nonpoint source pollution found in urban runoff is now a leading threat to the nation's water quality (US EPA 1999). A significant overall reduction in stream and wetland quality indicators occurs when impervious cover in a watershed exceeds 10%, with severe degradation expected beyond 25% impervious cover (Arnold and Gibbons 1996; Watershed Protection Research Monograph No. 1, 2003).

In addition to stormwater pollution, development projects are often designed to rapidly discharge storm and flood water offsite and into natural drainage features such as streams and rivers. Unless intentionally designed to do so, development typically leads to decreases in groundwater and local aquifer recharge. Since on the North Coast, groundwater is the principal summer water source for streams, rivers, and wetlands, increases in impervious surfaces and stormwater facilities designed for rapid drainage of stormwater off-site tend to result in decreased summer low flows, higher stream temperatures, and loss or even elimination of aquatic habitat during the summer. DFG therefore recommends the PEIR thoroughly evaluate potential direct and indirect impacts of increased stormwater runoff and altered hydrology to streams and rivers in the study area.

DFG recommends the City include a clear policy and implementation ordinances or standards that require developments be designed and managed to minimize the introduction of pollutants and increases in runoff to receiving waters. DFG recommends these standards prohibit developments, to the maximum extent practicable, from altering the hydrologic regime of streams by increasing peak flows or decreasing summer low flows.

To accomplish these objectives, DFG recommends the Update include a standard that requires the use of low-impact development (LID) elements such as pervious surface technologies for driveways and walkways, vegetated (green) roofs (Hutchinson et al., 2006, Voelz 2006), disconnected downspouts, water gardens and grassy swales to maximize pervious surfaces and capture and maintain on-site stormwater percolation and treatment, thus maintaining to the greatest extent practicable, post-project pervious surfaces. Utilizing LID elements will benefit aquatic resources by: 1) filtering out pollution and increasing the quality of stormwater runoff, 2) decreasing peak flows and erosion in downstream waters and 3) increasing ground water recharge and therefore helping maintain biologically-important summer low flows. DFG recommends that the Update require projects to the maximum extent practicable, treat all stormwater from at least two-year rain events (Q2) on-site through detention and percolation.

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The City of Portland, Oregon, Bureau of Environmental Services internet site (<http://www.portlandonline.com/bes/index.cfm?c=29323>) provides good examples of LID designs and urban stormwater enhancement policies and technologies, which, given its Pacific Northwest climate, may also be appropriate for the City. Sonoma County, the City of Santa Rosa, and the Russian River Watershed Counsel have also jointly developed a comprehensive set of urban stormwater mitigation guidelines for the Santa Rosa area (Sonoma County 2005).

Riparian and wetland vegetation improves stream and wetland water quality by removing organic and inorganic nutrients and toxic materials (Mitsch and Gosselink 2000). Riparian and wetland vegetation also provide important wildlife habitat values, flood water storage capacity, and bank protection, which help ameliorate bank erosion and the down-stream effects of flooding. Consequently, DFG recommends the Update include standards that allow riparian vegetation removal only in very limited circumstances. In all cases, before the substantial removal of riparian vegetation from the bed, bank, or channel of a stream, the responsible party must notify DFG to obtain a lake or streambed alteration agreement pursuant to Section 1600 *et seq.*, of the Fish and Game Code.

Encroachment and Development within Floodplains

DFG finds the floodplains of wetlands, streams and rivers provide significant biological functions to these waters and that development within floodplains is largely incompatible with the maintenance and enhancement of riparian, wetland, and aquatic habitats.

Development within floodplains is at significant risk from flood damage. Regional climate change models for California and the Pacific Northwest predict wetter winters, increased high runoff events and a higher frequency of flooding (Kim et al. 2002, Snyder et al. 2002, Bell et al. 2004, Kim 2005). The northern California Coast Range and the Sierra Nevada are expected to experience the largest increase in "heavy and extreme precipitation events" and the largest increases in annual precipitation in the region (Kim et al. 2002, Kim 2005). It is therefore reasonable to expect more frequent and more severe flood events over the life of the Update.

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Development within floodplains often results in future flood control measures such as channel dredging, bank armoring, riparian vegetation removal, and berm or dike construction, intended to protect floodplain property, but deleterious for the maintenance of functional riparian and floodplain habitat. To minimize the potential impacts of future projects on streams and rivers, DFG supports Update standards which restrict development in floodplains.

Impacts to Wetlands

The study area includes a diversity of wetland types. Over the past 200 years, the contiguous 48 states have lost an estimated 53% of their original wetlands, with California losing the largest percentage (91%) (Dahl 1990). The Fish and Game Commission (Commission) finds that California's remaining wetlands provide significant and essential habitat for a wide variety of important resident and migratory fish and wildlife species. The Commission also finds that projects that impact wetlands are damaging to fish and wildlife resources if they result in a net loss of wetland acreage or wetland habitat value. Therefore, it is the policy of the Commission to seek to provide for the protection, preservation, restoration, enhancement and expansion of wetland habitat in California.

It is DFG's policy to ensure that proposed projects will result in no net loss of wetland habitat values or acreage. DFG recommends the PEIR analyze the Update's potential impacts to wetlands and sensitive wetland species including an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats. Potential direct and indirect effects from development adjacent to wetlands include, but are not limited to: altered hydrology; diminished water quality from the discharge of pollutants such as sediment, pesticides, petroleum products, pathogens and other toxic substances; vegetation removal; disturbance to wildlife from noise, night lighting, and domestic animals; introduced invasive plant and animal species; altered microclimate; and human intrusion such as off-road vehicle use, homeless encampments, trash dumping, and illegal filling.

To best protect wetland habitat values, DFG recommends the Update include a clear wetland protection ordinance or standard that incorporates no-disturbance wetland buffers where no structures, grading, pavement, vegetation removal, septic systems, stormwater facilities, or other development would be permitted. These wetland buffers must minimize project impacts on wetlands to a less than significant level. Although currently under review and revision, DFG recommends that at a minimum, the City implement the DFG Region 1, 1994 wetland buffer recommendations.

Habitat Fragmentation and Conversion of Agricultural and Forestlands

Forestlands occur within and adjacent to the eastern and northern edges of the Update study area. These forest stands are habitat for numerous wildlife species. According to the Background Reports, forest stands in close proximity to, or within the study area may be occupied by the northern spotted owl (*Strix occidentalis caurina*), a Federally-listed threatened species and a fully-protected species pursuant to Fish and Game Code Section 3503.5. The project study area also includes large areas of coastal prairie, which are identified in the Background Report as having occurrences of a number of sensitive plant species.

The future development envisioned in this Update is likely to result in the fragmentation and conversion of agricultural and forestlands. Habitat fragmentation from urban development has substantial environmental effects on fish and wildlife habitats. Encroachment effects of roads and structures on undeveloped areas include wildlife road-kill, increased garbage and roadside dumping, light and noise disturbance, the introduction of invasive species, the killing of and disturbance to wildlife by domestic animals, and an increase in predator fauna well adapted to the urban-rural interface, such as jays, crows, and ravens. These affect the long-term sustainability of wildlife populations, e.g., northern spotted owl and marbled murrelet. Furthermore, the placement of residential developments in agricultural and forestlands typically leads to increases in human conflict with wildlife such as black bear, mountain lion, and fox. This conflict often results in depredation of these animals.

DFG therefore recommends the PEIR specifically evaluate the direct and indirect impacts of habitat fragmentation that will result from the Update. To minimize potentially significant development-related impacts to wildlife habitat within and adjacent to the study area, DFG recommends the Update include policies and standards that promote infilling and minimizes development in and conversion of the forested hillsides on the eastern and northern edges of the study area.

Exterior Lighting Standards and Photo-pollution

The adverse ecological effects of artificial night lighting on terrestrial and aquatic resources such as fish, birds, mammals, and plants are well documented (Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive rates, changes in foraging behavior and predator-prey interactions, altered wildlife species richness and community composition, and

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phototaxis (attraction and movement towards light). Much of the future development envisioned in the Update will take place on land in close proximity to resources areas with significant wildlife habitat values. DFG therefore recommends the PEIR evaluate the direct and cumulative effects that photo-pollution from artificial night lighting will have on fish and wildlife species.

To minimize the ecological consequences of artificial night lighting and glare on wildlife species and their habitats, DFG recommends the City adopt a standard that requires exterior lighting fixtures and street standards (both for residential and commercial areas) be fully-shielded and designed and installed to minimize off-site photo-pollution. As an example, DFG recommends the County consider the McKinleyville Community Services District Ordinance 51.07, adopted on June 30, 2000:

“Street lighting fixture standards shall be in accordance with the recommendation of the International Dark-Sky Society [sic], specifically selected and specified to minimize the potential for light pollution, and shall include external glare shields, and/or internal louvers to controlled [sic] direct glare and/or uplight.”

Fire Safe Zones, Vegetation Management, and Invasive Species Introductions

Recent changes to Public Recourses Code §4291 expand the defensible space clearance requirement maintained around buildings and structures from 30 feet to a distance of 100 feet. These guidelines also recommend more vegetation (fuels) clearing on lands with steeper terrain and larger and more dense fuels. Defensible space areas, typically require on-going vegetation management to reduce fuel loads. For subdivisions and other development projects proposed in forestlands, defensible space areas increases the ecological footprint and environmental effects of these projects.

DFG is concerned that designating defensible space areas that coincide with steep slopes and requiring periodic fuels-reducing vegetation removal will result in increased surface erosion and gullies and slope instability. Furthermore, areas routinely managed for vegetation removal are prone to infestation by invasive exotic species and noxious weeds. Invasive plant species are widely regarded as one of the most significant global threats to biodiversity. Horticultural plants used for landscaping are a principal cause of invasive plant

introductions, and a recent estimate puts economic cost of invasive plants in the United States at \$35 billion per year (Mack and Lonsdale 2001; Reichard and White 2001). Ironically, one way invasive plants can affect native ecosystems is by changing fuel properties, which can in turn affect fire behavior and, ultimately, alter fire regime characteristics such as frequency, intensity, extent, type, and seasonality of fire (Brooks et al., 2004).

For the above reasons, DFG recommends the Update incorporate defensible space standards that minimize the risk of erosion, slope instability, and the introduction of invasive plants. DFG recommends the Update include landscaping guidelines or recommendations that assist developers, landscapers, and the public in minimizing the risk of invasive exotic and noxious weed introductions from developments requiring defensible space areas. Because of the need for routine vegetation clearing within defensible space areas, DFG recommends the City develop a standard that requires fire safe zones be placed outside of riparian and wetland buffers.

Specific Recommendations:

- 1) Include in the PEIR an analysis of the Update's potential impacts to streams and riparian areas and an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats.
- 2) Incorporate no-disturbance riparian buffers into the Update which are at least as protective as the DFG Region 1, 1994 riparian habitat recommendations.
- 3) Include in the PEIR a thorough evaluation of potential direct and indirect impacts of increased stormwater runoff and altered hydrology on waters of the State.
- 4) Include Update standards that prohibit projects from altering the hydrologic regimes of streams by increasing peak flows or decreasing summer low flows by treating all stormwater from at least a two-year rain event (Q2) on-site through retention and percolation.
- 5) Include Update standards requiring low-impact design elements that maintain, to the greatest extent feasible, post-project pervious surfaces.

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- 6) Include Update standards that allow riparian vegetation removal only in very limited circumstances.
- 7) Develop and strengthen Update flood hazard policies to restrict development in floodplains.
- 8) Include in the PEIR an analysis of the Update's potential impacts to wetlands and sensitive wetland species including an evaluation of the potential for direct, indirect, and cumulative impacts to these habitats.
- 9) Strengthen the City wetland protection policy and standards to include an effective no-disturbance buffer where grading, vegetation removal and other development shall be prohibited.
- 10) Include in the Update policies that promote infilling and that minimize the fragmentation and conversion of agricultural and forestlands.
- 11) Include in the Update a standard that requires exterior lighting fixtures and street standards (both for residential and commercial areas) be fully-shielded and designed and installed to minimize off-site photo-pollution.
- 12) Incorporate defensible space standards in the Update that minimize the risk of erosion, slope instability, and the introduction of invasive plants.
- 13) Include in the Update landscaping guidelines or recommendations that assist developers, landscapers, and the public in minimizing the risk of invasive exotic and noxious weed introductions.
- 14) Include in the Update a standard that requires fire safe zones be placed outside of riparian and wetland buffers.

By adopting the recommendations set forth in this letter, DFG finds the City will feasibly minimize potentially significant impacts to fish and wildlife resources from the future development and land use changes anticipated in the Update. Furthermore, DFG finds that by implementing the riparian and aquatic protection measures listed above, the City will likely avoid take of listed anadromous salmonids, will actively help bring about their recovery and eventual down-listing, and consequently, spur a revival of the regional commercial and recreational fishing industries.

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If you have any questions or comments regarding this matter, please contact Staff Environmental Scientist Gordon Leppig at 619 Second Street, Eureka, California, 95501 or telephone (707) 441-2062.

Sincerely,


GARY B. STACEY
Regional Manager

Attachment

cc: See Page Fourteen

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cc: Ms. Irma Lagomarsino
National Marine Fisheries Service
Arcata Area Office
1655 Heindon Road
Arcata, California 95521

Mr. Mike Long
United States Fish and Wildlife Service
1655 Heindon Road
Arcata, California 95521

Mr. Kelley Reid
Army Corps of Engineers
Eureka Project Office
601 Startare Drive
Eureka, California 95501

Ms. Laurie Harnsberger
Department of Fish and Game
619 Second Street
Eureka, California 95501

ec: Messrs. Mark Stopher, William Condon, Ken Moore, Eric Haney,
Scott Downie, Bruce Webb, Scott Bauer, and Gordon Leppig
Mss. Donna Cobb, Michelle Gilroy, Jane Vorpapel, and Laurie Harnsberger
Dr. Gayle Garman
Department of Fish and Game
mstopher@dfg.ca.gov, wcondon@dfg.ca.gov, kmoore@dfg.ca.gov,
ehaney@dfg.ca.gov, sdownie@dfg.ca.gov, bwebb@dfg.ca.gov,
sbauer@dfg.ca.gov, gleppig@dfg.ca.gov, dcobb@dfg.ca.gov,
mgilroy@dfg.ca.gov, jvorpapel@dfg.ca.gov, lharnsberger@dfg.ca.gov,
ggarman@dfg.ca.gov

Messrs. John Short, Bruce Ho, and Paul Keiran
North Coast Regional Water Quality Control Board
jshort@waterboards.ca.gov, bho@waterboards.gov,
pkeiran@waterboards.gov

**Attachment One
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Impacts of urbanization and increased residential development on Fortuna area streams and riparian areas: relevant excerpts from the DFG Coastal Watershed Planning and Assessment Program 2006 Lower Eel River Basin Assessment.

Altered flow regimes

- Low summer flows are exacerbated by land and stream disturbances and result in dry or intermittent reaches on streams, which are stressful to salmonids;
- Fortuna operates five groundwater extraction wells near the Eel River;
- Increased development in Fortuna, especially in the southern and eastern parts of the city, has increased runoff from newly created impervious areas (FEMA 1981 cited in Mintier and Associates 2006);
- Many of the storm drains and culverts in Fortuna are undersized (Winzler and Kelly 2005), increasing the velocity of flows during precipitation events;
- Strongs and Rohner creeks have been modified where they flow through Fortuna to eliminate their floodplains, increasing the volume and velocity of flows during precipitation events;
- Winter floods are increasingly common due to high winter precipitation levels, increased runoff, and undersized storm water drainage structures. Areas with current flooding include the North Fortuna Drainage Area, Rohner Creek, the lower reaches of Strongs Creek, and Jameson Creek at the confluence with Strongs Creek (Winzler and Kelly 2005); and
- Undersized drainage capacity has also been identified in several areas including Rohner Creek and the Mill Creek drainage. Rohner Creek has the highest potential for serious flooding (Winzler and Kelly 2005).

Addition of pollutants

- When flows are sufficiently high, the Eel River floods into treatment ponds of the Fortuna Wastewater Treatment Plant;
- The Fortuna Wastewater Treatment Plant received a cease and desist order in 1997. The issue was resolved and the order was rescinded that same year;
- The treatment plant had three chlorine limit violations - one maximum and two minimum values that violated the permit level in 2004. Sewer overflows that occurred in the system were caused by high flows and collection system stoppages;
- Increased development in Fortuna, especially in the southern and eastern parts of the city, has increased runoff from newly created impervious areas (FEMA 1981 cited in Mintier and Associates 2006). Although no specific tests of chemicals have been conducted in Fortuna's streams, urban runoff in general is known to mobilize chemicals such as trace elements, pesticides, copper, and volatile organic compounds (Hamilton et al., 2004);

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- Livestock grazing likely occurs in 23% of subbasin and has been noted along Strongs and North Fork Strongs creeks. Although no specific tests of nutrients and/or coliform bacteria have been conducted in these creeks, levels of these constituents often exceed water quality standards in areas with extensive livestock use; and
- The Humboldt Creamery located just downstream of Fernbridge on the Eel River has a wastewater discharge permit.

Fish passage barriers where roads cross streams

- A culvert on Mill Creek (RM 1.3) and Rohnerville Road does not meet CDFG and NOAA Fisheries fish passage guidelines; and
- Palmer Creek has problems with fish passage due to a barrier in the 800 foot culvert under Highway 101.

Erosion from roads, construction wastes, and ground disturbance

- Natural erosion rates are high due to:
 - The major rock underlying the subbasin is alluvium, which constitutes 70% of the subbasin. The other bedrock, also sedimentary, is Pliocene marine. Both of these geologic types are highly erodible;
 - Rapid incision rates of the mainstem and its tributaries have left a series of river terrace deposits perched steeply above the current stream channels which contribute fine sediments through slope instability and dry ravel;
 - The Little Salmon fault cuts through this basin, weakening bedrock and increasing the potential for seismic triggering of landslides; and
 - During the winter rainy season, heavily silted water flows through the steep upstream terrain, which affects turbidity and sediment levels in streams.
- Changes in basin due to land use:
 - Sedimentation and in-filling as a result of land development and subdivision activities, gravel mining and timber harvesting practices have resulted in an overall reduction in channel area, and consequently in available salmonid habitat;
 - Fortuna grew from one square mile in 1950 to 4.68 square miles in size in 2006. This represents a change from approximately 4% to 19.5% of the subbasin;
 - The Fortuna annual average population growth rate from 1980 to 2005 was 1.6%. If the city continues to grow at this rate the population will rise from 11,250 to approximately 17,000 in the next 25 years (Mintier and Associates 2006);
 - There were 4,729 housing units in Fortuna in 2005. If current growth rates continue, Fortuna will require 2,298 new housing units by 2030 (Mintier and Associates 2006); and

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- Additionally, it is projected that there will be a need for an additional 852,866 square feet of commercial, retail, and manufacturing space by 2030 (Mintier and Associates 2006).
- Possible effects seen in stream conditions:
 - The Fortuna Creeks Project found that stressful turbidity levels are reached during the rainy winter months. These high levels of turbidity, which are particularly apparent in Strongs and Rohner creeks, occur during spawning season;
 - None of the surveyed streams met target values of pool depth; and
 - Excessive sediment in stream channels has resulted in an overall loss of spawning, rearing and feeding habitat for salmonids. High sediment levels are confirmed by embeddedness measurements in surveyed reaches.

There is concern about unrestricted stream access of livestock in agricultural areas.

- Impacts from livestock grazing have been noted during stream surveys on Strongs and North Fork Strongs creeks; and
- Livestock grazing operations likely occur in 23% of subbasin.

Instream habitat conditions for salmonids are thought to be poor.

- Quality pool structure is generally lacking in Middle Subbasin streams; no surveyed streams met standards for pool shelter. Pool shelter ratings ranged from fully unsuitable to somewhat unsuitable levels;
- None of the surveyed streams met target values of pool depth. However, streams of the Middle Subbasin were composed of more primary pools by length than those of the Upper Subbasin; and
- Spawning gravels in Strongs and North Fork Strongs creeks are found in only a limited number of reaches. Additionally, crowded and superimposed redds have been observed during spawning surveys. None of the CDFG surveyed streams of the Middle Subbasin met target values for cobble embeddedness.

ATTACHMENT TWO
(October 31, 2007, Letter to Duane Rigge)

Department of Fish and Game Comment Letter
City of Fortuna General Plan Update
Draft Program Environmental Impact Report
State Clearinghouse #2007062106
June 2008



DEPARTMENT OF FISH AND GAME

<http://www.dfg.ca.gov>
NORTHERN REGION
601 Locust Street
Redding, CA 96001
(530) 225-2300



October 31, 2007

Mr. Duane Rigge, City Manager
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Dear Mr. Rigge:

**The City of Fortuna's Aquatic Habitat Conservation Measures,
California Environmental Quality Act Process, and
The Strongs Creek Residential Subdivision**

This letter follows up on a recent meeting between City of Fortuna (City) staff and Department of Fish and Game (DFG) staff that addressed a number of important aquatic habitat conservation issues in the City. These include the City's General Plan Update (Update), the City's California Environmental Quality Act (CEQA) process, and the approval process and environmental impacts of the Strongs Creek Residential Subdivision.

This letter serves to inform the City that DFG finds the City's current efforts, as a lead agency pursuant to CEQA, are inadequate to mitigate the impacts of projects on wetland and riparian habitats and to protect and maintain listed salmonid fish populations and avoid their incidental take.

This letter also presents recommendations to assist the City to substantially improve its aquatic habitat protection efforts and identifies potential outcomes if the City does not improve its efforts.

As you are aware, the City's five named streams, all tributaries to the lower Eel River, provide habitat for coho salmon (*Oncorhynchus kisutch*), a State- and federally-threatened species; coastal cutthroat trout (*Oncorhynchus clarki clarki*), a California species of special concern; and steelhead trout (*Oncorhynchus mykiss*) a federally-threatened species and a California species of special concern. Chinook salmon (*Oncorhynchus tshawytscha*) a federally-threatened species, occurs downstream in the lower Eel River and reliable reports indicate it was historically present in Strongs Creek and its tributaries. Strongs Creek also has one of the southern-most documented populations of coastal cutthroat trout, a species whose range stretches from the Fortuna area to Alaska's Kenai Peninsula.



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On August 27, 2007, you and members of the City Planning Department met with DFG staff to discuss the comments and recommendations included in DFG's August 10, 2007, letter regarding the City's Update and draft program environmental impact report (PEIR) and other issues related to CEQA in the City. Representing the City at this meeting were Planners Ms. Liz Shorey and Mr. Steven Avis, Engineering Technician Kevin Carter, and yourself. DFG was represented by Senior Environmental Scientist William Condon and Staff Environmental Scientist Gordon Leppig.

DFG's August 10, 2007, letter to the City included a number of recommended aquatic habitat and water quality mitigation strategies proposed for inclusion in the Update, and identified several potentially significant impacts of the Update that should be addressed in the PEIR. DFG for instance recommended riparian buffer widths substantially greater than the City's current setback of 25 feet from a stream's centerline. These recommendations, if implemented, are likely to protect the City's streams from urban impacts, maintain and enhance listed salmonid fish populations, and reduce the likelihood of incidental take.

At the August 27 meeting, you informed DFG staff that the riparian protection measures recommended in DFG's August 10, 2007, letter would not be incorporated into the Update, though they will be evaluated by a committee over the next few years as the City works to update its riparian and wetland standards and ordinances.

California Environmental Quality Act

DFG's Lower Eel River Watershed Assessment (Downie and Gleason 2006) concludes that Fortuna's streams have been significantly impacted by various activities including timber harvesting, livestock grazing, stormwater runoff from the beef and cattle industry, and urban development. Based upon the available evidence, this report finds salmonid populations in Fortuna's streams are limited by the cumulative effects of the following:

- Decreased water quality from urban stormwater runoff.
- Low summer flows.
- High levels of fine sediments in streams.
- Loss of habitat area and complexity.
- Shortage of areas with suitable spawning gravel.
- High-summer water temperatures.

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In 1992, the Lower Eel River was added by the U.S. Environmental Protection Agency to California's 303(d) list of impaired waters due to elevated sedimentation/siltation and temperature. The Fortuna Update projects that by the year 2030, the City population will increase by more than 6,000 people, resulting in the construction of 2,800 new dwelling units, almost one million square feet of new retail space, and one million square feet of new office and industrial space. As discussed in DFG's August 10, 2007, letter, stream habitat quality degrades when impervious surfaces, such as buildings, roads, and parking lots cover greater than 10% of a watershed, with severe degradation expected beyond 25% (Arnold and Gibbons 1996; Watershed Protection Research Monograph No. 1, 2003).

Nonpoint source pollution found in urban stormwater runoff is now a leading threat to the nation's water quality (US EPA 1999). Based upon the Fortuna Update's projected growth and related increase in impervious surfaces, it is reasonable to predict that the habitat and water quality of Fortuna's streams will continue to degrade over the life of the Update unless effective mitigations are implemented.

The Fortuna Creeks Project (FCP), a Fortuna Union High School Club, has conducted limited water quality sampling of Fortuna's streams. Though their data is limited, their monitoring efforts are important for determining water quality status and trends and the ability of Fortuna's streams to support riparian and aquatic species.

An evaluation of FCP 1997-2003 water quality monitoring data shows numerous sampling periods where water quality parameters in Fortuna stream reaches were detrimental to the survival of salmonids (Cole 1993). This evaluation shows that Strongs Creek water temperatures exceeded the optimum range for salmonids (10° - 14°C) and dissolved oxygen fell below the minimum required concentration of 8 mg/L during late summer months (Cole 1993). Water temperatures greater than 13° - 16°C can have lethal effects on coho eggs and juveniles (DFG 2004; Reiser and Bjornn 1979). Dissolved oxygen concentrations of less than 8 mg/L can be lethal to coho embryos and alevins (DFG 2004). Monthly averages of turbidity (suspended sediment) were also above the threshold for salmonid habitat for the majority of the year. For Rohner Creek, monthly average turbidity exceeded the optimum range and dissolved oxygen concentrations were below the optimum range for salmonids throughout most of the year, except the summer low-flow months (Cole 1993).

Due to private property access limitations, only three tributary reaches of Fortuna's streams have been habitat typed by DFG and biological inventories are likewise cursory. These three reaches, on upper Strongs Creek, North Fork

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Strongs Creek, and upper Mill Creek, are all east of and upstream from developed areas of the City. DFG has determined that Strongs Creek still supports spawning habitat for coho salmon, coastal cutthroat trout, and steelhead trout on timberlands east of the City. However, DFG staff have determined through CEQA project review, Lake and Streambed Alteration Agreement inspections, and habitat improvement work, that salmonid spawning habitat in Fortuna's streams has been severely degraded due to embeddedness (deposition) of spawning gravels by sediment, channel incision and bank erosion from increased peak flows, and loss of riparian habitat; and now only rearing habitat exists on the majority of stream reaches within the City. Therefore, the City's stream reaches not only provide important juvenile rearing habitat but also spawning and out-migrant transport habitat.

Despite these impacts, Fortuna's streams remain habitat for listed salmonids and other aquatic and riparian species and therefore DFG finds they still have important fish and wildlife habitat values requiring adequate protection. For this reason, DFG has recently undertaken over \$200,000 in stream restoration and fish passage improvement projects on Fortuna's streams.

CEQA Section 21002, provides that public agencies should not approve projects if there are feasible alternatives or mitigations that would substantially lessen the significant environmental effects of the project. DFG finds that projects without stormwater mitigations built within 25-feet of the centerline of an anadromous stream will result in significant effects on Fortuna's streams and aquatic species. Consequently, DFG finds future projects approved by the City, such as large subdivisions, would not be in compliance with CEQA if they lack feasible riparian buffers and low impact development designs that effectively minimize habitat disturbance and water quality degradation. Without feasible mitigations, the significant environmental effects of these projects would not be substantially lessened.

According to CEQA Section 15064(1)(a) "If there is substantial evidence, in light of the whole record before the lead agency, that a project may have a significant effect on the environment, the agency shall prepare a draft EIR (environmental impact report)." If the City continues to approve projects without riparian buffers and water quality mitigations that effectively minimize disturbance by human activities and prevent water quality degradation, DFG is prepared, where necessary, to provide the City with substantial evidence that those projects will have a significant effect on the environment and therefore require preparation of an EIR.

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Furthermore, DFG finds that, henceforth, City-approved projects lacking effective riparian buffers and water quality mitigations, when viewed in connection with the effects of past, current, and probable future projects, will likely result in cumulatively considerable impacts on riparian and aquatic species, pursuant to CEQA Section 15065(a)(3). This determination of cumulatively considerable impacts would also necessitate the preparation of an EIR.

California Endangered Species Act

DFG staff informed you at the August 27, 2007, meeting that, pursuant to the California Endangered Species Act (CESA), if the City continues to approve projects with inadequate riparian buffers and water quality protection mitigations, DFG will likely find these projects may result in the incidental take of State or federally listed species, such as coho salmon. This incidental take would result from increased water temperatures, loss and degradation of habitat, nonpoint source pollution inputs, and altered hydrology.

Excessively high water temperatures, for example, are associated with disease outbreaks, reduced egg viability, and inhibited development and fitness of fry (DFG 2004). Water temperatures at and above 18° - 20° C will result in outright mortality of salmonids. Loss and degradation of habitat due to simplification, lack of large wood, and sedimentation can lead to take of listed salmonids in various ways. High streambed sediment composition is directly correlated with lower survivorship rates of coho salmon eggs (DFG 2004). Fine sediment deposition acts as a barrier to fry emergence and reduces dissolved oxygen levels resulting in intra-gravel embryo mortality. High turbidity levels significantly decrease feeding efficiency of juvenile coho salmon.

Optimal coho salmon rearing habitat includes cold, deep, dark, complex pools surrounded by streamside vegetation as well as refugia under large wood, quiet backwaters, side channels, and small tributary streams with overhanging banks. The filling of large pools and side channels with sediment, the loss of large wood due to the narrowing or outright removal of adequate riparian vegetation, including large conifers, and the culverting of small tributary channels can all result in the take of juvenile salmonids. These lethal effects result from increased water temperatures, higher predation rates, a decreased food supply, and greater susceptibility of being swept out of the stream due to the loss of quiet backwater refugia during high flow events (DFG 2004).

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Nonpoint source pollution, such as petroleum products, heavy metals, and pesticides in stormwater runoff are well documented as having acute and chronic lethal and sub-lethal effects on salmonids and other aquatic organisms.

The implementation of buffers that effectively minimize disturbance by urban development is one of the most important mitigation strategies for preventing stream and wetland habitat degradation and for avoiding take of listed salmonids. Pursuant to CESA, the incidental take of State-listed species requires project proponents obtain an incidental take permit (ITP) from DFG. The issuance of an ITP is typically a long process with detailed analysis of take and mitigation for that take. DFG therefore suggests that the City's implementation of effective riparian buffers and stormwater mitigations would be a timelier, economical, and efficient means for projects impacting City streams to avoid the unauthorized take of listed species or securing an ITP.

CEQA Document Submittal Requirements and State Agency Review

It has come to DFG's attention that the City has not been following the procedural requirements of CEQA to submit certain environmental documents to the State Clearinghouse within the Governor's Office of Planning and Research (OPR). The CEQA statute and State CEQA Guidelines require lead agencies, in this case the City, to send certain environmental documents to the State Clearinghouse for review and comment by State agencies (Title 14, California Code of Regulations, Section 15023(c)). The types of environmental documents that must be submitted to the State Clearinghouse are listed in an August 4, 2005, memorandum from the State Clearinghouse to all California public agencies. The City should have received this memorandum in 2005, and a copy was provided by DFG to City staff during the August 27, 2007, meeting.

According to CEQA statute (PRC 21080.4 and Title 14, California Code of Regulations, Section 15205 and 15206), draft EIRs and Negative Declarations must be submitted to the State Clearinghouse where a state agency is a responsible agency, trustee agency, or otherwise has jurisdiction by law with respect to the project. DFG is the trustee and responsible agency for the State's fish and wildlife resources and has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants and the habitat necessary to sustain their populations.

DFG is aware a number of recent City-approved projects that were not sent to the State Clearinghouse despite being located directly adjacent to sensitive habitat and potentially impacting State fish and wildlife resources. A query of the CEQAnet Database on the OPR website shows the City has sent

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four documents to the State Clearinghouse in the past 10 years. Consequently, the City's CEQA review process does not appear to be in conformance with state law and regulation. This nonconformance has impeded the ability of state agencies, such as DFG, to review and comment on City projects that affect public trust resources. DFG staff brought this issue to your attention at the August 27, 2007, meeting and we trust that henceforth the City will comply with the requirements of CEQA as stipulated in the August 4, 2005, State Clearinghouse memorandum.

Strong's Creek Residential Subdivision

On August 6, 2007, the City of Fortuna approved a project on Strong's Creek entitled "Strong's Creek Residential Subdivision." This project subdivides a 14.5-acre parcel (APN# 202-121-078) into 63 residential lots. A mitigated negative declaration (MND) was prepared by the City for this project and a determination was made that the project will not have a significant effect on the environment.

The northern portion of this project borders the south bank of Strong's Creek. A 1995, DFG electrofishing survey documented the presence of coho salmon, coastal cutthroat trout, and steelhead trout in this reach. DFG has determined through recent field visits that this reach still provides substantial juvenile rearing habitat for these species. According to the tentative subdivision map, an approximately 0.9-acre wetland occurs on the southern project boundary and from the map, it appears lots 45 to 51 have a substantial amount of wetland habitat.

Despite the occurrence of wetland and riparian habitat and State- and federally-threatened species on site and the potentially significant effects this project could have on them, the City did not submit CEQA documents to the State Clearinghouse. DFG did not receive the CEQA documents for this project until they were requested by DFG from the City after the project was approved. The City also did not request consultation from DFG pursuant to CESA, or for review of appropriate wetland mitigation strategies. In discussions with Ms. Shorey and North Coast Regional Water Quality Control Board (NCRWQCB) and Army Corps of Engineers (ACOE) staff, it appears the City also did not consult with, or provide CEQA documents or permit requests to the NCRWQCB or the ACOE.

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During the past year, DFG has recommended 100-foot riparian buffers on a number of City projects adjacent to fish-bearing streams, including projects adjacent to Strongs and Jameson creeks. Despite DFG's previous 100-foot riparian buffer recommendations on other City projects, and the known on-site occurrence of coho salmon rearing habitat, the City approved this project with a 25-foot buffer from the top of bank.

According to the MND, this projects appears to direct all stormwater into an existing City stormwater trunk that outflows to Strongs Creek east of Fortuna Boulevard. Based on the tentative subdivision map, it appears this project was approved without stormwater retention and treatment facilities or low-impact development designs used to capture and maintain on-site stormwater percolation and treatment or maintain postproject pervious surfaces. Therefore, the project appears to provide no postconstruction mitigations to minimize erosion-inducing peak flows or the introduction of nonpoint source pollution inputs to Strongs Creek.

DFG was informed from a September 17, 2007, phone call from Mr. Leppig to Ms. Shorey, that City staff discovered in July 2007, that Mr. Wendt, the project proponent, had impacted the wetlands on the project site and installed (on an adjacent property) an unpermitted drop inlet (DI) into the western edge of the wetland in order to drain it and divert a perennial spring-fed stream into the City's stormwater system. This DI is not indicated on the tentative subdivision map and was installed without a Construction General Permit from the NCRWQCB, an approved Storm Water Pollution Prevention Plan (SWPPP) or 401 Certification, an ACOE 404 permit or consultation, or a DFG Lake and Streambed Alteration Agreement notification or wetland consultation.

According to Ms. Shorey, the City made no attempt to inform state or federal regulatory agencies with permitting or trustee status of the unpermitted draining and filling of this wetland, nor, to her knowledge, did the City inform Mr. Wendt of the regulatory process required to drain a wetland and redirect a stream, pursuant to CEQA, Fish and Game Code and state policy. More troubling, this project was specifically discussed at the August 27, 2007, meeting with you and your staff, but the City did not raise this important issue with DFG staff. The NCRWQCB and ACOE staff have inspected the project site and are addressing this issue directly with Mr. Wendt. The ACOE issued Mr. Wendt a cease and desist letter on October 5, 2007.

The Fish and Game Commission (Commission) finds that projects that impact wetlands are damaging to fish and wildlife resources if they result in a net loss of wetland acreage or wetland habitat value. Therefore, it is the policy of the Commission to seek to provide for the protection, preservation, restoration,

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enhancement and expansion of wetland habitat in California. DFG is guided by Fish and Game Commission policy to ensure that proposed projects will result in no net loss of wetland habitat values or acreage.

Mitigation Measure #2 of the City's initial study and MND for this project states:

"A wetland delineation shall be prepared for the site and reviewed by regulatory agencies with jurisdiction over wetland resources (DFG, ACOE, and NCRWQCB). If any wetlands are found on the site, they shall be mitigated with the approval of and to the satisfaction of the regulatory agencies, or the subdivision layout shall be redesigned to eliminate the affected lots from the recorded tract map. All wetland delineations and review by regulatory agencies will be required before any construction activities are allowed and before approval of any improvement plans."

This wetland delineation was received by DFG on October 1, 2007, only after being requested from the City. The wetland delineation concludes there are 6.4 acres of wetlands in the 28-acre study area. DFG staff found that on September 26, 2007, the project site was already graded, roads were being constructed and utilities installed and that these activities have significantly impacted on-site wetlands. This project is substantially out of compliance with the City's MND because major construction activities have occurred prior to agency review and approval of the wetland mitigations. This project also does not comply with the State's "no net loss" wetland policy.

Furthermore, Ms. Shorey informed Mr. Leppig on September 17, 2007, that (despite MND mitigation measure #2), a redesigned subdivision layout and revision of the tentative subdivision map to mitigate impacts to the wetland is considered a "minor change" to the tentative map and would be effected "administratively" without prior trustee agency or City Planning Commission approval. DFG disagrees with the assessment of this action as a "minor change."

During the August 27, 2007, meeting between you, City staff and DFG, Mr. Avis informed DFG that, although this project has been approved, the City and Mr. Wendt have discussed revising the tentative subdivision map to widen the buffer on Strongs Creek and allow for the installation of a pedestrian trail, and that Mr. Wendt has expressed a willingness to do so. DFG understands the City is currently drafting a Strongs Creek Master Plan which will help guide development and implementation of streamside protection measures along the

Mr. Duane Rigge
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lower reaches of Strongs Creek between Fortuna Boulevard and Redwood Way. Mr. Avis informed DFG that Mr. Wendt is also willing to work with the City to modify this project in order to make it conform to the forth-coming Strongs Creek Master Plan.

Based on the above, DFG offers the following comments and recommendations:

- 1) The City shall incorporate substantially improved and enforceable wetland and riparian habitat buffers and stormwater quality mitigations into its Update.
- 2) Where DFG determines the City has approved, or intends to approve, a project adjacent to a stream, particularly a coho salmon-bearing stream, with ineffective riparian buffers and stormwater quality mitigations, DFG may, as appropriate:
 - I. Find the project is likely to result in the incidental take of State- and federally-threatened species and therefore require the issuance of an ITP, pursuant to CESA, prior to approval.
 - II. Provide substantial evidence, pursuant to CEQA Section 15064(1)(a) that the project will have a significant effect on the environment, and therefore require the preparation of an EIR.
 - III. Determine the project will result in cumulatively considerable impacts on riparian and aquatic species, as defined in CEQA §15065(a)(3).
 - IV. Appeal the project's approval before the City Council.
- 3) The City's approval process for the Strongs Creek Residential Subdivision was substantially out of compliance with state law and this project, as approved and currently being implemented, will result in significant impacts to fish and wildlife resources.
- 4) The wetland delineation and wetland mitigation measures for the Strongs Creek Residential Subdivision should have been approved by state trustee agencies prior to project approval. The City's approval of the project without wetland mitigations suggests the City had insufficient information to base its findings that the project will not have a significant effect on the environment.

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- 5) The City should only approve future projects that impact wetlands and streams if the project includes detailed and enforceable mitigations measures and review by state or federal trustee agencies, as appropriate.
- 6) The City shall require the removal of the drop inlet installed in the Strongs Creek Residential Subdivision wetland.
- 7) DFG finds the Strongs Creek Residential Subdivision tentative map should be substantially revised to exclude or otherwise mitigate impacts to wetlands, to include on-site stormwater retention and treatment facilities and a 100-foot buffer from the top of bank on Strongs Creek.
- 8) The substantial revision of the Strongs Creek Residential Subdivision tentative map should be considered a major revision requiring City Planning Commission, DFG and NCRWQCB approval.
- 9) DFG requests early scoping and consultation for the City's development of the Strongs Creek Master Plan and all other City master plans that could impact stream and wetland habitats.
- 10) The City shall comply with the legal requirements to submit CEQA documents to the State Clearinghouse pursuant to (Title 14, California Code of Regulations, Section 15023(c)) as described in the August 4, 2005, State Clearinghouse memorandum.

As trustee agency for California's fish and wildlife resources, DFG is mandated to recover the States' anadromous salmonid populations. Their recovery will bring about greater recreational and commercial fishing opportunities and state-wide economic enhancement. In order to do so, we must first protect, restore, and enhance their habitat. However, DFG cannot work effectively towards this goal without more effective cooperation and partnerships with local governments, such as the City of Fortuna.

From the August 27, 2007, meeting with DFG staff, you made it clear that the implementation of effective stormwater quality mitigations and riparian habitat conservation measures are ultimately policy decisions which are out of your control. For this reason, DFG seeks the opportunity to meet with Fortuna's Mayor and City Council to more effectively address these issues. We will be contacting you shortly to seek assistance in arranging this meeting. If you have

Mr. Duane Rigge
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any questions or comments regarding this matter, please contact Staff Environmental Scientist Gordon Leppig at (707) 441-2062 or Senior Environmental Scientist William Condon, at (707) 441-2064.

Sincerely,



for **GARY B. STACEY**
Regional Manager

cc: See Page Thirteen

References

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-
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Mr. Duane Rigge
October 31, 2007
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cc: Mss. Liz Shorey, Angie Wood,
Mr. Steven Avis
Community Development Department
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Fortuna City Council
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Fortuna Planning Commission
City of Fortuna
621 Eleventh Street
Fortuna, California 95540

Mr. Dennis Wendt
Wendt Construction
1660 Newburg Road
Fortuna, California 95540

Ms. Laurie Harnsberger
Department of Fish and Game
619 Second Street
Eureka, California 95501

Ms. Irma Lagomarsino
National Marine Fisheries Service
Arcata Area Office
1655 Heindon Road
Arcata, California 95521

Mr. Mike Long
United States Fish and Wildlife Service
1655 Heindon Road
Arcata, California 95521

Mr. Kelley Reid
Army Corps of Engineers
Eureka Project Office
601 Startare Drive
Eureka, California 95501

Mr. Duane Rigge
October 31, 2007
Page Fourteen

ec: Messrs. Mark Stopher, Scott Downie, Gary Flosi, William Condon,
Rick Macedo, Bruce Webb, Mark Moore, Richard Lis, Scott Bauer,
Michael van Hattem and Gordon Leppig
Mss. Donna Cobb, Michelle Gilroy, Tracy Nelson, and Laurie Harnsberger
Dr. Gayle Garman
Department of Fish and Game
mstopher@dfg.ca.gov, sdownie@dfg.ca.gov, gflosi@dfg.ca.gov,
wcondon@dfg.ca.gov, rmacedo@dfg.ca.gov, b.webb@dfg.ca.gov,
mmoore@dfg.ca.gov, rlis@dfg.ca.gov, sbauer@dfg.ca.gov,
mvanhattem@dfg.ca.gov, gleppig@dfg.ca.gov, dcobb@dfg.ca.gov,
mgilroy@dfg.ca.gov, tnelson@dfg.ca.gov, lharnsberger@dfg.ca.gov,
ggarmen@dfg.ca.gov

Messrs. John Short, Dean Prat, and Paul Keiran
North Coast Regional Water Quality Control Board
jshort@waterboards.ca.gov, dprat@waterboards.ca.gov,
pkeiran@waterboards.gov

Ms. Terry Roberts and Mr. Scott Morgan
State Clearinghouse, Governor's Office of Planning and Research
terry.toberts@opr.ca.gov, scott.morgan@opr.ca.gov

ATTACHMENT THREE
(May 6, 2008, State Water Resources Control Board
Resolution 2008-0030)

Department of Fish and Game Comment Letter
City of Fortuna General Plan Update
Draft Program Environmental Impact Report
State Clearinghouse #2007062106
June 2008

**STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 2008-0030**

REQUIRING SUSTAINABLE WATER RESOURCES MANAGEMENT

WHEREAS:

1. Sustainable water resources management is vital to California's future;
2. California continues to live beyond its means in water and energy resources. The threats of urban sprawl, climate change, water overdraft, and emerging pollutants require the State Water Resources Control Board and Regional Water Quality Control Boards (Water Boards) to stretch the scope of traditional water quality control efforts;
3. Low Impact Development (LID) includes stormwater management techniques to maintain or restore the natural hydrologic functions of a site by detaining water onsite, filtering out pollutants, and facilitating the infiltration of water into the ground. This innovative approach helps meet water quality and water supply objectives and maintain healthy, sustainable watersheds;
4. Regional Water Quality Control Boards (Regional Water Boards) have already begun to integrate LID and other sustainable water management strategies into compliance documents;
5. The Water Boards recognize the importance of continuing to apply climate change strategies and LID principles in regulatory and financial assistance programs to benefit water supply and contribute to water quality protection;
6. Training for Water Board staff and stakeholders is important to ensure successful implementation of climate change strategies and LID practices;
7. The State Water Resources Control Board (State Water Board) recognizes the relationship between energy, water supply, water quality and resource protection, and has already begun to integrate climate change strategies into its policies and program areas; and
8. Continued coordination with partners from other government agencies, non-profit organizations, and private industry and business will enhance and encourage sustainable activities within the administration of Water Board programs and activities.

THEREFORE BE IT RESOLVED THAT:

The State Water Board:

1. Continues to commit to sustainability as a core value for all Water Boards' activities and programs;

2. Directs Water Boards' staff to require sustainable water resources management such as LID and climate change considerations, in all future policies, guidelines, and regulatory actions;
3. Directs State Water Board staff to identify policies and program areas to integrate climate change strategies and comply with the goals stated in Assembly Bill 32, based on the Water-Energy Climate Action Team process;
4. Directs Regional Water Boards to aggressively promote measures such as recycled water, conservation, and LID Best Management Practices where appropriate and work with Dischargers to ensure proposed compliance documents include appropriate, sustainable water management strategies;
5. Directs State Water Board staff to assign a higher grant priority to climate-related and LID projects, particularly those that are supported by local policies or ordinances;
6. Supports training for Water Board staff and stakeholders to ensure successful implementation of climate change strategies and LID practices; and
7. Directs Water Boards' staff to coordinate with partners from other government agencies, non-profit organizations, and private industry and business to further enhance and encourage sustainable activities within the administration of Water Board programs and activities.

CERTIFICATION

The undersigned, Clerk to the Board, does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Board held on May 6, 2008.

AYE: Chair Tam M. Doduc
Vice Chair Gary Wolff, P.E., Ph.D
Charles R. Hoppin
Frances Spivy-Weber

NAY: None

ABSENT: Arthur G. Baggett, Jr.

ABSTAIN: None



Jeanine Townsend
Clerk to the Board

ATTACHMENT FOUR
(May 15, 2008, California Ocean Protection Council Resolution)

Department of Fish and Game Comment Letter
City of Fortuna General Plan Update
Draft Program Environmental Impact Report
State Clearinghouse #2007062106
June 2008

**Resolution of the California Ocean Protection Council
Regarding Low Impact Development**

May 15, 2008, as amended

WHEREAS, ocean water quality is critical to the health of marine and coastal ecosystems; and

WHEREAS, ongoing, traditional development of California's watersheds continues to replace natural landscapes with impervious surfaces; roads and parking lots make up about half of all impervious surfaces; and

WHEREAS, runoff from urbanized areas contains and transports pollutants – including trash, heavy metals, oil and grease, fertilizers, and pathogens – to the ocean; and

WHEREAS, these pollutants contribute to beach closures, harmful algal blooms and reduced fish populations; and

WHEREAS, increased runoff from urbanized landscapes also erodes stream banks and damages habitat for fish and a wide variety of plants and animals; and

WHEREAS, polluted runoff impacts California's \$46 billion, tourist-oriented, ocean-dependent economy; and

WHEREAS, rainwater is a valuable resource which should be conserved; and

WHEREAS, the Clean Water Act and Porter-Cologne Water Quality Control Act require that California reduce stormwater pollutant discharges from municipal storm drains, new developments and redevelopments, construction sites, Caltrans facilities, and industrial facilities; the Porter-Cologne Act also requires a California Ocean Plan for water quality regulation of ocean water, and prohibits waste discharges to Areas of Special Biological Significance (ASBS) which comprise one-third of the State's coastline; and

WHEREAS, the California Coastal Act requires that development in the coastal zone maintain and, where feasible, restore the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes; and

WHEREAS, Low Impact Development (LID) is a stormwater management strategy aimed at maintaining or restoring the natural hydrologic functions of a site to achieve natural resource protection objectives and fulfill environmental regulatory requirements; LID employs a variety of natural and built features that reduce the rate of runoff, filter pollutants out of runoff, and facilitate the infiltration of water into the ground; and

WHEREAS, by reducing water pollution and increasing groundwater recharge, LID helps to improve the quality of receiving surface waters and stabilize the flow rates of nearby streams; and

WHEREAS, LID design detains, treats and infiltrates runoff by minimizing impervious area, using pervious pavements and green roofs, dispersing runoff to landscaped areas, and routing runoff to rain gardens, cisterns, swales, and other small-scale facilities distributed throughout a site; and

WHEREAS, LID designs can alternatively, or in conjunction with the techniques set forth above, capture, retain, and treat stormwater for onsite reuse, such as for irrigating landscaping; and

WHEREAS, a recent U.S. Environmental Protection Agency report concluded that LID drainage designs can cost 15% to 80% less than more conventional drainage designs; other studies have shown LID facilities are less expensive to maintain than conventional stormwater treatment facilities; and

WHEREAS, LID has also been shown to help reduce the frequency of combined sewer overflows, which plague at least one major California coastal community; and

WHEREAS, other states and federal government departments, including the Department of Defense, have been leaders in advancing LID implementation faster than California; and

WHEREAS, Caltrans should continue its efforts to lead in innovative stormwater design approaches; and

WHEREAS, some local governments are concerned that they lack sufficient funds to maintain and improve existing drainage infrastructure and fully implement stormwater pollution prevention programs; and

WHEREAS, in 2005, the Local Government Commission adopted the Ahwahnee Water Principles for Resource-Efficient Land Use, which state in relevant part that “community design should be compact, mixed use, walkable, and transit-oriented so that automobile-generated urban runoff pollutants are minimized and the open lands that absorb water are preserved to the maximum extent possible” and that “impervious surfaces such as driveways, streets and parking lots should be minimized so that land is available to absorb stormwater, reduce polluted urban runoff, recharge groundwater, and reduce flooding”; and

WHEREAS, the California Ocean Protection Act mandates that the Ocean Protection Council (OPC) – made up of the Secretaries for the Resources Agency and Cal/EPA, the chair of the State Lands Commission, one designee each from the California Senate and Assembly, and two public members appointed by the Governor – coordinate and improve the protection of California’s ocean and coastal resources; and the Governor’s Ocean Action Plan calls for the OPC to play a leadership role in managing and protecting California’s oceans, bays, estuaries, and coastal wetlands, including integration of coastal water quality programs to increase their effectiveness.

NOW, THEREFORE, the California Ocean Protection Council hereby:

RESOLVES to promote the policy that new developments and redevelopments should be designed consistent with LID principles so that stormwater pollution and the peaks and durations of runoff are significantly reduced and, in the case of a new development, substantially the same as before development occurred on the site; and

RESOLVES to promote the retrofit of existing impervious areas throughout California with LID in all appropriate circumstances, and to support the Ahwahnee Water Principles for Resource-Efficient Land Use as described above; and

FINDS that LID is a practicable and superior approach that new and redevelopment projects can implement to minimize and mitigate increases in runoff and runoff pollutants and the resulting impacts on downstream uses, coastal resources and communities; and

RESOLVES to distribute this resolution widely, sending it to mayors, boards of supervisors, and appropriate agency managers of all coastal cities and counties and to appropriate federal agencies including resource protection agencies, the Army Corps of Engineers and the Department of Defense; and

FURTHER RESOLVES to advance LID implementation in California using the following approaches:

1. State Leadership

- a. *State Government Leadership on LID* – For all state-funded (including bond-funded) development projects greater than one acre, LID should be considered to be the best

available technology standard for reducing pollutants from stormwater discharges. All existing State facilities should consider retrofitting to meet LID objectives, whenever feasible. The California Environmental Protection Agency (Cal/EPA) and the California Resources Agency should assemble the relevant boards and departments within their agencies to develop a set of LID standards to be used in development projects built with state funds, including bond funds.

- b. *Department of Transportation (Caltrans)* – Caltrans is encouraged to continue to develop details and specifications for permeable pavements and other LID features and to incorporate LID where feasible in projects Caltrans funds or oversees, including local assistance programs. Caltrans should consider allocating a percentage of project budgets to the implementation of stormwater controls, with LID features as the highest priority. Caltrans should evaluate and revise as necessary any design standards which unnecessarily inhibit implementation of LID, such as street widths, required pavement and other materials, curb designs, and minimum parking requirements.
- c. *Office of Planning and Research* – The Office of Planning and Research (OPR) is encouraged to provide technical guidance to public agencies to promote the use of LID consistent with stormwater National Pollution Discharge Elimination System (NPDES) standards and criteria. The guidance should be provided through an OPR technical advisory and revisions to the OPR guidance for preparation of local general plans, as appropriate. OPR is also encouraged to work with the Resources Agency to develop proposals for future CEQA Guideline amendments that encourage consideration of LID in the CEQA review process.
- d. *Building Standards Commission* – The Building Standards Commission is encouraged to incorporate LID objectives and methods, and to incorporate or reference applicable NPDES permit criteria for stormwater treatment, flow control and use of LID in ongoing development of its Green Building Standards.
- e. *Department of Water Resources* – The Department of Water Resources (DWR) is encouraged to provide incentives for LID implementation and habitat protection goals in its integrated regional water management (IRWM) and stormwater flood management funding programs to encourage watershed resource protection. The OPC encourages DWR to adopt language to include the fostering of LID as a Program Priority in their draft IRWM guidelines.

2. State Regulatory Actions

- a. *State Water Board LID Policy* – The State Water Board is encouraged to adopt a statewide policy for addressing all elements associated with changes in runoff due to hydromodification impacts, including those specifically related to urbanization. This policy would include direction on when and how to use LID to avoid, minimize and mitigate runoff so that downstream water bodies are protected.
- b. *NPDES Permit Requirements* – When crafting stormwater NPDES permit requirements, the State Water Board and Regional Water Boards should ensure that LID designs are utilized as the primary approach to satisfying post-construction runoff control requirements and that LID designs can be utilized to control pollutants and the rate and volume of runoff.
- c. *LID Performance Evaluation and Monitoring* – Together with the Coastal Commission, the State Water Board is encouraged to conduct ongoing evaluation of the effectiveness

of their regulatory programs that promote LID (and other, similar approaches) implementation in regulated new development and redevelopment projects.

3. Incentives, Technical Support, and Research

The OPC will consider the following approaches, proposed by stakeholders and participants in public workshops sponsored by the OPC, to promote LID and to leverage funding with other agencies.

- a. *Local Streets and Drainage Retrofits* – Encourage local governments to retrofit existing streets, highways, municipal parking lots, public buildings, and drainage systems with LID where feasible. Promote and consider funding research and technology transfer related to the retrofit of local facilities, including demonstration projects with interpretive displays and technical documentation of results.
- b. *Technical Assistance to Local Government* – Promote and consider funding technical assistance for local agency public works, planning and engineering management and staff in the use of LID.
- c. *Research and Development of LID* – Promote and consider funding technical research for development of a LID design manual, including example designs and specifications for LID features, and post-construction evaluations of the effectiveness of constructed LID features in removing pollutants and controlling runoff flows.
- d. *Updating Local Development Policies* – Assist and consider funding for local governments to update standard details and specifications and other development policies to promote LID and remove barriers to LID.
- e. *Local Incentives* – Promote local programs that provide incentives, including reduction of stormwater utility fees, to encourage the use of cisterns, rain gardens, and other LID strategies to retain runoff and, where feasible, reuse runoff for irrigation.
- f. *Incentives for Stormwater Recharge* – Encourage water agencies to offer economic incentives for new regional and sub-regional stormwater recharge projects similar to incentives currently provided for water conservation and water reuse.

U.S. Department of Homeland Security
FEMA Region IX
1111 Broadway, Suite 1200
Oakland, CA. 94607-4052



FEMA

May 22, 2008

Stephen Avis, Assistant Planner
City of Fortuna
General Plan Update
621 11th Street
Fortuna, California 95540

Dear Mr. Avis:

This is in response to your request for comments on the Fortuna General Plan Update – Draft Program Environmental Impact Report (EIR) for the City of Fortuna, Humboldt County, California.

Please review the current effective Flood Insurance Rate Maps (FIRMs) for the City of Fortuna (Community Number 060063), Effective map dated May 3, 1982. Please note that the City of Fortuna, Humboldt County, California is a participant in the National Flood Insurance Program (NFIP). The minimum, basic NFIP floodplain management building requirements are described in Vol. 44 Code of Federal Regulations (44 CFR), Sections 59 through 65.

A summary of these NFIP floodplain management building requirements are as follows:

- All buildings constructed within a riverine floodplain, (i.e., Flood Zones A, AO, AH, AE, and A1 through A30 as delineated on the FIRM), must be elevated so that the lowest floor is at or above the Base Flood Elevation level in accordance with the effective Flood Insurance Rate Map.
- If the area of construction is located within a Regulatory Floodway as delineated on the FIRM, any *development* must not increase base flood elevation levels. **The term *development* means any man-made change to improved or unimproved real estate, including but not limited to buildings, other structures, mining, dredging, filling, grading, paving, excavation or drilling operations, and storage of equipment or materials.** A hydrologic and hydraulic analysis must be performed *prior* to the start of development, and must demonstrate that the development would not cause any rise in base flood levels. No rise is permitted within regulatory floodways.

Stephen Avis, Assistant Planner

Page 2

May 22, 2008

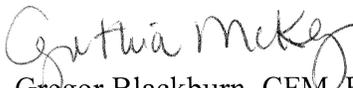
- All buildings constructed within a coastal high hazard area, (any of the "V" Flood Zones as delineated on the FIRM), must be elevated on pilings and columns, so that the lowest horizontal structural member, (excluding the pilings and columns), is elevated to or above the base flood elevation level. In addition, the posts and pilings foundation and the structure attached thereto, is anchored to resist flotation, collapse and lateral movement due to the effects of wind and water loads acting simultaneously on all building components.
- Upon completion of any development that changes existing Special Flood Hazard Areas, the NFIP directs all participating communities to submit the appropriate hydrologic and hydraulic data to FEMA for a FIRM revision. In accordance with 44 CFR, Section 65.3, as soon as practicable, but not later than six months after such data becomes available, a community shall notify FEMA of the changes by submitting technical data for a flood map revision. To obtain copies of FEMA's Flood Map Revision Application Packages, please refer to the FEMA website at <http://www.fema.gov/business/nfip/forms.shtm>.

Please Note:

Many NFIP participating communities have adopted floodplain management building requirements which are more restrictive than the minimum federal standards described in 44 CFR. Please contact the local community's floodplain manager for more information on local floodplain management building requirements. The City of Fortuna floodplain manager can be reached by calling Maria Ackerfield, Administrative Assistant, at (707) 725-1403. The Humboldt County floodplain manager can be reached by calling Todd Sobolik, Chief Building Official at (707) 445-7245.

If you have any questions or concerns, please do not hesitate to call Sarah Owen of the Mitigation staff at (510) 627-7050.

Sincerely,


802: Gregor Blackburn, CFM, Branch Chief
Floodplain Management and Insurance Branch

cc:

Maria Ackerfield, Administrative Assistant, City of Fortuna

Todd Sobolik, Chief Building Official, Humboldt County

Jerry Bare/Bill Hom, State of California, Department of Water Resources, Northern District

Sarah Owen, Floodplanner, CFM, DHS/FEMA Region IX

Alessandro Amaglio, Environmental Officer, DHS/FEMA Region IX

DEPARTMENT OF TRANSPORTATION

DISTRICT 1, P. O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 441-2009
FAX (707) 441-5869
TTY (707) 445-6463



*Flex your power!
Be energy efficient!*

June 30, 2008

1-HUM-101-Fortuna
General Plan Update DEIR
SCH# 2007062106

Stephen Avis
Community Development Department
City of Fortuna—City Hall
P.O. Box 545
Fortuna, CA 95540

Dear Mr. Avis,

Thank you for giving us the opportunity to comment on the Draft Environmental Impact Report (DEIR) for the Fortuna General Plan Update. The planning horizon for the document extends to the year 2030. We have the following comments:

Transportation & Circulation

In our letter to the Fortuna City Engineer, Doug Jackson (dated June 16, 2006), regarding the Fortuna Regional Shopping Center, we identified a number of traffic impacts at the existing Route 101 interchanges. The DEIR does not acknowledge the deficiencies that were previously identified as part of the regional shopping center review. With or without the proposed Fortuna regional shopping center, future growth is expected to impact existing State highway facilities and our previous comments are still valid. We have attached our comment letter from June 16, 2006 for reference.

In addition to the growth-related impacts to the Route 101 that have already been identified, the following significant issues will need to be addressed by both Caltrans and the City in the future:

12th Street/Riverwalk Drive Interchange:

- The 5-legged intersection at the southbound Route 101 ramps will need to be reconfigured if and/or when the intersection is signalized. This may require a significant realignment of Dinsmore Drive.
- The street cross section on bridge structure is not wide enough to meet current standards and could be a constraint for future growth. We anticipate the need to upgrade or replace this structure in the distant future.

Kenmar Interchange:

- As stated in the letter to Doug Jackson (see attached), the length of the off-ramps is not sufficient to safely accommodate queuing. Adding signals at the ramp termini is expected to increase queue length and reduce deceleration length on the ramps, potentially causing a significant impact to traffic safety.

- Due to the short bridge span of the highway over-crossing, there is inadequate width beneath the structure to widen Kenmar Road to add left-turn movement storage at the ramp terminal intersections. Traffic volumes at the intersections are expected to exceed capacity with future growth. Due to the insufficient storage space for the left turning vehicles at the freeway onramps, we would not support the installation of traffic signals for the existing interchange without substantial modifications.
- The existing highway over-crossing will need to be improved to better accommodate pedestrians and will need to be addressed as part of any improvement proposal.

TC-1.13 & -1.21: We support these General Plan Update policies as they make use of development impact funds to improve transportation infrastructure.

Page 4.1-3: Please note that the California MUTCD was updated in 2007 and references to previous versions of the MUTCD in the General Plan Update and the environmental document should be revised.

Page 4.1-16, Pass-by Trips: While higher pass-by rates may be justifiable, the Caltrans Guide for the Preparation of Traffic Impact Studies (December 2002) states: "Pass-by trips are only considered for retail oriented development. Reductions greater than 15% require consultation and acceptance by Caltrans."

Bicycle & Pedestrian Facilities

Page 4.2-1: Bicycle Facilities - Existing bicycle facilities listed in the text do not correspond with existing bicycle facilities displayed on Figure 4-6. In addition to [Class II] bike routes on portions of Main Street, 12th Street, and Rohnerville Road, the map shows bike routes on Redwood and Kenmar Road, but does not indicate the route classification.

Page 4.2-2/Figure 4-6: Existing Bicycle Facilities Map - We recommend adding map features that show proposed bikeways (including the class designation), existing and proposed bike parking, and bicycling destinations, such as schools, government buildings, shopping centers and transit stops. The map included in the 2004 Humboldt County Regional Bikeway Plan can be used as an example.

Page 4.2-3: Pedestrian Needs Assessment - The document references projects identified in the 2003 Humboldt County Pedestrian Needs Assessment. We recommend taking out the reference to the 2003 study as an updated (draft) Pedestrian Needs Assessment has just been released. The updated Needs Assessment should be consistent with the Fortuna General Plan Update document. We suggest that the Fortuna's pedestrian needs be identified on a map.

Page 4.2-5: Assumptions Bullet #7- Kenwood and Redwood are not listed as having existing bikeways or bike lanes, which appears to be inconsistent with other portions of this chapter.

Stephen Avis
6/30/2008
Page 3

Page 4.2-5: Assumptions Bullet #9 – We encourage the City to notify us of any identified deficiencies in non-motorized facilities on State Routes and provide more specific detail on items that could be corrected. The Department may be able to implement incremental improvements at these locations with future projects.

Page 4.2-5: Assumptions Bullet #10 - Bike Parking - We recommend that the City develop policies for bicycle parking, including guidelines which specify the number of bicycle racks/parking for various types and intensities of land uses.

Page 4.2-9: Multi-use Access: Additional access to the Eel River will be provided via frontage roads and pedestrian accommodation on the over-crossing as a result of the Alton Interchange project. Contact Project Manager Richard Mullen at 441-5877 for more information about this project.

Public Transportation

Currently, Humboldt Transit Authority (HTA) operates the only transit service in Fortuna. We recommend that the City assess and, if necessary, periodically monitor the need for a local (city-wide), independent transit service.

We look forward to working with the City to improve transportation and circulation as part of the City's plans to accommodate future growth. If you have questions or need further assistance, please contact me at the number above or contact Jeremy Mills of District 1 Community Planning at (707) 441-4542.

Sincerely,



Jesse Robertson
Associate Transportation Planner
District 1 Office of Community Planning

c: Scott Morgan, State Clearinghouse

DEPARTMENT OF TRANSPORTATION

DISTRICT 1, P. O. BOX 3700
EUREKA, CA 95502-3700
PHONE (707) 441-2009
FAX (707) 441-5869
TTY (Teletypewriter #707-445-6463)



*Flex your power!
Be energy efficient!*

June 16, 2006

1-HUM-101-60.49
Fortuna Regional Shopping Center

Doug Jackson, City Engineer
City of Fortuna
621 11th Street
P.O. Box 545
Fortuna, CA 95540

Dear Mr. Jackson,

Thank you for giving us the opportunity to comment on the Draft Traffic Impact Study (study) for the Fortuna Regional Shopping Center. The traffic study has been conducted for a site with potential for redevelopment, although no project has been officially proposed. The site is located east of Route 101 between Newburg Road and Kenmar Road, in the City of Fortuna. We have the following comments:

- On page 9, Table 3--Summary of Traffic Collision Rates, the Table shows five study intersections with collision rates above the statewide average, including the Kenmar Rd/Route 101 northbound (NB) ramp. While the total number of reported collisions at the Kenmar Rd/Route 101 NB ramp may be above the Statewide average, there is no correctable collision pattern and, for that reason, it does not presently qualify for funding under our safety program.
- We have concerns with installing the proposed signal mitigation on either Kenmar Rd/ Route 101 NB or SB ramp intersections for the following reasons:
 - 1) The elevation of the signal head combined with the bridge vertical sight distance (the bridge clearance does not meet current standards) would limit a driver's ability to see the signal head;
 - 2) The length of the off-ramps do not meet current standards and cannot safely accommodate queuing; and,
 - 3) The distance between intersections does not provide adequate storage for the projected volume of vehicles.
- Based on the proximity of Eel River Rd to the US Route 101 NB off-ramp, there appears to be insufficient storage between the ramp intersection and the proposed Kenmar shopping center entrance (opposite the Eel River Dr intersection with Kenmar Rd).

- While an All-Way Stop Control may be considered at the Kenmar Rd/Route 101 southbound (SB) ramps, a detailed study in queue length would need to be performed to determine if the queue would back up the onto off ramps and cause safety concerns. Additionally, the distance between bridge abutments and other limiting conditions will need to be considered.
- The shopping center proponent's engineer should evaluate the roundabout and the signal alternatives in order to determine the optimal mitigation measure/configuration for the intersection at 12th Street and the Route 101 ramps, based on operational efficiency and safety. A further analysis of the roundabouts scenario would be needed using traffic modeling to demonstrate that the system would function adequately.
- While we are not opposed to any of the traffic mitigation measures proposed at 12th Street, early consultation with Caltrans is recommended, particularly with the development of the roundabout. (Caltrans Design Information Bulletin 80-01 requires a consultation with headquarters staff to agree on the analysis and documentation required for the conceptual roundabout approval.)
- If the signal alternative is chosen for the 12th Street interchange, we recommend that Dinsmore Drive be relocated across Strongs-Mill Creek or other wise realigned due to it's close proximity to the 12th Street/SB ramps intersection. The three signals on 12th Street (two at the ramp intersections and one at the intersection with Newberg Rd) would all need to be coordinated due to their close spacing.
- For traffic signal analysis and design, the project proponent is advised to use the MUTCD 2003 and the MUTCD 2003 California Supplement.
- Passby trips for the PM Peak hour, on Page 21, uses 34% for shopping center trip generation and 43% for high-turnover sit-down restaurants. Caltrans TIS Guide allows only 15% reduction for "retail oriented development." Justification for going beyond that criterion would need to be given.
- TIS did not mention the RR right of way which currently exists and could still exist by project build-out. All improvement designs near the RR will need to deal with all RR design requirements and associated regulations and laws.

We appreciate the City's effort to involve Caltrans early in the planning stages for the regional shopping center and the General Plan update. We look forward to working with

Mr. Doug Jackson

06/30/08

Page 3

the City and the applicant's engineer to improve traffic and circulation issues at this location in order to accommodate the City's plans for future growth. If you have questions or need further assistance, please contact me at the number above or contact Lezlie Kimura of District 1 Community Planning at (707) 441-4542.

Sincerely,

ORIGINAL SIGNED BY

Jesse Robertson

Associate Transportation Planner

District 1 Community Planning

cc: Liz Shorey, Senior Planner, City of Fortuna

Enclosure: Caltrans Guide for the Preparation of Traffic Impact Studies



DEPARTMENT OF CONSERVATION

DIVISION OF LAND RESOURCE PROTECTION

801 K STREET • MS 18-01 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-0850 • FAX 916 / 327-3430 • TDD 916 / 324-2555 • WEBSITE conservation.ca.gov

June 25, 2008

Mr. Stephen Avis, Assistant Planner
City of Fortuna Community Development
621 11th Street
Fortuna, CA 95540

RE: Notice of Draft Environmental Impact Report (DEIR)
City of Fortuna General Plan Update - SCH #2007062106

Dear Mr. Avis:

The Department of Conservation's (Department) Division of Land Resource Protection (Division) has reviewed the notice for the referenced project. The Division monitors farmland conversion on a statewide basis and administers the California Land Conservation (Williamson) Act and other agricultural land conservation programs. We offer the following comments and recommendations with respect to the project's impacts on agricultural land and resources.

The project is an update of the City of Fortuna's 1993 General Plan to the year 2030. The Update proposes annexation of three areas for anticipated growth and services and extension of the planning area south of Highway 36 to the Van Duzen River. The DEIR indicates that the proposed 2030 General Plan will re-designate 1,758.2 agricultural acres within the planning area for uses other than agriculture.

Agricultural Setting of the Project

We recommend the Final Environmental Impact Report (FEIR) describe the project setting in terms of the actual and potential agricultural productivity of the land. The description should be expanded to include a soils map (if available) and data on the types of crops grown, crop yields and farm gate sales values.

Project Impacts on Agricultural Land and Mitigation Measures

The update would re-designate lands in the north, northeasterly portion of the plan from agriculture to rural residential and lands in the easterly and southeasterly planning area to open-space. The update recognizes that re-designation may lead to conversion of agricultural land and conflicts as development expands. The DEIR cites the conversion of agricultural lands as a significant and unavoidable impact.

The Department recommends that feasible alternatives to the project's location or configuration that would lessen or avoid farmland conversion impacts be considered in the FEIR. In addition, the FEIR should discuss feasible mitigation measures for the conversion of agricultural land.

The Department encourages the use of agricultural conservation easements on land of at least equal quality and size as partial compensation for the direct loss of agricultural land. If a Williamson Act contract is terminated, or if growth inducing or cumulative agricultural impacts are involved, we recommend that this ratio be increased. We highlight this measure because of its acceptance and use by lead agencies as mitigation under California Environmental Quality Act (CEQA). It follows a rationale similar to that of wildlife habitat mitigation. The loss of agricultural land represents a permanent reduction in the State's agricultural land resources. Agricultural conservation easements will protect a portion of those remaining resources and lessen project impacts in accordance with CEQA Guideline §15370.

Mitigation using agricultural conservation easements can be implemented by at least two alternative approaches: the outright purchase of easements or the donation of mitigation fees to a local, regional or statewide organization or agency whose purpose includes the acquisition and stewardship of agricultural conservation easements. The conversion of agricultural land should be deemed an impact of at least regional significance, and the search for replacement lands conducted regionally or statewide, and not limited strictly to lands within the project's surrounding area.

Another form of mitigation may be directing a mitigation fee to invest in supporting the commercial viability of the remaining agricultural land in the project area, County or region through a mitigation bank that invests in agricultural infrastructure, water supplies, marketing, etc.

When presenting mitigation measures in the FEIR, it is important to note that mitigation should be specific, measurable actions that allow monitoring to ensure their implementation and evaluation of success. A mitigation consisting only of a statement of intention or an unspecified future action may not be adequate pursuant to CEQA.

The Department believes that the most effective approach to farmland conservation and impact mitigation is one that is integrated with general plan policies. For example, the measures suggested above could be most effectively applied as part of the Agricultural and Timber Resources General Plan Policy in the City's general plan. Mitigation policies could then be applied systematically toward larger goals of sustaining an agricultural land resource base and economy. Within the context of a general plan mitigation strategy, other measures could be considered, such as the use of transfer of development credits, mitigation banking, and economic incentives for continuing agricultural uses.

Mr. Stephen Avis
June 25, 2008
Page 3 of 3

Williamson Act Lands

There are 492-acres subject to Williamson Act contracts within the General Plan update planning area. The DEIR indicates that General Plan implementation could be in conflict with Williamson Act contracted lands and lead to land uses other than agricultural.

The Department recommends that the following information be included in the FEIR regarding Williamson Act land impacted by the project. As a general rule, land can be withdrawn from Williamson Act contract through the nine-year nonrenewal process.

If cancellation is proposed, notification must be submitted to the Department when the County or City accepts the application as complete (Government Code §51284.1). The board or council must consider the Department's comments prior to approving a tentative cancellation. Required findings must be made by the board or council in order to approve tentative cancellation.

Information about agricultural conservation easements and the Williamson Act is available on the Department's website or by contacting the Division at the address and phone number listed below. The Department's website address is:

<http://www.conservation.ca.gov/dlrp/index.htm>

Thank you for the opportunity to comment on the DEIR. If you have questions on our comments, or require technical assistance or information on agricultural land conservation, please contact Adele Lagomarsino at 801 K Street, MS 18-01, Sacramento, California 95814; or, phone (916) 445-9411.

Sincerely,



Brian Leahy
Assistant Director

cc: Humboldt County Resource Conservation District
5630 South Broadway
Eureka, CA 95503



Wiyot Tribe

June 18, 2008

RE: DEIR of City of Fortuna General Plan Update

Stephen Avis
Assistant Planner
City of Fortuna
621 11th Street
Fortuna, CA 95540

Dear Stephen Avis,

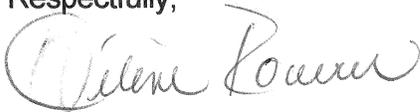
Thank you for the opportunity to comment on the *Draft Environmental Impact Report* for the *General Plan Update*. The Wiyot Tribe supports our shared commitment to protection of cultural resources and to positive dialogue and consultation on this process. After reviewing the *Cultural Resources Section 5.4* of the DEIR, I have the following comments:

- Under *Precontact Indigenous Period to 1848* there is no mention of Wiyot peoples, although there is discussion of “Native Americans from the Algonquian and the Athabaskan linguistic groups” and of the Lassik and Nongatl. Ethnographic literature as well as native oral histories substantiate that the original inhabitants of the Fortuna area were Wiyot. The *Wiyot Tribe Constitution and Bylaws* defines Wiyot territory as “all land encompassing the Tribe’s ancestral territory, including all that area from Little River to the north, Bear River Ridge to the south, and from the Pacific Coast out to as far as Berry Summit in the northeast and Chalk Mountain in the southeast.”
- Under the discussion of Section 106 responsibilities, it should be noted that the Federal agency making the determination of undertaking and effects must also afford the ACHP ability to comment (lest the agency make a decision without due consideration).
- Under NCR 7.10 *Archaeological Resource Surveys* there is mention of a “qualified archaeologist.” Somewhere in the document this should be defined, incorporating Secretary of Interior standards at the least. I would also suggest requiring local experience and knowledge. The tribe also requests amending the statement “prior to project approval in areas known to have archaeological resources,” to read “prior to project approval in areas known **or suspected** to have archaeological resources.” As the document notes in another section, many of the cultural resources are yet to be discovered.

- Under *Mitigation of Impacts* 5.4-12, the second NCR should read "...a qualified professional to work with the North Coast Information Center, **tribal representatives**, and other appropriate historical repositories..."
- Lastly, the Tribe requests the addition of a separate mitigation NCR to address any archaeological and cultural resources found as a result of site investigation or development: "Decisions regarding the stewardship and disposition of any native cultural resources discovered during project planning and implementation must be made in consultation with appropriate culturally affiliated tribal representatives."

The Wiyot Tribe looks forward to working with the City of Fortuna on the *General Plan Update* and future development. Please feel free to contact me with any questions and comments.

Respectfully,

A handwritten signature in cursive script, appearing to read "Helene Rouvier".

Helene Rouvier
Cultural Director/ THPO
Wiyot Tribe

HR/hr
cc: Gail Green, Wiyot Tribal Chairperson

7/16/08

From: Friends of Rohner Park
241 Newell Drive
Fortuna, Ca. 95540

Ms. Liz Shorey, City Planner
Mr. Stephen Avis, Assistant Planner
City of Fortuna
621 11th St.
P. O. Box 545
Fortuna, CA. 95540

RE: Response to Fortuna General Plan 2008 Update – Specifically sections 7.1—9, 7.1—13, 7.1—14. and related pertinent sections as listed.

Dear Ms. Shorey & Mr. Avis:

Friends of Rohner Park wish to file an objection to the City's plan described in Chap. 7.1—9 to build a 2 M Gal. water reservoir in the redwood forest area of Rohner Park together with associated piping and new pumping station.

We also object to the statement on pages 7.1—12 and 7.1—14 section PFS – 3.4 which states, "The City, "through its Capital Improvement Plan shall complete the water system improvements as identified and prioritized in the most recent Water Improvements Study." We assume this refers to the April 2007 Oscar Larson & Assoc. Report which includes the water tank in Rohner Park.

Your General Plan does not include reference to the impacts that such a project would pose, and we strongly believe that there are potentially significant impacts and that there is no way to mitigate against the removal of over a half acre of 100 year old second-growth redwood forest.

The following impacts would occur and need to be identified and addressed in your General Plan.

Environmental Impact

- I. **CEQA, Sec. 15125(c)** "Knowledge of the regional setting is critical to the assessment of environmental impacts. Special emphasis should be placed on **environmental resources that are rare or unique to that region** and would be affected by the project."
 - A. Redwood forest expert, Dr. Steve Sillet of H.S.U. has described this forest "as among the finest mature second-growth redwood forests I have seen." . . ."actually quite rare these days in Humboldt Co. . . ." . . ." If there is another suitable site for the water tank, I urge

the City of Fortuna to re-consider the proposed water tank in Rohner Park Forest. This forest is simply too precious to sacrifice even half an acre.” (See Ref. #1)

- B. Dr. Jeff Hogue, Professor of Biology/Botany at College of the Redwoods states that, “Rohner Park contains one of the few second-growth forests in Humboldt County with a flora remarkable in its abundance and diversity of herbaceous perennial and annual species normally found in old-growth redwood forests. These herbaceous species are very vulnerable to disturbance and my concern is that clear cutting at the proposed site, encompassing approximately 2/3 of an acre and the removal of 69 trees, would have an adverse effect far beyond the perimeter of this area. It is well known by botanists that clear cutting opens up forests to dry, desiccating breezes that negatively impact species such as Trilliums, Clintonias, Inside-Out-Flowers and other species that are adapted to cool, shady conditions. This impact is felt many hundreds of feet into the intact forest. This edge effect is widely documented and botanists have especially noted this negative impact in Pacific Northwest forests.” “After serious consideration I consider this plan to be deeply flawed and encourage you to consider alternative sites.” (Ref. #2)
 - C. CEQA Sec. 15125 (a) says, “An EIR must include a description of the physical environmental conditions in the vicinity of the project, as they exist at the time the NOP is published. This will constitute the baseline physical conditions by which a lead agency determines whether an impact is significant.”
 - D. CEQA Sec. 15125 (c) further states, “The EIR must demonstrate that the significant environmental impacts of the proposed project were adequately investigated and discussed and it must permit the significant effects of the project to be considered in the full environmental context.”
 - E. Your General Plan 7.1—13 indicates, “New or expanded water supply and distribution facilities could result in site-specific impacts.” Page 7.1—10 under Thresholds of Significance states, “General Plan implementation would have a significant water supply services impact if it: (b) Required or resulted in the construction of new water treatment facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.” These potential impacts have not been addressed under mitigation.
 - F. Clearly you have not complied with the requirements of the above listed CEQA sections. You have not adequately investigated and discussed the potential impacts. You haven’t even acknowledged them. We believe that the reference to a plan for a water tank in Rohner Park Redwood Forest should either be removed from your General Plan or the impacts described and discussed as required.
- II. One of the ways to address global climate change is to protect the ecosystems that sequester carbon by removing CO₂ from the atmosphere. The Mountain Echo states, “Forests play a key role in influencing the earth’s climate. They naturally sequester carbon, or store carbon,. . .but become a significant source of emissions when cut, burned, or degraded by human activity.”. . .”Mature coastal redwood forests have the highest carbon

density per acre in the world." . . ."Nothing sequesters CO2 like the coast redwood." (Ref. #3) Research increasingly supports this statement.

III. **Potential Marbled Murrelet Nest-Site Habitat**

Excerpts from a letter from the U. S. Fish & Wildlife Service to SHN Consulting Engineers dated June 26, 2008 follows:

"This responds to your request for U.S. Fish and Wildlife Service (Service) technical assistance received in our office on May 6, 2008, on the City of Fortuna's Rohner Park Water Reservoir Project (Project). At issue in the request is the Service's concurrence with the determination made by SHN Consulting Engineers & Geologists that enough elements of habitat suitability exist in the Project area to create a potential for incidental take of the federally listed marbled murrelet (*Brachyramphus marmoratus*) as a result of operations conducted as proposed on the above Project. . . . While not considered old-growth, the stand does contain mature conifers and several trees were observed with platforms suitable for nesting by marbled murrelets. The stand is the closest, oldest potentially suitable marbled murrelet habitat to the Headwaters Reserve, which is known to be occupied by marbled murrelets, and is located less than 3 miles from Rohner Park. . . .Based on the stand age, the presence of mature trees with platforms suitable for marbled murrelet nest sites, and the close proximity to known occupied marbled murrelet habitat, the Service concurs with your determination that the Project area does contain elements of suitable marbled murrelet habitat; therefore, . . .the Project area should be surveyed to protocol for marbled murrelet occupancy prior to any land disturbing activities." (Ref. #5)

Your General Plan does not even mention this **environmental impact**.

IV. **Park & Recreation Commission Letter opposing Water Tank in the Park**

(Sent 5/16/'08 by Harry Pritchard, Chairman, Fortuna Parks & Recreation Commission)

"I am writing to inform you that the Fortuna Parks and Recreation Commission is opposed to the placing of the 2 million gallon water tank in the middle of Rohner Park. We feel that the placing of a 2 million gallon tank in the middle of the parklands would destroy that park. . . . This commission is recommending that Council instruct staff to focus on finding an alternative site for the proposed water tank." (Ref. #6)

V. **Chap. 6.1—Parks, Recreation and Open Space**

Pros. – 1.10 *Encroachment Protection* – **"The City shall strive to protect parklands from encroachments and minimize adverse human impacts to natural recreation areas."**

Placing the water tank in the Rohner redwood forest is inconsistent with this statement and needs to be addressed in the final EIR.

Social, Aesthetic & Recreational Impact

- I. We have obtained over 900 names/signatures testifying to the value of this forest to the daily lives of the residents of Fortuna, neighboring cities, and visitors to the area – a place of peace and quiet; a place for hiking, jogging, bicycling, horseback riding, nature study, field trips, ecology, sketching – the only redwood forest within easy reach for our community. People express a reverence for the forest, an aura or a feeling akin to being in a church. This is a place which people need for their emotional wellbeing.
- II. The General Plan 6.2—2 specifies, “Views and proximity to scenic resources are quality of life issues that should be preserved.” Page 6.2—5 continues, “Implementing the General Plan could have a significant visual resources impact if it would: . . .Substantially degrade the existing visual character or quality of the site and its surroundings.”

Historical and Cultural Impact

- I. The intent of the acquisition of this piece of property was unquestionably that it be used for a park. In 1907 the \$1,000. sale price for the park was paid for by contributions from citizens and fund-raising projects. Mary Rohner (the land owner) contributed the first \$500. The people of the area took great pride in the park and collected another \$2,000. for improvements – several trails, a driveway, brush clearing, a picnic site, the first pavilion, and park beautification in general. Fortuna was the only city in So. Humboldt with a park – a source of pride and joy in the community, a natural, historical, and cultural resource.

Donald R. Thompson, in his research article, “Rohner Park, A symbol of Pride, History and Tradition,” states that research revealed that “The structure of events and experiences in Fortuna’s park seemed closely related to the fact that it is viewed not only as a recreation area but as a symbol of history, civic pride, & traditions of the area.” (Ref. #4)

The August 6th, 1907 edition of the *Greater Humboldt Edition of the Humboldt Daily Standard* states that , “One of the most attractive features of Fortuna is its beautiful redwood park consisting of 20 acres immediately adjacent to the heart of the town and constantly being beautified by driveways and accessories. Some specimens of second growth redwood in the park are three feet in diameter and trees of wonderful growth.”

- II. The redwood forest area of Rohner Park deserves to be preserved as an historic and cultural site in honor of the memory of the members of the Rohner family.

A. Supporting Statements from the General Plan – Chap. 5.4--10

NCR 7.4 Historic Structures & Sites, “The City shall support public and private efforts to identify, preserve, rehabilitate, and continue the use of historic . . . sites. . .”

NCR 7.5 –Controls on Demolition of Historic Properties, “The City shall discourage the premature demolition of existing. . .cultural landscapes and sites without first evaluating whether they are contributory to the historical. . .character of the city or neighborhood.”

NCR 7.7 – Historic Landmarks, “The City shall designate and preserve significant. . .sites. . .that are representative of the City’s social and physical development; are reminders of past eras, events and persons important in local. . .history; are unique and irreplaceable assets to the City and the neighborhood in which the historical resource is located.”

B. **Supporting Statements from CEQA** are found in Sec. 15064.5 (3) and (3) (B). –
“Determining the Significance of Impacts to Archeological and Historical Resources.” This redwood forest “is associated with the lives of persons important in our past.”

- III. Rohner Redwood Forest is certainly of historic and cultural value to the City of Fortuna. It is part of our heritage from the Rohner Family members who helped make Fortuna what it is today. This forest should be respected and appreciated as a valuable asset to the City of Fortuna and should be protected from encroachment so that future generations may enjoy the splendors of a redwood forest in their backyard.

Summary Statement

We firmly believe that there are major environmental, social, historical and cultural impacts associated with the plan for placement of a 2 million gallon water reservoir in the redwood forest area of Rohner Park, and we submit the foregoing statements in support of this position. We believe these impacts should be acknowledged and addressed in the General Plan Update or that this proposal should be removed from the plan, discontinued, and an alternative site chosen for the water tank. As the plan is written now, it totally ignores its own admonitions regarding the possible impacts which would result from completion of proposed projects.

Sincerely yours,

Marian L. Perry

Neil Palmer

Paul Trichilo



Marian Perry

From: Steve Sillett [prof.sillett@gmail.com]
Sent: Wednesday, May 14, 2008 5:40 PM
To: mlperry@quik.com; NJR@SBCGlobal.net
Subject: value of the forest

Dear Marian and Neil,

Thanks for inviting me to see the Rohner Park Forest today. The stand of redwoods within which the proposed water tank is to be located is among the finest mature second-growth redwood forests I have seen. This forest type is actually quite rare these days in Humboldt County, as nearly all of the redwood forests logged prior to the 1930s have been logged again. Today, mature second-growth redwood forests are far more scarce than even old-growth redwood forests. I estimate there are fewer than a few hundred acres of such forest left in all of Humboldt County. Thus, I feel it is important to explore alternatives to the proposed disturbance in Rohner Park Forest as removal of even a half-acre of this forest seems unwise.

The Rohner Park Forest in the vicinity of the proposed water tank location is an outstanding example of native redwood forest with a well-developed understory dominated by native shrubs and herbs, including evergreen huckleberry, red huckleberry, salal, oxalis, Clintonia lilly, and many other notable plant species. If there is another suitable site for the water tank, I urge the city of Fortuna to re-consider the proposed water tank in Rohner Park Forest. This forest is simply too precious to sacrifice even half an acre.

Also, there is an outstanding Monterey pine just above the proposed water tank. If the water tank project goes through as planned, I urge the city of Fortuna to provide special protection for that magnificent pine, which is the tallest and most stately of its species I have seen in Humboldt County.

Sincerely,

Professor Steve Sillett
Kenneth L. Fisher Chair in Redwood Forest Ecology'
Department of Forestry and Wildland Resources
Humboldt State University
Arcata, CA 95521

July 1, 2008

Ref: 11

To the Fortuna City Council,

My name is Jeff Hogue and I am a Fortuna resident. I hold the position of Professor of Biology at College of the Redwoods and teach Botany, Biology, and related subjects. I have both bachelor and master degrees in Botany and a PhD in Plant Pathology. I recently learned of the city of Fortuna's plan to investigate the potential of constructing a new water tank in Rohner Park. I attended the meeting of the Fortuna City Council to describe the proposal to the general public last month. After serious consideration I consider this plan to be deeply flawed and encourage you to consider alternative sites.

Rohner Park contains one of the few second growth forests in Humboldt County with a flora remarkable in its abundance and diversity of herbaceous perennial and annual species normally found in old growth Redwood forests. These herbaceous species are very vulnerable to disturbance and my concern is that clear cutting at the proposed site, encompassing approximately 2/3 of an acre and the removal of 69 trees, would have an adverse effect far beyond the perimeter of this area. It is well known by botanists that clear cutting opens up forests to dry, desiccating breezes that negatively impact species such as Trilliums, Clintonias, Inside-Out-Flowers and other species that are adapted to cool, shady conditions. This impact is felt many hundreds of feet into the intact forest. This edge effect is widely documented and botanists have especially noted this negative impact in Pacific Northwest forests .

I understand the principle of expediency and see the initial logic of constructing the proposed tank within the confines of Rohner Park. But consider the negative impacts to the surrounding forest, let alone the aesthetic damage, this proposed water tank would have. Try to understand the loss to this community, from both an ecological and aesthetic perspective, by the fragmentation of this remarkable forest. I have lived in Fortuna with my family for a little over one year. I was introduced to this Park during the summer of 2007 and have spent much time hiking with my wife and daughter there. I am considering planning field trips to the Park for my Environmental Science, Botany, and Wildflower courses that I offer at College of the Redwoods. Prior to my knowledge of the flora at Rohner Park I have taken my students to places such as Grizzly Creek State Park to see Clintonias and other plants typically found in old growth forests. I had no idea that such plants were so close to CR, and so easily accessible for viewing. If this project is realized I would not consider taking my students to Rohner Park.

Most communities would dearly love to have such a beautiful park in their midst. To see the City Council of Fortuna consider this destructive project is hard to imagine. Please step back and reconsider this ill-advised project. Future generations will be thankful to you and your colleagues that Rohner Park was spared.

Sincerely,



Jeff Hogue, PhD
Professor of Biology
College of the Redwoods

Seeing the Forests for the Carbon:

Sempervirens Fund Launches the Lompico Forest Carbon Project

Climate Change: The Role of Forests

Forests play a key role in influencing the earth's climate. They naturally sequester, or store, carbon through the process of photosynthesis, but become a significant source of emissions when cut, burned, or degraded by human activities.

Deforestation and other destructive land-use changes account for nearly 25% of global carbon dioxide emissions.

Redwoods: Giants of Carbon Storage

Sempervirens Fund and its supporters have long known of the benefits of preserving redwood forests: these majestic giants provide habitat for rare and endangered species, supply clean and safe drinking water by protecting underlying watersheds, and deliver immense

aesthetic and recreational benefits. More recently, however, redwoods are getting noticed for their ability to sequester massive amounts of carbon. Mature coastal redwood forests have the highest carbon density per acre in the world.

The Lompico Forest Carbon Project
Sempervirens Fund has embarked on an ambitious new project that utilizes the role of forest preservation in fighting climate change: the Lompico Headwaters Forest Carbon Project. Following the standards set forth by the California Climate Action Registry (CCAR), it is the first forest carbon project of its kind to embody the management goals of protection and preservation to generate carbon credits. Credits are derived from the 202-acre

Project area because Sempervirens Fund's actions prevented logging on the property and allowed for the continued sequestration of carbon through permanent protection.

"This is the most important project we can engage in beyond our 107-year old mission of redwood land acquisition," stated

Brian Steen, Sempervirens Fund's Executive Director. "Promoting increased carbon sequestration in our forests is a new priority for Sempervirens Fund."

Project Benefits: Carbon Storage and Emissions Reductions
The Lompico Carbon Project has followed the Registry's rigorous set

of Forest Protocols, or standards, in its design and implementation. Forest owners like Sempervirens Fund can register Forest Projects to quantify and monitor greenhouse gas reductions resulting from specific activities, such as reforestation, improved forest management practices and avoided deforestation.

We hired a team of experts from Winrock International, an industry leader in carbon measurement and monitoring, to collect and analyze the necessary data. They were able to create a model combining the projected carbon sequestration of the forest with the projected avoided emissions from having prevented future logging of the trees. The result? Sempervirens Fund's first carbon credits! ♣



"Global climate change is the single biggest challenge facing our generation. There are three ways we can address this problem: use less energy, use clean energy, and protect the ecosystems that sequester carbon. The last tool is the only one that actually removes CO₂ from our atmosphere, and nothing sequesters CO₂ like the coast redwood which is here in our own backyard."

~ Dan Martin, Sempervirens Fund Board Vice-President

Speaking of Carbon: A Glossary of Terms

Carbon credits: A greenhouse gas "currency" that can be bought and sold within a carbon market system.

Carbon sink: Occurs where carbon sequestration is greater than carbon releases (emissions) over a period of time.

Greenhouse gas (GHG): Any gas that contributes to the "greenhouse effect," the insulating effect of atmospheric gases that keeps the Earth's temperature about 60°F warmer than it would be otherwise.

Sequestration: The process through which carbon dioxide (CO₂) from the atmosphere is absorbed by trees and plants through photosynthesis and stored as carbon in vegetation and soils. New plant growth = increased sequestration.

For more information on our Carbon Project, visit: www.sempervirens.org/lompicocarbonproject.htm

Source: "The Mountain Echo" Sempervirens Fund Quarterly Newsletter, Fall 2007, Drawer BE, Los Altos CA 94023.

Reference #4

Thompson, Donald R. "Rohner Park A Symbol of Pride, History and Tradition," History of Fortuna Book No. 2, p. 137, Fortuna Depot Museum Reference Room



FILE COPY

Ref. # 3

United States Department of the Interior

FISH AND WILDLIFE SERVICE

Arcata Fish and Wildlife Office

1655 Heindon Road

Arcata, California, 95521

Phone: (707) 822-7201 FAX: (707) 822-8411



In Reply Refer To:
8-14-2008-TA-3445

JUN 26 2008

Ms. Aimee C. Weber
Botanist and Ecologist
SHN Consulting Engineers & Geologists, Inc.
812 West Wabash Ave.
Eureka, CA 95501

Subject: Response to Request for Technical Assistance Regarding the City of Fortuna's Rohner Park Water Reservoir Project, Fortuna, California

Dear Ms. Weber:

This responds to your request for U.S. Fish and Wildlife Service (Service) technical assistance, received in our office on May 6, 2008, on the City of Fortuna's Rohner Park Water Reservoir Project (Project). At issue in the request is the Service's concurrence with the determination made by SHN Consulting Engineers & Geologists that enough elements of habitat suitability exist in the Project area to create a potential for incidental take of the federally listed marbled murrelet (*Brachyramphus marmoratus*) as a result of operations conducted as proposed on the above Project. After review of the information pertaining to this request, and a site visit conducted by Mr. Ken Hoffman of my staff, the Service provides the following technical assistance.

Rohner Park was donated to the City of Fortuna approximately 100 years ago and the majority of the stand appears to date from that time. While not considered old-growth, the stand does contain mature conifers and several trees were observed with platforms suitable for nesting by marbled murrelets. The stand is the closest, oldest potentially suitable marbled murrelet habitat to the Headwaters Reserve, which is known to be occupied by marbled murrelets, and is located less than 3 miles from Rohner Park.

The proposed Project would require the removal of approximately 70 conifer trees, primarily Redwoods, ranging in size from 8 to 52 inches DBH from an area approximately 0.5 acre in size. In addition to the removal of potential marbled murrelet nest sites, opening a 0.5 acre hole in the stand would increase the likelihood of predation of murrelet eggs or chicks by corvids.

Based on the stand age, the presence of mature trees with platforms suitable for marbled murrelet nest sites, and the close proximity to known occupied marbled murrelet habitat, the Service concurs with your determination that the Project area does contain elements of suitable marbled murrelet habitat; therefore, to determine the likelihood of incidental take of marbled murrelets as a result of the implementation of the proposed Project, the Project area should be surveyed to protocol for marbled murrelet occupancy prior to any land disturbing activities.

May 16, 2008

Fortuna City Council
City of Fortuna
Fortuna, CA 95540

Dear Honorable Mayor John Campbell and Members of the City Council,

I am writing to inform you that the Fortuna Parks and Recreation Commission is opposed to the placing of the 2 million gallon water tank in the middle of Rohner Park. We feel that the placing of a 2 million gallon tank in the middle of the park lands would destroy that park.

We do not feel that this is keeping with the city of Fortuna's promise to the taxpayers of this city for a recreation park. As we understand our mission, as the Parks and Recreation Commission, it is to protect and enhance the parks of the city. We do not feel that placing this tank in the middle of the park will meet the requirements of our obligations.

It is hard for this commission to conceive how a 2 million gallon tank with a ten foot fence surrounding it, would be hidden from view. The size of the park and the established trail system prevent the tank from being beyond the view shed. Furthermore, removing trees in the middle of the park will inevitably damage other surrounding tress

The commission realizes the cost problem of installing the new tank, yet what price can you place on removing 67 trees from 19 acres of public parkland? We feel that this cost makes the park site financially infeasible for the tank. This commission is recommending that Council instruct staff to focus on finding an alternative site for the proposed water tank.

Sincerely,

Harry Pritchard

Chairman, Fortuna Parks and Recreation Commission
4433 Traci Way
Fortuna, CA 95540

The Harland Law Firm LLP

JAMES ASTE
TAMARA C. FALOR
GERALD R. HARLAND
ALLISON G. JACKSON
GERI ANNE JOHNSON*
AMY MENDOZA-STOVER
RICHARD SMITH
*of counsel

ATTORNEYS AT LAW
A LIMITED LIABILITY PARTNERSHIP
622 H Street
Eureka, California 95501
(707) 444-9281
Facsimile: (707) 445-2961
E-Mail: rsmith@harlandlaw.com

OTHER OFFICE:
954 MAIN STREET
FORTUNA, CA 95540
(707) 725-4426
FAX: (707) 725-5738

June 30, 2008

To: City of Fortuna
re: Comment of the Fortuna Industrial
Land Availability Association to the
Draft Program Environmental Impact Report

* * * * *

Thank you for the opportunity to present these written comments on the Fortuna General Plan Update process (the "Project") and its Draft Program Environmental Impact Report (the "DPEIR") during public comment meeting, on the above date and at the City of Fortuna Council Chambers.

We represent the Fortuna Industrial Land Availability Association, a voluntary association of persons interested in the Fortuna General Plan Update process and its impact on the availability of properties for light industrial uses and the effects on the environment of shifting such uses to other areas. These comments are made on behalf of that Association and its members.

The Project, which is the subject of the DPEIR, includes incorporating into the City lands located in the County and on the west side of Riverwalk Drive, assigning general plan land use designations to them and changing the use designations for property currently located in the City and on the east side of River Walk Drive. The Project also proposes to have zoning and allowable uses in both of these areas be changed to conform with the Project's general plan designation of "River Walk District."

This area is currently zoned M-1 (Light Industrial) and is intended to allow, "areas where light manufacturing, wholesaling, storage, and transfer functions can serve the community's need for industrial activities not offensive to nearby commercial and residential uses."

The uses allowed under the "River Walk District" are strictly incompatible with both current zoning and much of this area's actual use. The new designation would only allow, "single use and mixed use development as part of an integrated district that is oriented toward the Eel River. Uses may include retail and service uses, hotels and conference centers, restaurants, entertainment uses, professional and administrative

offices, public and quasi public uses, and similar and compatible uses.” Such currently existing uses that would become incompatible with the Project’s River Walk District would be Wendt Construction’s corporation yard, the Eel River Disposal transfer station, Eel River Transportation and Salvage’s scrap metal facility and its proposed construction demolition and debris recycling yard and existing storage facilities and several other such uses.

The Project as now proposed will make significant changes in this area, requiring that the current light industrial uses be frozen in place as non conforming uses and making the area no longer available for any new or different light industrial uses. Under ordinance 17.54.185(c), as nonconforming uses, these current conforming uses would be subject to the following new restrictions:

C. Regulations. All nonconforming uses or structures shall be subject to the following regulations:

1. A nonconforming use or structure shall not be enlarged, extended, or moved to a different portion of the lot or parcel of land occupied by such use, unless a use permit is granted to do so, except that a nonconforming structure may be reconstructed in such a way as to make it conforming.
2. A nonconforming use of a structure shall not be reestablished if such use has been discontinued for a period of nine months or more, or has been changed to, or replaced by, a conforming use. Intent to resume use of nonconforming structure shall not confer the right to do so.
3. A nonconforming use of land, not involving a structure other than fences, and buildings less than 400 square feet in area, shall not be reestablished if such use of land has been discontinued for a period of nine months or more, or has been changed to or replaced by a conforming use. Intent to resume a nonconforming use of land shall not confer the right to do so.
4. A nonconforming structure which is damaged by fire, flood, or act of God to an extent exceeding 50 percent of its fair market value shall not be restored or reconstructed except in such a manner and for such a use as will conform to the regulations for the district in which it is situated.
5. Notwithstanding any of the regulations of this section, nothing in this section shall be deemed to prevent normal maintenance and repair of any use or structure or the carrying out upon the issuance of a building permit of major structural alterations or demolitions necessary in the interest of public safety. In granting such a building permit, the building official shall state the precise reason why such alterations were deemed necessary.
6. The existence of one or more nonconforming uses on any parcel, lot or site shall not justify or allow a change in the character, nature or scale of the business or functioning of any nonconforming use.
7. The provisions of this section may not be altered or varied by conditional use permits or variances.

Over time the Project’s new general plan designations and the above rules will

June 30, 2008

page 3

have the effect of forcing the current light industrial users to relocate to other areas and will force similar and future development to initially locate elsewhere.

The DPEIR as now written fails to analyze and discuss the potential impacts on the environment of the Project's change in general plan designation to "River Walk District" as it relates to the above issues. It fails to discuss or to identify other compatible zones where the existing non conforming uses or new light industrial uses could and will be relocated nor the environmental effect of such a shift in physical location of such uses. At the same time, it fails to identify and discuss the potential environmental effects of a lack of sufficient property with appropriate zones for these uses, if that be the result of an appropriate study.

As a result of the forgoing, it is the belief of the Fortuna Industrial Land Availability Association that the DPEIR is deficient and fails to address and analyze the above described environmental impacts of the Project as is required by law.

Thank you for this opportunity to address these deficiencies in the DPEIR.

Sincerely,

A handwritten signature in black ink, appearing to read "Allison Jackson", written in a cursive style.

Allison Jackson

AJ/ds



COMMUNITY DEVELOPMENT SERVICES
PLANNING DIVISION
COUNTY OF HUMBOLDT

<http://co.humboldt.ca.us/CDS/Planning>

July 16, 2008

Duane Rigge, City Manager
City of Fortuna
621 11th Street
Fortuna, CA 95540

RE: Draft Environmental Impact Report for the City of Fortuna General Plan Update, State Clearinghouse Number (SCR#) 2007062106

Dear Mr. Rigge:

The Department of Community Development Services, Planning Division has reviewed the Draft Program Environmental Impact Report for the City of Fortuna General Plan Update (DEIR). The DEIR provides an assessment of the environmental impacts associated with the General Plan implementation, in addition to an annexation analysis and analysis of alternatives. The DEIR identifies significant, unavoidable impacts to hydrology and water resources, agriculture and timber, cultural resources, air quality, and flooding.

- Intended uses of the EIR (Section 1.3 of Chapter 1) should include the Humboldt County Local Area Formation Commission (LAFCo), as the proposed project and several of the alternatives involve lands outside of the jurisdiction of the City of Fortuna and could have a significant impact on resource land uses (agriculture and timberland). City acquisition of unincorporated lands for development should be examined by LAFCo in the context of the City's Sphere of Influence, which could determine the ultimate City boundary.
- The DEIR contains a discussion of agricultural land conversion, but fails to identify specific mitigation measures that might be employed to reduce the impacts of this type of conversion. It is not clear from the discussion of section 5.3 the nature of the agricultural lands to be converted. The DEIR proposes no mitigation for the conversion of 1,758.2 acres of agricultural land to residential uses and concludes that the conversion would be less than significant. We believe the impacts of this conversion are significant, if the conversion involves productive agricultural lands or prime agricultural land. We believe that review of this conversion should take into consideration the measures currently being considered for the Humboldt County General Plan Update for agricultural land conversion (see attached detailed comments). Lacking mitigation to reduce impact levels to less than significant in this impact category, the City will need to develop a Statement(s) of Overriding Consideration for the potential impact to agricultural lands that has been determined to be individually significant and cumulatively considerable. The DEIR should provide a more detailed

impact evaluation for this topic and include additional analysis, conclusions, mitigations (if any), and levels of significance after mitigation.

The uses proposed under any of the alternatives should be assessed for conformance with the Humboldt County General Plan, particularly agricultural uses. This review should also address the potential loss of agricultural sites as a consequence of the project and whether such loss could have a significant community impact or cumulative impact with respect to agricultural land viability.

- The Department believes that there could be significant impacts to aesthetics and open space areas such as agricultural lands and forested hillsides given the conversion of resource lands proposed under the plan and expansion of urban area into these domains. No mitigation is proposed in the DEIR to address these impacts. We recommend consideration of several measures, policies, and standards developed under the Humboldt County General Plan Update to address these potential impacts (see detailed comments).

Thank you for the opportunity to provide comments on the Program DEIR. If you have any questions regarding these comments, please contact Tom Hofweber or Michael Wheeler of our staff. We look forward to a more detailed treatment of these comment areas and development of mitigation to reduce or avoid impacts to agricultural lands, aesthetics and open space.

Sincerely,



Michael E. Wheeler, Senior Planner
Department of Community Development Services

Enclosure:

Page specific comments

Fortuna Draft PEIR
Page Specific Comments
Humboldt County Department of Community Development Services

Figures 2-2 and 2-3 are somewhat unclear; hard to distinguish between city boundary lines, sphere lines, and planning area lines. Some lines are overlain with roads in parts, making it difficult to know where they are.

Page 3.1-1, Paragraph 4, last sentence: numbers don't add up.

Table 3.1-2, The heading "Developable Acres" should be relabeled to "Potentially Developable Acres"

Page 3.1-11, Thresholds of Significance: This section does not identify the conversion of 1,758.2 acres of agricultural land to residential uses. This could be a significant conversion.

Page 3.1-12, Implications of land use diagram: Lacks an analysis of demand or need of non-residential (commercial and industrial) land uses.

Page 5.3-5, Assumptions: This section should explicitly state how many acres of agricultural lands and forest lands, including forested hillsides, could be converted to non-agricultural uses within the planning area.

Page 5.3-6, Implication of the Draft Land Use Diagram: It is stated the "*Within the Planning Area, the 1993 General Plan designated approximately 3,623.2 acres as Agriculture, whereas the proposed 2030 General Plan Land Use Diagram designates approximately 1,865 for agricultural use.*" This implies that 1,758.2 acres of agricultural land would be lost (i.e. changed to some other use). If this is the case, it should be so stated.

Page 5.3-8, Mitigation for conversion of agricultural lands. The DEIR proposes no mitigation for the conversion of 1,758.2 acres of agricultural land to residential uses and concludes that the conversion would be less than significant. We believe that review of this conversion should take into consideration the measures currently being considered for the Humboldt County General Plan Update for agricultural land conversion. The following policies, standards and implementation measures should be considered as potential mitigation for this agricultural land conversion and reviewed for consistency between the City and County General Plans.

AG-P10. Conservation of Agricultural Lands. Agricultural lands shall be conserved and conflicts minimized between agricultural and non-agricultural uses through all of the following:

- A. By establishing stable boundaries separating urban and rural areas and, when necessary, buffer areas to minimize land use conflicts.*
- B. By promoting in-filling to achieve a more logical urban/agricultural boundary.*
- C. By developing available lands not suited for agriculture, or those located within Urban Study Areas, prior to the conversion of agricultural lands outside of those areas.*

D. By assuring that public service facility expansions and non-agricultural development do not inhibit agricultural viability, either through increased assessment costs or degraded air or water quality.

E. By broadening the utility of agricultural preserves and the Williamson Act Program.

F. By not allowing residential subdivision of lands planned Agricultural Exclusive (AE).

G. By allowing lot-line adjustments for agriculturally designated lands only where planned densities are met and there is no resulting increase in the number of building sites. (modified Framework Plan policy)

AG-P14. Road Constraints and Density. Densities should reflect road constraints. No subdivisions are allowed where deficiencies have been identified that are not feasible to correct.

AG-S2. Subdivisions of AG and AGR. Subdivision of rural land may be approved if it can be found that:

A. There is proof of adequate water for domestic use and fire suppression (See Fire Safe Standards) provided through either:

1) Certified dry weather tests of individual developed water supply systems on each parcel using wells, creeks, or springs; or

2) Four or fewer connections to a developed private water system, including certified dry weather testing of source, storage, and transmission facilities, with recorded easements and legal agreements; or

3) Evidence of connection to a public water supply meeting the waterworks standards of the State of California.

4) Cumulative impact of water withdrawals from surface and groundwater sources shall be assessed and found to not be detrimental to beneficial uses.

B. There is proof that adequate sewage disposal capability will be provided through either:

1) Individual on-site systems approved by the Humboldt–Del Norte Health Department; or

2) Evidence of connection to a public waste disposal system.

C. Building sites are identified that are not subject to health and safety hazards caused by:

1) Geologic instability, steep slopes, and erosion;

2) Seismic activity;

3) Flooding; and

4) Inadequate access to structural fire protection.

D. Recorded access or other acceptable legally documented access to a publicly maintained road that is:

1) Adequate for ultimate development at planned densities; and

2) Adequate for use by emergency vehicles.

3) Not subject to adverse impacts caused by:

a) Geologic instability, steep slopes, and erosion;

b) Seismic activity;

c) Flooding; and

d) *Inadequate access to structural fire protection.*

AG-S3. Exceptions to Subdivision of AG and AGR. For subdivisions meeting the following findings, the standards of AG-S2 may be replaced:

- 1) All parcels created and any remainder are each in excess of 160 acres.*
- 2) The purpose of the parcels is resource production.*
- 3) A transfer of development rights for residential purposes is executed in favor of the County of Humboldt.*

Note: Residential development rights may be reclaimed by meeting the standards in AG-S2, Sections A, B, C, and D.

AG-S4 Subdivision of Lands Planned Agricultural Exclusive (AE). Within areas designated AE, no agricultural land division will be approved whereby any parcel thusly created will be less than 60 acres. However, divisions of these agricultural lands to a minimum size of 20 acres—and which are otherwise consistent with this Chapter—may be approved if the County or Planning Commission finds that the division is necessary for a specific agricultural purpose (e.g., to provide for a separate starter farm for a family member), and the division will not adversely affect the area's agricultural economy or habitat resources. The rezoning and parcel map may be approved only upon satisfaction of all of the following conditions:

- 1) Conveyance of an open space easement to the County of Humboldt or other public entity or private non-profit corporation, having as its chief goal the preservation of agricultural or open space lands.*
- 2) Conveyance of development rights beyond those necessary for agricultural purposes.*
- 3) Acknowledgment either on the parcel map or in a covenant within the chain of title that, although the new parcel is of a size below that considered a viable economic agricultural unit, its creation was approved for a specific agricultural purpose, and no further division or other conversion from agricultural use, except to other open space or habitat restoration use, will be allowed in the future even if agricultural use of such separate parcel does not provide adequate economic return.*

Page 6.2-9, Visual Impacts to Natural Elements. The Department believes that there could be significant impacts to open space areas such as agricultural lands and forested hillsides given the conversion of resource lands proposed under the plan. No mitigation is proposed in the DEIR to address these impacts. We recommend consideration of the following mitigation measures and policies developed under the Humboldt County General Plan Update to address these potential impacts:

Impact 4.1.2.1: Development may result in a substantial reduction in views from designated scenic roadways, coastal scenic areas and coastal view areas, or have a substantial adverse effect on a scenic vista.

Visual character consists of both the backdrop of surrounding open spaces and the ambience of Humboldt County communities. Given the high percentage of lands in the County that are managed for timber production, resource protection and passive recreation, most views within the County will be preserved. For new development, the majority of this will occur in or adjacent to existing communities. The updated General Plan includes policies for the maintenance of character within existing communities consistent visual character (see Policies SP-P1 through SP-P5). Implementation measures include requiring new development within designated areas to conform to design review criteria that will protect the character of scenic areas.

- SR-P1. Development in Scenic Areas.** In highly scenic areas, new development shall be subordinate to the character of the area, and natural contours, including slope, visible contours of hilltops and treelines, bluffs and rock outcroppings, shall suffer the minimum feasible disturbance compatible with development of any permitted use.
- SR-P2. Heritage Landscapes.** Protect the scenic quality of mapped heritage landscape areas with appropriate land use designations and design review standards to ensure that new development enhances the heritage landscape values of the site.
- SR-P3. Scenic Roadway Protection.** Protect the scenic quality of designated scenic roadways for the enjoyment of natural and scenic resources, landmarks, or points of historic and cultural interest.
- SR-P4. Community Separators.** The scenic quality of Community Separators shall be protected from degradation by maintaining adequate open space between communities and cities.
- SP-P5. Development Within Community Separators.** Retain a rural character and promote low intensities of development in Community Separators. Avoid their annexation or inclusion in spheres of influence for sewer and water services. Provide opportunities for consideration of additional development in community separators in exchange for permanent open space preservation and other overriding public benefits

Impact 4..1.2.2: Changes in land use may substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway, or may substantially degrade the existing visual character or quality of the site and its surroundings.

Implementation of the updated General Plan does not result in a substantial change to land uses within the County other than in developed communities. As such, few changes to scenic character are expected. The project will result in minor localized changes to the scenic character as localized areas are developed. These changes will be minor in relation to the overall goals of the designated scenic routes, coastal scenic areas and coastal view areas, and the length of the designated routes will insure that the overall scenic character is maintained. Proposed standards (see SR-S1 through SR-S4.) and implementation measures (see Coastal Zoning Regulations dealing with coastal scenic areas and coastal view areas) are designed to address these concerns. The County

Zoning Ordinance also establishes aesthetics standards for development adjoining scenic view sheds.

SR-S1. Natural Landform Protection. Natural contours, including slope, visible contours of hilltops and treelines, bluffs and rock outcroppings, shall suffer the minimum feasible disturbance compatible with development of any permitted use, and the following standards shall at a minimum secure this objective:

- A. Under any permitted alteration of natural landforms during construction, mineral extraction or other approved development, the topography shall be restored to as close to natural contours as possible, and the area planted with attractive vegetation common to the region.
- B. In permitted development, land form alteration for access roads and public utilities shall be minimized by running hillside roads and utility corridors along natural contours where feasible, and the optional waiving on minimum street width requirements, where proposed development densities or sue of one-way circulation patterns make this consistent with public safety, in order that necessary hillside roads may be as narrow as possible. (HBAP 3.40 (B)(2), modified)

SR-S2 Scenic and Visual Quality Protection. The scenic and visual qualities of scenic areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along scenic areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas. New development in highly scenic areas shall be subordinate to the character of its setting. (Coastal Act, Section 30251 of the Public Resources Code)

SR-S3 Scenic Roadway Plan Standards. The plan developed for scenic roadway protection should consider the following standards:

Visual Buffer Width. The width of the visual buffer along the road shall not exceed 200 feet from the edge of the traveled roadway.

Permitted Uses. Permitted uses shall be allowed except that within the visual buffer area, measures may be required to protect scenic qualities of the site.

Site Development. Buildings and landscaping within the visual buffer shall be designed and located on the site to create a harmonious visual relationship with surrounding development and the natural terrain and vegetation.

- Existing topography, vegetation and scenic features of the site shall be retained to the maximum extent possible and incorporated into the proposed development.
- Structures and signs shall be limited in height, bulk, and siting to be visually compatible with, and subordinate to, the character of surrounding areas.

Consideration of Views. Structures, signs, and plant materials within the visual buffer shall be constructed, installed and planted to complement, enhance, and retain scenic views. Vegetative screening shall be used where needed to prevent significant intrusion or degradation of public views.

Location and Screening of Unsightly Features. Within the visual buffer area, potentially unsightly features such as parking lots, etc. shall be located in areas not visible from the scenic highway. Where it is not possible to locate such features out of view, they shall be screened from view by planting and/or fences, walls, or berms. Screening shall utilize primarily natural materials rather than solid fencing, preferably vegetation in conjunction with low earth berms.

Site Grading. Any grading or earth-moving operation within the visual buffer area shall be planned and executed in such a manner that final contours appear to be consistent with the existing terrain both on, and adjacent to, the site

- Vegetative cover shall be provided within a reasonable time after grading is completed to prevent visible scars remaining on the land from such operations.
- Contours altered by grading should be restored by means of land sculpturing and a cover of top soil in such a manner as to minimize runoff and erosion and prevent ponding of water.
- Finished contours shall be planted with plant materials native to the area, so as to require minimum care and to be visually compatible with the existing ground cover.

Access Roads. The location and design of access roads within the visual buffer area should not detract from the scenic quality of the road.

Utilities. New, relocated or existing utility distribution lines within the visual buffer area should be placed underground whenever feasible. When it is not feasible to place lines underground, they should be located so as to be inconspicuous from the scenic route. Combined or adjacent rights of way and common poles should be used wherever feasible.

Railroads and Public Facilities. Visual buffers shall exclude railroad rights of way and public facilities.

SR-S4 Development within Community Separators. Unless there are existing design standards adopted for Community Separators, new structures within these areas must meet the following:

1. Site and design structures to take maximum advantage of existing topography and vegetation on order to substantially screen from view from scenic corridors.
2. Minimize cuts and fills on hills and ridges.
3. Minimize the removal of trees and other mature vegetation.

4. Where existing topography and vegetation would not screen structures from view from scenic corridors, install landscaping consisting of native vegetation in natural groupings that fits with the character of the area in order to screen from view.
5. Design structures to use building materials and color schemes that blend with the natural landscape.
6. To the extent feasible, cluster structures on each parcel within existing built areas and near existing natural features.
7. Exempt agricultural accessory structures and telecommunication facilities from these requirements.

While development in and of itself does not constitute a significant adverse impact on the visual quality of the environment, impacts on the visual quality and community character of the County could occur due to development encouraged by the new Plan.

In general, implementation of the new Plan could result in impacts on the visual quality and community character of the County through additional residential, commercial and industrial development. Unless carefully sited and designed, this development would have the potential to block or alter views of scenic resources.

The existing Framework Plan, and numerous community plans and coastal plans contain policies and implementation programs designed to minimize visual impacts by fitting new development in with the environmental setting of the County, and fitting new development into the scale and character of existing development. The General Plan Update would continue these policies and implementation programs.

Implementation of the many existing policies, programs, standards, and requirements which serve to mitigate visual impacts reduces these impacts of each of the project alternatives. These policies, programs, standards, and requirements are more specifically discussed below.

However, the forested hillslopes to the east of Highway 101 is a significant scenic resource that is presently not protected during review of building permits for new construction, however, this is an existing situation under the 1984 General Plan. Also, off-premise billboards are not limited to specific time frames.

To address these concerns the following measures are included in the General Plan Update:

SR-IM2 Identification and Protection of Heritage Landscapes and Forested Hillslopes. Map heritage landscape areas in the Ferndale and Arcata Bottoms, and the forested hillslopes between Eureka and Arcata and develop protection measures that protect the scenic quality of these areas with appropriate land use designations and design review standards.

SR-IM5. Off-Premise Billboards. Amend the sign ordinance to limit the term of new billboards to 15 years, and to disallow new billboards in the Resource Dependant Industrial land use designation.

SR-IM6. Removal of Illegal Billboards. Provide staffing and funding to identify billboards that may have been placed without permits, and through the State

Outdoor Advertising Branch, pursue removal of billboards found to be illegally placed .

Impact 4.1.2.3: Development may introduce new sources of light and glare into development areas and surrounding rural areas.

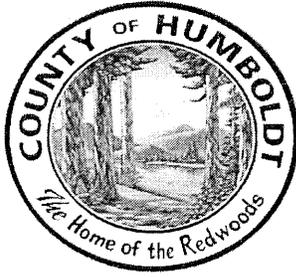
Development proposed under the updated General Plan could increase the amount of light in the County due to street lighting, signage, flood lights, security lighting, private residential lights, automobile lights, and other similar sources. The majority of new development will occur in or adjacent to existing communities, but some new development could introduce new light sources in currently remote locations. To address this potential adverse impact, additional mitigation will be required.

Exterior Lighting Standards and Photo-pollution

The adverse ecological effects of artificial night lighting on terrestrial and aquatic resources such as fish, birds, mammals, and plants are well documented (Rich and Longcore 2006). Some of these effects include altered migration patterns and reproductive rates, changes in foraging behavior and predator-prey interactions, altered wildlife species richness and community composition, and phototaxis (attraction and movement towards light). Much of the future development envisioned in the Update will take place on land in close proximity to resources areas with significant wildlife habitat values. DFG therefore recommends the DEIR evaluate the direct and cumulative effects that photo-pollution from artificial night lighting will have on fish and wildlife species.

To minimize the ecological consequences of artificial night lighting and glare on wildlife species and their habitats, DFG recommends the County adopt a standard that requires exterior lighting fixtures and street standards (both for residential and commercial areas) be fully-shielded and designed and installed to minimize off-site photopollution. DFG supports the Update Public Services Report Policy Option (8.7.a) that proposes establishing exterior lighting performance standards. As an example, DFG recommends the County consider the McKinleyville Community Services District Ordinance 51.07, adopted on June 30, 2000:

"Street lighting fixture standards shall be in accordance with the recommendation of the International Dark-Sky Society [sic], specifically selected and specified to minimize the potential for light pollution, and shall include external glare shields, and/or internal louvers to controlled [sic] direct glare and/or uplight."



COUNTY OF HUMBOLDT
DEPARTMENT OF HEALTH AND HUMAN SERVICES
Phillip R Crandall, Director

PUBLIC HEALTH BRANCH
Alexandra Wineland, Director

529 I Street Eureka, CA 95501
(707) 445-6200 Fax: (707) 445-6097

July 15, 2008

Stephen Avis
Assistant Planner
City of Fortuna

Dear Mr. Avis:

I am submitting the Humboldt County General Plan Update Health Impact Assessment as public comment to the Fortuna Planning Commission and City Council. The report is available at www.nrsrcaa.org/humpal/resources.htm. Although the analysis is about the entire county population, there is quite a bit of analysis in the study relevant to the city general plan, especially the proposed mitigation for negative health impacts. In particular the Transportation, Housing and Environmental sections are especially relevant.

I would like to emphasize that, as Health Officer, I am not taking a particular position on your general plan update, but I am suggesting you use this tool to promote consideration of the health implications of your planning efforts. I would be happy to attend a Planning Commission and/or City Council meeting to present the findings of this study.

Sincerely,

Ann Lindsay, MD



July 17, 2008

Mr. Steven Avis
City of Fortuna
621 11th Street
Fortuna, CA 95540

Subject: City of Fortuna's General Plan Update Draft Program Environmental Impact Report

Mr. Avis,

On behalf of the board, staff, and supporting members of the Environmental Protection Information Center (EPIC) and Humboldt Baykeeper, we would like to submit the following comments on the City of Fortuna's General Plan Update (GPU) and its associated Draft Program Environmental Impact Report (DEIR). EPIC is a non-profit organization that actively works to protect and restore damaged ecosystems on the North Coast of California. Humboldt Baykeeper works to safeguard our coastal resources for the health, enjoyment, and economic strength of Humboldt County.

The DEIR fails to meet basic criteria set forth in the California Environmental Quality Act (CEQA). Although significant impacts are identified, proposed mitigations are vague, inadequate, and unenforceable. Cumulative impacts of past, present, and future development that will occur as a result of adopting the Preferred Alternative are not adequately addressed. According to 14 Cal Code Reg. §15384(b), "Substantial evidence shall include facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts." The DEIR fails to meet this standard, and should be revised and recirculated as required by 14 Cal Code Reg. §15088.

We submit the following specific comments to assist the City of Fortuna's efforts to update its General Plan in order to comply with relevant laws and policies and to protect the beneficial uses and public trust values provided by streams and rivers, air quality and other environmental resources.

We are very concerned that the Fortuna General Plan Update (GPU) as currently drafted lacks appropriate implementation plans, and will result in significant individual and cumulative impacts to the area's important natural resources. Two related categories of potential impact of paramount importance are:

- 1) Further degradation of waterbodies and water quality; and
- 2) Impacts to aquatic species, especially salmonids and their habitat, including species protected under California and federal law.

While a number of positive policies and improvements are suggested in the GP documents, we are concerned that implementation of the growth identified in the GP will result in significant individual and cumulative impacts to water quality.

Inadequate Mitigation and Monitoring Measures

Overall mitigation measures are vague and do not allow for implementation tracking. For example, in Section 5.0 of the DEIR, impacts to Special Status Species (including salmonids and amphibians), Environmentally Sensitive Habitat Areas (including wetlands and riparian areas), Water Quality, Groundwater Depletion, Energy Use and Energy Demand are identified as "Potentially Significant." The DEIR states that these potentially significant impacts "can be reduced to less than significant with new and revised policies." However, it is not clear if or when policies and programs contained in the Public Hearing Draft Elements would be implemented, as this information is not given. There is no time designated for the mitigation measures or other action items in the Plan to be implemented, nor is there any indication the City will be able to commit sufficient future resources to implement the Plan. Without assurance that policies will be fully implemented on a certain time schedule, it may not be appropriate to consider these as mitigation measures for purposes of the EIR.

The GP lacks any significant provision for monitoring to ensure implementation of mitigation measures and to evaluate the success of these measures in reducing impacts to water quality and sensitive habitats to less than significant. We do not believe that the City's existing and proposed policies will achieve this goal. The DEIR should be revised: 1) to fully document existing and potential impacts of development, 2) to provide clear mitigation measures, and 3) to be capable of and certain to be implemented.

Policies and mitigation measures must contain clear and binding language that will result in the implementation of the stated policies. In the Biological Resources Element, the words "must" and "shall" are rarely used in actual policy language. To "support," "recommend," and "encourage" policies, programs, or studies does not ensure adequate mitigation of identified impacts. Without binding language, the proposed policies cannot mitigate for the impacts identified in the DEIR.

Appendix C of the DEIR, the Implementation Program Matrix, states in its entirety: “IMPLEMENTATION PROGRAM MATRIX TO BE PROVIDED AT A LATER DATE.” Failure to disclose specific mitigation measures is considered deferred mitigation, and violates the rule that members of the public and other agencies must be given an opportunity to review mitigation measures before a negative declaration is approved. *Gentry v. City of Murrieta*, 36 Cal.App.4th 1359, 1399-1400 (1995).ⁱ

Threatened and Impaired Waterbodies

Under the current General Plan approved in 1993, development policies as implemented by the City have failed to prevent waterbodies within the planning area from being degraded. They have been listed on the Clean Water Act section 303(d) List as Threatened and Impaired by the State Water Resources Control Board and the U.S. Environmental Protection Agency.ⁱⁱ Fortuna is the largest urban area within the Lower Eel River Hydrologic Unit, and municipal runoff (e.g., the collective effects of people hosing off driveways), municipal and industrial stormwater runoff, and construction sites all contribute to increased temperature impairment of the Lower Eel River.ⁱⁱⁱ The City’s current policies, ordinances, and implementation practices are clearly inadequate to protect beneficial uses of water, including supporting salmonids important to commercial and recreational fisheries, listed species, drinking water quality, and recreational uses.

The Eel and Van Duzen Rivers and their tributaries within the GPU’s study area are impaired by sedimentation, the result of alterations to bed, bank, and channel, altered hydrologic regimes, stormwater inputs, and loss of riparian habitat, among other things.^{iv} The Eel and Van Duzen Rivers support coho salmon (*Oncorhynchus kisutch*); Chinook salmon (*Oncorhynchus tshawytscha*); coastal cutthroat trout (*Oncorhynchus clarki clarki*); and steelhead trout (*Oncorhynchus mykiss*). Coho salmon and steelhead trout also occur in Palmer, Rohner, and Strongs Creeks, and Wolverton Gulch. A breeding population of Willow flycatcher (*Empidonax traillii*) a State-endangered species is documented within the study area along the Van Duzen River. Future development and other land use planning within these watersheds will be governed by the GPU. It is essential that the City strengthen policies in the GPU with regard to riparian buffer zones, inappropriate or poorly planned conversion and resulting development of timberlands and agricultural lands to residential uses, and location and management of road systems to protect beneficial uses of our North Coast water resources.

Impacts to Listed Salmonids

Salmonids have declined at alarming rates over the past 100 years, with devastating impacts to the local commercial and recreational fisheries particularly evident in the last generation. According to the State Water Resources Control Board and Dept. of Fish and Game, degradation and loss of freshwater habitat is considered one of the leading causes for the decline of salmonids in California.

Urbanization and conversion of open space lands to residential uses harms salmonids, through sedimentation, barriers to fish passage, increased peak flows and erosion, increased water diversions and associated low summer flows, flooding, and increases in point source and non-point pollution. The GPU must include specific binding language requiring mandatory actions that will avoid such impacts wherever possible, and require comprehensive and effective mitigation measures where those impacts cannot otherwise be avoided.

According to the DEIR, riparian areas provide the majority of habitat for special status species within the Planning Area and revisions to the proposed Land Use Diagram will result in conversion of land from non-urban to urban and residential uses (page 5.2-28). This “could result in conversion of potential wildlife habitat to urban uses, fragment existing wildlife habitat, and/or limit wildlife movement opportunities” and that “(e)xisting encroachment by development/land conversion within stream corridors is further exacerbating wildlife habitat connectivity” (page 5.2-28). The proposed policies NCR-2.1, 2.2, 2.3, 2.5, 2.6, 2.7, and 2.8 lack implementation language and mandatory measures to ensure that such degradation does not continue. Specific comments follow.

NCR-2.1: How will the City “strive to improve riparian habitats” to avoid impacts to or take of listed species? The City must include specific enforceable policies that will protect riparian habitats from further degradation and that will restore these areas to full productivity, including provisions such as adequate buffer zones.

NCR-2.2: Making “recommendations” for protection of salmonid-bearing streams is not adequate to mitigate potential significant impacts to listed salmonids. The City must include specific, measurable provisions that will allow review of the effectiveness of these policies to be analyzed.

NCR-2.3 and 2.5: How will the City accomplish these goals to ensure that impacts to listed salmonids are minimized?

NCR-2.6 and 2.7: Simply stating that the City shall require projects to meet requirements of CEQA, federal and state Endangered Species Acts, and other applicable regulations—without any implementation plan, ordinances, or other action plans—is clearly inadequate to avoid impacts to listed species.

NCR-2.8: How will the City “coordinate with resource agencies to encourage the preservation of native vegetation”? Again, this language lacks the force of law and is clearly inadequate to avoid impacts to listed species and their habitat. The City must include specific consultation provisions in order to ensure that appropriate consultation is undertaken.

The DEIR states that the Fortuna GPU has the potential to significantly impact Special Status Species and Environmentally Sensitive Habitat Areas, and that these impacts can be reduced to less than significant with “new and revised policies.” (page 5.2-25)

However, it is not clear how these new and revised policies described in the Natural and Cultural Resources Chapter will reduce impacts to less than significant.

Riparian & Wetland Buffers

No-disturbance riparian and wetland buffer zones should be implemented through ordinances; mere policy language contained in the DEIR is inadequate to reduce impacts to less than significant. Adequate buffer zones are necessary to minimize impacts of development on beneficial uses of waters of the state, riparian and aquatic habitats, and species dependent on these riparian and aquatic habitats.

NCR-2.1 states that “The City shall strive to improve riparian habitats that serve as movement corridors for wildlife through urban, suburban, and rural areas.” (page 5.2-24) Riparian areas clearly provide more than movement corridors, and this policy is inadequate to prevent impacts to fish and wildlife that depend on riparian habitat, water quality and quantity, and other features of riparian areas. Riparian buffers provide stream environments with levels of large woody debris (LWD), small woody debris (SWD), litterfall, shade, relative humidity that approximate natural conditions. They also reduce impacts related to increases in temperature, sediment and polluted runoff.

Riparian vegetation, including trees such as willows and alders, are crucial to fish and aquatic insects, and failure to prevent removal of such vegetation will result in negative impacts to aquatic species.^v Such modification of riparian vegetation results in increased water temperatures and turbidity, which are factors known to impact salmonids and other aquatic species. Removal of riparian canopy cover can impact water temperatures downstream as far as 2.5 km, and a continuous canopy of deciduous or coniferous trees immediately adjacent to the stream was found to be the most important land use parameter affecting water temperature.^{vi} Researchers in Oregon have found that “without a forested riparian management zone, accumulation of wood in the channel was minimal and did not increase through time.”^{vii} Without no-disturbance buffer zones to mitigate impacts of all future development within watersheds known to support listed salmonids, impacts to these species will occur as a result of development under the DEIR.

According to a study of riparian buffers required to protect salmonids in Washington,^{viii}

To eventually have instream levels of LWD and SWD that approximate natural conditions, a buffer width of one 300 year site potential tree height (SPTH₃₀₀) is needed. In western Washington, SPTH₃₀₀ generally range from 105-250 feet, while in eastern Washington, they range from 50-250 feet. To maintain instream litterfall rates at natural levels requires buffer widths of one-half a SPTH₃₀₀, while buffers become relatively windfirm when they are wider than 75 feet. In order to provide shade to streams that approximates natural conditions, buffer widths of 250 feet are required. Likewise, 250 foot buffers are necessary to maintain relative humidity levels near the stream at natural levels.

Therefore, in order to fully protect and restore riparian habitat upon which salmonids depend, interim buffer widths of 250 feet are proposed for all perennial streams and a width equal to

one full site potential tree height (50-250 feet) on all seasonal streams. These buffers are intended to ensure that riparian forests return to as close to 100% functionality over the long-term as is reasonably possible, and that the future condition of riparian forests does not contribute significantly to the loss of salmonid populations. The rationale for these buffer widths is based on the best, currently available scientific information.

Vegetative filter strips can reduce non-point source pollution, including sediment, nutrients, petroleum hydrocarbons, and pesticides in polluted stormwater runoff by treating overland flow before it enters streams.

Riparian buffers are also important in filtering polluted stormwater from urban, residential, and agricultural areas. Riparian buffer zones have been found to prevent many pollutants from reaching surface waters, including pesticides, disease-causing organisms such as fecal coliform, and heavy metals.^{ix}

In a review of scientific literature on nitrogen removal effectiveness, the U.S. Environmental Protection Agency found that “[w]hile some narrow buffers (1-15 m) removed significant proportions of nitrogen, narrow buffers actually contributed to nitrogen loads in riparian zones in some cases. Wider buffers (>50 m) more consistently removed significant portions of nitrogen entering a riparian zone.”^x

The Fortuna GPU’s proposed policies aimed at minimizing impacts to surface and ground water are inadequate, lack implementation measures, and therefore will not reduce impacts to less than significant. Policy NCR-1.1 (on page 5.1-10) states that “the City shall regulate development that could pollute watersheds and require adequate mitigation to ensure pollution will not occur” but the DEIR fails to explain how this policy will be implemented. A second Policy 1.1 (on page 5.1-11) states that the City shall condition development to minimize point source and non-point source discharges of pollutants, and shall require adequate mitigation for development that may change runoff quality and/or quantity to ensure pollution will not occur. The DEIR fails to address how the City will accomplish these stated goals without establishing no-disturbance riparian and wetland buffer zones.

We encourage the adoption of the following no-disturbance riparian buffers in Fortuna’s General Plan Update to minimize impacts of development on streams and rivers and their associated riparian areas to a less than significant level:

- 200-foot buffer zone for major rivers;
- 150-foot buffer zone for smaller fish-bearing streams;
- 75-foot buffer zone for non-fish-bearing streams.

The City’s current standard provides for 25-foot buffers on perennial streams and 50-foot buffers on intermittent streams outside urban development and expansion areas, and 50-foot and 25-foot buffers respectively for streams inside urban development and expansion areas. The City’s proposed standard fails to reflect the best available science on riparian and aquatic protections.

EPIC would further encourage the addition of language that would encourage and facilitate protection of riparian areas, addressing appropriate management actions and best practices within riparian buffers. Just as the degradation of riparian habitat has been one of the major drivers of watercourse impairment, improving riparian habitat conditions is critical to maintaining, restoring, and enhancing watershed condition and function, and to the recovery of listed salmonids.

Water Quality and Water Resources

According to the DEIR, “General Plan implementation would increase urban development, causing an increase in point source and non-point source discharges, which could lead to degraded water quality” (page 5.1-11). New development and conversion of land to residential uses will result in increased impervious surface coverage; cause changes in runoff quality and quantity; removal of riparian habitat; and physical alteration of stream channels, including the creation of barriers to fish migration. If the City intends to plan for growth, it must also plan for mitigation of related impacts. The proposed policies NCR-1.1, 1.4, 1.5, 1.6, and 1.7 lack implementation language to ensure that such degradation does not continue. Specific comments follow.

NCR-1.1: How will the City “condition development to minimize point source and non-point source discharges of pollution”? How will the City “require adequate mitigation for development that may change runoff quality and/or quantity to ensure pollution will not occur”? Simply stating that “The City shall regulate development that could pollute watersheds and require additional mitigation to ensure pollution will not occur” (page 5.1-10) is inadequate. Implementation of specific mitigation measures must address the impacts of development particularly because such development routinely entails such impacts as stormwater pollution, increased runoff and sediment discharges, stream modification, impacts of septic systems, residential and agricultural use of pesticides and fertilizers, and removal of native vegetation. Runoff quantity (including both peak discharge rates and total volume) as well as time of concentration are cumulative impacts of overall watershed development. The City should evaluate individual watersheds in order to determine the cumulative impacts of development-related runoff discharge and base future development-related mitigation measures on the results of this study.

NCR-1.4: How will the City “manage the extent of impervious coverage in the Planning Area to reduce impervious coverage and to minimize directly connected impervious areas”? This policy lacks sufficient information to be deemed an appropriate mitigation that will reduce the impacts of increased development to Less-Than-Significant. Furthermore, with the Plan’s recognition and support of conversion of large land areas into residential and/or urban uses, the amount of impervious area cannot be “reduced” as stated in this section.

NCR-1.8: This policy is insufficient to mitigate the impacts of increased development that are likely to lead to groundwater depletion and interference with groundwater recharge. In fact, the policy proposed as mitigation will likely increase these impacts,

since it proposes obtaining additional water supply to accommodate future development. Rather than addressing ways of preventing groundwater depletion, this policy seems focused solely on reducing impacts to the City's drinking water supply.

Water quality objectives must be met to provide key benefits to species and ecosystems. To ensure that water quality objectives are met in the future, it is critical that impacts from new development be fully mitigated and impacts from existing development be reduced. This requires further analysis as well as inclusion of enforceable standards and measures in the General Plan document.

Annexation Areas and Resource Land Conversion

Within the Planning Area, the 1993 General Plan designated approximately 3,623.2 acres as Agriculture, whereas the proposed 2030 General Plan Land Use Diagram designates approximately 1,865 for agricultural use (page 5.3-6). This represents a loss of approximately 50% of the lands currently zoned for agricultural uses, yet no mitigations for such loss of agricultural resources are proposed. The DEIR declares this loss of agricultural resources a Significant Unavoidable Impact, with no mitigations proposed. The City should disclose its rationale by explaining why such impacts are unavoidable, and why no mitigations are proposed.

The Strongs Creek Annexation and the Carson Woods Road Annexation propose conversion of lands currently zoned for agriculture and timber production to other uses, including Very Low Density Residential and Rural Residential (page 2-10). Resource lands such as agricultural and timber production lands provide important ecosystem functions, and conversion of such areas to urban uses cannot be reversed in the lifetime of the proposed General Plan. According to Section 5.3 of the DEIR, the annexation areas proposed in the updated Land Use Diagram would redesignate 1,758.2 acres of agricultural land for other uses, with the majority of land being converted to residential uses in the northern and northeastern portions of the Planning Area. This is determined to be a "Significant Unavoidable Impact," with no mitigation proposed. We believe that these impacts to agricultural and timber resources can be avoided by adoption of the Community-Oriented Alternative, which is the alternative favored by workshop participants according to the DEIR (page 2-10).

The environmental, public health and safety, and growth-inducing impacts of the Annexation of these areas under the GP Preferred Alternative are not adequately addressed in the DEIR. Thorough environmental analysis of the rezoning of nearly 2,000 acres of agricultural land to residential and other uses should be conducted in the DEIR, including direct, indirect, and cumulative impacts to Special Status Species, Water Quality, Traffic, Air Quality, Public Health and Safety, and Environmentally Sensitive Habitat Areas. Since the General Plan Update would eliminate the need for a General Plan Amendment to rezone these lands, this DEIR is the primary process for addressing and assessing these impacts. Cumulative impacts of individual projects should also be

addressed, since development of these parcels constitutes reasonably foreseeable future projects.

Once these lands have been rezoned under this GPU process the individual permits for principally permitted uses (such as residential development in residentially zoned areas) are ministerial permits and therefore not subject to environmental review and public comment. Any DEIR proposing conversion to other uses must fully address the impacts that will result from such conversion. According to 14 Cal Code Reg. §15144, "Drafting an EIR or preparing a negative declaration necessarily involves some degree of forecasting. While foreseeing the unforeseeable is not possible, an agency must use its best efforts to find out and disclose all that it reasonably can." The portion of the DEIR that relates to the annexation and conversion of these lands clearly does not meet the "best efforts" requirement found within the regulations.

In addition to the Annexation areas, the Preferred Alternative proposes rezoning hundreds of acres of resource lands outside the City of Fortuna's sphere of influence, including parcels under County jurisdiction. According to the DEIR, the Fortuna General Plan Land Use Diagram would redesignate a total of 1,758.2 acres of agricultural for other use. The majority of land converted to residential use is in the northern and northeasterly portions of the Planning Area. The proposed designation would be Rural Residential, with a density of 0.1 to 0.9 dwelling units per acre (page 5.3-7).

Furthermore, the DEIR does not contain any discussion or analysis of the full long term impacts of this change. According to 14 Cal Code Reg. §15126, "All phases of a project must be considered when evaluating its impact on the environment: planning, acquisition, development, and operation." 14 Cal Code Reg. §15126 (d) directs agencies to discuss growth-inducing impacts of the proposed project, including population growth in the surrounding environment. "Increases in the population may tax existing community service facilities, requiring construction of new facilities that could cause significant environmental effects." Facilities of particular importance due to their environmental impacts include expansion of water supply and wastewater facilities, roads, fire protection and fire suppression activities, energy generation and associated air pollution, and flood protection: none of these impacts are addressed within the DEIR, and the DEIR is therefore inadequate.

The DEIR as written inadequately addresses the impacts of annexation and rezoning of resource lands currently zoned for agricultural and timber production, and fails to adequately inform the public and decision-makers about the significant environmental impacts of the proposed annexation and conversion of resource lands to residential and other uses.

Greenhouse Gas Emissions and AB 32

Transportation currently accounts for the majority of greenhouse gas emissions in Humboldt County and the City of Fortuna and its sphere of influence. Reducing vehicle

miles traveled is the most effective way to reduce Humboldt County's greenhouse gas emissions as required under AB 32, the Global Warming Solutions Act of 2006. This landmark law requires reporting of greenhouse gas emissions and their reduction, including a reduction of carbon dioxide emissions to 1990 levels by 2020. Governments are not exempt from AB 32: cities and counties will have to comply with the regulations and plans that will be adopted to achieve the reduction of greenhouse gas emissions mandated by this legislation. The City of Fortuna could take action to offset its emissions and those of its residents by providing for increased public transportation and appropriate land use planning to reduce the transportation impacts of carbon dioxide and other greenhouse gases.

Land use has major impacts on transportation choices. People typically choose to drive if the trip distance is greater than 1/3 of a mile. Therefore, land use maps, land use policies, community design policies, and circulation policies need to work together to have a substantial positive impact on transportation balance.

According to the DEIR, "General Plan implementation may affect energy usage by creating a land-use pattern that could increase dependence on single-occupancy vehicles." (page 5.6-4) These impacts are identified as "Less-than-Significant" based on the statement that "land use patterns in the Land Use Diagram would locate most residential and commercial development within existing City boundaries and limit future rural area growth, except where needed to support agricultural production" This statement appears to be in direct contradiction to the Land Use Diagram which proposes annexation and conversion of more than 1,700 acres of agricultural land to rural residential (page 5.3-7). Substantial evidence in the DEIR when taken in its entirety does not support the claim that the proposed Land Use Diagram would indeed reduce impacts to energy usage and vehicle miles traveled to Less-Than-Significant. The GPU projects the City's population to increase by more than 6,000 people by the year 2030, with the City expanding by adding 2,800 new dwelling units, nearly one million square feet of new retail space, nearly one million square feet of new office and industrial space, and annexation of hundreds of acres, much of which is proposed for rezoning from agricultural to residential use.

Please address how the Preferred Alternative, including expanding city services and residential development into the proposed annexation areas, will reduce vehicle miles travelled and associated greenhouse gas emissions as required by AB 32, the Global Warming Solutions Act of 2006.

Alternatives

CEQA requires analysis of a reasonable range of alternatives which must include an environmentally superior alternative. In the case of the GPU, such an environmentally superior alternative would include an alternative which would result in the least conversion of lands to development, and would require that proposed projects must be practical and actionable in order to comply with the California Environmental Quality

Act (CEQA). According to the DEIR, the Community-Oriented City Alternative was favored by community workshop participants (page 2-10). This alternative would provide a balance of land uses, including a mix of residential, commercial, industrial, civic, and recreation uses, with most of the new development concentrated in the Riverwalk area and the Mill District. Key features of this alternative include: mixed use center; neighborhood and community serving retail stores; emphasizes the Riverwalk area as an area that will serve the needs of the local population; connects the Riverwalk area with the rest of the city; creates pedestrian friendly environments; provides a variety of housing types and choices. As the environmentally superior alternative, and the alternative that was favored by community workshop participants, the Community-Oriented City Alternative appears to be the best choice for the Preferred Alternative.

Cumulative Impacts

Past, present, and foreseeable future projects must include development that would result from the proposed rezoning and annexation included in the DEIR. A cumulative impact discussion may be found inadequate if it does not include the elements listed in CEQA Guidelines Section 15130 (Cumulative Impacts); specifically, it must include either a list of closely related past, present, and reasonably foreseeable future projects, or a summary of projections contained in an adopted planning document which is designed to evaluate regional or area-wide conditions. This section further requires that the analysis include a discussion of projects under review by the lead agency and projects under review by other relevant public agencies, using reasonable efforts to discover, disclose, and discuss other related projects.

The DEIR must address the cumulative impacts of all development that would occur as a result of proposed zoning changes, as well as development in areas that are currently zoned for residential and commercial use but are not yet converted to such uses. Significant cumulative impacts to the environment from such development will include increases in impervious surfaces and associated stormwater runoff and pollution; increased traffic and air quality impacts; increased number of vehicle miles travelled per person and impacts to human health; erosion and sedimentation from new road construction; impacts to water quality, aquatic species, and instream flows due to water diversion; etc. These impacts will add to impacts related to timber harvesting, such as erosion, sedimentation, turbidity, and other impacts to beneficial uses of tributaries to the Eel and Van Duzen Rivers.

The City of Fortuna's Draft Programmatic EIR fails as a planning document, as CEQA compliance, and as policy.

According to 14 Cal Code Reg. §15088.5(a), "A lead agency is required to recirculate an EIR when significant new information is added to the EIR after public notice is given of the availability of the draft EIR for public review under Section 15087, but before certification." "Significant new information" requiring recirculation includes a disclosure showing that:

"(1) A new significant environmental impact would result from the project or from a new mitigation measure proposed to be implemented.

(2) A substantial increase in the severity of an environmental impact would result unless mitigation measures are adopted that reduce the impact to a level of insignificance.

(3) A feasible project alternative or mitigation measure considerably different from others previously analyzed would clearly lessen the environmental impacts of the project, but the project's proponents decline to adopt it.

(4) The draft EIR was so fundamentally and basically inadequate and conclusory in nature that meaningful public review and comment were precluded.

According to CCR 14 §15088.5(e) "A decision not to recirculate an EIR must be supported by substantial evidence in the administrative record." The DEIR in its current form clearly meets the requirements for recirculation: both the GPU and its associated DEIR are inadequate under CEQA. Additional information must be added to both documents in order to comply with CEQA requirements and this updated document must be recirculated for review.

Please enter our comments into the administrative record along with the following references, which are provided electronically in their entirety.

Sincerely,

/s/

Scott Greacen, Executive Director
Environmental Protection Information Center
#122 • 600 F St Suite 3 • Arcata CA 95523

/s/

Pete Nichols, Executive Director
Humboldt Baykeeper
217 E Street, Eureka, CA 95501

REFERENCES

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- ⁱⁱ 2006 Clean Water Act Section 303(d) List of Water Quality Limited Segments. U.S. Environmental Protection Agency, June 27, 2007, *available at* http://www.swrcb.ca.gov/water_issues/programs/tmdl/docs/303dlists2006/epa/state_06_303d_req_tmdls.pdf
- ⁱⁱⁱ Lower Eel River Total Maximum Daily Loads for Temperature and Sediment. U.S. Environmental Protection Agency, Region IX. Dec. 18, 2007, *available at* http://www.epa.gov/region09/water/tmdl/lower_eel/LER-TMDLsPN.pdf
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July 17, 2008

To: Liz Shorey, City Planner
City of Fortuna
621 11th Street
Fortuna CA 95540
lshorey@ci.fortuna.ca.us

From: Janelle Egger
1020 Angel Hts.
Fortuna, CA 95540
725-2195
njir@sbcglobal.net

Re: PEIR comments

I write to express my concern that the PEIR does not adequately address the impact of the loss of the Mill District industrial land nor the effect of the various alternatives that might occur under the broad, undefined nature of the Mill District zoning, particularly with regards to a “single use.”

On page 1-8 of the February 2008 City of Fortuna General Plan Public Hearing Draft Policy Document states that the Mill District designation provides for “single use and vertical and horizontal mixed use development as part of a large, integrated center. Uses may include large-scale retail and service uses, restaurants, entertainment uses, professional and administrative offices, residential uses, public and quasi-public uses, and similar and compatible uses.” Additionally, the Document refers to an Industrial Reserve that also has not received sufficient review.

Table 3.1-3 shows that 174 acres were zoned Industrial in the 1993 General Plan and Table 3.1-4 shows a proposed revision to 121 acres. This may not appear to be a great change, however, 78 of the 121 acres are in the Industrial Reserve. This area is outside the City limits, under LU-9.1 the City shall develop plans for the Rohnerville Airport (adjacent to which the Reserve is located) and the PEIR does not adequately address the impacts of this rezoning, at least as it applies to land transportation. Until these issues are resolved the city is effectively reducing the amount of land available for industrial uses by over 60%. Therefore, I question the finding that “the General Plan would not constitute a major change in planned land use in the city.” (P 3.1-19)

Assuming that the industrial land issue can be dealt with, there remains the issue of the undefined nature of the Mill District. As mixed use, the land could be developed without negatively impacting the City. In fact, it could have a positive effect by reducing the need to build in the surrounding hills and the associated negative impacts; Table 3.1-4 shows the Mill District adding 240 units of housing representing 26% of the total and 60% of the medium density units). Conversely, any single use might constitute a major change in planned land use in the city.

July 17, 2008

One impact is evident in Figure 3-1 Existing Land use Diagram. This shows large area outside of the City limits, adjacent to Newburg Park that is zoned agricultural. It is a unique area of open space with a creek running through it. While the plan adds a section to Newburg Park and the hills would be open space, the greater part of the valley would be developed, as shown on Figure 3-4 Proposed Land Use Diagram. Looking at Figures 9-2, 9-3 and 9-4 of the Alternatives shows only the "South County Regional Center" requiring this rezoning. Apparently rezoning this agricultural land is necessary for a single use in the Mill District. Trading medium density for low density is an impact; there is relatively little medium density relative to low density housing in the City. The total number of dwelling units would be reduced, another impact. These impacts, and others including historical, environmental and economic, have not been adequately explored.

A regional shopping center has been proposed, presented and discussed at various public meetings. I heard the General Manager state that a regional shopping center would be possible under "Mixed Use" and the Document allows a single use. This is a real possibility that has not been adequately evaluated as to its impact.

Also, I wish to express my concern that the PEIR has not adequately evaluated the 5 acres per 1000 standard for parks. The source of this standard is not given.

The City now has 6.7 acres per 1000, and there is interest in more. Using 5 per 1000, 56 acres would accommodate the City's current population. Some years ago it was determined that Rohner Park (55 acres) was not enough.

Currently the City has a ratio of 6.7 acres per 1000. The city should at least maintain that ratio. While the plan is more than adequate to meet even a standard of 7%, it is only a plan and requires a realistic determination of the least acceptable.

Thank you for the opportunity to comment on the PEIR,

Janelle Egger

Jon Hansard
1675A Ronald Avenue
Fortuna, CA 95540-3827

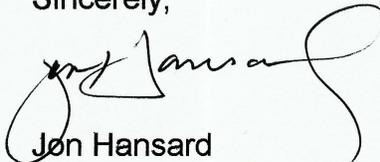
I want to express my concerns about the EIR, specifically, the **South County Regional Center Alternative**. This alternative proposing a major retail center (i.e., "Big Box") on the site of the old Pacific Lumber mill site is bad in every conceivable respect for the City of Fortuna and really should not even be on the table. The case against "big boxes" has been well documented and won't be belabored in this missive. This proposal is being shoved down the throats of Fortunans by four of the five members on the City Council and goes directly against the wishes of the citizens who participated in the community workshops. Their recommendation was for a **Community-Oriented City Alternative**. This alternative would provide a balanced and sensible mix of land uses and would also keep money circulating in the local and regional economy. Tax revenue, the impetus behind the "major retail" alternative, can also be realized with mixed retail.

At least four members of the City Council exhibit a great disdain for the community and the democratic process when they are so dismissive, as they have been, of the mixed retail alternative for the mill site. The clear impression is that they're going to "carry water" for Pacific Lumber rather than represent the City of Fortuna.

Whenever the City Council is in session and council members know that they will be voting on matters dealing with development of the mill site, both Mel Berti and John Campbell should recuse themselves so that there is no conflict of interest. Their long and well documented history of actively working on behalf of Pacific Lumber and their statements on behalf of Pacific Lumber advocating for big box development on the Fortuna mill site is reason enough for their recusal.

Thirteen stores closed down in Fortuna shortly after the Bayshore Mall opened and there's no reason to think it won't happen again if the City Council forces a "major retail" alternative on Fortunans.

Sincerely,



Jon Hansard

Ms. Liz Shorey, City Planner
City of Fortuna
621 11th St.
Fortuna, CA 95540

Dear Ms. Shorey,

Following review of the PEIR, I am submitting the following comments and questions that I request be addressed by city staff:

The Mill District Area: The Mill District Area contains the PALCO Mill site. The city has designated the Mill District area for “mixed use”. The city has not defined or created percentages for mixed use as it relates to the PALCO site. By not creating percentages for mixed use, the city has left open the possibility of 100% large scale retail on the PALCO site. This is a possible scenario since the Mill District currently has residential and other existing areas that meet mixed use designations. There certainly would be land use impacts in the City if the PALCO site were large scale retail. The city’s preferred alternative also leaves open the option for large scale retail. The city could conclude that it does not know what would be developed on this site. However, the PEIR does appear to address circulation and traffic impacts from large scale retail, if it were to occur on the PALCO site. Since traffic and circulation impacts were addressed in the PEIR, I believe land use impact in Fortuna from large scale retail on the PALCO site also needs to be addressed and assessed.

The Airport area. The airport area was not identified as an area for annexation and therefore, the impacts on the city that would result from annexing this area were not addressed in the PEIR. However, the airport area is listed for annexation in the city’s preferred alternative since it has been the location stated by city staff in community meetings as the area for business development (light industrial, etc.) to mitigate the loss of industrial acreage following a possible zoning change on the PALCO site in the Mill District. If the airport area is to be considered for annexation and business development during the term covered by the GPU, the impacts from that annexation should be included in this PEIR. If the airport area is not planned for annexation during this time period, how does the city plan to accommodate the desired and needed economic diversification for a healthy and vibrant economy with living wage jobs?

Economic Analysis of Alternatives

In the PEIR, the city identified *current* retail space demand in Fortuna at 476,520 sq.ft. and commercial office space demand at 283,605 sq.ft. These figures were defined as of 2004.

According to Dr. Steven Hackett, who conducted the city’s analysis and presented his findings at a public workshop, the estimated additional retail space needed in Fortuna in 2030 to meet projected population growth would be 243,455 sq.ft. of retail space. Of that figure, 18,877 sq.ft. is identified for auto dealerships and parts, 10,425 sq.ft. for gas

stations and 28,212 sq.ft. for food service and drinking establishments. Deducting these amounts leaves 196,366 sq.ft. of other retail needed 20 plus years from now. Dr. Hackett's demand numbers were based on retail square footage in Fortuna in 2004. However, since 2004, Fortuna has added approximately 32,000 sq.ft. of general retail in the ACE Hardware Store and significant retail footage in the new Strongs Creek Development. The retail footage from these developments needs to be factored in (subtracted) from the estimated demand.

Dr. Hackett's analysis also included a graduated scale of needed retail footage in Fortuna based on population growth over time. In other words, if 100,000 sq.ft. is needed 20 years from now, the 100,000 sq. ft. is not needed now to meet Fortuna's current needs.

The retail demand analysis for this PEIR needs to include the issues referenced above. In addition, developments that have occurred since 2004 and other retail developments that are being proposed in Eureka and other parts of the County need to be included in this PEIR since a regional impact was addressed.

Also, since the PEIR reflected a countywide impact from large scale retail development in Fortuna and a significant percentage of retail trade would need to switch to Fortuna from other areas in the ~~city~~^{County} for a major retail development to be viable, the city needs to determine the potential impact from increased traffic from other areas in the county to Fortuna? This potential impact and other impacts that would result from any large scale retail project as defined in the city's preferred alternative needs to be addressed in the PEIR.

If a large scale retail project is developed in Fortuna, the city's analysis concludes there would be no significant impact to the county as a whole. This conclusion does not take into consideration the issues raised above regarding using 2004 data. The city's analysis also does not address the potential impacts to the City of Fortuna in terms of loss of existing businesses and resultant blight in Fortuna from the probable effects of a disproportionate impact to existing Fortuna businesses. This potential impact needs to be addressed in this PEIR.

Downtown area as the economic "heart" of Fortuna During the Community Advisory Group (CAG) meeting on June 14, 2006, the city staff said the "downtown will be the economic, social and institutional focal point of the community." The PEIR plan objectives also state to "maintain the downtown areas as the established city center and social, institutional and economic heart of the city." Yet the preferred alternative states that the downtown area "remains the heart of the city with civic and commercial uses." What may appear as a slight difference in wording is actually potentially significant in that the preferred alternative does not indicate the downtown area is desired to be the future economic center for Fortuna. If that is correct, where is the center for economic activity in Fortuna being proposed?

Consultant's comments regarding fiscal implications to large scale retail development in Fortuna.

In discussing the fiscal implications for a large scale retail in Fortuna, the city's consultants stated,..... *if the ambitious retail sales goals established by a large scale retail development could be realized, it would have the ability to provide the strongest boost to the fiscal health of the City of Fortuna, though perhaps with the most risk as well. Strong growth in taxable retail sales would bring in a much larger income stream than other alternatives. Property taxes would also increase. On the other hand, the cost of city services will also be quite high, both for police, fire and public infrastructure. There is also the potential for higher social service costs to the city due to relatively low wages and benefits usually paid in retail sectors of the economy.*

How have these potential impacts been assessed and incorporated into the PEIR?

Consultant's comments regarding market feasibility of large scale retail in Fortuna.

When considering the market feasibility of large scale retail in Fortuna, the consultant's said,.....*the large scale retail alternative sets a goal for commercial growth that is nearly three times greater than the projected status quo growth of retail and commercial office space demand forecasted in the Background Report. In order to meet the very ambitious retail growth goals with this alternative, Fortuna retail sales would need to grow by as much as six times faster than the status quo growth forecast in the Background Report. This would require Fortuna to capture about half of all county retail sales (Fortuna currently captures 9.1% of total county taxable retail sales), or to draw large numbers of new shoppers from Ukiah, Santa Rosa, and beyond. The market feasibility of this retail growth goal appears to be low.*

How have these cautions and potential negative fiscal impacts to the City of Fortuna and its residents been incorporated into the PEIR?

Consultant's comments the overall economic health to the City of Fortuna resulting from a large scale retail development.

When considering the overall economic health in the City of Fortuna, the consultants stated.....*among the three alternatives reviewed, the regional shopping center large scale retail ranks lowest in the category of overall economic health. While the disproportionate focus on retail will likely improve the fiscal health of the City of Fortuna (subject to the cost of increasing City services), it is least likely to generate relatively high-paying jobs. Moreover, while economic health is usually associated with economic diversity, this alternative relies heavily on retail sector success. Unforeseen economic shocks to retail demand, such as substantial growth in Internet non-store retail, would bring disproportionate harm to the City of Fortuna's economic health.*

How has the potential impact from a disproportionate focus on retail in Fortuna been addressed in the PEIR when considering living wage jobs and overall economic health?

Thank you for consideration of these issues.

Sincerely,

A handwritten signature in black ink, appearing to read 'Jon G. Sapper', written in a cursive style.

Jon G. Sapper
1965 Home Ave.
Fortuna, CA 95540
(707) 498-6065



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southwest Region Arcata Area Office
1655 Heindon Road
Arcata, California 95521
Tel (707) 825-5163; Fax (707) 825-4840

In response refer to:

~~JUL 17 2008~~ 150308SWR2008AR00195

Mr. Stephen Avis
Assistant Planner
City of Fortuna
621 11th Street
Fortuna, California 95540

Re: Comments to the City of Fortuna General Plan Update Draft Environmental Impact Report (DEIR) / State Clearinghouse #2007062106

Dear Mr. Avis:

This letter is in response to the request for comments on the City of Fortuna's General Plan Update Draft Environmental Impact Report (DEIR), received in the mail by NOAA's National Marine Fisheries Service (NMFS) on May 19, 2008. The General Plan Update is a city guidance document that sets forth procedures and local policy concerning land use decisions and the DEIR is an analysis of its potential environmental impacts. NMFS is responsible for administering the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 *et seq.*) to protect Federally listed endangered and threatened species. The following species, listed as threatened under the Federal ESA and their designated critical habitat occur in the City of Fortuna: (1) Southern Oregon/Northern California Coast (SONCC) coho salmon (*Oncorhynchus kisutch*) Evolutionarily Significant Unit (ESU; June 28, 2005, 70 FR 37160); (2) critical habitat for SONCC coho salmon (May 5, 1999, 64 FR 24049); (3) California Coastal (CC) Chinook salmon (*O. tshawytscha*) ESU (June 28, 2005, 70 FR 37160); (4) critical habitat for CC Chinook salmon (September 2, 2005, 70 FR 52488); (5) Northern California (NC) steelhead (*O. mykiss*) Distinct Population Segment (DPS; January 5, 2006, 71 FR 834); and (6) critical habitat for NC steelhead (September 2, 2005, 70 FR 52488). Specifically, Chinook salmon, coho salmon, and steelhead and their critical habitat are identified in the Eel River and its tributaries (*e.g.*, Rohner Creek, Strongs Creek, Jameson Creek, Mill Creek), which transgress through the City of Fortuna.

In addition to authority under the ESA, NMFS provides consultation pursuant to the Magnuson-Stevens Fishery Conservation and Management Act (50 CFR 600) to protect Essential Fish Habitat (EFH) for species managed under the Pacific Coast Salmon Fishery Management Plan and in accordance with the Fish and Wildlife Coordination Act of 1934 (FWCA), as amended (16 U.S.C. 661-667).

The issuance of the General Plan Update and the DEIR does not trigger any take prohibitions of listed salmonids because there is not a specific proposed action for consideration. The



documents do, however, create the framework and streamlined process for future proposed actions that could result in the take of a listed species.

Land use change and development are attributed as a primary cause of habitat loss and ecological degradation (Lohse 2008). In turn, the threat of extinction to a species is primarily caused by habitat loss (Hansen 2001). Consequently, seemingly common and socio-economically beneficial changes in our community often have far-reaching negative and irreversible consequences to the environment. Specifically, urban and rural development are known to alter habitat in aquatic systems and ultimately lead to population decreases. Development, through construction activities, introduction of chemical leachates, and the removal of natural ground cover, contributes non-point source pollution such as sediment, suspended solids, and toxic leachates into the creek systems that feed larger river systems (Scott 1986). Stream-side development may result in the removal of riparian habitat and trees that previously provided shade and root-wad habitat for aquatic life. Concrete-lined rain gutters direct flow into streams at unnaturally high volumes and velocities, causing flushing events that scour creeks of natural habitat and transport toxic substances (*e.g.*, petroleum products, pesticides).

Salmon compete for food, space, and safety from predators; however, when excessive sedimentation and erosion occur, the ability to seek prey and avoid predators is hindered and directly harms individuals of the population. Furthermore, sediment is often rich in oxygen-demanding organics that deprive the living species of available oxygen. Sediment eventually settles and creates a shifting and unstable stream bed, tending to bury and crush the larvae and egg of both prey species and protected listed species. With the introduction of as little as 25 nephelometric turbidity units (NTUs) of turbidity (caused by sediment or particulate matter), individual salmonids respond by: (1) emigrating to clearer waters if available, (2) decreasing growth rates, and (3) damage to gill tissues if chronic exposure occurs (Sigler 1984). Avoidance, for example, is a sublethal effect on behavior that can cause a change in the biodiversity of a stream and can lead to the evacuation and absence of a salmonids prey species or the avoidance and loss of important salmonid nursery or rearing habitat. Either behavioral change is an impact that inhibits the survivability of listed salmonid species.

There are available and affordable means for protecting natural habitat in developing rural and urban areas. Proactive and responsible communities are committing openly to setbacks that allow riparian vegetation to shield aquatic habitat from storm runoff (pollution) and sedimentation. There is a wide array of erosion control measures whereby a biodegradable earth stabilizer is used in conjunction with ground-disturbing activities. Native vegetation around impermeable ground is an effective way to reduce toxic pollution from vehicles and painted building structures that enters aquatic habitat. There are many things that a community can do to limit its effect on the ecosystem that it encroaches. Having endangered and threatened species and critical habitat in a community, however, elevates the ability to consider these species and implement proven protective measures to an obligation.

NMFS is pleased to assist in identifying ways that the City of Fortuna can implement to help assure that listed salmonids and their habitats can co-exist with land use decisions. Please see the following comments with corresponding DEIR page number locations. The suggested mitigations were taken from the National Menu for Stormwater Best Management Practices

Website, provided by the U.S. Environmental Protection Agency (Chapter 4) for construction practices at: <http://cfpub.epa.gov/npdes/stormwater/menuofbmps/index.cfm>. The open commitment to best management practices will support the continued survival of aquatic species and be protective of critical habitats that are sensitive to changes in landscape and chemical composition of the air or water (Habera 2005). Other sources for best management practices are available. If desired, NMFS would be pleased to assist the City of Fortuna in identifying additional means for protecting listed species and critical habitat.

<u>Page</u>	<u>Comment</u>
Chapter 2 (In general)	NMFS understands the municipality's interest in streamlining policies to facilitate repair, maintenance, and development. However, the General Plan does not exempt private land owners from the prohibitions against take in the ESA, and is an opportunity to indicate known practices for avoiding the take of a protected species or degradation of critical habitat and to encourage conservation. Municipal, residential, commercial and industrial development and redevelopment are recognized as having significant potential to degrade habitat and take listed salmonids (Lohse 2008). In addition, policies that expedite mitigation requirements of permitting processes may not consider current levels of concern and protection warranted for listed species. Consequently, NMFS supports streamlined planning processes as long as: (1) the building permit review process for new residential construction utilizes the best information concerning sensitive and protected habitat, (e.g., critical habitat, wetlands, and riparian areas, to avoid permitting development that could result in significant impact to biological resources); and (2) instream flows and water quality are maintained or enhanced in accordance with the ESA. In order to avoid over-streamlining the environmental protections in the planning process, NMFS encourages the City of Fortuna to include specific best management practices or mitigations, such as those suggested here, to ensure that land owners and their agents incorporate recognizable methods for conserving the listed species and critical habitat.
2-10	The historical land uses of the annexations, Strongs Creek and Carson Woods Road, were formerly agriculture and timber producing lands, respectively. These historical contexts may be notable and useful information in the DEIR with the proposed land uses, rural residential, parks, and green ways, to compare and provide a context of the land use changes that are being proposed.
2-17	Under 3.1 Land Use, there are possible mitigations to consider, for example: <ul style="list-style-type: none"> • Preserve natural features and conform substantially with the natural boundaries and alignment of waterbodies. • Encourage native vegetation boundaries around non-natural landscapes to buffer nonpoint source pollution from aquatic habitat.

2-17

Under 3.2 Housing and Population, there are possible mitigations to consider, for example:

- Control increased runoff caused by changed surface conditions to minimize danger of flooding, erosion, sedimentation, and pollutants entering waterbodies prior to, during and after construction.
- Encourage construction site management techniques that include the proper handling and disposal of pesticides and petroleum products and containers.

2-19

Under 5.1 Hydrology and Water Resources, mitigations are somewhat broad and indeterminate. Additional possible mitigations to consider, for example:

- Prevent animal waste from entering waterbodies.
- Use setbacks to minimize disturbance of land adjacent to streambanks and shorelines when practicable.
- Establish riparian buffers.
- Discourage illegal dumping in waterbodies, establish a means for reporting and a response to illegal dumping in waterbodies.

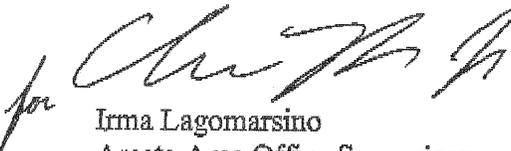
2-20

Under 5.2 Biological Resources, mitigations are somewhat broad and indeterminate. Perhaps consider an additional mitigation such as:

- Promote public awareness of important fish habitat necessary to support spawning, nursery, and migration pathways and regulations to protect them.
- Conduct road and bridge repairs adjacent to waterways during times of the year that are not concurrent with sensitive biological functions such as spawning, nursery, and migration.

NMFS is encouraged by the City's General Plan and the positive trend toward implementing means for improving shared habitats. We further appreciate the opportunity to provide comments and suggestions to the City of Fortuna. Please contact Ms. Debbie Duckworth at (707) 825-5169, or via email at Debbie.Duckworth@noaa.gov if you have any questions regarding these comments.

Sincerely,


for Irma Lagomarsino

Arcata Area Office Supervisor

References

- Habera, J., and S. Moore. 2005. Managing Southern Appalachian Brook Trout. *Fisheries* Volume 30, Issue 7 (July): 10-20.
- Hansen, A. J., R.P. Neilson, V.H. Dale, C.H. Flather, L.R. Iverson, D.J. Currie, S. Shafer, R. Cook, and P. J. Bartlein. 2001. Global change in forests: responses of species, communities, and biomes. *BioScience* 51(9): 765-779.
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- Scott, J.B., C. R. Steward, and Q. J. Strober. 1986. Effects of urban development on fish population dynamics in Kelsey Creek, Washington. *Transactions of the American Fisheries Society* 115: 555-567.
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NATIVE AMERICAN HERITAGE COMMISSION

915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax



May 20, 2008

Stephen Avis
City of Fortuna
621 11th Street
Eureka, CA 95540

RE: SCH# 2007062106 City of Fortuna General Plan Update Program EIR; Humboldt County.

Dear Mr. Avis:

The Native American Heritage Commission has reviewed the Notice of Completion (NOC) regarding the above referenced project. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA guidelines 15064(b)). To adequately comply with this provision and mitigate project-related impacts on archaeological resources, the Commission recommends the following actions be required:

- ✓ Contact the appropriate Information Center for a record search to determine:
 - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
 - If any known cultural resources have already been recorded on or adjacent to the APE.
 - If the probability is low, moderate, or high that cultural resources are located in the APE.
 - If a survey is required to determine whether previously unrecorded cultural resources are present.
- ✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
 - The final report containing site forms, site significance, and mitigation measures should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
 - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.
- ✓ Contact the Native American Heritage Commission for:
 - A Sacred Lands File Check. **Sacred Lands File check completed, no sites indicated**
 - A list of appropriate Native American Contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached**
- ✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
 - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
 - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
 - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

A handwritten signature in black ink that reads "Katy Sanchez".

Katy Sanchez
Program Analyst
(916) 653-4040

CC: State Clearinghouse

Native American Contacts

Humboldt County

May 20, 2008

Bear River Band of Rohnerville Rancheria
Len Bowman, Jr., Chairperson
27 Bear River Drive Wiyot
Loleta, CA 95551 Mattole
lbowman@bearriver.com
(707) 733-1900
(707) 733-1972 Fax

Wiyot Tribe
Andrea Davis, Environmental Coordinator
1000 Wiyot Drive Wiyot
Loleta, CA 95551
andrea@wiyot.com
(707) 733-5055
(707) 733-5601 Fax

Wiyot Tribe
Cheryl Seidner, Chairperson
1000 Wiyot Drive Wiyot
Loleta, CA 95551
wiyotone@yahoo.com
(707) 733-5055
(707) 733-5601 Fax

Bear River Band of Rohnerville Rancheria
Edwin Smith, Environmental Coordinator/Cultural
27 Bear River Drive Wiyot
Loleta, CA 95551 Mattole
(707) 733-1900
(707) 733-1972 (FAX)

Wiyot Tribe THPO
Helene Rouvier, Tribal Historic Preservation Officer
1000 Wiyot Drive Wiyot
Loleta, CA 95551
cultural@wiyot.us
(707) 733-5055
(707) 733-5601 Fax

Bear River Band of Rohnerville Rancheria
Bruce Merson, Tribal Administrator
27 Bear River Drive Wiyot
Loleta, CA 95551 Mattole
(707) 733-1900
(707) 733-1972 (FAX)

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed
CA# 2007062106 City of Fortuna General Plan Update Program EIR; Humboldt County.



ANIMAL MEDICAL CENTER

PHIL NYBERG, D.V.M.

105 N. Main Street
Fortuna, CA 95540-1840
Telephone: (707) 725-6114
Fax: (707) 725-9088

July 16, 2008

City of Fortuna
Attn: Stephen Avis
621 11th St.
Fortuna, CA 95540

Dear Mr. Avis:

The purpose of this letter is to communicate several comments on the pending PEIR and request that this also be made part of the record regarding the subsequent draft General Plan comment period to follow.

While I haven't made a career of attempting to digest the entire draft PEIR I have the following questions/comments.

1. Commercial Development

The maximum proposed commercial development is more than twice the amount of projected needs in the entire County by 2030. Several years ago I did a quick review of various county business data and in about one hour concluded that Mr Katz's sales tax projections would require that Fortuna capture over 50% of the related commerce in Humboldt County. Interestingly Fortuna's own consultant arrived at the same conclusion and found the current poorly hidden agenda unrealistic. The terms of the City Manager's outrageous new bullet proof contract further confirms the "agenda" suspicions and escalates concerns regarding the strength and validity of the document's economic assumptions and recognizes that management will have to defend indefensible political decisions. I believe supporting data is fatally flawed and will not withstand reasonable transparent scrutiny.

2. Annexation

The PEIR projects the need to annex because developable land will be used by 2025. This unbelievable conclusion fails to take into account long term (but current) "down" cycles which slow growth for extended periods. Boundary expansion also reduces the incentive to properly deal with updating of depressed/old areas (Brownfields). The City is also tragically using Redevelopment powers to create new low income areas and projects rather than using those funds to stimulate the upgrade of existing deteriorating properties. A recipe for future deterioration of "quality of life" and safety.

The draft also basically assumes that boundary expansion only increases Police service demands which "will be funded by the increase in property taxes". Factually the City receives a minuscule portion of property tax.

The PEIR fails to recognize the higher installation and maintenance costs of all public services and infrastructure when spread out, rather than being relatively concentrated. It also inadvertently recognizes the

probability of increased public safety ramifications of the current “Big Box/Low Income” agenda.

While unbelievable, the City Manager has been adamant that the millions of dollars borrowed and spent on City infrastructure recently has been only a necessary upgrade and provide no increased capacity. If true, that is in complete contrast to the concept of requiring foreseeable expansion of our City limits. However, the current borrow and spend actions of the past few years seem to indicate that the debt will have to be spread over a broader base to make it affordable. I, for one, do not feel this “growth at any cost” direction to be consistent with the stated goal of “maintaining our small town culture”. In fact, most of the plan objectives (Ch 2.6) seem to be in conflict concurrent political decisions.

3. Creek Development and Drainage

It concerns me that there is zero historical institutional knowledge remaining among Fortuna decision makers as it relates to local flood events. Many drainage improvements have been made, but even more high impact developments have occurred and are projected. The last major flood was 1964, then 1955, then 1937, then 1918. A major event is long overdue. There was also a severe local event in the 1970's when a massive local rainstorm occurred at the time the Eel was cresting at a level high enough so that our creeks could not empty. The result was total flooding of our low lands and many areas upstream including Fortuna Blvd., the entire Kenmar/101 off ramp area as well as the Strong Creek development area. Today the runoff rate from such an event would be even more rapid due to upstream development. These events impact mostly down stream development.

I feel strongly that the current 25' from creek center set back along with floodplain drainage easements is adequate (if actually enforced) and further confiscation would and should, be considered a “takings” of property values.

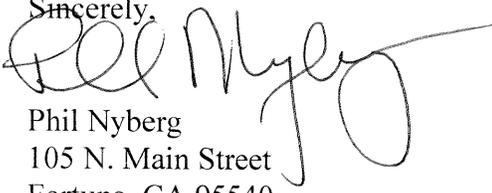
4. Planning Area

Finally a personal concern. I strongly object to have my farmland along the Van Duzen River included in the Fortuna “Planning Area”. Including the area North of Hwy 36 or even possibly the area between Hwy 36 and the Railroad Right of Way due to the current zoning of most of that area may have merit. It should not be used however to mask bad decisions regarding light industrial land use decisions within the City of Fortuna. I would not relish another agency to consult regarding my Ag Exclusive property far from the city.

My conclusion is that the eventual effects of the proposed General Plan involving economic development, Police and Fire cost ramifications, infrastructure maintenance, population growth and rural lifestyle goals are not consistent with the Plan's stated goals. The PEIR appears deficient in these areas. The rather obvious political agenda also appears in conflict.

Thank you for the opportunity to comment.

Sincerely,



Phil Nyberg
105 N. Main Street
Fortuna, CA 95540



**California Regional Water Quality Control Board
North Coast Region
Bob Anderson, Chairman**



Linda S. Adams
Secretary for
Environmental Protection

www.waterboards.ca.gov/northcoast
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

**Arnold
Schwarzenegger**
Governor

July 16, 2008

Mr. Stephen Avis
City of Fortuna
621 11th Street
Fortuna, CA 95540

Dear Mr. Avis,

Subject: Comments on the City of Fortuna General Plan 2030 Update Draft
Environmental Impact Report, SCH# 2007062106

File: City of Fortuna, General Plan 2030 Draft Environmental Impact Report

Thank you for the opportunity to comment on the City of Fortuna's General Plan 2030 Draft Environmental Impact Report (DEIR). The North Coast Regional Water Quality Control Board (Regional Water Board) is a responsible agency for this project, as defined by the California Environmental Quality Act (CEQA) having jurisdiction over the quality of ground and surface waters (including wetlands) and the protection of the beneficial uses of such waters. The DEIR identifies potential impacts of City development over the next 20 years. The document identifies key policies intended to guide development practices and to mitigate for their potential impacts on the environment. We are very concerned that development related impacts in the Fortuna area will result in significant degradation to water quality. Specifically, impacts related to loss of riparian and wetlands, stormwater pollution, hydromodification, and wastewater have been identified without clear, specific mitigation measures to avoid or minimize these impacts. Although the Regional Water Board has permitting authority over the City's stormwater and waste water discharges and therefore has regulatory tools to implement water quality mitigation in the City's permit program for new development, we would prefer that the City use its General Plan process to incorporate its own reasonable, specific mitigation measures for identified environmental impacts.

We have reviewed the DEIR prepared for the Fortuna General Plan Update and offer the following comments and recommendations on this DEIR and Update in our role as a trustee and responsible agency under CEQA.

California Environmental Protection Agency

Recycled Paper

General Comment –

General Plan update policies are carried out by implementation measures. For a policy to be useful as a guide to action, it must be clear, unambiguous, and have enforceable implementation measures.

According to the Governor's Office of Planning and Research 2003 General Plan Guidelines: "Adopting broadly drawn and vague policies is poor practice. It is better to adopt no policy than to adopt a policy with no backbone" (Governor's Office 2003).

We can find few clear, enforceable implementation measures in the Update. Update Appendix C: Implementation Program Matrix states "Implementation Program matrix to be provided at a later date." Therefore it is impossible during the DEIR comment period to evaluate how Update policies will be implemented and made effective and enforceable. It is unusual and ineffective for a general plan update to issue broad and unenforceable policy statements as mitigation measures. The Update's policies and programs intended to mitigate impacts to aquatic and riparian habitats and water quality are either not mitigations at all pursuant to CEQA §15370, or are vague, speculative, unquantifiable and unenforceable. According to CEQA §15370, Mitigation includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

We strongly recommend that clear and enforceable mitigation measures be developed and fully implemented to ensure that General Plan policies are met.

Hydrology and Water Resources/ Biological Resources

Policies include:

NCR-1.1 Watershed Protection. "The City shall regulate development that could pollute watersheds and condition development to minimize point source and non-point source discharges of pollutants in the local watersheds. The City shall also require adequate mitigation for development that may change runoff quality and/or quantity to ensure pollution will not occur."

NCR-1.4 Manage Impervious Coverage. "The City shall manage the extent of impervious coverage in the Planning Area to reduce impervious area coverage and to minimize directly connected impervious areas. This will reduce impacts associated with runoff from new development and re-development projects in the Planning Area."

NCR-1.5 Control Pollutant Sources. "The City shall require the integration of best management practices in new development and re-development projects to control pollutant sources and prevent pollutants from contacting runoff during and following development."

Update Policy NCR-2.1, Riparian Corridor Protection. "The City shall establish riparian buffers to provide terrestrial wildlife and fish movement corridors along fish bearing streams through the Planning Area. Development within these buffers shall be limited to recreational uses and the movement of wildlife."

NCR-2.2 Salmonid Bearing Stream Protection. "The City shall consult with, and require developers of projects to consult, the California Department of Fish and Game (CDFG) and other regulatory agencies for expertise and guidance prior to any restoration activity within salmonid-bearing streams. Some recommendations relative to all tributaries are as follows:

- Identify and inventory those portions of streams originating within or passing through the General Plan Area that are considered to support salmonid species;
- Inventory and map sources of stream bank erosion, then prioritize them according to present and potential sediment yield. Identified sites should be treated to reduce the amount of fine sediment entering the stream;
- Design and construct habitat enhancement structures that yield better gravel sorting, reduce fine sediment retention, increase pool habitat, and allow for juvenile and adult fish passage (i.e., barrier removal);
- Remove exotic vegetation and replant native vegetation, especially where the stream canopy is deemed less than optimum; and
- Reduce cattle trampling within the stream and riparian zone by exploring alternatives with landowners."

NCR-2.3 CDFG Collaboration. "The City shall work to implement the recommendations put forth in the Recovery Strategy for California Coho Salmon, and other wildlife species, such as the Willow Fly (sic) Flycatcher, (CDFG, 2004b) to benefit salmonid species present within the General Plan Area by enhancing and restoring riparian ecosystems, improving water quality, and reducing flooding."

NCR-2.4 Natural Production Streams. "The City shall use North Coast Basin Planning Project (BPP) stream inventory reports that characterize applicable habitat components to manage each identified stream tributary as an anadromous fish and natural production streams (sic)."

NCR-2.5 Sustainable Salmonid Stocks. "The City shall collaborate with the CDFG and National Oceanic and Atmospheric Association Fisheries to develop sustainable, long-term salmonid stocks, improve quantity and quality of habitat available to salmonids, and accelerate species recovery, as well as enhance opportunities for human enjoyment."

NCR-2.6 CEQA §15370 Requirements. "The City shall require projects that may result in a significant impact to special status species, as defined in CEQA §15380 or other applicable State or local regulations, to meet requirements of CEQA §15370 for avoiding, minimizing, or mitigating the impact to a less-than-significant level as determined by the jurisdictional resource agency(s)."

NCR-2.7 Endangered Species. "The City, as lead agency, shall require that all projects comply with the requirements of the federal Endangered Species Act, California Endangered Species Act, Clean Water Act, CDFG code, and CEQA."

NCR-2.8 Native Vegetation. "The City shall coordinate with resource agencies to encourage the preservation of native vegetation, while managing areas with high concentrations of invasive species and/or noxious weeds and preventing their encroachment into new areas."

NCR-2.9 Community Education. "The City shall encourage the installation of interpretive signs that educate the public on various environmental issues including stormwater runoff and detention, creek biology, and watersheds affecting the city. Appropriate Signs and plaques may be placed at sites near the Eel River and along public trails and bike paths adjacent to creeks."

NCR 2.11 ESHA Inventory. "The City shall collect information for a Planning Area ESHA inventory, including but not limited to, wetlands, riparian areas, anadromous fish streams, special status species and their essential habitat, and CNDDDB Sensitive Natural Communities, to assist with the project review process. This program shall include collaboration with resource agencies, such as CDFG and USFWS, to the extent possible. The inventory shall be updated at least every 10 years."

NCR 2.12 Wetland Protection. "In considering new development projects, the City shall protect wetlands identified in the Planning Area that have the potential to be impacted from new development. Mitigation requirements for this protection may include the use of buffers."

Comments:

We strongly support all of the policies addressed above. These policies are consistent with those implemented by other communities and, if fully supported by ordinances, review criteria and permit conditions would increase protections for water quality. Although we appreciate the City's ambition in addressing water quality issues in the above policies, we would like to see more detailed mitigation proposals. The statement of intent to develop mitigations in the future is not appropriate mitigation. The DEIR does not specify how these policies are being implemented. Coordinating to encourage implementation is not mitigation. The City should adopt specific ordinances to ensure compliance with these goals. Section 2.6 states that one General Plan objective is to provide protections for riparian corridors, Palmer Creek, Rohner Creek, North Fork Strongs Creek, Mill Creek, and Jameson Creek. The policies above do not ensure that this objective will be met.

Please note that the Eel River and its tributaries are on the Regional Water Board's 303(d) list as impaired due to excess sedimentation/siltation and temperature. The proposed annexation and development growth outlined in the DEIR may have severe impacts to natural resources, further degrading water quality. Current law prohibits further degradation of waters identified as impaired under Section 303d of the Clean Water Act. The addition of pollutants associated from new developments would fall under this criteria. In addition, we require a program of implementation measures to control existing sources of pollution in order to achieve water quality objectives. The Regional Water Board is available as a resource to ensure water quality standards are met. A comprehensive impact analysis and analysis of mitigations of the spheres of influence and the Planning areas are strongly advised. Although the Regional Water Board has permitting authority over the City's stormwater and waste water discharges and therefore has regulatory tools to implement water quality mitigation in the City's permit program for new development, we would prefer that the City use its General Plan process to incorporate its own reasonable mitigation measures for identified environmental impacts in order to protect beneficial uses for waters of the state.

Riparian Setbacks

The Update's absence of wetland and riparian habitat protection buffers, performance criteria and stormwater mitigations is likely to result in a greater amount of state and federal agency environmental review and consultation, longer permitting periods, and a more complicated permitting process than if the Update included clear, simple and preventative mitigation standards.

Riparian buffer zones serve critical functions for aquatic species, wildlife and humans. The benefits of healthy riparian zones include providing diverse wildlife habitat, improvement to water quality, flood protection, stream bank stabilization, stream temperature stability and ground water replenishment. Regional Water Board staff would like to suggest maximizing riparian setbacks from roadways, structures and

developed park areas. Setbacks to all surface waters should be included in specific ordinances. Adequate riparian shading and setbacks are essential in both helping to maintain water quality and in helping to create wildlife habitat and corridors. Non-intrusive native plant vegetation should be used for all proposed landscaping. The use of native species greatly reduces the need for pesticides, herbicides, fertilizers, and other potentially toxic chemicals, which could discharge directly to the creeks or River.

Creek Maintenance

Creek maintenance for flood control should balance that necessity with the need to keep a sufficient shade canopy over the creek. Shaded creek flows are cooler by nature and can make a huge difference in terms of the number and diversity of aquatic life. Rehabilitation and continual surveillance of waterways will enhance beneficial uses.

Impacts to wetlands and waters of the State

Waters of the state include all waters of the U.S. and any waters deemed non-jurisdictional as waters of the U.S. The new development and redevelopment proposes to reduce the impacts to waters of the state (hydrology and water resources) to a less than significant level where possible. Additionally, wetland areas, either natural or constructed as mitigation areas, may be impacted by development activities. These impacts should first be adequately evaluated to see if any portion of them may avoid or minimize project-related disturbance. All efforts to first avoid and second to minimize impacts to waters of the state must be fully implemented prior to use of mitigation activities. If, after careful and adequate evaluation, the project's impacts to waters of the state are deemed unavoidable, then compensatory in-kind mitigation (for acreage, function and value) will be necessary for direct and cumulative impacts. Seasonal wetland impacts must be mitigated by seasonal wetland mitigation; linear watercourse impacts must be mitigated by linear watercourse impacts.

For unavoidable impacts to waters of the state, submittal of applications for 401 Water Quality Certification and/or Waste Discharge Requirements (Dredge/Fill) permits from the regional Water Board will be necessary. U.S. Army Corps of Engineers Clean Water Act Section 404 permits and Department of Fish and Game stream alteration agreements may also be necessary.

The DEIR should include specific protection measures for sensitive areas. The Regional Water Board suggests GIS database for mapping these areas for the public and agencies. We are aware of an existing database that could be used for this purpose and would be happy to work with City staff in this effort.

Policy NCR-2.12 is vague and unenforceable. This policy provides no information on how, or by what process the City will identify and protect wetlands. We would strongly encourage the City to fully identify wetlands and other state waters in all CEQA documents where the City is lead agency. Such disclosures would provide useful

information to project proponents and may help prevent future enforcement actions by the Regional Water Board and/or other state or federal agencies.

Staff from the Regional Water Board prepared a draft report, *Stream and Wetlands Systems: Physical Forms, Ecological Processes and Water Quality Function* (July 2007) which summarizes some of the relevant scientific knowledge regarding the critical function of stream, wetland and riparian systems in protecting water quality. A copy of this report has been included for your convenience.

Wastewater Collection, Treatment, and Disposal

Policies include:

PFS-4.1 Public Sewer Infrastructure. "The City shall require all new urban development to construct sewer infrastructure according to the City's municipal standards and incorporate it into the city's sewer collection system."

PFS-4.2 Gravity-Flow Collection. "The City shall require that wastewater collection systems be designed on a gravity-flow basis, except where a site-specific engineering analysis clearly demonstrates the long-term cost-effectiveness or need for pumping facilities."

PFS-4.3 Clean Water Act Compliance. "The City shall comply with the requirements of the Federal Clean Water Act to minimize the discharge of pollutants to surface waters, as required by the City's National Pollutant Discharge Elimination System (NPDES) permit."

PFS-4.4 Sewer Capacity. "The City shall maintain sufficient wastewater plant and collection capacity to serve the residents of Fortuna."

PFS-4.5 Wastewater System Collection and Treatment Facilities and Components. "The City shall continue to identify through the Capital Improvement Program all significant components of the wastewater system that will need to be replaced or improved during the useful life cycle."

PFS-4.6 Wastewater System User Rate Structure. "The City shall continue to review and analyze the full operational, maintenance, and capital improvement costs, as well as the cost of developing future capacity of the city's wastewater system. The City shall maintain a rate and fee structure that is sufficient to generate revenues to offset these costs, thereby assuring future viability of the municipal wastewater system."

PFS-4.7 Alternative Private Wastewater Treatment Systems. "The City shall consider the use of alternative private wastewater treatment systems (i.e., septic) on individual parcels located in very low density areas of the city that are not served by the city's public sewer collection system. Such consideration would be predicated on a site-

specific engineering analysis that clearly demonstrates that connection to the public sewer system is financially not feasible. The alternative system must meet and comply with the requirements of the Humboldt County Department of Environmental Health and the North Coast Regional Water Quality Control Board.”

PFS-4.8 Septic System Compliance. “The City shall require that sewage disposal (septic) systems comply with all requirements of the Humboldt County Department of Environmental Health and the North Coast Regional Water Quality District.”

PFS-4.9 Regulatory Compliance. “The City shall construct, operate, and maintain the City’s municipal wastewater system to meet all of the regulatory requirements of the North Coast Regional Water Quality Control Board and the City’s NPDES permit, including the employment of appropriately certified operators.”

PFS-4.10 Sewer Main Extensions. “The City will follow current State law regarding the extension of the city water and sewer public utilities beyond the city’s boundaries as regulated by LAFCO policies.”

Comments:

In section 7.2 (Wastewater Collection, Treatment, and Disposal), all impacts were deemed less than significant and require no mitigation. The Regional Water Board disagrees with this assertion. We anticipate that the City of Fortuna will exceed the current wastewater design capacity well within the planning period. Accordingly, Table 7.2 should indicate mitigation is required.

Contrary to statements made in the DEIR, recent upgrades to the Wastewater Treatment Facility (WWTF) did not include increased hydraulic capacity. The WWTF is currently designed and permitted to treat an average dry weather flow of 1.5 million gallons per day (mgd). Actual average dry weather flow for 2007 was approximately 1.08 mgd. The DEIR indicates a population increase of approximately 6,655 persons or 2298 new dwelling units over the course of the projected general plan timeframe. Based on our calculations using an equivalent dwelling unit volume of 450 gallons per day, the increased population would result in increased average dry weather flows of 1.03 mgd.

The WWTF is currently regulated in accordance with Nation Pollution Discharge Elimination System Permit Waste Discharge Requirements Order No. R1-2007-0007 (permit). The permit requires that, “Whenever a WWTP will reach capacity within four years, the Discharger shall notify the Regional Water Board. A copy of such notification shall be sent to appropriate local elected officials, local permitting agencies, and the press. Factors to be evaluated in assessing reserve capacity shall include, at a minimum, (1) comparison of the wet weather design flow with the highest daily flow, and (2) comparison of the average dry weather design flow with the lowest 30-day flow. The Discharger shall demonstrate that adequate steps are being taken to address the

capacity problem. The Discharger shall submit a technical report to the Regional Water Board showing how flow volumes will be prevented from exceeding capacity, or how capacity will be increased, within 120 days after providing notification to the Regional Water Board, or within 120 days after receipt of Regional Water Board notification, that the WWTP will reach capacity within four years....[CCR Title 23, section 2232]"

In addition, the permit no longer allows discharges of waste receiving a lesser quality of treatment through former discharge location SN002 as indicated in the DEIR. In accordance with the General Waste Discharge Requirements for Sanitary Sewer systems, identified in the DEIR as Water Quality Order No. 2006-0003, the City of Fortuna will be required to address situations involving excessive infiltration and inflow, as well as inadequate conveyance capacity in areas that result in sanitary sewer overflows.

The State of California promotes a policy of encouraging the use of reclaimed water. The Regional Water Board would like to see a water conservation/reuse policy in Fortuna that is aimed at reducing, reusing and/or recycling water, which could mitigate future water demands of the City.

Stormwater and New Developments

Policies Include:

NCR-1.6 Self-Treat Runoff. "The City shall encourage the use of basic water quality strategies that self-treat runoff in new development and re-development projects. These strategies may include infiltrating runoff, retaining/detaining runoff, conveying runoff slowly through vegetation, and/or treatment of runoff on a flow-through basis using other standard treatment technologies."

NCR-1.7 Clean Water Act Compliance. "The City shall comply with the requirements of the Clean Water Act with the intent of minimizing the discharge of pollutants from point and non-point pollutant sources to surface waters."

PFS-5.1 Drainage Facilities Maintenance. "The City shall require the regular inspection and maintenance of all drainage facilities, including detention basins and both natural and manmade channels, to ensure that their full carrying capacity is not impaired."

PFS-5.2 Natural Drainage. "The City shall encourage the use of natural stormwater drainage systems in a manner that preserves and enhances natural features."

PFS-5.3 Runoff Quality. "The City shall improve the quality of runoff from urban and suburban development through use of appropriate and feasible mitigation measures including, but not limited to, artificial wetlands, grassy swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, and other best management practices."

PFS-5.4 Surface Drainage. “The City shall require that new development have surface drainage disposal accommodated in one of the following ways:

Positive drainage to a City-approved storm drain, stream, creek, or other natural water course; or

On-site drainage that is retained within the development.”

PFS-5.5 Future Drainage Compliance. “The City shall require future drainage system requirements to comply with applicable State and Federal non-point source pollutant discharge requirements.”

PFS-5.6 On-Site Drainage Treatment. “The City shall implement on-site storm drainage treatment facilities in City projects wherever feasible.”

PFS-5.7 Detention Facilities. “The City shall use stormwater detention facilities to mitigate drainage impacts and reduce stormwater drainage system costs. To the extent practical, stormwater detention facilities should be designed for multiple purposes, including environmental, recreational, and/or stormwater quality improvement.”

PFS-5.8 Hillside Erosion. “The City shall continue to collaborate with property owners in hillside areas to minimize erosion and conveyance of silt into City drainage facilities.”

PFS-5.9 Rainy Season. “The City shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of storm drainage facilities.”

PFS-5.10 Fair-Share Costs. “The City shall require all new developments to pay their fair share of the cost of improvements in the Storm Drainage Master Plan.”

PFS-5.11 Assessment Districts. “The City shall support the use of assessment districts or other types of funding mechanisms to spread out costs of planned drainage improvements included in the Storm Drainage Master Plan.”

PFS-5.12 Storm Drain Master Plan Implementation. “The City shall monitor the implementation of the Storm Drain Master Plan as development occurs, to ensure that the improvements are not being oversized nor undersized.”

PFS-5.13 Drainage Studies. “The City shall require site-specific studies including erosion control, watershed management, and flooding for all major developments that have the potential to create erosion, watershed, or flooding problems.”

PFS-5.14 Drainage Easements. “The City shall require dedication of drainage easements included in the Storm Drainage Master Plan as a condition of approval for any subdivision or use permit.”

PFS-5.15 County Developments. “The City shall monitor development in the County to ensure that drainage impacts from new projects do not impact the City's drainage system. If any impacts are projected to occur from developments in the County, the City shall require, as feasible, the County or developer to install adequate improvements to mitigate the anticipated impacts.”

PFS-5.16 Vegetation Control. “The City shall strive to keep excessive brush and vegetation clear from hillside creeks to facilitate stormwater drainage during heavy precipitation events.”

PFS-5.17 Watershed Protection. “The City shall promote the protection of watersheds and drainage systems within Fortuna by requiring mitigation from developers and by requiring that new development not increase the existing estimated 25-year peak runoff volume from a site.”

PFS-5.18 Peak Runoff Detention. “The City shall require any increase in runoff beyond the peak 25-year event resulting from new development to be retained or detained on-site or mitigated through off-site improvements to other streams or outlets.”

PFS-5.19 Bioswales. “The City shall encourage neighborhood parks, subdivisions, and commercial development to incorporate bioswales and permeable pavement, to minimize stormwater runoff in the city and comply with the NPDES permit.”

Comments:

We strongly support the intent of the policies listed above. In particular, we encourage the City to require that stormwater runoff quality and quantity mitigation measures be required for new development projects. The City needs to clearly identify the types of new development that would trigger these types of mitigations. In addition, the specific measures to be implemented, the appropriate sizing of such measures, and the monitoring and maintenance programs to ensure long-term effectiveness of such measures should be identified. In accordance with state and federal guidelines, we recommend that the City develop a stormwater mitigation program that includes required Low Impact Development techniques for new development. Without the specifics mentioned above, we do not believe the DEIR language is sufficient for mitigation.

We appreciate the City's goal of compliance with the Clean Water Act. We would encourage the City to fully implement its stormwater management plan in order to comply with NCR-1.7. Please be aware that the City is required to fully implement this program and to reduce levels of stormwater pollution to the maximum extent practicable. The update of this General Plan should be viewed as an opportunity to ensure that the City's stormwater management program is consistent with all of the legal and regulatory stormwater program requirements. See Stormwater Enclosure.

Hydromodification

Recent studies have confirmed that increased impervious surfaces within a watershed will lead to alteration of the natural hydrology expressed as higher winter flows (peak flows) and lower summer/fall flows (base flows). Alteration of the natural flow regime (hydromodification) can result in increased stream temperatures associated with low summer/fall creek levels, alteration of the channel morphology (e.g. widening or incising of stream channel) associated with increased peak flows, adverse impacts to native riparian vegetation and reduction in ground water recharge capabilities. The design and construction of new development projects such that the natural flow regimes are maintained, can help reduce the impacts of hydromodification and thus help prevent adverse impacts to stream and wetland systems. This practice is referred to as Low Impact Development (LID).

Stormwater Runoff Quality

The quality of stormwater runoff is directly correlated to the extent of impervious surfaces within a watershed. We encourage infiltrating treated stormwater runoff back into the ground as a means of "banking" water for introduction back into creeks during the dry season. This helps to buffer low summer/fall flows which in turn, helps to reduce creek temperatures. See LID Enclosure.

All newly installed impervious surfaces (runway, roads, roofs, sidewalk, etc.) must incorporate post construction stormwater treatments to remove any contaminants in the stormwater, and to attenuate the peak flow stormwater, before the stormwater enters any waters of the state. We strongly encourage use of Low Impact Development techniques to address potential stormwater impacts as close to the source as possible. Dry detention basins (particularly those with limited retention times) are not highly effective for pollutant removal. We suggest that the City develop a mandatory program to implement Low Impact Development techniques for new development. Permeable pavements can have significant benefits as long as subdrains are not needed. LID techniques promote healthy aquatic systems, and can help reduce the City's flood and drainage control costs over time.

Statement of Significant Unavoidable Adverse Impacts

Pursuant to CEQA §15093(b) "Statement of Overriding Considerations,"

When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.

Based upon the DEIR Cumulative Impacts Analysis, Chapter 10, it appears the DEIR proposes issuing statements of overriding consideration for the Update's unavoidable significant impacts on Hydrology and water resources, and on flooding.

The DEIR states: "Implementation of the General Plan has the potential to degrade water quality or violate water quality implementation standards. This is considered a significant, unavoidable impact."

We believe that it is highly unlikely the City can provide the substantial evidence to support this statement of overriding considerations. Our comments, and those of other agencies provide specific recommendations (such as requiring Low Impact Development (LID) techniques for new development), that would have a high likelihood of reducing these impacts to a less than significant level. LID includes stormwater management techniques to maintain or restore the natural hydrologic functions of a site by detaining water onsite, protecting natural areas, filtering out pollutants, and facilitating the infiltration of water into the ground. This approach helps meet water quality and water supply objectives and maintain healthy, sustainable watersheds. Regional Water Quality Control Boards have already begun to integrate LID and other sustainable water management strategies into compliance documents. We recommend the City incorporate the use of LID techniques in stormwater mitigation requirements to minimize the Update's impacts on wetlands and stream habitats. These techniques are tested, currently in use in many areas of California, and are often less expensive than traditional stormwater management strategies.

Two recent state resolutions by the California Ocean Protection Council and the State Water Resources Control Board attest to LIDs importance and effectiveness in protecting California's water resources. Because LID and other stormwater pollution prevention control techniques are documented as feasible and effective methods to mitigate water quality impacts of development, we believe the City cannot make a credible case that the Update's potentially significant impacts to hydrology and water resources are "unavoidable".

This Update represents a significant opportunity for the City to protect, restore, and enhance its wetland and stream habitats, to protect water quality, to provide quality open space, and to help recover the region's anadromous salmonid populations for current and future generations. The Update contains many laudable environmental policies, however, only with effective and tangible implementation measures will the Update be likely to meet its stated policy goals. We look forward to working with you on this project and providing any suggestions that may improve water quality impacts. Thank you for the opportunity to comment on the Fortuna General Plan Update.

If you have any questions or comments regarding this matter please contact John Short at JShort@waterboards.ca.gov or at (707) 576-2065.

Sincerely,



Catherine Kuhlman
Executive Officer

071608_AJT_FortunaDraftEIRComments

Enclosures:

1. Low Impact Development Resources
2. Post Construction Stormwater Treatment Resources
3. Stream and Wetlands Systems: Physical Forms, Ecological Processes and Water Quality Function Draft Report

Original Sent to: Mr. Stephen Avis, City of Fortuna, 621 11th Street,
Fortuna, CA 95540

Cc: State Clearing House, P.O. Box 3044, Sacramento, CA 95812

Mr. Dan Wilson, Department of Fish Game, P.O. Box 47,
Yountville, CA 94599

Ms. Kimberly Niemeyer, SWRCB, Office of the Chief Counsel

Ms. Vanessa Metz, California Coastal Commission, 710 E Street,
Suite 200, Eureka, CA 95501

Low Impact Development Links

This is the Regional Water Board's MS4 website that has stormwater and LID links:

http://www.waterboards.ca.gov/northcoast/water_issues/hot_topics/santa_rosa_ms4_npdes_stormwater_permit/

Resolution of the California Ocean Protection Council Regarding Low Impact Development:

http://www.resources.ca.gov/copc/05-15-08_meeting/05_LID/0805COPC05_%20LID%20Res%20amended.pdf

Low Impact Development – Sustainable Storm Water Management:

http://www.waterboards.ca.gov/water_issues/programs/low_impact_development/

Central Coast Regional Water Quality Control Board LID:

http://www.waterboards.ca.gov/centralcoast/stormwater/low%20impact%20devel/lid_index.htm

EPA Green Infrastructure Basic Information:

<http://cfpub.epa.gov/npdes/greeninfrastructure/information.cfm>

Managing Wet Weather with Green Infrastructure:

http://cfpub.epa.gov/npdes/home.cfm?program_id=298

EPA Managing Wet Weather with Green Infrastructure March 2008 Newsletter:

http://www.epa.gov/npdes/pubs/gi_newsletter_mar08.pdf

Low Impact Development Center:

<http://www.lowimpactdevelopment.org/>

A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption:

http://www.waterboards.ca.gov/lid/docs/ca_lid_policy_review.pdf

State Water Board Funded Projects That Include Low Impact Development:

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/low_impact_development/

For more information, please contact Mona Dougherty at

mdougherty@waterboards.ca.gov or John Short at jshort@waterboards.ca.gov

Stormwater Links:

This is the CASQA Construction BMP manual:
<http://www.cabmphandbooks.com/Construction.asp>

This is our MS4 website that has stormwater and LID links:
http://www.waterboards.ca.gov/northcoast/water_issues/hot_topics/santa_rosa_ms4_npdes_stormwater_permit/

State Water Board Storm Water Program:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/

Erase the Waste Campaign – California Storm Water Toolbox
http://www.waterboards.ca.gov/water_issues/programs/outreach/erase_waste/

State Water Board Storm Water Grant Program:
http://www.waterboards.ca.gov/water_issues/programs/grants_loans/prop84/index.shtml
!

This is the SF region storm water website - lots of interesting links:
http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/available_docs.shtml

EPA Storm Water Program:
http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Federal Funding Sources for Watershed Protection:
<http://cfpub.epa.gov/fedfund/>

California Stormwater Quality Association:
<http://www.casqa.org/>

Stormwater Manager's Resource Center:
<http://www.stormwatercenter.net/>

For more information, please contact Mona Dougherty at
mdougherty@waterboards.ca.gov or John Short at jshort@waterboards.ca.gov

June 29, 2008

Tina Christensen
2120 Campton Road, Suite C
Eureka, CA. 95503

Subject: City of Fortuna General Plan Update Draft EIR

Dear Tina:

As you requested I had a chance to review the Draft EIR for the Fortuna General Plan Update. I focused my review on Table 2.11-1 Impacts and Mitigation Summary. In summary based on my limited review of the GPU EIR, it appears to be well written, easy to follow and understand and meets the requirements of CEQA. I believe the EIR is legally defensible, unless there is additional evidence I'm not aware of. Of course the EIR is based on the City's identified Alternatives. Meaning it is really the GPU Alternatives, goals and policies that shape the EIR.

In any event, my comments apply to Chapter 5 Conservation and Open Space and Chapter 9, Plan Alternatives.

5.2 Biological Resources

Impact: Adverse Impact to Special Status Species

NCR-2.6 CEQA §15370 Requirements

Comment: Mitigation **requires** that Biological Studies be required for **all** development applications. Also the Mitigation seems to infer that CEQA Section 15370 requires the Biological Study. This is not the case. Below is a copy of Section 15370 of the CEQA Guidelines.

15370 Mitigation

"Mitigation" includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree of magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

Suggested Mitigation Language: The City, when considering development applications, shall refer applications to responsible and trustee agencies (i.e. CDFG & USFWS) and utilize the CNDDDB Sensitive Natural Communities to determine the presence of special status species, as defined in CEQA § 15380 or other applicable state or local regulations. Based on comments from responsible agencies, the City may require biological studies and/or surveys and appropriate mitigation as defined in CEQA §15370.

Impact: Environmentally Sensitive Habitat Areas (ESHA)

NCR-2.1 Riparian Corridor Protection

Comment: Mitigation requires riparian buffers along **fish bearing** streams within the Planning Area and **limits or restricts** these areas to **recreational uses and open space**. Every fish bearing stream should be identified so there's no question on which streams are restricted. See NCR-2.11 ESHA Inventory. In addition, I did not see the definition of riparian buffer or riparian corridor. A definition of riparian habitat is found in the glossary. Is the riparian buffer in addition to the riparian corridor? I would suggest that a definition be established for Riparian Corridor. Following is an example. }

Riparian Corridor: Those areas which fall into any of the following four (4) categories:

1. Perennial streams: An area extending outward twenty-five (25) feet from the top of the streambank.
2. Intermittent streams: An area extending outward fifteen (15) feet from the top of the streambank.
3. An area extending outward twenty (20) feet from the high water mark of an adjacent area of wetlands or natural body of standing water; or
4. An adjacent area of riparian vegetation. The boundary shall be defined as the outer limit of the occurrence of riparian vegetation and may extend farther than the above specified distances. This boundary may be determined by the Planning Director or Zoning Administrator.

Of course I would suggest provisions for exception requests to reduce the width of the riparian corridor. The granting of an exception could be conditioned by the requirement of mitigation measures to ensure compliance with the purposes of the resource protection policies. Required mitigation measures may include, but should not be limited to:

1. Maintenance of a protective strip of vegetation between the development and a stream, marsh, or body of standing water. The strip should have sufficient filter capacity to prevent significant degradation of water quality, and sufficient width to provide value for wildlife habitat, as determined by the Planning Director or Zoning Administrator.
2. Installation and maintenance of waterbreaks.
3. Surface treatment to prevent erosion or slope instabilities.

4. Installation and maintenance of drainage facilities.
5. Seeding or planting of bare soil including the establishment of ground cover or the planting of woody vegetation.
6. Installation and maintenance of sediment catch basins.

As mentioned above, development within riparian corridors "...shall be limited to recreational uses and the movement of wildlife." Again, I found no definition of recreational uses. Obviously it could include many different use types, from walking/bicycle trails to basketball courts, baseball fields, football stadiums or motocross tracks. I assume the intent is to provide for walking/bicycle trails. However, I would suggest at a minimum that THP's, removal of dead, dying or diseased trees or downed vegetation within the streambed or on the streambank; the removal of vegetation obstructing streamflow or causing streambed or streambank erosion and **road crossings** be considered as compatible uses.

Impact: Wetlands

NCR-2.12 Wetland Protection

Comment: Mitigation requires that wetlands be protected from development. Basically, it appears to me **that this would not allow for any development that would impact a wetland, any wetland.** However, it appears that Mitigation Measure NCR-2.11 ESHA Inventory includes wetlands as environmentally sensitive habitat areas. There are wetlands that are man-made, degraded and have little habitat value. In any event, there needs to be an exception provision that would allow for some impacts to existing wetlands. The same mitigation measures (avoidance, minimizing impacts, restoration, off-site mitigation, no net loss) required for ESHA's should be applied to wetlands.

NCR-2.13 Wetland Identification

Comment: Although it's entitled "Wetland Identification" the mitigation measure requires "...wetlands impact assessments..." for **all projects** where wetlands are known or suspected to exist, including on **adjacent parcels**, irregardless of the project, its location or its impact on the wetland. Even if the wetland is not impacted by the project, this mitigation requires a biological assessment and wetland delineation.

Suggested Mitigation Language: When biological assessments and/or wetland delineations are required as part of any project review, the City shall map and include any identified wetland areas in the City's ESHA Inventory. See NCR-2.11

9.5 Economic Analysis of Alternatives

Impact: Potential to cause physical deterioration in existing commercial and industrial space in the region.

LU-6.8 Funding for a Vibrant Business Community. The City shall require major new development to provide funds to promote vibrant commercial and manufacturing districts throughout the City."

Comment: This is a tricky area, in that economic and social impacts are not considered environmental effects under CEQA. Effects under CEQA must be related to a physical change in the environment (CEQA 15358(b)). The evaluation of economic or social effects is optional under CEQA. The City has chosen to evaluate the social and economic impacts of the GPU, which I believe is a good idea.

In any event, it appears that the Plan Alternatives would provide for more commercial/industrial areas than the demand would warrant, possibly impacting the existing commercial, industrial and business areas. This could be considered a "socioeconomic" impact. An economic or social change casually related to a physical change maybe considered when the significance of the physical change is determined (quantified). Again, this is a tricky area and a clear nexus should/needs to be established.

I hope this information is helpful to you in your review of the document. If you have any questions, need additional information or would like me to review specific issues, please let me know. Let me know where you would like me to drop off the binder containing the Draft EIR.

Sincerely,

Kevin Caldwell

Kevin Caldwell

Copy:
2008 X File

Comments on General Plan EIR
June 30, 2008

- 1-6 The table of contents should be the first or second page not page 1.6
- 2-15 Should be "divide" in Land Use Paragraph and "aircraft" not "aircrafts" in Public Health and safety.
- 2-16 Wrong number, should be 2-13.
- 2-17 Left turn lanes at 9th and Main and signals—just when we got the bulb-outs done! I think the 4 way stop is adequate.

Round about at the end of Main and Rohnerville Rd would not work with Newell Drive so close and no left hand land for traffic wanting to make a left hand turn onto Newell going east on Rohnerville Rd. Where would the pedestrians find any crossing?

I thought the Newburg, So Fortuna Blvd intersection had adequate protected left turn lanes.

- 2-18 There needs to be a left turn lane going from Kenmar Rd to Eel River Drive.
- 2-19 Traffic to the airport: if the airport is expanded and there is industrial development, no mitigation is necessary?
- 2-23 Delete "of" in paragraph 4

Do Clendenin's know their apple orchard will be a historic park and cultural resource center? Will they be reimbursed for this?
- 2-24 Potential Landslides, Soil instability, instability and erosion under Mineral and soil resources need no mitigation?
- 2-25 The city shall oppose non-mineral development which would be adversely impacted by mineral working—what does that mean? What about natural gas reserves?
- 2-26 Night lighting shall not be continuous except for security and operational purposes—so a big box retail center could have huge lighting impacts for their 24 hr operations.
- 2-27 The sewage treatment plant was budgeted to have the ability to utilize methane gas to help offset power requirements, is that going to be developed?

2-28 What about acceptable police (and fire) service to big-box and low-cost housing? What if those demands exceed the city budget?

2-29 And who believes there will be no increased demand for fire service that will need mitigation?

No mitigation for schools in spite of increasing traffic pressure for Ambrosini School with 370 students expected this fall.

Wood burning stoves: What about our older homes and low income seniors that have no heat source, or can't afford commercial energy.

2-31 What will the noise level standards be—greater or lessor than planes? Would this have an impact on aircraft using the airport?

What about all the houses built on south Rohnerville Rd recently on those steep slopes? What about city water storage systems on steep slopes?

2-32 Eel River disposal is certainly not above the 100 year flood zone, as well as city yard and sewage treatment plant.

2-33 We are not going to have any commercial development at the airport in opposition to the county general plan?

2-34 Would it be possible to have an excess of manufacturing space (LU-6.7). We need jobs here. We would certainly have an excess of retail space if we have the big box development. It states that this could have an impact on physical deterioration of existing commercial and industrial space. Sow's Ear still gets the award for the most deteriorated business in Fortuna. (The other night they had two trucks parked right to the white line of Rohnerville Rd. No bikes or pedestrians would have been able to use that side of the road without being in the path of traffic.

3.1-7 Redevelopment money is to be used to reduce blight, but in opposition to many nearby residents, the city is putting in low income housing with redevelopment money on Ross Hill and School Street intersection with inadequate parking. That will cause parking on the side of the road or in the nearby churches parking lots. This would be a source of blight.

Is redevelopment money used to encourage new businesses that will result in competition to the existing business that pay the redevelopment tax?

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standard route and pick up and drop off people every couple of hours to downtown, Redwood Shopping Center, Strong's Creek Shopping Center, Riverwalk area, Rohnerville Airport (assuming more commercial/manufacturing (airport compatible industry), Redwood Memorial Hospital and passengers from small planes.

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Sylvia Jutila
sylvia.jutila@suddenlink.net
725-4235, 834-2494
PO Box 606, Fortuna

Comments on General Plan EIR
June 30, 2008

- 1-6 The table of contents should be the first or second page not page 1.6
- 2-15 Should be "divide" in Land Use Paragraph and "aircraft" not "aircrafts" in Public Health and safety.
- 2-16 Wrong number, should be 2-13.
- 2-17 Left turn lanes at 9th and Main and signals—just when we got the bulb-outs done! I think the 4 way stop is adequate.

Round about at the end of Main and Rohnerville Rd would not work with Newell Drive so close and no left hand land for traffic wanting to make a left hand turn onto Newell going east on Rohnerville Rd. Where would the pedestrians find any crossing?

I thought the Newburg, So Fortuna Blvd intersection had adequate protected left turn lanes.

- 2-18 There needs to be a left turn lane going from Kenmar Rd to Eel River Drive.
- 2-19 Traffic to the airport: if the airport is expanded and there is industrial development, no mitigation is necessary?
- 2-23 Delete "of" in paragraph 4

Do Clendenin's know their apple orchard will be a historic park and cultural resource center? Will they be reimbursed for this?
- 2-24 Potential Landslides, Soil instability, instability and erosion under Mineral and soil resources need no mitigation?
- 2-25 The city shall oppose non-mineral development which would be adversely impacted by mineral working—what does that mean? What about natural gas reserves?
- 2-26 Night lighting shall not be continuous except for security and operational purposes—so a big box retail center could have huge lighting impacts for their 24 hr operations.
- 2-27 The sewage treatment plant was budgeted to have the ability to utilize methane gas to help offset power requirements, is that going to be developed?

2-28 What about acceptable police (and fire) service to big-box and low-cost housing? What if those demands exceed the city budget?

2-29 And who believes there will be no increased demand for fire service that will need mitigation?

No mitigation for schools in spite of increasing traffic pressure for Ambrosini School with 370 students expected this fall.

Wood burning stoves: What about our older homes and low income seniors that have no heat source, or can't afford commercial energy.

2-31 What will the noise level standards be—greater or lessor than planes? Would this have an impact on aircraft using the airport?

What about all the houses built on south Rohnerville Rd recently on those steep slopes? What about city water storage systems on steep slopes?

2-32 Eel River disposal is certainly not above the 100 year flood zone, as well as city yard and sewage treatment plant.

2-33 We are not going to have any commercial development at the airport in opposition to the county general plan?

2-34 Would it be possible to have an excess of manufacturing space (LU-6.7). We need jobs here. We would certainly have an excess of retail space if we have the big box development. It states that this could have an impact on physical deterioration of existing commercial and industrial space. Sow's Ear still gets the award for the most deteriorated business in Fortuna. (The other night they had two trucks parked right to the white line of Rohnerville Rd. No bikes or pedestrians would have been able to use that side of the road without being in the path of traffic.

3.1-7 Redevelopment money is to be used to reduce blight, but in opposition to many nearby residents, the city is putting in low income housing with redevelopment money on Ross Hill and School Street intersection with inadequate parking. That will cause parking on the side of the road or in the nearby churches parking lots. This would be a source of blight.

Is redevelopment money used to encourage new businesses that will result in competition to the existing business that pay the redevelopment tax?

3.1-19, LU-12.5 Non-conforming land use issues. The newer storage garages in Riverwalk area are incompatible with current land use. The city council would not have approved it but a council member had a conflict of interest and recused

himself, so we have this eyesore. Can we ensure that this will not happen again?

- 4.1-1 Are there plans to make Riverwalk Drive a 4 lane road? If so there is a motel that is too close on the East side, or we will lose more parking on the West side and there is not enough parking now. The heather at River Lodge is a treasure but there is an unsafe intersection at the east end of the River Lodge parking lot if you want to turn left.
- 4.1-2 It is amazing that Main Street is considered a Minor Arterial! Can left turn lanes be considered for Minor Arterials, at least at the busiest intersections. Is Rohnerville Rd 100 feet wide at the Sow's Ear?
- 4.1-6 A left turn lane is needed for Westbound Kenmar to Eel River Drive (illustration 13). A left turn lane is needed for Eastbound traffic on Rohnerville Rd to turn left onto Newell Dr (illustration 3)
- 4.1-8 New traffic studies need to be done at Kenmar and Eel River Drive since Drake Hill Rd has been closed, especially during the summer when the strawberry stand is open.
- 4.1-11 How are you going to encourage consolidation of private access points when homes are right on the edge of the arterial and collector streets?
- 4.1-17 I am glad the realignment is being proposed for the 12th street access, what about the railroad track and the traffic lights? If the track is opened again, what about cars exiting the freeway at Kenmar, 12th St and Main St. Will we have a long enough exit lane to allow for the back up of traffic?
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COMMENTS ON THE DRAFT PROGRAM EIR

I reviewed just Chapter 5 and Chapter 3. The generalized statements and the use of words such as "the City shall, "work", "strive", "develop", "encourage", "require" and "ensure" does not give me any confidence in the City being able to fulfill the Policies referred to. If this document represents the types of statements necessary to have the EIR adopted, then at least correct the mistakes. The real question is, how will the new General Plan be interpreted by the City and City Staff. The EIR is going to disappear after its certified. I think the Draft EIR is full of erroneous statements and generalized "feel good" words.

CHAPTER 5 Natural and Cultural Resources

1. Pg 5.1-1, Climate and Topography: "approximately 47 inches" I don't believe the number "47" is an approximate number when it comes to inches. Why not say "the average rainfall is 47 inches from measurements made between 1930? and 2007".
2. Pg 5.1-2, Palmer Creek: Does the Palmer Creek watershed really contain Rohner Creek?
3. Pg 5.1-8, Water Quality Issues: "Urban streams are often susceptible . . . failing septic tanks and contamination from nearby gas stations and industrial activities." Are you suggesting that we have these in the Planning Area at this time, if so, where are these locations? If these activities happened a long time ago, are you saying that we are still feeling the effects of these past activities and are the effects being measured and documented?
4. Pg 5.1-8, Groundwater Quality: You mean to tell me that you don't have any water testing data or groundwater level data from the Eel River basin that you could put in this EIR.
5. Pg 5.1-11 Impacts and Mitigation-Discussion: "New development MAY increase impervious surface coverage . . ." I think its safe to say "New development WILL increase impervious surface coverage."
6. Pg 5.1-11 Mitigation: NCR-1.1, What is the City's definition of "development", is "development" the same as CEQA's "project"? If so, then any "project" that may cause either a direct physical change in the environment or a reasonably foreseeable indirect physical change would come under CEQA. If one were to re-state this policy, it says "The city shall condition development to allow a minimum amount of pollution into out watersheds." And then "The City shall mitigate quality/quantity of runoff so that the "minimum amount of pollution" does not occur." Is this really what the City intends to do?
7. Pg 5.1-11 Mitigation: NCR-1.4, How about some examples? Are you planning to limit the width of concrete driveways to a new house? A concrete slab on a residential lot to park a motorhome, trailer or the building of a patio? Are you going to reduce the widths of flag roads or prevent the paving of long driveways off of public roads? Are you going to require the use of new "permeable" materials?
8. Pg 5.1-12 Mitigation: NCR-1.5, In NCR-1.1 the City is going to "minimize and mitigate" pollution and in this Policy, the City is going to try to prevent pollution.
9. Pg 5.1-12 Mitigation: NCR-1.6, Now the City realizes it can't prevent "pollution" so it will require development to "treat" runoff. How will the public know that a City project is being required to use the same or higher "treatment strategies" that new/re development is required to do?
10. Pg 5.1-13 Mitigation NCR-1.8, So the City will obtain additional sources of water whether or not

there is a subdivision or a "development" application before the City? If a Tentative Map is submitted to the City for a subdivision and is deemed "complete" and before the Planning Commission meeting, the "annual water use review" triggers the need for additional water sources, what happens to the Tentative Map?

11. 5.2-2 Urban/Disturbed, 4th Par: ". . . habitat within the Planning Area SHOULD BE surveyed. . ." What criteria is going to be used for survey or no survey, staff discretion, an Ordinance? Does this mean that a Hawk's nest on a site, otherwise suitable for development, becomes un-suitable for development? Does the Planning Commission get a "say" in the decision making process or is it an all Staff decision?
12. 5.2-2 Urban/Disturbed, 5th Par. In the 3rd paragraph you listed various invasive species, why not list various pest species, i.e. rat, possum, skunk, raccoon, weasel, fox, coyote, deer and bear, or are you afraid that some people might consider some of these animals "important wildlife species"?
13. 5.2-3,-4, Urban/Disturbed, Grassland/Pastureland, Forests and Evergreen Forest all "should be" surveyed prior to development? What criteria is going to be used for survey or no survey, staff discretion, an Ordinance?
14. 5.2-10, 2nd Par: "Areas that lack a dense understory of invasive species are typically unvegetated, possibly due to clearing and grading activities." Is that really what someone meant to say? How does the "predominance of invasive species" significantly impact water quality objectives?
15. 5.2-24 NCR 2.6, ". . . less-than-significant level . . ." needs to be determined by the City, not by bureaucrats that don't live or work or have any vested interest in our community.
16. 5.2-25 Discussion, last sentence: ". . . use activities to impact special status _____ if the . . ."
17. 5.2-26 NCR-2.6: Every project will now require a "biological study" because every project will be in either a "urban/disturbed" or "Grassland/pastureland" or "Forest" or "Evergreen Forest" or some variety of "Wetland". There again "less-than-significant" needs to be determined by the City, not by bureaucrats that don't live or work or have any vested interest in our community.
18. 5.2-26 NCR-2.9, ". . . shall include an appropriate level of biological and natural resources review, which may include a survey . . ." seems to conflict with "habitat within Planning Area should be surveyed . . ." per "Urban/Disturbed" and "Grassland/Pastureland" and "Forest" and "Evergreen Forest" and "Wetanlds" , "prior to development."
19. 5.2-26 NCR-2.1, "The City SHALL establish riparian buffers . . ." What happens to private property rights? Is the City going to tell property owners that the owners must remove fences and invasive species that are impeding "terrestrial wildlife" from using the existing "corridors? There is a "NCR-2.1" on page 5.2-24 that does not have the added language, is that what you planned?
20. 5.2-27 NCR 2.10, How will the public know when a "project" not subject to CEQA, may take place in a "ESHA" and that a "Biological Resources Assessments" may be conducted and the results of said "Assessments" and the "mitigation" required?
21. 5.2-27 NCR 2.11, How long will it take the City to collect information for a Planning Area ESHA? Will it be ready in 2 years, 5 years and will developers have to pay for it or since this information will benefit all City residents, will it be paid for out of the General Fund?
22. 5.2-27 NCR 2.12, Are you going to protect Wetlands from "any project" of just "new development

- projects"? You might or might not use "buffers" is that the only mitigation measure you can think of?
23. 5.2-28 NCR 2.13, in NCR 2.12 you are protecting Wetlands from "new development projects" and in NCR 2.13, you are requiring "impacts assessments" on ALL projects if Wetlands are even "suspected". What is the point of NCR 2.12?
24. 5.2-28 Discussion, "Movement between available habitats is critical for population stability, recruitment and dispersal". What species of wildlife is suffering from "population stability" or "recruitment and dispersal", and where are the studies to support this statement?
25. 5.2-29 NCR 2.3, It sure would be nice to know what "Recovery Strategy for California Coho Salmon" actually says so citizens won't be surprised when the City marches through their property on the way to "restore riparian ecosystems". Also, "(CDFG, 2004b)" in References there is a "2005b" is that the same reference?
26. 5.2-29 NCR 2.14, "Movement corridors shall limit physical barriers . . ." Is the City going to approach property owners along existing "movement corridors" and ask/tell them to remove fences that, in the opinion of the City, constitutes a "physical barrier"?
27. 5.3-1 Agricultural Production, On 5.1-1 you say it rains "approximately 47 inches" and now you say it rains between 40 and 60 inches or "approximately 50 inches", so which approximate number is correct?
28. 5.3-1 Agricultural Production, 4th Par: ". . . located just south of Kenmar Road, is partially forested . . ." Are you talking about the Nyberg dairy property and if so, where's the forest?
29. 5.3-9 Conversion-Discussion, Is it "northern boarder" or "northern border"?
30. 5.4-9 Assumptions, 3rd Par: "negatively impact remaining historical agricultural landscape along Main Street . . ." What "agricultural landscape" are you talking about, the Auction Yard?
31. 5.4-11 NCR 7.10, "areas known to have archaeological resources," how many studies has the City required in the last 10 years? Is one staff person going to decide if an "area" is known to have archaeological resources, or thinks there might be "resources"?
32. 5.4-11 word "beneficent" nice word, why can't you find a word more commonly used in our language?
33. 5.4-12 NCR ??, "The City shall compile a database of known . . . sites, events, individuals, tribes, transportation routes and structures . . ." When will the City have this completed by and what staff person has the qualifications to do it? The City "shall require an aplicant to retain a qualified professional". An APLICANT for WHAT, a business license, building permit, minor subdivision and does this include the City for replacing a water line, sewer line or storm drain?
34. 5.4-14 Rohner Park, Discussion, In describing Rohner Park are you mixing up the description of Newburg Park, i.e. "agricultural landscape which is still in pasture"?
35. 5.5-6, Soil Clogging, "If sludge or from the" Is there a work missing here?
36. 5.5-8, Fish and Game Code 1602, "Streambed Altercation Agreement" So that's why we always have to fight with Fish and Game.

37. 5.5-9 Methodology, Assumptions, So, "sand and gravel will continue to be extracted" and "the State will continue to regulate "aggregate" extraction" but not "sand and gravel" extraction and "increased development could affect slope stability in some areas of the City". Is "slope stability" related to "sand and gravel extraction" or something completely different?
38. 5.5-11 HS-5.1 and HS-5.6, "limit development on slopes greater than 25%" and call "areas with severe slopes (greater than 15 percent)" since when is 15 percent a "severe" slope?
39. 5.5-11 HS-5.7, A "soils report" for all subdivisions, even a two lot minor subdivision in an "infill" area surrounded by existing houses?
40. 5.5-12, Potential Landslides, Discussion, This is suppose to be a fact based document, so how many landslides have been documented within the City limits or in the Planning Area in the past 10 or 20 years. Its too easy to predict "landslides may occur in the future" what about the landslides that have occured in the past, are there documented landslides that have occured in the past?
41. 5.5-12,13, NCR-4.8, So the City is going to "plan" development so as not to interfere with "identified mineral deposits" and so far the City has talked about "sand and gravel" extraction, what other minerals might be considered, oil, gas, clay, topsoil? And the City would "oppose" development that "could adversely impact mineral working", considering that gravel extraction occurs in or near the river, and rivers are prone to flooding and development is not allowed in flood zones, does the person who wrote this have any real knowledge about "mineral extraction"?

CHAPTER 3 LAND USE

42. 3.1-17 LU-1.4, The City is going to "encourage" Planned Developments but with NO incentives.
43. 3.1-17 LU-1.7, The City is going to "encourage" Infill Development and "establish" incentives, such as "streamlined permitting", "specific plans" and "partnerships". So how are we going to know whether or not a "Planned Development" might also be considered an "Infill Development"?
44. 3.1-17 LU-1.12, So personal at the City have the expertise to "phase" growth based upon "market forces" and "infrastructure financing capacity" and "other infrastructure" needs? How does the City intend to accomplish this, by zoning or by declaring a development moratorium in parts of the City until the "market forces" look good?
45. 3.1-19 LU-11.3, How does a City "create an enviroment" that only attracts "compatible" business?
46. 3.1-19 LU-12.5, How are you going to relocate "sand and gravel extraction" that might be "deemed incompatible with successful promotion of tourist-serving businesses . . . adjacent to rivers in Fortuna"?
47. 3.1-28 LU-4.1 thru LU-11.6, So the City thinks they can circumvent "free market forces" in the development of the City. Does the City have examples where they have succeeded and where they have failed over the past 10 years?

Submitted by: Wallace Wright, 1660 Newburg Rd., 725-9490



**California Regional Water Quality Control Board
North Coast Region
Bob Anderson, Chairman**



Linda S. Adams
*Secretary for
Environmental Protection*

www.waterboards.ca.gov/northcoast
5550 Skylane Boulevard, Suite A, Santa Rosa, California 95403
Phone: (877) 721-9203 (toll free) • Office: (707) 576-2220 • FAX: (707) 523-0135

**Arnold
Schwarzenegger**
Governor

July 16, 2008

Mr. Stephen Avis
City of Fortuna
621 11th Street
Fortuna, CA 95540

Dear Mr. Avis,

Subject: Comments on the City of Fortuna General Plan 2030 Update Draft
Environmental Impact Report, SCH# 2007062106

File: City of Fortuna, General Plan 2030 Draft Environmental Impact Report

Thank you for the opportunity to comment on the City of Fortuna's General Plan 2030 Draft Environmental Impact Report (DEIR). The North Coast Regional Water Quality Control Board (Regional Water Board) is a responsible agency for this project, as defined by the California Environmental Quality Act (CEQA) having jurisdiction over the quality of ground and surface waters (including wetlands) and the protection of the beneficial uses of such waters. The DEIR identifies potential impacts of City development over the next 20 years. The document identifies key policies intended to guide development practices and to mitigate for their potential impacts on the environment. We are very concerned that development related impacts in the Fortuna area will result in significant degradation to water quality. Specifically, impacts related to loss of riparian and wetlands, stormwater pollution, hydromodification, and wastewater have been identified without clear, specific mitigation measures to avoid or minimize these impacts. Although the Regional Water Board has permitting authority over the City's stormwater and waste water discharges and therefore has regulatory tools to implement water quality mitigation in the City's permit program for new development, we would prefer that the City use its General Plan process to incorporate its own reasonable, specific mitigation measures for identified environmental impacts.

We have reviewed the DEIR prepared for the Fortuna General Plan Update and offer the following comments and recommendations on this DEIR and Update in our role as a trustee and responsible agency under CEQA.

California Environmental Protection Agency

Recycled Paper

General Comment –

General Plan update policies are carried out by implementation measures. For a policy to be useful as a guide to action, it must be clear, unambiguous, and have enforceable implementation measures.

According to the Governor's Office of Planning and Research 2003 General Plan Guidelines: "Adopting broadly drawn and vague policies is poor practice. It is better to adopt no policy than to adopt a policy with no backbone" (Governor's Office 2003).

We can find few clear, enforceable implementation measures in the Update. Update Appendix C: Implementation Program Matrix states "Implementation Program matrix to be provided at a later date." Therefore it is impossible during the DEIR comment period to evaluate how Update policies will be implemented and made effective and enforceable. It is unusual and ineffective for a general plan update to issue broad and unenforceable policy statements as mitigation measures. The Update's policies and programs intended to mitigate impacts to aquatic and riparian habitats and water quality are either not mitigations at all pursuant to CEQA §15370, or are vague, speculative, unquantifiable and unenforceable. According to CEQA §15370, Mitigation includes:

- (a) Avoiding the impact altogether by not taking a certain action or parts of an action.
- (b) Minimizing impacts by limiting the degree or magnitude of the action and its implementation.
- (c) Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- (d) Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.
- (e) Compensating for the impact by replacing or providing substitute resources or environments.

We strongly recommend that clear and enforceable mitigation measures be developed and fully implemented to ensure that General Plan policies are met.

Hydrology and Water Resources/ Biological Resources

Policies include:

NCR-1.1 Watershed Protection. "The City shall regulate development that could pollute watersheds and condition development to minimize point source and non-point source discharges of pollutants in the local watersheds. The City shall also require adequate mitigation for development that may change runoff quality and/or quantity to ensure pollution will not occur."

NCR-1.4 Manage Impervious Coverage. "The City shall manage the extent of impervious coverage in the Planning Area to reduce impervious area coverage and to minimize directly connected impervious areas. This will reduce impacts associated with runoff from new development and re-development projects in the Planning Area."

NCR-1.5 Control Pollutant Sources. "The City shall require the integration of best management practices in new development and re-development projects to control pollutant sources and prevent pollutants from contacting runoff during and following development."

Update Policy NCR-2.1, Riparian Corridor Protection. "The City shall establish riparian buffers to provide terrestrial wildlife and fish movement corridors along fish bearing streams through the Planning Area. Development within these buffers shall be limited to recreational uses and the movement of wildlife."

NCR-2.2 Salmonid Bearing Stream Protection. "The City shall consult with, and require developers of projects to consult, the California Department of Fish and Game (CDFG) and other regulatory agencies for expertise and guidance prior to any restoration activity within salmonid-bearing streams. Some recommendations relative to all tributaries are as follows:

- Identify and inventory those portions of streams originating within or passing through the General Plan Area that are considered to support salmonid species;
- Inventory and map sources of stream bank erosion, then prioritize them according to present and potential sediment yield. Identified sites should be treated to reduce the amount of fine sediment entering the stream;
- Design and construct habitat enhancement structures that yield better gravel sorting, reduce fine sediment retention, increase pool habitat, and allow for juvenile and adult fish passage (i.e., barrier removal);
- Remove exotic vegetation and replant native vegetation, especially where the stream canopy is deemed less than optimum; and
- Reduce cattle trampling within the stream and riparian zone by exploring alternatives with landowners."

NCR-2.3 CDFG Collaboration. "The City shall work to implement the recommendations put forth in the Recovery Strategy for California Coho Salmon, and other wildlife species, such as the Willow Fly (sic) Flycatcher, (CDFG, 2004b) to benefit salmonid species present within the General Plan Area by enhancing and restoring riparian ecosystems, improving water quality, and reducing flooding."

NCR-2.4 Natural Production Streams. "The City shall use North Coast Basin Planning Project (BPP) stream inventory reports that characterize applicable habitat components to manage each identified stream tributary as an anadromous fish and natural production streams (sic)."

NCR-2.5 Sustainable Salmonid Stocks. "The City shall collaborate with the CDFG and National Oceanic and Atmospheric Association Fisheries to develop sustainable, long-term salmonid stocks, improve quantity and quality of habitat available to salmonids, and accelerate species recovery, as well as enhance opportunities for human enjoyment."

NCR-2.6 CEQA §15370 Requirements. "The City shall require projects that may result in a significant impact to special status species, as defined in CEQA §15380 or other applicable State or local regulations, to meet requirements of CEQA §15370 for avoiding, minimizing, or mitigating the impact to a less-than-significant level as determined by the jurisdictional resource agency(s)."

NCR-2.7 Endangered Species. "The City, as lead agency, shall require that all projects comply with the requirements of the federal Endangered Species Act, California Endangered Species Act, Clean Water Act, CDFG code, and CEQA."

NCR-2.8 Native Vegetation. "The City shall coordinate with resource agencies to encourage the preservation of native vegetation, while managing areas with high concentrations of invasive species and/or noxious weeds and preventing their encroachment into new areas."

NCR-2.9 Community Education. "The City shall encourage the installation of interpretive signs that educate the public on various environmental issues including stormwater runoff and detention, creek biology, and watersheds affecting the city. Appropriate Signs and plaques may be placed at sites near the Eel River and along public trails and bike paths adjacent to creeks."

NCR 2.11 ESHA Inventory. "The City shall collect information for a Planning Area ESHA inventory, including but not limited to, wetlands, riparian areas, anadromous fish streams, special status species and their essential habitat, and CNDDDB Sensitive Natural Communities, to assist with the project review process. This program shall include collaboration with resource agencies, such as CDFG and USFWS, to the extent possible. The inventory shall be updated at least every 10 years."

NCR 2.12 Wetland Protection. "In considering new development projects, the City shall protect wetlands identified in the Planning Area that have the potential to be impacted from new development. Mitigation requirements for this protection may include the use of buffers."

Comments:

We strongly support all of the policies addressed above. These policies are consistent with those implemented by other communities and, if fully supported by ordinances, review criteria and permit conditions would increase protections for water quality. Although we appreciate the City's ambition in addressing water quality issues in the above policies, we would like to see more detailed mitigation proposals. The statement of intent to develop mitigations in the future is not appropriate mitigation. The DEIR does not specify how these policies are being implemented. Coordinating to encourage implementation is not mitigation. The City should adopt specific ordinances to ensure compliance with these goals. Section 2.6 states that one General Plan objective is to provide protections for riparian corridors, Palmer Creek, Rohner Creek, North Fork Strongs Creek, Mill Creek, and Jameson Creek. The policies above do not ensure that this objective will be met.

Please note that the Eel River and its tributaries are on the Regional Water Board's 303(d) list as impaired due to excess sedimentation/siltation and temperature. The proposed annexation and development growth outlined in the DEIR may have severe impacts to natural resources, further degrading water quality. Current law prohibits further degradation of waters identified as impaired under Section 303d of the Clean Water Act. The addition of pollutants associated from new developments would fall under this criteria. In addition, we require a program of implementation measures to control existing sources of pollution in order to achieve water quality objectives. The Regional Water Board is available as a resource to ensure water quality standards are met. A comprehensive impact analysis and analysis of mitigations of the spheres of influence and the Planning areas are strongly advised. Although the Regional Water Board has permitting authority over the City's stormwater and waste water discharges and therefore has regulatory tools to implement water quality mitigation in the City's permit program for new development, we would prefer that the City use its General Plan process to incorporate its own reasonable mitigation measures for identified environmental impacts in order to protect beneficial uses for waters of the state.

Riparian Setbacks

The Update's absence of wetland and riparian habitat protection buffers, performance criteria and stormwater mitigations is likely to result in a greater amount of state and federal agency environmental review and consultation, longer permitting periods, and a more complicated permitting process than if the Update included clear, simple and preventative mitigation standards.

Riparian buffer zones serve critical functions for aquatic species, wildlife and humans. The benefits of healthy riparian zones include providing diverse wildlife habitat, improvement to water quality, flood protection, stream bank stabilization, stream temperature stability and ground water replenishment. Regional Water Board staff would like to suggest maximizing riparian setbacks from roadways, structures and

developed park areas. Setbacks to all surface waters should be included in specific ordinances. Adequate riparian shading and setbacks are essential in both helping to maintain water quality and in helping to create wildlife habitat and corridors. Non-intrusive native plant vegetation should be used for all proposed landscaping. The use of native species greatly reduces the need for pesticides, herbicides, fertilizers, and other potentially toxic chemicals, which could discharge directly to the creeks or River.

Creek Maintenance

Creek maintenance for flood control should balance that necessity with the need to keep a sufficient shade canopy over the creek. Shaded creek flows are cooler by nature and can make a huge difference in terms of the number and diversity of aquatic life. Rehabilitation and continual surveillance of waterways will enhance beneficial uses.

Impacts to wetlands and waters of the State

Waters of the state include all waters of the U.S. and any waters deemed non-jurisdictional as waters of the U.S. The new development and redevelopment proposes to reduce the impacts to waters of the state (hydrology and water resources) to a less than significant level where possible. Additionally, wetland areas, either natural or constructed as mitigation areas, may be impacted by development activities. These impacts should first be adequately evaluated to see if any portion of them may avoid or minimize project-related disturbance. All efforts to first avoid and second to minimize impacts to waters of the state must be fully implemented prior to use of mitigation activities. If, after careful and adequate evaluation, the project's impacts to waters of the state are deemed unavoidable, then compensatory in-kind mitigation (for acreage, function and value) will be necessary for direct and cumulative impacts. Seasonal wetland impacts must be mitigated by seasonal wetland mitigation; linear watercourse impacts must be mitigated by linear watercourse impacts.

For unavoidable impacts to waters of the state, submittal of applications for 401 Water Quality Certification and/or Waste Discharge Requirements (Dredge/Fill) permits from the regional Water Board will be necessary. U.S. Army Corps of Engineers Clean Water Act Section 404 permits and Department of Fish and Game stream alteration agreements may also be necessary.

The DEIR should include specific protection measures for sensitive areas. The Regional Water Board suggests GIS database for mapping these areas for the public and agencies. We are aware of an existing database that could be used for this purpose and would be happy to work with City staff in this effort.

Policy NCR-2.12 is vague and unenforceable. This policy provides no information on how, or by what process the City will identify and protect wetlands. We would strongly encourage the City to fully identify wetlands and other state waters in all CEQA documents where the City is lead agency. Such disclosures would provide useful

information to project proponents and may help prevent future enforcement actions by the Regional Water Board and/or other state or federal agencies.

Staff from the Regional Water Board prepared a draft report, *Stream and Wetlands Systems: Physical Forms, Ecological Processes and Water Quality Function* (July 2007) which summarizes some of the relevant scientific knowledge regarding the critical function of stream, wetland and riparian systems in protecting water quality. A copy of this report has been included for your convenience.

Wastewater Collection, Treatment, and Disposal

Policies include:

PFS-4.1 Public Sewer Infrastructure. "The City shall require all new urban development to construct sewer infrastructure according to the City's municipal standards and incorporate it into the city's sewer collection system."

PFS-4.2 Gravity-Flow Collection. "The City shall require that wastewater collection systems be designed on a gravity-flow basis, except where a site-specific engineering analysis clearly demonstrates the long-term cost-effectiveness or need for pumping facilities."

PFS-4.3 Clean Water Act Compliance. "The City shall comply with the requirements of the Federal Clean Water Act to minimize the discharge of pollutants to surface waters, as required by the City's National Pollutant Discharge Elimination System (NPDES) permit."

PFS-4.4 Sewer Capacity. "The City shall maintain sufficient wastewater plant and collection capacity to serve the residents of Fortuna."

PFS-4.5 Wastewater System Collection and Treatment Facilities and Components. "The City shall continue to identify through the Capital Improvement Program all significant components of the wastewater system that will need to be replaced or improved during the useful life cycle."

PFS-4.6 Wastewater System User Rate Structure. "The City shall continue to review and analyze the full operational, maintenance, and capital improvement costs, as well as the cost of developing future capacity of the city's wastewater system. The City shall maintain a rate and fee structure that is sufficient to generate revenues to offset these costs, thereby assuring future viability of the municipal wastewater system."

PFS-4.7 Alternative Private Wastewater Treatment Systems. "The City shall consider the use of alternative private wastewater treatment systems (i.e., septic) on individual parcels located in very low density areas of the city that are not served by the city's public sewer collection system. Such consideration would be predicated on a site-

specific engineering analysis that clearly demonstrates that connection to the public sewer system is financially not feasible. The alternative system must meet and comply with the requirements of the Humboldt County Department of Environmental Health and the North Coast Regional Water Quality Control Board.”

PFS-4.8 Septic System Compliance. “The City shall require that sewage disposal (septic) systems comply with all requirements of the Humboldt County Department of Environmental Health and the North Coast Regional Water Quality District.”

PFS-4.9 Regulatory Compliance. “The City shall construct, operate, and maintain the City’s municipal wastewater system to meet all of the regulatory requirements of the North Coast Regional Water Quality Control Board and the City’s NPDES permit, including the employment of appropriately certified operators.”

PFS-4.10 Sewer Main Extensions. “The City will follow current State law regarding the extension of the city water and sewer public utilities beyond the city’s boundaries as regulated by LAFCO policies.”

Comments:

In section 7.2 (Wastewater Collection, Treatment, and Disposal), all impacts were deemed less than significant and require no mitigation. The Regional Water Board disagrees with this assertion. We anticipate that the City of Fortuna will exceed the current wastewater design capacity well within the planning period. Accordingly, Table 7.2 should indicate mitigation is required.

Contrary to statements made in the DEIR, recent upgrades to the Wastewater Treatment Facility (WWTF) did not include increased hydraulic capacity. The WWTF is currently designed and permitted to treat an average dry weather flow of 1.5 million gallons per day (mgd). Actual average dry weather flow for 2007 was approximately 1.08 mgd. The DEIR indicates a population increase of approximately 6,655 persons or 2298 new dwelling units over the course of the projected general plan timeframe. Based on our calculations using an equivalent dwelling unit volume of 450 gallons per day, the increased population would result in increased average dry weather flows of 1.03 mgd.

The WWTF is currently regulated in accordance with Nation Pollution Discharge Elimination System Permit Waste Discharge Requirements Order No. R1-2007-0007 (permit). The permit requires that, “Whenever a WWTP will reach capacity within four years, the Discharger shall notify the Regional Water Board. A copy of such notification shall be sent to appropriate local elected officials, local permitting agencies, and the press. Factors to be evaluated in assessing reserve capacity shall include, at a minimum, (1) comparison of the wet weather design flow with the highest daily flow, and (2) comparison of the average dry weather design flow with the lowest 30-day flow. The Discharger shall demonstrate that adequate steps are being taken to address the

capacity problem. The Discharger shall submit a technical report to the Regional Water Board showing how flow volumes will be prevented from exceeding capacity, or how capacity will be increased, within 120 days after providing notification to the Regional Water Board, or within 120 days after receipt of Regional Water Board notification, that the WWTP will reach capacity within four years....[CCR Title 23, section 2232]"

In addition, the permit no longer allows discharges of waste receiving a lesser quality of treatment through former discharge location SN002 as indicated in the DEIR. In accordance with the General Waste Discharge Requirements for Sanitary Sewer systems, identified in the DEIR as Water Quality Order No. 2006-0003, the City of Fortuna will be required to address situations involving excessive infiltration and inflow, as well as inadequate conveyance capacity in areas that result in sanitary sewer overflows.

The State of California promotes a policy of encouraging the use of reclaimed water. The Regional Water Board would like to see a water conservation/reuse policy in Fortuna that is aimed at reducing, reusing and/or recycling water, which could mitigate future water demands of the City.

Stormwater and New Developments

Policies Include:

NCR-1.6 Self-Treat Runoff. "The City shall encourage the use of basic water quality strategies that self-treat runoff in new development and re-development projects. These strategies may include infiltrating runoff, retaining/detaining runoff, conveying runoff slowly through vegetation, and/or treatment of runoff on a flow-through basis using other standard treatment technologies."

NCR-1.7 Clean Water Act Compliance. "The City shall comply with the requirements of the Clean Water Act with the intent of minimizing the discharge of pollutants from point and non-point pollutant sources to surface waters."

PFS-5.1 Drainage Facilities Maintenance. "The City shall require the regular inspection and maintenance of all drainage facilities, including detention basins and both natural and manmade channels, to ensure that their full carrying capacity is not impaired."

PFS-5.2 Natural Drainage. "The City shall encourage the use of natural stormwater drainage systems in a manner that preserves and enhances natural features."

PFS-5.3 Runoff Quality. "The City shall improve the quality of runoff from urban and suburban development through use of appropriate and feasible mitigation measures including, but not limited to, artificial wetlands, grassy swales, infiltration/sedimentation basins, riparian setbacks, oil/grit separators, and other best management practices."

PFS-5.4 Surface Drainage. “The City shall require that new development have surface drainage disposal accommodated in one of the following ways:

Positive drainage to a City-approved storm drain, stream, creek, or other natural water course; or

On-site drainage that is retained within the development.”

PFS-5.5 Future Drainage Compliance. “The City shall require future drainage system requirements to comply with applicable State and Federal non-point source pollutant discharge requirements.”

PFS-5.6 On-Site Drainage Treatment. “The City shall implement on-site storm drainage treatment facilities in City projects wherever feasible.”

PFS-5.7 Detention Facilities. “The City shall use stormwater detention facilities to mitigate drainage impacts and reduce stormwater drainage system costs. To the extent practical, stormwater detention facilities should be designed for multiple purposes, including environmental, recreational, and/or stormwater quality improvement.”

PFS-5.8 Hillside Erosion. “The City shall continue to collaborate with property owners in hillside areas to minimize erosion and conveyance of silt into City drainage facilities.”

PFS-5.9 Rainy Season. “The City shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of storm drainage facilities.”

PFS-5.10 Fair-Share Costs. “The City shall require all new developments to pay their fair share of the cost of improvements in the Storm Drainage Master Plan.”

PFS-5.11 Assessment Districts. “The City shall support the use of assessment districts or other types of funding mechanisms to spread out costs of planned drainage improvements included in the Storm Drainage Master Plan.”

PFS-5.12 Storm Drain Master Plan Implementation. “The City shall monitor the implementation of the Storm Drain Master Plan as development occurs, to ensure that the improvements are not being oversized nor undersized.”

PFS-5.13 Drainage Studies. “The City shall require site-specific studies including erosion control, watershed management, and flooding for all major developments that have the potential to create erosion, watershed, or flooding problems.”

PFS-5.14 Drainage Easements. “The City shall require dedication of drainage easements included in the Storm Drainage Master Plan as a condition of approval for any subdivision or use permit.”

PFS-5.15 County Developments. “The City shall monitor development in the County to ensure that drainage impacts from new projects do not impact the City's drainage system. If any impacts are projected to occur from developments in the County, the City shall require, as feasible, the County or developer to install adequate improvements to mitigate the anticipated impacts.”

PFS-5.16 Vegetation Control. “The City shall strive to keep excessive brush and vegetation clear from hillside creeks to facilitate stormwater drainage during heavy precipitation events.”

PFS-5.17 Watershed Protection. “The City shall promote the protection of watersheds and drainage systems within Fortuna by requiring mitigation from developers and by requiring that new development not increase the existing estimated 25-year peak runoff volume from a site.”

PFS-5.18 Peak Runoff Detention. “The City shall require any increase in runoff beyond the peak 25-year event resulting from new development to be retained or detained on-site or mitigated through off-site improvements to other streams or outlets.”

PFS-5.19 Bioswales. “The City shall encourage neighborhood parks, subdivisions, and commercial development to incorporate bioswales and permeable pavement, to minimize stormwater runoff in the city and comply with the NPDES permit.”

Comments:

We strongly support the intent of the policies listed above. In particular, we encourage the City to require that stormwater runoff quality and quantity mitigation measures be required for new development projects. The City needs to clearly identify the types of new development that would trigger these types of mitigations. In addition, the specific measures to be implemented, the appropriate sizing of such measures, and the monitoring and maintenance programs to ensure long-term effectiveness of such measures should be identified. In accordance with state and federal guidelines, we recommend that the City develop a stormwater mitigation program that includes required Low Impact Development techniques for new development. Without the specifics mentioned above, we do not believe the DEIR language is sufficient for mitigation.

We appreciate the City's goal of compliance with the Clean Water Act. We would encourage the City to fully implement its stormwater management plan in order to comply with NCR-1.7. Please be aware that the City is required to fully implement this program and to reduce levels of stormwater pollution to the maximum extent practicable. The update of this General Plan should be viewed as an opportunity to ensure that the City's stormwater management program is consistent with all of the legal and regulatory stormwater program requirements. See Stormwater Enclosure.

Hydromodification

Recent studies have confirmed that increased impervious surfaces within a watershed will lead to alteration of the natural hydrology expressed as higher winter flows (peak flows) and lower summer/fall flows (base flows). Alteration of the natural flow regime (hydromodification) can result in increased stream temperatures associated with low summer/fall creek levels, alteration of the channel morphology (e.g. widening or incising of stream channel) associated with increased peak flows, adverse impacts to native riparian vegetation and reduction in ground water recharge capabilities. The design and construction of new development projects such that the natural flow regimes are maintained, can help reduce the impacts of hydromodification and thus help prevent adverse impacts to stream and wetland systems. This practice is referred to as Low Impact Development (LID).

Stormwater Runoff Quality

The quality of stormwater runoff is directly correlated to the extent of impervious surfaces within a watershed. We encourage infiltrating treated stormwater runoff back into the ground as a means of "banking" water for introduction back into creeks during the dry season. This helps to buffer low summer/fall flows which in turn, helps to reduce creek temperatures. See LID Enclosure.

All newly installed impervious surfaces (runway, roads, roofs, sidewalk, etc.) must incorporate post construction stormwater treatments to remove any contaminants in the stormwater, and to attenuate the peak flow stormwater, before the stormwater enters any waters of the state. We strongly encourage use of Low Impact Development techniques to address potential stormwater impacts as close to the source as possible. Dry detention basins (particularly those with limited retention times) are not highly effective for pollutant removal. We suggest that the City develop a mandatory program to implement Low Impact Development techniques for new development. Permeable pavements can have significant benefits as long as subdrains are not needed. LID techniques promote healthy aquatic systems, and can help reduce the City's flood and drainage control costs over time.

Statement of Significant Unavoidable Adverse Impacts

Pursuant to CEQA §15093(b) "Statement of Overriding Considerations,"

When the lead agency approves a project which will result in the occurrence of significant effects which are identified in the final EIR but are not avoided or substantially lessened, the agency shall state in writing the specific reasons to support its action based on the final EIR and/or other information in the record. The statement of overriding considerations shall be supported by substantial evidence in the record.

Based upon the DEIR Cumulative Impacts Analysis, Chapter 10, it appears the DEIR proposes issuing statements of overriding consideration for the Update's unavoidable significant impacts on Hydrology and water resources, and on flooding.

The DEIR states: "Implementation of the General Plan has the potential to degrade water quality or violate water quality implementation standards. This is considered a significant, unavoidable impact."

We believe that it is highly unlikely the City can provide the substantial evidence to support this statement of overriding considerations. Our comments, and those of other agencies provide specific recommendations (such as requiring Low Impact Development (LID) techniques for new development), that would have a high likelihood of reducing these impacts to a less than significant level. LID includes stormwater management techniques to maintain or restore the natural hydrologic functions of a site by detaining water onsite, protecting natural areas, filtering out pollutants, and facilitating the infiltration of water into the ground. This approach helps meet water quality and water supply objectives and maintain healthy, sustainable watersheds. Regional Water Quality Control Boards have already begun to integrate LID and other sustainable water management strategies into compliance documents. We recommend the City incorporate the use of LID techniques in stormwater mitigation requirements to minimize the Update's impacts on wetlands and stream habitats. These techniques are tested, currently in use in many areas of California, and are often less expensive than traditional stormwater management strategies.

Two recent state resolutions by the California Ocean Protection Council and the State Water Resources Control Board attest to LIDs importance and effectiveness in protecting California's water resources. Because LID and other stormwater pollution prevention control techniques are documented as feasible and effective methods to mitigate water quality impacts of development, we believe the City cannot make a credible case that the Update's potentially significant impacts to hydrology and water resources are "unavoidable".

This Update represents a significant opportunity for the City to protect, restore, and enhance its wetland and stream habitats, to protect water quality, to provide quality open space, and to help recover the region's anadromous salmonid populations for current and future generations. The Update contains many laudable environmental policies, however, only with effective and tangible implementation measures will the Update be likely to meet its stated policy goals. We look forward to working with you on this project and providing any suggestions that may improve water quality impacts. Thank you for the opportunity to comment on the Fortuna General Plan Update.

If you have any questions or comments regarding this matter please contact John Short at JShort@waterboards.ca.gov or at (707) 576-2065.

Sincerely,



Catherine Kuhlman
Executive Officer

071608_AJT_FortunaDraftEIRComments

Enclosures:

1. Low Impact Development Resources
2. Post Construction Stormwater Treatment Resources
3. Stream and Wetlands Systems: Physical Forms, Ecological Processes and Water Quality Function Draft Report

Original Sent to: Mr. Stephen Avis, City of Fortuna, 621 11th Street,
Fortuna, CA 95540

Cc: State Clearing House, P.O. Box 3044, Sacramento, CA 95812

Mr. Dan Wilson, Department of Fish Game, P.O. Box 47,
Yountville, CA 94599

Ms. Kimberly Niemeyer, SWRCB, Office of the Chief Counsel

Ms. Vanessa Metz, California Coastal Commission, 710 E Street,
Suite 200, Eureka, CA 95501

Low Impact Development Links

This is the Regional Water Board's MS4 website that has stormwater and LID links:

http://www.waterboards.ca.gov/northcoast/water_issues/hot_topics/santa_rosa_ms4_npdes_stormwater_permit/

Resolution of the California Ocean Protection Council Regarding Low Impact Development:

http://www.resources.ca.gov/copc/05-15-08_meeting/05_LID/0805COPC05_%20LID%20Res%20amended.pdf

Low Impact Development – Sustainable Storm Water Management:

http://www.waterboards.ca.gov/water_issues/programs/low_impact_development/

Central Coast Regional Water Quality Control Board LID:

http://www.waterboards.ca.gov/centralcoast/stormwater/low%20impact%20devel/lid_index.htm

EPA Green Infrastructure Basic Information:

<http://cfpub.epa.gov/npdes/greeninfrastructure/information.cfm>

Managing Wet Weather with Green Infrastructure:

http://cfpub.epa.gov/npdes/home.cfm?program_id=298

EPA Managing Wet Weather with Green Infrastructure March 2008 Newsletter:

http://www.epa.gov/npdes/pubs/gi_newsletter_mar08.pdf

Low Impact Development Center:

<http://www.lowimpactdevelopment.org/>

A Review of Low Impact Development Policies: Removing Institutional Barriers to Adoption:

http://www.waterboards.ca.gov/lid/docs/ca_lid_policy_review.pdf

State Water Board Funded Projects That Include Low Impact Development:

http://www.waterboards.ca.gov/water_issues/programs/grants_loans/low_impact_development/

For more information, please contact Mona Dougherty at

mdougherty@waterboards.ca.gov or John Short at jshort@waterboards.ca.gov

Stormwater Links:

This is the CASQA Construction BMP manual:
<http://www.cabmphandbooks.com/Construction.asp>

This is our MS4 website that has stormwater and LID links:
http://www.waterboards.ca.gov/northcoast/water_issues/hot_topics/santa_rosa_ms4_npdes_stormwater_permit/

State Water Board Storm Water Program:
http://www.waterboards.ca.gov/water_issues/programs/stormwater/

Erase the Waste Campaign – California Storm Water Toolbox
http://www.waterboards.ca.gov/water_issues/programs/outreach/erase_waste/

State Water Board Storm Water Grant Program:
http://www.waterboards.ca.gov/water_issues/programs/grants_loans/prop84/index.shtml
!

This is the SF region storm water website - lots of interesting links:
http://www.waterboards.ca.gov/sanfranciscobay/water_issues/programs/stormwater/available_docs.shtml

EPA Storm Water Program:
http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Federal Funding Sources for Watershed Protection:
<http://cfpub.epa.gov/fedfund/>

California Stormwater Quality Association:
<http://www.casqa.org/>

Stormwater Manager's Resource Center:
<http://www.stormwatercenter.net/>

For more information, please contact Mona Dougherty at
mdougherty@waterboards.ca.gov or John Short at jshort@waterboards.ca.gov

STREAM AND WETLAND SYSTEMS:

PHYSICAL FORMS, ECOLOGICAL PROCESSES, AND WATER QUALITY FUNCTIONS

DRAFT REPORT

Last updated on July 13, 2007

Prepared by staff of the

**California Regional Water Quality Control Board,
North Coast Region**

**Watershed Management Division
Planning Unit**

Note:

Staff of the North Coast Regional Water Quality Control Board (Regional Water Board) is developing an amendment for consideration by the Regional Water Board to the Water Quality Control Plan (Basin Plan) for the North Coast Region. The purpose of this amendment—the *Stream and Wetland Systems Protection Policy*—will be to protect and restore the physical characteristics of stream and wetland systems, including their connectivity and natural hydrologic regimes, in order to protect beneficial uses.

This draft report has been prepared by staff and summarizes part of the scientific literature that staff has reviewed during its background research for the *Stream and Wetland Systems Protection Policy*. At this time, this draft report is being provided to the public as an informational document only. Information presented in this draft report may eventually be included in a Staff Report for the *Stream and Wetland Systems Protection Policy* to establish part of the scientific justification or basis for the amendment. However, this draft report does not present or provide the full scientific justification or basis for a specific policy and should not be interpreted as the Staff Report for the *Stream and Wetland Systems Protection Policy*.

Pursuant to California Health and Safety Code section 57004, the scientific justification or basis for any rule proposed for adoption by the Regional Water Board must undergo an external scientific peer review. Therefore, any portions of this draft report that may eventually be included in the Staff Report for the *Stream and Wetland Systems Protection Policy* to establish the scientific justification or basis for the amendment will undergo external scientific peer review at the appropriate time prior to public release of the Staff Report. This draft report has not undergone external scientific peer review.

Although staff welcomes comments on this draft report, formal public comments are not being solicited at this time and staff will not prepare formal responses to comments received on this draft report. Formal public comments will be solicited on the Staff Report when it is released and staff will prepare formal responses to comments received on the Staff Report at that time.

More information on the *Stream and Wetland Systems Protection Policy* as well as an electronic copy of this report can be found online at: <http://www.waterboards.ca.gov/northcoast/programs/basinplan/swspp.html>. Questions about this report or the *Stream and Wetland Systems Protection Policy* should be directed to Bruce Ho, lead author, at BHo@waterboards.ca.gov or 707-576-2460, or to Holly Lundborg, lead staff in the Basin Planning Unit, at HLundborg@waterboards.ca.gov or 707-576-2609.

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EXECUTIVE SUMMARY

This report looks at the ways in which stream and wetland systems, which include streams, wetlands and their associated aquatic and terrestrial environments, protect and enhance water quality and support the beneficial uses of waters of the State of California. This report provides the scientific background and context for the *Stream and Wetland Systems Protection Policy*, which is currently being developed as an amendment to the *Water Quality Control Plan for the North Coast Region*. This report does not propose specific policy. Rather, it supports development of water quality control strategies that utilize holistic, watershed-based approaches to address existing and potential threats to surface water and groundwater quality as a result of point and nonpoint source pollution (such as the approach proposed for the *Stream and Wetland Systems Protection Policy*).

This report draws from peer-reviewed scientific literature and local, state, and federal government agency research and guidance documents to describe the water quality functions of stream and wetland systems. This report further identifies the natural physical forms and ecological processes of these systems that are responsible for providing these water quality functions. Key stream and wetland system functions identified in this report include:

- Flood attenuation;
- Groundwater recharge and discharge;
- Surface water supply and replenishment;
- Sediment transport and storage;
- Nutrient and organic matter cycling;
- Pollutant filtration;
- Temperature and microclimate control; and
- Maintenance of plant and animal communities.

Although not a primary focus of this report, an underlying theme is that land use practices that disrupt key environmental variables and ecological processes may impair the ability of stream and wetland systems to perform water quality functions and provide beneficial uses. Activities in terrestrial environments can significantly influence watershed processes, including the transport and storage of water, sediments, nutrients, organisms, and other chemicals and materials, which directly affect the water quality of streams and wetlands and other aquatic habitats. By better understanding and recognizing these key environmental variables and ecological processes, it may be possible to implement land use management measures in ways that are compatible with stream and wetland systems, and to restore modified systems in such ways that protect and restore water quality and beneficial uses.

1. INTRODUCTION

Historically, the role of natural aquatic ecosystems in protecting water quality has not been well understood and significant degradation of these areas has occurred. For example, the number of wetland acres in California is less than 10 percent of the historic value and many of the remaining wetlands have been modified or degraded (Keeley and Zedler 1998; Traut 2005; Van Dyke and Wasson 2005; Dahl 1990; Ambrose and others 2006; Zedler and Kercher 2005). Impacts to streams also have been significant. Losses of stream riparian areas in California are estimated at 85 to 98 percent of their historic values (Riparian Habitat Joint Venture 2004). Other stream impacts, including channelization, dams, diversions, and increased pollutant loads, have impaired stream ecological processes and biological communities (e.g., Dynesius and Nilsson 1994; Kondolf and others 1996; Tockner and Stanford 2002). Activities that impact streams also may adversely affect human land uses by increasing flood damages and contributing to problems such as streambank failures, which can threaten infrastructure and necessitate expensive repairs (e.g., Booth 1991; Kondolf 1994).

As scientific understanding of streams and wetlands has increased over the last fifty years, state and federal governments have enacted laws, such as the federal Clean Water Act and California's Porter-Cologne Water Quality Control Act, to better protect these areas. Wetlands in California also are now protected under the California Wetlands Conservation Policy, which sets a goal to "ensure no overall net loss and achieve a long-term net gain in the quantity, quality, and permanence of wetlands acreage and values in California in a manner that fosters creativity, stewardship, and respect for private property" (Executive Order W-59-93). The federal government has adopted a similar wetlands policy at the federal level (Lewis 1995). However, despite these laws and policies, degradation of streams and wetlands continues to threaten water quality (Stoddard and others 2005; Ambrose and others 2006).

While billions of dollars are spent worldwide on stream and wetland restoration each year, including significant investments in the U.S. and California, restoration projects may fail without a proper understanding of the natural ecological processes that occur in and maintain these ecosystems (Bernhardt and others 2005; Palmer and others 2005). Additionally, the high cost of restoration has shown that preventing impacts by protecting intact or less degraded streams and wetlands is often more cost effective than attempting to reverse impacts later (Kauffman and others 1997; Kondolf 1998).

In order to protect and enhance the water quality of aquatic ecosystems, it is necessary to understand how these ecosystems function within their natural environments and how changes to the environment may affect the unique ecosystem services they provide. This report focuses specifically on two types of aquatic ecosystems—streams and wetlands—

and the climatic, geologic, and landscape variables that determine their physical forms, ecological processes, and water quality functions.¹

Because other aquatic and terrestrial ecosystems—for example, groundwater basins, lakes, riparian areas, coastal and marine environments, including estuaries, and the surrounding landscapes—interact with streams and wetlands, this report also considers areas that help maintain and are maintained by streams and wetlands. In so doing, this report develops a central theme, which is that streams and wetlands are reflections of their surrounding landscapes and are significant drivers of landscape evolution. Inherent within this theme is that it is not possible to explain how streams and wetlands function if they are viewed as independent from their associated landscapes.

The terms stream system and wetland system (collectively referred to as stream and wetland systems) are used in this report to capture the concept that streams and wetlands and their surrounding landscapes are integrated ecological units. Individual stream and wetland systems are functional ecosystems that protect and enhance water quality and in which all parts—streams, wetlands, and other associated terrestrial and aquatic ecosystems—contribute to cumulative and individual measures of ecosystem health (e.g., the quality of water supplies, diversity of biotic communities, and resiliency or ability to recover from disturbance). Healthy stream and wetland systems provide water quality functions that can include fish and wildlife habitat as well as clean drinking water sources and landscapes that minimize flood damages and stream instabilities, such as streambank failures.

This report is organized into four sections. First, the watershed is introduced as the basic functional unit within which to analyze stream and wetland systems. Ecological processes at the watershed scale, including the hydrologic cycle, interactions between aquatic and terrestrial ecosystems, and biotic life cycles are described in general terms to set the stage for more specific discussions of individual systems in the following sections. Second, wetland systems are introduced as key aquatic ecosystems within the watershed that affect site-specific, watershed-level, and region-wide water quality. This section focuses primarily on the internal processes of wetlands and the ways in which watershed variables affect these processes. Next, the stream system is introduced as the dominant aquatic ecosystem within the watershed that connects the upper and lower domains and integrates watershed variables into key measures of water quality and ecosystem health. The roles of wetlands and other aquatic and terrestrial ecosystems in protecting and enhancing stream water quality are discussed, as are the roles that streams play in maintaining and improving these other ecosystems. This section connects the concept of

¹ The term "water quality function" as used in this report is inextricably linked to the term "beneficial use" as used by the California State Water Resources Control Board (State Water Board) and the nine Regional Water Quality Control Boards (Regional Water Boards) to protect waters of the state of California under the state's Porter-Cologne Water Quality Control Act and the federal Clean Water Act. The State and Regional Water Boards have specifically recognized many water quality functions as beneficial uses and in these cases the two terms are interchangeable. Other water quality functions have not been recognized as individual beneficial uses, but as shown in this report, these functions directly support the beneficial uses of waters of the state.

individual stream and wetland systems to the broader concept of the watershed in which many stream and wetland systems combine to protect and enhance watershed- and region-wide water quality. Finally, this report concludes by briefly summarizing and discussing the concepts presented in earlier sections and their applicability to existing and emerging water quality concerns.

2. THE WATERSHED

A watershed, also known as a drainage basin or catchment, is the land area that drains to a single point in the landscape, such as the mouth of a stream. Watersheds integrate the physical forms and ecological processes that affect water quality and are the basic functional units of aquatic ecosystems (Kauffman and others 1997; May 1998; Leopold and others 1964). Watersheds can be viewed at a variety of spatial scales, from individual streams and wetlands to complex drainage networks that connect headwater streams to inland lakes and oceans. Watershed processes also can be viewed at different temporal scales, from single events to seasonal variation to longer-term patterns that extend across multiple years. In order to understand how aquatic ecosystems function, it is necessary to consider multiple watershed scales and the interactions that occur between these scales (Petts 2000; Poole 2002; Hughes and others 2001; Sedell and others 1990; Ward 1989). Furthermore, it is necessary to understand how watersheds are organized spatially and temporally within these scales because watershed conditions change across the landscape as a result of short- and long-term ecological processes (Ward 1989; FISRWG 1998; Naiman and others 1992).

Watersheds can be organized spatially along longitudinal, lateral, and vertical dimensions (see Figure 1). The longitudinal dimension refers to the direction of flow between upstream and downstream areas; the lateral dimension is the dimension that extends outward from the aquatic ecosystem into terrestrial environments; and the vertical dimension is the dimension that connects surface and subsurface flow pathways. Temporal variability in climate, geology, and landscape variables across these spatial dimensions and at different spatial scales drives ecological processes that determine watershed conditions (Ward 1989; FISRWG 1998; Naiman and others 1992). By understanding how these variables have interacted over time to shape the current watershed environment, it may be possible to predict how future land-use and management changes will shape future processes and conditions as a watershed continues to evolve (Sparks and others 1998).

This section provides a broad overview of critical watershed attributes—climate, geology, and landscape—that influence aquatic ecosystem processes at the macro-scale. Therefore, for the purposes of this section, the term watershed is used to refer to large landscapes in which multiple streams and wetlands interact and are connected through hydrologic processes. Smaller watershed scales are considered in later sections of this report, as are the roles that large-scale ecological processes play in shaping conditions at these smaller scales.

2.1 Climate

Climate controls the hydrologic cycle, which, along with geology and the landscape, drives watershed ecological processes. Key hydrologic variables controlled or significantly influenced by climate include:

1. Total annual precipitation;

2. The frequency, timing, magnitude, and duration of storms and storm peak flows;
3. The amount of precipitation that falls as snow and the timing of snowmelt;
4. Water temperatures; and
5. Water loss through evapotranspiration.

Combined, these variables constitute the hydrologic regimes of streams and wetlands in the watershed and are responsible for the development and maintenance of aquatic ecosystems (Poff and others 1997; Lewis 1995). Climatic variability between seasons, between years, and over long-term timescales also influences watershed processes and the natural physical forms, ecological processes, and water quality functions of individual aquatic ecosystems.

Mediterranean climate regions, such as coastal California, are characterized by wet winter months followed by a prolonged dry season. Although the exact durations of the wet and dry periods vary between years, the wet season generally occurs between mid-October and mid-May and is followed by seasonal drought that extends through the warm summer months and into the fall. As the dry season occurs during the time of year when evapotranspiration is highest, Mediterranean climate regions undergo annual periods of desiccation. Another feature of Mediterranean climates is significant variability in precipitation between years, such that years of higher than normal precipitation may be followed by extended drought (Gasith and Resh 1999; Bauder 2005). Although annual precipitation increases and average temperatures decrease in the northern regions of coastal California, the climate pattern remains highly seasonal (Naiman and others 1992). The seasonal concentration of rainfall and year-to-year variability in precipitation and flows means that in many ways, Mediterranean climate regions have less in common with humid areas than they do with arid ones, in which large, infrequent floods are a dominant ecological process that influences physical forms (Kondolf 1998; Kondolf and others 2001; Osterkamp and Friedman 2000; Tooth 2000; Valett and others 2005).

The consequences of this climate regime on aquatic ecosystems are several-fold:

1. Annual precipitation is concentrated during a few months of the year and a majority of annual rainfall may fall during a few large storms, making large storm events and flooding important, recurrent processes in watersheds (Gasith and Resh 1999);
2. Flood processes create temporal variability in the spatial extent and conditions of aquatic ecosystems, which increases habitat diversity (Kondolf 1998);
3. Interannual variability in precipitation provides that some years are characterized by larger than normal floods, and these large-scale natural disturbances may influence ecosystem processes beyond the single-year timeframe (Gasith and Resh 1999; Sloan and others 2001);

4. Because concentrated annual rainfall is followed by an extended dry season, many aquatic ecosystems are seasonal (e.g., intermittent streams, ephemeral streams, seasonal wetlands, and floodplains²) (Tooth 2000);
5. A prolonged dry season increases competition for water resources among water users, both human and non-human (Gasith and Resh 1999); and
6. Aquatic biota are adapted to predictable seasonal floods, wet-dry season fluctuations, and high magnitude infrequent flood events, and their life cycle stages, including breeding, rearing, migration, dispersal, and establishment, depend on these seasonal and interannual events (Gasith and Resh 1999).

2.2 Geology

Along with climate, geology is responsible for establishing the physical environment within the watershed, and it is necessary to understand the role of geology in shaping watershed landforms in order to understand how aquatic ecosystems function. Because current watershed conditions may, at least in part, reflect hundreds to thousands of years of geologic and hydrologic processes it is also important to consider both the short- and long-term roles of geology in determining spatial and temporal variability in the watershed (O'Connor and others 2003; Naiman and others 2000).

Watershed characteristics, including valley slope, channel slope, sediment loads, and sediment sizes are products of geomorphic processes, which are created by the intersection of geology and hydrology. As water moves through the watershed under the force of gravity, it travels over, under, and between surface and subsurface strata. A portion of this geologic material, determined by its erodibility and the force of water, is carried by water through the aquatic ecosystem as sediment before eventually being deposited downstream. This process of erosion and deposition is responsible for developing watershed landforms, such as stream channels and floodplains. Geologic processes also influence channel gradients and the development of landforms, such as hill slopes. These landforms may further evolve as a result of mass movements and erosion (Leopold and others 1964).

The influence of geology on aquatic ecosystems varies by geologic parent material, location within the watershed, and climate. Valley slope is important in determining how water flows through the watershed and landscape position influences the hydrologic and sediment regimes of aquatic ecosystems (Naiman and others 1992; Bauder 2005). For example, steep landscapes, such as headwater regions, with unstable materials, may be characterized by episodic sediment disturbance regimes in which large storms trigger mass movements (e.g., debris slides or debris flows) that can deliver sediment to the aquatic ecosystem (Grant and Wolff 1991).

² A floodplain may be defined generally as "a strip of relatively smooth land bordering a stream and overflowed at time of high water" (Leopold and others 1964, p. 317). Floodplains are discussed in more detail on page 20.

2.3 Landscape

In addition to climate and geology, aquatic ecosystem water quality reflects landscape conditions in the watershed. As landscape attributes change in space and over time, they affect the ecological processes that shape aquatic ecosystems, and it is necessary to consider aquatic ecosystems within the context of their surrounding landscapes in order to understand how they function and evolve over time (Gergel and others 2002; Décamps 1993; Reid 1998).

The watershed landscape is composed of heterogeneous habitats, or patches, such as stream reaches, individual wetlands, corridors of riparian vegetation, and communities of upland vegetation (see Figure 2). The distribution, abundance, and types of patches affect ecological processes. The scale of observation or analysis also influences the definition of individual patches, such that patches viewed at a large scale may themselves be composed of many different habitat types when viewed at a smaller scale. Therefore, the scale of observation used should be appropriate for the ecological process in question (Turner 1989; Wiens 2002; Poole 2002).

Individual patches may act as barriers or corridors for the movement of water, materials, and organisms, and interactions between patches as a result of these properties affect ecological processes (Puth and Wilson 2001; Pringle and others 1988; Wiens 2002). For example, a large stream may act as a habitat barrier for some terrestrial species, but may be a migration corridor for fish by connecting upper and lower stream reaches and habitats in the watershed. Connectivity and disconnectivity exist on a continuum and the level of connectivity or disconnectivity provided by an individual patch may vary over time and between ecological processes (Puth and Wilson 2001). For example, uplands isolate many depressional wetlands from other surface waters under normal hydrologic conditions, but may connect these wetlands to streams or other water bodies during periods of higher flows. Additionally, while uplands may provide barriers to surface water movement, groundwater pathways may provide subsurface hydrologic connectivity (Leibowitz 2003).

Landscapes include transitional boundaries, or ecotones, between patches that provide gradients in landforms and ecological processes within individual ecosystems as well as between different types of ecosystems (Kolasa and Weber 1995; Verry and others 2004; Poole 2002). Riparian areas, which are ecotones that connect aquatic and terrestrial environments, are some of the most important ecotones in the landscape and are discussed throughout this report. The National Research Council defines riparian areas as areas that are:

... transitional between terrestrial and aquatic ecosystems and are distinguished by gradients in biophysical conditions, ecological processes, and biota. They are areas through which surface and subsurface hydrology connect water bodies with their adjacent uplands. They include those portions of terrestrial ecosystems that significantly influence exchanges of energy and matter with aquatic ecosystems (i.e., a zone of influence).

Riparian areas are adjacent to perennial, intermittent, and ephemeral streams, lakes, and estuarine-marine shorelines. (Brinson 2002, p. 33)

Generally, the term riparian area refers to two types of areas in the landscape. First, riparian areas include areas that are influenced by aquatic ecosystems. Perennial and seasonal surface water flows and high water tables create surface and subsurface environments adjacent to stream channels and wetlands that are wetter than adjacent uplands. These areas support unique biotic communities, such as phreatophytic vegetation, which are plants that depend on saturated soils in the rooting zone. Second, riparian areas include areas that influence aquatic ecosystems by acting as sources of water, materials, or organisms or by buffering aquatic ecosystems from terrestrial influences. These two regions frequently overlap. For example, vegetation may be sustained by water from the aquatic ecosystem, while also providing functions to the aquatic ecosystem, such as temperature and microclimate control and input of organic material (Naiman and others 1992; Kondolf and others 1996; Tabacchi and others 1998). In this report, an area that is directly influenced by the surface or subsurface hydrology of an aquatic ecosystem is generally considered to be an extension of the aquatic ecosystem itself. Areas that provide functions to aquatic ecosystems but are not directly influenced by aquatic ecosystem hydrology are generally considered to be part of the broader landscape, although their effects on water quality may be equally as important.

3. WETLAND SYSTEMS

Research on wetlands has dramatically increased since the late-1970s (see Figure 3) and this research has revealed the important role that natural wetland systems play in protecting watershed-wide water quality (Lewis 1995). This section describes what wetlands are; identifies several of their key characteristics and ecological processes; describes how wetlands function within the landscape; and identifies the ways in which watershed variables, such as climate, geology, and landscape interact with natural wetland systems to protect and enhance water quality.

Wetlands are frequently associated with streams and other water bodies, and a thorough discussion of wetland systems by nature must incorporate processes that occur between wetlands and other water bodies. Some of that discussion is contained in this section; however, interactions between wetlands and streams also are discussed in later sections within the context of stream systems.

3.1 What Are Wetlands?

Wetlands are aquatic ecosystems that are characterized by unique hydrologic regimes that affect their physical, chemical, and biological attributes. The term wetland itself is relatively new, although other words have long been used to describe these areas (Lewis 1995). The term wetland encompasses a variety of other terms for aquatic ecosystems, including marshes, swamps, mudflats, sandflats, unvegetated ponded areas, vegetated shallows, sloughs, wet meadows, bogs, fens, playa lakes, prairie potholes, river overflow areas, natural ponds, vernal pools, and diked baylands. State and federal agencies have developed a variety of definitions for the term wetland (see Table 1), all of which reference common wetland characteristics, which include wetland hydrology, wetland substrates, and wetland biota. The National Research Council also has developed a scientific reference definition for wetlands that is independent from a specific regulatory context. The National Research Council defines a wetland as:

... an ecosystem that depends on constant or recurrent, shallow inundation or saturation at or near the surface of the substrate. The minimum essential characteristics of a wetland are recurrent, sustained inundation or saturation at or near the surface and the presence of physical, chemical, and biological features reflective of recurrent, sustained inundation or saturation. Common diagnostic features of wetlands are hydric soils and hydrophytic vegetation. These features will be present except where specific physicochemical, biotic, or anthropogenic factors have removed them or prevented their development. (Lewis 1995, p. 59)

This definition is used here to provide a baseline by which other definitions can be compared and to avoid limiting the discussion of wetlands in this section to a particular agency or program. Most of the definitions used by state and federal agencies may be considered scientific, but to some extent these definitions also reflect the policy goals and decisions of their developing agencies. Therefore, some areas that are considered to be

wetlands under one agency's definition may not be identified as wetlands under another agency's definition. While differences in the regulatory definitions of wetlands do not affect how aquatic ecosystems function in the watershed, they may limit the ability of individual agencies to address some wetlands and some wetland functions. Although such disparities exist, in general, the different wetland definitions are sufficiently similar such that the majority of concepts discussed in this section are applicable to all areas identified as wetlands under any of the state and federal agency definitions for wetlands that are listed in Table 1.

3.1.1. *Wetland Hydrology*

Wetland hydrology, which the National Research Council describes as "recurrent, sustained inundation or saturation at or near the surface," (Lewis 1995, p. 59), is the "driving force" that "controls the abiotic and biotic characteristics of wetlands" (Lewis 1995, p. 22). Wetlands generally have surface water depths of less than two meters, which distinguish them from deepwater aquatic ecosystems, such as lakes and many streams. Some wetlands are not regularly inundated, but contain saturated substrates for some period of time, which is the minimum hydrologic criteria that can be expected to lead to the development of characteristic wetland features, such as hydric soils and hydrophytic vegetation (Cowardin and others 1979; Environmental Laboratory 1987). Some wetlands are permanently wet, but many are non-perennial waters that are only periodically inundated or saturated during certain seasons or, in the case of many coastal wetlands, during high tides (Lewis 1995; Keeley and Zedler 1998; Euliss and others 2004). Shallow water depths and fluctuations between wet and dry periods create unique physical, chemical, and biological conditions within wetlands. These water depths and water level fluctuations also give wetlands characteristics of both terrestrial and aquatic ecosystems, which is why wetlands are sometimes described as "transitional" habitats, or ecotones (Lewis 1995; Cowardin and others 1979; Kolasa and Weber 1995).

Most wetlands undergo some form of seasonal change as a result of differences in seasonal water availability, and the specific temporal pattern of water level fluctuations in a wetland is known as its hydroperiod. Climate plays a critical role in determining this hydroperiod by controlling the amount of water available to the wetland and the timing of water availability (Lewis 1995). In Mediterranean climate regions, such as coastal California, water availability is highly seasonal and some wetland types, such as vernal pools, may be wet during the winter, but completely dry during the summer (Keeley and Zedler 1998). There also may be significant differences in wetlands between years due to interannual variability in precipitation (Keeley and Zedler 1998; Bauder 2005).

Wet-dry cycles control the direction of water flow in wetlands and in the watershed as a whole by promoting groundwater recharge or discharge, by controlling whether surface water flows are primarily into or out of wetlands, and determining whether wetlands experience a net loss of water to the atmosphere through evapotranspiration (Leibowitz 2003; Bullock and Acreman 2003; Euliss and others 2004; Elmore and others 2006; Rains and others 2005; Whigham and Jordan 2003; Winter and LaBaugh 2003; Middleton 2002; Naiman and others 1992).

3.1.2. *Wetland Substrates*

Sustained inundation or saturation tends to create anaerobic conditions, or a lack of oxygen, in wetland substrates, which limits the types of chemical and biological activity that can occur there. For example, although primary productivity in wetlands may be high, anaerobic conditions slow decomposition, and as a result wetland substrates tend to accumulate organic matter over time. Wetland hydrology does not always create anaerobic conditions (e.g., in wetlands where natural or artificial disturbance of substrates increases oxygen flow, or where the wetland water source contains a high concentration of dissolved oxygen), but in those wetlands where anaerobic conditions do exist, these conditions significantly influence the chemical characteristics of wetlands and the biotic communities that inhabit them (Lewis 1995). Anaerobic conditions in wetlands with soil substrates create hydric soils, which may develop specific physical and chemical indicators of wetland hydrology (Lewis 1995; Environmental Laboratory 1987). Hydric soils are a common characteristic of wetlands; however, as noted above, some wetlands do not develop anaerobic conditions and wetlands also may have non-soil substrates (e.g., rocky beaches) so hydric soils are not a universal wetland characteristic (Lewis 1995; Cowardin and others 1979).

3.1.3. *Wetland Biota*

Anaerobic conditions created by wetland hydrology are stressors for many plant species, and these conditions may impede or prevent such species from colonizing wetlands. Most plant species are not adapted to low-oxygen environments, and the reducing conditions in such environments also may create pH levels or chemical compounds that are toxic to many plant species. Those plants that are adapted to grow in or to withstand anaerobic conditions are called hydrophytes, and the presence of hydrophytic vegetation is commonly used to identify wetlands (Lewis 1995; Cowardin and others 1979; Environmental Laboratory 1987). Some wetlands, particularly riverine wetlands, are periodically exposed to moving water, and some plant species may not be able to tolerate the physical stresses created by these conditions. Seasonal drying of wetlands also may prevent some species from establishing. As a result, wetland plants tend to be those species that are adapted to a variety of stressors that inhibit other species (Lewis 1995; Keeley and Zedler 1998).

While wetland hydrology may create chemical conditions that are unfavorable to some organisms, this hydrology also provides necessary habitat conditions for a variety of other organisms. For example, plant species with high water requirements may only occupy wetlands as do a variety of species of aquatic invertebrates and amphibians that require standing water for all or part of their life cycles (Lewis 1995; Euliss and others 2002; Keeley and Zedler 1998). Many wetland species also are specifically adapted to wet-dry cycles, such that the timing of their life cycle stages, including breeding and rearing, correspond to the normal timing of water availability (Bauder 2005; Leibowitz 2003).

Climatic variability and disturbance are two of the primary factors that determine wetland vegetation communities (Jackson and Allen-Diaz 2006). Seasonal water availability may

affect plant species composition, with hydrophytes dominating seasonal wetlands during the wet months and upland species dominating during drier periods (Bauder 2005; Keeley and Zedler 1998). Seasonal flooding may be followed by a sharp increase in plant productivity (Euliss and others 2004). Total annual precipitation also affects the distribution of wetland and upland plant species, particularly in seasonal wetlands, by controlling the degree of wetness or length of ponding. During drier than normal years, wetland species may remain dormant, while upland species dominate (Bauder 2005; Keeley and Zedler 1998). Annual precipitation also affects flood magnitudes, which impact the succession of plant communities in riverine wetlands (Naiman and others 1992).

3.2 Wetlands in the Landscape

Climate, geology, and landscape attributes, such as proximity to other aquatic and terrestrial ecosystems, influence wetland characteristics and water quality functions by controlling the specific hydrologic regimes of individual wetlands and the types of materials and organisms available to them (see Figure 4; Carter 1996; Lewis 1995; Collins and others 2006). Differences in these watershed variables create a wide range of wetland types, which correspondingly perform a wide range of water quality functions (Cowardin and others 1979; Brinson 1993; Smith and others 1995).

3.2.1. Influence of Geology

Geology controls wetland development and ecological processes by influencing the ways in which water flows into and within wetlands. Basin slope influences wetland hydrology by controlling the magnitude and timing of surface water flows to wetlands (Bauder 2005). In riverine wetlands, the influence of these flows also may be determined by geomorphic structures (e.g., stream channels, floodplains, levees, and backwater areas) within stream corridors, which provide different hydrologic regimes and chemical processes (Johnston and others 2001). Geology, topography, and landforms also influence wetland hydrology by determining factors such as wetland depth and groundwater flows (Cole and others 1997; Stein and others 2004).

Wetland depth may affect a wetland's hydroperiod, with deeper wetlands maintaining water levels for longer periods of the year and shallower wetlands experiencing more variable flows (Brooks and Hayashi 2002). Depending on their underlying geology and their location within the watershed, wetlands may recharge groundwater basins or may receive groundwater discharge. This relationship to groundwater is an important factor in determining wetland hydrology and may affect the composition of wetland biota (Stein and others 2004; Brinson 1993; Euliss and others 2004). In vernal pools, underlying strata form impervious subsurface layers that perch water tables and create surface pools (Keeley and Zedler 1998; Rains and others 2005). Where groundwater intersects the land surface, water seepage recharges wetlands (see Figure 5). Such wetlands may be buffered against seasonal changes in precipitation if the groundwater source is sufficiently large (Brinson 1993).

Finally, geology affects soil and groundwater chemistry, which may affect biochemical processes in wetlands (Stein and others 2004). For example, groundwater often carries solutes, such as salts, which affect wetland chemistry (Euliss and others 2004).

3.2.2. *Landscape Interactions*

The types, conditions, and proximities of aquatic ecosystems influence flows of water, materials, and organisms into and out of wetlands. Additionally, a variety of terrestrial landscape features moderate interactions between wetlands and their adjacent terrestrial ecosystems. Terrestrial areas that influence wetland condition and transitional zones between wetlands and terrestrial ecosystems are wetland riparian areas. Other aquatic ecosystems as well as wetland riparian areas influence both the water quality and hydrologic regimes of wetlands. For example, terrestrial vegetation surrounding a wetland may influence how water flows through the landscape and may affect wetland water levels and water chemistry through processes such as nutrient uptake (Euliss and others 2004; Euliss and others 2002). Proximity to other aquatic ecosystems and access to flows from these ecosystems also affect wetland hydrology. For example, coastal wetlands, such as salt marshes, are affected by tides, while riverine wetlands rely on periodic floods for recharge (Middleton 2002; Naiman and others 1992; Greer and Stow 2003).

The watershed may supply a variety of materials to wetlands, including sediment and nutrients, which affect wetland characteristics (Mayer 2005; Euliss and others 2004; Fisher and Acreman 2004; Reuter and others 1992; Whigham and Jordan 2003). Flows from adjacent aquatic ecosystems may provide these materials as well as drive wetland biochemical processes, including denitrification and decomposition of organic matter (Middleton 2002; Bayley 1995; Junk and others 1989; Kang and Stanley 2005; Macheferit and Dise 2004; Pinay and others 2002; Tabacchi and others 1990; Valett and others 2005). Other wetlands in the watershed, particularly wetlands of other types, may store or transform sediment, nutrients, or other pollutants before they reach a wetland, or may be sources of these materials, thereby influencing the water quality of the receiving wetland (Traut 2005; Fisher and Acreman 2004; Whigham and Jordan 2003).

Wetland biota reflects both conditions within the wetland itself and conditions within the broader landscape. Wetlands surrounded by forested areas may be buffered from invasion by exotic species, thereby protecting species biodiversity (Houlahan and others 2006). Other aquatic ecosystems may help replenish species in some wetlands (e.g., riverine wetlands) while in other wetlands (e.g., vernal pools) species may be protected through their relative isolation from aquatic habitats that might otherwise act as sources of predators or competitors (Middleton 2002; Zedler 2003; Leibowitz 2003). Terrestrial areas in the landscape may connect aquatic habitats or may provide habitat for wetland species, such as many amphibians, which require access to both terrestrial and aquatic ecosystems during different life cycle stages (Semlitsch 1998; Semlitsch and Bodie 2003; Trenham and Shaffer 2005). Groups of similar wetlands within a watershed or region may collectively support populations of plant and animal species that might not otherwise persist. Such wetlands collectively maintain the species pool by providing sufficient

habitat and refugia to withstand disturbance, and migrants to re-colonize disturbed wetlands (Leibowitz 2003; Trenham and Shaffer 2005; Leidy and White 1998).

Finally, climate affects the degree of connectivity between wetlands and other water bodies in the watershed. Seasonal flooding within watersheds may provide periodic pathways for water, materials, and organisms to both enter and exit wetlands. Some geographically isolated wetlands may not be connected to other water bodies through surface water or groundwater pathways in normal hydrologic years, but wet years may provide intermittent hydrologic connections (Middleton 2002; Naiman and others 1992; Leibowitz 2003; Whigham and Jordan 2003; Winter and LaBaugh 2003). The degree of connectivity between wetlands and other water bodies impacts their species composition as well as their contributions to watershed ecological processes and to the water quality of other water bodies in the watershed (Zedler 2003; Leibowitz 2003; Fisher and Acreman 2004).

3.3 Wetland Water Quality Functions

Although wetlands occupy only a relatively small percentage of the landscape, they perform a variety of critical water quality functions (Lewis 1995; Dahl 1990). These functions include:

- Flood attenuation;
- Groundwater recharge and discharge;
- Surface water supply and replenishment;
- Sediment storage;
- Nutrient and organic matter cycling;
- Pollutant filtration; and
- Maintenance of plant and animal communities.

Many of these functions affect water quality within wetlands as well as the water quality of other water bodies in the watershed. This occurs because wetlands supply water, materials, and organisms to other water bodies and may be permanently or periodically connected to these water bodies through surface and subsurface hydrology. The roles of wetlands in protecting the water quality of other water bodies are briefly discussed here, but are covered in more detail later in the discussion of stream systems. The specific water quality functions of wetlands are determined by their individual attributes (see Table 2 and Table 3) as well as the interactions between individual wetlands and watershed variables such as climate, geology, and landscape. Therefore, some of the functions described here are not provided by all wetlands or are provided by different wetlands to varying degrees.

3.3.1. *Flood Attenuation*

Wetlands perform flood attenuation functions in watersheds during storms and periods of high flow. Riverine wetlands reduce flood peaks by absorbing and storing overbank flow for short- and long-term periods. Riverine wetlands also may reduce flow velocities by increasing contact between water and sediments over wide floodplain areas and providing resistance to flow through wetland topography and vegetation. Riverine wetlands may further decrease overbank flow volumes by promoting infiltration of water into the soil and by returning water to the atmosphere through evapotranspiration (Bullock and Acreman 2003; Naiman and others 1992). Wetlands outside the near stream environment, including geographically isolated wetlands, also may reduce flood peaks downstream. Similar to riverine wetlands, isolated wetlands absorb and store surface runoff, remove water through evapotranspiration, and slow delivery of runoff to streams through infiltration (Leibowitz 2003; Whigham and Jordan 2003).

3.3.2. *Groundwater Recharge and Discharge*

Wetlands may recharge groundwater basins when flooded as a result of overbank flow or after receiving water through direct precipitation or surface runoff (Bullock and Acreman 2003; Leibowitz 2003; Naiman and others 1992). Groundwater also may discharge to the surface in wetlands and support wetland communities and their associated functions. Examples of wetlands dependent on groundwater discharge include fens, springs, wet meadows, slope wetlands, and some vernal pools (Bedford and Godwin 2003; Bullock and Acreman 2003; Elmore and others 2006; Rains and others 2005). Groundwater recharge and discharge may occur simultaneously within different areas of the same wetland (Bullock and Acreman 2003).

3.3.3. *Surface Water Supply and Replenishment*

Wetlands store water and also may supply water to other aquatic ecosystems. Pondered water in wetlands and saturated soils support a variety of wetland plant and animal species (Lewis 1995). Although wetlands are water users that may intercept and remove water from the watershed (i.e., through evapotranspiration), they also may recharge other surface water bodies through surface and subsurface pathways, such as groundwater recharge (Bullock and Acreman 2003).

3.3.4. *Sediment Storage*

Wetlands remove turbidity and suspended solids from surface runoff by reducing flow velocities and providing contact with vegetation, which allows sediment to settle from the water column (Mayer 2005; Schuster and Grismer 2004; Reuter and others 1992; Nara and Pitt 2006). In addition to capturing sediment, wetland vegetation may stabilize soils and reduce erosion (Micheli and Kirchner 2002; Goldsmith and others 2001).

3.3.5. Nutrient and Organic Matter Cycling

Wetland vegetation and soils can remove nutrients from surface runoff through storage and transformation. Nutrients may be absorbed by wetland soils or used and stored by vegetation through uptake. Vegetative and microbial transformation processes such as denitrification remove nutrients from the watershed or alter the types of compounds available (Fisher and Acreman 2004; Mayer 2005; Pinay and others 2002; Reuter and others 1992; Schuster and Grismer 2004; Whigham and Jordan 2003; Traut 2005; Lewis 1995). Wetlands also produce and store organic matter, and coastal wetlands are effective at sequestering carbon (Lewis 1995; Brevik and Homburg 2004; Zedler and Kercher 2005). Storage of nutrients and organic matter in wetlands may be seasonal or temporary and wetlands also may provide sources of nutrients and organic matter to other aquatic ecosystems. Export of organic matter from wetlands may provide an important energy source for downstream aquatic organisms (Lewis 1995).

The roles of wetlands as nutrient and organic matter sinks, transformers, and sources depend on the particular nutrient and organic matter dynamics in the wetland; the degree of hydrologic connectivity between the wetland and other aquatic ecosystems; and the wetland disturbance regime (Lewis 1995; Whigham and Jordan 2003). The effectiveness of wetlands in removing or cycling nutrients and organic matter also may vary by wetland type or hydrologic regime. For example, denitrification may be most efficient in waterlogged environments, while removal of phosphorous may be more efficient in drier environments such as floodplains (Fisher and Acreman 2004).

3.3.6. Pollutant Filtration

In addition to removing sediment and nutrients from surface runoff and floodwaters, wetlands can remove other water pollutants, such as heavy metals and bacteria, from the water column (Schuster and Grismer 2004; Reuter and others 1992; Verhoeven and Meuleman 1999).

3.3.7. Maintenance of Plant and Animal Communities

The physicochemical environment in wetlands selectively excludes some species that are not well adapted to anaerobic conditions, but also provides conditions that are necessary or favorable for other species. As a result, wetlands support a number of plant and animal species that are not found in other environments, including rare and endemic species, such as fairy shrimp, California Tiger Salamander, and a number of plants (Keeley and Zedler 1998). Many species of aquatic invertebrates and amphibians depend on wetlands for all or part of their life cycles, as do a variety of birds, which utilize wetlands for breeding, nesting, rearing, drinking, feeding, and sheltering. Wetlands also provide food and habitat to fish, reptiles, and mammals (Lewis 1995; Semlitsch and Bodie 2003; Semlitsch 1998; Keeley and Zedler 1998; Stewart 1996).

4. STREAM SYSTEMS

Experimentation and observation over the last several decades has revealed that natural and restored stream systems often provide enhanced water quality benefits, resiliency, and stability when compared to their modified and impacted counterparts. As a result, stream management principles in the U.S. have gradually shifted from attempting to control streams and arrest their natural ecological processes, such as flooding, to working with or restoring these processes (FISWRG 1998; TFNBFF 2002; Riley 2003). This section describes what stream systems are; how they function within their watersheds; and the ways in which watershed variables, such as climate, geology, and landscape interact with natural stream systems to protect and enhance water quality.

4.1 What Are Streams?

Streams are aquatic ecosystems that receive and transport flowing surface and shallow subsurface water, sediment and other materials, and organisms through their associated watersheds. The term stream may be used to refer to both natural and modified or artificial bodies of flowing water and encompasses a variety of other terms for aquatic ecosystems, including rivers, canals, creeks, channels, ditches, floodways, runs, swales, tributaries, and washes.

4.1.1. Stream Hydrology

As with wetlands, hydrology is the defining aspect of streams, and the natural flow regimes of streams determine their physical forms and ecological processes (Poff and others 1997). Streams may flow year-round (i.e., perennial streams); during certain seasons or times of the year (i.e., intermittent streams); or only in direct response to precipitation (i.e., ephemeral streams). Stream flow regimes are dynamic. For example, streams may transition between intermittent and perennial waters as a result of altered landscape conditions, such as a reduction in vegetative cover, or variable climate conditions, such as wet and dry years (Greer and Stow 2003; Kondolf 1998).

Although streams are by definition landscape features that carry flowing water, it is not necessary for these flows to be perennial for streams to affect watershed-wide water quality. Intermittent and ephemeral streams account for approximately 59 percent of total stream length in the U.S., excluding Alaska, and comprise an even larger percentage of total stream length in regions with drier climates or more seasonal or variable precipitation regimes (Nadeau and Rains 2007). Intermittent and ephemeral streams may be connected to downstream perennial waters during high flow events, which have the potential to mobilize materials such as sediment, or during periods when many aquatic organisms rely on water availability or hydrologic connectivity for habitat, food sources, and movement. As a result, intermittent and ephemeral streams play important roles in watershed ecological processes and in protecting and enhancing watershed-wide water quality (Nadeau and Rains 2007; Freeman and others 2007; Alexander and others 2007; Wipfli and others 2007; Meyer and others 2007; Reid and Ziemer 1994).

4.1.2. Stream Channels

Streams form when water has sufficient power to erode sediment and create channels in the landscape. The specific shape of a stream channel is a function of its hydrologic and sediment regimes. Gravity provides the force of water, while underlying geology dictates the erodibility of sediment. Erosion occurs when the hydraulic force provided by water flows exceeds the resisting forces of the soil. If hydraulic forces are sufficiently high, they will create channels by mobilizing and moving sediment downstream or will erode sediment from streambanks or streambeds and reshape existing channels in the landscape (Leopold and others 1964; Fischenich 2001).

Although a wide-range of flows perform work on channels and contribute to channel morphology, many streams have a dominant discharge regime that is responsible for the majority of morphologic work on the channel. This discharge is sometimes referred to as the channel-forming or bankfull discharge. Bankfull discharge is the discharge at which a stream just begins to overflow its banks (i.e., the bankfull channel) onto its floodplain. In streams where bankfull discharge concepts apply, this discharge is responsible for the size and shape of the channel. For many streams, the bankfull discharge has a recurrence interval of 1 to 2 years. In other words, it is a flow that on average occurs once a year or once every other year (Leopold and others 1964; Copeland and others 2000). It is important to note, however, that concepts of bankfull discharge may be most applicable to humid climates. In areas with more arid climates or more variable precipitation regimes, including much of northwest California, larger, less frequent flows may be more important to stream morphology (Kondolf and others 2001; Kondolf 1998; Kondolf 1994; Nolan and others 1987).

Natural stream channels are dynamic in space and time and reflect ever-changing watershed conditions. Over time, channels adjust to their discharge and sediment regimes until they reach a stable or equilibrium condition. Stability in stream channels refers to the condition where stream valley slope, stream channel slope, sediment loads, sediment sizes, discharges, roughness of the stream channel, and bankfull channel widths and depths are in balance. Over short-term time scales, stable or equilibrium channels carry water discharges that have just enough energy to transport their sediment loads through the system. Under these conditions, channels do not experience excessive erosional or depositional instabilities, and characteristics such as the channel flow and sediment transport capacities and habitat (e.g., banks, bars, and pools) are maintained. Over longer periods, channels can be expected to adjust and establish new equilibrium forms as hydrologic or sediment conditions change in the watershed (Riley 2003; Leopold and others 1964).

Equilibrium conditions do not imply static channels. Erosion and deposition are natural processes that occur in equilibrium channels and these processes continually create, erode, and replace stream habitat features. For example, gravel bars in equilibrium streams may be continually eroded, but are replenished by new gravel that is deposited after being eroded from upstream areas. Additionally, meandering channels may migrate across their floodplains, while maintaining channel geometries that balance their

sediment and water loads (Kondolf and others 2001; Kondolf 1994; Naiman and others 1992).

Channels that are out of equilibrium will adjust until they reach a new equilibrium state. When the sediment loads or sizes are too little to balance stream power, the excess energy causes streams to erode their beds and banks, leading to wider or deeper channels, and/or to a decrease in channel gradient or slope. On the other hand, when stream power is insufficient to carry the sediment load, streams drop their sediment in the channel. As sediment aggrades, it creates in-channel sediment bars, and may lead to the formation of multiple, migrating channels. To reach a new equilibrium, such channels may eventually need to become narrower or shallower, which will increase stream velocities and the ability of the stream to transport its sediment load by constricting flows or increasing stream gradient (Riley 2003; Fischenich and Morrow 2000; Kondolf 1994; Leopold and others 1964).

Erosional and depositional processes in channels can be beneficial when they help restore channel equilibrium following disturbance, such as floods, or when they are part of the natural cycle of creation and maintenance of channel habitat (Naiman and others 1992; Kondolf 1998). However, these processes also can be destructive, particularly when ongoing changes or conditions in the watershed prevent establishment of a new equilibrium, such as in an urbanizing watershed where stream hydrology is in flux; or when streams have been significantly modified, such as by dams, channel straightening and widening, stream channel bed elevation changes, and channel confinement such as hardening of banks. Excess deposition, or aggradation, in stream channels can increase flooding in the watershed or create unstable migrating channels and problems of bank erosion. Excess hydraulic forces or unnatural steepening of stream gradient, such as by straightening a channel and removing its natural meanders, may lead to stream bed erosion, or incision, that migrates up through the watershed, creating sediment problems downstream. In these cases, without intervention, ongoing excess erosion or deposition may disrupt stream processes and the transition to a new equilibrium state may not occur for some time (Riley 2003; Fischenich and Morrow 2000; Florsheim and others 2001; Landwehr and Rhoads 2003; Castro 2003; Kondolf 1994; Griggs and Paris 1982).

4.1.3. Floodplains

Floodplains are depositional features, which are constructed by streams and composed of alluvial sediments. Although both small and large streams may have floodplains, floodplains are more prevalent in middle and lower reaches of streams, where flows are higher and overbank flow may be a more frequent occurrence (Naiman and others 1992; Leopold and others 1964).

When a stream overflows the confines of its channel and spreads outward over the land surface, it occupies a wider surface area, which brings the stream into contact with adjacent vegetation, topographic features, and other obstructions to flow. These features provide increased roughness, which helps reduce stream velocities. As streams overflow their banks, the cross-sectional area of their discharge also increases, which leads to a corresponding decrease in water velocity. Decreased flow velocities over the floodplain

may cause the stream to drop its sediment load. Deposition of sediment, or aggradation, on floodplains depends on flow dynamics, including flow velocities and sediment load sizes and characteristics. When there are high velocity flows over the floodplain, or when flows contain low sediment loads, flows also may scour, or erode, sediment from floodplains rather than depositing material (Leopold and others 1964; Riley 2003).

The processes of aggradation and scouring continually shape the landscape to create dynamic, topographically complex floodplains. Over time, under stable hydrologic and sediment regimes, floodplains, like channels, reach equilibrium conditions such that aggradation of the floodplain is balanced by scouring. Thus, under equilibrium conditions, floodplains collect and store sediments for certain periods of time before this sediment is eventually mobilized and transported downstream. In this way, floodplains are constructed and maintained by stream flows and also contribute to channel dynamics by acting as both sources and sinks of sediment. Because floodplains are geomorphically linked to stream channels and physically contain the stream during periods of high flow, they may be considered part of the stream system or part of the stream itself (Kondolf 1994; Naiman and others 1992; Leopold and others 1964). Floodplain areas also may become part of the stream channel over time as a result of processes such as channel migration, in which one or more stream channels may meander across the floodplain (Sear 1994; Kondolf and others 2001; Naiman and others 1992).

Some floodplains reflect previous hydrologic or sediment conditions in the watershed and are no longer maintained by the stream. These floodplains are referred to as abandoned floodplains, or floodplain terraces, and are located at higher elevations than their stream's current, active floodplains. Floodplain terraces are formed when streams erode their beds, or incise, thus lowering the streambed elevation (see Figure 6). An incising stream may become hydrologically disconnected from its floodplain, such that it no longer, or only infrequently, overflows its banks and interacts with its floodplain. Over time, an incised stream may construct a new floodplain at a lower elevation by eroding its banks and widening the channel (Riley 2003; Leopold and others 1964). Floodplain terraces may still be inundated during infrequent, high magnitude floods (Tooth 2000).

Floodplains and floodplain terraces are created by streams, but these areas also regulate the passage of water, materials, and organisms from terrestrial ecosystems to streams, thereby affecting stream processes. In this way, floodplains and floodplain terraces act as ecotones that connect streams with adjacent terrestrial ecosystems (see, e.g., Brinson 2002; Naiman and others 1992; Décamps 1993; Junk and others 1989). Floodplains and floodplain terraces are part of a stream's riparian areas and landscape interactions between streams and their floodplains and floodplain terraces contribute to a variety of stream ecological processes and water quality functions, which are discussed later in this section.

4.1.4. Hyporheic Zones

In addition to surface flows and processes, streams have subsurface flow components called hyporheic zones. The hyporheic zone is "the interstitial habitat beneath the streambed that is the interface between surface water and the adjoining groundwater"

(Naiman and others 1992, p. 149). Hyporheic zones are ecotones between surface water and groundwater in which stream water penetrates and interacts with sediments and connects streams to adjacent groundwater systems. Hyporheic zones vary in space and time throughout the stream system and generally become larger and more continuous in the downstream direction. They interact with floodplain aquifers and thus frequently overlap with and correspond to floodplain areas. In terms of aquatic habitat volume, hyporheic zones may be many times larger than stream channels (Brunke and Gonser 1997; Naiman and others 1992; Sedell and others 1990; Stanford and Ward 1988).

Similar to floodplains, hyporheic zones interact with stream channels such that water, materials, and organisms flow from channels into hyporheic zones as well as from hyporheic zones into channels. Contributions of water, materials, and organisms from hyporheic zones to channels may be from sources that originated in the channel and were temporarily stored in the hyporheic zone or may be from upland or groundwater sources that pass through the hyporheic zone and are newly introduced into the stream. In this way, hyporheic zones are part of and maintained by the stream, but also are part of the larger system of terrestrial and aquatic ecosystems in the watershed that affects and maintains stream processes (Brunke and Gonser 1997; Naiman and others 2000; Naiman and others 1992; Sedell and others 1990; Stanford and Ward 1988; Johnson 2004; Poole and Berman 2001; Story and others 2003).

4.1.5. *Stream Biota*

Like wetlands, stream hydrology provides habitat conditions that support a variety of plant and animal species. Stream channels provide water sources necessary for aquatic organisms, such as fish, amphibians, aquatic invertebrates, and aquatic plants. Because floodplains are periodically inundated and often have high water tables, they frequently include wetlands and support a variety of wetland species (Junk and Wantzen 2003; Fischenich and Morrow 2000; Sommer and others 2001). Some floodplains may not be inundated frequently enough to establish wetland conditions, but are still subject to periodic inundation and may have high water tables. These conditions support a variety of unique species, including phreatophytes (Dall and others 1997; Bendix and Hupp 2000; Bayley 1995; Kondolf and others 1996; Miller and others 1995; Tockner and Stanford 2002; Dreesen and others 2002). Subsurface flows in the hyporheic zone support many species of aquatic invertebrates by providing cool oxygenated water (Brunke and Gonser 1997; Sedell and others 1990; Stanford and Ward 1998). Streams also support a variety of species that are found in the near stream environment as well as upland areas (Dall and others 1997; Kondolf and others 1996).

Vegetation supported by stream hydrology frequently is referred to as riparian vegetation, which the U.S. Fish and Wildlife Service defines as:

... plant communities contiguous to and affected by surface and subsurface hydrologic features of perennial or intermittent lotic and lentic water bodies (rivers, streams, lakes, or drainage ways). Riparian [vegetation] has one or both of the following characteristics: 1) distinctively different vegetative species than adjacent areas, and 2)

species similar to adjacent areas but exhibiting more vigorous or robust growth forms. (Dall and others 1997, p. 3)

However, the term riparian vegetation also may be used to refer to upland vegetation that is not directly supported by stream hydrology, but which affects stream conditions, such as by providing shade and microclimate control, sediment stabilization on adjacent slopes, or input of large woody debris (Kondolf and others 1996; Naiman and others 1992; Tabacchi and others 1998).

In addition to providing water levels that are required to support a variety of species, flood processes in streams create disturbance and temporal and spatial heterogeneity that affect stream communities. For example, floodplain vegetation must be adapted to withstand physical disturbance from floods or to colonize scoured soils following flooding. Flood disturbance affects the patterns of stream communities by periodically uprooting or burying vegetation and resetting the process of succession (Bendix and Hupp 2000; Baattrup-Pedersen 2005; Bayley 1995; Bunn and Arthington 2002; Décamps 1993; Dreesen and others 2002; Junk and others 1989; Kang and Stanley 2005; Kondolf and others 1996; Lite and others 2005; Naiman and others 1992; Naiman and others 1993; Nilsson and Svedmark 2002; Pollock and others 1998; Sedell and others 1990; Sluis and Tandarich 2004; Tabacchi and others 1998; Tickner and others 2001; Townsend 1989; Bravard and others 1986).

Finally, stream biota may reflect species that are adapted to using different habitats during various life cycle stages. For example, a variety of fish species live in stream channels during lower flows, but occupy floodplains during the wet season. Additionally, some species, such as anadromous fish and some amphibians utilize streams for spawning, breeding and rearing, but migrate to other aquatic or terrestrial habitats during other periods (Feyrer and others 2004; Bayley 1991; Junk and others 1989; Junk and Wantzen 2003; Ribiero and others 2004; Sedell and others 1990; Sommer and others 2004; Sommer and others 2001; Semlitsch 1998; Semlitsch and Bodie 2003).

4.2 Stream Drainage Networks

Perennial, intermittent, and ephemeral streams, as well as associated aquatic habitats, such as wetlands, form drainage networks that drain the land surface and transport water, materials, and organisms through their watersheds. In order to understand how a stream functions within its watershed, it is necessary to understand how drainage networks are organized and how upstream and downstream processes affect stream functioning within any one stream or any one stream reach (Dynesius and Nilsson 1994; FISRWG 1998; Naiman and others 1992; Naiman and others 2000; Poole 2002; Sedell and others 1990; Vannote and others 1981; Ward 1999).

Although processes in individual stream reaches are affected by a variety of factors, including local hydrology and landscape conditions, drainage networks may be divided into three general regions within their watersheds: headwater regions, transport regions, and depositional regions, which are described below (FISRWG 1998; Naiman and others 1992; Dynesius and Nilsson 1994; Kondolf 1994).

4.2.1. Headwater Streams

Headwater regions are those hillslopes where channels first begin to form in the landscape. As such, headwater streams are small streams, usually first- or second-order,³ that have relatively steep gradients. Because they are located in the upper parts of their watersheds and receive water from a relatively small area, stream power is usually low and channel forms are relatively stable during normal flows. However, during infrequent, high magnitude storm events, headwater streams may rapidly erode and release large amounts of sediment downstream (Alexander and others 2007; Naiman and others 1992; Richardson and Danehy 2007).

Nationwide, headwater streams are estimated to comprise at least two-thirds of total channel length in watersheds (Nadeau and Rains 2007; Wipfli and others 2007; Freeman and others 2007; Naiman and others 1992). Large streams are “fed by literally hundreds of thousands of small headwater streams” (Freeman and others 2007, p. 6). A majority of headwater streams have intermittent or ephemeral flow regimes because they are located above groundwater tables or are not fed by sufficiently large groundwater basins to sustain flows year-round during dry periods. Therefore, many headwater streams are periodically isolated hydrologically from the rest of the drainage network (Winter 2007; Izbicki 2007). However, headwater streams play significant ecological roles in watersheds through periodic hydrologic connections. They are the primary sources of downstream surface water and sediment and also are significant in controlling nutrient and organic matter fluxes in downstream waters, both by contributing and storing or removing these substances (Alexander and others 2007; Naiman and others 1992; Reid and Ziemer 1994; Pinay and others 2002; Richardson and others 2005; Richardson and Danehy 2007; Wipfli and others 2007).

4.2.2. Transport Streams

Transport regions in the drainage network are comprised of medium-sized streams, usually third- to fifth-order. These streams may have moderately steep gradients and generally have enough power to transport the majority of sediment they receive from the upper watershed to downstream areas. Both erosion and deposition occur in these streams, but the dominant process, or net effect, is generally sediment transport (Naiman and others 1992).

Sediment may be temporarily stored in mid-order channels, particularly as a result of mass-wasting events, such as landslides, which form debris dams. In steep mid-order watersheds that are prone to mass-wasting, landslides may be the dominant geomorphic process that determines channel form. When debris dams breaks, stored sediment is rapidly transported downstream (Naiman and others 1992).

³ First-order streams are streams that do not have tributaries, second-order streams are streams whose tributaries are only first-order streams, third-order streams are streams with only first- and second-order tributaries, and so on (see Figure 7).

Discharge increases in mid-order streams and these streams undergo moderate flood processes, which begin to create wider valley floors. Although the majority of sediment moves through the channel or is stored behind debris dams, some sediment may be temporarily stored on floodplains. Periodic inundation of floodplains also may support floodplain vegetation communities, including wetlands. Hyporheic zones in mid-order streams also make important contributions to stream water and water quality. Mid-order streams are more likely to be perennial streams than are headwater streams due to increased groundwater inputs that sustain flows throughout the year (Naiman and others 1992).

4.2.3. *Depositional Streams*

As streams converge and become wider still in the downstream direction, drainage networks transition into depositional regions. High-order streams, those that are usually sixth-order or above, begin to sort sediment into fine and coarse materials as stream gradients decrease and streams begin to meander across floodplains. Coarser materials are deposited in upper reaches of depositional regions, while finer materials are carried through to lower reaches. Flood processes tend to be more significant in high-order streams and these streams develop depositional features like floodplains and bars. Wider floodplain areas also give rise to increased hyporheic exchange between channels and groundwater systems (Naiman and others 1992).

High-order streams usually receive significant surface water and groundwater inputs throughout the year and thus tend to be perennial waters. High water availability supports corridors of riparian vegetation as well as wetlands within the floodplain. The majority of nutrients and organic matter in high-order streams comes from headwater and transport regions as well as from production that occurs on the floodplain. Therefore, water quality in high-order streams depends significantly on upstream watershed conditions as well as floodplain conditions. Whereas overland flow is an important contribution to stream water in low- and mid-order streams, high-order streams depend mostly on water inputs from upstream waters, further increasing the importance of upstream areas in determining downstream water quality (Naiman and others 1992; Richardson and others 2005; Pinay and others 2002; Pinay and others 1999; Reid and Ziemer 1994; Junk and others 1989; Brinson 2002).

4.3 Stream Water Quality Functions

Individual streams perform a variety of critical water quality functions that affect local water quality. These streams also contribute to watershed-wide water quality through their roles in the drainage network. Stream and drainage network functions include:

- Flood attenuation;
- Groundwater recharge and discharge;
- Surface water supply and replenishment;

- Sediment transport and storage;
- Nutrient and organic matter cycling;
- Pollutant filtration;
- Temperature and microclimate control; and
- Maintenance of plant and animal communities.

Many of these functions occur as a result of or are enhanced by interactions between streams and other aquatic and terrestrial ecosystems, including wetlands and riparian areas and upstream and downstream waters. In addition to wetland water quality functions, which enhance stream water quality, stream riparian areas perform a variety of critical water quality functions (see Table 4). These functions occur in conjunction with stream processes, such as flooding, as well as in riparian areas' roles as ecotones that moderate terrestrial influences on stream ecosystems. Interactions between streams and their riparian areas are described in the following descriptions of stream functions. As with wetlands, the specific water quality functions of streams are determined by their individual attributes as well as the interactions between individual streams and watershed variables such as climate, geology, and landscape. Therefore, some of the functions described here are not provided by all streams within the drainage network or are provided by different streams to varying degrees.

4.3.1. Flood Attenuation

Drainage networks perform flood attenuation functions through the short- and long-term storage of surface water and by promoting groundwater recharge. Flood attenuation functions are primarily performed by mid- and high-order streams, but also may be performed by headwater streams. Headwater streams are the primary routing mechanism for water from the upper to lower reaches of the watershed and these streams may decrease flood flows by promoting groundwater recharge and delaying water transport through temporary storage of water (Bullock and Acreman 2003; Nadeau and Rains 2007; Naiman and others 1992). Isolated wetlands in headwater areas may pond water and reduce total surface runoff through evapotranspiration and groundwater recharge (Leibowitz 2003). However, soils in headwater streams also may become saturated quickly, which may increase conveyance of rainfall through these channels to downstream waters, rather than providing upstream storage (Bullock and Acreman 2003). Although flows from headwater areas can contribute to increased flows downstream, downstream waters attenuate flood flows due to features such as larger floodplains. Therefore, the net effect of the drainage network is still to attenuate flood flows (Naiman and others 1992).

The primary flood attenuation functions of drainage networks are performed by floodplains. Floodplains receive overbank flow during periods of high flow and store water for short- and long-term periods, which slows water flows and decouples flows, thereby reducing flood peaks downstream. Contact between floodwaters and floodplain

sediments, reduces flow velocities through friction. Riparian vegetation and wetlands in floodplains also reduces flow velocities by providing topographic complexity and increasing surface roughness (Naiman and others 1992; Tabacchi and others 1998; Bullock and Acreman 2003). Floodplain wetlands and backwater habitats may pond water and reduce the volume of water that moves downstream (Sommer and others 2001; Bullock and Acreman 2003; Naiman and others 1992).

By spreading floodwaters over a larger surface area and reducing flow velocities, floodplains also increase groundwater recharge and evapotranspiration, which reduces flood magnitudes. Floodplains are significant groundwater recharge zones that receive and store water in alluvial aquifers, which later sustain stream flow during drier periods of the year (Naiman and others 1992; Poore 2003; Valett and others 2005).

Riparian vegetation growing on floodplains and in uplands also reduces flood flows through evapotranspiration, which includes water losses from canopy interception and evaporation, evaporation of water that reaches the soil, and water that is transpired by vegetation (Spence and others 1996). A portion of precipitation never reaches the ground because it is intercepted by vegetation and evaporated back to the atmosphere. In vegetated areas, storage through interception is a function of plant type and form and vertical and horizontal plant community density. In a densely vegetated riparian area little rainfall will actually reach the soil surface. Consequently, while interception is usually insignificant in areas with little or no vegetation, densely vegetated riparian areas can attenuate flood peaks through the process of interception (FISRWG 1998; Dunne and Leopold 1978). Riparian areas, with their characteristic plant community structural diversity have a high evapotranspiration potential. Coniferous forests generally have the highest leaf surface-area and thereby have the greatest potential for transpiration losses, followed in descending order by deciduous trees, shrubs, grasslands, and desert shrubs (Spence and others 1996).

4.3.2. Groundwater Recharge and Discharge

As noted above, floodplains recharge alluvial aquifers during periods of high flow. In addition to slowing flow velocities, which promotes infiltration, riparian vegetation on floodplains and in upland areas increases groundwater recharge and infiltration rates by increasing soil porosity, both by providing habitat for burrowing organisms, which create pore spaces, and by protecting the soil from the direct impact of raindrops, which can lead to loss of soil pore spaces (FISRWG 1998). Undisturbed soils in riparian forests can capture, absorb and store amounts of rainfall at rates much higher than disturbed soils (e.g., agriculture fields or construction sites) or grass turf or pasture (Palone and Todd 1998).

Headwater streams also provide a significant source of groundwater recharge. Because many headwater streams are ephemeral streams they are located above the groundwater table, so vertical flows tend to be in the downward direction into aquifers. Mid- and high-order streams also recharge groundwater through hyporheic zones during periods of high flow (Naiman and others 1992; Winter 2007; Nadeau and Rains 2007).

Groundwater contributions to surface flows, known as base flows, sustain stream flows in many mid-order and high-order streams, as well as some low-order headwater streams, throughout the year or during certain times of the year. Water stored in aquifers and hyporheic zones maintains base flows during drier periods of the year when stream levels drop below water tables (Naiman and others 1992; FISRWG 1998).

Groundwater recharge and hyporheic flows sustain a variety of plant and animal communities, including riparian vegetation and aquatic invertebrates, in floodplains and hyporheic zones, while groundwater discharge during dry periods is an important source of water for organisms in the stream channel (Dreesen and others 2002; Kondolf and others 2001; Brunke and Gonser 1997; Sedell and others 1990; Naiman and others 1992). Alluvial aquifers also provide water supplies for human uses.

4.3.3. Surface Water Supply and Replenishment

Streams store and transport water and also may supply water to other aquatic ecosystems. Stream flows and flood flows recharge floodplain wetlands and riparian communities, which support a variety of plant and animal species (Middleton and 2002; Kondolf and others 1996; Naiman and others 1992; Miller and others 1995). Streams also provide water for human uses both within channels and by recharging alluvial aquifers.

Headwater streams are the primary source of downstream surface water and both perennial and seasonal connectivity between upstream and downstream waters is important in maintaining water supply (Alexander and others 2007; Naiman and others 1992; Bunn and Arthington 2002). As described above, stream systems also store groundwater in fluvial aquifers and hyporheic zones, which then supply water to aquatic communities during drier periods.

Stream biota, such as riparian vegetation, are water users and therefore may reduce supplies available to other uses (e.g., through vegetative uptake and evapotranspiration) (Brown and others 2005). However, stream vegetation also performs functions that may increase the water storage capacity of stream systems. For example, vegetation provides resistance to flow, both from surface runoff and flood flows, which encourages soil infiltration and groundwater recharge. Vegetation also helps reduce erosive forces that can cause problems such as channel incision (Goldsmith and others 2001; Micheli and Kirchner 2002; Micheli and others 2004; Simon and Collison 2002; Booth 1991; Naiman and others 1992). When channels incise, water tables drop, decreasing access to water for a variety of users that depend on groundwater supplies (Brunke and Gonser 1997; Kondolf 1994; Castro 2003).

4.3.4. Sediment Transport and Storage

Natural stream channels adjust to their sediment and flow regimes to create stable channel forms that are able to move water and sediment effectively through the watershed. These channel forms help maintain a dynamic equilibrium between sediment and discharge that prevents excessive erosional and depositional instabilities, which can

lead to water quality problems and the destruction of stream habitats, such as pools (Riley 2003; Naiman and others 1992).

A variety of features within the stream system store sediment for short- and long-term periods and help maintain this dynamic equilibrium. Headwater streams provide the majority of downstream sediment, but also store a significant amount of sediment in upper watershed areas. Sediment storage in the upper watershed is a product of relatively low stream power, combined with large woody debris inputs from riparian vegetation and boulders in channels, which capture and store sediment (Naiman and others 1992; Reid and Ziemer 1994; Richardson and Danehy 2007; Grant and Wolff 1991). Floodplains in mid- and high-order streams are depositional features that capture sediment during high flows, reducing suspended sediments and stream bed load (McEwen and Robbins 2003; Ritchie and others 2004; Valett and others 2005).

Deposition on floodplains is increased by riparian vegetation, which provides resistance to flow and encourages deposition by decreasing flow velocities. Riparian vegetation also helps stabilize soils in streambanks and floodplains by reducing scouring forces and increasing the sheer strength of soil through roots (Goldsmith and others 2001; Micheli and Kirchner 2002; Micheli and others 2004; Tooth 2000). Vegetation on hill slopes also stabilizes soil by reducing the direct impact of rain and runoff on soil, which can mobilize sediments, through living and dead vegetation (e.g., leaf litter); by providing soil strength through roots; and by enhancing the internal drainage of soils, which helps prevent excess soil moisture and resulting slope instabilities (Goldsmith and others 2001).

4.3.5. Nutrient and Organic Matter Cycling

Nutrient and organic matter cycling in streams happens in the longitudinal, lateral, and vertical dimensions. In the longitudinal direction, headwater streams are significant sources of nutrients and organic matter to downstream waters. Headwater streams are the primary routing mechanism for vegetative material (e.g., large woody debris) from hill slopes to downstream waters and the majority of nutrients and organic matter in large streams is transported from upstream areas (Alexander and others 2007; Pinay and others 2002; Naiman and others 1992; Reid and Ziemer 1994; Pinay and others 1999; Richardson and others 2005; Richardson and Danehy 2007). Headwater streams also are sources of aquatic insects, which provide food sources to aquatic biota in downstream waters (Richardson and Danehy 2007). Because many headwater streams are intermittent and ephemeral, nutrients and organic matter may build-up in stream channels before it is transported downstream during episodic, seasonal storms and flows that provide longitudinal hydrologic connections (Richardson and others 2005).

In addition to acting as sources of nutrients and organic matter and transporting these materials downstream, headwater streams perform important nutrient and organic matter processing functions. Because headwater streams are small, they have a high ratio of stream surface area to water volume, which increases contact between water and sediments. Similar to wetlands, this contact allows biogeochemical processes to occur, such as denitrification, which reduce nutrient concentrations. As stream size increases, contact between water and sediment decreases, and large stream channels are less

efficient at removing nutrients than are smaller ones (Pinay and others 2002; Alexander and others 2000; Sweeney and others 2004; Jacobs and Gilliam 1985). Aquatic invertebrates in headwater streams also process organic matter (e.g., into fine particulate organic matter) and transform it into forms that are more easily used by downstream species (Richardson and others 2005; Vannote and others 1981). Processing of organic matter continues through the drainage network such that aquatic organisms in mid-order streams transform and export organic matter to low-order streams. In this way energy use efficiency is maximized from upstream to downstream waters as different organisms transform upstream organic matter inputs into biomass (Vannote and others 1981).

Although most transport of nutrient and organic matter in streams occurs in the downstream direction, transport can also occur in the upstream direction when animals travel from downstream to upstream waters and deposit nutrients and organic matter. For example, salmonids migrate to upstream areas to spawn before dying. This introduces large quantities of organic matter, which originated in marine environments, to medium and large rivers. Some salmonids also may spawn in small streams where they significantly influence stream nutrient dynamics (Richardson and others 2005).

In the lateral direction, nutrient and organic matter is provided by and exchanged with riparian vegetation and floodplains adjacent to channels. Surface runoff from the watershed also is a significant source of nutrients. Organic matter may be provided by vegetation in the form of large woody debris and leaf litter that falls into stream channels. These inputs are most important in headwater and mid-order channels and, per unit area, smaller streams tend to have more organic matter than do larger streams (Richardson and others 2005; Naiman and others 1992; Kondolf and others 1996). In high-order streams, vegetation input may be less important, but overland flow may provide a significant source of nutrients. Floodplains, riparian vegetation, and wetlands that receive overland flow before it reaches stream channels may moderate nutrients contributions from these flows by capturing and storing or transforming nutrients before they reach channels (Naiman and others 1992; Pinay and others 2002; Sweeney and others 2004; Wigington and others 2005; Bedard-Haughn and others 2004; Meals 2001; Jacobs and Gilliam 1985).

Floodplains and riparian vegetation and wetlands on floodplains play important roles in nutrient and organic matter cycles during flood flows. Productivity on floodplains may be high and these areas provide important food sources to aquatic biota when inundated (Schemel and others 2004; Sommer and others 2001; Sommer and others 2004; Ribiero and others 2004; Bayley 1991; Junk and others 1989; Junk and Wantzen 2003; Gladden and Smock 1990). Floodplains also absorb nutrients from floodwaters and reduce nutrient concentrations in downstream waters. Similar to in headwater streams, increased contact between floodwaters and floodplain sediments provides increased opportunities for biogeochemical processes, such as denitrification, to occur. Wetland and riparian vegetation also uptake nutrients and contribute to nutrient transformation (Groffman and Crawford 2003; Kang and Stanley 2005; Junk and others 1989; Pinay and others 2002; Schemel and others 2004; Tabacchi and others 1998; Valett and others 2005; Jacobs and Gilliam 1985). As with wetlands, alternating wet-dry cycles on floodplains create both

aerobic and anaerobic conditions, which may increase decomposition of organic matter and nutrient loss through processes such as denitrification (Pinay and others 2002; Macheferet and Dise 2004; Tabacchi and others 1998; Valett and others 2005).

Finally, nutrient and organic matter cycling occurs in the vertical dimension between stream channels and groundwater through hyporheic zones. Groundwater with high concentrations of nutrients or organic matter may be a significant source of these substances to streams through groundwater discharge. Hyporheic zones may filter and store nutrients and organic matter from groundwater or stream water inputs as well as provide sources of these materials to streams, such as during low flows when water stored in the hyporheic zone recharges channels (Brunke and Gonsler 1997; Pinay and others 2002; Naiman and others 1992; Stanford and Ward 1988).

4.3.6. Pollutant Filtration

In addition to storing and removing sediment and nutrients from runoff and floodwaters, floodplains and riparian vegetation can remove a variety of other water pollutants, such as heavy metals and bacteria from the water column (Atwill and others 2002; Meals 2001; Tate and others 2004; Schuster and Grismer 2004; Reuter and others 1992; Verhoeven and Meuleman 1999).

4.3.7. Temperature and Microclimate Control

Streams maintain a variety of temperatures and microclimates that are needed by stream biota, such as fish and amphibians. Stream water temperatures are affected primarily by solar radiation and groundwater inputs. Increases or decreases in stream temperature as a result of solar radiation, groundwater input, or other sources are transmitted downstream so the upper reaches of a stream and the tributaries to a stream may play an important role in its thermal regime. Confluences between streams and their tributaries provide mixing zones that may increase or decrease water temperatures in the main channel as a whole or may provide local thermal refugia (Johnson 2004; Poole and Berman 2001; Shrimpton and others 2000; Naiman and others 1992; Tockner and others 2000).

Riparian vegetation that provides shade to streams may moderate local and downstream temperatures by blocking solar radiation. Generally, streams that have wider corridors of riparian vegetation are more insulated from solar radiation and have lower mean and maximum water temperatures. The effect of riparian vegetation on stream temperatures is generally greatest on narrower streams where the vegetation is able to shade the entire stream channel. Narrower streams also have lower stream surface areas with which to absorb solar radiation and, as a result, may heat up more slowly (Poole and Berman 2001; Johnson 2004; Shrimpton and others 2000; Kiffney and others 2003; Naiman and others 1992; Tabacchi and others 1998; Welsh and others 2005). Riparian vegetation also maintains stream microclimates that have higher humidity and cooler air temperatures (Johnson 2004; Welsh and others 2005). Although vegetation reduces maximum water temperatures compared to unvegetated streams, it may increase minimum temperatures by providing insulation that slows heat loss during the night. In this way, vegetation

reduces diurnal fluctuations between low and high temperatures, which creates less extreme stream temperature environments (Poole and Berman 2001; Johnson 2004).

Groundwater also affects stream temperatures. Generally, groundwater is cooler than surface water because it is insulated from solar radiation. Therefore, where groundwater discharges into streams, it may create thermal refugia for aquatic species that require cooler water temperatures (Story and others 2003; Tockner and others 2000). Hyporheic zones also may moderate stream temperatures through heat exchange during different times of the day. When water temperatures are warmer during the daytime, hyporheic zone water may provide a source of cooler temperatures. During the nighttime, however, heat that was transferred during the day from the channel to the hyporheic zone may be radiated back into the channel. In this way, hyporheic zones, like riparian vegetation, help moderate stream temperatures and reduce diurnal fluctuations (Johnson 2004; Naiman and others 1992; Poole and Berman 2001; Story and others 2003).

During flooding, floodplains may provide different thermal regimes than channels, which provide habitat for different species. Topographic complexity on the floodplain creates thermal heterogeneity and a diversity of habitats. Shallower water depths on floodplains may create warm water habitats, but backwater habitats on floodplains also may be fed by groundwater discharge and provide cool thermal refugia during the summer (Junk and Wantzen 2003; Tockner and others 2000).

4.3.8. Maintenance of Plant and Animal Communities

Streams provide diverse habitats for a variety of plant and animal species and help support and maintain species biodiversity. In-channel habitats include pools, riffles, and bars and support fish, aquatic invertebrates, and other organisms. Headwater, transport, and depositional regions also provide different types of habitat structures and a diversity of habitat conditions, such as different energy sources and hydrologic and thermal regimes, which influence species assemblages (Vannote and others 1981).

Headwater streams are often located in forested areas and generally have cool water temperatures, which make them important habitat for a variety of temperature-sensitive species, such as amphibians. High organic matter inputs and low light conditions also support a variety of invertebrates. Similar to wetland biota, species that utilize headwater streams often must be adapted to periodic dry periods during the year. As a result, organisms such as fish, which require water year round or deeper water depths, may not be found in many headwater streams. However, while fish abundance is often lower in headwater streams than in other areas of the drainage network, headwater streams may provide important thermal refugia for species that require cooler water temperatures during the summer as well as rearing habitat for fish that later move into perennial channels. Headwater streams also may support distinct communities of riparian vegetation, which contribute to stream biodiversity (Richardson and Danehy 2007; Reid and Ziemer 1994).

Mid- and high-order streams may support a variety of plant and animal communities both within channels and in floodplain habitats. Stream channels provide movement corridors

and dispersal systems that connect organisms, such as fish, with resources and refuges (Junk and others 1989). Floodplains also provide food sources and habitat during high flows. Many fish species utilize floodplains as rearing habitats, including rare and endangered species. Native species may be adapted to the specific timing of annual floods and require access to floodplains during certain stages of their life cycles (Ribiero and others 2004; Sommer and others 2004; Sommer and others 2001). Seasonal and permanent floodplain wetlands also may provide habitat for a variety of organisms, including migratory waterfowl (Sommer and others 2001).

Floodplains support specific plant communities that are adapted to periodic flood disturbance, including the physical force of floods and the chemical conditions created by periodic inundation and soil saturation. As with animals, plants are often adapted to the specific flood regime of a stream and the spatial and temporal pattern of disturbance helps maintain plant communities. Floodplains also tend to support high species richness due the diversity of conditions created by fluctuating water levels and flood disturbance. Although floodplains support a variety of plants that grow in upland areas, they also support many species of riparian vegetation that are only found within the stream environment (Bendix and Hupp 2000; Baattrup-Pedersen 2005; Décamps 1993; Kondolf and others 1996; Lite and others 2005; Miller and others 1995; Naiman and others 1992; Mouw and Alaback 2003; Nilsson and others 1991; Tickner and others 2001; Tockner and Stanford 2002; Bravard and others 1986).

Corridors of riparian vegetation along streams provide significant habitat to a variety of organisms throughout the watershed. Many headwater stream organisms, including water-dependent terrestrial animals, such as various species of amphibians, mammals, birds, and reptiles, rely on adjacent forested areas for habitat for at least part of their life cycles. The extent of areas utilized by these organisms varies from relatively narrow corridors to much wider areas, depending on species (Duncan 2003; Semlitsch 1998; Semlitsch and Bodie 2003; Kondolf 1996; Perkins and Hunter 2006; Spackman and Hughes 1995).

Finally, hyporheic zones provide habitat, including rearing areas and refugia during flood disturbance, for aquatic invertebrates and microorganisms that are important to food webs and biochemical processes in streams (Brunke and Gonser 1997; Sedell and others 1990; Stanford and Ward 1988).

5. DISCUSSION

As described throughout this report, the physical forms, ecological processes, and water quality functions of natural stream and wetland systems interact in space and over time to protect and enhance watershed-wide water quality. Key concepts that have been developed in this report include:

- The hydrologic regimes of stream and wetland systems, including the seasonality of flows and temporal changes in longitudinal, lateral, and vertical connectivity, create and maintain the physical forms of these systems, and drive ecological processes, which determine their water quality functions;
- The transitional zones, or riparian areas, between streams and wetlands and their associated terrestrial environments play critical roles in protecting and enhancing water quality by maintaining natural ecological processes, such as contributions of water, materials, and organisms from terrestrial environments;
- Individual stream and wetland systems contribute to the water quality of other aquatic ecosystems through permanent and periodic surface and subsurface hydrologic connections, and healthy systems perform functions that protect and enhance watershed-wide water quality throughout the year (e.g., by attenuating flood waters during the wet season and by maintaining stream base flows through groundwater discharge during the dry season); and
- Natural temporal and spatial heterogeneity in climate, geology, and landscape within the watershed and within individual stream and wetland systems support a diversity of habitats and water quality functions.

As discussed in the introduction, a majority of stream and wetland systems in California have been degraded or lost through a variety of land use practices. Although this report has not focused on the impacts of land uses on stream and wetland system conditions, an underlying theme has been that key watershed variables and ecological processes must be protected or restored in order to protect and enhance the water quality functions of stream and wetland systems.

A significant body of scientific literature shows that land use practices that alter key environmental variables and ecological processes in watersheds and stream and wetland systems can impair the ability of these systems to perform beneficial water quality functions. Such impairments impact both human- and non-human land and water users (e.g., Pinay and others 2002; Trimble 2003; Kondolf 1994; Booth 1990; Booth 1991; Booth and others 2002; Booth and Jackson 1997; Paul and Meyer 2001; Zedler 2003; Constantine and others 2005; Kauffman and others 1997; Moore and others 2005). However, the scientific literature also shows that by implementing appropriate management techniques and restoration programs, many of these impacts can be prevented, reduced, or reversed (e.g., Rice 1999; Sommer and others 2001; FISRWG

1998; Riley 2003; Gregory and Chin 2002; Breaux and others 2005; Griggs and Paris 1982).

Existing stream and wetland policies and programs in California and in the North Coast Region may be insufficient to fully protect the water quality functions of stream and wetland systems (e.g., CA SWRCB 2003; Ambrose and others 2006). To address these concerns, it is necessary to develop policies and programs that recognize the physical forms and ecological processes that create water quality functions, and to recognize the diversity of functions that these systems provide. Furthermore, it is necessary to take sufficiently broad views of the watershed and stream and wetland system landscapes in order to identify the cumulative contributions of different forms, processes, or activities that support or may impact water quality functions (Reid 1998; Benyamine and others 2004; Ambrose and others 2006).

In addition to understanding existing and ongoing impacts on stream and wetland systems, it is important to recognize potential future changes to these systems that may impact their functioning within watersheds. For example, over the next years and decades, climate change in California is predicted to increase both the frequency and severity of storms and floods during the winter, and to create water supply shortages, primarily due to a reduced snow pack and earlier timing of snow melt, during the normally drier summer months. Sea level rise as a result of climate change also will impact coastal ecosystems and water supplies (e.g., through salt water intrusion into groundwater aquifers) and may contribute to increased flooding in inland areas. Although the specific future impacts of these changes on stream and wetland system functions are unknown and may vary between watersheds, it is likely that the state will experience reduced quality and reliability of water supplies (CA DWR 2006; Traut 2005; Greer and Stow 2003; Gleick 2000). Under these conditions, the abilities of protected and restored stream and wetland systems to enhance water supply, such as through groundwater recharge, and to attenuate floods may become increasingly important.

As highlighted earlier, it is often costly and difficult, if not impossible, to restore or recreate lost or degraded stream and wetland system functions (Zedler and Kercher 2005; Zedler and Callaway 1999; Kauffman and others 1997; Kondolf 1998; Booth and Jackson 1997). By understanding how stream and wetland systems function in the watershed, it may be possible to develop appropriate management techniques that protect and enhance water quality functions; improve the success of restoration projects; and help prevent future water quality impacts or provide a degree of mitigation for impacts from continued watershed development and climate change.