What Is the Countywide Plan?

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The Marin Countywide Plan guides the conservation and development of Marin County. California law requires every city and county in the state to prepare and adopt a comprehensive long-range general plan for the physical development of the jurisdiction. While the law establishes specific requirements for the contents of the general plan, within that framework each community has the latitude to design its own future. Through extensive public participation, individual residents and representatives of many organizations have contributed to the creation of this document.

INTRODUCTION

Marin County has long maintained a tradition of environmental planning balanced with the recognition of ~~linking~~ the essential linkages between land use ~~with~~, transportation, and the need for affordable housing. The first Countywide Plan, adopted in 1973, remains a visionary document.

In the Countywide Plan the 606 square miles of land and water comprising Marin County are designated as an environmental unit consisting of regions called corridors. Each corridor is based on specific geographical and environmental characteristics and natural boundaries formed by north- and south-running ridges (see Map 1-2). In the 1973 Plan, the following three environmental corridors were designated:

The Coastal Recreation Corridor (renamed the Coastal Corridor in this update) is adjacent to the Pacific Ocean and is primarily designated for federal parklands, recreational uses, agriculture, and the preservation of existing small coastal communities.

"Planning is best done in advance."

-- Anonymous

The Inland Rural Corridor in the central and northwestern part of the county is primarily designated for agriculture and compatible uses and for preservation of existing small communities.

The City-Centered Corridor along Highway 101 in the eastern part of the county near San Francisco and San Pablo Bays is primarily designated for urban development and for protection of environmental resources. This corridor is divided into six planning areas generally based on watersheds.

The environmental features which focus development within the City-Center Corridor have been updated and clarified as depicted in Map 3-1a and 3-1b.

For over 30 years, these geographic designations have been widely recognized as the organizing principle of the Countywide Plan and have been modified only slightly in the course of three updates of the Plan. In this update of the Plan, the following fourth environmental corridor has been designated:

The Baylands Corridor, encompassing lands along the shoreline of San Francisco and San Pablo Bays, provides heightened recognition of the unique environmental characteristics of this area and the need to protect its important resources. The area generally contains marshes, tidelands, and diked lands that were once wetlands or part of the bays, and adjacent, largely undeveloped uplands. Non-tidal portions of small, privately-owned parcels have not been included in the Baylands Corridor.

History

The Countywide Plan, first adopted in 1973, was revised twice before the current update. The first update was adopted in 1982 and the second in 1994.

The 1973 Plan established the three environmental corridors. The Plan also focused on balancing environmental protection with the needs of present and future residents for housing, jobs, and recreation, and on the need for transportation options to reduce dependence on automobile transportation. ~~A f~~Freeways and sprawling major development projects were proposed for pristine West Marin prior to adoption of the first Countywide Plan.

The public process culminating in the adoption of the Plan began a tradition of cooperation and coordination between the County and the 11 cities and towns. The public body that reviewed and commented on the Plan included elected officials, planning commissioners, and citizens representing all the cities and towns as well as the County. This was a plan for the whole county, not just the unincorporated area.

"When one tugs at a single thing in nature, he finds it attached to the rest of the world."

-- John Muir

The 1982 Plan, which was reviewed by a committee composed of elected officials from all 12 jurisdictions in the county, identified urban service areas around cities as suitable for annexation because urban levels of service could be provided in these locations. Recognizing funding limitations, the Plan included modest increases in transportation service and encouraged less costly transportation solutions, such as carpooling. The 1982 Plan also focused on energy conservation and the use of renewable energy sources. In 1993 the Countywide Planning Agency was formed by a joint powers agreement among all the cities/towns and Marin County to address planning and development issues of countywide concern and to review and comment on the Countywide Plan as well as the general plans of the cities and towns.

The 1994 Plan was a comprehensive update using the newly available technologies of geographic information system (GIS) and transportation modeling to identify development potential and transportation capacity. Parcel-specific maps of land use designations were created. The 1994 Plan included an Agriculture Element and a Parks and Recreation Element. An Economic Commission was established to provide advice on economic issues and to write an Economic Element. (See Map 1-1.)

In 2005, the scope of the Countywide Plan has been revised to reflect the theme of planning sustainable communities and to recognize the adoption of Marin County government's first strategic plan in 2001, which seeks to achieve excellence in public service. This latest version has also been enlarged to include such social equity and cultural issues as public health, environmental justice, child care, the economy, and arts and culture. This update also benefited from widespread community input resulting from a series of public outreach and working group meetings, as well as public access to the Countywide Plan website, prior to drafting Plan revisions.

Framework: Planning Sustainable Communities

Guiding Principles

To begin the current Countywide Plan update process, a working group of local residents was convened to help prepare guiding principles. The efforts of this group resulted in the formation of the principles listed below.

Planning Sustainable Communities is the overarching theme of the Marin Countywide Plan. Marin County government is committed to lead by example, promote public participation, and work in community partnerships to protect the natural systems that support life and improve our quality of life.

To design a sustainable future, we* will strive to:

1. Link equity, economy, and the environment locally, regionally, and globally.

We will improve the vitality of our community, economy, and environment. We will seek innovations that provide multiple benefits.

2. Minimize the use of finite resources and use all resources efficiently and effectively.

We will reduce overall and individual consumption, and reuse and recycle resources. We will reduce waste by optimizing the full life-cycle of products and processes.

3. Reduce the use and minimize the release of hazardous materials.

We will continue to make progress toward eliminating the release of substances that cause damage to natural systems. We will use a precautionary approach to prevent environmentally-caused diseases.

4. Reduce greenhouse gas emissions that contribute to global warming.

We will join other communities addressing climate change by lowering our greenhouse gas emissions. We will increase the use of renewable resources, which do not have a negative impact on the earth's climate.

5. Preserve our natural assets.

We will continue to protect and restore open space, wilderness, and damaged ecosystems, and enhance habitats for bio-diversity.

6. Protect our agricultural assets.

We will protect agricultural lands and work to maintain our agricultural heritage. We will support the production and marketing of healthy, fresh, locally-grown food.

* "We" refers to the larger Marin community including County government, other governmental bodies, local residents, businesses, employees, and visitors.

7. Provide efficient and effective transportation.

We will expand our public transportation system to better connect jobs, housing, schools, shopping and recreational facilities. We will provide affordable and convenient transportation alternatives that reduce our dependence on single-occupancy vehicles, conserve resources, improve air quality, and reduce traffic congestion.

8. Supply housing affordable to the full range of our members of the workforce and diverse community.

We will provide and maintain well-designed, energy-efficient, diverse housing close to job centers, shopping and transportation links. We will pursue innovative opportunities to finance senior, workforce, and special needs housing, promote infill development, and reuse and redevelop underused sites.

"Never doubt that a small, group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has."

-- Margaret Mead

9. Foster businesses that create economic, environmental, and social benefits.

We will support locally owned businesses and retain, expand, and attract a diversity of businesses that meet the needs of our residents and strengthen our economic base. We will partner with local employers to address transportation and housing needs.

10. Educate and prepare our workforce and residents.

We will make high-quality education, workforce preparation, and lifelong learning opportunities available to all sectors of our community. We will help all children succeed in schools, participate in civic affairs, acquire and retain meaningful employment, and achieve economic independence.

11. Cultivate ethnic, cultural, and socioeconomic diversity.

We will honor our past, celebrate our cultural diversity, and respect human dignity. We will build vibrant communities, and foster programs to maintain, share and appreciate our cultural differences and similarities.

12. Support public health, safety, and social justice.

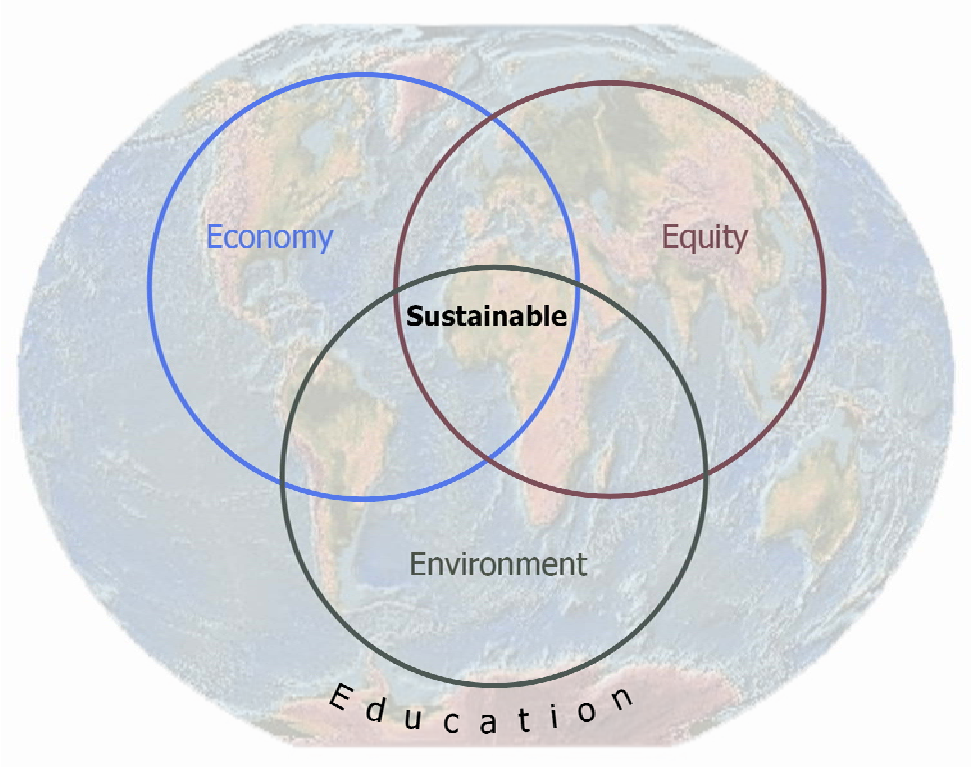
We will live in healthy, safe communities and provide equal access to amenities and services. We will particularly protect and nurture our children, our elders, and the more vulnerable members of our community.

What is Sustainability?

For the purpose of the Countywide Plan, sustainability is defined as aligning our built environment and socioeconomic activities with the natural systems that support life. In the long run, sustainability means

adapting human activities to the constraints and opportunities of nature. Central to this definition is meeting the needs of both the present and the future.

The symbol below is a graphic representation of a sustainable community. Each ring represents one of the Three E's: the Environment, Economy, and social Equity. Each of these rings is connected to, and dependent upon, the others.



During the late 1970's and early 1980's, a number of independent scientists, activists and other policy makers worldwide began working on responses to problems where issues of the environment were linked with human development. They began to use the term "sustainability" to describe the goal of joining economic prosperity with ecological health.

In 1987, the United Nations' World Commission on Environment and Development released a report, "Our Common Future," which brought the term sustainability into widespread use. In defining sustainability, the United Nations' World Commission offered these five key concepts:

- The needs of the future must not be sacrificed to the demands of the present.
- Humanity's economic future is linked to the integrity of natural systems.
- The present world system is not sustainable because it is not meeting the needs of many, especially the poor.
- Protecting the environment is impossible unless we improve the economic prospects of the Earth's poorest peoples.

- We must act to preserve as many options as possible for future generations, since they have the right to determine their own needs for themselves.

The American Planning Association identified the following four objectives in planning for sustainability:

1. Reduce dependence upon fossil fuels, extracted underground metals and minerals.
2. Reduce dependence on chemicals and other manufactured substances that can accumulate in Nature.
3. Reduce dependence on activities that harm life-sustaining ecosystems.
4. Meet the hierarchy of present and future human needs fairly and efficiently.

"We did not inherit the land from our fathers. We are borrowing it from our children."

-- Amish Proverb

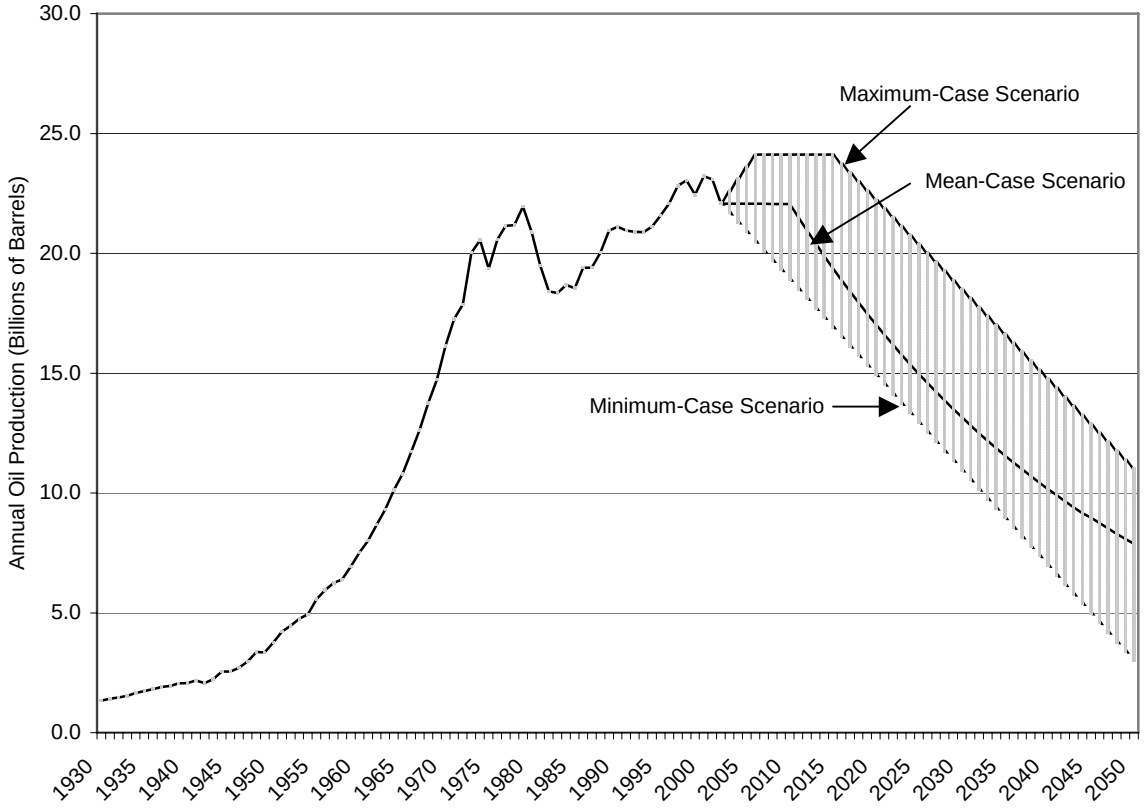
Why plan sustainable communities?

Current trends have demonstrated the need for planning healthy, safe, and sustainable communities. One trend is the increasing impact of greenhouse gases on the world's climate. Another trend is the decreasing supply of resources that support life.

Climate Change

Much of our built environment is now powered by fossil fuels. Fossil fuel use creates the greenhouse gases that contribute to global warming. Increasing consequences of global warming raise concerns about the need to reduce the use of fossil fuels. On average, climate models suggest about a 3 degree rise in global temperature over the next 50 to 100 years.

Figure 1–1 Global Oil Production 1930-2050:
Maximum, Minimum, and Mean-Case Scenarios



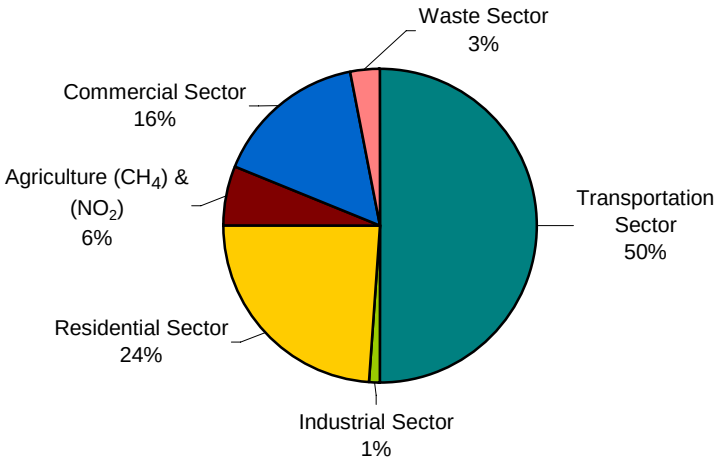
Source: 2004 C.J. Campbell; Marin County CDA

As Figure 1–1 depicts, oil production is projected to begin a rapid decline sometime before 2020. This, combined with the negative impact of fossil fuel use on the climate, prompts the need to shift away from the use of fossil fuel.

The impact of global warming is compounded by a decreasing resource base. Water, forests, and productive farm land are diminishing. Social inequities mount along with competition for natural resources. Equitably providing the means for prosperity, while also improving environmental quality is a core challenge.

Figure 1-2 illustrates the distribution of greenhouse gas emissions countywide by sector. This information is useful for developing policies and programs to reduce Marin's contribution to greenhouse gases.

Figure 1–2 Countywide Greenhouse Gas Emissions, 2000



Source: 2003 Economic Competitiveness Group, Inc.

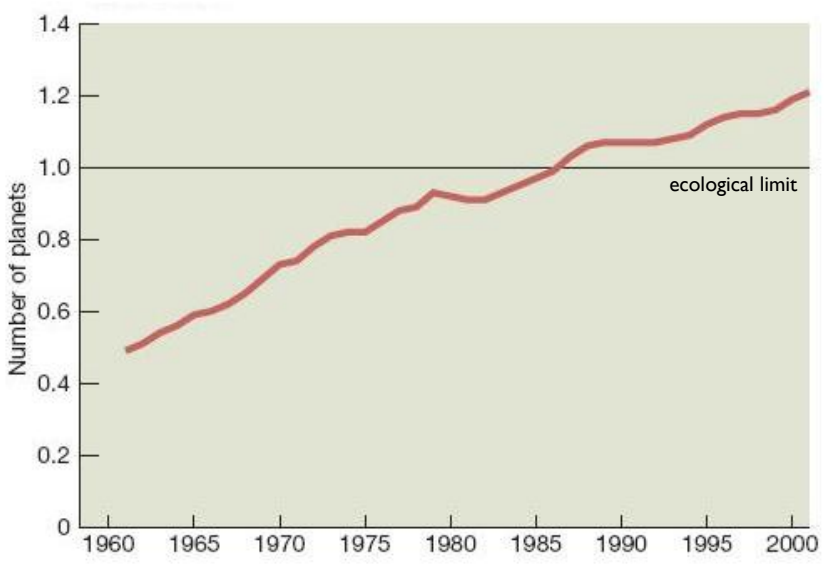
Resource use

Research about ecological sustainability increasingly indicates that the worldwide use of resources is exceeding the Earth's capacity to renew them. This is driven largely by energy and materials consumption in the United States and other industrialized nations and, more recently, increased levels in developing nations. The Living Planet Report, issued in 2004 by the World Wildlife Fund, describes how in the past 30 years human demand on natural resources has increased 160 percent while ~~the ability of natural systems to renew themselves~~ the health of natural systems (as measured by loss of wild species populations) has declined 40 percent.

"In today's world. . . we need to be sensitive to the concerns of others. . . no one can afford to think in purely local terms."

-- Kofi Annan

Figure 1–3
Humanity's Ecological Footprint



Source: 2004 World Wide Fund for Nature

To learn more about the ecological footprint go to: www.footprintnetwork.org or:www.redefiningprogress.org

The ***ecological footprint*** measures the use of natural resources against the planet's actual biocapacity, its ability to supply these resources. It can be calculated for individuals, regions, countries, or the entire Earth and is expressed as the number of ~~acres of biologically productive area~~ global acres (acres with world average biological productivity)that it takes to support one person. Given the current global population, about 4.5 global acres are available to support each individual on Earth. When humanity's footprint exceeds the amount of biocapacity, an over-use of natural capital occurs. ~~Currently, as illustrated in Figure 1–3, humanity's ecological footprint has breached ecological limits.~~Figure 1–3 shows that since the mid-1980's, humanity's demand for ecological resources has exceeded the Earth's supply each year.

"Plans are the dreams of the wise."

-- German proverb

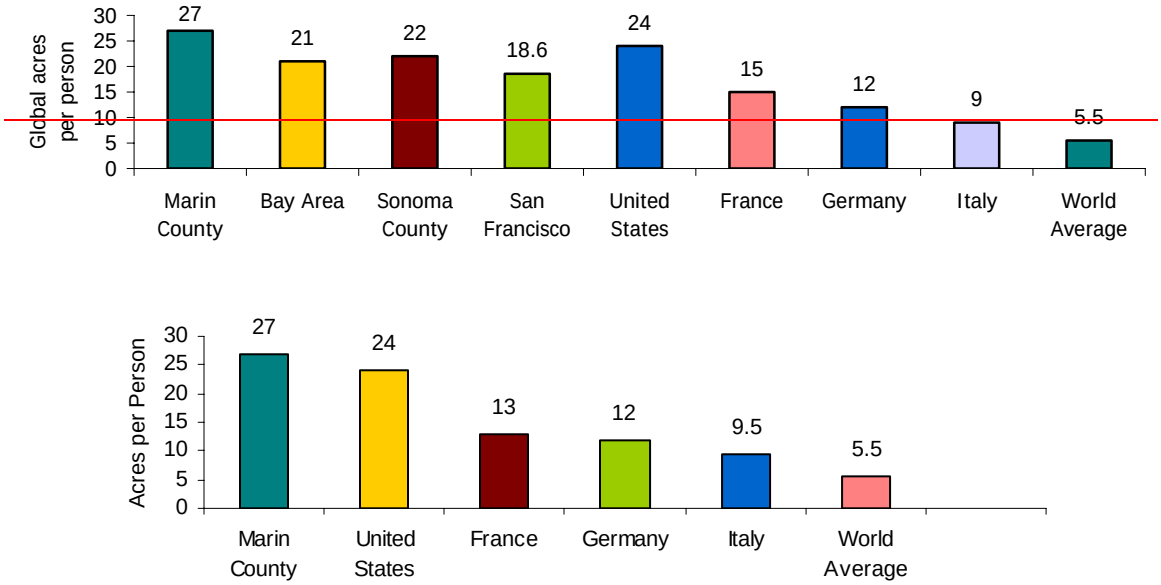
For example, as Figure ~~1–5~~1–4 illustrates, the average American uses 24 acres per capita~~. The average San Francisco Bay Area resident requires 20.9 acres~~, while the average Marin resident requires 27 global acres. Other western democracies such as France, Germany and Italy have footprints of ~~15~~13, 12 and 9 global acres per person, respectively.

Figure 1–5 shows the breakdown of Marin County's footprint

by the type of area used. The largest component is "energy land," the area of unharvested forest required to absorb the carbon diozide that is produced when burning fossil fuels.

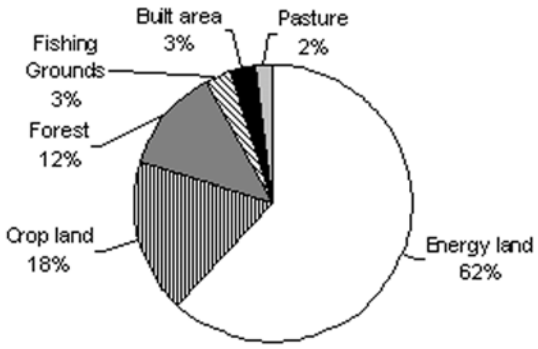
Figure 1-6 shows the amount of land required by Marin's footprint. The inner circle on this figure shows the am0ount of land that would be required if Marin residents had the same footprint as residents of Italy. Figure 1-7 shows the number of earths that would be required if every one in the world had the footprint of a selected Bay Area county.

Figure ~~1–6~~1–4
Ecological Footprint Comparison



Sources: Redefining Progress, Sustainable Sonoma County, World Wide Fund for Nature

Figure ~~1–4~~1–5 Ecological Footprint of Marin County, 2004



Source: 2004 Redefining Progress

Figure ~~1-5~~1–6 ~~Marin County's Ecological~~ Footprint Land Requirements

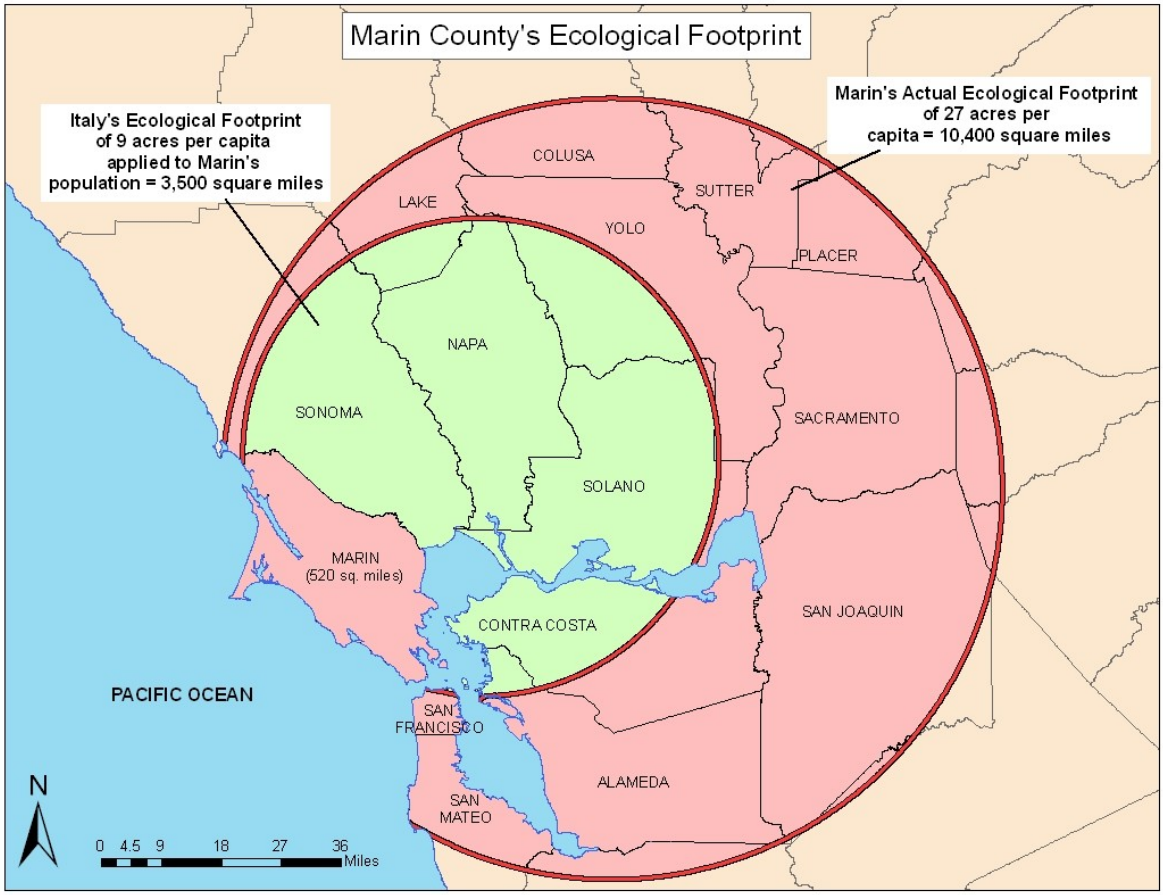
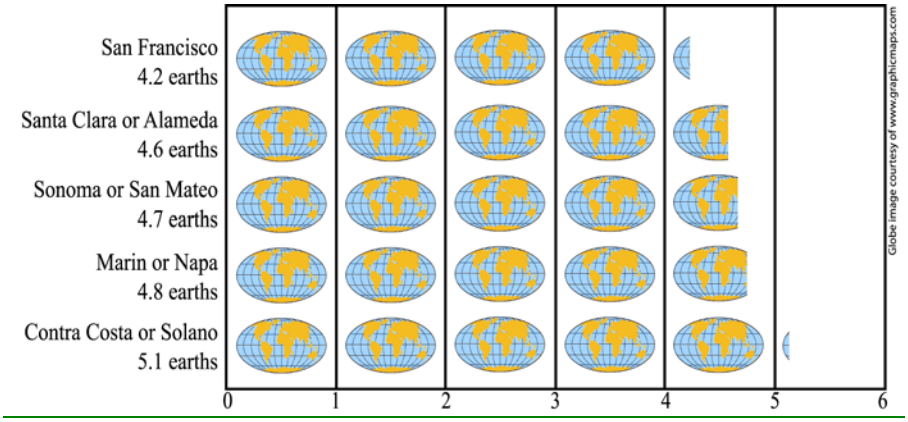


Figure 1-7 Number of Earths required if the World Population footprint equaled a Bay Area county



Planning sustainable communities is of global importance, as distant decisions can affect the health of natural systems and consequently human well-being even in faraway places. Furthermore, the carrying capacity of an ecosystem, city, or bioregion is also affected by land use planning and human resource consumption.

"We cannot direct the wind, but we can adjust the sails."

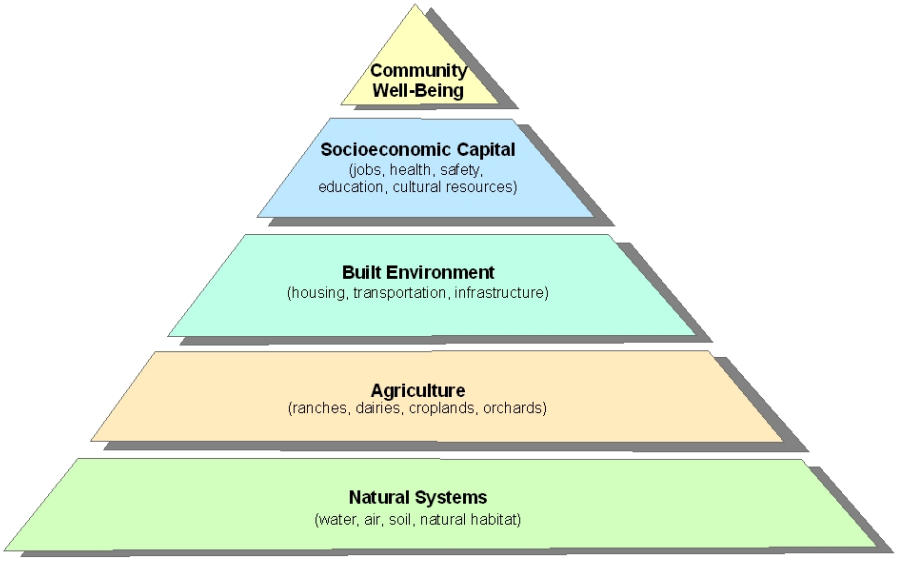
-- Anonymous

How can we plan sustainable communities?

Marin County is a major contributor to the Bay Area's regional open space and agricultural greenbelt, and the Countywide Plan establishes land use policies intended to provide a balanced mix of jobs and housing. A strategic infill approach that supports ~~the provision of~~ affordable housing for members of the workforce housing at selected mixed-use locations near existing jobs and transit, along with an emphasis on green building and business practices, offers Marin communities a way to carry out the three E's of sustainability.

During the development of this Plan, a conceptual framework designed by the economist Herman Daly was considered that integrates natural systems, social systems and human aspirations illustrated as a pyramid. As modified below to more closely correlate to the organization of the Countywide Plan, the foundation of this pyramid consists of natural systems, such as water, air, soil, and natural habitats that support life. The illustration depicts the mutually supportive relationship of natural and built environments that, along with economic and social capital, provide the means to achieve individual and community well being.

FRAMEWORK FOR SUSTAINABILITY



Daly's conceptual framework has three principles:

1. Renewable resources (such as groundwater, soil and fish) should not be used faster than they regenerate.
2. Non-renewable resources (such as minerals and fossil fuels) should not be used faster than renewable substitutes for them can be put into place.
3. Pollution and waste should not be emitted faster than natural systems can absorb, recycle or render them harmless.

To accomplish this it will be necessary to make significant changes in the way communities process and consume resources, a shift sometimes referred to as an "ecological U-turn." Towards this end, it is intended that the non-binding targets listed under plan implementation will be periodically monitored and reevaluated during future Countywide Plan updates throughout the 21st century.

The **Precautionary Principle**, another conceptual framework considered during the preparation of the Plan**,** carries the sense of foresight and preparation, and is the common sense idea behind many adages: "Be careful." "Better safe than sorry." "Look before you leap." "First do no harm." Historically, many environmentally harmful activities have only been stopped after they have resulted in environmental degradation or serious harm to many people. The Precautionary Principle is an approach characterized by minimizing or eliminating potential hazards at the onset of an activity instead of the approach that determines an "acceptable level of harm." In addition, the Precautionary Principle utilizes full cost accounting to assess the potential costs and benefits of a given activity or product.

The California Office of Planning and Research has also published General Plan Guidelines that include information regarding sustainable development. The Countywide Plan has been prepared consistent with these guidelines.

Countywide Goals

Countywide goals reflect core community values and identify what fundamental outcomes are desired. Although these overarching goals are not quantifiable or time dependent, implementation of the policies and programs of the Countywide Plan is intended to assist the larger Marin community in achieving the following:

- **A Preserved and Restored Natural Environment.** Marin watersheds, natural habitats, wildlife corridors, and open space will be protected, restored, and enhanced.
- **A Sustainable Agricultural Community.** Marin's working agricultural landscapes will be protected and the agricultural community will remain viable and successfully produce and market a variety of healthy foods and products.
- **A High-Quality Built Environment.** Marin's community character, the architectural heritage of its downtowns and residential neighborhoods, and the vibrancy of its business and commercial centers will be preserved and enhanced.
- **More-Affordable Housing.** Marin's members of the workforce, the elderly, and special needs groups will have increased opportunities to live in well-designed, socially and economically diverse affordable housing strategically located in mixed use sites near employment or public transportation.
- **Less Traffic Congestion.** Marin community members will have access to flexible work schedules, car pools and additional transportation choices for pedestrians, bicyclists and transit users that reduce traffic congestion.
- **A Vibrant Economy.** Marin's targeted businesses will be clean, prosperous, meet local residents' and regional needs, and provide equal access to meaningful employment, fair compensation, and a safe, decent workplace.

"The world will not evolve past its current state of crisis by using the same thinking that created the situation."

-- Albert Einstein

- **A Reduced Ecological Footprint.** Marin residents and businesses will increasingly use renewable energy, fuel-efficient transportation choices, and green building and business practices similar to the level of Western Europe.
- **Collaboration and Partnerships.** Marin public agencies, private organizations and regional partners will reach across jurisdictional boundaries to collaboratively plan for and meet community needs.
- **A Healthy and Safe Lifestyle.** Marin residents will have access to a proper diet, health care, and opportunities to exercise and the community will maintain very low tobacco, alcohol, drug abuse, and crime rates.
- **A Creative, Diverse and Just Community.** Marin will celebrate artistic expression, educational achievement, and cultural diversity and will nurture and support services to assist the more vulnerable members of the community.

Users Guide

How Is the Countywide Plan Organized?

While the basic components of a general plan are established by the requirements of California State planning law, the organization of the document is left to local discretion. The law states that each city and county must adopt a general plan that includes seven sections or elements, which are: conservation, open space, safety, land use, housing, circulation, and noise. A city or county may also adopt optional elements. State law establishes that each element is of equal importance and that the elements must be consistent with one another.

"A hundred years after we are gone and forgotten, those who never heard of us will be living with the results of our actions."

-- Oliver Wendell Holmes

This edition reorganizes the Countywide Plan into three sections. Most legally required general plan topics have been incorporated into the Natural Systems and Agriculture and Built Environment Elements of this Plan, while most optional subjects have been concentrated in the Socioeconomic Element.

The Natural Systems and Agriculture Element focuses on "Nature" and life support systems, including:

- **biological resources**, including special status species, sensitive natural communities, wetlands, riparian habitat, and the Baylands Corridor (addresses contents for Conservation Elements)
- **water resources**, including watersheds, hydrology, flooding, and water conservation (addresses contents for Conservation, Safety, and Land Use Elements)
- **environmental hazards** from seismic activity, landslides, and fires (addresses contents for Safety Elements)
- **open space** (addresses contents for Open Space Elements)
- **trails** (addresses contents for Open Space Elements)
- **agriculture and food** (addresses contents for Open Space and Conservation Elements)

The Built Environment Element principally addresses villages, towns and construction-related activities including:

- **community development** (addresses contents for Land Use Elements)
- **design**
- **energy and green building**
- **mineral resources** (addresses contents for Conservation Elements)
- **housing** (implements portions of the County's Housing Element)
- **transportation** (addresses contents for Circulation Elements)
- **noise** (addresses contents for Noise Elements)
- **public facilities and services** (addresses contents for Circulation Elements)
- **planning areas** (addresses contents for Land Use Elements)

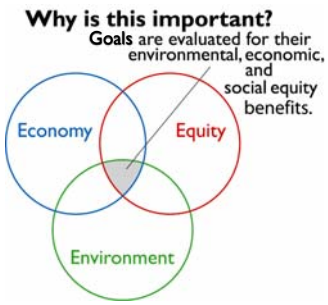
The Socioeconomic Element focuses on people and what they do for each other, including:

- **the economy**
- **childcare**
- **public safety** (addresses contents for Safety Element~~s~~)
- **community participation**
- **diversity**
- **education**
- **environmental justice**
- **public health**
- **arts and culture**
- **historical and archaeological resources**
- **parks and recreation** (addresses contents for Open Space Element~~s~~)

Basic Building Blocks of the Plan

The Plan includes background information and key trends, as well as goals, policies, programs and diagrams. These components represent the development policies, diagrams, objectives, principles, standards, and plan proposals called for in California's planning law.

Goal: an expression of community values and desired outcomes - a sought after end state that is not quantifiable or time dependent. A graphic displays which of the three E's (Environment, Economy, and social Equity) are benefited by the goal as indicated within the overlapping circles.



Policy: a statement derived from a goal that represents the jurisdiction's adopted position and guides action by decision-making bodies.

Program: a specific implementation measure to carry out goals and policies of the Countywide Plan.

Diagram: a graphic representation of the Plan's policies. While the Plan's land use diagrams are not as specific as zoning maps, they do provide guidance about the appropriate uses of each parcel of land within the County's jurisdiction.

Each element of the Plan is organized to answer the following questions:

- What are the desired outcomes? These discussions lay out the Plan's Goals and Policies.
- Why is it important? These discussions focus on how specific Goals and Policies in the Plan promote the "Three E's" of sustainability – Environment, Economy, and social Equity.
- How will results be achieved? These discussions describe the Plan's Programs (specific implementation measures).

- How will success be measured? The Plan includes "indicators," "benchmarks," and "targets" to help measure and evaluate progress in achieving Goals and promoting related Policies (indicators, benchmarks, and targets are discussed in more detail later in this section of the Plan).

Technical Background Reports and Other Supporting Documents

Preparation of the Countywide Plan involved developing a series of technical background reports. These included:

- 2003 Congestion Management Program
- Agriculture
- Air Quality
- Archeology
- Biology
- Community Facilities
- Energy
- Flooding
- Geology
- Hydrology and Water Quality
- Noise
- Marin County Targeted Industries Study Final Report
- Parks and Recreation
- Trails
- Transportation
- Watershed Management Plan

While these reports provided a basis for drafting the Countywide Plan itself, they are not part of the Plan.

Similarly, the Plan at times makes reference to various other documents produced and/or adopted by Marin County. These documents are also not a part of the Plan.

How to Read the Countywide Plan

The following principles govern how the Marin Countywide Plan should be read, interpreted, and implemented.

Relationship between Plan's various goals and policies. In California, the general plan is often characterized as being a community's "constitution" for development and conservation. ~~Its scope is broad, covering a wide variety of topics. And, a~~ general plan is called upon to address a range of diverse, sometimes divergent, public interests. A city or county enjoys broad discretion to weigh and balance competing interests in formulating general plan policies.

All general plans, including this one, must address a host of concerns within a consistent, well-integrated policy framework. In implementing the Plan, it is the task of the Board of Supervisors (or ~~others to whom the Board has delegated authority~~ its delegates) to make policy determinations in a manner that

promote the overall goals of the Plan and the public welfare, in accordance with existing resources, staffing, and priorities. Policy and program implementation will equire reasonable and thoughtful consideration of other Plan policies. ~~By their nature, s~~Such implementation decisions will come up on a case-by-case basis as the Board, Planning Commission, County staff, and others work to effectively implement the entire Plan.

~~Plan goals, policies, and programs are subject to state and federal law.~~ Another overall principle to guide the reading, interpretation, and implementation of the Plan is that none of its provisions will be interpreted by the County in a manner that violates state or federal law. ~~Thus,~~ For example, Policy CD-5.2 ("Assign financial responsibility for growth") requires new development to pay for its fair share of the cost of public facilities. This policy will be implemented subject to applicable legal standards. ~~Therefore, i~~In reading every provision of the Plan, one should infer that it is limited by the principle, "to the extent legally permitted."

Effect of headings and titles. The Plan's policies and programs are typically accompanied by a heading or title. These are provided for convenience only. To the degree these headings or titles conflict with the text they accompany, the text shall govern.

Plan Implementation

As described above, the Countywide Plan includes specific implementation measures or "Programs." The following principles ~~will~~ guide Plan implementation ~~of the Plan~~.

- Implementation can take time, especially when needed resources are limited and required for more than one Program.

- Because implementation can take time, the Board of Supervisors and those to whom the Board delegates authority, may need to ~~make decisions about which~~ prioritize Programs ~~to pursue first, to what degree, etc~~. The Plan contemplates this on-going process as part of Marin County's policy-making function.

- While the Plan identifies specific ~~implementation measures as its~~ Programs, implementation measures may be adjusted over time based on new information, changing circumstances, and ~~feedback on~~ evaluation of their effectiveness, ~~provided program implementation~~ so long as they remain~~s~~ consistent with the intent of the Plan.

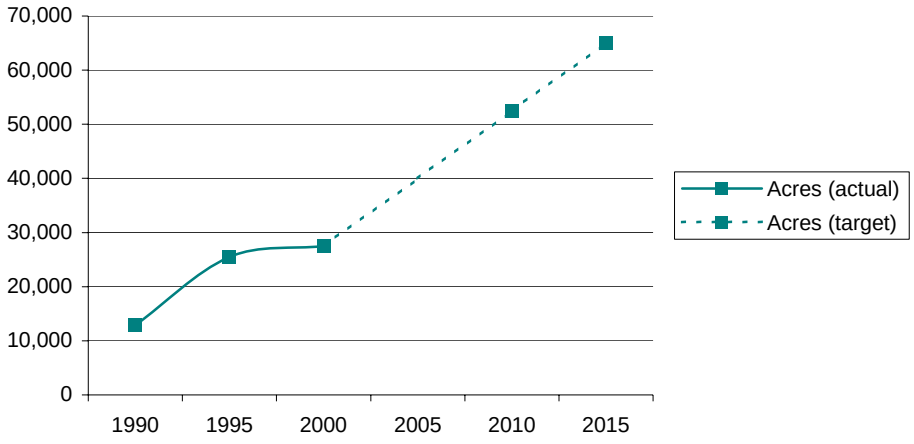
Indicators, Benchmarks, and Targets

A frequent criticism of general plans and their implementation is that there is insufficient feedback to know whether progress is being made in meeting the Plan's goals and promoting its policies. The Countywide Plan takes several important, innovative steps in addressing this concern, by incorporating "indicators," benchmarks, and "targets." ~~These are not traditional components of general plans, nor are they required under California planning law. They are neither not Plan Goals, Policies, or Programs, nor do they set a policy direction for the Plan. Rather, they~~ These are non-binding informational tools to monitor progress. This process will provide an opportunity to consider the need for new or revised Countywide Plan strategies or implementation measures.

~~Indicators quantify the state of some characteristic of the County that is related to a Plan Goal or Policy (e.g., acres of land farmed organically, per capita non-renewable energy use, juvenile crime rate, voter turnout in general elections). An indicator assists in measuring movement toward or away from Plan goals and policies. Indicators will be monitored and reported on periodically in accordance with a program to be established after adoption of the Plan. The results will be useful in alerting the public and decision makers to the ongoing effectiveness of the Policies and Programs aimed at achieving the Goals of the Countywide Plan.~~

Measuring progress is important to determine the effectiveness of any plan. An **indicator** is a measurement that assists in demonstrating movement toward or away from plan goals and policies. Proposed indicators will be crafted to be understandable, representative and relevant. **Benchmarks** establish a "starting point" – the state of an indicator as of a particular point in time (e.g., the year 2000). A **target** is a quantifiable outcome that provides a framework for measuring progress.

Figure I–~~7~~ 8 Marin Agricultural Land Trust Easements



Source: 2003 Marin Agricultural Land Trust

~~Targets represent "measuring sticks" – quantifications of desired change (increases or decreases, depending on the indicator) over a specified period of time. They provide a framework for measuring progress in relation to Plan goals and policies.~~

It is important to note that by adopting indicators, benchmarks, and targets, which are not required to be included in a general plan, Marin County does not intend to establish additional general plan Goals and Policies. Rather, the intent is to establish a "feedback loop" which will aid in monitoring progress in meeting the various Goals and Policies of the Countywide Plan.

Examples of indicators, benchmarks, and targets include:

Indicator	Benchmark	Target
Acres preserved with agricultural easements.	27,517 acres preserved in 2000.	Increase by: 25,000 acres by 2010 12,500 additional acres by 2015.

Implementation Charts

The Countywide Plan contains implementation charts to identify responsibilities, potential funding, priorities, and estimated time frames for carrying out proposed Programs.

In some cases, implementation of the Plan will occur through revisions to other land use plans and regulations. For example, the Countywide Plan will be implemented through revisions to the County's Development Code including, but not limited to, consideration of:

- modified stream conservation zoning standards for developed properties
- a uniform agricultural zoning district that resembles the current C-APZ district
- the definition of agriculture
- home size limitations on agricultural and other lands
- increased energy efficiency standards
- community based design and parking standards
- enhanced linkages between jobs, housing, and transportation

Land Use Categories

The Countywide Plan establishes and maps land uses according to the following categories:

"However beautiful the strategy, you should occasionally look at the results."

-- Winston Churchill

Agriculture

Agriculture and Conservation Land Use Categories

Agriculture and Conservation land use categories (AGC 1-3) are established for land with resource values for both ~~for~~ agricultural production and ~~for~~ wetlands and wildlife habitat. These lands may also have physical constraints, such as heavily wooded hillsides that limit their potential for agricultural production, and deserve protection on the basis of their habitat and visual resource values. Historically, 60 –acres has been the minimum parcel size for most agricultural and resource conservation lands in the County.

Agricultural Land Use Categories

Agricultural land use categories (AG 1-3) are established to preserve and protect a variety of agricultural uses and enable the potential for agricultural production and diversification. Historically, 60 acres has been the minimum parcel size for most agricultural lands in the County.

Residential

~~Residential Land Use Categories~~

Residential development categories are established at a full range of densities, with an emphasis on providing more affordable housing.

Very Low Density Residential

Very low density residential land use categories (Single-Family 1-2 with minimum lot sizes of 5 to 60 acres) are designated for single-family residential development on large properties in rural areas where public services are very limited or non-existent, and on properties where physical hazards and/or natural resources significantly restrict development.

Rural/Residential

Rural/residential density land use categories (Single-Family 3-4 and Planned Residential with minimum lot sizes of 20,000 square feet to 10 acres) are established for single-family residential development in areas where public services are limited and on properties where physical hazards and/or natural resources may restrict development.

Low Density Residential

Low density residential land use categories (Single-Family 5-6 and Multi-Family 2 with minimum lot sizes of 10,000-20,000 square feet or less) are established for single-family and multi-family residential development in areas where some public urban services are available and where properties are not typically constrained.

Low to Medium Density Residential

Low to medium density residential land use categories (Multi-Family 3 and 3.5 allowing 5 to 16 units per acre) are established where moderate density and multi-family residential development can be accommodated in areas that are accessible to a range of urban services near major streets, public transit, and neighborhood shopping facilities.

Medium to High Density Residential

Medium to high density residential land use categories (Multi-Family 4 and 4.5 allowing 11 to 45 units per acre) are established within the City-Centered Corridor in communities where multi-family development can be accommodated with easy access to a full range of urban services at locations near major arterials, public transit, and community and regional shopping facilities.

Commercial and Mixed Use

~~Commercial and Mixed Use Land Use Categories~~

The following land use categories are established for general, office, neighborhood and recreational commercial, and industrial uses. Mixed-use developments that incorporate residential units on commercial properties are encouraged to provide on-site housing for employees, ~~as well as~~ and

other residents, and contribute to fair share housing needs. Accordingly, residential uses may be permitted in all of the following commercial land use categories:

General Commercial / Mixed Use

The General Commercial land use category is established to allow for a wide variety of commercial uses including retail and service businesses, professional offices, and restaurants, as well as moderate to high density mixed-use residential development.

Office Commercial / Mixed Use

The Office Commercial land use category is established to encourage a mixture of professional, administrative, and medical office uses, as well as medium to high density mixed-use residential development, where appropriate. Employee and resident-serving retail and service businesses may also be permitted within this category.

Neighborhood Commercial / Mixed Use

The Neighborhood Commercial land use category is established to encourage smaller-scale retail and neighborhood-serving office and service uses and mixed-use development oriented toward pedestrians and located in close proximity to residential neighborhoods.

Recreational Commercial

The Recreational Commercial land use category is established for resorts, lodging facilities, restaurants, and privately-owned recreational facilities, such as golf courses and recreational boat marinas. Housing for employees or very low and low income households may also be permitted.

Industrial

The Industrial land use category is established for industrial uses such as warehouses, storage, laboratories, retail sales, mine processing, light manufacturing and administrative offices. Housing for employees or very low and low income households may also be permitted.

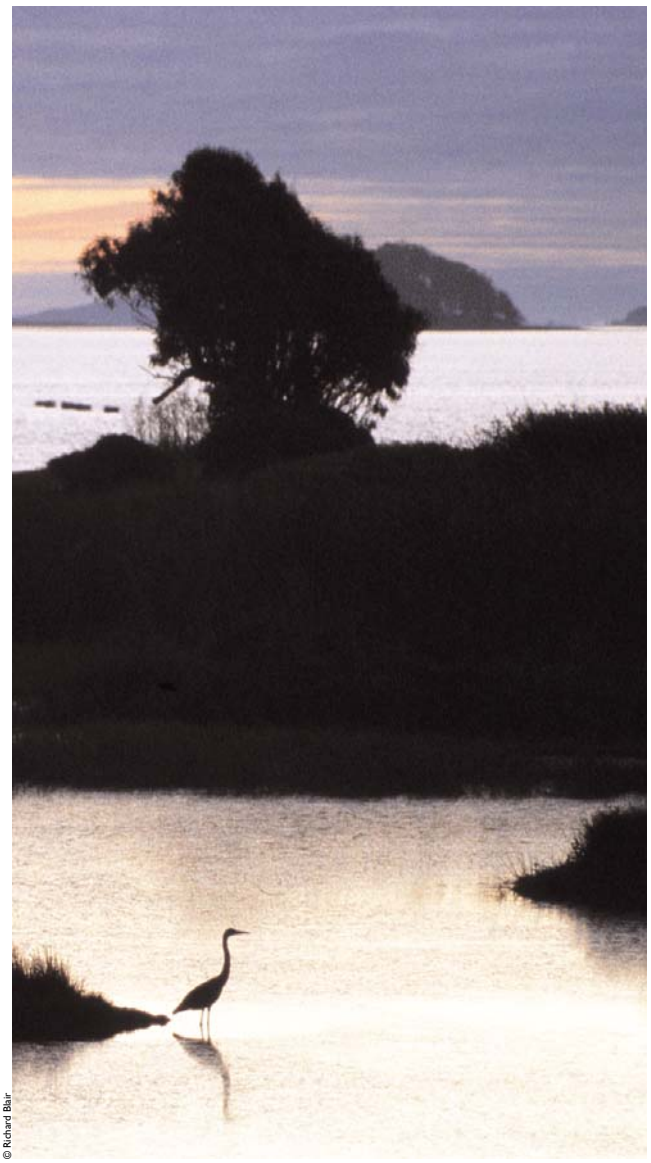
Planned Designation

The Planned Designation land use category is established and includes the following subcategories: Planned Designation-Agricultural and Environmental Resource Area (PD-Agricultural and Environmental Resource Area), Planned Designation-Transit Village Area (PD-Transit Village Area), and Planned Designation-Reclamation Area (PD-Reclamation Area). This land use category enables the planning of reuse projects at major opportunity sites. In order to provide a forum for comprehensive community based planning, projects in this land use category are subject to approval of a Specific or Master Plan and consistency with the Countywide Plan, including policies promoting affordable housing, and innovative, environmentally friendly, transit oriented and energy efficient designs.

Public, Quasi-Public and Open Space

The Public, Quasi-Public, and Open Space land use categories are established for both public and quasi-public institutional purposes, including open space, schools, hospitals, cemeteries, government facilities, correctional facilities, power distribution facilities, sanitary landfills, and water facilities. The "public" category is established for land owned by a governmental agency and used as a public institution. The "quasi-public" category is established for land owned by a non-governmental agency that is used as an institution serving the public. Lands in public ownership for open space purposes, such as recreation and watershed and habitat protection and management, are designated Open Space. In addition, private lands may be designated open space when subject to deed restrictions or other agreements limiting them to open space and compatible uses. Lands designated as public or quasi-public facilities may be combined with another land use.

NATURAL SYSTEMS & AGRICULTURE ELEMENT



© Richard Blair

Marin County is known for its distinctive natural setting and environmental and agricultural heritage. Surrounded on three sides by water, Marin encompasses abundant environmental resources ~~both~~ beautiful and rich in diversity, as well as working agricultural landscapes. From the quality of the air we breathe, the water we drink, the food we eat, and the ~~landscape~~ outdoors where we ~~recreate~~relax and rejuvenate, we depend on nature to provide for us. ~~Recognizing our~~ A responsibility to understand and protect the environment and agriculture is a fundamental component of ~~the~~ this

NATURAL SYSTEMS & AGRICULTURE ELEMENT

~~Natural Systems and Agriculture~~ Element of the Countywide Plan~~, while r~~Reinforcing the critical role of watershed planning is an overarching concern.

Watershed functions, water quality, riparian habitat, wetlands, and baylands are all addressed in the Natural Systems and Agriculture Element. The topics addressed in this element are interrelated, as are all the components of natural systems. Issues that threaten Marin County's biodiversity – such as water quality degradation, invasive flora, ~~and~~ non-native animal species, habitat fragmentation, and loss of sensitive biological resources as a result of land conversion and development – are also threats to agriculture and food production. How we treat streams, marshes, and wetlands not only affects the plants and animals that depend on these aquatic habitats, but also creates flood-related and other impacts in low-lying areas.

Below are the topics covered in this portion of the Countywide Plan:

- Biological Resources
- Water Resources
- Environmental Hazards
- Atmosphere and Climate
- Open Space
- Trails
- Agriculture and Food

Topics related to naturally-occurring environmental hazards are located in this Element while hazardous materials issues are discussed under Public Safety in the Socioeconomic Element. Issues pertaining to environmental justice, public health, historic and archaeological resources, and parks and recreation are addressed in the Socioeconomic Element.

2.2 Key Trends and Issues

Biological Resources

> *"Trend is not destiny."*
> – Rene Dubois

Preservation of large parts of Marin County has served to protect important biological resources and the biodiversity of the region. Nevertheless, future development may ~~continue to~~ threaten sensitive resources in Marin and contribute to further fragmentation of ~~the remaining~~ natural areas. In 2001, Marin ranked 17th among the 58 California counties in the number of special status species documented here, indicating both an opportunity for preservation and continued threat to sensitive resources. In fact, Lagunitas Creek supports the most important remnant population of federally threatened wild coho salmon in central California. Despite ~~these~~ positive efforts ~~of~~ to protect and restore habitat protection and restoration, ~~the~~ native biodiversity is still at risk. Factors contributing to these risks such as the continued loss of habitat, fragmentation of natural areas, inadequate management of open space lands, ~~the~~ potential for catastrophic wildfires, and invasion by exotic species all pose significant threats to native plants and animals. Other risks and concerns include obstruction of wildlife movement corridors, filling of wetlands, and loss of oak woodlands to disease.

Water Resources

Providing adequate water for human use while supporting habitat for fish, other aquatic species, and terrestrial wildlife is very important and ~~is~~ an increasingly difficult challenge. Water demand among Marin residents has risen while fish populations have declined ~~in response to a variety of factors~~. Human impacts are adversely affecting water quality. Urbanization increases the rate of storm runoff to local creeks. Excess runoff scours creeks and causes habitat loss.

Environmental Hazards

Marin's spectacular coastline, high ridges, and variety of landscapes have been influenced by natural phenomena such as earthquakes, wildfires, and flooding. These same phenomena can also significantly impact the built environment and human activity. The epicenter of the 1906 earthquake was near Olema on the San Andreas Fault. Massive wildfires occurred on Mt. Tamalpais in 1929 and Mt. Vision in 1995. Significant flooding has occurred throughout the county on various occasions during periods of sustained, heavy rainfall and high tides. ~~Significant but i~~Infrequent but significant events ~~such as these~~, as well as a multitude of more frequent smaller events throughout the county are part of the natural process and ~~can be~~ are expected ~~to occur at any time~~. While these events can have beneficial effects on the natural environment, they can also result in catastrophic and costly devastation when structures and human activities are in their path.

Atmosphere and Climate

Transportation and energy production are among the activities associated with the combustion of fossil fuels that are increasing the amounts and concentrations of greenhouse gases (carbon dioxide, methane, nitrogen oxide) in the atmosphere that contribute to global warming. The U.S. Environmental

Protection Agency estimates that by 2100 carbon dioxide concentrations could be up to three times higher than current levels. Much of the air pollution in Marin results from motor vehicle use, and many private automobile trips cover short distances, which tends to concentrate emissions in certain areas.

Open Space

The County Open Space District manages and protects ridgelands, baylands and other environmentally sensitive lands. Open space lands also accommodate low impact recreational uses. Most of the District budget goes toward managing open space, leaving little for land acquisition. The District relies increasingly on conservation or open space easements from private landowners to extend its preservation efforts. Parks and recreation services and their facilities are discussed in the Socioeconomic Element.

Trails

The Marin trail system is widely recognized as one of the best anywhere, and Marin has become a trail recreation destination. Demand by hikers, road and mountain bicyclists, and equestrians is increasing, as is commercial use, such as organized hiking, dog walking, and nature interpretation. Trail use also is rising among sports enthusiasts. Increased activity on trails has led to conflicts among users and with neighbors, especially regarding parking and private property issues. Parks and recreation services and their facilities are discussed in the Socioeconomic Element.

Agriculture and Food

Nearly one-fourth of Marin's agricultural land has been permanently protected from subdivision and development, but working ranches are increasingly ~~being converted~~ threatened by the prospect of conversion to single-family residential estates. The majority of local agricultural operations are only marginally profitable. Major issues facing local agriculture include the high cost of land, regulation by multiple agencies, and difficulty recruiting younger generations to work in agriculture. Many local operations have begun diversifying to increase their viability, producing row crops and value-added products such as cheese, butter, organic foods, and grass-fed beef. Although agriculture is not technically considered a "natural system," most ranchers and farmers in Marin conduct agricultural activities in a manner compatible with the natural environment.

2.3 Framework

The Vision

The 21st century in Marin will include a restored natural environment that supports a rich array of native plants and animals and provides for human needs. Residents and visitors will enjoy clean air and water. Native habitat and essential corridors for wildlife movement and plant dispersal will be protected. Watershed function will improve with enhancements to water infiltration, preservation of stream-flow capacity and riparian vegetation, and restoration of stream corridors, marshlands, and other natural wetlands.

Local agricultural heritage will be celebrated. Local farmers and ranchers will provide an increase in healthy food, much of which will be grown, processed, and consumed in the San Francisco Bay Area, enhancing food security and agricultural viability while lowering our ecological footprint and reducing the costs associated with food transport. Expanded agricultural uses will provide needed products for county and regional residents, while ~~still~~ protecting important biological resources.

Topics in the Natural Systems and Agriculture Element include:

◆ **Biological Resources (See Section 2.4):** Marin is home to a wide variety of plants and animals, as well as a number of unique natural communities and highly sensitive biological and wetland resources. Protecting and restoring native habitat are the most effective methods of preserving plant and animal diversity.

◆ **Water Resources (See Section 2.5):** Watersheds are dynamic systems that transport water, sediments, and nutrients from ridgetops to watercourses, and perform many vital water quality and storage functions along the way. Preserving and improving water and watershed quality depends on maintaining equilibrium between inflow and consumption, and avoiding human alterations that can diminish natural functions.

◆ **Environmental Hazards (See Section 2.6):** Environmental conditions can threaten habitat, wildlife, the built environment, and human life. Since Marin is in a seismically active area, groundshaking from earthquakes is a major potential hazard, as are wildland fires and flooding. Countywide Plan policies and programs are proposed to minimize the impact of hazards related to these natural phenomena.

◆ **Atmosphere and Climate (See Section 2.7):** Marin's relatively good air quality is compromised by high concentrations of ozone caused by vehicle traffic, and localized high volumes of particulate matter caused by construction activities, wood burning, off-road travel and agricultural operations. Scientists generally concur that the earth's climate is changing through a buildup of gases that trap heat in the atmosphere. With the uncertainty about location, rate, and magnitude of possible climate-changing impacts, it is more important than ever to take steps to improve air quality and minimize greenhouse gas emissions.

◆ **Open Space (See Section 2.8):** Public open space contributes significantly to the way people think and feel about Marin. Open lands are managed primarily for resource preservation, and secondarily for

lower impact recreational uses such as hiking, horseback riding, and mountain biking. Preserving natural resources while providing access to open space lands poses an ongoing challenge.

◆ **Trails (See Section 2.9):** Marin County has approximately 639 miles of public trails. The countywide trail system connects environmentally important areas (such as bayland, coastal and ridgeland areas), parks and open space, and greenbelts between urban areas. Preserving~~ation of~~ existing trails, acquiring~~sition of~~ new rights-of-way, minimizing~~ation of~~ environmental impacts, and balancing access and property-rights remain key issues in managing local trails.

◆ **Agriculture and Food (See Section 2.10):** The viability of Marin farms and ranches is threatened by a combination of low profit margins and pressure to convert agricultural lands to single family estates. Access to locally and responsibly grown, healthy food requires successful protection of agricultural land, support for local farmers and ranchers, and efforts to promote diversification of local products.

Clapper Rail

2.4 Biological Resources

Background

Marin is home to a number of diverse and important natural communities, from coastal marine environments to bay marshlands and mudflats, riparian habitats, and an upland mosaic of forests, woodlands, grasslands and chaparral (see Map 2-1). Detailed information and maps of these ecosystems, their associated sensitive biological and wetland resources, and a summary of resource-protection regulations can be found in the Biological and Wetland Protection Technical Background Report (see Appendix).

Special-status species are plants and animals that are legally protected under the State and/or federal Endangered Species Acts or other regulations, as well as other species that are considered rare enough by the scientific community and trustee agencies to warrant special consideration, particularly with regard to protection of isolated populations, nesting or denning locations, communal roosts, and other essential habitat. (See Figure 5-1, Special Status Animal Species Known from Marin County, and Figure 5-2, Special Status Plant Species Known from Marin County.)

Occurrences of special-status species are known throughout Marin (See Map 2-2). More than 90 special-status plant and animal species in Marin are monitored by the California Department of Fish and Game, and at least another 35 species that meet special-status criteria have been reported locally. The Community Development Agency maintains a current list of special-status species in Marin.

Human activity has had major adverse ceffects on the health and sustainability of these natural communities. Since the mid-19th century, grazing, logging, agriculture, road building, and development have markedly altered the natural landscape. This Section of the Countywide Plan contains policies intended to preserve native habitat and protect sensitive resources through appropriate land use practices and restoration and enhancement efforts. Sensitive resources include: jurisdictional wetlands, occurrences of special-status species, occurrences of sensitive natural communities, wildlife nurseries and nesting areas, and wildlife movement corridors. Specific programs seek preservation of special-status species, sensitive natural communities, important wildlife habitat and movement corridors, wetlands, riparian habitats, coastal dunes, and baylands. The Water Resources Section of this Element contains related policies and programs.

Resource Protection

Federal and State laws regulate wetlands, stream channels, and plant and animal species vulnerable to change or threatened with extinction. The jurisdiction, resource management practices, and code enforcement activities of the federal and State regulatory agencies ~~varies~~ vary depending on the specific sensitive resource. Wetlands and special-status plants and animals listed as "endangered" or "threatened" receive the highest protection ~~because of their sensitivity~~ (Map 2-2 Special-Status Species and Sensitive Natural Communities). Other plant and animal species that are not listed are still considered vulnerable enough to be recognized as special-status species (see Figure 5-1, Special Status Species Known from Marin County) located in Section 5 of this Plan. In addition, a number of unique natural communities (sensitive natural communities) are recognized by the California Department of Fish and Game because of their scarcity and continued loss as a result of development.

The County development review process typically requires a site assessment by qualified professionals to confirm whether any sensitive resources could be affected, and to identify measures necessary to protect those resources and mitigate potential impacts. Detailed surveys are necessary where there is a potential for occurrence of sensitive resources. Consultation and permit authorization from regulatory agencies may be required where proposed development would affect essential habitat for listed special-status species or jurisdictional wetlands, although avoidance is the preferred mitigation whenever feasible. Enactment of local ordinances also serves to regulate potential loss of sensitive resources and establishes standards for protection and mitigation.

Sensitive natural communities are natural community types that are considered particularly rare or threatened by the California Natural Diversity Data Base of the California Department of Fish and Game. Sensitive natural community types in Marin include but are not limited to: coastal and valley freshwater marsh, freshwater seep and spring, riparian forest and woodland, coastal brackish marsh, coastal terrace prairie, central dune scrub, coastal bluff scrub, northern coastal salt marsh, northern maritime chaparral, northern vernal pool, serpentine bunchgrass, valley needlegrass grasslands, old growth redwood and Douglas fir forests, and deciduous woodlands dominated by valley oaks or Oregon white oak.

The continued loss of oak woodland, oak savannah and other native woodland habitat through their conversion to primarily urban uses resulted in the adoption of the County Native Tree Preservation and Protection Ordinance in 1999. This regulates the removal of native trees and is intended to use local regulations to protect sensitive resources. This ordinance broadened the protection of native tree species ~~that was~~ not previously addressed by tree protection development standards and findings being applied through the discretionary permit review process. While this ordinance does serve to partially illustrate the opportunity to regulate sensitive biological resources on the local level, it should be amended and additional guidelines adopted to ~~consider~~ address a greater number of factors that contribute to woodland preservation and its relationship to wildlife habitat.

A number of State and federal agencies have regulatory authority over sensitive resources, including jurisdictional wetlands and waters, certain special status species, and coastal areas. These agencies include:

- **California Department of Fish and Game** (www.dfg.ca.gov)
- **California Coastal Commission** (www.coastal.ca.gov)
- **Regional Water Quality Control Board** (www.waterboards.ca.gov/sanfranciscobay)
- **U.S. Fish and Wildlife Service** (www.fws.gov)
- **National Marine (NOAA) Fisheries Service** (www.nmfs.noaa.gov)
- **U.S. Army Corps of Engineers** (www.usace.army.mil/inet/functions/cw/cecwo/reg/)

~~Additional information on sensitive resources, their regulation, and management is provided on the internet sites for these State and federal agencies, listed above.~~

Wetlands are areas periodically or permanently inundated by surface or groundwater that support vegetation adapted to life in saturated soil, and are delineated based on hydrology, soils, and vegetation. Jurisdictional wetlands and unvegetated other waters are regulated by the U.S. Army Corps of Engineers and the Regional Water Quality Control Board. Certain wetlands, streams, and waters are also regulated by the California Department of Fish and Game under the Streambed Alteration Agreement program.

Effectively implementing resource protection policies and regulations is dependent in part upon the availability of accurate mapping and an understanding of the value of the remaining natural habitat. Expanding and improving the County's mapping of wetlands, streams, and vegetation types will assist in identifying potential impacts early ~~on~~ in the development review process. Conveying this information to the public will also allow property owners and developers to be responsive to resource protection policies and standards in the design of their ~~proposals~~projects.

Wetlands

Wetlands are considered important natural resources because of their high inherent value to fish and wildlife, their role as storage areas for storm and floodwaters, and their water recharge, filtration, and purification functions. They provide essential habitat for aquatic invertebrates, amphibians, and fish, are important for large numbers of bird and mammal species, and freshwater wetlands are an important source of drinking water for terrestrial species.

Proposed modifications to wetlands are regulated through a complex jurisdictional and permitting process of State and federal agencies, depending on the type, location and functions and values of the existing wetlands. In general, loss or modifications to wetlands must be avoided given the difficulty and questionable success of recreating wetlands, and the length of time required to replace habitat lost as a result of development. At a minimum, project applicants must demonstrate compliance with State and federal wetlands regulations. Additional County requirements may apply where necessary to protect sensitive habitat values and other functions.

Marin County places a high priority on protecting and enhancing existing wetlands and relies upon restoration or replacement as secondary measures where complete avoidance of wetlands cannot be accomplished. Additional and more precise mitigation criteria should be developed to establish a clear and consistent approach to preserving wetlands. Policies for wetlands protection also serve to prioritize land for restoration and open space acquisition.

Wetlands are protected for their high inherent value to fish and wildlife, their role as storage areas for storm and floodwaters, and their water recharge, filtration, and purification functions (Map 2-3, Wetlands/ Streams of Marin County). They provide essential habitat for aquatic invertebrates, amphibians, and fish, are important for large numbers of bird and mammal species, and are an important source of drinking water for terrestrial species. Characteristic wetland types in Marin include: coastal saltmarsh, brackish marsh, freshwater marsh, the lower channel slopes of streams and riparian habitat, seasonal wetlands, vernal pools, and freshwater seeps and springs.

Riparian Habitat

Streams convey, filter, and store sediment and nutrients~~, and their~~. Their floodplains are important for recharge of groundwater aquifers and flood prevention. They also provide critical wildlife movement corridors between important habitats for both aquatic and terrestrial species. Ephemeral channels are important for maintaining healthy watersheds. Perennial and intermittent streams provide more permanent aquatic habitat and serve as fish migration, spawning, and rearing habitat (Map 2-4). Riparian vegetation is essential to proper functioning of stream systems and is a critical component of high quality fish habitat. Woody vegetation provides shade that keeps water temperatures within tolerable ranges for fish and other aquatic organisms, stabilizes streambanks and floodplains, provides protective cover for wildlife, and contributes debris to stream channels for fish habitat structure. Herbaceous vegetation helps stabilize streambanks and filters and traps sediments and pollutants.

Riparian Habitat. Riparian habitats are transitional zones between land and freshwater that occur along freshwater watercourses including perennial and intermittent streams, lakes, springs, and other bodies of fresh water. Riparian habitat is distinguished by characteristic woody vegetation, a variety of important ecological functions, and generally high wildlife habitat values.

The continued health and restoration of streams and riparian resources have become an increasingly important policy objective with the designation of the coho salmon and steelhead trout as special-status species by the State and federal governments. Stream Conservation Area policies were strengthened with the adoption of zoning regulations that expand and refine the applicability of stream setback requirements for development projects that have the potential for harming riparian vegetation and water quality. Additional development review procedures and standards are established or recommended in policies for stream conservation as an ongoing effort to create a well-balanced, regulatory approach to protecting these important resources. Policies for riparian protections also serve to prioritize land for restoration and open space acquisition.

Baylands

Baylands, areas between historic high and low tide elevations, form a complex ecosystem of aquatic and upland habitats. The baylands ecosystem in Marin forms a varied pattern of open water, tidal marshes and mudflats, rocky shoreline, seasonal wetlands, and adjacent uplands.

Baylands ecosystems vital to the health of San Pablo, San Francisco, and Tomales Bays have undergone tremendous change as historical tidal areas were diked for agricultural use, marshes filled and drained for development, and channels dredged and straightened for navigation. The baylands ecosystem consists of the baylands themselves, together with a buffer on the remaining undeveloped uplands and the open waters of the deep bay and channels. The remaining agricultural baylands, used primarily for dryland farming and livestock grazing, support grassland cover and provide important winter habitat for shorebirds and waterfowl attracted to wet season ponding in fields.

The Baylands Corridor was established to protect important baylands and large adjacent undeveloped uplands along the San Pablo and San Francisco Bays (see Map 2-5, Baylands Corridor). Non-tidal portions of small, developed, privately-owned parcels have not been included in the Baylands Corridor.

The 1999 *Baylands Ecosystem Habitat Goals* at www.abag.ca.gov/bayarea/sfep contains information on the San Francisco Estuary baylands ecosystem, key habitats, and recommendations for Marin County.

The Baylands Corridor reinforces and refines the current Bayfront Conservation Zone, protecting important tidelands and adjacent undeveloped uplands within the City-Centered Corridor (see Introduction, Map 1-2, Environmental Corridors~~, in the Introduction~~). The Baylands Corridor encompasses much of the current Bayfront Conservation Zone along the entire shoreline of San Francisco Bay and San Pablo Bay, comprising most of the Tidelands Subzone, the Diked Bay Marshland and Agricultural Subzone, and the Shoreline Subzone, as defined in the 1994 Countywide Plan. Modifications have been made to boundaries of the current Bayfront Conservation Zone where appropriate, to provide for more consistent mapping criteria and to exclude non-tidal portions of small, developed, privately-owned parcels from the Baylands Corridor. Establishment of a Baylands Corridor along Tomales Bay may be considered during the update of the Marin County Local Coastal Program. Policies for the Baylands Corridor also serve to prioritize land for restoration and open space acquisition.

Key Trends and Issues

Are sensitive biological resources adequately protected?

- **A number of sensitive natural communities and species are becoming increasingly rare.** These include, but are not limited to, bay marshlands and associated protected species such as salt marsh harvest mouse, California clapper rail, and Point Reyes's bird's beak; riparian corridors and associated protected species such as steelhead trout, coho salmon, California red-legged frog, and California freshwater shrimp; and serpentine grasslands and associated protected species such as Tiburon mariposa lily, Tiburon Indian paintbrush, and Marin western flax.

- **Not all special-status species receive adequate protection.** The Department of Fish and Game Natural Diversity Data Base does not closely monitor at least 35 species reported locally that meet special-status criteria, and mapping is limited to known occurrences and does not identify all areas in which special-status species are present. Regulatory standards are generally not available to define appropriate development setbacks necessary to protect sensitive resources, requiring site-specific protective measures.

- **Natural communities, habitats, and corridors essential to wildlife health and movement and plant dispersal are vulnerable.** Intensive development and inadequate buffers threaten streams, shorelines, wetlands, and protected open space lands. Riparian corridors, marshlands, and wetlands can be altered by filling, draining, removal of vegetative cover, and other modifications, eliminating their habitat values and functions. Wetlands and other sensitive resources can also be indirectly affected by development as a result of water quality degradation, lighting, introduction and spread of invasive exotic species, and increased activity of humans and pets.

- **Oak woodlands are threatened by Sudden Oak Death, development, and poor land management.** Since its initial detection in the mid-1990s in Blithedale Canyon in Mill Valley, Sudden Oak Death (see Map 2-6) has had a major impact on native habitats in Marin. The pathogen believed to be a major cause of Sudden Oak Death, *Pytophthora ramorum*, is known to affect at least 31 species of plants. Studies of the cause and treatment of this disease, and management of woodlands to reduce the fire hazard posed by dead trees while still protecting habitat for special-status species and other wildlife are all necessary in addressing the impacts of this disease. Oak woodland and savannah are also threatened by development. Indiscriminate development and poor land management practices, such as removal of native tree cover, filling of creeks and wetlands, and use of pesticides and herbicides, can contribute to further degradation of woodlands and other vital native habitat.

- **Development is encroaching on baylands and limiting the potential for restoration of historic diked ~~historic~~ tidal areas.** Major opportunities for preservation and enhancement of the baylands ecosystem in Marin exist north of Point San Pedro where a wide, continuous band of diked and tidal marsh stretches along the shores of China Camp State Park north to San Antonio Creek and along the Gallinas and Novato creek corridors. Threatened marshland complexes also fringe the Corte Madera shoreline and the west end of Richardson Bay.

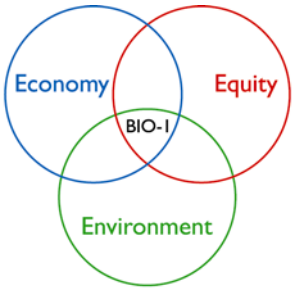
- **Future development may further impact public lands where it is proximate to sensitive habitat on public lands.** Inappropriate development could, for example, fragment habitat or negatively impact adjacent sites. The Countywide Plan establishes or reaffirms policies that protect natural resources on and adjacent to public lands. For instance, the Ridge and Upland Greenbelt, Wetlands Conservation Area, Streamside Conservation Area, and Baylands policies all strive to limit impacts on sensitive sites and, by extension, public lands adjacent to them.

Goals, Policies, and Programs.

What Are the Desired Outcomes?

Goal BIO-1

Enhanced Native Habitat and Biodiversity. Effectively manage and enhance native habitat, maintain viable native plant and animal populations, and provide for improved biodiversity throughout the County.



Policies

BIO-1.1 **Protect Wetlands, Habitat for Special-Status Species, Sensitive Natural Communities, and Important Wildlife Nursery Areas and Movement Corridors.** Protection achieved ~~sensitive biological resources, wetlands, and wildlife movement corridors~~ through careful environmental review of proposed development applications, including consideration of cumulative impacts, participation in comprehensive habitat management programs with other local and resource agencies, and continued acquisition and management of open space lands that provide for permanent protection of important natural habitats.

"Look deep into nature, and then you will understand everything better."

-- Albert Einstein

BIO-1.2 Acquire Habitat. Continue to acquire areas containing sensitive resources for use as permanent open space, and encourage and support public and private partnerships formed to acquire and manage important natural habitat areas, such as baylands, wetlands, coastal shorelines, wildlife corridors and other lands linking permanently protected open space lands.

BIO-1.3 Protect Woodlands, Forests and Tree Resources. Protect large native trees, trees with historical importance, oak woodlands, and forest habitats, and prevent the untimely removal of trees through implementation of standards in the development code and the Native Tree Preservation and Protection Ordinance. Encourage other local agencies to adopt tree preservation ordinances to protect native trees and woodlands, regardless of whether they are located in urban or undeveloped areas.

BIO-1.4 **Support Vegetation and Wildlife Disease Management Programs.** Support agency programs and proven methods to limit the impacts of Sudden Oak Death syndrome and any other diseases harmful to native vegetation and wildlife in Marin County, while addressing any potential adverse ~~affects~~ effects on sensitive resources. (See also Socioeconomic Element, PS-4.2, Hazardous Vegetation.)

BIO-1.5 **Promote Use of Native Plant Species.** Encourage use of a variety of native or compatible non-native, non-invasive plant species indigenous to the site vicinity as part of project landscaping to improve wildlife habitat values.

"Thoreau suggested that every community should have its patch of woods where people could refresh themselves. His notion of Nature as having healing powers has now the force of revealed truth."

Wallace Stegner, *Where the Bluebird Sings to the Lemonade Springs*, 1992.

BIO-1.6 **Control Spread of Invasive Exotic Plants.** Prohibit use of invasive species in required landscaping as part of the discretionary review of proposed development. Work with landowners, landscapers, the Marin County Open Space District, nurseries, and the multi-agency Weed Management Area to remove and prevent the spread of highly invasive and noxious weeds. Invasive plants are those plants listed in the State's Noxious Weed List, the California Invasive Plant Council's list of "Exotic Pest Plants of Greatest Ecological Concern in California," and other priority species identified by the Agricultural Commissioner and California Department of Agriculture. Species of particular concern include: barbed goatgrass (*Aegilops triuncialis*), giant reed (*Arundo donax*), Italian thistle (*Carduus pycnocephalus*), distaff thistle (*Carthamus lanatus*), purple starthistle (*Centaurea calcitrapa*), yellow starthistle (*Centaurea solstitialis*), pampas grass (*Cortaderia selloana*), Scotch broom (*Cytisus scoparius*), Cape ivy (*Delairea odorata*), oblong spurge (*Euphorbia oblongata*), fennel (*Foeniculum vulgare*), French broom (*Genista monspessulana*), salt-water cord grass (*Spartina alternifolia*), Spanish broom (*Spartium junceum*), medusahead (*Taeniatherum caput-meduase*), gorse (*Ulex europaeus*), and periwinkle (*Vinca major*), among others.

BIO-1.7 **Remove Invasive Exotic Plants.** Require the removal of invasive exotic species, to the extent feasible, when considering applicable measures in discretionary permit approvals, and include monitoring to prevent re-establishment in managed areas.

BIO-1.8 **Restrict Use of Herbicides, Insecticides, and Similar Materials.** Encourage the use of integrated pest management and organic practices to manage pests with the least possible hazard to the environment. Restrict the use of insecticides, herbicides, or any toxic chemical substance in sensitive habitats, except when an emergency has been declared; the habitat itself is threatened; a substantial risk to public health and safety exists, including maintenance for flood control; or when such use is authorized pursuant to a permit issued by the Agricultural Commissioner. Encourage non-toxic strategies for pest control, such as habitat management using physical and biological controls, as an alternative to chemical treatment and allow use of toxic chemical substances only after other approaches have been tried and determined unsuccessful.

BIO-1.9 **Control Spread of Non-Native Invasive Animal Species.** Work with landowners, the Marin County Open Space District, the California Department of Fish and Game, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, the National Invasive Species Council, and other agencies and organizations to control and prevent the spread of non-native, invasive animal species. Species of particular concern include: introduced red fox (*Vulpes vulpes*), Chinese mitten crab (*Eriocheir sinensis*), bullfrog (*Rana catesbeiana*), and wild boar (*Sus scrofa*), among others. Wild turkey (*Meleagris gallopavo*) is also a non-native species of increasing abundance and concern in the County, which requires careful management to prevent adverse impacts on native habitat.

Why is this important?

Sustaining native habitat secures essential habitat for special-status species and protects the remaining sensitive natural communities, wetlands, and other important biological resources in the County.

Environment: An estimated 47% of the County has been developed with urban, suburban residential, and agricultural uses, and anticipated future development continues to threaten the remaining native habitat and associated biodiversity. Adequate protection and effective management is essential to sustaining the health of the remaining natural areas.

Economy: Preserving and enhancing native habitat contributes to healthy working and living conditions, provides a continuing draw for tourism and recreational industries, and stimulates related economic investment opportunities.

Equity: Sustainable and diverse native habitat benefits the human population by contributing to healthy living conditions, providing a place for outdoor recreation and enjoyment, helping to clean water by filtering urban pollutants, stabilizing hillside slopes, and preserving environmental beauty and diversity for present and future generations.

How Will Results Be Achieved?

Implementing Programs

BIO-1.a *Map Natural Communities.* Work with other agencies to complete GIS mapping of vegetation, wetlands, and streams in the county according to the National Vegetation Classification system, consistent with methodology used to map vegetation in the Golden Gate National Recreation Area and Point Reyes National Seashore.

BIO-1.b *Develop Habitat Monitoring Programs.* Using countywide GIS mapping of natural communities and other information sources, work with other agencies to develop a program to monitor trends in habitat loss, protection, and restoration. Establish cumulative thresholds for habitat loss for particularly vulnerable natural communities and use as a basis for modifying standards for mitigation.

"All ethics so far evolved rest upon a single premise: that the individual is a member of a community of interdependent parts.... The land ethic simply enlarges the boundaries of the community to include soils, waters, plants, and animals, or collectively: the land."

-- Aldo Leopold (1886-1948), *A Sand County Almanac,* 1949

BIO-1.c *Maintain a Natural Resource Information Program.* ~~Maintain a Natural Resource Education and Native Species Protection Program to p~~Provide interested public, ~~other~~ the cities/towns in the county, and land owners with up-to-date information on sensitive ecological resources and regulations enacted to protect these resources, to accurately assess the potential impacts of proposed development on species and habitat diversity, determine when additional detailed site environmental assessment is necessary, provide information on invasive exotic species control, and monitor development trends and habitat management activities. The Natural Resource Program should contain:

1) Up-to-date information on verified sightings of special-status species and sensitive natural communities compiled by the California Natural Diversity Data Base, California Department of Fish and Game, Non-Game Heritage Division;

2) Reports and agency recovery programs for special-status species and sensitive natural communities, and related information summarizing regulations;

3) Up-to-date information from the U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration Fisheries, and California Department of Fish and

Game, including lists of special-status species and their current status and lists of terrestrial natural communities and sensitive natural communities;

4) Available recovery plans for listed special-status species, mapping of critical habitat areas, and sightings and inventories of migratory species; ~~R~~reports, sightings and recovery programs from credible, local sources such as the ~~Point Reyes Bird Observatory~~PRBO Conservation Science, California Native Plant Society, and Marin Audubon Society;

5) Biological reports completed as part of environmental review of proposed development projects and other studies, including information shared with cities and districts within Marin County;

6) Lists of appropriate and inappropriate plant species for use in developing landscape plans; and

7) Summarized information for use by landowners addressing habitat protection and management of sensitive resources. This may include a list of references to existing and ongoing information sources pertaining to natural resource management, and production of brochures summarizing setback standards, appropriate and inappropriate lands use practices, and desired management programs.

"In the end, our society will be defined not only by what we create, but by what we refuse to destroy."

- John C. Sawhill (1936–2000), ~~p~~President, The Nature Conservancy, 1990–2000.

BIO-1.d ~~*Reevaluate County Tree Ordinance.*~~ *Reevaluate County Native Tree Preservation and Protection Ordinance #3291*~~, and c~~Consider expanding existing provisions along with establishing a complementary education and outreach program to ensure woodland conservation and management, not simply protection of individual trees. Factors to address in the reevaluation include preserving stands or groups of trees, identifying and promoting representative species and a diversity of age classes, minimizing fragmentation and providing linkages and corridors, protecting and enhancing other components of forest and woodlands such as understory species and associated wildlife, and providing for sustainable regeneration through natural processes.

BIO-1.e *Protect Against Vegetation and Wildlife Diseases.* Participate in developing public information programs and regulations addressing diseases, and in publicizing management practices to control their spread. Manage hazardous vegetation affected by Sudden Oak Death syndrome according to standards set by the California Oak Mortality Task Force.

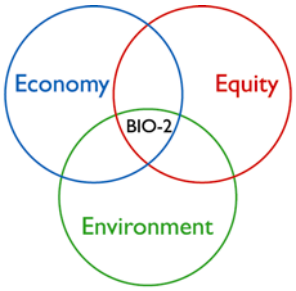
BIO-1.f *Prepare Appropriate Landscape Lists.* Prepare lists of appropriate native landscape species ~~and~~, inappropriate water-thirsty plants, and undesirable invasive exotic species for property owner~~s~~ use in developing new ~~landscape plans~~ or enhancing existing landscaping. Prepare lists with input from the California Department of Fish and Game, Agricultural Commissioner, University of California Cooperative Extension, California Native Plant Society, Marin Municipal Water District, and other appropriate sources to verify suitability.

BIO-1.g *Expand Education, Outreach, and Regulatory Programs Regarding Control of Invasive Exotic Species.* Continue to work with the Marin/Sonoma Weed Management Area to promote the control and management of invasive exotic plant species. ~~Coordinate a~~s part of the Natural Resource Information Program, ~~to~~ provide interested public and land owners with information on invasive exotic species control and management, including up-to-date lists of invasive exotic plant and animal species of concern in Marin County, links to other agencies and organizations involved in monitoring their status such as the California Department of Fish and Game, U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration Fisheries, the National Invasive Species Council, and the California Invasive Plant Council. Explore the feasibility of creating an ordinance which prohibits the sale of selected invasive exotic plant species of particular threat to natural habitat in Marin County, such as Scotch broom and French broom.

What Are the Desired Outcomes?

Goal BIO-2

Protection of Sensitive Biological Resources. Require identification of sensitive biological resources and commitment to adequate protection and mitigation, and monitor development trends and resource preservation efforts.



Policies

BIO-2.1 **Include Resource Preservation in Environmental Review.** Require environmental review pursuant to CEQA of development applications to assess the impact of proposed development on native species and habitat diversity, particularly special-status species, sensitive natural communities, wetlands, and important wildlife nursery areas and movement corridors. Require adequate mitigation measures for ensuring the protection of any sensitive resources and

"Health is the capacity of the land for self-renewal. Conservation is our effort to understand and preserve this capacity."

-- Aldo Leopold

achieving "no net loss" of sensitive habitat acreage, values and function.

BIO-2.2 **Limit Development Impacts.** Restrict or modify proposed development in areas that contain essential habitat for special-status species, sensitive natural communities, wetlands, baylands and coastal habitat, and riparian habitats, as necessary to ensure the continued health and survival of these species and sensitive areas. Development projects shall preferably be modified to avoid impacts on sensitive resources, or to adequately mitigate impacts by providing on-site or (as a lowest priority) off-site replacement at a higher ratio.

BIO-2.3 **Preserve Ecotones.** Condition or modify development permits to ensure that "ecotones," or natural transitions between habitat types, are preserved and enhanced because of their importance to wildlife. ~~Natural e~~Ecotones of particular concern include those along the margins of riparian corridors, baylands and marshlands, vernal pools, and woodlands and forests where they transition to grasslands and other habitat types.

BIO-2.4 **Protect Wildlife Nursery Areas and Movement Corridors.** Ensure that important corridors for wildlife movement and dispersal are protected as a condition of discretionary permits, including consideration of cumulative impacts. Features of particular importance to wildlife for movement may include riparian corridors, shorelines of the coast and bay, and ridgelines. Linkages and corridors shall be provided that connect sensitive habitat areas such as woodlands, forests, wetlands, and essential habitat for special-status species including an assessment of cumulative impacts.

BIO-2.5 **Restrict Disturbance in Sensitive Habitat During Nesting Season.** Limit construction and other sources of potential disturbance in sensitive riparian corridors, wetlands, and baylands to protect bird nesting activities. Disturbance should generally be set back from sensitive habitat during the nesting season from March 1 through August 1 to protect bird nesting, rearing, and fledging activities. Preconstruction surveys should be conducted by a qualified professional where development is proposed in sensitive habitat areas during the nesting season, and appropriate restrictions should be defined to protect nests in active use and ensure any young have fledged before construction proceeds.

BIO-2.6 **Identify Opportunities for Safe Wildlife Movement.** Ensure that existing stream channels and riparian corridors continue to provide for wildlife movement at roadway crossings, preferably through the use of bridges, or through over-sized culverts, while maintaining or restoring a natural channel bottom. Consider the need for wildlife movement in designing and expanding major roadways and other barriers in the County. Of particular concern is the possible widening of Highway 101 north of Novato to the county line, where maintenance of movement opportunities for terrestrial wildlife between the undeveloped habitat on Burdell Mountain ~~with~~ and the marshlands along the Petaluma River is critical.

BIO-2.7 **Protect Sensitive Coastal Habitat.** Protect coastal dunes, streams and wetlands, and sensitive wildlife habitat from development in accordance with coastal resource management standards in the development code.

BIO-2.8 **Coordinate with Trustee Agencies.** Consult with trustee agencies (California Department of Fish and Game, U.S. Fish and Wildlife Service, National Oceanic and Atmospheric Administration Fisheries ~~Service~~, U.S. Army Corps of Engineers, Environmental Protection Agency, Regional Water Quality Control Board, and Bay Conservation and Development Commission) during environmental review when special-status species, sensitive natural communities, or wetlands may be adversely affected.

BIO-2.9 **Promote Early Consultation with Other Agencies.** Require applicants to consult with all agencies with review authority for projects in areas supporting wetlands and special-status species at the outset of project planning.

Why is this important?

The loss of critical, sensitive biological resources is well documented ~~and~~. To minimize further loss, it is necessary to identify remaining sensitive resources and their habitats to protect them from the impacts of development.

Environment: Marin County supports a high number of sensitive biological resources, because of both the wide diversity of habitats and their vulnerability to future threats. Over 120 plant and animal species and over eight sensitive natural communities are monitored by the state because of their vulnerability. Continued monitoring is needed to fully understand on-going threats and provide for adaptive management of essential habitat.

Economy: Protecting both sensitive resources and larger areas of surrounding natural habitat improves their long-term viability and the overall biodiversity of the region. Because many sensitive resources are highly regulated by state and federal agencies, leaving them in their natural state minimizes the need for costly mitigation and monitoring of replacement habitat.

Social Equity: Preserving essential habitat for sensitive resources provides additional opportunities for enjoyment of our natural resources, contributes to healthy living conditions, and provides opportunities for passive recreation and enjoyment for all.

How Will Results Be Achieved?

Implementing Programs

BIO-2.a *Require Site Assessments.* Require site assessment by a qualified professional for development applications that may adversely affect sensitive biological or wetland resources, including jurisdictional wetlands, occurrences of special-status species, occurrences of sensitive natural communities, and important wildlife nursery areas and movement corridors. ~~Require the assessment to be conducted by a qualified professional paid for by the applicant to~~ The assessment should determine the

presence or absence of any sensitive resources which could be affected by development, to assess the potential impacts, and to identify measures for protecting the resource and surrounding habitat. Require the assessment to be conducted by a qualified professional paid for by the applicant. Unless waived, the qualified professional should be hired directly by Marin County.

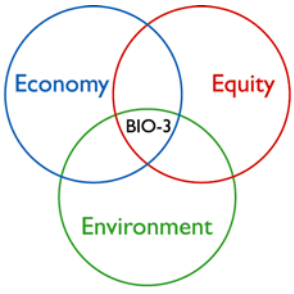
BIO-2.b *Conduct Habitat Connectivity Assessment.* Conduct a comprehensive assessment of habitat fragmentation and connectivity loss in coordination with resource agencies, landowners and interested public. Develop recommendations for policies to protect essential habitat corridors and linkages, and to restore and improve opportunities for native plant and animal dispersal. Protection could include acquisition as open space in fee title, permanent preservation and management under a conservation easement, or other suitable method. Important factors that should be considered as part of the assessment include: locations of sensitive resources such as special-status species and wetlands; methods to eliminate obstructions along streams that currently limit the functions and values of riparian corridors; effects of intensive development, major roadways, and fencing on plant and animal dispersal; and the need to protect and enhance linkages between baylands and undeveloped uplands through the eastern part of the county.

BIO-2.c *Facilitate Agency Review.* Coordinate County review with that of agencies with jurisdiction over proposed activities and areas, and require evidence of compliance with any necessary permits from federal and State agencies prior to issuance of County grading or building permits.

BIO-2.d *Promote Early Agency Consultation.* Inform applicants upon initial contact with the County about other agencies that may have jurisdiction and the policies and standards of those agencies that may regulate proposed development activities.

What Are the Desired Outcomes?

Goal BIO-3



Wetland Conservation. ~~Take and r~~Require all feasible measures to avoid and minimize potential adverse impacts on existing wetlands and encourage programs for restoration and enhancement of degraded wetlands.

Policies

BIO-3.1 Protect Wetlands. Require development to avoid wetland areas so that the existing wetlands and upland buffers are preserved and opportunities for enhancement are retained. Establish a Wetland Conservation Area (WCA) for jurisdictional wetlands to be retained, which includes the protected wetland and associated buffer area. Development shall be set back a minimum distance to protect the wetland and provide an upland buffer. Larger setback standards may apply to wetlands supporting special-status species or associated with

riparian systems and baylands under tidal influence, given the importance of protecting the larger ecosystems for these habitat types as called for under Stream Conservation and Baylands Conservation policies defined in Policy BIO-4.1 and BIO-5.1, respectively. Employ the following criteria when evaluating development projects that may impact wetland areas (see Figure 2-1):

City-Centered Corridor:

- For parcels more than 2 acres in size, a minimum 100 foot development setback from wetlands is required.
- For parcels between 2 and 0.5 acres in size, a minimum 50 foot development setback from wetlands is required.
- For parcels less than 0.5 acres in size, avoid jurisdictional wetlands to the extent feasible, use best management practices, and provide landowner education and technical assistance. The developed portion(s) of parcels (less than 0.5 acres in size) located behind an existing authorized flood control levee or dike are not subject to a development setback.

Coastal, Inland Rural, and Baylands Corridors:

- For all parcels, provide a minimum 100 foot development setback from wetlands.

  Exceptions to full compliance with the WCA setback standards may only apply if:

  1) Parcel is already developed with an existing use, provided no direct unauthorized fill or other modifications to wetlands occur as part of on-going use and enjoyment of the property;

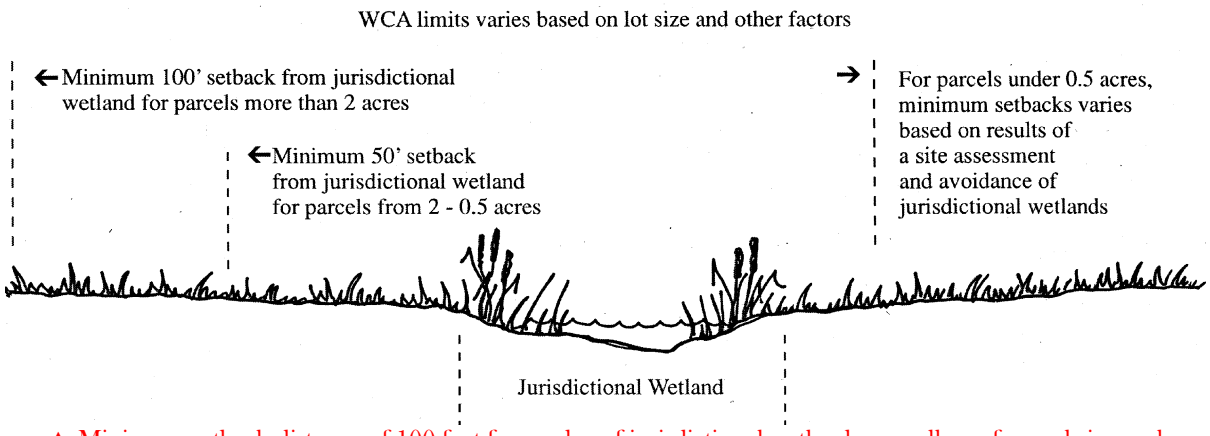
  2) Parcel is undeveloped and falls entirely within the WCA;

  3) Parcel is undeveloped and potential impacts on water quality, wildlife habitat, or other sensitive resources would be greater as a result of development outside the WCA than development within the WCA, as determined by a site assessment;

  4) Wetlands are avoided and a site assessment demonstrates that minimal incursion within the minimum WCA setback distance would not result in any significant adverse direct or indirect impacts on wetlands.

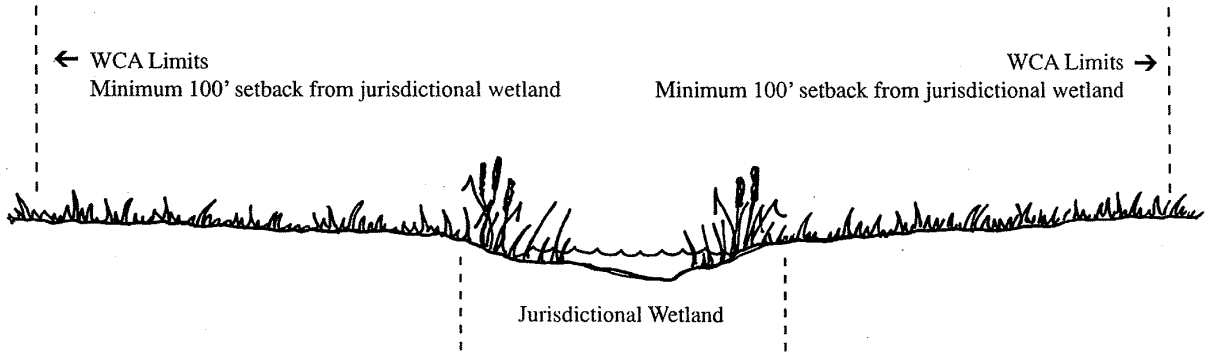
Figure 2–1 Typical Cross-Sections of Wetland Conservation Areas

City Centered Corridor



- ~~Minimum setback distance of 100 feet from edge of jurisdictional wetlands regardless of parcel size, unless an exception is allowed because parcel falls entirely within WCA or development outside WCA is either infeasible or would have greater impact.~~
- ~~A site assessment is required where incursion into a WCA is proposed and where full compliance with all WCA criteria would not be met for any parcel size.~~
- Minimum setback distance of 100 feet from jurisdictional wetlands for parcels more than 2 acres.
- Minimum setback distance of 50 feet from jurisdictional wetlands for parcels between 2 and 0.5 acres.
- No specific minimum setback distance from jurisdictional wetlands for parcels less than 0.5 acres in size, but assumes any wetlands are avoided and a site assessment is required which considers site constraints, presence of other sensitive biological resources, and options for alternative mitigation.
- A site assessment is required where incursion into a WCA is proposed and where full compliance with all WCA criteria would not be met for any parcel size.

Inland Rural, Baylands, and Coastal Corridors



- Minimum setback distance of 100 feet from edge of jurisdictional wetlands regardless of size, unless an exception is allowed because parcel falls entirely within WCA or development outside WCA is either infeasible or would have greater impact.
- A site assessment is required where incursion into a WCA is proposed and where full compliance with all WCA criteria would not be met for any parcel size.
- ~~Minimum setback distance of 100 feet from jurisdictional wetlands for parcels more than 2 acres.~~

- ~~Minimum setback distance of 50 feet from jurisdictional wetlands for parcels between 2 and 0.5 acres.~~
- ~~No specific minimum setback distance from jurisdictional wetlands for parcels less than 0.5 acres in size, but assumes any wetlands are avoided and a site assessment is required which considers site constraints, presence of other sensitive biological resources, and options for alternative mitigation.~~
- ~~A site assessment is required where incursion into a WCA is proposed and where full compliance with all WCA criteria would not be met for any parcel size.~~

BIO-3.2 **Require Thorough Mitigation.** Where complete avoidance of wetlands is not possible, require provision of replacement habitat on-site through restoration and/or habitat creation at a minimum ratio of two acres for each acre lost (2:1 replacement ratio) for on-site mitigation and a minimum 3:1 replacement ratio for off-site mitigation, provided that, to the maximum extent feasible, no net loss of wetland acreage, function, and habitat values occurs. Mitigation shall also be required for incursion within the minimum WCA setback distance where direct or significant indirect impacts on wetland functions or values would occur as a result of the incursion.

Why is this important?

An estimated 90 percent of all wetlands in the nation have been eliminated by past filling and dredging. Net losses could continue to occur unless wetlands are accurately mapped and protected, and efforts are made to effectively restore and enhance degraded wetlands

Environment: Wetlands are both highly productive and sensitive resources biologically, supporting a great diversity of plant and animal species, providing essential habitat for a high number of special-status species and migratory birds and fish, and serving critical water purification and groundwater recharge functions. Development setbacks are necessary around wetlands to provide a buffer to prevent disturbance of important wildlife habitat and to filter sediments and pollutants from disturbed areas and urban runoff.

Economy: Maintaining and enhancing wetlands serve to protect the long-term health of the County, and ~~its attractiveness as~~ consequently make it a desirable location for business and commerce. Protecting the natural water filtration and recharge functions of wetlands serves to reduce the costs of flood damage, water pollution, and water supply redistribution.

Equity: Protecting and restoring natural wetlands provide improved habitat for both wildlife and humans, often at the fringe of urban areas where population densities are high~~est~~ and the need for open space and recreational opportunities are greatest.

How Will Results Be Achieved?

Implementing Programs

BIO-3.a *Adopt Wetland Conservation Area Ordinance.* Prepare and adopt an ordinance to refine wetland standards pursuant to WCA polices. Setback distances and buffer criteria for smaller developed parcels within the City-Centered Corridor should allow flexibility based on site constraints, opportunities for avoidance, presence of sensitive biological resources, and options for alternative mitigation. As part of the new

ordinance, consider including incentives to reduce the extent of existing development within a WCA, or improve conditions that may be impacting sensitive resources if the parcel is proposed for redevelopment.

BIO-3.b *Comply with Regulations to Protect Wetlands.* Continue to require development applications to include ~~the~~ submittal of a wetland delineation for sites with jurisdictional wetlands and to demonstrate compliance with these wetlands policies, standards and criteria, and with State and federal regulations.

BIO-3.c *Require Site Assessment.* Require development applications to include the submittal of a site assessment prepared by a qualified professional where incursions into the WCA are proposed, or adverse impacts to wetlands resources may otherwise occur. ~~The site assessment shall be paid for by the applicant and~~ The assessment should be considered in determining whether any adverse direct or indirect impacts on wetlands would occur as a result of the proposed development, whether wetlands criteria and standards are being met, and to identify measures necessary to mitigate any significant impacts. The site assessment may also serve as a basis for the County to apply restrictions in addition to those required by state and federal regulations. The site assessment shall be paid for by the applicant. Unless waived, the qualified professional should be hired directly by Marin County.

BIO-3.d *Prioritize Wetland Avoidance.* Amend the Development Code to require development to avoid wetland areas to the extent feasible. Where complete avoidance of wetlands is not possible, require provision of replacement habitat on-site through restoration and/or habitat creation, provided that no net loss of wetland acreage, function, and habitat values occurs. On-site wetlands mitigation shall be provided at a minimum ratio of two acres for each acre lost (2:1 replacement ratio). Allow off-site wetland mitigation only when an applicant has demonstrated that no net loss of wetland functions and values would occur and that on-site mitigation is not possible or would result in isolated wetlands of extremely limited value. In those rare instances when on-site wetlands loss is unavoidable and on-site replacement is infeasible, require that a minimum of three acres be provided through mitigation for each acre lost (3:1 replacement ratio), preferably of the same habitat type as the wetland area that would be lost.

BIO-3.e *Establish Clear Mitigation Criteria.* Amend the Development Code to incorporate wetland impact mitigations measures that accomplish the following objectives:

a) No net losses shall occur in wetland acreage, functions, or values. This should include both direct impacts on wetlands and essential buffers, and consideration of potential indirect effects of development due to changes in available surface water and non-point water quality degradation. Detailed review of the adequacy of a proposed mitigation plan shall be performed as part of environmental review of the proposed development project to allow for a thorough evaluation of both the anticipated loss and replacement acreage, functions, and values.

b) Mitigation shall be implemented prior to and/or concurrently with the project activity causing the potential adverse impact to minimize any short-term loss and modification to wetlands.

c) An area of adjacent upland habitat shall be protected to provide an adequate buffer for wetland functions and values. Development shall be set back the minimum distance specified in Policy BIO-3.1 to create this buffer, unless an exception is allowed and appropriate mitigation is provided where necessary, pursuant to Policy BIO-3.2.

d) Mitigation sites shall be permanently protected and managed for open space and wildlife habitat purposes.

e) Restoration of wetlands is preferred to creation of new replacement wetlands, due to the greater likelihood of success.

f) Mitigation projects must to the extent feasible minimize the need for on-going maintenance and operational manipulation (dredging, artificial water level controls, etc.) to ensure long-term success. Self-sustaining projects with minimal maintenance requirements are encouraged.

g) All plans to mitigate or minimize adverse impacts to wetland environments shall include provisions to monitor the success of the restoration project. The measures taken to avoid adverse impacts may be modified if the original plans prove unsuccessful. Performance bonds shall be required for all mitigation plans involving habitat creation or enhancement, including the cost of five years of post-completion monitoring.

h) Mitigation must be commensurate with adverse impacts of the wetland alteration and consist of providing similar values and greater wetland acreage than those of the wetland area adversely affected. All restored or created wetlands shall be provided at the minimum replacement ratio specified in Program BIO-3.b and shall have the same or increased habitat values as the wetland proposed to be destroyed.

BIO-3.f *Establish Criteria for Setbacks.* Establish criteria to be used in the review of individual development applications for determining an adequate setback distance in upland habitat to serve as a buffer zone between development and wetland areas. Setbacks should provide for minimum filtration functions to intercept sediments and prevent degradation of adjacent wetlands to be protected. The setbacks shall conform with distances specified in Policy BIO-3.1, with varied minimum setbacks in the City-Centered Corridor, and minimum 100 foot setback distances in the Coastal, Inland Rural, and Baylands Corridors. Within the City-Centered Corridor, flexibility should be included in the criteria based on site constraints, opportunities to ensure the avoidance of sensitive wetlands and associated resources such as special-status species,

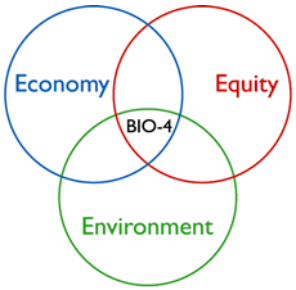
and the feasibility of alternative mitigation options for already developed properties and exceptions for existing uses.

BIO-3.g *Provide Landowner Education.* Landowner education regarding the sensitivity of wetlands and adjacent upland buffer areas will be provided as part of the Natural Resource Information Program called for in Program BIO-1.c. An emphasis will be placed on educating owners of developed properties adjacent to wetlands where minimum upland setback distances are not provided. Information on regulations protecting wetlands should be available, together with general methods to minimize disturbance and improve habitat values. An updated list of regulatory agencies and their contact information should be maintained as part of the Natural Resource Information Program.

What Are the Desired Outcomes?

Goal BIO-4

Riparian Conservation. Protect and, where possible, restore the natural structure and function of riparian systems.



Policies

BIO-4.1 Restrict Land Use in Stream Conservation Areas. Limit land uses in a designated Stream Conservation Area to those that create minimal disturbance or alteration to water, soils, vegetation, and wildlife and that maintain or improve stream function or habitat values.

A *Stream Conservation Area* (SCA) is established to protect the active channel, water quality and flood control functions, and associated fish and wildlife habitat values along streams. Development shall also be set back to protect the stream and provide an upland buffer. Best management practices[1] shall be adhered to in all designated SCAs. Best management practices are also strongly encouraged in ephemeral streams not defined as SCAs.

SCAs are designated along perennial, intermittent, and ephemeral streams as defined in the Countywide Plan Glossary. An ephemeral stream is subject to the SCA policies if it: a) supports riparian vegetation for a length of 100 feet or more, and/or b) supports special status species and/or a sensitive natural community type, such as native grasslands, regardless of the extent of riparian vegetation associated with the stream.

SCAs consist of the watercourse itself between the tops of the banks and a strip of land extending laterally outward from the top of both banks to the widths defined below (See Figure 2–2). The SCA encompasses any jurisdictional wetland or unvegetated other waters within the stream channel, together with the adjacent uplands, and supercedes setback standards defined for WCAs. Human-made flood control channels under tidal influence are subject to the Bayland Conservation policies. The following criteria shall be used to evaluate proposed development projects that may impact riparian areas:

City-Centered Corridor:

- For parcels more than 2 acres in size, provide a minimum 100 foot development setback on each side of the top of bank.

[1] Such as those outlined in *Start at the Source* and *Start at the Source Tools Handbook* (Bay Area Stormwater Managers Agencies Association)

- For parcels between 2 and 0.5 acres in size, provide a minimum 50 foot development setback on each side of the top of bank.

- For parcels less than 0.5 acres in size, provide an adequate setback from the top of bank based on a site assessment by a qualified professional, avoidance of woody riparian vegetation, presence of other sensitive biological resources, and options for alternative mitigation. The developed portion(s) of parcels (less than 0.5 acres in size) located behind an existing authorized flood control levee or dike are not subject to a development setback.

- This policy only applies to parcels within the City-Centered Corridor.

Coastal, Inland Rural, and Baylands Corridors:

- For all parcels, provide a minimum 100 foot development setback on each side of the top of bank. This shall be extended to include a buffer of 50 feet landward from the edge of riparian vegetation associated with the stream. SCAs shall be measured as shown in Figure 2–2.

- This policy only applies to parcels within the Coastal, Inland Rural, and Baylands Corridor.

Allowable uses consist of the following provided they conform to zoning and all relevant criteria and standards for SCAs:

- Currently existing permitted or legal non-conforming structures or improvements, their repair and retrofit within the existing footprint;
- Projects to improve fish and wildlife habitat;
- Road and utility crossings, if no other location is feasible;
- Water-monitoring installations;
- Passive recreation that does not significantly disturb native species;
- Necessary water supply and flood control projects that minimize impacts to stream function and to fish and wildlife habitat;
- Agricultural uses that do not require removal of woody riparian vegetation, result in installation of fencing within the SCA which prevents wildlife access to the riparian habitat within the SCA and do not involve animal confinement within the SCA.

  Exceptions to full compliance with all SCA criteria and standards may only be allowed if:

  1) A parcel falls entirely within the SCA; or

  2) Development on any portion of the parcel outside the SCA is either infeasible or would have greater impacts on water quality, wildlife habitat, other sensitive biological resources, or other environmental constraints.

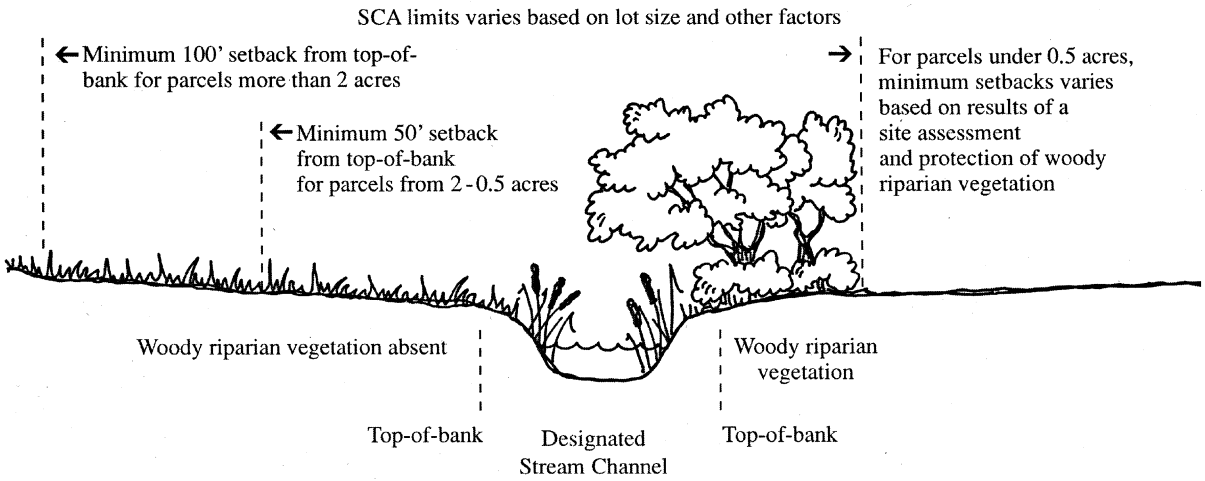
BIO-4.2 **Comply with SCA Regulations.** Implement established setback criteria for protection of SCAs through established discretionary permit review processes and/or through adoption of new ordinances. Environmental review shall be required where incursion into a SCA is proposed and a discretionary permit is required.

In determining whether allowable uses are compatible with SCA regulations, development applications shall not be permitted if the project:

- Adversely alters hydraulic capacity;
- Causes a net loss in habitat acreage, value, or function;
- Degrades water quality.

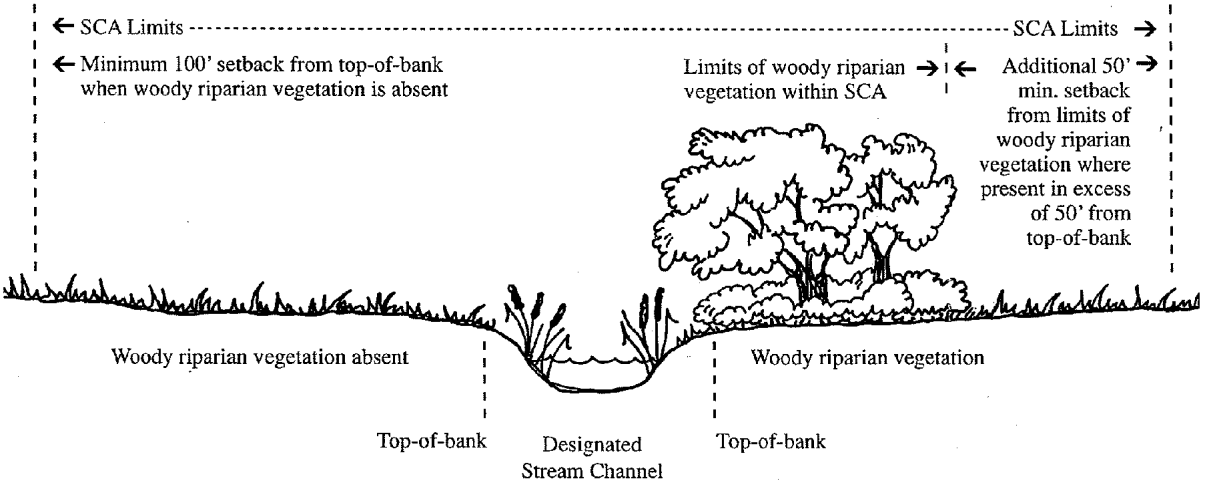
Figure 2–2
Typical Cross Section of a Stream Conservation Zone

City Centered Corridor



- Minimum setback distance of 100 feet from top-of-bank for parcels more than 2 acres.
- Minimum setback distance of 50 feet from top-of-bank for parcels between 2 and 0.5 acres.
- No specific minimum setback distance from top-of-bank for parcels less than 0.5 acres in size, but assumes any woody riparian vegetation is avoided and a site assessment is required which considers site constraints, presence of other sensitive biological resources, and options for alternative mitigation.
- A site assessment is required where incursion into an SCA is proposed and where full compliance with all SCA criteria would not be met for any parcel size.

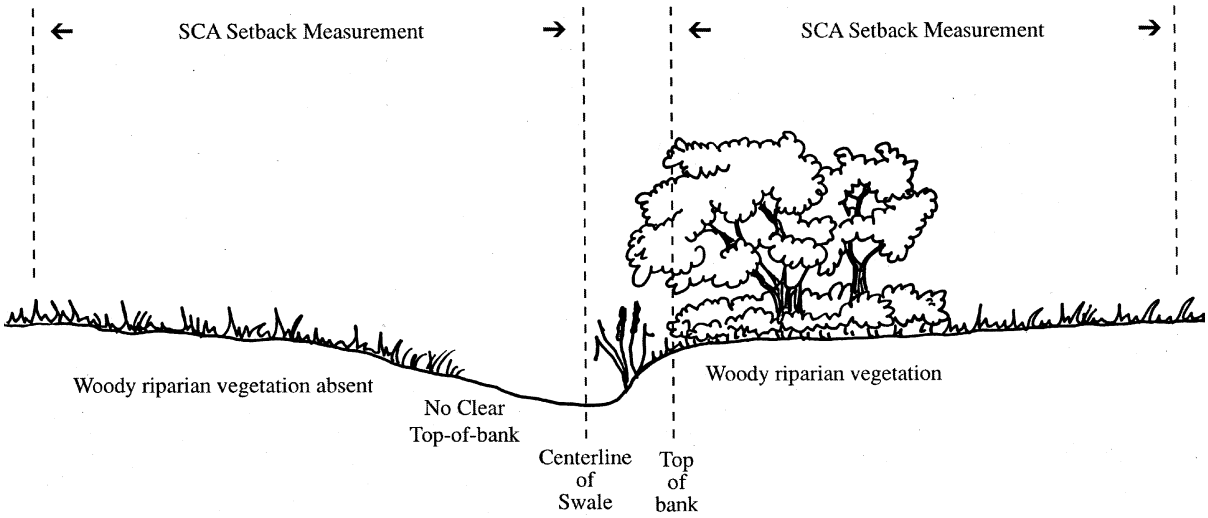
Inland Rural, Baylands, and Coastal Corridors



- Minimum setback distance of 100 feet from top-of-bank or an additional 50 feet from edge of woody riparian vegetation regardless of lot size, unless an exception is allowed because parcel falls entirely within SCA or development outside SCA is either infeasible or would have greater impacts.

- A site assessment is required where incursion into an SCA is proposed and where full compliance with all SCA criteria would not be met for any parcel size.

Setback Measurement for Ephemeral Streams



- Setback measurements are based on the corridor in which the stream is located.

BIO-4.3 **Manage SCAs Effectively.** Review proposed land divisions in SCAs to allow management of a stream by one property owner to the extent possible.

BIO-4.4 **Promote Natural Stream Channel Function.** Retain and, where possible, restore the hydraulic capacity and natural functions of stream channels in SCAs. Discourage alteration of the bed or banks of the stream, including filling, grading, excavating, installation of storm drains and culverts. Protect and enhance fish habitat, including through retention of large woody debris, except in cases where removal is essential to protect against property damage or prevent safety hazards. In no case~~s~~ shall alterations that create barriers to fish migration be allowed on streams mapped as historically supporting salmonids. Alteration of natural channels within SCAs for flood control should be designed and constructed in a manner that retains and protects the riparian vegetation, allows for sufficient capacity and natural channel migration, and allows for re-establishment of woody trees and shrubs without compromising the flood flow capacity where avoidance of existing riparian vegetation is not possible.

BIO-4.5 **Restore and Stabilize Stream Channels.** Pursue stream restoration and appropriate channel redesign where sufficient right-of-way exists that includes: a hydraulic design, a channel plan form, a composite channel cross-section that incorporates low flow and bankfull channels, removal and control of invasive exotic plant species, and biotechnical bank stabilization methods to promote quick establishment of riparian trees and other native vegetation.

BIO-4.6 **Control Exotic Vegetation.** Remove and replace invasive exotic plants with native plants as part of stream restoration projects and as a condition of site-specific development approval in an SCA, and include monitoring to prevent re-establishment.

BIO-4.7 **Protect Riparian Vegetation.** Retain riparian vegetation ~~– diverse species of trees, shrubs, grasses and forbs –~~ for stabilization of streambanks and floodplains, moderating water temperatures, trapping and filtering sediments and other water pollutants, providing wildlife habitat, and aesthetic reasons.

BIO-4.8 **Reclaim Damaged Portions of SCAs.** Restore damaged portions of SCAs to their natural state wherever possible, and re-establish as quickly as possible any herbaceous and woody vegetation that must be removed within an SCA, replicating the structure and species composition of indigenous native riparian vegetation.

BIO-4.9 **Restore Culverted Streams.** Replace storm drains and culverts in SCAs with natural drainage and flood control channels ~~whenever~~ wherever feasible. Where culverts interfere with fish migration but replacement is not possible, modify culverts to allow unobstructed fish passage.

BIO-4.10 **Promote Interagency Cooperation.** Work in close cooperation with flood control districts, water districts, and wildlife agencies in the design and choice of materials for construction and alterations within SCAs.

BIO-4.11 **Promote Riparian Protection.** Support agencies, organizations, and programs in Marin County that protect, enhance, and restore riparian areas.

BIO-4.12 **Support and Provide Riparian Education Efforts.** Educate the public and County staff about the values, functions, and importance of riparian areas. Landowner education regarding the sensitivity of riparian corridors will be provided as part of the Natural Resource Information Program called for in Program BIO-1.c. An emphasis will be placed on public outreach to owners of developed properties encompassing or adjacent to SCAs where minimum setback distances are not provided. Information on regulations protecting riparian corridors should be available, together with general methods to minimize disturbance and improve habitat values. An updated list of regulatory agencies and their contact information should be maintained as part of the Natural Resource Information Program.

BIO-4.13 **Provide Appropriate Access in SCAs.** Ensure that public access to publicly owned land within SCAs respects the environment, and prohibit access if it will degrade or destroy riparian habitat. Acquire public lands adjacent to streams where possible to make resources more accessible and usable for passive recreation and to protect and enhance streamside habitat.

BIO-4.14 **Reduce Road Impacts in SCAs.** Locate new roads and roadfill slopes outside SCAs, except at stream crossings, and consolidated new road crossings wherever possible to

minimize disturbance in the SCA. Require spoil from road construction to be deposited outside the SCA, and take special care to stabilize soil surfaces.

BIO-4.15 **Reduce Wet Weather Impacts.** Ensure that development work adjacent to and potentially affecting SCAs is not done during the wet weather or when water is flowing through streams, except for emergency repairs, and that disturbed soils are stabilized and replanted, and areas where woody vegetation has been removed are replanted with suitable species before the beginning of the rainy season.

BIO-4.16 **Regulate Channel and Flow Alteration.** Allow alteration of stream channels or reduction in flow volumes only after completion of environmental review, commitment to appropriate mitigation measures, and issuance of appropriate permits by jurisdictional agencies based on determination of adequate flows necessary to protect fish habitats, water quality, riparian vegetation, natural dynamics of stream functions, groundwater recharge areas, and downstream users.

Why is this important?

Riparian habitats are irreplaceable, vital biological systems that provide critical functions for water purification, flood control, fish and wildlife movement, and native habitat. However, large portions of existing riparian systems have been eliminated by past stream channelization, agricultural expansion, and urban development.

Environment: Preserving and restoring riparian habitats are essential to maintaining habitat connectivity and improving degraded conditions for fish and wildlife species. Adequate setbacks and limitations on uses within designated Stream Conservation Areas are needed to minimize disturbance to sensitive resources and to maintain and improve wildlife habitat, flood protection, and water purification.

Economy: Maintaining healthy waterways and natural habitat areas is critical to the economic health and vitality of the County. Protecting and restoring native vegetation along riparian corridors minimize potential erosion, downstream sedimentation, and water quality degradation. Directing development out of floodways reduces potential costly flood damage and loss.

Equity: Protecting and restoring riparian corridors provide an opportunity to link urban and natural areas to benefit human beings as well as native plants and wildlife. This expands the network of open space lands, areas for healthy recreation and exercise, ~~and~~ an appreciation of natural systems, and aesthetic benefits.

How Will Results Be Achieved?

Implementing Programs

BIO-4.a *Adopt Expanded SCA Ordinance.* Adopt a new SCA ordinance that would implement the SCA standards for parcels that are subject to conventional zoning designations, especially those traversed by or adjacent to a mapped anadromous fish stream and tributary. Such an ordinance could, by way of example, require compliance with the incorporation of best management practices into the proposed project and could

consider modest additions to existing buildings that would not result in significant impact to riparian resources, such as additions that do not exceed 500 square feet of total floor area and which do not increase the existing encroachment into the SCA provided a site assessment first confirms the absence of adverse impacts to riparian habitats. Buffer criteria for smaller developed parcels within the City-Centered Corridor should allow flexibility based on site constraints, opportunities for avoidance, presence of sensitive biological resources, and options for alternative mitigation. As part of the new ordinance, consider including additional incentives to reduce the extent of existing development within a SCA~~,~~ or improve conditions that may be impacting sensitive resources.

BIO-4.b *Reevaluate SCA Boundaries.* Beginning with the City-Centered Corridor and smaller parcels, conduct a comprehensive study to reevaluate standards used to protect SCAs and regulate development adjacent to streams. The study shall consider available data on stream protection and management standards, their effectiveness, and the effectiveness of the current standards used in Marin County, including the 50 and 100 foot setback distances (plus additional setbacks from the edge of riparian vegetation where applicable). The study shall consider stream functions on a watershed-level basis, and include input from professionals such as a fluvial geomorphologist, hydrologist, wildlife biologist, and vegetation ecologist, together with resource agencies and interested public. Each SCA should encompass all woody riparian vegetation and be of sufficient width to filter sediments and other pollutants before they enter the stream channel. Careful study may be needed to distinguish woody riparian vegetation from other types of woodland or forest vegetation in some areas.

BIO-4.c *Prepare County Stream Map.* Use the County GIS to map perennial, intermittent, and where feasible ephemeral streams subject to SCA policies. Use the resulting mapping in conjunction with USGS maps and the "ephemeral stream" definition to confirm SCAs on parcels proposed for development. Add to and update the map on an ongoing basis as additional streams are surveyed.

BIO-4.d *Establish Functional Criteria for Land Uses in SCAs.* Develop detailed criteria for protection of riparian functions, and identify methods for their use in evaluating proposed development.

BIO-4.e *Identify Proposals within SCAs.* Determine whether a proposed development falls wholly or partially within an SCA, through review by County staff, and as necessary by a qualified professional, of discretionary application materials and site inspection~~, whether a proposed development falls wholly or partially within an SCA~~.

BIO-4.f *Identify Potential Impacts to Riparian Systems.* At the time of a development application, evaluate potential impacts on riparian vegetation and aquatic habitat, and incorporate measures to protect riparian systems into the project design and construction. Retain and minimize disturbance to woody and herbaceous riparian vegetation in SCAs and adjacent areas. (Tree growth may be cleared from the stream

channel where removal is essential to protect against property damage or prevent safety hazards.)

BIO-4.g *Require Site Assessment.* Require development applications to include the submittal of a site assessment prepared by a qualified professional where incursions into the SCA are proposed, or adverse impacts to riparian resources may otherwise occur. Unless waived, the qualified professional shall be hired by Marin County. The site assessment shall be paid for by the applicant and considered in determining whether any adverse direct or indirect impacts on riparian resources would occur as a result of the proposed development, whether SCA criteria and standards are being met, and to identify measures necessary to mitigate any significant impacts. The site assessment may also serve as a basis for the County to apply restrictions in addition to those required by state and federal regulations. ~~Unless waived, the qualified professional shall be hired by Marin County.~~

BIO-4.h *Comply with SCA Criteria and Standards.* All development permit applications shall be reviewed for conformity with these SCA policies, criteria and standards and in accordance with the California Environmental Quality Act. Proposals that do not conform to SCA policies, and cannot be modified or mitigated to conform, shall be denied. If a proposal involves the creation of a new parcel which is wholly or partially in an SCA, the land division shall be designed to assure that no development occurs within the SCA.

BIO-4.i *Replace Vegetation in SCAs.* When removal of riparian vegetation is unavoidable in an SCA, and mitigation is required, require establishment of native trees, shrubs, and groundcovers within a period of five years at a rate sufficient to replicate~~, after a period of five years,~~ the appropriate density and structure of vegetation removed. Require replacement and enhancement planting to be monitored and maintained until successful establishment provides for a minimum replacement or enhancement ratio of 2:1.

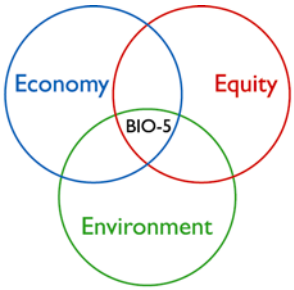
BIO-4.j *Continue Funding Fencing of Sensitive Stream Areas.* Encourage continued funding in conjunction with the Resource Conservation District, the Natural Resource and Conservation Service, and other relevant agencies, to pay the cost of fencing sensitive streamside areas (on both public lands and private property) that could be impacted by cattle grazing.

BIO-4.k *Locate Trails Appropriately.* Situate trails at adequate distances from streams to protect riparian and aquatic habitat and wildlife corridors. Trails may occasionally diverge close to the top of bank to provide visual access and opportunities for interpretive displays on the environmental sensitivity of creek habitats. (See policies and programs in the Trails Section of this Element.)

BIO-4.l *Monitor Stream Conservation Areas.* Establish a system of monitoring SCAs which may include mapping fenced streams and stream restoration areas to assure the protection of vegetation, soils, water quality, and wildlife habitat along streams.

What Are the Desired Outcomes?

Goal BIO-5



Baylands Conservation. Preserve and enhance the diversity of the baylands ecosystem, including tidal marshes and adjacent uplands, seasonal marshes and wetlands, rocky shorelines, lagoons, agricultural lands, and low-lying grasslands overlying historical marshlands.

The **Baylands Corridor** extends along the shoreline of San Francisco Bay and San Pablo Bay (as depicted on Map 2-5*, Options 1, 2, and 3, and the Land Use Policy Map Set 3-37). Portions of small parcels not subject to tidal action are not included in the Baylands Corridor unless the parcel is in public ownership and designated for open space purposes.

For purposes of finalizing the map, the following options are provided:

BAYLANDS OPTION 1 (SFEI including setback)

Portions of large undeveloped parcels (over 2 acres in size, unless determined otherwise based on specific characteristics of the site), generally consisting of the area from 300 feet landward of the historic bay marshlands based on maps prepared by the San Francisco Estuary Institute. The inclusion of an additional 300-foot distance for large undeveloped parcels adjacent to baylands is consistent with the minimum setback recommendations from tidelands contained in the 1999 *Baylands Ecosystem Habitat Goals*. This portion of the Baylands Corridor serves to both recognize the heightened sensitivity of uplands adjacent to remaining tidelands and the opportunity to improve habitat values as part of future restoration of historic tidelands. The mapped Baylands Corridor does not extend west of Highway 101, or over developed lands on privately-owned parcels.

BAYLANDS OPTION 2 (to Highway 101 in Las Gallinas Planning Area)

Portions of large undeveloped parcels (over 2 acres in size, unless determined otherwise based on specific characteristics of the site), generally consisting of the area from 300 feet landward of the historic bay marshlands based on maps prepared by the San Francisco Estuary Institute, although in the Las Gallinas Planning Area the Corridor includes lands to Highway 101. The inclusion of an additional 300-foot distance for large undeveloped parcels adjacent to baylands is consistent with the minimum setback recommendations from tidelands contained in the 1999 *Baylands Ecosystem Habitat Goals*. This portion of the Baylands Corridor serves to both recognize the heightened sensitivity of uplands adjacent to remaining tidelands and the opportunity to improve habitat values as part of future restoration of historic tidelands. The mapped Baylands Corridor does not extend west of Highway 101, or over developed lands on privately-owned parcels.

* For illustrative purposes only; for actual location, see land use maps.

BAYLANDS OPTION 3 (to the railroad in Las Gallinas Planning Area; Gnoss Field excluded)

Portions of large undeveloped parcels (over 2 acres in size, unless determined otherwise based on specific characteristics of the site), generally consisting of the area from 300 feet landward of the historic bay marshlands based on maps prepared by the San Francisco Estuary Institute, although in the Las Gallinas Planning Area the boundary follows the Northwestern Pacific Railroad. Gnoss Field and the lands between the airport and the railroad are excluded. The inclusion of an additional 300-foot distance for large undeveloped parcels adjacent to baylands is consistent with the minimum setback recommendations from tidelands contained in the 1999 *Baylands Ecosystem Habitat Goals*. This portion of the Baylands Corridor serves to both recognize the heightened sensitivity of uplands adjacent to remaining tidelands and the opportunity to improve habitat values as part of future restoration of historic tidelands. The mapped Baylands Corridor does not extend west of Highway 101, or over developed lands on privately-owned parcels.

The boundary line of the Baylands Corridor was also drawn utilizing the following principles:

1. Large parcels (over 2 acres in size, whether developed or undeveloped) which are publicly owned open space lands and partially or wholly in baylands are included in the Baylands Corridor. These include: Days Island, Deer Island Preserve, Rush Creek Open Space, China Camp State Park, Bothin Marsh, and Richardson Bay.

2. On the San Quentin State Prison and the San Rafael Rock Quarry sites, the Baylands Corridor generally extends 100 feet landward from the mean high tide consistent with the Bay Conservation and Development Commission jurisdiction boundary. On the quarry property, the Baylands Corridor follows the San Francisco Estuary Institute boundary where existing wetlands remain.

3. On small parcels (under 2 acres in size, whether developed or undeveloped) the Baylands Corridor includes only the area that is submerged or subject to inundation by tidal action.

Policies

BIO-5.1 **Protect the Baylands Corridor.** Ensure that baylands and large, adjacent essential uplands are protected and encourage enhancement efforts of baylands, including those in the Baylands Corridor. The following criteria shall be used to evaluate proposed development projects that may impact the Baylands Corridor:

- For large parcels (over 2 acres in size) adhere to development setback standards for areas qualifying for protection under the WCA and SCA, but increase setback distances as necessary to ensure that hydrologically isolated features such as seasonal wetlands and freshwater marsh are adequately linked to permanently protected habitat. These additional development setbacks shall serve to prevent fragmentation and preserve essential upland buffers in the Baylands Corridor.

- The Baylands Corridor and specified setbacks do not extend over non-tidal portions of smaller parcels (2 acres or less in size) which border or partially extend

over tidelands. Where suitable habitat exists, up to ten feet landward of mean high tide should be preserved as a species refuge area for high water events. Site constraints, opportunities for avoidance of sensitive biological resources, and options for alternative mitigation will be considered in lieu of fixed setbacks on these properties.

- Minor redevelopment involving less than 25 percent of a structure on a residential or industrial parcel that is already filled and at least 50 percent developed may be exempted from the requirements for a site assessment provided no additional filling or modification to wetlands occurs. (See BIO-5.2.)

BIO-5.2 **Limit Development and Access.** Ensure that development does not encroach into sensitive vegetation and wildlife habitats, damage fisheries or aquatic habitats, limit normal wildlife range, or create barriers that cut off access to food, water, or shelter for wildlife. Require an environmental assessment where development is proposed within the Baylands Corridor.

BIO-5.3 **Leave Tidelands in Their Natural State.** Require that all tidelands are left in their natural state to respect their biological importance to the estuarine ecosystem. Any modifications should be limited to habitat restoration or enhancement plans approved by regulatory agencies.

BIO-5.4 **Restore Marshlands.** Enhance wildlife and aquatic habitat value of diked bay marshlands, and encourage land uses that provide or protect wetland or wildlife habitat and do not require diking, filling, or dredging.

BIO-5.5 **Protect Freshwater Habitats.** Preserve and, where possible, expand habitats associated with freshwater streams, seasonal wetlands, and small former marshes to facilitate the circulation, distribution, and flow of fresh water and to enhance associated habitat values.

BIO-5.6 **Use Flood Basins for Seasonal Habitat.** Utilize natural or manage man-made flood basins to provide seasonal habitat for waterfowl and shorebirds, and prohibit development in these basins to protect habitat values.

BIO-5.7 **Limit Access to Wetlands.** Design public access to avoid or minimize disturbance to wetlands, necessary buffer areas, and associated important wildlife habitat while facilitating public use, enjoyment, and appreciation of bayfront lands.

BIO-5.8 **Control Shoreline Modification.** Ensure that any modifications to the shoreline do not result in a loss of biodiversity or opportunities for wildlife movement. Possible modifications may include construction of revetments, sea walls, and groins, as permitted by State and federal agencies.

BIO-5.9 **Allow Limited Agricultural Use.** Encourage only those agricultural uses that are compatible with protection of wetlands and other sensitive resources to remain in

baylands. Conversion of non-agricultural lands to agriculture should occur only if wetlands or other sensitive biological resources would not be lost or adversely affected. Where possible, wetlands should be enhanced and restored as part of agricultural use or conversion.

BIO-5.10 **Encourage Acquisition of Essential Baylands.** Continue to acquire large, essential baylands for open space and habitat restoration purposes, and support public and private partnerships working to acquire baylands.

Why is this important?

An estimated 82 percent of the historic tidal marshlands along the edge of the San Francisco Bay-Delta Estuary have been filled or altered. The remaining baylands continue to be threatened by increasing human populations and associated pollution and disturbance to sensitive habitat; continued dredging, filling, and urban development; major water diversion projects; and other factors.

Environment: Adequate building setbacks and some restrictions on public access are needed to maintain the buffers that protect the sensitive habitat of the baylands.

Economy: As with all wetlands, maintaining and enhancing baylands protect the long-term health of the County, and its attractiveness as a desirable location for business and commerce. Protecting the natural water filtration and recharge functions of baylands reduces the costs of flood damage, water pollution, and habitat degradation.

Social Equity: Protecting and restoring baylands provide for improved human and wildlife habitat at the fringe of urban areas where population densities are high~~est~~ and the need for open space and recreational opportunities are greatest.

How Will Results Be Achieved?

Implementing Programs

BIO-5.a *Establish Criteria for Upland Setbacks in the Baylands Corridor.* Establish criteria to be used in the review of individual development applications for determining an adequate setback distance in adjacent uplands to serve as a buffer zone between development and remaining or historic tidelands and wetlands. Setbacks should provide for at least the minimum distances necessary to avoid adverse effects of increased human activity and potential disturbance to sensitive biological resources, and to provide essential linkages between important features such as seasonal wetlands, freshwater marsh, and roosting and nesting areas.

BIO-5.b *Provide Landowner Education.* Landowner education will be provided regarding the sensitivity of baylands and adjacent upland buffer areas as part of the Natural Resource Information Program called for in Program BIO-1.c. An emphasis will be placed on educating owners of developed properties adjacent to baylands where minimum upland setback distances are not provided. Information on regulations protecting baylands should be available, together with general methods to minimize disturbance

and improve habitat values. An updated list of regulatory agencies and their contact information should be maintained as part of the Natural Resource Information Program.

BIO-5.c *Update Development Code*. Update the Development Code redefining the Bayfront Conservation Zone to reflect Baylands Corridor policies as well as including relevant aspects from the current Bayfront Conservation Zone. The updated Development Code shall identify criteria to be used in evaluating proposed development projects, and appropriate development restrictions necessary to protect sensitive biological and wetland resources.

BIO-5.d *Enforce Tidelands Restrictions.* Ensure the Development Code prohibits diking, filling, or dredging in tidelands, unless the area is already developed and currently being dredged. Current dredging operations for maintenance purposes may continue subject to environmental review, if necessary. In some cases, exceptions may be made for areas that are isolated or limited in productivity. In tidal areas, only land uses that are water-dependent shall be permitted, as consistent with federal, State, and regional policy. These include, but are not limited to:

- ports
- water-dependent industry and utilities
- essential water conveyance
- wildlife refuge and habitat restoration
- water-oriented recreation

Exemptions may be granted for emergency or precautionary measures taken in the public interest, such as protection from flooding or other natural hazards. Removal of native vegetation shall be discouraged and secondary effects evaluated such as potential reduction in available surface water and water quality degradation due to non-point discharge. Alteration of hydrology should only be allowed when it can be demonstrated that the impact will be beneficial or insignificant.

BIO-5.e *Enforce Diked Bay Marshlands Requirements.* Ensure the updated Development Code allows only those land uses in diked bay marshlands that protect wetland or wildlife habitat and do not require diking, filling, or dredging, including:

- restoration to tidal status
- restoration to seasonal wetlands
- appropriate agricultural use
- flood basins
- wastewater reclamation areas
- maintenance and minor expansion of existing development located landward of existing dikes

Other uses that do not require diking, filling, or dredging may be allowed consistent with zoning if it can be demonstrated that impacts to baylands are minimized and

adequately mitigated. Land uses that provide protection from flood or other natural hazards may be allowed if necessary to protect public health and safety. Existing dredging operations in developed areas may continue, subject to environmental review, if necessary. Priority shall be given to water-oriented uses, such as public access and low-intensity passive recreational and educational opportunities that include habitat protection and enhancement components.

BIO-5.f *Control Public Access.* Design public use areas to be clearly marked, to minimize possible conflicts between public and private uses, to provide continuous ten-foot-wide walkways from the nearest roads to the shoreline and along the shoreline, to be set back at least ten feet from any proposed structure, and to be buffered from wetlands. Restrict access to environmentally sensitive marshland and adjacent habitat, especially during spawning and nesting seasons.

BIO-5.g *Identify Baylands as a Priority for Open Space Acquisition.* Designate regionally significant baylands, including tidelands, diked marshlands, and adjacent uplands, as a priority for open space acquisition, particularly in areas known to support essential habitat for special-status species, wetlands, and important habitat linkages for wildlife (see policies and programs in the Open Space and Trails Sections of this Element).

BIO-5.h *Encourage Baylands Protection in Cities.* Work with the cities and towns of Corte Madera, Larkspur, Mill Valley, Novato, San Rafael, Sausalito, Belvedere and Tiburon to protect tidelands and remaining undeveloped, diked historic saltmarsh areas.

Figure 2–3 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
BIO-1 Enhanced Native Habitat and Biodiversity	•				•							
BIO-2 Protection of Sensitive Biological Resources	•				•							
BIO-3 Wetland Conservation	•			•	•							
BIO-4 Riparian Conservation	•			•	•	•						
BIO-5 Baylands Conservation	•			•	•							

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicator	Benchmark	Target
Number of identified Northern Spotted Owls	75 pairs in ~~2004~~2000	No decrease in the number of owls identified

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–4
Biological Resources Program Implementation

Programs	Responsibility	Potential Funding	Priority	Time frame
BIO-1.a – Map Natural Communities.	Community Development Agency (CDA)	Existing budget and may require additional grants or revenues*	Medium	Med. term
BIO-1.b – Develop Habitat Monitoring Programs.	CDA, Resource Protection Agencies	Will require additional grants or revenues*	Low	Long term
BIO-1.c – Maintain a Natural Resource Information Program.	CDA, Resource Protection Agencies	Existing budget and may require additional grants or revenues*	High	Med. Term
BIO-1.d – Reevaluate County Tree Ordinance.	CDA	Existing budget	Medium	Short term
BIO-1.e – Protect Against Vegetation and Wildlife Diseases.	Agricultural Commissioner, Farm Advisor, Fire Agencies	Existing budget	Medium	Med. term
BIO-1.f – Prepare Appropriate Landscape Lists.	CDA	Existing budget	High	Ongoing

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Potential Funding	Priority	Time frame
BIO-1.g – Expand Education, Outreach, and Regulatory Programs Regarding Control of Invasive Exotic Species.	CDA, Agricultural Commissioner, Resource Protection Agencies	Existing budget and may require additional grants or revenues*	Medium	Ongoing
BIO-2.a – Require Site Assessments.	CDA	Existing budget	High	Ongoing
BIO-2.b – Conduct Habitat Connectivity Assessment.	CDA, Marin County Open Space District (MCOSD), Resource Protection Agencies	Will require additional grants or revenues*	Medium	Long term
BIO-2.c – Facilitate Agency Review.	CDA	Existing budget	High	Ongoing
BIO-2.d – Promote Early Agency Consultation.	CDA	Existing budget	High	Ongoing
BIO.3.a – Adopt Wetland Conservation Area Ordinance.	CDA	Existing budget	High	Ongoing
BIO-3.b – Comply with Regulations to Protect Wetlands.	CDA. Resource Protection Agencies	Existing budget	High	Ongoing
BIO-3.c – Require Site Assessments.	CDA	Existing budget	High	Ongoing
BIO-3.d – Prioritize Wetland Avoidance.	CDA, Resource Protection Agencies	Existing budget	High	Short term
BIO-3.e – Establish Clear Mitigation Criteria.	CDA	Existing budget	High	Short term
BIO-3.f – Establish Criteria for Buffer Zones.	CDA	Existing budget	Medium	Short term
BIO-3.g – Provide Landowner Education.	CDA, Resource Protection Agencies	Existing budget and may require additional grants or revenues*	High	Med. term
BIO-4.a – Adopt Expanded SCA Ordinance.	CDA	Existing budget	High	Short term
BIO-4.b – Reevaluate SCA Boundaries.	CDA, Resource Protection Agencies	Existing budget and may require additional grants or revenues*	High	Short term
BIO-4.c – Prepare County Stream Map.	CDA, Department of Public Works (DPW)	Existing budget and may require additional grants or revenues*	High	Ongoing

Programs	Responsibility	Potential Funding	Priority	Time frame
BIO-4.d – Establish Functional Criteria for Land Uses in SCAs.	CDA	Existing budget and may require additional grants or revenues*	High	Short term
BIO-4.e – Identify Proposals within SCAs	CDA	Existing budget	High	Short term
BIO-4.f – Identify Potential Impacts to Riparian Systems.	CDA	Existing budget	High	Short term
BIO-4.g – Require Site Assessments.	CDA	Existing budget	High	Ongoing
BIO-4.h – Comply with SCA Criteria and Standards.	CDA	Existing budget	High	Ongoing
BIO-4.i – Replace Vegetation in SCAs.	CDA	Existing budget	High	Ongoing
BIO-4.j – Continue Funding Fencing of Sensitive Stream Areas.	Marin Resource Conservation District	Existing budget, Private Donations	High	Ongoing
BIO-4.k – Locate Trails Appropriately.	MCOSD, CDA	Existing budget and may require additional grants or revenues*	High	Ongoing
BIO-4.l – Monitor Stream Conservation Areas.	DPW	Will require additional grants or other revenue*	TBD	Long term
BIO-5.a – Establish Criteria for Upland Setbacks in the Baylands Corridor.	CDA	Existing budget	High	Short term
BIO-5.b – Provide Landowner Education.	CDA, Resource Protection Agencies UCCE-FA	Existing budget and may require additional grants or revenues*	High	Med. Term
BIO-5.c – Update Development Code.	CDA	Existing budget and may require additional grants or revenues*	High	Short term
BIO-5.d – Enforce Tidelands Restrictions.	CDA, Resource Protection Agencies	Existing budget	High	Ongoing
BIO-5.e – Enforce Diked Bay Marshlands Requirements.	CDA, Resource Protection Agencies	Existing budget	Medium	Short term
BIO-5.f – Control Public Access.	CDA, MCOSD	Existing budget	Medium	Short term

Programs	Responsibility	Potential Funding	Priority	Time frame
BIO-5.g – Identify Baylands as a Priority for Open Space Acquisition.	MCOSD	Existing budget and public & private sources	Set annually by BOS	Ongoing
BIO 5.h – Encourage Baylands Protection in Cities.	CDA, Community Based Organizations (CBO's)	Existing budget	High	Ongoing

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

UCCE-FA: University of California Cooperative Extension, FA: Farm Advisor

Black Mountain at sunset

2.5 Water Resources

Background

Marin watersheds are ridge-bounded ecosystems that drain into the bay or ocean (see Map 2-7, Major Watersheds, and the Technical Appendix for the Watershed Management Plan). These systems carry water, sediments, and nutrients downstream, which also infiltrate the ground to recharge aquifers and springs (see ~~also the~~ discussion of riparian systems in the Biological Resources Section of this Element). While it takes many millennia for watersheds to achieve equilibrium, human activities can degrade their functions in a matter of years by

Water Quality Regulations

Water quality is regulated under federal, State and local laws by the following agencies:

- State Water Resources Control Board
- Regional Water Quality Control Boards
- California Department of Fish and Game
- U.S. Environmental Protection Agency
- State Department of Health Services
- County Environmental Health and Public Works Departments (grading and storm water ordinances)
- Stormwater Ordinance
- California Coastal Commission (in the Coastal Zone)

increasing or concentrating runoff, altering drainages, or causing changes at outlets (such as rising sea level), affecting the availability and quality of water supplies.

Local drinking water comes primarily from surface sources (see discussion of water provision in the Public Facilities and Services Section of the Built Environment Element). Many substances considered pollutants occur naturally in watersheds and only become problems when unusually concentrated. For example, sediment is a product of natural erosion but in excess quantities becomes a pollutant. Because most fecal coliform levels do not distinguish between human and wildlife sources, it is often difficult to determine whether pollution results from natural processes, human activities, or both.

Sediment is a major concern countywide as it can damage aquatic habitat and cause flooding by filling in channels and floodplains. Sediment sources include construction, road building, and agriculture. Other local water quality concerns include toxic chemicals (especially in urban areas), mercury (in Walker Creek and Tomales Bay), and nutrients such as nitrogen and phosphorous. Toxic runoff sources include oil and gas, pesticides, cleaning agents, and sewage. In rural areas, septic systems (Map 2-8) and livestock waste contribute to nutrient and pathogen contamination.

"If there is magic on this planet, it is contained in water."

– Loren Eisley

Watershed Management Plans that are underway or have been completed including: Tomales Bay, Bolinas Lagoon, and Marin County. Marin County is refining its first *Watershed Management Plan,* which describes and maps local watersheds and prescribes actions for maintaining and improving watershed health countywide. The plan presents detailed recommendations for modifying the development review and permitting process, changing construction and maintenance practices, supporting interagency planning efforts, and establishing educational outreach programs. This Section of the Countywide Plan contains policies and programs that reflect those recommendations in order to preserve and enhance watershed health and water quality in Marin.

Key Trends and Issues

Is water quality and watershed function threatened in Marin?

Nonpoint source describes pollutants contributed by many small sources that cannot be easily distinguished but together degrade water quality. Pollution caused by release of waste or contaminated water through distinct structures such as pipes is termed point source. Because nonpoint source pollution can accumulate from diverse sources throughout a watershed, numerous small management changes can improve ~~on~~ water quality.

Recent studies list pollutants in local waters. The State has listed all urban streams in the City-Centered Corridor as impaired by the pesticide Diazinon, and San Pablo Bay as impaired by metals. Richardson Bay is identified as impaired by pathogens, while Tomales Bay is listed as impaired by metals (mercury), and excess sediment, nutrients, and pathogens. Walker Creek is impaired by metals, sediment, and nutrients while Lagunitas Creek is listed for sediment, nutrients, and pathogens. Pollutant levels are probably caused by urban and agricultural runoff.

Development has created extensive impervious surfaces. The Bay Area Stormwater Management Agencies Association has found that studies evaluating stream and wetland health consistently show that significant water quality impacts begin with impervious land coverage levels as low as 10 percent. At impervious land coverage over 30 percent, impacts on streams and wetlands become more severe and degradation is almost unavoidable without special measures. The Association of Bay Area Governments reports in its Projections 2003 that 10.1 percent of all land in Marin was developed in 2000 (compared with 4.4 percent in Napa County and 7.7 percent in Sonoma County).

Threatened and endangered fish are showing signs of recovery. Coho salmon listed at the state and federal level as endangered, and steelhead, federally listed as a threatened species, have suffered significant losses in Marin, but the long-term trend may be changing. These species recently have shown limited signs of recovery in certain areas, most likely in response to concerted efforts aimed at restoring watershed function and riparian habitat. Lagunitas Creek watershed annually produces as much as 15 percent of the total population of California's estimated 5,000 spawning adult coho.

Methods to Increase Infiltration

- Use pervious pavements whenever possible. Drain water into cisterns, dry wells or infiltration trenches.
- Keep vegetated areas undisturbed whenever possible. Re-establish groundcover and woody plants immediately after disturbance.
- Use grass-lined swales instead of hard-surfaced ditches.

Septic systems require maintenance, repair and upgrades. Faulty septic systems have been identified as one of the possible sources of pathogens in Tomales Bay and connected waterways. A voluntary survey along the East Shore of Tomales Bay found that 40 percent of the inspected septic systems were functioning marginally or directly discharging to the bay. (Policies and programs in the Public Facilities and Services section of the Built Environment Element address regulations for septic systems.)

Stream restoration practices have changed significantly in the past 15 years. The design and construction practices associated with the hydrologic restoration of streams and their associated biotic

habitats have steadily evolved and are now recognized as credible alternatives to standard engineering channel design and stabilization measures (e.g. concrete lining, concrete retaining walls, rock riprap and gabion revetments). The primary goal of a stream restoration project should be a natural channel restoration utilizing fluvial geomorphic design principles including hydraulic engineering design and limited bank stabilization.

Agricultural and recreational uses impact water quality. The impacts of agricultural operations can be mitigated by using proper management practices for agricultural and livestock operations to prevent contribution of excess sediment, nutrients, and pathogens to downstream waters. Recreational aquatic uses also can contribute pathogens if human waste is not properly managed.

Ahwahnee Principles for Water Supply

This set of concepts was identified by the Local Government Commission to help guide communities in developing policies for water supply, water quality, and watershed integrity.

Communities should:

- Recognize and live within the limits of available water resources.
- Promote a stewardship ethic to care for and sustainably manage water resources.
- Maximize self -sufficiency and reliability of water resources by developing a diverse portfolio of local and regional water supplies and efficient water management practices.
- Maximize available potable supplies by ensuring that the type of water being used is matched with the appropriate end use.
- Support natural resources planning on a watershed basis and use whole system management approaches when evaluating development. They should encourage adjacent communities to collaborate on such efforts within their watersheds.
- Protect and restore natural systems, habitats, groundwater recharge areas, and watersheds as an integral part of water management and local land use planning and development.
- Use natural systems wherever possible to achieve flood control, water quality, and water supply goals, and ~~should~~ attempt to mimic and restore natural ecosystems and hydrologic functions when projects are constructed.
- Encourage the design of buildings, landscapes, and land use to maximize water efficiency, water reuse, and the beneficial use of storm water including groundwater recharge and ~~improving~~ water quality improvement.
- Evaluate the multiple benefits of a project or program and incorporate this information into cost effectiveness analyses.
- Fully engage the public and all stakeholders in water planning efforts.
- Encourage the state and federal resources agencies to conduct natural resource-based planning on a watershed basis and to use whole-system management approaches.
- Participate as much as possible in regional, state and federal planning for water resources.

Source: Local Government Commission, 2004

Goals, Policies, and Programs

What Are the Desired Outcomes?

Goal WR-1

Healthy Watersheds. Achieve and maintain proper watershed function, including sediment transport and groundwater recharge and filtration, and ensure high-quality water for current uses, future generations, and the natural environment.

Policies

WR-1.1 **Protect Watersheds and Aquifer Recharge**. Give high priority to the protection of watersheds, aquifer-recharge areas, and natural drainage systems in any consideration of land use.

WR-1.2 **Restore and Enhance Watersheds**. Support watershed restoration efforts, coordinate County watershed activities with efforts by other groups, and simplify permit acquisition for watershed restoration and enhancement projects.

> *"People have a fundamental yearning for great bodies of waer. But the very movement of the people toward the water can also destroy the water."*
>
> – Christopher Alexander, Sara Ishikawa, and Murray Silverstein, *A Pattern of Language, Towns, Buildings, Construction* (Oxford, 1977).

WR-1.3 **Improve Infiltration.** Enhance water infiltration throughout watersheds to decrease accelerated runoff rates and enhance groundwater recharge. Whenever possible, maintain or increase a site's pre-development infiltration to reduce downstream erosion and flooding.

WR-1.4 **Protect Upland Vegetation.** Limit development and grazing on steep slopes and ridgelines in order to protect downslope areas from erosion and to ensure that runoff is dispersed adequately to allow for effective infiltration.

Why is this important?

According to the Bay Area Stormwater Management Agencies Association watershed health suffers when impervious land coverage exceeds 10 percent. Impervious surfaces in Marin approach that threshold.

Environment: Sediment, pathogens, nutrients and other chemical pollutants have devastating impacts on water quality and watershed health and diversity. Local watershed areas vary from steep creek canyons with limited groundwater recharge capacity to tidal lands such as those ~~fringing~~ bordering

Tomales Bay. Tomales Bay alone is home to nearly 900 species of plants, 500 species of birds, and a mariculture industry. Proposed increases in the amount of paved and other unnatural surfacing should be carefully scrutinized and tightly controlled.

Economy: The use of best management practices and improvements in water quality-related regulations and education are smart financial investments toward preventing watershed degradation which can be costly to the local economy.

Equity: Water quality is vital to community health and prosperity. Pollutants from non-point sources and improperly functioning septic systems pose significant human and non-human health risks.

How Will Results Be Achieved?

Implementing Programs

WR-1.a *Support Watershed Education and Outreach.* Continue to support and fund the Marin County Stormwater Pollution Prevention Program and local county stormwater program efforts to encourage residents to adopt practices that increase groundwater infiltration, and to educate them about how they can make a significant difference.

"Wetlands have a poor public image.... Yet they are among the earth's greatest natural assets... mankind's waterlogged wealth."

– Edward Maltby,
Waterlogged Wealth, 1986

WR-1.b *Establish Development Standards for Infiltration.* Establish qualitative standards to maximize groundwater infiltration and minimize surface water runoff based on criteria developed by the Bay Area Stormwater Management Agency Associates. Standards should: regulate the amount of impervious surfaces; vary by project type, land use, building-site placement, soils and area characteristics; and provide for water impoundments, protecting and planting vegetation, cisterns, and other measures such as restricting wet weather grading to increase groundwater recharge and reduce sedimentation.

WR-1.c *Seek Watershed Assessment and Monitoring Assistance.* Pursue federal and State funding to conduct baseline assessments and trend monitoring of water quality, aquatic habitat, sensitive species, and restoration in County watersheds.

WR-1.d *Coordinate Watershed Efforts.* Work with land and water management agencies, community-based watershed restoration groups, and private property owners to explore methods and programs for maintaining and improving watershed health, including carrying out the actions recommended in the *Marin County and Tomales Bay Watershed Plans.*

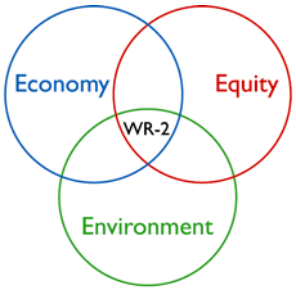
WR-1.e *Require Restoration of Degraded Areas.* Require replanting of vegetation and remediation of associated erosion in conjunction with requested land use approvals, especially those including roads and over-grazing on steep slopes.

WR-1.f *Require Stream Restoration Projects.* Require restoration of streams in conjunction with associated land use approvals to improve groundwater re-charge and filtration and to ensure high-quality water. Restoration projects should follow the design principles of natural channel restoration utilizing geomorphic concepts.

What Are the Desired Outcomes?

Goal WR-2

Clean Water. Ensure that surface and groundwater supplies are sufficiently unpolluted to support local natural communities, the health of the human population, and the viability of agriculture and other commercial uses. (Policies on water availability are found in the Public Facilities and Services Section.)



Policies

WR-2.1 **Reduce Toxic Runoff.** Reduce the volume of urban run-off from pollutants—such as pesticides from homes, golf courses,, cleaning agents, swimming pool chemicals, and road oil—and of excess sediments and nutrients from agricultural operations.

WR-2.2 **Reduce Pathogen, Sediment, and Nutrient Levels.** Support programs to maintain pathogen and nutrient levels at or below target levels set by the Regional Water Quality Control Board~~s~~, including the efforts of ranchers, dairies, agencies, and community groups to address pathogen, sediment, and nutrient management in rural watersheds.

WR-2.3 **Avoid Erosion and Sedimentation.** Minimize soil erosion and discharge of sediments into surface runoff, drainage systems, and water bodies. Continue to require grading plans that address avoidance of soil erosion and on-site sediment retention. Require developments to include on-site facilities for the retention of sediments, and, if necessary, ~~upon project completion,~~ require continued monitoring and maintenance of these facilities upon project completion.

WR-2.4 **Design County Facilities to Minimize Pollutant Input.** Design, construct, and maintain County buildings, roads, bridges, drainages, and other facilities to minimize the volume of sediment and other pollutants in storm water flows, and continue to improve road maintenance methods to reduce erosion and sedimentation potential.

WR-2.5 **Take Part in Water Quality Education.** Continue to support local storm water and community watershed group efforts to inform the public about practices and programs to minimize water pollution.

Why is this important?

Stormwater runoff is increasingly trapped above impervious surfaces picking up pollutants ~~and~~ before running off into streams, lakes, and estuaries~~, picking up pollutants along the way~~.

Environment: Runoff from urban and agricultural uses is contributing to excessive pollutant levels in local streams and bays. Reducing the source volume of pollutants is necessary so that levels of sediment, nutrients, pathogens, and other pollutants do not threaten the health of natural and human communities.

Economy: Maintaining non-polluted water sources supports local businesses that depend on clean water, including agriculture, mariculture, tourism, and recreation.

Equity: Ensuring that runoff is free of harmful pollutants is essential to maintaining healthy living and working conditions.

How Will Results Be Achieved?

Implementing Programs

WR-2.a *Participate in Updating Standards.* Work with the Regional Water Quality Control Boards and interested parties in the development and implementation of reasonable and achievable standards for clean water. Participate in the development and implementation of Total Maximum Daily Load (TMDL) standards for impaired water bodies, both for pollutants from the built environment and from agricultural and rural activities as identified by the Regional Boards, to achieve to the maximum extent practicable compliance with adopted TMDLs. (See also Agriculture and Food Program AG-1.r.)

The State Porter-Cologne Act (enacted 1969) authorizes Regional Boards to address nonpoint sources through local watershed planning. The federal Clean Water Act (originally enacted 1972) emphasizes control of nonpoint pollutants such as nutrients, pathogens and chemicals (in descending order of importance).

WR-2.b *Integrate "Start at the Source" Tools.* All projects should integrate stormwater design features for stormwater quality protection to the extent feasible, such as those included in the "Start at the Source" manual ~~for stormwater quality protection~~ and the~~ir~~ "Tools Handbook." ~~to the extent feasible. In addition the relevant development code sections should be modified accordingly.~~

WR-2.c *Research and Implement Safe and Effective Alternative Waste Options.* Research the potential to expand the use of alternative waste disposal methods – such as pre-treatment drip dispersal septic systems, graywater systems, composting toilets, waterless urinals, and other techniques – and community systems to help reduce the potential for contaminants to pollute water bodies and create human health hazards. Continue to allow carefully monitored demonstration projects for experimental systems to ensure consistency with local public health protection standards. Revise the appropriate codes to permit technologies and practices that prove safe and effective. (Also see Program PFS-2.j in the Public Facilities and Services Section of the Built Environment Element.)

WR-2.d *Monitor and Maintain Septic Systems.* Establish watershed-wide septic maintenance programs to ensure proper septic system monitoring, repair, and function. Establish the frequency of required inspections based on the risk associated with the location of

the septic system. For example, a high-priority system near a waterway may need to be inspected as frequently as every 2 years, while a system in a well drained, dry upland area may need inspection only every 5–10 years. Septic program and permitting procedures must at a minimum comply with State law.

WR-2.e *Continue Providing High-Priority Inspections.* Continue providing no-cost inspections of on-site wastewater systems if funds are available and make improvement recommendations to decrease impacts of high-priority systems near waterways.

WR-2.f *Continue Alternative Septic System Monitoring.* Conduct alternative septic system inspections and participate in manufacturer feedback regarding ~~advocacy~~ efficacy of the systems.

WR-2.g *Inspect Septage Haulers.* Review reports from septage haulers and assure compliance with health and safety requirements.

WR-2.h *Pursue Establishment of Marshall County Service Area.* Pursue establishment of a Marshall County Service Area to relocate septic systems away from Tomales Bay, and to establish septic monitoring of on-site septic systems in a risk based, comprehensive and cost effective manner. The proposed boundary of the County Service Area could include the entire East Shore planning area.

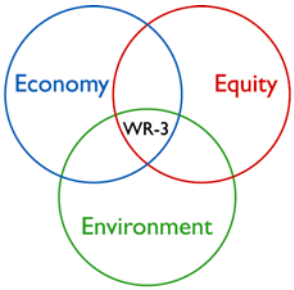
WR-2.i *Consider Establishing a Septic Inspection, Monitoring, and Maintenance District.* Pursue the establishment of a countywide Septic Management and Monitoring District that would include all or portions of unincorporated areas with septic systems. Modify applicable codes to enable the inspection and monitoring of on-site septic systems in a risk-based, comprehensive and cost effective way.

WR-2.j *Continue Public Outreach Regarding Toxic Chemical Use.* Continue to educate homeowners, the public, businesses, and agricultural operators about toxicity issues related to use of pesticides, cleaning agents, and other commonly used chemicals through the Marin County Stormwater Pollution Prevention Program.

WR-2.k *Establish Educational Partnerships.* Coordinate with the Regional Water Quality Control Board~~s~~, Marin Resource Conservation District, University of California Cooperative Extension, Natural Resources Conservation Service, Marin County Stormwater Pollution Prevention Program, watershed groups, the public, stakeholders and other interested parties to develop and implement public education programs and provide technical assistance to find alternatives and minimize erosion and sedimentation, pathogen and nutrient, and chemical sources of water pollution. Coordinate with local, State, and Federal recreation management agencies to educate boaters and other recreational groups regarding proper management and disposal of human waste.

What Are the Desired Outcomes?

Goal WR-3



Adequate Water for Wildlife and Humans. Ensure that the available supply of surface and groundwater supplies ~~are sufficient to support~~is used responsibly, so that the needs of both wildlife and the human ~~needs~~population are met.

Policies

WR-3.1 Conserve Water and Develop New Sustainable Sources. Reduce the waste of potable water through efficient technologies, conservation efforts, design and management practices, and by better matching the source and quality of water to the user's needs.

WR-3.2 Mitigate Water Demand in New Development. Assess and mitigate the impacts of new development on potable water supplies and water available for wildlife.

Potable Water

Because of the hilly terrain and dry climate in Marin, providing clean water to county residents requires a large amount of energy. The water consumed each year by a family of four in Marin has an energy footprint larger than half a football field.

Why is this important?

Present water use is exceeding the amount of water available to support our population and local ecosystems. Water-efficient technologies and sustainable water supplies will benefit the environment, economy, and communities as a whole.

Environment: Conservation efforts countywide can increase the amount of groundwater left in the natural environment to support wildlife and the rest of the local ecosystem.

Economy: Conserving water and developing sustainable, alternative supply sources are cost-saving measures that benefit businesses.

Equity: Homes and institutions designed to be more water efficient also make them more affordable to maintain over the long term.

Implementing Programs

WR-3.a *Support Water Conservation Efforts.* Support the efforts of a variety of interested individual and groups countywide in improving water conservation techniques and applying them to existing and new development, household and commercial practices, and agricultural operations (see policies and programs under Goals AG-1 in the Agriculture and Food Section of this Element and PFS-2 in the Public Facilities and Services Section of the Built Environment Element).

WR-3.b *Support and Integrate Water District Conservation Efforts.* Support the efforts of the water districts to reduce waste and increase reuse through integrated planning of programs and complementary land use and building regulations. Assess and remove barriers to integrated water planning and mitigate the demand for water in new development. (Also see policies and programs under Goals AG-1 in the Agriculture and Food Section of this Element, and PFS-2 in the Public Facilities and Services Section of the Built Environment Element).

Water Facts: Did you know...?

- Humans require about 2½ quarts of water a day.
- The average individual uses about 125 gallons of water per day.
- A faucet that drips 60 times in one minute would waste over 3 gallons a day, 1,225 gallons per year.
- It takes about 1 gallon of water to process a quarter pound of hamburger.
- It takes 39,000 gallons of water to manufacture a new car, including tires.
- Four quarts of oil can cause an eight-acre oil slick if spilled or dumped down a storm sewer.
- One gram of 2,4--D (a common household herbicide) can contaminate 2.6 million gallons (10 million liters) of drinking water.

Figure 2–5 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
WR-1 Healthy Watersheds	•		•	•	•	•						•
WR-2 Clean Water	•		•		•	•						•
WR-3 Adequate Water for Wildlife and Humans	•	•		•	•	•						

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicators	Benchmarks	Targets
Water quality – standard industry measure: beneficial water uses.	16 beneficial uses in 2004.	No decline in water quality through 2015.
Healthy aquatic habitat standard industry measure: ~~M~~macroinvertebrate diversity.	See Index of Biological Integrity (www.krisweb.com).	No decrease in ~~M~~macroinvertebrate diversity due to water quality through 2015.
Reported pesticide use countywide.	54,328 pounds in 2000.	No increase through 2015 using a five year average.

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–6
Water Resources Program Implementation

Programs	Responsibility	Potential Funding	Priority	Time Frame
WR-1.a – Support Watershed Education and Outreach.	MCSTOPPP UCCE-FA	Will require additional grants or other revenue*	TBD	Long term
WR-1.b – Establish Development Standards for Infiltration.	DPW (MCSTOPPP)	Will require additional grants or other revenue*	TBD	Long term
WR-1.c – Seek Watershed Assessment and Monitoring Assistance.	DPW (MCSTOPPP) UCCE-FA	Will require additional grants or other revenue*	TBD	Long term
WR-1.d – Coordinate Watershed Efforts.	MCSTOPP, Agricultural Commissioner UCCE-FA	Existing budget and may require additional grants or revenues*	High	Ongoing

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Potential Funding	Priority	Time Frame
WR-1.e – Require Restoration of Degraded Areas.	CDA, Agricultural Commissioner, Resource Protection Agencies	Existing budget	High	Ongoing
WR-1.f – Require Stream Restoration Projects.	CDA, Resource Protection Agencies	Existing budget	High	Ongoing
WR-2.a – Participate in Updating Standards.	RWQCB, MCSTOPP, CDA	Existing budget	High	Ongoing
WR-2.b –Integrate "Start at the Source" Tools.	CDA, MCSTOPP	Existing budget	Medium	Ongoing
WR-2.c – Research and Implement Safe and Effective Alternative Waste Options.	CDA, RWQCB	Existing budget	Medium	Ongoing
WR-2.d – Monitor and Maintain Septic Systems.	CDA	Existing budget and may require additional grants or revenues*	High	Med. term
WR-2.e – Continue Providing High-Priority Inspections.	CDA	Will require additional grants or revenues*	High	Ongoing
WR-2.f – Continue Alternative Septic System Monitoring.	CDA	Existing budget	Medium	Ongoing
WR-2.g – Inspect Septage Haulers.	CDA	Will require additional grants or other revenue*	Low	Ongoing
WR-2.h – Pursue Establishment of Marshall County Service Area.	CDA, CAO	Assessments and may require additional grants or revenues*	High	Ongoing
WR-2.i – Consider Establishing a Septic Inspection, Monitoring, and Maintenance District.	EHS, CAO	Assessments and may require additional grants or revenues*	High	Ongoing
WR-2.j –Continue Public Outreach Regarding Toxic Chemical Use.	DPW	Will require additional grants or other revenue*	TBD	Long term
WR-2.k – Establish Educational Partnerships.	DPW (MCSTOPP) UCCE-FA	Will require additional grants or other revenue*	TBD	Long term
WR-3.a – Support Water Conservation Efforts.	Water districts, CDA, Agricultural Commissioner, Farm Advisor	Existing budget, and may require additional grants or revenues.*	High	Ongoing

Programs	Responsibility	Potential Funding	Priority	Time Frame
WR-3.b – Support and Integrate Water District Conservation Efforts.	Water districts, CDA	Existing budget, and may require additional grants or revenues.*	Medium	Ongoing

* Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

UCCE-FA: University of California Cooperative Extension, FA: Farm Advisor

Mt. Vision fire

2.6 Environmental Hazards

Background

The policies and programs in this Section of the Countywide Plan are intended to minimize harm to people and property due to environmental hazards from seismic activity, geologic conditions, flooding, and fire. The County maintains an Emergency Operations Plan to guide agency and public natural disaster preparedness and response, as described under Goal PS-3 in the Public Safety Section of the Socioeconomic Element.

Earthquakes can produce surface rupture and displacement, but ground shaking is a more likely threat, especially on looser soils (Map 2-9, Seismic Shaking

Amplification Hazards). The San Andreas is the only local fault subject to the Alquist-Priolo Act (Map 2-10, Fault Hazards), which prohibits specified types of habitable structures within 50 feet of an active trace. Shaking of water-saturated soil can result in liquefaction, another potential source of damage (Map 2-11, Liquefaction Susceptibility Hazards). Earthquakes also can generate tsunamis – ocean waves that threaten coastal areas, and seiches – waves in enclosed waters that can overtop dams and flood downstream.

Landslides on steep slopes can be triggered by earthquakes or heavy rainfall. Rain also can cause expansive soils to swell and damage overlying structures. Buildings may suffer damage from subsidence of bay mud and other weak soils or differential settlement due to placement on multiple soil types. Erosion and slope instability can threaten structures built on coastal bluffs.

Flooding can originate from storm runoff, tidal activity, or high surf. Areas near streams may be flooded after heavy rainfall, while high tides combined with heavy rains can cause flooding in bayfront and coastal areas. Dam failure and subsequent flooding can also result from earthquake activity (Map 2-12 Flooding).

The absence of large fires in recent history has resulted in areas with high fuel loading. For example, areas surrounding Mt. Tamalpias have not burned since 1945 resulting in a forest overstocked with trees and brush with high concentrations of dead material. To make matters worse, Sudden Oak Death has created additional tinder that amplifies the threat of wildland fire to homes and communities on the urban interface. (See Map 2-13, Urban-Wildland Interface Zone.) Insufficient water pressure, supply, and difficult access also contribute to the risk of property damage, injury, and loss of life from fire in some locations. The County provides structural fire protection to most unincorporated areas of the County (Map 2-14 State Responsibility Areas for Fire Protection), while some rural and all urbanized areas are served by local fire protection districts, volunteer protection and fire departments. State and local protection is provided to wildland areas.

Marin County is subject to tsunamis and seiches. Tsunamis are long-period waves generated by shifting of a large volume of water. Seiches are related to tsunamis and are triggered by the same sources, but occur in enclosed and semi-enclosed bodies of water, such as bays, inlets, lakes, and reservoirs. Tsunamis are generally associated with seismic activity and are a common hazard in tectonically active portions of the world. The west coast of North America is susceptible to this hazard. Seiches could occur in any reservoir located in the County and in San Pablo and San Francisco Bays. A tsunami is considered to be a greater potential hazard. Once a tsunami reaches land, the damage ~~and real extent are~~ is determined by the wave run-up and the extent of inundation. The exposure of the Marin coastline to a tsunami hazard will vary locally, depending on the many factors involved. The creation of tsunami runup and inundation maps help to identify the extent of hazard. Currently tsunami inundation maps do not include the Marin County coast. However, a map has been completed for the San Francisco-San Mateo County area.

To prepare for and respond to emergencies, the Marin County Sheriff's Department established the Office of Emergency Services (OES). The function of the OES is to coordinate efforts to develop disaster resistant communities and to educate residents on emergency preparedness. In the event of a major emergency or disaster, the OES has established a fully functional Emergency Operations Center (EOC) from which centralized emergency management can be performed. In April 2005 the OES

prepared the Marin County Operational Area Hazard Mitigation Plan, which describes strategies for sustaining and building on existing mitigation activities to ensure the future and safety of lives, preservation of property, and protection of the environment during times of disaster.

The United States Coast Guard military installations in Point Reyes Station and Point Bonita are located in areas of known fire and geologic hazards. Any proposed development at these facilities should assess the potential impacts of these hazards and include careful planning, siting, and construction to lessen the hazard potential.

Policies and programs addressing emergency and disaster preparedness and hazardous materials are contained in the Public Safety Section of the Socioeconomic Element.

Key Trends and Issues

Are threats from environmental hazards increasing?

Many structures lie in hazardous areas, and land for new development may be even more hazard-prone. With most easily buildable land already developed, construction increasingly is being proposed on the remaining marginal lots with difficult access and steep hillsides which are subject to slope instability and are vulnerable to rapid changes in fire behavior. Bluff erosion is threatening coastal homes built when bluff edges seemed safely distant. Vegetation that can fuel fires has increased because natural fires have been suppressed, and residential development continues to encroach on wildlands. Proliferation of impermeable surfaces and alteration of natural drainage patterns have increased the frequency and severity of flood events, and estimates indicate that bay level could rise as much as two inches by 2036. Maps 2-9 through 2-15 are utilized by the County in reviewing land use activities proposed in areas with hazard potential.

How can hazards be avoided?

Careful planning, siting, and construction can lessen hazard potential. Limiting development densities (see Policy CD 8.6 in the Community Development Section of the Built Environment Element) and ensuring adequate access for emergency vehicles and evacuation in areas with hazard potential can reduce risks to people and property. Appropriate placement and engineering of foundations can render buildings less prone to ground shaking and liquefaction. Adequate site clearing and construction techniques such as fire sprinklers can help reduce the threat of fire. County zoning and development standards help mitigate flood damage by limiting what can be built in flood-prone areas. Special attention must be paid to land use activities at the urban-wildland interface zone, where people and property may be particularly susceptible to environmental hazards.

Historical development trends have allowed homes to be built on hillsides or steep slopes sometimes with limited access and surrounded by brush and trees. An aggressive education campaign has been under

~~-~~taken for building clearance space, limiting development on hillsides, and improving site access. ~~There remains o~~Older neighborhoods with limited access remain. ~~and t~~This Plan proposes an aggressive program on evacuation route education.

Will County public safety employees be available during a major emergency?

Most public safety employees live outside Marin. According to the 2002 Marin County Employee Housing Options Report, approximately 80 percent of County Sheriff and Fire Department employees live out of the county, with about 60 percent residing in Sonoma County. Their need to travel to the Emergency Operations Center, isolated fire stations, and other key locations during a major event could ~~affect the adequacy of a~~ result in inadequate public safety in emergency situations. ~~presence when most needed.~~ (Program HS-4.a in the Housing Section of the Built Environment Element describes mechanisms for helping public safety employees locate housing in Marin.)

Urban-Wildland Interface Zone: That geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels.

Source: 2003 International Urban Wildlife Interface Code.

Can adequate defensible space be created?

The urban-wildland interface areas in the County are particularly threatened because of the many jurisdictions and private properties maintaining lands in this area (see Map 2-13, Urban-Wildland Interface Zone). Designation of wildland-urban boundary areas, along with applicable regulations, will be used to impose defensible space requirements for new and substantially remodeled structures.

Fire risk potential is based on a variety of factors including~~:~~ the amount of surrounding fuels (vegetation), ~~and the~~ slope and ~~the direction the~~ parcel ~~faces~~ exposure. The fire risk map (Map 2-15) illustrates which areas of the County have the greatest potential for large, damaging fires based on these factors. As depicted ~~in~~ on the map, some of the most hazardous locations are in water ~~D~~district and federal lands which interface with a variety of communities.

Is adequate emergency service provided for our aging population?

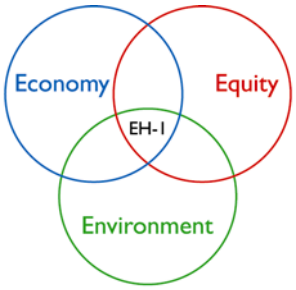
The demand for emergency services will continue to increase along with our increased population age. First response fire personnel will continue to have medical training.

Goals, Policies, and Programs

What Are the Desired Outcomes?

Goal EH-1

Hazard Awareness. Raise public awareness and responses about potential environmental hazards.



Policies

EH-1.1 **Enhance Public Awareness.** Advise the public regarding the availability of countywide and local area environmental hazards studies, sources of hazard information, and public services.

EH-1.2 **Improve Information Base.** Support scientific studies that increase and refine the body of knowledge regarding hazardous conditions in Marin County.

EH-1.3 **Identify Evacuation Routes.** Provide the public with information identifying accessible evacuation routes for fire, geologic, and other hazards.

Why is this important?

The public needs accurate and reliable information to cope with a variety of life-threatening natural hazards, including earthquakes, landslides, floods, and fires.

Environment: Expanded knowledge about hazards can protect the local environment and can improve the way in which environmental resources are managed.

Economy: Increased hazard awareness and data can help people make decisions about where they want to invest in homes and businesses. Well-informed decisions are financially sound decisions.

Equity: Providing the public with information about the potential for hazards can help save lives and reduce property damage.

How Will Results Be Achieved?

Implementing Programs

EH-1.a *Provide Educational Materials.* Work with the real estate community, homeowner associations, civic organizations, fire districts, and other groups to prepare and distribute materials, in multiple languages as appropriate, informing prospective and current property owners about potential safety hazards and appropriate evacuation routes.

EH-1.b *Distribute Maps.* Prepare and make available to the public maps depicting evacuation routes and areas prone to environmental hazards.

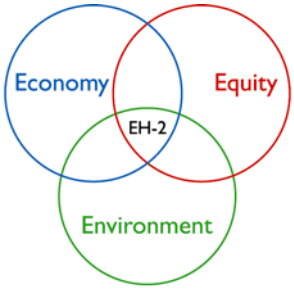
EH-1.c *Improve Soils Information.* Compile and make available drilling log data that helps define the hazard potential due to specific soil conditions, such as areas with expansive soils, artificial fill, or bay mud.

EH-1.d *Facilitate Scientific Investigation.* Continue to support scientific study of hazard potential in Marin, including by providing investigators with access to public land and facilitating access to other areas.

EH-1.e *Support Emergency Preparedness Training.* Support the activities of Local Disaster Councils and fire departments in offering community emergency response training courses.

What Are the Desired Outcomes?

Goal EH-2



Safety from Seismic and Geologic Hazards. Protect people and property from risks associated with seismic activity and geologic conditions.

Policies

EH-2.1 Avoid Hazard Areas. Require development to avoid or minimize potential hazards from earthquakes and unstable ground conditions.

EH-2.2 Comply with the Alquist-Priolo Act. Continue to prohibit specified types of structures for human occupancy in State-designated active fault areas.

EH-2.3 **Ensure Safety of High-Occupancy Structures.** Require that structures to be occupied by large groups, such as offices, restaurants, hotels, senior housing, and multi-family housing, are designed to be as safe as technically feasible in locations subject to ground shaking or other geologic hazards.

EH-2.4 **Protect Coastal Areas from Tsunamis.** Consider tsunami wave runup and inundation when reviewing proposed development along coastal areas of Marin County.

Why is this important?

Lives can be saved and property protected when buildings are located safely.

Environment: Well-planned development protects the environment and minimizes impacts to natural systems when structures or facilities are damaged.

Economy: Careful planning in the placement and construction of buildings can help ensure safety during a hazardous event and provide for a speedy recovery. This lessens the severity and duration of the economic impact caused by a seismic event and/or unpredictable geologic conditions.

Equity: The future health and prosperity of the community depend on our ability to ~~weather~~ cope with a ~~significant~~ major hazardous event. Earthquakes on the San Andreas and Hayward-Rodgers Creek fault systems could significantly affect Marin.

How Will Results Be Achieved?

Implementing Programs

EH-2.a *Require Geotechnical Reports.* Continue to require any applicant for land division, master plan, development approval, or new construction in a geologic hazard area to submit a geotechnical report prepared by a State-certified engineering geologist (unless waived), in conformance with the State Seismic Hazards Mapping Act (PRC Div. 2, Chapter 7.8), that:

- evaluates soil, slope, and other geologic conditions;
- commits to appropriate and comprehensive mitigation measures sufficient to reduce risks to acceptable levels, including post-construction site monitoring, if applicable; and
- addresses on-site structural engineering, impact of the project on adjacent lands, and potential impacts of off-site conditions.

When available, post and disseminate information from Seismic Hazard Zone maps in conformance with the Act.

EH-2.b *Require Construction Certification.* Require any work undertaken to correct slope instability or mitigate other geologic conditions to be supervised and certified by a geotechnical engineer and, when necessary, an engineering geologist.

EH-2.c *Prohibit Structures in Active Fault Traces.* Prohibit placement of specified types of structures intended for human occupancy within 50 feet of an active fault trace in compliance with the Alquist-Priolo Earthquake Fault Zoning Act.

EH-2.d *Limit Building Sites in Alquist-Priolo Zones.* Prohibit new building sites in any Alquist-Priolo zone, unless a geotechnical report prepared by a certified engineering geologist establishes sufficient and suitable land area for development pursuant to all applicable County regulations.

EH-2.e *Retrofit County Buildings.* Identify and remedy any County owned structures in need of seismic retrofit or other geotechnical improvement, including ~~by~~ eliminating any potentially hazardous features, and/or relocating services if necessary.

EH-2.f *Avoid Known Landslides Areas.* Continue to prohibit development in landslide areas and on landslide-prone deposits on steep slopes, except where the required geotechnical report indicates that appropriate mitigation measures can stabilize the site for construction.

EH-2.g *Identify Compressible Soil Potential.* Require that geotechnical reports for projects on land underlain by compressible materials (such as fill, bay mud, and marsh or slough areas) delineate locations where settlement will be greatest and subsidence may occur, and recommend site preparation and construction techniques necessary to reduce ~~the~~ risk and public liability to an acceptable level.

EH-2.h *Match Uses to Conditions.* Amend the Development Code to limit uses in areas with high potential for slope instability or differential soil activity to those that would not be damaged by ground movement and ~~that would~~ provide minimum inducement to slope failure or differential settlement.

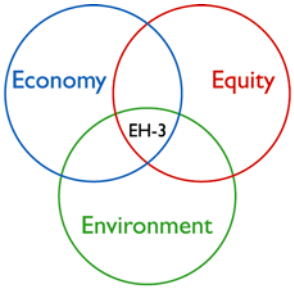
EH-2.i *Minimize Impacts of Site Alteration.* Amend the Development Code to strictly limit the extent of any proposed fill, excavation, or other grading activities that could create or exacerbate risks in areas susceptible to geologic hazards as displayed on Maps 2-9, 2-10, and 2-11.

EH-2.j *Seek Supplemental Expertise.* Continue to hire consultants expert in soils engineering as necessary for evaluating specific developments proposed on bay mud and fill prone to differential settlement.

EH-2.k *Address Tsunami Potential.* Review tsunami wave runup and inundation maps, when available, along with other applicable information to be considered in coastal planning and development.

What Are the Desired Outcomes?

Goal EH-3



Safety from Flooding and Inundation. Protect people and property from risks associated with flooding and inundation. (Also see the Public Facilities and Water Resources sections.)

Policies

EH-3.1 **Follow a Regulatory Approach.** Utilize regulations instead of flood control projects whenever possible to minimize losses in areas where flooding is inevitable.

EH-3.2 **Retain Natural Conditions.** Ensure that flow capacity is maintained in stream channels and floodplains, and achieve flood control using biotechnical techniques instead of storm drains, culverts, riprap, and other forms of structural stabilization.

EH-3.3 **Monitor Environmental Change.** Consider changes to hydrological conditions, including alterations in drainage patterns and the potential for a rise in sea level, when processing development applications in areas with flooding or inundation potential.

Why is this important?

With increases in sea level due to global warming, flooding is predicted to increase in the future. Locating development in flood-prone areas can expose structures to damage and create risks for inhabitants in the immediate and surrounding areas.

Environment: Prohibiting development in the floodplain helps preserve valuable habitat, vital groundwater recharge capacity, and other natural systems.

Economy: Significant flooding with associated economic impacts has occurred in portions of Corte Madera, Larkspur, Greenbrae, Ross, San Anselmo, San Rafael, and Novato over the last 30 years. (Clearwater Hydrology—see Key Trends and Issues Report) Flooding has also occurred in Mill Valley, Fairfax, and Muir Beach. Extensive property damage could be ~~substantial~~ expected in inundated valleys, ~~even~~ especially those downstream from major dam/reservoir complexes. Protecting property from future flooding risks contributes to economic stability.

Equity: Limiting development in floodplain and coastal areas contributes to the protection of residents and their property.

How Will Results Be Achieved?

Implementing Programs

EH-3.a *Regulate Development in Flood and Inundation Areas.* Continue to require all improvements in Bayfront, Floodplain, Tidelands, and Coastal High Hazard Zones to be designed to withstand impacts from flooding, tsunamis, seiches, and related water-borne debris, and to be located so that buildings and features such as docks, decking, floats, and vessels do not become dislodged.

EH-3.b *Update Maps.* Overlay County zoning maps to show flood, tsunami, and inundation hazard areas along the San Francisco Bay, San Pablo Bay, Tomales Bay, and the Pacific Ocean, the Bayfront Conservation Zone, and the Coastal Zone.

EH-3.c *.Revise Regulations.* Consider expanding the F-1 and F-2 Floodway Districts to include areas of the unincorporated county that lie within primary and secondary floodways , and/or establishing an ordinance that will ensure that land use activities in flood hazard areas will be allowed only in compliance with federal standards.

EH-3.d *Alert Property Owners.* Notify owners of property in areas with inundation or flooding potential regarding those hazards when they seek development review or other related County services.

EH-3.e *Restrict Development in Flood Prone Areas.* Continue to regulate development in Special Flood Hazard areas by applying the County's Floodplain Management Ordinance, Federal Emergency Management Agency regulations, and environmental review pursuant to the California Environmental Quality Act (CEQA).

EH-3.f *Require Hydrologic Studies.* Continue to require submission of detailed hydrologic and geologic studies for any proposed development that could increase sedimentation of a watercourse or alter natural drainage patterns~~, and~~. ~~a~~Amend the Development Code to include findings to continue to regulate development in flood prone areas to ensure public health and safety and to preserve the hydraulic and geomorphic integrity of the stream system and associated habitat.

EH-3.g *Locate Critical Facilities Safely.* Amend the Development Code to prohibit placement of public safety structures within flood-prone areas.

EH-3.h *Retain Ponding Areas.* Maintain publicly controlled flood ponding areas in a natural state for flood control, and continue to promote compatible uses in ponding areas, such as agriculture, open space, and recreation.

EH-3.i *Update Dam Inundation Maps.* Update and make public inundation maps for dam/reservoir complexes where downstream valleys are inhabited and the risk of loss of life and extensive property damage is significant.

EH-3.j *Review and Inspect Dams.* Maintain permit authority over and continue to oversee construction of dams too small to be regulated by the State or federal government.

EH-3.k *Anticipate Sea Level Rise.* Work with the U.S. Geological Survey, the San Francisco Bay Conservation and Development Commission, and other monitoring agencies to track bay and ocean levels; utilize estimates for mean sea level rise to map potential areas subject to future inundation (including by updating information about watershed channel conditions and levee elevations); and amend the Development Code to incorporate construction standards for any areas subject to increased flooding from a rise in sea level.

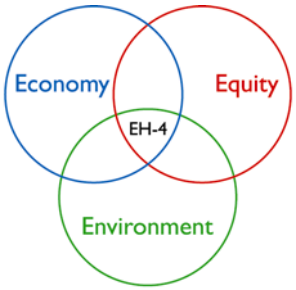
EH-3.l *Limit Seawall Barriers.* Limit repair, replacement, or construction of coastal sea walls and erosion barriers consistent with Local Coastal Program requirements, and as demonstrated to be necessary to protect persons and properties from rising sea level.

EH-3.m *Maintain Flood Controls.* Continue to implement adopted flood control programs, including limitations on land use activities in flood hazard areas and through repair and maintenance of necessary flood control structures.

~~How Will Success Be Measured?~~What Are the Desired Outcomes?

Goal EH-4

Safety from Fires. Protect people and property from hazards associated with wildland and structural fires.



Policies

EH-4.1 **Limit Risks to Structures.** Ensure that adequate fire protection is provided in new development and when modifications are made to existing structures.

EH-4.2 **Remove Hazardous Vegetation.** Abate the buildup of vegetation around existing structures or on vacant properties that could help fuel fires. (See also Natural Systems and Agriculture Element, BIO-1.~~5~~4, Support Vegetation~~,~~ and Wildlife ~~and~~ Disease Management Programs).

EH-4.3 **Adopt and Implement a Fire Management Plan.** Develop a proactive approach to manage wildfire losses by identifying hazard risks and enacting effective mitigation strategies.

EH-4.4 **Ensure Adequate Emergency Response.** Ensure that there are an adequate number of trained and certified emergency medical technicians to address the increase in medical demand.

EH-4.5 **Regulate Land Uses To Protect from Wildland Fires.** Use land use regulations, including but not limited to subdivision approvals and denials, as means of protecting people and property from hazards associated with wildland fires.

Why is this important?

Fire plays a critical role in California's diverse ecology and protecting people and property from fires will be a continuing challenge.

Environment: Using measures such as controlled burning to remove vegetation that has built up because of historic fire suppression efforts improves firefighting effectiveness and can help restore environmental balance in the County.

Economy: Fire costs can soar to millions of dollars a day from suppression costs, destruction of homes, loss of home-based businesses, damage to utilities, and impacts on recreation areas. Minimizing flammable vegetation can reduce potential economic impacts and help speed recovery.

Equity: Marin County has numerous structures located within the wildland-urban interface. Homes with wood siding, wood decks, and wood shingled roofs are at extreme risk from a wildland fire. Designing structures to be fire resistant protects all occupants as well as neighboring areas by limiting fuel available to a spreading fire.

How Will Results Be Achieved?

Implementing Programs

EH-4.a *Provide Information about Fire Hazards.* Work with Fire Safe Marin, the Marin County Fire Department and local, regional, and State agencies to make maps of areas subject to wildland fire hazard publicly available, and to provide public information and educational programs regarding fire hazards, and techniques for reducing susceptibility to fire damage and areas of low water pressure.

EH-4.b *Restrict Land Divisions.* Prohibit new land divisions in very high and high fire hazard areas unless the availability of adequate water for fire suppression is demonstrated and guaranteed; access for fire fighting vehicles and equipment is provided from more than one point; necessary fire trails and fuel breaks are provided; fire-resistant materials are used exclusively in construction; and adequate clearances from structures and use of fire-resistant plants in any landscaping is required.

EH-4.c *Require Compliance with Fire Department Conditions.* Continue to refer land development and building permit applications to the County Fire Department or local fire district for review and incorporate their recommendations as conditions of approval as necessary to ensure public safety~~, and~~. ~~c~~Continue to require compliance with all provisions of the most recently adopted version of the California Fire Code (with local amendments).

EH-4.d *Review Applications for Fire Safety.* Require applicants to identify defensible space and compliance with fire safety standards, and continue to work with local and State fire agencies to ensure that California Fire Code (with local amendments), County Development Code, and State standards for construction are applied uniformly countywide.

EH-4.e *Require Sprinkler Systems.* Continue to require installation of automatic fire sprinkler systems in all new structures and existing structures undergoing substantial remodeling, and provide incentives for sprinkler installation in all other habitable structures, especially those in high fire hazard areas.

EH-4.f *Require Fire-Resistant Roofing and Building Materials.* Continue to require and provide incentives for Class A fire-resistant roofing for any new roof or replacement of more than 50 percent of an existing roof. Work with Marin County fire departments to prepare and adopt an ordinance requiring fire resistant building materials in extreme and high fire hazard areas.

EH-4.g *Develop and Maintain Fuel Breaks and Access Routes.* Work with public agencies and private landowners to construct and maintain fuel breaks, and emergency access routes~~, and share in ongoing fire clearance activities~~ to facilitate effective fire suppression.

EH-4.h *Require Adequate Clearance.* ~~Establish~~ Require standards for clearance of vegetation on vacant lots, around structures, and landscaped areas~~,~~ to ensure timely and adequate removal of potential fire fuel on both public and private property (also see Program PS-3.j in the Public Safety Section of the Socioeconomic Element).

EH-4.i *Use Varied Methods to Provide Fuel Breaks And Fire Suppression.* Use the best fuel reduction methods (depending on the time of year, fuel types, reduction prescriptions, and cost) to implement the Marin County Community Wildfire Protection Plan. This may include using CDF inmate crews, the Tamalpias Fuel Crew, the Marin Conservation Corps, animal grazing, or fuel reduction contractors.

EH-4.j *Conduct Life Safety Assessments.* Conduct a life safety assessment that considers the costs of fire safety maintenance prior to the County purchase of new land and facilities.

EH-4.k *Adopt Amended Urban Wildlands Interface Regulations.* Work with Marin fire departments to prepare and adopt urban-wildland interface regulations for new development and substantial remodels in order to reduce fire hazards in high and extreme fire hazard areas.

EH-4.l *Continue Fire Safe Marin Program.* Continue the various education efforts and safety projects sponsored by Fire Safe Marin and implemented through each neighborhood.

EH-4.m *Continue to Use Technology to Promote Fire Safety.* Continue to apply computer technology, such as Geographic Information Systems, vegetation inventory, and air movement modeling programs to identify, analyze, and plan for potential fire hazards~~, and n~~Notify affected parties of any relevant findings.

EH-4.n *Evaluate Development Standards.* Request Fire Department review of County requirements for peakload water supply and roadways (especially on hillsides) to determine whether those provisions need modification, such as limiting one-way road use, grade/slope limits, minimum radius, and turnaround widths, to ensure adequate fire protection and suppression.

EH-4.o *Support a Fire Management Plan.* Adopt a resolution supporting a Fire Management Plan (including a fuel break plan) and encourage Marin cities and towns to also support its recommendations.

EH-4.p *Provide Paramedics as Needed.* Assess the adequacy and number of firefighters trained as emergency medical technicians and train more paramedics or firefighters, as needed.

Figure 2–7 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
EH-1 Hazard Awareness.	•									•		•
EH-2 Safety from Seismic and Geologic Hazards.	•									•		•
EH-3 Safety from Flooding and Inundation.	•		•							•		•
EH-4 Safety from Fires.	•		•		•					•		•

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicators	Benchmarks	Targets*
Number of Marin residents trained in emergency preparedness.	1,000 residents (.4%) trained as of 2004.	1% of county population trained by 2010 and 1.5% trained by 2015.
Number of county employees trained as disaster service workers to Federal standards.	50% of employees trained as of 2004.	100% of county ~~government employees receive a 90-minute training~~ Emergency First responders, Emergency Operations Center staff, and other county employees with designated disaster response roles by 2010 and maintain through 2015.

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–8
Environmental Hazards Program Implementation

Program	Responsibility	Potential Funding	Priority	Timeframe
EH-1.a -- Provide Educational Materials.	OES, CDA	Existing budget and may require additional grants or revenues*	Low	Ongoing
EH-1.b -- Distribute Maps.	CDA, OES	Existing budget and may require additional grants or revenues*	High	Ongoing

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Program	Responsibility	Potential Funding	Priority	Timeframe
EH-1.c -- Improve Soils Information.	CDA, United States Geological Survey (USGS)	Existing budget and may require additional grants or revenues*	Low	Ongoing
EH-1.d -- Facilitate Scientific Investigation.	OES, CDA	Existing budget	Medium	Ongoing
EH-1.e – Support Emergency Preparedness Training.	OES, Fire departments	Existing budget	High	Ongoing
EH-2.a -- Require Geotechnical Reports.	CDA	Existing budget	High	Ongoing
EH-2.b -- Require Construction Certification.	CDA	Existing budget	High	Ongoing
EH-2.c -- Prohibit Structures in Active Fault Traces.	CDA	Existing budget	High	Ongoing
EH-2.d -- Limit Building Sites in Alquist-Priolo Zones.	CDA	Existing budget	High	Ongoing
EH-2.e -- Retrofit County Buildings.	DPW	Will require additional grants or other revenue*	TBD	Long term
EH-2.f -- Avoid Known Landslides Areas.	CDA	Existing budget	High	Ongoing
EH-2.g -- Identify Compressible Soil Potential.	CDA	Existing budget	Medium	Long term
EH-2.h -- Match Uses to Conditions.	CDA	Existing budget and may require additional grants or revenues*	Medium	Med. term
EH-2.i -- Minimize Impacts of Site Alteration.	CDA	Existing budget and may require additional grants or revenues*	Medium	Ongoing
EH-2.j -- Seek Supplemental Expertise.	CDA	Existing budget	High	Ongoing
EH-2.k – Address Tsunami Potential.	CDA, California Coastal Commission (CCC), USGS	Existing budget and may require additional grants or revenues*	Medium	Med. term

Program	Responsibility	Potential Funding	Priority	Timeframe
EH-3.a -- Regulate Development in Flood and Inundation Areas.	CDA, DPW, OES	Existing budget, Fees	High	Ongoing
EH-3.b -- Update Maps.	CDA, DPW	Existing budget	Medium	Med. term
EH-3.c -- Revise Regulations.	CDA, DPW	Existing budget and may require additional grants or revenues*	High	Ongoing
EH-3.d -- Alert Property Owners.	CDA, DPW	Existing budget	High	Ongoing
EH-3.e -- Restrict Development in Flood Prone Areas.	CDA, DPW	Existing budget	High	Ongoing
EH-3.f -- Require Hydrologic Studies.	CDA, DPW	Existing budget	High	Ongoing/Med. term
EH-3.g -- Locate Critical Facilities Safely.	CDA	Existing budget	High	Ongoing
EH-3.h -- Retain Ponding Areas.	DPW	Will require additional grants or other revenue*	TBD	Long term
EH-3.i -- Update Dam Inundation Maps.	CDA, OES	Existing budget	Medium	Med. term
EH-3.j -- Review and Inspect Dams.	CDA, DPW	Existing budget	Medium	Ongoing
EH-3.k -- Anticipate Sea Level Rise.	USGS, BCDC, CCC, CDA	Existing budget and may require additional grants or revenues*	Medium	Med. term
EH-3.l -- Limit Seawall Barriers.	CDA, CCC	Existing budget	High	Ongoing
EH-3.m -- Maintain Flood Controls.	Flood Control Districts	Existing budget and may require additional grants or revenues*		Ongoing
EH-4.a – Provide Information about Fire Hazards.	County Fire Departments, CDF, CDA	Existing budget	High	Ongoing
EH-4.b – Restrict Land Divisions.	CDA	Existing budget	High	Ongoing
EH-4.c – Require Compliance with Fire Department Conditions.	CDA (Building & Safety), County Fire Departments/Districts	Existing budget	High	Ongoing

Program	Responsibility	Potential Funding	Priority	Timeframe
EH-4.d – Review Applications for Fire Safety.	County Fire Department	Existing budget	High	Ongoing
EH-4.e – Require Sprinkler Systems.	CDA, County Fire Departments	Existing budget	High	Ongoing
EH-4.f – Require Fire-Resistant Roofing and Building Materials.	CDA, County Fire Departments	Existing budget	High	Ongoing
EH-4.g – Develop and Maintain Fuel Breaks and Access Routes.	County Fire Department/Fire Districts	Existing budget	High	Ongoing
EH-4.h – Require Adequate Clearance.	CDA, County Fire Department/Fire Districts	Existing budget	High	Ongoing
EH-4.i – Use Varied Methods to Provide Fuel Breaks and Fire Suppression.	County Fire Department	Existing budget and may require additional grants or revenues*	High	Ongoing
EH-4.j – Conduct Life Safety Assessments.	MCOSD, Parks, DPW (Flood control)	Existing budget	High	Ongoing
EH-4.k – Adopt Amended Urban Wildlands Interface Regulations.	County Fire Department	Existing budget and may require additional grants or revenues*	High	Ongoing
EH-4.l – Continue Fire Safe Marin Program	County Fire Department	Will require additional grants or revenues*	High	Ongoing
EH-4.m – Continue to Use Technology to Promote Fire Safety.	County Fire Department	Existing budget	High	Ongoing
EH-4.n – Evaluate Development Standards.	CDA, County Fire Department	Existing budget	Medium	Med. term
EH-4.o – Support aFire Management Plan.	Fire Departments, BOS	Existing budget	High	Medium
EH-4.p – Provide Paramedics as Needed.	Fire Departments	Existing budget	High	Ongoing

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

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2.7 Atmosphere and Climate

Background

Although air quality in Marin County is generally very good, emissions from within the county may contribute to pollution problems elsewhere in the region and climate changes that are occurring on a global scale. In some parts of the Bay Area, ozone levels exceed National Ambient Air Quality Standards and particulate concentrations exceed State standards (Figures 2–9and 2–13). Vehicle traffic produces most of the emissions leading to increased ozone levels, while construction activities, wood burning, off-road travel, and agriculture generate some measured particulate matter.

The Bay Area Air Quality Management District (BAAQMD) encourages local jurisdictions to implement policies that will help improve regional air quality and to especially recognize sensitive receptors. This Section of the Countywide Plan provides a regulatory framework for articulating air quality objectives consistent with regional air quality programs. The Transportation, Energy and Green Building, Public Facilities and Services, and Community Development sections of the Built Environment Element also include policies and programs intended to reduce the impact of future development on air quality and global warming.

"Climate change is likely to have considerable impacts on most or all ecosystems."

-- UNEP World Conservation Monitoring Center

On a global scale, data indicate an increase in mean surface air temperatures over historic levels and climate models predict this warming will continue. Scientists expect that average global surface temperature could rise 1 to 4.5°F in the next 50 years and 2.2 to 10°F in the next century. A rise of this magnitude is significant: for example, the difference in temperature between 1995 and the ice ages was 5 to 8°F. Mounting scientific evidence suggests that the discharge by human activities of gases that trap heat in the atmosphere is largely responsible for this trend. A major consequence of global warming is melting glaciers and warmer waters, which cause the oceans to expand and rise. Sea-level rise and higher evaporation rates are expected to increase storm frequency and severity. The resulting economic loss from increased storm activity will be equally dramatic: it has already increased tenfold over the past 40 years. Climate change will amplify existing environmental problems, such as erosion, storm-surge floods and landslide risk, and changes to the water cycle will further stress domestic water supply as well as indigenous plant and animal populations. Further complicating the issue of climate change is the high level of complexity and uncertainty associated with modeling and predicting climate behavior. While it is clear that damage resulting from weather-related events is already on the rise, it is not known whether future changes will be gradual or abrupt. Nor it is clearly understood what the full spectrum of impacts will be. Given the global risks to economic, environmental and social stability, it is imperative that climate change be addressed at all levels of government.

Fortunately, local governments can play a meaningful role in addressing climate change by instituting measures that reduce the vulnerability and increase the adaptability of Marin's physical infrastructure, economic activities and natural systems. Furthermore, steps taken to address climate change will yield positive benefits in local efforts to improve air quality, as vehicle traffic and energy generation are major contributors to both greenhouse gases and air pollution.

"Everybody talks about the weather, but nobody does anything about it."

- Mark Twain (1835–1910)

The issue of climate change is ultimately part of the larger challenge of fostering sustainable communities. Climate change goals are more effectively accomplished when efforts are focused on integrating principles of sustainability within sectors such as transportation,

buildings, ecosystems and water systems. While the aim of this Section is to provide a framework for addressing atmosphere and climate change, the detailed policies and programs that address climate protection are located throughout the Countywide Plan and are referenced here in this section.

Key Trends and Issues

How clean is the air in Marin?

Air quality indicators show improvement. Marin has experienced a drop both in the total number of days exceeding State Ambient Air Quality Standards and in the number of days exceeding safe levels of ozone since 1996. Marin also has had a reduction in the number of days that safe levels of particulate matter have been exceeded in the county since 1996 (Figure 2–9). Ozone precursor pollutants have decreased locally, and are expected to continue to decline.

Figure 2–9
Summary of Measured Air Quality Exceedances

Pollutant	Standard	Monitoring Station	Days Exceeding Standard								
			1996	1997	1998	1999	2000	2001	2002	2003	2004
Ozone (O_3)	NAAQS 1-hr	San Rafael	0	0	0	0	0	0	0	0	0
		BAY AREA	8	0	8	3	3	1	9	1	0
	NAAQS 8-hr	San Rafael	0	0	0	0	0	0	0	0	0
		BAY AREA	8	0	16	9	4	7	7	7	0
	CAAQS 1-hr	San Rafael	2	1	0	2	0	0	2	0	0
		BAY AREA	34	8	29	20	12	15	16	19	7
Fine Particulate Matter (PM-10)	NAAQS 24-hr	San Rafael	0	0	0	0	0	0	0	0	0
		BAY AREA	0	0	0	0	0	0	0	0	0
	CAAQS 24-hr	San Rafael	0	2	1	2	0	0	0	0	1
		BAY AREA	3	4	5	12	7	10	6	6	3
All Other (CO, NO_2, Lead, SO_2)	All Other	San Rafael	0	0	0	0	0	0	0	0	0
		BAY AREA	0	0	0	0	0	0	0	0	0

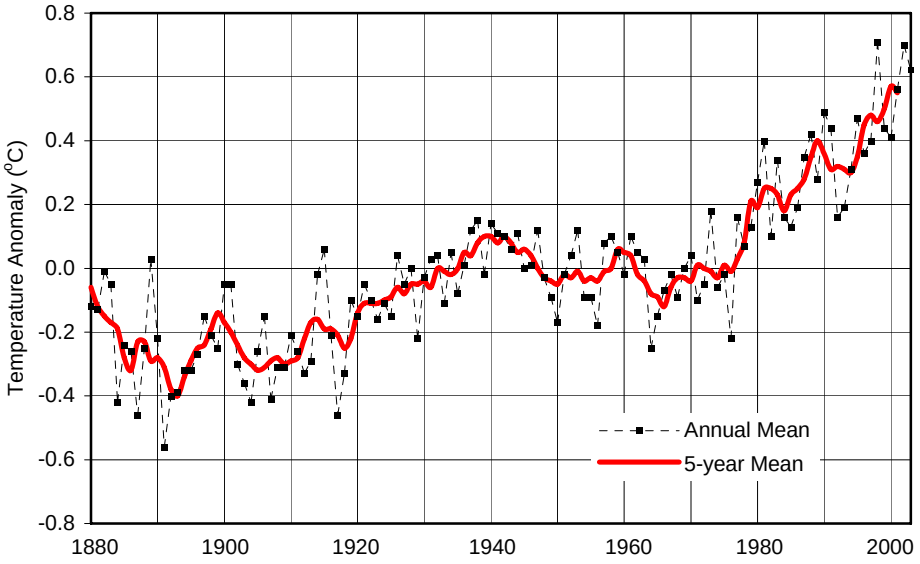
Source: 1996-2004 Bay Area Air Quality Management District

Pollution levels can be reduced. Most particulate matter comes from areawide sources, such as combustion of wood and other non-clean fuels, and from homes and businesses without emission-control devices. Simple measures such as requiring clean burning stoves can achieve improvements in air quality~~, and~~. ~~r~~Reducing motor vehicle use can result in significantly cleaner air.

Are temperatures rising globally?

The 10 warmest years of the 20th century all occurred after 1985, with 1998 the warmest year on record. The average of all global climate models suggests about a 3-to-10°F rise in global temperature over the next 50 to 100 years. Global surface temperatures have increased about 1°F over the 20th century with approximately 70% (or 0.7°F) of that change occurring in the last 25 years. The following graph illustrates the increasing rate and magnitude of global surface air temperatures.

Figure 2–10 Global Temperature



Source: NASA Goddard Institute for Space Studies

"The climate system is being pushed hard enough that change will become obvious to the man in the street in the next decade."

– James E. Hansen, director of NASA's Goddard Institute for Space Studies, quoted in *Newsweek*, Jan. 22, 1996

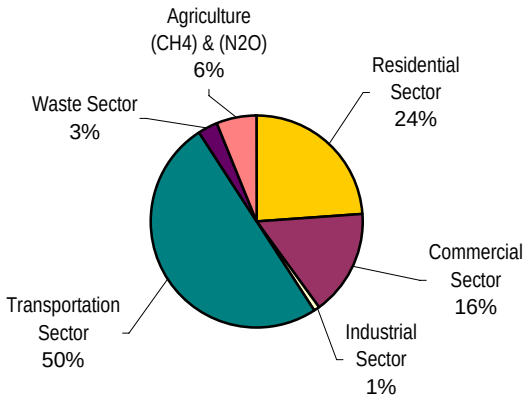
Is sea level rising?

Globally, sea level has risen 4 to 8 inches over the past century. The Intergovernmental Panel on Climate Change (IPCC) notes that it is very likely that the 20th-century warming has contributed significantly to rising sea levels, through thermal expansion of seawater and loss of land ice. The EPA estimates that sea level is likely to rise 1.8 feet along most of the west coast by 2100. By comparison, the San Francisco Bay level has increased about 4 inches since 1850. . Given a 1-foot rise in sea level, the current 100-year high in the storm surge felt on the levee system of inland San Francisco Bay and Delta would become the 10-year high. In other words, the frequency of a 100-year event would increase 10-fold.

What activities are contributing the greenhouse gases in Marin?

Marin emits nearly 3 million tons of carbon dioxide every year. Vehicle traffic accounts for 50% of the total emissions and energy use by buildings (residential, commercial and industrial combined) accounts for 41%.

Figure 2–11 Countywide Emissions Analysis

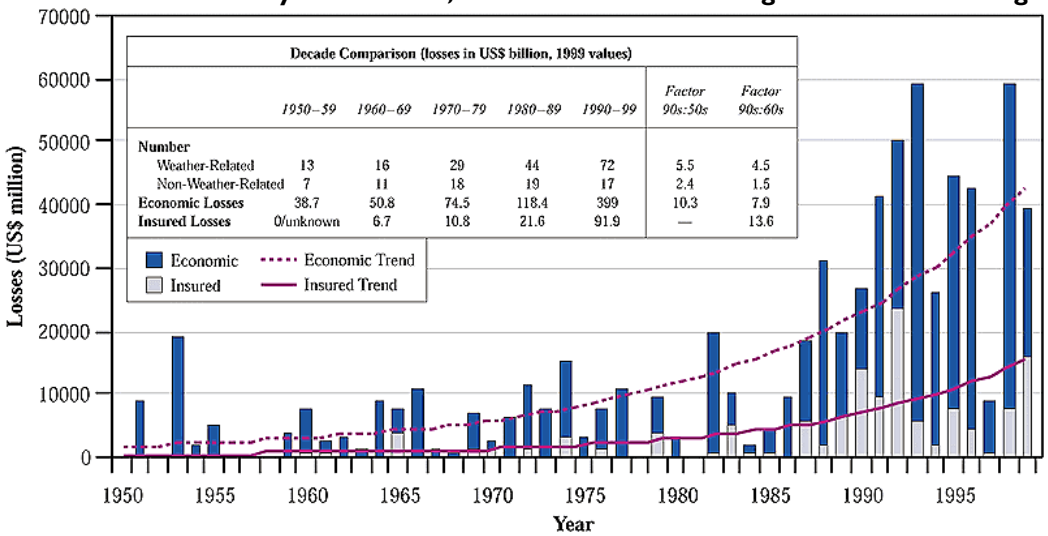


Source: Community Development Agency, Greenhouse Gas Emissions Analysis Report, 2000

Has climate change affected the global economy?

Challenges resulting from weather- and climate-related events include changes to world food production and supply, migration, and access to clean water and energy. As indicated in the table below, costs have increased substantially since 1980.

Figure 2–12 Cost to Society of Insurable, Weather-Related Damages from 1950 through 1999

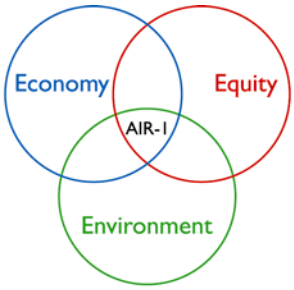


Source: International Panel on Climate Change, 2001

Goals, Policies, and Programs

What Are the Desired Outcomes?

Goal AIR-1



Improved Regional Air Quality. Promote planning and programs that result in the reduction of airborne pollutants measured within the county and the Bay Area.

Policies

AIR-1.1 Coordinate Planning and Evaluation Efforts. Coordinate air quality planning efforts with local, regional, and state agencies, and evaluate the air quality impacts of proposed plans and development projects.

AIR-1.2 Meet Air Quality Standards. Seek to attain or exceed the more stringent of Federal or State Ambient Air Quality Standards for each measured pollutant (Figure 2–13).

AIR-1.3 Require Mitigation of Air Quality Impacts. Require projects that generate potentially significant levels of air pollutants to incorporate best available air quality mitigation in the project design.

Why is this important?

It is essential to use a regional approach to improving air quality since polluted air flows from one place to another.

Environment: Cleaner air and water mean healthier marine and terrestrial ecosystems.

Economy: Poor air quality is linked to a higher incidence of public health costs associated with respiratory illnesses. The California Air Resources Board (CARB) suggests that the annual health impacts of exceeding state health-based standards for ozone and particulate matter include 6,500 premature deaths, 4,000 hospital admissions for respiratory disease and 350,000 asthma attacks. The loss of productive workdays also affects the local economy. The American Lung Association (ALA) states that asthma accounts for an estimated 3 million lost workdays for adults nationally.

Equity: Poor air quality is linked to a higher incidence of respiratory illnesses. Asthma, which can be triggered and/or caused by poor air quality, currently affects 2.3 million Californians. In Marin, there were 17,083 cases of asthma in 2004, which translates to an impact on ~~3~~7% of the population.

How Will Results Be Achieved?

Implementing Programs

AIR-1.a *Inform Local and Regional Agencies.* Notify local and regional jurisdictions of proposed projects in unincorporated areas that may affect regional air quality, as identified by project type and size thresholds in the *BAAQMD CEQA Guidelines, Assessing the Air Quality Impacts of Projects and Plans* (Figure 2–14).

AIR-1.b *Evaluate Air Quality Impacts of Proposed Projects and Plans.* As part of the Environmental Review Process, use the current BAAQMD CEQA Guidelines to evaluate the significance of air quality impacts from projects or plans, and to establish appropriate minimum submittal and mitigation requirements necessary for project or plan approval.

AIR-1.c *Take Part in Regional Programs.* Continue to participate in the Cities for Climate Protection and Spare the Air programs.

AIR-1.d *Cooperate to Enforce Air Quality Standards.* Cooperate with the U.S. Environmental Protection Agency (EPA), the California Air Resources Board and the BAAQMD to measure air quality at emission sources (including transportation corridors) and to enforce the provisions of the Clean Air Act and State and regional policies and established standards for air quality.

Figure 2–13 California and National Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards[1]	National Standards[2,3]
Ozone	8-hour	–	0.08 ppm (176μg/m^3)
	1-hour	0.09 ppm (180 μg/m^3)	0.12 ppm (235 μg/m^3)
Carbon Monoxide	8-hour	9 ppm (10 mg/m^3)	9 ppm (10 mg/m^3)
	1-hour	20 ppm (23 mg/m^3)	35 ppm (40 mg/m^3)
Nitrogen Dioxide	Annual	–	0.053 ppm (100 μg/m^3)
	1-hour	0.25 ppm (470 μg/m^3)	–
Sulfur Dioxide	Annual	–	0.03 ppm (80 μg/m^3)
	24-hour	0.04 ppm (105 μg/m^3)	0.14 ppm (365 μg/m^3)
	1-hour	0.25 ppm (655 μg/m^3)	–
Particulate Matter PM-10	Annual	20 μg/m^3 (geometric mean)	50 μg/m^3 (arithmetic mean)
	24-hour	50 μg/m^3	150 μg/m^3
Particulate Matter (Fine) PM-2.5	Annual	12 μg/m^3	15 μg/m^3
	24-hour	–	65 μg/m^3
Lead	Calendar quarter	–	1.5 μg/m^3
	30-day average	1.5 μg/m^3	–
Hydrogen Sulfide	1 hour	0.03 ppm (42 μg/m^3)	–
Vinyl Chloride (chloroethene)	24 hour	0.010 ppm (26 g/m^3)	–
Sulfates	24 hour	25 μg/m^3	–

Notes:

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1-hour and 24-hour), nitrogen dioxide, suspended particulate matter – PM10, and visibility reducing particles are values that are not to be exceeded. The standards for sulfates, Lake Tahoe carbon monoxide, lead, hydrogen sulfide, and vinyl chloride are not to be equaled or exceeded. If the standard is for a 1-hour, 8-hour or 24-hour average (i.e., all standards except for lead and the PM10 annual standard), then some measurements may be excluded. In particular, measurements are excluded that ARB determines would occur less than once per year on the average. The Lake Tahoe CO standard is 6.0 ppm, a level one-half the national standard and two-thirds the state standard.
2. National standards other than for ozone, particulates and those based on annual averages are not to be exceeded more than once a year. The 1-hour ozone standard is attained if, during the most recent three-year period, the average number of days per year with maximum hourly concentrations above the standard is equal to or less than one. The 8-hour ozone standard is attained when the 3-year average of the 4th highest daily concentrations is 0.08 ppm or less. The 24-hour PM10 standard is attained when the 3-year average of the 99th percentile of monitored concentrations is less than 150 μg/m3. The 24-hour PM2.5 standard is attained when the 3-year average of 98th percentiles is less than 65 μg/m3.

   Except for the national particulate standards, annual standards are met if the annual average falls below the standard at every site. The national annual particulate standard for PM10 is met if the 3-year average falls below the standard at every site. The annual PM2.5 standard is met if the 3-year average of annual averages spatially-averaged across officially designed clusters of sites falls below the standard.

   National air quality standards are set at levels determined to be protective of public health with an adequate margin of safety. Each state must attain these standards no later than three years after that state's implementation plan is approved by the Environmental Protection Agency.

Source: 2004 Bay Area Air Quality Management District

Figure 2–14
Projects with Potentially Significant Emissions

Land Use Category	Trip Generation Rate	Size of Project Likely to Generate 80 lb/day NOx
Housing		
Single Family	9.4/d.u.	320 units
Apartments	5.9/d.u.	510 units
Retail		
Discount Store	48.3/1000 sq.ft.	87,000 sq.ft.
Regional Shopping Center	96.2/1000 sq.ft.	44,000 sq.ft.
Supermarket	178/1000 sq.ft.	24,000 sq.ft.
Office		
General Office	10.9/1000 sq.ft.	280,000 sq.ft.
Government Office	68.9/1000 sq.ft.	55,000 sq.ft.
Office Park	12.8/1000 sq.ft.	210,000 sq.ft.
Medical Office	37.1/1000 sq.ft.	110,000 sq.ft.
Other		
Hospital	13.8/1000 sq.ft.	240,000 sq.ft.
Hotel	8.7/room	460 rooms

Note: Trip rates for many land uses will vary depending upon size of project. See latest edition of Trip Generation, Institute of Transportation Engineers.

Source: 1999 Bay Area Air Quality Management District

AIR-1.e *Conduct Public Education Program.* ~~Conduct a public education campaign~~ Educate regarding the ~~purpose and requirement of~~ reason for requiring using best management practices to improve air quality.

AIR-1.f *Limit Residential Wood Burning.* Continue to implement the ordinance that phases out the use of older, polluting wood burning appliances and limits the installation of wood-burning devices in new or renovated homes to pellet stoves, EPA-certified woodstoves and fireplace inserts, or natural gas or propane appliances.

AIR-1.g *Require Control Measures for Construction and Agricultural Activity.* Require reasonable and feasible measures to control particulate emissions (PM-10 and PM-2.5) at construction sites and during agricultural tilling activity, pursuant to the recommendations in the BAAQMD CEQA Guidelines, which may include:

- Watering active construction or agricultural tilling areas;
- Covering hauled materials;
- Paving or watering vehicle access roads; and
- Sweeping paved and staging areas.

Goal AIR-2

Protection from Emissions. Minimize the potential impacts from land uses that may emit pollution and/or odors on residential and other land uses sensitive to such emissions (Map 2–16, Sensitive Receptor Sites in Unincorporated Marin County).

Policies

AIR-2.1 **Buffer Emission Sources and Sensitive Land Uses.** Consider potential air pollution and odor impacts from land uses that may emit pollution and/or odors when locating (a) air pollution point sources, and (b) residential and other pollution-sensitive land uses in the vicinity of air pollution point sources (which may include manufacturing, extraction, hazardous materials storage, landfill, food processing, wastewater treatment, and other similar uses).

Why is this important?

People and sensitive plants and animals need to be protected from sources of air pollution.

Environment: Air pollution creates stress on fragile and sensitive ecosystems by reducing reproductive capacity and food sources.

Economy: Lowering pollutants from area wide and point sources would lower public health costs associated with respiratory illnesses and lead to fewer sick days at the workplace.

Equity: Children, people who are ill, and elderly people are particularly sensitive to air pollution. Places where they congregate need protection from polluted air.

How Will Results Be Achieved?

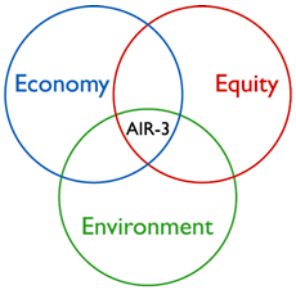
Implementing Programs

AIR-2.a *Require Separation Between Point Sources and Other Land Uses.* Only allow (a) emission point sources or (b) other uses in the vicinity of air pollution or odor point sources if the minimum screening distances between sources and receptors established in the BAAQMD CEQA Guidelines can be met, unless detailed project-specific studies demonstrate compatibility with adjacent uses despite separations that do not meet the screening distance requirements.

AIR-2.b *Protect Sensitive Receptors Near High-Volume Roadways.* Amend the Development Code to require mitigation measures such as increased indoor air filtration to ensure the protection of sensitive receptors (facilities where individuals are highly susceptible to the adverse effects of air pollutants, such as housing, child care centers, retirement homes, schools ~~or~~ and hospitals) near freeways, arterials and other major transportation corridors.

Goal AIR-3

Reduction of Vehicle-Generated Pollutants. Reduce vehicle trips and emissions, and improve vehicle efficiency, as means of limiting the volume of pollutants generated by traffic.



Policies

AIR-3.1 **Institute Transportation Control Measures.** Support a transportation program that reduces vehicle trips, increases ridesharing, and meets or exceeds the Transportation Control Measures recommended by BAAQMD in the most recent Clean Air Plan to reduce pollutants generated by vehicle use.

Why is this important?

Vehicle emissions are a major source of air pollution and reduction of vehicle trips will improve air quality.

Environment: Vehicle travel is responsible for 54 percent of nitrogen oxides, 73 percent of carbon monoxide, and 79 ~~percent~~% of the particulate matter released in Marin. These pollutants create stress on Marin's marine and terrestrial ecosystems through a loss of species diversity and reproduction capacity.

Economy: In addition to alleviating the economic burden of public health costs, a reduction in vehicle trips will reduce traffic congestion. In 2002, over 8,400 productive hours were lost as a result of traffic congestion and delay.

Equity: Based on EPA's most current data, vehicle generated sources are responsible for 91% of the air-related cancer risk in Marin County. Furthermore, lower-income neighborhoods tend to be nearest to major transportation routes, thus exposing these residents to higher levels of mobile source pollutants. One study finds that in the Bay Area, prevalence of asthma and bronchitis symptoms are about 7 ~~percent~~% higher for children in neighborhoods with higher levels of traffic pollutants compared with other children in the study.

How Will Results Be Achieved?

Implementing Programs

AIR-3.a *Support Voluntary Employer-Based Trip Reduction.* Provide assistance to regional and local ridesharing organizations and advocate legislation to maintain and expand employer ridesharing incentives, such as tax deductions or credits.

AIR-3.b *Utilize Clean Vehicle Technology.* Promote new technologies and other incentives, such as allowing zero or partial zero emission vehicles rated at 45 miles or more per

gallon in Marin County car pool lanes, and replacing fleet vehicles with these and similar clean vehicles.

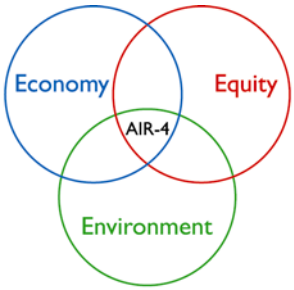
> *"Adding lanes to solve traffic congestion is like loosening your belt to solve obesity."*
> – Glen Hemistra

AIR-3.c *Consider Model Clean Vehicle Requirements.* Research and consider adoption of an ordinance or standards that provide a set of voluntary measures to incorporate clean vehicles in fleets and promote the use of clean alternative fuels.

AIR-3.d *Reduce Peak-Hour Congestion.* Implement recommended Bay Area Air Quality Management District (BAAQMD) Transportation Control Measures in the Clean Air Plan to reduce vehicle emissions and congestion during peak commute periods.

AIR-3.e *Improve Arterial Traffic Management.* Modify arterial roadways to allow more-efficient bus operation, including possible signal preemption, and expand signal-timing programs where air quality benefits can be demonstrated.

Goal AIR-4



Minimizeation of Contributions to Greenhouse Gases. Prepare policies that promote efficient management and use of resources in order to minimize greenhouse gas emissions.

Policies

AIR-4.1 Reduce Greenhouse Gas Emissions. Adopt practices that promote improved efficiency and energy management technologies, shift to low-carbon and renewable fuels and zero emission technologies.

AIR-4.2 Foster the Absorption of Greenhouse Gases. Foster and restore forests and other terrestrial ecosystems which offer significant carbon mitigation potential.

Carbon Dioxide

The Ecological Footprint shows that the single largest human demand on ecosystems comes from carbon dioxide emissions. The land area required to absorb this waste product makes up over half the Ecological Footprint of the average Marin resident. If Marin County reduced its carbon dioxide emissions by 20%, it could reduce its total Footprint by an area equal to almost the entire size of Marin County.

Why is this important?

Major contributors to greenhouse gas emissions, such as vehicle traffic and building energy use, can be reduced on a local level through the implementation of sustainable development policies.

Environment: Increased greenhouse gas emissions lead to climate change, which could include increases in temperature and shifting amounts of rainfall. Changes in temperature and water availability affect terrestrial and

marine ecosystems. Furthermore, higher temperatures lead to higher evaporation rates, as well as reductions in stream flow and an increased frequency of droughts. Droughts are a problem in Marin, where 80 ~~percent~~% of our water comes from rainfall.

Economy: Mitigation measures that reduce emissions can result in substantial savings. The Tellus Institute estimates that California can save 1.9 billion dollars annually by 2020 through adoption of more stringent building codes and standards, efficiency programs, and increased supply of energy from renewable sources.

Equity: Access to clean water, energy, and mineral resources, and availability of productive arable land are all threatened by changes in climate. Weather- and temperature-related issues will add strain to an already overburdened public health system. Furthermore, low-income families will be disproportionately impacted as they will be the least able to adapt to the effects of climate change.

Implementing Programs

AIR-4.a *Reduce Greenhouse Gas Emissions Resulting from Energy Use in Buildings.* Implement energy efficiency programs and use of renewable energy. (Also see ~~Energy and Green Building sections:~~ EN-1, EN-2, ~~CF~~PFS-2 and TR-4.)

AIR-4.b *Reduce Greenhouse Gas Emissions Resulting from Transportation.* Increase clean-fuel use, promote transit-oriented development and alternative modes of transportation, and reduce travel demand. (Also see ~~sections:~~ TR-4, AIR-3, DES-2, HS-2, HS-3, CD-2, CD-3 and EC-1.)

AIR-4.c *Reduce Methane Emissions Released from Waste Disposal.* Encourage recycling, decrease waste sent to landfills, require landfill methane recovery, and ~~determine the potential to use~~ promote methane recovery for ~~use in~~ energy production. (See ~~section: CF~~PFS-3.)

Changing Scientific Understanding of Human Influences on Climate Change

1990: "Our judgment is that global mean surface air temperature has increased...[though] the unequivocal detection of the enhanced greenhouse effect is not likely for a decade or more."

1995: "The balance of evidence suggests a discernible human influence on global climate."

2001: "The Earth's climate system has demonstrably changed on both global and regional scales...There is new and stronger evidence that most of the warming observed over the last 50 years is attributable to human activities."

Source: Intergovernmental Panel on Climate Change (IPCC)

Cities for Climate Protection Milestones

In August 2002, the Board of Supervisors partnered with the Cities for Climate Protection Campaign to address climate change through five actions:

1. Analyze baseline greenhouse gas emissions.
2. Set a target for reducing emissions.
3. Develop a local action plan for pursuing emissions reductions measures.
4. Implement local action plan
5. Monitor progress

Source: www.iclei.org

AIR-4.d *Reduce Greenhouse Gas Emissions from Agriculture.* Compile an inventory of agricultural greenhouse gas emissions. Partner with AgStar, the U.S. Department of Agriculture and the U.S. Department of Energy to encourage the use of methane recovery technologies and determine potential use in energy production.

AIR-4.e *Reduce County Government Contributions to Greenhouse Gas Emissions.* Where feasible, replace fleet vehicles with hybrid fuel and other viable alternative fuel vehicles, increase energy efficiency of County-maintained facilities, increase renewable energy use at County-maintained facilities, adopt purchasing practices that promote emissions reductions, and increase recycling at County-maintained facilities. (Also, s~~S~~ee sections: EN-1, EN-2, CF-3, TR-4, EC-1 and PH-1.)

AIR-4.f *Establish a Climate Change Planning Process.* Integrate climate change planning and program implementation into long range and current planning functions and other related agencies. Establish and maintain a process to implement, measure, evaluate, and modify implementing programs, using the Cities for Climate Protection Campaign as a model (refer to sidebar).

AIR-4.g *Work with Bay Area Governments to Address Regional Climate Change Concerns.* Play a leading role to encourage other local governments to commit to addressing climate change. Participate in programs such as the Cities for Climate Protection Campaign to address local and regional climate change concerns.

AIR-4.h *Evaluate the Carbon Emissions Impacts of Proposed Developments.* Incorporate a carbon emissions assessment into land use plans and the environmental impact report for proposed projects.

"New analyses suggest that 15–37% of a sample of 1,103 land plants and animals would eventually become extinct as a result of climate changes expected by 2050."

-- *Nature Medicine*, 2004

AIR-4.i *Work with Appropriate Agencies to Determine Carbon Uptake and Storage Potential of Natural Systems.* Study Marin's wetlands, forests, baylands, and agricultural lands to determine the potential to sequester carbon over time. Determine their value as carbon sinks.

AIR-4.j *Acquire and Restore Natural Resource Systems.* Take and require all technically feasible measures to avoid or minimize potential impacts on existing natural resource systems that serve as carbon sinks. ~~(S~~(Also, see sections: CD-1, BIO-2, BIO-3, BIO-4, BIO-5, OS-1 and OS-2.)

AIR-4.k *Encourage the Planting of Trees.* Adopt urban forestry practices that encourage re-forestation as a means of storing carbon dioxide. ~~(S~~(Also, see sections: BIO-1, DES-3)

AIR-4.l *Preserve Agricultural Lands.* Protect agricultural lands and soils that serve as carbon sinks. ~~(S~~(Also, see sections: AG-1)

AIR-4.m *Focus Development in Urban Corridors.* Build in urban corridors and limit development in natural resource areas. Encourage green spaces that serve as carbon sinks in urban corridors. ~~(S~~(Also, see sections: CD-1, CD-2 and DES-3)

AIR-4.n *Monitor for Carbon Storage Research.* Monitor federal and international research on technological approaches to carbon storage.

Goal AIR-5

Adaptation to Climate Change. Adopt policies and programs that promote resilient human and natural systems in order to ease the impacts of climate change.

Policies

AIR-5.1 **Determine Marin-Specific Climate Change.** Participate in research that examines the effects of climate change on human and natural systems in Marin.

AIR-5.2 **Prepare Response Strategies for Impacts.** Prepare appropriate response strategies that aid systems in adapting to climate change based on sound scientific understanding of the potential impacts.

Why is this important?

~~Confronting~~ Adapting to climate change will require accurate scientific understanding as well as an institutionalized policy framework.

Environment. Wildlife distributions, population size, population density, and behavior are directly affected by changes in climate and indirectly through changes in vegetation. As wildlife tries to adapt to changes in the environment caused by shifting temperature and precipitation patterns, the already high number of threatened and endangered species could see a marked increase. New analyses suggest that 15 to 37 ~~percent~~% of a sample of 1,103 land plants and animals would eventually become extinct as a result of climate changes expected by 2050.

Economy. Aquaculture products brought 2.4 million dollars into Marin's economy, representing 5.4% of Marin's entire agriculture industry. Warmer ocean waters and saltwater inundation due to climate change may impact coastal ecosystems by speeding the decline in fish populations and marine ecosystems already stressed from habitat loss and reduced freshwater flows. ~~Aquaculture products brought 2.4 million dollars into Marin's economy, representing 5.4 percent of Marin's entire~~

"My interest is in the future, because I am going to spend the rest of my life there."

– Charles Kettering

~~agriculture industry.~~ A report sponsored by the U.N. stated that worldwide economic losses could soar to $150 billion a year within the next ten years.

Equity. Adopting and fostering resilience within the natural and built environment will save significant resources, speed recovery, and protect public health and safety for people of all income levels.

Implementing Programs

AIR-5.a *Coordinate with Local and Regional Agencies.* Coordinate with U.S. Geologic Survey, Bay Conservation and Development Commission, California Coastal Commission and other monitoring agencies to study near-term and long-term high probability climate change effects. ~~Marin County shall e~~Explore funding and collaborations with Bay Area partners in the Cities For Climate Protection Campaign in order to share resources, achieve economies of scale, and develop plans and programs that are optimized to address climate change on a regional scale.

AIR-5.b *Study the Effect of Climate Change.* Determine how climate change will affect the following:

- Natural Systems: ~~changes~~ Changes in water availability, shifting fog regimes (and the effect on coastal redwoods and fire ecology), temperature changes and shifting seasons.
- Biological Resources: Changes in species distribution and abundance in estuary ecosystems resulting from salinity changes and flooding~~;~~. ~~f~~For marine ecosystems determine changes in distribution and abundance resulting from warmer waters, rising sea level, changes in ocean currents and freshwater inflows.
- Environmental Hazards: Runoff, fire hazards, floods, landslides and soil erosion, and the impact on coastal and urban infrastructure.
- Built Environment: ~~e~~Effect of flooding and rising sea level on sewage systems, damage to property and infrastructure.
- Water Resources: Runoff, changes in precipitation, increases and decreases in drought, salinity changes, sea level rise and shifting seasons.
- Agricultural and Food Systems: Food supply, economic impacts and effect on grazing lands.
- ~~Environmental Hazards: Runoff, fire hazards, floods, landslides and soil erosion, and the impact on coastal and urban infrastructure~~
- Public Health: Temperature-related health effects, air quality impacts, extreme weather events and vector-, rodent-, water-, and food-borne diseases.

AIR-5.c *Prepare Response Strategies.* In coordination with California Coastal Commission, Bay Conservation and Development Commission, water districts, wildlife agencies, and flood control districts, prepare response strategies for Marin's human and natural systems. Current response strategies include:

- Water Resources: ~~Natural~~ Improve drainage systems, harvesting flows and recharge designs in order to direct runoff to landscaped areas where the water can percolate into the soil (See section: WR-1)
- Biological Resources: Limit development such that coastal wetlands are able to migrate inland in response to sea level rise, ~~protect~~ wildlife corridors are protected, preserved ecotones and limit development impacts. Promote the restoration of wetlands and riparian areas to provide capacity for high water and flood flows. ~~(S~~(Also, see sections: BIO-2, BIO-4, BIO-5, OS-~~3~~2, DES-1, DES-5.)
- Public Health: General strengthening of public health infrastructure and health-oriented environmental management, such as with air and water quality, and community and housing design.
- Built Environment: Assess development located in coastal areas that are subject to sea level rise and increased flooding and develop a response strategy, such as a planned retreat program, for the relocation of facilities in low-lying areas. Work with the County flood control and water districts to prepare a plan for responding to a potential rise in the sea level, consider developing flood control projects, and amend County Code Chapters 11, 22, 23 & 24 to include construction standards for areas potentially subject to increased flooding from a rise in sea level.
- Environmental Hazards: Develop response strategies that cope with increasing storm events, flooding, fire, landslides, and soil erosion. Establish surveillance systems. With the development of advanced (spatial) surveillance technology, it is conceivable that such systems will be expanded to address forest health and productivity, monitoring biotic vectors and natural elements, as well as tree and ~~stand~~ storm responses. ~~(S~~(Also, see sections: EH-3, EH-4, BIO-1 and PH-1.)

AIR-5.d *Monitor Local Climate Change.* Encourage appropriate local and regional agencies to track the following environmental indicators of climate change:

- Sea level ~~(S~~(Also, see section: EH-3)
- Minimum and Maximum Temperature
- Precipitation
- Timing and Volume of River Flow
- River Temperatures
- Sea Surface Temperatures
- Diversity and Abundance of Fish Stocks and Sea Birds

"The causes and effects of climate change occur around the world. Individuals, communities, and nations must work together cooperatively to stop global climate change."

– The Environmental Justice and Climate Change Initiative

AIR-5.e *Seek Resources for Response Strategies.* Explore funding and collaborative opportunities that share resources, to develop plans and programs that are optimized on a regional scale.

AIR-5.f *Protect and Enhance Native Habitats and Biodiversity.* Effectively manage and enhance native habitat, maintain viable native plant and animal populations, and provide for improved biodiversity throughout Marin. Require identification of sensitive biological resources and commitment to adequate protection and mitigation. ~~(S~~(Also, see sections: BIO-1 and BIO-2)

"It is not the strongest of the species that survive, nor the most intelligent, but the one most responsive to change."

– Charles Darwin

AIR-5.g *Conduct Public Outreach and Education.* Increase public awareness about climate change and encourage Marin residents and businesses to become involved in activities and lifestyle changes that will aid in reducing greenhouse gas emissions.

Figure 2–15 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
	Guiding Principles											
AIR-1 Improved Regional Air Quality	•		•	•	•							•
AIR-2 Protection from Emissions	•		•	•	•							•
AIR-3 Reduction of Vehicle-Generated Pollutants	•		•	•	•		•					•
AIR-4 ~~Preparedness for Sea Level Rise~~ Minimization of Contributions to Greenhouse Gases	•	•	•	•		•	•		•			•
AIR-5 Adaptation to Climate Change					•	•				•		•

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicators	Benchmarks	Targets
Number of days of poor air quality.	No exceedences in 2000.	No increase through 2015.
Amount of greenhouse gas emissions countywide.	~~2,634,003~~ 2,849,000 tons CO_2 in 1990.	Reduce 15~~–20~~% by 2015.
Amount of greenhouse gas emissions from County government sources.	~~16,945~~ 15,200 tons CO_2 in 1990.	Reduce 15 - 20% by 2015.

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–16
Atmosphere and Climate Program Implementation

Programs	Responsibility	Potential Funding	Priority	Time Frame
AIR-1.a – Inform Local and Regional Agencies.	CDA	Existing budget	High	Ongoing
AIR-1.b – Evaluate Air Quality Impacts of Proposed Projects and Plans.	CDA	Existing budget	High	Ongoing
AIR-1.c – Take Part in Regional Programs.	CDA	Existing budget	High	Ongoing
AIR-1.d – Cooperate to Enforce Air Quality Standards.	CDA, EPA, CA Air Resources Board, BAAQMD	Existing budget, State and Federal funds	High	Ongoing

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Potential Funding	Priority	Time Frame
AIR-1.e – Conduct Public Education Program	CDA, BAAQMD	Existing budget and may require additional grants or revenues*	High	Ongoing
AIR-1.f – Limit Residential Wood Burning.	CDA	Existing budget, Tobacco Settlement Funds	Medium	Ongoing
AIR-1.g – Require Control Measures for Construction and Agricultural Activity.	CDA, Agricultural Commissioner	Existing budget	High	Ongoing
AIR-2.a – Require Separation Between Point Sources and Other Land Uses.	CDA, BAAQMD	Existing budget	High	Ongoing
AIR-2.b – Protect Sensitive Receptors Near High-Volume Roadways.	CDA	Existing budget	Medium	Long term
AIR-3.a – Support Voluntary Employer-Based Trip Reduction.	DPW, TAM	Will require additional grants or other revenue*	TBD	Long term
AIR-3.b – Utilize Clean Vehicle Technology.	1.) CDA/CalTrans-carpool lanes, 2.) DPW- County fleet	1.) Existing budget, 2.) Will require additional grants or other revenue*	1.) Medium, 2.) TBD	1.) Ongoing, 2.) Long term
AIR-3.c – Consider Model Clean Vehicle Requirements.	DPW	Will require additional grants or other revenue*	TBD	Long term
AIR-3.d – Reduce Peak-Hour Congestion.	TAM	TFCA	Low	Ongoing
AIR-3.e – Improve Arterial Traffic Management.	DPW, TAM	Grants, traffic mitigation fees, transportation sales tax*	Low	Ongoing
AIR-4.a – Reduce Greenhouse Gas Emissions Resulting from Energy Use in Buildings.	CDA	Existing budget and may require additional grants or revenues*	Medium	Med. Term
AIR-4.b – Reduce Greenhouse Gas Emissions Resulting from Transportation.	1.) TAM, CDA, 2.) DPW	1.) General Fund, TAM budget, TLC/HIP Grants, and will require additional grants or other revenue*	1.) Medium, 2.) TBD	1.) Ongoing 2.) Long term

Programs	Responsibility	Potential Funding	Priority	Time Frame
AIR-4.c – Reduce Methane Emissions Released from Waste Disposal.	DPW	Will require additional grants or other revenue*	TBD	Long term
AIR-4.d – Reduce Greenhouse Gas Emissions from Agriculture.	Agricultural Commissioner, CDA, USDA, USDOE	Grants, Existing budget	Medium	Ongoing
AIR-4.e – Reduce County Government Contributions to Greenhouse Gas Emissions.	DPW	Will require additional grants or other revenue*	TBD	Pending
AIR-4.f – Establish a Climate Change Planning Process.	CDA	Existing budget and may require additional grants or revenues*	High	Immediate
AIR-4.g – Work with Bay Area Governments to Address Regional Climate Change Concerns.	CDA, ABAG, ICLEI	Existing budget and may require additional grants or revenues*	High	Ongoing
AIR-4.h – Evaluate the Carbon Emissions Impacts of Proposed Developments.	CDA	Existing budget and may require additional grants or revenues*	High	Ongoing
AIR-4.i – Work with Appropriate Agencies to Determine Carbon Uptake and Storage Potential of Natural Systems.	CDA, CEC, BAAQMD, other municipalities	Will require additional grants or revenues*	Low	Long term
AIR-4.j – Acquire and Restore Natural Resource Systems.	MCOSD	Will require additional grants or revenues*	High	Ongoing
AIR-4.k – Encourage the Planting of Trees.	CDA, NGO's, CBO's	Will require additional grants or revenues*	Medium	Ongoing
AIR-4.l – Preserve Agricultural Lands.	CDA, MALT, CBO's	Will require additional grants or revenues*	High	Ongoing
AIR-4.m – Focus Development to Urban Corridors.	CDA	Existing budget	High	Ongoing
AIR-4.n – Monitor for Carbon Storage Research.	CDA, ICLEI	Existing budget and may require additional grants or revenues*	Medium	Ongoing

Programs	Responsibility	Potential Funding	Priority	Time Frame
AIR-5.a – Coordinate with Local and Regional Agencies.	CDA, Bay Conservation and Development Commission (BCDC), CCC, BAAQMD, USGS, International Council for Local Environmental Initiatives (ICLEI)	Existing budget and may require additional grants or revenues*	High	Ongoing
AIR-5.b – Study the Effect of Climate Change.	CDA, BCDC, CCC, BAAQMD, USGS, ICLEI	Will require additional grants or revenues*	Medium	Ongoing
AIR-5.c – Prepare Response Strategies.	CDA, CCC, BCDC, Water Districts, Resource Protection Agencies, ICLEI	Will require additional grants or revenues*	Medium	Ongoing
AIR-5.d – Monitor Local Climate Change.	CDA, CCC, BCDC, Water Districts, Resource Protection Agencies, ICLEI	Existing budget and may require additional grants or revenues*	Medium	Ongoing
AIR-5.e – Seek Resources for Response Strategies.	CDA, CCC, BCDC, Water Districts, Resource Protection Agencies, ICLEI	Existing budget and may require additional grants or revenues*	Medium	Ongoing
AIR-5.f – Protect and Enhance Native Habitats and Biodiversity.	Parks & Open Space, CDA, CBO's	Existing budget and may require additional grants or revenues*	High	Ongoing
AIR-5.g – Conduct Public Outreach and Education.	CDA, CBO's, ICLEI	Existing budget and may require additional grants or revenues*	Medium	Ongoing

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

Marin County Dept of Parks~~,~~ and Open Space~~, and Cultural Resources~~

2.8 Open Space

Background

Residents of Marin County enjoy a wealth of public open space unparalleled in the nine county Bay Area. Land preservation has a long history in Marin. Some existing parklands--Muir Woods, Mt. Tamalpais and ~~S.~~Samuel P. Taylor-- were established in the early twentieth century. Point Reyes National Seashore was established in 1962. In 1971, the Marin County Planning Department

published a seminal land use planning document, *Can the Last Place Last?*, which set forth a vision for a countywide open space system. Since then, federal, state, and local agencies, in partnership with non governmental organizations and Marin's residents, have met with considerable success in achieving that vision by acquiring or otherwise protecting the hills, ridgelines, wetlands, watershed lands, agricultural lands and other undeveloped lands that generally define the term "open space" in Marin.

Marin voters created the Marin County Open Space District in 1972 as the local agency responsible for creating the County's own system of public open space. The District's mission is "to enhance quality of life in Marin through the acquisition, protection and responsible stewardship of ridgelands, baylands, and environmentally sensitive lands targeted for preservation in the Countywide Plan."

A handful of other public agencies and non-governmental organizations, most notably the Golden Gate National Recreation Area, Point Reyes National Seashore, California State Parks, the Marin Municipal Water District, the North Marin Water District, and the Marin Agricultural Land Trust (MALT), also protect land in Marin, but according to their own missions and for their own purposes. See Table ~~xx~~2-17. All (with the exception of MALT) share a responsibility for managing extensive lands, amounting to thousands of acres each, that are more or less in a natural condition and open to the public. Together, these lands are a highly visible, defining element of the County's landscape mosaic, offering multiple benefits – beauty, educational opportunities, watershed protection, habitat protection, trail-based recreation, and others – to the Marin County community.

The goals, policies, and programs in this section are intended to complement and support the missions and policies of the Open Space District and the other public agencies listed above. Coordination between the Countywide Plan's open space goals and policies and the Open Space District's goals and policies is essential because:

- the Open Space District's mission is tied to the Countywide Plan, and
- the Open Space District helps the County "preserve Marin's unique environmental heritage", a key element of the County's mission.

At the time of this writing, the Open Space District was nearing completion of a Policy Review Initiative – a review of its land management policies in the following areas:

- Fire
- Trails
- Non-Native Plants and Animals
- Special Status Species
- Parking
- Visitor Facilities
- Access for the Disabled
- Countywide Trail System
- Public Outreach
- Camping

The Open Space District's own policies further define the more general open space policies contained in the Countywide Plan.

Figure 2–17 Mission Statements of Key Public Land Managers and Land Conservation Organizations in Marin.

Marin County Open Space District

To enhance the quality of life in Marin through the acquisition, protection, and responsible stewardship of ridgelands, baylands, and environmentally sensitive lands targeted for preservation in the Marin Countywide Plan.

Marin Municipal Water District

It is the purpose of the Marin Municipal Water District to manage sensitively the natural resources with which it is entrusted, to provide customers with reliable, high-quality water at an equitable price, and to ensure the fiscal and environmental vitality of the district for future generations.

North Marin Water District

We provide an adequate supply of safe, reliable and high quality water and deliver reliable and continuous sewer service to our customers at reasonable cost consistent with good conservation practices and minimum environmental impact.

Golden Gate National Recreation Area

Golden Gate National Recreation Area's mission is to preserve and enhance the natural environment and cultural resources of the coastal lands north and south of the Golden Gate for the inspiration, education, and recreation of people today, and for future generations. In the spirit of bringing national parks to the people, we reach out to the diverse urban community, bringing the richness and breadth of the national park experience to all including those who may never have the opportunity to visit other national parks. We also work to protect the integrity of our park's fragile resources in the challenging context of an urban setting. And, we are committed to forging partnerships with the community to strengthen the park's relevance to our metropolitan neighbors and to engage the public in stewardship of the park's history and ecology.

Point Reyes National Seashore

Point Reyes National Seashore was established to preserve and protect wilderness, natural ecosystems, and cultural resources along the diminishing undeveloped coastline of the western United States.

Marin Agricultural Land Trust

Marin Agricultural Land Trust (MALT) was the first land trust in the United States to focus on farmland preservation. Founded in 1980 by a coalition of ranchers and environmentalists to preserve farmland in Marin County, California, MALT acquires agricultural conservation easements on farmland in voluntary transactions with landowners. MALT also encourages public policies that support and enhance agriculture. It is a model for agricultural land preservation efforts across the nation. MALT has so far permanently protected 35,000 acres of land on 53 family farms and ranches.

California State Parks

To provide for the health, inspiration and education of the people of California by helping to preserve the state's extraordinary biological diversity, protecting its most valued natural and cultural resources, and creating opportunities for high-quality outdoor recreation.

Key Trends and Issues

Are Marin's public land management agencies still acquiring land? Do these agencies still have sufficient funds to purchase land?

The Open Space District currently owns and manages over 14,000 acres of land (Map 2-17). The Open Space District acquired more land in 1995 – 2,426 acres – than in any other year in its 32-year history. Annual acquisition totals for all succeeding years have been substantially lower. The availability of funding is among the chief factors enabling an agency to acquire land. Since its creation, the Open Space District has had to budget an increasing portion of its annual property tax revenues for land management purposes, as compared to land acquisition. The Open Space District receives slightly less than one percent of annual ad valorem property taxes collected in Marin, amounting to nearly $4 million in fiscal year 2004-2005. In recent years, 95 to 100 percent of the Open Space District's annual property tax revenues have been budgeted for purposes other than land acquisition. The Open Space District continues to purchase open space by obtaining private and public grants, and by levying special taxes and assessments.

Regarding land acquisition by other agencies:

Golden Gate National Recreation Area: The Golden Gate National Recreation Area has largely met its land acquisition goals but still acquires land on occasion, most recently in Oakwood Valley and the vicinity of Tomales Bay.

Marin Municipal Water District: MMWD does not have an active land acquisition program; however, it does consider acquiring additional properties for the purpose of improving watershed protection as opportunities permit. Also, MMWD vigorously seeks Watershed Protection Agreements with private landowners within the drainage area of reservoirs. These agreements provide permanent restrictions for maintenance and development in order to safeguard water quality.

What are emerging land management issues?

Respondents to a survey conducted by the Open Space District as part of its Policy Review Initiative regarded fire, non native plants and animals, and special status species as three of the Open Space District's four most important policy areas. Trail use, while ranked the most important of the four, is not a new issue. This outcome suggests that fire danger reduction, reduction of non-native plant and animal populations, and special status species habitat protection will figure prominently in the Open Space District's long range land management planning. Because of Marin's vast acreage of public open space and its close proximity to developed areas of the county, addressing the issue of fire danger will require collaboration among communities, fire agencies and public land management agencies.

Regarding emerging land management issues from the perspective of other public agencies:

Golden Gate National Recreation Area. Fire management planning in the wildland-urban interface, boundary management, habitat fragmentation, congestion management, endangered species management.

Marin Municipal Water District. Non-Native Species: A major MMWD focus is maintaining Mt. Tamalpais's unique natural diversity by controlling non-native invasive species. MMWD is seeking to

control the expansion of wild turkey populations that are threatening Marin's ecosystems. Impacts to amphibian and quail populations are of particular concern.

Roads and Trails: Erosion and siltation from roads and trails on MMWD watershed lands and other public lands is harming salmon and steelhead habitat in local streams and reducing reservoir capacity. MMWD's Mt. Tamalpais Watershed Road and Trail Plan provides direction for reducing the footprint of the roads and trails and implementing a program of best management practices for sediment control.

Fire Hazard: Decades of fire suppression has resulted in high fuel loads on MMWD watershed lands and other nearby public lands. MMWD is revising its 10-year-old Vegetation Management Plan in order to better employ available methods (prescribed burning, mechanized brush clearing, goats, and chemical controls), to effectively reduce both fuel loads and invasive plants.

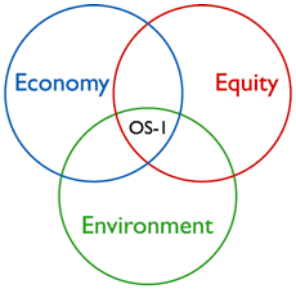
Science-Based Decision Making: MMWD is managing natural resource inventory and monitoring programs for key species at risk as well as conducting general baseline studies. This information is used to set resource management priorities and to minimize impacts from administrative and recreational use of watershed lands.

Goals, Policies, and Programs

What Are the Desired Outcomes?

Goal OS-1

Sustainably Managed Open Space. Manage open space in a sustainable manner for environmental health and the long-term protection of resources.



Policies

OS-1.1 **Enhance Open Space Stewardship.** Promote collaborative resource management among land management agencies. Monitor resource quality. Engage the public in the stewardship of open space resources.

OS-1.2 **Protect Open Space for Future Generations.** Ensure that protected lands remain protected in perpetuity, and that adequate funding is available to maintain it for the benefit of residents, visitors, citizens, wildlife and the environment.

Open space

Living within the ecological limits of the planet means both reducing demand (Footprint) on ecological resources and maintaining or even increasing supply (biocapacity). With 48% of its land area preserved as open space, watershed or parkland, Marin County has already protected much of its existing biocapacity. Designating an additional 23,000 acres as open space would increase the amount of biocapacity in Marin's protected open space by 15%.

Why is this important?

Sustainable management of open space will ensure that this resource remains a public asset for many years.

Environment: After open space has been acquired, it has to be managed for the long term so that it will continue yielding reduced runoff, cleaner air, cleaner water, beautiful landscapes, and a healthy ecosystem.

Economy: Good land management can save money for governments, home owners and private businesses. For example, according to the Marin County Open Space District, the cost to realign a fire protection road to restore natural drainage and direct water away from a landslide-prone slope can be as little as $1,500. The cost to repair a landslide affecting nearby homes caused, in part, by runoff from an improperly graded road can be $500,000 or more, plus legal expenses.

Equity: Intelligent, sustainable open space management contributes to recreational opportunities and healthy and safe communities, which benefit all Marin's residents. In addition, the open space lands enjoyed today are a living legacy for future generations.

How Will Results Be Achieved?

Implementing Programs

OS-1.a *Coordinate Countywide Open Space Management.* Encourage public land management agencies, cities and towns, fire agencies, and others with an interest in open space management, to share resource information and collaboratively address open space management issues. Examples of the latter include non-native species management and fire hazard reduction.

OS-1.b *Promote Compatible Open Space Policies.* Regularly review Countywide Plan open space policies for compatibility with Open Space District policies.

OS-1.c *Utilize Integrated Pest Management.* Minimize the use of pesticides and herbicides in open space management.

OS-1.d *Inform and Enforce.* Utilize a variety of methods to disseminate information about what agencies are doing to protect open space, and what the public can do to help. Continue efforts to inform and educate open space visitors about the importance of open space and its appropriate use. Use enforcement authority as necessary to ensure compliance with regulations.

OS-1.e *Inventory Resources.* Conduct inventories of sensitive resources and resource management issues – erosion sites or areas where populations of non-native species are expanding, for example – to determine resource management priorities.

OS-1.f *Encourage Environmental Education.* Partner with schools and colleges to foster an understanding and appreciation of open space among all age levels.

OS-1.g *Encourage Resource Monitoring.* Document trends in resource quality and public use to help guide long-term resource management decision-making.

OS-1.h *Accommodate Research.* Consider research requests to address issues such as non-native species management.

OS-1.i *Identify and Apply Best Management Practices.* Review existing stewardship practices and the experiences of other land managers to identify best practices and make cost effective, sustainable, environmentally sound land management decisions.

OS-1.j *Explore Tools to Fund Open Space Stewardship.* Consider local ballot measures, possibly in partnership with other agencies when land management interests overlap, and private funding sources, including private grants, endowments, and bequests.

OS-1.k *Establish Partnerships.* Establish partnerships among public land management agencies, other public agencies, cities, towns, and non-governmental organizations to maximize funding opportunities for land stewardship.

OS-1.l *Engage the Public in Stewardship.* Encourage volunteerism in resource management and enhancement activities to foster a sense of responsibility for the care of open space resources.

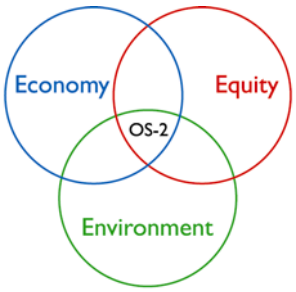
OS-1.m *Monitor Federal and State Legislation.* Support legislation that maintains and enhances existing open space protection.

OS-1.n *Promote New State Legislation.* Develop and support State legislation that will enhance open space protection in Marin County.

What Are the Desired Outcomes?

Goal OS-2

Preservation of Open Space for the Benefit of the Environment and Marin Community Members. Close the gaps in the pattern of protected public open space and private lands where land acquisition or other methods of preservation would create or enhance community separators, wildlife corridors, watershed protection, riparian corridors, sensitive habitat, or trail connections.



Policies

OS-2.1 **Support Countywide Open Space Planning.** Encourage Marin's public land management agencies to review the existing public open space system and prepare proactive, long range plans to guide future land acquisition and preservation efforts consistent with their respective missions, and to create an interconnected system of public open space.

OS-2.2 **Continue to acquire or otherwise preserve additional open space countywide.** Targeted greenbelts and community separators in the Baylands and City-Centered Corridor include:

- *Wolfback Ridge to Tennessee Valley*, west of Highway 101, around to Oakwood Valley, preserves Marin's southern gateway. It connects the Golden Gate National Recreation Area (GGNRA) with Sausalito and Marin City. Most of this area has been acquired as part of the GGNRA.
- *Ridge above Tamalpais Valley*, along Panoramic from Tennessee Valley westward, includes trail links with Mount Tamalpais State Park. Portions are included in the GGNRA.
- *Tiburon Peninsula Ridge* includes trails to several points along the bay. The Open Space District and the Town of Tiburon have acquired portions of this ridge.
- *Northridge* is one of the most important community separators in Marin, connecting Mill Valley, Corte Madera, and Larkspur with the Marin Municipal Water District lands to the west. Most of the ridge has been acquired through the joint efforts of the Open Space District, cities, and nongovernmental organizations.
- *The rim of the Corte Madera Creek Watershed* connects the Upper Ross Valley communities with the Marin Municipal Water District lands to the west. Most of the ridge has been acquired through the joint efforts of the Open Space District, cities, and nongovernmental organizations.
- *Southern Heights Ridge*, dividing San Rafael and the Ross Valley.
- *San Pedro Peninsula Hills* provides a backdrop for the Civic Center and offers panoramic views of the bay region. Most of this ridge has been acquired by the State, the Open Space District, and the City of San Rafael.
- *Terra Linda-Sleepy Hollow Divide.* Substantial portions have been acquired by the Open Space District.
- *Big Rock Ridge* separates the Novato basin from the Lucas Valley-Marinwood communities, extends to Stafford Lake Park, and borders the College of Marin - Indian Valley campus. Portions have been acquired by the Open Space District, the County, and the Marinwood Community Services District.
- *Hills east of Highway 101 near St. Vincent's School* provide a continuous greenbelt system between Big Rock Ridge and San Pablo Bay. This space separates Novato from San Rafael.
- *Pinheiro Ridge* functions as a ridge and upland greenbelt/community separator between the Atherton community and the lands including and surrounding Gnoss Field.

- *Mount Burdell* is the major landmark of North Marin. Existing protected lands on Mt. Burdell are the Open Space District's 1600-acre Mt. Burdell Open Space Preserve and Olompali State Historic Park.

OS-2.3 **Balance Shoreline Protection and Access to Water Edge Lowlands.** Consider tideland ecosystem health, habitat protection, and passive and active recreation in pursuing acquisition of additional marsh and other bay margin open space areas:

Targeted water edge lowlands in the Baylands and City-Centered Corridors include:

- *Richardson Bay.* These sections of shoreline should be acquired or otherwise protected: Manzanita Green, connecting Marin City with the bay, and Strawberry Cove. Bothin Marsh (with the exception of the Martin Brothers' Triangle), most of the Tiburon shoreline, and the head of Richardson Bay have been acquired.
- *Corte Madera Bayfront.* Existing marshes should be preserved, and portions of the San Quentin area should be considered for public access to the bay. The Corte Madera Ecological Reserve has been established in this area and provides habitat for the endangered Clapper Rail.
- *San Rafael Bay.* Land along the bayshore, which includes some of the highest density residential area in the county, should be permanently secured for open space. San Rafael has been actively acquiring a band of open space along the Bay.
- *San Pedro Peninsula shoreline* should be protected from McNear's Beach north to Gallinas Creek. Major portions have been acquired as part of China Camp State Park.
- *San Pablo Bayfront, Gallinas Creek to Novato Creek*, should be kept open to preserve the tidelands. Gallinas Creek provides habitat for threatened and endangered species, as well as migratory species. The creekside should be kept free of developments that would contribute to siltation and loss of navigational use in the stream channels. This area contains McInnis County Park and undeveloped, diked baylands.
- *Novato Creek to Black Point* is an important tidal marsh that contains habitat for endangered and migratory species~~,~~ and a valuable flood ponding area. Large areas have been acquired.
- *Petaluma River.* Marshes, riverbank areas, and other lowlands should be preserved in cooperation with Sonoma County. The State and Open Space District have acquired significant wetland areas between Rush Creek and Basalt Creek.

OS-2.4 **Support Open Space Efforts Along Streams.** Support efforts to restore, enhance, and maintain natural vegetation and other habitat values along streams in the Baylands and City-Centered Corridors~~, and~~. ~~m~~Maintain strict controls and high environmental standards in these zones~~:~~.

Targeted streams and creeks in the Baylands and City-Centered Corridors include:

- *Mill Valley Area Creeks.* Local jurisdictions should provide adjacent parks and regulate development to protect streamside vegetation along Arroyo Corte Madera del Presidio, Old Mill, Cascade, Homestead, and Coyote Creeks.
- *Corte Madera Creek.* Although much of this creek has already been lined with concrete, a landscaped bicycle path now extends from the Larkspur Ferry Terminal through the lower Ross Valley. The California Clapper Rail inhabits marshes along this creek.
- *Miller Creek* from Highway 101 to Big Rock should provide a continuous natural strip through Marinwood and Lucas Valley to the Bay~~,~~. The Marinwood Community Services District, the Open Space District, and the City of San Rafael have acquired a substantial portion of the land targeted for acquisition along Miller Creek.
- *Novato and Warner Creeks*, among the few remaining natural streams in east Marin, should be protected as far to the west as possible.

OS-2.5 **Support Open Space Efforts in the Inland Corridor.** Targeted lands in the Inland Rural Corridor include:

- *Marin Municipal Water District Lands.* This area includes lands around Kent Lake and the Carson Creek drainage.
- An area north of Samuel P. Taylor State Park including Devil's Gulch has been acquired by the federal government as part of a continuous park strip from the Golden Gate.
- *The Nicasio Reservoir* area.
- *The* ~~vicinity of~~ *Stafford Lake vicinity.*~~, which~~ ~~i~~Includes the lake owned by the North Marin Water District and the adjacent Stafford Lake County Park.
- *Ridgelands defining the San Geronimo Valley.* Includes Pine Mountain Ridge westward from White Hill, and the lands between Loma Alta and S~~.~~amuel P. Taylor State Park. The Open Space District has acquired substantial acreage here in the past decade.

OS-2.6 **Support Open Space Efforts in the Coastal Corridor.** Work with State and Federal agencies to preserve targeted sensitive coastal lands, including:

- *Golden Gate National Recreation Area.* The National Park Service oversees this continuous corridor of public land along Marin's southern coast and adjacent to Point Reyes National Seashore. It should be retained in its natural state to the greatest extent possible.
- *Point Reyes National Seashore and Tomales Bay State Park.* The National Seashore should be retained in its natural condition with ecologically fragile areas remaining relatively inaccessible.
- *Bolinas Lagoon.* The Marin County Open Space District, which oversees this former County Park, has teamed with the U.S. Army Corps of Engineers to develop an adaptive management program to protect the lagoon's fragile subtidal and intertidal habitat resources.
- *Mount Tamalpais State Park and Stinson Beach Federal Park.*

Why is this important?

A planned, coordinated approach to acquiring open space will ensure that the most important areas are preserved.

Environment: Connecting isolated parcels of open space creates wildlife corridors for plants and animals. This supports healthier ecosystems because organisms can have access to a bigger genetic pool for cross-breeding. Connected open space parcels also give animals the ability to access a broader land mass for food, water and nesting.

Economy: Open space preservation is often the most affordable way to safeguard drinking water, clean the air, and achieve other environmental goals. Public open space also improves property values and contributes to a community's sense of identity and pride. For example, a three-mile greenbelt around Lake Merritt in Oakland, near the city center, was found to add $41 million to surrounding property values. (Source: Steve Lerner and William Poole., *The Economic Benefits of Parks and Open Space*. The Trust for Public Land. 1999.)

Equity: Maintaining and expanding open space countywide preserves Marin's unique environmental heritage and supports healthy communities. Marin's residents recognize the benefits of public open space as demonstrated in a recent survey that indicated strong support for more open space acquisition in Marin. (Source: Moore Iacofano Goltsman, Inc., *Policy Review Initiative Survey Report*. Marin County Open Space District. January 2004.)

How Will Results Be Achieved?

Implementing Programs

OS-2.a *Encourage Land Management Agencies, Cities, and Towns to Assess Their Land Protection Goals in the Baylands, City-Centered, Inland Rural, and Coastal Corridors.* Assess whether additional land acquisition is necessary to fulfill an agency's mission. Determine short, medium, and long term priorities and the most suitable method of protection.

OS-2.b *Coordinate Open Space Planning.* Identify shared interests and priorities among Marin's land management agencies, cities, towns, and non-governmental organizations. Explore opportunities for collaborative open space acquisition or protection. Determine the purpose for linking public open space – wildlife corridors, trails, etc. – and the most suitable tools – purchase, trail easement, conservation easement, etc. – to accomplish linkages.

OS-2.c *Acquire and Protect Lands Pursuant to the Open Space District's Mission Statement.* Acquire and protect lands according to the Open Space District's mission statement. Lands should principally, but not solely, be within in the City-Centered Corridor. Within this corridor, and consistent with its mission, strive to acquire or otherwise protect:

- *Ridgelands* that contribute to the completion of greenbelts and community separators surrounding the cities and towns in eastern Marin.

- *Baylands,* including tidal areas, water edges, mudflats, salt marshes and submerged lands.

- *Environmentally Sensitive Lands*, including wildlife corridors, endangered species, habitats, riparian corridors, coastal estuaries, and seasonal wetlands.

Although most of the District's acreage is in the City-Centered Corridor, it owns and manages substantial acreage in the Inland Rural Corridor, in the vicinity of the San Geronimo Valley. In the Coastal Corridor, the District owns and manages Bolinas Lagoon.

The Open Space District also acquires land and easements that contribute to the completion of the countywide public trail system. (See Trails Section.) The Open Space District criteria to determine whether to acquire land include, but are not limited to, the following:

- Does the property adjoin existing District land? If not, is its acreage sufficiently large to avoid high per acre management costs typically associated with small parcels?
- Does the property connect District land with other public open space?
- Is there community support for the acquisition?
- What are the geologic risks?
- What is the scope of fuel management required to reduce the risk of wildfire?
- Are there encroachments? Can clear title be obtained?

OS-2.d *Establish Partnerships to Fund Open Space Protection.* Establish partnerships among land management agencies, cities, towns, and non-governmental organizations to maximize open space funding opportunities.

OS-2.e *Fund Open Space.* Utilize multiple open space funding sources including:

- grants from public agencies and private organizations;
- agency or organization revenues; ~~and~~
- bond financing through the creation of assessment districts or community facilities districts; and
- endowments, bequests and other philanthropy.

OS-2.f *Employ Tools to Preserve Open Space.* Utilize a variety of methods to maximize the success of open space protection efforts, including:

- fee acquisition, such as fair market purchase, development dedication, bargain or tax sale, donation, life estate, eminent domain, and lease-back arrangements;

- easement acquisition, including conservation, open space, agricultural conservation, and scenic easements;
- ~~C~~county land use regulations;
- ~~a~~ Transfer of Development Rights (TDR) program; and
- Williamson Act and Farmland Security Zone contracts.

OS-2.g *Apply County Zoning.* Enforce County zoning provisions, and amend the Development Code as necessary to provide effective protection to open space areas.

OS-2.h *Require Clustered Development.* In cases where a public agency is unable to purchase or otherwise permanently secure an area designated as open space, limit allowed development to low density residential, agricultural or low intensity recreational uses with a provision requiring clustering to provide effective protection to open space and environmental resources.

Figure 2–18 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
OS-1 Sustainably Managed Open Space	•	•		•	•							•
OS-2 Preservation ~~and Acquisition~~ of Open Space for the Benefit of the Environment and Marin Community Members	•	•		•	•							•
~~OS-3 An Interconnected, Countywide System of Protected Public and Private Lands~~	•	•		•	•							•

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicator	Benchmark	Target
Percent of land preserved.	48% (159,744 acres) in protected open space, watershed or park land in 2000.	Increase land preserved by 5% (16,640 additional acres) by 2010 and 7% (23,296 additional acres) by 2015.

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–19
Open Space Program Implementation

Programs	Responsibility	Potential Funding	Priority	Time Frame
OS-1.a – Coordinate Countywide Open Space Management.	MCOSD, GGNRA, CDA, PRNS, MMWD, State Parks, NMWD, Cities, Towns	Existing budget and may require additional grants or revenues*	High	Ongoing
OS-1.b – Ensure Compatible Policies.	MCOSD, CDA	Existing budget	Medium	Long term
OS-1.c –Utilize Integrated Pest Management.	MCOSD	Existing budget	High	Ongoing
OS-1.d – Inform and Enforce.	MCOSD	Existing budget	Medium	Ongoing
OS-1.e – Inventory Resources.	MCOSD	Existing budget and may require additional grants or revenues*	Medium	Ongoing

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Potential Funding	Priority	Time Frame
OS-1.f – Encourage Environmental Education.	MCOSD	Existing budget and may require additional grants or revenues*	Medium	Ongoing
OS-1.g – Encourage Resource Monitoring.	MCOSD	Existing budget	High	Ongoing
OS-1.h – Accommodate Research.	MCOSD	Existing budget	Low	Ongoing
OS-1.i – Identify and Apply Best Management Practices.	MCOSD	Existing budget and may require additional grants or revenues*	High	Ongoing
OS-1.j – Explore Tools to Fund Open Space Stewardship.	MCOSD	Existing budget, grants, private donations, ballot measures*	High	Ongoing
OS-1.k – Establish Partnerships	MCOSD, GGNRA, CDA, PRNS, MMWD, State Parks, NMWD, Cities, Towns	Existing budget and may require additional grants or revenues*	High	Ongoing
OS-1.l – Engage the Public in the Stewardship of Open Space.	MCOSD	Existing budget	Medium	Ongoing
OS-1.m – Monitor Federal and State Legislation.	MCOSD	Existing budget	Medium	Ongoing
OS-1.n – Promote New State Legislation.	MCOSD	Existing budget	Medium	Ongoing
OS-2.a – Encourage Land Management Agencies, Cities, and Towns to Assess Their Land Protection Goals in the Baylands *City-Centered*, Inland Rural, and Coastal Recreation Corridors.	MCOSD, Cities, Towns, Land Management Agencies	Existing budget and may require additional grants or revenues	Medium	Ongoing
OS-2.b – Coordinate Open Space Planning.	MCOSD	Existing budget	Medium	Ongoing
OS-2.c – Acquire and Protect Lands Pursuant to the Open Space District's Mission Statement.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Grants, private donations, ballot measures*	High	Ongoing

Programs	Responsibility	Potential Funding	Priority	Time Frame
OS-2.d –Establish Partnerships to Fund Open Space.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
OS-2.e – Fund Open Space Acquisition.	MCOSD	Existing budget	High	Short term & Ongoing
OS-2.f – Employ Tools to Preserve Open Space.	MCOSD, CDA, NGOS	Existing budget	High	Ongoing
OS-2.g – Apply County Zoning.	CDA	Existing budget	High	Ongoing
OS-2.h – Require Clustered Development.	CDA	Existing budget	High	Ongoing

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

Marin County Dept of Parks~~,~~ and Open Space~~, and Cultural Resources~~

2.9 Trails

Background

Trails enhance the quality of life in Marin and the health of the public by offering opportunities to enjoy the wealth of parks and open space in Marin County. Trails originated in Marin as links between Native American communities. The transportation needs of missions, logging enterprises, and ranches resulted in an expansion of this original trail system in the nineteenth and early twentieth centuries. Some of these old trails and roads have become part of Marin's road system while others have disappeared through disuse. Still others survive to this day on public parks and open space lands, ranches, and elsewhere. The current

public trail network was created over decades, segment by segment, mile by mile, as public agencies acquired land and made it accessible to the public. Some of these agencies have acquired public trail easements through private lands, expanding the public trail network beyond the boundaries of public lands and creating trail connections between public lands ~~and between public lands~~ and Marin's communities (see Figure 2–20). Expanding the public trail network still further, some of Marin's public trails are – or could be - part of regional or statewide trail systems such as the State Coastal Trail, the Bay Area Ridge Trail, and the San Francisco Bay Trail (see Map 2–18,Coastal, Ridge and Bay Trails, and Maps 2-19a through j, Marin Countywide Trails Plan).

Figure 2–20
Miles of Trails in Marin County by Managing Agency

Agency	Total Miles
Marin County Open Space District	190
Marin Municipal Water District~~1~~	149 (91 miles are unpaved fire ~~P~~protection roads)
Golden Gate National Recreation Area and Point Reyes National Seashore	212
California State Parks	88
North Marin Water District	2
Total	641

Source: 2004 Marin County Community Development Agency

The Countywide Plan first included a Trails Element in 1984, following a study of existing and proposed trails in the county. All 11 Marin cities and towns contributed funds to the study, and most adopted their respective portions of the final plan.

This section of the Countywide Plan contains policies and programs intended to ensure that trails are acquired, built, and managed effectively and provide appropriate access for all segments of the population. In this section of the plan, "trails" are defined as unpaved public access routes ranging from narrow paths to fire protection roads. These trails are not intended for public motorized vehicle use. The Transportation Section of the Built Environment Element discusses paved bike paths. A *Trails Technical Background Report (see Appendix)* discusses trail acquisition, development, maintenance, and liability issues and describes types of trails and categories of trail users in detail.

The maps contained in this section are for use in planning and preserving Marin's network of public trails~~.~~ – not as trail guides. Trails of local significance that do not appear in the following maps may appear in Community Plans.

Agencies owning and managing public trails establish their own trail policies consistent with their respective missions. These agencies include the Golden Gate National Recreation Area, Point Reyes National Seashore, California State Parks, the Marin Municipal Water District, Marin County Open Space District, and some of Marin's cities and towns. The goals, policies and programs in the Trails

Section are intended to complement each agency's trail policies. Policies regarding community trails are found in the respective community plan.

Key Trends and Issues

Can the trail system continue to grow?

Yes. There are many proposed trails over which the public has yet to gain access. Most of these trails run through private land. For the public trail system to expand, public agencies must acquire the land or a public trail easement for members of the public to access any trail lawfully. While many proposed trails follow existing paths or fire protection roads, agencies will have to build others. Following acquisition and/or construction, agencies must have the resources to maintain the trails and manage public use.

Expansion of the public trail system is constrained by the funding necessary to acquire and/or construct trails, and the willingness of private landowners to sell their land or a public trail easement. Occasionally, agencies acquire trail easements when a landowner seeks approval to develop his or her land. In other circumstances, an agency may acquire a lease or license to permit public trail use through private land if a landowner is unwilling to sell a permanent easement. Due to the many challenges associated with acquiring public trail rights, the creation of a public trail system requires many years of effort.

Are conflicts with neighboring property owners increasing?

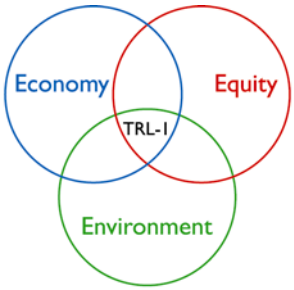
Parking has become a source of concern in a few neighborhoods, especially in situations where a subdivision predates acquisition of nearby public parkland or open space. Some neighborhoods, particularly older ones located on steep or hilly terrain, have narrow and/or winding roads with limited on-street parking. When trailheads are located in these neighborhoods, residents must share their limited on-street parking with open space visitors. Poorly or illegally parked vehicles may make passage by emergency vehicles difficult.

Trespass is also a concern for some landowners. Trespass occasionally occurs when a trail user on public land or on a public right of way is separated from his or her destination by private land. The general public may lawfully access a trail on private land only when a public agency has acquired an easement, lease, or license allowing public use of the trail. Public agencies have yet to acquire many miles of proposed trails through private lands. Some members of the public may take for granted their long time access to private trails when a landowner has not attempted to prevent access. When ownership of such land changes, however, conflicts may occur because patterns of long-term trail use are sometimes difficult to change. Compromised privacy, interference with agricultural operations, and liability are some of the major landowner concerns related to trespass.

Public agencies employ a variety of methods, including education, signage, enforcement, and coordination with local law enforcement agencies, to address trail-related parking and trespass problems.

Goals, Policies, and Programs

Goal TRL-I



Trail Network Preservation and Expansion. Preserve existing trail routes designated for public use on the Marin Countywide Trails Plan maps, and expand the public trail network for all user groups, where appropriate.

Policies

TRL-1.1 Protect the Existing Countywide Trail System. Maintain the existing countywide trail system and protect the public's right to access it.

TRL-1.2 Expand the Countywide Trail System. Acquire additional trails to complete the proposed countywide trail system, providing access to or between public lands and enhancing public trail use opportunities for all user groups, as appropriate.

TRL-1.3 Facilitate Public Dedication of Trails. Seek the dedication of trail easements and/or the improvement of trails in conjunction with developments proposed on lands traversed by trails shown on the Marin Countywide Trails Plan maps.

TRL-1.4 Coordinate Trail Planning Promote collaboration among public land management agencies, non-governmental organizations, and private landowners to implement the Marin Countywide Trails Plan and regional trail systems.

TRL-1.5 Preserve Paper Streets. Preserve undedicated or unaccepted (paper) streets where a paper street may provide access to trails or open space areas.

Why is this important?

Trails allow Marin residents and people from all over the world to explore Open Space District lands and state and national parks.

Environment: Trails are the means by which Marin's residents and visitors access and enjoy substantial park and open space lands. There is a high degree of access to Marin's 639 miles of public trails, especially in eastern Marin where the Open Space District alone manages 175 trailheads. Consequently, many open space visitors enjoy access to open space without the need for a car. The Golden Gate National Recreation Area, Point Reyes National Seashore, Mt. Tamalpais State Park, Samuel P. Taylor State Park, and the Open Space District's Bothin Marsh, Loma Alta, and White Hill preserves are especially well served by public transit. This decreases tailpipe emissions that could impact the local ecosystem.

Economy: Trails are enjoyed on foot, ~~on a~~ bicycle and ~~on a~~ horse. These activities make substantial contributions to Marin's economy. For example, in the fall of 2000, there were almost 3,400 horses in Marin County and an estimated 4,400 equestrians. Equestrian activity had a direct economic impact in Marin amounting to $97.1 million in 2000. When indirect ~~and induced~~ effects ~~are~~ were taken into account, the contribution of equestrian activity to the total Marin County economy was $155 million.

(Source: Benito, Carlos A. and Sundin, Kathleen R. *Economic and Social Value of Marin County Equestrian Activities*, Sonoma State University Economics Department, July 2001.)

Equity: Access to open space enhances the public's appreciation of and respect for these lands and their resources, especially when visitors are provided with informative interpretive materials and programs. The Open Space District's interpretive naturalist program offers nearly 100 interpretive outings annually. The outings are free and occur on other federal, state, and District and other local park and open space lands in Marin.

How Will Results Be Achieved?

Implementing Programs

TRL-1.a *Maintain Marin County Trails Maps.* Periodically update maps that show existing and proposed public trails throughout the county. The maps should:

- use distinctive symbols to indicate whether ~~the status of~~ a trail is existing or proposed~~, or currently open to the public~~.
- be developed with state of the art technology.
- Include trails owned or managed by local, State and Federal agencies.

TRL-1.b *Designate Trail Use Consistent with Agency Missions.* Develop criteria to determine public use of trails consistent with each agency's mission and policies.

TRL-1.c *Obtain Lawful Public Access Across Private Lands.* Strive to secure public access rights ~~over~~ to proposed public trails crossing private land..

TRL-1.d *Establish Regional Trail Connections.* Strive to complete regional trail systems in Marin County, including the Bay Area Ridge Trail, the San Francisco Bay Trail and the California State Coastal Trail.

TRL-1.e *Explore Funding for Trail Acquisition . .* Consider developing or supporting legislation to assist trail acquisition. Consider public and private funding sources, including private endowments and bequests.

TRL-1.f *Prioritize Trails for Acquisition.* Agencies should strive to identify their respective trail acquisition priorities and work collaboratively to acquire trails of mutual interest.

TRL-1.g *Evaluate Proposed Development for Trail Impacts.* Review development proposals for consistency with the Marin Countywide Trails Plan and/or local community plan(s). Encourage project sponsors to grant trail easements and/or improve trails on lands traversed by proposed trail connections shown on the adopted Marin Countywide Trails Plan maps. Consider requiring dedication as conditions of development approval~~, as appropriate~~.

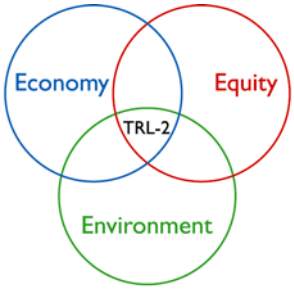
TRL-1.h *Encourage Voluntary Dedication.* Encourage project sponsors to grant trail easements and/or the improvement of trails in conjunction with development proposed on lands traversed by trail connections shown on the adopted Marin Countywide Trails Plan maps.

TRL-1.i *Avoid Motorized Vehicle Use in Trail Rights-of-Way.* Ensure that existing trails do not become access roads for new development. When such vehicle use is unavoidable, require that new public trails rights-of-way are provided separate from developed roads where possible.

TRL-1. j *Encourage Public-Private Trail Partnerships.* Encourage partnerships and cooperation between public land management agencies and trail interest groups to increase and improve trail use opportunities and minimize conflicts.

TRL-1. k *Monitor New Trail Construction and Right-of-Way Acquisition.* Report annually on progress of new trail construction and acquisition of public trail rights.

Goal TRL-2



Appropriate Trail Design, Location, Management, and Maintenance. Design, build, manage, and maintain trails, as appropriate, in a manner compatible with natural resource protection. Ensure safe trails. Ensure that trails are managed and maintained in a sustainable manner.

Policies

TRL-2.1 **Preserve the Environment.** In locating and designing trails, ~~take into account the~~ protec~~tion of~~ sensitive habitat and natural resources ~~and~~ by avoiding those areas.

TRL-2.2 **Respect the Rights of Private Landowners.** Design and manage trails to avoid trespass and trail construction impacts on adjacent private land.

TRL-2.3 **Ensure User Safety.** Plan and maintain trails to protect the safety of trail users.

TRL-2.4 **Consider Historic Use.** In trail design and designation, consider historic and cultural uses that have occurred prior to public acquisition.

TRL-2.5 **Provide Access for Persons with Disabilities.** Design and develop trails and trail programs to enhance accessibility by persons with disabilities.

TRL-2.6 **Provide Multiple Access Points.** Design trails with multiple access points to maximize accessibility and minimize concentrating access.

TRL-2.7 **Ensure Sustainable Maintenance.** Continue to assure that trails are responsibly maintained.

TRL-2.8 **Provide Trail Information.** Strive to provide information to trail users that facilitates visitor orientation, nature interpretation, code compliance and trail etiquette.

Why is this important?

Trails need to be well sited, built, and maintained so that the public can use them responsibly and safely.

Environment: A well maintained trail system and well managed public use of trails results in a low to insignificant impact on open space resources. For example, by implementing seasonal trail closures and rebuilding and realigning erosive trails, the Marin Municipal Water District and the Marin County Open Space District have reduced sediment loads and improved habitat in local streams inhabited by the endangered Coho salmon and Steelhead.

Economy: Marin County's well-developed trail network stimulates tourism by attracting hikers, bicyclists and equestrians from throughout the Bay Area and the state. The Trust for Public Land has documented the multiple economic benefits of trail recreation in its publication The Economic Benefits of Parks and Open Space.

Equity: Some public agencies such as the Open Space District annually contract with the Marin Conservation Corps (MCC) for trail and other open space maintenance work. Among other benefits, the MCC provides job skill training for its employees, many of whom are from disadvantaged communities.

How Will Results Be Achieved?

Implementing Programs

TRL-2.a *Locate Trails to Protect Habitat.* Align or relocate trails to avoid sensitive habitats such as wetlands and areas where endangered species are present. Avoid aligning trails along the boundaries of sensitive habitats.

TRL-2.b *Design, Build, and Manage Trails in a Sustainable Manner.* Incorporate design measures that protect vegetation, protect habitats, and minimize erosion. Suggested measures include:

- Limit grading and vegetation removal;
- Discourage people and pets from entering sensitive habitats or disturbing wildlife through education, signage, enforcement and, as a last resort, fencing.
- Provide vegetative buffers between trails and wetlands or other sensitive habitats;
- Consider using existing roads or trails rather than building new ones when possible.
- Close trails seasonally when necessary to minimize erosion or resource impacts.

TRL-2.c *Eliminate Trail Redundancy.* Identify, abandon, and restore redundant or otherwise unnecessary trails or trail segments.

TRL-2.d *Protect Private Property.* Design and locate trails to avoid trespassing and adverse impacts on adjacent private lands and sensitive land uses~~, such as agricultural operations~~.

TRL-2.e *Design Safe Trails.* Design trails so that their surfaces, grades, cross gradients, sight distances, curve radii, vegetation clearance and other specifications—consistent with anticipated uses.

TRL-2.f *Acknowledge Historic Trail Users.* Consider trail use that occurred prior to public acquisition when determining public use.

TRL-2.g *Promote Harmony Among Trail Users.* Provide educational information and consider special programs and events to promote trail etiquette and cooperation among trail user groups.

TRL-2.h *Identify Opportunities for Disabled Access.* Review existing disabled access opportunities. Identify and pursue new opportunities.

TRL-2.i *Distribute Information about Trails and Trail Programs for People with Disabilities.* Distribute information concerning the availability of accessible trails and trail programs for disabled persons.

TRL-2.j *Address Trailhead Parking Issues.* Work with neighborhood groups, cities, and towns to encourage carpooling, explore parking alternatives, and enforce parking restrictions at trailheads.

TRL-2.k *Ensure Trail Maintenance.* Encourage public agencies to develop trail maintenance plans and enter into cooperative trail maintenance agreements. Encourage volunteer trail stewardship programs.

TRL-2.l *Ensure Trail Maintenance Funding.* Strive to identify and secure consistent sources of funding for trail maintenance.

TRL-2.m *Maintain Trails in a Sustainable Manner.* Consider and ~~enact~~ implement as appropriate:

- Using natural materials~~;~~
- Using longer lasting materials
- Using recycled materials
- Reducing or avoiding use of chemicals~~;~~
- Scheduling maintenance activities to avoid disturbing the nesting and breeding seasons of sensitive species
- Exploring alternatives to fossil fuels for maintenance vehicles and equipment
- Rebuilding and/or realigning trails with chronic maintenance problems~~.~~
- Seasonal trail closures~~.~~

TRL-2.n *Promote Interagency Cooperation.* Encourage information sharing and cooperation among public agencies concerning sustainable trail maintenance.

TRL-2.o *Distribute Trail Maps and Information.* Provide clear signs and maps. Provide code, natural resource, and directional information about the trail network in multiple formats and languages.

TRL-2.p *Improve Code Compliance.* Encourage trail managers to enforce codes, secure consistent funding for code enforcement, monitor the type and frequency of violations, and offer educational materials and programs to reduce code violations. Expand or create volunteer opportunities to monitor trail use..

Figure 2–21 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
TRL-1 Trail Network Preservation and Expansion.	•				•							•
TRL-2 Appropriate Trail Design, Location and Maintenance.					•							•

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets8 will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicator	Benchmark	Target
Miles of trails in Marin County	639 miles in 2004	Maintain or increase the number of miles of trails

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–22
Trails Program Implementation

Programs	Responsibility	Funding	Priority	Time Frame
TRL-1.a -- Maintain Marin County Trail Maps.	CDA, MCOSD	Existing budget and may require additional grants or revenues*	Medium	Ongoing
TRL-1.b -- Designate Trail Use Consistent with Agency Missions and Policies.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Short term
TRL-1.c -- Obtain Lawful Public Access Across Private Lands.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	Medium	Ongoing
TRL-1.d -- Establish Regional Trail Connections.	MCOSD	Existing budget	Medium	Ongoing
TRL-1.e -- Explore Funding for Trail Acquisition.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Grants, private donations, existing budget	High	Short term

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Funding	Priority	Time Frame
TRL-1.f -- Prioritize Trails for Acquisition.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	Medium	Med. term
TRL-1.g – Evaluate Proposed Development for Trail Impacts.	CDA, MCOSD	Existing budget	High	Ongoing
TRL-1.h -- Encourage Voluntary Dedication.	MCOSD, NGO's	Existing budget	High	Ongoing
TRL-1.i -- Avoid Motorized Vehicle Use in Trail Rights-of-Way.	CDA, MCOSD	Existing budget	Medium	Ongoing
TRL-1.j -- Encourage Public-Private Trail Partnerships.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-1.k -- Monitor New Trail Construction and Right-of-Way Acquisition.	MCOSD	Existing budget	High	Short term
TRL-2.a – Locate Trails to Protect Habitat.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.b -- Design ,Build and Manage Trails in a Sustainable Manner.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.c – Eliminate Trail Redundancy.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	Medium	Ongoing
TRL-2.d -- Protect Private Property.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.e – Design Safe Trails.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.f – Acknowledge Historic Trail Users.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	Medium	Ongoing

Programs	Responsibility	Funding	Priority	Time Frame
TRL- 2.g -- Promote Harmony Among Trail Users.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.h -- Identify Opportunities for Disabled Access.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.i -- Distribute Information about Trails and Trail Programs for People with Disabilities.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.j – Address Trailhead Parking Issues.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.k – Ensure Trail Maintenance.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget, Endowments	High	Ongoing
TRL-2.l – Ensure Trail Maintenance Funding.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget, Find new sources	High	Ongoing
TRL-2.m -- Maintain Trails in a Sustainable Manner.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.n -- Promote Interagency Cooperation.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget	High	Ongoing
TRL-2.o – Distribute Trail Maps and Information.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget and may require additional grants or revenues*	High	Ongoing
TRL-2.p – Improve Code Compliance.	MCOSD, GGNRA, PRNS, MMWD, NMWD, State Parks, Cities, Towns, NGOS	Existing budget and may require additional grants or revenues*	High	Med. term

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.

UC Cooperative Extension

2.10 Agriculture and Food

Background

Marin's farms and ranches have been a part of its diverse landscape since European settlers arrived here in the mid-1800s. Since that time, many generations of agricultural families have managed natural processes to provide food, forage, fiber, and other products vital to human survival. Marin's farmers and ranchers have worked with nature to produce a varied array of food and fiber products over the past half-century. Livestock and dairy products have been the foundation of the agricultural economy here but diversified farms also continue to produce different kinds of vegetable, fruit, and forage crops. Dairies continue

to generate the majority of agricultural revenue (see Figure 2–23). Dairies and livestock ranches cover most of the county's agricultural land, while smaller areas of row crops occupy better soils, often in valley bottoms. Local animal products include milk, beef, sheep, poultry, and eggs, with oysters, mussels, and clams being produced by the aquaculture industry. Local farms also produce fruits, vegetables, wine grapes, flowers, nursery crops, wool, hay, honey, and herbs. Specialty products such as organic vegetables, grass-fed meats, olive oil, and farmstead cheese now supplement traditional farm income.

Agricultural ecosystems, or "agroecosystems", integrate elements of natural systems and managed agricultural practices into working landscapes which balance environmental soundness with social equity and economic viability. Inherent in this definition is the idea that sustainability must be extended not only globally but indefinitely in time, and to all living organisms including humans. Agroecosystems are controlled by management of ecological processes. Their position in the continuum between natural and cultivated ecosystems depends on the kind of crops produced and management systems employed by individual farmers and ranchers.

"The question we must deal with is not whether the domestic and the wild are separate; it is how, in the human economy, their indissoluble and necessary connection can be properly maintained."

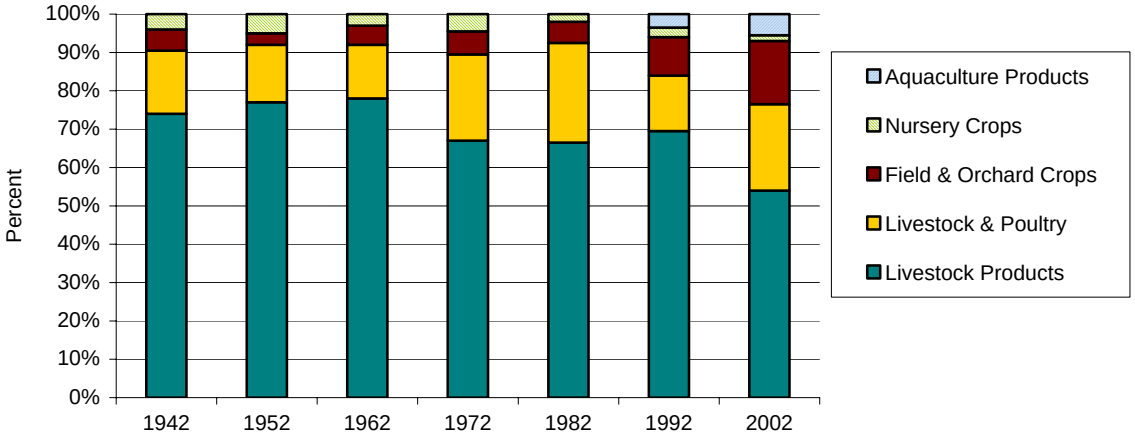
-- Wendell Berry

Agroecosystems can be intensively managed, as in the case of some row crop farms, or can simply involve the harvest of naturally produced biomass, as with low input range livestock operations. Agroecology often incorporates ideas about a more environmentally and socially sensitive approach to agriculture, one that focuses not only on production, but also on the ecological sustainability of the productive system. This definition ~~implies~~ incorporates a number of ~~features about~~ societ~~y~~al and production issues that go well beyond the typical historic limits of ~~the~~ agricultural ~~field~~.

In other cases, agricultural practices can be used to enhance native species diversity by emulating or replacing essential disturbance regimes that have been lost through human suppression of natural processes.

Marin is a leader in organic agriculture, and local producers and support agencies are mounting a concerted effort to certify organic production. The Marin County Agricultural Commissioner's office established the first local government organic certification agency in the U.S.A. Since 2000, Marin Organic Certified Agriculture (MOCA) has certified 30 local producers and processors to meet USDA, National Organic Program standards. This program represents an efficient and effective public agency-agricultural cooperative collaboration . The Marin County Agricultural Commissioner's office has also put into place the state's first certification for grass-fed livestock.

Figure 2–23
Marin County Agricultural Value by Commodity Category, 1942–2002*



Aquaculture Products have included oysters, mussels, and clams that are farmed (not wild harvested). Nursery Crops have included container or bare root plants, and cut flowers. Field and Orchard Crops include pasture, fruits, nuts, vegetables hay, silage, and field crops. Livestock and Poultry includes eggs, cattle, lambs, and other livestock. Livestock Products include milk and wool.
* In 2003, Aquaculture Products were 5%, Nursery Crops 1%, Field and Orchard Crops 16%, Livestock and Poultry 26%, and Livestock Products 53%.

Source: 1942-2003 Marin County Department of Agriculture, Weights and Measures

Figure 2–24
Status of Lands in Agricultural Use in Marin County

Description	Approximate Acres	Percent
Private agricultural lands:		
Private agriculturally zoned land in Land Conservation Contract (10-year)[1]	82,157	48.6%
Private agriculturally zoned land in Farmland Security Zone Contract (20-year)[1]	16,417	9.7%
Private agriculturally zoned land not under land conservation contract[1]	38,426	22.8%
Public agricultural lands:		
Golden Gate National Recreation Area and Point Reyes National Seashore[2]	32,000	18.9%
Totals	169,000	100.0%

[1] May 2003 Marin County Assessor's Office

[2] 2003 National Park Service

The Marin Agricultural Land Trust was the first private non-profit in the nation created specifically to protect agricultural land. Since 1988 MALT has acquired conservation easements on 49 ranches covering about 33,000 acres (roughly one-fourth of the private agricultural land in Marin; see Map 2-20). Many of these were purchased with $15 million originally allocated by State Proposition 70, which was fully expended by 2000. MALT easements are now purchased with a combination of private contributions, grants, and ten percent of County Open Space District uncommitted acquisition funds (about $35,000 annually).

The county agricultural land base consists of about 137,000 acres of private land and 32,000 acres of federal land in the Point Reyes National Seashore and Golden Gate National Recreation Area (see Figure 2–24). Federal legislation provides authority to lease or permit lands for agricultural use in these areas. The Agriculture (A), Agricultural Residential Planned (ARP), and Agricultural Production Zone (APZ) districts generally require at least 60-acre parcels in specific locations in the Inland Rural and Coastal Corridors, and coastal areas, ~~respectively~~. The Limited Agricultural (A-2) and Residential Agricultural (R-A) districts allow residential uses and limited agriculture. Specified agricultural land uses are also allowed in the Residential Single Family Planned (RSP) and Residential Multiple Planned (RMP) districts. This Section of the Countywide Plan contains policies and programs that seek to protect agricultural land and operations and maintain agricultural use.

Agricultural parcels are eligible for land conservation contracts under the Williamson Act (enacted by the State 1965), provided certain acreage, zoning, and production criteria are met (see Map 2–20, Protected Agricultural Lands). Land conservation contracts restrict land to agriculture for 10 years in exchange for tax assessment based on agricultural use rather than market value. These contracts allow only one principal residence per ownership, but additional dwellings may be allowed for family members or agricultural workers, in compliance with zoning. In agricultural zoning districts, landowners can request that the County create a farmland security zone, which allows owners to gain a 35 percent reduction in assessed valuation for a minimum period of 20 years.

Forage for livestock in Marin can vary annually by more than 200 percent depending on rainfall, one of the many variables that make ranching a challenging occupation. Total annual forage production ranges from approximately 1,800 pounds per acre on infertile steep slopes on drier sites to more than 6,000 pounds per acre on moist, fertile soils. In contrast, some of the drier, interior regions of California produce less than 1,000 pounds per acre annually.

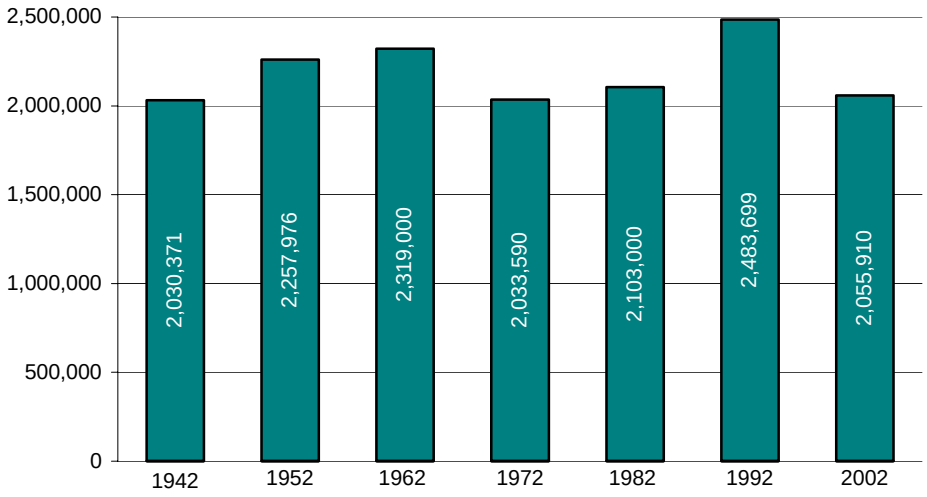
Agricultural land can also be preserved through conservation easements with land stewardship entities that compensate landowners financially for giving up non-agricultural development potential. These easements typically prohibit residential or non-agricultural commercial development and uses that would hamper agricultural productivity. Conservation easements do not limit an owner's right to sell, bequeath, or otherwise transfer title, and they can help modernize operations, pay taxes, and facilitate generational succession.

Key Trends and Issues

How has the County's agricultural production changed?

Milk continues to generate over half of gross agricultural revenues and beef production is increasing. Overall milk production has held constant since the early 1960s (see Figure 2–25). Although the number of Marin dairies has dropped from about 200 in the 1950s to about 30 in 2002, the remaining dairies have larger herds and higher per cow production. Specialty cheeses and organic milk, butter, and yogurt are providing new markets. Some operators have transitioned to raising replacement heifers for other dairies, while others have switched to, or lease land for, beef production. Beef ranching occupies the majority of agricultural land in the county, and grass-fed beef raised in Marin represents an emerging specialty market.

Figure 2–25
Milk Production in Hundreds of Pounds, 1942 through 2002*

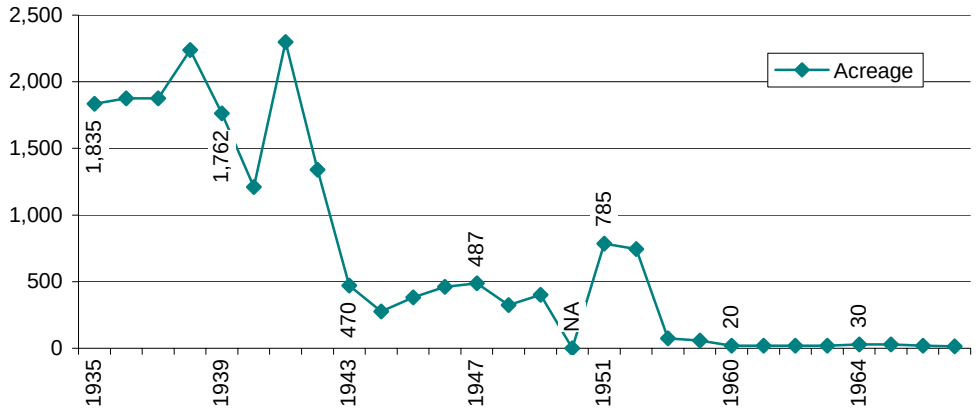


* Milk production in 2003 was 2,110,169.

Source: 1942-2003 Marin County Department of Agriculture, Weights and Measures

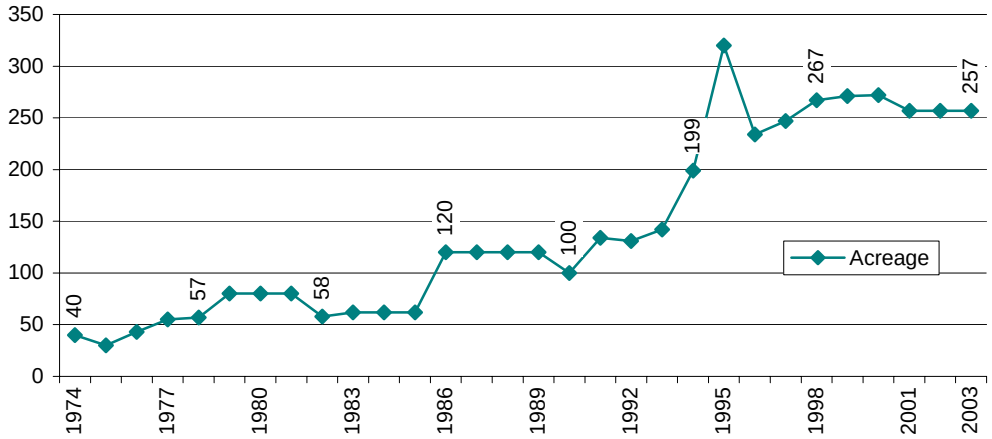
Row crops are making a comeback. Land for fruits, nuts, and vegetables has increased in recent years after a dramatic decline in the 1950s and 1960s; row crop acreage has steadily increased since 1991 (see Figures 2–26 and 2–27). In 1935, more than 1,800 acres of vegetables and nearly 1,000 acres of fruits and nuts were raised in Marin. In the 1930s and early 1940s, peas and artichokes – most of which were dry farmed – were important crops in coastal areas, with 2,000 acres of peas alone at the peak of production.

Figure 2–26
Vegetable Acreages 1935–1967



Source: 1935-1967 Marin County Department of Agriculture, Weights and Measures

Figure 2–27
Fruit, Nut, and Vegetable Acreages 1974–2003

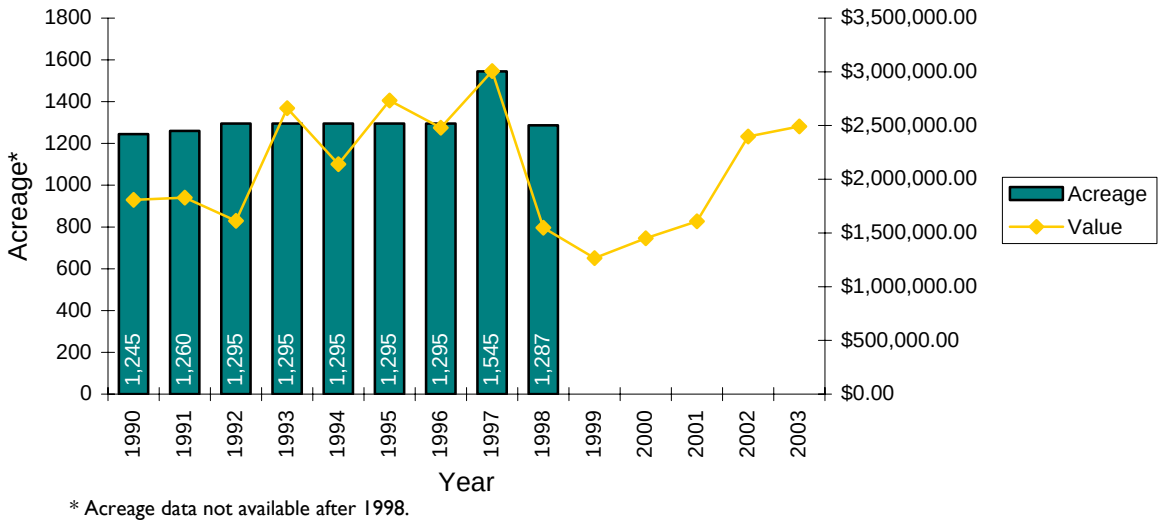


Note: There is no commercial nut acreage in Marin. Fruit, Nut, and Vegetable Acreages is a standardized category established by the California State Department of Food and Agriculture. Fruit acreage includes wine grapes.

Source: 1974-2002 Marin County Department of Agriculture, Weights and Measures

Aquaculture remains a steady agricultural component. Shellfish farming has been practiced in the county since the mid-1800s, but has only been included in annual countywide crop reports since 1990. Figure 2–28 illustrates the production and dollar value of oysters, clams, and mussels in Marin County.

Figure 2–28
Acreage and Value of Aquaculture Products, 1990–2003



* Acreage data not available after 1998.

Source: 1990-2003 Marin County Department of Agriculture, Weights and Measures

Organic agriculture is expanding. Organic operations have increased from 67 acres in 1990 to 1,560 acres in 2002, with almost 90 percent in dairying and livestock feed production. Organic crops also include vegetables, flowers, olives, dairy products, fruits, silage and pasture. More than 20 operations were certified organic in the county in 2002 (compared with 4 in 1990), producing gross revenues of $3.9 million.

Definition of Agriculture (land use): The breeding, raising, pasturing, and grazing of livestock, for the production of food and fiber; the breeding and raising of bees, fish, poultry, and other fowl; and the planting, raising, harvesting and producing of agricultural, aquacultural, horticultural and forestry crops.

Source: Marin County Development Code.

Can local agriculture remain viable?

Low profit margins make agriculture a difficult business. A 2003 University of California Cooperative Extension survey found that only 37 percent of farmers and ranchers responding considered their operations ~~to be~~ profitable. The cost of agricultural land has increased far beyond what agricultural revenues can support. This trend has been exacerbated in recent years by the purchase of agricultural land for residential estates by non-agricultural buyers. While high land prices, long work hours, hard work, and more-lucrative off-farm employment discourage younger generations from

continuing family agricultural operations, the study indicated that most agricultural operators desire to remain in their current business.

Residential demand is threatening agriculture. According to a 2003 study (see Appendix), agricultural activities are most likely to be economically viable in Marin when land ownership costs and taxes are kept low as a result of very limited residential development and the use of protective agricultural easements. However, residential estate development is driving land ownership costs beyond farmers' and ranchers' ability to cover taxes, insurance, and maintenance. Unless residential development is limited to sizes reasonably related to agricultural production, estate development will continue to erode the county agricultural land base.

Definition of Agricultural Worker Housing: Any attached and detached dwelling unit used to house agricultural workers and their family members, including temporary mobile homes. For the purpose of calculating density, no more than one food preparation area shall be provided for each agricultural worker housing unit.

Source: Marin County Development Code.

Product diversity and changes in regulations can help. New and different commodities can decrease vulnerability to market fluctuations and value-added products can increase on-farm profits. County permitting regulations can be simplified to focus on health, safety, and environmental protection, and to coordinate the requirements of all agencies with jurisdiction over agriculture. Simpler regulation can save time and money and encourage innovation. Zoning can be updated to better protect agriculture, and ~~TDR~~ transfer of development rights potential can be enhanced through identification of receiver sites or by providing funding to purchase development rights.

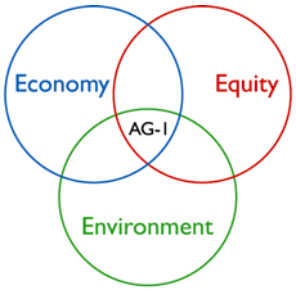
Limited water supplies constrain agricultural diversification. Historically, agricultural practices in Marin have not created high demands on water supplies; however, the lack of groundwater locally may require limited surface water impoundments to provide irrigation for even a modest diversification of farming. Because most of Marin's row crop farms are small (usually less than 10 acres) and some crops can be dry farmed, relatively small water developments can provide significant irrigation. Strict regulation by numerous agencies intended to ensure environmental protection as well as safeguard against impacts to aquatic habitats ~~by numerous agencies~~ presents a challenge to developing agricultural water sources on many sites~~ as well as a safeguard against impacts to aquatic habitats~~.

Goals, Policies and Programs

What Are the Desired Outcomes?

Goal AG-1

Preserve Agricultural Lands and Resources. Protect agricultural land by maintaining parcels large enough to sustain agricultural production, preventing conversion to non-agricultural uses, and prohibiting uses that are incompatible with long-term agricultural production. Preserve important soils, agricultural water sources, and forage to allow continued agricultural production on agricultural lands.



Policies

AG-1.1 **Limit Residential Use.** Maintain agricultural production as the principal use on agricultural lands by limiting residential development to that which is reasonably related to agriculture.

AG-1.2 **Encourage Contractual Protection.** Facilitate agricultural conservation easements, land conservation and farmland security zone contracts, and transfer of development rights when used to preserve agricultural lands and resources.

AG-1.3 **Preserve Agricultural Zoning.** Maintain very low-density agricultural zoning in the Inland Rural and Coastal Corridors to support land-extensive agricultural production and discourage conversion to non-agricultural uses.

AG-1.4 **Limit Non-Agricultural Zoning.** Apply non-agricultural zoning only in areas where conflict with agricultural uses will be minimized, and ensure that development standards preserve and enhance nearby agricultural uses.

Agricultural easements

Agricultural easements not only help preserve the character of Marin County but also its land's ability to supply food, fiber, and other environmental goods and services. Adding an additional 32,000 acres of easements would more than double the protected biological capacity of pasture and cropland in Marin County.

AG-1.5 **Restrict Subdivision of Agricultural Lands within the Coastal, Inland Rural, and Baylands Corridor.** Require that the subdivision of agricultural lands shall only be allowed upon demonstration that long-term productivity on each parcel created would be enhanced as a result of subdivision. In the *City-Centered* Corridor, subdivision of agricultural lands shall only be allowed upon demonstration that the overall agricultural productivity of the subdivided parcel would not be reduced as a result of the subdivision. In considering subdivisions in all corridors, the County may approve fewer parcels than the maximum number of parcels allowed by applicable Countywide Plan

land use designation and by the Development Code, based on site characteristics such as topography, soil, water availability, and the capacity to sustain viable agricultural operations,

AG-1.6 **Limit Non-Agricultural Development.** Limit non-agricultural development in the Agricultural Production Zone to allowed residential and accessory uses ancillary to and compatible with agricultural production. Require dwellings and other non-agricultural development to be limited in size and clustered or grouped together in building envelopes covering up to ~~than~~ five percent of the property or as determined through a site specific analysis of agricultural and environmental constraints and resources, with the remainder preserved for agricultural production. Clustering of residential development on very large parcels may be limited to less than five percent of the land area.

AG-1.7 **Limit Ancillary Non-Agricultural Land Uses.** Require non-agricultural land uses on agricultural lands to be ancillary to and compatible with agricultural land uses, agricultural production, and the rural character of the area, and to enhance the economic viability of agricultural operations.

AG-1.8 **Maintain the Agricultural Land Base.** Encourage private and public owners of lands that have traditionally been used for agriculture to keep land in agricultural use by continuing existing agricultural uses, developing compatible new agricultural uses, and/or leasing lands to agricultural operators.

AG-1.9 **Continue Agricultural Uses on Federal Land.** Encourage continuation of agricultural operations and uses in the pastoral zones of the Point Reyes National Seashore and the Golden Gate National Recreation Area through long-term tenure agreements (leases) with agricultural operators.

AG-1.10 **Protect Productive Agricultural Soils.** Discourage or prohibit non-agricultural buildings, impermeable surfaces, or other non-agricultural uses on soils classified by the Natural Resources Conservation Service as Prime Farmland soils or Farmland soils of Statewide Importance.

AG-1.11 **Preserve Rangeland Forage.** Discourage the conversion of rangeland to non-agricultural uses.

AG-1.12 **Support Sustainable Water Supplies.** Explore opportunities to provide sustainable water supplies, such as water conservation, collection, treatment, and reuse to support small-scale agricultural diversification in a manner that does not adversely affect aquatic or other resources.

AG-1.13 **Protect Water Quality to Keep Mariculture Viable.** Protect and enhance the quality of waters used for mariculture through cooperation with other stakeholders, and outreach and education.

Why is this important?

Agriculture can continue and thrive only if the land that supports it is protected.

Environment: Working landscapes that produce food and other agricultural products maintain open areas with living plants which absorb greenhouse gas emissions. Also, the aesthetic qualities that distinguish the local landscape are reinforced.

Economy: Preserving existing agricultural land and resources is vital to ensuring that agriculture remains an important contributor to a diverse and healthy economy in Marin County. County residents ~~working~~ employed in the agricultural ~~employment~~ sector benefit from accessible, stable jobs.

Equity: Local agricultural production provides consumers with additional, ~~and~~ often healthier food choices and strengthens the cultural heritage and sense of community that stem from a working landscape.

How Will Results Be Achieved?

Implementing Programs

AG-1.a *Limit Residential Building Size.* Limit residential development on agriculturally zoned property to ~~reflect~~ dwelling sizes typically accessory to agricultural production uses, while considering the need for landowner family housing. Limitations for residential development on a parcel shall be based upon the following criteria:

Option 1

i. The total floor area of all dwelling units and non-agricultural accessory structures on a parcel shall not exceed an aggregate of 6,000 square feet; and

ii. The total floor area for any single dwelling unit on a parcel shall not exceed 3,000 square feet;

iii. Agricultural worker housing, up to 540 square feet of garage space for each dwelling unit, agricultural accessory structures, and up to a total of 500 square feet of office space used as a home occupation in connection with the agricultural operation on the property shall be excluded from the above residential floor area limits.

iv. Residential development shall not be allowed to diminish current or future agricultural use of the property or convert it to primarily residential use.

vi. Single dwelling units in excess of 3,000 square feet of floor area, but not more than 6,000 square feet of floor area, may be allowed if there is evidence of a bona fide commercial agricultural production operation on the property. In making this determination, the County may require an Agricultural Production and Stewardship Plan demonstrating that: (1) the long term agricultural use of the

property will be preserved; (2) agricultural infrastructure, such as fencing, processing facilities, marketing mechanisms, agricultural worker housing or agricultural land leasing opportunities have been established or will be enhanced; (3) agricultural uses proposed in connection with the residence are appropriate to the site and; (~~3~~4) sound land stewardship, such as Marin Organic Certification, riparian habitat restoration, water recharge projects, and erosion control measures, have been implemented or will be enacted. Dedication or sale of perpetual agricultural conservation easements may be voluntarily offered to ensure continued agricultural production.

The square footage limitations noted in the above criteria represent *potential* maximum dwelling unit sizes and do not establish a mandatory entitlement or guaranteed right to development.

Option 2

i. The total floor area for all dwelling units and accessory structures not used as the primary place of residence by the property owner(s), family members, and agricultural employees who are directly engaged in the production of agricultural commodities for commercial purposes shall not exceed 2,500 square feet unless affirmative findings are made consistent with the criteria set out in items (iii) and (iv) below, in addition to other applicable findings. Total floor area for these dwelling units shall not exceed 6,000 square feet.

ii. The primary place of residence of the property owner(s), family members or lessee who are directly engaged in the production of agricultural commodities for commercial purposes on the property, buildings and structures accessory to such residences, and agricultural worker housing shall be excluded from the above floor area limits.

iii. Residential development shall not be allowed to diminish current or future agricultural use of the property or convert it to primarily residential use.

iv. Dwellings subject to criteria (i), above, that are in excess of 2,500 square feet of floor area, but not more than 6,000 square feet of floor area may be allowed if there is evidence of a bona fide commercial agricultural production on the property. In making this determination, the County may require an Agricultural Production and Stewardship Plan demonstrating that: (1) the long term agricultural use of the property will be preserved; (2) agricultural infrastructure, such as fencing, processing facilities, marketing mechanisms, agricultural worker housing or agricultural land leasing opportunities have been established or will be enhanced; (3) agricultural uses proposed in connection with the residence are appropriate to the site; and, (~~3~~4) sound land stewardship, such as Marin Organic Certification, riparian habitat restoration, water recharge projects, and erosion control measures, have been implemented or will be enacted. Dedication or sale

of perpetual agricultural conservation easements may be voluntarily offered to ensure continued agricultural production.

The square footage limitations noted in the above criteria represent *potential* maximum dwelling unit sizes and do not establish a mandatory entitlement or guaranteed right to development.

Option 3

Amend the Development Code to establish limits for residential development on parcels subject to a Williamson Act or Farmland Security Contract according to the following criteria. For the purpose of applying these criteria, all contiguous parcels subject to the same Williamson Act Contract or Farmland Security Contract shall be considered a single development site.

i. Up to three existing or new dwelling units per parcel(s) may be allowed subject to the standards set out below. These standards do not apply to agricultural worker housing as defined by State and County law.

   a. The property is being used for the production of an agricultural commodity for commercial purposes.

   b. The three dwelling units shall be either the primary place of residence for the owner(s) or family members of the parcel(s), the residence of a ranch manager for the parcel(s), or the residence of a person(s) employed in commercial agriculture.

   c. The dwelling units comply with the density requirements of the Countywide Plan and the zoning district.

   d. The total floor area for up to three dwelling units on a parcel(s) shall not exceed 6,000 square feet.

   e. The total floor area for any single dwelling unit on a parcel shall not exceed 4,000 square feet.

   f. The dwelling units comply with the County standards for clustering of non-agricultural buildings on agriculturally zoned lands.

   g. Existing dwelling units not previously authorized by the County may be legalized within a prescribed time period by an amnesty program establishing minimum requirements for public health and safety.

   h. New dwelling units may be exempt from Design Review if the total building area (habitable area in addition to garage and non-agricultural accessory structures) does not exceed 3,500 square feet and complies with the

development standards of the governing zoning district. The Design Review exemption shall also be contingent upon the property owner(s) demonstrating that the project complies with the County's Single Family Residential Design Guidelines and policies and standards for Stream Conservation Areas, wetlands, visually prominent ridgelines, and protection of special status species.

An agricultural production and stewardship plan may be required to demonstrate that the property is being used for agricultural commodities for commercial purposes.

ii. Agricultural worker housing may be permitted in addition to the dwelling units described in Item (i) above. An Agricultural Production and Stewardship Plan may be required prior to the approval of agricultural worker housing if the Community Development Agency determines it necessary to demonstrate the need for such housing.

Option 4

Convene a working group to prepare criteria and/or standards for the purpose of establishing limitations on the size of residential development on agriculturally zoned lands. Such limitations shall be considered for adoption through a future update of the Marin County Development Code.

AG-1.b *Require Production and Stewardship Plans.* Agricultural Production and Stewardship Plans shall be prepared and submitted for residential and other non-agricultural development as required by the Development Code. The purpose of these Plans is to ensure long-term agricultural productivity will occur and ~~that they~~ will substantially contribute to Marin's agricultural industry. Such plans shall clearly identify and describe existing and planned agricultural uses for the property, explain in detail their implementation, identify on-site resources and agricultural infrastructure, identify product markets and processing facilities (if appropriate), and demonstrate how the planned agricultural uses substantially contribute to Marin's agricultural industry. Agricultural Production and Stewardship Plans shall provide evidence that at least 90 percent of the useable land will remain in agricultural production and identify stewardship activities to be undertaken to protect agricultural and natural resources. Agricultural Production and Stewardship Plans shall be prepared by qualified professionals with appropriate expertise in range management and land stewardship. The approval of development proposals including Agricultural Production and Stewardship Plans shall include conditions ensuring the proper, long-term implementation of the plan.

The requirement for an Agricultural Production and Stewardship Plan may be waived for dwelling units and residential accessory buildings or structures occupied or used by the property owner(s) or lessee who are directly engaged in the production of agricultural commodities for commercial purposes on the property and agricultural

worker housing. It may also be waived for non-agricultural land uses that are determined by the County to be ancillary to and compatible with agricultural production as the primary use of the land. Waivers may be granted when the Review Authority finds that the proposal will not diminish current or future agricultural use of the property or convert it to primarily residential use, as evidenced by bona fide commercial agricultural production on the property, and agricultural infrastructure, such as fencing, processing facilities, marketing mechanisms, agricultural worker housing or agricultural land leasing opportunities have been established or will be enhanced.

On parcels where Agricultural Production and Stewardship Plans are required, criteria and standards will be developed to define commercial agricultural production and differentiate between commercial agricultural production and agricultural uses accessory to residential or other non-agricultural uses.

AG-1.c *Encourage Merger of Parcels on Lands Protected by Agricultural Conservation Easements.* Agricultural conservation easements should include, but not be limited to, merger of contiguously owned agricultural lands where proper findings can be made.

AG-1.d *Standardize Conservation Easements.* Modify the format for agricultural conservation easements accepted and held by the County to match that of the Marin Agricultural Land Trust to ensure that County agricultural conservation easements meet current industry standards.

AG-1.e *Facilitate Land Conservation Contracts.* Encourage agricultural landowners to contract with the County on a voluntary basis through Williamson Act and farmland security zone procedures to restrict the use of their land in exchange for taxation of the land based on agricultural use. Strengthen future Williamson Act contracts by prohibiting subdivision of the land for the duration of these contracts.

AG-1.f *Review the TDR Program.* Evaluate the potential for the Transfer of Development Rights program to achieve effective protection of agricultural lands and the viability of existing agricultural operations.

AG-1.g *Revise Agricultural Zoning Districts.* Modify existing agricultural zoning districts to create a more uniform approach to preservation of agricultural lands, mandatory clustering, development standards, allowance of ancillary and compatible non-agricultural uses, and to limit incompatible non-agricultural commercial uses. The principal use of agriculturally zoned land shall be agricultural production, with non-agricultural uses limited to necessary residential uses and compatible ancillary uses that enhance farm income.

Consolidate suitable agricultural lands in the Inland Rural Corridor into a strengthened agricultural zoning district similar to the Agricultural Production Zoning District and

create compatible zoning districts to accommodate lands currently zoned for, but not suited for, agriculture as a principal use.

Agricultural Production Zoning (APZ) shall apply to lands in the Inland Rural Corridor suitable for land-intensive or land-extensive agricultural productivity as well as on soils classified as Prime Farmland or Farmland of Statewide Importance capable of supporting production agriculture. The purpose of this zoning district shall be to preserve lands within the zone for agricultural use. The principal use of these lands shall be agricultural, and any development shall be accessory, incidental, or in support of agricultural production.

Agricultural Residential Planned District Zoning (ARP) shall apply to lands adjacent to residential areas, and at the edges of Agricultural Production Zones in the Inland Rural and Coastal Corridors that have potential for agricultural production. This district may also be applied to lands with historic or potential agricultural uses within the City-Centered Corridor and in locations that function as community separators or greenbelts. This district is intended to protect agriculture but also allows residential and compatible commercial uses in areas that are transitional between residential and agricultural production uses.

Residential Agricultural Zoning District (RAZ) shall apply in rural areas within the City-Centered, Inland Rural, Coastal , and Baylands Corridors to accommodate typical rural uses including small-scale row crop production, 4H projects and associated uses, along with residential uses and compatible commercial uses.

Woodland Conservation Zoning District (WCZ) shall apply to selected lands currently in agricultural zoning districts that have a very dense native tree cover. Aerial photography shall be utilized to determine the extent of canopy cover characterizing properties to be included in this zoning district.

AG-1.h *Assess ARP Zoning.* Conduct an assessment of lands within the ARP District to determine which are appropriate for agricultural production. Consider rezoning those that are not located near towns, villages, or the City-Centered corridor, and are physically and geographically suited for agricultural production to an agricultural zoning district similar to the existing APZ District. (See Program AG-1.g, above.)

AG-1.i *Assess Density in Agricultural Districts.* Conduct an assessment of lands within A-20 or smaller zoning districts to determine which are appropriate for agricultural production. Consider rezoning those that are not suitable for agricultural production to the RAZ or ARP districts.

AG-1.j *Uphold Right-to-Farm Ordinance.* Continue to implement the right-to-farm ordinance that protects agricultural and mariculture operations from nuisance complaints by adjacent non-agricultural and non-mariculture property owners regarding allowable

agricultural procedures and maricultural practices. The ordinance has established a grievance procedure to address the needs of all concerned.

AG-1.k *Define Non-Agricultural Ancillary Uses.* Develop criteria and standards to identify compatible ancillary and subordinate land uses, such as small-scale environmental and agricultural tourism, that enhance the economic viability of agricultural operations.

AG-1.l *Preserve Agricultural Lands and Uses.* Continue to use a combination of agricultural zoning, conservation easements, and agricultural preserve contracts with landowners to preserve open agricultural land and to sustain and encourage dairy and ranching ~~issues~~operations.

AG-1.m *Encourage Agricultural Leasing.* Explore a mix of incentives and guidelines to non-farming landowners to encourage leasing of all or part of their land to farmers and ranchers, as appropriate.

AG-1.n *Standardize Sustainable Agricultural Indicators.* Establish~~ing~~ sustainable agriculture indicators, such as an increase in organic farming ~~will~~, to assist in determining farm activities that protect agricultural land, promote farm economic viability, and further social activities necessary to sustain agriculture.

AG-1.o *Map Important Soils.* Identify on digital soils maps the most suitable soils for row crop production. These include soils classified as Prime Farmland Soils and Farmland Soils of Statewide Importance and soils with similar physical and chemical characteristics within other soil map units. Use this mapping to identify these soils in relation to proposed construction of buildings, impermeable surfaces, or other uses that would prevent farming on these soils.

> *"The soil is the great connector of our lives, the source and destination of all."*
> – Wendell Berry, 1977

AG-1.p *Evaluate Small-Scale Water Development.* Explore means to encourage water conservation, collection, treatment and re-use and development of other potential small-scale water sources for agriculture that do not adversely affect aquatic or other environmental resources (see also Water Resources Program WR-3.a in this Element and programs under Goal ~~CF~~PFS-2 in the Public Facilities and Services Section of the Built Environment Element).

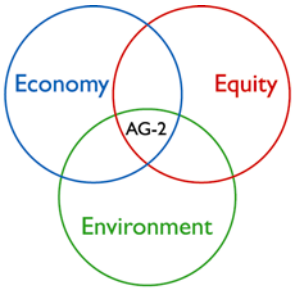
AG-1.q *Support Irrigation Alternatives.* Support the efforts of farmers and ranchers in developing water sources for agricultural diversification. Promote use of recycled water for irrigation and other non-potable uses. Promote investment in decentralized

solutions such as small-scale waste treatment and rainwater catchments (on a community-scale). Assess and implement cost-effective use of recycled water to irrigate County-owned properties and encourage its use at other public and private facilities. (See also Natural Systems and Agriculture Element, Agriculture and Food Policy AG-1.12 and~~,~~ Program AG-1.n.)

AG-1.r *Provide Agricultural Industry Support.* Encourage agencies to provide on-line Irrigation Scheduling calculators, California Irrigation Management Information system (CIMIS) Hotline to provide current reference evapotranspiration data, pump and system efficiency test program to determine how efficiently the irrigation system is applying water to crops.

Goal AG-2

Improved Agricultural Viability. Enhance the viability of Marin County farms, ranches and agricultural industries.



Policies

AG-2.1 **Promote Organic Certification.** Support Marin Organic Certified Agriculture (MOCA) to perform local organic farm certification to comply with National Organic Program (NOP) standards.

Sustainable farming

Sustainable farming practices such as organic and dry farming can both reduce a farm's demand for resources and preserve its ability to provide food in the future. 100 acres of farmland that relies heavily on artificial fertilizer, for example, requires an energy Footprint of almost 10 global acres just to support its fertilizer consumption. Conventional farming and pasture management can also damage soil fertility, reducing the future biocapacity of that land.

AG-2.2 Support Local, Organic, and Grass-Fed Agriculture. Encourage and protect local, organic, grass-fed, and other ecologically-sound agricultural practices, such as dry farming, including field crops and animal agriculture, as a means to increase on-farm income, diversify Marin agriculture, and provide healthy food for the local supply.

AG-2.3 Support Small-Scale Diversification. Diversify agricultural uses and products on a small percentage of agricultural lands to complement existing traditional uses, help ensure the continued economic viability of the county agricultural industry, and provide increased food security.

AG-2.4 Encourage Agricultural Processing. Encourage processing and distribution of locally produced foods to support local food security and strengthen Marin's agricultural industry.

AG-2.5 **Market Local Products.** Support the efforts of local farmers and ranchers to develop more diverse and profitable markets, including a permanent public market~~, for Marin~~

~~County agricultural products, including~~ and direct markets to local and regional restaurants for Marin County agricultural products.

AG-2.6 **Promote Small-Scale Crop Production.** Encourage small-scale row crop production that contributes to local food security on appropriate sites throughout the County.

AG-2.7 **Preserve and Promote Mariculture.** Support maricultural usage of tidelands and on-shore production areas. The need for mariculture sites in coastal waters should be aligned with the need to provide for other uses, such as commercial fishing, recreational clamming and boating, and the need to protect coastal native wildlife species, water, and visual resources.

AG-2.8 **Avoid Introduction of Invasive Mariculture Species.** Encourage state and federal regulatory agencies that permit mariculture activities to prevent the introduction of invasive species.

AG-2.9 **Support Livestock Production Programs.** Assist ranchers in using non-lethal methods to protect~~ing~~ herd animals from predators ~~using non-lethal methods~~.

AG-2.10 **Increase Knowledge of Agriculture.** Raise the level of public awareness and understanding of Marin County agriculture, including its ecological, economic, open space, and cultural value; and its importance to local food security.

AG-2.11 **Facilitate the Inter-generational Transfer of Agricultural Land.** Encourage and support transfer through inheritance, sale, or lease of agricultural properties to future generations of ranchers and farmers.

Why is this important?

Encouraging and supporting Marin agricultural producers in develop~~ment~~ing specialty products and markets will help to keep farming viable.

Environment: Viable agricultural operations provide habitats for many native plant and animal species and have many fewer negative impacts to the environment than alternative types of development that could replace non-viable farms and ranches.

Economy: Diversification and local processing contribute to the economic viability of Marin's agricultural industry by ensuring the continuation of the farming and ranching community.

Equity: Encouraging new generations of farmers and ranchers to retain land in active agricultural production helps to keep Marin's historic agricultural heritage alive while providing food security.

" The farm is a place to live. The criterion of success is a harmonious balance between plants, animals, and people; between the domestic and the wild; between utility and beauty."

-- Aldo Leopold

How Will Results Be Achieved?

Implementing Programs

AG-2.a *Promote Organic Products.* Provide adequate staffing to serve all Marin producers and handlers that wish to obtain organic certification (and account for expected annual growth within this market niche), and develop incentives to encourage farmers and ranchers to transition from conventional farming practices to organic, grass-fed, or other ecologically-sound techniques such as dry farming, or "beyond organic."

AG-2.b *Support Sustainable Agriculture.* Work with University of California Cooperative Extension and Marin County Agriculture Commissioner's staff to assist producers with development, diversification and marketing of Marin's sustainable agricultural products.

AG-2.c *Prepare Criteria and Standards.* Prepare criteria and standards to identify compatible agricultural activities and applicable development code requirements.

AG-2.d *Expedite Permitting.* Continue to simplify and expedite the permitting process for bona fide agricultural enterprises.

AG-2.e *Train Staff.* Educate County staff regarding the needs, benefits and operational aspects of production agriculture, and how these are affected by the County permitting process.

AG-2.f *Permit Special Signage.* Allow agricultural producers to use small, tasteful, on-site signage to advertise their products and services, and consider the establishment of a community based~~, discreet off-site sign~~ program of discreet, off-site signs ~~to~~ for directing the public to on-farm sales areas.

AG-2.g *Consider Mariculture Zoning.* Amend the Development Code to include mariculture as a conditional use in the C-RSP or other zoning districts as appropriate for lands located along the shoreline of Tomales Bay.

AG-2.h *Conduct a Cumulative Analysis of Mariculture Operations.* Encourage the California Department of Fish and Game, U.S. ~~Department of~~ Fish and Wildlife Services, or any other qualified entity to conduct a cumulative analysis of Mariculture Operations.

AG-2.i *Support County Livestock Protection Program.* Continue to support the Livestock Protection Program and provide livestock ranchers with technical assistance and funding to implement non-lethal predator control methods.

AG-2.j *Promote Local Foods.* Promote the distribution of local foods through the Community Food Bank. Continue to offer farmers market food coupons to ~~farmers markets~~ to welfare recipients but increase the individual allotment.

AG-2.k *Promote Agriculture Education in Schools.* Support sustainable agriculture education, such as the Food for Thought curricula, in local schools, including the College of Marin.

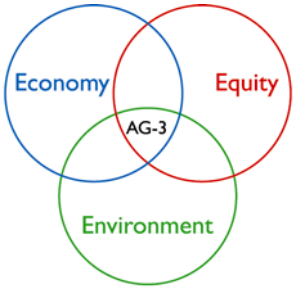
AG-2.l *Raise Agricultural Awareness.* Promote public appreciation of agriculture by supporting organizations and agencies that carry out educational programs.

AG-2.m *Draw Attention to Agricultural Areas.* Identify agricultural areas with placement of appropriate directional signs in an effort to inform residents and visitors of the importance of agriculture in Marin.

AG-2.n *Support Food and Agriculture Assessment Panel.* Assess the effects of local, state and federal policies on agriculture and determine future policy directions.

Goal AG-3

Community Food Security. Increase the diversity of locally produced foods to give residents greater access to a healthy, nutritionally-adequate diet.



Policies

AG-3.1 **Support Local Food Production.** Promote local food production in agricultural zoning districts, as well as on appropriate urban and suburban lands.

AG-3.2 **Promote Local and Organic Food.** Increase consumer appreciation of, and access to, locally produced and organic food and agricultural products.

AG-3.3 **Enhance Food Security Education.** Promote public awareness and education about the importance of locally produced food and food security.

Local Food

The food that Marin residents eat doesn't only place demand on crop land. Food products that travel many "food miles" from farm to dinner plate can have an energy land Footprint much higher than the same products produced locally. Flying a single bottle of Australian wine to the U.S. demands an energy Footprint of almost 250 square feet.

Why is this important?

Growing food locally offers many benefits to growers and consumers.

Environment: Locally grown food requires less energy and resources to transport, thus reducing greenhouse gas emissions and decreasing the size of our ecological footprint.

"There is no love sincerer than the love of food."

George Bernard Shaw

Economy: Buying local products supports the local economy; encourages efforts to develop diversified agricultural operations, including on-farm processing; and ensures that food is available regardless of trade and other issues that can affect supplies.

Equity: Locally available, fresh, organic food provides numerous health benefits, and can be more readily available in the event of an emergency.

How Will Results Be Achieved?

Implementing Programs

AG-3.a *Encourage Community Gardens.* Allow community gardens on County property that is underutilized or where such use would complement current use, and amend the Development Code to require space for on-site community gardens in new residential developments of ten units or greater. Work with community based organizations to manage such gardens using ecologically sound techniques, and to provide on-site water if available (find more information at: http://www.communitygarden.org/).

"Health and cheerfulness mutually beget each other."

Joseph Addison

AG-3.b *Provide Community Education.* Provide community education regarding organic and other ecologically sound techniques of farming and the benefits of its produce. Raise awareness of farmers' market dates and times.

"He who hath good health is young."

Proverb

AG-3.c *Promote Edible Landscaping.* Encourage fruit trees or other edible landscaping when possible in new development and when renewing planting on County property where appropriate. Include the replacement of irrigated ornamentals with drought-resistant edible plants, as appropriate.

AG-3.d *Use Locally Grown and/or Organic Foods in County Services.* Develop and adopt a food policy and procurement program that incorporates organic and locally grown foods into cafeteria services, the jail, and County-sponsored events.

"Nature has given to us the seeds of knowledge, but not knowledge itself."

Seneca

AG-3.e *Promote Organic Food in Schools.* Support school programs, including on-site gardens, which incorporate organic foods into school meals.

AG-3.f *Support Local Groups.* Support the efforts of local groups such as the Marin Food Policy Council that make recommendations and support forums addressing sustainable food systems.

Figure 2–29 Relationship of Goals to Guiding Principles

This figure illustrates the relationship of each goal in this section to the Guiding Principles.

Goals	Guiding Principles: 1. Link equity, economy, and the environment locally, regionally, and globally.	2. Minimize the use of finite resources and use all resources efficiently and effectively.	3. Reduce the use and minimize the release of hazardous materials.	4. Reduce greenhouse gas emissions that contribute to global warming.	5. Preserve our natural assets.	6. Protect our agricultural assets.	7. Provide efficient and effective transportation.	8. Supply housing affordable to the full range of our workforce and diverse community.	9. Foster businesses that create economic, environmental, and social benefits.	10. Educate and prepare our workforce and residents.	11. Cultivate ethnic, cultural, and socioeconomic diversity.	12. Support public health, safety, and social justice.
AG-1 Preserved Agricultural Lands and Resources	•			•	•	•						
AG-2 Improved Agricultural Viability	•			•	•	•			•			
AG-3 Community Food Security	•			•	•	•			•		•	•

How Will Success Be Measured?

Indicator Monitoring

Non-binding indicators, benchmarks and targets* will help to measure and evaluate progress. This process will also provide a context to consider the need for new or revised implementation measures.

Indicators	Benchmarks	Targets
~~Acres in agricultural production.~~	~~332,800 acres in agricultural production in 2000.~~	~~No decrease in acres of agricultural land through 2015.~~
Acres preserved with agricultural easements.	~~28,503~~ 28,377 acres preserved in 2000.	Increase by 25,000 acres by 2010 and by 12,500 additional acres by 2015.
Acres of land farmed organically.	357 acres in 2000.	Increase by 1,500% by 2010 and 1,700% by 2015.
Annual sales of identified Marin farmers markets: Civic Center, Downtown San Rafael, Novato and Fairfax.	9,800,000 in 2005	Increase annual sales 10% by 2010 and 15% by 2015.

* Many factors beyond Marin County government control, including adequate funding and staff resources, may affect the estimated time frame for achieving targets and program implementation.

Program Implementation

The following table summarizes responsibilities, potential funding priorities and estimated time frames for proposed implementation programs. Program implementation within the estimated time frame† will be dependent upon the availability of adequate funding and staff resources.

Figure 2–30
Agriculture and Food Program Implementation

Programs	Responsibility	Potential Funding	Priority	Time Frame
AG-1.a – Limit Residential Building Size.	CDA	Existing budget	High	Short term
AG-1.b – Require Production and Stewardship Plans.	CDA	Existing budget	High	Ongoing
AG-1.c – Encourage Merger of Parcels on Lands Protected by Agricultural Conservation Easements.	CDA	Existing budget	Low	Med. term

† Time frames include: Immediate (0–1 years); Short term (1-2 years); Med. term (3–5 years); Long term (over 5 years); and Ongoing.

Programs	Responsibility	Potential Funding	Priority	Time Frame
AG-1.d – Standardize Conservation Easements.	CDA, Farm Advisor, County Counsel	Existing budget	Low	Med. term
AG-1.e – Facilitate Land Conservation Contracts.	CDA, Assessor's Office	Existing budget	Low	Med. term
AG-1.f – Review the TDR Program.	CDA	Existing budget and may require additional grants or revenues*	Low	Med. term
AG-1.g – Revise Agricultural Zoning Districts.	CDA	Existing budget and may require additional grants or revenues*	High	Med. term
AG-1.h – Assess ARP Zoning.	CDA	Existing budget and may require additional grants or revenues*	Medium	Long term
AG-1.i – Assess Density in Agricultural Districts.	CDA	Existing budget	Medium	Long term
AG-1.j – Uphold Right-to-Farm Ordinance.	CDA or Agricultural Commissioner	Existing budget	High	Ongoing
AG-1.k – Define Non-Agricultural Ancillary Uses.	CDA	Existing budget	High	Immediate
AG-1.l – Preserve Agricultural Lands and Uses.	CDA, Assessor's Office, MALT	Existing budget	High	Ongoing
AG-1.lm– Encourage Agricultural Leasing.	CDA or Agricultural Commissioner	Existing budget	High	Ongoing
AG-1.n – Standardize Sustainable Agricultural Indicators.	Agricultural Commissioner	Existing budget	High	Med. term
AG-1.o – Map Important Soils.	NRCS, CDA, Agricultural Commissioner	Existing budget and may require additional grants or revenues*	High	Immediate
AG-1.p – Evaluate Small-Scale Water Development.	Agricultural Commissioner, Farm Advisor, Water Districts, RCD	Existing budget and may require additional grants or revenues*	Medium	Med. term
AG-1.q– Support Irrigation Alternatives.	Agricultural Commissioner, Farm Advisor, Water Districts, RCD	Existing budget and may require additional grants or revenues*	Medium	Long term

Programs	Responsibility	Potential Funding	Priority	Time Frame
AG1.r – Provide Agricultural Industry Support.	Agricultural Commissioner, Farm Advisor	Will require additional grants or revenues*	Medium	Long term
AG-2.a – Promote Organic Products.	Agricultural Commissioner, MOCA, Farm Advisor, CBO's	Existing budget and may require additional grants or revenues*	High	Ongoing
AG-2.b – Support Sustainable Agriculture.	Agricultural Commissioner, MOCA, Farm Advisor, CBO's	Existing budget and may require additional grants or revenues*	High	Ongoing
AG-2.c – Prepare Criteria and Standards.	CDA	Supplemental funding	Medium	Short term
AG-2.d –Expedite Permitting.	CDA or Agricultural Commissioner, Farm Advisor	Existing budget	High	Ongoing
AG-2.e – Train Staff.	CDA, Farm Advisor, Agricultural Commissioner	Existing budget and may require additional grants or revenues*	High	Ongoing
AG-2.f – Permit Special Signage.	CDA	Existing budget and may require additional grants or revenues*	Low	Med. term
AG-2.g – Consider Mariculture Zoning.	CDA	Existing budget and may require additional grants or revenues*	Medium	Med. term
AG-2.h – Conduct a Cumulative Analysis of Mariculture Operations.	CDA, USFWS, UCCE-SeaGrant, other Resource Protection Agencies	Will require additional grants or revenues*	Medium	Long term
AG-2.i – Support County Livestock Protection Program.	Agricultural Commissioner	Existing budget	High	Ongoing
AG-2.j – Promote Local Foods.	H&HS, Marin Food Policy Council, CBO's, UCCE/FA	Existing budget and may require additional grants or revenues*	Medium	Med. term
AG-2.k – Promote Agriculture Education in Schools.	Marin Food Policy Council, School Districts, COM, CBO's, ~~Agricultural Commissioner~~ UCCE/FA	Existing budgets and may require additional grants or revenues	High	Ongoing

Programs	Responsibility	Potential Funding	Priority	Time Frame
AG-2.l – Raise Agricultural Awareness.	Farm Advisor, MEC, Agricultural Commissioner, CBO's	Existing budget	High	Ongoing
AG-2.m– Draw Attention to Agricultural Areas.	Farm Advisor, Agricultural Commissioner, CBO's	Existing budget and may require additional grants or revenues*	High	Ongoing
AG-2.n –Support Food and Agriculture Assessment Panel.	Agricultural Commissioner, Farm Advisor	Will require additional grants or revenues*	Medium	Med. Term
AG-3.a – Encourage Community Gardens.	CDA, Agricultural Commissioner, DPW, MCOSD	Existing budget	Low	Ongoing
AG-3.b – Provide Community Education.	Farm Advisor, Agricultural Commissioner, CBO's	Existing budget and may require additional grants or revenues*	Medium	Ongoing
AG-3.c – Promote Edible Landscaping.	CDA, Agricultural Commissioner, MCOSD	Existing budget	Low	Ongoing
AG-3.d– Use Locally Grown and/or Organic Foods in County Services.	Cultural Services, Agricultural Commissioner, Farm Advisor	Existing budget and may require additional grants or revenues, as well as Incentive Payments to Growers*	High	Ongoing
AG-3.e – Promote Organic Food in Schools.	Farm Advisor, Agricultural Commissioner, Marin Food Policy Council, CBO's	Existing budget and may require additional grants or revenue*	Medium	Ongoing
AG-3.f – Support Local Groups.	Agricultural Commissioner, CBO's	Existing budget and may require additional grants or revenues*	Medium	Ongoing

*Completion of this task is dependent on acquiring additional funding. Consequently, funding availability could lengthen or shorten the timeframe and ultimate implementation of this program.