



**PARKS + OPEN SPACE**

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# Parks + Open Space



Parks and open space provide Benicia residents with recreational opportunities and scenic beauty. Emissions associated with parks and open space result from the regular maintenance and irrigation of parks, open space and streetscapes. This includes Parks and Community Services department vehicles, fossil fuel powered maintenance equipment, and treated irrigation water.

Emissions can be reduced by converting maintenance equipment from standard gas and diesel-powered engines to electric alternatives; decreasing the amount of water used for irrigation; and by using reclaimed rather than potable water. Increasing the amount of foliage, such as trees, reduces emissions through carbon sequestration. Trees also provide shade, wind breaks, and reduce the heat island effect. The establishment of community gardens can enhance the local food supply, reduce dependence on distant food producers, and foster community interaction and education.

## Adaptation

Climate change may affect park maintenance and irrigation through sea level rise; altered annual precipitation patterns; warmer summers; and an increase in the length, number, and intensity of heat waves. Adapting to changing temperature and precipitation patterns may require adjustments in maintenance, watering schedules, and preferred plant lists. Periodic evaluation of local conditions should be conducted to assure that resources are being effectively used and managed. Benicia's proximity to the ocean reduces the likelihood that native species will suffer dramatic habitat alterations.<sup>34</sup> Sea level rise has the potential to affect existing parks adjacent to the Carquinez Strait including Matthew Turner Park, 9th Street Park, Turnbull Park, and the Benicia State Recreation Area.

### Did you know?



A large front yard tree can clean 330 lbs. of CO<sub>2</sub> from the atmosphere through direct sequestration in the tree's wood.<sup>35</sup>

Parks + Open Space Objective Table	Emissions Reduction Type	Emissions Reduction
Objective P-1: Reduce the Water Consumed for the Irrigation of Park Space by 40% by 2020	City	
Objective P-2: Reduce Emissions from Maintenance Equipment 50% by 2020	City	
Objective P-3: Reduce Emissions from Maintenance Vehicles 50% by 2020	City	
Objective P-4: Increase the Number of City Maintained Park and Street Trees	City	
Objective P-5: Increase Number of Trees in the Community	Community	
Objective P-6: Increase Use of Drought Tolerant Landscaping	City	
Objective P-7: Establish Community Gardens	City	

34) Ackerly, D.; Hayoe, K. (2008). Climate change could severely impact California's unique native plants. Retrieved January 29, 2009 from <http://escien-cenews.com/articles/2008/06/24/climate.change.could.severely.impact.californias.unique.native.plants>

35) Center for Urban Forest Research, Pacific Southwest Research Station, USDA Forest Service, Davis, California

**Objective P-1: Reduce the Water Consumed for the Irrigation of Park Space by 40% by 2020**



**IRRIGATION**

Irrigation in Benicia includes the watering of community park space, streetscapes, and landscaping. Sustainable irrigation practices can decrease the amount of water pumped to individual sites. Reducing the amount of water used to irrigate and maintain landscaped areas will help the City reduce its greenhouse gas emissions resulting from water pumps and treatment facilities while simultaneously reducing operational costs.

**Existing Actions**

The General Plan indicates that the City will implement water reduction measures and continue to implement water conservation best management practices.

The City utilizes drip irrigation systems in front of City Hall, the Police Station, and East 6<sup>th</sup> Street Park during evening hours to reduce the amount of water lost to evaporation and wind. Street landscapes are watered by hand on an “as needed” basis; the volume and frequency of watering is adjusted with the changing seasons.

**◆ Strategy P-1.1. Install Drip Irrigation Systems in all City-Maintained Landscapes**



Drip irrigation systems reduce water consumption by decreasing runoff and evaporation. Drip irrigation systems should be installed in all flowerbeds, medians, and streetscapes.

Implementation Action

- Begin installation of drip irrigation systems citywide.

CO2EMT Reduction Range

- 38%-40% of Objective P-1.

**◆ Strategy P-1.2. Install Irrigation Control Systems**



“Smart” irrigation control systems (ICS) monitor water use, measures soil moisture, identifies plumbing leaks, and prevents excessive water loss. These systems decrease water consumption by approximately 25 percent by allowing irrigation adjustments to be made remotely, reducing vehicle miles traveled to individual parks and streetscapes.

Implementation Actions

- Install ICS in the largest City-owned parks and landscaped areas;
- Install ICS in all City-maintained parks, fields, landscaped areas and streetscapes.

CO2EMT Reduction Range

- 62%-70% of Objective P-1.

**◆ Strategy P-1.3. Utilize Low-Maintenance, Drought Tolerant Landscaping**



Drought tolerant landscapes reduce the amount of water and energy required for irrigation. All landscaping projects should utilize low maintenance, drought tolerant plants.

Implementation Action

- Utilize drought tolerant plants in new landscapes and as replacement plants for existing landscapes.

CO2EMT Reduction Range

- Unknown Reductions.



Jack London Park (2008).

## Objective P-2: Reduce Emissions from Maintenance Equipment 50% by 2020



### MAINTENANCE EQUIPMENT AND VEHICLE FLEET

The Benicia Parks and Community Services Department primarily utilizes gasoline-powered maintenance equipment, such as lawnmowers, hedge trimmers, and weed whackers, which contribute to the City Government's emissions. The Department's fleet of maintenance trucks is also primarily gasoline or diesel-powered.

Parks are regularly mowed by gasoline-powered mowers twice per week. The trees in the parks typically require minimum maintenance unless they are interfering with private property or pose a hazard to adjacent structures.

Emissions can be reduced by increasing vehicle and equipment efficiency, decreasing VMT and overall equipment usage, and converting trucks and equipment to alternative fuel sources.

#### Existing Actions

The Parks and Community Services Department of Benicia currently has one hybrid sports utility vehicle in its maintenance fleet.

#### ◆ Strategy P-2.1. Replace Fossil Fuel-Powered Maintenance Tools with Electric Equipment

Replace existing fossil fuel powered maintenance equipment, including existing riding mowers, with electric-powered equipment.<sup>36</sup>

##### Implementation Actions

- Establish a phased equipment replacement program for all equipment;
- Fully execute equipment replacement program.

##### CO<sub>2</sub>EMT Reduction Range

- 94%-100% of Objective P-2.

36) Conversion to electric maintenance equipment includes utilizing electric push and riding mowers. There are a variety of mower options and models available.

#### ◆ Strategy P-2.2. Develop a Biodiesel Conversion Program for Diesel powered vehicles

Develop a biodiesel conversion program to convert existing diesel engines to utilize biodiesel fuels.

##### Implementation Actions

- Assess the feasibility of creating a biodiesel program and purchasing a biodiesel conversion system;
- Develop a biodiesel program with the purchase of a biodiesel conversion system.

##### CO<sub>2</sub>EMT Reduction Range

- Unknown Reductions.

##### Did you know?



Biodiesel produced from waste oil is far superior to biodiesel created from crop waste; biodiesel produced from crop waste may actually increase greenhouse gas emissions on a global scale due to displacement of food crops and deforestation.

#### ◆ Strategy P-2.3. Utilize Biodiesel Fuel in Maintenance Equipment

Retrofit diesel-powered equipment to operate on B20 biodiesel.

##### Implementation Actions

- Establish a phased equipment retrofit program for all diesel-powered equipment;
- Fully execute replacement program;
- Convert 50 percent of diesel-powered maintenance equipment to B20 biodiesel.

##### CO<sub>2</sub>EMT Reduction Range

- Unknown Reductions.

#### ◆ Strategy P-2.4. Reduce Mowing Frequency at Parks facilities

Develop a modified lawn mowing schedule that reduces the frequency of mowing of park facility lawns to one time per week.

##### Implementation Action

- Develop and implement a modified mowing schedule.

##### CO<sub>2</sub>EMT Reduction Range

- 6%-10% of Objective P-2.

### Objective P-3: Reduce Emissions from Maintenance Vehicles 50% by 2020



#### ◆ Strategy P-3.1. Replace Unnecessary City Trucks with Alternative-Fuel Vehicles

Replace existing vehicles with high-efficiency compressed natural gas (CNG), electric, or hybrid cars.

##### Implementation Action

- Conduct a fleet audit to determine which vehicles are necessary. Replace gasoline-powered trucks with alternative fuel compact automobiles.

##### CO2EMT Reduction Range

- Unknown Reductions.

#### ◆ Strategy P-3.2. Replace Half-Ton Trucks with E85 Ethanol or Compressed Natural Gas (CNG) Trucks

Replace half-ton, gasoline-powered trucks at the end of their lifecycle with ethanol or compressed natural gas (CNG) trucks; such a measure will improve vehicle efficiency and reduce greenhouse gas emissions.

##### Implementation Actions

- Establish a half-ton truck replacement strategy;
- Begin replacement.

##### CO2EMT Reduction Range

- 68% to 70% of Objective B-3.

#### ◆ Strategy P-3.3. Biodiesel in Heavy-Duty Trucks

Replace heavy-duty, three-quarter and one-ton and heavy-duty diesel trucks with trucks able to utilize B20 biodiesel at the end of the vehicle's specified lifecycle. Retrofit heavy-duty diesel trucks with B21 biodiesel capability.

##### Implementation Action

- Establish a biodiesel replacement and retrofit program for heavy-duty trucks.

##### CO2EMT Reduction Range

- 21% to 25% of Objective B-3.

### Objective P-4: Increase the Number of City Maintained Park and Street Trees



## TREE PLANTING AND CARBON SEQUESTRATION

Trees provide a number of benefits to the community. Increasing the number of trees in Benicia will increase the amount of carbon dioxide absorbed from the atmosphere. They provide shade to naturally cool buildings, create wind barriers to surrounding areas, and enhance streetscapes to encourage alternative modes of transportation. Benicia currently lacks a formalized approach for increasing the amount of trees within the community, as well as criteria for selecting trees based on drought tolerance and carbon sequestration characteristics.

### Existing Actions

The Benicia General Plan recognizes the significance of trees and plants to absorb carbon dioxide, release oxygen, and store carbon. The Tree Committee establishes policy, programs and practices related to tree removal, alterations, and plantings. The Benicia General Plan states the City's intent to preserve significant areas of vegetation, watershed, and open space.

In 2004 the Parks, Recreation and Cemetery Commission formed an ad hoc Tree Committee to review and update Benicia's tree policies. The first task assigned to the committee was to revise Benicia's tree ordinance. In 2008, Benicia adopted a new Tree Ordinance and formally established a Tree Committee. The Tree Committee is charged with the implementation of the Tree Program including advancing arboriculture education and events, as well as review of the Tree Fund.

On March 14, 2009 Benicia was officially designated a Tree City USA community. Tree City USA is a tree planting and tree care program sponsored by the Arbor Day Foundation and the USDA Forest Service Urban and Community Forestry Program. The effort to become a Tree City USA was a joint venture between the City of Benicia and The Rotary Club of Benicia.

### ◆ Strategy P-4.1. Tree Maintenance Program



Establish a maintenance program through the existing Tree Ordinance “Tree Fund” to ensure the health and safety of trees while replacing dead or dying trees. Pruning should be done at appropriate intervals for the tree species to promote the health and longevity of trees.

#### Implementation Action

- Establish and implement a tree maintenance program.

#### CO2EMT Reduction Range

- Unknown Reductions.

### ◆ Strategy P-4.2. Increase the Number of City Trees



Establish a tree planting program to increase the number of City owned trees in parks and streetscapes, including areas such as the Fleetside and Goodyear sections of the industrial zones and Landscape and Lighting Districts.

#### Implementation Action

- Establish and implement a tree planting program with a goal of 300 additional trees, with priority given to street trees.

#### CO2EMT Reduction Range

- 100% of Objective B-4.

## Objective P-5: Increase Number of Trees in the Community



### ◆ Strategy P-5.1. Residential Tree Fund



Create a residential tree fund to provide residents with financial incentives for planting approved street trees and provide City assistance with tree maintenance. Such a strategy will encourage residents to plant drought tolerant, native trees, thus increasing the removal of carbon dioxide from the atmosphere.

#### Implementation Actions

- Identify funding source;
- Establish tree fund.

#### CO2EMT Reduction Range

- Unknown Reductions.

### ◆ Strategy P-5.2. Adopt-A-Tree Program



Create an Adopt-A-Tree Program. The program would allow community members to sponsor City tree planting by offsetting up front costs. Trees would be located on City land and maintained by City staff.

#### Implementation Action

- Develop an adopt-a-tree program.

#### CO2EMT Reduction Range

- Unknown Reductions.

## Objective P-6: Increase Use of Drought Tolerant Landscaping



### ◆ Strategy P-6.1. Develop a City-Approved Tree and Plant List



Coordinate with the Tree Committee to adopt an approved tree and plant list. This list should include plants and trees that are drought-tolerant and have excellent carbon sequestration characteristics. The list would be used for municipal landscaping, street tree specifications and the Cash for Grass Program (Strategy WW-1.1)

#### Implementation Action

- Develop and adopt a drought tolerant tree and plant list.

#### CO2EMT Reduction Range

- Unknown Reductions.



Tree in the Benicia Capitol State Historic Park (2009).

## Objective P-7: Establish Community Gardens



### COMMUNITY GARDENS

A community garden is a piece of land that is collectively gardened by an organized group of people. There are several important benefits associated with community gardens, including access to fresh, local produce and emission reductions associated with food distribution. In addition, they can reduce food costs, conserve natural resources and reduce the heat-island effect caused by other land uses such as parking lots.

#### Existing Actions

The City has initiated preliminary discussions regarding community gardens, potential locations in underutilized portions of existing parks; and, the logistics of growing edible plants on City owned property.

### ◆ Strategy P-7.1. Community Gardens in City Parks and Underutilized Sites



Develop themed community gardens in to-be-determined locations citywide. The themes may include butterfly gardens, native plant gardens, waterless gardens, edible plant gardens (berries, vegetables, etc), with informational plaques that direct residents to a website where they can learn more about developing their own similar garden.

#### Implementation Actions

- Engage the community to determine suitable sites, guidelines, and community service group/non-profit partners;
- Determine funding source(s) and secure funding;
- Develop outreach program to promote community engagement;
- Plant community gardens.

#### CO2EMT Reduction Range

- Unknown Reductions.