CITY OF CHULA VISTA

CLIMATE ADAPTATION STRATEGIES
Implementation Plans
May 2011

SUMMARY

The City of Chula Vista has long understood the threats of climate change to its community and has established itself as a leader amongst municipalities in planning to reduce or "mitigate" citywide greenhouse gas emissions. However, despite efforts both locally and globally to mitigate emissions, some level of climate change will still occur and have noticeable impacts on the San Diego region. In order to manage these likely climate change impacts and to reduce future risks and costs, the City of Chula Vista's Climate Change Working Group - comprised of residents, businesses, and community representatives - recommended 11 strategies to "adapt" the community to these impacts within energy and water supply, public health, wildfires, ecosystem management, coastal infrastructure, and the local economy sectors.

List of Climate Adaptation Strategies

#	Strategy Focus	#	Strategy Focus
1	Cool Paving	7	Extreme Heat Plans
2	Shade Trees	8	Open Space Management
3	Cool Roofs	9	Wetlands Preservation
4	Local Water Supply & Reuse	10	Sea Level Rise & Land Development Codes
5	Storm Water Pollution Prevention & Reuse	11	Green Economy
6	Education & Wildfires		----------

At City Council's direction, staff has developed more detailed implementation plans for these *Climate Adaptation Strategies*. For each strategy, the plans outline specific implementation components, critical steps, costs, and timelines. In order to limit the necessary staffing and funding required to implement the strategies, the plans were also designed to build upon existing municipal efforts rather than create new, stand-alone policies or programs. Initial implementation of all 11 strategies will be phased in over the next 3 years and will cost approximately $554,000. Of these initial costs, existing funding sources will allow at least 8 of 11 strategies to be fully or partially implemented. Ongoing implementation of the 11 strategies will cost approximately $337,000 annually and will be partially covered through existing funding sources as well. If the *Climate Adaptation Strategies'* plans are approved by City Council, staff will partially implement the measures based on available funding and pursue additional external funding sources to support full, long-term implementation. Therefore, approval of the *Climate Adaptation Strategies* will not create a new impact to the General Fund.

OVERVIEW

Since the early 1990s, Chula Vista has been engaged in multiple climate change forums including the United Nations Framework Convention on Climate Change, the ICLEI Cities for Climate Protection campaign, the California Climate Action Registry, and the U.S. Conference of Mayor's Climate Protection Agreement and has committed to reduce its greenhouse gas (GHG) emissions 20% below 1990 levels. To accomplish this GHG reduction or climate "mitigation" goal, the City adopted a Carbon Dioxide (CO2) Reduction Plan in 2000 which outlined steps for Chula Vista to reduce energy and fuel use at municipal facilities and throughout the community. In 2008, seven new climate mitigation measures were adopted by City Council to augment past efforts by improving energy and water efficiency, expanding renewable energy systems, converting to more fuel efficient and alternative fuel vehicles, and designing transit-friendly, walkable communities. Overall, the City's climate protection programs and policies have helped Chula Vista reduce GHG emissions from municipal operations by 47% and community per capita emissions by 27% compared to 1990 levels. As a result, the City has been recognized for its climate-related accomplishments by multiple external organizations such as the US Environmental Protection Agency, ICLEI-Local Governments for Sustainability, California Sustainability Alliance, California Center for Sustainable Energy, San Diego Gas & Electric, Sierra Club, and EarthWorks San Diego.

To complement these climate mitigation efforts, City Council directed staff in October 2009 to reconvene a Climate Change Working Group (CCWG) – comprised of residents, businesses, and community representatives – to develop a list of recommended strategies to reduce Chula Vista's vulnerability to expected local climate change impacts (known as climate "adaptation"). Expected impacts include hotter and drier weather, diminished imported water supplies, more poor air quality/heat wave days, more frequent wildfires, shifts in habitat and species distribution, and increased rates of sea level rise. These impacts were identified in the San Diego Foundation's Focus 2050 Study which synthesized the most recent, science-based information pertaining to climate change trends and the resulting vulnerabilities to the region. The State of California also analyzed future statewide climate change impacts through its Climate Adaptation Strategy (2009) and has directed local governments to begin assessing their community's vulnerability to climate change impacts and to begin integrating these impacts into land use decisions. By minimizing the risks associated with climate impacts now, future costs and public health concerns can be avoided and/or minimized.

The reconvened CCWG, which was established as a subcommittee of the City's Resource Conservation Commission, included some members from the previous working group augmented with additional members to reflect the group's new climate adaptation-related focus areas. Stakeholders participating on the CCWG included representatives from development companies, business associations, energy and water utilities, environmental organizations, and education institutions. The group held 11 public-noticed meetings between December 2009 through August 2010 to review potential impacts and identify over 180 opportunities to reduce these risks. In addition, the CCWG hosted 2 public workshops on climate adaptation planning to solicit additional feedback which attracted over 30 community participants. The CCWG was further supported by regional experts, climate scientists, and staff from multiple municipal departments.

In October 2010, the Climate Change Working Group presented their 11 recommended *Climate Adaptation Strategies* (Appendix A) to City Council to address climate change vulnerabilities and solutions related to energy and water supplies, public health, wildfires, biodiversity, coastal resources, and the local economy. As a result, City Council directed staff to develop more detailed implementation plans for the 11 recommendations which would outline implementation steps, timelines, and costs. These detailed plans, which would be created by a multi-department team and reviewed by applicable City Commissions, would be presented to City Council for future consideration within 180 days.

This document outlines staff's general approach for implementing the 11 recommended *Climate Adaptation Strategies.* For each strategy, a specific implementation plan has been created which includes the following sections:

Overview – A review of potential climate change impacts, the original CCWG recommendation to address these impacts, and how it relates to the proposed program/policy

Program Strategy – An in-depth description of the programmatic approach for implementing the proposed program/policy to reduce future risks and costs from climate change impacts including outreach activities and required municipal regulatory steps

Performance Metrics – The metrics which will be tracked and reported to quantify the performance of the program/policy

Timeline – A general timeline of important milestones as the program/policy is implemented

Budget & Financing – The required funding to implement the program/policy as proposed by City staff

As proposed, initial implementation of all 11 strategies will be phased in over the next 3 years and will cost approximately $554,000. Of these initial costs, approximately $273,500 or 49% will be supported by existing funding sources and will allow at least 8 of 11 strategies to be fully or partially implemented. Ongoing implementation of the 11 strategies will cost approximately $337,000 annually and will be partially covered (49%) through existing funding sources as well.

If the *Climate Adaptation Strategies'* plans are approved by City Council, staff will partially implement the measures based on available funding and will pursue additional external funding sources to support full, long-term implementation. Therefore, approval of the plans will <u>not</u> create a new impact to the General Fund and in some cases may generate utility cost savings for municipal operations (and the community) over time. Furthermore, the cost of "no action" could be significant in the long term through public and private infrastructure damages (due to wildfires and sea level rise), public safety and health issues (due to extreme heat, wildfires, and poor air quality), and energy and water shortages (due to higher local demand). Potential

external funding sources include federal and state grants, utility public goods charges, and greenhouse gas offset/mitigation fees. A City Council-approved implementation plan will potentially make Chula Vista more competitive in soliciting these funding sources because the plans provide a broader framework and an explicit commitment which many funding agencies seek in applicants. In addition, City staff will continue to identify new opportunities to leverage existing municipal efforts and work plans to cost-effectively implement the *Climate Adaptation Strategies.*

STRATEGY #1: COOL PAVING

OVERVIEW

By 2050, annual average temperatures in the San Diego region are expected to increase up to 4.5 degrees Fahrenheit with summer temperatures increasing even higher.[1] This temperature shift will likely amplify the "urban heat island effect" and its negative community impacts. The urban heat island effect, which was first recognized in the 19th century by climatologists who measured differences in cities where natural vegetation and trees had been removed, is a phenomena in which the air in urban areas can be 4-5°F hotter than in surrounding undeveloped areas.[2] As natural landscapes are replaced with buildings, rooftops, and pavement that absorb, store, and then radiate heat, the amount of energy used for cooling purposes, the concentration of smog, and the general discomfort of residents and visitors within the community increases. In areas with tall buildings and narrow streets, heat can be trapped and airflow reduced between structures. In addition, waste heat from air conditioning, vehicles, and industrial processes contributes further to an urban community's heat load. As such, the Climate Change Working Group recommended that the City should develop an ordinance incorporating reflective (or "cool paving") into all municipal projects (parking lots and streets) and new private parking lot projects over a specific size. Cool pavements refer to a range of established and emerging paving materials which store less heat and have lower surface temperatures compared with conventional products.

To address these climate change impacts related to the urban heat island effect, City staff will (1) perform a comprehensive study to evaluate and test multiple reflective pavement technologies and (2) develop options, based on the study's results, for incorporating cool pavement technologies into municipal capital improvement and development parking lot standards.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff over the next 24 months:

1. *Cool Paving Study & Test Area* – The Public Works Department (Operations & Engineering), with the assistance of outside technical consultants and the US Environmental Protection Agency, will perform a pilot project to evaluate multiple reflective or "cool" pavement strategies to help inform creation of new policies for municipal paving capital improvement projects and private parking lot projects. In siting a potential test area, the City will explore opportunities to focus on areas which already need pavement repair or replacement. The pilot project will consider:
    a. The current and future technologies and their applications – possible use of test sites with long term performance measurement
    b. Costs associated with reflective paving (for both municipal operations & developers)
    c. Thorough understanding of the benefits/drawbacks of cool paving techniques
    d. Installation techniques and reflective paving standards
    e. Short and long term performance and comparison with current practices

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008
[2] US Environmental Protection Agency. www.epa.gov/heatisland

f. Streets – residential vs. arterial and private vs. public facilities
g. Parking lots – private vs. public facilities
h. Maintenance of existing public and private facilities
i. Incentive opportunities (such as reduced minimum parking requirements) for private owners to use reflective paving
j. Benefits of street and parking lot landscaping (shade trees)

2. *Cool Paving Study Results & Standards Options* – Based on the study results, staff will develop options for incorporating reflective pavement into all municipal projects and private parking lot projects over a specific size. The options will be presented to City Council for review and consideration.

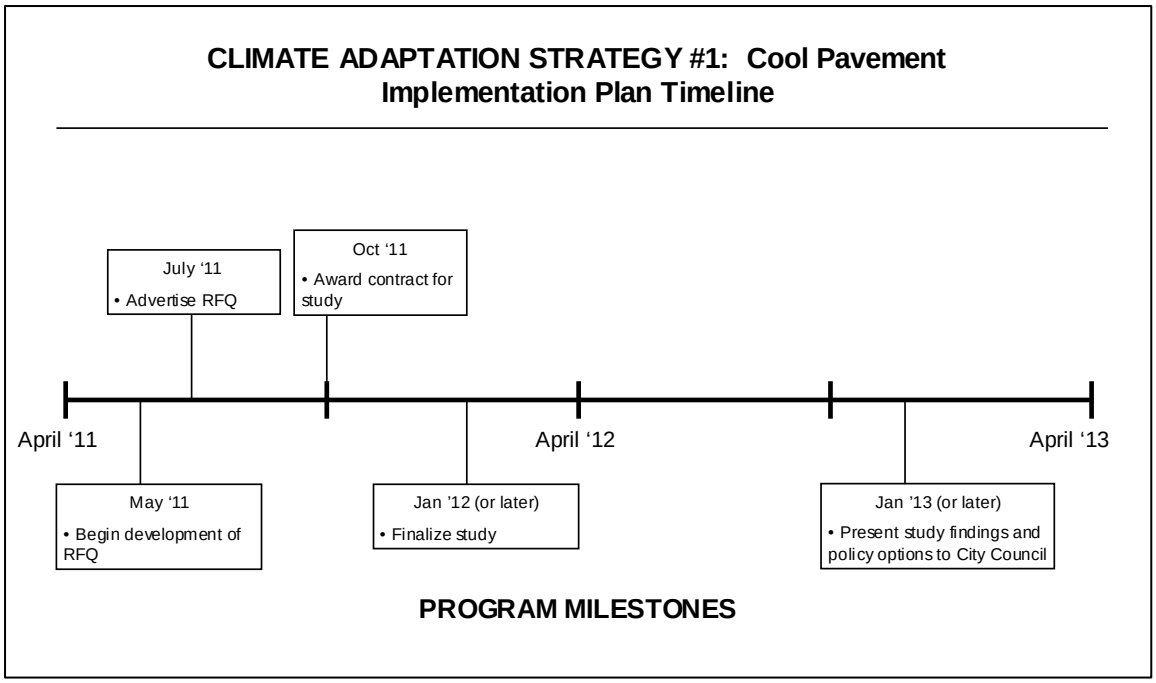
PERFORMANCE METRICS

Although the development of specific performance metrics would be informed by the proposed cool pavement study, below are some potential metrics that could be tracked and reported on an ongoing basis to quantify the performance of the "Cool Pavement" strategy:

- Temperature reduction of cool versus traditional paving materials in test areas
- Total square feet of paved surfaces incorporating cool paving technologies

TIMELINE

The initial implementation of this strategy will occur over a 24-month period (summarized in figure below). City staff will develop and release a Request for Qualifications (RFQ) for consultants to assist in designing and implementing a cool pavement study between May and July 2011. By the end of 2011, the study will begin and last 12-36 months (estimated). With the results of the study and field tests, staff will prepare policy options for cool pavements which will be vetted through the various City commission and presented to City Council for final consideration.



BUDGET & FINANCING

The proposed components' initial implementation costs are estimated to be approximately $115,000 for staffing and consultant fees to further evaluate cool paving opportunities and policy options (summarized in table below). Potential ongoing annual expenses are estimated at $5,000. These costs may be covered partially through existing external founding sources, but additional funding will be required for full implementation. Any cool pavement policy presented to the City Council for future consideration would include a more robust cost analysis on municipal operations for ongoing implementation of the strategy. This analysis will also identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #1 - Cool Pavement

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Cool Pavement Study & Testing	City Staff	$ 20,000	$ 5,000	---------
	Supplies	$ -	$ -	---------
	Consultant Fees	$ 85,000	$ -	---------
Cool Pavement Policy Options Report	City Staff	$ 5,000	$ -	---------
	Consultant Fees	$ 5,000	$ -	---------
	TOTAL	$ 115,000	$ 5,000	
	UNFUNDED PORTION	$ 115,000	$ 5,000	

STRATEGY #2: SHADE TREES

OVERVIEW

As previously described in this report, annual average temperatures are expected to increase up to 4.5 degrees Fahrenheit with summer temperatures increasing even higher by 2050.[1] These higher temperatures, combined with a larger regional population, will cause peak electricity demand to grow by over 70% compared to current levels. Shade trees contributing to a robust urban forest are useful in addressing both higher temperatures and energy demand by acting as a natural cooling mechanism for urban areas. In addition, canopy-forming trees help reduce storm water runoff, provide habitat for wildlife, and increase property values.[2] As such, the Climate Change Working Group recommended that Chula Vista adopt a shade tree ordinance, so that shade trees are incorporated into all municipal improvement projects and all private development parking lot projects. The CCWG also noted that any new ordinance should be flexible to adjust to project features such as solar carports or other regulations such as the existing landscape water conservation ordinance.

To address these climate change impacts related to higher air temperatures and energy demand, City staff will (1) develop a shade tree policy for future City Council consideration, (2) amend the Municipal Landscape Manual to be consistent with the new policy, and (3) ensure that the recently-updated Design Manual is consistent with the new policy.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff over the next 12 months:

1. *Municipal Shade Tee Policy* – The Land Development Division's Landscape Section will create a new policy which emphasizes shade trees in all municipal improvement projects and private development parking lot projects. City staff has determined that a formal City Council policy (rather than an ordinance) would be the most effective way to ensure that the use of shade trees is incorporated into all future projects to help mitigate and adapt to climate change impacts. The new policy will be developed as described in the context of Theme 5 of the General Plan (Healthy & Sustainable Environment) and will specifically address tree species selection, maintenance considerations, water usage, and planting standards. The new policy will also be designed to allow implementation flexibility, so that site-specific factors (such as ensuring retail signage is still visible from public right-of-way) are properly addressed. A cost impact analysis on municipal operations and private developers will be presented prior to final approval. The analysis will include opportunities to integrate reduced minimum parking requirements as part of an incentive package. An approved shade tree list will be incorporated into the policy by reference and be developed in partnership with the City's Arborist and Urban Forestry Division. Staff will also review successful urban forestry programs in other local jurisdictions to inform policy development.

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008
[2] US Environmental Protection Agency. www.epa.gov/heatisland

A variety of related City Council policies will be superseded by adoption of a new shade tree policy:

576-05 – Tree Preservation Policy
576-09 – Landscaping for City Buildings Policy
576-08 – Median landscaping Policy
576-07 – Street Tree Maintenance
576-06 – Palm Tree Preservation Policy
576-04 – Approved Tree Policy
576-03 – Tree Planting Policy
576-01 – Tree and Shrubbery Policy

2. *Landscape Manual Update* – The Chula Vista Landscape Manual is the City's primary guidance document for all development projects in terms of the design, installation, and maintenance of their landscaped areas. To align the Landscape Manual with the new City Council policy on shade trees (described above), the Land Development Division's Landscape Section will update the manual accordingly. The new shade tree guidance provided in the Landscape Manual will take into consideration limited landscape water budgets, tree maintenance requirements, and available root/canopy space. These updates will also be coordinated with modifications to reflect new state laws requiring lower water use plant palettes and on-site storm water capture and treatment. Finally, the new Landscape Manual's shade tree requirements for parking lot projects may provide exemptions if cool (see *Climate Adaptation Strategy #1*) or porous (see *Climate Adaptation Strategy #5*) pavements are provided, or some combination of the three. The new requirements may also provide reduced minimum parking standards as part of an incentive package.

3. *Design Manual Update* **–** The City's Design Manual will be reviewed and updated (if necessary) by the Development Planning Division to be consistent with the new shade tree requirements outlined in the revised Landscape Manual and new City Council shade tree policy. However, it is envisioned that most of the design criteria will be captured in the Landscape Manual, while the Design Manual will just reference the Landscape Manual for compliance guidance.

PERFORMANCE METRICS

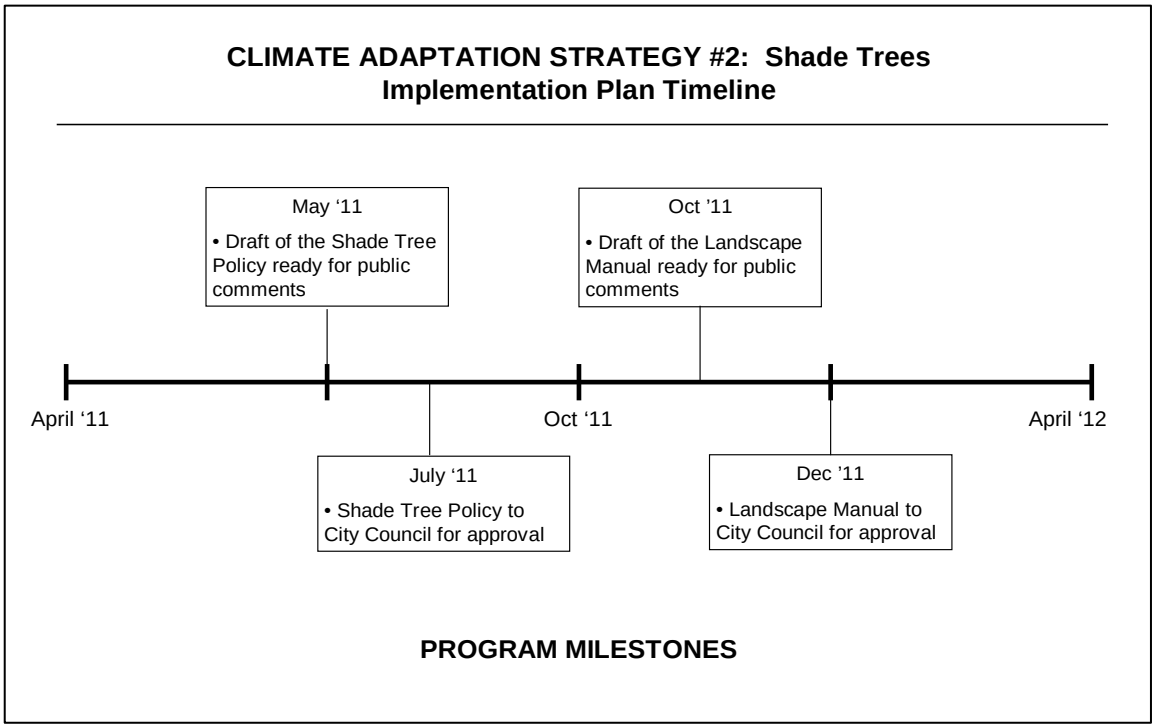
The following metric will be tracked and reported on an ongoing basis to quantify the performance of the "Shade Trees" strategy:

- # of new projects incorporating the new shade tree standard

TIMELINE

The implementation of this strategy will occur over an 8-month period (summarized in figure below). After the draft shade tree policy is circulated for public feedback, staff will present the draft policy to the various City Commissions and, ultimately, to the City Council in July 2011 for review and consideration. After City Council's approval of the new policy, the Landscape

Manual will be revised accordingly and presented to City Council for consideration in December 2011.



BUDGET & FINANCING

The proposed components' initial implementation costs are estimated to be $40,000 for staffing (summarized in table below). These costs will be covered through existing external founding sources. Staff does not foresee any ongoing, additional costs to the City associated with implementing this climate adaptation strategy. However, any new policy presented to the City Council would include a more robust cost analysis on municipal operations and identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #2 - Shade Trees

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
New Shade Tree Policy	City Staff	$ 20,000	$ -	SDG&E LGP
Landscape & Design Manual Updates	City Staff	$ 20,000	$ -	SDG&E LGP
	TOTAL	$ 40,000	$ -	
	UNFUNDED PORTION	$ -	$ -	

STRATEGY #3: COOL ROOFS

OVERVIEW

Annual average temperatures are expected to increase up to 4.5 degrees Fahrenheit by 2050 with summer temperatures increasing even higher.[1] These higher temperatures, combined with a larger regional population, will cause peak electricity demand to grow by over 70% compared to current levels. Every house changes the microclimate around it by retaining the sun's heat and contributing to the urban heat island which increases discomfort for everyone, requires an increase in the amount of energy used for cooling purposes, and increases the formation and concentration of smog. Cool roofs, which are made of highly reflective and emissive material that can remain approximately 50 to 60°F cooler than traditional materials, can help address the problem of heat islands by lowering the ambient temperatures inside and outside of buildings, providing a more comfortable and healthy environment, and reducing energy use for air-conditioning.[2] As such, the Climate Change Working Group recommended that the City should require and provide incentives (such as contributing to the City's enhanced energy code requirements) for new residential development with air-conditioning systems to install ENERGY STAR cool roof technology.

To address these climate change impacts related to higher air temperatures and energy demand, City staff will further evaluate cool roofing options and propose amendments to municipal building codes to incorporate cool roofs for new residential developments with air-conditioning (AC) systems. Staff will also evaluate further the CCWG's suggestion to provide cool roofing incentives and will offer recommendations for future City Council consideration.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff over the next 9 months:

1. *Municipal Building Code Update* – The Building Division will propose amendments to the City's Green Building Standards - Chula Vista Municipal Code Chapter 15.12 - to require cool roofs on new residential developments (single-family and multi-family) with air conditioning. Any new standard would <u>not</u> apply to retrofitted roofs on existing residential buildings. Chula Vista Municipal Code Chapter 15.12 adopts and amends the 2010 California Green Building Standards Code (CalGreen). Currently, cool roofing is a voluntary measure in CalGreen, and staff will be proposing to make these measures mandatory. The CalGreen residential voluntary measures for cool roofs are categorized into two tiers: Tier 1 and Tier 2. Tier 1 standards meet ENERGY STAR and California Energy Commission (CEC) minimum specifications for cool roofs, while Tier 2 standards require higher efficiency levels than Tier 1. Staff will evaluate the cost and benefit of both tiers and, based on staff's findings, will recommend to City Council which standards to adopt. Staff will also evaluate the cost and benefit of requiring cool roofs on new residential developments without AC systems. Homes built without an AC system may later have a system installed and because cool roofs provide a cooler, more comfortable indoor/outdoor environment, requiring cool roofs on homes without an AC

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008
[2] US Environmental Protection Agency. www.epa.gov/heatisland

system could potentially negate the need to have an AC system installed in the future by occupants. Finally, any new cool roof standard will be designed to not impede the installation of solar photovoltaic or other renewable energy systems on the roof space.

The majority of all new residential developments in the City, excluding some multi-residential units, will have sloped roofs with concrete or clay tile roofing material. Based on staff's preliminary research, the majority of concrete and clay tile roofing that is locally available meets or exceeds minimum ENERGY STAR specifications at zero to minimal incremental cost compared to traditional "non-cool" products. It also should be noted that many of the existing homes in the City's newer areas have concrete or clay tile roofing that meet minimum ENERGY STAR specifications. Finally, cool roof products are currently available in a wide variety of types, shapes, and colors.

Even though staff is not proposing amending the California Energy Code to require cool roofs, the California Energy Commission has informed the City that the CEC will have to approve any cool roof ordinance before it can take effect. The CEC's involvement is triggered because cool roofing is one of the options available to builders under the performance method of compliance with the Energy Code and it plays a role in the energy efficiency of buildings. The CEC approval process is similar to the City's past process with adopting its increased energy efficiency standards which involved a cost-effectiveness analysis, a City Council determination that the proposed requirements are cost-effective, and submittal of the proposed requirements to the CEC after the ordinance's first reading by City Council. The final CEC review and approval process can take up to three months.

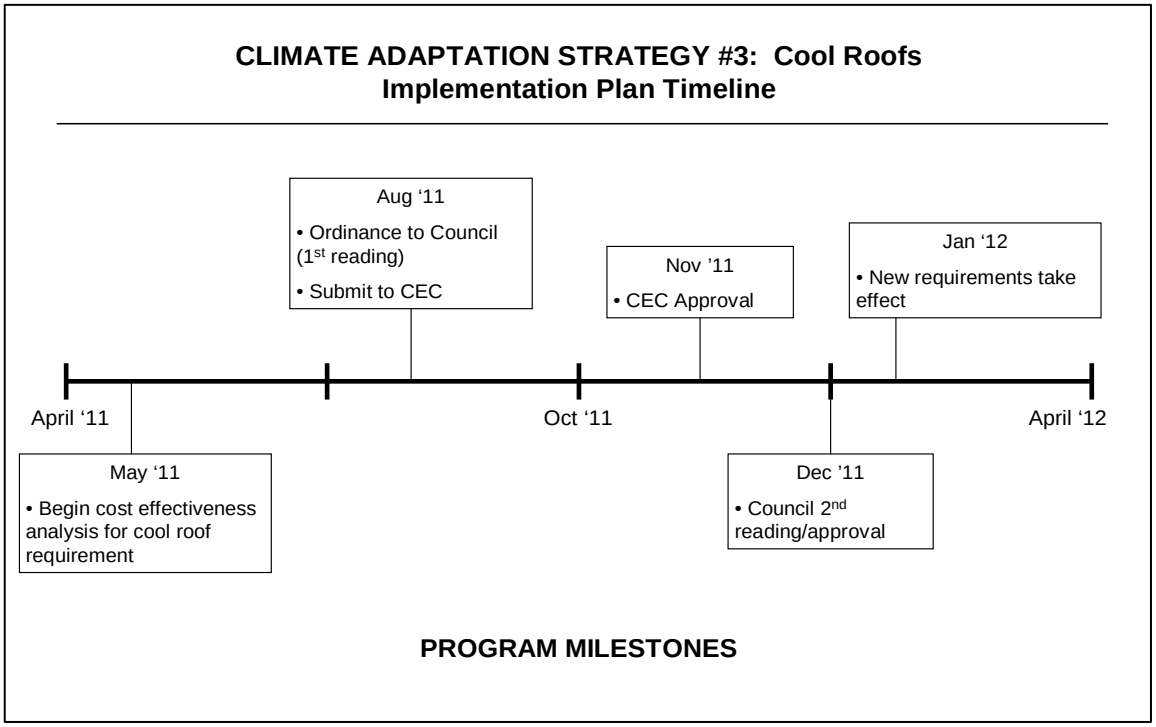
PERFORMANCE METRICS

The following metric will be tracked and reported on an ongoing basis to quantify the performance of the "Cool Roofs" strategy:

- # of new residential units incorporating cool roofs

TIMELINE

The implementation of this strategy will occur over a 9-month period (summarized in figure below). With the help of a consultant, Building Division staff anticipates having the cost-effectiveness study completed in May 2011 and a proposed ordinance to City Council in August 2011, after being vetted through various City Commissions. After City Council's approval of first reading, staff will submit the proposed requirements to the CEC for approval (anticipated for November 2011). After CEC approval, staff will bring the ordinance back to City Council for second reading and adoption in December 2011. If approved by City Council, the new requirements will take effect in January 2012 which is 30 days after formal adoption.



BUDGET & FINANCING

The one-time and annual costs are estimated to be $29,000 and $3,500, respectively (summarized in table below). The one-time values represent the code development costs, while the annual values represent the estimated cost of ongoing public education and outreach efforts. Staff anticipates that ongoing plan review and inspections costs will be minimal and that fees will not need to be updated to recover the cost. Both one-time and annual costs will be covered through existing external founding sources. Any new policy presented to the City Council will also identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #3 - Cool Roofs

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Municipal Building Code Update	City Staff	$ 26,000	$ 3,000	SDG&E LGP
	Supplies	$ 500	$ 500	SDG&E LGP
	Consultant Fees	$ 2,500	$ -	SDG&E LGP
	TOTAL	$ 29,000	$ 3,500	
	UNFUNDED PORTION	$ -	$ -	

STRATEGY #4: LOCAL WATER SUPPLY & REUSE

OVERVIEW

By 2050, San Diego County's demand for water is expected to increase by 37% as a result of population and economic growth. In addition, prolonged droughts exacerbated by climate change could reduce water supplies from imported sources by 20% or more.[1] These climate change impacts could limit imported water availability, increase utility costs for residents and businesses, and lead to higher demand for local water sources. As such, the Climate Change Working Group recommended that Chula Vista should educate its residents and businesses about the benefits and appropriate uses of local water supplies (including recycled water, groundwater desalination, and onsite water reuse systems) and further integrate recycled water (if available) and onsite water reuse systems into new development and redevelopment plans.

To address these water-related climate change impacts and reduce future risks and costs, the City, in close coordination with local water districts, will (1) evaluate and propose municipal building code amendments to incorporate single-source gray water "stub-outs" in new residential buildings and indoor recycled water in new commercial buildings, (2) develop an educational guide for the general public about proper use of gray water systems, (3) create an incentive (using external funding sources) to promote onsite water reuse, and (4) update the City's water-related plans to reference and promote recycled water and onsite water reuse systems.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff in partnership with Sweetwater Authority and the Otay Water District over the next 2 years:

1. *Water Reuse Building Codes & Standards* – The Building Division will evaluate and propose new ordinances to incorporate gray water plumbing "stub-outs" (all residential properties) and dual plumbing for indoor recycled water use (commercial properties in eastern area) for new development projects. These new codes will contribute to meeting the City's Green Building Standards for indoor and outdoor water use efficiency and be complemented by education and outreach to developers and building permit applicants. A cost impact analysis on municipal operations and private developers also will be presented prior to final ordinance approval.

   Based on new state regulations, gray water systems, which typically collect water from showers, non-food sinks, and clothes washers, can be installed at residences and be used to irrigate landscaped areas, thus lowering demand for imported water. The proposed strategy will require a simple stub-out for clothes washers on a new home's exterior, so that homeowners can more easily install PVC pipes to water their landscaping. The stub-out requirement will also help ensure that homeowners are properly using a single-source gray water system, because currently there is no municipal permit needed for this system type. The new standard will be developed to place special emphasis on maintaining proper public health and safety and avoiding any urban runoff concerns. Staff also

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

expects that the new standard will take into consideration the residential building type (single-family detached, single-family attached, and multi-family), lot size, soil type, and laundry room location in the new home. Based on information from the City of Tucson which incorporated a similar requirement in 2008, the incremental cost for the stub-out during construction is estimated to be less than $200 per home. Finally, the City will coordinate with the applicable regulatory agencies in developing the new standards for gray water stub-outs.

Currently, recycled water is provided by the Otay Water District in the eastern section of Chula Vista and used mainly for landscaping on commercial properties, street medians and parkways, parks, and open space districts. To broaden the use of this drought-resistant, local water source, the Building Division will evaluate and propose a new standard expanding recycled water to indoor commercial uses. Specifically, the new standard will integrate dual plumbing systems in new commercial buildings in Otay Water District's service territory. The new system will allow recycled water to be used for indoor plumbing flush fixtures such as toilets and urinals and for mechanical systems such as HVAC cooling towers. The new standard will be developed to place special emphasis on maintaining proper public health and safety and be adjusted for different commercial building sizes, uses, and location (i.e. access to a recycled water delivery pipes). Finally, the City will coordinate with the applicable regulatory agencies in developing the new standards for indoor recycled water plumbing.

2. *Single-Source Gray Water Best Practices* – To help community members who are interested in utilizing single-source gray water systems, the Conservation Division in partnership with the Building Division will develop a "best practices" manual describing proper installation methods for installing the systems at residential properties. This user-friendly document will address single-source gray water systems at both new homes (to complement the new stub-out requirement described above) and at existing residences. Special emphasis in the guides will also be placed on maximizing the systems' effectiveness, protecting human health, and avoiding water runoff. The Gray Water Best Practices Guide will be available at the City's Permit Counter and on the CLEAN website and will be distributed to the public at community events and through landscape-related educational opportunities (such as on-site NatureScape certifications and Composting classes).

3. *Onsite Water Reuse Incentive* – The Conservation Division will collaborate with the local water districts to create an "Onsite Water Reuse Incentive Fund" to provide rebates for onsite water reuse. The fund will specifically target retrofitting existing residences and businesses (which are not addressed through the new stub-out requirement described above) to maximize onsite water collection and reuse, thus decreasing reliance on imported water sources and helping to lower monthly utility costs. Examples of potential incentive uses include providing rebates for the purchase of rain barrels and single-source gray water (clothes washer) conversion kits. Similar to the City's current *Home Upgrade, Carbon Downgrade* Appliance Exchange Rebate Program, the new rebates could be structured as point-of-sale discounts at local retailers in order to support the local Chula Vista economy and to streamline the participation process for interested

residents and businesses. Potential funding sources for the Onsite Water Reuse Incentive Fund could include water efficiency grants, partnerships with non-profit agencies, and/or other funding mechanisms, as available.

4. *Landscape Manual & Water Conservation Plan Guidelines Updates* – Outdoor water conservation for new construction and major renovations is guided by a variety of municipal documents at various stages in the development approval process. At the sub-area plan stage, development projects with 50 or more dwelling units (or equivalent) must complete Water Conservation Plans to outline their strategies for maximizing indoor and outdoor water use efficiency. At the permit review stage, new development and redevelopment projects must comply with the City's Landscape Manual which directs project proponents to design and install landscaping (plant palettes and irrigation systems) that meet a designated water budget and design standards. To further promote recycled water and onsite water reuse systems, the Advanced Planning and Land Development Divisions will revise the Water Conservation Plan Guidelines and the Landscape Manual, respectively, to explicitly incorporate and promote recycled water and onsite water reuse systems (such as gray water and rain water harvesting) into the project design and review process. As part of the revisions, Homeowner Associations' CC&Rs will also be required in the future to include information concerning onsite water reuse opportunities to help educate new homeowners and lower their utility costs.

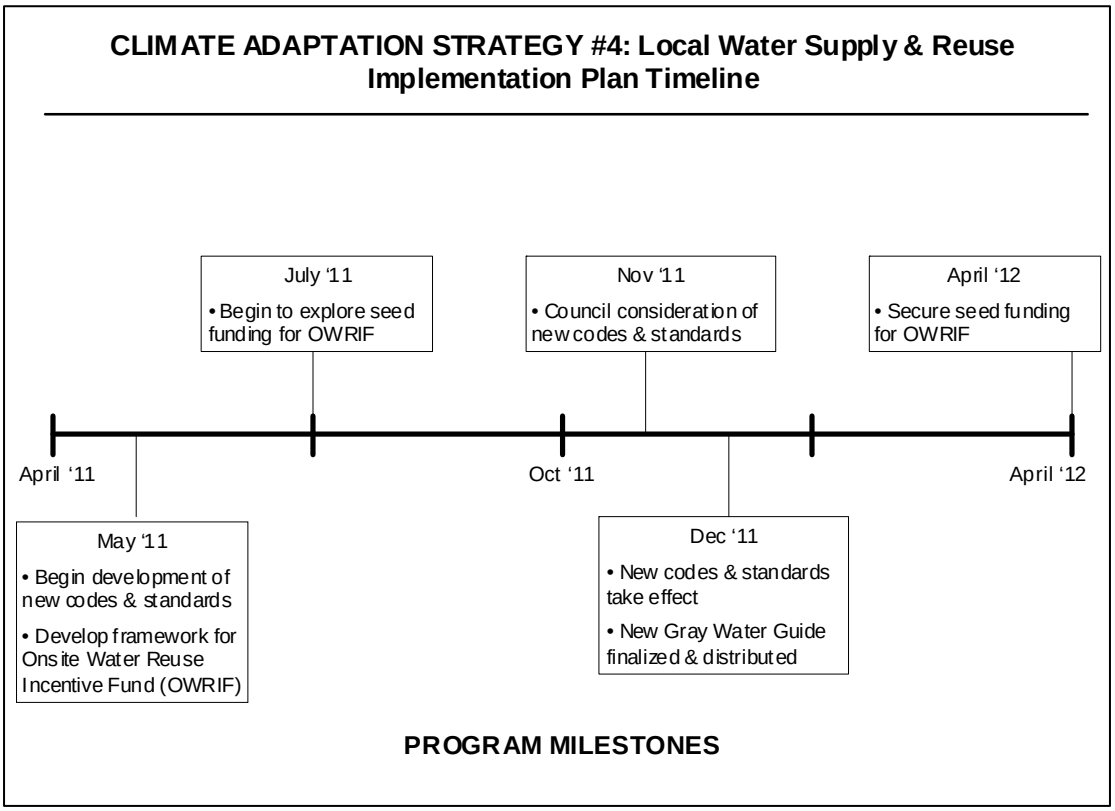
PERFORMANCE METRICS

The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Local Water Supply & Reuse" strategies:

- # of new residential units incorporating a gray water stub-out
- # of new commercial buildings incorporating indoor dual plumbing for recycled water
- Amount of incentive funds distributed for retrofitting existing buildings with onsite water collection and reuse systems

TIMELINE

Implementation of the above-mentioned components will occur over a 12-month period (summarized in figure below). Between May and October 2011, the new water reuse codes and standards will be drafted for review by various City Commissions, and ultimately for ordinance consideration by the City Council. Likewise, updates to the Water Conservation Plan Guidelines and Landscape Manual will be vetted through the various City commission prior to City Council consideration. Once the new codes and standards are adopted, the Gray Water Best Practices Guide will be finalized to ensure consistency between documents. Finally, between April 2011 and April 2012, City staff will work to develop and seek initial, external financial support for an Onsite Water Reuse Incentive Fund.



BUDGET & FINANCING

The proposed components' costs are estimated to be $112,000 and $6,500 for initial and ongoing implementation, respectively (summarized in table below). Estimated one-time costs include updating codes and policies, creating associated guidebooks, developing an incentive fund, training staff, and initial community outreach efforts. Annual costs cover ongoing outreach and program administration efforts. As part of the Water Reuse Codes & Standards component, it should be noted that plan review and inspection costs for dual plumbing are estimated to be 2-3 hours per project (not including the cost of a potentially required annual inspection program) and development fees would most likely need to be adjusted to recover these additional staff costs. Finally, any new policy or ordinance presented to City Council will also identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #4 - Local Water Supply & Reuse

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Water Reuse Codes & Standards	City Staff	$ 46,000	$ 4,500	Division Budget
	Supplies	$ 1,000	$ 1,000	Division Budget
Gray Water Best Practices Guide	City Staff	$ 13,200	$ -	Division Budget
	Printing & Distribution	$ 3,500	$ 1,000	Division Budget
Onsite Water Reuse Incentive Fund	City Staff	$ 12,300	$ -	Division Budget
	Consultant Fees	$ 5,000	$ -	Division Budget
Landscape Manual & Water Conservation Plan Guidelines Updates	City Staff	$ 31,000	$ -	Division Budget
	Consultant Fees	$ -	$ -	Division Budget
	TOTAL	$ 112,000	$ 6,500	
	UNFUNDED PORTION	$ -	$ -	

STRATEGY #5: STORM WATER POLLUTION PREVENTION & REUSE

OVERVIEW

San Diego County's water resources have many beneficial uses and play a major role in the lifestyle and economy of the region. By 2050, climate change will likely alter regional precipitation patterns.[1] This precipitation variability will impact watersheds by altering water runoff and sediment movement flows. Because of urbanization and its associated activities, pollutants are discharged with these flows into the City's storm drainage systems, creeks, rivers, San Diego Bay, and the ocean and reduce the beneficial uses of these water bodies for the Chula Vista community. As such, the Climate Change Working Group recommended that Chula Vista revise its storm water regulations and applicable municipal codes to efficiently manage higher concentrations of pollutants in urban runoff by minimizing water waste, using natural landscapes to help drain or reuse runoff, and by ensuring that irrigations systems are properly installed and maintained.

To address these storm water-related climate change impacts and reduce future risks and costs, the City will (1) update municipal codes to prohibit landscape runoff flowing into storm drains and receiving water bodies, (2) develop new guidelines to promote the reuse of pipe flushing water at construction sites, (3) create incentives to reward Low Impact Development projects which capture and reuse storm water onsite, and (4) investigate opportunities for broader reuse of storm water via the City's conveyance system.

PROGRAM STRATEGY

The following specific actions, which are above and beyond federal and state regulations, will be pursued by City staff in partnership with local water districts and other regional agencies over the next 24 months:

1. *Landscape Water Waste Reductions* – Currently, Chula Vista Municipal Code (CVMC) Section 14.20.110 exempts landscape irrigation, irrigation water, and lawn watering from discharge prohibitions. However, testing on samples taken from storm drainage systems throughout the City during the past few years indicates that nitrate, which is a commonly-used fertilizer, is a persistent pollutant in urban runoff. Landscape runoff, a likely source for nitrates as well as phosphorous and pesticides, is commonly caused by overwatering or improperly functioning irrigation systems. In fact, the State Water Resources Control Board has conducted water sampling and testing in Poggi Creek and Sweetwater River under the Surface Water Ambient Monitoring Program, and has determined that test results warrant placing Poggi Creek and Sweetwater River on the list of impaired water bodies (303(d) list) for toxicity. To implement this strategy, the Storm Water Management Division will update CVMC Section 14.20.110 to remove landscape irrigation, irrigation water, and lawn watering from any property type from the list of exempted discharges. This regulatory update will be complemented by public outreach activities to help educate the community about the new guidelines. Similar to the City's

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

current approach in managing storm water compliance, all violators are first given a written warning before any citation is issued.

2. *Construction Site Water Waste Reductions* – As part of construction and grading activities, pipe flushing is a common practice which is conducted after the installation of all water and sewer pipes. It is intended to remove any debris or sediment that may have entered the pipes during construction work. Currently, the effluent from pipe flushing is allowed to discharge into the City's storm drainage systems and eventually into a receiving water body (such as a creek, river, or bay). As a result, all debris and sediment that is accumulated in the pipes are discharged to storm drainage systems (in violation of CVMC Section 14.20.100) and gallons of potable water, which can be re-used in construction activities, is wasted. To implement this strategy, City staff will develop a program to encourage developers and contractors to re-use line flushing effluent from construction activities for on-site beneficial uses such as dust control, moisture control for soil compaction, and temporary irrigation of hydro-seeded slopes. The City may partner with the Associated General Contractors of San Diego and the local water districts to develop the program.

3. *Low Impact Development Incentives* – When a natural parcel of land is developed, increased impervious areas alter the site's hydrology such that peak flow rates and durations are increased (known as hydromodification), along with the pollutants that are carried in the storm water. Recent experience shows that utilizing natural systems to manage urban runoff, known as Low Impact Development (LID), provides one of the most effective methods for preventing pollutant and sediment discharges to storm water conveyance systems. Sediment is considered a pollutant because it clogs fish gills and smothers bottom-dwelling aquatic life. LID concepts include infiltration, bioretention, vegetated swales and roofs, porous pavements, and rain harvesting.

   Currently, the Chula Vista Development Storm Water Manual includes requirements for incorporating Low Impact Development features in new development and major redevelopment. However, developers and consultants generally fail to take full advantage of the site's potential for LID features because dedicated land is required for such features, costs may be (or perceived to be) higher than traditional methods, and breaking from past practices is not easy. In order to encourage developers to incorporate LID features in their project designs to the fullest extent possible, City staff will provide incentives through expedited permitting process or another non-monetary means (such as reduced minimum parking requirements) to project proponents.

4. *Beneficial Storm Water Reuse* – Preliminary estimates indicate that on a typical dry summer day, about 430,000 gallons of water flows through the City's storm water conveyance systems. Dry weather flow is generated either by urban activities such as landscape over-irrigation and car washing or natural processes such as groundwater seepage which can be exacerbated by landscape irrigation infiltration. Storm water conveyance system flows may have various potential uses, such as irrigation of open spaces, public parks, and golf courses, or cooling, washing, or other activities related to industrial facilities. Urban runoff reuse also contributes to minimizing the community's

reliance on imported water and to reducing pollution in creeks, rivers, and the San Diego Bay. The presence of certain constituents such as dissolved salts may, however, require water treatment before reuse. To implement this strategy, City staff will conduct a feasibility study to determine dry weather flow sources, potential uses, possible site locations, as well as the economic feasibility of various reuse scenarios. The study will also assess the impact of diverting dry season flow on wildlife and sensitive habitats.

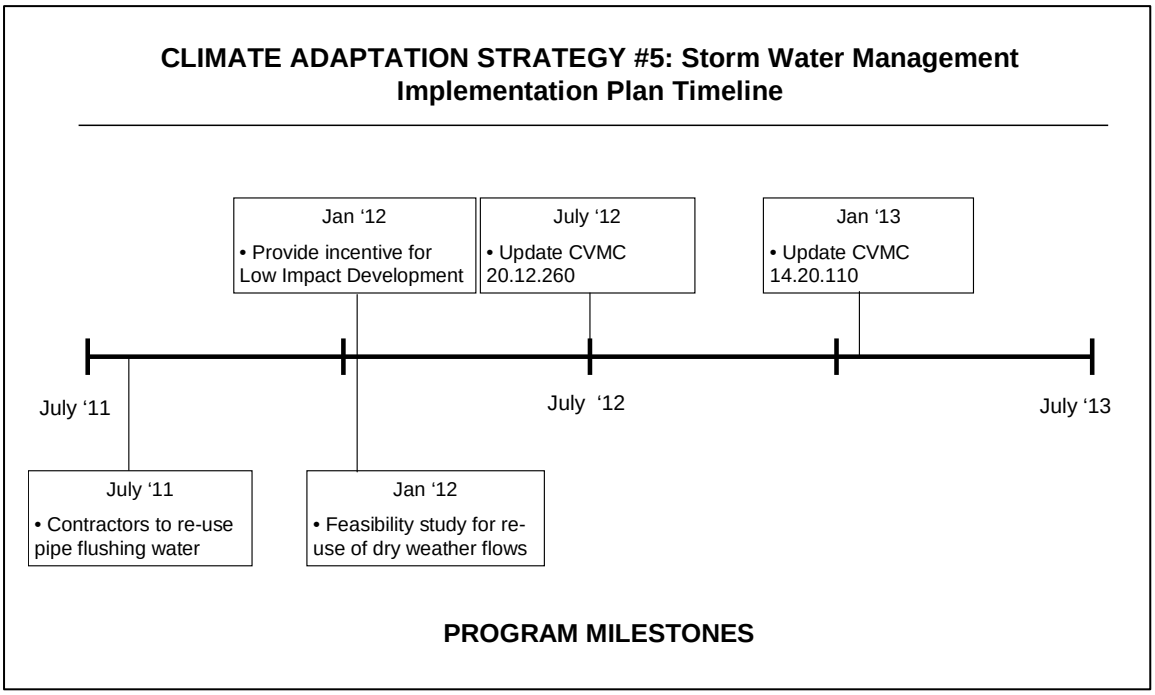
PERFORMANCE METRICS

The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Storm Water Prevention & Reuse" strategies:

- # of construction sites conserving and re-using pipe-flushing water
- # of developments taking advantage of incentives to incorporate LID features in their projects
- # of gallons of urban runoff diverted for reuse
- # of properties upgrading or adjusting their irrigation systems to prevent over-watering runoff or over-spray

TIMELINE

Implementation of the above-mentioned components will occur over a 24-month period (summarized in figure below). All municipal code updates referenced above will be drafted for ordinance consideration by the City Council after being vetted through various City Commissions. Updates to the Chula Vista Development Storm Water Manual will be made 12 months after the adoption of the next National Pollutant Discharge Elimination System (NPDES) Municipal Permit for the San Diego Region.



BUDGET & FINANCING

The proposed components' initial implementation costs are estimated to be $63,500 for staffing, supplies, and consultant services (summarized in table below). Although the proposed components' tasks could be integrated into the Storm Water Division's existing work plans, annual funding available for storm water-related inspections and regulatory compliance has been reduced. As such, the funding source for the above costs has not yet been identified. Finally, any new policy or ordinance presented to City Council will also identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #5 - Storm Water Pollution Prevention & Reuse

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Landscape Irrigation Runoff	City Staff	$ 6,500	$ -	Not Identified
	Supplies	$ -	$ -	Not Identified
	Consultant Fees	$ -	$ -	Not Identified
Contractors to Re-Use Pipe Flushing Water	City Staff	$ 12,000	$ -	Not Identified
	Supplies	$ 5,000	$ -	Not Identified
	Consultant Fees	$ -	$ -	Not Identified
Low Impact Development	City Staff	$ 20,000	$ -	Not Identified
	Supplies	$ -	$ -	Not Identified
	Consultant Fees	$ -	$ -	Not Identified
Re-Use of Stream Flows	City Staff	$ -	$ -	Not Identified
	Supplies	$ -	$ -	Not Identified
	Consultant Fees	$ 20,000	$ -	Not Identified
	TOTAL	$ 63,500	$ -	
	UNFUNDED PORTION	$ 63,500	$ -	

STRATEGY #6: EDUCATION & WILDFIRES
STRATEGY #7: EXTREME HEAT PLANS

OVERVIEW

If current trends continue, San Diego County's risk from wildfires will become greater by 2050. This increased susceptibility to wildfires will be driven by warmer spring temperatures extending the fire season and drier vegetation conditions (from prolonged drought periods) intensifying available fuel sources. This combination will likely increase up to 20% the number of days annually with ideal conditions for large-scale fires. In addition to wildfires, extreme heat days in Chula Vista could triple over the next 40 years, which will lead to further public safety and health concerns including poor air quality (from ground level ozone) and infectious disease transmittal (from mosquitoes and rodents).[1] As such, the Climate Change Working Group recommended that Chula Vista actively educate the general public and the business community about the impacts of climate change using existing City and community partner outreach mechanisms with a special emphasis on making homes more resilient to wildfires, incorporating poor air quality day notifications, and educating businesses about employee heat illness risks. Furthermore, the City should include "extreme heat" events as a significant emergency in its public safety planning efforts with a special emphasis on serving vulnerable populations and supporting a robust network of energy-secured "Cooling Centers."

To address these wildfire and public health-related climate change impacts and reduce future risks and costs, the City will (1) leverage municipal and partner agencies' outreach mechanisms to broaden wildfire education in the community, (2) revise the City's existing Emergency Response Plan and the Multi-Jurisdictional Hazard Mitigation Plan to include extreme heat events, and (3) establish a extreme heat and poor air quality notification system for residents and businesses.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff in close collaboration with community partners over the next 4 years:

1. *Wildfire Outreach & Education* - The Fire Department, with assistance from the Conservation Division, will leverage existing municipal programs and community organizations to broaden the public distribution of wildfire educational materials to support wildfire preparedness and prevention. Existing outreach venues that will be updated to include the expanded wildfire education component include, but are not limited to, Chula Vista Fire Explorers, Chula Vista CERT Program, Southwestern College Work Experience Program, Chula Vista Fire Safe Council, and Conservation Division's Home Energy Assessment and NatureScape programs. All outreach measures will be designed to provide a clear and consistent message to community members about wildfire safety. In addition to traditional marketing approaches (such as community newsletters and brochures), the City will maximize its use of door-to-door canvassing and

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

social media (such as Facebook). All educational and outreach materials will be produced in English and Spanish formats.

2. *Emergency Response Plan & Hazard Mitigation Plan Updates* - The City's existing Emergency Response Plan, a component of the Chula Vista Emergency Operational Plan, provides a framework for local public safety response in case of a large-scale emergency. To help prepare the community for higher frequencies and duration of extreme heat days in the future, the Fire Department will revise the City's Emergency Response Plan to include extreme heat events and the appropriate response actions to mitigate the impacts from the events. As part of the update process, the City will evaluate the need to expand "cooling centers" in Chula Vista to serve vulnerable populations such as the elderly, young, and sick and to incorporate renewable energy and/or energy storage for electricity reliability in case of blackouts. A similar revision will also be completed for the Multi-Jurisdictional Hazard Mitigation Plan by the Fire Department during its next regularly scheduled update in 2015. This countywide plan identifies risks and ways to minimize damage by natural and manmade disasters through enhancing public awareness, creating a decision tool for management, promoting compliance with State and Federal program requirements, enhancing local policies for hazard mitigation capability, and providing inter-jurisdictional coordination.

3. *Poor Air Quality & Extreme Heat Notifications* - In addition to health risks from heat exhaustion and heat stroke, exhaust from vehicles and industrial sources cause ground-level ozone to accumulate at high concentrations during extreme heat events. These harmful concentration levels can trigger a variety of public health problems including chest pain and coughing, and can worsen bronchitis, emphysema, and asthma. To help prepare the community for more frequent extreme heat and poor air quality days, the Conservation Divisions will establish a procedure for notifying residents, businesses, and community organizations about these events. The notification system will build off the San Diego Air Pollution Control District's air quality monitoring and forecasting system and utilize the City's Nixle and Lyris messaging platforms, as well as its social media sites (such as Facebook).

PERFORMANCE METRICS

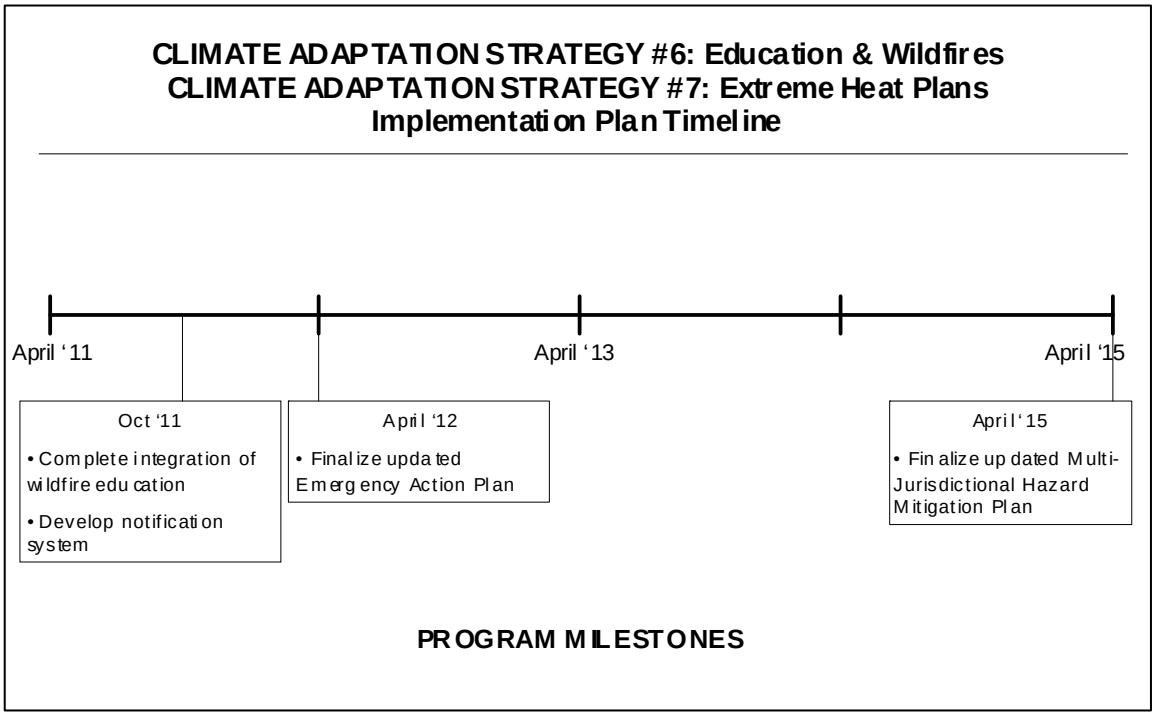
The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Education & Wildfire" and "Extreme Heat Plans" strategies:

- # of wildfire education materials distributed
- % increase in community awareness from outreach and education (based on surveys)
- # of residents & businesses subscribed to notification system (through Nixle, Lyris, & other messaging distribution methods)

TIMELINE

Implementation of the above-mentioned components will occur over a 4-year period (summarized in figure below). Between May and October 2011, existing community and municipal outreach efforts will be revised to include wildfire education and a City-administered

notification system for extreme heat and poor air quality days will be established. The Emergency Action Plan and Multi-Jurisdictional Hazard Mitigation Plan will be updated to include extreme heat events by April 2012 and April 2015, respectively.



BUDGET & FINANCING

The proposed components' costs are estimated to be $64,600 and $46,500 for initial and ongoing implementation, respectively (summarized in table below). The one-time values represent staff costs and supplies for initial development and distribution of wildfire education materials, establishment of an air quality notification system, and updates to emergency action plans, while the annual values represent the estimated cost of ongoing public education and outreach efforts. Some one-time and annual costs will be covered through existing annual division budgets, while additional external funds will need to be secured to support full implementation.

Adaptation Strategy #6 - Education & Wildfires

Adaptation Strategy #7 - Extreme Heat Plans

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Wildfire Outreach & Education	City Staff	$ 15,000	$ 10,000	---------
	Supplies	$ 4,500	$ 1,500	---------
	Printing & Mailing	$ 15,500	$ 15,500	---------
	Other Commodities	$ 17,000	$ 17,000	---------
Emergency Plan Updates	City Staff	$ 10,000	$ -	Division Budget
	Supplies	$ 100	$ -	Division Budget
Notification System	City Staff	$ 2,500	$ 2,500	Division Budget
	TOTAL	$ 64,600	$ 46,500	
	UNFUNDED PORTION	$ 52,000	$ 44,000	

STRATEGY #8: OPEN SPACE MANAGEMENT

OVERVIEW

With a rich natural diversity, San Diego County may be home to more plants and animals - many of them imperiled - than any other county in the continental United States. The region's beaches, canyons, mountains, and deserts support an amazing variety of plants and animals, some of which are found nowhere else on the planet. This great biodiversity is already under stress from human population growth and land use changes that have broken up and reduced species habitat to fragmented areas. By 2050, the impacts of climate change - more severe and frequent wildfires, extended droughts, sea level rise, higher temperatures, and increased air pollution - will add to the pressures on habitats and their associated species.[1] As a result, the locations where the temperature, moisture, and other environmental conditions are suitable for a particular species will shift. Chula Vista's open space areas include landscaped areas within developments, parks and recreation areas, and open space that has been set aside as a preserve for sensitive biological resources. In order to assess and reduce impacts associated with climate change on parks and open space and their associated ecosystems, the Climate Change Working Group recommended that the City seek opportunities to partner with the Resource Agencies, non-profit organizations, and/or adjacent public land managers to monitor and manage/restore ecosystems (as funding becomes available) to ensure long-term habitat connectivity, species resilience, and community recreational opportunities.

To address these open space-related climate change impacts and reduce future risks and costs, the City, in close coordination with local partners, will (1) update the Otay Ranch Preserve Monitoring and Plans to actively manage and mitigate these impacts, (2) amend the Otay Valley Regional Park Concept Plan to ensure climate change impacts are considered into future park development and management, and (3) continue the City's transition to low water use landscaping within medians, parks, and open space areas.

PROGRAM STRATEGY

The following specific actions will be pursed by City staff in partnership with the County of San Diego, City of San Diego, US Fish and Wildlife Service, California Department of Fish and Game, Otay Valley Regional Park Citizen Advisory Committee, Otay Ranch Preserve Steward (RECON), JPB Development, and Otay Land Company over the next 18 months:

1. *Otay Ranch Preserve Monitoring and Plan Amendments (Phase 2)* – The Advanced Planning Division will collaborate with the County of San Diego and the Otay Ranch Preserve Steward in the preparation of the Otay Ranch Preserve's annual work plans to document potential vegetation and species diversity changes as a result of climate change. These annual plans outline the active (such as habitat/species surveys, invasive species removal, and native plant restoration) and passive (such as litter abatement and fencing) management priorities for the given calendar year. As part of this climate adaptation strategy, specific management and monitoring actions in response to observed climate changes will also be incorporated into the annual work plans, as necessary, to

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

ensure long-term habitat and species viability. Finally, the Otay Ranch Resource Management Plan (Phase 2) will also be revised to incorporate policies and objectives which promote the evaluation of the impacts of climate change on open space and recreational opportunities as these uses are planned in or adjacent to the Otay Ranch Preserve.

2. *OVRP Concept Plan & Trail Design Guidelines* – The Otay Valley Regional Park (OVRP) Concept Plan & Trail Design Guidelines provide a blueprint for the long-term management of the multi-jurisdictional park and for the development of its trail network, respectively. As part of this climate adaptation strategy, the Advanced Planning Division will work with OVRP partners to amend the OVRP Concept Plan to include criteria for educational opportunities in the park such as interpretive centers/stations and written materials. All educational materials will incorporate information about climate adaptation programs and opportunities in the OVRP. The Advanced Planning Division will also work with the partners to amend the OVRP Trail Design Guidelines to allow for climate adaptation in the design of future trails and active recreation areas by incorporating a planting pallet that can withstand varied climates from heavy rain/flood to drought and alternative access points and trail rerouting for existing and new trails in the case of flooding

3. *Open Space Management* – Currently, the City's Open Space Division manages a network of open space areas which include urban canyons, parkways, and medians. To address climate change impacts especially related to extended drought periods, the Open Space Division will continue and expand its efforts to install state of the art irrigation systems (i.e. low flow, web-based smart controllers, master valves, and flow sensors) in these areas. Staff will also seek additional opportunities to convert turf and other groundcover materials to drought tolerant or drought resistant plant materials throughout the City's Community Facility Districts (CFDs). Large-scale mulch applications which can help retain moisture soil and lower water needs will be utilized in some CFD areas, where appropriate. Finally, any improvements to CFDs will be supported by external funding sources or their existing funding levels and any water cost savings will be retained by the CFD

PERFORMANCE METRICS

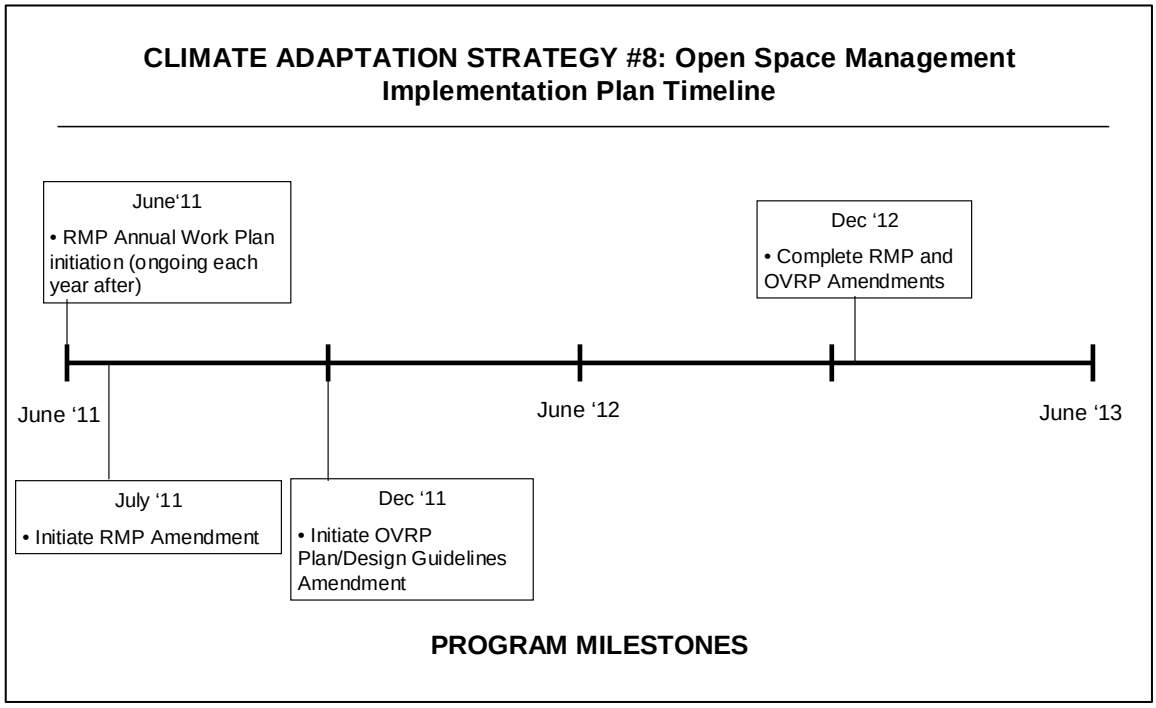
The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Open Space Management" strategies:

- # of surveys conducted within the Otay Ranch Preserve to document potential vegetation and species diversity changes as a result of climate change
- # of interpretive centers/stations in the OVRP that include information about climate adaptation programs and opportunities
- # of brochures that have been prepared for the OVRP that include information about climate adaptation programs and opportunities
- # of linear feet of new state of the art irrigation systems installed within CFD areas
- # of low flow, web-based smart controllers, master valves, and flow sensors installed within CFD areas

- # of square feet of turf and other groundcover materials within CFDs converted to drought tolerant or drought resistant plant materials.
- # of square feet of mulch applications utilized in CFDs

TIMELINE

The implementation of this strategy will mainly occur over an 18-month period (summarized in figure below). In June 2011, revisions to the Otay Ranch Reserve Management Plan's annual work plan process will commence with the new work plans beginning the following month. By the end of 2011, revisions to the OVRP concept Plan and Trail Design Guidelines will also begin and continue through 2012. Finally, the conversion of open space areas to more water efficient plant pallets and irrigation will occur over an 8-year period (not displayed in figure below).



BUDGET & FINANCING

The proposed components' costs are estimated to be $44,300 and $209,000 for initial and ongoing implementation, respectively (summarized in table below). The one-time values represent staff and consultant costs for updating the Otay Ranch Work Plans, OVRP Concept Plan, and OVRP Trail Guidelines. Annual values represent supply costs for installing more water efficient irrigation systems and plant palettes in open space districts as well as the ongoing administrative and maintenance costs for all proposed components. While a portion of one-time and ongoing costs will be covered by through existing developer fees and division budgets, additional funds will need to be identified to fully implement all components.

Adaptation Strategy #8 - Open Space Management

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Otay Ranch Preserve Monitoring & Plan Amendments	City Staff	$ 15,000	$ 9,000	Developer Fees/ Division Budget
	Consultant Fees	$ 15,000	$ 35,000	---------
OVRP Concept Plan & Trail Guidelines	City Staff	$ 9,300	$ -	OVRP Budget
	Consultant Fees*	$ 5,000	$ -	---------
Open Space Management**	City Staff	$ -	$ -	---------
	Supplies	$ -	$ 165,000	CFD/Division Budgets (partial)
	TOTAL	$ 44,300	$ 209,000	
	UNFUNDED PORTION	$ 20,000	$ 100,000	

*Consultant will only be needed if a biologist from the County of San Diego is not available to consult on biological issues

**Assumes annual budget of $100,000 from CFDs (over an 8 year priod) with the remaining amount being unfunded currently

STRATEGY #9: WETLANDS PRESERVATION

OVERVIEW

By 2050, warmer temperatures and less rain in the San Diego County will keep the region highly vulnerable to prolonged drought periods. This precipitation variability will stress riparian wetlands and may alter sediment movement from surrounding watersheds. Along coastline and bays, estuarine wetlands will additionally be impacted by rising sea levels. These impacts from rising sea levels will be exacerbated during storm events. As a result, the locations where the temperature, moisture, and other environmental conditions are suitable for wetlands and their associated species will shift.[1] In order to reduce impacts associated with climate change on wetlands, the Climate Change Working Group recommended that when preserving or restoring coastal and riparian wetlands, the City should take steps to incorporate adequate upland or transition habitats to accommodate shifts in wetlands coverage and help ensure public access due to sea level rise and other climate change impacts as informed by biological studies and Resource Agency consultation.

To address these wetlands-related climate change impacts and reduce future risks and costs, the City, in close coordination with local partners, will (1) evaluate the feasibility of monitoring local wetlands species ranges and abundances in response to climate change impacts, (2) incorporate wetlands "migration" in habitat management and restoration design criteria in the future Bayfront Natural Resources Management Plan, and (3) revise the Otay Valley Regional Park's Habitat Restoration Plan and Non-native Plant Removal Guidelines to include strategies for climate change adaptation issues.

PROGRAM STRATEGY

The following specific actions will be pursed by City staff in partnership with South County Land Managers, Port of San Diego, Environmental Health Coalition, City of San Diego, County of San Diego, and the Otay Valley Regional Park Citizen Advisory Committee over the next 18 months:

1. *Regional Biological Monitoring* – Currently, the Advanced Planning Division collaborates with other public agencies such as the US Fish & Wildlife Service, California Department of Fish & Game, and other local jurisdictions to monitor the region-wide network of Multi-Species Conservation Plan preserve land. The various agencies coordinate and standardize their biological monitoring of the abundance and distribution of key habitats and species. These types of surveys are typically performed at least annually on preserve lands. As part of this climate adaptation strategy, the City will use this collected data to help gauge the response of sensitive habitats and species to climate change impacts. In addition, the City will work with its project partners to determine the feasibility of correlating species distributions to microclimate patterns in order to more robustly track climate change impacts on preserve lands region-wide.

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

2. *Bayfront Natural Resources Management Plan (NRMP) Preparation* – In collaboration with the Port of San Diego and community stakeholders, the City will prepare a management plan for the Bayfront development area. The Bayfront Natural Resources Management Plan (NRMP), is being prepared to guide the management of the bayfront's biological resources and to preserve its natural resources from indirect and direct development impacts. As part of its this work effort, the City will also ensure that management strategies are included into the NRMP which promote the resiliency of the bayfront ecosystems against future sea level rise and other climate change impacts. Potential resource management strategies may include incorporating transitional habitats into wetland restoration projects, including buffers between sensitive habitats and development, and protecting upland areas adjacent to wetlands.

3. *OVRP Habitat Restoration Plan and Non-native Plant Removal Guidelines* – The City will work with the other OVRP Partners (City of San Diego & County of San Diego) to amend the OVRP Habitat Restoration Plan Guidelines and Non-native Plant Removal Guideline to provide for climate change adaptation strategies. Specifically, the amendments to these guidelines will include policies to encourage management activities for wetlands and other habitats that are responsive to climate change impacts through restoration designs, non-native species removal methods, and public access planning.

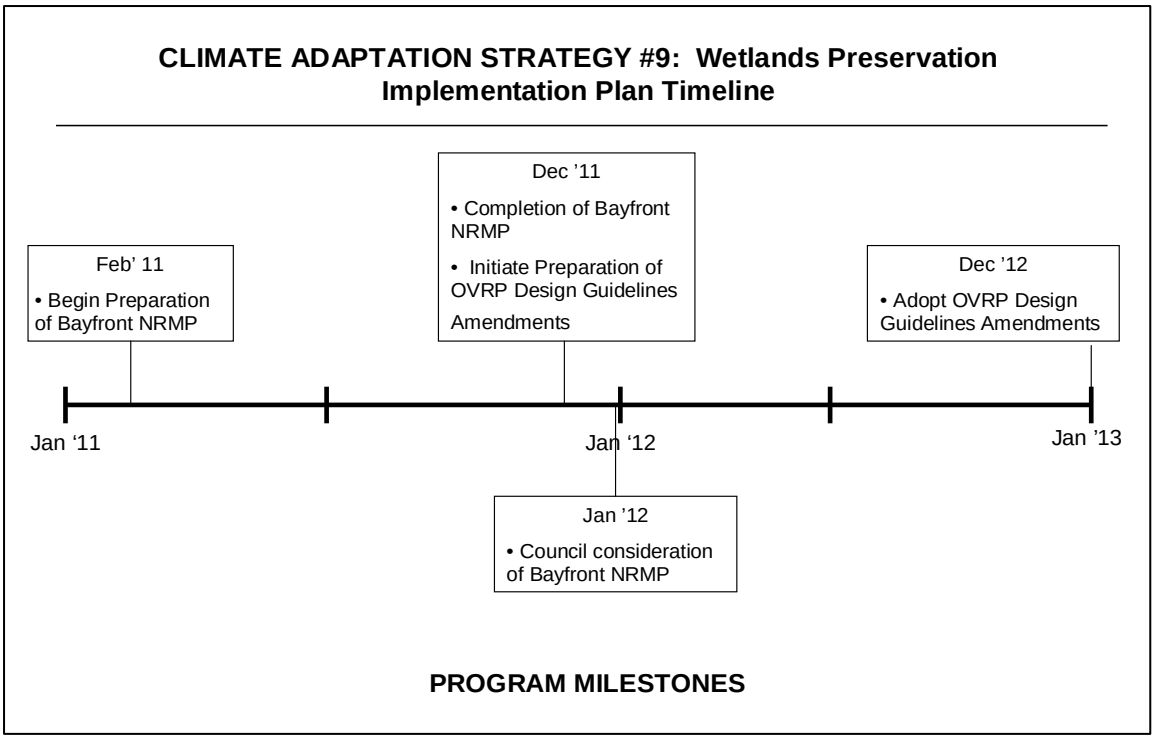
PERFORMANCE METRICS

The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Wetlands Preservation" strategies:

- # of surveys performed to monitor shifts in local species range and diversity resulting from climate adaptation.
- # of habitat restoration areas within the OVRP where climate change impacts were incorporated into project designs

TIMELINE

The implementation of this strategy will occur over an 18-month period (summarized in figure below). In February 2011, staff will begin preparation of the Natural Resources Management Plan which should be finalized by the end of the year. The OVRP Habitat Restoration Plan and Non-native Plant Removal Guidelines' revision process will commence in December 2011 with final City Council review and consideration scheduled for December 2012 after being vetted through various City Commissions.



BUDGET & FINANCING

The proposed components' costs are estimated to be $30,000 and $52,000 for initial and ongoing implementation, respectively (summarized in table below). The one-time values represent staff and consultant costs for integrating wetlands-related climate adaptation measures into the new Bayfront Natural Resource Management Plan and the existing OVRP Habitat Restoration Plan and Non-native Plant Removal Guidelines. The annual values represent the estimated cost of ongoing implementation of the resource management plans including monitoring activities. While a portion of one-time and ongoing costs will be covered by through existing developer fees, additional funds will need to be identified to fully implement all components.

Adaptation Strategy #9 - Wetlands Preservaton

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Regional Biological Monitoring*	City Staff	$ -	$ 4,000	---------
	Consultant Fees	$ -	$ 20,000	---------
Bayfront Natural Resource Management Plan**	City Staff	$ 11,000	$ 3,000	Port of SD/ Division Budgets
	Consultant Fees	$ 5,000	$ 25,000	Port of SD/ Division Budgets
OVRP Plan & Guidelines Updates***	City Staff	$ 9,000	$ -	Division Budget
	Consultant Fees***	$ 5,000	$ -	Division Budget
	TOTAL	$ 30,000	$ 52,000	
	UNFUNDED PORTION	$ -	$ 24,000	

*Costs include yearly monitoring of NRMP provisions

**Pending concurrence from the Port of San Diego

**Budget assumes 50% funded by developer fees and 50% funded by Division Budgets

STRATEGY #10: SEA LEVEL RISE & LAND DEVELOPMENT CODES

OVERVIEW

Between 1900 and 2000, sea levels rose 6 inches on average along San Diego County coastlines and bays. Over the next 40 years, sea level rise rates are expected to increase with local sea levels 12 to 18 inches higher than their current levels. Higher sea levels can result in increased erosion, more frequent flooding and property damage, loss of wetland habitats, and fewer waterfront public access options. These impacts from rising sea levels will be exacerbated during storm events.[1] As such, the Climate Change Working Group recommended that Chula Vista amend its land development codes and CEQA guidelines to incorporate climate change-related sea level rise into future development and municipal infrastructure projects' design and review.

To address these climate change impacts and reduce future risks and costs, the City will (1) revise its grading ordinance to consider a project's vulnerability to future sea level rise and flooding events, (2) modify its Subdivision Manual to ensure that storm water/drainage infrastructure can address future sea level rise and flooding impacts, and (3) ensure that environmental review and CEQA procedures are consistent with these changes.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff over the next 12 months:

1. *Update the Grading Ordinance* – The Chula Vista Grading Ordinance provides guidance to developers and engineers by regulating grading, drainage, and erosion control on private and public property to safeguard public health, property, and general welfare and to prevent water pollution and sedimentation of the City's water resources. To meet the ordinance's requirements, project proponents complete and submit a grading plan to demonstrate their compliance. As part of the implementation of *Climate Adaptation Strategy #10*, Land Development Division staff will update the grading ordinance to require that all "tidally influenced" projects account for anticipated sea level rise for the next 50 years (currently projected at 1.5' of sea level rise) into their project development and grading plans. The costs of additional grading on the front end are relatively small compared to having to remove and/or replace all infrastructure in "tidally influenced" areas in the future. The revised ordinance will require an update to the Subdivision Manual every 5 years to account for changes in sea-level rise predictions over time using the best available data. The revised ordinance will be presented to City Council for final review and consideration.

2. *Update the City's Subdivision Manual* – The purpose of the Subdivision Manual is to provide developers and engineers a guide for land development processing within the City of Chula Vista. The Subdivision Manual covers development processes beginning with the filing of a Tentative Map through approval and recordation of Final Maps. To account for increased risk from sea level rise, Land Development Division staff will

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

update the Subdivision Manual to add requirements for development projects within "tidally influenced" areas to demonstrate, prior to Tentative Map Approval or grading plan approval, that:

a. the storm drain system for the project is designed to maintain at least a dry driving lane in each direction during a 50 year design storm that occurs at the highest high tide with a projected 1.5' feet of sea level rise
b. the storm drain system for the project is designed to prevent any property damage with a 100-year storm occurring at the highest high tide with a projected 1.5' of sea level rise.

3. *Update the City's Environmental Review Procedures* – For any project or activity that could potentially directly or indirectly impact environmental quality, the City is required to review and mitigate the impacts under the California Environmental Quality Act (CEQA). To ensure that environmental review and CEQA procedures are consistent with the Grading Ordinance and Subdivision Manual revisions referenced above, the Advanced Planning Division will review and update (if necessary) the threshold language to the environmental review procedures for development projects located in "tidally influenced areas." The thresholds may also be amended on a 5-year basis, so that the threshold is refined as sea level rise information and prediction technology improves. Initial thresholds are estimated at an additional 1.5' on top of the highest high tide for a project with a 50-year lifespan.

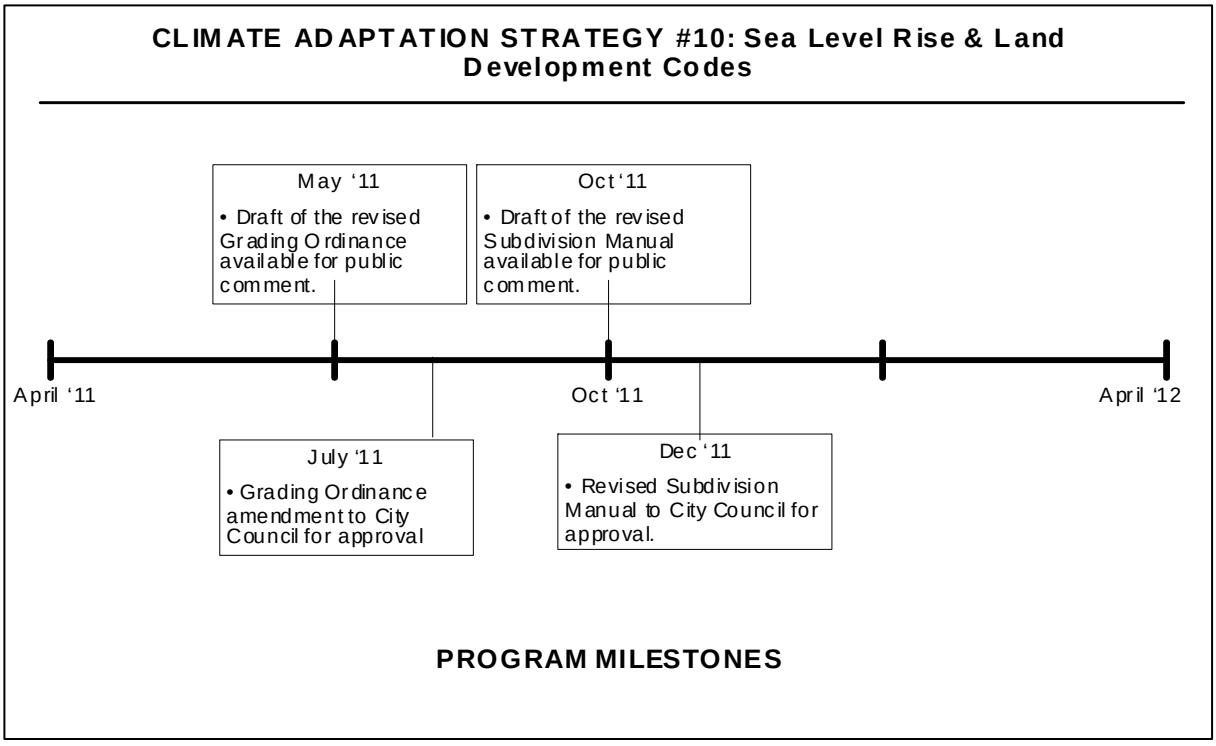
PERFORMANCE METRICS

The following metric will be tracked and reported on an ongoing basis to quantify the performance of the "Sea Level Rise & Land Development Codes" strategy:

- # of development projects complying with the new standards

TIMELINE

The implementation of this strategy will occur over a 12-month period (summarized in figure below). In May 2011, staff will begin to develop a revised Grading Ordinance and Subdivision Manual which will be distributed for public comment. Both the Grading Ordinance and Subdivision Manual will be vetted through various City Commissions before being presented to the City Council for review and consideration in July and December 2011, respectively. Finally, CEQA procedures will be updated (if necessary) by April 2012.



BUDGET & FINANCING

The proposed components' initial implementation costs are estimated to be $30,000 for staffing (summarized in table below). A funding source for the above one-time costs has not yet been identified. There are no ongoing, additional costs to the City associated with implementing this climate adaptation strategy. Finally, any new policy or ordinance presented to City Council will also identify costs to any particular stakeholder group (such as residents, businesses, and developers).

Adaptation Strategy #10 - Sea Level Rise & Land Development Codes

Component	Item	One-Time Cost	Annual Cost	Identified Funding Source
Grading Ordinance Amendment	City Staff	$ 10,000	$ -	---------
Subdivision Manual Revision	City Staff	$ 20,000	$ -	---------
	TOTAL	$ 30,000	$ -	
	UNFUNDED PORTION	$ 30,000	$ -	

STRATEGY #11: GREEN ECONOMY

OVERVIEW

By 2050, Chula Vista and the surrounding region will likely be impacted by a variety of climate change impacts such as hotter and drier weather, higher sea levels, and more frequent and intense wildfires.[1] Climate change impacts create new issues which local communities and, in particular, businesses need to address and prepare for in order to reduce future risks and costs. These issues can include higher insurance premiums due to greater flooding or wildfire risks, more expensive utility costs due to higher energy and water demand, lower productivity due to more employee sick days from frequent extreme heat and poor air quality days. As such, the Climate Change Working Group recommended that Chula Vista should provide assistance and non-monetary incentives to help businesses manage climate change risks and to attract businesses that provide "green" products or services into Chula Vista.

To address these climate change-related concerns from businesses, the City, in close coordination with local business stakeholders, will (1) revise the municipal purchasing policy to more robustly promote the procurement of "green" products and services, and to give preference for purchases from local Chula Vista businesses, (2) revise existing environmental outreach programs to businesses to include recommendations on how to reduce future climate change risks, and (3) continue to pursue the recruitment and retention of "green" businesses and manufacturers in Chula Vista.

PROGRAM STRATEGY

The following specific actions will be pursued by City staff in partnership with local business associations over the next 6 months:

1. *Green Procurement Policy & Process* – The Environmental Services Division, in partnership with the Conservation Division and the Finance Department, will revise the City's "Municipal Environmentally Preferable Purchase Policy" to greater emphasize the procurement of a broader array of eco-friendly goods and services leveraging Chula Vista's annual supplies and services budget of approximately $58 million (includes capital, redevelopment, and sewer fund budgets). The existing policy, which was revised in 2008, encourages City divisions and departments to show a purchasing preference for products and services which incorporate resource efficiency (i.e. raw materials, energy, and water) and pollution prevention into their design, manufacturing, use, and disposal. However, staff has struggled with tracking the policy's implementation and assessing its efficacy. As part of the revision process, the policy will be redesigned to address these concerns and to provide City divisions and departments a more user-friendly tool for complying with the City Council policy. Finally, the policy will modified to give preference for purchases from <u>local</u> Chula Vista businesses, especially those participating in the City's CLEAN Business program.

[1] San Diego Foundation. "Focus 2050 Study: San Diego's Changing Climate." 2008

2. *CLEAN Business & FREBE* – Chula Vista offers businesses free assistance to help them become more sustainable, lower their monthly utility costs, and ultimately improve their bottom line allowing them to hire more employees and expand their operations locally. The Free Resource & Energy Business Evaluation (FREBE) program, which is a required component of the annual business licensing process for storefronts and offices, provides businesses an on-site review of their energy and water use. Through the evaluation, trained City staff are able to identify opportunities for participants to improve their energy and water efficiency and take advantage of special rebate and financing programs. Annually, over 1,000 evaluations are completed through the FREBE program and approximately 95% of past participants would recommend the program to other businesses. The Chula Vista CLEAN Business program builds off of the FREBE program by recognizing local businesses who have demonstrated leadership in energy and water conservation, pollution prevention, and materials management. These businesses have voluntarily improved their operations and/or facilities to meet high standards of sustainability and efficiency. Through implementation of this strategy component, these business-oriented environmental outreach efforts will be revised to include an assessment of a business's "vulnerability" to future climate change impacts and recommendations to reduce associated future risks and costs. Businesses will not be required to implement any of the recommendations identified by staff in either program.

3. *Green Business Recruitment & Retention* – The Economic Development Division will continue to pursue the development of an Eco-Industrial/Green Business Park. The physical development would incorporate green building techniques and renewable energy infrastructure, with the ultimate goal of recruiting and attracting new business operations and manufacturing that specializes in clean technologies, products, and services. This project will create a business climate that is attractive to technology companies, by providing the companies with the required infrastructure, skilled workers, research institutions, and financing mechanisms.

   As part of the Economic Development Division's efforts to promote local business-to-business transactions, staff will work to connect current clean tech-oriented Chula Vista businesses with each other through formal and informal peer networks. Economic Development staff will work with new and existing businesses to identify existing and attract new business services, supply chain, and support services for the business community. Further, staff will work with current Chula Vista businesses to identify opportunities for new "green" product and service development.

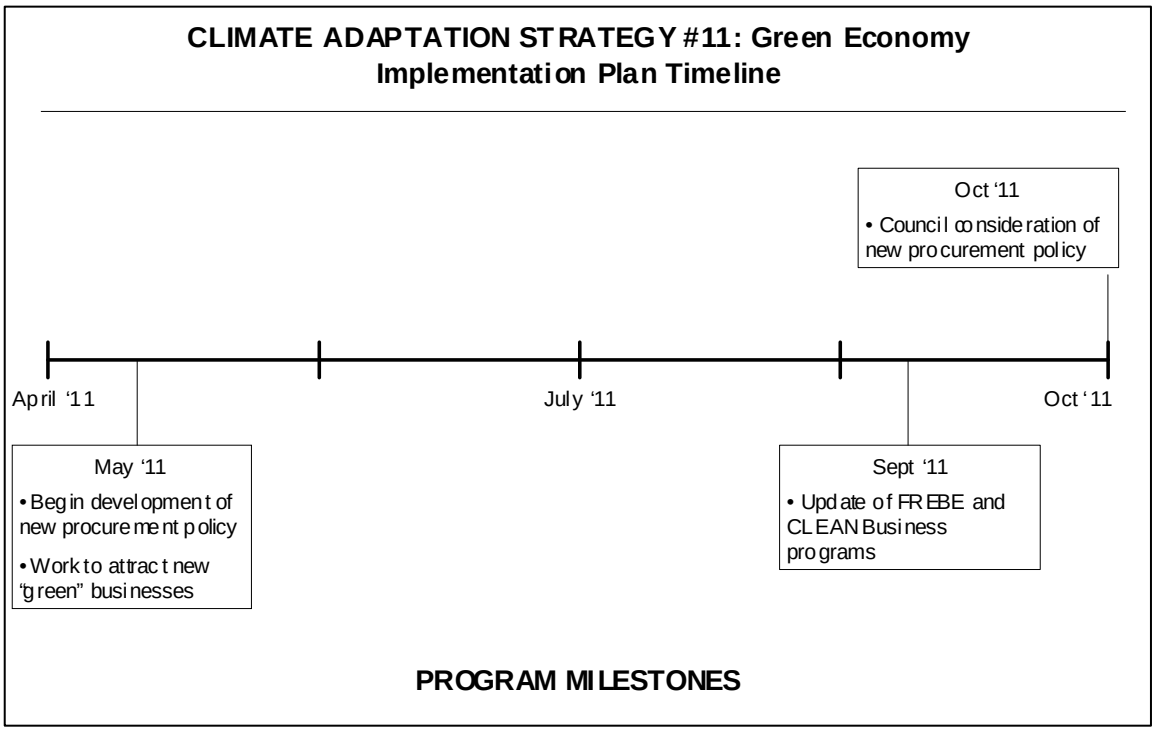
PERFORMANCE METRICS

The following metrics will be tracked and reported on an ongoing basis to quantify the performance of the "Green Economy" strategies:

- # of businesses participating in the FREBE and CLEAN Business programs annually
- Value of municipal environmentally-preferred purchases annually
- # of businesses which are located in Chula Vista offering "green" products or services

TIMELINE

Implementation of the above-mentioned components will occur over a 6-month period. Between May and October 2011, a new municipal "green" procurement policy and process will be drafted, vetted through various City Commissions, and ultimately presented to the City Council for review and consideration. Likewise, the FREBE and CLEAN Business programs will be updated by October 2011 in order to incorporate recommendations to help businesses prepare for climate change impacts. Finally, the Economic Development Division will continue working to attract and retain businesses focused on "green" products and services.



BUDGET & FINANCING

The proposed components' initial implementation costs are estimated to be $25,500 and $14,500 for initial and ongoing implementation, respectively (summarized in table below). These costs are for staffing to develop the new Green Procurement Policy, update the FREBE and CLEAN Business programs, and recruit and retain "green" businesses locally. These costs will be funded by existing division budgets.

Adaptation Strategy #11 - Green Economy				
Component	**Item**	**One-Time Cost**	**Annual Cost**	**Identified Funding Source**
New Green Procurement Policy	City Staff	$ 24,000	$ -	Division Budget
FREBE & CLEAN Business Program Updates	City Staff	$ 1,500	$ -	Division Budget
Green Business Recruitment & Retention	City Staff	$ -	$ 14,500	Division Budget
	TOTAL	$ 25,500	$ 14,500	
	UNFUNDED PORTION	$ -	$ -	

APPENDIX A

CLIMATE CHANGE WORKING GROUP
Recommendations on Climate Adaptation Strategies

SUMMARY
Below are the Climate Change Working Group's final recommendations on climate adaptation strategies that the City of Chula Vista should implement to reduce the community's future risk from climate change-related impacts (numbering does not reflect priorities):

1. Develop an ordinance **incorporating reflective paving (or "Cool Paving") into all municipal paving projects (parking lots & streets) and new private parking lot projects** (over a specific size).

2. Develop an ordinance **incorporating shade trees into all municipal projects (parking lots & streets) and new private parking lot projects** (over a specific size). The new ordinance should include a deviation for solar carports (or other shade structures), be complementary to existing free tree programs, and potentially be incorporated into the existing Landscape Water Conservation regulations.

3. Require and provide incentives (such as contributing to City's enhanced energy code requirements) for new residential development with air-conditioning systems to install **ENERGY STAR cool roof technology.**

4. Educate residents and businesses about the benefits and appropriate uses of **local water supplies (including recycled water, groundwater desalination, and onsite water reuse systems)** and further integrate recycled water (if available) and onsite water reuse systems into new development and redevelopment plans.

5. Revise the City's Stormwater regulations and applicable landscape/building codes to efficiently **manage higher concentrations of pollutants in runoff** by minimizing water waste, using natural landscapes which help drain or reuse runoff, and by ensuring that irrigation systems are properly installed/maintained.

6. Actively **educate the general public and the business community** (through community newsletters, websites, public events, and signage) about the impacts of climate change and what the community is doing to address impacts. In close coordination with the Fire Department, special emphasis should be given to using existing outreach mechanisms (Southwestern College's Services Learning program, Americorps/CERT training, and City environmental outreach programs) to expand public education on making homes more resilient to wildfires.

7. Include **"extreme heat" events as a significant emergency** in Chula Vista's Emergency Response Plan (short term) and its portion of the County's Multi-Jurisdiction Hazard Mitigation Plan (long term), and redefine "extreme heat" events with a special emphasis on serving vulnerable populations, supporting a robust network of "Cooling Centers", incorporating poor air quality day notifications, educating businesses about employee heat illness risks, and integrating renewable energy sources into emergency/cooling centers.

8. In order to assess and reduce impacts associated with climate change on parks and open space and their associated ecosystems, seek opportunities to partner with the Resource Agencies, non-profit organizations, and/or adjacent public land managers **to monitor and manage/restore ecosystems** (as funding becomes available) to ensure long-term habitat connectivity, species resilience, and community recreational opportunities

9. When preserving or restoring coastal and riparian wetlands, **incorporate adequate upland or transition habitats to accommodate shifts in wetlands coverage and help ensure public access** due to sea level rise and other climate change impacts as informed by biological studies and Resource Agency consultation.

10. Use the outcome of the current San Diego Bay Climate Adaptation Study (being sponsored by the San Diego Foundation and ICLEI) to revise the City of Chula Vista's Land Development Ordinances (such as Grading Ordinance) and CEQA Guidelines to **incorporate climate change-related sea level rise & other flooding risks** into future development and municipal infrastructure projects' design and review.

11. **Provide assistance and non-monetary incentives to help businesses** manage climate change risks and to attract businesses that provide "green" products or services into Chula Vista.

If these recommendations are supported by City Council, City staff should develop more detailed implementation plans for the measures. Within these plans, staff should outline implementation steps, timelines, and cost estimates for each measure. These detailed implementation plans should be presented to City Council for a final decision on whether to move forward with specific measures.

BACKGROUND

In October 2009, City Council directed staff to reconvene a Climate Change Working Group (CCWG) – comprised of residents, businesses, and community representatives – to develop a list of recommended strategies for the City to reduce vulnerabilities to expected local climate change impacts (known as "climate adaptation"). Expected impacts include hotter and drier weather, diminished imported water supplies, more poor air quality/heat wave days, more frequent wildfires, shifts in habitat and species distribution, and increased rates of sea level rise. The reconvened CCWG, which was established as a subcommittee of the City's Resource Conservation Commission (RCC), included some members from the previous working group augmented with additional members to reflect the group's new climate adaptation-related focus areas:

Focus Area	***Stakeholder Representatives***
Water Management	William Granger/Rhianna Pensa – Otay Water District Sue Mosburg – Sweetwater Authority
Energy Management	Robert Friar/Larry James – Chula Vista Electric Andrea Cook – CA Center for Sustainable Energy Julie Ricks – San Diego Gas & Electric
Infrastructure & Resources	Nick Lee – Corky McMillin Company Sean Kilkenny – Otay Ranch Company
Public Health, Education, & Wildfires	Lynda Gilgun (Chair) – Education/RCC Trish Axsom/Terry Davis – Southwestern College Ana Melgoza – Independent Public Health Representative
Ecosystems & Biodiversity	Serge Dedina/Katie Westfall – WiLDCOAST Harry Orgovan – Chula Vista Kayak
Business & Economy	Richard D'Ascoli – Pacific Southwest Assoc. of Realtors/Chamber of Commerce Sassan Rahimzadeh – Arya Cleaners/RCC
Planning Process	Brian Holland – ICLEI Nicola Hedge – San Diego Foundation

The CCWG planning process was facilitated by Conservation & Environmental Services Department staff with technical support from the Fire, Public Works, and Development Services Departments.

PLANNING PROCESS

The CCWG met 11 times from December 2009 through August 2010 in public meetings at various municipal locations. In addition to posting public notices prior to each meeting, an email notice was sent to over 60 additional stakeholder groups and community members to invite them to attend the meetings and provide feedback. The majority of these stakeholder groups had been involved in the previous climate mitigation planning process in 2008. A notice was also published through the City's *Community Connections* newsletter at the onset of the climate adaptation planning process to help build community awareness about the CCWG effort. To solicit additional public feedback, the CCWG hosted a public forum on June 16, 2010 at the Norman Park Senior Center. Over 30 community members attended the "open house" meeting and shared their opinions and priorities for climate adaptation strategies.

The planning process was split into three phases – information gathering, risk assessment, and strategies selection. During the first phase, the meetings featured presentations from CCWG members and regional experts on the different adaptation topics. These presentations discussed the current state of practices (i.e. "business as usual"), the predicted impacts to the San Diego region from climate change based on the best available data, and the vulnerability of municipal operations and the broader community to these impacts. Staff summarized this information into a *Climate Adaptation Planning Matrix* for each focus area. In the end, the CCWG identified over 180 possible climate adaptation strategies.

In phase two, the CCWG assigned risk levels to each identified vulnerability in consultation with researchers from the University of California San Diego. Risk was defined as a product of the likelihood of the climate change impact occurring and the consequence of the impact. Each factor was scored from 1-5 and overall risk was categorized as "Low," "Medium," or "High." In addition, various adaptation strategies to address each impact and vulnerability were vetted based on three initial criteria: (1) strategy falls within the City's jurisdiction, (2) strategy is fiscally feasible (i.e. does not rely on General Fund support for implementation), and (3) strategy does not duplicate or contradict current climate mitigation measures.

In the final phase, CCWG members discussed and prioritized which strategies would be ultimately included in their recommendations. Strategies that could be characterized as "no regret" actions or actions having multiple co-benefits were regarded as high priority measures. The CCWG also worked to combine multiple strategies into a single recommendation to broaden their positive impact. Community members attending the meetings in this final phase were heavily involved in the discussion and prioritization activities. Finally, the CCWG made a presentation to the Resource Conservation Commission at their September 13th meeting to receive feedback and further inform their final recommendation selection (Appendix A). The CCWG also received a joint comment letter from the Environmental Health Coalition and San Diego Coastkeeper (Appendix B).

NEXT STEPS

The Climate Change Working Group's final list of recommendations to help Chula Vista "adapt" to climate change impacts are designed to reduce future risk and costs within energy and water supply, public health, wildfires, ecosystem management, coastal infrastructure, and the local economy sectors. The adaptation strategies complement the City's current climate mitigation measures and many strategies will also contribute to lowering citywide greenhouse gas emission levels. Due to the limited resources available to the CCWG, a formal cost analysis for each recommendation could not be completed. As such, the CCWG recommends that City Council direct staff to develop more detailed plans to better define implementation costs, critical steps, and timelines for future City Council review and consideration.