

5. ENVIRONMENT

Goals

- Preserve and protect the natural environment.
- Ensure a sufficient supply of quality water for the future.
- Protect Oak Creek and its riparian habitat.
- Reduce the impacts of flooding and erosion on the community and environment.
- Promote environmentally responsible building and design.

Environment Chapter:

- Water Resources
- Resource Conservation
- Policies
- Action Plan

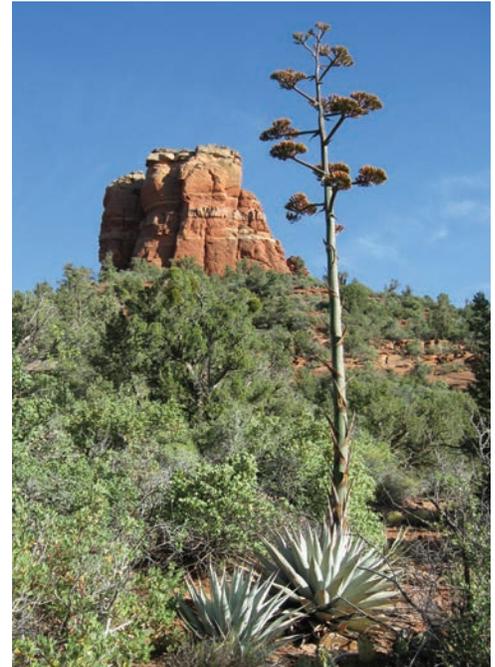
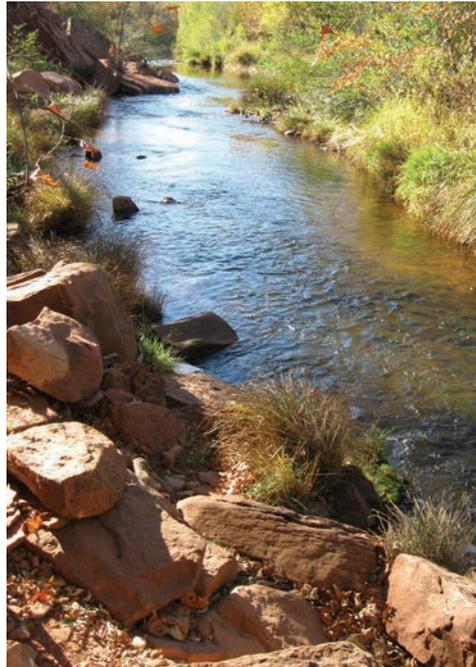
What Changed Since 2002?

- New studies on water supply and projected demand for the Verde Valley Region.
- Educational programs on water conservation.
- Ordinance adopted that prohibits wood-burning stoves and fireplaces.
- Adopted covered loads ordinance.
- Native, drought tolerant plants ordinance adopted.
- *Stormwater Master Plan* adopted.
- The Sedona Wetlands Preserve constructed at the City's Wastewater Treatment Plant.

What's New in This Plan?

- Recommendation to develop a green building program.
- Recommendation to develop an action plan that would focus on methods to improve energy efficiency and conservation and reduce harmful emissions.
- Recommendation to use low impact development and green infrastructure to manage stormwater.

Protection of the environment is the community's top priority, and sustainability is a fundamental goal of the Plan. This chapter addresses our impacts to the environment, locally and globally, from conserving non-renewable resources to protecting the health of the ecosystem. While some of these issues may not seem to be a problem today, if the current rates of consumption and impacts continue, the long-term results will be a significant decline in the health of the environment, the availability of vital resources, and the community's quality of life.



WATER RESOURCES

Water is a vital resource for the health of the community, the environment, and the economy. Oak Creek was the main attraction for early settlement of Sedona and is now a draw for recreational activities by those wanting to escape the heat of summer. Oak Creek flows to the Verde River and is part of the Verde Watershed, which is relied upon by growing communities, including Cottonwood and Camp Verde. An ample supply of clean water for future generations is critical to the future of Sedona and the region.

Water Supply and Demand

Surface water includes Oak Creek and other streams, springs, lakes, ponds, and reservoirs. Appropriated water rights to surface water in the Verde Watershed currently exceed the available supply of water. Flood and stormwater can also be a source of water, yet require collection, storage, appropriate use, and treatment that is difficult with an intermittent and unreliable source. Wastewater effluent is another potential water source (see wastewater discussion below).

Groundwater is found in underground aquifers that are recharged by water seeping into the pores and cracks in soil and rocks. Aquifers are connected and can be influenced by recharge and withdrawals occurring far beyond the immediate area, and they will be impacted by the cumulative effects of what occurs throughout a region.

Groundwater is the primary source of domestic water for most communities, including Sedona. There are several private water providers in the City that supply potable water, including the Arizona Water Company and Oak Creek Water Company. Both draw on groundwater wells to supply residential and business needs. While groundwater is a currently available supply of water, there is an overdraft in the Verde Valley. Overdraft occurs when the amount of water being used exceeds the amount being recharged.

There have been several studies concerned with the future of our regional water supply, such as the *Central Yavapai Highlands Water Resource Management Study*, a partnership of the Yavapai County Water Advisory Committee, the U.S. Bureau of Reclamation, and the Arizona Department of Water Resources; and the findings of the U.S. Geological Survey's regional groundwater flow model. The predictions are that based on water supply and population estimates, demand will exceed the supply of water in the Verde Watershed by 2050.

The City partners with multiple organizations concerned with the sustainability of the region's water supply, including the Yavapai County Water Advisory Committee, the Verde River Basin Partnership, the Coconino Plateau Water Advisory Council, and the Northern Arizona Municipal Water Users Association.

Key Issues

- Projections that the long-term supply of water in the Verde Watershed will be inadequate.
- Oak Creek's water quality has exceeded standards for E. Coli bacteria.
- The water supply for City residents is managed by private entities.
- Flooding has resulted in property damage and other impacts.
- Flooding and erosion have impacted property, habitat, and the water quality of Oak Creek.

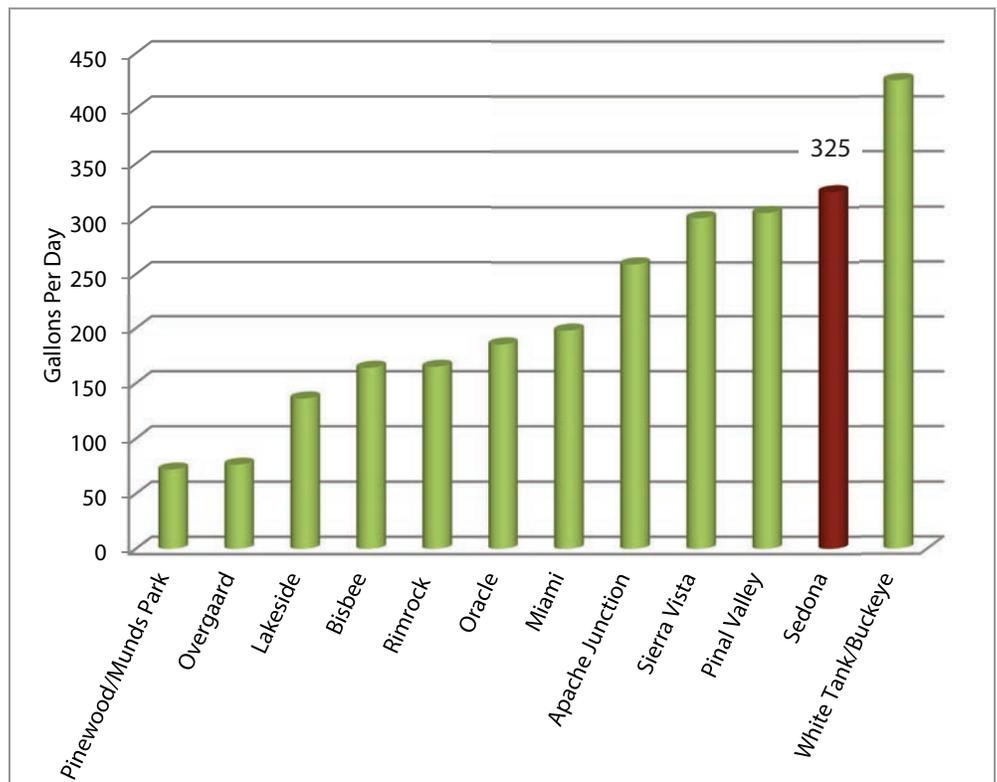
Water Conservation

The City and local water companies have provided education and outreach programs that encourage the public to reduce water use. However, Sedona residents have higher rates of water use than most Arizona communities (see table below). Commercial businesses and non-residential users rank as the 2nd highest in water use compared to the other communities listed below. Much of the water use in Sedona goes to landscaping, which could be reduced by using more efficient irrigation and landscaping techniques that require less water.

Water Quality

One of Sedona’s greatest assets is Oak Creek, which is also a major attraction for tourists to Oak Creek Canyon. Unfortunately, the creek has suffered from poor water quality since at least 1973. The levels of *E.Coli* bacteria have often exceeded water quality standards, resulting in health warnings and restrictions. Contaminants enter the water supply from multiple sources, and can impact both groundwater and surface water. The causes of contamination include waste from wildlife, humans, dogs, livestock, septic systems, recreation, and agriculture. Stormwater can carry

2012 Average Water Use of Sedona Residential Water Users



Source: Arizona Water Company

pollutants such as pesticides and oil, as well as trash and other debris. Efforts are underway, led by the Oak Creek Watershed Council, to counteract these impacts through education and outreach, and through projects such as installing more public toilets, trash receptacles, and dog waste stations.

Wastewater Management

The City incorporated in 1988, and most of the City's infrastructure was originally developed under the jurisdiction of either Coconino or Yavapai Counties. The City established its sewer system in 1993 and has since converted 60 percent of City homes and businesses off of septic systems. Reducing the number of septic systems by converting to the City sewer system is removing one of the threats to Oak Creek's water quality.

Treated wastewater is a form of effluent that is considered an available supply of water if it is claimed at the time of discharge. Typically it is impounded, evaporated, or stored underground. The City's Wastewater Treatment Plant produces treated effluent that is currently stored in reservoirs or disposed of in ponds or with spray irrigation. Effluent can be reused for a variety of purposes when treated to appropriate levels. The challenge to reusing effluent from the City's Wastewater Treatment Plant is in distributing the water, especially since the treatment plant is four miles beyond the city limits.



Stormwater Management

The City's 2005 *Stormwater Facilities Master Plan* proposes drainage improvements where there are significant flooding concerns. Projects are prioritized based on criteria such as the threat to life or property, the frequency of flooding, and the potential to coordinate with other projects. The City continues to implement these projects annually as part of the City's Capital Improvement Plan. The City's storm drain system consists of culverts, roadside drainage ditches, and natural washes. Besides the potential for flood damage, stormwater can also carry pollutants. One key aspect of the City's stormwater management program is public education and outreach to citizens and businesses about protecting water quality by preventing pollutants from entering the stormwater system.

The City's *Stormwater Management Plan* addresses measures to maintain and improve the quality of stormwater being discharged into Oak Creek and its tributary drainages. The plan focuses on reducing the discharge of pollutants into

Oak Creek, increasing public awareness of water quality issues, promoting regional programs, and satisfying the water quality requirements of the Clean Water Act. Stormwater can be managed with the use of more natural features that accommodate the water rather than funneling it across paved surfaces to enter drainages, referred to as low impact development. The intent is to increase infiltration rather than runoff. Increased infiltration can reduce the impacts of flooding downstream and ultimately contribute to groundwater recharge. Just as in nature, plants can slow the movement of water, discourage erosion, and naturally irrigate landscaping, while increasing wildlife habitat and improving property appearance. This may be as simple as adding a curb cut that allows water to collect in a median or strip of landscaping between a street and sidewalk. Other methods include using permeable or porous pavers and pavements, creating depressions or bioswales that act as retention basins, or simply preserving more natural open space within developments.

Low Impact Development:
A stormwater management approach that preserves or mimics natural drainage systems for infiltration and the reuse of stormwater.



RESOURCE CONSERVATION

The environment that surrounds us is made up of resources that we all depend on, and with the goal of sustainability in mind, these resources must be conserved for future generations.

Energy Conservation and Air Quality

Conserving energy will reduce costs while decreasing the use of fossil fuels and resulting pollution. Improving the efficiency of buildings can reduce the need for heating and cooling and result in lower utility bills. Solar power is already in use by many homes and businesses, and there is the potential for expanding the use of solar energy throughout the community.

Air quality is affected by vehicle exhaust, fireplaces, wood burning stoves, prescribed burns, and dust from off-highway vehicles. Less manageable air quality impacts are primarily from wildfires and excessive winds carrying dust and particulates. Improving energy efficiency and reducing vehicle use and traffic congestion are ways of reducing air pollution and thus improving air quality.

Habitat Conservation

A healthy natural environment is reliant on maintaining the natural functions of the ecosystem, on which plants and animals depend. The idea that the built environment is in harmony with the natural environment means that the natural landscape should be preserved wherever possible and replicated in landscaping and restoration. While preserving the landscape in its natural state is preferred, landscaping with native plants can reduce water consumption while providing wildlife habitat.

Green Building

Green building and low impact development are environmentally friendly design and construction practices. Integrating these methods into new and existing projects will have multiple benefits, such as improving energy efficiency, reducing air pollution, conserving water, and providing wildlife habitat.

Key Issues

- The impacts to environmental quality from increasing traffic and vehicle use.
- Environmental impacts of increasing numbers of people recreating on public land.
- Habitat loss and degradation from development, erosion, and recreation.
- The potential for increasing the use of solar and other renewable energy.

Green Building:
Design, construction, and operational practices that use resources responsibly and efficiently.

ENVIRONMENT POLICIES

1. Participate in and contribute to regional and statewide water planning efforts.
2. Investigate and implement appropriate methods to reuse treated wastewater and to recharge groundwater.
3. Improve and maintain the water quality of Oak Creek.
4. Implement incentives or regulations for existing and new development to incorporate water conservation measures and energy efficient site design and building features.
5. Incorporate water conservation, energy efficiency, the use of renewable energy sources, and sustainable practices into new and existing City facilities and programs.
6. Establish standards for the use of low impact development practices to manage stormwater.
7. Work with Coconino County to relocate structures out of floodways during redevelopment efforts.
8. Reduce harmful emissions.
9. Support community efforts to be dark sky compliant.
10. Preserve and restore natural drainages and open space areas with native plants to provide wildlife habitat, reduce erosion, and improve stormwater retention.
11. Control the spread of invasive exotic plant species through education, removal, and prevention.
12. Implement a green building program that includes education, standards, and incentives.
13. Support recycling and other waste stream reduction efforts.

ENVIRONMENT ACTION PLAN

Action	Lead	Partners
Priority 1 (0-5 years):		
1 Ensure that a City representative participates in regional water advisory organizations.	Community Development, Public Works	Yavapai County, Verde Valley municipalities and regional organizations
2 Collaborate with private water companies to reduce water consumption.	Community Development, Public Works	Private water companies
3 Reevaluate and update the dark sky ordinance.	Community Development	Planning and Zoning Commission, City Council
4 Investigate existing weed management efforts and implement appropriate actions, which may include a partnership weed management plan.	Public Works	Community Development, Forest Service
5 Develop a City green building code and associated incentives for all development.	Community Development	Planning and Zoning Commission, City Council, citizens, building community
Priority 2 (6-10 years):		
6 Conduct an inventory and audit of water conservation and energy efficiency of City facilities and operations and implement appropriate measures.	Public Works	Private water companies, Community Development
7 Develop an action plan that would focus on methods to improve energy efficiency and conservation and reduce harmful emissions.	Community Development	Public Works, City Manager's Office, Planning and Zoning Commission
8 Investigate the acquisition of private water companies.	City Manager's Office	Public Works, City Attorney, Community Development, water companies